WEST HANTS REGIONAL MUNICIPALITY
Special Council Meeting - Agenda
May 20, 2021 – 6:00 p.m.
Virtual via Zoom
(also FB Livestream)

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1. Call to Order

2. Attendance

3. Approval of the Agenda

4. Declaration(s) of Conflict of Interest

5. Announcements

6. Presentations
   a) Jason Haughn, Municipal Advisor, Dept. of Municipal Affairs – Conflict of Interest (including previous Orientation information)

7. Meeting with Dept. of Fisheries, Oceans, and the Canadian Coast Guard Representative re. Avon River Causeway Gate – Information Report

8. Hantsport Fire Station – Information Report, Maps, Table, and Hantsport Fire Station Combined Drawing Set Issue For RFP_2021.04.20

9. Next Meeting Date / Adjournment

Municipal Conflict of Interest Act

Council of West Hants Regional Municipality

Thursday, May 20, 2021

Virtual Meeting, 6pm

NOVA SCOTIA

Agenda

- Overview
- What is a Conflict of Interest?
- Actions
- Redress



Purpose

As an elected member of Council, you have been given the public trust to make decisions on behalf of all citizens within your municipality. As an active member of your community, you may find yourself faced with a situation which could result in a possible conflict of interest. It is important that you understand the *Municipal Conflict of Interest Act* in order to avoid any violations.



The Goal

When you have completed this workshop, you should:

1. Have a greater familiarity with the *Municipal Conflict of Interest Act;*

2. Be able to recall what a conflict of interest is as defined by the Act;

3. Have a greater understanding of your responsibilities under the Act;

4. Know the steps involved in recusing yourself should you find yourself in a situation; and,

5. Be familiar with avenues of recourse available to all citizens in general, and council as a body.

The Presentation

There is a lot of information contained in this presentation.

The presenters will not be able to address specific situations or “real-life” scenarios.

We do encourage dialogue on the general concepts and ask that you either use the “raise hand” function or write your question in the chat section.

In addition, there will be “pause points” throughout the presentation where we will check in with the group for questions or clarification.

Conflict of Interest:

Municipal Conflict of Interest Act

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Overview: The Act

- *Municipal Conflict of Interest Act*
- https://nslegislature.ca/sites/default/files/legc/statutes/municipal%20conflict%20of%20int.pdf
- … or type “Nova Scotia Municipal Conflict of Interest Act” into your favorite search engine.
- It’s brief – 7 pages long.

What is a conflict of interest?

- A “conflict of interest” occurs when a matter before council/local board may have a **financial impact** on you, immediate family members, a person living with you, or an affiliated entity.

- The Act dictates the rules with respect to the who, what, when, where, and how of financial conflicts of interest.

Overview: The Question

Will this put me in a position where I can use my influence in order to receive a financial benefit not available to others?



Overview: Why?

Simply finding yourself in a situation where you may face a possible conflict of interest is not necessarily a bad thing.

What matters most: **what you do with that information.**

“When in doubt, sit it out”

Overview: Who?

- Municipalities – towns, regionals, county/district municipalities

- Local boards – any board, commission, committee, body or local authority of any kind:
  - That exercises any authority under any general or special Act with respect to the affairs or purposes of a municipality
  - To which a municipality is required to provide funds

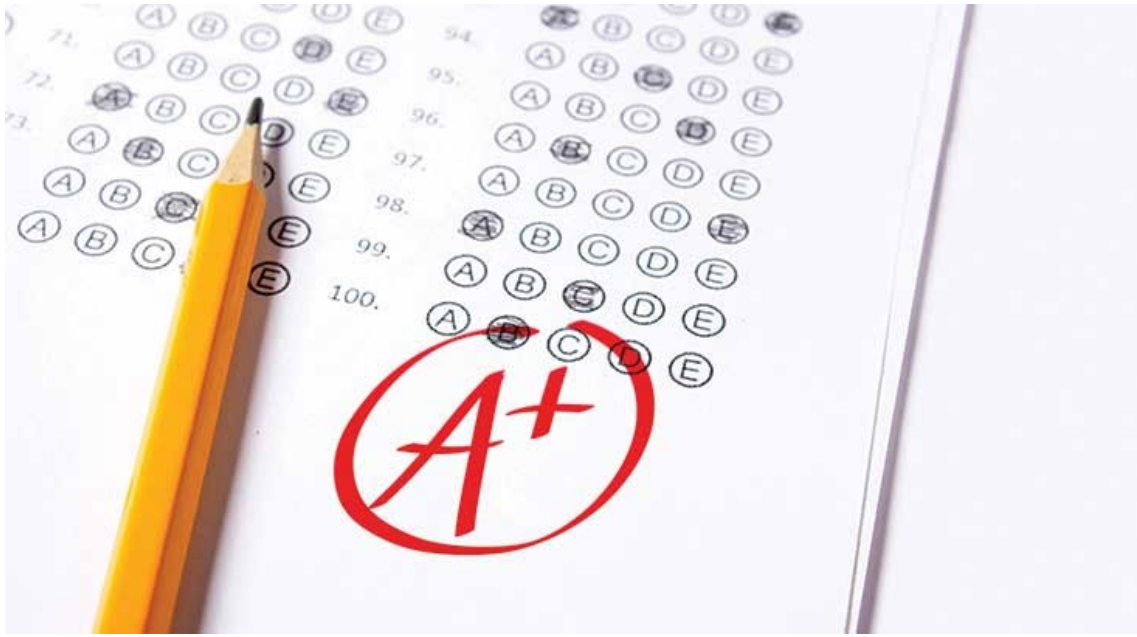
What: Pecuniary Interests

- Pecuniary Interest
  - Could a matter before council/local board have a financial impact on me?
- Indirect Pecuniary Interest
  - Could a matter before council/local board have a financial impact on an organization that I have an interest in?
- Deemed Pecuniary Interest
  - Could a matter before council/local board have a financial impact on my spouse, immediate family member, or someone I live with?
- Intent to Obtain Interest
  - Could a matter before council/local board have a financial impact on me in the immediate future?

What: Exceptions

- The Act does not apply to any interest in any matter that a member may have:
  - As an elector.
  - By reason of receiving the same service as other residents.
  - By reason of being appointed by council to another board.
  - By reason of having a pecuniary interest in common with electors generally.
  - By reason only of an interest that is so remote or insignificant that it cannot reasonably be regarded as likely to influence that person.

Knowledge Check



- Who does this Act apply to?

- According to the Act, when does a conflict of interest occur?

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Knowledge Check

- Who does this Act apply to?

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Local boards – any board, commission, committee, body or local authority of any kind:
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- To which a municipality is required to provide funds

- According to the Act, when does a conflict of interest occur?

A “conflict of interest” occurs when a matter before council/local board may have a **financial impact** on you, immediate family members, a person living with you, or an affiliated entity.

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Actions: General

- Disclose the interest ASAP
- Withdraw from the meeting
  - Public meeting: leave the table
  - Private meeting: leave the room
- Don’t participate in consideration, debate, or vote
- Don’t try to influence the decision in any way
- If you aren’t at a meeting, but you have an interest in a topic discussed, you must disclose it at the next meeting
- **It’s not just about voting, it’s about influence!**

Actions: Record

- Record the declared conflict and the general nature in the minutes.

- Every municipality and local board shall keep a central record of disclosure, which shall be open to inspection by any elector without fee at all reasonable times.

Actions: Quorum

- The MCOIA allows for a reduced quorum if it is lost due to conflicts of interest:
  - One third of the council/local board; or,
  - Two members (whichever number is greater).

- **If you are conflicted, do not participate in the matter simply because of a lack of quorum!**

Actions: Perception matters

- Actual, perceived, or potential – does it really matter?
- You could be taken to court to defend your position regardless of whether or not the interest is real.
- It could sully your reputation and that of the municipality more broadly.
- **When in doubt, sit it out!**

Knowledge Check

True or False:

“By disclosing my conflict of interest, I can still debate I just can’t vote on the matter”





Knowledge Check

True or False:



“By disclosing my conflict of interest, I can still debate I just can’t vote on the matter”

Disclose, Withdraw, Don’t Participate

It’s not just about voting, it’s about influence!

Redress: Self Disclosure

- The process of declaring a conflict of interest is self disclosure.
- This means that it is solely up to the person themselves to declare that there is a situation in which they find themselves to be in conflict.
- You cannot declare a fellow councillor to be in conflict.

Redress: Process for Council

- As a council collectively
  - Request an inquiry (by resolution)
  - Attorney General may appoint someone to make the inquiry
- As an individual councillor
  - Same options as any other resident
  - You can go to court where a judge will determine whether the councillor has contravened the *MCOIA*

Redress: Process for an Elector

- Go to court
    - A judge will determine if there has been a contravention of the Act.

- Have a Councillor make a motion on their behalf
    - Have council determine if there is interest to request an inquiry.
    - As a council: by resolution and adopted by majority vote.

Redress: Penalties

- Fine of up to $25k or imprisonment for up to a year (in default of payment).
- May result in forfeiture of office.
- Disqualification from office for up to 10 years.
- Restitution for any personal financial gain.
- Councillors in Nova Scotia have had to finance their own defense even when found not to be in violation of Act.

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Knowledge Check



If a Council has a serious concern that a conflict of interest is not being handled properly, which of the following is the appropriate course of action:

a) Have the Mayor or Warden state that the member is in conflict.
b) Adopt a resolution to request the Attorney General to strike a board of inquiry.
c) Direct the CAO to take the matter to court so that a judge can determine whether or not the Act was contravened.
d) Adopt a resolution which would declare that the member is in conflict and apply appropriate sanctions.

Knowledge Check

If a Council has a serious concern that a conflict of interest is not being handled properly, which of the following is the appropriate course of action:

a) Have the Mayor or Warden state that the member is in conflict.

b) Adopt a resolution to request the Attorney General to strike a board of inquiry.

c) Direct the CAO to take the matter to court so that a judge can determine whether or not the Act was contravened.

d) Adopt a resolution which would declare that the member is in conflict and apply appropriate sanctions.

Bottom Line

- If an individual Councillor is concerned → independent legal advice
- If Council as a whole concerned → municipal solicitor
- Ultimately, only a Judge or Board of Inquiry can decide

“When in Doubt, Sit it Out.”

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In Summary

In this workshop, you have been introduced to:

1. The *Municipal Conflict of Interest Act;*
2. How conflict of interest is defined by the Act;
3. Your responsibilities under the Act;
4. The steps involved in recusing yourself should you find yourself in a situation; and
5. The avenues of recourse available to all citizens in general, and council as a body

- As an elected member of Council, you have been given the public trust to make decisions on behalf of all citizens within your municipality. As an active member of your community, you may find yourself faced with a situation which could be possible conflict of interest. It is important that you understand the *Municipal Conflict of Interest Act* in order to avoid any violations.

Follow-up Workshops



Your team from Governance and Advisory Services would be happy to work with you on any of the material from a “menu” of topics.

We provide “advanced” training workshops that explore concepts in much more depth and that can help set you and your Council up for success.

Disclaimer

- Information contained in the presentation is considered accurate to the date on the title slide, changes may occur after that date
- Any errors or omissions are solely the responsibility of the person presenting
- This presentation, and the related discussions; is **not legal advice nor is it a substitute for same**

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WEST HANTS REGIONAL MUNICIPALITY

Presenter/Presentation Overview

Date: May 20, 2021 Special Council Meeting

Name of Presenters & Organization: Jason Haughn, Municipal Advisor, Dept. of Municipal Affairs (DMA)

Presentation Outline/Summary (Matter): Conflict of Interest – Attached is the Council Orientation information reviewed with WHRM Council in April 2020 as well as the Provincial Guide presented to new and returning elected officials in November 2020 (for those that registered for the workshop session).

Municipal Advisor Jason Haughn will have further information to share closer to the meeting date.

Request of WHRM Council: A presentation pertaining to Conflict of Interest as it pertains to Municipal Officials.

Thank you for providing this information & a full copy of your presentation one full week ***BEFORE*** *the date you are scheduled to present to West Hants Regional Council to sthornton@westhants.ca !*

Council Orientation Package

2020

REGION OF WINDSOR AND WEST HANTS MUNICIPALITY

WINDSOR / WEST HANTS TOGETHER

Table of Contents

Welcome to local government! 2

Our Vision, Mission and Values 2

Find Your Bearings 2

Mark Your Calendars 3

Learn the Landscape 3

What Does a Councillor Do? 4

Purpose of the Municipal Government Act 5

The Role of Council 6

- Role of the Mayor 8
- Responsibilities of the Municipal Council 8
- Role of the Chief Administrative Officer (CAO) 9
- Responsibilities of Municipal Staff 10

Code of Conduct 10

The Decision-Making Process 10

Conflict of Interest Guidelines 11

- Conflict of Interest 12

Exemptions 13

Discharging Obligations under the Act 13

Consequences upon Failure to Disclose an Interest 14

Frequently Asked Questions 14

- Municipal website and general phone numbers? 14
- Where are the Municipality's Policies, By-laws and Resolutions kept? 15
- Communication 15

Welcome to local government!

CONGRATULATIONS on being elected as the Council Members (Mayor/Councillors) to represent residents and businesses in Nova Scotia's NEWEST (and definitely the most awesome (perhaps a bit bias) Regional Municipality, the Region of Windsor and West Hants Municipality.

This Councillor Orientation Package is designed to provide you with basic information that, as a new council member, you need to know. Over time, you will gain more and more insight into your new role.

First things first…

Our Vision, Mission and Values

The Region of Windsor and West Hants Municipality is a diverse collection of rural & urban communities and has its own cultural blend that brings quality family living, diversity, fun & festivities, and service centres together. We will promote and protect our natural beauty, active lifestyle and heritage through dedicated, effective and open government and robust community involvement.

As a NEW regional municipality, a branding exercise will help us establish our new vision, mission and values and will be undertaken when viable. (COVID-19 pandemic has hampered this process for the time being).

Find Your Bearings

The Chief Administrative Officer (CAO) will be an invaluable source of information for you and legislatively, the only employee of Council.

The Administrative Supervisor, Shelleena Thornton, will be conducting an orientation session for all of you. As a start, thank you all for completing the "Get to Know You" form and we hope that you received some value in receiving some of staff's as well.

If not already done, Shelleena or Rhonda (the Municipal Clerk) will obtain your contact information, home and cell phone numbers, as well as your mailing and civic addresses. Each Councillor is provided with a municipal e-mail address which is where all notifications from the Regional Municipality will be sent. If you have not yet received one; you will soon.

All Councillors will be supplied with an iPad and training will be arranged by Shelleena and provided by Jeff Hanshaw, the Municipality's IT Consultant.

You will (or perhaps already) be provided with a payroll package as well as a copy of the Council Remuneration Policy. The forms are to be filled out as soon as possible and returned to either Shelleena Thornton or Pamela Northup, Payroll and Benefits Specialist so that they can be processed. Forms regarding expenses such

as mileage can be found on SharePoint and will be shown to you during the iPad training.

Shelleena will help you, as a new council member, navigate your way in your new role. Her contact information:

Shelleena Thornton, Administrative Supervisor 902-798-2275 ext. 207
sthornton@town.windsor.ns.ca

Mark Your Calendars

Your first meeting of Council will take place on Wednesday, April 01, 2020 where you will all be sworn in as Mayor and Councillors. Following that meeting, the regular Committee of the Whole (COTW) meetings will take place the second (2nd) Tuesday of each month starting at 6 p.m. and the regular Council meetings will be the fourth (4th) Tuesday of each month, also starting at 6 p.m. All members are expected to be in attendance.

Meeting agendas and packages are uploaded to SharePoint for Council members to view no later than the Thursday prior to the COTW and Council meeting dates. All notifications of meetings are placed in the Council calendar on SharePoint.

Learn the Landscape

First, what is the difference between the three levels of governments in Canada:

Federal Government - partisan, meaning he/she belongs to a Political Party (i.e. Liberal, NDP, Conservative, etc) - "an organization one of whose fundamental purposes is to participate in public affairs by endorsing one or more of its members as candidates and supporting their election." There's always a single leader at the top, who serves as all-powerful boss of the party. The leader formulates party policy and determines where his/her party stands on the political issues of the day. All politicians below him/her, including members of the House of Commons and Senate are expected to support and endorse his/her agenda. Politicians who misbehave can be expelled from the party by the leader. In Canadian federal elections, party leaders run as candidates for Prime Minister.

Provincial Government - partisan, meaning he/she belongs to a Political Party (i.e. Liberal, NDP, Conservative, etc) - similar to the Federal Government; however, the elected leader is Premier and represents his/her Province. Similarly, all politicians below him/her in the same party, are expected to support and endorse his/her agenda.

Municipal Government - non-partisan, meaning he/she does not sit as a council member affiliated with any party but instead is elected as a resident individual. Also, others elected to council are not expected to support and endorse his/her positions on matters; but rather, each is an individual that does not speak to a political party's agenda/objectives.

Federal Government	Provincial Government	Municipal Government
Defense	Property and Civil Rights	Water
Criminal Law	Administration of Justice	Sewage
Employment Insurance	Natural Resources and Environment	Waste Collection
Postal Service	Education	Public Transit
Census	Health	Land Use Planning
Copyrights	Welfare	Libraries
Trade Regulation		Emergency Services
External Relations		Animal Control
Money and Banking		Economic Development
Transportation		
Citizenship		
Indian Affairs		

The *Municipal Government Act* as it is the principal piece of legislation for municipal government in Nova Scotia. Documents such as municipal by-laws and policies, budget documents, Parks and Open Space Plan, the Municipal Climate Change Action Plans as well as other plans/strategies/reviews/studies that have been undertaken are also available on SharePoint and contain valuable information that may assist you during your term as a Council member.

Staff are very familiar with legislation affecting the Municipality and will provide information and advice to Council on how these pieces of legislation affect the Municipality. Councillors should not hesitate to ask for clarification or more information regarding legislation.

The Department of Municipal Affairs and Housing (DMAH) provides on-going support through their Municipal Advisors. There are three Municipal Advisors in the province who are responsible for liaising with the municipalities in Nova Scotia. Our advisor is Jason Haughn.

Remember that one of the qualities of a successful municipal politician is to embrace continuous learning and appreciate that you have many experts in their professions supporting you within our organization. As an elected official there are many opportunities available from a variety of sources. These include the Nova Scotia Federation of Municipalities (NSFM), Dalhousie University's College of Continuing Education, as well as the Province of Nova Scotia.

What Does a Councillor Do?

Adapted from Nova Scotia Municipal Elections, 2012

Make Decisions as Part of a Team

Being a municipal council member means being a community leader and is an opportunity where you and your fellow council members can make a difference in

your community. You will have the opportunity to bring your diverse knowledge, experience and views to the decision-making process.

You will approve the municipal budget which determines programs, service levels and much more in-between. Result, the budget will represent how much property tax a homeowner, business or a farmer will pay. The budget is prepared by the CAO and directors and presented in such a way that even if you don't have a financial background, you will be able to understand the impact of the decisions made could have on residents/business owners and the Municipality as a whole.

You will be part of discussions that lead to strategic decisions about such things as land use planning, economic development and many areas that will have a very long-lasting effect on the future and indeed, the viability of the Municipality.

The Municipality follows parliamentary rules of order to ensure fair and democratic meetings; *Robert's Rules of Order*. A "*Quick Study"* of the rules have already been provided to each of you and there are copies of the book with staff and in Council Chambers.

Form Relationships with People in Your Community

As a Council Member, you have the opportunity to engage your citizens in the discussion. Through meaningful community consultation, your residents will be able to contribute, through you, to the best possible quality of life for all residents, current and future; at the governance level.

In the relationships you foster with your community you will have the opportunity to listen and respond to various concerns they may have. One key item to keep in mind, although you represent a district, the entire region is the wide lens to consider.

Interact with Organizations Outside of Your Municipality

Many of the areas that you will deal with require coordination and cooperation with the Province of Nova Scotia and other municipalities. Individual municipalities, for a variety of reasons, cannot do everything themselves. You will need to understand these relationships and ensure that they are productive and serve the interest of the people you represent.

As a municipal councillor you will be given the chance to represent the Municipality on a number of boards and committees. Appointments for committees of Council take place during the November Council meeting, except in our case, due to our March Municipal Election, your appointments will be done April 01, 2020.

A full listing of all committees of Council has or will be provided by means of the *Meeting and Committee Procedural Policy*.

Purpose of the Municipal Government Act

Adapted from Province of NS *Guide for New Municipal Councillors*, November 2016

(note: a link to the Municipal Government Act (MGA) is available on SharePoint)

In a nutshell, Municipalities are creatures of the Province. As such, the Province spells out through Provincial Legislation what municipalities can do. The key piece of legislation the Province uses to do this is the Municipal Government Act (MGA).

The *Municipal Government Act (MGA)* gives a broad authority to Councils respecting their right to govern municipalities within the jurisdiction given to them. The *Act* enhances the ability of Council to respond to present and future issues in their municipalities, and recognizes that the functions of the municipality are to:

- Provide good governance;
- Provide services, facilities, and other things that are deemed necessary or desirable for all or part of the municipality; and
- Develop and maintain safe and viable communities.

The *MGA* gives Council the power to collect money. Property taxes generally provide a municipality with approximately 80% of its income while user fees, fines and grants provide the remainder of municipal income.

Powers to spend money are included in *Section 65* of the *MGA*. This section lists all the items on which a municipality may spend money, and all items for municipality ownership and operation.

Municipalities are not permitted to expend any money on private individuals or organizations; however, may provide grants for certain non-profit organizations or community groups. Consideration of grants takes place during budget deliberations.

Section 218 of the *MGA* also deals with spending powers. Municipalities may spend money on development projects if they are consistent with a Municipal Planning Strategy, and if it is the only way to realize these plans.

Municipalities have the power to create by-laws on a wide range of activities, provided they do not impede Provincial or Federal jurisdiction, including:

- Health, well-being, safety, and protection of persons such as dog control and false alarms;
- Persons, activities, and things in, on, or near a public place or place that is open to the public;
- Nuisances (weeds, noise, burning, odours, fumes, vibrations);
- Transport systems;
- Businesses and business activities;
- The use of pesticides, herbicides, and insecticides; and
- Condition or maintenance of vacant buildings, structures, and properties.

The Role of Council

Council members are elected to represent the entirety of their municipality and represent the interests of their constituents, even those who have been elected under the district/ward system. Council should be viewed as a unified decision-

making body, meaning that no one councillor is more important than any other and each member is entitled to a single vote. This is done through participating in discussions and decisions made by Council. It is important to note that decisions are made by Council under the majority vote rule.

Individual Councillors cannot make decisions or direct the operations of the Municipality. Council is a strategic body and direction can only be given by Council as a whole. *Section 14* of the *MGA* states: "The powers of a Municipality are exercised by the Council."

The primary role of a council member is participating in council meetings and committees. As an individual member of council you will be expected to attend, participate and vote in these various meetings. Regular attendance of councillors is expected under the MGA.
Council meetings and Committees of Council are ways in which to collectively meet, discuss the matters at-hand and engage in great discussion. Many think that Council meetings are "the" one to learn of matters; however, essentially, Council Meetings are where matters go to be approved. Typically, before a matter gets on the Council Meeting agenda it has been discussed more in-depth at Committee of the Whole or other Advisory Committee meetings.
All meetings are held in a public-forum; they are open for the public to attend. This allows citizens to voice their concerns and allows council to operate in an open and transparent manner throughout the legislative process. The MGA outlines when a meeting can be permitted to be 'closed' (aka in-camera). These permissions are outlined in Section 22 of the MGA and summarized as follows:

- Purchase, sale or lease of municipal property
- Prices for a tax sale
- Personnel issues, labour relations, or contract negotiations
- Litigation or potential litigation
- Legal advice eligible for solicitor-client privilege
- Public security

Only for these issues, set out in the MGA, is council permitted to meet privately. The purpose of private meetings is to protect sensitive information. Council cannot vote on a decision with the exception of procedural matters and directions to municipal staff or solicitors. If the matter requires a vote, council must wait until a public meeting to vote on the matter discussed in camera. Discussion during a public meeting is still required prior to a vote on the issue. A closed meeting cannot be used to "rubber stamp" an issue prior to a public vote.

It is vital that you do not publicly discuss any matters which have been disclosed during a private meeting. It is possible to be held personally liable for publicizing information that results in a loss for your municipality. While the intention of municipalities is to be as transparent as possible, there will also be times when legal limitations prevent you from disclosing specific information.
All council members are also required to vote during meetings and any non-vote will be deemed as a vote in-favour (in the positive) of the issue. (MGA outlines in the negative; however, Municipalities are permitted to have a policy which records

non-votes in the positive. Our Municipality has that policy, *Meeting and Committee Procedural Policy*).

Councillors should carefully review the pre-meeting packages provided. These packages will inform you of the agenda set for the meeting and provide important information on the issues. This will aid in following the meeting and allow you to have informed discussions on the issues with your fellow council members along with making informed votes on issues.

It is important to remember that your fellow council members have also been elected to represent the community. Respectful and informed discussions on the issues are encouraged. Consider the perspective beyond your community (district) and think about problems which may affect your region and neighbouring municipal units. Working with other councils and sharing resources can help provide innovative solutions to region-wide issues.

There will be many times when you may be on the losing side of a vote and this is not something to take as a personal slight. Councils are most effective when members respect the decisions of their peers and allow meetings to proceed smoothly.

- Role of the Mayor

Section 15 of the *MGA* specifies the role of Mayor.

The mayor's most important job is to chair meetings and provide leadership for council. Prior to the meeting, the mayor will consult with the CAO to set the meeting agenda. It is their job to ensure that meetings proceed smoothly and that the agenda is followed. The mayor may also call a special meeting should an issue arise that requires immediate attention.

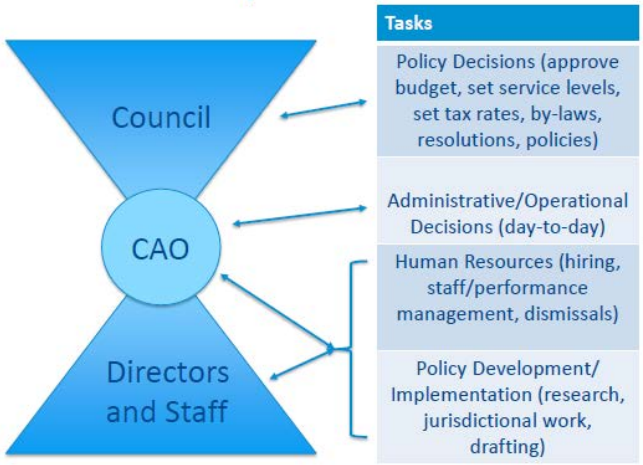
An effective mayor also provides leadership and direction to council but does not infringe on their opinions and voting. While they are the chairperson for meetings, mayors are still members of councils and have the same voting powers as all councillors.

The mayor is often also a "public face" for the municipality. This can range from attending consultations with government to attending events or performing ceremonial functions. The mayor may also act as a public spokesperson in the media, however, this can be designated to another member should council choose to do so. Members of the public will often associate the mayor as the primary leader of a municipality. This is often due to the visibility of the mayor's role and not any additional powers granted. It is council as a whole that makes decisions for the municipality, not one individual person.

- Responsibilities of the Municipal Council

The Council, in many ways, is similar to a Board of Directors of a Company and set the long-term direction of the municipality each year through approval of the budget but are not involved with day-to-day operations. The day-to-day operations are led by your Chief Administrative Officer, who then works with all staff to carry out the policies, strategies and plans of the Council.

Roles and Responsibilities



The main functions of a Council can be described as follows:

- Legislative function such as developing and passing the municipal by-laws, short and long term planning, and policy;
- Approve the budget and set the property tax rates;
- Approve major purchases;
- Represent the views of the citizens;
- Resolving conflicting interests in the community;
- Hire the Chief Administrative Officer.

- Role of the Chief Administrative Officer (CAO)

The Municipality has adopted the Chief Administrative Officer (CAO) System of Administration. This system provides for a separation of legislative and administrative powers, and reliance on a professional staff person (the CAO) to administer the operation of the Municipality.

The *MGA*, *Sections 30 and 31*, sets out the role and responsibilities of the CAO. Specifically, *Section 31(1)* contains the mandatory responsibilities of a CAO, with *Section 32* noting the responsibilities that a municipality may wish to give the CAO.

The CAO and designated staff are responsible for preparation of policy and planning reports and recommendations; preparation of the budget; reporting to Council; administering the municipality and the hiring and firing of staff.

The CAO is Council's only employee. Council gives direction to the CAO and the CAO, through staff and organizational function, executes the direction of Council. The CAO, Mark Phillips, can be reached at mphillips@westhants.ca or 902.670.4255.

- Responsibilities of Municipal Staff

In Nova Scotia, 95% of local governments have the CAO system. The CAO is the link between Council and municipal staff. The CAO oversees the day-to-day operation of the municipality, preparation of reports, policy, budgets, and recommendations to Council. Council members are not to provide staff with direction; only the CAO can do that. Council members are encouraged to contact either the Administrative Supervisor, Shelleena Thornton or CAO Mark Phillips for information and collaboratively, they will assist.

An overview of Departments as well as Organizational Chart can be found attached to this package.

Code of Conduct

The Region of Windsor and West Hants Municipality has a Code of Conduct and all Council members are required to sign a "Statement of Commitment to the Code" within seven (7) days of taking the Councillor's Oath pursuant to *Section 147* of the *Municipal Elections Act*, R.S.N.S. 1989, c. 300.

The Decision-Making Process

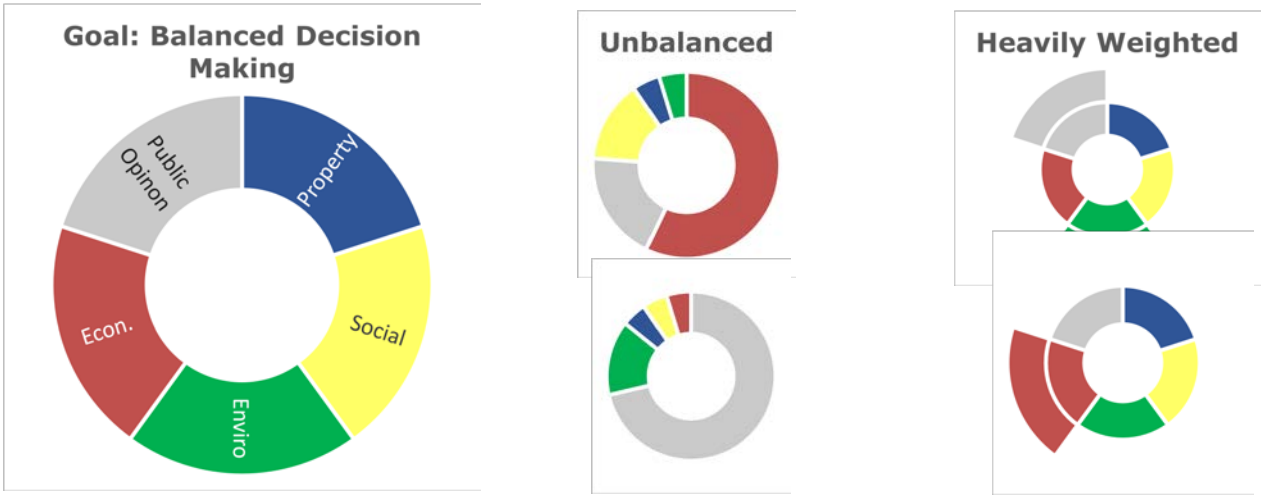
This information below is also available in the Municipality's *Meeting and Committee Procedural Policy.*

Council and resident members are encouraged to assess every issue presented through the lenses of property, environment, economics, social, and public opinion before making a decision or recommendation for action. Council and residents have the responsibility to research all lenses in order to make a balanced and respectful decision. Information on an issue can become heavily weighted around a single lens, leaving out other factors that will influence the community as a whole. Council and resident members strive to make recommendations that are balanced and unbiased, without emotion, which reflect all lenses, to protect the best interests of the Municipality and the people it serves.

- **Property:** "something at the disposal of a person, a group of persons, or the community or public". Examples: single use, shared use, noise, beautification, traffic, zoning, regulations
- **Environment:** "the air, water, minerals, organisms, and all other external factors surrounding and affecting a given organism at any time". Examples include regulatory requirements and land use.
- **Economic:** "pertaining to the production, distribution, and use of income, wealth, and commodities". Examples: cost savings or expense with decision, property taxation, spending in community, tourism, assessments, market impacts
- **Social:** "of or relating to human society". Examples: Acceptance, limited available or benefit, values
- **Public Opinion:** "the collective opinion of many people on some issue,

problem, etc., especially as a guide to action, decision, or the like". Examples: feedback, communication, media, other municipal units

- **Other:** In some cases, other lenses may be required to fully understand an issue. Examples: chance of success, innovation.



Conflict of Interest Guidelines

Adapted from "Conflict of Interest Guidelines for Members of Councils and Local Boards", Local Government Resource Handbook, SNSMR 2005

At some point, a question may arise as to whether a member of a Council is in a conflict of interest over a matter for which a discussion is being asked of Council. This is a matter which cannot be taken lightly and it has warranted the provincial legislature to adopt the *Municipal Conflict of Interest Act.* Furthermore, failure to act upon a conflict of interest can have serious consequences upon an individual councillor and the credibility of the Municipality.

The following provides a brief overview of the Act but note that the material involves interpretation of legislation as it applies in general situations. Specific situations may require careful legal analysis, and reference should be made to the *Municipal Conflict of Interest Act*, other relevant legislation, and legal advisors.

Only a councillor can determine or declare his/her own conflict of interest. This decision may be subject for review or appeal. It is also important to note that the municipal solicitor does not advise individual councillors on issues regarding conflict of interest as their role is to represent Council as a whole. It is the personal responsibility of the Councillor to obtain his or her own legal advice on such matters.

- Conflict of Interest

The *Municipal Conflict of Interest Act* was enacted in 1982. The *Act* deals with various types of interests and what conduct is required when those interests arise, as well as the penalties which result from the failure to observe the standards set out in the *Act*. Within the *Act,* the term "conflict of interest" is not used. Rather, the *Act* talks about declaring an interest. If the interest is declared, there is no conflict. This also means the councillor does not participate in the discussion or the decision.

Public office is a trust conferred by the public for public purposes. The present legislation in Nova Scotia permits members of councils to do business with the municipality or board, provided that they remove themselves from the decision-making process in respect to that business. It recognizes that the judgment of even the most well-meaning persons may be impaired when their own financial interests, or the financial interest of someone close to them are affected.

The *Act* covers members of both Council and local boards which includes elected officials of municipalities, and appointed members of municipal and inter-municipal commissions, boards, bodies, authorities, and committees.

Interests

The *Act* speaks of "interests". These can be discussed under the headings; direct pecuniary interest, indirect pecuniary interest; and deemed pecuniary interest.

General Ethics Overview

As an elected official, you can be held accountable for a breach of ethics to both the general public and any government regulations concerning your position. You have been elected to serve the public good, not to use your position to increase your personal wealth or that of your family. When making decisions as an elected official, it is always important to consider the ethics of your choices. While the majority of elected officials do not breach ethical guidelines intentionally, it is important to be aware and avoid any accidental violations.

A "conflict of interest" occurs when a matter before council will result in a net benefit for yourself or any of your family members, friends, etc. An example would be council deciding on the company to use to repair a municipal public pool and your spouse's pool service company has provided one of the bids. Any doubts you may have of a conflict should be disclosed or at a minimum discussed with a solicitor for further clarity.

As a councillor it is your responsibility to be proactive in knowing the upcoming agendas for council meetings. This is so you can make yourself aware of any potential conflicts of interest. Failing to disclose, even if unintentionally, can still create unnecessary headaches during your time as a councillor. As an elected official, you may also want to consider the perception of a conflict or ethical breach. While an issue may not exist, the perception of one could be damaging to both your reputation as an elected official and your municipality.

Avoiding conflicts of interest is extremely important as a municipal councillor. Becoming involved in a conflict of interest can cause potential legal issues both for yourself and the municipality. Legislation has been created to protect the public and municipalities from being used for personal gain by elected officials or their families. The Municipal Conflict of Interest Act (MCIA) can be found on Sharepoint.

Limiting your Participation

If you suspect you have an 'interest" in an item on council's agenda, you must immediately excuse yourself from the council table. You cannot participate in debate or vote on the issue. Even if you are not in attendance at the meeting where the conflict would have occurred, you must disclose the conflict at the next meeting you attend. Under the MCIA, even informal meetings can be considered council business. Therefore, you should avoid discussing any potential conflicts of interest with your fellow council members.

Once you have disclosed the conflict, you cannot attempt to influence council in any way regarding the issue in question. You are not required to leave the room but you must sit in the public gallery while the matter is being debated and voted on. You will be required to leave the room should this declaration be on a matter discussed in-camera.

Consequences

If you are found to have violated the MCIA, there could be serious penalties. An application for review can be brought by the Nova Scotia Attorney General or a citizen of your municipality. This application will be reviewed by a judge who *must* declare your seat vacant should a breach be found. A judge can also issue a ban on running for office, repayment of money, or even jail time in some of the most severe violations. A judge may also find the violation was a result of "inadvertence or bona fide error in judgement." This would mean that the violation was an honest mistake and the judge would not be forced to declare the council seat vacant.

To avoid this process entirely, proactive disclosure is the best practice as an elected official. Conflicts of interest should be an important consideration at all times for any elected official. It is your responsibility to ensure that you follow best practices to avoid any potential issues. It may be helpful to review the MCIA to fully understand the scope of potential conflicts of interest or speak with a solicitor if you have further questions.

Exemptions

Section 5(1) of the *Act* provides the exemptions and the circumstances. They are self-explanatory; however, if there is any question, the Councillor should seek independent legal advice. This is not legal advice from the municipal solicitor, whose role is to advise the Council and not individual Councillors.

Discharging Obligations under the Act

Section 6 of the *Act* states that any and all interests must be declared at the start of a meeting where the matter is to be considered, and the member must withdraw from his or her place. In closed door meetings, he or she must physically leave the

room, and at meetings open to the public, he or she must withdraw to that part of the room set aside for the general public and abstain from taking part in any discussion or voting on the matter. It is to be understood that interested members must refrain from attempting in any way whether before, during, or after the meeting to influence the decision of the Council or local board with respect to the matter.

Consequences upon Failure to Disclose an Interest

The consequences of failing to declare a conflict of interest can be severe. Section 9 of the *Act* provides that the Attorney General or an elector (this includes a Council member) may apply to the Nova Scotia Supreme Court for the determination of whether a member has breached the *Act*. The Attorney Generals Department has stated that responsibility to pursue complaints that do not involve Provincial interests lies in the hands of the electors of the Council concerned and that it will not pursue claims which are local in nature. An application under Section 9 must be done within sixty days of the alleged contravention coming to the applicant's attention, and within ten years after the date of the alleged breach.

If a member fails to declare an interest, the Court may also order that the Council's, board's, or committee's action in respect to the subject matter be void. The judge, however, is required to consider the effect this may have on innocent third parties.

As an alternative to a court application by an elector, the Council or local board may by resolution request an inquiry into any alleged breach of the Act. The Attorney General may then appoint a judge or other suitable person to head the inquiry. The appointee is required to report to the Attorney General and the Council on the results of evidence taken at the inquiry.

The issue of "conflict of interest" is a serious matter of concern for all elected officials of municipalities, school boards, appointed members of municipal and inter-municipal commissions, boards, bodies, authorities, and committees. Each of the above should have their own copy of the *Municipal Conflict of Interest Act* as soon as they assume their position and they should review it on a regular basis.

Frequently Asked Questions

- Municipal website and general phone numbers?
  www.westhants.ca

  Main Line: 902-798-8391
  Fax: 902-798-8553

  Council members will have access to a full list of all staff work phone numbers and emails through SharePoint.

- ## Where are the Municipality's Policies, By-laws and Resolutions kept?

  Copies of policies, by-laws and resolutions are available through Sharepoint. Signed (originals) are kept by the Municipal Clerk, Rhonda Brown. If you cannot find what you are looking for, please contact her at rbrown@westhants.ca. (NOTE: currently, we have three sets of policies and by-laws: (1) Region of Windsor and West Hants Municipality; (2) Town of Windsor; and (3) Municipality of the District of West Hants). Until a new policy/by-law is adopted by the Regional Municipality, the Town's and West Hants' remain for their respective area (or unless they are repealed and not replaced as being deemed unnecessary).

- ## Communication

  The Municipality uses e-mail and Sharepoint as a means of communication with Council members. If not already, you will receive your iPad and orientation to ensure that you know how to use it and SharePoint.

  As an elected official, residents of our region will need to be able to contact you. On the Municipal Website (www.westhants.ca), your photos, district number and contact information is posted and made available to staff. A municipal email will be given to each of you to use during your term in office.

  As a Council member you may be approached to speak on issues/items within the region. Please note that the Mayor is the official spokesperson for the Municipality for matters that pertain to Council as a whole and, the Deputy Mayor may speak on behalf of Council in lieu of the Mayor.

  Individual councillors are permitted to speak to issues concerning their district, as long as the issue is not confidential or discussed at a closed (in-camera) meeting. In most cases, or if you feel uncomfortable speaking to the media on an issue, it is best to direct them to speak to the Mayor or CAO.

  The CAO may also speak to the media on matters that pertain to administration and operational issues, or other matters as related to the Municipality or as directed by Council.
  Municipal staff are looking forward to working with all of you.

Guide for

New Municipal Councillors

November 2020

NOVA SCOTIA

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Guide for New Municipal Councillors

Congratulations!

Congratulations on your election as a municipal councillor. You have been chosen by your constituents to represent their interests and priorities in guiding your community forward. This is an important role as you and your fellow councillors will be making decisions potentially affecting all members of your community. It is both a great responsibility and an exciting opportunity to serve your community and represent their interests.

About this Guide

This guide provides a brief overview of your role and responsibilities as a newly elected official. It is an introductory guide only. It does not cover every potential issue you may face as a municipal councillor. Rather, it offers helpful advice that may assist you in your time as a member of council. It supplements any training you may receive from your own municipality, the Department of Municipal Affairs and Housing, and the Nova Scotia Federation of Municipalities.

This guide has been prepared by staff at the Department of Municipal Affairs and Housing. It may not entirely reflect the specific policies and procedures that are currently in place for your municipality. However, at the end of this guide are a variety of additional sources should you want more information. You may also be able to direct questions as a new member of council to your fellow councillors, your Chief Administrative Officer (CAO), or the Department of Municipal Affairs and Housing (DMAH).

If any information in this guide conflicts with the relevant legislation, then the legislation prevails.

This guide is not a substitute for legal advice and any questions regarding a specific fact situation should be directed to a lawyer.

Contents

Introduction To Municipal Government 1

Role of Provincial and Federal Governments and Legislative Framework 1

Areas of Municipal Responsibility 2

Roles and Responsibilities 3

- Governance and Management 3
- Council 3
- Mayor/Warden 4
- CAO and Municipal Staff 5
- Policy and Strategic Direction vs Day-to-Day Operations 6
- Other Organizations 7

Municipal Powers 8

- Resolutions, Policies, and By-laws 8
- Areas of Jurisdiction 9
- Limits on Council Action 9
- Policies and Procedures 9

Council Business and Meetings 9

- Meeting Minutes 10
- Conduct of Business 10
- Rules of Procedure 10
- Attendance/Preparation for Meetings 10
- Quorum and Voting 11
- Legal Considerations 11
- Open/Closed (In Camera) Meetings 11
- Special Meetings and Emergency Meetings 12
- Standing, Special, and Advisory Committees 12

Municipal Conflict of Interest Act (MCIA) 13
General Ethics Overview 13
Limiting Your Participation 14
Consequences 14
Communication/Engagement with the Public 14
Community Opinions 15
Public Participation 15
Media 15
Access to Information and FOIPOP 16
Citizen Complaints 17
Ombudsman 17
Courts 18
Financial Management 18
The Role of Council 18
Annual Audits 18
Financial Reporting 19
Council Expense Reporting Requirement 20
Taxes and Revenue Sources 20
Budgets 21
Best Practices 22
Regional Enterprise Networks (RENs) 22
Setting Municipal Priorities 22
Municipal Planning 22
Relevant Legislation 23

Introduction to Municipal Government

Municipal governments in Nova Scotia have a long history, predating even the founding of Canada. In 1841, Halifax became the first incorporated municipality in Nova Scotia. When Nova Scotia joined confederation under the Constitution Act (1867), municipalities became a responsibility of the provincial government. This means that all legislation which enables and restricts municipal governments comes from the provincial legislature.

As the number of incorporated municipalities in the province grew, the Nova Scotia Federation of Municipalities (NFSM) was established in 1906 to represent their interests. The NSFM continues to help municipalities in creating strong vibrant communities and advocates for their interests.

Currently, there are 49 municipalities and 21 villages in Nova Scotia. Together, these local governments include more than 400 elected officials and more than 7,000 municipal employees. All directly elected officials in municipalities serve a four-year term, and accordingly, municipal elections are held across the province every four years.

Role of Provinces and Federal Governments and Legislative Framework

Despite no formal constitutional status, municipalities are granted many powers by provinces, such as the ability to tax property, make laws (by-laws), and expropriate land for municipal needs. In Nova Scotia, this means that the Halifax Regional Municipality (HRM) is governed by the *Halifax Regional Municipality Charter* (Charter), while all other municipal governments are governed by the *Municipal Government Act* (MGA). The remainder of this guide focuses on the MGA. While the Charter is similar in many respects, councillors for HRM should ensure that they are familiar with the Charter and the specific provisions contained therein.

The Municipal Government Act sets out the roles and responsibilities of municipal governments along with the granting and restriction of their powers. There are other pieces of legislation that impact municipalities; however, the MGA is the main governing document of municipalities.

The MGA came into effect in 1999 and is regularly reviewed and amended in consultation with municipalities, NSFM, and the provincial government. Municipalities may also find themselves interacting with various federal departments and agencies; however, the granting and restriction of their powers lies with the provinces.

Areas of Municipal Responsibility

Under the MGA in Nova Scotia, there are no required services to be provided by a municipality. However, there are a number of different services that a municipality may opt to provide. Some services are also governed by additional legislation. For example, under subsection 35(1) of the *Police Act*, "Every municipality is responsible for the policing of and maintenance of law and order in the municipality and for providing and maintaining an adequate, efficient and effective police department at its expense in accordance with its needs."

Services that a municipality may opt to provide:

- Fire protection services
- Solid waste collection
- Parks and recreation areas/community centres
- Wastewater treatment
- Streets and sidewalks (including snow removal and parking enforcement)
- Economic development
- Tourism and cultural
- Animal control
- Building and fire code inspection
  - See also *Building Code Act*, subsection 5(2), "A building official or building officials shall be appointed by each council to administer and enforce this Act in the municipality."
- Public transit
- Zoning and land use planning

It will be helpful to familiarize yourself with the different services your municipality provides in order to better understand the priorities for your council. Assessing which services will be provided and what service levels are offered is one of the most important tasks a council will face.

Roles and Responsibilities

Governance and Management

Municipal government can be divided along the lines of elected officials and municipal staff. The principal role of the elected officials is to govern, and to do so as a collective, while the principal roles of staff are to manage and implement.

The council of your municipality is composed of members who have been elected by your local voters. They may be elected by ward (divided by districts) or at large (across the entire municipality) depending on the system your local area utilizes. A council will have a minimum of three members, but many councils are larger depending on the size and number of polling districts.

Most municipalities employ a Chief Administrative Officer. The CAO is the most senior municipal official and is the only direct employee of council. They are the link between council and the rest of the organization and are accountable to council for the effective management of staff. The CAO has the leadership responsibility for the effective management of the organization as a whole and staff as individuals, in order to ensure that day-to-day decisions reflect the strategic direction set by council.

Council

The primary role of a council member is that of governance. As a member of council, you will play a critical role in setting the strategic direction of your community. This means you and your council colleagues are responsible, as a collective, for the oversight and guidance of the entire organization. Individual councillors do not have decision making authority, all powers of the municipality are made by council as a whole. And as a team, you will participate in budgeting and financial planning, debating and adopting the by-laws that regulate the activities of citizens and businesses, and articulating the core values of your municipality.

A large portion of your time will be spent participating in council meetings and committees. As an individual member of council, you are expected to attend, participate, and vote in these various meetings. Missing three regular council meetings without permission can result in your dismissal from council. Regular attendance of councillors is expected under the MGA.

All council members are also required to vote during meetings, and any non-vote will be deemed as a vote against the issue (unless your council has a policy which states otherwise). Remember, you only have one vote — use it wisely.

Councillors should carefully review the pre-meeting packages provided. These packages inform you of the agenda set for the meeting and provide important information on the issues. You will spend a lot of time in meetings, and being an effective leader means that you're prepared to have informed discussions on the issues with your fellow council members and to make informed votes on issues.

Staying informed on the concerns facing the greater community will also help you to discuss these issues when they arise at council. Best practices include regularly speaking with, and learning from, your constituents and their concerns in the municipality. Raising relevant issues at the council table is an important part of your role as the voice of the residents you serve.

Once elected to council, it is important to remember that you represent the entirety of your municipality, even if you have been elected under a ward/district system. Your job on council is to govern strategically for the whole of the municipality. While robust debate is essential to effective decision making, in the end, council is a unified decision-making body. This means that once a decision is arrived at, it is the decision of council, and individual councillors should avoid undermining the legitimacy of the institution.

Consider the perspective beyond your municipality and think about problems which may affect your region. Working with other councils and sharing resources can help provide innovative solutions to region-wide issues. Governing effectively for the benefit of your constituents means thinking broadly, looking for creative solutions, developing and strengthening partnerships inside and outside of your municipality, and working together as a team.

Mayor/Warden

A mayor is elected at large by all voters in a municipality and acts as the chair at council meetings. Prior to a meeting of council, the mayor consults with the CAO to set the meeting agenda. It is the mayor's job to ensure that meetings proceed smoothly and that the agenda is followed. The mayor may also call a special meeting should an issue arise that requires immediate attention.

An effective mayor also provides leadership and direction to council but does not infringe on council members' opinions and voting. The mayor is not the political leader of council but rather a regular member with some additional responsibilities. While mayors are chairpersons for meetings, they are still members of councils and have the same voting powers as all councillors.

The mayor is often also the "public face" of the municipality. This can range from attending consultations with government to attending events or performing ceremonial functions. The mayor may also act as a public spokesperson in the media; however, this can be designated to another member should council choose

to do so. Members of the public often consider the mayor to be the primary leader of the municipality. This is often due to the visibility of the mayor's role and not to any additional powers granted. It is council as a whole that makes decisions for the municipality, not one individual person.

A warden has a similar position to a mayor but is elected to the position of warden by their fellow councillors instead of directly by the voters. The warden has all of the same powers as a mayor. The position of warden is mostly found in rural municipalities, although a municipality may still opt to use general voting to elect a mayor.

The term of a warden is determined by the individual municipality; however, many use a term of two years. At the end of those two years, the council may choose to nominate and vote on the current warden or opt for a new chairperson. For the purposes of this guide, the term mayor will be used throughout, but most wardens will have similar responsibilities.

CAO and Municipal Staff

The Chief Administrative Officer is the primary member of municipal staff to interact with council. The person in this position acts as the organizational leader of a municipality, making important decisions such as hiring employees, planning budgets, and managing operations.

The CAO reports directly to council and is accountable to council for any decisions made under their authority as CAO. This is the only employee to directly communicate and take instruction from council. Council is in turn expected to provide the CAO with guidance and direction on their priorities for the community. The CAO is also responsible for preparing and submitting the annual budget and, following council approval, for administering the budget on behalf of the municipality.

Hiring a qualified CAO is one of the most important decisions a council can make in shaping how their municipality is run. Although the position of CAO is optional, the MGA does require a municipality to maintain specific staff positions. The required staff include clerk and treasurer (often the same person), engineer, and dangerous and unsightly administrator. Even in municipalities with no CAO, these positions are required to be filled under the MGA. These positions also have required duties to be completed by these employees under the legislation.

Some smaller municipalities do not use a CAO as their primary administrator. For these communities, a clerk/treasurer acts as the main administrator for the municipality while the council as a whole fills many of the roles of a CAO which results in a larger workload for councillors. As a newly elected official, you will want to be familiar with the system your municipality uses so that you can effectively understand the organizational demands.

Other municipal staff may have limited interaction with council. This may be by way of staff reports and presentations to council. These types of updates should occur during regular council meetings, and requests should be made through your CAO. It is inappropriate for council members to direct municipal staff. Any concerns regarding staff should be communicated directly to your CAO with other council members present.

Policy and Strategic Direction vs Day-to-Day Operations

Although briefly discussed above, it is important to note once more that council governs while staff manage. As a member of council, you are not individually responsible for the day-to-day operations of your municipality. Your role on council is to collectively hold the CAO accountable for the effective management and implementation of the strategic direction of the municipality while staying out of the way of organizational decisions needed to run the operations of the municipality.

This can be challenging when faced with complaints from citizens who may blame you for operational issues. However, your community has many challenges and opportunities ahead and needs a council focused on the "big picture." Simply put, council needs to lead. Together, you and your fellow councillors will be responsible for articulating the long-term vision of your community.

This work is substantial and includes establishing and enforcing bylaws, adopting a strategic plan, setting overall service levels and programs that are delivered to citizens, leading land use planning, encouraging growth and sustainability, approving operating and capital budgets, setting property tax rates, and so much more.

Other Organizations

In addition to your municipality, other organizations can be great resources for you:

Nova Scotia Federation of Municipalities (NSFM)

The NSFM is the association responsible for representing the interests of Nova Scotia municipalities. All municipalities in Nova Scotia are members. The NSFM provides a number of services to their membership, including programs, training sessions, and advocacy. As an elected official, your municipality is a part of this membership, and you will have access to a variety of resources the NSFM has for helping you and your municipality. For more information, visit the NSFM's website: **nsfm.ca**

The NSFM advocates on behalf of Nova Scotia municipalities on many issues which are important to its membership. Many of these are found in the One Nova Scotia Report, which addresses the challenges currently faced in the province and charts a course towards solutions. The NSFM has a page addressing municipal issues from the One Nova Scotia report: **myonensmunicipal.ca**

Association of Municipal Administrators (AMA or AMANS)

The AMA is an association representing the administrative staff in Nova Scotia's municipal governments. This may include your CAO, financial staff, or other professional administrators from your municipality. The AMA works closely with the NSFM, Province of Nova Scotia, and municipalities in serving on various committees, building relationships between stakeholders, and helping to ensure a high standard for professional municipal administrators in Nova Scotia. For more information on the AMA, visit their website: **amans.ca**

Federation of Canadian Municipalities (FCM)

The Federation of Canadian Municipalities represents municipalities across Canada on the federal level. The majority of municipalities in Nova Scotia are part of its membership. The FCM advocates in areas which have direct connection to the federal government for funding or regulations. Your council as a whole may be asked to provide input on various issues which affect your municipality. For more information on the FCM, visit their website: **fcm.ca**

Department of Municipal Affairs and Housing (DMAH)

The Department of Municipal Affairs and Housing is the provincial government department directly responsible for supporting municipalities in providing effective local governance and planning healthy communities and liaising with municipalities on a variety of issues. The Department is responsible for the MGA as the governing legislation of municipalities. The Department provides both oversight and assistance to municipal governments across the province. The Department includes Municipal Sustainability, Corporate Policy and Innovation, Housing, Office of the Fire Marshall, and the Emergency Management Office.

DMAH can help your municipality in a number of different ways including providing information on programs, grants, and funding opportunities and offering services and guidance in areas such as budget planning, land use, infrastructure, and policy and program development. The Department's mandate is to help municipalities to ensure that communities across Nova Scotia are healthy, safe, and vibrant. For more information, please visit our website at: **https://beta.novascotia.ca/government/municipal-affairs-and-housing**

Municipal Powers

Resolutions, Policies, and By-laws

Councils have several different options when voting on issues. Depending on the issue, they may choose to use a resolution, a policy, or a by-law. These powers have been granted to municipalities by the province under the MGA.

Resolutions – A resolution is a motion of council and once adopted it reflects the will of council. It may be offered in the form of a resolution due to its length, complexity, formality, or because it is required to be in this form. Resolutions are generally used when a council is conducting routine business. These are likely common administrative matters that require the approval of council. Resolutions are restricted to matters that do not specifically require a by-law or policy under the MGA. They are not as strong as a by-law or policy and do not have the same procedural requirements. For example, a resolution may recognize a local community member for their volunteer service, or approval for the municipality to proceed with capital borrowing.

Policies – For more important matters, a council may wish to set a policy on an ongoing basis. Policies direct the operations of the municipality on an on-going basis until altered in some way. To regulate some specific issues, policies may be required under the MGA, should council choose to legislate on that issue. Examples would include the rate on overdue property taxes, or the use of solid waste disposal facilities. For any issue that requires a resolution, council may also use a policy should they choose to do so. Policies are an important tool for council to set standards and procedures within a municipality.

By-laws – By-laws are the strongest legislative tool available to municipal councils and may regulate the behaviour of citizens. There are issues under the MGA where council is required to use a by-law, although they may choose to utilize a by-law for anything covered under a policy or resolution. By-laws are often used for decisions that may have a long-term impact on the municipality because they are considered a stronger expression from council than a policy or resolution.

As a lawmaking body, it is crucial that council follow the proper procedure for passing a by-law or it may be challenged in court. This includes a minimum of two readings at council meetings and public notice at least two weeks prior to the second reading. This will allow local residents to attend meetings and express their opinions on a proposed by-law. Once a by-law is passed, the municipality must notify the public via publication in a local newspaper. These are the minimum requirements under the MGA. Your council may have even stricter requirements for the introduction and passing of a by-law under their policies, and all new councillors should be aware of their municipality's rules in this regard.

Areas of Jurisdiction

Municipalities are permitted to make resolutions or policies, or pass by-laws concerning any areas delegated to them under the MGA. However, council members should be aware of any federal or provincial legislation that could potentially affect their decision. For example, zoning and land use planning for lands around an airport involves federal jurisdiction. Any municipal legislation may be trumped by provincial or federal statute under their respective jurisdictions.

It is important for council and their CAO to consult any relevant levels of government that may be affected by council action. Consulting prior to a project with relevant provincial and federal departments will help prevent possible delays and jurisdictional issues.

Limits on Council Action

Council should be aware of the limitations on their actions. A municipal by-law cannot override any existing provincial legislation. By attempting to act on a power not granted to municipalities under the MGA, a council may open itself up to legal action. If a council has questions regarding its ability to act on a specific issue, it should first contact its municipal solicitor. Members of council should familiarize themselves with the areas of municipal jurisdiction and act within that scope. If a municipality acts beyond its scope of authority, a court may strike down the action as “ultra vires” meaning beyond their legal power or authority.

Policies and Procedures

Your municipality may have already developed an organizational by-law and procedural by-law. An organizational by-law sets out the structure of the municipality, while a procedural by-law covers council and the correct procedures for setting, announcing, and conducting meetings. Some municipalities may also have a code of conduct for staff, elected officials, or both. As a councillor, it will be helpful to familiarize yourself and understand the rules specific to your municipality. Council should also review these by-laws regularly to ensure that they are functioning for the current needs of the municipality.

Council Business and Meetings

Your council should have already set regular meetings on a recurring day and time in order to ensure residents know when council will meet and to attend if they wish to do so. Your municipality may have a procedural by-law that establishes time, date, location, and public notice for meetings. This by-law should be reviewed often to ensure that the current procedures meet the needs of your municipality.

Generally, meetings are on a weekday evening to ensure that both councillors and residents can attend. While council can meet privately on specified matters, all decisions and voting are to be made during public council meetings. For all open council meetings, minutes are drafted and sent to members of council prior to the start of their next meeting.

Meeting Minutes

Minutes of each council meeting are recorded and distributed to members of council following the meeting. At the beginning of the next meeting, council approves the minutes of the previous meeting. These minutes are available to the public and allow residents to review the business of council if they are unable to attend a meeting. Many municipalities post these minutes on their website or provide other methods of public access.

Conduct of Business

A council meeting proceeds according to the agenda prepared by your CAO. Following the approval of the previous meeting's minutes, council moves to the agenda for the current meeting. This is the agenda that the mayor follows when chairing the meeting. Generally, an agenda starts with the most important items of business and moves down to the least important. This allows for increased engagement on the most important issues facing a municipality.

Your CAO should distribute the agenda and any additional documents prior to the meeting so you can review them. Reviewing these documents will allow you to follow the meeting as it progresses and participate in discussions on the issues.

Rules of Procedure

The rules of procedure for your council meetings may already be established in a procedural by-law. These are the rules that determine how council meetings are conducted. A council may have established their own or use a standard version such as Robert's Rules of Order or Bourinot's Rules of Order. Familiarizing yourself with these rules is an important part of understanding how your council conducts business during meetings. It would be helpful to have a reasonable understanding of your council's specific rules prior to your first meeting.

Attendance/Preparation for Meetings

Councillors are expected to be in attendance for meetings. Missing more than three consecutive regular meetings without permission from council could result in your dismissal. Preparation is also extremely important in your role as a councillor. Without proper preparation, it may be hard to follow discussion and

provide an informed vote on an issue before council. Serving as an elected official can be a rewarding experience, but it does take commitment and preparation to be effective as a member of council.

Quorum and Voting

Quorum is the minimum number of councillors required in order to have a valid vote. Under the MGA, a quorum is defined as the majority of the maximum number of elected members on council, including the mayor. This means that if there are six elected officials on council, then a minimum number for quorum would be four (including the chairperson for the meeting). Because voting is mandatory, as long as you are in attendance, you are counted as part of quorum.

Legal Considerations

It is important that council conducts itself in accordance with the applicable legislation (e.g., the MGA) along with any rules or procedures adopted by your municipality. A council could open itself up to legal action should it act outside of its jurisdiction as set out under the legislation. The primary areas of municipal jurisdiction can be found in the MGA under Part III – Powers, but there are other pieces of legislation that also touch on municipal authority (e.g., *Building Code Act*, *Emergency Management Act*, etc.).

Open/Closed (In Camera) Meetings

All council and committee meetings should be open to the public, unless the specific matter/issue fits into one of a limited number of exceptions and council deems it appropriate to go into closed session. This allows citizens to voice their concerns and permits council to operate in an open and transparent manner throughout the legislative process. When council meets privately, these closed meetings are known as "in camera" sessions. Council is permitted to meet in camera to discuss the following issues:

- Purchase, sale, or lease of municipal property
- Setting minimum prices for a tax sale
- Personnel issues, labour relations, or contract negotiations
- Litigation or potential litigation
- Legal advice eligible for solicitor-client privilege
- Public security

It is only for these issues that council is permitted to meet privately, and it is at the discretion of council (see section 22 of the MGA).

The purpose of private meetings is to protect sensitive information. Council cannot vote during an in camera session with the exception of procedural matters and directions to municipal staff or solicitors. If the matter requires a vote, council must make this vote in open (public) session. The meeting record will show the date and type of matter that was discussed but no further details. Discussion during a public meeting is still required prior to a vote on the issue. A closed meeting cannot be used to "rubber stamp" an issue prior to a vote in public.

It is vital that you do not publicly discuss any matters that have been disclosed during a private meeting. It is possible to be held personally liable for publicizing information that results in a loss to your municipality. While the intention is to be as transparent as possible, there will also be times when legal limitations prevent you from disclosing specific information.

Special Meetings and Emergency Meetings

Council may also hold additional meetings to deal with any urgent business that cannot be postponed until the next scheduled meeting. However, for these meetings, councillors must receive a minimum of three days notice along with two days of notice to the public prior to the meeting. A special meeting may be called by the Clerk at the request of the mayor or by a majority of the councillors submitting their own request.

Council is also permitted to hold emergency meetings with as much notice as possible under the circumstances. These meetings would be called by the mayor and do not have the same notice requirements as a special meeting. Emergency meetings are a rare event intended to deal with an immediate crisis event and not simply urgent council business.

Standing, Special, and Advisory Committees

Committees will often be established to provide information and guidance to councils. Standing committees are created to advise council on ongoing business such as financial matters or land use planning. A council may also establish a special committee to provide further information to council on a specific issue, and the committee will be dissolved once council has found a resolution.

Your council may establish committees as they see fit. Councillors may serve on committees alongside members of the general public. Committee members are appointed by council, and any member of council may serve on a committee. For special committees, a councillor would not be appointed if there was a conflict of interest at issue. Committee meetings should be open to the public and are subject to the same public notice requirements as council meetings outlined above.

Municipal Conflict of Interest Act (MCIA)

General Ethics Overview

As an elected official, you can be held accountable for a breach of ethics to both the general public and any government regulations concerning your position. You have been elected to serve the public good, not to use your position to increase your personal wealth or that of your family. When making decisions as an elected official, it is always important to consider the ethics of your choices. While the majority of elected officials do not breach ethical guidelines intentionally, it is important to be aware and avoid any accidental violations.

In particular, you should be aware of the *Municipal Conflict of Interest Act* and how it applies to you as a councillor. A "conflict of interest" occurs when a matter before council will result in a net financial benefit for you, an immediate family member, someone living with you, a company or organization that you have an interest in, etc. An example would be council deciding on the company to use to repair a municipal public pool and your spouse's pool service company has provided one of the bids. Any doubts you may have of a conflict should be disclosed or at a minimum discussed with a solicitor for further clarity. If you are in a conflict, you must not participate in the decision-making process in any way. When in doubt, sit it out!

As a councillor, it is your responsibility to be proactive in knowing the upcoming agendas for council meetings. This is so you can make yourself aware of any potential conflicts of interest. Failing to disclose, even if unintentional, can still create unnecessary headaches during your time as a councillor. As an elected official, you may also want to consider the perception of a conflict or ethical breach. While an issue may not exist, the perception of one could be damaging to both your reputation as an elected official and your municipality.

Avoiding conflicts of interest is extremely important as a municipal councillor. Becoming involved in a conflict of interest can cause potential legal issues both for yourself and the municipality. Legislation has been created to protect the public and municipalities from being used for personal gain by elected officials or their families. The full text of the *Municipal Conflict of Interest Act* can be found online: **nslegislature.ca/legc/statutes/muncpcf.htm**

Limiting Your Participation

If you suspect you have a pecuniary (financial) interest in an item on council's agenda, you must immediately excuse yourself from the council table. You cannot participate in debate or vote on an issue where you or your family have a pecuniary interest. Even if you are not in attendance at the meeting where the conflict would have occurred, you must disclose the conflict at the next meeting you attend. Under the MCIA, even informal meetings can be considered council business. Therefore, you should avoid discussing with your fellow councillors any issues which may trigger a conflict of interest for you.

Once you have disclosed the conflict, you cannot attempt to influence council in any way regarding the issue in question. However, it is best practice to leave the council room entirely and avoid any potential influence from your presence.

Consequences

If you are found to have violated the MCIA, there could be serious penalties. An application for review can be brought by the Nova Scotia Attorney General or a citizen of your municipality.

This application will be reviewed by a judge who must declare your seat vacant should a breach be found. A judge can also issue a ban on running for office, order restitution, and/or levy a fine (with the possibility of jail time for failing to pay the fine). A judge may also find the violation was a result of "inadvertence or bona fide error in judgement." This would mean that the violation was an honest mistake and the judge would not be forced to declare the council seat vacant.

To avoid this process entirely, proactive disclosure is the best practice as an elected official. Conflicts of interest should be an important consideration at all times for any elected official. It is your responsibility to ensure that you follow best practices to avoid any potential issues. It may be helpful to review the MCIA to fully understand the scope of potential conflicts of interest or speak with a solicitor if you have further questions.

Communication/Engagement with the Public

As a newly elected official, you are now a visible representative of your municipal government. This means that local voters will want to share opinions and, potentially, frustrations with you when they see you in public.

This is not limited to when you are at the council table. It may mean speaking with residents whenever you are in the community. While this may not be convenient for you, it is helpful to remember to respect the opinions of residents and not make them feel ignored.

As a municipal councillor, it can be a challenge to balance your personal time with your role as an elected official. Just remember to remain professional and express to the resident that perhaps another time would be better for a discussion if you feel it is not a good time for you.

Community Opinions

Not all voters will necessarily agree with your votes on council or the decisions of council as a whole. As an elected official, it is your role to listen and understand these opinions. While you may disagree or feel this is a fringe opinion, remember that you represent all members of the community. They have elected you to serve them and as a result you should do your best to hear the opinions of all community members, not just those who support you.

Depending on your municipality, you may have increased visibility and recognition as an elected official. Being respectful and polite when dealing with members of the public will be helpful as an elected official and a public face of local government.

Public Participation

Participation by the public is a key factor in ensuring a healthy and representative democracy. Residents should feel that their council provides enough opportunities for feedback and community opinions. Your council should provide ample opportunities for public engagement.

Council should set regular meeting times so that members of the public know when council is in session. Holding meetings on weekday evenings is often the most recommended time period for promoting resident engagement.

Council should also strive to provide as much notice as possible for any special or emergency meetings they may hold. Open and transparent meetings help residents feel connected to the municipal decision-making process and that their opinions are heard by council.

Media

Occasionally you may encounter questions and inquiries from members of the local media. Depending on the events covered, you may find this is your local newspaper or even regional television stations for a larger news event. Your municipality should have a designated representative who speaks for the municipality as a whole.

In some municipalities, there may be several media-trained staff who speak on different areas of expertise. Your CAO should be able to provide the contact information for your municipality's spokesperson should a media request be received.

Access to Information and FOIPOP

Freedom of Information and Protection of Privacy (FOIPOP) is covered under Part 20 of the MGA. There are a few important highlights from this section to understand as a newly elected official. While most of the FOIPOP processes are handled by municipal staff, it is important to be aware of the system and what is covered under FOIPOP.

Citizens are entitled to an open and transparent municipality. These practices help instill confidence in government and allow access for those who wish to become involved. Best practice would be to have the majority of municipal documents easily available to citizens, allowing for open and transparent operation of the municipality. This could include posting certain documents online, including meeting minutes and approved municipal budgets.

You should be aware that, as an elected official, the majority of your work as a councillor will be available to the public upon request. It is important to remain professional at all times while conducting business as a member of council. The grounds for withholding municipal documents are limited and, as a result, almost all of your work on council will either become part of the public record or accessible through a FOIPOP request. Remember that in using council resources, such as municipal email, your communications are subject to FOIPOP. Therefore, it's probably best to avoid making editorial comments about specific individuals; stick to the facts.

As a whole, almost all of a municipality's business is covered under freedom of information access. This includes committees, regular council meetings, reports, and potentially other business of the municipality. However, a municipality is also required to protect the personal information of both employees and citizens.

Information that may not be disclosed includes personal health records, specific information on work-related injuries, and some personal information provided by residents during their interactions with the municipality. Please note that a citizen may request specific information about themselves if the municipality has such information on record.

Under the legislation, a municipality must comply with an official FOIPOP request within 30 days. There is an option to request an additional 30 days. If a municipality does not comply within that time frame or request an extension, its response is considered a refusal. A refusal may be subject to a review process by the Information and Privacy Commissioner (formerly known as the Review Officer) if requested.

The MGA specifies the CAO (clerk or designated official where there is no CAO), or his/her delegate, as the staff responsible for FOIPOP matters within your municipality, including processing of any freedom of information requests. If you have further questions on any issues about freedom of information or personal privacy, other resources include the Department of Municipal Affairs and Housing, NSFM, and your municipal solicitor.

Citizen Complaints

Addressing complaints from local residents is an important part of your new role as councillor. While most issues of this natures will be raised during council meetings or in conversations with residents, there are formal processes in place should citizens feel their municipality has acted improperly. These processes also provide citizens with the ability to challenge the municipality should they feel their complaint was not appropriately addressed.

Ombudsman

If a citizen feels they have been treated unfairly by the municipality, they may opt to file a complaint with the Nova Scotia Office of the Ombudsman. This is an independent provincial office designed to investigate complaints involving the administration of any law of the province, or any law that applies to the municipal unit. This includes complaints regarding administration by provincial and/or municipal government, along with any agencies, boards, or commissions.

Specifically, the Ombudsman can investigate and make recommendations with respect to:

- Government programs and services
- Fairness and accountability issues
- Youth and seniors' issues
- Alleged wrongdoing by government officials

During your time on council, your municipality and/or council members may be subject to a complaint to the ombudsman. The Office of the Ombudsman process is often only used after a citizen feels a complaint has not been addressed through any internal processes currently available within the municipality itself, and all available external avenues of redress have been exhausted. The Ombudsman's Office will investigate and may provide recommendations based on the original complaint. The Ombudsman may also initiate an investigation on its own initiative, and make recommendations following an "own motion" investigation.

As a member of council, you may be required to address recommendations provided by the ombudsman as part of your council business. This may include examining the current procedures and policies as practiced in your municipality.

For more information, please visit the Nova Scotia Office of the Ombudsman's website: **https://ombudsman.novascotia.ca/**

Courts

Citizens have the right to initiate a court action against their municipality. A court challenge can be a long and expensive process, and for these reasons, it is likely the last resort for a resident.

Council should always follow proper procedures and policies and remain within their legislative scope to avoid challenges to by-laws, policies, or resolutions. Your council and municipal staff should contact a solicitor immediately regarding any legal actions taken against the municipality.

Financial Management

The Role of Council

Council has an important role in the financial management of its municipality. Council will sometimes make challenging decisions and set priorities based on what it believes to be in the best interests of the community. Councillors are not expected to be financial experts but should have a reasonable understanding of the financial health of their municipality.

Your CAO will provide the majority of the financial management, subject to council approval. As part of council's responsibilities, it must approve an annual budget submitted by the CAO of the municipality. Council is also responsible for approving services and service levels to be delivered by the municipality. Council may also be required to approve large expenditures or contracts entered into by the municipality. However, the budget administration and routine purchases will be managed by your CAO.

Over the course of the year, council should receive regular updates (e.g., monthly, quarterly, etc.) on the budget and spending from your CAO. This allows your council to respond to any unexpected adjustments which may be required. Council needs to continuously monitor the municipality's finances over the year to ensure that priorities are being met and services are delivered as intended. Monitoring the municipality's finances is also important as the municipality cannot run deficits. If a deficit is incurred, the municipality is required to include the deficit in the following year's budget.

Annual Audits

Every year the municipality will hire an independent municipal auditor registered with the Province of Nova Scotia. The municipality is required to establish an audit committee (composed of council members and at least one citizen representative who is not a member of council or an employee of the municipality) and an audit

committee policy. It is recommended that at least one member of the audit committee be financially literate. The audit committee reviews the annual audited financial statements as prepared by the auditor, reviews the adequacy of the audit including any internal control deficiencies or weaknesses noted by the auditor, and investigates any issues found. The municipal auditor then reports to council and presents the audited financial statements for approval.

The audit committee's review is more detailed than what would typically be discussed during a council meeting; however, the final approval of the audit must come from council. Once the audited financial statements have been approved, they must be submitted to the Minister of Municipal Affairs and Housing by September 30th of each year. As outlined in the *Municipal Grants Act* (Section 19B), grants will be withheld until the audited financial statements along with other required information are submitted to DMAH. Details on specific financial reporting requirements can be found within the Financial Reporting and Accounting Manual. DMAH reviews municipal audited financial statements each year to ensure that municipalities remain financially healthy and sustainable for the future. Municipalities make the reports linked to these annual documents public, and they can be reviewed by both residents and other municipalities.

Financial Reporting

In order to help municipal governments with financial transparency, the Department of Municipal Affairs and Housing publishes the Annual Report of Municipal Statistics, Financial Condition Indicators, and Municipal Profiles online. The Financial Condition Indicators (FCI) provide a quick summary of finances. It includes 15 key indicators that provide an overview of a municipality's financial health.

Municipalities can use this tool to evaluate themselves against the recommended threshold and track how its financial situation has changed over time. It is important to remember that each municipality may face individual challenges and that the reports cannot always reflect unique situations faced by communities. Therefore, it is important to review the comment section to gain more context around what is impacting the indicator(s).

These reports are made public to provide residents with open and transparent financial reporting for their municipal governments. Financial reporting is an important check-up to ensure municipalities are continuing to move in a positive financial direction. The FCI helps municipalities understand financial trends year over year for both positive and negative directions.

More information, including the above-noted reports, is available on-line at: **https://beta.novascotia.ca/programs-and-services/municipal-finance-and-statistics**

Council Expense Reporting Requirement

Council members incur expenses while carrying out their duties, and certain expenses are eligible for reimbursement from the municipality. The municipality is required to have an expense policy and hospitality policy that prescribes eligible expenses and approval processes. For reimbursed expenses, the municipality is required to post the expenses by council member on the municipality's website within 90 days after the end of each quarter, along with the CAO's expenses. The reportable municipal expenses for online reporting include travel and travel-related expenses, meals, and professional training and development expenses. In addition, the municipality is required to submit the Annual Summary Report to the Department of Municipal Affairs and Housing by September 30th, and the Annual Summary Report must be reviewed by the audit committee before it is submitted.

Taxes and Revenue Sources

The main source of revenue for your municipality is property taxes. More than 75% of municipal revenue comes from property taxes for most municipalities.

The right of a municipality to tax residents is provided for under the MGA and the *Assessment Act*. Taxes are calculated using the taxable assessed value of a property times the municipal tax rate (residential or commercial).

The assessment is done by the Property Valuation Services Corporation (PVSC). It is an independent, not-for-profit organization responsible for valuing all real property in Nova Scotia on an annual basis. Each January, PVSC provides an assessment roll to municipalities which is used to calculate property taxes, and delivers property assessment notices to every Nova Scotia property owner.

PVSC adheres to mass appraisal standards set by the International Association of Assessing Officers and is mandated by the Nova Scotia *Assessment Act* and governed by the *Property Valuation Services Corporation Act*. The PVSC is funded by all municipalities across the province under a formula outlined in its governing legislation. To support administrative and operational efficiencies, the PVSC also provides value-added property and information services to municipalities.

If you have questions about property assessment or would like more information about their services, you are encouraged to contact the PVSC. Also, residents of your municipality should be directed to the PVSC's service centre when they have questions about their property assessment. The PVSC can be contacted at 1-800-380-7775, Monday to Friday, from 8:30 am to 4:30 pm. Property information and tools and resources can also be accessed at their website: **pvsc.ca/en/home/default.aspx**

Council is responsible for setting tax rates in line with the budgeted needs of the municipality for the year. Council may choose to set separate rates for residential and commercial properties. They may also alter tax rates for different service levels experienced by rural, suburban, and urban residents. It is important for council to consider the services that residents enjoy so that those who do not receive certain services are not required to cover the costs.

It is also important that council carefully consider the priorities and services they would like to provide when setting the tax rate in line with their annual budget. Councillors are not expected to act as financial experts, and your CAO should provide guidance. As a councillor, however, you should still familiarize yourself with the outline of the budget and municipal priorities in order to be engaged during the budgeting process.

Another source of revenue for municipalities is grants. Grants provided to a municipality may have specific conditions attached depending on the type of grant and program it supports. There are a wide variety of grants available to municipalities from both provincial and federal programs.

A municipality may also generate additional revenue from direct programs they provide. Municipalities are permitted to charge user fees for certain services provided, such as recreation facility fees, along with licensing regimes such as dog licensing. User fees allow a municipality to provide a service where the cost is directly attached to use of the program. Licensing regimes allow a municipality to help subsidize the cost of a service by creating revenue from an area it has jurisdiction over, such as animal control.

Budgets

Your CAO will draft and create the budget for your municipality. However, council must approve the budget put forward. This is council's opportunity to provide feedback on the budget and direct the CAO to make adjustments if necessary. The financial year for municipal governments begins on April 1 and ends March 31 of the subsequent year. It is important for council and its CAO to begin the budgeting process as early as possible to avoid delays.

Best Practices

Regional Enterprise Networks (RENs)

The Regional Enterprise Network (REN) model is a powerful vehicle for coordinating the development efforts of different jurisdictions and generating greater cooperation and policy alignment across the province. The RENs have been developed through cooperation between DMAH, municipalities, and First Nations across the province.

RENs provide regional economic development leadership, develop and implement regional strategies, and cultivate meaningful relationships with the business community in various industry sectors. RENs improve regional workforce gaps by navigating employers and employees to various labour force participation programs and resources. RENs act as a catalyst for regional change by bringing together business communities, the province, municipalities, First Nations, and other groups in economic development.

Councils can work alongside RENs to help with the economic development initiatives in their communities. The RENs are a valuable tool available to councils should they choose to engage in economic development as outlined under the MGA.

Setting Municipal Priorities

Together with your fellow councillors, you will want to assess the current state of your municipality along with your priorities as a council. This may involve a number of examinations including effectiveness of current programs and services, potential services to offer, budget and projected revenue, and many other factors. By examining these priorities early, a council can set goals and expectations, and have informed discussions on what each councillor wants to see the municipality prioritize during the council's term.

Municipal Planning

Planning can be an important part of setting council's long-range vision for a community. Amendments were made to the *Municipal Government Act* and the *Halifax Regional Municipality Charter* as it relates to planning on September 25, 2018. These amendments mandate that municipalities create land use plans to meet specific requirements. These requirements reflect a minimum threshold for land use planning. The amendments also require municipalities to consult with neighbouring communities when adopting or amending their plan.

By adopting a planning strategy, council provides a vision to residents on where future development should occur within a community. Section 214 in the MGA, and section 229 of the HRM Charter outline the mandatory as

well as discretionary policy options. The *Minimum Planning Requirements Regulations* provide further direction to municipalities on the form and content of municipal plans. Requirements for the development of a policy on engaging with neighbouring municipalities regarding planning changes are found in the *Engagement Programs Content Regulations*.

By adopting a proactive approach to planning, councils can avoid having to continually make ad-hoc decisions regarding future development. Planning can help assure businesses and residents that their potential investment is protected, and allows them to predict who their neighbours will likely be in the future. Council may also adopt plans of various lengths depending on their vision and priorities for municipal development.

Relevant Legislation

While the MGA and Charter are the primary pieces of legislation that impact the day-to-day activities of municipalities, there is other legislation that impact municipal governments as well. The following are some of the more common pieces of legislation that you may come across as a council member. However, please note that this is not a complete list, and is intended only to provide a high-level overview of the legislative framework in which municipalities operate.

Municipal Conflict of Interest Act

This is an important piece of legislation for elected officials for ensuring that their actions as councillors do not create conflicts of interest. Violation of this legislation could have serious consequences for both the councillor and the municipality.

Municipal Elections Act

This legislation governs the eligibility of candidates and procedures to be followed for municipal elections. You may already be familiar with this legislation through your own election.

Municipal Grants Act

This legislation provides for grants in lieu of taxes on provincial property as well as financial capacity grants for municipalities.

Assessment Act

This legislation sets out the rules and exemptions for property taxation, the largest source of revenue for municipalities.

Other legislation relevant to a municipality:

Artists Municipal Tax Exemption Act
Building Code Act
Cape Breton Island Marketing Levy Act
Clothesline Act
Daycare Act Education Act
Emergency 911 Act
Emergency Management Act
Fences and Detention of Stray Livestock Act
Fire Safety Act
Heritage Property Act
HRM Charter Act
HRM Marketing Levy Act
HRM Water Commission Act
Homes for Special Care Act
Human Rights Act
Income Tax Act
Interpretation Act
Land Registration Act
Land Titles Clarification Act
Motor Vehicle Act
Municipal Finance Act
Municipal Fiscal Year Act
Municipal Hospital Loans Act
Municipal Housing Corporation Act
Municipal Loan and Building Fund Act
Occupational Health and Safety Act
Ombudsman Act
Pay Equity Act Pension Benefits Act
Personal Information International Disclosure Protection Act
Police Act

Policing Services Act
Private Ways Act
Property Valuation Services Corporation Act
Public Highways Act
Public Procurement Act
Public Service Act
Public Utilities Act
Rural Fire District Act
Sales Tax Act
Sheep Protection Act
Smoke-free Places Act
Summary Proceedings Act
Theatres and Amusements Act
Trade Union Act
Trails Act
Utility and Review Board Act
Wharves and Public Landings Act
Workers Compensation Act
Yarmouth Marketing Levy

WINDSOR / WEST HANTS TOGETHER

WEST HANTS REGIONAL MUNICIPALITY REPORT

Information ☑	Recommendation ☐	Decision Request ☐	Councillor Activity ☐

To: Special Council Meeting

Submitted by: _____
Mark Phillips, CAO

Date: May 20, 2021

Subject: Meeting with Dept. of Fisheries, Oceans, and the Canadian Coast Guard Representative

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LEGISLATIVE AUTHORITY

N/A

RECOMMENDATION or DECISION REQUEST

There is no recommendation or decision request associated with this report. This report is being presented to provide information to Council, resulting from a request of Council to meet with Minister Jordan with Dept. of Fisheries, Oceans, and Canadian Coast Guard.

BACKGROUND

Property ☐	Public Opinion ☑	Environment ☑	Social ☐	Economic ☐	Councillor Activity ☐

A Ministerial Order was issued on March 18th and renewed bi-weekly impacting the Causeway Aboiteau Gate System of the Avon River System in Windsor, NS

DISCUSSION

West Hants Regional Municipality Council wrote a letter to Minister Jordan dated May 4th (sent via e-mail May 5th), requesting an information session with the Department of Fisheries and Oceans (DFO), about its anticipated plans to regulate the flow of the Avon River.

Subsequently, at a special council meeting on May 11th, Council directed another letter be sent to Minister Jordan requesting the Ministerial Order not be renewed.

On May 14th, WHRM Council received a letter from Minister Jordan (in response to the May 5th letter), indicating that someone from the Regional Director General's office (Doug Wentzell), would be in contact with us to meet to discuss the role of DFO in regulating this facility (aboiteau gate system).

On May 17th, Mayor Zebian was advised by the Regional Director General's Office that Mr. Wentzell and one of his Director's, Mark G. McLean would meet with the Mayor and CAO in a preferred less formal environment to discuss the matter.

NEXT STEPS

If "Alternative #2" is opted by Council, the position of Council should be identified at the May 20th Special Council Meeting so the primary speaking points can be conveyed during the meeting with Mr. Wentzell's Office.

FINANCIAL IMPLICATIONS

None

ALTERNATIVES

1. Council provide direction not to meet as proposed by Mr. Wentzell's Office.
2. Council directs the Mayor and CAO to meet.

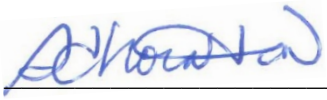
ATTACHMENTS

Appendix 1: May 4, 2021 letter from WHRM to Minister Jordan (sent May 5, 2021)

Appendix 2: May 12, 2021 letter from WHRM to Minister Jordan

Appendix 3: May 14, 2021 letter from Minister Jordan to WHRM in response to May 5th letter

CHIEF ADMINISTRATIVE OFFICER REVIEW

Report Prepared by: 

Shelleena Thornton, Administrative Supervisor

Report Approved by: 

Mark Phillips, Chief Administrative Officer

WINDSOR / WEST HANTS TOGETHER

West Hants Regional Municipality
Mayor
Abraham Zebian
76 Morison Drive
Windsor ,NS
B0N2T0

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5/4/2021

Fisheries and Oceans Canada
c/o The Honourable Bernadette Jordan
Sent by e-mail: Bernadette.Jordan@parl.gc.ca

RE: West Hants Regional Municipality – Ministerial Order, Windsor, NS Avon River Causeway Aboiteau Gate System

Dear Minister Jordan

Please accept the following letter in relation to your Order originating on March 18, 2021 and renewed bi-weekly impacting the Causeway Aboiteau Gate System of the Avon River System in Windsor, NS.

Representing the West Hants Regional Municipality, I share with you the following motion that was approved at the March 23, 2021 Council meeting.

"That Council request, in writing, an information session with the Department of Fisheries and Oceans (DFO), about its anticipated plans to regulate the flow of the Avon River. As a community we are concerned because if the regulations to be implemented by DFO result in the incursion of saltwater into the river system cause flooding of lands currently protected by the aboiteau, then we would like to begin a dialogue to better understand if and where we would be best directed for further discussion on mitigation for any affected areas or parties within our Region that would be negatively impacted by such a change in protocols".

It is the will of our Council to initiate dialogue with you and members of your department immediately to relay the

significant impacts the Order and changes to the operations of the aboiteau gate system is having on our community. Specifically, impacts are being felt most notably by our agricultural community, Ski Martock, the business community of Windsor, the Pisiquid Canoe Club, recreational activities, residents in the Windsor and Falmouth areas living by the lake, and river system and the passing public who are witnessing a significant change in the landscape with an empty Lake Pisiquid and Avon River south of the causeway.

As a municipality, the order and jurisdictional authority held by Fisheries and Oceans Canada is very clear. However, as municipal representatives, we represent our residents and businesses in the most direct manner. We live in our communities and interact with them every day. Your Order and resulting change in the operation of the gate system is creating a level of mobilization and protest not comparable to any recent issue in our community. We are being asked questions that we cannot answer about the impacts and potential remedial action to address these changes.

We request your in-person attention to this matter immediately. We have capacity to accommodate a virtual in-person meeting if this is the manner you wish to meet.

We look forward to what we hope is an immediate response to our request to meet.

Yours truly,

Abraham Zebian
Mayor of West Hants Regional Municipality

cc.
Member of Parliament for Kings–Hants, Kody Blois
Nova Scotia Minister of Agriculture and Minister of Fisheries and Aquaculture, The Honourable Keith Colwell
MLA Hants West, The Honourable Chuck Porter
West Hants Regional Council
Chief Administrative Officer, Mark Phillips

WINDSOR / WEST HANTS TOGETHER

West Hants Regional Municipality
Mayor
Abraham Zebian
76 Morison Drive
Windsor, NS
B0N2T0

902-798-8391 p
azebian@westhants.ca

May 12, 2021

Fisheries and Oceans Canada
c/o The Honourable Bernadette Jordan
Sent by e-mail: Bernadette.Jordan@parl.gc.ca

RE: West Hants Regional Municipality – Ministerial Order, Windsor, NS Avon River Causeway Aboiteau Gate System
"Request Not to Renew Order"

Dear Minister Jordan,

Please accept the following letter in relation to your Order originating on March 18, 2021 and renewed bi-weekly impacting the Causeway Aboiteau Gate System of the Avon River System in Windsor, NS. Please note this is the second letter sent to your office in relation to this matter in the last two weeks. Correspondence was sent to you on May 5, 2021, requesting direct communications with you on this matter.

Representing the West Hants Regional Municipality, I share with you the following motion that was approved at the May 11, 2021 Special Council meeting.

MOVED BY P. MORTON/MURLEY THAT COUNCIL SEND A LETTER TO THE MINISTER OF FISHERIES, OCEANS AND THE CANADIAN COAST GUARD, THE HONOURABLE BERNADETTE JORDAN, SPEAKING ON BEHALF OF THE IMPACTED RESIDENTS OF THE WEST HANTS REGIONAL MUNICIPALITY, REQUESTING THAT THE MINISTERIAL ORDER ISSUED THIS SPRING SET TO EXPIRE ON MAY 18, 2021 NOT BE RENEWED.

FURTHER

NOTING THAT THE DISCONTINUATION OF THE MINISTERIAL ORDER WILL PERMIT THE OPERATION OF THE AVON RIVER CAUSEWAY GATES IN WINDSOR TO RESUME IN THE SAME MANNER IT HAS SINCE ITS CONSTRUCTION IN 1970, AIMED TO PROTECT THE COMMUNITY OF

WINDSOR AND OTHER AREAS OF THE WEST HANTS REGIONAL MUNICIPALITY FROM THE NEGATIVE IMPACTS OF THE LOSS OF A RELIABLE BACK UP WATER SUPPLY FOR FIRE FIGHTING PURPOSES, SOCIAL/ECONOMIC IMPACTS, ENVIRONMENTAL/HEALTH IMPACTS, POTENTIAL LOSS OF BUSINESS, AND THE POTENTIAL LOSS OF TAX REVENUE FROM DECREASED ASSESSMENTS UNTIL SUCH TIME AS AN ACCEPTABLE SOLUTION IS IDENTIFIED BY DFO.

FURTHER

THIS REQUEST IS IN KEEPING WITH THE AUTHORITY THE MINISTER MAY EXERCISE AS STATED IN THE FEDERAL FISHERIES ACT, SPECIFICALLY REFERENCED IN SECTION 2.5 ARTICLES (E) AND (G) AND SECTION 34.1(1) ARTICLE (H);

2.5 EXCEPT AS OTHERWISE PROVIDED IN THIS ACT, WHEN MAKING A DECISION UNDER THIS ACT, THE MINISTER MAY CONSIDER, AMONG OTHER THINGS,

(E) COMMUNITY KNOWLEDGE;

(G) SOCIAL, ECONOMIC AND CULTURAL FACTORS IN THE MANAGEMENT OF FISHERIES;

34.1 (1) BEFORE RECOMMENDING TO THE GOVERNOR IN COUNCIL THAT A REGULATION BE MADE IN RESPECT OF SECTION 34.4, 35 OR 35.1 OR UNDER SUBSECTION 35.2(10), 36(5) OR (5.1), PARAGRAPH 43(1)(B.2) OR SUBSECTION 43(5) OR BEFORE EXERCISING ANY POWER UNDER SUBSECTION 34.3(2), (3) OR (7), PARAGRAPH 34.4(2)(B) OR (C), SUBSECTION 34.4(4), PARAGRAPH 35(2)(B) OR (C) OR SUBSECTION 35(4), 35.1(3), 35.2(7) OR 36(5.2), OR UNDER SUBSECTION 37(2) WITH REGARD TO AN OFFENCE UNDER SUBSECTION 40(1), THE MINISTER, PRESCRIBED PERSON OR PRESCRIBED ENTITY, AS THE CASE MAY BE, SHALL CONSIDER THE FOLLOWING FACTORS:

(H) ANY OTHER FACTOR THAT THE MINISTER CONSIDERS RELEVANT. MOTION CARRIED

Dialogue with you directly remains a top priority for the Municipality and Council so that we can discuss the Order as well as the impacts on our community.

An immediate response from you is requested.

Yours truly,

Abraham Zebian
Mayor of West Hants Regional Municipality

cc.
Prime Minister of Canada, The Right Honorable Justin Trudeau
Member of Parliament for Kings–Hants, Kody Blois
Nova Scotia Minister of Agriculture and Minister of Fisheries and Aquaculture, The Honourable Keith Colwell
MLA Hants West, The Honourable Chuck Porter
West Hants Regional Council
Chief Administrative Officer, Mark Phillips

Minister of
Fisheries, Oceans
and the Canadian Coast Guard

Ministre des
Pêches, des Océans
et de la Garde côtière canadienne

May 14, 2021

His Worship Abraham Zebian
Mayor of West Hants Regional Municipality
76 Morison Drive
PO Box 3000
Windsor NS B0N 2T0

Dear Mayor Zebian:

Thank you for your correspondence of May 5, 2021, regarding the Avon River causeway aboiteau gate system.

Fisheries and Oceans Canada (DFO) takes the conservation of fish and their natural environment seriously. The Department has been, and remains, involved in efforts to improve fish passage at the existing causeway located at the mouth of the Avon River.

I have received letters of concern regarding potential impacts from businesses and organizations in your area over the past several months. DFO continues to work with the Nova Scotia Department of Agriculture (NSDA) to evaluate the tidal gate operations with respect to issues concerning fish passage and the safety of public and private property.

In order to further explain the role of DFO in regulating this facility and to understand the concerns of West Hants Regional Municipality, I have asked the Regional Director General, Mr. Doug Wentzell, to meet with you. His office will be in contact with yours to set up this meeting in the near future.

DFO is awaiting additional information from NSDA related to flood control measures, which may necessitate changes to the Ministerial Order to ensure protection of property in the area. Therefore, you may also wish to contact NSDA to discuss including your concerns in the information they are preparing, and to discuss how the current operations of the aboiteau may be affecting other stakeholders, as well as possible mitigation measures.

Thank you for taking the time to share your concerns.

Sincerely,

The Honourable Bernadette Jordan, P.C., M.P.
Minister of Fisheries, Oceans and the Canadian Coast Guard

c.c.: Distribution List

Canada

Distribution List:

Mr. Kody Blois, M.P.
Kings–Hants
The Honourable Keith Colwell, M.L.A.
Nova Scotia's Minister of Agriculture and Minister of Fisheries and Aquaculture
The Honourable Chuck Porter, M.L.A.
Hants West

WINDSOR / WEST HANTS TOGETHER

WEST HANTS REGIONAL MUNICIPALITY REPORT

Information ☑	Recommendation ☐	Decision Request ☐	Councillor Activity ☐

To: Special Council Meeting

Submitted by: _____
Todd Richard

Date: May 20, 2021

Subject: Hantsport Fire Station Site

LEGISLATIVE AUTHORITY

Nova Scotia Municipal Government Act, Sections 65 and 65A authorizes Council to expend funds for municipal purposes.

RECOMMENDATION or DECISION REQUEST

There is no recommendation or decision request associated with this report. This report is being presented to provide information to Council, resulting from a request for clarification from Council.

BACKGROUND

Property ☑	Public Opinion ☐	Environment ☐	Social ☐	Economic ☐	Councillor Activity ☐

Recent correspondence from Council has raised concern with the selected site for the Hantsport Fire Station, 5 Oak Street, Hantsport. Communications within Council and the CAO's Office have resulted in staff providing an all-encompassing report to share the history of discussions surrounding the replacement of the Fire Station and more specifically, the location.

Comments and details requested by members of Council are specific to:

1. Interpretation of the geotechnical reports undertaken at 5 Oak Street and 19 Chittick Ave

2. Costs associated with the demolition of existing structures at Oak Street (Former Town Hall / Foodbank and current Fire Station)
3. Temporary relocation costs associated with the Fire Department relocating to the Public Works Depot on Chittick Ave.
4. Food Bank relocations costs.
5. Potential environmental abatement costs.
6. Further ground environmental assessment costs.
7. Site Preparation Cost Estimates - Removal and installation of fill.
8. Flood Risk Mitigation and Elevation considerations.

HISTORY

The existing Hantsport Fire Station building constructed around 1970, is a one-story building consisting of an assembly hall and truck garage with five bays. The 2014 OPUS Report for Hantsport dissolution classified the building in "fair" condition, with numerous recommendations for upgrade and/or immediate improvement.

In 2018, following an independent renovation feasibility report by Architect Vincent den Hartog[1], an information report was presented to Municipality of the District of West Hants Committee of the Whole with the preliminary cost analysis of construction for a combined use facility to be shared by the Hantsport Fire Department and Public Works Department. In November 2019, a directive was received by the Public Works department to proceed with the development of a Request for Proposal (RFP) to perform the Design Services for the Hantsport Fire Department. At this time Public Works staff also requested a geotechnical evaluation be conducted by ABLE Engineering[2] for the proposed Public Works site location on Chittick Avenue.

In December 2019, Public Works issued a Request for Proposal for the provision of Design Services for a replacement Fire Station in the community of Hantsport to be modelled from the new fire station and municipal complex in Canning, NS. With only a single bid received for the Design, Municipality of the District of West Hants Council decided not to proceed with the design contract for the new fire station and deferred any further actions until a new Council and budget was in place for the consolidated Municipality.

In March 2020, West Hants Planning and Development staff conducted a review of potential locations for the new Hantsport Fire Station, based on the 2018 den Hartog assessment report recommending a minimum of 55,000 sf property. During this review, the existing site on Oak Street was <u>not</u> considered as it was believed that the Oak Street site was not large enough to accommodate the replacement 5-bay fire station.

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[1] Hantsport Fire Hall Renovation Feasibility Report: Final Report, den Hartog, March 2018
[2] Geotechnical Investigation Summary – Proposed New Fire Hall Building, ABLE Engineering Services Inc., November 2019

The resulting staff report and memo from Planner Saira Shah[3] to the CAO has been attached.

In accordance with Council direction in 2020, staff authorized the work to perform a Geotechnical evaluation at the existing Hantsport Fire Station site (Oak Street), by Harbourside Engineering, as well as perform a Hazardous Materials evaluation at the existing Hantsport Fire Station and the Hantsport Food Bank buildings by Strum Environmental.

In July 2020, following review of the Geotechnical evaluation by Harbourside Engineering[4] and the Hazardous Materials evaluation by Strum Consulting[5]; Council approved award of a contract to HarveyARCHITECTURE to proceed with the design component at the existing Oak Street location.

In January 2021, Council approved the Option 1 general design for the replacement of the Hantsport Fire Station at the existing Oak Street location, as provided by HarveyARCHITECTURE, and Council provided direction for staff to proceed with the release of a public Request for Proposal for the evaluation and selection of the project general contractor, in accordance with the approved Municipal procurement process.

In April 2021, HarveyARCHITECTURE completed the detailed design specification and drawings for the replacement Hantsport Fire Station for the Oak Street location. The public Request for Proposal closes on Thursday, May 13, 2021.

DISCUSSION

In October 2020, a design working group was formed to discuss the site location and design requirements for the replacement Hantsport Fire Station. This working group consisted of the following representatives:

- Peter Johnston, HFD Fire Chief
- Paul Maynard, HFD Deputy Fire Chief
- Ron Starrett, HFD Member
- Karrie Ritchie, HFD Member
- Todd Richard, West Hants Regional Municipality, Public Works
- Brad Carrigan, West Hants Regional Municipality, Public Works
- Shelleena Thornton, West Hants Regional Municipality, Office of the CAO
- Mark Phillips, West Hants Regional Municipality, Office of the CAO

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[3] Staff Memorandum, Hantsport Fire Station – Potential Locations, Saira Shah, March 2020
[4] Geotechnical Investigation – Hantsport Fire Station (File #203102), Harbourside Engineering, September 2020
[5] Qualitative Regulated Materials Survey – Hantsport Fire Station, Strum Consulting, October 2020

This design group initiated biweekly in-person meetings with Wade Noiles and Mike Harvey of HarveyARCHITECTURE to establish a preferred location, a base design, and then refined design options to be considered for the Hantsport Fire Station. The original conceptual design incorporated the recommended user space allocations that were previously established in the 2018 Hantsport Fire Hall Renovation Feasibility Report by den Hartog.

Multiple sites were revisited by the group throughout the community of Hantsport, including potential sites near Mariner's Drive, Riverview Drive, School Street (adjacent to the Hantsport School), Main Street (adjacent to HMCC), Highway #1 (near the old tourist bureau location), Chittick Avenue, and Oak/William Street.

It was determined that all sites may have challenges and variables with no site being the perfect site. Noted variables were social, economic, geotechnical, influenced by flood risks, traffic flow, response times, fire service preference, and other factors. The sites that were deemed to predominantly have negative social affects were excluded, removing locations in residential growth centres of the community (Mariner's Drive and Riverview Drive), avoiding loss of the ball field adjacent to the school (School Street), avoiding loss of the community centre property and basketball court (Main Street), and avoiding the economic and civil challenges of building into the hillside near the old tourist bureau site. The two remaining sites deemed with highest suitability, and least amount of negative social and economic impact were existing Municipal-owned properties located on Chittick Avenue and Oak Street.

Proposed Chittick Avenue Site

The working group first engaged in considerable discussion of the pros and cons related to the proposed Chittick Avenue site. This location was previously considered in 2019 as a possible site to house a combined replacement Fire Station and replacement Public Works Shop/Compound, prior to consolidation with the Town of Windsor. The Chittick property is already owned by the Municipality and is currently home of the Hantsport Public Works equipment compound. The Chittick site was also deemed to be a suitable location (central Hantsport) with good proximity and access to the school and major industry.

Although a proposed new fire station building may not interfere with the existing structures on site, the existing material laydown space for Public Works operations would be greatly reduced during construction and following construction. With a 'fair to poor' condition[1] of the existing Public Works garage and outbuildings, and the simultaneous consolidation with Windsor, the needs of future Public Works buildings has been re-evaluated and the existing structures are needed as a satellite depo for regional PWs operations. Staff have identified that the current structures provide a valuable asset to allow efficient operations for storage of equipment along with staff facilities, snow and ice control materials along with storage of aggregates and stock for water and sewer operations. This factored into the decision of the Chittick site being less favourable due to having a working Public Works depo operating in the backyard of a new modern fire service facility.

It was noted by Peter Johnston (HFD Fire Chief and Public Works Superintendent) that the property fronting Chittick Avenue has some historic concerns, as the site as well as access to the site was prone to annual flooding. It was also noted by the Superintendent that parts of the property have been previously infilled with spoils from construction activities, past demolition materials along with old furniture and garbage material, a reason that past historical practice has been using this area only for raw material laydown. Noting a geotechnical report has been provided by ABLE Engineering, this historic knowledge was a concern and should be further investigated should the Chittick site be reconsidered.

Chittick Avenue fronting the proposed building was flagged at risk of flooding as identified by the West Hants Planning Department, based on data collected from the Hantsport Stormwater Management Study by Dillon Consulting[6]. The following photos in Figure 1a & 1b show the extent of the potential flooding along Chittick Avenue, which occurred during a recent major rainfall event in 2019.

It was identified in the ABLE Engineering geotechnical investigation summary[2]:

> *"To prepare the building areas to receive foundation/slabs, it will be necessary to place a minimum of 3.5 to 4 feet of compacted structural fill over the entire building footprint, extending at least 5 feet from the building limits."*

It was determined by the working group that the fiscal impact for civil preparation work to the site to make it suitable to receive foundation/slabs, to be excessive and therefore contributed to further investigation of alternative sites. This analysis was further supported by the municipality planning department[3] with the history of significant localized flooding and identification as an at-risk location in the Hantsport Stormwater Management Study. It should be further noted that new Fire Department Facilities should respect "Post Disaster" building requirements when applicable. Given the history of flooding and restricted access, along with proximity to Willow Brook the Chittick site possesses challenges resulting in additional capital investments to protect the building from flooding and unknown capital expenditures to eliminate the flooding potential impacting access and egress to the site during extreme weather events. If further exploration is required regarding overland flooding or stormwater backup, due to the open ditch system, the Province of Nova Scotia and the County of Kings should be engaged as the stormwater discharge system feeds under a Provincial bridge and onto lands in the County of Kings before reaching the Avon River.

[6] *Hantsport Stormwater Management Study, Dillon Consulting, July 2018*



Figure 1a: Flooding 19 Chittick Avenue, Hantsport



Figure 1b: Flooding 19 Chittick Avenue, Hantsport

Proposed Oak Street Site

The working group engaged in discussion of the pros and cons related to the existing Oak Street site. This location was not previously discussed as the property did not meet the minimum 55,000 sf as recommended by den Hartog[1]. The Oak/William property is already owned by the Municipality and is currently home of the Hantsport Fire Department and Hantsport Food Bank building (original Town Hall building). The Oak/William site also was deemed to be a suitable location (central Hantsport), provided good traffic flow, with good historic proximity and access to the school and major industry.

Topics of concern from the working group were regarding the amount of parking that was required for the fire department during emergency calls, as well as displacement of the Hantsport Food Bank and temporary displacement of the Hantsport Fire Department equipment and apparatus.

It was concluded that the number of parking spaces that den Hartog has allocated in his study to be excessive for a stand-alone fire station, acting with a functional warming center. The number of parking spaces and minimum area would only be required if the building was to be constructed with the multipurpose as a fire station, community center, and public comfort station. Parking availability of larger fire stations (Kentville and Windsor) were compared to that of Hantsport, and it was determined that for emergency fire calls, the existing street side parking would be quite adequate for HFD on the Oak Street site, with neighboring Foundry Rd providing parking space support.

The Hantsport Food Bank building was deemed to be in poor repair by the Municipal Building Official, Tim Leslie and was previously recommended for demolition. The upstairs of the building had already been abandoned, with the upper floor furnace and oil tanks removed from the site. The municipality entered into open conversations with the Food Bank Society and found suitable space in a newer building to meet their future needs. Decommissioning this building and relocating the Hantsport Foodbank was deemed to be a positive outcome of the discussions. An allocation of $47,000 was provided by Council to accommodate the renovations of the Foundry Building.

Post consolidation, the Public Works Compound in Hantsport on Chittick Avenue has been repurposed as a satellite depo site. With minor renovations to the building, it was able to be prepared by public works staff to make a very suitable temporary home for the HFD apparatus during planned construction activities. Renovations included some minor electrical and plumbing upgrades, along with removal of the interior storage mezzanine to fit the fire apparatus.

Further items for consideration were site geotechnical suitability and presence of existing hazardous materials within the two buildings that would need to be demolished to accommodate replacement of the fire station on the site. Council approved the preliminary geotechnical and hazardous materials studies prior to the final selection of the site and design by HarveyARCHITECTURE.

As discussed in the Harbourside Engineering geotechnical investigation summary[4]:

> *"From a geotechnical perspective, the site is suitable for the proposed development. The sand deposits are capable of supporting typical spread foundations, although excavation and replacement of excessively loose material below the influence area of spread foundations may be necessary.*
>
> *The following sections provide geotechnical recommendations to assist with design…"*

These stated geotechnical recommendations from Harbourside were considered by HarveyARCHITECTURE and their subsequent civil, foundation and structural subconsultants during their design activities for the proposed Oak/William Street site.

> *"Strum Consulting was retained by Harvey Architecture Ltd. to undertake a Regulated (Hazardous) Materials Survey at the Hantsport Fire Station and adjacent food bank building, located at 5 Oak Street in Hantsport, Nova Scotia. The scope of Regulated Materials Survey consisted of a site visit to review building materials and the sampling of building materials that may require special handling or disposal during deconstruction of the building."*

Building findings included presence of some non-friable asbestos containing material (ACM), presence of lead in paint, mercury in lighting appliances and ozone-depleting materials in refrigerating units, PCB containing materials in lighting ballasts, silica, and mould. All of these noted items are standard findings in a commercial building of this age (constructed in 1970), and typical for special disposal during standard deconstruction activities. These stated recommendations[5] from Strum Consulting were also considered by HarveyARCHITECTURE to be included in the design specifications for the contractor to bid on.

Following this extensive review of the sites, as part of the working group, the HFD members consulted with the HFD active membership to review the discussion and findings of the various sites. Feedback was provided back to the working group that the existing site at Oak Street was their preferred location for the replacement station. The site had proved well for the past 50 years, without any major issues, except the existing fire station space limitations that have been realized in the past 5+ years with the size demands of fire apparatus and need for modernization of social spaces.

Oak Street Design Considerations

The Oak Street project site proved challenging to fit the required building features into the relatively small and unique shaped property lot, however it was still deemed possible by HarveyARCHITECTURE. With the subject property located on a corner lot, there was consideration for the building to face with Oak Street (as existing) or alternatively to face William Street. The site plan for the subject property is shown in Figure 2 below. The original concept plan shown in Figure 3 below, showing that the concept does not fit the constraints of the property in its original traditional rectangular shape.

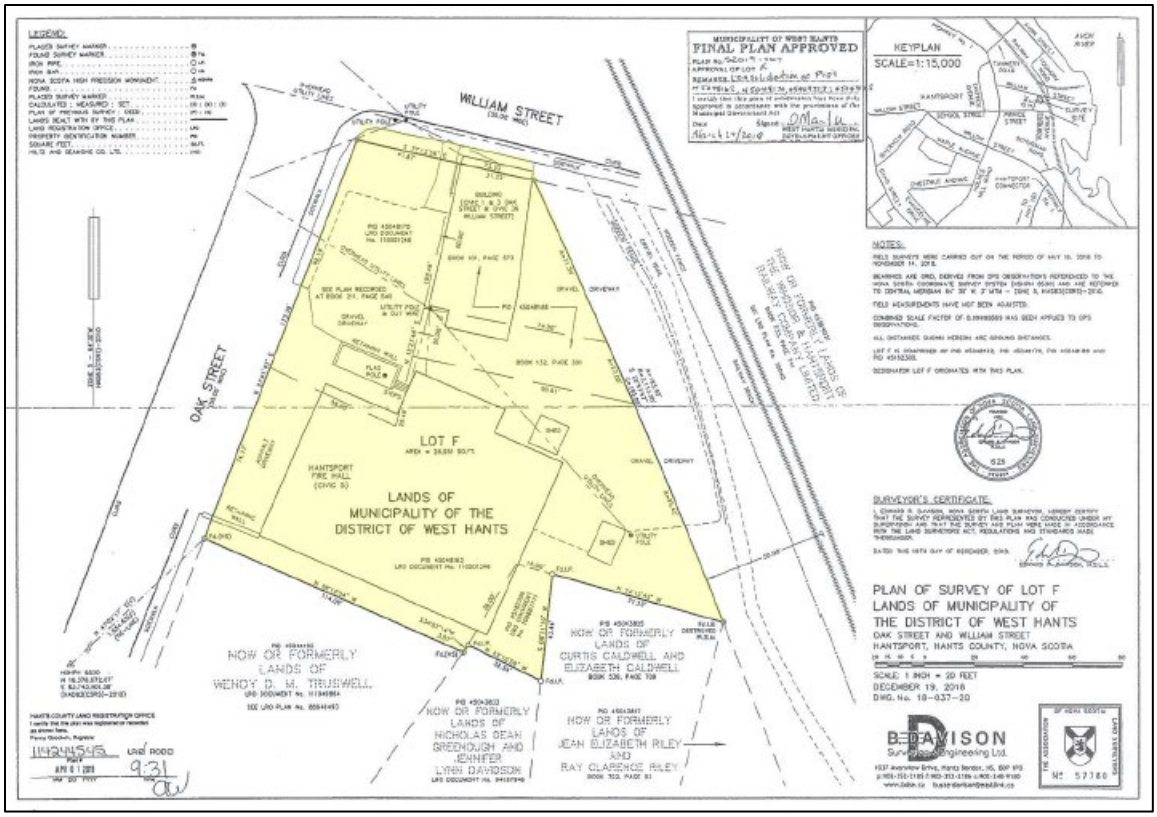


Figure 2: HFD Oak/William Street Site Plan

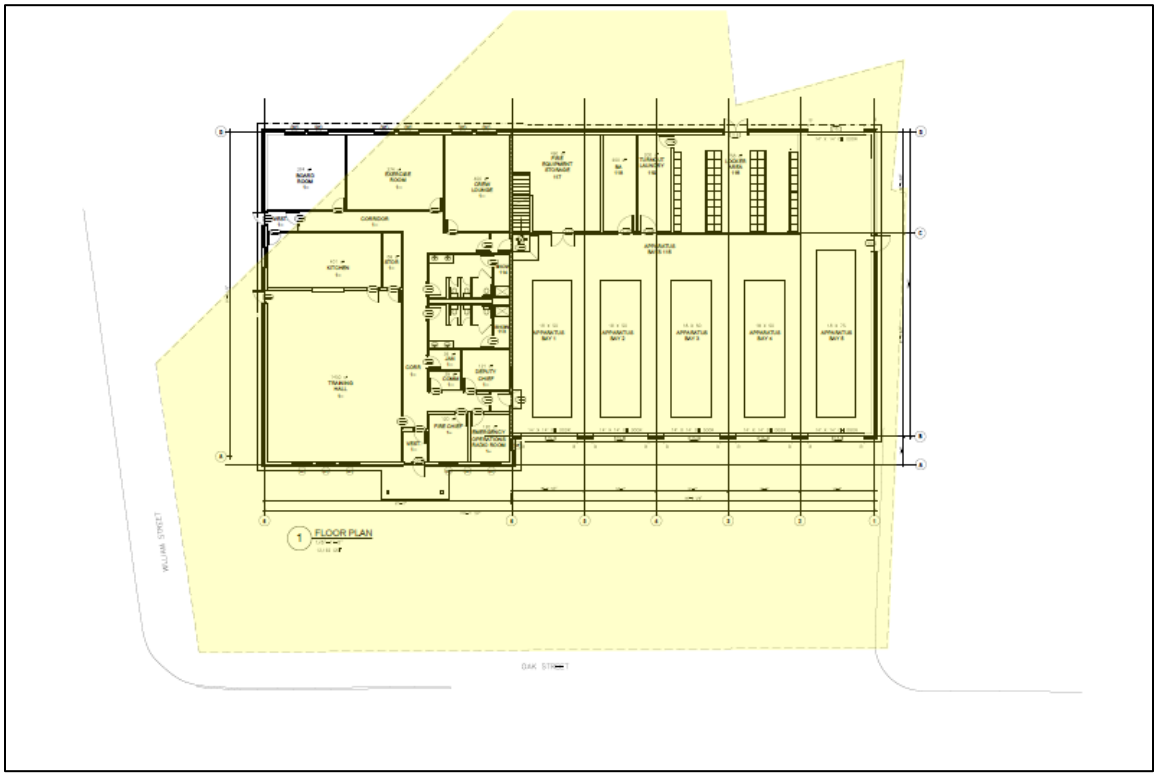


Figure 3: HFD Conceptual Plan (Original Concept)

Due to the property shape constraints, it was determined the preferred configuration was to have the apparatus bays face Oak Street, with the administrative offices along William Street. A limited number of parking spaces would be located along Oak Street, with supplemental parking available in the rear of the building adjacent to the rail corridor walking trail. Building location then required modification to accommodate bylaw requirements for setback distances from adjacent properties. Refined concept design drawings are shown in Figure 4 and Figure 5 below, showing both apparatus facing configurations.

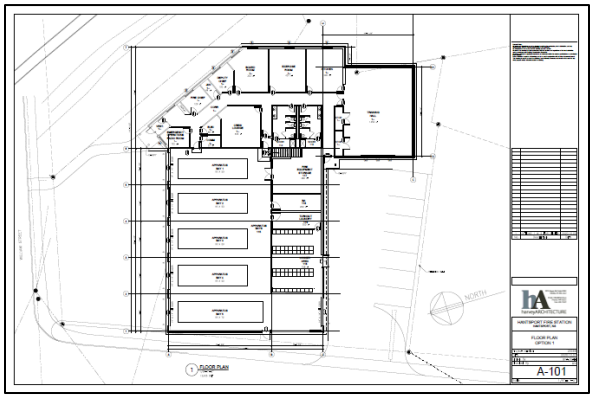


Figure 4: Concept Facing William Street

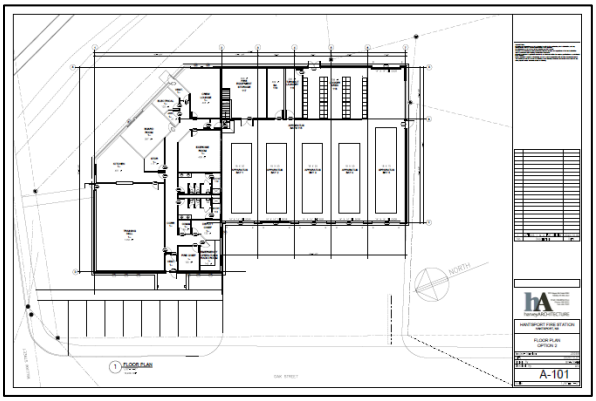


Figure 5: Concept Facing William Street

The design working group turned their attention to the architectural review of room and space sizes, overall ergonomic configuration and flow of users throughout the building. Included in this was appropriate allocation of space for building electrical, mechanical, and emergency generator spaces.

It was decided the most appropriate use of space was to locate the main electrical room, mechanical room (including compressor room), and emergency generator in the mezzanine second floor space behind the fire apparatus. HFD members were consulted to ensure the space was adequate to accommodate the current and future needs for fire apparatus, locker space for 60 members, breathing air room requirements, laundry and degassing space, and workshop and storage spaces.

A preliminary review was conducted by HFD admin members for administrative requirements for the spaces allocated for kitchen space, training room, exercise room, crew lounge space, suitable accessible washroom spaces, radio room, offices and boardroom. This review has also included a review of required kitchen appliances to accommodate the needs of the HFD. User-benefit features were added to allow access to washrooms and crew lounge directly from the fire apparatus floor. During this review it was also determined that a drive-through bay was not feasible with the existing size, shape and topography of the site.

Architectural, mechanical and electrical review produced both OPTION 1 and OPTION 2 layouts as shown in Figure 6 and Figure 7 below.

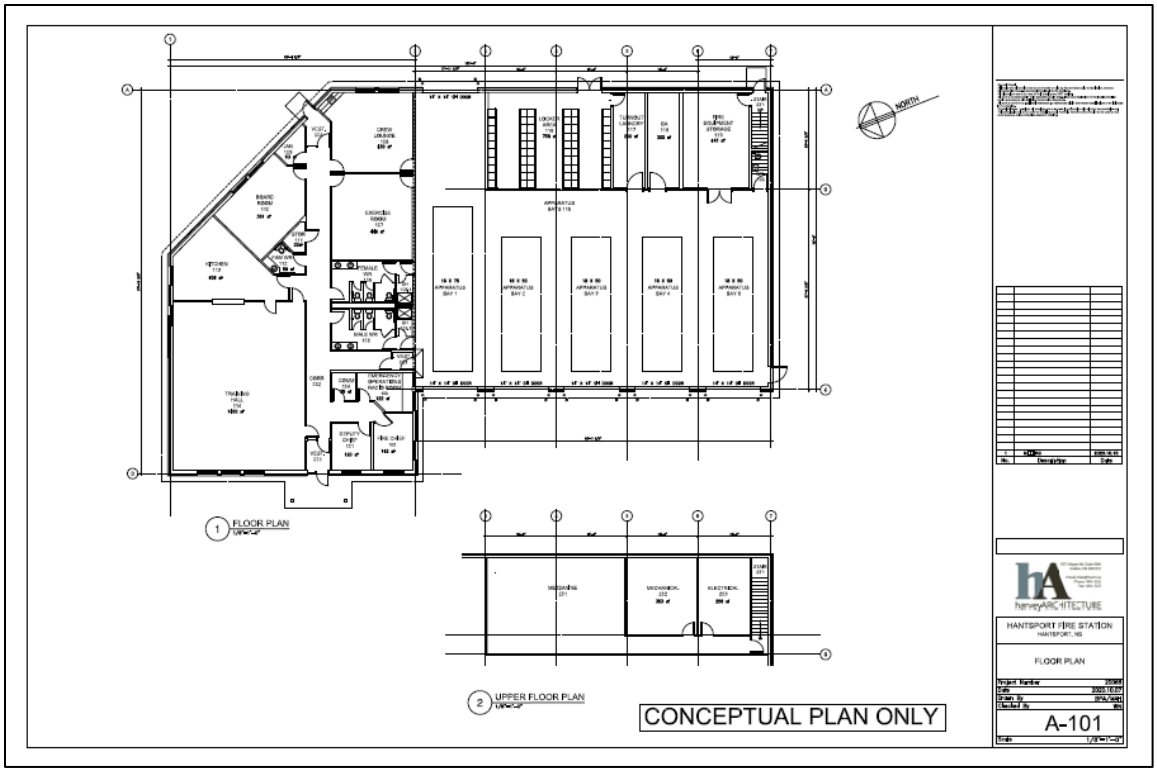


Figure 6: OPTION 1 Hantsport Fire Station

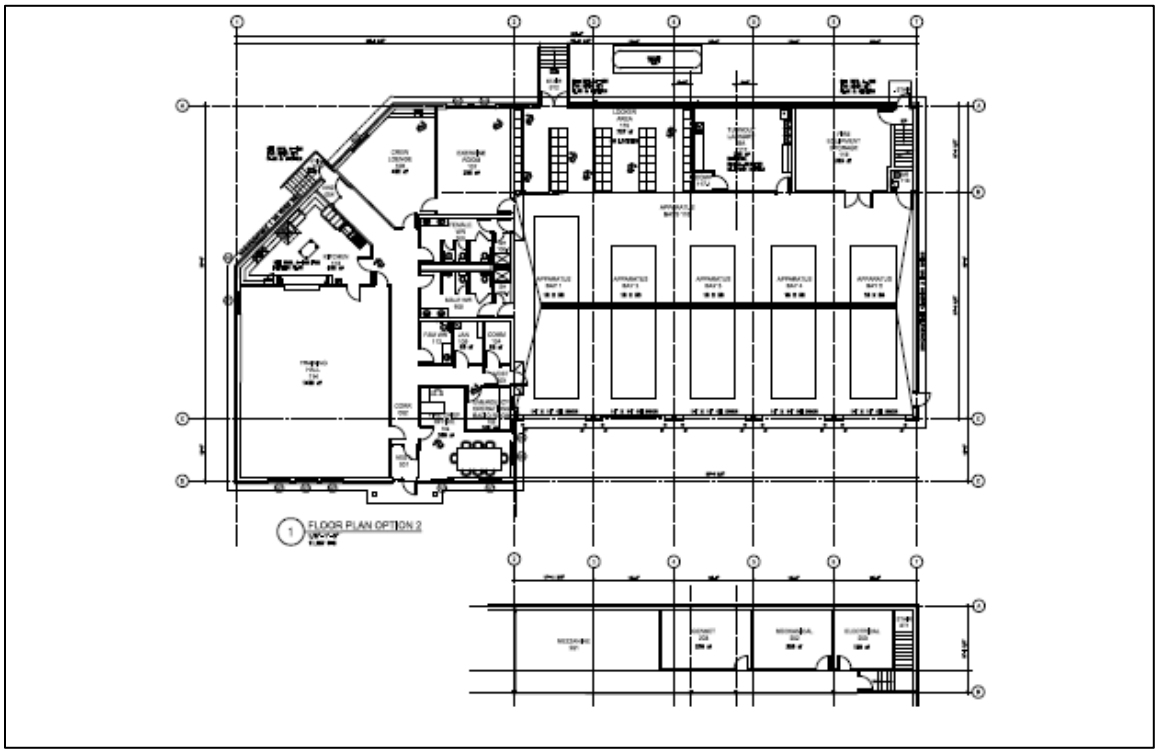


Figure 7: OPTION 2 Hantsport Fire Station (reduced building footprint)

Option 1 Design Plan

With the Option 1 design plan established, HarveyARCHITECTURE engaged QS Online to produce a Class D Order of Magnitude Cost Estimate. The Class D estimate for construction (excluding demolition and contingency) was $3,307,167. Based on the 14,353 sf building space, budget costs equated to $230.42 per square foot.

Option 2 Design Plan

The design working group looked at all possible ways to reduce the overall building footprint to reduce this overall construction cost. The Option 2 design plan was achieved by reducing approximately 1,200 sf of apparatus bay space and administrative space from the design layout. Reducing this space would eliminate the plan for a stand-alone board room and would reduce the facility to a single shared space office (combines 2 administrative offices and boardroom into one space). Option 2 also minimizes the bay floor space for the largest apparatus, reduces the locker and storage spaces, breathing air filling and laundry space, workshop space, electrical, mechanical and generator spaces.

Although the Option 2 space had been identified as the absolute minimum space required, it leaves no contingency space for future expansion or for a modified use of the space, i.e. reduces capacity to be used as an emergency warming centre.

HarveyARCHITECTURE engaged QS Online to produce a second Class D Order of Magnitude Cost Estimate. The Class D estimate for construction (excluding demolition and contingency) was $3,063,817. Based on the 12,862 sf building space, budget costs equated to $238.21 per square foot.

Class D Order of Magnitude Estimates

The Quantity Surveyor has noted that the Mechanical and Electrical rates seem higher than expected at roughly 45% of the budget, where they typically come in at the range of 35% of the budget. One factor that is a major contributor to this influx is the outline specification completed that the estimator based the rates upon has a large level of incompletion to it. Architectural and Civil design has additional detail that allows the project site, building systems and envelope to be marginally priced correctly.

The designer’s hesitation with resting on this Class D being assumed to be the final cost is that these numbers always error on the high side, as very little design has been completed by the project team; this is clearly the case here. In most Class D estimate deliveries, the rough overage factor is near 25% of the total project budget. As the design progresses through the various stages of completion that pricing accuracy comes down significantly to be in the range of 5-10% of the real estimated project value.

	OPTION 1	OPTION 2
Floor Area: Ground Floor	12,450 sf	11,045 sf
Floor Area: Mezzanine	1,903 sf	1,817 sf
Floor Area: Total Area	14,353 sf	12,862 sf
Shell	$1,104,684	$1,019,994
Interiors	$491,484	$424,353
Mechanical Services	$614,455	$597,495
Electrical Services	$419,750	$397,197
Site & Ancillary Work	$204,990	$187,690
General Requirements (8%)	$226,829	$210,138
Contractor Fee (8%)	$244,975	$226,949
Total – Excluding Contingency	$3,307,167	$3,063,817
Unit Rate	$230.42 /sf	$238.21 /sf
Estimated Demolition	$66,982	$66,982

Table 1: Summary Comparison of Design Option 1 vs Option 2 (Oak Street)

The Hantsport Fire Department (HFD) Active Membership has recently been re-polled about the proposed location. The planned Oak Street location has received full support (100%) from the 22 of 29 active members that have replied (number of respondents as of the date of this report being written). The fire chief has a copy of the responses to this recent survey of its' active members.

NEXT STEPS

Council to award the construction tender to the successful proponent, is planned for award in conjunction with the 2021/2022 fiscal budget.

It is planned for demolition of the existing buildings and replacement fire station construction by the successful proponent, to begin in the Spring 2021 with occupancy planned around Spring, 2022.

FINANCIAL IMPLICATIONS

The financial implications for the estimated construction costs of both design options, are identified above for consideration, Option 1 was approved by council and the cost of the tendered project will be confirmed on May 13, 2021 during Bid Opening.

If an alternative site was to be re-considered at this time, a complete re-design and the preparation of all new drawings and specification documents may be required by HarveyARCHITECTURE (work was valued at $198,620 in the original bid).

Much effort, resources and expenditures have taken place to bring us to this point in the process with a tender opening on May 13, 2021. This along with the considerable effort in the relocation of the Food Bank. Staff are confident all options have been explored and the existing approved location of the new Hantsport Fire Station is a good choice and has been well researched with the best interests of all, residents, major industry / businesses and all parties involved for the community of Hantsport.

ALTERNATIVES

No alternatives have been identified at this time.

ATTACHMENTS

Appendix 1: Hantsport Fire Hall Renovation Feasibility Report: Final Report, den Hartog, March 2018

Appendix 2: Geotechnical Investigation Summary – Proposed New Fire Hall Building, ABLE Engineering Services Inc., November 2019

Appendix 3: Staff Memorandum, Hantsport Fire Station – Potential Locations, Saira Shah, March 2020

Appendix 4: Geotechnical Investigation – Hantsport Fire Station (File #203102), Harbourside Engineering, September 2020

Appendix 5: Qualitative Regulated Materials Survey – Hantsport Fire Station, Strum Consulting, October 2020

Appendix 6: Hantsport Stormwater Management Study, Dillon Consulting, July 2018

Appendix 7: Regional Fire Services Study

Appendix 8: Geotechinical Review, Glenn Woodward, P.Eng., Design Point Engineering, May 2021

CHIEF ADMINISTRATIVE OFFICER REVIEW

I hope the information provided in the report, the attachments, and table displaying further comparables between the Chittick and Oak sites provides Council with the needed information. Particularly, information that relates to site preparation including geotechnical assessments and structural fill requirements as well as flood risks and flood mitigation.

By May 20, 2021 Council will have the benefit of being informed of the tender results associated with the Station's construction. Unknown costs will be confirmed associated with asbestos abatement, demolition, site preparation, materials, etc.

What is evident is that Council, municipal staff, and the HFD members recognize the need for a new Station. It is further evident that all potential sites have challenges. Revisiting the site characteristics expresses a high duty of care ensuring the best

possible site has been selected. Moving forward with the project is important as it relates to construction timing. If further, investigations are needed we look forward to Council's direction.

Report Prepared by: _____

Brad Carrigan, P.Eng., Capital Projects Engineer

Report Reviewed by: _____

Todd Richard, Director of Public Works

Report Approved by: _____

Mark Phillips, Chief Administrative Officer

2018

Hantsport Fire Hall Renovation Feasibility Report: Final Report



Vincent den Hartog

Architect

3/26/2018

Contents

Mandate:.....2
Assumptions:.....2
Tasks:.....2
Observations:.....3
Conclusions:.....4
Appendix A: Preliminary Building Program.....5
Appendix B: Preliminary Renovation Budget.....9
Appendix C: Photographs of existing conditions.....10

Mandate:

The given mandate was to prepare a preliminary concept and construction budget for renovations to the existing fire hall. The intent would be that renovations be completed that will serve the fire department's needs for the next 2 to 3 decades. It is understood that this report will provide a comparison to building a new fire hall on a separate site as another means to meet the fire department's needs. The report is expected to be used as a discussion point around a request for funding for either a renovation of the existing facility or the construction of a new fire hall.

Assumptions:

It is understood that the neighbouring building on PID 45048188 is owned by the municipality and that it currently houses the area food bank, but has no other current uses. We were told that the building requires significant deferred maintenance. For the purposes of this report it is assumed that this building will be removed.

The existing fire hall has a community hall with a bar, and kitchen facility. It has been used for rental income. During our initial meeting we were told that the use of the hall for rental purposes has been discontinued due to conflicts that arise during fire calls. For the purpose of this report it is assumed that there is no community space within the fire hall program.

Any renovation plan for this site will have to be undertaken in a manner that maintains the Fire Department operations throughout the work. Therefore we have investigated potential solutions that would incorporate new truck bays as an addition to the building. Renovations to the existing building could be undertaken once the new addition is operational.

Tasks:

The tasks we have undertaken are as follows:

- Visual survey of the building to become familiar with the layout of the existing conditions
- Measurements of the existing conditions to prepare a base plan
- Photographic survey
- Review of the property survey information provided by the client
- Review of the property information available on Viewpoint.ca
- Preparation of a building program for the fire hall
- Preparation of a preliminary construction budget

Observations:

Based upon our review of the property information available on viewpoint.ca we have the following observations

1. There appears to be an encroachment of the existing fire hall building on the PID number 45043825. The existing building straddles that property. On Viewpoint.ca PID 45043825 is listed for sale. It is recommended that this situation be investigated and resolved prior to sale of that property, if indeed there is a conflict
2. There are three separate properties upon which the fire hall development is proposed. PID's 45048170, 45048188, and 45048162. It is noted that consolidation of the properties would likely be required to develop the renovation /addition project on this location.
3. Note that the building on PID 45048188 that is assumed to be demolished also appears to be encroaching with the railroad property.
4. Note that most of the existing parking area is actually on the rail right-of-way. Any new development, whether building or parking area, cannot be located on the rail right-of-way.
5. The total area of the PID's 45048170, 45048188, and 45048162 is only +- 24,000 sq.ft. This is less than half the area, 55,000 sq.ft., required to accommodate the building program. (see appendix A).

Based upon our visual survey of the building, we have the following observations;

1. The building has had several additions built over the years. Enough have been created that each new addition becomes more complex to achieve.
2. The original building does not have an energy efficient envelope. It appears to be mostly concrete block backup wall with veneer brick exterior, with little to no insulation. It was not possible to determine the composition of the existing roof during our site visit.
3. The size of the existing truck bays is inadequate for the fleet of apparatus. The doors are only a few inches wider than the trucks. In order to leave as much room as possible between the trucks and the gear lockers at the rear some of the trucks must be parked so close to the front doors that it is not possible to walk around the front of them (see photo 2, appendix C). The space between the trucks and the gear lockers is so narrow that in some places fire fighters are leaning against the truck to put on their gear. The situation is hazardous.
4. There is currently only one storage room for the fire department's use. It is not adequate.
5. There is no administrative space, and no designated meeting space or training space.
6. There is currently no exercise space or equipment.

Based upon an analysis of the preliminary building program versus the review of the site and existing building, we have the following observations;

1. The building program including the exterior space requirements for fire fighter parking is more than 2 times the size of the existing site, making it impossible to fit all the program requirements on this property.
2. We have illustrated the minimum space required to accommodate 30 fire fighter parking spaces on the existing site plan. It is clear that this cannot be accommodated on the site.
3. We have illustrated three options for new truck bays on the existing site plan. It is clear from this exercise that the addition of truck bays cannot be accommodated on the site. Also illustrated at the same scale as the site is an example for a parking lot of 30 vehicles for fire fighter parking. When compared to the existing site it is also clear that the number of parking spaces required for fire fighter parking cannot be accommodated on the existing site.
4. It is also desirable to have space in front of the truck bays to accommodate at least the full length of the trucks on the property. It is clear that this cannot be accommodated on this property.

Conclusions:

Upon our initial site visit it was apparent that existing fire hall is in need of significant upgrades to meet the functional requirements of the Fire department for the next 20 to 30 years. Current deficiencies include no administrative space, no showers, no exercise space or equipment, and no dedicated training space. The storage space for equipment is too small. All the laundry, storage and equipment is located in one small room.

The most glaring deficiency is the size of the truck bays themselves. The current apparatus barely fit within the building. The space remaining for the fire fighter gear lockers is so close to the trucks that the situation is not safe. There is no room for laying out hoses for drying.

As soon as we prepared the building program and compared it to the size of existing site it became clear that the existing site is simply not large enough to accommodate the needs of the Fire Department.

The existing site is approximately 24,000 sq.ft. The minimum lot size required to accommodate the building program is 55,000 sq.ft.

Although the program does not fit on the existing site, as a theoretical exercise only, we prepared a preliminary budget for a renovation on this property so that you could make some comparisons with construction costs for new fire-halls of similar size that have been built recently in the Annapolis Valley. The preliminary budget is presented with a high and low range.

Prepared by Vincent den Hartog, Architect

Appendix A: Preliminary Building Program

This program is preliminary, intended for review and acceptance by the Hantsport Fire Department.

It comprises information from visiting the new Canning Fire Hall and recent RFP for a new Fire Hall in Middleton. Both these fire departments have approximately 40-50 fire fighters, similar in size to Hantsport Department.

The building program states the user needs. The same program could be used for both a new build or to renovate the existing facility. When renovating the existing conditions might lead to modifying slightly the parameters due to the implications of changing specific things about the building.

Building Program

Trucks & Support: **8387 sq.ft.**

Truck bays: (5) 20'x70' bays. 7000sq.ft.
alternative (3) double length 20'x100' drive thru type 6000sq.ft.

- At least one bay shall be drive thru type
- The additional space at the back of truck bays accommodates space to lay hoses for drying.
- Ceiling height 20'
- Concrete hardener on floor surface
- Trucks (80,000 lbs)
- Cord reels are required to power trucks from above
- Garage doors 14'Wx 16'H min. to include vision lites

Fire Fighters Gear Stalls: 50 stalls 22'x36', 792 sq.ft.

- open wire locker bins 2'x 1'-6" dp.
- Ideally located adjacent to the truck bays, but planned so that there is no conflict with moving trucks and fire fighters accessing their gear
- Gear locker space should also be located conveniently adjacent to parking area where fire fighters arrive at the station

Radio Room: 8'x12' 96 sq.ft.

- visibility to front of truck bays and the street
- space for two people to work
- (2) chairs and work stations

Hazmat Storage: 5'x5' 25 sq.ft.

- exhaust directly to the outdoors

SCBA: 12’x15’ 180 sq.ft.

- breathing air equipment storage and refill
- shall have fresh air intake and exhaust

Laundry Room: 10’x15’ 150 sq.ft.

- industrial washer, specialty drying machine
- drying racks for gear

Tools & Equipment: 12’x12’ 144 sq.ft.

- Storage for equipment
- Work bench for repairs

Office & Administration: **1100 sq.ft.**

Fire Chief Office: 10’x12’ 120 sq.ft.

- (1) 30x60 desk, (1) desk chair
- (2) guest chairs, file, shelves

Office Storage: 8’x10’, 80 sq.ft.

- copier, files, storage shelves

Conference / Board Room: 15’x20’ 300 sq.ft.

- conference table and chairs for 14,
- AV equipment,
- storage cabinet

Training Room: 20’x30’ 600 sq.ft.

- fold up tables and chairs for 30 people
- AV equipment,
- storage cabinet

Fire Fighters’ Services: **1680 sq.ft.**

Exercise Room: 20’x24’, 480 sq.ft.

- (10) pieces of exercise equipment
- Flooring to be athletic rubber for weights

Club Room: 20’x30’	600 sq.ft.

- w/ kitchenette, sink, microwave, fridge, dishwasher, stove
- large screen TV , soft seating for 12,
- table and chairs for 8

Washrooms: 20’x30’	600 sq.ft.

- mens and womens with shower stalls 1 per gender /
- (2)WC ,
- (2) sinks,
- 1 shower stall in each
- Showers to be tiled, not prefab

Common Spaces:	**400 sq.ft.**
Entrance Lobby: 10’x10’	100 sq.ft.
Utility: 20’x15’	300 sq.ft.

- Power entrance
- HVAC / heating equipment
- Water entrance

Subtotal:	**11,550 sq.ft.**
Circulation space, mechanical space, walls and structure 20%	2,310 sq.ft.
Construction Area:	**13,860 sq.ft.**
Exterior:	**41,600 sq.ft.**
Fire Fighter Parking: up to 30 stalls with direct access to gear stalls area	10,500 sq.ft.

- Should be identified for fire fighter use only
- Easy access for arrival
- Easy access to fire hall
- 9’x18’ typical parking stall size

Visitor Parking	600 sq.ft.

- 3-5 spaces / 9’x18’
- Adjacent to entrance lobby
- Ideally distant from fire fighter parking and front of truck bays

Space in front of truck bays 3500 sq.ft.

- There should be an area in front of the truck bays large enough that trucks can pull entirely out of the truck bays and be entirely within the property lines prior to pulling onto the street.

Landscaping & building setbacks 20,000 sq.ft.

Future Expansion area 7,000 sq.ft.

- Any project with a long term outlook should have a consideration for future expansion

The **minimum lot size** to accommodate the program identified above is **55,000 sq.ft. = 1.25 acres**

End Appendix A

Appendix B: Preliminary Renovation Budget

Optimistic Outlook:

New Addition: Truck Bays	6000 sq.ft. @ $100 / sq.ft.	$600,000.00
Renovations: Interior renovations	6000 sq.ft. @ $60 /sq.ft.	$360,000.00
Demolition Neighbouring building		$25,000.00
Demolition old kitchen addition		$10,000.00
Consolidation of land parcels:		$10,000.00
Exterior site upgrades:		$30,000.00
Subtotal:		**1,035,000.00**

Pessimistic Outlook:

New Addition: Truck Bays	7000 sq.ft. @ $125 / sq.ft.	$875,000.00
Renovations: Interior renovations	6500 sq.ft. @ $80 /sq.ft.	$520,000.00
Demolition Neighbouring building		$30,000.00
Demolition old kitchen addition		$15,000.00
Consolidation of land parcels:		$10,000.00
Exterior site upgrades:		$40,000.00
Subtotal:		**1,490,000.00**

The budget numbers above for renovation space do not address building energy efficiency of either the envelope or the mechanical or electrical systems.

End Appendix B

Appendix C: Photographs of existing conditions



Space at rear of trucks



No space between trucks and doors



Doors are barely wider than trucks



The only space for storage is too small to accommodate the current needs

ABLE
Engineering Services Inc.

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4073 Highway #3
Chester, NS B0J 1J0
Phone: (902) 273-3050

5209 St. Margaret's Bay Road
Upper Tantallon, NS B3Z 1E3
Phone: (902) 820-3255

November 27, 2019

Municipality of the District of West Hants
PO Box 3000
Windsor, NS
B0N 2T0

RE: GEOTECHNICAL INVESTIGATION SUMMARY - PROPOSED NEW FIRE HALL BUILDING, HANTSPORT, NOVA SCOTIA

Dear Karrie:

At your request, ABLE Engineering Services Inc. has investigated the subsurface conditions for a proposed new building at a site located on Chittick Avenue, Hantsport, Nova Scotia. The following is a summary of the encountered conditions and recommendations for design and costing.

Currently, it is understood that a new building is proposed for construction. The structure will be founded on shallow foundations, and have main floor slab-on-grade. It is our understanding the site grade will be raised approximately 3 feet. A site sketch showing approximate test pit locations is enclosed.

SUBSURFACE CONDITIONS

The fieldwork for the investigation was carried out on November 26, 2019, and included the excavation of four (4) test pits at/near the proposed building area. Approximate test pit locations are indicated on the enclosed site plan. The investigation was carried out using a backhoe supplied by the Public Works Department.

In summary, the subsurface conditions encountered at the site were found to be variable. Generally, compact gravels were encountered overlying sandy gravelly fill over undisturbed site-native silty clay deposits. The sandy gravelly fill typically varied from compact to loose with depth. The silty clay deposits were typically compact, moist, and greyish in colour. These deposits were proven to a total depth of 5.0 feet at three test pits. Groundwater was not encountered in these three test pits; however, water was encountered at TP 4 at a depth of 1.5 .

/2

RECOMMENDATIONS

To prepare the building areas to receive foundations/slabs, it will be necessary to place a minimum of 3.5 to 4.0 feet of compacted structural fill over the entire building footprint, extending at least 5 feet the building limits.

Final design grades would dictate the quantity of fill required. Structural fill should consist of imported rock fill for a minimum of 3 feet, covered with geotextile filter fabric, followed by well-graded sand and gravel, with a maximum particle size of 8 inch, and a "fines" fraction not exceeding 10 percent. Fill should be placed in lifts not exceeding 12 inch thickness, and should be compacted to 100 percent of the materials standard proctor maximum dry density using a vibratory drum roller. If any wet conditions are encountered, it is strongly recommended that an approved crushed clean rockfill be used for the bottom lift(s) (i.e. 2 feet thickness). Geotechnical inspection and certification of engineered fill material placement is recommended.

During earthworks, water may be expected to enter excavations during precipitation events, as surface runoff or as seepage from within the soil strata. The rate of infiltration into shallow excavations is expected to be minor to moderate, and may be controlled by conventional dewatering techniques consisting of 75 to 100mm diameter portable pumps, and grading of excavations to sump locations. Water pumped from excavations is expected to contain "fines" and will require care in disposal. Provision for proper site drainage (in accordance with applicable municipal, provincial and federal environmental requirements) should be made at the construction stage.

During the current investigation, the test pits were backfilled at completion, and lightly compacted by the backhoe bucket. It should be noted the test pit backfill is loose and will settle. It is recommended that during construction at this site, the test pits in the building footprint (or trafficked areas) be re- excavated, and the material properly compacted. The fill material and the compaction effort should be as given above for structural fill. Under no circumstances should a structure be placed over the area of a test pit without reconstruction of the test pit backfill.

FOUNDATIONS

Footings placed on properly prepared engineered fill or undisturbed site-native alluvial deposits can be designed for an allowable soil bearing pressure of 3,000 psf (150 kPa). At this design, pressure total and differential settlements are not expected to exceed 1 and 3/4 inches, respectively.

Generally, foundations on engineered fill should be placed at a minimum depth of 4 feet below finished outside grade to maintain adequate frost protection.

REUSE OF ON-SITE MATERIALS AND BACKFILLING

Select portions of the pit run sand and gravel maybe considered suitable for reuse at the site as common material or, in some applications, as engineered fill. The reuse of on-site materials will be contingent to a large extent on the condition of the materials after excavation, handling and stockpiling, and the environmental quality.

To qualify as engineered wall backfill, all boulders, debris, and deleterious inclusions should be removed. Wall backfill should be placed in lifts not exceeding a 10 inch thickness, and compacted in-place to 95 percent standard proctor maximum dry density. A higher level of compaction (i.e. 98 percent) is recommended for backfill beneath load bearing areas.

FLOOR SLABS

Slab-on-grade floors for the proposed structures should be cast on a free-draining granular material (NSTIR Type 1, 1 inch clear, or equivalent), with a minimum thickness of 6 inches. This material should be compacted to 98 percent of the material's standard proctor maximum dry density. To reach the level of the under-slab base course, excavation/filling should be carried out in accordance with previous recommendations for foundation preparation.

ABLE
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Phone: (902) 820-3255

COMMENTS ON CONSTRUCTION

The following comments on specific construction aspects of the project are provided for the guidance of designers. The contractor undertaking the work should make their own interpretation of the factual information provided in this report as it affects their construction procedures and scheduling.

The on-site soils are subject to loosening and softening in the presence of water. Construction methods and scheduling should reflect this. If construction takes place in the winter months, care must be taken not to allow freezing of sub-soils. Any fill or native soil that freezes must be sub-excavated and replaced.

Geotechnical inspection of structural fill preparation beneath building areas is strongly recommended.

Yours truly,

A. W. (Sandy) Dewar, P. Eng.
awd\ajs
hantsport fire hall geotechnical november 26, 2019

REGISTERED PROFESSIONAL ENGINEER
DATE 11/27/19
A.W. DEWAR
2937
PROVINCE OF NOVA SCOTIA

Appendix A

Explanation of Terms and Symbols

SYMBOLS AND TERMS USED ON THE BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Behavioural properties (i.e. plasticity, permeability) take precedence over particle gradation in describing soils.

Terminology describing soil structure:

Desiccated	-having visible signs of weathering by oxidation of clay minerals, shrinkage cracks etc.
Fissured	- having cracks, and hence a blocky structure
Varved	-composed of regular alternating layers of silt and clay
Stratified	- composed of alternating layers or different soil types, e.g. silt and sand or silt and clay
Well Graded	- having wide range in grain sizes and substantial amounts of all intermediate particle sizes
Uniformly Graded	- predominantly of one grain size.

Terminology used for describing soil strata based upon the proportion of individual particle size present:

Trace, or occasional	Less than 10%
Some	10-20%
Adjective (e.g. silty or sandy)	20-35%
And (e.g. silt and sand)	35-50%

The standard terminology to describe cohesionless soils includes the relative density, as determined by laboratory test or by the Standard Penetration Test 'N' - value: the number of blows of 140 pound (64 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (305 mm) into the soil.

Relative Density	'N' Value	Relative Density %
Very loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by insitu vane tests, penetrometer tests, unconfined compression test, or occasionally by standard penetration tests.

Consistency	Undrained Shear Strength Kips/sq.ft.	kPa	'N' Value
Very Soft	<0.25	<12.5	<2
Soft	0.25-0.5	12.5-25	2-4
Firm	0.5-1.0	25-50	4-8
Stiff	1.0-2.0	50-100	8-15
Very Stiff	2.0-4.0	\00-200	15-30
Hard	>4.0	>200	>30

SOIL SAMPLES

CONDITION- This column graphically indicates the depth and condition of the sample:

 undisturbed [gJ disturbed not recovered

TYPE- The type of sample is indicated in this column as follows:

A auger sample
B block sample
C rock core, or frozen soil core
D drive sample
G grab sample
SS split spoon
P Pitcher tube sample
U tube sample (usually thin-walled)
W wash or air return sample
O other (see report text)

PENETRATION RESISTANCE- Unless otherwise noted this column refers to the number of blows (N) of a 140 pound (63.5 kg) hammer freely dropping 30 inches (0.76 m) required to drive a 2 inch (50.8 mm) O.D. open-end sampler 0.5 feet (0.15 m) to 1.5 feet (0.45 m) into the soil, or until 100 blows have been applied, in which case, the penetration is stated. This is the standard penetration test referred to in ASTM D 1586.

OTHER TESTS

In this column are tabulated results of other laboratory tests as indicated by the following symbols:

*C	Consolidation test
Fines	Percentage by weight smaller than #200 sieve
DR	Relative density (formerly specific gravity)
k	Permeability coefficient
*MA	Mechanical grain size analysis and hydrometer test (if appropiate)
pp	Pocket pentrometer strength
*q	Triaxial compression test
qu	Unconfined compressive strength
*SB	Shearbox test
SO_4	Concentration of water-soluble sulphate
*ST	Swelling test
TV	Torvane shear strength
VS	Vane Shear Strength (undistrubed-remolded)
Et	Unit strain at failure
y	Unit weight of soil or rock
Yd	Dry unit weight of soil or rock p Density of soil or rock
Pd	Dry density of soil or rock

*The results of these tests usually are reported separately

Appendix B

Test Pit Logs

TP1
TP2
TP4
TP3
Chittick Ave
Chittick Ave
Chittick Ave

Test Pit Record - Pit # 1

Owners Name: Hantsport Fire Hall

Subdivision/Location: Chittick Avenue, Hantsport, NS Date: November 26, 2019

Inspector/Engineer: Sandy Dewar & Alex de Sousa Weather: Sunny, 8C

See Figure 1 - Site Layout

Total Depth:	5.0 feet
Bedrock at:	N/A
Water Table:	N/A
Slope:	0-5%
Roots to:	N/A
Mottling at:	N/A

Permeability of soil in-situ:	
Design Flow	
Occupancy	

Soil Stratum	Soil Type	Thickness	Density	Moisture	Notes
Organic	N/A				
1st Layer	Gravel	0.0' – 1.0'	Compact	Dry	Top of Parking Lot
2nd Layer	Miscellaneous Gravelly Sand, Trace Organics	1.0'-4.0'	Loose	Damp	
3rd Layer	Medium Grey Silty Clay	4.0'-5.0	Dense		Bottom of Pit

Test Pit Record - Pit #2

Owners Name: Hantsport Fire Hall

Subdivision/Location: Chittick Avenue, Hantsport, NS

Date: November 26, 2019

Inspector/Engineer: Sandy Dewar & Alex de Sousa

Weather: Sunny, 8C

See Figure 1 - Site Layout

Total Depth:	5.0 feet
Bedrock at:	N/A
Water Table:	N/A
Slope:	0-5%
Roots to:	N/A
Mottling at:	N/A

Permeability of soil in-situ:	
Design Flow	
Occupancy	

Soil Stratum	Soil Type	Thickness	Density	Moisture	Notes
Organic	N/A				
1st Layer	Gravel	0.0' – 1.0'	Compact	Dry	Top of Parking Lot
2nd Layer	Miscellaneous Sand Fill, Some Gravel, Trace Organics	1.0'-3.5'	Loose	Damp	
3rd Layer	Medium Grey Silty Clay	3.5'-4.5	Dense		
4th Layer	Light Grey Silty Clay	4.5'-5.0	Dense		Bottom of Pit

Test Pit Record - Pit #3

Owners Name: Hantsport Fire Hall

Subdivision Location: Chittick Avenue, Hantsport, NS Date: November 26, 2019

Inspector/Engineer: Sandy Dewar & Alex de Sousa Weather: Sunny, 8C

See Figure 1 - Site Layout

Total Depth:	5.0 feet
Bedrock at:	N/A
Water Table:	N/A
Slope:	0-5%
Roots to:	N/A
Mottling at:	N/A

Permeability of soil in-situ:	
Design Flow	
Occupancy	

Soil Stratum	Soil Type	Thickness	Density	Moisture	Notes
Organic	N/A				
1st Layer	Gravel	0.0' – 1.0'	Compact	Dry	Top of Parking Lot
2nd Layer	Gravelly Sand, Trace Organics	1.0'-3.0'	Loose		
3rd Layer	Medium Grey Silty Clay	3.0'-4.0	Dense	Damp	
4th Layer	Light Grey Silty Clay	4.0'-5.0	Dense		Bottom of Pit

Test Pit Record - Pit #4

Owners Name: Hantsport Fire Hall

Subdivision/Location: Chittick Avenue, Hantsport, NS

Date: November 26, 2019

Inspector/Engineer: Sandy Dewar & Alex de Sousa

Weather: Sunny, 8C

See Figure 1 - Site Layout

Total Depth:	5.0 feet
Bedrock at:	N/A
Water Table:	1.5
Slope:	0-5%
Roots to:	N/A
Mottling at:	N/A

Permeability of soil in-situ:	
Design Flow	
Occupancy	

Soil Stratum	Soil Type	Thickness	Density	Moisture	Notes
Organic	N/A				
1st Layer	Miscellaneous Sand Gravel Fill, Trace Asphalt	0.0' – 1.5'	Compact	Dry	Top of Parking Lot
2nd Layer	Gravelly Sand & Gypsum	1.5'-3.0'	Loose	Water	Bottom of Pit

MEMORANDUM

To:	Mark Phillips, Chief Administrative Officer
C:	Madelyn LeMay, Planning and Development Director Kathy Kehoe, Parks and Recreation Director
From:	Saira Shah, Planner
Date:	March 23, 2020
Re:	Hantsport Fire Hall- Potential Locations

Background:

Ms. LeMay advised that a request was made to determine potential locations for a new fire hall in the community of Hantsport. I reviewed the January 28, 2020 recommendation report to Council submitted by Mr. Laycock, the *Hantsport Fire Hall Renovation Feasibility Report*, the *Hantsport Stormwater Management Study*, and the *Hantsport Municipal Planning Strategy* and *Hantsport Land Use By-law*. Based on this review, an ideal property would be owned by the Municipality, zoned institutional (I), at least 55,000 sq. feet, and away from flood vulnerable areas.

Discussion:

As shown in Figure 1, there are no properties that meet those requirements. There are four (4) properties that meet the size requirements and are owned by the Municipality. Figure 2 provides an ortho photo image highlighting the current uses of the potential properties. The property on Riverbank Drive is the Riverbank Cemetery which would not be appropriate for a potential site. The property on Mariners Drive is within a residential subdivision which does not provide adequate road access for a fire hall. The property at 19 Chittick Avenue is on a street vulnerable to flooding which would impact access to the site. Figure 3 shows potential areas of flooding identified by Dillon Consulting.

The property at School Street meets most of the requirements. It is a baseball field which was used predominantly by the Shamrock senior men's ball team. I have discussed this site with Ms. Kehoe who stated the Shamrock team disbanded two (2) years ago and since then the site has only been rented by a couple of groups one (1) to two (2) times per year. The property is over 158,000 sq. feet. and is owned by the Municipality. Part of School Street is vulnerable to flooding but not the portion where

this property is located and there are clear access points to the rest of the community. The site is not zoned institutional (I) which is the only zone in Hantsport that permits a fire hall. There is no policy in the Hantsport Municipal Planning Strategy that would enable Council to proceed without amending the map of the Land Use By-law. Policy IP-2 enables Council to consider rezoning any property to the Institutional (I) zone. This process typically takes approximately six (6) months to complete including staff review, Hantsport Area Advisory Committee review, Planning Advisory Committee review, and Council approval.

Conclusion:

The School Street property would be the best location for the proposed fire hall in Hantsport. The site would require a map amendment to the Hantsport Land Use By-law to permit the fire hall. The amendment process would allow full public discussion.

Next Steps:

Please advise me if you wish me to start the amendment process for the School Street site.

Attachments:

Figure 1 Municipality Owned Properties in Hantsport over 20,000 sq. feet. Zoning

Figure 2 Municipality Owned Properties in Hantsport over 20,000 sq. feet. Ortho Photo

Figure 3 Future Flood Vulnerability Areas in Hantsport

Base data derived from the Nova Scotia Property Records Database (NSPRD), Copyright Her Majesty The Queen in the Right of the Province of Nova Scotia.

This map is a graphical representation and is not intended for legal descriptions or to calculate exact dimensions or area.

Prepared by: Windsor / West Hants Planning Department March 2020

Hantsport Municipally Owned Land Over 20,000 sq. ft.

Figure 1

0 200 400

Metres

Scale: 1:8,500

Municipally Owned Land over 20,000 sq. ft.

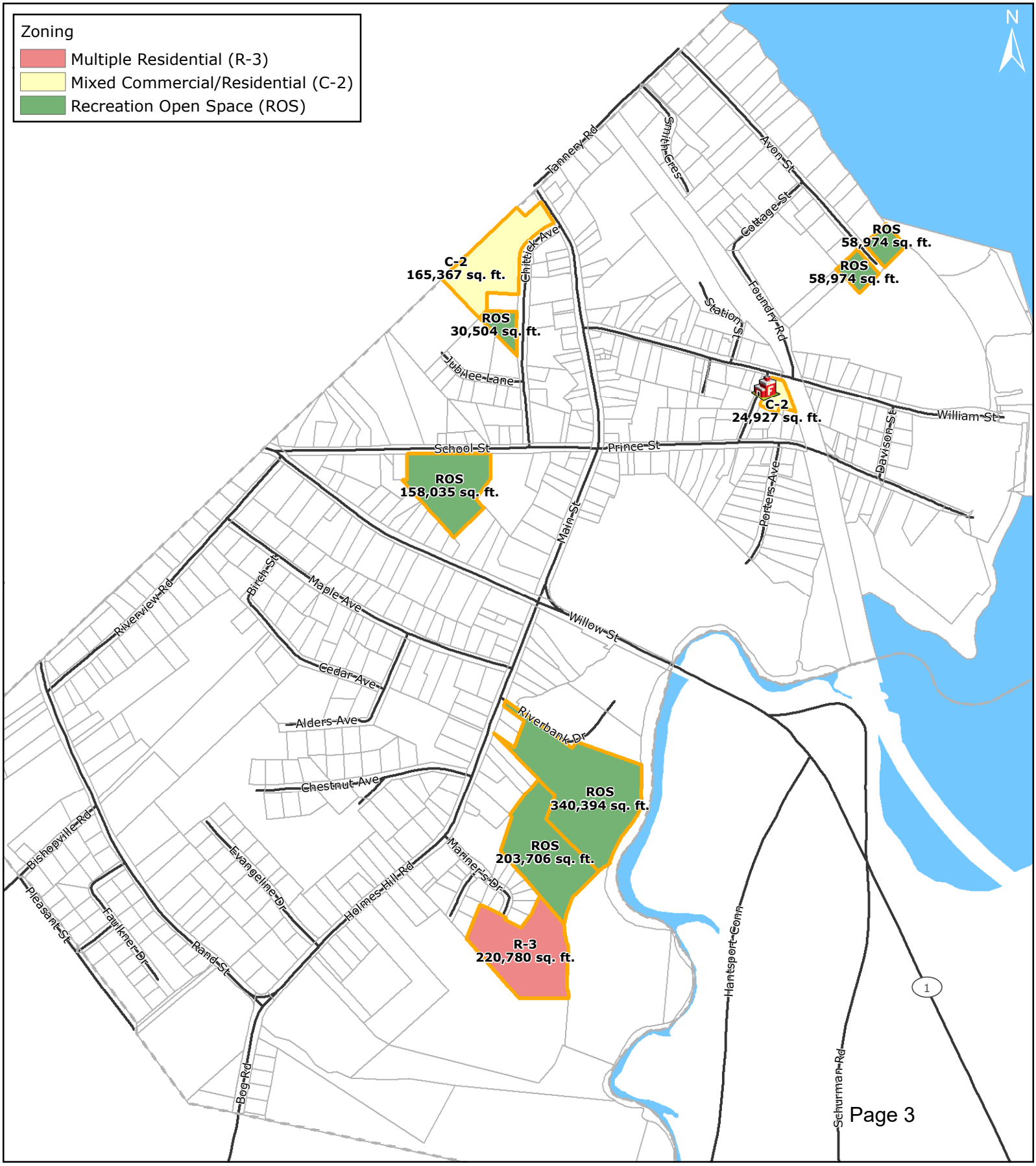
Fire Department

Communities

Parcels

Roads

Water



Base data derived from the Nova Scotia Property Records Database (NSPRD), Copyright Her Majesty The Queen in the Right of the Province of Nova Scotia.

This map is a graphical representation and is not intended for legal descriptions or to calculate exact dimensions or area.

Prepared by: Windsor / West Hants Planning Department March 2020

Hantsport Municipally Owned Land Over 20,000 sq. ft.

Figure 2

0 200 400

Metres

Scale: 1:8,500

Municipally Owned Land over 20,000 sq. ft.

Fire Department

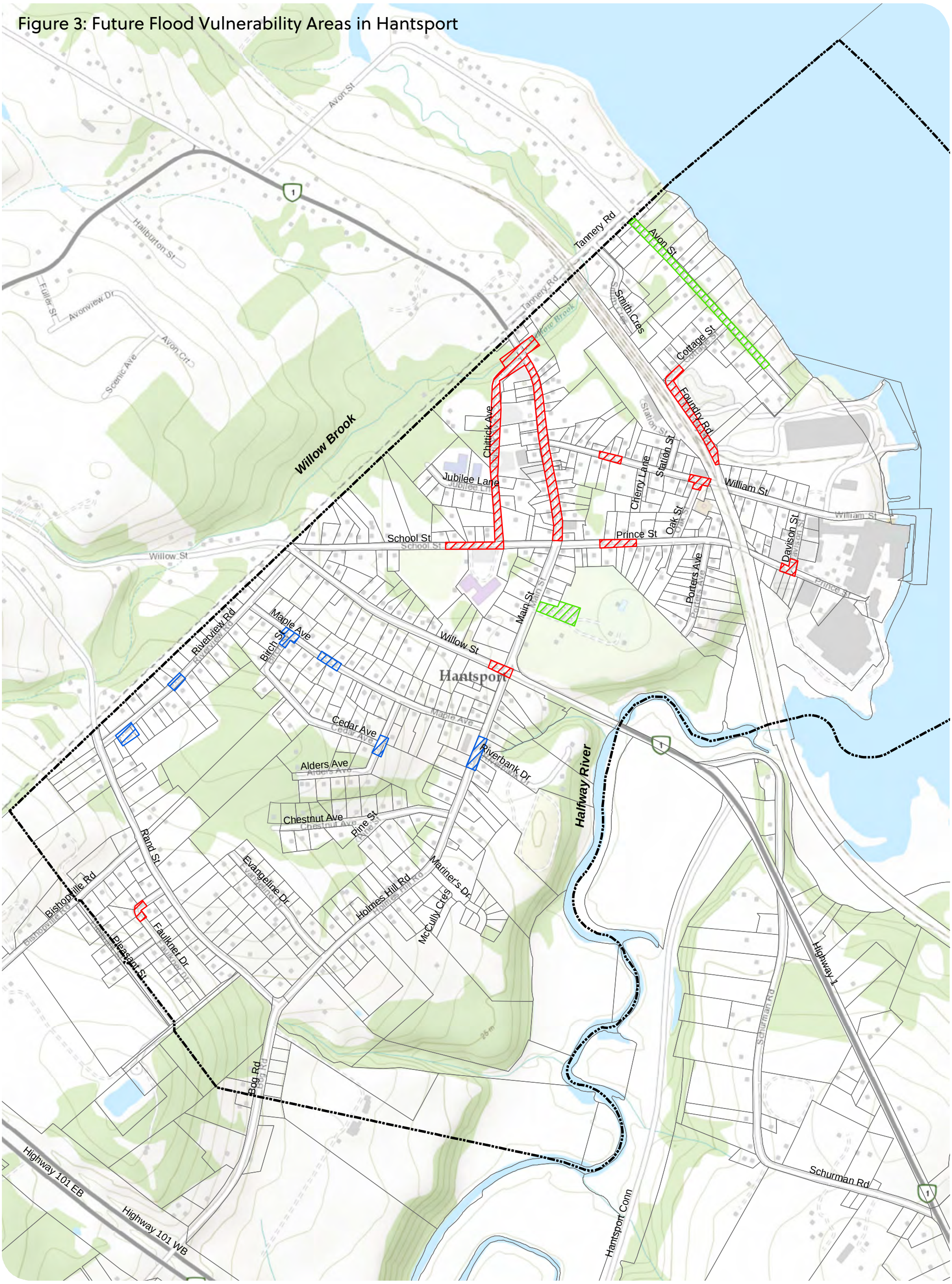
Communities

Parcels

Roads



Figure 3: Future Flood Vulnerability Areas in Hantsport



MUNICIPALITY OF THE DISTRICT OF WEST HANTS
HANTSPORT SWM STUDY

FUTURE FLOOD VULNERABLE AREAS
FIGURE 6-2

- FLOOD VULNERABLE AREAS (DUE TO FUTURE LAND USE)
- FLOOD VULNERABLE AREAS (DUE TO FUTURE LAND USE AND CLIMATE CHANGE)
- FLOOD VULNERABLE AREAS (ADDITIONAL IDENTIFIED BY THE MUNICIPALITY)
- LAND PARCEL
- MUNICIPAL BOUNDARY

MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI & WEST HANTS

MAP CREATED BY: JGC
MAP CHECKED BY: JAM
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

FILE LOCATION: \\DILLON.CA\DILLON_DFS\LONDON\LONDON CAD\GIS\VISUAL COMMUNICATIONS DI\MXD TEMPLATES\BEIGE - 11X17 LANDSCAPE - LEGEND BOTTOM.MXD

SCALE 1:7,500
0 50 100 200 Meters

PROJECT: 17-6276 STATUS: FINAL DATE: 18/04/27

Geotechnical Investigation

Windsor-West Hants Regional Municipality – Hantsport Fire Station
Hantsport, NS
File No: 203102

Prepared for:
Windsor-West Hants
Regional Municipality
76 Morison Dr., P.O. Box 3000
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Prepared by:
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219 Waverley Rd., Suite 200
Dartmouth, NS B2X 2C3

September 23, 2020

TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 SITE DESCRIPTION AND GEOLOGY 2
3.0 INVESTIGATIVE PROCEDURES 3
3.1 General 3
3.2 Boreholes 3
3.3 Laboratory Testing 3
3.4 Surveying 4
4.0 SUBSURFACE CONDITIONS 5
4.1 Asphalt 5
4.2 Fill 5
4.3 Silt, Sand, and Gravel 5
4.4 Glacial Till 6
4.5 Groundwater 7
5.0 DISCUSSION AND RECOMMENDATIONS 8
5.1 General 8
5.2 Site Preparation 8
5.2.1 Excavation in Soil 8
5.2.2 Control of Surface Water and Groundwater 9
5.2.3 Sequencing Work and Protection of Exposed Soils 9
5.3 Structural Fill 9
5.4 Foundations 10
5.4.1 Spread Footings 10
5.5 Slabs-on-Ground 11
5.6 Erosion Control and Drainage 11
5.7 Retaining Walls 11
5.8 Geotechnical Parameters 12
5.9 Winter Weather Conditions 12
5.10 Seismic Site Classification 12
6.0 CLOSURE 13

LIST OF TABLES

Table 1 Summary of Subsurface Conditions 5
Table 2 Particle Size Analyses – Silt, Sand, and Gravel 6
Table 3 Particle Size Analyses – Glacial Till 6
Table 4 Geotechnical Bearing Resistance 10
Table 5 Unfactored Geotechnical Parameters 12

LIST OF APPENDICES

Appendix A Symbols and Terms Used on Borehole and Test Pit Records
Borehole Records BH01, BH02, and BH03
Appendix B Laboratory Testing Results
Appendix C Borehole Location Plan

1.0 INTRODUCTION

Acting at the request and authorization of Windsor-West Hants Regional Municipality (WWH), Harbourside Geotechnical Consultants (Harbourside) have completed a geotechnical investigation for the proposed replacement of the Hantsport Fire Station in Hantsport, Nova Scotia.

The existing fire station is a five-bay garage that stores various equipment while also acting as an indoor parking area for Hantsport Fire Department vehicles. WWH is planning for the design and construction in order to replace the existing structure.

The purpose of this geotechnical investigation was to determine the subsurface soil conditions at the site and to provide geotechnical recommendations to aid with design and construction of the replacement structure.

The scope of work completed for this project includes the following:

- Completion of a geotechnical field investigation, consisting of three boreholes;
- A laboratory testing program; and
- Preparation of this report detailing the findings of the field investigation and laboratory analyses, as well as discussion and recommendations to aid with site earthworks and foundation design.

This report has been prepared specifically and solely for the project described herein and contains all the findings of this investigation.

2.0 SITE DESCRIPTION AND GEOLOGY

The Hantsport Fire Station is located at 5 Oak St, in Hantsport, Nova Scotia. The site in question is bordered by William Street to the north, Oak street to the west, a rail line to the east, and an assortment of lightly treed residential properties to the south.

The existing Hantsport Fire Station is currently still in operation and is being used to store equipment and Hantsport Fire Department vehicles. The lot surrounding the building is occasionally used for parking of personal passenger vehicles. The lot surface is gravel except for a paved section on the western side, in front of the five-bay garage, with grades decreasing gently from southwest to northeast. The lot south of the fire station is at an elevation approximately 2.0 to 3.0 m higher than the parking lot surface. This material is retained by a combination of the south wall of the fire station and a retaining wall extending parallel to the south wall of the fire station.

Previous experience in this area and geological mapping indicate that the principal overburden strata is silty glacial till plain consisting of silty, compact material derived from both local and distant sources. Bedrock geology mapping indicates the site overlies sedimentary bedrock of the Chevrie Formation, comprised of sandstone, siltstone, and conglomerate.

3.0 INVESTIGATIVE PROCEDURES

3.1 *GENERAL*

The geotechnical field investigation, which included drilling three boreholes, was conducted between August 18th and August 19th, 2020. The boreholes were put down using a track-mounted CME55 drill equipped for geotechnical sampling and testing. Samples of the soil were recovered from the boreholes, classified in the field, and taken to our laboratory for final classification and testing. A detailed summary of the soil conditions encountered, as well as the sampling and testing carried out, is presented on the Borehole Records in Appendix A. A document entitled "Symbols and Terms used on Borehole and Test Pit Records", which clarifies terms used through this report, as well as symbols and terms used on the borehole records is also included in Appendix A.

3.2 *BOREHOLES*

To support the design of the new structures, three boreholes were advanced to the west, north and east of the existing fire station.

Conditions at each location were observed and logged by Harbourside geotechnical personnel. Boreholes were drilled to depths ranging from 12.2 to 12.6 m below the ground surface. The boreholes were advanced through the overburden using a combination of standard flight augers, and HW-sized casing. Soil sampling was carried out at regular intervals using conventional split-spoon samplers while performing Standard Penetration Testing (SPT) as described in *ASTM D1586 Standard Test Method for Standard Penetration Test and Split-Barrel Sampling of Soils*.

The SPT "N-value" is the number of blows required to advance a 50-mm outer-diameter split-spoon sampler a distance of 300 mm into the soil using a standardized drop height and weight. N-values generally provide an indication of soil consistency or compactness and may also be used to aid in estimation of other soil parameters.

A standpipe piezometer was installed in one borehole (BH01) to measure water levels following drilling. Boreholes were backfilled to grade with a combination of sand, borehole cuttings, and asphalt patch.

3.3 *LABORATORY TESTING*

All soil samples recovered from the test locations were stored in water-tight containers and taken to our geotechnical laboratory for final classification and testing. Laboratory testing on select soil and rock samples included:

- Water content determinations (*ASTM D2216 Standard Test Methods for Laboratory Determination of Water Content of Soil and Rock by Mass*),
- Particle-size analyses (*ASTM D6913 Standard Test Method for Particle-Size Distribution of Soils Using Sieve Analysis*), and
- Atterberg Limits *(ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils)*.

A summary of the testing performed is presented on the borehole records in Appendix A and in separate figures in Appendix B. Soil descriptions used throughout this report are in general accordance with the Unified Soil Classification System (*ASTM D2487 Standard Practice for Classification of Soils for Engineering purposes / ASTM D2488 Standard Practice for Description and Identification of Soils*).

3.4 *SURVEYING*

The locations and ground surface elevations of all boreholes were surveyed by Harbourside personnel with construction-grade GPS equipment. Borehole coordinates are provided in UTM Zone 20 NAD83 CSRS (2010). Elevations are referenced to the Canadian Geodetic Vertical Datum of 2013 (CGVD2013).

4.0 SUBSURFACE CONDITIONS

The subsurface conditions at the borehole locations generally consisted of the following sequence:

- Asphalt,
- Fill,
- Silt, Sand, and Gravel, and
- Glacial till.

The subsurface conditions observed in the test pits are summarized in Table 1 and the following paragraphs, and are described in additional detail on the test pit records provided in Appendix A.

Table 1 Summary of Subsurface Conditions

Location	Ground Elevation[a] (m)	Layer Thickness (m)				Groundwater	
		Asphalt	Fill	Silt, Sand, And Gravel	Glacial Till	Depth to Surface (m)	Surface Elevation[a] (m)
BH01	14.42	-	1.58	3.04	>7.57	10.87[b]	3.55
BH02	14.64	-	1.37	7.06	>4.14	-	-
BH03	16.35	0.08	1.98	4.54	>5.87	-	-

(a) Elevations are referenced to CGVD2013.
(b) See discussion in Section 4.5.

4.1 *ASPHALT*

In borehole BH03 a layer of asphalt was encountered at surface. This layer was 0.08 m in thickness.

4.2 *FILL*

Fill was encountered below the asphalt in borehole BH03 and at the surface of boreholes BH01 and BH02. The fill ranged in thickness from 1.37 to 1.98 m. The fill generally consisted of a layer of grey gravel with silt and sand, approximately 0.3 to 0.4 m in thickness, underlain by brown silty sand with gravel.

The water contents of two samples of the fill were 7 and 13 percent. The results of two particle-size analyses on the fill indicated 23 to 28 percent gravel, 50 to 58 percent sand, and 19 to 22 percent silt- and clay-sized particles.

Based on the sampling and testing completed, the fill encountered may generally be described as grey gravel with silt and sand, and brown silty sand with gravel.

4.3 *SILT, SAND, AND GRAVEL*

Granular deposits of orangish-brown to brown sands and silts with varying amounts of gravel were encountered below the fill in all three boreholes. These deposits varied in thickness from 3.04 m at borehole BH01, to 7.06 m at borehole BH02. The stratigraphy of these materials generally consisted of silty sands with varying amounts of gravel, underlain by silt with sand, occasionally interlayered with lean clay.

The results of five particle-size analyses completed on samples from these deposits are summarized in Table 2, below. The natural water content of seven samples from these deposits ranged from 7 to 24 percent, with an average of 16 percent.

Table 2 Particle Size Analyses – Silt, Sand, and Gravel

Location	Sample No.	Sample Depth (m)	ASTM Soil Classification[a]	Material Composition by Weight (%)		
				Gravel	Sand	Fines[b]
BH01	SS04	2.1 to 2.7	Silty Sand with Gravel	30	54	16
BH01	SS06	3.7 to 4.3	Silt with Sand	0	17	83
BH02	SS05	3.0 to 3.6	Silty Sand	10	72	18
BH02	SS10	6.7 to 7.3	Lean Clay	0	5	95
BH03	SS06	3.3 to 3.9	Silty Sand with Gravel	24	61	15

(a) See ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
(b) For particle size analyses performed by sieve, the percent of silt- and clay-sized particles are reported collectively as the percent fines.

Atterberg limit testing on a sample taken from an interlayer of lean clay within these deposits indicated a plastic limit of 15 and a liquid limit of 23.

SPT N-values from these deposits ranged from 6 to 29, indicating that the sand and silt layers can generally be classified as loose to compact. Based on the sampling and lab testing carried out, this layer can generally be described as loose to compact orangish-brown to brown silty sand with gravel to silt with sand.

4.4 *GLACIAL TILL*

Glacial till comprised of clay, sand, and gravel was encountered in all three boreholes. Boreholes were terminated within the till layer, at a maximum penetration of 7.57 m. Occasional cobbles were noted within this layer in borehole BH01

The results of three particle-size analyses on the glacial till are presented in Table 3. The natural water content of seven samples of the till ranged from 8 to 14 percent, with an average of 12 percent.

Table 3 Particle Size Analyses – Glacial Till

Location	Sample No.	Sample Depth (m)	ASTM Soil Classification[a]	Material Composition by Weight (%)		
				Gravel	Sand	Fines[b]
BH01	SS10	6.1 to 6.7	Clayey Sand	11	45	44
BH02	SS15	10.5 to 11.1	Sandy Lean Clay	10	39	51
BH03	SS14	9.5 to 10.1	Sandy Lean Clay	7	41	52

(c) See ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
(d) For particle size analyses performed by sieve, the percent of silt- and clay-sized particles are reported collectively as the percent fines.

Atterberg limit testing on three samples of glacial till indicated plastic limits ranging from 11 to 12 and liquid limits ranging from 23 to 26.

SPT N-values from the glacial till ranged from 13 to 45, indicating that the till can generally be classified as stiff to hard. Refusal occurred twice within this material in borehole BH01, suggesting occasional cobbles. Field testing on samples of the glacial till with a pocket penetrometer indicated undrained shear strengths ranging from 50 to 200 kPa. Based on the sampling and testing carried out, the till can be described as stiff to hard brown sandy lean clay to clayey sand.

4.5 *GROUNDWATER*

A standpipe piezometer was installed in borehole BH01 on August 18th, 2020. The groundwater surface was measured at elevation 3.55 m on August 19th, 2020, which is 10.87 m below ground surface. The groundwater surface was measured at a depth of 50 mm below ground surface on September 11th, 2020. This water level was measured approximately 12 hours after a significant rainfall event. Further to this, visibly wet samples were recovered below a depth of approximately 3.2 m below ground surface, which may provide an indication of the actual groundwater table.

Groundwater levels may fluctuate with tidal regimes, precipitation events and in response to climatic and seasonal weather trends.

5.0 DISCUSSION AND RECOMMENDATIONS

5.1 *GENERAL*

We understand that the new fire hall will be constructed in a similar area on the lot to the existing structure. Preliminary layouts and designs are being considered, but the final design will likely be influenced by the results of this investigation. We anticipate that site redevelopment will include a new building supported on spread footings and slabs on grade, along with asphalt pavement areas for driveways and parking.

The site is underlain by deposits of loose to compact silty sand with gravel to silt with sand up to

The main findings of our investigation are as follows:

- A surficial layer of asphalt and fill consisting of gravel with silt and sand and silty sand with gravel overlies the area with a thickness of 1.4 to 2.0 m.
- Fills are underlain by deposits of loose to compact silts and sands with varying amounts of gravel. These deposits vary in thickness from 3.04 m at borehole BH01, to 7.06 m at borehole BH02, on the eastern side of the site. These materials will likely act as the founding material for shallow foundations on the site. Their compressibility may limit the serviceability limit state (SLS) bearing capacity of these foundations. Consideration should be given to the degree of excavation and replacement of these materials with compacted structural fill.
- Stiff to hard clayey glacial till was encountered at depths of 4.6 to 8.4 m below ground surface. Significant excavation would be required to construct spread footings at these depths.
- Bedrock was not encountered during this investigation.
- Groundwater was noted 10.9 m below the existing ground surface. Groundwater levels were also inferred at an approximate depth of 3 m based on recovered sample moisture contents. However, groundwater elevations and inflow rates may be tidally influenced due to the proximity of the site to the Minas Basin.
- From a geotechnical perspective, the site is suitable for the proposed development. The sand deposits are capable of supporting typical spread foundations, although excavation and replacement of excessively loose material below the influence area of spread foundations may be necessary.

The following sections provide geotechnical recommendations to assist with design.

5.2 *SITE PREPARATION*

5.2.1 Excavation in Soil

We recommend that all unsuitable materials, including any rootmat, topsoil, and soils containing deleterious materials such as organics or construction debris be removed from within the influence area of shallow foundations and slabs-on-grade. The influence zone should be taken as 1.0 m perimeter around the building footprint plus a horizontal distance beyond the edge of the footprint equal to the depth of excavation below the bearing surface (i.e. a 1H:1V splay from the edge of the foundation).

After removal of the required materials, the exposed surfaces should be re-graded, compacted, and inspected by qualified geotechnical personnel prior to any placement of fill, formwork, or concrete. Structural fill should meet the requirements of Section 5.3.

Temporary excavation side slopes in soils should be cut no steeper than 1H:1V and should be closely monitored for sloughing or seepage which could result in the need for further flattening.

5.2.2 Control of Surface Water and Groundwater

At the time of the investigation, the water level was measured at approximately 10.9 m below the ground surface. As previously noted, groundwater levels were also inferred based on the noticeably wet samples encountered at a depth of approximately 3 m. Groundwater will likely be encountered during excavations required for construction. Based on the relative proximity to the Minas Basin, groundwater may also be influenced tidally. However, this will depend on the depth of excavations. Groundwater inflow rates and excavation stability should be closely monitored and addressed based on encountered field conditions.

Good practice dictates that surface water should be directed away from excavations. This may be accomplished through the use of ditches and swales. The base of excavations should be shaped to drain to one or more sumps and pumped, if required. A layer of graded-gravel should be used as a filter material lining ditches, swales, and the intake area of sumps in order to limit loss of ground and migration of fines during dewatering. Any water discharged from site should meet all applicable regulatory requirements including those related to erosion and sedimentation control.

5.2.3 Sequencing Work and Protection of Exposed Soils

Work should be sequenced to limit exposed soils to those areas where work can be performed in a timely manner. Therefore, handling of site and nearby borrow materials should be well-planned to minimized degradation and material would ideally be excavated and replaced as part of one continuous operation.

Prepared surfaces should be protected to limit rendering suitable soils from becoming unsuitable. The site soils contain a relatively high proportion of fine-grained material and are anticipated to deteriorate due to trafficking, particularly in the presence of water. It would be prudent to include a provision for a stabilizing layer of rockfill, well-graded gravel, or a mudslab in areas where construction will require trafficking over the exposed surface.

5.3 *STRUCTURAL FILL*

All structural fill within the influence area of shallow foundations and slabs-on-grade should be placed and compacted to 100 percent of standard Proctor maximum dry density in lift thicknesses compatible with the material and compaction equipment used.

All subgrade fills for driveways and parking areas should be compacted as follows:

- Within 300 mm of design subgrade elevation: 98 percent of standard Proctor maximum dry density.
- Below 300 mm of design subgrade elevation: 95 percent of standard Proctor maximum dry density.

Portions of the existing fill in parking areas may be acceptable for reuse, as long as they do not contain deleterious materials such as organics or construction debris. Furthermore, working with relatively fine-grained materials during wet weather conditions can render initially suitable material

to become unsuitable due to ingress of water during handling. Therefore, any placement of site materials should be well-planned to minimize degradation of the material.

Imported structural fill could consist of common fill from a local borrow pit excavated within the local glacial till or it may consist of well-graded granular material such as imported sand and gravel or quarried rock. Structural fill should have a water content during placement within approximately two percent of the standard Proctor optimum water content, be free or organic matter, and have a maximum particle size of about 200 mm. Finer-grained fill should not be placed over coarser-grained material without a proper filter medium.

Over-excavation of disturbed or excessively loose soil below the proposed slab and footing grades and replacement with granular structural fill may be required to stabilize the base of some excavations. Granular fill, such as 200-mm minus rock fill, should be used where over-excavation is completed for this purpose.

To ensure that unsuitable materials are removed, that approved fills are used, and that proper placement techniques and procedures are being followed, we recommend that placement of all structural fill be supervised by experienced geotechnical personnel.

5.4 *FOUNDATIONS*

The design depth of frost penetration should be taken as 1.2 m. Therefore, for frost protection, exterior footings and other foundations in unheated areas should be provided with a minimum of 1.2 m of soil cover or an equivalent combination of soil and insulation.

5.4.1 Spread Footings

Shallow foundations placed on undisturbed silty sands, or approved structural fill are a suitable option to support the anticipated structure.

The factored bearing resistance of shallow foundations at ultimate limit states (ULS) depends on a number of factors that are unknown at this time including the foundation width and length, the condition of the material placed under the footing, and the thickness of fill placed above the native ground. Table 4, below, may be used from preliminary design. This table assuming a long strip footing of various widths, and a concentric load. Bearing resistances should be confirmed once the loading and geometry are known in more detail.

Table 4 also indicates the geotechnical resistance at serviceability limit states (SLS) conditions for 25-mm and 50-mm of settlement. Excavation and replacement of material 2.0 m below the underside of footing with compacted fill against structure such as a well-graded rock fill could increase SLS bearing resistances by approximately 50%.

Table 4 Geotechnical Bearing Resistance

Footing Width (m)	ULS Bearing Resistance (kPa)	SLS Bearing Resistance (for 25 mm of settlement)	SLS Bearing Resistance (for 50 mm of settlement)
2.0	305	135	265
2.5	325	115	230
3.0	345	105	210
3.5	365	95	195

Footings were assumed to have a minimum burial depth of 1.2 m below finished grade. The bearing resistances assume vertical concentric loads and footings placed on horizontal ground away from any downward slopes. The bearing resistance will be reduced under eccentric or inclined loading or if footings are placed near sloping ground.

In accordance with the National Building Code of Canada a resistance factor of 0.5 has been applied to the ULS values.

5.5 *SLABS-ON-GROUND*

Slabs-on-ground should be bedded on a layer of free-draining gravel, such as 25-mm clear stone or gravel type 1, placed over silty sand. The specific material and thickness of bedding will be dependent on slab loading and drainage requirements; however, a minimum thickness of 200 mm is generally recommended.

For design of slabs constructed above silty sand, a preliminary subgrade modulus (k) of 14 MPa/m (based on a 750 mm diameter plate) may be used.

5.6 *EROSION CONTROL AND DRAINAGE*

Based on the particle-size distributions of the soils encountered at the test locations, they are generally considered to have a moderate to high erodibility. In order to control erosion and sedimentation off-site, the following general measures are recommended:

- Contain all sediment-impacted water on the site. This may require construction of a rock-lined settling pond.
- Grade all stripped areas so that the runoff remains within the excavation.
- Prepare limited plan areas to subgrade and cover the area with rock fill or gravel prior to any precipitation events.
- Place and compact all excavated material that is intended for reuse as soon as practical. All excavated material not reused should be promptly removed off site. Excavated reusable material that cannot be promptly used should be placed in a compact stockpile surrounded at the toe by silt fence. Stockpiles could also be covered by tarps, to limit water infiltration and erosion in wet weather.
- Erect and maintain sediment fences to intercept sediment-contaminated water and reduce the runoff velocity.

5.7 *RETAINING WALLS*

Retaining walls, if required, should be founded on undisturbed silty sand or structural fill prepared as described above. Footings for retaining walls may be designed based on the ULS and SLS criteria provided in Section 5.4.

Retaining walls should generally be backfilled with a non-frost susceptible, non-expansive, non-corrosive, free-draining, well-graded material such as NSTIR fill against structure, gravel type 1, or gravel type 2. The extent of the granular backfill should be in accordance with the wall design requirements.

It is important that retaining walls are designed to ensure thorough drainage of the backfill material. This may be accomplished with a drainage system such as a longitudinal drainpipe discharging to a positive outlet. When backfilling behind a retaining wall, fill should be placed in lifts and compacted as a minimum to 95 percent of the standard Proctor maximum dry density. Care should be taken not to damage walls when performing backfilling and compaction

operations. To limit compaction-induced stresses, compaction within 1.0 m of retaining structures should be performed with a walk-behind vibratory plate tamper or another lightweight compaction equipment in lieu of a vibratory drum roller.

All drainage materials, including backfill and drainage blankets, must be designed to limit loss of soil according to filter criteria.

The values for the soil parameters presented in the next section may be used for design of retaining walls. The earth pressure coefficients used for design should be selected or adjusted based on the appropriate finished back-slope angle. Walls that can tolerate little or no movement should be designed for at-rest lateral earth pressures.

5.8 *GEOTECHNICAL PARAMETERS*

The following unfactored values (Table 5) for the indicated parameters may be used for design purposes:

Table 5 Unfactored Geotechnical Parameters

Parameter	Value		
	Existing Fill or Compacted Common Fill[a]	Silty Sand	Fill Against Structure, Gravel Type 1, or Gravel Type 2 [a][b]
Effective Angle of Internal Friction, degrees	32	30	36
Total Unit Weight, kN/m^3	21.5	20.5	22.0
Submerged Unit Weight[c], kN/m^3	11.7	10.7	12.2
Coefficient of Active Earth Pressure[d]	0.31	0.33	0.26
Coefficient of Passive Earth Pressure[d]	3.25	3.00	3.85
Coefficient of At-Rest Earth Pressure[d]	0.47	0.50	0.41
Friction Factor, Soil/ Mass Concrete Interface[e]	0.40	0.35	0.50

(a) Compacted material shall be placed in lifts and suitably compacted as described above.
(b) As NSTIR's Standard Specification for Highway Construction and Maintenance (2011).
(c) For uplift design the groundwater table should be assumed at the ground surface and submerged unit weights should be used.
(d) Coefficients of earth pressure presented in table assume a frictionless wall with a vertical back face and a horizontal back slope.
(e) For mass concrete or masonry, lower values will be required for precast or formed concrete.

5.9 *WINTER WEATHER CONDITIONS*

Where practical, earthwork during freezing temperatures should be avoided. In the event of winter construction, special measures will be required to ensure that fills and foundations are not placed on frozen ground and that the soils are protected from freezing after placement. Even following careful procedures and precautions experience has shown that earthworks in these types of soils often become impractical at temperatures below approximately -5°C.

5.10 *SEISMIC SITE CLASSIFICATION*

Based on the findings at the test pits, the site classification for seismic site response in accordance with the National Building Code of Canada is Seismic Site Class D (stiff soil).

6.0 CLOSURE

This report has been prepared to assist in the design and construction of the new Hantsport Fire Station. This report has been prepared for the sole benefit of WWH and their agents. Any use which a third party makes of this report is the responsibility of such third party.

The recommendations made in this report are in accordance with our present understanding of your project. If any details are included in the final design of the proposed structure that differ from the assumptions outlined in this report, the geotechnical engineer should be consulted.

This report is based on the site conditions encountered by Harbourside Geotechnical Consultants at the time of the work at the specific sampling locations and can only be extrapolated to a limited extent around these locations. Should any conditions differ from those detailed on the test pit records, the engineer should be notified to allow reassessment of any design assumptions.

If you have any questions or require any additional information, please do not hesitate to contact the undersigned at your convenience.

H a r b o u r s i d e
Geotechnical Consultants

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APPENDIX A

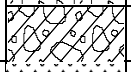
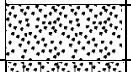
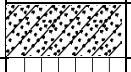
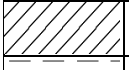
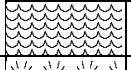
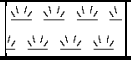
Symbols and Terms Used on Borehole and Test Pit Records
Borehole Records BH01, BH02, and BH03

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

STRATA PLOT

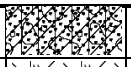
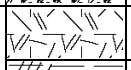
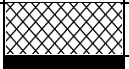
Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols:

USCS SOIL CLASSIFICATION SYMBOLS

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN 75 µm SIEVE SIZE	GRAVELS MORE THAN 50% OF COARSE FRACTION RETAINED ON 4.75 mm SIEVE	CLEAN GRAVELS		**GW**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				**GP**	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES. LITTLE OR NO FINES
		GRAVELS WITH FINES		**GM**	SILTY GRAVELS, GRAVEL – SAND – SILT MIXTURES
				**GC**	CLAYEY GRAVELS, GRAVEL – SAND – CLAY MIXTURES
	SANDS MORE THAN 50% OF COARSE FRACTION PASSING THE 4.75 mm SIEVE	CLEAN SANDS		**SW**	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				**SP**	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES		**SM**	SILTY SANDS, SAND – SILT MIXTURES
				**SC**	CLAYEY SANDS, SAND – CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN 75 µm SIEZE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		**ML**	INORGANIC SILTS
				**CL**	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY
				**OL**	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		**MH**	INORGANIC SILTS
				**CH**	INORGANIC CLAYS OF HIGH PLASTICITY
				**OH**	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				**PT**	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

OTHER COMMONLY USED SYMBOLS

GLACIAL TILL		UNSTRATIFIED GLACIAL DEPOSIT RANGING FROM CLAY TO BOULDERS
BEDROCK		IGNEOUS BEDROCK
		METAMORPHIC BEDROCK
		SEDIMENTARY BEDROCK
MATERIALS PLACED BY HUMANS		FILL: SUBSURFACE MATERIALS IDENTIFIED AS PLACED BY HUMANS
		ASPHALT
		CONCRETE

SAMPLE TYPE

SS	Split Spoon (obtained by performing SPT)
ST	Shelby Tube (Thin-Walled Tube)
GB	Grab Sample
PS	Piston Sample
WS	Wash Sample
HQ, NQ, AQ, BQ, etc.	Rock Core Samples Obtained Using Standard Size Diamond Bits

SPT N-VALUE (N-INDEX)

The standard penetration test (SPT) provides a qualitative evaluation of compactness and a qualitative comparison of subsoil stratification. The SPT is performed in in the bottom of a borehole where a split-barrel sampler having an outside diameter of 50.8 mm is impacted using a hammer weighing 623 N falling 0.76 m for each hammer blow. The SPT N-value is the blow count representation of the penetration resistance of the soil. In accordance with ASTM D1586, the N-value, reported in blows per 300 mm, equals the sum of the number of blows (N) required to drive the sampler over the depth interval of 150 to 450 mm. However, when a 600 mm sampler is used the number of blows (N) required to drive the sampler over the interval of 300 to 600 mm may be reported if this value is lower. For samples where insufficient penetration was achieved and N-Values cannot be presented, the number of blows are reported over sampler penetration in mm (e.g. 50/120). Although some methods make use of N-values corrected for various factors (for equipment used, overburden stress, length of drill rod, etc.) no corrections have been applied to the N-values presented on the logs.

DYNAMIC CONE PENETRATION TEST (DCPT)

Dynamic cone penetration tests (DCPT) are performed using a standard 60-degree apex cone connected to 'A' size drill rods with the same standard fall height and weight as the SPT test. The DCPT value is the number of blows of the hammer required to drive the cone 300 mm. The DCPT provides a qualitative evaluation of compactness and allows for a qualitative comparison of subsurface stratification.

RECOVERY

For soil samples, recovery is recorded as the total length of the soil sample recovered. For rock core, recovery is expressed as a percentage of the total length drilled on a per run basis.

OTHER TESTS

S	Sieve Analysis	CD	Consolidated-Drained Triaxial	C	Consolidation
H	Hydrometer Analysis	CU	Consolidated-Undrained Triaxial	Q_u	Unconfined Compression
γ	Unit Weight	UU	Unconsolidated Undrained Triaxial	I_p	Point Load Index, Ip(50)
G_s	Specific Gravity of Soil Particles	DS	Direct Shear	k	Laboratory Permeability

SOIL DESCRIPTION

Terminology describing common soil genesis:

Rootmat	Vegetation, roots, and moss with organic matter and topsoil typically forming a mattress at the ground surface.
Topsoil	Mixture of soil and humus capable of supporting vegetative growth.
Peat	A soil composed of vegetable tissue in various stages of decomposition usually with an organic odor, a dark-brown to black color, a spongy consistency, and a texture ranging from fibrous to amorphous.
Till	Non-stratified glacial deposit which may range from clay to boulders
Fill	Artificial (man-made) deposits transported and placed on the natural surface of soil or rock.

Terminology describing soil structure:

Homogeneous	The lack of visible bedding and the same appearance and colour throughout
Desiccated	Having visible signs of weathering by oxidation of clay minerals, shrinking cracks, etc.
Fissured	Having cracks and hence a blocky structure
Stratified	Composed of regular alternating successions of different soil types
Varved	Comprised of regular alternating successions of silt and clay which were transported into freshwater lakes by melt water
Layer	> 75 mm
Seam	2 mm to 75 mm
Parting	< 2 mm
Pocket	Small erratic deposit, usually less than 300 mm
Lens	Lenticular deposit

Terminology describing soil types:
Soils are described in accordance with the Unified Soil Classification System (USCS) as described in ASTM D2487 and ASTM D2488. This system classifies soil into categories representing the results of laboratory tests to determine the particle-size characteristics, the liquid limit, and the plasticity index. Using this system, soils are assigned a group name (e.g. silty sand) and symbol (e.g. SM). The various groupings of this classification system have been devised to correlate in a general way with the engineering behavior of soils. Laboratory tests are performed on the portion of the sample passing the 75 mm sieve.

When laboratory test results indicate that that the soil is close to another classification group, the borderline condition can be indicated with two symbols separated by a slash (e.g. CL/CH).

Terminology describing cobbles, boulders, and non-matrix materials:
Materials outside of the USCS (e.g. particles larger than 75 mm, organic matter, construction debris) are described based on the proportion of these materials by weight using the following terminology:

Trace, or occasional	< 10%
Some	10% to 20%
Frequent	> 20%

Terminology describing the compactness condition of cohesionless soils:
A qualitative term describing the compactness condition of a cohesionless soil is interpreted from the SPT N-value (also known as the N-index). The relationship between the SPT N-value and the compactness condition is shown in the following table.

Compactness Condition	**SPT N-Value (blows per 0.3 m)**
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	Over 50

Terminology describing the compactness condition of cohesive soils:
Cohesive soils can be classified in relation to undrained strength. Undrained strength can be determined by a number of tests including: unconfined compression tests, field and laboratory vane tests, laboratory fall-cone tests, shear-box tests, and triaxial tests. The consistency and undrained shear strength may also be approximately related the SPT N-Value. The relationship between the consistency and the undrained shear strength, as well as a rough correlation with SPT N-Value as shown in the following table.

Consistency	Undrained Shear Strength (kPa)	SPT N-Value (blows per 0.3 m)
Very Soft	< 12	< 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	> 200	> 30

ROCK DESCRIPTION

Rock is a natural aggregate of minerals that cannot be readily broken by hand and that will not disintegrate on a first wetting and drying cycle. A rockmass comprises blocks of intact rock that are separated by discontinuities such as cleavage, bedding planes, joints, shears and faults.

Terminology Describing Geological Classification of Rock:

Rock is classified with respect to its geological origin or lithology as follows:

Igneous Rocks	Rocks such as granite, diorite, and basalt, which are formed by the solidification of molten material.
Sedimentary Rocks	Rocks such as sandstone, limestone and shale, which are formed by the lithification of sedimentary soils.
Metamorphic Rocks	Rocks such as quartzite, schist, and gneiss, which have been altered by the application of intense heat and/or pressure.

Terminology Describing the Strength of Intact Rock:

Strength is the maximum stress level that can be carried by a specimen. Rocks may be classified based on their intact strength as shown in the following table.

Term	Unconfined Compressive Strength (MPa)
Extremely Weak	0.25 to 1
Very Weak	1 to 5
Weak	5 to 25
Medium Strong	25 to 50
Strong	50 to 100
Very Strong	100 to 250
Extremely Strong	> 250

Terminology Describing Discontinuity Spacing

The structural integrity of a rockmass will be affected by the presence of discontinuities. The spacing of discontinuities can vary from extremely wide to extremely close as indicated in the table below.

Term	Spacing Width (m)
Extremely Close	< 0.02
Very Close	0.02 to 0.06
Close	0.06 to 0.20
Moderately Close	0.20 to 0.6
Wide	0.6 to 2.0
Very Wide	2.0 to 6.0
Extremely Wide	> 6.0

Rock Quality Designation (RQD)

RQD is an indirect measure of the number of fractures within a rockmass. The method provides a quick and objective technique to estimate rockmass quality during diamond drill core logging. All pieces of intact and sound rock greater than 100 mm long are summed and divided by the total length of the core run in accordance with ASTM D6032.

RQD Classification	RQD (%)
Very Poor Quality	0 to 25
Poor Quality	25 to 50
Fair Quality	50 to 75
Good Quality	75 to 90
Excellent Quality	90 to 100

Terminology to Describe Rock Weathering

The state of weathering significantly alters the geotechnical behaviour of rocks and rockmasses. Weathering of the rockmass may be classified as shown in the following table.

Term	Description
Fresh	No visible sign of rock material weathering; perhaps slight discolouration on major discontinuity surfaces.
Slightly Weathered	Discolouration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discoloured by weathering and may be somewhat weaker than its fresh condition.
Moderately Weathered	Less than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discoloured rock is present either as a discontinuous framework or as corestones
Highly Weathered	More than a half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discoloured rock is present either as a discontinuous framework or as corestones.
Completely Weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.

HARBOURSIDE
Geotechnical Consultants

BOREHOLE RECORD

BH01

N: 4991097 E: 407449

CLIENT WINDSOR-WEST HANTS REGIONAL MUNICIPALITY — **PROJECT No.** 203102

LOCATION HANTSPORT FIRE STATION, 5 OAK STREET, HANTSPORT, NS — **DATUM** CGVD2013

DATES: BORING 18/08/2020 — **WATER LEVEL** 19/08/2020 — **BH SIZE** HW/HQ

UNDRAINED SHEAR STRENGTH - kPa (20, 40, 60, 80)

WATER CONTENT & ATTERBERG LIMITS (W_P, W, W_L)

DYNAMIC PENETRATION TEST, BLOWS/0.3m

STANDARD PENETRATION TEST, BLOWS/0.3m

DEPTH (m)	ELEVATION (m)	SOIL/BEDROCK DESCRIPTION	GRAPHIC LOG	WATER LEVEL	TYPE	NUMBER	REC. SOIL (mm)	BLOWS / 150 mm (N VALUE)	OTHER TESTS
	14.42								
	14.12	FILL: grey gravel with silt and sand			SS	1	425	19-13-12-7 (19)	
1		FILL: brown silty sand with gravel			SS	2	350	11-6-4-6 (10)	S
	12.84								
2		Compact orange-brown silty SAND with gravel			SS	3	300	11-11-10-11 (21)	
					SS	4	350	10-11-9-7 (16)	S
3	11.20								
		Compact brown SILT with sand interlayered with lean CLAY			SS	5	450	4-5-7-10 (12)	
4					SS	6	550	10-10-11-10 (21)	S
	9.80				SS	7	350	3-3-7-6 (10)	
5		Firm to hard brown sandy lean clay to clayey sand TILL - with occasional cobbles			SS	8	425	8-8-10-14 (18)	
					SS	9	375	5-7-7-9 (14)	
6					SS	10	350	8-9-12-12 (21)	S
7									
					SS	11	0	11-14-13-21 (27)	
8					SS	12	225	14-16-20-30 (36)	
					GB	13	200		
9					SS	14	250	8-11-20-64 (31)	

105 100 125 200

■ Miniature Vane □ Torvane

◆ Penetrometer ◇ UU Triaxial

▲ Field Vane △ Unconfined Compression

HARBOURSIDE GEOTECHNICAL CONSULTANTS, BOREHOLE RECORD 23/9/20

(Continued Next Page)

HARBOURSIDE
Geotechnical Consultants

BOREHOLE RECORD

BH01

N: 4991097 E: 407449

CLIENT WINDSOR-WEST HANTS REGIONAL MUNICIPALITY **PROJECT No.** 203102

LOCATION HANTSPORT FIRE STATION, 5 OAK STREET, HANTSPORT, NS **DATUM** CGVD2013

DATES: BORING 18/08/2020 **WATER LEVEL** 19/08/2020 **BH SIZE** HW/HQ

DEPTH (m)	ELEVATION (m)	SOIL/BEDROCK DESCRIPTION	GRAPHIC LOG	WATER LEVEL	TYPE	NUMBER	REC. SOIL (mm)	BLOWS / 150 mm (N VALUE)	OTHER TESTS
11		Firm to hard brown sandy lean clay to clayey sand TILL - with occasional cobbles *(continued)*		▼	SS	15	300	20-58-50 / 50 mm	
12	2.23				SS	16	300	52-50 / 125 mm	
		End of Borehole - install standpipe							

UNDRAINED SHEAR STRENGTH - kPa
20 40 60 80
W_P W W_L
WATER CONTENT & ATTERBERG LIMITS
DYNAMIC PENETRATION TEST, BLOWS/0.3m
STANDARD PENETRATION TEST, BLOWS/0.3m
0 10 20 30 40 50 60 70 80
225

■ Miniature Vane □ Torvane
◆ Penetrometer ◇ UU Triaxial
▲ Field Vane △ Unconfined Compression

HARBOURSIDE GEOTECHNICAL CONSULTANTS, BOREHOLE RECORD 23/9/20

HARBOURSIDE
Geotechnical Consultants

BOREHOLE RECORD

BH02

N: 4991076 E: 407459

CLIENT WINDSOR-WEST HANTS REGIONAL MUNICIPALITY **PROJECT No.** 203102

LOCATION HANTSPORT FIRE STATION, 5 OAK STREET, HANTSPORT, NS **DATUM** CGVD2013

DATES: BORING 18/08/2020 TO 19/08/2020 **WATER LEVEL** Not Measured **BH SIZE** HW/HQ

DEPTH (m)	ELEVATION (m)	SOIL/BEDROCK DESCRIPTION	GRAPHIC LOG	WATER LEVEL	TYPE	NUMBER	REC. SOIL (mm)	BLOWS / 150 mm (N VALUE)	OTHER TESTS
	14.64								
	14.34	FILL: grey gravel with silt and sand			SS	1	375	4-5-5-6 (10)	
1		FILL: brown silty sand with gravel			SS	2	450	8-5-5-6 (10)	
	13.27								
2		Loose to compact orange-brown silty SAND			SS	3	200	9-11-11-21 (22)	
					SS	4	375	19-26-16-13 (29)	
3		- wet below 3.2 m			SS	5	400	5-5-4-5 (9)	S
4					SS	6	425	4-4-5-9 (9)	
					SS	7	300	3-5-4-4 (8)	
5	9.18				SS	8	425	8-5-8-13 (13)	
		Loose to compact brown SILT with sand interlayered with lean CLAY			SS	9	425	9-5-8-10 (13)	
6					SS	10	450	13-5-5-8 (10)	S
7					SS	11	0	3-4-5-11 (9)	
8	6.21				SS	12	500	13-22-17-17 (34)	
		Very stiff to hard brown sandy lean clay to clayey sand TILL			SS	13	0	8-10-13-17 (23)	
9					SS	14	500	13-22-17-17	

UNDRAINED SHEAR STRENGTH - kPa
20 40 60 80
W_P W W_L
WATER CONTENT & ATTERBERG LIMITS
DYNAMIC PENETRATION TEST, BLOWS/0.3m
STANDARD PENETRATION TEST, BLOWS/0.3m
0 10 20 30 40 50 60 70 80

115
131

■ Miniature Vane □ Torvane
◆ Penetrometer ◇ UU Triaxial
▲ Field Vane △ Unconfined Compression

HARBOURSIDE GEOTECHNICAL CONSULTANTS, BOREHOLE RECORD 23/9/20

(Continued Next Page)

HARBOURSIDE
Geotechnical Consultants

BOREHOLE RECORD

BH02

N: 4991076 E: 407459

CLIENT WINDSOR-WEST HANTS REGIONAL MUNICIPALITY **PROJECT No.** 203102

LOCATION HANTSPORT FIRE STATION, 5 OAK STREET, HANTSPORT, NS **DATUM** CGVD2013

DATES: BORING 18/08/2020 TO 19/08/2020 **WATER LEVEL** Not Measured **BH SIZE** HW/HQ

DEPTH (m)	ELEVATION (m)	SOIL/BEDROCK DESCRIPTION	GRAPHIC LOG	WATER LEVEL	TYPE	NUMBER	REC. SOIL (mm)	BLOWS / 150 mm (N VALUE)	OTHER TESTS
11		Very stiff to hard brown sandy lean clay to clayey sand TILL *(continued)*						(34)	
					SS	15	450	8-10-11-12 (21)	S
12	2.07				SS	16	350	11-14-18-21 (32)	
		End of Borehole							
13									
14									
15									
16									
17									
18									
19									

UNDRAINED SHEAR STRENGTH - kPa

20 40 60 80

W_P W W_L

WATER CONTENT & ATTERBERG LIMITS

DYNAMIC PENETRATION TEST, BLOWS/0.3m

STANDARD PENETRATION TEST, BLOWS/0.3m

0 10 20 30 40 50 60 70 80

105

165

■ Miniature Vane □ Torvane

◆ Penetrometer ◇ UU Triaxial

▲ Field Vane △ Unconfined Compression

HARBOURSIDE GEOTECHNICAL CONSULTANTS, BOREHOLE RECORD 23/9/20

HARBOURSIDE
Geotechnical Consultants

BOREHOLE RECORD

BH03

N: 4991085 E: 407426

CLIENT WINDSOR-WEST HANTS REGIONAL MUNICIPALITY — **PROJECT No.** 203102

LOCATION HANTSPORT FIRE STATION, 5 OAK STREET, HANTSPORT, NS — **DATUM** CGVD2013

DATES: BORING 19/08/2020 — **WATER LEVEL** Not Measured — **BH SIZE** HW/HQ

DEPTH (m)	ELEVATION (m)	SOIL/BEDROCK DESCRIPTION	TYPE	NUMBER	REC. SOIL (mm)	BLOWS / 150 mm (N VALUE)	OTHER TESTS
	16.35						
	16.27	ASPHALT					
		FILL: grey gravel with silt and sand	SS	1	350	8-10-10-8 (18)	
	15.76	FILL: brown silty sand with gravel	SS	2	325	9-7-12-8 (19)	S
1			SS	3	375	5-4-12-8 (16)	
2	14.29	Compact orange-brown silty SAND with gravel	SS	4	0	8-8-8-9 (16)	
			SS	5	250	8-8-7-9 (15)	
3			SS	6	250	7-6-6-7 (12)	S
4	11.98						
		Loose to compact brown SILT with sand interlayered with lean CLAY	SS	7	50	2-2-4-7 (6)	
5			SS	8	350	5-7-12-13 (19)	
6			SS	9	0	6-7-8-14 (15)	
	9.75		SS	10	350	9-14-14-15 (28)	
7		Stiff to very stiff brown sandy lean clay with gravel TILL					
			SS	11	0	7-9-9-9 (18)	
8			SS	12	500	9-10-12-48 (22)	
9			SS	13	200	5-7-12-10 (19)	
			SS	14	600	10-12-13-13	S

UNDRAINED SHEAR STRENGTH - kPa

20 40 60 80

W_P W W_L

WATER CONTENT & ATTERBERG LIMITS

DYNAMIC PENETRATION TEST, BLOWS/0.3m

STANDARD PENETRATION TEST, BLOWS/0.3m

0 10 20 30 40 50 60 70 80

■ Miniature Vane □ Torvane

◆ Penetrometer ◇ UU Triaxial

▲ Field Vane △ Unconfined Compression

HARBOURSIDE GEOTECHNICAL CONSULTANTS, BOREHOLE RECORD 23/9/20

(Continued Next Page)

HARBOURSIDE
Geotechnical Consultants

BOREHOLE RECORD

BH03

N: 4991085 E: 407426

CLIENT WINDSOR-WEST HANTS REGIONAL MUNICIPALITY **PROJECT No.** 203102

LOCATION HANTSPORT FIRE STATION, 5 OAK STREET, HANTSPORT, NS **DATUM** CGVD2013

DATES: BORING 19/08/2020 **WATER LEVEL** Not Measured **BH SIZE** HW/HQ

DEPTH (m)	ELEVATION (m)	SOIL/BEDROCK DESCRIPTION	GRAPHIC LOG	WATER LEVEL	TYPE	NUMBER	REC. SOIL (mm)	BLOWS / 150 mm (N VALUE)	OTHER TESTS
								(25)	
	5.99								
11		Stiff to hard brown gravelly lean clay with sand TILL			SS	15	300	6-6-7-14 (13)	
12	3.88				SS	16	300	9-22-26-19 (45)	
		End of Borehole							
13									
14									
15									
16									
17									
18									
19									

UNDRAINED SHEAR STRENGTH - kPa

20 40 60 80

W_P W W_L

WATER CONTENT & ATTERBERG LIMITS

DYNAMIC PENETRATION TEST, BLOWS/0.3m

STANDARD PENETRATION TEST, BLOWS/0.3m

0 10 20 30 40 50 60 70 80

112

■ Miniature Vane □ Torvane

◆ Penetrometer ◇ UU Triaxial

▲ Field Vane △ Unconfined Compression

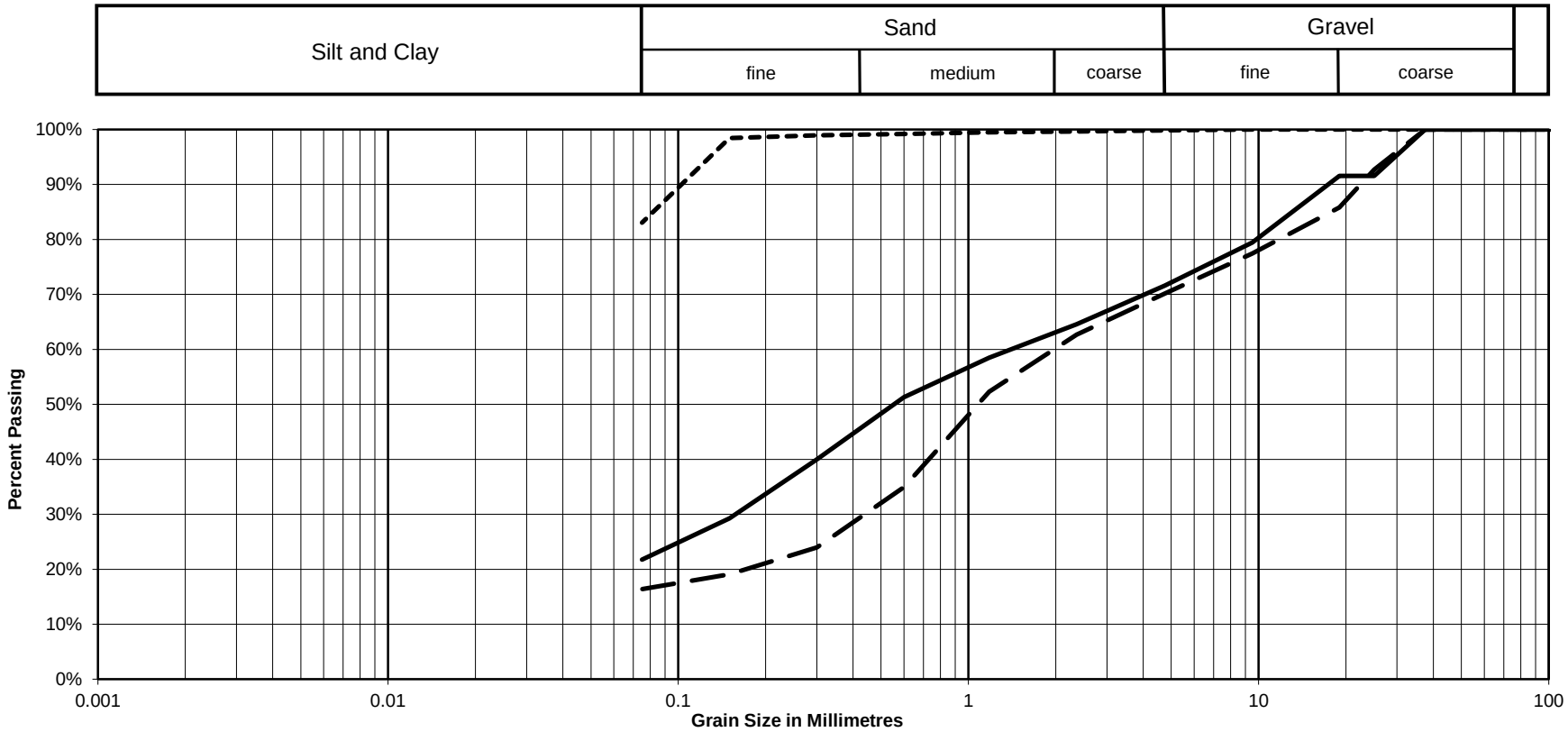
HARBOURSIDE GEOTECHNICAL CONSULTANTS, BOREHOLE RECORD 23/9/20

APPENDIX B

Laboratory Testing Results

Checked: **DJW**

GRAIN SIZE DISTRIBUTION



CURVE	BOREHOLE / TESTPIT	SAMPLE	DEPTH (m)	SOIL FRACTION			SOIL DESCRIPITION
				GRAVEL	SAND	SILT/CLAY	
———	BH01	SS02	0.6 to 1.2	28%	50%	22%	Silty Sand with Gravel
— — -	BH01	SS04	2.1 to 2.7	30%	54%	16%	Silty Sand with Gravel
- - - -	BH01	SS06	3.7 to 4.3	0%	17%	83%	Silt with Sand

PROJECT No.: 203102

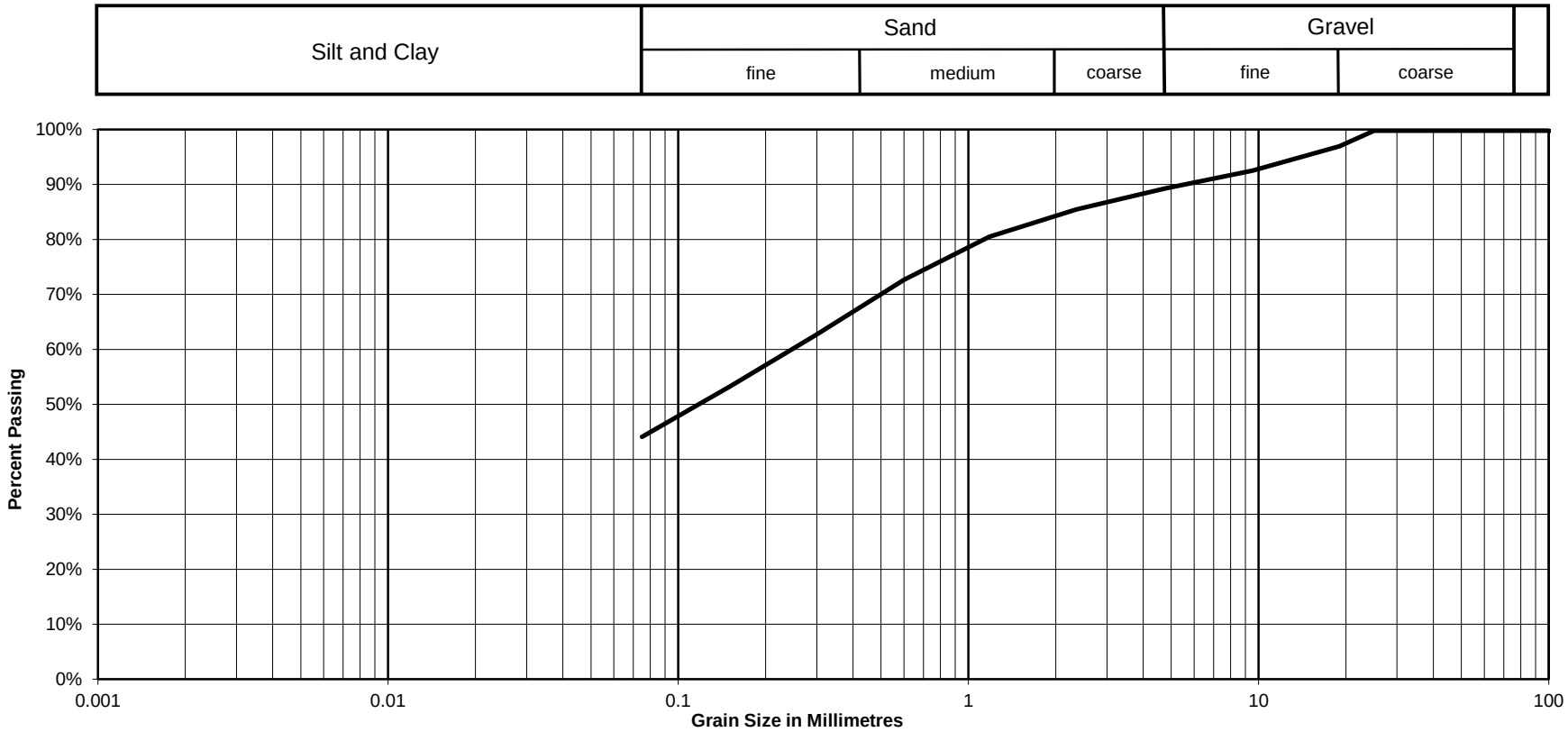
HGC

t: 1.902.405.4696 | f: 1.902.405.4693
219 Waverley Road, Suite 200
Dartmouth, NS B2X 2C3
http://harboursideengineering.ca

CLIENT Windsor-West Hants Municiplaity
PROJECT Hantsport Fire Station
LOCATION Hantsport, NS

Checked: **DJW**

GRAIN SIZE DISTRIBUTION



CURVE	BOREHOLE / TESTPIT	SAMPLE	DEPTH (m)	SOIL FRACTION			SOIL DESCRIPITION
				GRAVEL	SAND	SILT/CLAY	
———	BH01	SS10	6.1 to 6.7	11%	45%	44%	Clayey Sand

PROJECT No.: 203102

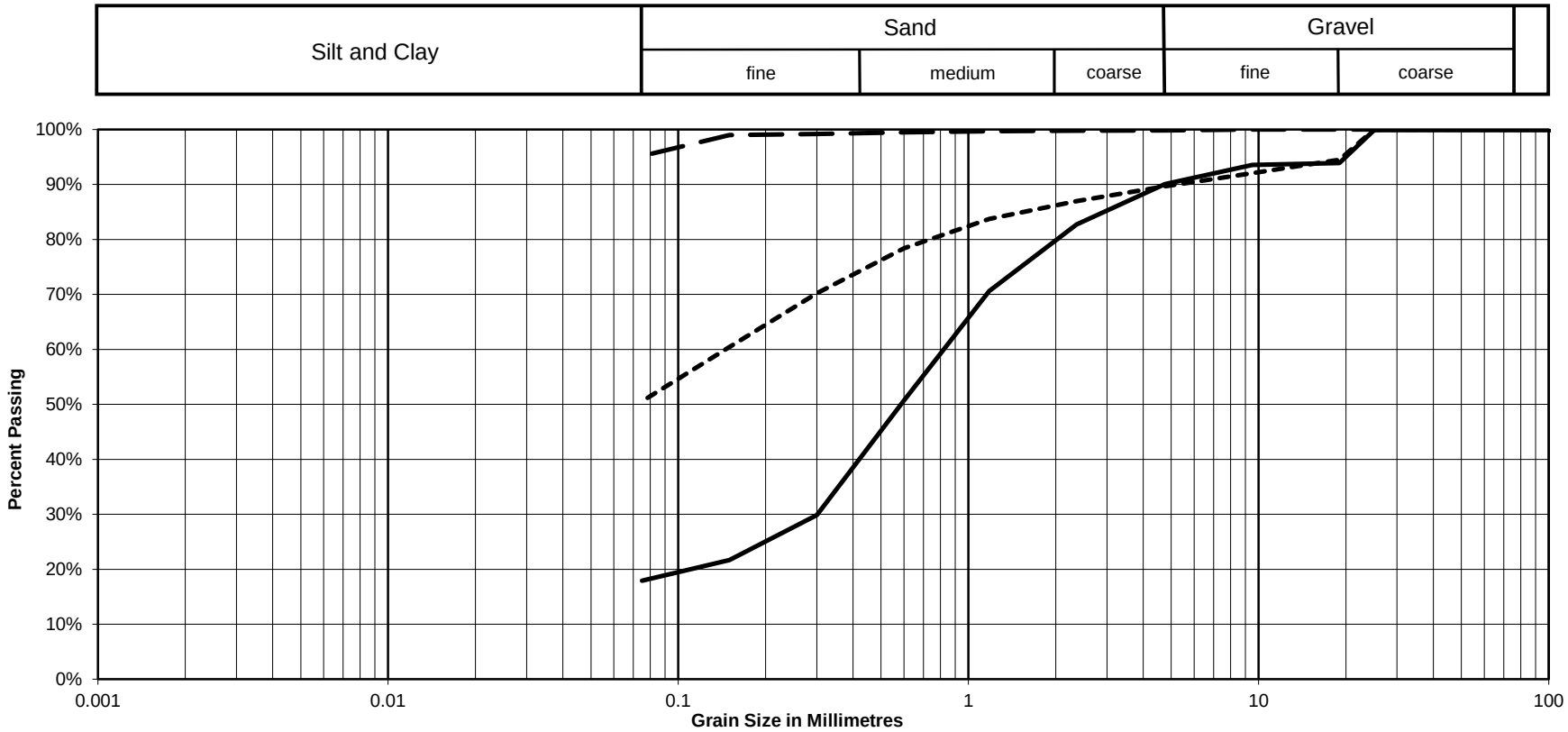
HGC

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Dartmouth, NS B2X 2C3
http://harboursideengineering.ca

CLIENT Windsor-West Hants Municiplaity
PROJECT Hantsport Fire Station
LOCATION Hantsport, NS

Checked: **DJW**

GRAIN SIZE DISTRIBUTION



CURVE	BOREHOLE / TESTPIT	SAMPLE	DEPTH (m)	SOIL FRACTION			SOIL DESCRIPITION
				GRAVEL	SAND	SILT/CLAY	
———	BH02	SS05	3.0 to 3.6	10%	72%	18%	Silty Sand
— — -	BH02	SS10	6.7 to 7.3	0%	5%	95%	Lean Clay
- - - -	BH02	SS15	10.5 to 11.1	10%	39%	51%	Sandy Lean Clay

PROJECT No.: 203102

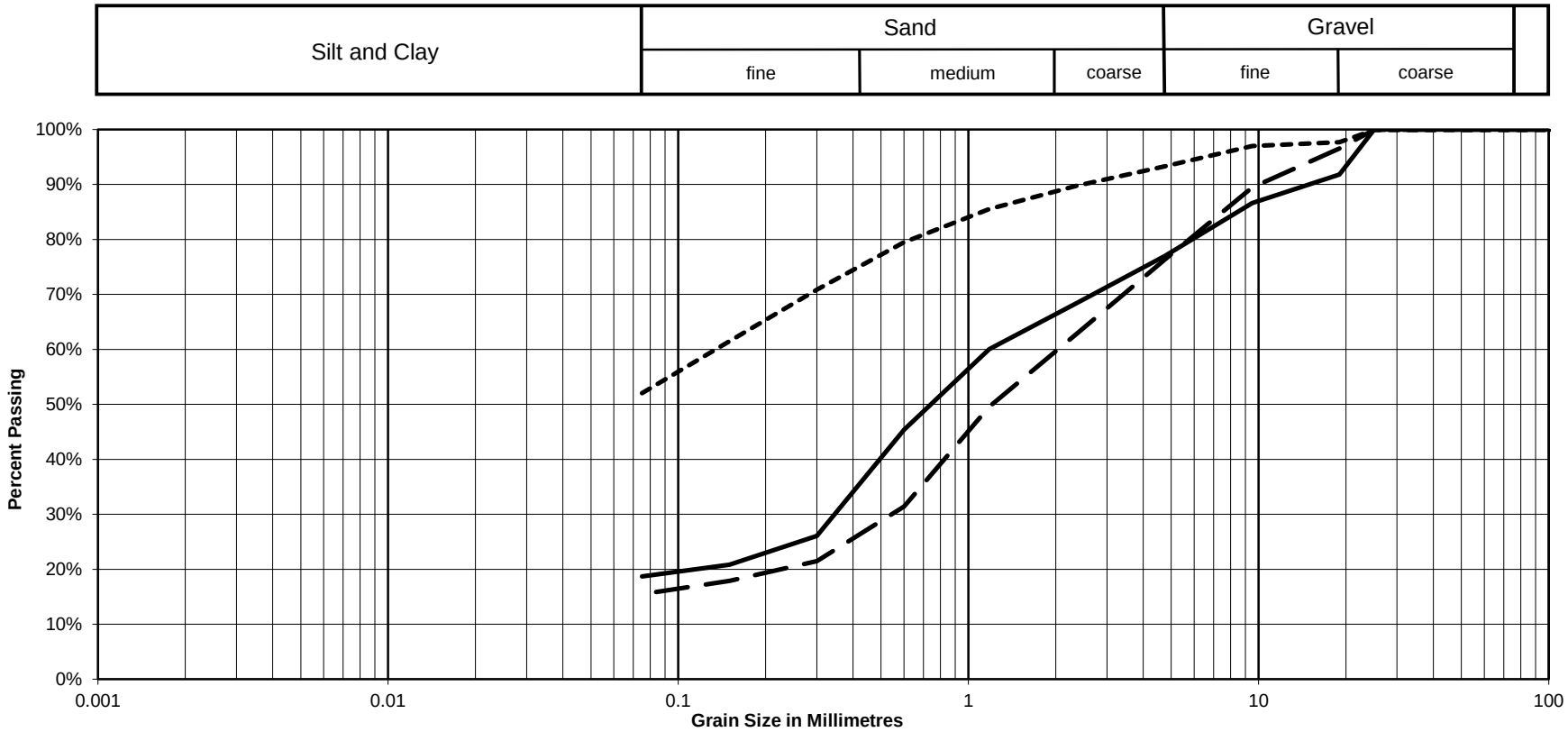
HGC

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Dartmouth, NS B2X 2C3
http://harboursideengineering.ca

CLIENT Windsor-West Hants Municiplaity
PROJECT Hantsport Fire Station
LOCATION Hantsport, NS

Checked: **DJW**

GRAIN SIZE DISTRIBUTION



CURVE	BOREHOLE / TESTPIT	SAMPLE	DEPTH (m)	SOIL FRACTION			SOIL DESCRIPITION
				GRAVEL	SAND	SILT/CLAY	
———	BH03	SS02	0.8 to 1.4	23%	58%	19%	Silty Sand with Gravel
— — -	BH03	SS06	3.3 to 3.9	24%	61%	15%	Silty Sand with Gravel
- - - -	BH03	SS14	9.5 to 10.1	7%	41%	52%	Sandy Lean Clay

PROJECT No.: 203102

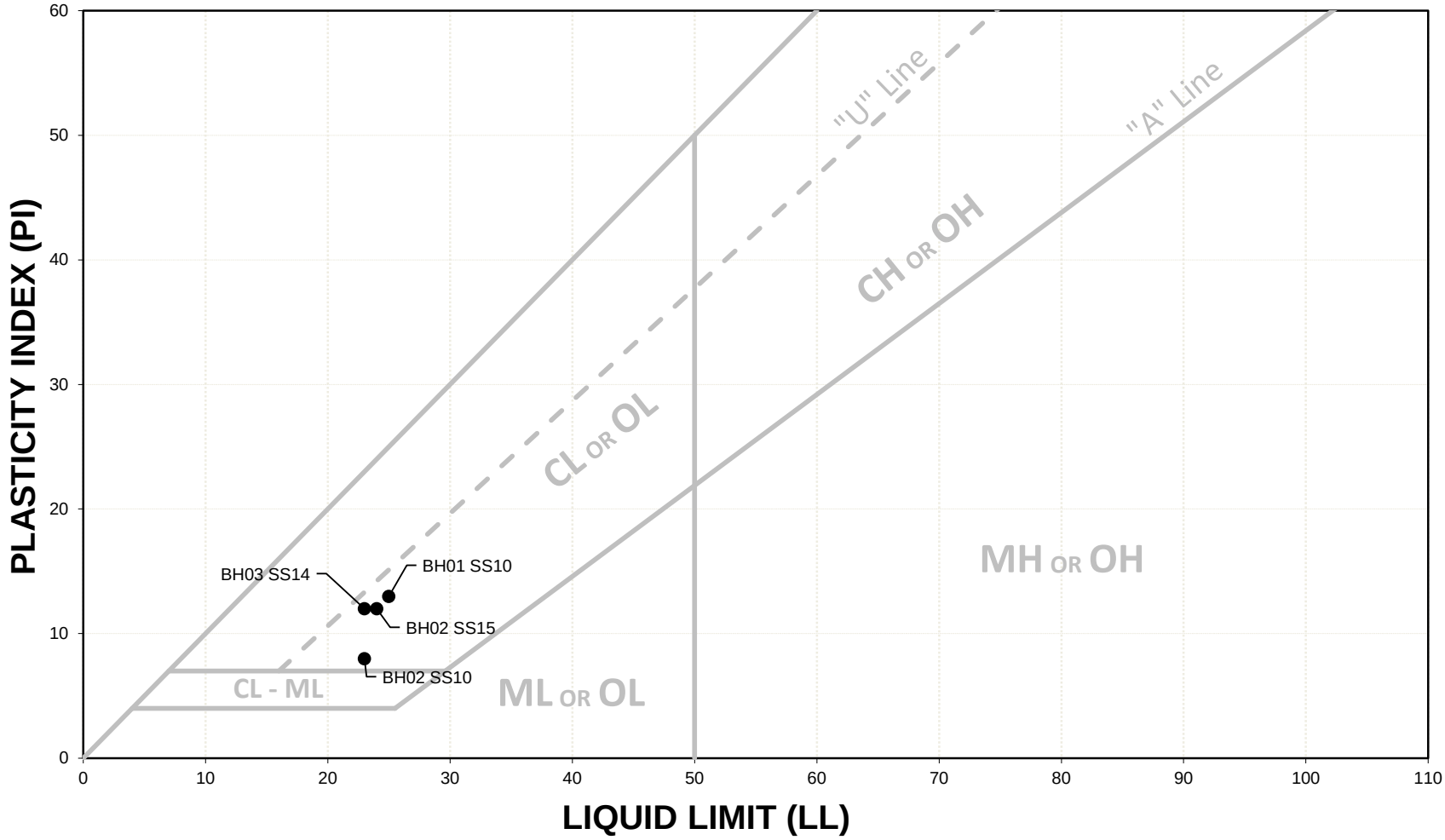
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http://harboursideengineering.ca

CLIENT Windsor-West Hants Municiplaity
PROJECT Hantsport Fire Station
LOCATION Hantsport, NS

Checked: DJW

ATTERBERG LIMITS



PROJECT No.: 203102

HGC

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http://harboursideengineering.ca

CLIENT	Windsor-West Hants Regional Municipality
PROJECT	Hantsport Fire Station
LOCATION	Hantsport, NS

APPENDIX C

Borehole Location Plan

BOREHOLE LOCATION PLAN

PROJECT 203102:
HANTSPORT FIRE HALL

HARBOURSIDE
Geotechnical Consultants

N

BH01

BH03

BH02

BOREHOLE(BH)	NORTHING	EASTING	ELEVATION
BH01	4991097.4	407448.5	14.4
BH02	4991075.5	407459.3	14.6
BH03	4991084.9	407425.8	16.3

LEGEND

BOREHOLE(BH)

COORDINATES ARE IN REFERENCE TO NAD83 UTM ZONE 20

ELEVATIONS ARE IN REFEENCE TO CGVD2013

DATA SOURCES: IMAGERY OBTAINED FROM ESRI

DD-MM-YYYY: 28-08-2020

0 5 10 20 m

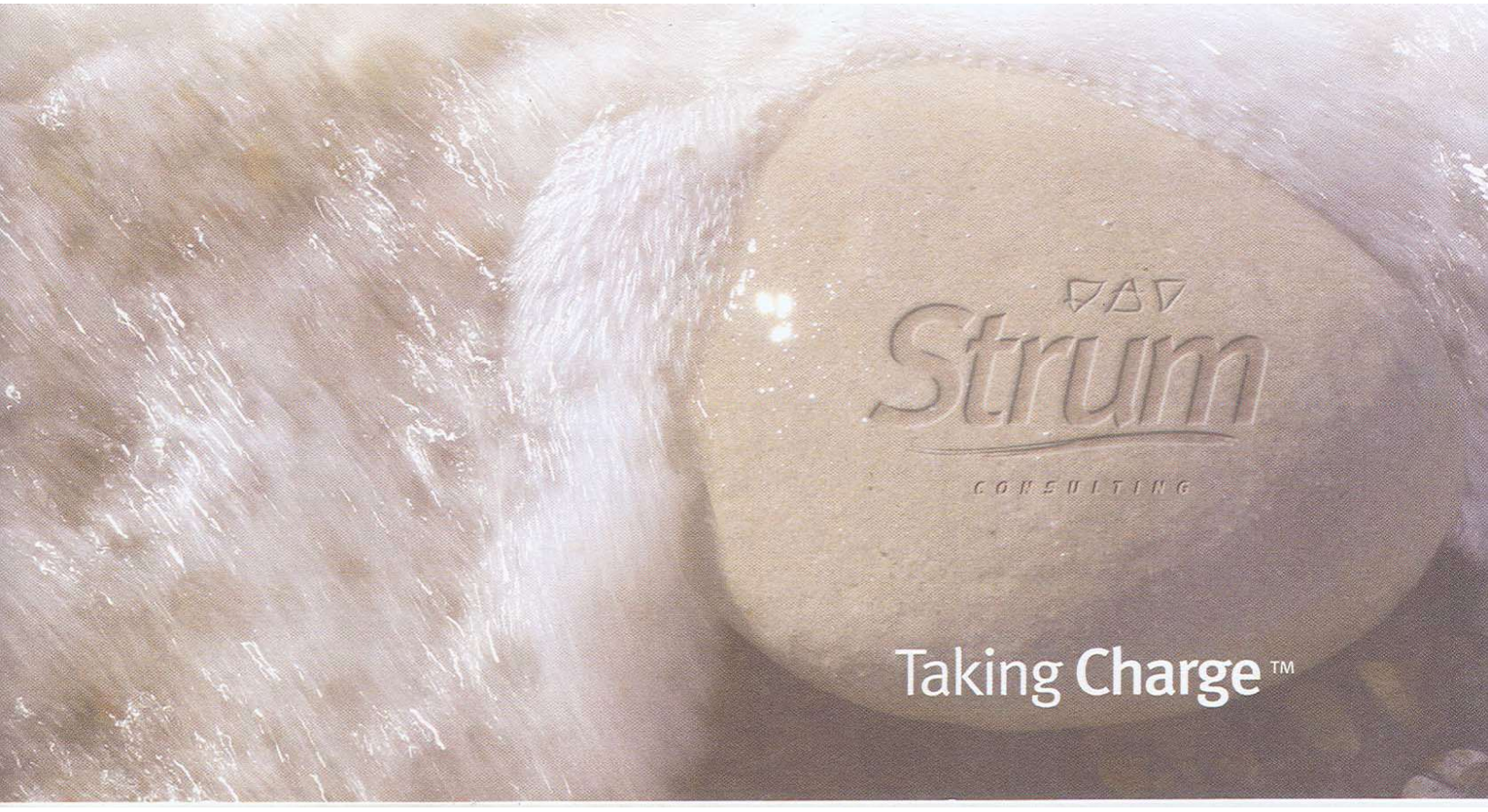
0 15 30 60 ft

KEY PLAN



QUALITATIVE REGULATED MATERIALS SURVEY
Hantsport Fire Station
5 Oak Street
Hantsport, NS

October 1, 2020



October 1, 2020

Mr. Wade Noiles
Harvey Architecture Ltd.
#3004 - 7071 Bayers Road
Halifax, NS B3L 2C2

Dear Mr. Noiles,

Re: Qualitative Regulated Materials Survey
Hantsport Fire Station, 5 Oak Street, Hantsport, NS

Attached is the Qualitative Regulated Materials Survey report prepared for the Hantsport Fire Station, 5 Oak Street, Hantsport, NS.

This report documents our observations, findings, and recommendations.

We trust this to be satisfactory at this time. Once you have had an opportunity to review this correspondence, please contact us to address any questions you may have.

Thank you,

Patrick Avery, CET
Environmental Technologist
pavery@strum.com

Jeff Faulkner, P.Geo.
Senior Project Manager
jfaulkner@strum.com

EXECUTIVE SUMMARY

In August 2020, Strum Consulting was retained by Harvey Architecture Ltd. to undertake a Regulated (Hazardous) Materials Survey at the Hantsport Fire Station and adjacent food bank building, located at 5 Oak Street in Hantsport, Nova Scotia. The scope of the Regulated Materials Survey consisted of a site visit to review building materials and the sampling of building materials that may require special handling or disposal during deconstruction of the building. This report provides our findings and recommendations.

Main Findings & Recommendations

The main findings of the assessment are outlined below:

Asbestos	• Non-friable asbestos containing material (ACM) was identified during the assessment, including vinyl flooring located within several areas of the food bank building and in roofing tar underlying the asphalt shingles of the food bank building. As such, all flooring similar in appearance to flooring within the client and kitchen area on the main floor of the food bank building, and all roofing material of the food bank building should be considered to contain ACM. • Asbestos abatement practices and precautionary measures protective of human health will be required to safely remove all ACM prior to the proposed demolition.
Lead in Paint	• Concentrations of lead in paint samples were reported to range from non-detect to 35,000 mg/kg. • Two samples collected from black and white paint within the upper level of the food bank building reported leachable lead concentrations that exceed the provincial disposal guidelines of 5 mg/L, and therefore, are considered to be leachate toxic and not suitable for regular disposal at an NSE approved solid waste landfill or C&D waste disposal site. These materials will require disposal through the services of an approved hazardous waste disposal company. • Precautionary measures protective of human health will be required during the disturbance and disposal of lead containing building materials containing lead concentrations exceeding the Surface Coating Materials Regulations (SCMR 90 mg/kg) defined by the Canada Consumer Product Safety Act.
Mercury in Appliances	• Fluorescent lighting that may contain mercury vapour and tilt-switch thermostats that may contain mercury were identified throughout the building.
Ozone-Depleting Substances	• Several refrigerators and wall mounted air conditioning units were identified in the assessment area as potentially ODS containing and should be screened for ODS prior to disposal.

Polychlorinated Biphenyls (PCBs)	• Potential PCB containing ballasts were identified during the assessment. • No potential PCB containing caulking or electrical equipment was observed during the assessment.
Silica	• Typical of standard construction, concrete, and masonry materials used for foundations, flooring, and walls may contain silica.
Mould	• Potential mould and water damage were observed throughout the assessment area. Precautionary measures protective of human health will be required during the disturbance and disposal of these materials.

Based on the findings of this assessment the following recommendations are forwarded:

1. Prior to the completion of any demolition activities, a qualified abatement contractor should be retained to complete the safe removal and disposal of non-friable asbestos containing vinyl flooring and roofing materials, as per the applicable provincial regulations and codes of practices. Workers handling ACM should be outfitted with appropriate personal protective equipment (PPE). The appropriate level of barriers and/or containment should be put in place to restrict access to the work areas, until such time that the abatement activities can be completed.

2. Workers handling lead or other metal containing dusts should be outfitted with appropriate PPE. Special care should be taken not to grind or pulverize leaded materials during removal. Materials coated in black and white paint sampled within the food bank building will require disposal through the services of an approved hazardous waste disposal company.

3. Potentially mercury containing fluorescent bulbs should be removed prior to demolition activities and disposed of in an appropriate manner in accordance with applicable regulations.

4. Although no PCB-containing ballasts were identified, ballasts should be screened on an individual basis to determine PCB content and appropriate disposal options prior to demolition activities.

5. All fixtures identified to contain an ozone depleting refrigerant should be decommissioned by a qualified refrigeration technician prior to disposal.

6. Workers involved in the demolition and disposal of building materials should be outfitted with appropriate PPE, protective of asbestos, lead, silica, and mould. Special care should be taken not to grind or pulverize leaded materials during removal. In addition, appropriate dust hoarding should be erected if excessive dust is generated.

This Executive Summary provides a brief overview of the main conclusions of this assessment. Complete details are provided in the report and the attached Appendices. The statements made in this Executive Summary are subject to the same limitations as described in Sections 1.2 and 15.0.

TABLE OF CONTENTS

page

1.0 INTRODUCTION 1
1.1 Scope of Work 1
1.2 Limitations 1
2.0 ASBESTOS SAMPLING & ANALYSIS 2
2.1 Applicable Guidelines & Regulations 2
2.2 Sampling Methodology 2
2.3 Asbestos Sample Results 3
3.0 LEAD IN PAINT & SURFACE COATINGS 4
3.1 Applicable Guidelines & Regulations 4
3.2 Sampling Methodology 5
3.3 Lead in Paint Sample Results 5
4.0 LEAD LEACHATE 6
4.1 Sampling Methodology 6
4.2 Analytical Results 6
5.0 MERCURY ASSESSMENT 6
6.0 OZONE DEPLETING SUBSTANCES 7
7.0 PCB ASSESSMENT 7
7.1 Applicable Guidelines & Regulations 7
7.2 PCB Assessment Methodology 8
7.3 NLPCBs (Non-Liquid PCBs) 8
8.0 SILICA 8
9.0 MOULD 9
10.0 RADIOACTIVE MATERIALS 9
11.0 UREA FORMALDEHYDE FOAM INSULATION (UFFI) 9
12.0 OTHER REGULATED MATERIALS 9
13.0 SUMMARY OF FINDINGS 9
14.0 RECOMMENDATIONS 11
15.0 STATEMENT OF QUALIFICATIONS AND LIMITATIONS 12

TABLES

Table A: Summary of Fire Station Bulk Asbestos Samples 3
Table B: Summary of Food bank Building Bulk Asbestos Samples 3
Table C: Summary of Findings 9

APPENDICES

Appendix A: Site Diagrams
Appendix B: Sample Logs
Appendix C: Laboratory Reports

1.0 INTRODUCTION

In August 2020, Strum Consulting was retained by Harvey Architecture Ltd. to undertake a Regulated (Hazardous) Materials Survey at the Hansport Fire Station and adjacent food bank building, located at 5 Oak Street in Hansport, Nova Scotia. The objective of this assessment is to identify any regulated materials that will require removal from the building prior to proposed demolition.

1.1 Scope of Work

The scope of the Regulated Materials Survey consisted of a site visit on August 27, 2020, to review building materials and the sampling of building materials that may require special handling or disposal during deconstruction. The assessment areas and investigation points are shown on Drawings 1 and 2 (Appendix A). The following is a list of materials reviewed:

- Asbestos containing material (ACM)
- Lead containing material (LCM)
- Mercury
- Ozone depleting substances (ODS)
- Polychlorinated biphenyls (PCBs)
- Silica (free crystalline silica)
- Mould
- Radioactive materials
- Urea formaldehyde foam insulations (UFFI)

Other regulated materials referred to in various provincial and federal regulations are not expected to be present in this location. Should any of the excluded substances be found within the areas designated for deconstruction, they should be assessed on an individual basis prior to disturbance.

1.2 Limitations

While every effort was made to identify all hazardous materials within the assessment area, undiscovered regulated materials may still exist in the building within enclosed areas such as wall cavities.

If additional materials suspected of potentially containing hazardous materials are identified during site work, these materials should be assessed to determine if they contain hazardous materials.

2.0 ASBESTOS SAMPLING & ANALYSIS

2.1 Applicable Guidelines & Regulations

Nova Scotia has issued guidelines and codes of practice for the handling and disposal of ACM. Regulations and Codes of Practice governing asbestos work in Nova Scotia and Federal sites are listed below.

- Code of Practice for Removal of Friable Asbestos Containing Material (11/21/13)
- Code of Practice for A Guide to Assessment & Management of Asbestos in the Workplace (11/21/13)
- Outdoor Work with Asbestos (Removal Projects)
- Asbestos Waste Management Regulations N.S Reg. 53/95
- Canada Occupational Health and Safety Regulations - SOR/86-304
- Hazardous Products Act, R.S., c. H-3
- Hazardous Products (Crocidolite Asbestos) Regulations, SOR/89-440
- Occupational Health and Safety Act, S.N.S 1996

These codes define ACM as a material which contains greater than 0.5% asbestos by volume. Prior to the commencement of any architectural demolition, all identified ACM must be removed from the building and disposed of appropriately. Workers and building occupants must be protected at all times from potential exposure to fibres from both friable and non-friable ACM sources. The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) for exposure to asbestos is 0.1 fibres/cc. This TLV is enforced through the Nova Scotia Occupational Health and Safety Act.

Where a friable material contains trace amounts of asbestos (i.e. < 0.5%), but has the potential to release sufficient amount of fibres to create an area where there is a reasonable potential that airborne concentrations of asbestos will exceed occupational health and safety exposure limits, the materials are to be treated as asbestos-containing and must be removed under controlled conditions prior to general demolition or renovations.

2.2 Sampling Methodology

Samples of materials potentially containing asbestos were obtained throughout the fire station and food bank building by Strum staff on August 27, 2020. The collection of asbestos samples was performed with the intent to determine a general pattern of asbestos use within the building.

Efforts were made to ensure that every type of material that could potentially contain asbestos was sampled. Materials that were sampled for asbestos content within the fire station included drywall/joint compound, vinyl flooring, textured ceiling plaster, and ceiling tiles. Materials that were sampled for asbestos content within the food bank building included drywall/joint compound, vinyl flooring and countertop, plaster parging, paper underlay, ceiling tiles, caulking and asphalt roofing shingles.

A total of 15 building material samples [A1(AU27) – A13(AU27), A15(AU27) – A16(AU27)] from the fire station and 19 building material samples [A17(AU27) – A35(AU27)] from the food bank building were collected by Strum field staff. All samples were submitted to EMSL Analytical in Mississauga, ON, for analysis of asbestos by Polarized Light Microscopy (EPA 600R-93/116). Sampling methodology was in compliance with Strum QA/QC protocols.

Site Plans showing the locations of the collected samples are provided as Drawings 1 and 2 in Appendix A. A Photo Log of samples collected, along with analytical results, is provided in Appendix B. Laboratory reports are provided in Appendix C.

2.3 Asbestos Sample Results

As per the regulations and codes of practice listed in Section 2.1, any building materials found to contain greater than 0.5% asbestos is considered to be ACM. Samples identified as ACM are highlighted on Drawings 1 and 2 (Appendix A).

A summary of the bulk samples collected from the fire station and food bank building, as well as the number of samples identified to be are presented in the following Table A and Table B.

Table A: Summary of Fire Station Bulk Asbestos Samples

Bulk Material	Number of Samples Submitted for Analysis	Number of Samples Identified as ACM
Drywall/Joint Compound	5	0
Vinyl flooring	5	0
Textured Ceiling Plaster	3	0
Ceiling Tiles	2	0
Total	**15**	**0**

As shown in Table A, none of the bulk material building samples collected from the fire station were found to contain asbestos content.

Table B: Summary of Food bank Building Bulk Asbestos Samples

Bulk Material	Number of Samples Submitted for Analysis	Number of Samples Identified as ACM
Drywall/Joint Compound	4	0
Vinyl flooring	7	2
Paper Flooring Underlay	2	0
Vinyl Countertop	1	0
Plaster Parging	2	0
Ceiling Tile	1	0
Caulking	1	0
Asphalt Roofing Shingles/Tar	1	1
Total	**19**	**3**

As shown in Table B, three of the 19 building materials collected from the food bank building were found to be asbestos containing, including in vinyl flooring, and in tar of the asphalt shingles.

Vinyl Flooring
Vinyl flooring found to be non-friable ACM includes off-white vinyl roll-out flooring located within the kitchen and adjacent office room, and a light brown 9 x 9 vinyl floor tiles located within the client area, both on the main level of the food bank building.

Asphalt Roofing Tar/Shingles
Roofing tar found to be non-friable ACM was identified underlying the asphalt roofing shingles.

At the time of testing, the materials sampled were in good or fair condition. It is understood that demolition of the site building assessment area is to be completed; and therefore, ACM containing materials should be safely removed under controlled conditions by an experienced abatement contractor, prior to any demolition or disturbance of this material. Asbestos abatement should be completed as per the applicable provincial regulations and codes of practices presented in this report. The appropriate level of containment should be constructed to prevent the escape of asbestos contamination from the work area. Workers handling ACM should be outfitted with appropriate PPE.

3.0 LEAD IN PAINT & SURFACE COATINGS

3.1 Applicable Guidelines & Regulations
Regulations and guidelines dealing with the disposal of lead containing materials in Nova Scotia include the following:

- Nova Scotia Department of the Environment Guidelines for Disposal of Contaminated Solids (1994)
- Code of Practice for Working with Lead
- Working with Inorganic Lead – An Information Package
- Hazardous Products Act, R.S., c. H-3

Regulations and guidelines which govern the safe handling and disposal of lead containing materials in Nova Scotia are defined by the Federal Hazardous Products Act (HPA). The amount of lead in consumer paint products is currently regulated according to the Surface Coating Materials Regulations (SCMR) under the Canada Consumer Product Safety Act to not contain more than 90 mg/kg lead.

Disposal of lead-containing materials from a demolition standpoint should be evaluated on an individual basis, taking into account the concentrations contained within the material as well as the total volume of material to be disposed. If the reported concentrations of lead comply with

disposal guideline criteria (1,000 mg/kg), the material can be disposed of at a local solid waste disposal facility without any special considerations.

If the concentrations of lead exceed the disposal criteria, additional leachate testing must be completed on the material to determine if the concentrations in a leachate extraction exceed 5 mg/L. This is to prevent toxic materials from leaching or migrating into the ground and creating adverse environmental effects. If lead leachate concentrations are below the landfill disposal guidelines, the material is deemed suitable for disposal at an NSE approved solid waste landfill or C&D waste disposal site. If the material reports leachate concentrations which exceed the landfill guidelines, it is considered *leachate toxic* and must be disposed of at an approved facility.

3.2 Sampling Methodology

Paint samples were collected by Strum field staff on August 27, 2020 and analyzed to determine the concentrations of lead. The collection of paint samples was performed with the intent to determine a general pattern of paint use within the building. Samples were collected based on condition, pliability, and layering, and included the painted substrate where paint remained well adhered. Painted areas from which the samples were collected were observed to typically be in fair condition.

A total of 12 paint samples [L1(AU27) – L12(AU27)] were submitted to Bureau Veritas in Bedford, NS for analysis of lead in paint (ICPMS). Sampling methodology was in compliance with Strum QA/QC protocols.

Site Plans showing the locations of the collected samples are provided as Drawing 1 and 2 (Appendix A). A Photo Log of samples collected, along with the analytical results, is provided in Appendix B. Laboratory reports are provided in Appendix C.

3.3 Lead in Paint Sample Results

Samples collected for lead in paint analysis reported concentrations of lead ranging from below laboratory detection limits (i.e. non-detect) to 35,000 mg/kg. Eight samples reported lead concentrations that comply with the Nova Scotia Department of the Environment Disposal Guidelines of 1,000 mg/kg; however, the remaining four samples [L2(AU27), L6(AU27), L7(AU27), and L8(AU27)] reported lead concentrations that exceed the applicable guidelines. Material containing lead in paint concentrations below the applicable guideline of 1,000 mg/kg can be disposed of at a local solid waste disposal facility without any special considerations. To address the elevated lead concentrations reported in these four samples, analysis of lead leachate was completed as detailed in Section 4.0.

As a best management practice, all workers handling paints and surface coatings containing concentrations of lead exceeding the SCMR defined by the Canada Consumer Product Safety Act (90 mg/kg) should be outfitted with appropriate Personal Protective Equipment (PPE) if

disturbing the material during renovation or demolition activities. Special care should be taken not to grind or pulverize lead containing materials during removal.

4.0 LEAD LEACHATE

4.1 Sampling Methodology

To determine the disposal requirements for materials reported to contain concentrations that exceed the provincial disposal guidelines for lead (1,000 mg/kg), additional leachate testing was completed on samples L2(AU27), L6(AU27), L7(AU27), and L8(AU27). These samples were analyzed for lead leachate (CGSB) by Bureau Veritas in Bedford, NS. Sampling methodology was in compliance with Strum QA/QC protocols.

A Photo Log of samples collected, along with the analytical results, is provided in Appendix B. Laboratory reports are provided in Appendix C.

4.2 Analytical Results

The samples submitted for CGSB leachate analysis reported leachate concentrations ranging from 0.81 to 7.2 mg/L. Two of the four samples [L7(AU27) and L8(AU27)] analyzed for leachable lead concentrations were reported to exceed the provincial disposal guidelines of 5 mg/L, and therefore, are considered to be leachate toxic and not suitable for regular disposal at an NSE approved solid waste landfill or C&D waste disposal site. Samples L7(AU27) and L8(AU27) were both collected from the common area within the upper level of the food bank building.

Based on these findings, materials coated in black paint on walls and white paint on trim within the food bank building will require disposal through the services of an approved hazardous waste disposal company. All remaining materials sampled reported lead or leachable lead concentrations that comply with the provincial regulations, and therefore, can be disposed of at a local solid waste or C&D facility.

5.0 MERCURY ASSESSMENT

During the site visit, a visual inspection was completed within the assessment area to identify and assess materials potentially containing mercury such as switches, fluorescent lighting, and thermostats. Mercury containing materials are regulated through Health Canada's Hazardous Products Act and Transportation of Dangerous Goods Act.

Fluorescent lighting was identified throughout the building area and may potentially contain mercury vapour. Fluorescent bulbs were identified in light fixtures and stored in various areas throughout the building. Several tilt-switch thermostats were also observed in various locations within the building that may potentially contain mercury.

Any appliances/fixtures that potentially contain mercury and will be disturbed by demolition activities should be removed and sealed in appropriate sealable containers and be disposed of at an appropriate disposal facility.

6.0 OZONE DEPLETING SUBSTANCES

Strum personnel completed an inventory to document all potential ozone depleting substances (ODS) within the assessment area. To classify the potential of a chemical in relation to its ozone depleting properties, an Ozone Depleting Potential (ODP) is assigned to each gas. This is a relative value that indicates the potential of a substance to destroy ozone gas as compared with the potential of chlorofluorocarbon-11 (CFC-11) which is assigned a reference value of 1. Any substance with an ODP value greater than zero is known to be ozone depleting.

Several refrigerators and vending machines potentially containing ODS were identified throughout the building during the assessment. Potentially ODS containing wall-mounted air conditioners were also identified in the buildings. No other ODS containing appliances were identified within the assessment area.

All fixtures/appliances containing or potentially containing ODS should be decommissioned by a qualified refrigeration contractor in accordance with applicable regulations, if the unit is to be disposed of.

7.0 PCB ASSESSMENT

A survey of the assessment area was completed to identify electrical equipment (ballasts, transformers, capacitors) which may contain liquid PCBs and building materials which may contain non-liquid PCBs (i.e. Thiokol caulking).

7.1 Applicable Guidelines & Regulations

Regulatory requirements detailing the manufacturing, processing, and handling of PCB containing materials are listed below.

- Canadian Environmental Protection Act (CEPA) SOR 2008-273
- Nova Scotia PCB Management Regulations N.S. Reg. 163/97

In addition, the Nova Scotia Department of the Environment Guidelines for Disposal of Contaminated Solids (1994) states that material containing PCBs in excess of 50 ppm are not suitable for landfill disposal. Materials which exceed this concentration are classified as hazardous waste and therefore require disposal at an approved hazardous waste disposal facility.

7.2 PCB Assessment Methodology

Fluorescent light fixtures were visually identified throughout the buildings during the assessment. To determine if dielectric fluid containing PCBs was present within the ballasts of the fluorescent lighting, accessible light ballasts will need to evaluated. Identification of PCB containing light ballasts should be completed based on available manufacturer information and procedures detailed in the Environment Canada publication entitled Identification of Lamp Ballasts Containing PCBs. Screening of light ballasts or sampling of dielectric fluid was not completed during this survey.

No evidence of fluid leakage from lighting fixtures was noted during the assessment. No other electrical equipment that may contain PCBs (e.g. transformers, capacitors) was identified within the assessment area.

It is therefore recommended that all ballasts be screened prior to demolition to ensure specialized disposal is not required.

7.3 NLPCBs (Non-Liquid PCBs)

Non-liquid PCBs are materials containing PCBs that by visual inspection do not flow at room temperature (25˚C or 77˚F). Buildings that were constructed or refurbished before 1977 may still contain caulking with elevated levels of PCBs.

No potential PCB containing caulking was identified during the assessment. Should it be discovered during renovations, testing should be completed to determine PCB content for disposal purposes.

8.0 SILICA

No sampling of silica containing materials was completed during this assessment, however, silica, sand, and gravel are commonly used in building construction (i.e. concrete, ceramic, and refractory materials). Concrete and/or masonry block used for footings, flooring, and walls inside the building may contain silica.

As a best management practice, special precautions should be undertaken during demolition activities if dust is being generated to protect workers and occupants from potential silica containing dust. At a minimum, PPE should consist of a full body protective suit and a half-faced Air Purifying Respirator employing HEPA P100 filtration.

The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) for worker exposure to the respirable fraction of crystalline silica is 0.05 mg/m^3.

9.0 MOULD

Potential mould or evidence of chronic water damage issues were not observed within the buildings at the time of the assessment.

As a best management practice, workers should wear appropriate PPE, including respirators with organic filters, if exposed to materials exhibiting mould contamination during demolition of the buildings.

10.0 RADIOACTIVE MATERIALS

No radioactive materials were identified within the assessment area.

11.0 UREA FORMALDEHYDE FOAM INSULATION (UFFI)

No UFFI was identified to be within the assessment area.

12.0 OTHER REGULATED MATERIALS

Other regulated materials referred to in various provincial and federal regulations are typically only present in industrial or manufacturing facilities. For this reason, isocyanates, vinyl chloride monomer, benzene, acrylonitrile, coke oven emissions, and ethylene oxide are not expected to be present in this building. Should any of the excluded substances be found within the areas designated for deconstruction, they should be assessed on an individual basis prior to disturbance.

13.0 SUMMARY OF FINDINGS

The findings of the August 2020 Regulated Materials Survey completed at 5 Oak Street, in Hantsport, NS are summarized below:

Table C: Summary of Findings

Asbestos	• Non-friable ACM was identified during the assessment, including vinyl flooring located within several areas of the food bank building and in roofing tar underlying the asphalt shingles of the food bank building. As such, all flooring similar in appearance to flooring within the client and kitchen area on the main floor of the food bank building, and all roofing material of the food bank building should be considered to contain ACM. • Asbestos abatement practices and precautionary measures protective of human health will be required to safely remove all ACM prior to the proposed demolition.

Lead in Paint	• Concentrations of lead in paint samples were reported to range from non-detect to 35,000 mg/kg. • Two samples collected from black and white paint within the upper level of the food bank building reported leachable lead concentrations that exceed the provincial disposal guidelines of 5 mg/L, and therefore, are considered to be leachate toxic and not suitable for regular disposal at an NSE approved solid waste landfill or C&D waste disposal site. These materials will require disposal through the services of an approved hazardous waste disposal company. • Precautionary measures protective of human health will be required during the disturbance and disposal of lead containing building materials containing lead concentrations exceeding the SCMR (90 mg/kg) defined by the Canada Consumer Product Safety Act.
Mercury in Appliances	• Fluorescent lighting that may contain mercury vapour and tilt-switch thermostats that may contain mercury were identified throughout the building.
Ozone-Depleting Substances	• Several refrigerators and wall mounted air conditioning units were identified in the assessment area as potentially ODS containing and should be screened for ODS prior to disposal.
Polychlorinated Biphenyls (PCBs)	• Potential PCB containing ballasts were identified during the assessment. • No potential PCB containing caulking or electrical equipment was observed during the assessment.
Silica	• Typical of standard construction, concrete, and masonry materials used for foundations, flooring, and walls may contain silica.
Mould	• Potential mould or evidence of chronic water damage issues were not observed within the buildings at the time of the assessment.

14.0 RECOMMENDATIONS

Based on the findings of this assessment the following recommendations are forwarded:

1. Prior to the completion of any demolition activities, a qualified abatement contractor should be retained to complete the safe removal and disposal of non-friable asbestos containing vinyl flooring and roofing materials, as per the applicable provincial regulations and codes of practices. Workers handling ACM should be outfitted with appropriate personal protective equipment (PPE). The appropriate level of barriers and/or containment should be put in place to restrict access to the work areas, until such time that the abatement activities can be completed.

2. Workers handling lead or other metal containing dusts should be outfitted with appropriate PPE. Special care should be taken not to grind or pulverize leaded materials during removal. Materials coated in black and white paint sampled within the food bank building will require disposal through the services of an approved hazardous waste disposal company.

3. Potentially mercury containing fluorescent bulbs should be removed prior to demolition activities and disposed of in an appropriate manner in accordance with applicable regulations.

4. Although no PCB-containing ballasts were identified, ballasts should be screened on an individual basis to determine PCB content and appropriate disposal options prior to demolition activities.

5. All fixtures identified to contain an ozone depleting refrigerant should be decommissioned by a qualified refrigeration technician prior to disposal.

6. Workers involved in the demolition and disposal of building materials should be outfitted with appropriate PPE, protective of asbestos, lead, silica, and mould. Special care should be taken not to grind or pulverize leaded materials during removal. In addition, appropriate dust hoarding should be erected if excessive dust is generated.

15.0 STATEMENT OF QUALIFICATIONS AND LIMITATIONS

This Report (the "Report") has been prepared by Strum Consulting ("Consultant") for the benefit of the Harvey Architecture Ltd. ("Client") in accordance with the agreement between Consultant and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations, and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations");
- represents Consultant's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to Consultant which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement;
- in the case of subsurface, environmental, or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time

Consultant shall be entitled to rely upon the accuracy and completeness of information that was provided and has no obligation to update such information. Consultant accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental, or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

Consultant agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but Consultant makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

The Report is to be treated as confidential and may not be used or relied upon by third parties, except:

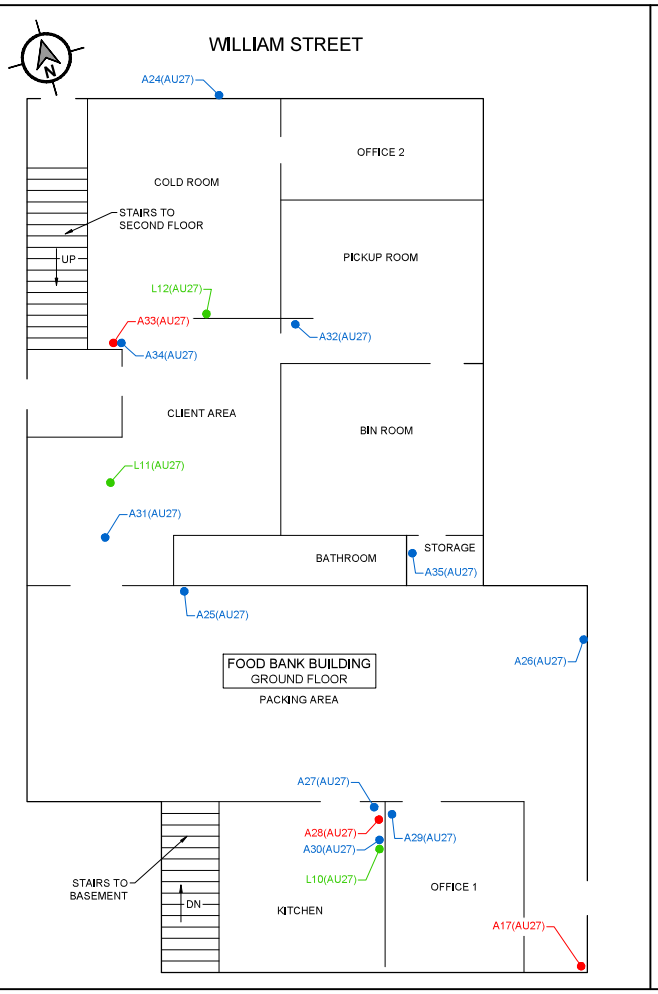
- as agreed in writing by Consultant and Client;
- as required by law; and
- for use by governmental reviewing agencies.

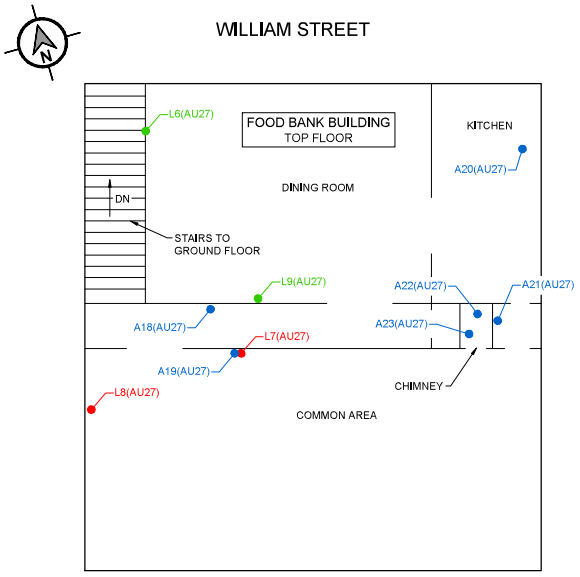
Consultant accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss, or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of Consultant to use and rely upon the Report and the Information. Any damages arising from improper use of the Report or parts thereof shall be borne by the party making such use.

This Statement of Qualifications and Limitations forms part of the Report and any use of the Report is subject to the terms hereof.

This report was prepared by Patrick Avery, CET, Environmental Technologist and was reviewed by Jeff Faulkner, P.Geo., Senior Project Manager.

APPENDIX A
SITE DIAGRAMS





LEGEND

ASBESTOS SAMPLE.. A#(mmdd) A#(mmdd)

LEAD SAMPLE..... L#(mmdd) L#(mmdd)

RED LABELS INDICATES EXCEEDANCE OF APPLICABLE CRITERIA

GENERAL NOTES:

1. SITE FEATURES AND SERVICES ARE APPROXIMATE ONLY. SUBJECT TO SURVEY.

CLIENT:

HARVEY ARCHITECTURE LTD.

PROJECT:

HAZARDOUS MATERIALS SURVEY

LOCATION:

OAK STREET
HANTSPORT, N.S.

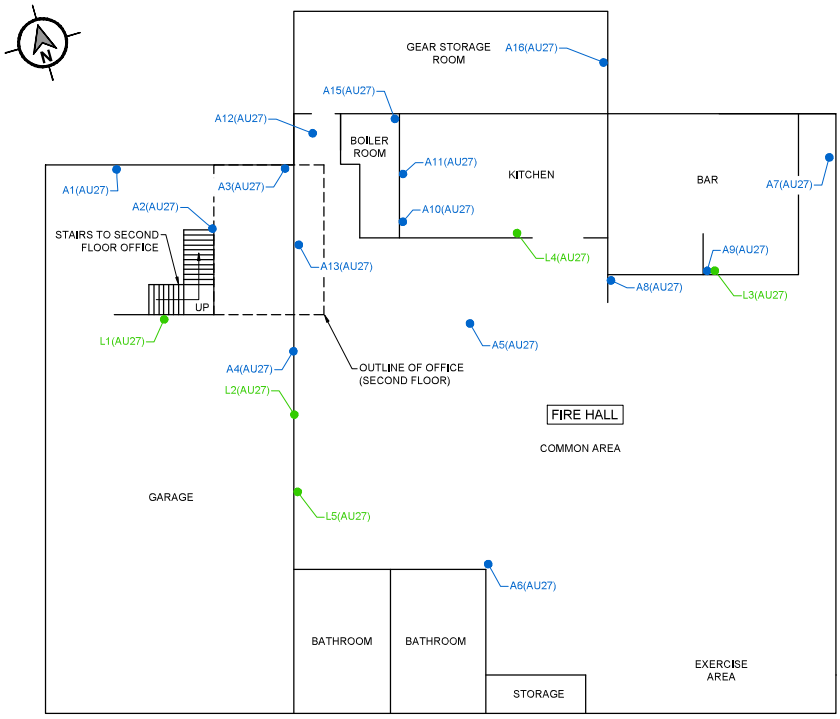
TITLE:

FOOD BANK BUILDING
GROUND FLOOR & SECOND FLOOR

CONSULTANT:

Strum CONSULTING
Engineering * Surveying * Environmental
Bedford * Antigonish * St John's * Moncton

SCALE: H: NOT TO SCALE V:		
DATE: SEPTEMBER 2020		DRAWN: L. PEMBERTON
DESIGNED:	CHECKED: P. AVERY	APPR'D: J. FAULKNER
PROJECT No.: 20-7511		
DRAWING No.: 1		



LEGEND:

ASBESTOS SAMPLE.. A#(mmdd) A#(mmdd)

LEAD SAMPLE..... L#(mmdd) L#(mmdd)

RED LABELS INDICATES EXCEEDANCE OF APPLICABLE CRITERIA

GENERAL NOTES:

1. SITE FEATURES AND SERVICES ARE APPROXIMATE ONLY. SUBJECT TO SURVEY.

CLIENT:
HARVEY ARCHITECTURE LTD.

PROJECT:
HAZARDOUS MATERIALS SURVEY

LOCATION:
OAK STREET
HANTSPORT, N.S.

TITLE:
FIRE STATION

CONSULTANT:
Strum CONSULTING
Engineering * Surveying * Environmental
Bedford * Antigonish * St John's * Moncton

SCALE: H: NOT TO SCALE V:

DATE:	DRAWN:
SEPTEMBER 2020	L. PEMBERTON

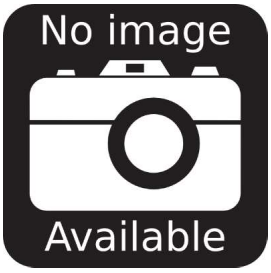
DESIGNED:	CHECKED:	APPR'D:
	P. AVERY	J. FAULKNER

PROJECT No.: 20-7511

DRAWING No.: 2

APPENDIX B
SAMPLE LOGS

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

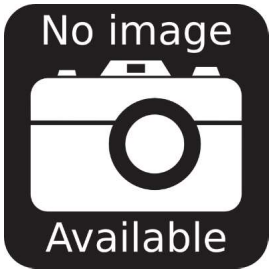
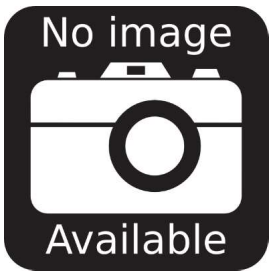
Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A1(AU27)	Joint Compound	Fire Station - Garage		White painted joint compound **Covering**: Paint **Condition**: Good **Access**: A **Hazard**: No **Friability**: - **PLM Analytical Results –** Lab ID # 552008923-0001 Phase: Joint Compound; Asbestos Fibres (%): -; Non-asbestos fibres (%): -; Non-fibrous material (%): 100
A2(AU27)	**Grey floor Tile**	Fire Station - Office		Grey 12”x12” floor tile **Covering**: None **Condition**: Good **Access**: A **Hazard**: No **Friability**: - **PLM Analytical Results –** Lab ID # 552008923-0002 Phase: Floor Tile; Asbestos Fibres (%): -; Non-asbestos fibres (%): 0; Non-fibrous material (%): 100

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A3(AU27)	Joint Compound	Fire Station - Office		White painted joint compound **Covering**: Paint **Condition**: Good **Access**: A **Hazard**: No **Friability**: - **PLM Analytical Results –** Lab ID # 552008923-0003 Joint Compound: Asbestos Fibres (%) -; Non-asbestos fibres (%) -; Non-fibrous material (%) 100
A4(AU27)	Vinyl Floor Tile	Fire Station – Common area		White / Brown 12”x12” vinyl floor tile **Covering**: None **Condition**: Fair **Access**: A **Hazard**: No **Friability**: - **PLM Analytical Results –** Lab ID # 552008923-0004 Floor Tile: Asbestos Fibres (%) -; Non-asbestos fibres (%) -; Non-fibrous material (%) 100

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A5(AU27)	Stipple Ceiling	Fire Station – Common area ceiling		White stipple/ popcorn ceiling **Covering:** None **Condition:** Good **Access:** A **Hazard:** No **Friability:** - **PLM Analytical Results –** Lab ID # 552008923-0005 Phase: Stipple Ceiling Plaster; Asbestos Fibres (%): -; Non-asbestos fibres (%): 0; Non-fibrous material (%): 100
A6(AU27)	Stipple Ceiling	Fire Station – Common area ceiling		White stipple/ popcorn ceiling **Covering:** Paint **Condition:** Good **Access:** A **Hazard:** No **Friability:** - **PLM Analytical Results –** Lab ID # 552008923-0006 Phase: Stipple Ceiling Plaster; Asbestos Fibres (%): -; Non-asbestos fibres (%): -; Non-fibrous material (%): 100

Legend:

ACCESS		CONDITION	
A	**All Building Occupants**	**Good**	**No visible damage or exposed material**
B	**Maintenance & Operations Staff without use of a ladder**	**Fair**	**Repairable damage with minor amounts of exposed material**
C	**Maintenance & Operations Staff with use of a ladder**	**Poor**	**Irreparable damage with exposed and missing material**
D	**Inaccessible**		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A7(AU27)	Stipple Ceiling	Fire Station – Common area ceiling		White stipple/ popcorn ceiling **Covering**: Paint **Condition**: Good **Access**: A **Hazard**: No **Friability**: -
				PLM Analytical Results – Lab ID # 552008923-0007
				Phase: Stipple Ceiling Plaster; Asbestos Fibres (%): -; Non-asbestos fibres (%): -; Non-fibrous material (%): 100
A8(AU27)	Vinyl Floor Tile with Caulking and Mastic	Fire Station – Common area		3 Phases • Caulking • Off white with brown flecks 12”x12” Vinyl floor tile • Mastic **Covering**: None **Condition**: Good **Access**: A **Hazard**: No **Friability**: -
				PLM Analytical Results – Lab ID # 552008923-0008
				Caulking: Asbestos Fibres (%): -; Non-asbestos fibres (%): -; Non-fibrous material (%): 100
				Floor Tile: Asbestos Fibres (%): -; Non-asbestos fibres (%): -; Non-fibrous material (%): 100
				Mastic: Asbestos Fibres (%): -; Non-asbestos fibres (%): -; Non-fibrous material (%): 100

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

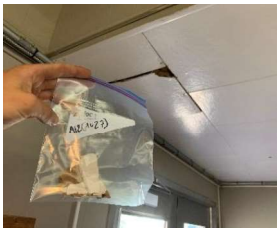
Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A9(AU27)	Joint Compound	Fire Station - Bar		Pink painted joint compound **Covering**: Paint **Condition**: Good **Access**: A **Hazard**: No **Friability**: - **PLM Analytical Results –** Lab ID # 552008923-0009 Phase: Joint Compound; Asbestos Fibres (%): -; Non-asbestos fibres (%): -; Non-fibrous material (%): 100
A10(AU27)	Vinyl Roll Flooring	Fire Station - Kitchen		Brown vinyl roll flooring **Covering**: None **Condition**: Good **Access**: A **Hazard**: No **Friability**: - **PLM Analytical Results –** Lab ID # 552008923-0010 Phase: **Vinyl Flooring**; Asbestos Fibres (%): -; Non-asbestos fibres (%): -; Non-fibrous material (%): 100

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A11(AU27)	Joint Compound	Fire Station - Kitchen		White painted joint compound **Covering:** Paint **Condition:** Good **Access:** A **Hazard:** No **Friability:** - **PLM Analytical Results –** Lab ID # 552008923-0011
A12(AU27)	Ceiling Tile	Fire Station - Hallway		White/brown fibrous ceiling tile **Covering:** None **Condition:** Good **Access:** A **Hazard:** No **Friability:** - **PLM Analytical Results –** Lab ID # 552008923-0012

Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
Joint Compound	-	-	100
Ceiling Tile	-	90	10

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A13(AU27)	Ceiling Tile	Fire Station - Hallway		White/ brown fibrous ceiling tile **Covering**: None **Condition**: Good **Access**: A **Hazard**: No **Friability**: - **PLM Analytical Results –** Lab ID # 552008923-0013

Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
Ceiling Tile	-	90	10

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A15(AU27)	Joint Compound	Fire Station – Electrical/ Boiler room		White joint compound **Covering**: None **Condition**: Fair **Access**: B **Hazard**: No **Friability**: - **PLM Analytical Results –** Lab ID # 552008923-0014

Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
Joint Compound	-	-	100

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A16(AU27)	Vinyl Flooring	Fire Station – Gear room		Brown/Grey vinyl flooring **Covering:** None **Condition:** Fair **Access:** B **Hazard:** No **Friability:** - **PLM Analytical Results –** Lab ID # 552008923-0015
A17(AU27)	Asphalt Shingle	Food Bank – Exterior Roof		2 Phases • Asphalt shingle – Black • Tar **Covering:** None **Condition:** Good **Access:** C **Hazard:** Yes **Friability:** Non-Friable **PLM Analytical Results –** Lab ID # 552008923-0016

Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
Vinyl Flooring	-	-	100

Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
Shingle	-	55	45
Tar	**4 (Chrysotile)**	**-**	**96**

4% Chrysotile Asbestos

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A18(AU27)	Vinyl Roll Flooring	Foodbank – Upper Level – Hallway		Patterned vinyl roll flooring- Brown **Covering:** None **Condition:** Good **Access:** A **Hazard:** No **Friability:** - **PLM Analytical Results –** Lab ID 552008923-0017 Phase: Vinyl Flooring; Asbestos Fibres (%): -; Non-asbestos fibres (%): -; Non-fibrous material (%): 100
A19(AU27)	Tar Paper	Foodbank – Upper Level - Common area		2 Phases • Sheet Flooring • Tar paper underlay – Black **Covering:** Flooring **Condition:** Good **Access:** B **Hazard:** No **Friability:** Non-Friable **PLM Analytical Results –** Lab ID # 552008923-0018 Sheet Flooring: Asbestos Fibres (%): -; Non-asbestos fibres (%): 55; Non-fibrous material (%): 45 Tar Paper: Asbestos Fibres (%): <0.25; Non-asbestos fibres (%): -; Non-fibrous material (%): 100

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result			
A20(AU27)	Vinyl Laminate Countertop	Foodbank - Upper Level - Kitchen		Off white Vinyl Countertop	**Covering**	None	
					Condition	Good	
					Access	B	
					Hazard	No	
					Friability	-	
				PLM Analytical Results – Lab ID 552008923-0019			
				Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
				Countertop	-	-	100
A21(AU27)	Joint Compound	Foodbank - Upper Level - Kitchen		White painted joint compound	**Covering**	Paint	
					Condition	Good	
					Access	A	
					Hazard	No	
					Friability	-	
				PLM Analytical Results – Lab ID # 552008923-0020			
				Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
				Joint Compound	-	-	100

Legend:

ACCESS		CONDITION	
A	**All Building Occupants**	**Good**	**No visible damage or exposed material**
B	**Maintenance & Operations Staff without use of a ladder**	**Fair**	**Repairable damage with minor amounts of exposed material**
C	**Maintenance & Operations Staff with use of a ladder**	**Poor**	**Irreparable damage with exposed and missing material**
D	**Inaccessible**		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A22(AU27)	Tar Paper	Foodbank - Upper Level -		Tar Paper - Black **Covering:** Flooring **Condition:** Poor **Access:** B **Hazard:** No **Friability:** - **PLM Analytical Results –** Lab ID 552008923-0019

Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
Tar Paper	-	60	40

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A23(AU27)	Plaster Parging	Foodbank - Upper Level -		2 Phases • Skim coat • Rough coat **Covering:** None **Condition:** Poor **Access:** B **Hazard:** Yes **Friability:** - **PLM Analytical Results –** Lab ID # 552008923-0020

Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
Skim Coat	-	-	100
Rough Coat	-	-	100

Legend:

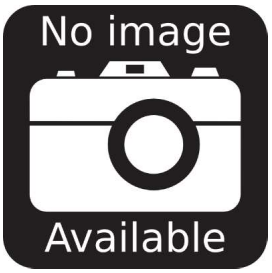
ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A24(AU27)	Caulking	Foodbank - Exterior		Painted exterior window caulking - Brown **Covering:** Paint **Condition:** Fair **Access:** C **Hazard:** No **Friability:** - **PLM Analytical Results –** Lab ID 552008923-0017

Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
Caulking	-	-	100

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A25(AU27)	Vinyl Roll Flooring	Foodbank - Lower Level – Packing Area		Yellow / Brown vinyl roll flooring **Covering:** None **Condition:** Good **Access:** A **Hazard:** No **Friability:** - **PLM Analytical Results –** Lab ID # 552008923-0018

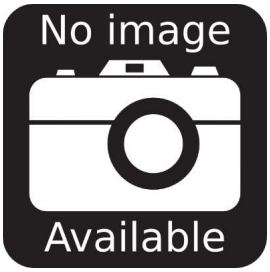
Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
Vinyl Flooring	-	-	100

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result			
A26(AU27)	Joint Compound	Foodbank - Lower Level – Storage Area		White joint compound	**Covering**	Paint	
					Condition	Good	
					Access	B	
					Hazard	No	
					Friability	-	
				PLM Analytical Results – Lab ID 552008923-0019			
				Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
				Joint Compound	-	-	100
A27(AU27)	Vinyl Roll Flooring	Foodbank – Lower Level – Kitchen		Vinyl Roll flooring - White with brown flecks	**Covering**	None	
					Condition	Good	
					Access	A	
					Hazard	No	
					Friability	-	
				PLM Analytical Results – Lab ID # 552008923-0020			
				Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
				Vinyl Flooring	-	-	100

Legend:

ACCESS		CONDITION	
A	**All Building Occupants**	**Good**	**No visible damage or exposed material**
B	**Maintenance & Operations Staff without use of a ladder**	**Fair**	**Repairable damage with minor amounts of exposed material**
C	**Maintenance & Operations Staff with use of a ladder**	**Poor**	**Irreparable damage with exposed and missing material**
D	**Inaccessible**		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A28(AU27)	Vinyl Roll Flooring	Foodbank - Lower Level – Kitchen		Vinyl Roll flooring - Off white **Covering:** None **Condition:** Good **Access:** A **Hazard:** Yes **Friability:** Non-friable **PLM Analytical Results –** Lab ID 552008923-0019 Phase: Vinyl Flooring; Asbestos Fibres (%): **15**; Non-asbestos fibres (%): -; Non-fibrous material (%): 85 **15% Chrysotile**
A29(AU27)	Vinyl Floor Tile with Mastic	Foodbank - Lower Level -		2 Phase • 12”x12” Vinyl Grey with green flecks floor tile • Mastic **Covering:** None **Condition:** Good **Access:** A **Hazard:** No **Friability:** - **PLM Analytical Results –** Lab ID # 552008923-0020 Phase: Vinyl Tile; Asbestos Fibres (%): -; Non-asbestos fibres (%): -; Non-fibrous material (%): 100 Phase: Mastic; Asbestos Fibres (%): -; Non-asbestos fibres (%): -; Non-fibrous material (%): 100

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A30(AU27)	Joint Compound	Foodbank - Lower Level -		White painted joint compound **Covering**: Paint **Condition**: Good **Access**: A **Hazard**: No **Friability**: - **PLM Analytical Results –** Lab ID 552008923-0017

Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
Joint Compound	-	-	100

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A31(AU27)	Plaster	Foodbank - Lower Level – Wall Cavity in Attic		White plaster **Covering**: None **Condition**: Poor **Access**: C **Hazard**: No **Friability**: - **PLM Analytical Results –** Lab ID # 552008923-0018

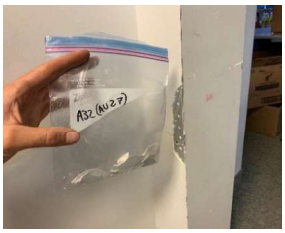
Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
Plaster	-	0	100

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A32(AU27)	Joint Compound	Foodbank - Lower Level – Pickup Room		White painted joint compound **Covering:** Paint **Condition:** Good **Access:** A **Hazard:** No **Friability:** - **PLM Analytical Results –** Lab ID # 552008923-0013 Joint Compound: Asbestos Fibres (%) -; Non-asbestos fibres (%) -; Non-fibrous material (%) 100
A33(AU27)	Vinyl Floor Tile with Mastic	Foodbank – Lower Level -		2 Phases • 9x9 Vinyl floor tile – Light brown • Mastic **Covering:** Carpet **Condition:** Fair **Access:** A **Hazard:** No **Friability:** Non-Friable **PLM Analytical Results –** Lab ID # 552008923-0014 **Vinyl Tile**: Asbestos Fibres (%) **3**; Non-asbestos fibres (%) **-**; Non-fibrous material (%) **97** Mastic **3% Chrysotile**

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and exterior	**Site Address:**	Hantsport Fire Hall & Foodbank
	Asbestos Analysis By:	EMSL Analytical		

Sample ID	Material Type	Area	Photo	Material Description & Analytical Result
A34(AU27)	Ceiling Tile	Foodbank - Lower Level – Cold Room		Fibrous ceiling tile – White / Brown **Covering:** None **Condition:** Fair **Access:** A **Hazard:** No **Friability:** - **PLM Analytical Results –** Lab ID # 552008923-0015
A35(AU27)	Vinyl Roll Flooring	Foodbank – Lower Level – Bin room closet		Vinyl Roll Flooring - Blue **Covering:** None **Condition:** Good **Access:** A **Hazard:** No **Friability:** - **PLM Analytical Results –** Lab ID # 552008923-0016

Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
Ceiling Tile	-	90	10

Phase	Asbestos Fibres (%)	Non-asbestos fibres (%)	Non-fibrous material (%)
Vinyl Flooring	-	-	100

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected (no asbestos fibres were observed)

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and Exterior	**Site Address:**	Hantsport Firehall & Foodbank
	Paint Analysis By:	Bureau Veritas Labs		

Sample ID	Material Type	Area	Photo	Analytical Result
L1(AU27)	Navy blue paint	Fire Station - Garage		**Analytes** / **Result** / **RDL** / ***Guideline** Lead / 38 mg/kg / 5.0 mg/kg / 1000 mg/kg **Paint Metals:** Lab ID NFI821 * Nova Scotia Department of the Environment Guidelines for Disposal of Contaminated Solids In Landfills, 2004.
L2(AU27)	Red paint	Fire Station - Garage		**Analytes** / **Result** / **RDL** / ***Guideline** Lead / **1700 mg/kg** / 5.0 mg/kg / 1000 mg/kg Leachable Lead / 0.81 / 0.005 mg/L / 5 mg/L **Paint Metals:** Lab ID NFI822 * Nova Scotia Department of the Environment Guidelines for Disposal of Contaminated Solids In Landfills, 2004.

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and Exterior	**Site Address:**	Hantsport Firehall & Foodbank
	Paint Analysis By:	Bureau Veritas Labs		

Sample ID	Material Type	Area	Photo	Analytical Result
L3(AU27)	Light pink paint	Fire Station - Bar		**Analytes** / **Result** / **RDL** / ***Guideline** Lead / nd / 5.0 mg/kg / 1000 mg/kg Lab-Dup / nd / 5.0 mg/kg / 1000 mg/kg **Paint Metals:** Lab ID NFI823 * Nova Scotia Department of the Environment Guidelines for Disposal of Contaminated Solids In Landfills, 2004.
L4(AU27)	Cream paint	Fire Station - Kitchen		**Analytes** / **Result** / **RDL** / ***Guideline** Lead / 610 mg/kg / 5.0 mg/kg / 1000 mg/kg **Paint Metals:** Lab ID NFI824 * Nova Scotia Department of the Environment Guidelines for Disposal of Contaminated Solids In Landfills, 2004.

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and Exterior	**Site Address:**	Hantsport Firehall & Foodbank
	Paint Analysis By:	Bureau Veritas Labs		

Sample ID	Material Type	Area	Photo	Analytical Result
L5(AU27)	Grey paint	Fire Station – Common Area		**Analytes** / **Result** / **RDL** / ***Guideline**: Lead — 27 mg/kg — 5.0 mg/kg — 1000 mg/kg **Paint Metals:** Lab ID NFI825 * Nova Scotia Department of the Environment Guidelines for Disposal of Contaminated Solids In Landfills, 2004.
L6(AU27)	Red paint	Foodbank – Upper Level - Stairwell		**Analytes** / **Result** / **RDL** / ***Guideline**: Lead — **10000 mg/kg** — 5.0 mg/kg — 1000 mg/kg; Leachable Lead — 1.4 mg/L — 0.005 mg/L — 5 mg/L **Paint Metals:** Lab ID NFI826 * Nova Scotia Department of the Environment Guidelines for Disposal of Contaminated Solids In Landfills, 2004.

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and Exterior	**Site Address:**	Hantsport Firehall & Foodbank
	Paint Analysis By:	Bureau Veritas Labs		

Sample ID	Material Type	Area	Photo	Analytical Result
L7(AU27)	Black paint	Foodbank – Upper Level – Common Area		**Analytes** / **Result** / **RDL** / ***Guideline** Lead: **35000 mg/kg** / 5.0 mg/kg / 1000 mg/kg Leachable Lead: **6.0 mg/L** / 0.005 mg/L / 5 mg/L **Paint Metals:** Lab ID NFI827 * Nova Scotia Department of the Environment Guidelines for Disposal of Contaminated Solids In Landfills, 2004.
L8(AU27)	White trim/ ceiling paint	Foodbank – Upper Level – Common Area		**Analytes** / **Result** / **RDL** / ***Guideline** Lead: **20000 mg/kg** / 5.0 mg/kg / 1000 mg/kg Leachable Lead: **7.2 mg/L** / 0.005 mg/L / 5 mg/L **Paint Metals:** Lab ID NFI828 * Nova Scotia Department of the Environment Guidelines for Disposal of Contaminated Solids In Landfills, 2004.

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and Exterior	**Site Address:**	Hantsport Firehall & Foodbank
	Paint Analysis By:	Bureau Veritas Labs		

Sample ID	Material Type	Area	Photo	Analytical Result
L9(AU27)	Light blue green paint	Foodbank – Upper Level - Kitchen		**Analytes** / **Result** / **RDL** / ***Guideline**: Lead / 280 mg/kg / 5.0 mg/kg / 1000 mg/kg **Paint Metals:** Lab ID NFI827 * Nova Scotia Department of the Environment Guidelines for Disposal of Contaminated Solids In Landfills, 2004.
L10(AU27)	White paint	Foodbank – Lower Level - Kitchen		Layered **Analytes** / **Result** / **RDL** / ***Guideline**: Lead / nd / 5.0 mg/kg / 1000 mg/kg **Paint Metals:** Lab ID NFI828 * Nova Scotia Department of the Environment Guidelines for Disposal of Contaminated Solids In Landfills, 2004.

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected

Strum CONSULTING	**Project #**	20-7511	**Field Work Date:**	August 27, 2020
	Assessment Area(s):	Building(s) Interior and Exterior	**Site Address:**	Hantsport Firehall & Foodbank
	Paint Analysis By:	Bureau Veritas Labs		

Sample ID	Material Type	Area	Photo	Analytical Result
L11(AU27)	Green/ Brown paint	Foodbank – Lower Level - False Ceiling		**Analytes** / **Result** / **RDL** / ***Guideline**: Lead / 110 mg/kg / 5.0 mg/kg / 1000 mg/kg **Paint Metals:** Lab ID NFI827 * Nova Scotia Department of the Environment Guidelines for Disposal of Contaminated Solids In Landfills, 2004.
L12(AU27)	Blue paint	Foodbank – Lower Level – Cold Room		Layered **Analytes** / **Result** / **RDL** / ***Guideline**: Lead / 5.5 mg/kg / 5.0 mg/kg / 1000 mg/kg **Paint Metals:** Lab ID NFI828 * Nova Scotia Department of the Environment Guidelines for Disposal of Contaminated Solids In Landfills, 2004.

Legend:

ACCESS		CONDITION	
A	All Building Occupants	Good	No visible damage or exposed material
B	Maintenance & Operations Staff without use of a ladder	Fair	Repairable damage with minor amounts of exposed material
C	Maintenance & Operations Staff with use of a ladder	Poor	Irreparable damage with exposed and missing material
D	Inaccessible		

nd = None Detected

APPENDIX C
LABORATORY REPORTS

EMSL Canada Inc.

2756 Slough Street Mississauga, ON L4T 1G3
Phone/Fax: (289) 997-4602 / (289) 997-4607
http://www.EMSL.com / torontolab@emsl.com

EMSL Canada Order 552010923
Customer ID: 55STRU78
Customer PO: 20-7511
Project ID:

Attn: Jeff Faulkner
Strum Consulting
Railside, 1355 Bedford Highway
Bedford, Nova Scotia, NS B4A 1C5

Phone: (902) 835-5560
Fax: (902) 835-5574
Collected:
Received: 9/01/2020
Analyzed: 9/05/2020

Proj: 20-7511

Test Report: Asbestos Analysis of Bulk Materials for Nova Scotia Code of Practice Section 66 OHS Act - Asbestos in the Workplace via EPA600/R-93/116 Method

Client Sample ID: A1(AU27) ***Lab Sample ID:*** **552010923-0001**
Sample Description: garage/joint compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	White	0.0%	100.0%	None Detected	

Client Sample ID: A2(AU27) ***Lab Sample ID:*** **552010923-0002**
Sample Description: office/grey vinyl floor tile

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Gray/Black	0.0%	100.0%	None Detected	

Client Sample ID: A3(AU27) ***Lab Sample ID:*** **552010923-0003**
Sample Description: office/joint compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	White	0.0%	100.0%	None Detected	

Client Sample ID: A4(AU27) ***Lab Sample ID:*** **552010923-0004**
Sample Description: common area/white/ grey vinyl tile

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Gray	0.0%	100.0%	None Detected	

Client Sample ID: A5(AU27) ***Lab Sample ID:*** **552010923-0005**
Sample Description: ceiling common area/stucko/ popcorn ceiling

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	White	0.0%	100.0%	None Detected	

Client Sample ID: A6(AU27) ***Lab Sample ID:*** **552010923-0006**
Sample Description: ceiling common area/stucko/ popcorn ceiling

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	White	0.0%	100.0%	None Detected	

Client Sample ID: A7(AU27) ***Lab Sample ID:*** **552010923-0007**
Sample Description: ceiling common area/stucko/ popcorn ceiling

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	White	0.0%	100.0%	None Detected	

EMSL Canada Inc.

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http://www.EMSL.com / torontolab@emsl.com

EMSL Canada Order 552010923
Customer ID: 55STRU78
Customer PO: 20-7511
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Nova Scotia Code of Practice Section 66 OHS Act - Asbestos in the Workplace via EPA600/R-93/116 Method

Client Sample ID: A8(AU27)-Caulking ***Lab Sample ID:*** **552010923-0008**

Sample Description: common area/brown/ white vinyl tile

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Tan/Beige	0.0%	100.0%	None Detected	

Client Sample ID: A8(AU27)-Floor Tile ***Lab Sample ID:*** **552010923-0008A**

Sample Description: common area/brown/ white vinyl tile

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Beige	0.0%	100.0%	None Detected	

Client Sample ID: A8(AU27)-Mastic ***Lab Sample ID:*** **552010923-0008B**

Sample Description: common area/brown/ white vinyl tile

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Gray/Black	0.0%	100.0%	None Detected	

Client Sample ID: A9(AU27) ***Lab Sample ID:*** **552010923-0009**

Sample Description: bar/white joint compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	White	0.0%	100.0%	None Detected	

Client Sample ID: A10(AU27) ***Lab Sample ID:*** **552010923-0010**

Sample Description: kitchen/brown roll flooring

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Brown/Black	0.0%	100.0%	None Detected	

Client Sample ID: A11(AU27) ***Lab Sample ID:*** **552010923-0011**

Sample Description: kitchen/white joint compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	White	0.0%	100.0%	None Detected	

Client Sample ID: A12(AU27) ***Lab Sample ID:*** **552010923-0012**

Sample Description: hallway/fibrous ceiling tile- white/ brown

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Brown/White	90.0%	10.0%	None Detected	

Client Sample ID: A13(AU27) ***Lab Sample ID:*** **552010923-0013**

Sample Description: hallway/fibrous ceiling tile- white/ brown

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Brown/White	90.0%	10.0%	None Detected	

EMSL Canada Inc.

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http://www.EMSL.com / torontolab@emsl.com

EMSL Canada Order 552010923
Customer ID: 55STRU78
Customer PO: 20-7511
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Nova Scotia Code of Practice Section 66 OHS Act - Asbestos in the Workplace via EPA600/R-93/116 Method

Client Sample ID: A15(AU27) ***Lab Sample ID:*** **552010923-0014**
Sample Description: electrical/ boiler room/white joint compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	White	0.0%	100.0%	None Detected	

Client Sample ID: A16(AU27) ***Lab Sample ID:*** **552010923-0015**
Sample Description: gear room/grey flooring

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Brown/Black	0.0%	100.0%	None Detected	

Client Sample ID: A17(AU27)-Shingle ***Lab Sample ID:*** **552010923-0016**
Sample Description: roof/black- ashphalt shingle

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Black	55.0%	45.0%	None Detected	

Client Sample ID: A17(AU27)-Tar ***Lab Sample ID:*** **552010923-0016A**
Sample Description: roof/black- ashphalt shingle

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Black	0.0%	96.0%	**4% Chrysotile**	

Client Sample ID: A18(AU27) ***Lab Sample ID:*** **552010923-0017**
Sample Description: hall/ kitchen/patterned roll flooring

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Brown/Beige	0.0%	100.0%	None Detected	

Client Sample ID: A19(AU27)-Sheet Flooring ***Lab Sample ID:*** **552010923-0018**
Sample Description: common area (under carpet)/black tar paper underlay

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Black/Beige	55.0%	45.0%	None Detected	

Client Sample ID: A19(AU27)-Underlay Paper ***Lab Sample ID:*** **552010923-0018A**
Sample Description: common area (under carpet)/black tar paper underlay

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Gray	80.0%	20.0%	**<1% Chrysotile**	
400 PLM Pt Ct	9/05/2020	Gray	0.0%	100.0%	**<0.25% Chrysotile**	

Client Sample ID: A20AU27) ***Lab Sample ID:*** **552010923-0019**
Sample Description: kitchen counter/laminated counter top

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Brown/Beige	0.0%	100.0%	None Detected	

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EMSL Canada Order 552010923
Customer ID: 55STRU78
Customer PO: 20-7511
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Nova Scotia Code of Practice Section 66 OHS Act - Asbestos in the Workplace via EPA600/R-93/116 Method

Client Sample ID: A21(AU27) ***Lab Sample ID:*** **552010923-0020**

Sample Description: kitchen/joint compound -white

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	White	0.0%	100.0%	None Detected	

Client Sample ID: A22(AU27) ***Lab Sample ID:*** **552010923-0021**

Sample Description: chimney room/ storage room/tar paper

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Black	60.0%	40.0%	None Detected	

Client Sample ID: A23(AU27)-Skim Coat ***Lab Sample ID:*** **552010923-0022**

Sample Description: chimmney- chimney / storage room/plaster/ parging on chimney- white

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	White	0.0%	100.0%	None Detected	

Client Sample ID: A23(AU27)-Rough Coat ***Lab Sample ID:*** **552010923-0022A**

Sample Description: chimmney- chimney / storage room/plaster/ parging on chimney- white

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Gray	0.0%	100.0%	None Detected	

Client Sample ID: A24(AU27) ***Lab Sample ID:*** **552010923-0023**

Sample Description: building exterior windows/window caulking

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Brown	0.0%	100.0%	None Detected	

Client Sample ID: A25(AU27) ***Lab Sample ID:*** **552010923-0024**

Sample Description: packing area/yellow brown roll flooring

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Beige	0.0%	100.0%	None Detected	

Client Sample ID: A26(AU27) ***Lab Sample ID:*** **552010923-0025**

Sample Description: storage area/joint compound- white

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	White	0.0%	100.0%	None Detected	

Client Sample ID: A27(AU27) ***Lab Sample ID:*** **552010923-0026**

Sample Description: kitchen/white-ish roll flooring

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Beige	0.0%	100.0%	None Detected	

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EMSL Canada Order 552010923
Customer ID: 55STRU78
Customer PO: 20-7511
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Nova Scotia Code of Practice Section 66 OHS Act - Asbestos in the Workplace via EPA600/R-93/116 Method

Client Sample ID: A28(AU27) ***Lab Sample ID:*** **552010923-0027**
Sample Description: kitchen/off white roll flooring

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Yellow/Beige	0.0%	85.0%	**15% Chrysotile**	

Client Sample ID: A29(AU27)-Floor Tile ***Lab Sample ID:*** **552010923-0028**
Sample Description: office 1/grey/ green vinyl floor tile

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Gray	0.0%	100.0%	None Detected	

Client Sample ID: A29(AU27)-Mastic ***Lab Sample ID:*** **552010923-0028A**
Sample Description: office 1/grey/ green vinyl floor tile

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Yellow	0.0%	100.0%	None Detected	

Client Sample ID: A30(AU27) ***Lab Sample ID:*** **552010923-0029**
Sample Description: kitchen/joint compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	White	0.0%	100.0%	None Detected	

Client Sample ID: A31(AU27) ***Lab Sample ID:*** **552010923-0030**
Sample Description: attic of addition inside wall cavity/white plaster

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Gray	0.0%	100.0%	None Detected	

Client Sample ID: A32(AU27) ***Lab Sample ID:*** **552010923-0031**
Sample Description: pickup room/white joint compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	White	0.0%	100.0%	None Detected	

Client Sample ID: A33(AU27)-Floor Tile ***Lab Sample ID:*** **552010923-0032**
Sample Description: cold room (under carpet)/brown tile

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Tan	0.0%	97.0%	**3% Chrysotile**	

Client Sample ID: A33(AU27)-Mastic ***Lab Sample ID:*** **552010923-0032A**
Sample Description: cold room (under carpet)/brown tile

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Black	0.0%	100.0%	None Detected	

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EMSL Canada Order 552010923
Customer ID: 55STRU78
Customer PO: 20-7511
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Nova Scotia Code of Practice Section 66 OHS Act - Asbestos in the Workplace via EPA600/R-93/116 Method

Client Sample ID: A34(AU27) ***Lab Sample ID:*** **552010923-0033**

Sample Description: cold room/ceiling tile- white

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Brown/White	90.0%	10.0%	None Detected	

Client Sample ID: A35(AU27) ***Lab Sample ID:*** **552010923-0034**

Sample Description: bin room closet/blue roll flooring

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/05/2020	Gray/Beige	0.0%	100.0%	None Detected	

Analyst(s):

Kira Ramphal PLM (41)
400 PLM Pt Ct (1)

Reviewed and approved by:

Matthew Davis or other approved signatory
or Other Approved Signatory

None Detected = <0.1%. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted. This report must not be used to claim product endorsement by NVLAP of any agency or the U.S. Government

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Report amended: 09/08/202009:10:36 Replaces initial report from: 09/05/202013:50:33 Reason Code: Client-Change to Project

BV Labs Job #: C0M5768
Report Date: 2020/09/30

Strum Environmental
Client Project #: 20-7511
Sampler Initials: PA

RESULTS OF ANALYSES OF PAINT

BV Labs ID		NNH408		
Sampling Date		2020/08/27		
COC Number		n/a		
	UNITS	L2 (AU27)	RDL	QC Batch
Charge/Prep Analysis				
Dry Weight	g	13	0.010	6941548
Volume of Acetic Acid	mL/L	10	N/A	6941550
Inorganics				
Moisture	%	ND (1)	5.0	6933507
Initial pH	N/A	6.2	N/A	6941549
Final pH	N/A	5.1	N/A	6941549

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Moisture value reported is a visual estimate for calculation purposes.

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BV Labs Job #: C0M5768
Report Date: 2020/09/30

Strum Environmental
Client Project #: 20-7511
Sampler Initials: PA

ELEMENTS BY ICP/MS (PAINT)

BV Labs ID		NNH408		
Sampling Date		2020/08/27		
COC Number		n/a		
	UNITS	L2 (AU27)	RDL	QC Batch
Metals				
Leachable Lead (Pb)	ug/L	810	5.0	6944102

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0M5768
Report Date: 2020/09/30

Strum Environmental
Client Project #: 20-7511
Sampler Initials: PA

ELEMENTS BY ATOMIC SPECTROSCOPY (PAINT)

BV Labs ID		NNH407	NNH408	NNH409	NNH409	NNH416		
Sampling Date		2020/08/27	2020/08/27	2020/08/27	2020/08/27	2020/08/27		
COC Number		n/a	n/a	n/a	n/a	n/a		
	UNITS	L1 (AU27)	L2 (AU27)	L3 (AU27)	L3 (AU27) Lab-Dup	L10 (AU27)	RDL	QC Batch
Metals								
Acid Extractable Lead (Pb)	mg/kg	38	1700	ND	ND	ND	5.0	6925182

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected

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BV Labs Job #: C0M5768
Report Date: 2020/09/30

Strum Environmental
Client Project #: 20-7511
Sampler Initials: PA

RESULTS OF ANALYSES OF SOLID

BV Labs ID		NNH412	NNH413	NNH414		
Sampling Date		2020/08/27	2020/08/27	2020/08/27		
COC Number		n/a	n/a	n/a		
	UNITS	L6 (AU27)	L7 (AU27)	L8 (AU27)	RDL	QC Batch
Charge/Prep Analysis						
Dry Weight	g	13	12	6.5	0.010	6968123
Volume of Acetic Acid	mL/L	1.9	0.0	0.0	N/A	6968127
Inorganics						
Moisture	%	7.9	3.6	3.5	1.0	6962137
Initial pH	N/A	5.3	4.5	4.8	N/A	6968125
Final pH	N/A	5.4	4.6	5.1	N/A	6968125

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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ELEMENTS BY ICP/MS (SOLID)

BV Labs ID		NNH412	NNH413	NNH414		
Sampling Date		2020/08/27	2020/08/27	2020/08/27		
COC Number		n/a	n/a	n/a		
	UNITS	L6 (AU27)	L7 (AU27)	L8 (AU27)	RDL	QC Batch
Metals						
Leachable Lead (Pb)	ug/L	1400	6000	7200	5.0	6970681

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0M5768
Report Date: 2020/09/30

Strum Environmental
Client Project #: 20-7511
Sampler Initials: PA

ELEMENTS BY ATOMIC SPECTROSCOPY (SOLID)

BV Labs ID		NNH410	NNH411	NNH412	NNH413	NNH414	NNH415	NNH417		
Sampling Date		2020/08/27	2020/08/27	2020/08/27	2020/08/27	2020/08/27	2020/08/27	2020/08/27		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	L4 (AU27)	L5 (AU27)	L6 (AU27)	L7 (AU27)	L8 (AU27)	L9 (AU27)	L11 (AU27)	RDL	QC Batch
Metals										
Acid Extractable Lead (Pb)	mg/kg	610	27	10000	35000	20000	280	110	5.0	6925181

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs ID		NNH418		
Sampling Date		2020/08/27		
COC Number		n/a		
	UNITS	L12 (AU27)	RDL	QC Batch
Metals				
Acid Extractable Lead (Pb)	mg/kg	5.5	5.0	6925181

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	21.3°C

REVISED REPORT - re-issued to include CGSB leachate + lead on sample L2(AU27) as per email request from J. Faulkner 2020-09-09 KMA

REVISED Report - re-issued to include CGSB leachate + lead on samples L6(AU27), L7(AU27 and L8(AU27) as per email request from J. Faulkner. 2020-09-24 KMA

Sample NNH408 [L2 (AU27)] : The minimum weight of 50g for the standard CGSB extraction, as per Reference Method CGSB 164-GP-1 MP R1999, could not be achieved due to insufficient sample. Client consent has been received to proceed using the modified CGSB method. The uncertainty of the analysis may be increased, and the reported results may not be suitable for compliance purposes.

Sample NNH412 [L6 (AU27)] : The minimum weight of 50g for the standard CGSB extraction, as per Reference Method CGSB 164-GP-1 MP R1999, could not be achieved due to insufficient sample. Client consent has been received to proceed using the modified CGSB method. The uncertainty of the analysis may be increased, and the reported results may not be suitable for compliance purposes.

Sample NNH413 [L7 (AU27)] : The minimum weight of 50g for the standard CGSB extraction, as per Reference Method CGSB 164-GP-1 MP R1999, could not be achieved due to insufficient sample. Client consent has been received to proceed using the modified CGSB method. The uncertainty of the analysis may be increased, and the reported results may not be suitable for compliance purposes.

Sample NNH414 [L8 (AU27)] : The minimum weight of 50g for the standard CGSB extraction, as per Reference Method CGSB 164-GP-1 MP R1999, could not be achieved due to insufficient sample. Client consent has been received to proceed using the modified CGSB method. The uncertainty of the analysis may be increased, and the reported results may not be suitable for compliance purposes.

Results relate only to the items tested.

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DILLON CONSULTING

MUNICIPALITY OF WEST HANTS

Hantsport Stormwater Management Study



July 2018 – 17-6276

July 3, 2018

137 Chain Lake Drive
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Hantsport Municipal Public Works Office
20 Main Street
Hantsport, NS
B0N 2T0

Municipality of West Hants
Hantsport Stormwater Management Study

Attention: Mr. Brad Carrigan, Director of Public Works

Dear Mr. Carrigan,

Dillon Consulting Limited (Dillon) is pleased to present the following report entitled Hantsport Stormwater Management Study.

The attached report provides the methodology and hydrologic and hydraulic simulation results for the drainage network in Hantsport. The report assesses the current drainage network under existing and future development conditions. The effects of climate change have also been investigated as part of the study. Preliminary recommendations have been developed for areas of concern with respect to the need for stormwater conveyance improvements.

Sincerely,

DILLON CONSULTING LIMITED



Sarah Devereaux, M.Eng., P.Eng., FEC
Partner, Project Manager

SLD:jgc

Our file: 17-6276

Table of Contents

Executive Summary

1.0 Introduction 1

2.0 Background 1

3.0 Existing Drainage Network 4

3.1 Site Reconnaissance and Survey 4
3.1.1 September 5th – 8th, 2017 4
3.1.2 October 4th, 2017 5
3.1.3 November 22nd, 2017 6
3.2 Hydrometric Observations 6
3.2.1 Halfway River (September 5th – October 4th) 6
3.2.2 Willow Brook (October 4th – November 22nd) 8
3.2.3 Flood Frequency Analysis 10

4.0 Hydrologic and Hydraulic Analysis 12

4.1 Hydrologic Characteristics 12
4.1.1 Catchment Parameters 12
4.1.2 Meteorological Inputs 13
4.1.3 Water Level Data 15
4.2 Hydraulic Model Development 16
4.3 Hydraulic Model Calibration 18
4.3.1 Willow Brook 18

5.0 Simulation Results 21

5.1 Existing Performance 22
5.1.1 Downtown – Chittick Avenue, Main Street & School Street 22
5.1.2 Riverview Road, Maple Avenue & Birch Street 22
5.1.3 Foundry Road 25
5.1.4 William Street, Prince Street & Main Street 25
5.1.5 Willow Street 26

5.1.6 Holmes Hill Road, Maple Avenue & Chestnut Avenue 26
5.1.7 Rand Street, Bog Road & Evangeline Drive 27
5.1.8 Rand Street, Bishopville Road & Riverview Road 27
5.2 Future Performance 28
5.2.1 Downtown – Chittick Avenue, Main Street & School Street – Future Land Use Conditions 29
5.2.2 Riverview Road, Maple Avenue & Birch Street – Future Land Use Conditions 29
5.2.3 Foundry Lane – Future Land Use Conditions 29
5.2.4 William Street, Prince Street & Main Street – Future Land Use Conditions 31
5.2.5 Willow Street – Future Land Use Conditions 31
5.2.6 Holmes Hill Road, Maple Avenue & Chestnut Avenue – Future Land Use Conditions 31
5.2.7 Rand Street, Bog Road & Evangeline Drive – Future Land Use Conditions 32
5.2.8 Rand Street, Bishopville Road & Riverview Road – Future Land Use Conditions 32
5.3 Future Performance with Climate Change Conditions 33
5.3.1 Downtown – Chittick Avenue, Main Street & School Street – Future Land Use Conditions with Climate Change 33
5.3.2 Riverview Road, Maple Avenue & Birch Street – Future Land Use Conditions with Climate Change 34
5.3.3 Foundry Lane – Future Land Use Conditions with Climate Change 34
5.3.4 William Street, Prince Street & Main Street – Future Land Use Conditions with Climate Change 35
5.3.5 Willow Street – Future Land Use Conditions with Climate Change 36
5.3.6 Holmes Hill Road, Maple Avenue & Chestnut Avenue – Future Land Use Conditions with Climate Change 36
5.3.7 Rand Street, Bog Road & Evangeline Drive – Future Land Use Conditions with Climate Change 37
5.3.8 Rand Street, Bishopville Road & Riverview Road – Future Land Use Conditions with Climate Change 37

6.0 Assessment of Future Flood Risk Vulnerability 38
6.1 Urban Drainage Flood Risk 38
6.2 Halfway River Flood Risk 40

7.0 Preliminary Drainage Improvement Options 42

8.0 Conclusion 45

Figures

Figure 2-1: Study Location 2
Figure 2-2: Photograph of Post-Failure Aboiteau near Hantsport (taken November 22, 2017) 3
Figure 2-3: Photos of Recently Upgrade Roadway on Chittick Avenue (left) and typical Road section (right) 4
Figure 3-1: Halfway River Water Level Observations 7
Figure 3-2: 24-Hour Water Level Observation Summary 8
Figure 3-3: Level Logger Deployment in Willow Brook (left), and Downstream Open Bottom Pre-Cast Structure Facing Downstream (right) 9
Figure 3-4: Willow Brook Water Level Observations (Geodetic Elevation) 10
Figure 3-5: Regional Frequency Analysis Theoretical Peak Flow Plot 11
Figure 4-1: Map of Sub-Catchment Delineation 14
Figure 4-2: 24-Hour Alternating Block Method Distribution for 100-year Historical Event 15
Figure 4-3: Existing Drainage Network 19
Figure 4-4: Comparison of Willow Brook Simulated and Observed Hydrograph for October 30th, 2017 Event 20
Figure 5-1: Simulation Results – Catchment Areas 24
Figure 5-2: Future Development 30
Figure 6-1: Photographs of Catchbasin in Library/Playground Area (taken November 22, 2017) 40
Figure 6-2: Map of Future Flood Vulnerable Areas 41
Figure 6-3: Existing Aboiteau Overflow at Halfway River Railway Crossing 42
Figure C-1: Comparison of Simulated Water Level Elevations on Chittick Avenue – 5-year Existing Conditions, 5-year with Climate Change & 100-year with Climate Change C-2
Figure C-2: Simulated Water Level Elevations on Main Street Avenue – 5-year Existing Conditions, 5-year with Climate Change & 100-year with Climate Change C-2
Figure C-3: Simulated Water Level Elevations at Main Street Bridge Crossing – 5-year Existing Conditions, 5-year with Climate Change & 100-year with Climate Change C-3
Figure C-4: Simulated Water Level Elevations on Maple Avenue – 5-year Existing Conditions, 5-year with Future Land Use, 5-year with Future Land Use (CC) & 100-year with Future Land Use (CC) C-3
Figure C-5: Simulated Water Level Elevations on Alders Avenue – 5-year Existing Conditions, 5-year with Future Land Use, 5-year with Future Land Use (CC) & 100-year with Future Land Use (CC) C-4
Figure C-6: Simulated Water Level Elevations at Riverview Road – 5-year Existing Conditions, 5-year with Future Land Use, 5-year with Future Land Use (CC) & 100-year with Future Land Use (CC) C-4

Figure C-7: Simulated Water Level Elevations at Riverview Road Ditch – 5-year Existing Conditions, 5-year with Future Land Use, 5-year with Future Land Use (CC) & 100-year with Future Land Use (CC) C-5
Figure D - 1: 24-Hour Alternating Block Method Distribution for 2-year Historical Event D-2
Figure D - 2: 24-Hour Alternating Block Method Distribution for 5-year Historical Event D-2
Figure D - 3: 24-Hour Alternating Block Method Distribution for 10-year Historical Event D-3
Figure D - 4: 24-Hour Alternating Block Method Distribution for 25-year Historical Event D-3
Figure D - 5: 24-Hour Alternating Block Method Distribution for 50-year Historical Event D-4
Figure D - 6: 24-Hour Alternating Block Method Distribution for 100-year Historical Event D-4
Figure D - 7: 24-Hour Alternating Block Method Distribution for 2-year Climate Change (Future) Event D-5
Figure D - 8: 24-Hour Alternating Block Method Distribution for 5-year Climate Change (Future) Event D-5
Figure D - 9: 24-Hour Alternating Block Method Distribution for 10-year Climate Change (Future) Event D-6
Figure D - 10: 24-Hour Alternating Block Method Distribution for 25-year Climate Change (Future) Event D-6
Figure D - 11: 24-Hour Alternating Block Method Distribution for 50-year Climate Change (Future) Event D-7
Figure D - 12: 24-Hour Alternating Block Method Distribution for 100-year Climate Change (Future) Event D-7

Tables

Table 3-1: Regional Hydrometric Station Summary 10
Table 3-2: Regional Flood Frequency Peak Flow Estimates for Willow Brook and Halfway River 11
Table 4-1: Summary of Historical and Estimated Future Rainfall Depth for 24-hour Rainfall Events at Kentville, NS 13
Table 4-2: Downstream Boundary Condition Summary for Study Area 16
Table 5-1: Summary of Simulated Water Level Elevations for Existing Conditions – Downtown 22
Table 5-2: Summary of Simulated Water Level Elevations for Existing Conditions – Riverview Road, Maple Avenue & Birch Street 23
Table 5-3: Summary of Simulated Water Level Elevations for Existing Conditions – Foundry Road 25
Table 5-4: Summary of Simulated Water Level Elevations for Existing Conditions – William Street, Prince Street & Main Street 26
Table 5-5: Summary of Simulated Water Level Elevations for Existing Conditions – Willow Street 26

Table 5-6: Summary of Simulated Water Level Elevations for Existing Conditions – Holmes Hill Road, Maple Avenue & Chestnut Avenue 27
Table 5-7: Summary of Simulated Water Level Elevations for Existing Conditions – Rand Street, Bog Road & Evangeline Drive 27
Table 5-8: Summary of Water Level Elevations for Existing Conditions – Rand Street, Bishopville Road & Riverview Road 28
Table 5-9: Summary of Simulated Future Water Level Elevation Impacts for Historical Climate – Riverview Road, Maple Avenue & Birch Street 29
Table 5-10: Summary of Simulated Future Water Level Elevation Impacts for Historical Climate – Holmes Hill Road, Maple Avenue & Chestnut Avenue 31
Table 5-11: Summary of Simulated Future Water Level Elevation Impacts for Historical Climate - Rand Street, Bog Road & Evangeline Drive 32
Table 5-12: Summary of Simulated Future Water Level Elevation Impacts for Historical Climate – Rand Street, Bishopville Road & Riverview Road 32
Table 5-13: Summary of Simulated Future Water Level Elevation Impacts for Future Development and Climate Change Conditions – Downtown 33
Table 5-14: Summary of Simulated Future Water Level Elevation Impacts for Future Development and Climate Change Conditions – Riverview Road, Maple Avenue & Birch Street 34
Table 5-15: Summary of Simulated Future Water Level Elevation Impacts for Future Development and Climate Change Conditions – Foundry Lane 35
Table 5-16: Summary of Simulated Future Water Level Elevation Impacts for Future Development and Climate Change Conditions – William Street, Prince Street & Main Street 35
Table 5-17: Summary of Simulated Future Water Level Elevation Impacts for Future Development and Climate Change Conditions – Willow Street 36
Table 5-18: Summary of Simulated Future Water Level Elevation Impacts for Future Development and Climate Change Conditions – Holmes Hill Road, Maple Avenue & Chestnut Avenue 36
Table 5-19: Summary of Simulated Future Water Level Elevation Impacts for Future Development and Climate Change Conditions – Rand Street, Bog Road & Evangeline Drive 37
Table 5-20: Summary of Simulated Future Water Level Elevation Impacts for Future Development and Climate Change Conditions – Rand Street, Bishopville Road & Riverview Road 38
Table 7-1: Summary of Preliminary Drainage Improvement Options 43
Table A-1: PCSWMM Catchment Parameters – Existing & Future Conditions A-2
Table B-2: Summary of Simulated Future Water Level Elevations for Historical Climate - Downtown B-2

Table B-3: Summary of Simulated Future Water Level Elevations for Future Development – Downtown B-3
Table B-4: Summary of Simulated Future Water Level Elevations for Historical Climate – Riverview Road, Maple Avenue & Birch Street B-4
Table B-5: Summary of Simulated Future Water Elevations for Future Development – Riverview Road, Maple Avenue & Birch Street B-5
Table B-6: Summary of Simulated Future Water Level Elevations for Historical Climate – Foundry Road B-6
Table B-7: Summary of Simulated Future Water Level Elevations for Future Development – Foundry Road B-6
Table B-8: Summary of Simulated Future Water Levels for Historical Climate – William Street, Prince Street & Main Street B-6
Table B-9: Summary of Simulated Future Water Level Elevations for Future Development – William Street, Prince Street & Main Street B-7
Table B-10: Summary of Simulated Future Water Levels for Historical Climate – Willow Street B-7
Table B-11: Summary of Simulated Future Water Level Elevations for Future Development – Willow Street B-8
Table B-12: Summary of Simulated Future Water Levels for Historical Climate – Holmes Hill Road, Maple Avenue & Chestnut Avenue B-8
Table B-13: Summary of Simulated Future Water Level Elevations for Future Development – Holmes Hill Road, Maple Avenue & Chestnut Avenue B-9
Table B-14: Summary of Simulated Future Water Levels for Historical Climate – Rand Street, Bog Street & Evangeline Drive B-9
Table B-15: Summary of Simulated Future Water Level Elevations for Future Development – Holmes Hill Road, Maple Avenue & Chestnut Avenue B-10
Table B-16: Summary of Simulated Future Water Level Elevations for Historical Climate – Rand Street, Bishopville Street & Riverview Road B-10
Table B-17: Summary of Simulated Future Water Level Elevations for Future Development – Rand Street, Bishopville Street & Riverview Road B-11

Appendices

A PCSWMM Catchment Parameters
B Additional Simulation Results
C PCSWMM Profiles
D Rainfall Distributions
E Meeting Minutes
F Capacity of Undersized Pipes

References

Executive Summary

The Municipality of West Hants (the Municipality) has retained Dillon Consulting Limited (Dillon) to undertake a Stormwater Management Study within the Community of Hantsport (Community). The Community is located along the west coast of mainland Nova Scotia in the vicinity of the Avon River estuary near the Bay of Fundy. The Community has a population of approximately 1,200 people. Historically, the Community has experienced drainage issues in the following areas:

- Chittick Avenue;
- Foundry Road;
- Riverview Road;
- Library/Playground on Main Street;
- Avon Street (no existing drainage infrastructure); and,
- Maple Drive.

The purpose of this study is to assess the performance of the current drainage system for a series of scenarios including existing and future conditions. Based on these assessments, a set of conceptual drainage improvement options were developed with the following objectives:

- Protect citizens from flooding dangers (loss of life, loss of property, etc.);
- Mitigate damage to public infrastructure; and,
- Use low impact development (LID) and best management practices (BMP) stormwater management techniques to improve groundwater and surface runoff quality, and in turn improve the quality of aquatic habitat in the area.

Drainage infrastructure within the Community consists of a combination of storm and combined sewer, along with numerous overland drainage routes. Many of the roadways within the Community do not appear to be constructed as a dual-drainage network (i.e. major/minor drainage). However some of the recently upgraded road sections include new curb and gutter and would provide a degree of minor and major conveyance.

Hydrologic/hydraulic modelling was undertaken to simulate the performance of current drainage network. The numerical simulation was completed using the latest version (2017 Professional) of the Computational Hydraulic Institutes (CHI) PCSWMM modelling software. The PCSWMM model was used to assess the drainage network in Hantsport for six (6) 24-hour rainfall events with return periods ranging from two (2) years to 100 years. These rainfall events were developed using historical rainfall data as well as developed with climate change adjustments assuming a moderate greenhouse gas emissions scenario (RCP 4.5).

The future land use model was developed based on discussion the Municipality on November 22nd, 2017. The Municipality indicated a projected annual growth over a 50 year horizon of approximately two

(2) homes per year along with the potential construction of a nursing home. The expected developments were assumed to take place at the following locations:

- Extension of Faulkner Drive to Bog Road – Estimated 16 new homes;
- Connection of Chestnut Avenue to Evangeline Drive – Estimated 15 new homes;
- Extension of Mariner Drive – Nursing home;
- Extension of Alders Avenue to the west – Estimated 48 new homes; and,
- Extension of McCully Crescent and Mariner's Drive – Estimated 18 new homes.

The future land use model incorporates an estimated 97 new homes and a nursing home.

A series of simulations for both existing and future conditions were completed to assess the performance of the existing drainage works. The simulations scenarios included existing conditions with historical climate, future land use with historical climate, and future land use with climate change conditions. These simulations identified nine (9) areas potentially vulnerable to flooding, including:

- Holmes Hill Road – At the intersection with Riverbank Drive;
- Riverview Road – In the vicinity of Civic #8 and #23, and the ditch near the intersection with Rand Street;
- Maple Avenue – In the vicinity of Civic #24 and #30;
- Main Street Bridge Crossing;
- Chittick Avenue, Main Street, and School Street (Downtown) – In the vicinity of Civic #22 and #47 on Chittick Avenue, Civic #25 and #39 on Main Street, and Civic #12 on School Street;
- Foundry Road – In the vicinity of the soccer field;
- Prince Street and William Street – In the vicinity of Civic #11 on Prince Street and Civic #14 on William Street;
- Willow Street – At the intersection with Main Street; and,
- Faulkner Drive – In the vicinity of Civic #80.

A set of conceptual drainage improvement options were prepared for the vulnerable areas; improvements were also recommended for Avon Street and the library/playground area on Main Street (as noted by the Municipality). Recommendations include separation of the combined sewer systems on Willow Street, Prince Street, and William Street, and increased storm sewer sizes along Holmes Hill Road, Riverview Road, and Foundry. Storm sewers were sized to convey the 5-year return period event with climate change adjustments.

The aboiteau in the lower Halfway River failed in November 2017. The failure was concerning due to the potential of increased flood risk associated with storm surge from the Bay. Based on review of potential future water levels and surrounding topography, the estimated freeboard between the extreme water level elevation and the lowest residence adjacent to the river is approximately 8.8 m. The risk of riverine flooding to the residents of Hantsport is expected to be minimal.

1.0 Introduction

The Municipality of West Hants (the Municipality) has commissioned Dillon Consulting Limited (Dillon) to undertake a Stormwater Management Study within the Community of Hantsport (Community). This report describes the methodology and findings of the study, and puts forth recommendations to improve drainage conditions within the Community. The objectives of recommended drainage improvements are as follows:

- Protect citizens from flooding dangers (loss of life, loss of property, etc.);
- Mitigate damage to public infrastructure; and,
- Use low impact development (LID) and best management practices (BMP) stormwater management techniques to improve groundwater and surface runoff quality, and in turn improve the quality of aquatic habitat in the area.

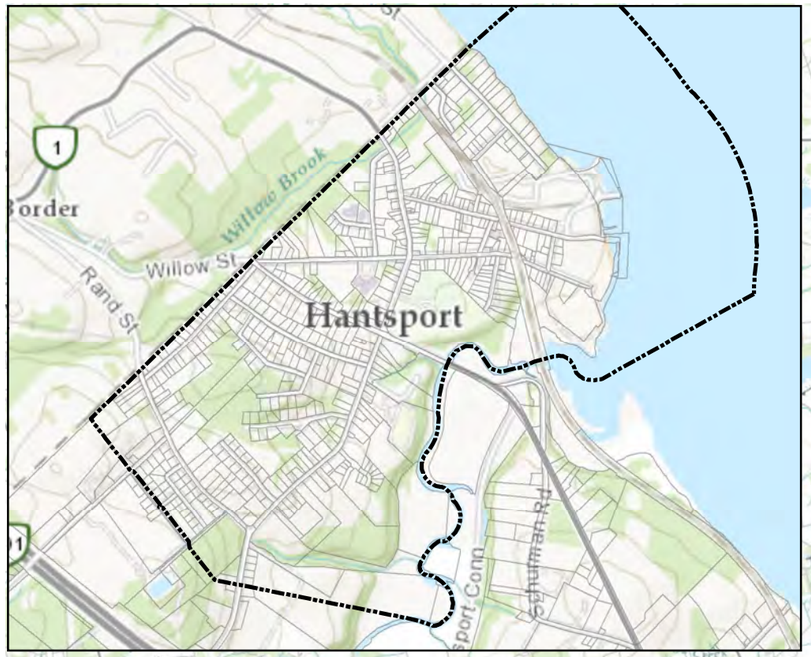
2.0 Background

The Community of Hantsport is located along the west coast of mainland Nova Scotia in the vicinity of the Avon River estuary near the Bay of Fundy. The general location of Hantsport and municipal boundaries are presented in Figure 2-1. The community has a population of approximately 1,200 people and is home to the CKF Food Services and Packaging Plant which is a significant employer in the area.

Historical significant flooding within the Community is limited to reports of localized flooding along the route connecting NS Highway 101 (Exit 8) to Route 1. The most recent instance of flooding was reported in late September 2017 where Exit 8 was closed and traffic was redirected. This flooding is probably the result of increased levels along the Halfway River. Furthermore, this section of highway near the Halfway River has been identified as at risk due to the effects of storm surge and projected sea level rise (Proosdij, 2009). Additionally, drainage issues have been noted throughout the Community at the following locations:

- Chittick Avenue;
- Riverview Road;
- Avon Street (no existing drainage infrastructure); and,
- Maple Drive.

Of special note, the existing aboiteau located at the mouth of Halfway River was reported to be in disrepair (Proosdig, 2009), allowing for partially restricted tidal flow to propagate up the Halfway River. In the fall of 2017 the Municipality reported that the aboiteau had completely collapsed. A photograph of the post-failure aboiteau taken on November 22 is presented in Figure 2-2. The failure of the



Area
Big Creek
Kingsport
Habitant
Lower Canard
Boot Island National Wildlife Area
North Grand Pré
Ransom Creek
Starrs Point
Horton Landing
Grand-Pré National Historic Site of Canada
Hortonville
Grand Pré
Avonport Station
Lower Wolfville
Avonport
Cornwallis River
Oakland Brook
Port Williams
Wolfville
Cheverie
Kempt Shore
Summerville
Cogmagun River
Aldershot
North Kentville
Belcher Street
Meadowview
Kentville
Greenwich
Wallbrook
Lockhartville
West Brooklyn
Melanson
Wolfville Ridge
Gaspereau
Hants Border
Hantsport
Highbury
White Rock
Gaspereau Mountain
Forest Hill
Robinson Corner
Newtonville
Mount Denson
KENTVILLE CDA
New Minas—Commercial St

MUNICIPALITY OF THE DISTRICT OF WEST HANTS
HANTSPORT SWM STUDY

REGIONAL CONTEXT
FIGURE 2-1

KENTVILLE CDA METEOROLOGICAL STATION (ID: 8202800)
MUNICIPAL BOUNDARY
LAND PARCEL

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI & WEST HANTS

MAP CREATED BY: JGC
MAP CHECKED BY: JAM
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

SCALE 1:30,000
0 1 2 4 Kilometers

FILE LOCATION: \\DILLON.CA\DILLON_DFS\LONDON\LONDON CAD\GIS\VISUAL COMMUNICATIONS DI\MXD TEMPLATES\GREY - 11X17 LANDSCAPE - LEGEND BOTTOM.MXD

PROJECT: 17-6276 STATUS: FINAL DATE: 18/04/27

aboiteau is expected to impact flood levels along the Halfway River, potentially increasing the effects of storm surge and/or restricting drainage along the Halfway River watershed to the Bay of Fundy.



Figure 2-2: Photograph of Post-Failure Aboiteau near Hantsport (taken November 22, 2017)

Drainage infrastructure within the Community consists of a combination of storm and combined sewer, along with numerous semi formalized overland drainage routes. Many of the roadways within the Community do not appear to be constructed as a dual-drainage network (i.e. provision for major/minor drainage). However some of the recently upgraded road sections include new curb and gutter and would be expected to provide a degree of minor and major flow conveyance. Examples of these road sections within the Community are presented in Figure 2-3.

Dual drainage networks are generally designed such that stormwater runoff is evacuated from the drainage area and conveyed through a combination of overland infrastructure, such as roadways (i.e. the major system), and sewer infrastructure (i.e. the minor system). The minor system is commonly sized to accommodate a 1:5 year or 1:10 year flood without surcharging into the roadway. For more intense flood events (e.g. the 1:100 year flood), the sewers would be expected to surcharge to the roadway and combined with excess flow from within the right of way (ROW) would be conveyed by the roadway. The roadway section is expected to provide safe conveyance without flooding areas outside the road ROW. Maximum ponding depths along the roadway are commonly designed to be no greater than ~ 0.3 m during a 1:100 year flood. The advantage of a dual-drainage system is that the size of underground sewers can be significantly reduced (i.e. limited to 1:5 or 1:10 year level of service) and not require significant stormwater management facilities.



Figure 2-3: Photos of Recently Upgrade Roadway on Chittick Avenue (left) and typical Road section (right)

Referring to Figure 2-3, the recently upgraded roadway section (e.g. Chittick Avenue) would be expected to perform as a dual-drainage network. However, the older road sections without curb and gutter would be expected to spill onto private property once the capacities of the catchbasins and/or sewer are exceeded. This may result in uncontrolled overland flow routes, potentially impacting low-lying private property.

To address flood risk within the Community and to identify mitigation options to improve drainage, an assessment of existing stormwater infrastructure has been undertaken. This assessment seeks to identify both minor and major drainage routes within the study area and to identify hydraulic constrictions (i.e. bottlenecks) where surcharging occurs. Numerical simulation of design rainfall events has been undertaken to facilitate this assessment.

This study has also evaluated, at a conceptual level, the flood risk posed by the Halfway River as a result of the recent aboiteau failure.

3.0 Existing Drainage Network

3.1 Site Reconnaissance and Survey

To understand the existing level of flood risk within the Community, a series of site visits were completed in the fall of 2017. These visits included topographical survey, visual inspection of drainage infrastructure and water level monitoring. These observations were also used to support the development of the drainage model (described in subsequent sections of this report). A summary of each site visit is provided in the sections below.

3.1.1 September 5th – 8th, 2017

The first site visit took place on September 5th with objectives including the installation of a water level logger, and a targeted survey of the drainage network. The water level logger was installed along

Halfway River downstream of the Highway 1 bridge crossing (see Figure 4-3). The purpose of the logger was to record a period of water level fluctuations and obtain an understanding of the tidal influences on the lower river reach. The targeted survey investigated areas that have historically exhibited drainage issues, as discussed in the kickoff meeting which took place on August 29th. These areas include the following:

- Chittick Avenue;
- Riverview Road;
- Avon Street (no existing drainage infrastructure); and,
- Maple Drive.

A detailed survey was completed along Chittick Avenue on September 5th. The street consists of a curb/gutter and piped system. Dimensions and measurements were also collected along the Willow Brook crossing on Main Street.

The second site visit (undertaken on September 8th) involved a continued investigation and survey of the areas noted in the kickoff meeting. The ditch at the southern end of Riverview Road was noted as historically exhibiting drainage issues. Field observations revealed the ditch to be overgrown with an outlet pipe that was partially blocked due to soil/debris, leading the potential for roadway flooding.

3.1.2 October 4th, 2017

The site visit undertaken on October 4th involved relocation of the water level logger along with a survey of the select sites within the Community. The water level logger was relocated to Willow Brook slightly upstream of the Tannery Road culvert crossing (see Figure 4-3) to collect data for rainfall events to calibrate the PCSWMM model (described further in Section 4.5).

This survey focused on manhole inspections to investigate both their condition as well as obtain estimates of pipe diameters and depth. The purpose of the survey was also to confirm drainage routes due to limited records available for the drainage network. Based on this survey it was determined that the majority of the Community discharges to Willow Brook while the remainder discharges to Halfway River or directly to the Avon River. The location of these rivers can be seen in Figure 4-1.

Based on the site visits conducted in September and October it was observed that several catchbasins throughout Hantsport were full of leaves and debris significantly limiting the inlet capacity of the catchbasins which can potentially lead to roadway flooding. Performing regular maintenance flushing and cleaning would reduce this risk. Streets that contained a significant number of blocked structures included:

- Riverview Road;
- Willow Street;
- Maple Avenue;
- Alders Avenue;

- Cedar Avenue; and,
- Northern portion of Rand Street.

3.1.3 November 22nd, 2017

The site was visited to remove the water level logger from the Willow Brook monitoring location (deployed October 4th) and to undertake additional targeted survey of select drainage infrastructure. The survey was intended to infill some of the data gaps identified during model development.

A progress meeting with the Municipality was also organized during this visit. The meeting entailed discussions concerning the preliminary simulation results for existing conditions. At the time, municipal staff also provided an account of anecdotal flooding reports within the community during this meeting. The following areas were noted as areas of concern for flooding:

- Chittick Avenue – existing ditch located adjacent to a dentist office has caused localized flooding in the past;
- Chittick Avenue – flooding in the vicinity of the Community municipal storage yard has been reported;
- Library/Playground located along Main Street has experienced flooding in the past;
- The section of Cottage Street near the Soccer Field and adjacent to the CKF plant;
- Localized flooding at the top of Riverview Road has been reported; and,
- Flooding along Chestnut Avenue has been reported in the past – however, a new French drain was constructed and is believed to have mitigated the issue.

In addition to the above historical flood reports, the Municipality also identified the following drainage concerns:

- Ball Field located at the end of Porters Avenue has been used as a snow dump in the past and has been the site of bank failures; and,
- The failure of the Halfway River aboiteau was discussed, and noted as an issue of particular concern to Municipal staff.

3.2 Hydrometric Observations

3.2.1 Halfway River (September 5th – October 4th)

The water level data at the Halfway River monitoring station were collected and readings were compensated for changes in barometric pressure. A summary of water level fluctuations during the observation period is presented in Figure 3-1. Water levels at the observation site are clearly tidally influenced, and are indicative of the semi-diurnal tide cycles dominate in the Bay of Fundy. Figure 3-1 also includes the coincident observations at the Department of Fisheries and Oceans (DFO) gauge located in Saint John, NB.

It is noteworthy that the Halfway River level logger is not submerged during periods of low tidal fluctuations; this can be seen in Figure 3-1 where the level observations have a minimum value of approximately 2.5 m. Given the significant tidal range, the level logger could not safely be installed in a location that allowed for capture of the complete tidal cycle.

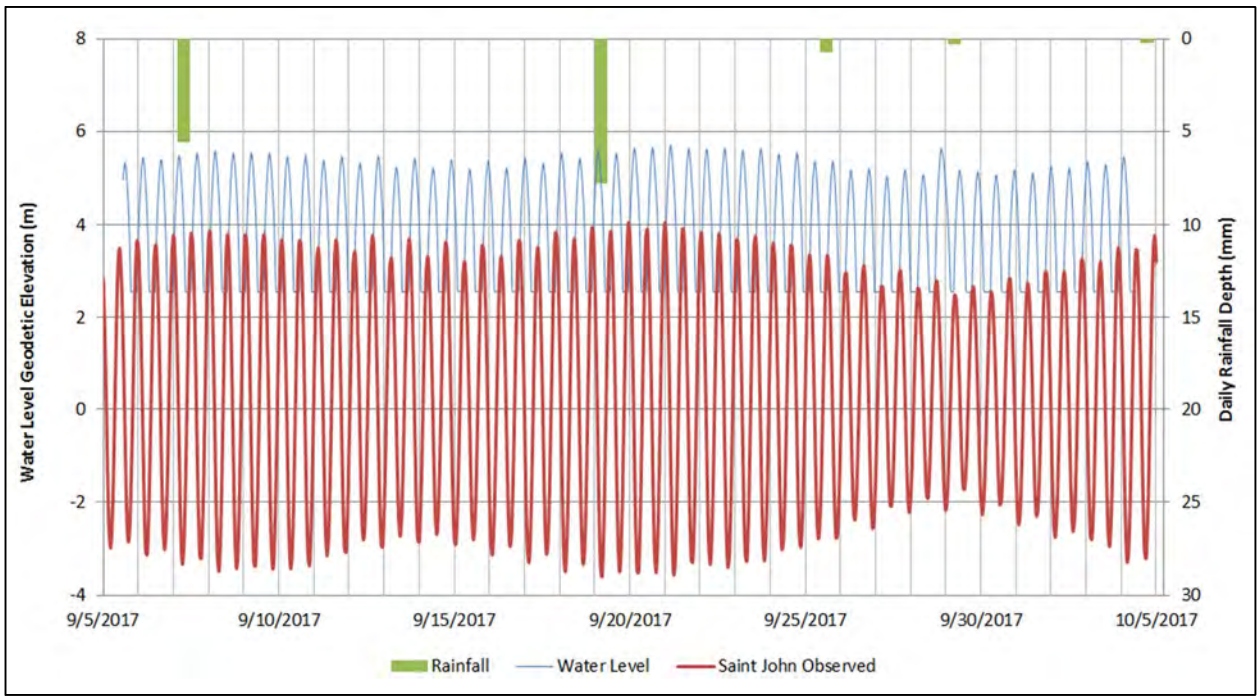


Figure 3-1: Halfway River Water Level Observations

It can be seen in the above figure that variation between the Fisheries and Oceans Canada (DFO) and Halfway River observations is evident. A refined view of a typical 24-hour observation period is also presented in Figure 3-2 to further demonstrate this deviation. This variation suggests that the Halfway River water level is frequently more than 2 m higher than levels in the Bay of Fundy. There is also a delay of roughly 3.5 hours between the high water level in the Halfway River compared to the Bay of Fundy at Saint John. Some of this variation is presumably due to the considerable distance between the two gauges (~150 km) and the backwatering effects along the channels; however the impact of runoff from the Halfway River and hydraulic constriction at the aboiteau is also a possible factor.

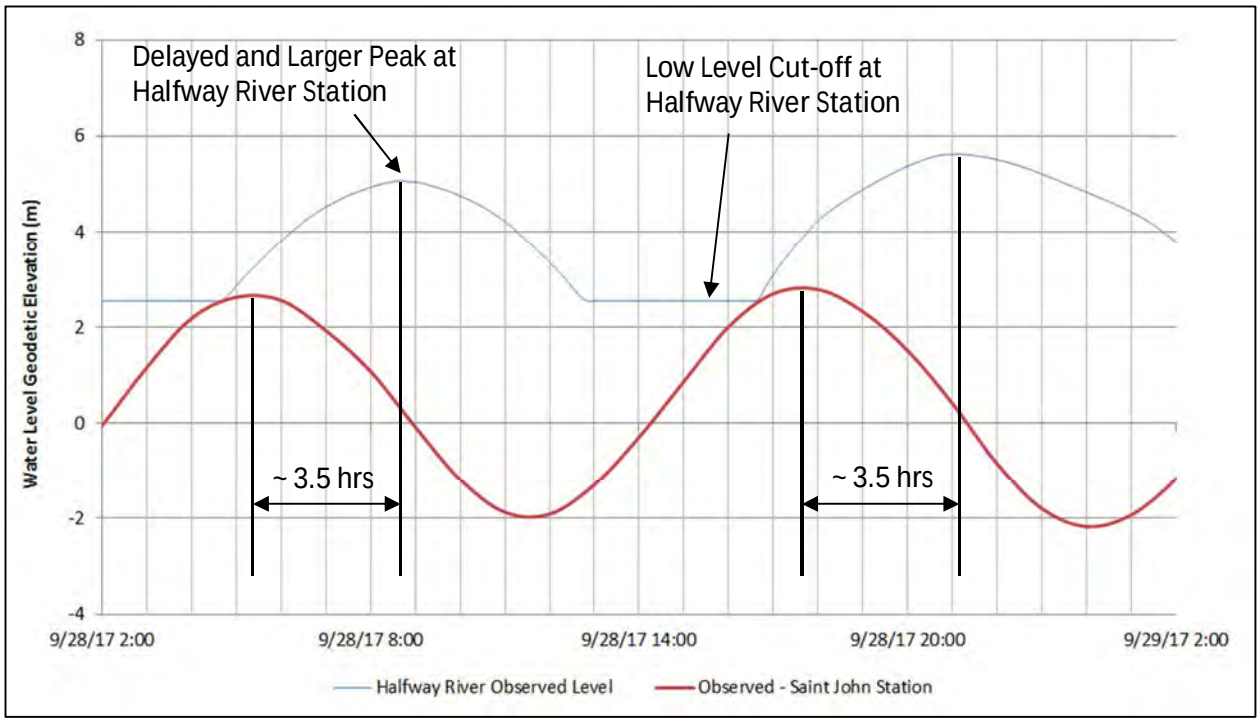


Figure 3-2: 24-Hour Water Level Observation Summary

It is important to note that the typical tidal fluctuation (high to low) along the Halfway River was significant (>2 m) leaving the monitoring station unsubmerged at times during the tidal cycle; as discussed above, this results in a low level cut-off of approximately 2.5.

It is noted that these observations were made prior to the recent failure of the Halfway River aboiteau. The failure has created a free outlet to the Avon River. It is expected that the current condition of the aboiteau (see Figure 2-2) could potentially increase flood risk associated with storm surge from the Bay. However the free outlet may slightly decrease flood risk associated with high flows in the Halfway River, since discharges to the Avon River are no longer restricted by the capacity of the aboiteau.

3.2.2 Willow Brook (October 4th – November 22nd)

As noted previously the water level logger was relocated on October 4th from the Halfway River to Willow Brook. The location of the logger is presented in Figure 4-3. A photograph of the Willow Brook level logger station is presented in Figure 3-3. Willow Brook receives runoff from a substantial portion of the Hantsport study area and therefore provides a suitable model calibration/validation point for evaluating peak flows within the watershed.

The logger was installed immediately upstream of the existing pre-cast concrete box culvert structure conveying flows under Tannery Road. The conveyance structure provides a controlled flow section,

thus allowing for a simple estimation of the discharge through the structure using the observed water levels recorded upstream.

A summary of water level observations and rainfall records from the Environment Canada Kentville climate station (#8202810) are presented in Figure 3-4. The two largest rainfall events occurred on October 26 and 30th with 14.9 and 15.7 mm of daily rainfall reported, respectively. While higher intensity rainfall events (50+ mm) would provide a stronger indication of rainfall-runoff response, these two events were the highest observed daily rainfall accumulations during the monitoring period. These rainfall data will be used to support subsequent model validation calibration (Section 4.5).



Figure 3-3: Level Logger Deployment in Willow Brook (left), and Downstream Open Bottom Pre-Cast Structure Facing Downstream (right)

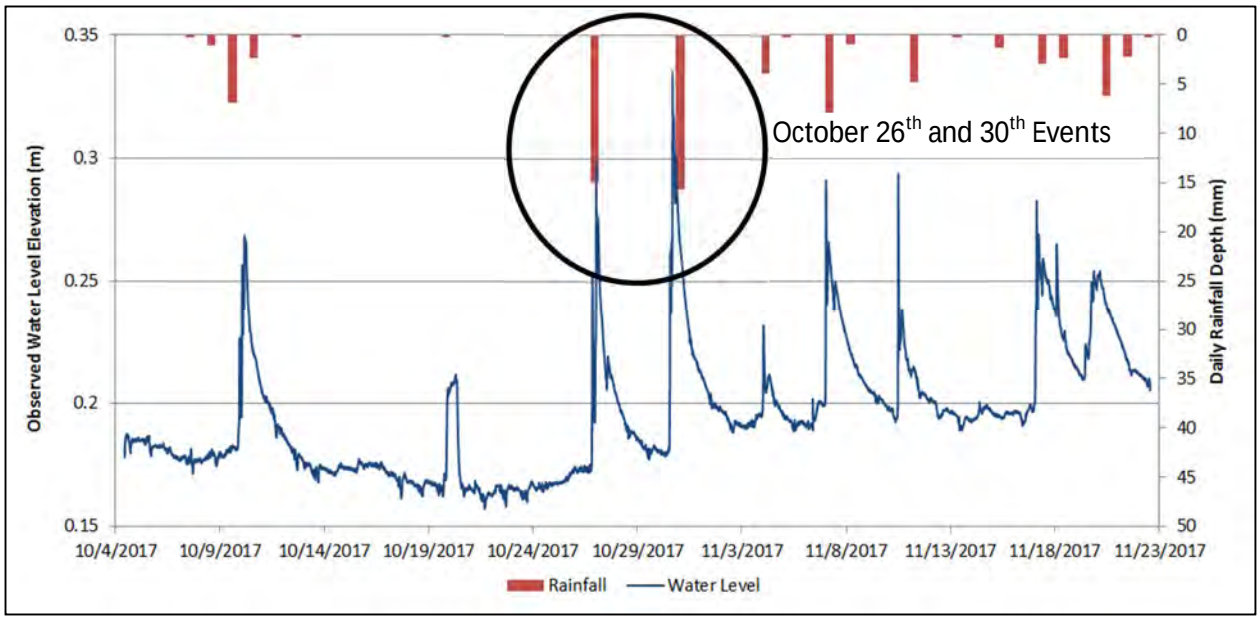


Figure 3-4: Willow Brook Water Level Observations (Geodetic Elevation)

3.2.3 Flood Frequency Analysis

A review of other regional hydrometric gauges along the west coast of Nova Scotia was undertaken to generate a regional flood frequency analysis for the study region. This exercise involved using the HYFRAN statistical software to perform a frequency analysis of six hydrometric stations in Nova Scotia. The stations used for the frequency analysis are summarized in Table 3-1, and were chosen due to their proximity to the study area and the period of record. Only stations with greater than 20 years of data were used to support the regional frequency analysis discussed below.

Table 3-1: Regional Hydrometric Station Summary

Station Name	Station ID	Period of Record	Years of Complete Data	Drainage Area (km^2)
Kelley River at Eight Mile Ford	01DL001	1969 - 2013	44	63.2
Great Village River near Scrabble Hill	01DJ005	1993 - 2013	21	89.0
Sharpe Brook at Lloyds	01DD004	1966 - 1995	30	8.81
Fraser Brook near Archibald	01DH003	1965 - 1991	27	10.1
North Brook at North River	01DD004	1973 - 1995	20	202
Salmon River at Union	01DH005	1977 - 1999	23	287

Based on the frequency analysis of the six regional stations with >20 years of observations, a log-log graph was plotted of drainage area against peak flow for each return period flood events (i.e. 2-year, 5-year, etc.). A trend line was fitted to each return event to obtain a relationship between peak flow and drainage area for the west coast of Nova Scotia. Using these relationships, the theoretical peak flow for each return period flood may be estimated for watersheds of various sizes within the west coast of Nova Scotia. The log-log graph of the six regional stations is presented in Figure 3-5.

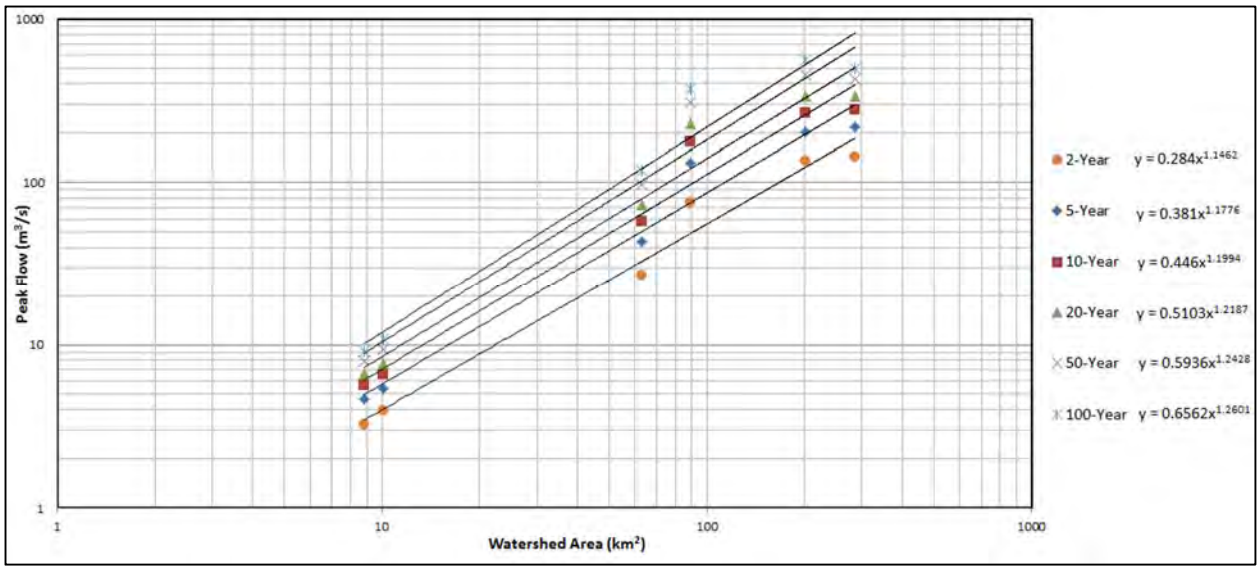


Figure 3-5: Regional Frequency Analysis Theoretical Peak Flow Plot

Table 3-2 presents a summary of the estimated peak flow values for Willow Brook and Halfway River using regional frequency analysis approach. The total drainage areas for Willow Brook and Halfway River were approximately 3.30 km^2 and 201 km^2, respectively.

Table 3-2: Regional Flood Frequency Peak Flow Estimates for Willow Brook and Halfway River

Return Period (Years)	Regional Flood Frequency Results for Willow Brook (m^3/s)	Regional Flood Frequency Results for Halfway River (m^3/s)
100	201	2.30
50	168	2.00
20	129	1.70
10	104	1.50
5	80.1	1.20
2	51.7	0.90

It is noteworthy that flows in Willow Brook are expected to be higher than above due to the degree of urbanization in the Willow Brook catchment area.

4.0 Hydrologic and Hydraulic Analysis

Hydrologic/hydraulic modelling was undertaken to simulate the performance of the current drainage system within the study area under both existing and projected future conditions. The numerical simulation was completed using the latest version (2017 Professional) of the Computational Hydraulic Institutes (CHI) PCSWMM modelling software. This model was selected based on its integrated hydrologic and hydraulic computational abilities.

The following sections describe the model inputs and set up required to complete the numerical simulation.

4.1 Hydrologic Characteristics

4.1.1 Catchment Parameters

4.1.1.1 Catchment Delineation

Catchment delineation was initially completed using the existing LiDAR data (obtained from GeoNova) for the Hantsport study area. The initial coarse sub-catchment delineation was further refined based on the observations made during the site visits. The basin was delineated into 56 sub-catchments as shown in Figure 4-1. Each sub-catchment was given a unique identifier for the PCSWMM model.

4.1.1.2 Rainfall-Runoff Parameters

Runoff from the catchment that can directly contribute to flooding occurs when the rate of rainfall far exceeds the capacity of the ground to absorb the water. This is often impacted by impervious covers, such as asphalt, concrete and building roofs. The magnitude of runoff that may lead to flooding depends on the intensity and duration of the rainfall, the areal extent of the storm, antecedent (pre-storm) ground moisture conditions, and drainage basin characteristics (e.g. topography, slope, soils, vegetation, and land cover type).

The U.S. Soil Conservation Service (SCS) Unit Hydrograph transformation method was adopted for the numerical simulation. Using the curve number, catchment lag is estimated as a function of the average basin slope, flow length and the SCS Curve Number (CN) value. The digital elevation model derived from existing LiDAR data was used to estimate the average basin slope and flow length for each sub-catchment. The CN value for each sub-catchment was estimated based on the dominant land cover type/surficial geology (OAS, 1984), and published CN values according to Ponce (1989).

Losses of precipitation due to infiltration, depression storages and interception in the sub-catchments were incorporated into the model through CN values. A review of topography within the study area was also undertaken to estimate the effective runoff from each sub-catchment. This review identified

significant natural landform barriers and/or depressions that diverted or collected large amounts of surface runoff. These estimates were then included in the simulated sub-catchments.

A summary of the runoff parameters assigned to each sub-catchment is provided in Table A-1 in Appendix A.

4.1.2 Meteorological Inputs

Rainfall intensity-duration-frequency (IDF) statistics for the Kentville Environment Canada climate station (#8202800) were retrieved. The Kentville station is approximately 25 km from Hantsport with about 32 years (1960 – 1995) of continuous climate observations, including precipitation. Estimated existing rainfall depths for a range of short duration (24-hour) rainfall events are presented in Table 4-1.

A potential future rainfall climate change scenario has also been considered in this assessment. The Canadian Water Network's IDF Climate Change Computerized Tool (https://www.idf-cc-uwo.ca) has been used to estimate future rainfall intensity. A comparison of historical and future rainfall for the Kentville station is also presented in Table 4-1.

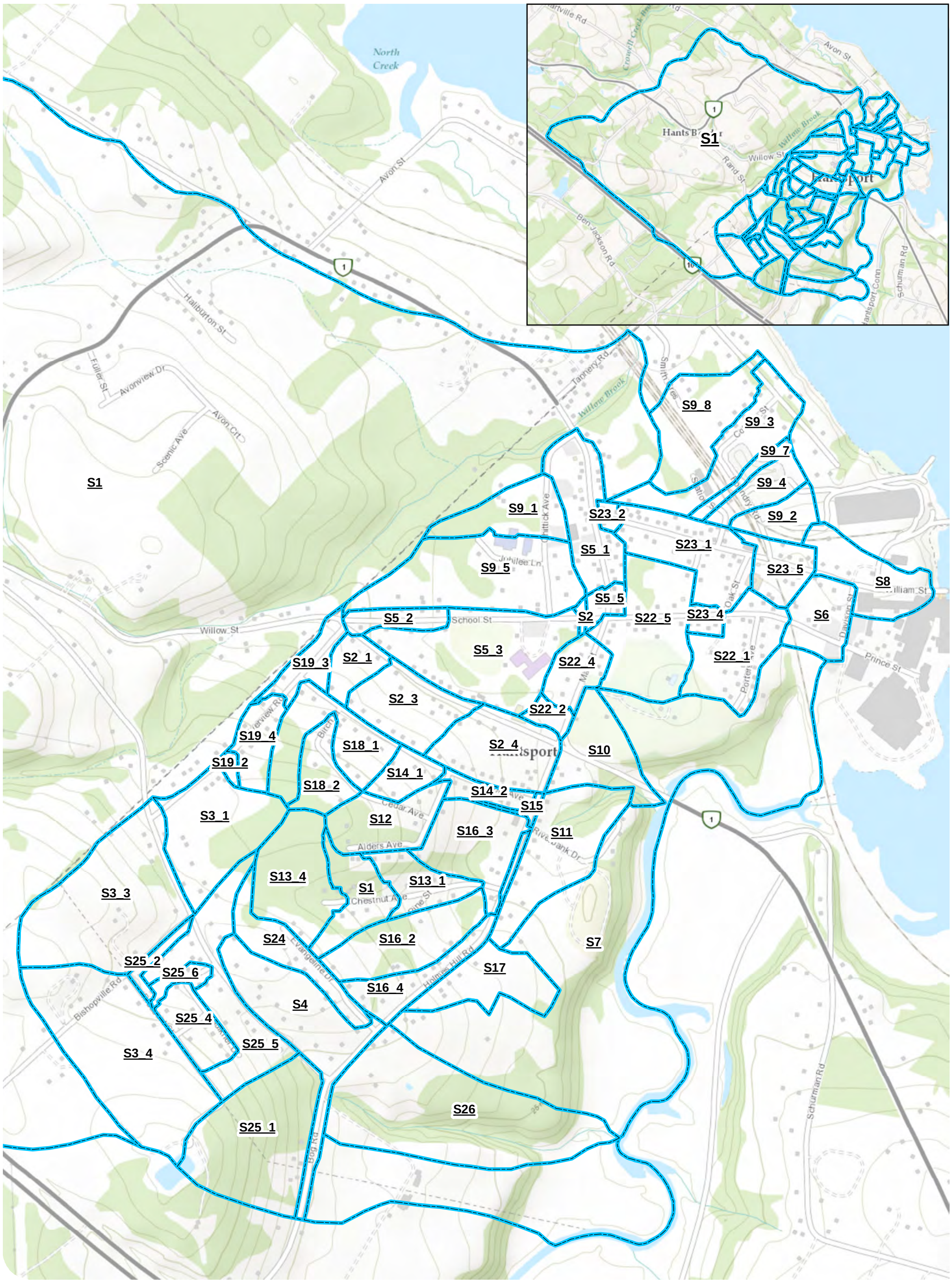
Table 4-1: Summary of Historical and Estimated Future Rainfall Depth for 24-hour Rainfall Events at Kentville, NS

Return Period (Years)	Historical Rainfall Depth (mm)	Estimated Future (2020 – 2070) Climate Change Rainfall Depth (mm)[1]	Percent Difference
2	56.2	64.1	+14%
5	74.2	87.3	+18%
10	86.3	103.9	+20%
25	101.7	126.3	+24%
50	113.3	144.7	+28%
100	124.9	162.7	+30%

[1]Assumes Moderate Emissions Scenario – RCP 4.5

It can be seen that for a range of return periods, and for a storm duration of 24-hours, an increase of roughly 14 – 30% is expected under estimated future conditions. It is noteworthy that the largest increase in total rainfall accumulation is associated with the lowest frequency event (i.e. 100-year return period). The implications of such increases in rainfall intensity can be significant and must be considered when assessing drainage under future scenarios.

The total 24-hour rainfall depths presented in Table 4-1 were distributed using the Alternating Block Method (Chow, 1988). The Alternating Block Method allows for the development of a design hyetograph from regional IDF statistics. The rainfall time series generated includes rainfall accumulation for the 10-minute, up to the 24-hour storm duration. Thus, the Alternating Block Method allows for some flexibility with respect to the estimation of lag time within the watershed. An example of this distribution for the 100-year historical rainfall event is presented in Figure 4-2.



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SUB-CATCHMENT DELINEATIONS
FIGURE 4-1

WEST HANTS
NOVA SCOTIA

SUB-CATCHMENT

S1 SUB-CATCHMENT IDENTIFIER FOR PCSWMM MODEL

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MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI & WEST HANTS

MAP CREATED BY: JGC
MAP CHECKED BY: JAM
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

FILE LOCATION: \\DILLON.CA\DILLON_DFS\LONDON\LONDON CAD\GIS\VISUAL COMMUNICATIONS DI\MXD TEMPLATES\BEIGE - 11X17 LANDSCAPE - LEGEND BOTTOM.MXD

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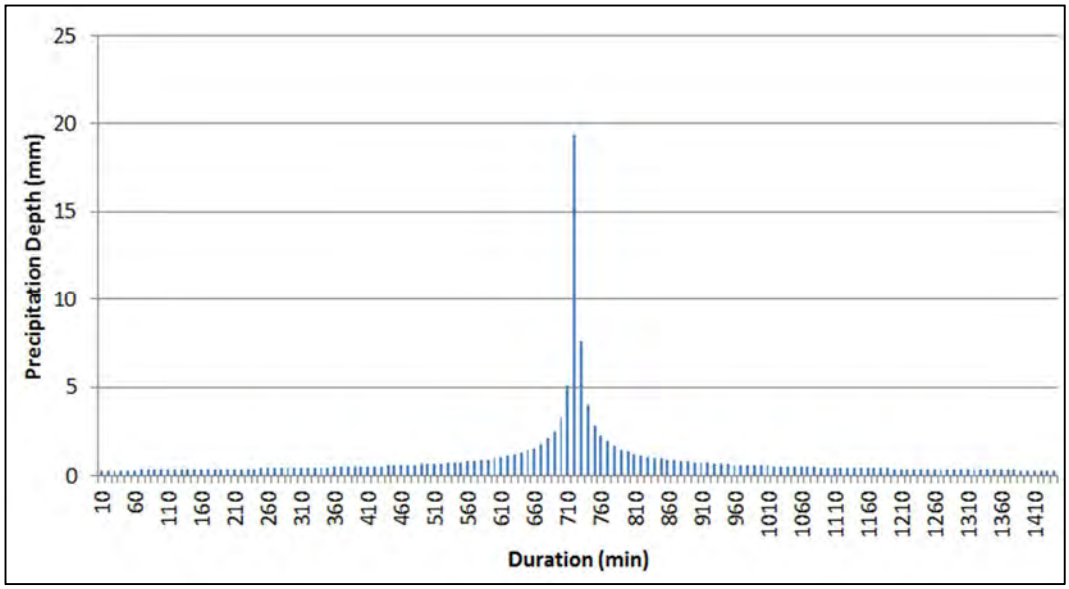


Figure 4-2: 24-Hour Alternating Block Method Distribution for 100-year Historical Event

4.1.3 Water Level Data

The water level boundary conditions were determined by reviewing the observed data along the Halfway River, and comparing to observed water levels in the Bay of Fundy (DFO station #65 at Saint John), see Figure 3-2. The confluence of the Halfway and Avon rivers is located approximately 7 km from the Minas Basin (Bay of Fundy); the downstream boundary condition for the study area is located approximately 0.5 km upstream of the confluence. Due to the proximity of the study area to the Minas Basin, it has been assumed that water levels in lower Halfway River are tidally influenced, as demonstrated in Figure 3-2. The tidal outlet boundary conditions considered in model development include the ditch outlets near Mariner's Drive and adjacent to NS Route 1.

Generally, an ordinary high water condition would be expected to coincide with a typical spring tide for the area. A moderate high water condition was determined to be comparable with the 10-year water level estimated using frequency analysis of the water level observations at Saint John. The frequency analysis was completed using 41 years (1977 – 2017) of complete record.

The estimated extreme tide condition was determined by obtaining the 100-year water level and adding a value of 0.5 m for storm surge (assumed typical surge for extreme event). The boundary conditions considered for this assessment are summarized in Table 4-2. The boundary conditions assume that the recently failed aboiteau provides no protection from storm surge; rehabilitation of the aboiteau would presumably reduce impacts of storm surge.

In addition to changes in future precipitation intensity, sea levels are also expected to increase along the coastal areas of the Bay of Fundy (Daigle, 2011). The estimated future projected sea level rise for over

the next 80 years is approximately 1.10 m (+/- 0.48 m) for coastal sections of Hantsport according to Daigle (2011). The estimated future projected water level elevation is presented in Table 4-2.

Table 4-2: Downstream Boundary Condition Summary for Study Area

Event	Peak Water Level Geodetic Elevation(m)
Typical Boundary Condition (normal spring tide)	4.60
Moderate Boundary Condition (1 in 10 year)	4.77
Extreme Boundary Condition (1 in 100 year + 0.5 m surge)	5.43
Future Projected Boundary Condition – Year 2100 (1 in 100 year + 0.5 m surge)	6.53

The estimated water levels presented above have been used as downstream boundary inputs for the hydraulic model. It is important to note that the water levels presented in Table 4-2 have been increased by 2 m in the hydraulic model to remain consistent with the difference in water level observations collected at the Saint John station and the Halfway River monitoring station (see Figure 3-3).

4.2 Hydraulic Model Development

To simulate drainage within the study area under existing conditions, hydrologic/hydraulic modelling was undertaken to simulate the performance of the existing drainage network. The numerical simulation was completed using the latest version (2017 Professional) of the Computational Hydraulic Institute's (CHI) PCSWMM modelling software. This model was selected based on its integrated hydrologic and hydraulic computational abilities. This allows for the dynamic simultaneous simulation of the rainfall-runoff relationship for complex drainage networks. The PCSWMM model was used to assess the existing drainage network in Hantsport with six (6) rainfall events.

The drainage network observed during the site visits in September and October was used to develop the model in PCSWMM for analysis. The drainage network in the Community of Hantsport consists of combined sewers, storm sewers, culverts and open ditches/watercourses. It is important to note that the PCSWMM model assumed the drainage network to be operating under ideal conditions (i.e. manholes have been cleaned and sewers have been flushed). A visual of the Community's drainage network is presented in Figure 4-3.

Combined sewers, which convey both storm and sanitary flows, run along six (6) streets within the Community which are listed below:

- Willow Street
- Prince Street;
- William Street;
- A portion of Main Street; and,

- Davidson Street.

The storm water makes its way into the system through catchbasins which connect laterally to the trunk sewer. Based on the site visits that took place in September 2017 and October 2017, these combined sewers eventually discharge to open watercourses included Halfway River and the Avon River.

Dedicated storm sewers are the primary method of storm water conveyance in Hantsport. Storm sewers convey all storm water from the residential lands located southwest of Willow Street as well as School Street, Chittick Avenue and Main Street. The majority of these storm sewers discharge to Willow Brook through open ditches.

The peak sanitary flow in the combined sewer systems were estimated using the Atlantic Canada Wastewater Design Guidelines (2006). These calculations assumed an average number of persons per dwelling of 2.3 based on the findings of the 2011 Census of Population and Statistics Canada. The Willow Street combined sewer was assumed to convey wastewater from 30 residential dwellings with an estimated peak daily flow of 1.0 L/s. The combined sewer system encompassing Prince Street, William Street, and Main Street assumed wastewater conveyance from 100 residential dwelling with an estimated peak daily flow of 4.0 L/s. It is important to note that these peak sanitary flows are small when compared to the estimated stormwater runoff flows.

It is important to note that the drainage network was not surveyed in its entirety. A targeted survey of the network was completed during the site visits carried out between September 2017 and November 2017 (see Section 3.1). These surveys captured the necessary components for model development; however several assumptions were necessary to complete the model. These assumptions are summarized below:

- Bridge slab thickness of 0.7 meters (Main Street and Tannery Road);
- Sewer grades equal to the grade of the roadway or a minimum of 1.0%;
- Watercourse and ditch centerlines that weren't collected by high resolution GPS have been estimated from aerial imagery;
- Watercourse and ditch cross sections have been estimated from the LiDAR; and,
- Catchbasin leads that were not surveyed are assumed to be 200mm diameter concrete pipe.

The assumptions described above were considered acceptable based on field observations noted during the site visits in the fall of 2017.
The following additional assumptions were also necessary to estimate catchment parameters:

- Hantsport soil has been given a Hydraulic Classification B - based on provincial surficial geologic mapping;
- Manning's roughness value (n) for concrete pipes and PVC pipes is 0.015 and 0.010, respectively (Chow, 1959); and,

- Effective catchment areas were used in the model; these reduced catchment areas were calculated assuming low lying areas did not contribute stormwater runoff to the drainage system. A topographical review revealed these low lying areas.

4.3 Hydraulic Model Calibration

4.3.1 Willow Brook

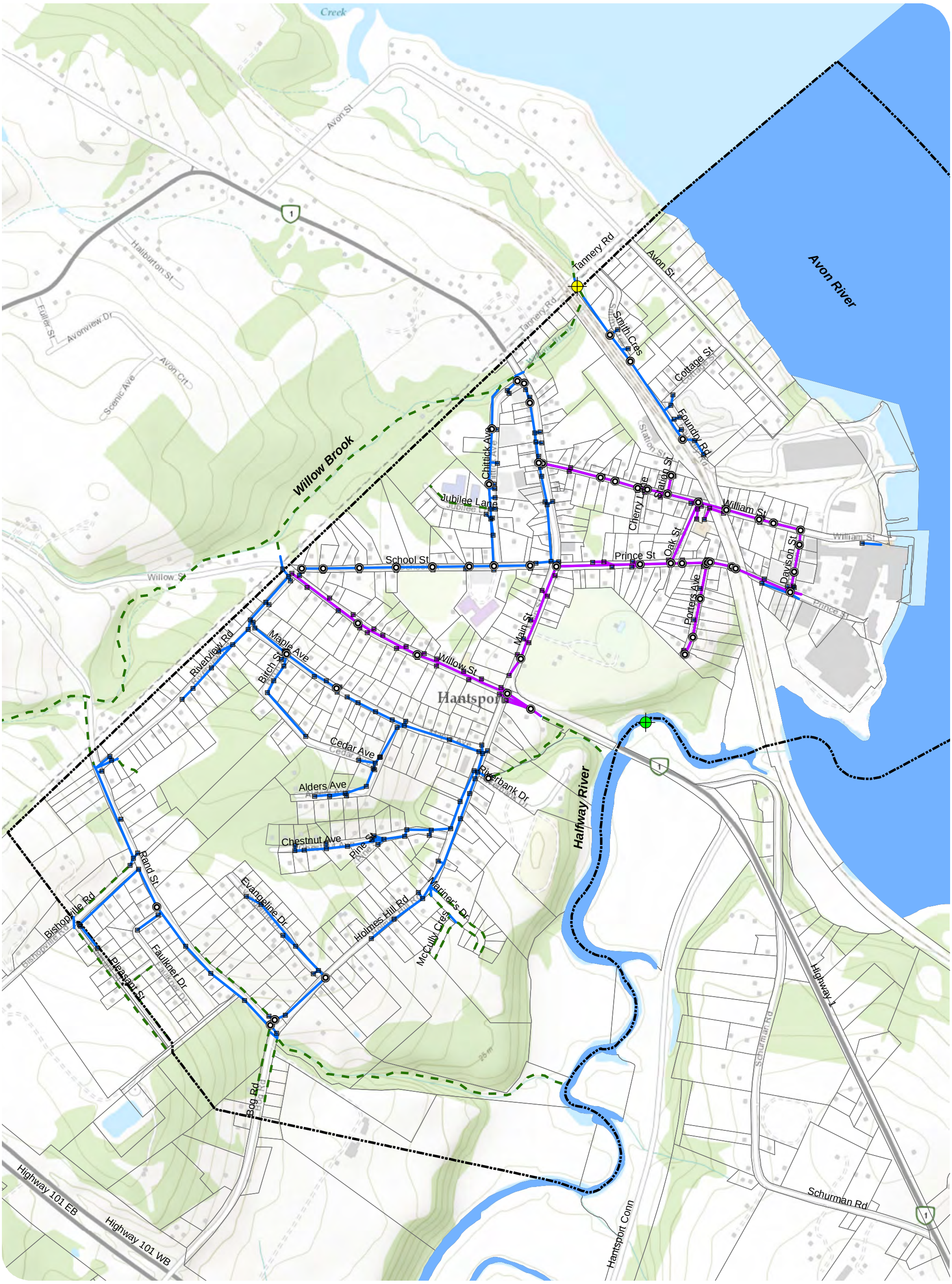
The water level observations discussed in Section 3.2.2 were used to estimate flow through the concrete box culvert at the Tannery Road crossing of Willow Brook. The Manning Equation was used to develop a rating curve for the Tannery Road crossing using the following parameters, collected during field survey and derived from LiDAR:

- Average bed slope of 3.6 %;
- Culvert Opening width of 3.66 m;
- Upstream Culvert Invert Elevation of 9.84 m;
- Downstream Culvert Invert Elevation of 9.86 m.

The Manning Equation assumes that flow is unobstructed by drainage infrastructure such as, bridges and culverts. This assumption was considered acceptable due to the low water levels associated with the daily rainfall on October 26th and 30th (14.9 and 15.7 mm, respectively). The recorded water levels for the October 26th and 30th rainfall events were approximately 0.30 and 0.34 m, corresponding to an HGL elevation of 10.14 and 10.18 m, respectively. Using the Manning's Equation the discharge during the two October events was estimated to be approximately 0.65 and 0.80 m^3/s.

A comparison of the simulated and observed runoff hydrograph for Willow Brook at the Tannery Road crossing during the October 30th event is presented in in Figure 4-4. The model results at this crossing encompass discharge generated from a large portion of the study area including sections of Rand Street, Riverview Road, Chittick Avenue, Main Street and Foundry Road (~0.6 km^2).

Observed rainfall depths at the Kentville climate station were requested from Environment Canada, and included 15-minute rainfall depth observations. These rainfall data were used to create a rainfall timeseries in the PCSWMM model.



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EXISTING DRAINAGE NETWORK
FIGURE 4-3

WEST HANTS
NOVA SCOTIA

- STORM SEWER
- COMBINED SEWER
- WATERCOUSE AND/OR OPEN DITCH
- CATCHBASIN
- MANHOLE
- MUNICIPAL BOUNDARY
- LAND PARCEL
- HALFWAY RIVER WATER LEVEL LOGGER
- WILLOW BROOK WATER LEVEL LOGGER

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The following updates to the numerical model were made to simulate the Willow Brook response to the October 30th rainfall event:

- The PCSWMM model was updated to account for the observed baseline discharge leading up to the October 30th rainfall event (0.283 m^3/s) – this base flow was maintained for all subsequent simulations;
- The runoff curve number (CN) value was reduced to reflect the dry antecedent moisture leading up to the October rainfall events, from 65 (AMC II – Average) to 40 (AMC I – Dry) – this was in response to the unseasonably dry summer and fall months, whereby September recorded a total monthly rainfall depth of 15.9 mm compared to a historical average of 87.3 mm;
- Sections of sewer contributing to Willow Brook that were observed to be severely blocked with debris were restricted for this simulation (see Section 3.1).

The model required a slight calibration based on the comparison of observed and simulated flow. The depression storage values for pervious and impervious drainage areas were increased to 5 mm and 1 mm, respectively. This reduced the simulated peak flow slightly to be more in line with the observed peak flow. The simulated hydrograph in Figure 4-4 is the calibrated simulation results.

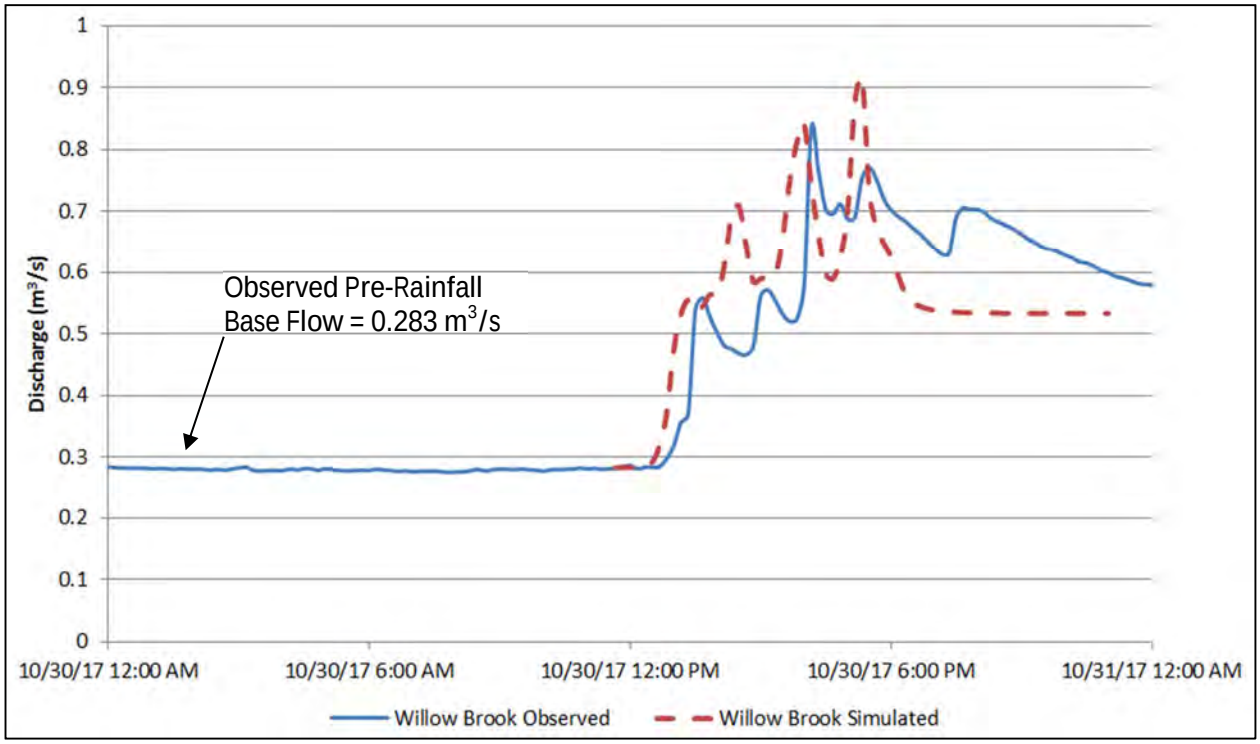


Figure 4-4: Comparison of Willow Brook Simulated and Observed Hydrograph for October 30th, 2017 Event

The simulated peak flow was approximately 0.08 m^3/s (+9.5%) greater than the observed peak value. It is expected that there was a lag between the rainfall recorded in Kentville and that which fell within the Willow Brook gauge watershed. Therefore the beginning of the October 30th rainfall event was delayed

by 1.5 hours to compensate for the distance between Kentville and the study watershed (25 km). This delay allowed for the simulated and observed runoff responses to occur at roughly the same time.

It is important to note that the Halfway River was not used for model calibration. The Halfway River watershed is large (~201 km^2) resulting in significant flows (as shown in Section 3.2.3). The Halfway River conveys approximately 1.1 km^2 of stormwater runoff from within the Community. The stormwater runoff volumes from the Community are expected to have negligible impacts on water levels in the Halfway River. By comparison, the Willow Brook watershed (~3.3 km^2) conveys approximately 0.6 km^2 of stormwater runoff from within the Community. Willow Brook was deemed more suitable for model calibration.

5.0 Simulation Results

The following sections present the simulation results for the Hantsport drainage network under both existing conditions and future development conditions. The drainage network was assessed for six (6) 24-hour rainfall events with return periods ranging from two (2) years to 100 years. For the purposes of summarizing these results, the drainage network has been divided into eight (8) areas based on outlet location (see Figure 5-1).

Tables 5-1 through 5-20 provide the estimated water level elevations for the 5-year and 100-year return period events at areas noted as “drainage challenges” for three (3) different simulation scenarios. It is important to note that values in red indicate that water levels surcharge above the ground surface. The simulation results for all rainfall events are provided in Appendix B. Simulated water level profiles for select areas are presented in Appendix C, with peak flow results summarized in Appendix F.

The maximum ponding depth considered for the PCSWMM simulation was 0.3 m. A review of stormwater management guidelines in other municipalities suggests that 0.3 m is a common maximum for acceptable ponding depth in major drainage networks for the 100-year flood condition (e.g. the cities of Waterloo and Windsor, Ontario). It is noted that any amount of roadway ponding during the 5-year flood condition is generally considered unacceptable. Minimizing roadway ponding is an important consideration for the safety of motorists (e.g. reduced potential for hydroplaning) and increases the longevity of the roadway surface.

Generally, the maximum roadway ponding assumption was not applicable to roadways with curb and gutter, and sufficient grade to convey storm flows within the roadway. Accordingly, the maximum ponding depth of 0.3 m was most relevant to areas where road grades suggest the potential for the accumulation of runoff (e.g. accumulation of runoff in road sags).

5.1 Existing Performance

5.1.1 Downtown – Chittick Avenue, Main Street & School Street

The downtown core of Hantsport is comprised of three main streets which include School Street, Chittick Avenue, and Main Street. Drainage is conveyed through a series of storm sewers and ultimately discharges to Willow Brook at the Main Street bridge crossing.

Simulations of the downtown area suggest that the system conveys runoff for the 5-year rainfall event with only minor ponding in localized areas along Chittick Avenue, School Street, and Main Street. Under more extreme rainfall events (i.e. 100-year), the model shows increasing flooding along School Street and Main Street. Flood levels are most concerning near the Main Street Bridge crossing.

Drainage issues in this area are presumably highly influenced by the water levels in Willow Brook. Estimated peak water levels along Chittick Avenue, Main Street, and School Street are presented in Table 5-1. Simulated water levels profiles along Chittick Avenue and Main Street are provided in Appendix C.

Table 5-1: Summary of Simulated Water Level Elevations for Existing Conditions – Downtown

Location	Existing Development Conditions Peak Water Level (m)	
Return Period Rainfall Event	5 yr	100 yr
Main Street – Civic #25 (CB98)	18.16	18.38[2]
Main Street – Civic #39 (CB93)	18.27	19.38[2]
Main Street Bridge (J46)	14.38	15.75[1]
Chittick Avenue – Civic #22 (J1)	14.57	15.01[2]
Chittick Road - Civic #47 (CB84)	14.87[2]	14.87[2]
School Street – Civic #12 (J26)	16.68[2]	16.68[2]

[1] Overtopping of bridge deck.
[2] Roadway ponding greater than 0.3 m in depth.

5.1.2 Riverview Road, Maple Avenue & Birch Street

The area comprised of Riverview Road, Maple Avenue, and Birch Street, conveys runoff through a series of storm sewers. The system outlets to Willow Brook at the west end of School Street.

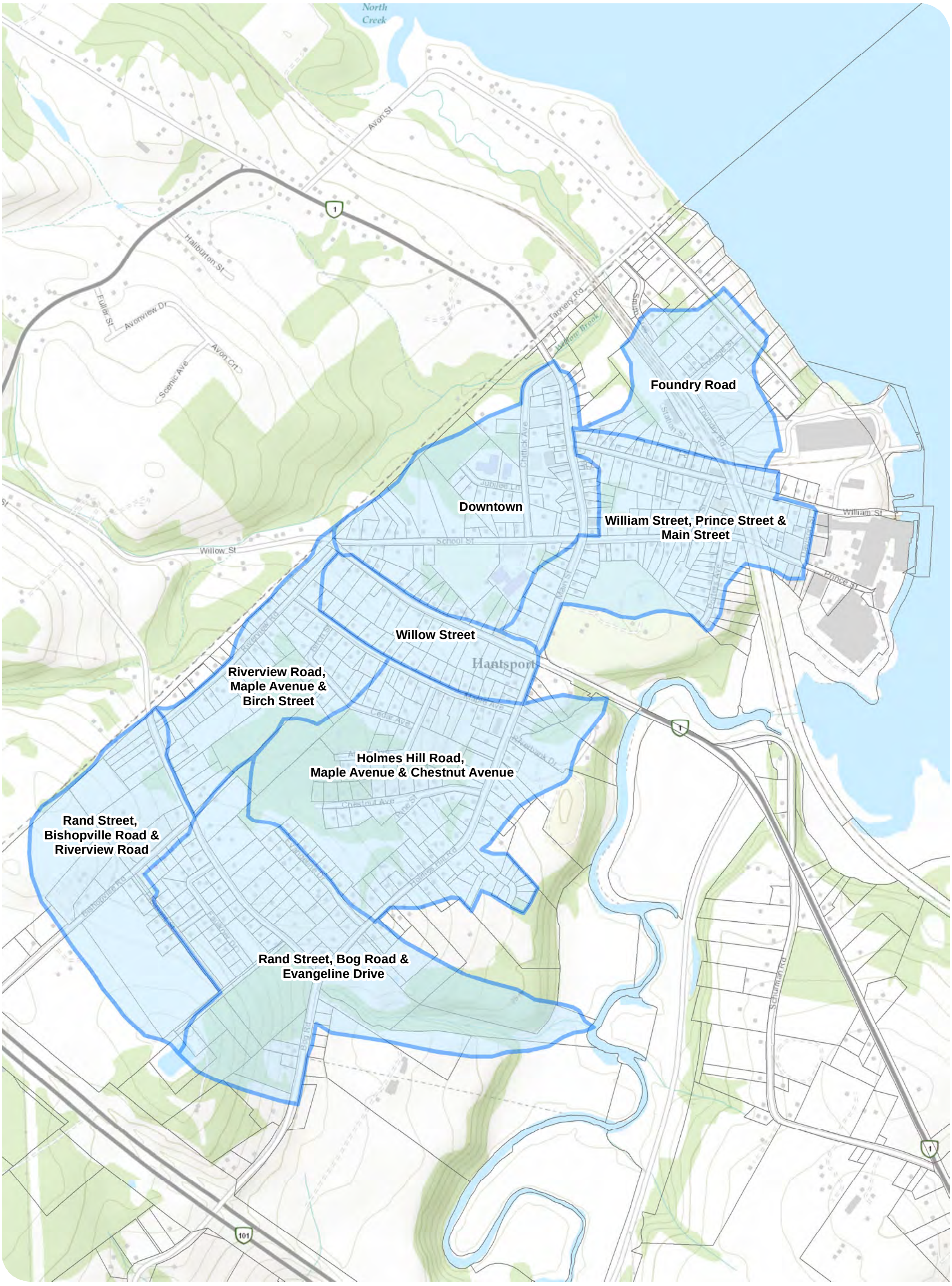
Simulation of the Riverview Road/Maple Avenue area suggests flooding during the 5-year rainfall event along areas of Maple Avenue and Riverview Drive in the vicinity of Civic #23. The flooding along Riverview Drive is presumable a result of the undersized (100 mm) diameter storm sewer lead from CB168. Estimated peak water levels at this location are presented in Table 5-2. Simulated water levels profiles along Riverview Road and Maple Avenue are provided in Appendix C.

Table 5-2: Summary of Simulated Water Level Elevations for Existing Conditions – Riverview Road, Maple Avenue & Birch Street

Location	Existing Development Conditions Peak Water Level (m)	
Return Period Rainfall Event	5 yr	100 yr
Maple Avenue – Civic #24 (J77)	40.71[2]	40.71[2]
Maple Avenue – Civic #30 (MH169)	40.39	40.52[2]
Riverview Road – Civic #8 (CB158)	36.84	37.45
Riverview Road – Civic #23 (CB168)	54.42[2]	54.42[2]

[2]Roadway ponding greater than 0.3 m in depth.

No significant challenges to adequate drainage were noted in this area.



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SIMULATION RESULTS: CATCHMENT AREAS
FIGURE 5-1

CATCHMENT AREA - SIMULATION RESULTS

LAND PARCEL

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MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI & WEST HANTS

MAP CREATED BY: JGC
MAP CHECKED BY: JAM
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

FILE LOCATION: \\DILLON.CA\DILLON_DFS\LONDON\LONDON CAD\GIS\VISUAL COMMUNICATIONS DI\MXD TEMPLATES\BEIGE - 11X17 LANDSCAPE - LEGEND BOTTOM.MXD

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5.1.3 Foundry Road

Foundry Road conveys stormwater runoff from Cottage Street and Avon Street. The system picks up stormwater runoff from Smith Crescent before discharging to Willow Brook near the Tannery Road bridge crossing.

Simulation of the Foundry Road area suggests that the system does not effectively convey stormwater runoff for the 5-year storm. The model indicates roadway flooding near the soccer field and along Cottage Street. It is also important to note that the 100 mm diameter storm sewer which crosses Foundry Road in front of the Fire Station is undersized for estimated stormwater runoff volumes. The Foundry Road area is noted as an area requiring drainage upgrades to adequately convey stormwater runoff. Table 5-3 presents the estimated peak water level simulated near the soccer field on Foundry Road.

Table 5-3: Summary of Simulated Water Level Elevations for Existing Conditions – Foundry Road

Location	Existing Development Conditions Peak Water Level (m)	
Return Period Rainfall Event	5 yr	100 yr
Soccer Field (J137)	15.40[2]	15.40[2]

[2]Roadway ponding greater than 0.3 m in depth.

5.1.4 William Street, Prince Street & Main Street

The collection system encompassing William Street, Prince Street and Main Street includes primarily combined sewers with some minor storm sewer. The system converges at the intersection of Davidson Street and Prince Street and ultimately discharges to the Avon River.

As discussed in Section 4.4, peak sanitary flows were estimated for the combined sewer systems using the Atlantic Canada Wastewater Guidelines Manual (2006). The combined sewer along William Street, Prince Street, and Main Street was modelled with a peak sanitary flow of 0.004 cms assuming 100 residential dwellings. Simulations suggest that the area experiences flooding for the 5-year rainfall event particularly at the following locations:

- Main Street at the intersection with Prince Street
- Prince Street in the vicinity of Civic #11;
- William Street in the vicinity of Civic #17; and,
- William Street at the intersection with Oak Street.

In general, the locations noted above are low lying areas which will tend to collect stormwater runoff under major rainfall events. These areas are concerning as surcharging of the combined sewer system could potentially result in sanitary waste on the roadway. Table 5-4 presents the estimated peak water levels simulated at these locations.

Table 5-4: Summary of Simulated Water Level Elevations for Existing Conditions – William Street, Prince Street & Main Street

Location	Existing Development Conditions Peak Water Level (m)	
Return Period Rainfall Event	5 yr	100 yr
William Street – Civic #14 (CB57)	16.67[2]	16.67[2]
Prince Street – Civic #11 (CB40)	17.19[2]	17.19[2]
William Street – Intersection with Oak Street (CB47)	15.30	15.43[2]
Prince Street – Intersection with Davidson Road (CB23)	14.09[2]	14.09[2]

[2]Roadway ponding greater than 0.3 m in depth.

5.1.5 Willow Street

The Willow Street stormwater runoff is conveyed through a combined sewer system which outlets to Halfway River upstream of the N.S. Highway 1 bridge crossing.

The combined sewer was modelled with an estimated peak sanitary flow of 1 L/s assuming 30 residential dwellings. Simulations suggest that roadway flooding occurs for the 5-year rainfall event near the intersection with Main Street. Roadway flooding is expected to be minimized due to the existing grade along Willow Street and conveying stormwater runoff along the roadway network to Halfway River.

Table 5-5: Summary of Simulated Water Level Elevations for Existing Conditions – Willow Street

Location	Existing Development Conditions Peak Water Level (m)	
Return Period Rainfall Event	5 yr	100 yr
Willow Street – Intersection with Main Street (CB137)	19.93[2]	19.93[2]

[2]Roadway ponding greater than 0.3 m in depth.

The combined sewer system presents a drainage challenge as surcharging of the system could result in spillage of sanitary flows on the roadway.

5.1.6 Holmes Hill Road, Maple Avenue & Chestnut Avenue

The Holmes Hill Road drainage system conveys stormwater runoff from Maple Avenue, Chestnut Avenue, and Mariner's Drive, through a series of storm sewers. The system discharges to a watercourse on Riverbank Drive and ultimately discharges to Halfway River.

The model results indicate that the Chestnut Avenue storm sewer conveys stormwater flows effectively. Simulations indicate potential flooding along Holmes Hill Road for the 5-year rainfall events; the simulation also suggests minor flooding along Alders Avenue for the 5-year event. Due to the existing

grade along Holmes Hill Road and Alders Avenue it is expected that any buildup of storm water flows overland eventually discharging to the open ditch along Riverbank Drive. Table 5-6 summarizes the estimated peak water levels simulated along Holmes Hill Road and Alders Avenue. Simulated water levels profiles along Alders Avenue are provided in Appendix C.

Table 5-6: Summary of Simulated Water Level Elevations for Existing Conditions – Holmes Hill Road, Maple Avenue & Chestnut Avenue

Location	Existing Development Conditions Peak Water Level (m)	
Return Period Rainfall Event	5 yr	100 yr
Alders Avenue – Intersection with Cedar Avenue (CB177)	41.94	43.57[2]
Holmes Hill Road – Intersection with Riverbank Drive (J130)	20.70[2]	20.70[2]
Mariner's Drive (J53)	33.04	34.01

[2]Roadway ponding greater than 0.3 m in depth.

5.1.7 Rand Street, Bog Road & Evangeline Drive

The drainage network encompassing Rand Street (south), Bog Road, and Evangeline Drive includes a combination of storm sewers and open ditches. The stormwater runoff from this area ultimately discharges to Halfway River.

Simulations of the area suggest that the majority of the system can convey stormwater runoff volumes for the 100-year rainfall event with minimal drainage issues. The model indicates flooding along Faulkner Drive; however, due to the relatively steep grade throughout the catchment area ponding is expected to be minimal. Table 5-6 presents the estimated peak water levels simulated on Faulkner Drive under existing conditions.

Table 5-7: Summary of Simulated Water Level Elevations for Existing Conditions – Rand Street, Bog Road & Evangeline Drive

Location	Existing Development Conditions Peak Water Level (m)	
Return Period Rainfall Event	5 yr	100 yr
Faulkner Drive – Civic #80 (CB225)	64.49[2]	64.49[2]

[2]Roadway ponding greater than 0.3 m in depth.

5.1.8 Rand Street, Bishopville Road & Riverview Road

The area comprised of Rand Street (north), Bishopville Road, and Riverview Road conveys stormwater runoff through a series of open ditches with some minor storm sewer infrastructure. The system discharges to Willow Brook.

Simulations suggest that the system experiences minor flooding for the 5-year rainfall event. The model indicates increased flooding along Pleasant Drive and Riverview Road during more extreme rainfall

events (i.e. 100-year). Table 5-7 presents the estimated peak water levels simulated at these locations under existing conditions. Simulated water levels profiles along Riverview Road are provided in Appendix C.

Table 5-8: Summary of Water Level Elevations for Existing Conditions – Rand Street, Bishopville Road & Riverview Road

Location	Existing Development Conditions Peak Water Level (m)	
Return Period Rainfall Event	5 yr	100 yr
Pleasant Drive (J61)	71.27	71.55[2]
Riverview Road – Ditch Inlet (J40)	55.55	56.19[2]
Rand Street – Intersection with Bishopville Drive (CB227)	61.55	61.71

[2]Roadway ponding greater than 0.3 m in depth.

No significant challenges to adequate drainage were noted in this area.

5.2 Future Performance

Based on discussions with the Municipality of the District of West Hants on November 22nd, 2017, the expected annual projected growth over the next 50 years is an average two (2) new homes per year along with the potential construction of a nursing home. Three potential locations were identified during these discussions for the projected 100 new homes and nursing home. These locations are listed below and presented in Figure 5-2.

- Extension of Faulkner Drive to Bog Road (16 new homes);
- Connection of Chestnut Avenue to Evangeline Drive (15 new homes); and,
- Extension of Mariner Drive (new nursing home).

These three locations may not provide sufficient land to allow for the projected 50 year growth of 100 new homes and a nursing home. Dillon has assumed that all future development will take place in the southwest part of the Community. The following locations were also considered for potential future development during modelling:

- Extension of Alders Avenue to the west (48 new homes); and,
- Extension of McCully Crescent and Mariner's Drive (18 new homes).

Four (4) of the eight (8) drainage systems in the Community are expected to be influenced by future development. The following set of simulation results assesses the future performance of the drainage network with an estimated 97 new homes and a nursing home. A summary of the updated runoff parameters assigned to each sub-catchment are provided in Appendix A.

Figure 5-2 identifies flood vulnerable areas resulting from future development.

5.2.1 Downtown – Chittick Avenue, Main Street & School Street – Future Land Use Conditions

The downtown area is not expected to convey stormwater runoff from new developments over the next 50 years. The simulation results for future land use conditions are the same as existing conditions (see Table 5-1).

5.2.2 Riverview Road, Maple Avenue & Birch Street – Future Land Use Conditions

The Riverview Road drainage system is expected to collect stormwater runoff from future developments along the Alders Avenue extension. Refer to Appendix A for the projected increase in impervious surface parameters to the associated catchment areas.

Under future development conditions, simulations of the Riverview Road drainage area suggest potential flooding issues. Similar to the existing conditions simulations, future flooding is expected for the 5-year rainfall events particularly along Maple Avenue in the vicinity of Civic #30, and along Riverview Road in the vicinity of Civic #23. The existing grade along Riverview Road and Maple Avenue is expected to minimize issues resulting from roadway ponding.

The estimated water levels observed at the locations above are summarized in Table 5-9. Most notably, increased flooding along Maple Avenue is expected for the 5-year rainfall event.

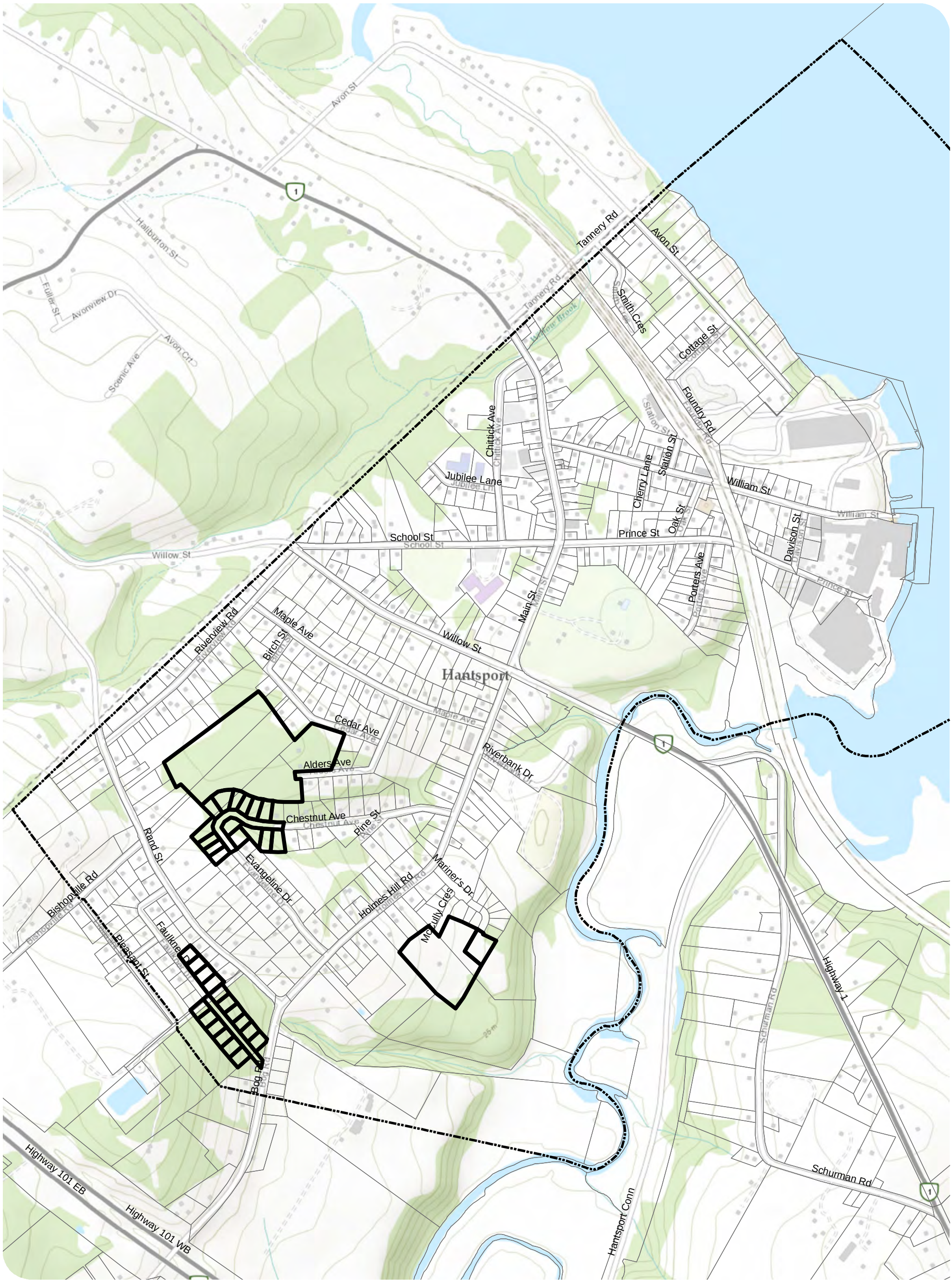
Table 5-9: Summary of Simulated Future Water Level Elevation Impacts for Historical Climate – Riverview Road, Maple Avenue & Birch Street

Location	Existing Development Conditions Peak Water Level (m)		Future Development Conditions Peak Water Level (m)		Water Level Impact (m)	
Return Period Rainfall Event	5 yr	100 yr	5 yr	100 yr	5 yr	100 yr
Maple Avenue – Civic #24 (J77)	40.71[2]	40.71[2]	40.71[2]	40.71[2]	0.00	0.00
Maple Avenue – Civic #30 (MH169)	40.39	40.52[2]	40.52[2]	40.52[2]	+0.13	0.00
Riverview Road – Civic #8 (CB158)	36.84	37.45	36.85	37.72[2]	+0.01	+0.27
Riverview Road – Civic #23 (CB168)	54.42[2]	54.42[2]	54.42[2]	54.42[2]	0.00	0.00

[2]Roadway ponding greater than 0.3 m in depth.

5.2.3 Foundry Lane – Future Land Use Conditions

The Foundry Lane area is not expected to convey stormwater runoff from new developments over the next 50 years. The simulation results for future land use conditions are the same as existing conditions (see Table 5-3).



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FUTURE DEVELOPMENT
FIGURE 5-2

FUTURE DEVELOPMENT AREAS (97 HOMES, 1 NURSING HOME)

LAND PARCEL

MUNICIPAL BOUNDARY

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI & WEST HANTS

MAP CREATED BY: JGC
MAP CHECKED BY: JAM
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

FILE LOCATION: \\DILLON.CA\DILLON_DFS\LONDON\LONDON CAD\GIS\VISUAL COMMUNICATIONS DI\MXD TEMPLATES\BEIGE - 11X17 LANDSCAPE - LEGEND BOTTOM.MXD

0 50 100 200 Meters
SCALE 1:7,500

N W E S

PROJECT: 17-6276 STATUS: FINAL DATE: 18/04/27

5.2.4 William Street, Prince Street & Main Street – Future Land Use Conditions

The drainage system is not expected to convey stormwater runoff from new developments over the next 50 years. The simulation results for future land use conditions are the same as existing conditions (see Table 5-4).

5.2.5 Willow Street – Future Land Use Conditions

The Willow Street area is not expected to convey stormwater runoff from new developments over the next 50 years. The simulation results for future land use conditions are the same as existing conditions (see Table 5-5).

5.2.6 Holmes Hill Road, Maple Avenue & Chestnut Avenue – Future Land Use Conditions

This area has been considered as a primary location for development over the next 50 years. As noted above, the extension of Chestnut Avenue and Alders Avenue would accommodate approximately 63 new homes. It has been assumed that the majority of stormwater runoff from the new developments will be conveyed through this system.

The model indicates that these developments are not expected to significantly in increase roadway flooding from pre-development. Simulations suggest primary areas of concern include Alders Avenue and Holmes Hill Road.

The estimated water levels observed at these locations above summarized in Table 5-10.

Table 5-10: Summary of Simulated Future Water Level Elevation Impacts for Historical Climate – Holmes Hill Road, Maple Avenue & Chestnut Avenue

Location	Existing Development Conditions Peak Water Level (m)		Future Development Conditions Peak Water Level (m)		Water Level Impact (m)	
Return Period Rainfall Event	5 yr	100 yr	5 yr	100 yr	5 yr	100 yr
Alders Avenue – Intersection with Cedar Avenue (CB177)	41.94	43.57[2]	42.00	43.57[2]	+0.06	0.00
Holmes Hill Road – Intersection with Riverbank Drive (J130)	20.70[2]	20.70[2]	20.70[2]	20.70[2]	0.00	0.00
Mariner's Drive (J53)	33.04	34.01	33.04	34.01	0.00	0.00

[2]Roadway ponding greater than 0.3 m in depth.

Based on the existing grade within this catchment area, any significant buildup of stormwater runoff will presumably flow overland and eventually discharge to the open ditch along Riverbank Drive.

5.2.7 Rand Street, Bog Road & Evangeline Drive – Future Land Use Conditions

The connection of Evangeline Avenue and Chestnut Avenue has been noted as a location for development in the next 50 years. This development is expected to accommodate approximately 15 new homes resulting in additional impervious surface in the Evangeline Drive catchment area.

The simulations suggest that the majority of the existing system is adequate to convey projected stormwater runoff volumes for the 100-year rainfall event. Similar to the existing conditions assessment, an area of concern is Faulkner Drive in the vicinity of Civic #80. Due to the relatively steep grade throughout the catchment area, it is expected that roadway ponding will be minimal.

The estimated water levels observed at the locations above are summarized in Table 5-11.

Table 5-11: Summary of Simulated Future Water Level Elevation Impacts for Historical Climate - Rand Street, Bog Road & Evangeline Drive

Location	Existing Development Conditions Peak Water Level (m)		Future Development Conditions Peak Water Level (m)		Water Level Impact (m)	
Return Period Rainfall Event	5 yr	100 yr	5 yr	100 yr	5 yr	100 yr
Faulkner Drive – Civic #80 (CB225)	64.49[2]	64.49[2]	64.49[2]	64.49[2]	0.00	0.00

[2]Roadway ponding greater than 0.3 m in depth.

5.2.8 Rand Street, Bishopville Road & Riverview Road – Future Land Use Conditions

The extension of Alders Avenue is expected to result in 48 additional homes. A portion of the stormwater runoff from this new development is expected to be conveyed through Riverview Road and Rand Street collection systems. The model indicates a couple of areas of potential concern along Pleasant Street and Riverview Road.

The estimated water levels observed at these locations are summarized in Table 5-12.

Table 5-12: Summary of Simulated Future Water Level Elevation Impacts for Historical Climate – Rand Street, Bishopville Road & Riverview Road

Location	Existing Development Conditions Peak Water Level (m)		Future Development Conditions Peak Water Level (m)		Water Level Impact (m)	
Return Period Rainfall Event	5 yr	100 yr	5 yr	100 yr	5 yr	100 yr
Pleasant Drive (J61)	71.27	71.55[2]	71.27	71.55[2]	0.00	0.00
Riverview Road – Ditch Inlet (J40)	55.55	56.19[2]	55.72	56.19[2]	+0.17	0.00
Rand Street – Intersection with Bishopville Drive (CB227)	61.55	61.71	61.55	61.71	0.00	0.00

[2]Roadway ponding greater than 0.3 m in depth.

5.3 Future Performance with Climate Change Conditions

This set of simulations assesses the performance of the existing system assuming future land use for a range of rainfall events that have been adjusted for climate change. As noted in Section 4.1.2, the climate change adjustments assume a moderate greenhouse gas emissions scenario over the next 50 years (RCP 4.5).

The rainfall distributions used in the model are provided in Appendix D. Figure 6-2 identifies flood vulnerable areas resulting from future development with climate change conditions.

5.3.1 Downtown – Chittick Avenue, Main Street & School Street – Future Land Use Conditions with Climate Change

The future development model indicates potential flooding issues along Chittick Avenue, School Street, and Main Street during the 5-year rainfall event. More extreme precipitation events (i.e. 100-year) result in increased flooding on all three streets. Water levels in Willow Brook are suspected to influence the potential of flooding.

Under future climate conditions, simulations suggest the potential for increased flooding during the 5-year rainfall event along Chittick Avenue and Main Street. The Main Street Bridge crossing is an area of significant concern with respect to flooding. Simulation results indicate flooding in the following additional areas:

- Chittick Avenue in vicinity of Civic #22 and #47;
- School Street in the vicinity of Civic #12; and,
- Main Street in the vicinity of Civic #25 and Civic #39.

The estimated water levels observed at the locations above are summarized in Table 5-13.

Table 5-13: Summary of Simulated Future Water Level Elevation Impacts for Future Development and Climate Change Conditions – Downtown

Location	Historical Climate Conditions Peak Water Level (m)		Climate Change Conditions Peak Water Level (m)		Water Level Impact (m)	
Return Period Rainfall Event	5 yr	100 yr	5 yr	100 yr	5 yr	100 yr
Main Street – Civic #25 (CB98)	18.16	18.38[2]	18.38[2]	18.38[2]	+0.22	0.00
Main Street – Civic #39 (CB93)	18.27	19.38[2]	19.23	19.38[2]	+0.96	0.00
Main Street Bridge (J46)	14.38	15.75[1]	15.38	15.75[1]	+1.00	0.00
Chittick Avenue – Civic #22 (J1)	14.57	15.01[2]	15.01[2]	15.01[2]	+0.44	0.00
Chittick Road - Civic #47 (CB84)	14.87[2]	14.87[2]	14.87[2]	14.87[2]	+0.00	0.00
School Street – Civic #12 (J26)	16.68[2]	16.68[2]	16.68[2]	16.68[2]	0.00	0.00

[1] Overtopping of bridge deck.
[2] Roadway ponding greater than 0.3 m in depth.

5.3.2 Riverview Road, Maple Avenue & Birch Street – Future Land Use Conditions with Climate Change

The future development simulation results suggest potential flooding at the top of Riverview Road and Maple Avenue. The 100-year event indicated increased flooding along Riverview Road and Maple Avenue.

Simulations of the Riverview Road area assuming the effects of climate change suggest increased flooding issues during the 5-year rainfall event. The model shows minor flooding throughout the system particularly along Maple Avenue in the vicinity of Civic #24 and Civic #30, and along Riverview Road in the vicinity of Civic #23. The existing grade along Riverview Road and Maple Avenue is expected to help minimize flooding.

The estimated water levels observed at the locations above are summarized in Table 5-14.

Table 5-14: Summary of Simulated Future Water Level Elevation Impacts for Future Development and Climate Change Conditions – Riverview Road, Maple Avenue & Birch Street

Location	Historical Climate Conditions Peak Water Level (m)		Climate Change Conditions Peak Water Level (m)		Water Level Impact (m)	
Return Period Rainfall Event	5 yr	100 yr	5 yr	100 yr	5 yr	100 yr
Maple Avenue – Civic #24 (J77)	40.71[2]	40.71[2]	40.71[2]	40.71[2]	0.00	0.00
Maple Avenue – Civic #30 (MH169)	40.52[2]	40.52[2]	40.52[2]	40.52[2]	0.00	0.00
Riverview Road – Civic #8 (CB158)	36.85	37.72[2]	36.86	37.72[2]	+0.01	0.00
Riverview Road – Civic #23 (CB168)	54.42[2]	54.42[2]	54.62[2]	54.62[2]	0.00	0.00

[2]Roadway ponding greater than 0.3 m in depth.

5.3.3 Foundry Lane – Future Land Use Conditions with Climate Change

The Foundry Lane area is of significant concern for potential flooding during the historical 5-year return period event. Increased flooding is expected for future climate conditions due to increased rainfall amounts. It is also noteworthy that the simulations indicate an undersized catchbasin lead (100 mm) from CB12 (in front of the Fire Station).

The estimated water levels observed in the vicinity of the Soccer Field are summarized in Table 5-15.

Table 5-15: Summary of Simulated Future Water Level Elevation Impacts for Future Development and Climate Change Conditions – Foundry Lane

Location	Historical Climate Conditions Peak Water Level (m)		Climate Change Conditions Peak Water Level (m)		Water Level Impact (m)	
Return Period Rainfall Event	5 yr	100 yr	5 yr	100 yr	5 yr	100 yr
Soccer Field (J137)	15.40[2]	15.40[2]	15.40[2]	15.40[2]	0.00	0.00

[2]Roadway ponding greater than 0.3 m in depth.

5.3.4 William Street, Prince Street & Main Street – Future Land Use Conditions with Climate Change

Under future development conditions, the William Street, Prince Street, and Main Street combined system is expected to experience drainage issues for the 5-year event. The model indicates localized flooding along William Street and Prince Street. The 100-year rainfall event shows increased flooding along William Street and Prince Street.

Similar to the results indicated during historical rainfall events, minor flooding is expected along Prince Street and William Street for the projected 5-year climate change event with increased flooding during the 100-year event.

The estimated water levels observed at the locations above are summarized in Table 5-16.

Table 5-16: Summary of Simulated Future Water Level Elevation Impacts for Future Development and Climate Change Conditions – William Street, Prince Street & Main Street

Location	Historical Climate Conditions Peak Water Level (m)		Climate Change Conditions Peak Water Level (m)		Water Level Impact (m)	
Return Period Rainfall Event	5 yr	100 yr	5 yr	100 yr	5 yr	100 yr
William Street – Civic #14 (CB57)	16.67[2]	16.67[2]	16.67[2]	16.67[2]	0.00	0.00
Prince Street – Civic #11 (CB40)	17.19[2]	17.19[2]	17.19[2]	17.19[2]	0.00	0.00
William Street – Intersection with Oak Street (CB47)	15.30	15.43[2]	15.35	15.43[2]	+0.05	0.00
Prince Street – Intersection with Davidson Road (CB23)	14.09[2]	14.09[2]	14.09[2]	14.09[2]	+0.00	0.00

[2]Roadway ponding greater than 0.3 m in depth.

The locations identified above are primarily low lying areas which will tend to act as collection points during extreme rainfall events. As discussed in Section 5.1.4, separation of the combined sewer should be considered for this area.

5.3.5 Willow Street – Future Land Use Conditions with Climate Change

Similar to the results of the existing conditions simulations, the model suggests that the system continues to experience flooding at the intersection of Main Street for the 5-year event. As discussed in Section 5.1.5, it is expected that the roadway system minimizes ponding by conveying stormwater runoff along Willow Street and ultimately discharging to Halfway River.

Estimated water levels observed at the intersection of Main Street are summarized in Table 5-17.

Table 5-17: Summary of Simulated Future Water Level Elevation Impacts for Future Development and Climate Change Conditions – Willow Street

Location	Historical Climate Conditions Peak Water Level (m)		Climate Change Conditions Peak Water Level (m)		Water Level Impact (m)	
Return Period Rainfall Event	5 yr	100 yr	5 yr	100 yr	5 yr	100 yr
Willow Street – Intersection with Main Street (CB137)	19.93[2]	19.93[2]	19.93[2]	19.93[2]	0.00	0.00

[2]Roadway ponding greater than 0.3 m in depth.

As discussed in Section 5.1.5, separation of the combined sewer should be considered for Willow Street.

5.3.6 Holmes Hill Road, Maple Avenue & Chestnut Avenue – Future Land Use Conditions with Climate Change

Flooding is a concern at the intersection of Holmes Hill Road with Riverbank Drive during the historical 5-year rainfall event. Increased flooding is expected for the 100-year rainfall event. The effects of climate change indicate that the Alders Avenue system provides less than a 5-year level of service.

The estimated water levels observed at the locations above are summarized in Table 5-18. Notably, Mariner's Drive is expected to experience increased flooding for the future 100-year rainfall event.

Table 5-18: Summary of Simulated Future Water Level Elevation Impacts for Future Development and Climate Change Conditions – Holmes Hill Road, Maple Avenue & Chestnut Avenue

Location	Historical Climate Conditions Peak Water Level (m)		Climate Change Conditions Peak Water Level (m)		Water Level Impact (m)	
Return Period Rainfall Event	5 yr	100 yr	5 yr	100 yr	5 yr	100 yr
Alders Avenue – Intersection with Cedar Avenue (CB177)	42.00	43.57[2]	43.57[2]	43.57[2]	+1.57	0.00
Holmes Hill Road – Intersection with Riverbank Drive (J130)	20.70[2]	20.70[2]	20.70[2]	20.70[2]	0.00	0.00
Mariner's Drive (J53)	33.04	34.01	33.25	34.25[2]	+0.21	+0.24

[2]Roadway ponding greater than 0.3 m in depth.

Based on the existing grade within this catchment area, any significant buildup of stormwater runoff will presumably flow overland and eventually discharge to the open ditch off Riverbank Drive.

5.3.7 Rand Street, Bog Road & Evangeline Drive – Future Land Use Conditions with Climate Change

The Rand Street and Bog Road drainage system is expected to experience minor flooding during the historical 5-year rainfall event. An area of concern is along Faulkner Drive in the vicinity of Civic #80. The combined impact of future development and climate change conditions do not indicate any additional flooding concerns in this area.

The estimated water levels observed at the locations above are summarized in Table 5-19.

Table 5-19: Summary of Simulated Future Water Level Elevation Impacts for Future Development and Climate Change Conditions – Rand Street, Bog Road & Evangeline Drive

Location	Historical Climate Conditions Peak Water Level (m)		Climate Change Conditions Peak Water Level (m)		Water Level Impact (m)	
Return Period Rainfall Event	5 yr	100 yr	5 yr	100 yr	5 yr	100 yr
Faulkner Drive – Civic #80 (CB225)	64.49[2]	64.49[2]	64.49[2]	64.49[2]	0.00	0.00

[2]Roadway ponding greater than 0.3 m in depth.

5.3.8 Rand Street, Bishopville Road & Riverview Road – Future Land Use Conditions with Climate Change

Simulation results indicate the system can adequately convey stormwater runoff from the 5-year rainfall event assuming future development conditions. Localized flooding becomes an issue during more extreme rainfall events (i.e. historical 100-year). The model indicates minor flooding for the projected 5-year climate change rainfall event.

The estimated water levels observed at the locations above are summarized in Table 5-20. It is noteworthy that the intersection of Bishopville Drive with Rand Street is not at risk of flooding during future development alone; however, this area is a potential flood concern for the climate change adjusted 100-year event.

Table 5-20: Summary of Simulated Future Water Level Elevation Impacts for Future Development and Climate Change Conditions – Rand Street, Bishopville Road & Riverview Road

Location	Historical Climate Conditions Peak Water Level (m)		Climate Change Conditions Peak Water Level (m)		Water Level Impact (m)	
Return Period Rainfall Event	5 yr	100 yr	5 yr	100 yr	5 yr	100 yr
Pleasant Drive (J61)	71.27	71.55[2]	71.42	71.55[2]	+0.15	0.00
Riverview Road – Ditch Inlet (J40)	55.72	56.19[2]	56.35	56.19[2]	+0.63	0.00
Rand Street – Intersection with Bishopville Drive (CB227)	61.55	61.71	61.58	63.09[2]	+0.03	+1.38

[2]Roadway ponding greater than 0.3 m in depth.

6.0 Assessment of Future Flood Risk Vulnerability

6.1 Urban Drainage Flood Risk

As previously discussed, the drainage network in the Community of Hantsport is comprised of storm sewer, combined sewer, and open ditching. The simulation results suggest that the majority of the drainage system can adequately convey stormwater runoff under existing conditions. The future development model incorporates an estimated 97 new homes and a nursing home. These developments result in increased impervious surfaces leading to increased runoff. The following three (3) locations are expected to experience drainage issues as a result of future development:

- Holmes Hill Road – The model indicates localized flooding along Holmes Hill Road at the intersection with Riverbank Road. It is expected that flooding is minimized however due to the existing grade in the area which would tend to convey runoff overland to the ditch on Riverbank Drive.
- Riverview Road – The model indicates two areas at risk of potential flooding along Riverview Road. The ditch located at the southern end of the road has an estimated 2-year level of service under future development conditions. The model indicates that the ditch has inadequate capacity to handle projected stormwater flows and the existing 300 mm diameter inlet pipe in undersized. Simulations suggest localized flooding in the vicinity of Civic #8 and #23 due to an undersized storm sewer.
- Maple Avenue – Localized low areas along Maple Avenue have been identified as potential flood risks. Most notably, the model indicates flooding in the vicinity of Civic #24 and #30.

Under future land use conditions with climate change, simulations suggest some inadequate drainage infrastructure. The results indicate six (6) locations of potential flood risk:

- Main Street Bridge Crossing – The Main Street Bridge crossing area has been noted for potential flood risk. Based on the simulation results, it is suspected that this issue is related to the channel capacity of Willow Brook in the area. The limited channel capacity is expected to influence and

further impact flood vulnerability further upstream along Chittick Avenue, Main Street, and School Street.

- Chittick Avenue, Main Street, and School Street – The simulation results suggest that Chittick Avenue, Main Street and School Street are potential flood risks. It is expected that the downstream Main Street Bridge crossing has an influence on flooding at these sites. Further simulations were completed to identify undersized drainage infrastructure along these streets. These streets are at low elevations relative to the surrounding topography.
- Foundry Road – The Foundry Road area presents a significant challenge to provide adequate drainage. The simulation results show that this area experiences flooding during an estimated level of service of 2 years. Detailed investigation of topographical data along Foundry Road indicates that it is a low lying area which acts as a probable collection point of stormwater runoff. Undersized drainage infrastructure is also inadequate to convey the estimated stormwater runoff volumes.
- Prince Street and William Street – Localized low areas along Prince Street and William Street have been identified as potential flood risks. Most notably, the model indicates flooding along William Street in the vicinity of Civic #14, and along Prince Street in the vicinity of Civic #11.
- Willow Street – The model indicates localized flooding at the intersection of Willow Street with Main Street. The Willow Street system is combined therefore flooding could potentially result in sanitary flows on the roadway.
- Faulkner Drive – The simulation results indicate potential flooding along Faulkner Drive due to undersized drainage infrastructure. The catchbasin lead from CB225 (in the vicinity of Civic #80) is undersized for the estimated stormwater runoff volumes.

The Municipality also noted areas of concern during the meetings on August 29th and November 22nd. The additional two (2) areas were not assessed during the modeling exercise due to lack of stormwater infrastructure (Avon Street) and insufficient information (library/playground). These locations are described below:

- Library/Playground (Main Street) – The playground behind the library on Main Street experiences drainage issues annually. A site visit on November 22nd revealed that drainage from the area is collected by a single catchbasin which is full of sediment/debris and a raised cover. These factors limit the inlet capacity of the structure which contributes to the flooding issue. Figure 6-1 provides photos of the catchbasin.
- Avon Street – Avon Street does not have any existing drainage infrastructure and frequently experiences flooding during heavy rainfall events. These flooding events are typically short lived as water quickly infiltrates into the ground.

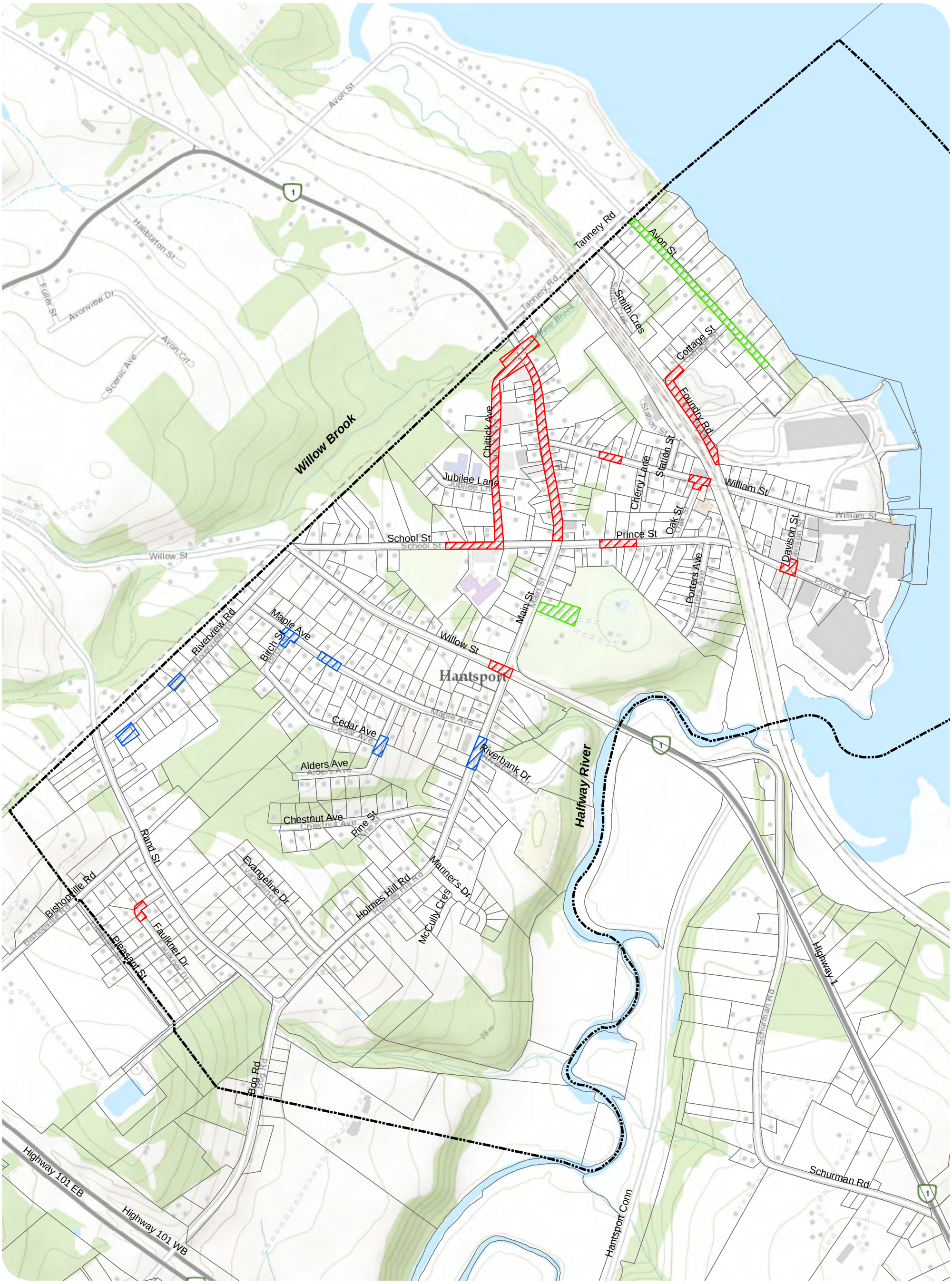


Figure 6-1: Photographs of Catchbasin in Library/Playground Area (taken November 22, 2017)

6.2 Halfway River Flood Risk

As mentioned previously, the aboiteau crossing the existing railway embankment has failed. The hydraulic regime of the lower Halfway River is expected to have changed as a result of this failure. The collapsed aboiteau (see Figure 2-2) is expected to allow migration of extreme tides and storm surge into the lower Halfway River. Similarly, peak flows from the Halfway River watershed are expected to flow reasonably unimpeded into Avon River. Some hydraulic restriction as a result of the collapsed structure is expected, however this restriction would be expected to decrease over time as the collapsed material is exposed to tidal action and high flood flows from the river causing erosion.

There is also a set of four overflow culverts located east of the aboiteau, shown in Figure 6-3. These culverts appear to be operational, though quite deteriorated. The culverts appear to consist of 900 mm corrugated steel pipe (CSP). These culverts act as an overflow mechanism to prevent overtopping of the railway and risk of flooding along Willow Street/Highway 1 in the event of high water levels in the lower Halfway River.



MUNICIPALITY OF THE DISTRICT OF WEST HANTS
HANTSPORT SWM STUDY

FUTURE FLOOD VULNERABLE AREAS
FIGURE 6-2

- FLOOD VULNERABLE AREAS (DUE TO FUTURE LAND USE)
- FLOOD VULNERABLE AREAS (DUE TO FUTURE LAND USE AND CLIMATE CHANGE)
- FLOOD VULNERABLE AREAS (ADDITIONAL IDENTIFIED BY THE MUNICIPALITY)
- LAND PARCEL
- MUNICIPAL BOUNDARY

MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI & WEST HANTS

MAP CREATED BY: JGC
MAP CHECKED BY: JAM
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

FILE LOCATION: \\DILLON.CA\DILLON_DFS\LONDON\LONDON CAD\GIS\VISUAL COMMUNICATIONS DI\MXD TEMPLATES\BEIGE - 11X17 LANDSCAPE - LEGEND BOTTOM.MXD

SCALE 1:7,500
0 50 100 200 Meters

PROJECT: 17-6276 STATUS: FINAL DATE: 18/04/27



Figure 6-3: Existing Aboiteau Overflow at Halfway River Railway Crossing

The collapse has created a free outlet to the Avon River. It is expected that the current condition of the aboiteau could potentially increase flood risk associated with storm surge from the Bay. However the free outlet may slightly decrease flood risk associated with high flows in the Halfway River, since discharges to the Avon River are no longer restricted by the capacity of the aboiteau.

The flood risk along Willow Street from the Halfway River is expected to be minimal. A topographical review of the area suggests that the lowest lying residences have an elevation in the order of 16.8 m (Willow Street Civic #1). Notably, the historical 100-year water level in the Bay of Fundy is expected to be in the order of 5.4 m, with projected future (year 2100) 100-year level of roughly 6.5 m with sea level rise.

Based on observations collected along the Halfway River (Section 3.2), the HGL in the lower river are typically 2 m higher than the bay. This suggests the potential future extreme water level in the lower Halfway River in the order of 8.5 m. However, it is noteworthy that extreme flood flows combined with storm surge conditions would also presumably increase the HGL beyond this level.

The estimated freeboard between the extreme water level elevation and the lowest residence adjacent to the river is approximately 8.8 m, therefore the risk of riverine flooding to the residents of Hantsport is expected to be minimal. Flooding is presumably limited to downstream areas outside the limits of the Community.

7.0 Preliminary Drainage Improvement Options

Based on the observations from the site visits (September 2017 – November 2017), as well as the PCSWMM simulation results, a set of conceptual drainage improvement options were prepared and are described in the subsequent sections. It is noteworthy that these upgrades have been developed using the PCSWMM model assuming future build-out conditions and the projected future climate rainfall depths distributed using the Alternating Block rainfall distribution (described in Section 4.2).

A Community wide overview of the recommended preliminary improvements is presented in Table 7-1. A prioritization ranking has been assigned to each drainage challenge based on the extent of the issue and the potential risk to Community infrastructure.

Table 7-1: Summary of Preliminary Drainage Improvement Options

Drainage Improvement Option	Description	Prioritization Rank
Main Street Bridge Crossing	Based on the model results, it is estimated that the channel capacity of Willow Brook near Main Street provides a 2-year level of service. This limited channel capacity results in drainage issues throughout the downtown area (Chittick Avenue, Main Street, and School Street). Based on these findings, it is recommended that hydraulic modelling be completed for Willow Brook. This exercise would involve flood extent mapping along Willow Brook to determine the optimal channel dimensions for stormwater conveyance. Furthermore, this analysis would investigate the potential impact of these changes to the upstream and downstream reaches of Willow Brook. The recommended hydraulic modelling software for this analysis is HEC-RAS.	1
Combined Sewer Separation	Results indicate localized flooding of the combined sewers along William Street, Prince Street, and Main Street. The separation of these combined systems as well as the system along Willow Street should be considered. Based on preliminary model results, the following trunk sewers have been sized to adequately convey the future 5-year event: · William Street – 600 mm · Prince Street – 600 mm · Main Street – 375 mm · Willow Street – 375 mm	2
Foundry Road Improvements	Model simulations indicate significant roadway flooding along Foundry Road area. Further analysis revealed that the trunk sewer is potentially undersized and catchbasin intake capacity is not adequate for the stormwater runoff volumes. Preliminary model results indicate that the trunk sewer along Foundry Lane should be increased to 600 mm (from MH215) and catchbasin leads should be increase to 375mm. Additional catchbasins are also recommend along Foundry Road in the vicinity of Civic #3 for increased inlet capacity to reduce roadway flooding.	3

Drainage Improvement Option	Description	Prioritization Rank
Chittick Avenue, School Street, and, Main Street Improvements	The model indicates flooding along Chittick Avenue, School Street, and Main Street. Based on preliminary model results, the following trunk sewers have been sized to adequately convey the future 5-year event: · Chittick Avenue – 900 mm · School Street – 750 mm (between Civic #27 and Hantsport School) · Main Street – 750 mm	4
Holmes Hill Road	The model suggests flooding along Holmes Hill Road in the vicinity of the Riverbank Road intersection. Based on preliminary model results, the following recommendations have been developed: · Increase storm sewers along Holmes Hill Road to 450 mm (south of Riverbank Drive); · Increase storm sewers on Homes Hill Road to 750 mm (north of Riverbank Drive); · Increase storm sewers along Alders Avenue and Maple Avenue to 375 mm; and, · Additional catchbasins at the intersection of Riverbank Drive to minimize roadway flooding.	5
Library/Playground Area	The existing catchbasin providing stormwater runoff collection for this area is full of sediment/debris with a raised cover. The outlet location of this storm sewer could not be confirmed through field investigation; however, it is assumed to outfall to Halfway River (east). Based on field investigation, the following is recommended: · Reset cover and cleanout the existing catchbasin; · Addition of new catchbasins; and, · Regrade the area to catchbasins. Preliminary calculations indicate that a 250 mm sewer could adequately convey projected future 5-year runoff volumes.	6
Avon Street Improvements	Avon Street currently does not have any existing drainage infrastructure and the area experiences flooding during extreme rainfall events. It is recommended to install a storm sewer system along this road to prevent these flooding events. Preliminary model results indicate that a 375 mm diameter trunk sewer (assuming slope of 2%) will adequately convey the projected future 5-year return period flows.	7

Drainage Improvement Option	Description	Prioritization Rank
Riverview Road Ditch	As previously discussed, the model indicates that the Riverview Road ditch (in the vicinity of Civic #37 is undersized. Based on preliminary model results, the ditch inlet should be replaced with a 450 mm diameter pipe assuming a grade of 1% grade.	8
Faulkner Drive	The model indicates localized flooding along Faulkner Drive in the vicinity of Civic #80. A review of the simulated 5-year return period flows suggests that the existing 200 mm diamter pipe is undersized. Based on preliminary model results, the existing storm sewer on Faulkner should be replaced with a 375 mm diameter storm sewer to adequately convey future 5-year return period flows.	9
Riverview Road	The model indicates localized flooding along Faulkner Drive in the vicinity of Civic #23. A review of the simulated 5-year return period flows suggests that the existing 100 mm diameter pipe is undersized. Based on preliminary model results, the existing storm sewer on Riverview Drive should be replaced with a 250 mm diameter storm sewer to adequately convey future 5-year return period flows.	10

8.0 Conclusion

This report provides a review of the performance of the existing drainage infrastructure in the Community of Hantsport. Hydrologic and hydraulic numerical simulation of the system was completed to investigate the performance of existing drainage works. The system was assessed under existing conditions, future development conditions, and projected future climate change conditions. Rainfall events with return periods ranging from two (2) to 100 years were used to assess the stormwater system. The projected future climate change events were adjusted for climate change assuming a moderate greenhouse gas emissions scenario (RCP 4.5). The future development model incorporated the construction of an estimated 97 new homes and a nursing home. Updated runoff parameters for the future development model are presented in Appendix A.

Based on the simulation, the following 10 areas/systems were identified as concerning with respect to adequate drainage (see Figure 6-2).

- Main Street Bridge Crossing
- Chittick Avenue, Main Street, and School Street
- Foundry Road
- Combined Sewers Systems
- Holmes Hill Road

- Riverview Road
- Maple Avenue
- Faulkner Drive
- Avon Street
- Library/Playground Area (Main Street)

The future development model (with climate change adjustments) was then updated to include the recommended drainage improvements summarized in Table 7-1. The recommended pipe sizes are based on providing adequate conveyance of the future 5-year return period event with climate change adjustment. Additional catchbasins have also been recommended in some cases to minimize roadway flooding during the 100-year event. It is important to note that these recommended improvements are preliminary and a detailed analysis would be required prior to construction.

As noted in the report, the aboiteau in the low Halfway River failed in November 2017. The failure was concerning due to the potential of increased flood risk associated with storm surge from the Bay. Based on review of potential future water levels and surrounding topography, the estimate freeboard between the extreme water level elevation and the lowest residence adjacent to the river is approximately 8.8 m. The risk of riverine flooding to the residents of Hantsport is expected to be minimal.

Appendix A

PCSWMM Catchment Parameters

Table A-1: PCSWMM Catchment Parameters – Existing & Future Conditions

Catchment	Catchment Area (ha)	Effective Catchment Area (ha)	Slope (%)	Imperviousness – Existing (%)	Imperviousness – Future (%)
S1	275.73	275.40	9.0	4.7	4.7
S2	0.12	0.10	1.9	48.9	48.9
S2_1	1.16	1.16	10.1	16.1	16.1
S2_3	2.88	2.88	12.0	24.8	24.8
S2_4	3.40	3.40	7.2	25.9	25.9
S3_1	4.42	4.42	4.0	9.1	19.1
S3_3	7.74	7.74	11.6	7.5	7.5
S3_4	8.65	8.65	7.5	5.9	5.9
S4	4.81	4.81	11.2	20	20
S5_1	3.10	2.97	4.4	70.5	70.5
S5_2	0.95	0.95	3.8	41.9	41.9
S5_3	5.91	5.85	4.1	23.8	23.8
S5_5	0.54	0.47	4.0	93.7	93.7
S6	1.97	1.97	4.3	41	41
S7	37.15	37.06	11.4	1.4	3.8
S8	2.66	2.56	9.3	43	43
S9_1	2.34	2.34	2.5	29.3	29.3
S9_2	1.28	1.28	3.5	3.6	3.6
S9_3	3.20	2.95	2.7	21.4	21.4
S9_4	1.32	1.32	3.5	12.2	12.2
S9_5	6.08	5.90	2.9	22.4	22.4
S9_7	0.60	0.60	2.9	13.8	13.8
S9_8	3.70	2.80	3.8	19.7	19.7
S10	2.83	2.83	7.9	23	23
S11	4.27	4.27	9.9	7.8	7.8
S12	2.55	2.55	10.8	23	38.6
S13_1	1.68	1.68	15.3	30.5	30.5
S13_3	2.09	2.09	11.6	15.1	20.7
S13_4	3.62	3.62	6.8	5	40.3
S14_1	1.07	1.07	12.3	27.5	27.5

Catchment	Catchment Area (ha)	Effective Catchment Area (ha)	Slope (%)	Imperviousness – Existing (%)	Imperviousness – Future (%)
S14_2	0.81	0.81	10.0	44.5	44.5
S15	0.21	0.21	6.4	55	55
S16_2	3.33	3.33	11.4	7.4	7.4
S16_3	3.14	3.12	11.2	16	16
S16_4	2.05	2.05	9.2	39.3	39.3
S17	2.58	2.58	8.3	25	25
S18_1	3.17	3.17	10.9	20.8	23.3
S18_2	1.59	1.59	11.3	20.1	32.1
S19_2	0.22	0.22	8.9	22.6	22.6
S19_3	1.27	1.25	7.3	30.5	30.5
S19_4	1.45	1.45	9.9	18.7	18.7
S22_1	3.24	2.99	5.2	29.8	29.8
S22_2	0.50	0.50	3.7	39.6	39.6
S22_4	1.43	1.39	3.8	32.6	32.6
S22_5	4.65	4.41	4.2	22.2	22.2
S23_1	3.54	3.51	3.8	45.2	45.2
S23_2	0.27	0.27	3.2	54.9	54.9
S23_4	0.42	0.40	3.3	45.2	45.2
S23_5	1.55	1.55	2.9	37.5	37.5
S24	2.11	2.11	7.4	26	31.3
S25_1	6.31	6.25	16.9	3.1	10.6
S25_2	0.45	0.45	6.6	22.2	22.2
S25_4	1.66	1.65	13.4	30.2	30.2
S25_5	4.36	4.36	10.3	14.5	19.9
S25_6	0.47	0.47	5.8	38.2	38.2
S26	9.92	9.92	18.4	1.3	1.3

Note: - Imperviousness values in red indicate changes under future development conditions.

Appendix B

Additional Simulation Results

Table B-2: Summary of Simulated Future Water Level Elevations for Historical Climate - Downtown

Location		Return Period Rainfall Event					
		2	5	10	25	50	100
Main Street – Civic #25 (CB98)	Existing Development Conditions Peak Water Level (m)	17.57	18.16	18.38[2]	18.38[2]	18.38[2]	18.38[2]
	Future Development Conditions Peak Water Level (m)	N/A	N/A	N/A	N/A	N/A	N/A
Main Street – Civic #39 (CB93)	Existing Development Conditions Peak Water Level (m)	17.17	18.27	19.26	19.38[2]	19.38[2]	19.38[2]
	Future Development Conditions Peak Water Level (m)	N/A	N/A	N/A	N/A	N/A	N/A
Main Street Bridge (J46)	Existing Development Conditions Peak Water Level (m)	14.06	14.38	15.35	15.75[1]	15.75[1]	15.75[1]
	Future Development Conditions Peak Water Level (m)	N/A	N/A	N/A	N/A	N/A	N/A
Chittick Avenue – Civic #22 (J1)	Existing Development Conditions Peak Water Level (m)	14.34	14.57	15.01[2]	15.01[2]	15.01[2]	15.01[2]
	Future Development Conditions Peak Water Level (m)	N/A	N/A	N/A	N/A	N/A	N/A
Chittick Road - Civic #47 (CB84)	Existing Development Conditions Peak Water Level (m)	14.87[2]	14.87[2]	14.87[2]	14.87[2]	14.87[2]	14.87[2]
	Future Development Conditions Peak Water Level (m)	N/A	N/A	N/A	N/A	N/A	N/A
School Street – Civic #12 (J26)	Existing Development Conditions Peak Water Level (m)	16.68[2]	16.68[2]	16.68[2]	16.68[2]	16.68[2]	16.68[2]
	Future Development Conditions Peak Water Level (m)	N/A	N/A	N/A	N/A	N/A	N/A

[1] Overtopping of bridge deck.
[2] Roadway ponding greater than 0.3 m in depth.

Table B-3: Summary of Simulated Future Water Level Elevations for Future Development – Downtown

Location		Return Period Rainfall Event					
		2	5	10	25	50	100
Main Street – Civic #25 (CB98)	Historical Climate Conditions Peak Water Level (m)	17.57	18.16	18.38[2]	18.38[2]	18.38[2]	18.38[2]
	Climate Change Conditions Peak Water Level (m)	18.38[2]	18.38[2]	18.38[2]	18.38[2]	18.38[2]	18.38[2]
Main Street – Civic #39 (CB93)	Historical Climate Conditions Peak Water Level (m)	17.17	18.27	19.26	19.38[2]	19.38[2]	19.38[2]
	Climate Change Conditions Peak Water Level (m)	17.87	19.23	19.38[2]	19.38[2]	19.38[2]	19.38[2]
Main Street Bridge (J46)	Historical Climate Conditions Peak Water Level (m)	14.06	14.38	15.35	15.75[1]	15.75[1]	15.75[1]
	Climate Change Conditions Peak Water Level (m)	14.29	15.38	15.75[1]	15.75[1]	15.75[1]	15.75[1]
Chittick Avenue – Civic #22 (J1)	Historical Climate Conditions Peak Water Level (m)	14.34	14.57	15.01[2]	15.01[2]	15.01[2]	15.01[2]
	Climate Change Conditions Peak Water Level (m)	14.62	15.01[2]	15.01[2]	15.01[2]	15.01[2]	15.01[2]
Chittick Road - Civic #47 (CB84)	Historical Climate Conditions Peak Water Level (m)	14.87[2]	14.87[2]	14.87[2]	14.87[2]	14.87[2]	14.87[2]
	Climate Change Conditions Peak Water Level (m)	14.87[2]	14.87[2]	14.87[2]	14.87[2]	14.87[2]	14.87[2]
School Street – Civic #12 (J26)	Historical Climate Conditions Peak Water Level (m)	16.68[2]	16.68[2]	16.68[2]	16.68[2]	16.68[2]	16.68[2]
	Climate Change Conditions Peak Water Level (m)	16.68[2]	16.68[2]	16.68[2]	16.68[2]	16.68[2]	16.68[2]

[1] Overtopping of bridge deck.
[2] Roadway ponding greater than 0.3 m in depth.

Table B-4: Summary of Simulated Future Water Level Elevations for Historical Climate – Riverview Road, Maple Avenue & Birch Street

Location		Return Period Rainfall Event					
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
Maple Avenue – Civic #24 (J77)	Existing Development Conditions Peak Water Level (m)	40.31	40.71[2]	40.71[2]	40.71[2]	40.71[2]	40.71[2]
	Future Development Conditions Peak Water Level (m)	40.65	40.71[2]	40.71[2]	40.71[2]	40.71[2]	40.71[2]
Maple Avenue – Civic #30 (MH169)	Existing Development Conditions Peak Water Level (m)	39.66	40.39	40.52[2]	40.52[2]	40.52[2]	40.52[2]
	Future Development Conditions Peak Water Level (m)	39.71	40.52[2]	40.52[2]	40.52[2]	40.52[2]	40.52[2]
Riverview Road – Civic #8 (CB158)	Existing Development Conditions Peak Water Level (m)	36.80	36.84	36.88	36.89	36.89	37.45
	Future Development Conditions Peak Water Level (m)	36.82	36.85	36.88	36.89	36.90	37.72[2]
Riverview Road – Civic #23 (CB168)	Existing Development Conditions Peak Water Level (m)	53.37	54.42[2]	54.42[2]	54.42[2]	54.42[2]	54.42[2]
	Future Development Conditions Peak Water Level (m)	54.12	54.42[2]	54.42[2]	54.42[2]	54.42[2]	54.42[2]

[1] Overtopping of bridge deck.
[2] Roadway ponding greater than 0.3 m in depth.

Table B-5: Summary of Simulated Future Water Elevations for Future Development – Riverview Road, Maple Avenue & Birch Street

Location		Return Period Rainfall Event					
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
Maple Avenue – Civic #24 (J77)	Historical Climate Conditions Peak Water Level (m)	40.65	40.71[2]	40.71[2]	40.71[2]	40.71[2]	40.71[2]
	Climate Change Conditions Peak Water Level (m)	40.65	40.71[2]	40.71[2]	40.71[2]	40.71[2]	40.71[2]
Maple Avenue – Civic #30 (MH169)	Historical Climate Conditions Peak Water Level (m)	39.71	40.52[2]	40.52[2]	40.52[2]	40.52[2]	40.52[2]
	Climate Change Conditions Peak Water Level (m)	40.52[2]	40.52[2]	40.52[2]	40.52[2]	40.52[2]	40.52[2]
Riverview Road – Civic #8 (CB158)	Historical Climate Conditions Peak Water Level (m)	36.82	36.85	36.88	36.89	36.90	37.72[2]
	Climate Change Conditions Peak Water Level (m)	36.83	36.86	36.91	37.59	37.72[2]	37.72[2]
Riverview Road – Civic #23 (CB168)	Historical Climate Conditions Peak Water Level (m)	54.12	54.42[2]	54.42[2]	54.42[2]	54.42[2]	54.42[2]
	Climate Change Conditions Peak Water Level (m)	54.12	54.42[2]	54.42[2]	54.42[2]	54.42[2]	54.42[2]

[1] Overtopping of bridge deck.
[2] Roadway ponding greater than 0.3 m in depth.

Table B-6: Summary of Simulated Future Water Level Elevations for Historical Climate – Foundry Road

Location	Return Period Rainfall Event						
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
Soccer Field (J137)	Existing Development Conditions Peak Water Level (m)	15.40[2]	15.40[2]	15.40[2]	15.40[2]	15.40[2]	15.40[2]
	Future Development Conditions Peak Water Level (m)	N/A	N/A	N/A	N/A	N/A	N/A

[1] Overtopping of bridge deck.
[2]Roadway ponding greater than 0.3 m in depth.

Table B-7: Summary of Simulated Future Water Level Elevations for Future Development – Foundry Road

Location	Return Period Rainfall Event						
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
Soccer Field (J137)	Historical Climate Conditions Peak Water Level (m)	15.40[2]	15.40[2]	15.40[2]	15.40[2]	15.40[2]	15.40[2]
	Climate Change Conditions Peak Water Level (m)	15.40[2]	15.40[2]	15.40[2]	15.40[2]	15.40[2]	15.40[2]

[1] Overtopping of bridge deck.
[2]Roadway ponding greater than 0.3 m in depth.

Table B-8: Summary of Simulated Future Water Levels for Historical Climate – William Street, Prince Street & Main Street

Location	Return Period Rainfall Event						
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
William Street – Civic #14 (CB57)	Existing Development Conditions Peak Water Level (m)	16.67[2]	16.67[2]	16.67[2]	16.67[2]	16.67[2]	16.67[2]
	Future Development Conditions Peak Water Level (m)	N/A	N/A	N/A	N/A	N/A	N/A
Prince Street – Civic #11 (CB40)	Existing Development Conditions Peak Water Level (m)	17.19[2]	17.19[2]	17.19[2]	17.19[2]	17.19[2]	17.19[2]
	Future Development Conditions Peak Water Level (m)	N/A	N/A	N/A	N/A	N/A	N/A
William Street – Intersection with Oak Street (CB47)	Existing Development Conditions Peak Water Level (m)	15.27	15.30	15.35	15.43[2]	15.43[2]	15.43[2]
	Future Development Conditions Peak Water Level (m)	N/A	N/A	N/A	N/A	N/A	N/A
Prince Street – Intersection with Davidson Road (CB23)	Existing Development Conditions Peak Water Level (m)	14.02	14.09[2]	14.09[2]	14.09[2]	14.09[2]	14.09[2]
	Future Development Conditions Peak Water Level (m)	N/A	N/A	N/A	N/A	N/A	N/A

[1] Overtopping of bridge deck.
[2]Roadway ponding greater than 0.3 m in depth.

Table B-9: Summary of Simulated Future Water Level Elevations for Future Development – William Street, Prince Street & Main Street

Location		Return Period Rainfall Event					
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
William Street – Civic #14 (CB57)	Historical Climate Conditions Peak Water Level (m)	16.67[2]	16.67[2]	16.67[2]	16.67[2]	16.67[2]	16.67[2]
	Climate Change Conditions Peak Water Level (m)	16.67[2]	16.67[2]	16.67[2]	16.67[2]	16.67[2]	16.67[2]
Prince Street – Civic #11 (CB40)	Historical Climate Conditions Peak Water Level (m)	17.19[2]	17.19[2]	17.19[2]	17.19[2]	17.19[2]	17.19[2]
	Climate Change Conditions Peak Water Level (m)	17.19[2]	17.19[2]	17.19[2]	17.19[2]	17.19[2]	17.19[2]
William Street – Intersection with Oak Street (CB47)	Historical Climate Conditions Peak Water Level (m)	15.27	15.30	15.35	15.43[2]	15.43[2]	15.43[2]
	Climate Change Conditions Peak Water Level (m)	15.28	15.35	15.43[2]	15.43[2]	15.43[2]	15.43[2]
Prince Street – Intersection with Davidson Road (CB23)	Historical Climate Conditions Peak Water Level (m)	14.02	14.09[2]	14.09[2]	14.09[2]	14.09[2]	14.09[2]
	Climate Change Conditions Peak Water Level (m)	14.05	14.09[2]	14.09[2]	14.09[2]	14.09[2]	14.09[2]

[1] Overtopping of bridge deck.
[2]Roadway ponding greater than 0.3 m in depth.

Table B-10: Summary of Simulated Future Water Levels for Historical Climate – Willow Street

Location		Return Period Rainfall Event					
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
Willow Street – Intersection with Main Street (CB137)	Existing Development Conditions Peak Water Level (m)	19.93[2]	19.93[2]	19.93[2]	19.93[2]	19.93[2]	19.93[2]
	Future Development Conditions Peak Water Level (m)	N/A	N/A	N/A	N/A	N/A	N/A

[1] Overtopping of bridge deck.
[2]Roadway ponding greater than 0.3 m in depth.

Table B-11: Summary of Simulated Future Water Level Elevations for Future Development – Willow Street

Location		Return Period Rainfall Event					
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
Willow Street – Intersection with Main Street (CB137)	Historical Climate Conditions Peak Water Level (m)	19.93[2]	19.93[2]	19.93[2]	19.93[2]	19.93[2]	19.93[2]
	Climate Change Conditions Peak Water Level (m)	19.93[2]	19.93[2]	19.93[2]	19.93[2]	19.93[2]	19.93[2]

[1] Overtopping of bridge deck.
[2]Roadway ponding greater than 0.3 m in depth.

Table B-12: Summary of Simulated Future Water Levels for Historical Climate – Holmes Hill Road, Maple Avenue & Chestnut Avenue

Location		Return Period Rainfall Event					
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
Alders Avenue – Intersection with Cedar Avenue (CB177)	Existing Development Conditions Peak Water Level (m)	41.90	41.94	41.97	43.57[2]	43.57[2]	43.57[2]
	Future Development Conditions Peak Water Level (m)	41.93	42.00	43.57[2]	43.57[2]	43.57[2]	43.57[2]
Holmes Hill Road – Intersection with Riverbank Drive (J130)	Existing Development Conditions Peak Water Level (m)	20.70[2]	20.70[2]	20.70[2]	20.70[2]	20.70[2]	20.70[2]
	Future Development Conditions Peak Water Level (m)	20.70[2]	20.70[2]	20.70[2]	20.70[2]	20.70[2]	20.70[2]
Mariner's Drive (J53)	Existing Development Conditions Peak Water Level (m)	32.97	33.04	33.25	33.53	33.75	34.01
	Future Development Conditions Peak Water Level (m)	32.97	33.04	33.25	33.53	33.75	34.01

[1] Overtopping of bridge deck.
[2]Roadway ponding greater than 0.3 m in depth.

Table B-13: Summary of Simulated Future Water Level Elevations for Future Development – Holmes Hill Road, Maple Avenue & Chestnut Avenue

Location		Return Period Rainfall Event					
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
Alders Avenue – Intersection with Cedar Avenue (CB177)	Historical Climate Conditions Peak Water Level (m)	41.93	42.00	43.57[2]	43.57[2]	43.57[2]	43.57[2]
	Climate Change Conditions Peak Water Level (m)	41.94	43.57[2]	43.57[2]	43.57[2]	43.57[2]	43.57[2]
Holmes Hill Road – Intersection with Riverbank Drive (J130)	Historical Climate Conditions Peak Water Level (m)	20.70[2]	20.70[2]	20.70[2]	20.70[2]	20.70[2]	20.70[2]
	Climate Change Conditions Peak Water Level (m)	20.70[2]	20.70[2]	20.70[2]	20.70[2]	20.70[2]	20.70[2]
Mariner's Drive (J53)	Historical Climate Conditions Peak Water Level (m)	32.97	33.04	33.25	33.53	33.75	34.01
	Climate Change Conditions Peak Water Level (m)	32.99	33.25	33.56	34.25[2]	34.25[2]	34.25[2]

[1] Overtopping of bridge deck.
[2]Roadway ponding greater than 0.3 m in depth.

Table B-14: Summary of Simulated Future Water Levels for Historical Climate – Rand Street, Bog Street & Evangeline Drive

Location		Return Period Rainfall Event					
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
Faulkner Drive – Civic #80	Existing Development Conditions Peak Water Level (m)	64.49[2]	64.49[2]	64.49[2]	64.49[2]	64.49[2]	64.49[2]
	Future Development Conditions Peak Water Level (m)	64.49[2]	64.49[2]	64.49[2]	64.49[2]	64.49[2]	64.49[2]

[1] Overtopping of bridge deck.
[2]Roadway ponding greater than 0.3 m in depth.

Table B-15: Summary of Simulated Future Water Level Elevations for Future Development – Holmes Hill Road, Maple Avenue & Chestnut Avenue

Location		Return Period Rainfall Event					
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
Faulkner Drive – Civic #80	Historical Climate Conditions Peak Water Level (m)	64.49[2]	64.49[2]	64.49[2]	64.49[2]	64.49[2]	64.49[2]
	Climate Change Conditions Peak Water Level (m)	64.49[2]	64.49[2]	64.49[2]	64.49[2]	64.49[2]	64.49[2]

[1] Overtopping of bridge deck.
[2]Roadway ponding greater than 0.3 m in depth.

Table B-16: Summary of Simulated Future Water Level Elevations for Historical Climate – Rand Street, Bishopville Street & Riverview Road

Location		Return Period Rainfall Event					
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
Pleasant Drive (J61)	Existing Development Conditions Peak Water Level (m)	71.08	71.27	71.42	71.55[2]	71.55[2]	71.55[2]
	Future Development Conditions Peak Water Level (m)	71.08	71.27	71.42	71.55[2]	71.55[2]	71.55[2]
Riverview Road – Ditch Inlet (J40)	Existing Development Conditions Peak Water Level (m)	55.42	55.55	55.82	56.19[2]	56.19[2]	56.19[2]
	Future Development Conditions Peak Water Level (m)	55.45	55.72	56.19[2]	56.19[2]	56.19[2]	56.19[2]
Rand Street – Intersection with Bishopville Drive (CB227)	Existing Development Conditions Peak Water Level (m)	61.49	61.55	61.58	61.63	61.67	61.71
	Future Development Conditions Peak Water Level (m)	61.49	61.55	61.58	61.63	61.67	61.71

[1] Overtopping of bridge deck.
[2]Roadway ponding greater than 0.3 m in depth.

Table B-17: Summary of Simulated Future Water Level Elevations for Future Development – Rand Street, Bishopville Street & Riverview Road

Location		Return Period Rainfall Event					
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
Pleasant Drive (J61)	Historical Climate Conditions Peak Water Level (m)	71.08	71.27	71.42	71.55[2]	71.55[2]	71.55[2]
	Climate Change Conditions Peak Water Level (m)	71.12	71.42	71.55[2]	71.55[2]	71.55[2]	71.55[2]
Riverview Road – Ditch Inlet (J40)	Historical Climate Conditions Peak Water Level (m)	55.45	55.72	56.19[2]	56.19[2]	56.19[2]	56.19[2]
	Climate Change Conditions Peak Water Level (m)	55.49	56.19[2]	56.19[2]	56.19[2]	56.19[2]	56.19[2]
Rand Street – Intersection with Bishopville Drive (CB227)	Historical Climate Conditions Peak Water Level (m)	61.49	61.55	61.58	61.63	61.67	61.71
	Climate Change Conditions Peak Water Level (m)	61.51	61.58	61.64	61.72	62.11	63.09[2]

[1] Overtopping of bridge deck.
[2]Roadway ponding greater than 0.3 m in depth.

Appendix C

PCSWMM Profiles

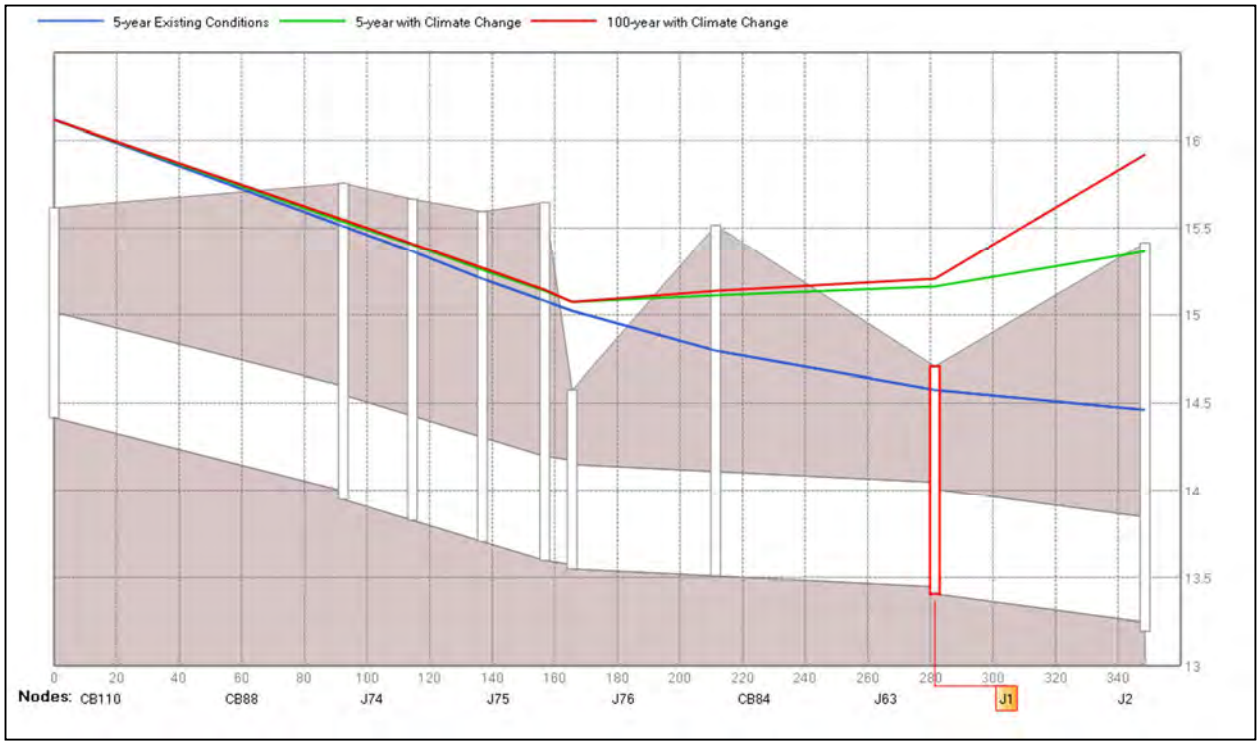


Figure C-1: Comparison of Simulated Water Level Elevations on Chittick Avenue – 5-year Existing Conditions, 5-year with Climate Change & 100-year with Climate Change

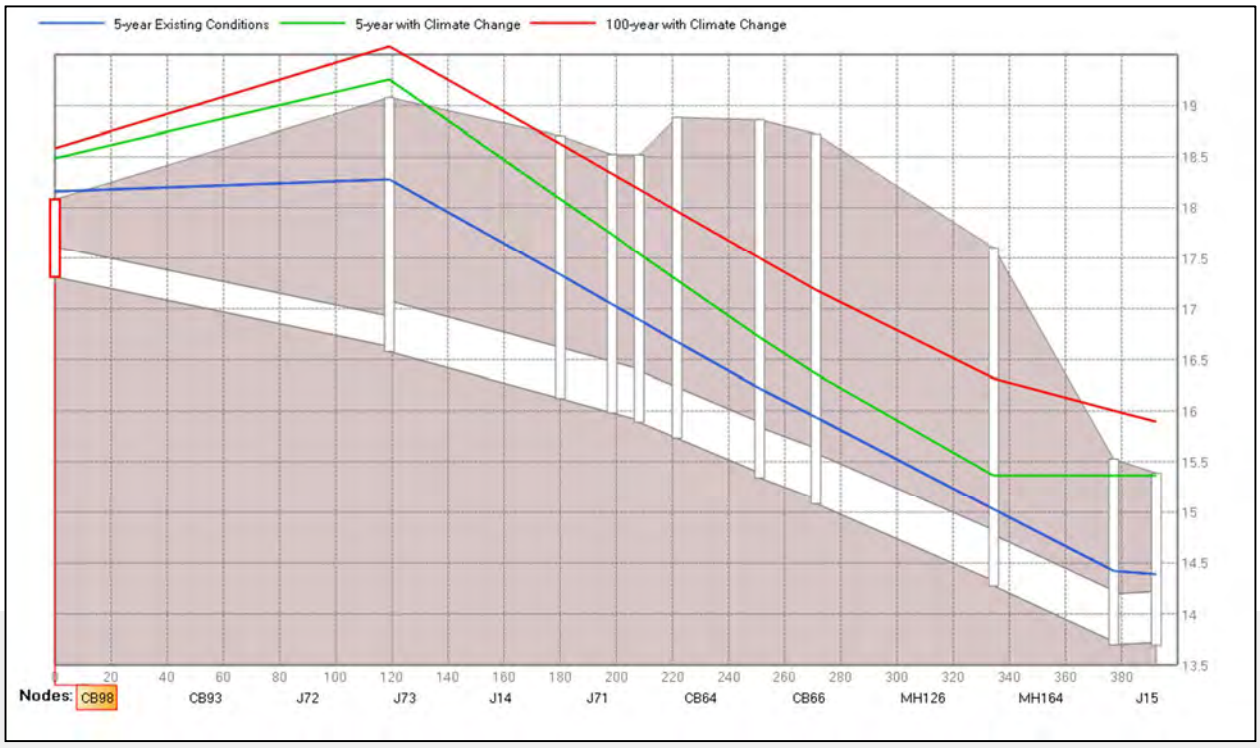


Figure C-2: Simulated Water Level Elevations on Main Street Avenue – 5-year Existing Conditions, 5-year with Climate Change & 100-year with Climate Change



Figure C-3: Simulated Water Level Elevations at Main Street Bridge Crossing – 5-year Existing Conditions, 5-year with Climate Change & 100-year with Climate Change

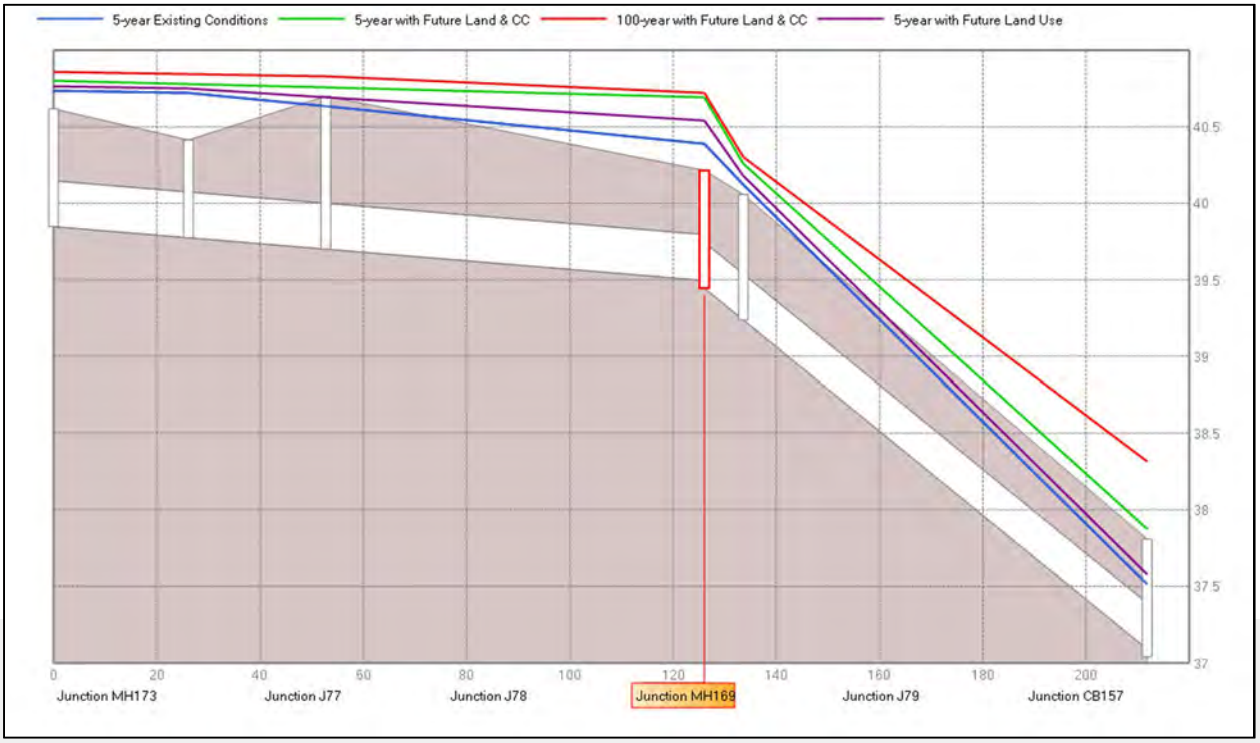


Figure C-4: Simulated Water Level Elevations on Maple Avenue – 5-year Existing Conditions, 5-year with Future Land Use, 5-year with Future Land Use (CC) & 100-year with Future Land Use (CC)

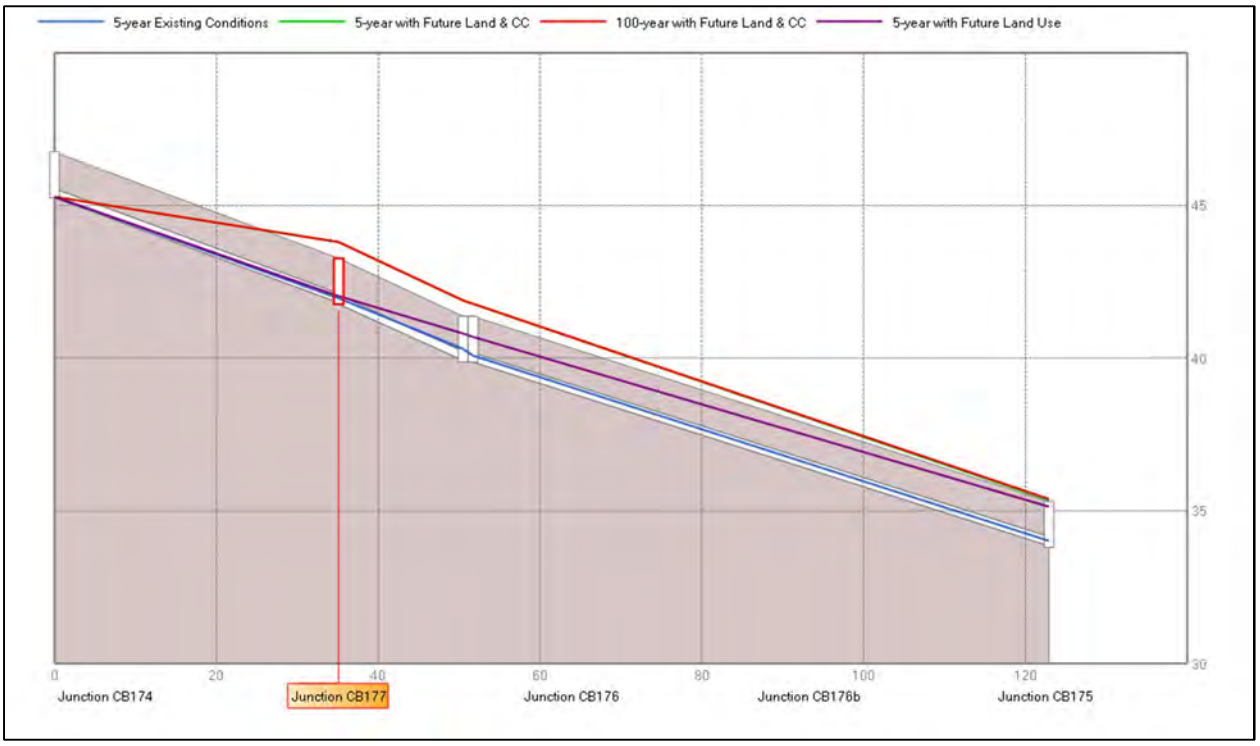


Figure C-5: Simulated Water Level Elevations on Alders Avenue – 5-year Existing Conditions, 5-year with Future Land Use, 5-year with Future Land Use (CC) & 100-year with Future Land Use (CC)

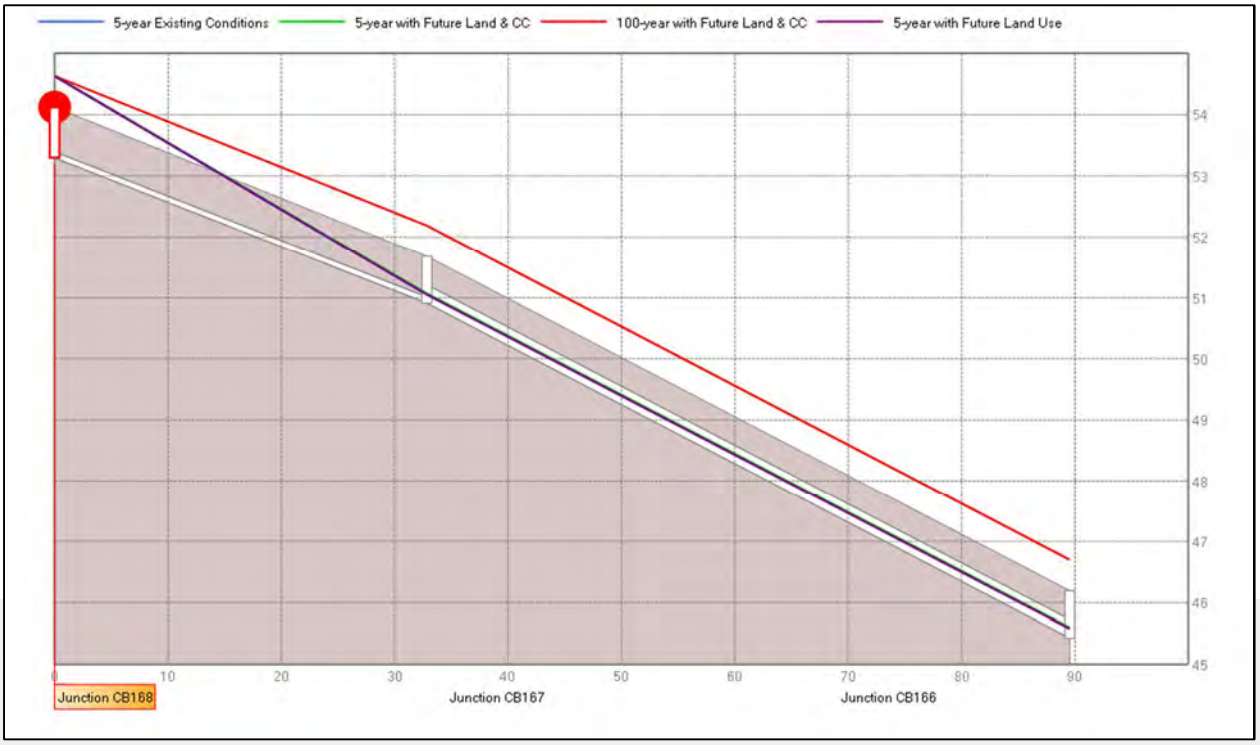


Figure C-6: Simulated Water Level Elevations at Riverview Road – 5-year Existing Conditions, 5-year with Future Land Use, 5-year with Future Land Use (CC) & 100-year with Future Land Use (CC)

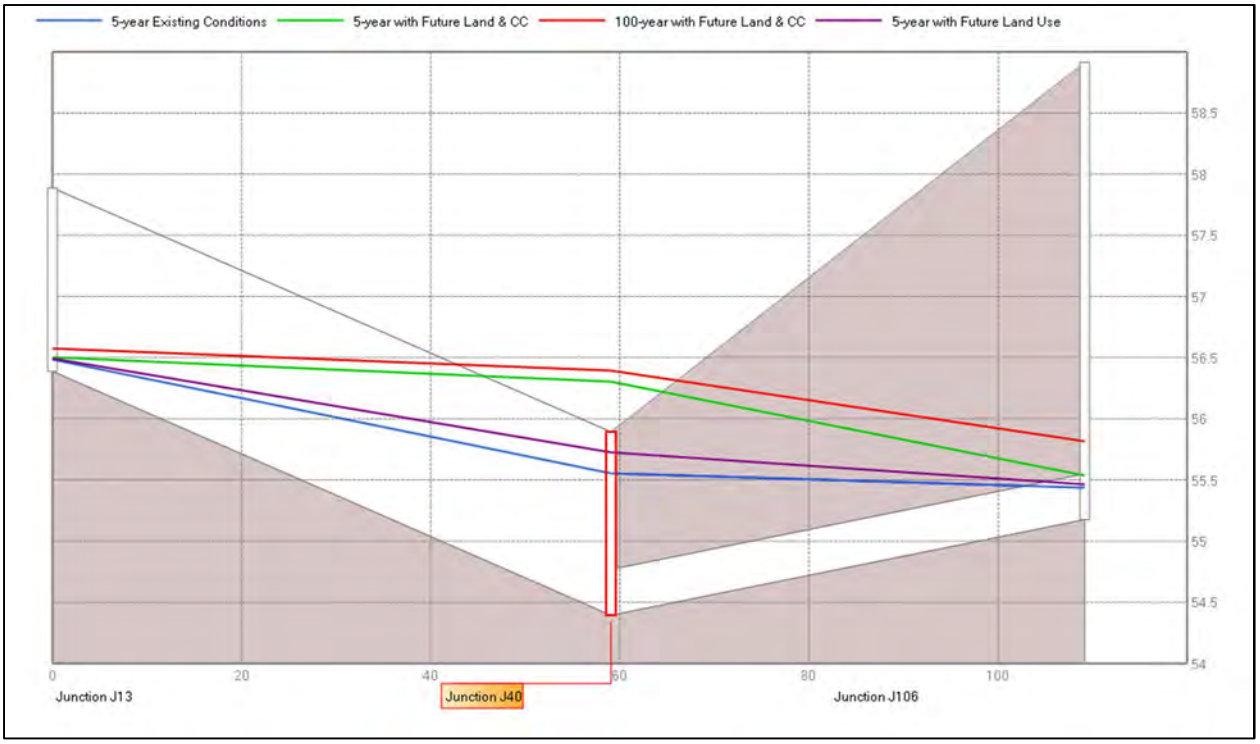


Figure C-7: Simulated Water Level Elevations at Riverview Road Ditch – 5-year Existing Conditions, 5-year with Future Land Use, 5-year with Future Land Use (CC) & 100-year with Future Land Use (CC)

Appendix D

Rainfall Distributions

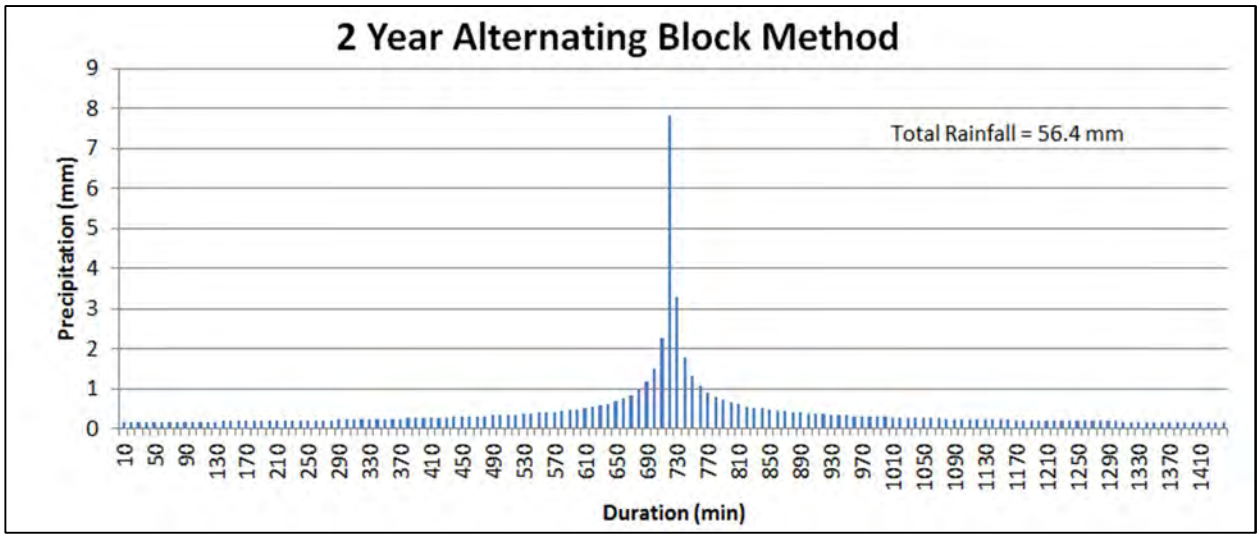


Figure D - 1: 24-Hour Alternating Block Method Distribution for 2-year Historical Event

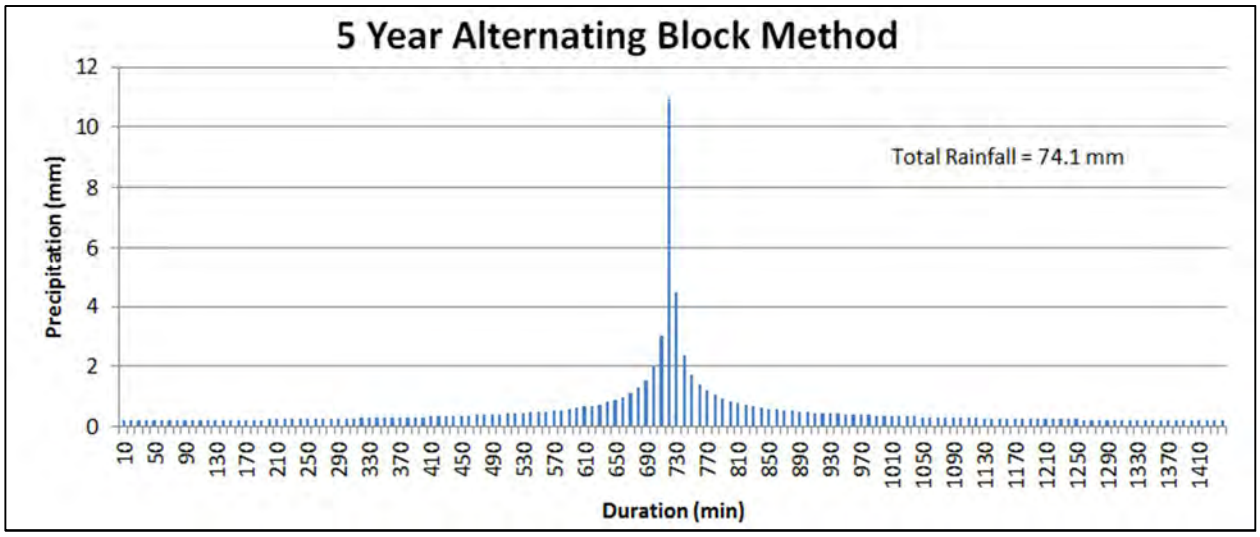


Figure D - 2: 24-Hour Alternating Block Method Distribution for 5-year Historical Event

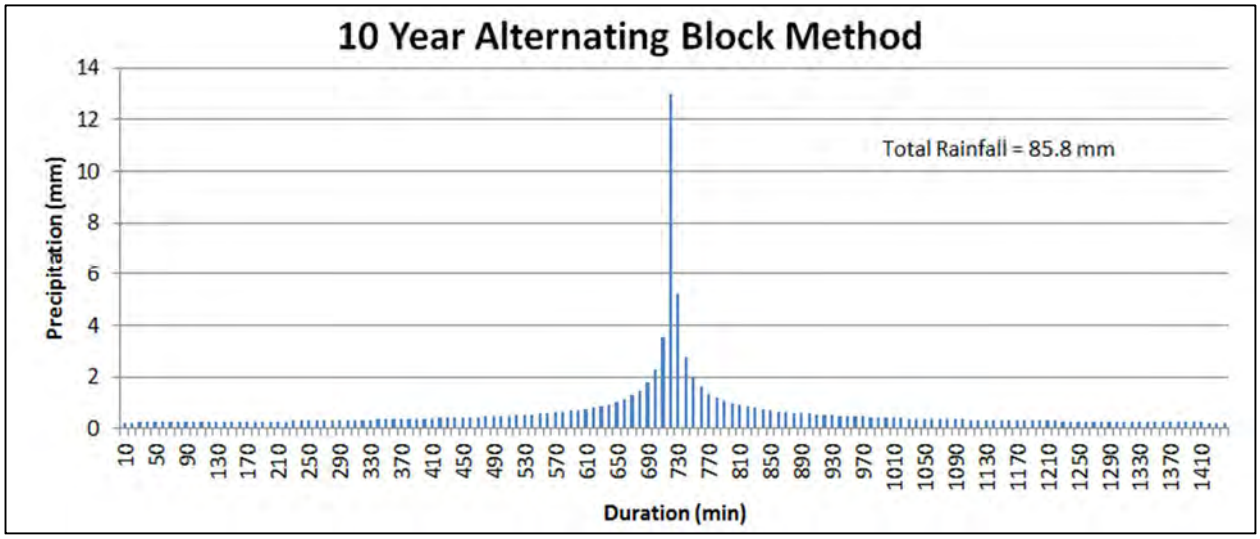


Figure D - 3: 24-Hour Alternating Block Method Distribution for 10-year Historical Event

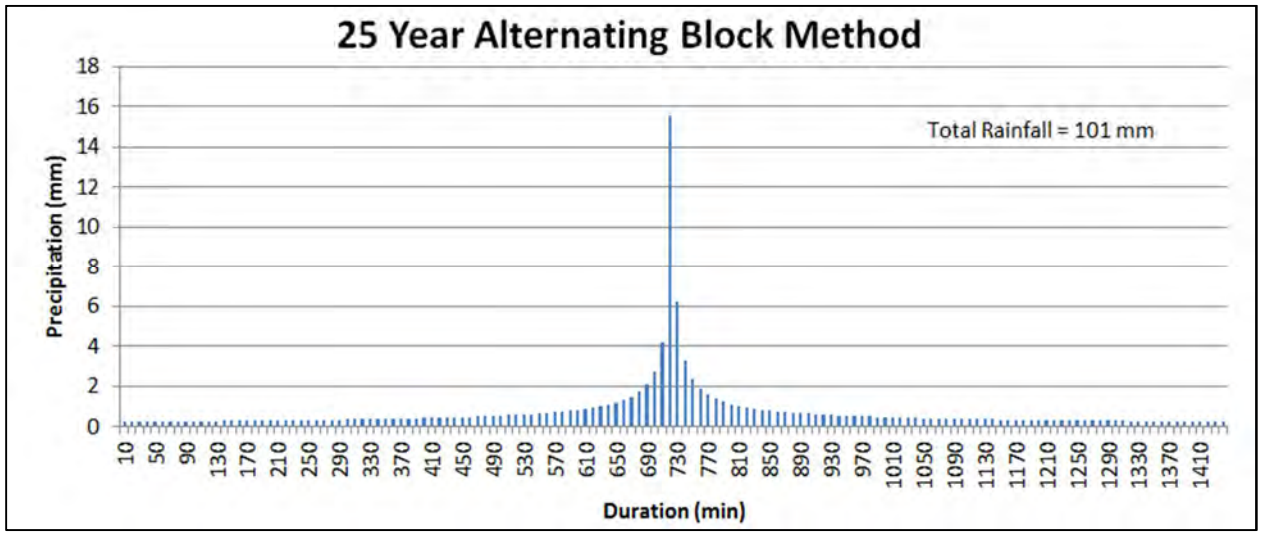


Figure D - 4: 24-Hour Alternating Block Method Distribution for 25-year Historical Event

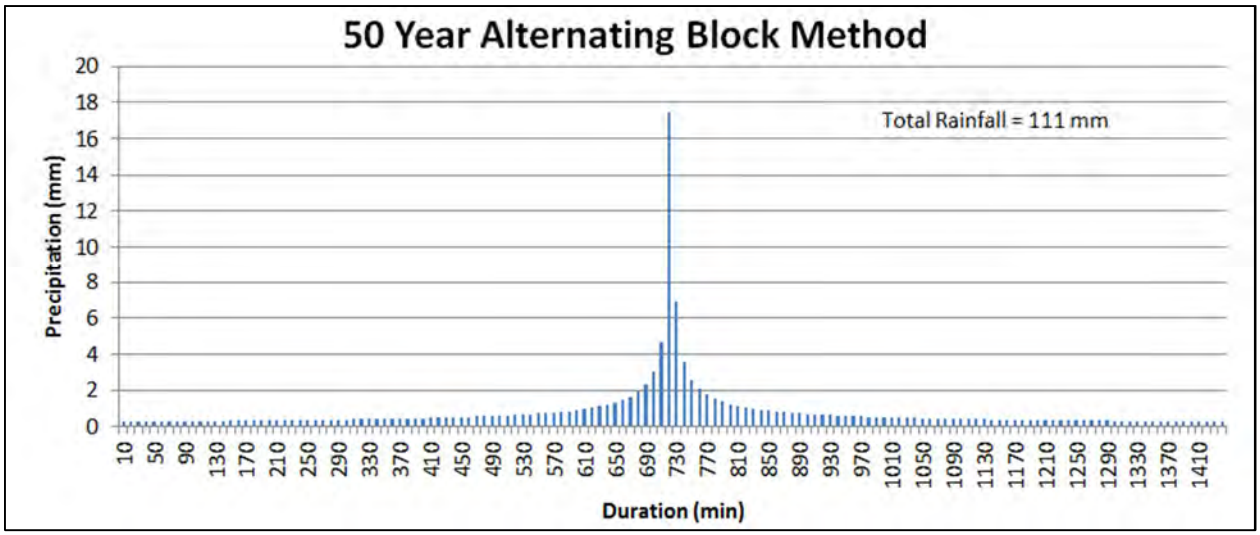


Figure D - 5: 24-Hour Alternating Block Method Distribution for 50-year Historical Event

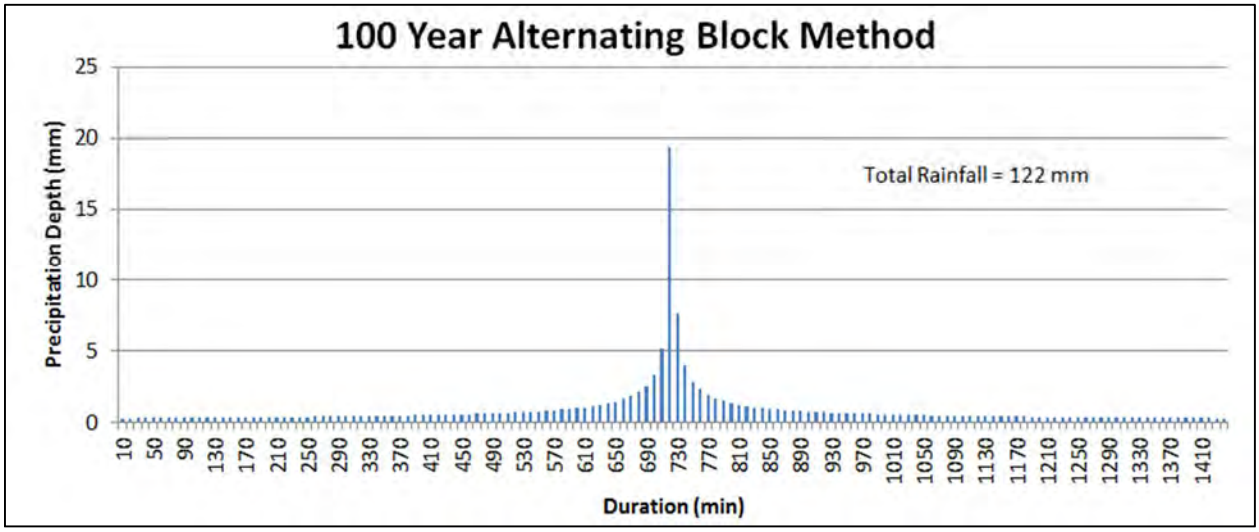


Figure D - 6: 24-Hour Alternating Block Method Distribution for 100-year Historical Event

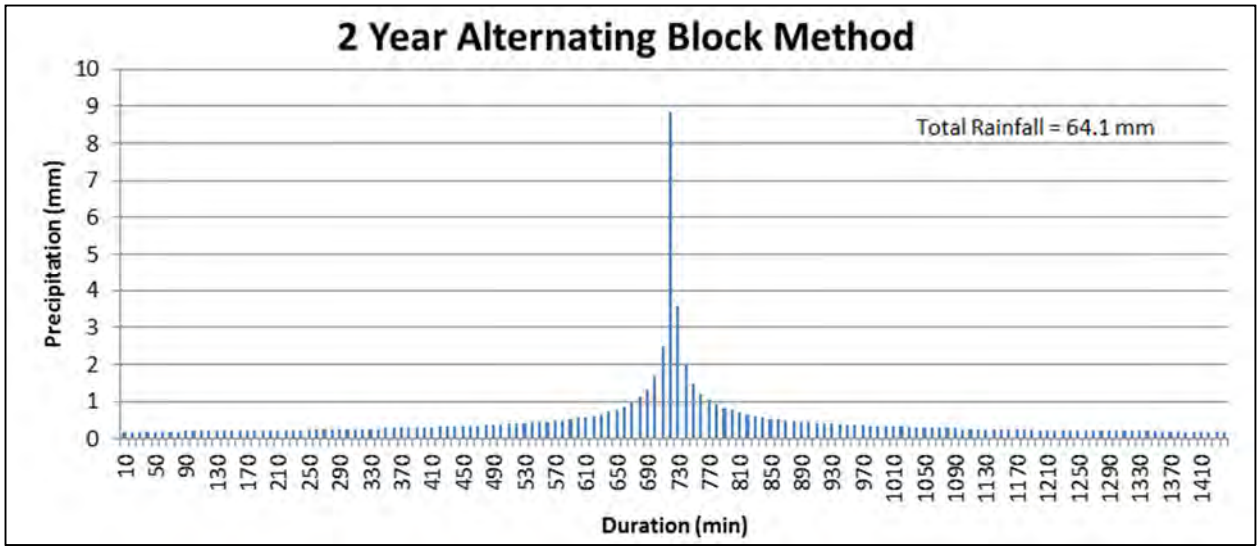


Figure D - 7: 24-Hour Alternating Block Method Distribution for 2-year Climate Change (Future) Event

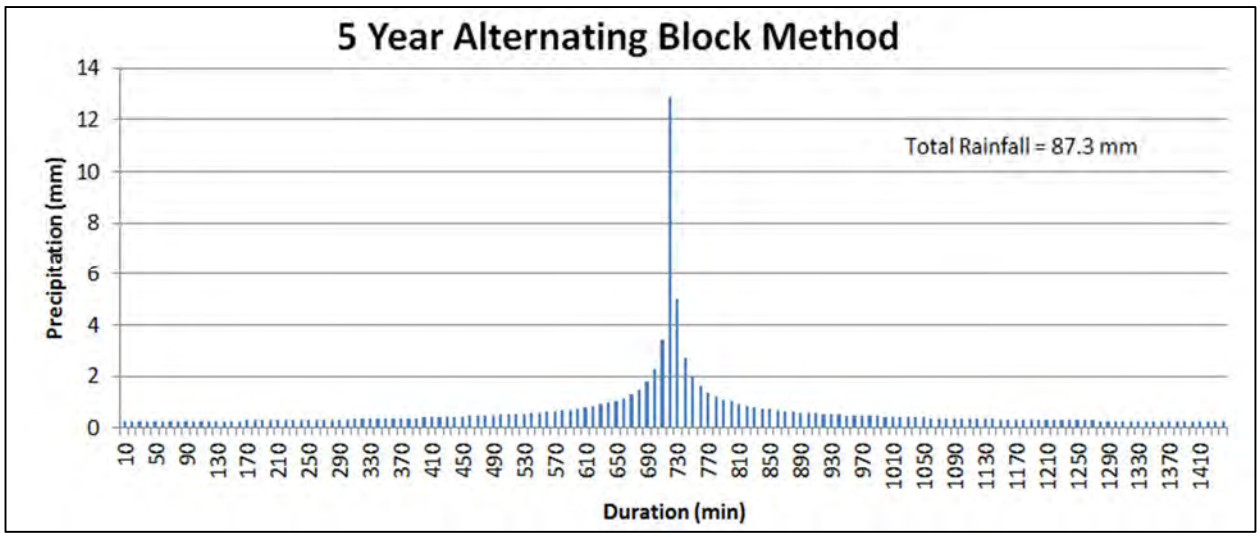


Figure D - 8: 24-Hour Alternating Block Method Distribution for 5-year Climate Change (Future) Event

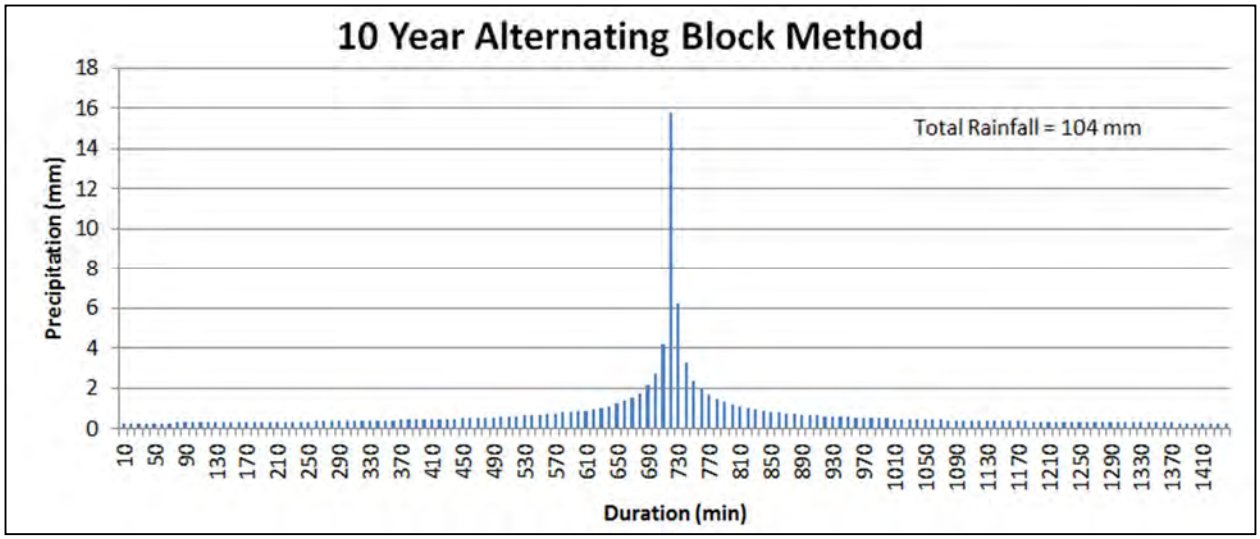


Figure D - 9: 24-Hour Alternating Block Method Distribution for 10-year Climate Change (Future) Event

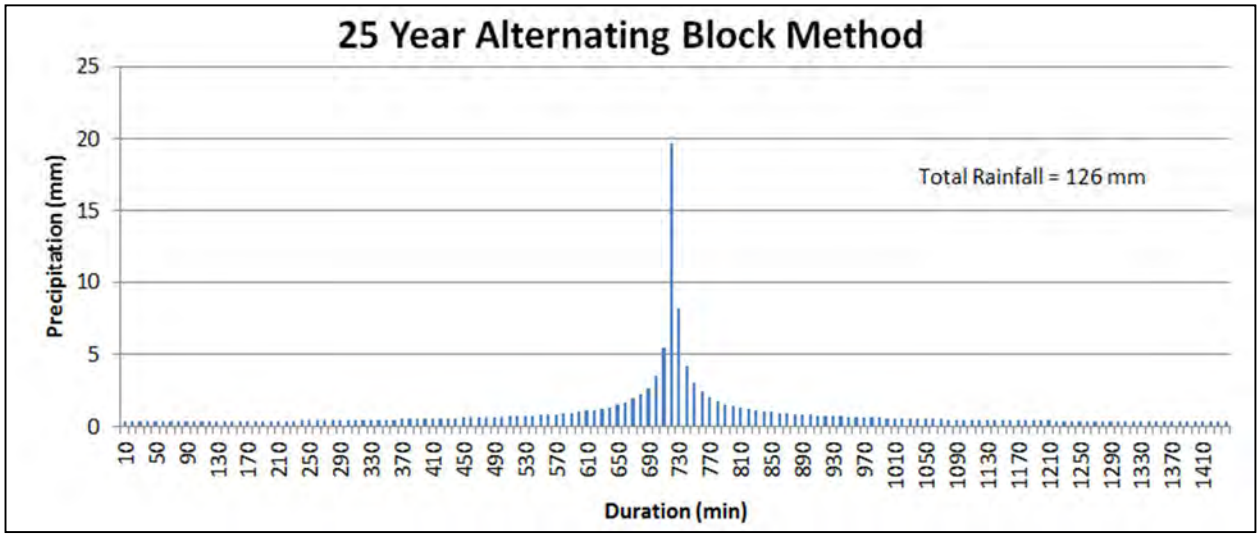


Figure D - 10: 24-Hour Alternating Block Method Distribution for 25-year Climate Change (Future) Event

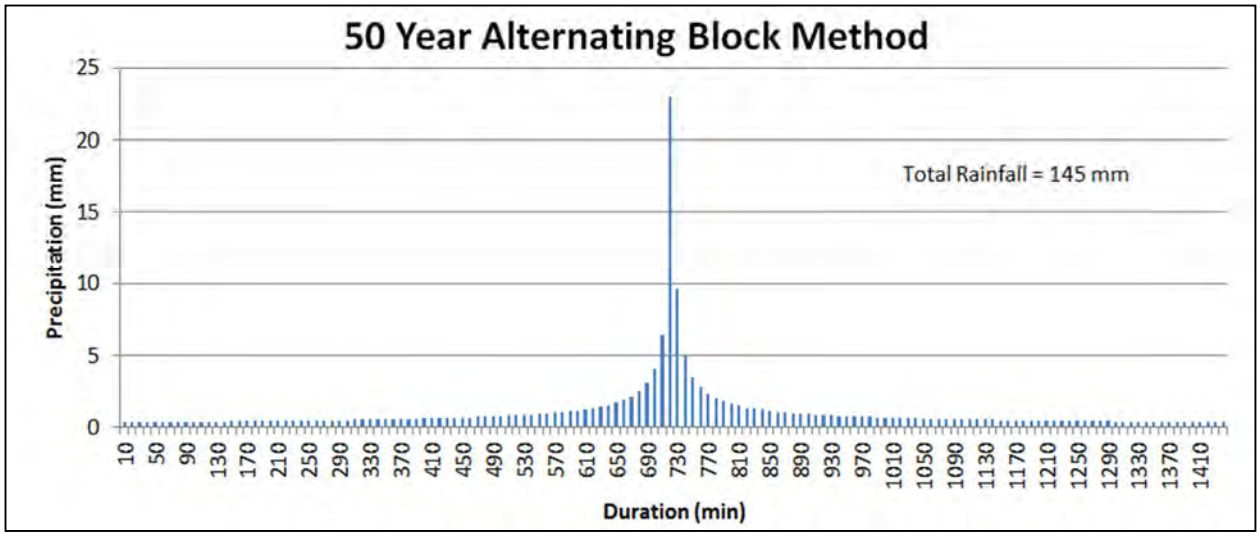


Figure D - 11: 24-Hour Alternating Block Method Distribution for 50-year Climate Change (Future) Event

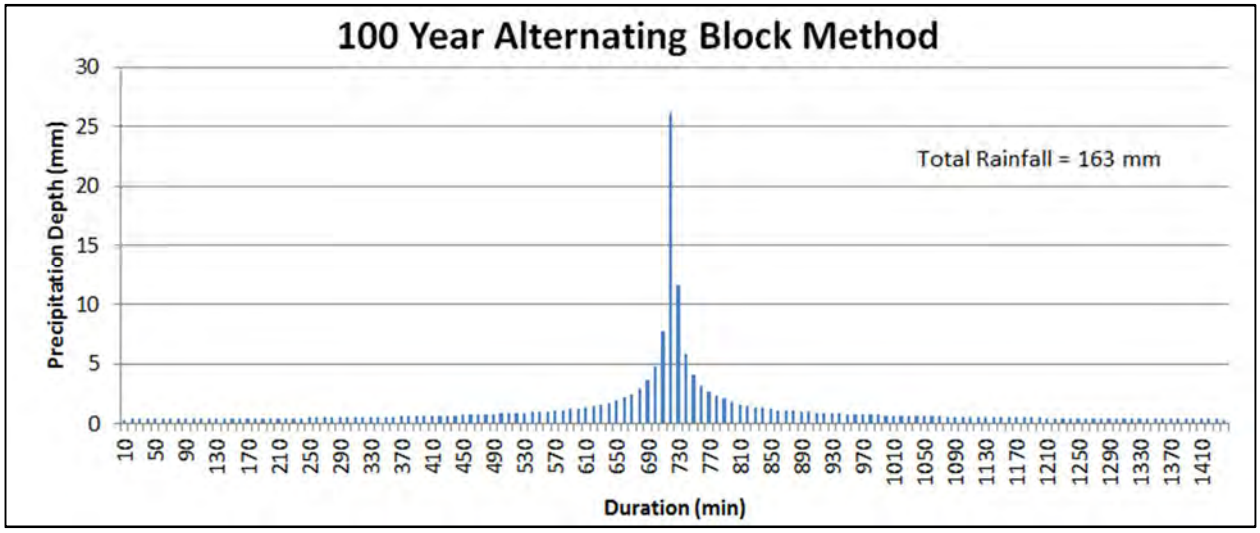


Figure D - 12: 24-Hour Alternating Block Method Distribution for 100-year Climate Change (Future) Event

Appendix E

Meeting Minutes

MEETING MINUTES

Subject: Start-up Meeting, Hantsport Stormwater Management Study
Date and Time: Tuesday, August 29, 2017, 9:00 am
Location: Hantsport Office, Municipality of the District of West Hants
Our File: 17-6276-1000

Attendees

Brad Carrigan	Director Public Works, West Hants
Karrie Ritchie	Public Works Admin, West Hants
Peter Johnston	Public Works Superintendent, West Hants
Martin Kehoe	Water Plant Operator, West Hants
Saira Shah	Planner, West Hants
Sarah Deveraux	Project Manager, Dillon
Annamarie Burgess	Water Resources Engineer and Planner, Dillon

Notes

Item	Discussion	Action By
1.	Introduction & Review of scope of work	
1.1.	Scope of work of the assignment was reviewed and confirmed as consistent with Dillon's proposal.	
1.2.	West Hants confirmed their priority for the study is to: • Develop Best Management Practices to guide future development • Identify/confirm infrastructure priorities and approaches to achieve best life cycle with future infrastructure works • Work towards a 'future scenario' of final segments of combined sewer and stormwater pipes being separated	
1.3.	West Hants confirmed Brad Carrigan to be main point of contact for the study	
1.4.	West Hants identified that they have also planned to conduct a full documentation of existing stormwater infrastructure and modeling of the existing and proposed system. West Hants to consider adding this to Dillon's scope of work, recognizing that there will be inherent efficiency in tying the two projects together.	
2.	Description of Existing/Historical Areas of Concern	

2.1. West Hants provided an overview of areas of concern inside the community of Hantsport that frequently experience flooding, as well as additional commentary about the existing infrastructure in the area. Areas discussed include:

- Riverview Road has water on sidewalks and across the road every spring, and after heavy rains
- Avon Street has no SWM infrastructure. It floods after heavy rains but the water quickly infiltrates and a few hours after a rain evet there is no longer any standing water.
- Maple Drive has French drains
- The sluice gate at the old rail tracks has failed and has not been repaired
- Older houses are tied into the stormwater sewer, though newer houses are not
- Roads as they are rebuilt are constructed with separated sanitary and storm sewers, however, the system is incomplete and all separated system re-converge

3. Available Information & Field Review

3.1. West Hants to provide available information:

- infrastructure sizes
- LiDAR coverage of Hantsport
- Gauge data of the Avonmore River collected by CBCL in Falmouth study

3.2. Dillon will install stream gauge as soon as possible. *Post Meeting Note: Dillon Staff were installing the stream gauge September 5, 2017 on Halfway River.*

3.3. Dillon will complete a field review of the study area and gather supplemental survey as required.

4. Proposal Debrief

4.1. Dillon requested any feedback West Hants could provide on the proposal submission in order to improve future submissions. West Hants identified strengths in having strong representative projects (relevant size and scope), and clearly written and easy to follow approach.

Errors and/or Omissions

These minutes were prepared by Annamarie Burgess who should be notified of any errors and/or omissions.

Appendix F

Capacity of Undersized Pipes

Table F-1 through F-3 provide an indication of the percentage of capacity of undersized pipes for existing conditions, future land use conditions, and future land use with climate change conditions. A percentage of capacity over 100% is a pipe that is undersized by that relative amount. For example a pipe at 167% capacity has a flow that exceeds its capacity by 67%. The pipes identified in these tables are limited to those that have resulted in roadway flooding for the 5-year return period rainfall event. The purpose of this information is to assist the Municipality in prioritizing improvements and upgrades.

The theoretical pipe capacities were calculated assuming pipes flowing full (e.g. the flow depth of a 300 mm diameter pipe is 300 mm) for the 5-year return period rainfall event. It is noteworthy that the stormwater network was modeled as a system with surcharging resulting from inflows, downstream water levels, or a combination thereof.

Table F-1 presents the estimated percentage of capacity of the undersized infrastructure for existing conditions.

Table F-1: Summary of Undersized Pipe Infrastructure for Existing Conditions

Location	Pipe Diameter (mm)	Theoretical Capacity (m^3/s)	Simulated Inflow (m^3/s)	Percentage of Capacity(%)[1]
Main Street – Civic #25 (CB98)	300	0.063	0.105	167%
Main Street – Civic #39 (CB93)	500	0.283	0.445	157%
Main Street Bridge (J46)	NA			
Chittick Avenue – Civic #22 (J1)	600	0.261	0.383	147%
Chittick Road - Civic #47 (CB84)	600	0.160	0.596	373%
Maple Avenue – Civic #24 (MH171)	300	0.044	0.074	168%
Maple Avenue – Civic #30 (MH169)	300	0.139	0.172	124%
Riverview Road – Civic #8 (CB158)	300	0.230	0.175	76%
Riverview Road – Civic #23 (CB168)	100	0.012	0.018	150%
Soccer Field (J137)	200	0.037	0.048	130%
William Street – Civic #14 (CB57)	450	0.150	0.133	89%
Prince Street – Civic #11 (CB40)	300	0.057	0.195	342%
William Street – Intersection with Oak Street (CB47)	450	0.166	0.233	140%
Prince Street – Intersection with Davidson Road (CB23)	CB INTAKE CAPACITY INSUFFICIENT			
Willow Street – Intersection with Main Street (CB137)	CB INTAKE CAPACITY INSUFFICIENT			

Alders Avenue – Intersection with Cedar Avenue (CB177)	300	0.290	0.188	65%
Holmes Hill Road – Intersection with Riverbank Drive (J130)	CB INTAKE CAPACITY INSUFFICIENT			
Mariner's Drive (J53)	2 x 250	0.442	0.198	45%
Faulkner Drive – Civic #80 (CB225)	200	0.032	0.137	428%
Pleasant Drive (J61)	300	0.155	0.266	172%
Riverview Road – Ditch Inlet (J40)	375	0.021	0.179	852%
Rand Street – Intersection with Bishopville Drive (CB227)	600	1.257	0.469	37%

[1]These values are based on the simulated system capacity and would be expected to vary in response to upstream/downstream upgrades. It is recommended that the impact on overall system performance be evaluated for the preferred upgrade scenarios.

Table F-2 shows the estimated percentage under capacity of pipes for future land use conditions. These results assume the construction of approximately 97 new homes and a nursing home over the 50 year horizon.

Table F-2: Summary of Undersized Pipe Infrastructure for Future Development

Location	Pipe Diameter (mm)	Theoretical Capacity (m^3/s)	Simulated Inflow (m^3/s)	Percentage of Capacity (%)[1]
Maple Avenue – Civic #24 (MH171)	300	0.044	0.074	168%
Maple Avenue – Civic #30 (MH169)	300	0.139	0.187	135%
Riverview Road – Civic #8 (CB158)	300	0.230	0.18	78%
Riverview Road – Civic #23 (CB168)	100	0.012	0.018	150%
Alders Avenue – Intersection with Cedar Avenue (CB177)	300	0.290	0.249	86%
Holmes Hill Road – Intersection with Riverbank Drive (J130)	CB INTAKE CAPACITY INSUFFICIENT			
Mariner's Drive (J53)	2 x 250	0.442	0.198	45%
Faulkner Drive – Civic #80 (CB225)	200	0.032	0.137	428%
Pleasant Drive (J61)	300	0.155	0.266	172%
Riverview Road – Ditch Inlet (J40)	375	0.021	0.254	1210%
Rand Street – Intersection with Bishopville Drive (CB227)	600	1.257	0.469	37%

[1]These values are based on the simulated system capacity and would be expected to vary in response to upstream/downstream upgrades. It is recommended that the impact on overall system performance be evaluated for the preferred upgrade scenarios.

Table F-3 summarizes the estimated percentage under capacity of pipes identified for future land use conditions with climate change.

Table F-3: Summary of Undersized Pipe Infrastructure for Future Development with Climate Change

Location	Pipe Diameter (mm)	Theoretical Capacity (m^3/s)	Simulated Inflow (m^3/s)	Percentage of Capacity (%)[1]
Main Street – Civic #25 (CB98)	300	0.063	0.164	260%
Main Street – Civic #39 (CB93)	500	0.283	0.522	184%
Main Street Bridge (J46)	NA			
Chittick Avenue – Civic #22 (J1)	600	0.261	0.385	148%
Chittick Road - Civic #47 (CB84)	600	0.160	0.627	392%
School Street – Civic #12 (J26)	375	0.178	0.266	149%
Maple Avenue – Civic #24 (MH171)	300	0.044	0.074	168%
Maple Avenue – Civic #30 (MH169)	300	0.139	0.205	147%
Riverview Road – Civic #8 (CB158)	300	0.230	0.222	97%
Riverview Road – Civic #23 (CB168)	100	0.012	0.023	192%
Soccer Field (J137)	200	0.037	0.073	197%
William Street – Civic #14 (CB57)	450	0.150	0.165	110%
Prince Street – Civic #11 (CB40)	300	0.057	0.216	379%
William Street – Intersection with Oak Street (CB47)	450	0.166	0.286	172%
Prince Street – Intersection with Davidson Road (CB23)	CB INTAKE CAPACITY INSUFFICIENT			
Willow Street – Intersection with Main Street (CB137)	CB INTAKE CAPACITY INSUFFICIENT			
Alders Avenue – Intersection with Cedar Avenue (CB177)	300	0.290	0.310	107%
Holmes Hill Road – Intersection with Riverbank Drive (J130)	CB INTAKE CAPACITY INSUFFICIENT			
Mariner's Drive (J53)	2 x 250	0.442	0.254	57%
Faulkner Drive – Civic #80 (CB225)	200	0.032	0.173	541%
Pleasant Drive (J61)	300	0.155	0.362	234%
Riverview Road – Ditch Inlet (J40)	375	0.021	0.327	1557%
Rand Street – Intersection with Bishopville Drive (CB227)	600	1.257	0.578	46%

[1]These values are based on the simulated system capacity and would be expected to vary in response to upstream/downstream upgrades. It is recommended that the impact on overall system performance be evaluated for the preferred upgrade scenarios.

The Region of Windsor and West Hants Municipality

Regional Fire Services Review



November, 2019

DISCLAIMER

This Report is prepared by Goudreault Associates on behalf of The Region of Windsor and West Hants Municipality (The Client). The report along with its findings and conclusions contained herein, is intended for the sole use to assist in the fire protection planning needs of the municipality. Judgements about the conclusions drawn and opinions presented in this report should only be made after considering the report in its entirety. This report is confidential and is intended for the exclusive use of the Client.

The Report is not intended to and should not be used or relied upon by anyone else. Goudreault Associates does not accept any duty of care, to any other person or entity other than The Client. The Report has been prepared for the purpose set out in the Goudreault Associates Proposal dated June 21, 2019.

Goudreault Associates reports are prepared incompliance with commonly accepted fire service and insurance industry standards at the time services were rendered. While Goudreault Associates have made every attempt to ensure that the information contained in this report is accurate, it was the responsibility of The Client and its departments to provide accurate data as requested by Goudreault Associates. Goudreault Associates is not responsible for any errors or omissions, or for the results obtained from the use of this information.

Cost contained within this report are estimates only, based upon current data and are not intended to be relied upon by any person for accuracy. The Client should obtain written bids from qualified businesses and or contractors in order to determine the actual costs.

Information contained in the Report is current as at the date of the Report, and may not reflect any event or circumstances which occur after the date of the Report.

Goudreault Associates will not be responsible to the Client for any losses or damages, whether consequential or other, however caused, incurred or suffered as a result of services provided.

TABLE OF CONTENTS

Disclaimer ..... **i**
Table of contents ..... **ii**
Introduction ..... **ix**
Executive Summary ..... **x**
Methodology ..... **xii**
Definitions ..... **xvi**
STAKEHOLDERS & CONSULTATIONS ..... **xxi**
Stakeholders and Consultations **2**
What was heard **2**
The Process **3**
Challenges **3**
Consultations **4**
Liability, Registrations, Service Agreements & Policies **6**
Liability **7**
National Fire Protection Association (NFPA) **9**
Society Registrations **11**
Fire Service Agreements **13**
Municipality of the County of Kings and the Municipality of West Hants *13*
Glooscap First Nations *15*
The Municipality of East Hants Contracted Fire Services *15*
Municipality of East Hants and the Brooklyn Volunteer Fire Dept. *16*
Beneficial Ownership Agreement *16*
Mutual-aid Agreements **17**
Municipality of West Hants. *17*
East Hants Fire Services Association and Brooklyn Volunteer Fire Department *19*
Hantsport and Kings County *19*
Southwest and Lunenburg County *19*
Mutual-aid Summary *19*
Fire Department Operating Polices and Procedures **21**
West Hants Policy COGE-007.00 ..... *21*
Fire Related Bylaws *23*
HUMAN RESOURCES **25**

Recruitment and Retention **26**
Recruitment *27*
Retention *33*
Valuing Volunteers *36*
Recruiting and Retention Summary *37*
Current Retention Program *38*
Retention Program Recommendations *39*
Recruitment and Retention Conclusion *40*
Honourarium **41**
Intent of the Volunteer Honoraria *41*
Honourarium Expectations *42*
Honourarium Definition and Intent. *42*
Honourarium Complexities *43*
Municipality of West Hants Honourarium Policy *44*
Emergency Services Volunteers - CRA *46*
Honourarium – Canadian Revenue Agency Rules. *46*
Eligible services *47*
Pensionable and Insurable Rescue or Volunteer Firefighter Income *47*
Regional Honourarium Program Recommendations *47*
Honourarium Conclusion *48*
Fire Service Promotions **49**
Review of current Practices *51*
Promotion Recommendations *51*
Health and Safety Policies Review **56**
Introduction *56*
The Review *56*
The Occupational Health and Safety officer and the Incident Safety Officer. *58*
Professional Qualifications and Standards (Training) **62**
Training Principles *62*
Observations *69*
Training Summary *80*
Succession Planning **82**
ORGANIZATION AND STAFFING **83**
Overview of current Fire Services **84**

Services Provided *85*
Standardization *86*
Organizational Design and Staffing Models *86*
Staffing Models *87*
Fire Service Line Function Staffing/Positions; Existing and Proposed **90**
Rotational ON-CALL Opportunities *101*
Fire Prevention **104**
Overview of Services Provided *104*
Fire-Inspection *106*
Fire Investigation *110*
Fire-Safety Education *111*
The Fire Services Organizational Review Objective **113**
***Model 1**: The Status Quo* *114*
***Model 2**: Integrated Regional Service* *117*
***Model 3**: Hybrid Regional Fire Service* *120*
Sample Fire Services Job Descriptions *126*
Organization Conclusion, Recommendations *126*
OPERATIONS **128**
Emergency Call Taking and Fire Service Radio Communications **129**
911 Call Taking and Routing **129**
Windsor/West Hants 911 Service *129*
Valley Communications **131**
Communications/Dispatch Service Contract Notes *132*
Valley Communications Operations *133*
Computer Aided Dispatch *137*
Municipality Responsibilities *138*
911 Call Taking and Dispatch Recommendations *139*
Fire Services Radio Communications **140**
IamResponding Application/Software *140*
Radio Hardware Inventory. *141*
KPIs *144*
Who is Listening? *145*
Radio System Related Recommendations *147*
Alternative Service Providers *148*

Fire Service Radio and Unit Identification system 148
Fire Station Numbering 149
Fire Apparatus Identification 149
Position Radio Call Signs 150
Other Functional Radio IDs 151
Summary and Recommendation Radio IDs 152
Incident Response Operations 154
Existing Operations 154
Fire Stations, existing 154
Fire Apparatus, existing 154
Incident Responses 157
Details on Incident Types 161
Incident Responses by Community, Growth 166
Service Demand Growth 167
Population 167
Planned Growth Areas, West Hants 170
Conclusion, Population Growth Service Demands 174
Development Growth, Fire Service Capability 176
Community Fire Risk Factors 178
Bridges 178
Rural Water Supply Infrastructure 180
Residential Fire Risk 182
Large Building Fire Risks 186
Assessments and Property Counts 187
Community Fire Risk Profile 189
***Fire District Revisions* 191**
Current Fire Districts 191
Revising Fire Districts 192
Revised Fire Districts 197
Standards for Provision of Apparatus and Manpower 199
NFPA-1720, Benchmarks 199
Fire Underwriters Survey; Table of Effective Response 201
Matching Resource Deployment and Risk 202
Recommended Front-Line Staffing and Equipment 210

Windsor: *210*
Hantsport: *210*
South West *210*
Brooklyn *211*
Three Mile Plains *211*
Summerville *211*
Changes in Assessments and Property Counts, Revised Fire Districts *212*
Apparatus Recommendations **213**
Replacing Fire Trucks **213**
The Value of Fire Apparatus Standardization **218**
The Value of Major Equipment Standardization **227**
Fire Station Facilities and Future Needs **232**
Station Location **232**
Summerville Volunteer Fire Station *233*
Hantsport Volunteer Fire Station *234*
Three Mile Plains Station *235*
Town of Windsor Fire Station *235*
Community of Falmouth *235*
Brooklyn Fire Station *237*
Southwest Hants Fire Station *238*
Fire station facilities **239**
Apparatus and Equipment *239*
Equipment Bay Configuration *239*
Apparatus Floor and Miscellaneous Off Floor Service Rooms Sizing *241*
Maintenance, Repair, Storage and Support Space Requirements *241*
Facility Space Guidelines *243*
Current Facility Observations *244*
Current Fire Stations. *244*
Apparatus Floor Space Requirements *245*
Storage Needs *246*
Summary *247*
BUDGETS and FORECASTS **248**
Financial Analysis and Budget Forecasts **249**
Current Annual Operating Budget **249**

Annual Operations Budget Analysis *251*
Roll-Up of Expenses *262*
Benchmark for Future Budgets **263**
Annual Operations Budget Benchmark *263*
Major Capital Needs *280*
Major Capital Forecast *286*
Benchmark Budget 2020, Roll-Up *293*
Projected 10-Year Budget Impacts **295**
Population Growth *296*
Development Growth *299*
Other Threats *300*
Benchmark Budget Growth Conclusion: *301*
APPENDICES **302**
Appendix I; Model Fire Service Registration Policy **303**
Appendix II; West Hants /Valley Communications Contract **320**
Appendix III; Town of Windsor /Valley Communications Contract **326**
Appendix IV; Provincial Legislation **328**
The Region of Windsor and West Hants Municipality Act *328*
The Municipal Government Act *328*
The Fire Safety Act *333*
Forests Act *340*
Forest Fire Protection Regulations *342*
Summary of Duties and Powers, Provincial Legislation *344*
Appendix V; Model; Volunteer Recruitment and Selection Process **346**
Purpose *346*
Definitions: *346*
Requirements *346*
Selection Process Overview *347*
Appendix VI; VFIS Plans and Coverages (for reference) **351**
Appendix VII; Sample Job Duties and Descriptions **356**
Director of Protective Services/Fire Chief Draft Job Description *356*
Assistant Chief of Fire Prevention *361*
Divisional Chief of Training, Occupational Health & Safety, & Communications *366*
Appendix VIII; Administrative Office Space and Costs **371**

Administration Office Space Requirements **371**
Office Functional Requirements and Location *371*
Office Cost Estimates *372*
Appendix IX; Standardized Fire Apparatus Features **377**
Standard Pumper, Key standardized Features **377**
Standard Pumper, Key standardized Features; for Rural areas **379**
Standard Midi-Pumper/Rescue, Key standardized Features **381**
Pumper/Tanker, Key Features **383**
Aerial, Key Features **385**
Quint, Key Features **387**
Rescue, Key Features **389**
Utility, Key Features **389**
Appendix X; Table of Recommendations **390**

INTRODUCTION

The following report and recommendations are a result of extensive review and research. This was made possible due to the efforts and guidance of numerous municipal staff, and the fire service personnel and supportive agencies.

Goudreault Associates would like to recognize and thank the following persons for their assistance.

- Mark Phillips, CAO, Region of Windsor and West Hants Municipality
- Martin Laycock, CAO Municipality of West Hants
- Louis Coutinho, former CAO Town of Windsor
- Todd Richard, Acting CAO, Town of Windsor
- The Region's Fire Chiefs and Deputy Chiefs
- Region's Firefighters

The information and data requested was extensive and onerous on all, and we greatly appreciated the effort. If it were not for the effort of those all involved the resulting report and recommendations would not have been possible.

The RFP requested a Regional Fire Services Review of the current Fire Services and, based upon those findings, create a plan for a new Regional Fire Services for the New Regional Municipality

The following report is an accumulation of local information measured against current legislation, regulations, recognized standards and guidelines.

The report and its recommendations will achieve the overall objective of a standardized delivery of service for the new Regional Municipality.

EXECUTIVE SUMMARY

On April 1, 2020 the consolidation of the Town of Windsor and the Municipality of the District of West Hants will occur. Goudreault Associates (GA) was retained to conduct this Fire Services Review; with an intent to propose a plan for a more regionalized approach to fire and rescue services in the new municipality.

There are currently six fire departments providing fire and rescue services in Windsor/West Hants (W/WH). These include the four W/WH departments (Windsor, Hantsport, Brooklyn and Summerville). Hantsport administers a second station in Vaughan (called South West) and Brooklyn manages a second station in Garlands Crossing (called Three Mile Plains).

Two East Hants Regional Municipality departments also provide services in bordering areas of West Hants; the Walton Shore Volunteer Fire Department and the Uniacke and District Volunteer Fire Department.

Hantsport/South West are currently municipal services, while the remainder operate as corporate bodies under the NS Societies Act. The Windsor department has been for quite a few years a quasi-municipal department, with a full-time fire chief (an employee of the Town) up until fairly recently. Several casual employees work in the fire stations with all but one being compensated (directly or indirectly) by the municipalities. Almost all the departments do fund raising.

For the W/WH departments, the municipalities own most of the major fire equipment and fire apparatus and have largely or completely financed new fire stations and annually contribute to station upkeep, and many other expenses. Financial contribution to Walton/Uniacke is proportionally provided also. Collectively the W/WH municipal governments have annually granted in each of the past three years about $2.75m towards operational and capital costs, representing approximately 13% of the municipalities' annual combined budgets.

Municipal concerns appear to center around a few issues; accountability and transparency for the use of municipal funds, adherence to municipal purchasing and spending practices, unnecessary duplication of resources, fiscal economy, region-wide cooperation to improve effectiveness and

efficiency, response districts, and the inconsistencies arising from the various and different service agreements.

The concept of a regional fire service means the collective efforts of Registered Service Providers working in a collaborative environment for the planning/preparing for responding to fires and other emergencies. All that, done in an efficient and effective manner while collectively pursuing opportunities for improving services, bettering the health and safety of volunteer firefighters, and maintaining a local community volunteer fire services identity.

The concept of regionalization in the fire service has been around for a number of years, but more recently the drive towards higher municipal efficiency, even survival, has accelerated regionalization efforts. The W/WH consolidation is seen by the provincial government as a test case with future consolidations on the horizon. Regionalization can yield some strong end results for those that navigate the process successfully.

With regionalization of services, the main goals are cost efficiencies, elimination of duplication of services, better utilization of resources, better cooperation in service delivery, consistency of equipment and procedures, enhanced firefighter safety and benefits, uniform training and performance standards, and adequate qualifications and staffing levels.

The goal of the fire service should be to safely provide the maximum amount of service to the population served while maintaining operational effectiveness and cost efficiencies and with due regard for the safety and wellbeing of the responders.

This review encompassed three major areas of study;

Emergency Response Program

The review goal was to develop a service delivery excellence program for the regional communities.

Governance and Organizational Structure

The first objective of this Part was to recommend an appropriate Governance model for the fire service, to ensure that the goals and objectives identified in the project's recommendations are achieved.

The second objective was to recommend an appropriate organizational structure and areas of responsibility within the organization; i.e., Operations (emergency response), Fire Prevention, Training, Health and Safety, and Administration.

The third objective was to determine appropriate service delivery expectations.

Administration and Program Implementation

The first objective was to review and identify any deterrents that may impede the overall success of the initiative to move forward with a more Regional fire service and to develop appropriate programs to ensure its success.

The second objective was to determine costs over a ten-year period for the provision of fire/rescue services.

The third objective was to develop an implementation plan that achieved the overall goals identified in the other parts of the Review.

METHODOLOGY

The Review included several approaches to obtaining a picture of the current service. These included;

- stakeholder meetings and interviews,
- the completion by fire chiefs of survey forms/charts,
- the completion of data worksheets,
- reviews of previous reports,
- the study of provincial acts and regulations,
- a review of current municipal and fire department policies, procedures,
- identification of applicable organizational/governance standards,
- identification of applicable standards, guidelines and related best practices.

During the Review, data validity was a concern, and fact checking was a major component of ensuring that conclusions and recommendations were based on correct information. Most of the data used was provided by the client (as required under the terms of the contract) and through the stakeholder process, and solicited through the data queries. It was apparent that not all requested data existed or was available. Conclusions were reached that acknowledged some gaps in understanding.

A general finding from the Review of the current fire services is that there are substantial silos between the six fire departments that provide fire emergency response in W/WH. There is no standardization of major or minor equipment purchases, including personal protective equipment, fire apparatus, tools, or supplies. Standards and service levels are not the same, the organizational structures differ, policies and procedures are substantially different. Each fire department, even the municipal ones, operates at arm's length and substantially independently from each other and from the municipal governments. For many, the only interaction occurs at budget time.

Some efforts have been made between fire departments over the past couple of years to improve cooperation in the areas of training and emergency responses. The training effort has been virtually unsuccessful, although there is a past history of cooperation being achieved in this area.

Emergency response issues currently exist where the fire districts are not established with the concept of a region-wide closest appropriate resource allocation to an incident. The current district map was redrawn in late October 2015 after the Windsor fire department withdrew fire protection services for proximate areas of West Hants, a contract that had been in place for approximately 65 years. More mutual-aid is now being utilized between the W/WH fire departments (than was immediately after the Windsor issue) as the fire chiefs have recognized the need.

There is currently substantial variability in benefits and honourariums for the volunteer firefighters. Although W/WH municipalities provide funding to the societies for this purpose, there is no mandate that minimum or uniform levels of insurance, WCB, EAP, or stipend be paid. There is no apparent effort this way either. This fact is well known amongst the volunteer

firefighters as a whole, and has precipitated distortions of fact, exacerbating for some feelings of unfairness around the issue.

GA has identified three organizational options; the status quo, a regional municipal service, and the recommended hybrid regional service.

GA recommends the hybrid model because it is the best compromise in providing regional coordination and efficiencies yet maintains the local volunteer character of the fire department.

GA recommends providing centralized administration support, management and leadership. A full-time Director of Public Safety Services – Regional Fire Chief, and a full time Assistant Fire Chief with primary responsibilities for fire prevention are recommended. A part-time Divisional Chief is also recommended to take responsibility for developing and coordinating of firefighter qualifications and training.

GA recommends a District Fire Chief management committee as a key recommendation, to bring together all the local fire district management personnel; so that plans and decisions on common issues of concern and service delivery can be made.

GA recommends better accountability and standardization of policies, procedures, major equipment, training and qualification standards, and levels of service. Accompanying this is revised response districts that minimize travel times to all portions of W/WH. To help ensure maximum efficiency and effectiveness of resource utilization, recommendation are made to develop response scenarios where all resources are available to respond as needed and are not bounded by fire department district silos.

GA recommends the benchmark annual operating budget as a starting point going forward.

GA recommends the proposed 20-year capitalization plan, primarily for fire apparatus replacements, using a standardized approach to specification and group purchasing.

GA recommends that all purchasing of significant-cost items be coordinated.

GA recommends minimum standards for training and qualifications of firefighters; in order to achieve a consistent service level throughout the new municipality that meets public

expectations. Also recommended is a benefits package for the volunteer firefighters that recognizes the long term physical and mental health risks that fire/rescue first-responders are exposed to. Recommendations include a fair and uniform honourarium system.

GA recommends that all fire prevention activities, including fire-inspection, fire-investigation, and fire-safety education be brought inhouse. These are mandated services and require coordination, proper execution, and prioritizing in order to meet legislative mandates. For this purpose,

GA recommends that the current 1.5 FTE fire-inspectors in Planning and Development be reassigned to the regional fire service.

GA recommends that four on-call fire-investigators be trained and equipped to investigate all fires and to gather necessary information on origin, cause and circumstances, and to liaise with the office of the Fire Marshal and RCMP in securing evidence as necessary.

GA recommends that better coordination and support of local fire department efforts in fire-safety education be provided, including the possible involvement of non-firefighting personnel from the community in this activity.

There are many more detailed recommendations in the accompanying report. Collectively, implementation of all recommendations will likely take several years. The outcome should be a much more robust fire service that provides improved fire and rescue services, that meets municipal mandates for accountability and transparency, that meets legislative service mandates, that provides better protections for volunteer firefighters, and that maintains that essential local flavour of the volunteer fire department.

Costs for most recommendations are included in the benchmark budget estimates.

DEFINITIONS

Aerial Device – Ladder	A mobile truck with a mounted hydraulically operated ladder
Aerial Device – Platform	A mobile truck with a mounted hydraulically operated boom or ladder with an enclosed bucket platform device.
ALI	Automatic Location Identification is part of the E-911 technology which is provided by telephone service providers to determine the location of the caller. If the caller is using a landline it will provide the street address. If the call is by cellular technology, it will provide the location of the closest cellular tower.
ANI	Automatic Number Identification is part of the E-911 technology which is provided by telephone service providers to which determines the telephone number of the caller, landline or cellular.
APCO	Association of Public Safety Communication Officials.
Automatic Aid	Is apparatus from another department that always responds by written SOP on first alarm structure fires.
Fire Apparatus	As per NFPA1901 Standard for Automotive Fire Apparatus 2016 - A vehicle designed to be used under emergency conditions to transport personnel and equipment or to support the suppression of fires or mitigation of other hazardous situations.
First Due Assignment	The number of and types of fire apparatus required to respond on the initial alarm of fire.
Front Line Apparatus	Fire vehicles those are ready to respond to any emergency either as First Due assignment or subsequent assignments. Opposite of Reserve Apparatus

FUS	Fire Underwriters Surveys.
GPM	Water flow rate measured in American gallons per minute.
Heavy Rescue	Is a type of specialty firefighting apparatus. They are primarily designed to provide the specialized equipment necessary for technical rescue situations such as traffic collisions requiring vehicle extrication, building collapses, confined space rescue, rope rescues and swift water rescues. They carry an array of special equipment such as the Jaws of life, wooden cribbing, generators, winches, hi-lift jacks, cutting torches, circular saws and other forms of heavy equipment unavailable on standard trucks.
Igpm	Water flow rate measured in imperial gallons per minute.
Initial Attack Apparatus	Aka (Quick Attack) Fire apparatus with a fire pump of at least 250 gpm (1000 L/min) capacity, water tank, and hose body whose primary purpose is to initiate a fire suppression attack on structural, vehicular, or vegetation fires, and to support associated fire department operations.
Midi Pumper	Similar to a pumper with a smaller pump and smaller water tank but with a bigger pump and larger water tank than a mini pumper.
Midi Rescue	Is similar to a heavy rescue other than it typically carries less similar equipment, but more task specific. The vehicle is smaller than the heavier rescue.
MFR	Medical First Responder program sponsored by the Province of Nova Scotia's Emergency Health Services, provided by trained local fire fighters.

Mutual-aid	Fire Underwriters define Mutual-aid as anything requested after a unit arrives on scene needed during the fire or and is not part of the first alarm assignment, or outside aid. NFPA-1201 Standard for Providing Fire and Emergency Services to the Public, 2015 Edition defines mutual-aid as a reciprocal assistance by emergency services under a prearranged plan.
NFPA	National Fire Prevention Association
Quint	Fire apparatus with a permanently mounted fire pump, a water tank, a hose storage area, an aerial ladder or elevating platform with a permanently mounted waterway, and a complement of ground ladders.
Pumper	Is a vehicle that is primarily designed to carry hose, a small water tank, some cases a foam tank, a fire pump, foam pump, miscellaneous tools and manpower, for the purpose of pumping water onto a fire
Pumper Tanker	Is similar to a pumper other than the water tank capacity is larger than 800 imperial gallons of water.
Rehab	NFPA-1500 Fire Fighter Safety, requires on-scene rehabilitation which shall include at least rest, hydration, active cooling where required, basic life support care, food where required, and protection from extreme elements.
Relay	The method of moving fire water over long distances employing fire pumpers and large diameter hose.
RFF	The amount of water flow required measured in imperial gallons per minute to control and mitigate a fire.

Reserve Apparatus	A fire apparatus retained as a backup apparatus and used to replace a primary (front line) apparatus when the primary (Front Line) apparatus is out of service.
Shuttle	A method of transporting water to a fire scene from a water source, employing pumps and mobile water tankers.
SOC	Span of Control, this is the number of persons ideally that a supervisor can effectively manage in the work environment. In the fire service the general guideline, depending upon job function is one (1) supervisor to every five (5) direct reports.
Special Services Vehicles	A multipurpose vehicle that primarily provides support services at emergency scenes. These services could be rescue, command, hazardous material containment, air supply, electrical generation and floodlighting, or transportation of support equipment and personnel.
TMR	Is a digital (P25) two-way radio system that uses a digital control channel to automatically share frequencies/channels with groups of users. The Trunked Mobile Radio System (aka TMR2 in Nova Scotia) is used by multiple Public Agencies across the Maritime provinces. The system is shared between NS/PEI/NB. The TMR2 system operates in the 700 MHz range of frequencies. TMR and VHF radios are discrete and cannot share systems.
ULC	Underwriters Laboratory of Canada
VHF	A radio frequency range used by certain emergency responders and private companies. Very-high frequency (VHF) is the designation for radio frequencies in the range between 30 megahertz (MHz) and 300 megahertz, with wavelengths ranging from ten meters to one meter. Fire Departments generally use radios in frequency

ranges between 138 and 158 MHz. VHF marine radio is 156-158 MHz. TMR and VHF radios are discrete and cannot share systems.

STAKEHOLDERS & CONSULTATIONS

STAKEHOLDERS AND CONSULTATIONS

The early focus for this study was to speak to stakeholders. Eighty-four stakeholders were interviewed, as follows:

- Firefighters from all West Hants and Windsor stations,
- Chief Fire Officers from all West Hants and Windsor stations, as well as Uniacke and Walton Shore FDs,
- The former West Hants REMO/Fire Service Coordinator,
- Municipal CAOs,
- West Hants Chief Building Official,
- EHS (as a coordinating service provider),
- RCMP (as a coordinating service provider),
- Valley Communications (who in addition to providing paging services, is one of four provincial Public Safety Answering Points for 9-1-1. In addition, Valley Comms provides Emergency dispatching services for 86 fire departments including all the West Hants departments and the Windsor fire department.),
- A member of the NS Critical Incident Stress Debriefing (CISD),
- The DNR Chief Fire Technician for the area (as a coordinating service provider), and the
- Municipality of East Hants, (to review methodology for their mutual-aid agreements and contracting of fire services with the Brooklyn Volunteer Fire Department)

All the stakeholders and reference sources were open with their thoughts and opinions and were appreciative of the fact that they had an opportunity to meet with us. They all understood the value of contributing to the process.

WHAT WAS HEARD

For the Windsor/West Hants (W/WH) firefighters, there is a common concern over the possible outcome of this study, especially as it relates to whether Council will accept the recommendations. In particular, there is concern over the place of the fire services in the new municipality, especially with regards to support by Council for the budgetary needs of the fire services and support from municipal administration.

In general, there are some positive themes. Many firefighters and chief officers have expressed that there is a need for change. This is encouraging as it means there appears to be a strong basis

for closer cooperation in the future. These themes are in addition to the aforementioned budgetary concerns and include ideas that have the potential to improve the relationship with the municipality and should improve the delivery of services to the communities.

On the whole the firefighters appear to be open to change and agree on the need to work more cooperatively with each other. They do have some fears, but those are generally in line with not being in control of an evolving process of municipal consolidation.

Although there is an expressed desire for improvement, that is not to say that everything will be completely smooth moving forward. There are signs that there is the need for some strong central direction and support, and there is the also the need to ensure that past service level gains are not lost. There is also the need for effective and sensitive handling of stakeholder concerns. concerns.

THE PROCESS

In order to solicit feedback from the fire chiefs, a user-friendly Responsible-Accountable-Communicate-Inform (RACI) questionnaire was distributed. This questionnaire included most if not all areas that accompany managing and operating a fire/rescue service. The objective was to obtain an initial snapshot of what the chief officers perceived as their responsibilities, and what they were actually doing in terms of best practices from a management perspective.

At the same time a Strengths-Weaknesses-Opportunities-Threats (SWOT) exercise was initiated with the fire chefs. This was an opportunity for them to express their vision for a future fire service in the consolidated municipality.

All four W/WH fire departments were issued a workbook to collect various critical data related to this study. The requested information covered a number of service delivery areas.

CHALLENGES

A review of existing and future fire services, such as this study, is very heavily dependent upon data. Data is required to analyze, as well as report, key elements of an organization's performance, challenges, and successes as well as the community's risks and demands for

services. Data quality is essential for a "complete picture" and helps to ensure the accuracy of conclusions. The timely availability of data is also important, as study timelines are finite.

Expert analysis of data can lead to insights and recommendations that have the potential to improve service delivery, efficiency, and firefighter safety. It can also contribute, (for the benefit of the municipality, Council and the public) to improved transparency and accountability. Data analysis can identify service gaps and over-servicing; if and where they occur.

In this study, (as with many similar ones); data completeness, the relevance of what has been collected, and even the existence of needed data, has all been challenges. As a result, there will need to be more reliance on best-practices and our professional insights to fill in data deficiencies.

The timeliness for obtaining the existing data was challenging. There are several reasons for this, not the least of which is likely the stresses of managing organizations through these times of change. We cannot thank enough the assistance we have received from municipal staff.

CONSULTATIONS

Consultations with a number of reference sources for best practices in the areas of volunteer recruitment, retention, training, governance and communications, to name some of the areas, as well as in pursuit of verifying matters and interpretive intent relating to legislation were conducted.

Some of the organizations and Agencies consulted were;

- Kennebecasis Valley Regional Fire Department, Kennebecasis Valley, NB
- Town of Sussex, NB Volunteer Fire Service.
- Charlottetown, PEI, Regional Fire Service
- HRM Fire & Emergency Services, Senior Staff
- Town of Wolfville Volunteer Fire Department
- Enfield volunteer Fire Department
- DNR, NS Windsor Office
- Fire Services Association of Nova Scotia Committee Chair, Fire Service Communications and Dispatch.

- NS Emergency Health Services
- NS Fire Service Critical Incident Stress Committee Member
- Office of the Provincial Fire Marshal
- Department of Municipal Affairs Policy Group
- Municipality of East Hants
- Various Regional Fire Services Coordinators from across the province
- Insurance Bureau of Canada, Atlantic
- Workers Compensation Board, Office of Policy
- Volunteer Fireman's Fund Insurance Services
- NS Department of OH&S
- NS E-911 Assistant Manager

All municipal personnel, Windsor//West Hants fire personnel and persons of the above government departments, agencies, volunteer organizations and businesses have in one way or another contributed to this Regional Fire Services Review.

LIABILITY, REGISTRATIONS, SERVICE AGREEMENTS & POLICIES

LIABILITY

A big question for any municipality/fire department/firefighter is their exposure to liability claims. The MGA does provide some protection from litigation related to mutual-aid in §302, and more generally in §300 and §301.

However, the MGA also allows that claims are possible against both the fire department and or the municipality in cases of gross negligence or through vicarious liability (actions of employees/agents/members).

Litigation against municipalities for the actions or omissions of their fire departments and emergency personnel is a real concern. Liability concerns can arise from virtually every aspect of the fire service. Fire service delivery actions that present opportunities for liability risk are those surrounding fire-inspections, fire-investigations, emergency response (e.g. rescue), and all fire suppression activities.

The majority of claims surround the failure on the part of the municipality/fire department to implement appropriate policies, procedures, guidelines, training; and usually start with the failure to act or the alleged actions of firefighters/officers in the execution of their duties. Allegations could include negligence, gross negligence, breach of duty, and generally not meeting the standard of care.

Defending against such law suits requires proving that actions and preparations met the standard of care; i.e. of a similarly situated fire department/municipality/firefighter in a similar situation.

Some Canadian cases demonstrate that liability concerns are real, and appear to be occurring more frequently. Note that not all are emergency response related.

LITIGATION REGARDING FIRE SERVICES

Year	Case	Alleged	Situation
1984	Riverscourt Farms Ltd v. Niagara-on-the-Lake	Negligence, inadequate water supply, failure to attack fire, failure to secure additional water supply in timely manner	Fire at farm, hydrants/water system were not able to provide adequate flows for fire protection, hazards in building
1988	Halabura v. Fraserwood Fire Dept.	Negligence; failure to extinguish previous days wildland fire	Wildland rekindle next day, loss of building
1989	Ennis-Paikin Steel v. City of Hamilton	Negligence; Failure to establish fire watch from previous incident led to later fire	Large Fire after 5-6 hours earlier overheated fan incident
1991	Smith v. Jacklin (Parry Sound)	Breach of duty, failure to enforce Fire Code and By-law; violations directly led leading to injuries to resident when fire occurred	Fire in tenement, enforcement action not taken against owner who was given grace period
1993	Bayus v. Coquitlam	Breach of Duty, outdated maps lead to delayed response	Fire in tenement, firefighters could not find dead-end street
1999	Schouten v. Rideau Township	Negligence (acts and omissions); failure to establish proper size-up and tactics	Feedlot fire, loss of barn and storage silos with feed
2009	Healy et al v. Halifax Regional Municipality et al	negligence, gross negligence; failure to mop-up and establish fire-watch caused rekindle	Large wildland fire, multiple homes lost
2009	Ontario (Ministry of Labour) v. Town of Meaford	Failure to take reasonable measure to ensure safety of firefighters, firefighter injured	Restaurant fire, firefighter became lost, ran out of air
2010	Univar Canada v. City of Kelowna	Negligence and breach of duty, failure to stop the fire from entering building and failure to pre-plan, failure to inspect	Strip mall fire with internal exposures that spread to chemical storage causing environmental cleanup
2011	Schulz v. City of Mississauga	Negligence, breach of duty, bad faith	Fire truck collision, killed driver of car
2013	Promutuel Insurance et al v. Ie-Verte	Negligence; slow to arrive, no pre/emergency plan, improperly equipped, slow to call for assistance	Multi-fatality (32) care-home fire
2016	Stringer v. Town of Oakville	Negligence; fire in roof not extinguished completely	Rekindled house fire,
2017	Robertson et al v. Town of the Pas	Breach of duty and negligence; fire not completely extinguished first time	Rekindle hotel fire, large loss

One aspect of standard of care is the level of service delivery. This involves several aspects, including qualifications of personnel and benchmarks and/or best practices in service delivery. An often referred to set of such standards for both service delivery and qualifications is the National Fire Protection Association's set of consensus standards. The following will help understand the place for these standards in Nova Scotia's fire departments.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

References to NFPA standards will made numerous times in this report. There are no requirements for the general adoption of NFPA firefighting standards in Nova Scotia or indeed in Canada. However, NFPA qualification standards are referenced by the Nova Scotia Fire Marshal's office (NSFMO) and in firefighter standards setting organizations in NS that are supported by the NSFMO.

Numerous NFPA standards are the basis for requirements under several NS regulations, a few examples of which follow, (restricted to references that pertain to fire services);

Required by Legislation	Section	NFPA Std	Reference
NS Reg 52/2013; Workplace Health and Safety	§23.13(2)(a)	NFPA-1901	Aerial apparatus
NS Reg 52/2013; Workplace Health and Safety	§23.13(2)(b)	NFPA-1911	Aerial apparatus
NS Reg 44/99; Occupational Safety General Regulations	§191	NFPA-1971	Firefighter helmets
NS Reg 44/99; Occupational Safety General Regulations	§192	NFPA-1971	Firefighter boots
NS Reg 44/99; Occupational Safety General Regulations	§193	NFPA-1971	Firefighter gloves
NS Reg 44/99; Occupational Safety General Regulations	§194	NFPA-1971	Firefighter protective coat and trousers
NS Reg 44/99; Occupational Safety General Regulations	§195(1)	NFPA-1981	Firefighter SCBA (respiratory protective equipment
NS Reg 44/99; Occupational Safety General Regulations	§195(1)	NFPA-1981	Firefighter hood (balaclava)
NS Reg 44/99; Occupational Safety General Regulations	§195(2)	NFPA-1981	Firefighter buddy system
NS Reg 44/99; Occupational Safety General Regulations	§195(3)	NFPA-1982	Firefighter PASS (man-down alarm)
NS Reg 44/99; Occupational Safety General Regulations	§198	NFPA-1983	Firefighter body harness, ropes, hardware
NS Reg 44/99; Occupational Safety General Regulations	§200	NFPA-1931	Ground ladder purchasing
NS Reg 44/99; Occupational Safety General Regulations	§200	NFPA-1932	Ground ladder maintenance and inspection
NS Reg 44/99; Occupational Safety General Regulations	§201	NFPA-1914	Testing of aerial ladder devices
NS Reg 38/97; Nova Scotia Building Code	Numerous	Numerous	Apply to fire safety systems
NS Reg 160/96; Automatic Sprinkler System Maintenance	§4	NFPA-25	Inspection testing and maintenance of water-based sprinkler system
National Fire Code (adopted by the Fire Safety Act)	Numerous	Numerous	Apply to fire safety systems

The NFPA is a USA based organization[1] that has been involved with fire safety for a long time. It has international participation in establishing its standards. According to its webpage; [2]

> "The National Fire Protection Association (NFPA) is a global self-funded nonprofit {sic} organization, established in 1896, devoted to eliminating death, injury, property and economic loss due to fire, electrical and related hazards.

[1] The National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts, USA 02169-7471.

[2] https://www.nfpa.org/overview

> NFPA delivers information and knowledge through more than 300 consensus codes and standards, research, training, education, outreach and advocacy; and by partnering with others who share an interest in furthering our mission. Our mission is to help save lives and reduce loss with information, knowledge and passion."

NFPA develops consensus[3] standards and codes[4] in the field of fire safety, which includes most notably building and occupant fire safety codes that are widely adopted in the USA. In Canada, NFPA fire protection standards are also widely adopted for fire prevention and firefighter equipment purposes, often incorporated into building codes and fire codes, and into provincial regulation.

NFPA also develops standards on qualifications and processes for the provision of municipal firefighting services. In Nova Scotia, NFPA standards relating to municipal firefighting are sometimes recognized as guidelines (not necessarily as standards) and only for specific and generally narrow purposes. This is typical for all of Canada.

The Nova Scotia Fire Services Professional Qualifications Board (NSFSPQB) produces voluntary certification standards, and some of the NFPA standards are specified as part of an individual's voluntary certification process. This usage of the NFPA standards is not an adoption per se of the standards, but more properly falls under the adage of "why reinvent the wheel" and a further recognition of a consensus process of the standard's development; i.e. a best practice.

[3] "Important Notices and Disclaimers Concerning NFPA Documents…" colophon page of NFPA-1001, 2013 edition, "NFPA® codes, standards, … are developed through a consensus standards development process approved by the American National Standards Institute. This process brings together volunteers representing varied viewpoints and interests to achieve consensus on fire and other safety issues. While the NFPA administers the process and establishes rules to promote fairness in the development of consensus, it does not independently test, evaluate, or verify the accuracy of any information or the soundness of any judgments contained in NFPA Documents."

Note: To See more on the *NFPA* process; https://www.nfpa.org/Codes-and-Standards/Standards-development-process/How-the-process-works

[4] List of available *NFPA* codes and standards; https://www.nfpa.org/Codes-and-Standards/All-Codes-and-Standards/List-of-Codes-and-Standards

SOCIETY REGISTRATIONS

As reviewed in the **Appendix IV; Provincial Legislation**, the *Municipal Government Act* (MGA) Part X contains the provisions for "*Fire and Emergency Services.*" §293 allows the Municipality to:

> "Maintain and provide fire and emergency services by providing the service, **assisting others to provide the service**, working with others to provide the service or a combination of means, *1998, c, 18, s. 293"* {emphasis added}

The MGA provides for a corporate body (society fire department) to register as a fire department under the provisions of §294. Essentially, the municipality does not have the right to refuse registration, provided the fire department meets the municipality's conditions.

In consultation with the Provincial Department of Municipal Affairs, Policy Office and the Office of the Fire Marshal, it is highly recommended that in addition to the registration of the corporate body, that a service agreement between the corporate body and the municipality be established to clarify and agree to expectations of service provision.

Currently, all of the corporate bodies (fire departments) that provide fire and emergency services in West Hants are registered with the municipality. This includes the Brooklyn Volunteer Fire Department (two stations), the Summerville and District Volunteer Fire Department, the Uniacke and District Volunteer Fire Department, and the Walton Shore (volunteer) Fire Department.

Hantsport is a fully municipal service (two stations) and is not registered with West Hants. The Windsor Fire Department is not a registered Fire Department with West Hants or with Windsor.

GA recommends that when the new regional municipality officially comes into being April 1, 2020, that all the fire departments, municipal[5] or otherwise, providing fire and rescue services

[5] The MGA §294(3) says "(3) A fire department, including a fire department of a municipality, village or fire protection district, shall register in each municipality in which it provides emergency services."

This is echoed in the MGA Fire and Emergency Services Guide (1999) which says "Every fire department must register in every municipality in which it provides emergency services on a regular basis. This provision covers all volunteer fire departments as well as fire departments of municipalities, villages and fire commissions such as rural fire districts." {emphasis added}

within the region, including those that are contracted by the municipality, register with the new municipality on an annual basis.

GA recommends that the municipality include a multi-lateral automatic aid provision in their service agreement with each of the society fire departments. This provision will simplify utilizing the closest, appropriate, and adequate resources to incidents in all of the geographic area of the Region, irrespective of registered protection area (aka fire districts). This will accomplish a number of things;

- Permit the development of Region-wide Run-Cards designating pre-planned resource deployment for identified risks,
- Recognition that the services provided are not just within their first response districts,
- Authority to provide appropriate resources wherever needed in accordance with the mantra of the closest appropriate resources,
- Reinforce and facilitate the principal of resource dispatching and not just station dispatching,
- Generate closer working ties between departments,
- Help ensure that standardized guidelines and operating procedures prevail in the Region,
- Assist with better statistics in that multiple resource allocations are not mutual-aid and can be coded for their actual nature.

GA recommends that a review of the current registration form used by the Municipality of West Hants be used as the base registration document, and that it be amended to reflect the new regional municipality and its needs.

Attached as **Appendix 1** to this report is a Model Fire Service Registration Policy Document, provided by the NS Joint Municipal Fire Services Committee. This document may aid in the development of a new registration policy and format.

FIRE SERVICE AGREEMENTS

Municipality of the County of Kings and the Municipality of West Hants

Currently, the Municipality of West Hants, provides fire services to the Hantsborder, Bishopville, Lockhartville, West Brooklyn, Avonport, and Black River Lake communities and to the Glooscap First Nations reserve located within the boundaries of the Municipality of the County of Kings. The signed fire service agreement between the Municipality of the County of Kings expires March 31, 2020

Concerns with Municipality of the County of Kings Fire Services Agreement

In the Municipality of the County of Kings and the Municipality of West Hants Fire Services agreement, Section 3 outlines a number of obligations on West Hants/Hantsport Fire Department. There are two specific clauses and one fire district that are of particular concern.

> *"3.c. Conduct and sponsor research into the cause of fires and methods of preventing fire losses;"*

There is no clarifying editorial explaining the intent or the meaning of this clause. On face value this is a very huge undertaking complete with a very heavy financial burden especially for any fire service not alone a small volunteer fire service.

Multimillion-dollar organizations, like the National Research Council of Canada, Factory Mutual and Warnock Hersey are primary fire research organizations that provide the type of research indicated in clause 3c of the agreement.

GA recommends the Kings County registration, clause 3.c. be edited for clarity. If the intention here is simply to require fires to be investigated then that should be stated clearly.

The next clause of concern is as follows;

> *"3.d. Endeavor to educate and instruct the citizens in methods of fire prevention and fire 'suppression';"*

GA recommends that in the Kings County registration; either a) replace the term "*fire suppression*" with "*fire extinguisher training*" or b) delete the reference to "*fire suppression.*" Again, without clarity it is challenging to understand the meaning or intent of the term "*fire suppression*".

One must ask why would any fire service educate non-fire service citizens in fire suppression. If the intent is to teach citizens how to use a fire extinguisher, then that is typically part of fire prevention (fire-safety education) activities.

Another clause that should be reviewed and edited is;

> *"7 c. Review and amend, as required to make consistent with this agreement, the Hantsport Fire Department's by-laws and regulations."*

GA recommends in the Kings County registration, one of two options; a) delete cause 7.c. or b) reword the clause to reflect the following;

"The municipality and the Hantsport fire station will endeavour to amend its operating procedures and guidelines to meet the objectives of the Regional Municipality of Windsor -West Hants and Municipality of the County of Kings Fire service agreement"

Whereas the Hantsport fire department is now a municipal department of the Municipality of West Hants and no longer a society, one must ask what the probative value is of this clause.

Also in the agreement, there is a definitions section that defines "Fire District"

> *"f. "Fire District" means the area which the Fire and Emergency Services will be provided, consistent with the Hantsport Fire Department Registrations with Kings and West Hants pursuant to Section 294 (4) of the Act;"*

There is an area within Kings County (Duck Pond Road/Black River Lake) that originally was serviced by the Greenwich Volunteer Fire Department. However, this area is not accessible by road from Kings County, so the Duck Pond Road area which consists of dirt, likely seasonal, roads and cottage like development is currently the responsibility of the Hantsport fire department.

In reviewing the Hantsport Fire Department Fire Services Registration with the County of Kings, the Duck Pond Road/Black River Lake area is not referenced in their Registration, however, Kings County does show this area as Hantsport fire department protected on their county road map.

GA recommends that Duck Pond Road area of Kings County, as indicated on the map noted as Schedule 'A' of the Kings County agreement, be serviced by Southwest Hants. The Southwest Hants fire station is the closest station and the Duck Pond Road will fall within their recommended fire response district.

Glooscap First Nations

Glooscap First Nations provides an annual fee for fire service delivery in the amount of $7,065 (2019). This service fee has only increased by $1.00 over the past four years. Unfortunately, no fire service agreement was provided for review. Whereas it is apparent that there is a contractual arrangement, probably unwritten.

GA recommends that the arrangement with Glooscap FN be formalized through a service agreement between the two entities to establish the fire service programs and service levels that will be provided by W/WH.

The Municipality of East Hants Contracted Fire Services

To provide coverage for the extreme boundary areas of the municipality, West Hants receives fire services in its north-westerly boundary area from Walton Shores (volunteer) Fire Department and in the east from the Uniacke and District Volunteer Fire Department. There are currently no fire service agreements in place for either coverage area. The provision for the contract services are solely reliant on the required annual fire department registrations as outlined in Chapter X section 294 of the MGA.

GA recommends that a formal service agreement be established with the Walton Shore Volunteer Fire Department that specifies the services and service levels and other expectations that the Regional municipality has. As noted in the section on ***Fire District Revisions*** starting on

page **191**, the continued receipt of services from Uniacke and District Volunteer Fire Department is not recommended.

Municipality of East Hants and the Brooklyn Volunteer Fire Dept.

The Brooklyn Fire Department Society is a registered body with the Municipality of East Hants for the provisions of Fire and Emergency Services to the South Rawdon area of the Municipality of East Hants. There is no additional Fire Service agreement between the two parties. The service is provided solely based upon the fact that Brooklyn is a party to the Mutual-aid agreement between the Municipality of East Hants and the East Hants Fire Services Association. The last fully executed mutual-aid agreement that was provided for inclusion in this Review was dated 2012.

The Brooklyn Fire Department receives funding for those services from the Municipality of East Hants for the designated response area of East Hants, based upon an area assessment and area fire rate. For the three years between 2017 and 2019 East Hants paid $143,768 for these services.

Beneficial Ownership Agreement

The Municipality of West Hants signed with the Summerville and District Volunteer Fire Department a Beneficial Ownership Agreement dated April 30, 2019 outlining apparatus ownership in the event Summerville and District volunteer fire department ceases to provide fire and/or other emergency services, or on the sale of assets that the municipality has contributed funds for.

MUTUAL-AID AGREEMENTS

The Municipal Government Act §302 provides the municipality the authority to enter into Mutual-aid Agreements.

Mutual-aid agreements are important because they set out the expectations of each party to the agreement, and also provides some liability protection. See **The Municipal Government Act** section starting on page **328** in **Appendix IV**.

These expectations should include the type and standard of service that will be exchanged, or any limitations thereto. The agreement should set out who has the authority to request or to provide the aid. It should set out any cost recovery expectations. It should set out any conditions under which the aid may be reasonably refused. It may also set out certain rules related to chain of command and responsibility at the incident, personnel safety, and other stipulations similar to operating guidelines, and so forth.

Although the MGA is not explicit in requiring a mutual-aid agreement, the gist of this section of the MGA is the protections that come with a mutual-aid agreement. Specifically the protections from liability.

Municipality of West Hants.

The current Mutual-aid Agreement in effect with the Municipality of West Hants includes the following West Hants departments; Summerville, Brooklyn and its substation station located in Garlands Crossing, Hantsport and its substation located in Vaughan. In addition, the two East Hants departments that provide service to the municipality of West Hants, Walton Shores and Mount Uniacke and District volunteer fire department are signatories to the agreement and the Town of Windsor fire department signed onto the mutual-aid agreement, February 28, 2019.

The mutual-aid agreement is a standard mutual-aid agreement used throughout the Annapolis valley.

One section of the West Hants mutual-aid agreement, or any mutual-aid agreement the municipality is a signatory to, that should be reviewed is exemplified by §6 *"Mutual Assistance Reciprocal"* of the agreement. Which is dated 28 February 2019. This clause states

> *"All Fire Departments hereto agree that mutual assistance at emergency scene is reciprocal and that no demand will be made by any Fire Department for monetary reward".*

This clause is fairly clear that a mutual-aid department cannot levy against the department receiving the aid any charges that would be interpreted as monetary reward.

What is missing in this agreement is a reciprocal clause that affords a participating Fire Department the ability to charge for reasonable consumables. It is not uncommon for mutual-aid agreements to have a clause that reimbursing assisting fire departments for fuel consumed at scene, any consumables (e.g. firefighting foam used), and if required sustenance and accommodation for fire personnel at scene.

GA recommends that a consumables cost recovery clause be developed and considered for inclusion in any mutual-aid agreement.

Impact of Consolidation on current West Hants Mutual-Aid agreement.

If Council selects the integrated municipal fire department (i.e. Model 2), there will not be a requirement for mutual-aid or auto-aid agreements between the six regional fire stations or with the municipality. The reason for this is that the fire services under that model will operate as a single fire department within the region.

GA recommends that any model the Council chooses that maintains the existence of individual incorporated fire departments (i.e. Status Quo model-1 or Hybrid model-3) should have a multi-lateral mutual-aid agreement in place between the municipality and each fire department, as well as with all other municipalities that the fire department might provide assistance to if they are to enjoy all the protections provided under §302 of the MGA. This would likely include Kings County, The Municipal District of East Hants, the District of Chester (Lunenburg County), and Halifax Regional Municipality.

GA recommends that the East Hants fire departments of Walton Shores and Uniacke should execute a Mutual-aid Agreement with the Regional Municipality. By virtue of being a Regional Municipality and employing a Regional fire service model if so chosen, the municipality will be signing mutual-aid agreements with other parties on behalf of all of the Regional fire stations.

East Hants Fire Services Association and Brooklyn Volunteer Fire Department

The Brooklyn Volunteer Fire department is party to the Mutual-aid Agreement between the Municipality of East Hants and the East Hants Fire Services Association. There were several Agreements provided. However, none of the agreements provided had complete sign off by all parties named in the agreement other than the 2012 agreement.

Hantsport and Kings County

The Hantsport Fire Department is a signatory to the Municipality of the County of Kings mutual-aid agreement. The agreement is a standard mutual-aid agreement and basically mirrors other agreements mentioned in this report.

GA recommends that the Kings County mutual-aid agreement should be reviewed and updated with any required amendments since the last update for this agreement is from 2001, and include execution by W/WH.

Southwest and Lunenburg County

GA recommends that the new Regional municipality enter into a mutual-aid agreement with the Municipality of the District of Chester (MDC) in Lunenburg County and the New Ross and Chester Volunteer Fire Departments. MDC shares a border with the Region and with the fire districts of the New Ross Fire Department and the Chester Fire Department.

Mutual-aid Summary

GA recommends that all mutual-aid agreements be signed by the municipalities involved, not only by the individual fire departments. The mutual-aid agreements currently in force are standard across the region. The main difference is who are the signatories to the agreements.

Whereas the municipality has ownership of the majority of the capital investment of the regional fire services then the municipality has significant responsibility in providing mutual-aid services. Whereas there will be a new regional municipality commencing April 2020 all the mutual-aid agreements will require amending to reflect the new regional municipality.

FIRE DEPARTMENT OPERATING POLICES AND PROCEDURES

The Review requested a review of policies and guidelines of the municipalities and the various fire departments to identify any gaps in relation to legislative requirements, and inconsistencies between the fire departments.

As a result of a lack of information provided by some departments, a complete and thorough review of policies and operating guidelines including all departments was not possible.

However, the review that was conducted, and did reveal non standardized practices in the selection of volunteers, promotion processes, rank structure and qualifications, membership classifications and policies in dealing with honorariums across the region.

The limited review on operational procedures and policies is augmented by comments made by stakeholders during the many stakeholder meetings. Comments made during those sessions strongly confirm our understanding of inconsistencies in some operating procedures and guidelines amongst the various fire departments. Review of promotional procedures and recruitment practices as well as areas of operations and human resource management are varied across the region's fire stations.

GA recommends that regardless of the organizational model chosen by council, that a review and standardization of all policies, procedures, and guidelines of all types, that apply to the fire departments is undertaken quickly. The goal should be to produce consistency and fairness, and to meet the best practices of a collaborative fire and emergency service delivery program for the Region.

West Hants Policy COGE-007.00

The above refenced policy was approved by Municipal Council October 09, 2018. The policy (COGE007) is a well thought out document and attempts consistency in service delivery across the region by the individual service providers.

There are a couple of areas that require review and amending, one in particular, may pose a risk to not only the department providing the service but the municipality itself.

Schedule 4 of COGE007, addresses the duties and responsibilities of the "*Custodial Fire Support Position*" under role expectations. Sentence 4 states;

> *"Respond to emergency calls by being qualified to drive and operate equipment and apparatus and acting as Incident Commander at emergency sites until a senior officer relieves them of duty."*

Sentence 6 states;

> *"Willing to work with all members of the Fire Department including training with and providing assistance to training staff."*

Individual fire departments have policies that determine qualifications for individuals, particularly officers, in order for them to be able to perform in an incident command role. The reasons for requiring such qualifications are sound and necessary. The role of the incident commander carries much responsibility and liability.

Policy COGE007 provides for an individual who does not even have to be a firefighter to perform in an Incident Command role. Further, there is no mandatory requirement for the individual in this position to participate in firefighter training. The policy suggests they "*be willing to train with*" but there are no stipulated requirements on what subjects or skills to be trained in. This equates to having a passerby run the emergency scene until such time a senior officer arrives on scene.

In the policy, there is no definition for "*Senior Officer*." The senior officer term in many organizations refers to only those that have the word "chief" in their rank title, others define it as an officer position higher than an individual's current rank within the organization. However, it must be assumed that the term in this clause refers to anyone who is a firefighter.

It is understood that in one station the custodian is a volunteer Deputy Chief of that station, so at that location the issue does not exist. However, in another station, the custodian is not even a firefighter, yet under this policy they could be the Incident Commander.

GA recommends that policy COGE007 be amended to more appropriately place responsibilities on station custodial staff. Sentence 4 of the policy has the potential to place a number of people and organizations at risk, not to mention the responders themselves.

Fire Related Bylaws

A review of the following Municipal Fire related bylaws was conducted.

Town of Windsor:

Bylaw 18, March 05, 1997, Prevention of Fire Bylaw (This is basically a bylaw requiring a permit to burn)

Bylaw 39, December 03, 2010, Outdoor Fires Bylaw.

GA's recommendation of these by-laws are in the next sub-section.

Municipality of West Hants:

False Alarm Bylaw, March 16, 2011, (This Bylaw permits fining property owners who experience multiple false alarms).

Fire Protection Bylaw, September 22, 2004. (This Bylaw is basically an out of doors burning bylaw).

GA recommends that the Windsor and West Hants false alarm, fire protection, burn permit and outdoor fires by-laws be reviewed and harmonized. The Bylaws relating to out of doors burning may need to address differing needs by area due to the rural nature of the Municipality of West Hants vs the very urban nature of Windsor.

West Hants' False Alarm Bylaw is an admirable bylaw in an effort to reduce unnecessary fire responses, especially to those occupancies who have ongoing issues with their fire alarm systems or occupancies whose operating conditions or maintenance lapses manifest into accidental alarms and owners fail to take appropriate measures to address issues causing the unnecessary

alarms and unneeded fire department responses. GA understands that the bylaw has not been enforced.

Unless the Bylaw is enforced there are two scenarios that could lead to negative consequences and possible civil action against the municipality. The first challenge to those occupancies in which fire alarms are not uncommon, responders become complacent and do not respond as per standing operating procedures, and the noncompliant typical standard response causes either a delay in response or a lack of resources responding and upon arrival there is a working structure fire. This could possibly result in a litigation against the fire department and the municipality.

The second scenario is where occupants fail to evacuate the building as they should when the alarm sounds, since they have become acclimatized to alarms sounding as an annoying but otherwise nonconsequential event. In a real fire scenario these residents could be in jeopardy for their lives and the expectations on the fire department will be to rescue them, which may not be feasible and/or could result in injury and death to firefighter and residents.

GA recommends that if the false fire-alarm by-law is not enforced, that the by-law should be repealed.

HUMAN RESOURCES

RECRUITMENT AND RETENTION

Traditional volunteer firefighter recruit sources have changed. The old model of neighbors helping neighbors is all but gone in most places, as many people don't have strong ties to or even know their neighbors anymore. We have always relied on multigenerational families passing down the tradition of joining the local fire department, but that is also becoming a thing of the past. As with many other industries, as the baby boomers retire en masse on the back end, they need to be replaced with young people on the front end.

In sheer number, there aren't enough millennials and iGens to replace the baby boomers, and worse for us, those two younger generations aren't trending toward the fire service. With many young people needing two jobs to survive, plus other obligations, the free time necessary to be part of the emergency sector is a luxury few can afford. In addition, the number of non-profit organizations recruiting the same volunteers is at an all-time high, and frankly, our fire service, as it exists with its current culture, is not an attractive option for younger generations who value flexibility, creativity, and inclusivity.

The ability to attract/recruit and retain volunteer firefighters is in part a demographic challenge. Prospective volunteers must be fit enough and available. Generally, fit means a healthy adult who is not too young nor too old. The aging population means there are fewer younger persons in the community, and current volunteers eventually get too old to withstand the rigours of being a firefighter.

A secondary demographic problem is local employment. Volunteer firefighters with jobs that are distant from their fire station are less likely to remain volunteer firefighters. They are not able to effectively respond to incidents while at work; and they spend more time commuting and therefore have less time available for volunteer firefighting. A volunteer firefighter should expect to contribute between 100 and 300 hours per year in scheduled activities; training, equipment maintenance, fund-raising, meetings, and in going to incidents.

Management of fire departments need to be skilled, understand, and have effective strategies for dealing with the challenges.

Recruitment

There is an inextricable link between recruitment and retention. Often non-profit volunteer managers have a tendency to focus their time and attention on recruitment only to be stuck in a holding pattern of perpetual recruitment in part due to increasing competition among non-profits and everyday life. High turnover rates within a volunteer organization, creates an urgent and ongoing need for new bodies to fill the positions. The time, effort and costs for recruitment can severely impact negatively on service delivery, especially for the volunteer fire service and burnout for those involved with the recruitment process.

Volunteer energy is a natural resource which is a "human-made, renewable/recyclable resource that can be grown." In their conceptualization, if organizations use the volunteer energy responsibly and positively then it will be sustainable but if it is used inappropriately then the volunteer energy risks exhaustion and depletion. When an organization exploits this resource through overuse or neglect there is a high risk of drop-out or burn-out, which not only leads to being in perpetual recruitment mode but also contributes to the depletion of the total pool of volunteer energy.

When people think of volunteer work, they tend to evaluate it in terms of sacrifice and reward. The sacrifice part is easier to understand. Volunteers are using their time, energy and, at times, knowledge for the benefit of the organization and for the most part with little or no monetary compensation.

Understanding why a particular volunteer has chosen to serve can help the volunteer manager use appropriate rewards to encourage the volunteer which will raise their satisfaction level and lead to higher rates of retention.

The sacrifice and rewards involved in a particular volunteer relationship are part of a larger concept central to volunteer management, the contract. The contract is an individual's beliefs regarding the terms and conditions of a reciprocal exchange agreement between the volunteer and the organization. When a volunteer signs on to work with an organization they bring their own individual perspective on what promises, conditions and agreements have been made. Each

party has their own idea and expectation of their reciprocal obligations based on their own intention, interpretation and perception of implicit and explicit messages.

In the context of volunteer relationships, when there are perceived breaches in the contract (which can occur at any stage in the relationship) there can be consequences such as dissatisfaction, lowered level of participation in the organization, or actual withdrawal from the organization. Fulfillment of the contract can occur through organizational efforts to express recognition of the volunteer and show that they value the relationship and care about the well-being of the volunteer.

In one study conducted by Farmer and Fedor (1999),[6] Volunteers who reported their expectations were met, and they perceived organizational support and care was there; they were shown to have increased attendance and intentions to remain. This study found that organizations were perceived to be better at meeting expectations of ongoing support than they are at matching expectations that volunteers had upon entry. However, the study also showed that when volunteers sense the organization cares about their general *well-being,* they are more willing to overlook particular unmet expectations.

How to achieve and meet expectations/needs of both the volunteer and the organization is a time-consuming challenge to any organization. Volunteers bring their own expectations to the organization based upon perceived knowledge, information passed on by current volunteers, who may over sell the position or organization, and in today's world, on social media.

Retention all Starts with Recruitment!

Recruitment should start with a needs assessment of the organization. Each community's demographics are different, especially in rural and smaller urban communities where the population is aging, local manufacturing is closing, and the younger citizens are moving to more urban settings. There is often competition amongst volunteer organizations.

[6] Farmer, S. M., & Fedor, D. B. (1999). Volunteer Participation and Withdrawal: A Psychological Contract Perspective on the Role of Expectations and Organizational Support. Non-profit Management & Leadership, 9 (4), 349-367.

A review of the fire service needs may reveal that there are positions that do not require young, physically fit, gung-ho individuals. Positions such as in public fire-safety education, administration, radio operators, traffic control persons, occupational health and safety opportunities, truck drivers. There may be seniors or retired firefighters who are looking to keep active and are willing to provide some time, a skill set, and experience that can fill a void within the organization.

In today's volunteer services there are two groups of functions that are needed in the delivery of fire and emergency services, line and staff. Line is the most labour intensive and on the front-line of the service delivery. Staff positions are the folks that support the front-line responders.

Traditionally, the majority of volunteer fire services required any and all members of their respective departments to be firefighters. They were then trained in all services offered by the department. This has caused some issues, as not all members wanted to respond to, for examples: medicals incidents, or high angle rope rescue, or possibly water rescue, and etc. Some volunteer firefighters just wanted to fight fires.

The challenges facing the recruitment of volunteers firefighters today requires a change in recruitment practices and a reconsideration of the past the standard requirement of being a firefighter first.

This begs the question, *"Do all volunteer fire department members have to be fire trained"?* The answer is no.

Volunteer fire departments do need the majority of their membership to be fire trained so as to be able to deliver the department's core services; i.e. responding to and rescuing people from danger and extinguishing fires.

Positions for Non-Firefighter Members

What types of functions/positions are required at the scene of a structure fire that are required to be firefighter qualified?

- Firefighters
- Fire Officers

- Fire Incident Safety officer
- Accountability Officer

What are some of the functions/positions that are required at the scene of a structure fire that ***do not*** require being a trained firefighter?

- Apparatus driver/operator
- Air/SCBA support person
- Command Post - radio communicator/scribe
- Firefighter rehabilitation support personnel
- EMS
- Traffic Safety Control
- Logistics

What are some of the other types of emergency services do some fire departments provide that ***do not***require volunteer members to be firefighter trained?

- Water rescue, (Boat enthusiasts, SCUBA Drivers)
- Ice Rescue
- High angle rescue service
- Medical First Responders (MFR)

Additional non-emergency Staff functions in which volunteers do not need to be firefighter trained but could be most beneficial to the fire department.

- Administration, Mgt of Records (data) and reports, budget, inter-government relations)
- Fire Prevention (fire-inspection)
- Fire Prevention (fire-safety educator)
- Fire Prevention (fire-investigator)
- Maintenance of equipment
- Communications
- Research & Planning
- Community Relations/Public Information
- Financial Management
- Personnel Management

Regardless of the function/role of the volunteer, all volunteers will require specific subject/service training, skills, maintenance of skills, and fire department orientation.

The use of non-trained firefighters in non-active firefighter roles will lessen the burden on the firefighting volunteers and help prevent early burnout and the potential of member loss to the organization.

Review Needs

GA recommends that the new fire department administration conduct a human resource needs assessment of the fire service in the Region. The recommendations on active front-line firefighter numbers is contained in **Recommended Front-Line Staffing and** Equipment starting on page **210** of this report, but there are numerous support (staff) positions not identified there.

GA recommends a review of the current recruitment and selection process, including currency with best practices, modifications required to meet the real needs of the organization, compliance with current Human Rights requirements, and alignment with corporate human resource policies.

GA recommends a review of fire department job descriptions, ensuring there is a job description for every position, volunteer or otherwise. Job descriptions should be complete with expectations and rewards. They outline necessary qualifications, time commitments (frequency and length), responsibilities and activities involved, the organization's accountability structure, and the performance evaluation methods.

It is important to match volunteer interests and talents with organizational needs, not only for recruitment purposes but also for long term retention.

Caution in selecting volunteer applicants.

It may be tempting for the fire service to accept any help that is offered; after all the fire service is resource dependent and volunteers could be viewed as free labour. Though seemingly correct, this logic is based on false assumptions and understandings. A volunteer firefighter is not the equivalent of free labour. If the recruitment and retention of volunteer firefighters is to be

effective it will require some expenditure in the areas of orientation, training, promotion, and materials.

At the front end the fire service must pour a lot into the volunteer firefighter candidate in order to bring them to a point where they will be capable and effective. Cost-effectiveness is achieved when a volunteer can exemplify the established level and quality of services offered to the public. When this occurs then the volunteer firefighter acts as an expansion of resources, i.e. is no longer a burden. In order to get to that point, the fire service must first devote time, energy and resources in growing the volunteer firefighter.

Therefore, it will serve the organization well to be selective in choosing volunteers who have the skills and abilities necessary to fulfill the role requirements. The organization must conduct proper vetting in advance in order to uncover any conflicts or contradictions. Valuable resources will be wasted unnecessarily if the organization indiscriminately signs on volunteers and pours resources into them only to find out later that the volunteers are unable or unwilling to fulfill their role. This is a real danger because people experience a euphoric feeling about signing on to do good but at this juncture that feeling is based on a romantic idealism of how things will be and coupled with both a low commitment and sense of loyalty to the service.

In a volunteer service, volunteer firefighters are required in each of its fire districts/communities. Some districts are in need of volunteers more than others. Some of the reasons are demographics. There is a current practice of volunteers living in one fire district and yet belonging to a different fire district, thus depleting a potential resource to the district in which they reside. Anecdotally, there are reports of some volunteers that respond from their home in one district, through other fire districts, so as to attend an incident in the fire station district that they have chosen (and been accepted) to be a member of.

GA recommends that membership in a fire department be restricted to those volunteer firefighters who actual reside in the fire district. Moving forward, the current practice of selectively choosing the fire department you prefer should no longer be permitted. As this practice robs the community of which a volunteer resides of a valuable resource. It also increases

the risk of an accident as the volunteer rushes longer than necessary distances to attend the fire station when the pager goes off.

With a properly constructed recruitment policy in place and followed, the end result will be a contract between the volunteer and the fire service that meets the needs of both.

Recruitment Process.

GA recommends that volunteer firefighter recruitment be a region-wide program for the regional fire service and that successful applicants be assigned to a regional station, based upon the closest station (i.e. fire district) to their residence.

GA recommends that the recruitment process commence with a properly designed marketing program throughout the region. This coordinated approach to recruiting will help to ensure standards are met and will ease the burden on individual stations. Turnover in volunteer fire departments is typically as much as 20% annually, but GA does not have the actual figures for WWH. It is likely that there is a need for an annual recruitment process, managed regionally with direct input and assistance from each of the stations.

See Appendix V, **; Model; Volunteer Recruitment and Selection** Process starting on page **346** of this report.

Retention

Retention is a difficult management task, with challenges requiring a continuous effort on behalf of management. Officers and managers in each station must have the requisite human resource and soft skills, leadership training, and acumen (emotional intelligence) to be able to manage and address the complex nature of not only the current volunteers but newer younger volunteers who reside and live within a world environment that may be foreign to the individual officers and the organization as a whole. Station leadership is crucial in managing retention.

Retention is the maintenance phase of the volunteer/organization relationship. This phase focuses on communication, individualized feedback, and the need to provide recognition and appreciation for volunteer efforts. A simple coffee card or a department t-shirt for performance

little above and beyond expectations can go a long way. As the old saying goes, “little hinges swing big doors”.

People often volunteer for differing reasons. Some believe that they possess certain skills and traits that the organization can take value from. For others it’s the desire to help others, and for others it is simply a desire to have an affiliation with a social entity.

Volunteers often tend to stay because of the rewards experienced such as opportunities for socializing and enjoyment of the tasks with which they are assigned. In other words, for personal reasons.

If the station’s District Fire Chief or other officer recognizes a volunteer’s lack of engagement there are a couple of paths to assist in the retention of the volunteer who is a valuable asset to the organization. It is vital that the reasons for the loss of engagement is diagnosed, if it is possibly medical or related to family or work stresses, then the appropriate course of action is to seek appropriate care.

Sometimes it is necessary to, if possible, redefine their role or provide opportunities that meet their motivational change and still meet the needs of the organization. Sometimes it’s to permit a restorative break, (leave of absence), so that the volunteer can deal with his/her issues.

It is important during the restorative break; the manager should stay in contact and check-in on them during their away time. This will allow for easier re-entry and will send the message that the organization cares about the volunteer as a person and not just because of what they do for the organization. This is an important distinction in being able to protect volunteer energy and keep it as a renewable, sustainable resource. This should be done even if there is no guarantee that the volunteer will return.

The Critical Role of the volunteer Fire Chief

Potential volunteers have many choices as to where to spend their time. Time is valuable and limited, and how fire chief uses a volunteer’s time in the fire department is key to retaining active volunteers.

Capable volunteer fire chiefs know how to focus volunteer firefighters' time and energy on activities that have the greatest impact on the department's mission, its service to the community, and the life safety of its members and citizens. Much of this comes down to understanding the volunteer chiefs' role and how they can use their skills to support their members.

The Volunteer Fire Chief's Responsibilities

Today's volunteer fire chief has one foot in the organization and one foot in the community. Chiefs must work to expand the quality and quantity of services to the citizens by integrating the community with fire department staff. Chiefs initiate projects and ideas with the support of volunteers, but must realize their ideas are likely to succeed only when the volunteers actually buy in. Volunteer chiefs have several additional responsibilities:

- Clarify volunteer-related issues in order to reduce confusion and resolve conflict.
- Document the various ways the volunteers impact the quality of life in their community, telling their stories when necessary.
- Think about new ways to do the things that the fire service does and why they do what they do.
- Coach volunteers by providing training, guiding and counseling.

A volunteer fire chief's general role and responsibilities have more to do with people skills than with emergency response roles. The chief must serve as a leader, manager, coordinator, enabler, change agent, capacity-builder, role model, human resource manager, facilitator, volunteer advocate, visionary and planner. A District Fire Chief who is an excellent emergency leader may be a poor choice as a personnel manager. Personnel management is the key role that will make or break the retention of volunteer firefighters.

Increasingly, advanced skills will be required of fire chiefs, whether paid or not. Chiefs should create a professional development plan and make the time to develop their own leadership and management skills.

GA recommends that the Regional Municipality invest in developing the leadership and management skills in the officers of all fire departments in the Region, as appropriate to their respective roles.

Valuing Volunteers

The most significant asset in any volunteer fire department organization, is the volunteers themselves. Stations, equipment and apparatus are indeed valuable, but really serve no purpose without competent staff to operate them.

Fire chiefs who manage volunteers must ensure that a motivational climate within the fire department creates a friendly and healthy environment. General praise is critical to team success. Chiefs must realize that they are a cheerleader for the department and the volunteers by maintaining their own enthusiasm for the efforts of volunteers.

Further, chiefs should look for additional talent and skills that volunteer members bring to the department that can help build a successful organization, as well as deliver quality services that meet expectations.

Contributing, satisfied, and well-managed volunteer firefighters will remain active longer. A successful fire chief will allow more people to be engaged in managing the organization. Volunteers will want to make contributions if leadership will allow it. A good organization has leaders at all levels in the organization.

Reasons most often heard why volunteers quit: It's not fun, I'm not appreciated, it's a waste of time, there were unrealistic expectations, there was too much organizational drama, people were resistant to my ideas, and I do not feel important. These are more than likely the symptoms of a larger problem within the department related to a lack of leadership.

Everyone has value. There are different levels of value based upon personality, attitude and activity level. Effective leaders make volunteers feel that they are high-priority, valued members, and show respect for their individuality.

Never take volunteers for granted. Managing volunteers is a REAL job. It is not about being compensated; it is about the personal determination to accept the duties and responsibilities – and do the job. Compensation (or lack of) is not an excuse for success or failure.

Volunteer retention studies and information received from GA's station tours and meetings with the regional volunteers highlight a number of key expectations of the volunteer. All stated financial gain was not the reason for becoming a volunteer. However, in a regional setting they all expect the region to provide the following.

- Their wellbeing looked after
- Inclusiveness
- Open two-way communications, they too have things to contribute
- Fair and equitable treatment across the Region
- Recognize and value the volunteer's knowledge, skills and time

Points to Consider in volunteer valuation

- Most firefighters said a simple "thank you" from superiors would motivate them.
- Celebrate department successes.
- Recognition can be as small as a social media post.
- Officers need improved people skills.
- Research and implement recognition and benefit practices that are personalized to your department and are scalable.
- Evaluate the effectiveness of the practices you implement.
- Include your members' families in recognitions.
- Focus on both tangible and intangible benefits.
- Recognize administrative members for their contributions, not just firefighters.
- Make sure recognition not only comes from the top but also from peers.

Recruiting and Retention Summary

The objectives of volunteer recruitment and retention are inextricably linked. A volunteer manager must consider the reciprocal impact of the one on the other in order to successfully build and maintain a volunteer work force. Volunteers have a complex and an innumerable assortment of motivations and expectations that can cause difficulties in facilitating long term commitments. The most important activity a volunteer manager can attend to in attempting to retain volunteers is building relationships. The relationships built should be between the

volunteer and the volunteer manager as well as between the volunteer and the volunteer community. An individual who feels genuinely cared for and has a strong sense of belonging is willing to overlook other unmet expectations and will demonstrate higher levels of commitment and loyalty.

Current Retention Program

Currently, across the Region there are differences amongst the various stations as to how they recruit, and provide for the wellbeing and recognition of their volunteers. In some cases we were told, areas of difference were dependent upon the financial resources of the individual station. Volunteers compare, and are aware of differences, which was expressed as dissatisfaction. In one case another station was disparaged for spending money on annual banquets, and a few minutes later it was asked why they themselves don't have the funds to do it. The risk here is that unequal treatment can lead to the perception that some are less appreciated by the organization.

Currently there are some stations covered by worker's compensation benefits (WCB), while others are not. Those stations that are not covered by WCB pay for accident and sickness insurance coverage for their personnel. WCB can cover the volunteer firefighter when their fire department responds to an emergency incident either within their community or on mutual-aid as a result of a request by another department.

Mutual aid causes issues when one department has WCB coverage and another does not. It is possible to have covered and non-covered volunteer firefighters working side by side; one firefighter with protection and one without. The practice of firefighters belonging to more than one station, so called "mutual-aid firefighters," gets complicated when one of the stations they belong to has coverage and the other does not.

However, in mid-October, 2019, the Nova Scotia Provincial Government announced changes were forthcoming to legislation that will require all municipalities in the province to register their volunteer firefighters with WCB and pay for the coverage. This will eliminate the issue previously reported. However, the regulations are not expected to come in force until late 2020.

GA recommends that the Regional municipality register their volunteer firefighters with WCB before the eventual requirement for such registration occurs. Such registration will address the issues of concern mentioned above sooner.

All of the fire departments currently subscribe to some level of coverage by VFIS[7] insurance, with the lowest coverage of $50,000 and the highest at $250,000 principal amount. The Windsor and Hantsport/South West firefighters are currently covered under WCB and have access to EAP. All others do not.

With municipal WCB coverage, the volunteers are covered by the provincial Presumptive Cancer regulations[8]. However, those stations that do not have WCB coverage do not have access to the benefits of this coverage.

Individual departments provide their membership with an annual Banquets and awards program. Some are individual station and some are combined station banquets.

Typically, volunteers are issued some form of a uniform at no cost and are exempt from paying provincial vehicle registration for their personal vehicle.

Each station provides for annual Honorariums. Again, there is no uniformity across the region. This particular issue causes organizational stressors. Some stations issues T4s as required by federal CRA rules with others pay honorariums by cash and do not issue the required T4s. This last method of payment does not provide for transparency, is in violation of CRA rules and prevents the volunteer from accessing tax credits both federally and provincially. During GA's stakeholder interviews it was discovered that many of the volunteer firefighters were not well informed on CRA exemptions and reporting limits and deductions.

Retention Program Recommendations

As with any organization, it is often a challenge to develop a program that will meet the need and desires of all participants. However, if there is a standard program paid for by the municipality

[7] See **Appendix VI**, starting on page **351** for details of all recommended VFIS coverage plans.

[8] Firefighters' Compensation Regulations, N.S. Reg. 140/2003

and is seen as being fair and equitable across the region it will go a long way to minimize any negativity and will enhance the relationship between the various stations across the region.

GA recommends the following recruitment and retention initiatives be implemented as part of a Region-wide program aimed at volunteer firefighter retention and in recognition of the special needs of volunteer firefighters;

- The Regional Municipality Fire Service develop a volunteer retention policy and program, that includes providing managers and officers with the appropriate skills to lead and manage the volunteer firefighters. There are resources[9] available to assist with developing such a program.
- The Regional Municipality provide the following wellbeing coverages for all fire department members;
    - WCB coverage at the maximum coverage rate
    - VFIS[10] programs; on-duty Accident and Sickness (AD&D) at $200,000 principal amount and $300/$700 weekly payment; off-duty AD&D coverage for the member and family as a co-pay program; Member and Family Assistance Program (MFAP),
    - Group life insurance coverage at the principal amount of $100,000
    - Liability insurance for errors and omissions associated with on-duty activities
- The Regional Municipality provide for an annual awards banquets
- The Regional Municipality manage and administer a Regional Fire Service Honorarium program
- All Honourariums be issued by Municipal cheques addressed to each recipient
- All Honourarium recipients be issued CRA T4s as required by legislation and CRA policy.

Recruitment and Retention Conclusion

Recruitment and retention are a business the fire service needs to corner the market on volunteer availability. The business needs to promote programs that will invigorate and inspire community minded citizens to not only become a part of, but feel needed and appreciated. Programs of recognition and programs that enhance individual self-satisfaction are important to assist in the retention of volunteers. Recruitment and retention are continuous year-long endeavors.

[9] Consider; Recruitment and Retention Guide released in 2009, by the Office of the Fire Marshal and the Fire Service Association of Nova Scotia; Recruitment and Retention Toolkit by the Office of the Fire Marshal, NWT, 2014.

[10] Reference details of these program coverages at **Appendix VI** starting on page **351** of this report.

HONOURARIUM

Intent of the Volunteer Honoraria

The client's request for proposal required the consultant to review the current honourarium program in place across the Region. This required; reviewing Canada Revenue Agency's regulations pertaining to Volunteer Renumeration/Honourarium, Provincial Regulations as to the definition of a volunteer firefighter and the many Society related bylaws and departmental programs and procedures as well as other jurisdictions that offer renumeration programs for their volunteers.

One of the issues in reviewing the current situation was the availability of information as to what actually was paid out in previous years. One department did actually provide this information. The combined municipal budget estimate in fiscal year 2019/20 for pay-out to the fire departments for honourariums was $200,100.

A high-level review of the available information for the current situation reveals the following (not all inclusive):

- The rules governing the payments of the departments honourarium are contained within their operational procedures or guidelines.
- Lack of standardization across the region either in funding the program, the eligibility requirements to receive an Honourarium, and who actually qualifies to receive renumeration.
- The review indicated that one department is paying Honourarium bonuses for certain department positions with a rate difference of 56% when compared to another department.
- Over the course of the review, it was learned that one department would pay a bonus based upon the type of fire department vehicle one drives. This included any vehicle from a half ton truck to an aerial apparatus, while others do not.
- Some departments provide non-firefighting volunteers that assist with fund raising for the department an honourarium, although these are minimal amounts.
- Base honourarium rates for a department Fire Chief range from $900 per annum to $5,000 per annum.
- One department pays in cash, with no T4s issued.

Honourarium Expectations

Honorarium is a component of the volunteer firefighters' satisfaction. When speaking with volunteers at the several meetings during this Review, many volunteer firefighters spoke to the fact that "*it is not the money why they volunteer.*" However, they are very aware of the differing honourarium programs between the fire departments across the region. This is a stressor relating to the topic; the volunteers expect the honourarium will recognize value and be fair and equitable region-wide. One of the reported issues is that each station has a different ability to fund the honoraria. Seeing as the majority[11] of honourarium comes from the municipal budget, equity and fairness should be achievable.

Honourarium Definition and Intent.

What actually is the definition of Honourarium? An honourarium is a voluntary payment that is given to a person for services for which fees are not legally or traditionally required. Honoraria are under CRA and provincial rules, and are intended to assist in covering expenses incurred by the individual volunteers during their volunteer activity. Some often refer to it as renumeration.

Renumeration is defined as compensation for work done and includes honourarium, wages, salary and other payments. In other words, not much difference between the term renumeration and honourarium.

The initial intent and objective of honoraria in the volunteer fire service for the volunteer was to cover out of pocket expenses for those individuals who actively participate in an emergency role; i.e. firefighting, rescue, medical, environmental, or in an incident support role. However, over the years it has become a tool to assist with recruitment and retention as well as recognition for the volunteer's time and dedication to the community and is expected as renumeration for individuals volunteering their time.

[11] West Hants policy COGE-007.00 states the following in this regard: "The Municipality shall establish and fund annual honorarium budgets for each Registered Service Provider. The method of distribution of a Registered Service Provider's annual honorarium allotment shall be established by the Registered Service Provider, who may, based on funds from sources other than the Municipality being available to fund it, award an honorarium greater than the total value of the amount awarded by Council.

The *Volunteer Fire and Ground Search and Rescue Services Act* of Nova Scotia, §3(d) defines a volunteer fire fighter as;

> ""volunteer firefighter" means an individual performing services for a volunteer fire department who does not receive in respect of those services
>
> (i)compensation, other than reasonable reimbursement or allowance for expenses actually incurred, or
>
> (ii)money or other thing of value in lieu of compensation in excess of five hundred dollars per year or such other amount as prescribed by the regulations."

Honourariums are for compensating volunteers who meet minimum criteria for out of pocket expenses, nothing more, nothing less. GA's review of the various department's procedures and protocols to determine how much an individual will be entitled to receive for any given fiscal year, some of those policies and procedures do not necessarily comply with the intent of or definition of honourarium as defined by provincial and federal regulations.

Examples:

- A fire department has a travel and meal policy in addition an honourarium policy
- Bonus payment based upon size and type of vehicle being operated by a volunteer.
- Active firefighters in one department can earn extra credits (points) depending on how long the incident is in duration and they remain on scene. The points turn into a dollar value.
- Honourarium bonuses for attendance at certain types of department functions other than those outlined in the regulations.
- Honourariums plus position pay based upon rank

Honourarium Complexities

Given the many differences in roles, positions, duties and responsibilities as well as expectations across the many fire stations, creates many challenges. There are a number of factors that need to be considered in defining and developing a fair and equitable Regional Volunteer Fire Service Honourarium Program that complies with the intent of the CRA and Provincial regulations such as:

- Position Role and Responsibilities
- On Call periods

- In House Training
- Out of Municipality Training
- Fire Department Related Communication meetings (i.e. not Society related)
- Public Events
- Fund Raising
- Committee service
- Use of Personal Vehicle for Emergency response and station activities.
- Part time department employees who also serve as volunteers
- Manageability of the program
- Municipal Affordability.
- Provincial rules
- Federal CRA rules

Municipality of West Hants Honourarium Policy

West Hants Fire and Emergency Services Policy COGE-007-00 establishes the funding of an Honourarium Program for Registered providers. The above policy was approved by Municipal Council October 2018.

Section 19, page 14/15 of the policy address Honourariums and states:

> "An honorarium is a voluntary payment that is given to an Active Volunteer for **services** for which fees are not legally required". (Note: Honourariums for volunteer firefighters by definition and regulations **cannot** be paid for services).
>
> a) The Municipality shall establish and fund annual honorarium budgets for each Registered Service Provider. The method of distribution of a Registered Service Provider's annual honorarium allotment shall be established by the Registered Service Provider, who may, based on funds from sources other than the Municipality being available to fund it, award an honorarium greater than the total value of the amount awarded by Council.
> b) Registered Service Providers agree to comply with all applicable income tax requirements in the distribution of the honorarium to individual personnel."

The policy attempts to recognize fire and emergency services responders for their contribution of time and expenses towards protecting the municipality by establishing a fund and requiring the registered providers to comply with Canadian Revenue Agency requirements for the issuing of T4s.

The policy although admirable, has some short comings. The policy has actually established a means for affluent registered providers to provide a higher honourarium payout then other providers across the municipality. The policy does not establish criteria for honourarium payments, permitting variances in volunteer honourarium payment across the municipality for the same level of commitment.

The policy does not provide direction as to the method of payment nor any procedures for tracking and accounting for monies received and paid out by the registered provider.

Issues pertaining to Honourariums were aired during some of the meetings held with the firefighters across the region as a contentious item.

The Municipality's policy requires an amendment as to the purpose of the honourarium as Honourariums by federal and provincial regulations are for expenses incurred not for services.

Nova Scotia Volunteer Firefighter Tax Credit

The Nova Scotia Department of Finance and Treasury Board provides a five-hundred-dollar provincial Tax credit for eligible volunteer firefighters. To be eligible the individual had to serve a minimum of six months within the taxation year, attended 20% each of all training, emergency calls and meetings. And have **not received** any payments (salary, wages, compensation or anything in lieu of salary) outside of reasonable reimbursements or allowances for expenses, in respect of firefighting or ground search and rescue services.

The department Fire Chief must complete the required forms and submit by January 31 of each year. On the form it asks the question did the volunteer receive any compensation, if the volunteer received any honourarium, then the answer is "YES". In addition, the volunteer firefighter also qualifies for vehicle registration cost exemption.

In Canada, honoraria are considered salary and thus, taxable income under the *Income Tax Act*. In the case where a gift is substituted for honorarium (gift in lieu of money), it is still classified as a taxable benefit by Canada Revenue Agency. These rules must be taken into consideration in creating an honourarium program.

Emergency Services Volunteers - CRA

Under the Income Tax Act, a government, municipality, or public authority may exclude reporting as income up to $1,000 from amounts paid to any of the following individuals:

- volunteer firefighters
- volunteer ambulance technicians
- emergency service volunteers who help in the search or rescue of individuals, or in other emergency situations and disasters

The $1,000 exemption only applies if the amount paid for the duties that the individual performs is a nominal amount compared with what it would have cost in the same circumstances to have the same duties performed by a regular full-time or part-time individual.

The $1,000 exemption does not apply if the individual was employed in the year by the **same** public authority for the same or similar duties (such as a full-time firefighter who, from time to time, acts as a volunteer firefighter or rescue worker for their employer), or a part-time station maintenance person who is also a volunteer firefighters for that same organization.

Individuals who receive a T4 slip may also qualify for the volunteer firefighters' tax credit or the search and rescue volunteers' tax credit. When eligible individuals file their income tax and benefit return, they can choose to either receive an income exemption or claim a tax credit.

Honourarium – Canadian Revenue Agency Rules.

A volunteer fire fighter is eligible (in addition to the provincial tax credit) to claim $3,000 for the volunteer firefighters' amount (VFA) or the search and rescue volunteers' amount (SRVA), but not both, if the volunteer meets all of the following conditions:

- A person was a volunteer firefighter or a search and rescue volunteer during the year.
- They completed at least **200 hours** of eligible volunteer firefighting services or eligible search and rescue volunteer services in the year.

The volunteer firefighter can combine the hours they volunteered for both search and rescue and firefighter activities to claim either the VFA or the SRVA. However, if you were also employed by the same organization, other than as a volunteer, for the same or similar duties, you cannot

include any hours related to that organization in determining if you have met the 200-hour threshold.

Eligible services

Eligible volunteer firefighting services with a fire department include:

- responding to and being on call for firefighting and related emergency calls as a firefighter
- attending meetings held by the fire department
- participating in required training related to preventing or suppressing fires

Pensionable and Insurable Rescue or Volunteer Firefighter Income

The Canada Revenue Agency has rules that specify when income earned from search and rescue or volunteer firefighting organizations is pensionable or insurable. As a general rule, volunteer firefighters are not employees and would not be considered engaged in insurable or pensionable employment. If, however, the volunteer is being paid to perform services, the firefighter would not be considered a volunteer.

Regional Honourarium Program Recommendations

GA recommends that the new Regional Municipality strike a committee of the appropriate fire service and municipal personnel, including finance personnel, to establish a fair, equitable and affordable honourarium program across the region. The program should meet the following points;

1. The objective is to promote an active volunteer program and appropriately recognize the service through the honourarium.
2. The program should be applied to the volunteer firefighters who have reached the Age of Majority for the Province of Nova Scotia, and who are eligible for renumeration.
3. The program should establish participation standards for attendance at training, emergency incidents, and department operational communication meetings (i.e. not Society business or other meetings).
4. The program should develop an annual honourarium base amount for each volunteer within the organization regardless of position and regardless of incident volumes of that station, then further identify and define what is reasonable bonuses based upon position, and services (e.g. emergency responses) provided by the volunteer.
5. Procedures for the distribution and payment should also be established, especially surrounding payment method, i.e. individual cheques and the issuance of T4s by the municipality.

Honourarium Conclusion

The original intent of the honourarium was to replace expenses incurred by the volunteer in their performing of a volunteer service. Over the many years it has grown into renumeration for volunteer services provided; which is not in compliance with current federal and provincial regulations. It can be used as a tool for recruitment and retention, unfortunately if not managed properly it can become a source of frustration and discontent. Volunteers for the most part accept they do not get paid for service. However, like most employees in a work place they want to be treated fairly and equitably.

The challenge for the municipality is to ensure that the program is fair and recognizes equal contributions by all, and meets the requirements of both the Provincial and Federal legislation and policies.

FIRE SERVICE PROMOTIONS

According to General Colin Powell,[12] "*Ultimately, it is people-not plans, systems, structures, or budgets-who make the difference between organizational success and organizational failure*". For this reason, it is important that fire departments take the time to identify reliable and valid processes to select personnel for promotion; processes that will help ensure the most qualified person meeting the needs of the organization effectively is chosen.

In general, promotion practices in the volunteer fire service can be contentious and are often based on ancient practices. In the context of modern expectation of fairness and promotional competence, there can be some glaring gaps between existing practice and good HR policy/practice.

Fire Lieutenants and Fire Captains probably have more influence on retention, morale of the fire volunteers, and cost reduction than any other group or position within the fire station.

Being a front-line volunteer fire officer is one of the most difficult, demanding, and challenging jobs in any organization. It is also very rewarding even at the first level; a supervisor must be able to think and act in terms of the total system of operation. This includes defining and assigning priorities, planning and organizing, and programming and coordinating the operating tasks of a department so that the objectives of both the department and the community as a whole are achieved.

The front-line fire officer must excel in interpersonal skills. More and more, the trend is for volunteers to be a heterogeneous group of individuals, many of whom are not especially dedicated to their jobs, or their departments. Handling the variety of attitudes and values in this multiple-generation base has become extremely difficult.

It is the front-line fire officer who must cope with volunteers face to face and day to day. Being able to communicate effectively is vital. Being able to work with people is the most important characteristic a front-line fire officer can have.

[12] Harari, O (2002). The Leadership Secrets of Colin Powell. New York, NY: Mc Graw-Hill, p.24

Frontline officers must have technical competence in their role. Frontline officers must be able to themselves perform the specific tasks they ask their assigned personnel to do, and must understand the equipment used.

Having good technical skills allows supervisors to deal with the many challenges that firefighters face in accomplishing their assigned objectives/tasks, and facilitates their ability to mentor and train their subordinates.

A fire officer is always accountable and responsible for the outcomes associated with the assigned tasks and roles of the position. There are various fire officer ranks, and the main difference between them is the amount of accountability and responsibility as well as the expected technical competence.

For a specific example; a fire lieutenant (which is the entry level officer position) is a front-line and hands-on fire officer. Lieutenants are required to have good technical competence in operating forceable-entry tools (axe, sledge hammer, Haligan bar, power saws, etc.). He/she is responsible for mentoring and training the crew members to also have effective forceable-entry skills, and to work successfully together as a team; such that they achieve assigned or needed objectives.

On the other hand, the Fire Chief, who no doubt had good hands-on skills at one time when he was a Lieutenant, is no longer expected to maintain his/her task skills in this particular area. However, the Fire Chief does have a part to play in forceable-entry. It is the Fire Chief's responsibility to ensure that the Lieutenant and her/his crew have the required tools to achieve forceable-entry and to ensure that the rules of engagement (e.g. as to when forceable-entry is appropriate) are developed and clear to everyone in the fire department, and to address when the rules are violated. The Fire Chief is accountable for the service being provided. He is responsible for ensuring that the fire service operates within best practices and that it meets public expectations.

Review of current Practices

Following is a high-level overview of current promotional practices within the region. It should be noted that entire details of each department's process are not included in the overview. However, terms of office, eligibility and qualification criteria are different for each department.

Summerville Volunteer Fire Department:

Summerville has a subjective annual process where a nominating committee receives attendance and credential records of all members, and presents a selection of nominees for the general membership to vote on. If during the year there is a vacancy it will be filled by special resolution of the membership. If there is no nomination the chair (Fire Chief) may appoint.

Brooklyn Volunteer Fire Department:

Brooklyn chiefs and front-line officers are appointed subject to an application and interview by the Society's executive committee. Each position has a set service term and perquisite of qualifications required to be met before a candidate is eligible to submit their application.

Windsor Fire Department:

Windsor chief and front-line officers are appointed subject to an application and interview process. Each position has a set service term and prerequisite of qualifications required to be met before a candidate is eligible to submit their application.

Hantsport Fire Department:

The chief officers are elected every two years. The front-line officers, Captains and Lieutenants are appointed by the Chief officers, subject to eligibility and qualification criteria.

Promotion Recommendations

There are a number of agencies, associations and organizations that provide qualification recommendations for each of the positions within a fire department. These recommendations are general in nature in an attempt to cover a broad spectrum of communities and fire service

organizations. The base line for any trained firefighter is NFPA-1001,[13] Level I. For fire officers it is NFPA-1021.[14]

The Fire Services Association of Nova Scotia has produced a set of recommendations for various volunteer firefighter and officer qualifications according to position within the department. These standards reference NFPA-1001 Level I, and indirectly several other NFPA standards since available training is through the Nova Scotia Firefighters School which trains to NFPA standards.

The following recommendations are based upon an organization having separate and identified Incident Safety and Health and Safety officer positions as well as the usual line officers. It is in accordance with the general theme of current practices within the region. The recommended qualifications standardized across the many stations has many benefits for the organization, not only in knowing the volunteers of similar rank regardless of station can fulfill the same position at another station or at an incident in time of need.

KSAs

Any and all training has three basic components comprised of Knowledge, Skills and Abilities (KSA). Any person who attends a quality training program will attain Knowledge and Skills; Abilities will be attained to a degree. However, abilities require as the fire term suggests *"Time In"*, in other words experience. Certain positions regardless of the training and education received will require a certain amount of time-in, and experiences to be able to fulfill the mandate of the position. Thus, the reason for years of service requirements for the certain positions. Typically, the higher the position the more time-in is required.

Incumbents

If the recommendations are accepted, the incumbents who may not meet all of the qualifications in their current position should remain in their current position until their current term expires or until such time as there are candidates available that meet the minimum eligibility and

[13] National Fire Protection Association; NFPA-1001, Standard for Fire Fighter Professional Qualifications

[14] National Fire Protection Association; NFPA-1021, Standard for Fire Officer Professional Qualifications

qualification requirements. Incumbents who do not meet the minimum qualifications should be afforded every opportunity during their remaining term, to acquire any necessary qualifications so as to maintain their position/rank, if they desire to do so.

Recommended Position Qualifications

GA recommends that the following table of qualifications be implemented as a standard baseline for officer promotions in all fire departments in the Region.

Position	**Term (years)**	**Probation Period (years)**	**Min. Years Service Eligibility**	**Minimum Qualifications**
Health and Safety Officer (HSO)[15]	Indefinite	1	4	- Have thorough knowledge of the NFPA standard on Fire Department Occupational Safety, Health, and Wellness Program (NFPA-1500) - Familiarity with NS OH&S regulations (training by recognized provider)
Incident Safety Officer (ISO)	2	1	Minimum 1 term as a Fire Captain	- Pro Board-Certified Fire Safety Officer as per NFPA-1521 - Completed Fire Officer Level II (NFPA-1021 qualified) - Incident Command, ICS 200 (NSFS course 4042) - All the requirements of a Fire Captain
Fire Lieutenant	2	1	Minimum 4 years as a FF	- MFR (EHS recognized program) - Incident Command, ICS 100 (NSFS course 4041) - Managing Company Tactical Operations (NSFS course 4030) - Any requirements of a firefighter for the district station assigned - NFPA-1001 Level I with NFPA-1072 Haz Mat Ops sect. 6.2 & 6.6 (NSFS courses 1001-1023) - Level II FF by end of term (NFPA-1001 qualified) - Fire Officer Level I by end of term (NFPA-102 qualified) - Fire Service Instructor Level I, by end of term (NFPA-1041, qualified)
Fire Captain	2	1	Minimum 1 term as a Lieutenant	- Certified Fire Service Instructor Level I - Fire Officer Level I - Fire Investigation Fundamentals (NSFS course 3200) - ICS 200 (NSFS course 4042) - Any requirements of a firefighter for the district station assigned - Completed Fire Officer Level II by end of term (NFPA-1021 qualified)
Deputy District Fire Chief	3	1	1 term as a Fire Captain in the respective District Station	- All qualifications of a Fire Captain - Completed FMO Course on Roles and Responsibilities of a Local Assistant to the Fire Marshal - Risk Hazard Analysis - Individual communications skills course - Respect in the Workplace course (corporate HR course) - Fire Service Personnel Leadership course - ICS 300 by end of term - NFPA-1021 Fire Officer II (NSFS course 4060) by end of term
District Fire Chief	3	1	1 Term as a Deputy in the Regional fire service	- All of the requirements of the District Deputy Fire Chief - Certified Fire and Explosion Investigator, CFEI (current) - Budgeting (corporate Finance training) - Dalhousie University Certificate in Fire Service Leadership - Strategic planning (corporate management training) - Risk Management (corporate management training)

[15] As per the NS fire Services OHS Guide of 2003, this is an appointed position by the District fire Chief. However, the recommendations listed in the table above are guidance to the District Fire Chief in their selection of the HSO.

Recommended Promotional Process

GA recommends the following promotional process.

- Annually the promotional cycle for all districts shall be completed by December 01 of each calendar year.
- The process should commence with each District Station adhering to the annual completion date and their respective Bylaws/procedures for the establishment of a nominating committee(s).
- The committee should complete their internal processes in the developing of a promotional list each year for the filling of fifty per cent of the Lieutenants, Fire Captains and Incident Safety officer positions based upon the incumbent's term; i.e. staggered terms for each rank category. For the Deputy District Chiefs and the District Fire Chiefs this too should be staggered on a three (3) year cycle.
- All Candidates under consideration by the District committees, should produce a current driver abstract, a criminal/vulnerability background check, a medical health report, and proof of qualifications, all as part of the selection process.
- Once the District has completed their process for the positions of Incident Safety Officer, Lieutenant, and Captain, the list with Candidate qualifications should be submitted to the District Fire Chief who will review the Candidates with the Director of Public Safety/Fire Chief (DPS), before proceeding to interview the Candidates.
- The District Fire Chief should seek the agreement of the DPS before offering any position to a selected Candidate.
- Successful Candidates will be notified in writing by the DPS/FC and will commence their duties effective January 01 of the next calendar year.

For the positions of District Deputy Chief and District Fire Chief, the entire process should commence one month earlier than the other ranks process, so that the new chief officers can participate in the selection process of lower ranks.

- Candidates recommended by the nomination committee(s) should be submitted to the DPS/FC, who will meet with the committee to review the process and qualifications, including previous experience.
- Once the Candidates are selected by the DPS/FC, they should be notified in writing by the DPS/FC and will commence their duties effective January 01 of the next calendar year.

GA recommends that performance evaluations be done by the immediate supervisor annually.

- Captain and Lieutenant evaluations should be performed by the District Deputy & the evaluation confirmed by the District Fire Chief.
- The ISO and HSO should be reviewed by the District Deputy Chief and the evaluation confirmed by the District Fire Chief.
- The Deputy District Chief should be reviewed by the District Fire Chief and confirmed by the Director of Public Safety/Fire Chief (DPS).

- The District Fire Chief should be reviewed by the DPS.

DPS/Fire Chief has the authority to remove any officer from any position for cause and with due process in accordance with Corporate HR procedure and process.

HEALTH AND SAFETY POLICIES REVIEW.

Introduction

A review of Health and Safety Policies was asked to be conducted as part of the Fire Service Review contract. The basis for the review was the Nova Scotia *Occupational Health and Safety Act* and associated Regulations along with the Nova Scotia Fire Services Occupational Health & Safety Reference Guide; which is based upon NFPA-1500 *Standard on Fire Department Occupational Safety and Health Program*.

A fire service safety program is mission critical to any organization, even more critical for the fire service. Any injury that involves lost time for a volunteer or even death is costly not only in financial terms, and quality of life but the possible degradation of department morale and the negative psychological impact on members of the department and the community. A fire service safety program includes two distinct functions, a staff function, "*Occupational Health and Safety* and a Line function "*Incident Safety Officer.*" Although these roles have safety as their base responsibility, the roles have very different responsibilities and skill sets.

The objective and goals of any fire service safety program is to identify problems in wait and develop methods, procedures, and control measures to address prevention, then train personnel in those measures to lessen the risk to all department members and ultimately the municipality.

The Review

There are no less than ten (10) NFPA standards addressing firefighter safety. This review focused on only two of those standards NFPA-1500; *Standard on Fire Department Occupational Safety and Health Program* and NFPA-1521; *Standard for Fire Department Safety Officer*.

In addition to reviewing the provided fire department procedures and operating guidelines, two surveys were used covering eight (8) targeted subject areas, including 44 topics.

Targeted subject areas included:

- Occupational Health & Safety officers, numbers of, and qualifications
- Incident Safety Officers numbers of, and qualifications

- Emergency response vehicles
- Targeted fire equipment, i.e. ladders and hose
- Personal Protective Ensembles (PPE)
- Rescue rope
- Respiratory Protection (SCBA)
- Fire extinguishers

Based upon the survey results; regionally the compliance-average was 71%.

Firefighter Rehabilitation

In an additional area, the review of the provided departments' standard operating procedures, guidelines, policies and administration procedures, showed no reference to firefighter rehabilitation either at the emergency scene or in training exercises. (Rehabilitation was not specifically included in the safety survey).

As part of firefighters' health and wellbeing there is a need during emergency operations and training exercises to monitor their physical condition. This is normally done to help identify any issues that may lead to serious medical conditions that would require medical attention, or even worse, hospitalization.

NFPA-1584; *Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises*, establishes protocols and requirements for emergency responder at scene rehabilitation. The NFPA Standard identifies rehabilitation preparedness, criteria for rehabilitation area responsibilities and characteristics, and outlines the procedures for emergency scene and training rehabilitation.

GA recommends that standard operating procedures/guidelines (SOP/Gs) be developed that outline a systematic approach for the rehabilitation of members operating at incidents and training exercises; in accordance with NFPA-1584. The procedures need to address cooling and warming, medical monitoring, Emergency Medical Care, member accountability, and documentation.

The Occupational Health and Safety officer and the Incident Safety Officer.

A review of department positions appeared, in some cases, not to differentiate the role of the department Safety Officer into its two safety functions. What is the difference between a fire department Occupational Health and Safety Officer (HSO) and that of the Incident Safety Officer (ISO), which are distinct and separate roles?

Both roles are responsible for identifying risks and putting into place, practices, policies and procedures to prevent injury to fire department personnel. Their roles differ as one position, the ISO is part of an incident Command Team during an incident and addresses acute dangers present during an emergency incident.

ISO ROLE

The role of the ISO is one of a formidable task and includes but not limited to;

- Assists in the development of the Incident Action Plan.
- Conducts ongoing risk assessments.
- Assists in the management of risks at the incident.
- Assists in the development of the Incident Action Plan.
- Co-approves with the Incident Commander the Incident Action Plan.
- Monitors the Incident Action Plan throughout the incident.
- Checks for unsafe acts.
- Checks to unsafe conditions.
- Checks for unsafe behaviours.
- Has authority to alter or terminate operations to prevent injury
- Conducts at scene Accident Investigations
- Prepares documentation for required HSO investigation
- Conducts Posit Incident Analysis

ISO SKILL SET

The ISO position must have the necessary background, training and experience such as,

- Comprehensive knowledge of incident hazards
- Risk management criteria, including what constitutes unacceptable level of risk;

- Ability to apply knowledge of fire behavior and fire dynamics and their impact on conditions, building construction, hazardous energy, reading smoke,
- Experience as a fire ground officer

HSO ROLE

The HSO is responsible for programs and polices relating to chronic illnesses that could result from an event or accumulation of events that can occur prior to and post an emergency incident, or of a training event, or from station conditions. These include exposure to the effects of fire or an environmental incident, or around the fire station. The HSO ensures that proper protocols are carried out as per provincial legislation and best practice standards for certain types of equipment.

The role of the HSO is labour intensive and includes but not limited to;

- Development of and implementation of the OHS organizational risk management plan dealing with chronic issues.
- Identify risks; develop goals, objectives, and action plans to manage those risks; analyze data; perform cost-benefit analysis.
- Develop a plan for the treatment and transport of an injured or ill member.
- Conducts Facilities inspection.
- Develops, implements and manages the organization's Accident prevention program.
- Conducts safety and health investigations.
- Manage the collection and analysis of data related to accidents, occupational deaths, injuries, illnesses, and exposures to infectious agents and communicable diseases.
- Recommend safety-related specifications for fire apparatus and fire equipment, given new or existing fire apparatus and fire equipment specifications.
- Analyzes the fire department health maintenance program and makes recommendations if required.
- Develop, implement and manage the fire department's infection control program.

HSO SKILL SET

The HSO position must have the necessary background and experience in

- Occupational Health and Safety
- Understanding the intent of applicable Acts, regulations and standards
- Ability to assess, classify and determine risks and implement appropriate control measures.
- Ability to identify risks, develop goals, objectives, and action plans to manage those risks; perform cost-benefit analysis; compile and analyze data,

- Ability to conduct investigations and write comprehensive legal reports.
- Ability to manage the collection and analysis of data.

GA recommends that separate roles for ISO and OHS be established at each fire station.

TRAINING, and CERTIFICATION vs QUALIFICATION

Training of ISOs and HSOs as well as the difference between Certification and Qualification and its potential impact on the fire service will be discussed in the Training section of this Fire Services Review report. However in brief, the ISO should be certified, while the HSO should be qualified.

OH&S SUMMARY

A fire services organization strives to improve operational excellence while keeping firefighters and the community safe. If the organization is relying on inconsistent, out-of-date or incomplete policies for guidance, then the organization is at increased risk of experiencing an adverse event, and the potential for significant legal liability, and specifically in the area of OH&S there is a possibility of the laying of criminal charges.

It is the utmost importance to ensure that the regulations and standards for personnel safety and the maintenance of fire equipment are adhered to.

GA recommends that; as required by regulations and standards that an official written occupational safety, health, and wellness policy be developed for the Regional Fire Services that that identifies specific goals and objectives;

- The prevention and elimination of accidents and occupational injuries,
- The management of exposure to communicable diseases,
- The management of exposure to products of combustion (carcinogens, fireground contaminants, and other incident-related health hazards),
- The elimination of preventable illnesses, and fatalities.

This policy must be in compliance with and meet the intent of applicable regulations and applicable best practice standards. The situation for volunteer firefighters vis-à-vis the applicability of the *Occupational Health and Safety Act* and Regulations in Nova Scotia is

currently in flux. However, the general duty clause (§13) of the *Act* clearly lays out an employers' responsibility towards everyone when it states "*Every employer shall take every precaution that is reasonable in the circumstances to…ensure the health and safety of persons at or near the workplace…*" This provision clearly includes volunteer firefighters, and this was confirmed by NS's Occupational Health and Safety Division.

There are ample best practices and standards to demonstrate what these precautions should be for volunteer firefighters, including the provincial government's own *Occupational Health and Safety Reference Guide* developed for the Nova Scotia Fire Services. A failure to follow these clear directions could have serious consequences.

GA recommends that the fire service evaluate the effectiveness of the occupational safety, health, and wellness program at least once every 3 years and submit an audited report of the findings to the DPS/FC and corporate CAO.

Overall the current fire departments are managing health and safety fairly well but there are a number of areas that require further review, positive action, and corporate assistance.

PROFESSIONAL QUALIFICATIONS AND STANDARDS (TRAINING)

Training Principles

The Reginal Fire Services Review was requested to look into professional qualifications and training standards; more specifically to assess standards of existing department personnel in order to determine current and future training needs (gaps), and with consideration to documentation requirements, and succession planning.

Training and Learning

What is the difference between Training and Learning?

Albert Einstein once said, "Education is not about learning of the facts, but the training of the mind to think."

According to TalentLMS;[16]

> *"It's important to understand the difference between learning and training. Both assist in leading individuals into expected performances. Of course, they are **inextricably linked**, but they are **unique aspects of any educational process**. Training is the giving of information and knowledge, through speech, the written word, or other methods of demonstration in a manner that instructs the trainee. Learning is the process of absorbing that information in order to increase skills and abilities and make use of it under a variety of contexts.*
>
> *Whatever the goals, the quality of the learning will rely largely on the quality of the training, and so the role of trainer is very important as it can have a huge effect on the outcome of learning for the student.*
>
> *The Characteristics of Learning*
>
> *As mentioned above, learning is the process of absorbing information and retaining it with the goal of increasing skills and abilities in order to achieve goals – but it's more than that. Learning is what we go through when we want to be equipped for non-specific and unexpected situations; and the two are not mutually exclusive. While you*

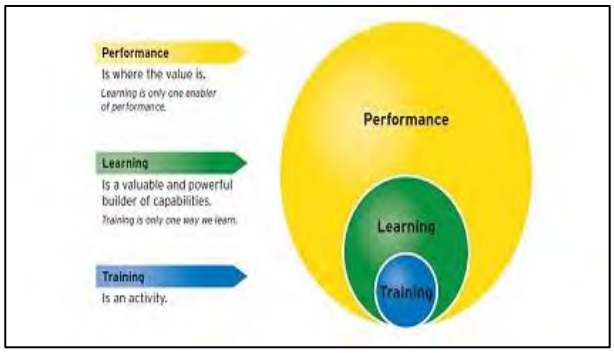
[16] https://www.talentlms.com/elearning/learning-vs-training

do learn to do something specific, you are also inadvertently equipped with the knowledge and/or skills to face future challenges. In essence, ***learning is all about equipping a person to tackle not just today's issues, but preparing him/her to creatively come up with ways to tackle tomorrow's issues****.*

The Characteristics of Training

Training, on the other hand, ***focuses more on the development of new skills or skill sets that will be used****. Training is the process each new employee goes through when joining a new organization to learn how to carry out the day-to-day operations, know how their department works and how job-specific tools operate in order to carry out their responsibilities. In essence, through training, we are not looking to reshape the behavior of an individual rather the point is to teach the employee or learner how things are done so that they can then carry out a process on their own."*

In summary; Training is how to do something and is also for compliance purposes. Learning is understanding the; knowing how, experience, and the why. The desired outcome is improved Performance. The accompanying diagram[17] shows this very well.



Fire Service Needs

The fire service needs both training and learning, as they complement each other. Certain aspects of the firefighter's role will require more on the training equation than that of learning; i.e. the things they need to do even if they do not fully understand why. Other skill sets, depending upon the fire service role, will rely more heavily on learning; i.e. the ability of apply skills to new situations. But all fire service job functions and skill sets require a little of both to enable the firefighter to fulfill their mandate and community expectations. The community expectations, (regardless of whether the firefighters is career or volunteer), are that a professionally trained and qualified person will attend to their emergency.

The fire service needs to be risk averse. In the fire service, whether career or volunteer, training is required to minimize the fire service's, and by vicarious liability the municipality's, exposure

[17] Dr. Rhonda Dubec, 2019, ePost to Lakehead University Teaching Commons

to possible civil litigation. Certain types of training are specifically designed and needed to minimize the risk to workers and the organization in terms of accidents, safety code violations, lawsuits and citizen complaints. In today's modern environment, organizations require diversity training, training about sexual harassment, workplace safety training, customer/taxpayer service training, and other quality initiatives can all help develop better work environments and services while minimizing any hazards along the way.

Traditionally fire service personnel trained only on how to respond, to emergencies, operate, and maintain equipment. Now they must have the required skill sets to write training syllabus, policies, procedures, reports, and to read, understand, and develop complex budgets and financial reports. In some roles to read and understand legislation and legal documents.

Fire Service Qualifications versus Certifications

Credential Creep is a term that means a tendency over time to focus on credentials which in turn leads to an inflation of minimum requirements for a specific task. This is pervasive in the health care industry and has been creeping into the fire service for years. A mass move towards certification requirements has led to significant business opportunities for institutions and private organizations. The move towards certifications are arising in part as a result of litigation against the fire service; i.e. the focus on proven qualifications.

To maintain and retain volunteer firefighters who in today's society are often working more than one jobs to make ends meet, and are raising families is a challenge. The competing needs amongst school, sporting, church activities, and competition with other community volunteer organizations, who do not have the same levels of demands on personal time as the fire department increases the challenge to maintain qualified, not alone certified, community minded volunteers.

If a volunteer knows how to operate a pump, then he/she knows how to operate a pump. In a volunteer world what is the difference whether they are qualified or certified? As long as they have been trained to the standards of pump operation and tested to the Job Performance Requirements (JPRs) of pump operation, and there are standardized records of training, and there is continuous training to maintain skills, there should be no issue.

During GA's stakeholder meetings the issue surrounding qualification versus certification was raised numerous times. The concern was the extra time and costs for certification. To assist in making a decision on which level of training should be accepted by the Region's fire services, i.e. whether all volunteer emergency services courses should be certified, or not, is the answer to the question "*is certification really required and what is the beneficial difference between qualification and certification to the organization?*"

Within the fire service there are two certifying and accreditation bodies, Pro Board® and The International Fire Service Accreditation Congress (IFSAC). IFSAC is a not-for-profit, peer-driven, self-governing system of both fire service certifying entities. The IFSAC Certificate Assembly provides accreditation to entities that certify the competency of and issue certificates to individuals who pass examinations based on National Fire Protection Association (NFPA) fire service professional qualifications, and other standards approved by the Assembly. The accreditation is made at the provincial, federal government, or territorial level for fire fighter certification programs. The IFSAC Certificate Assembly accredits the certification (examination) process of certifying entities. This includes evaluation of various elements of knowledge (written) and practical skills examinations,

Pro Board Accredits those public sector organizations (generally governmental or educational) that certify emergency services responders against the requirements of the Standards of the National Professional Qualifications System. Those Standards are promulgated by the NFPA. They do not accredit training systems, programs, or curriculum. Their focus is directed at the testing process used by an eligible agency. They do not accredit for profit companies or concerns. Pro Board accredits organizations that use the NFPA professional qualification standards.

WHAT ARE THE BENEFITS OF CERTIFICATION?

Professionalism has long been a goal sought by members of the fire service. It has only been within the past 25 years that a system has evolved to produce national professional qualifications standards that an agency can use to establish performance measures for personnel. Agencies that achieve either IFSAC or Pro Board accreditation are recognized as having met the rigors of

review by an independent organization. This third-party independent review is the best way to assure firefighters and governance bodies that the agency's program meets the national standards.

The term "*Professional*" does not differentiate between career or volunteer, it refers to a person formally certified by a professional body of belonging to a specific profession by virtue of having completed a required course of studies and/or practice; whose competence can usually be measured against an established set of standards.

WHAT IS CERTIFICATION?

Certification is a voluntary program administered by a non-governmental organization. Depending upon the subject It grants the use of a credential to individuals for a specific period of time. Certification is available to those who meet predetermined and standardized criteria for knowledge, skills, or competencies. Testing is by a third party. Depending on the field of study, recertification after a prescribed period of time may be required.

WHAT IS QUALIFICATION?

Qualification is awarded for achievement of a narrow body of knowledge with very specific learning objectives. This type of program often takes the form of a classroom learning experience and some practical exercises, followed by an assessment to determine if the desired learning goals and objectives for the training have been met. Testing is typically administered by the course instructor or course agency. Qualifications typically have no recertification component.

WHAT IS TRAINED TO?

"*Trained to*" is a term in the fire service the means an instructor in a specific subject has trained students to a certain standard. However, there was no method of ensuring the students in attendance acquired the specific knowledge or skills of that standard, or associated with the course attended. In other words, there was no testing or validation that either the instructor provided the required information or that the student absorbed or acquired the taught knowledge and skills. The student ends up with, basically, a certificate or record of attendance.

Certification Needs

The Review required the fire departments to provide current training records and to complete a training survey indicating the various training received by its members; identifying whether the training was a qualification or a certification. Unfortunately, as a result of lacking and conflicting data, the review was not able to verify results. However, even though meaningful analytics was problematic, it was obvious training was conducted across the region in several areas.

The second part of the Review was to determine what training courses needed to be certified if any. As a result of previous fire industry litigations and the potential for litigation and the need for stringent technical knowledge, it has been determined that there are four (4) identified fire service positions that require certification;

- Training Officers,
- Fire Department Incident Safety Officers, and
- Fire Inspector
- Fire Investigators.

The following certification courses are available through the Nova Scotia Firefighters School, who are able to provide the training locally within the Region.

- Fire Inspector I NFPA-1031
- Fire Investigator NFPA-1033
- Fire Instructor I & II NFPA-1041

Unfortunately, the Incident Safety Officer certification is not available in eastern Canada. There are a number of locations throughout the United States, the most notable being the Fire Department Safety Officer Association programs, in New York.

For individuals interested in becoming a fire inspector or investigator, the Fire Prevention Officers Association of British Columbia offer a Pro Board certification 100% on line program that is available to fire personnel all across Canada. The written and practical exams are conducted by Trained Evaluators across Canada.

A review of the fire service needs, and skill sets required for those needs, may reveal that there are positions that do not require young, physically fit, gung-ho individuals. Positions such as Public Education, administration, radio operators, traffic control persons, occupational health and safety opportunities, truck drivers. There may be seniors who are looking to keep active and are willing to provide some time to a volunteer organization with previous skill sets and experience that can fill a void within the organization.

Traditionally, the majority of volunteer fire services required any and all members of their respective departments to be firefighters, who were trained in additional services offered by the department. This means answering the question, *"Do all volunteer fire department members have to be fire trained"?* The answer is no.

Volunteer fire departments do need the majority of their membership to be fire trained so as to be able to deliver the department's core services; responding to, rescuing people from and extinguishing fires.

Qualification Needs

What types of functions/positions are required at the scene of a structure fire that are required to be firefighter qualified?

- Firefighters
- Fire Officers
- Incident Safety Officer
- Accountability Officer
- Incident Commander

What are some of the functions/positions that are required at the scene of a structure fire that ***do not*** need to be a trained firefighter?

- Apparatus Driver/operator
- Air/SCBA support person
- Command Post - radio communicator/scribe
- Firefighter rehabilitation support personnel
- EMS
- Traffic Safety Control

- Logistics

What are some of the other types of emergency services that some fire departments provide that ***do not*** require volunteer members to be firefighter trained?

- Water rescue, (Boat enthusiasts, SCUBA Drivers)
- Ice Rescue
- High angle rescue service
- Medical First Responders

Additional non-emergency Staff functions in which volunteers do not need to be firefighter trained but could be most beneficial to the fire department.

- Administration, Mgt of Records (data) and reports, budget, inter-government relations)
- Fire Prevention (fire-safety education, fire-investigation, fire-inspection/enforcement)
- Maintenance
- Communications
- Research & Planning
- Community Relations/Public Information
- Financial Management
- Personnel Management

Regardless of the function/role of the volunteer, all volunteers will require specific subject/service training, skills maintenance, and fire department orientation. All persons in their specifically assigned role will need to trained and qualified for their assigned role. However, taking the specific assigned role approach to training and learning, some of the traditional basic firefighting courses would not be required and thus make more effective use of allotted training funds and perhaps aid in department recruitment.

Observations

Documentation

The first observation related to the review of Professional Qualification and Standards is the lack of appropriate training documentation. The training records that were provided and the training survey data, proved to be challenging in that there were variations and discrepancies. This resulted in the inability to conduct a proper and thorough analytical review.

GA recommends acquiring a proper records management system (RMS). If related recommendations throughout this report are accepted, then an RMS training module adhering to NFPA-1401; *Recommended Practice for Fire Service Training Reports and Records* can be acquired as part of an overall Records Management System.

The Municipality of West Hants as part of their Fire Services Policy COGE-0700.00, Dated 2018, provides the basis for a standard training record table. The table only captures one of many required elements required of a proper training record. It is believed this record of training, has more to do with identifying a registered fire department's ability to provide the level of services in the department's Fire Service registration filed with the municipality, than a proper recording and tracking of a department's training program. However, it appears that the form has become the record of choice.

The National Fire Protection Association's standard, requires training reports and records that are comprised of eight (8) sections, totaling thirty-five (35) recording elements.

The majority of required minimal records for training reports and training records can be found in canned Fire Records Management Systems.

Schedule 2A – Example of Training Record Format

Summary of Active Fire Fighters Training Records

			Training (Please check all applicable training)								
Name	Rank	Year of Service	Level I Qualified	Level I Certified	Incident Command	Strategy & Tactics	Fire Safety Officer	Fire Prevention Educator	Fire Investigation	MFR	Other (Specify)

West Hants Training Standards

The Municipality of West Hants as part of their Fire Services Policy COGE-007.00, Dated 2018, provides a *Minimum Service Level Standards Table*. The table lays out what service level is required. Indirectly this forms the basis, to a point, for the required training standards needed to meet the service delivery standard.

This form raises a couple of questions as it relates to training and standards.

WEST HANTS
NOVA SCOTIA

POLICY COGE-007.00

Minimum Service Level Standards Table:

Minimum Service and Level Standards	Per Station	Per Station2	Per Region	Outside Suppor
	Serviced	Unserviced		
Fire - Structure	yes	yes		
Fire - Defensive	yes	yes		
Medical - Reg First Responder (level 4)		yes		
Medical - Medical Assistance (level 1-3,5,6)	yes			
Veh Rescue-Technician	NA	NA		
Veh Rescue Operational	yes	yes		
Veh Rescue Awareness	NA	NA		
Water Rescue - Technician	NA	NA		
Water Rescue Operational	yes	yes		
Water Rescue Awareness	yes	yes		
Ice Rescue Technician	NA	NA		
Ice Rescue Operational	yes	yes		
Ice Rescue Awareness	yes	yes		
Structural/Excavation Collapse Technician				
Structural/Excavation Collapse Operational			1	HRM
Structural/Excavation Collapse Awareness	NA	NA		
High Angle Rescue Technician			1	1
Hig Angle Rescue Operational			1	
High Angle Rescue Awareness	NA	NA	1	
Hax Mat Technician				1
Haz Mat Operational	yes	yes	1	
Haz Mat Awareness	NA	NA		
Ground Search and Rescue Provider	no	no		
Ground Search and Rescue Assistance	yes	yes		

NFPA Standards versus Service Standards Table

As part of the Service Standards Table is the Appendix A, Definitions. In the definition section it makes references to a few NFPA standards and editions of those particular standards. Some of the standards refenced have had several updates from the year referenced in the policy. One referenced standard edition is 1995, making the edition out of date by twenty-four years.

Examples:

- NFPA-472; Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents, 1997 edition; the Current Edition is 2018.
- NFPA-1983; Standard on Fire Life Safety Rope and System Components 1995 edition. The Current is 2017
- NFPA-1670; Standard on Operations and Training for Technical Search and Rescue Incidents. No version referenced, the most current is 2017.

Other notable observations include the fact that within the policy it makes reference to various specialized rescue services, such as ice rescue and water rescue. The table references NFPA-1670 as noted above. This standard provides outlines as an aid to the user of the standard in developing training for personnel who will be involved in the various levels of the search and rescue disciplines. The standard it is not a competency standard, it is an operational methods standard. The competency Standard that should be referenced is NFPA-1006; *Standard for Technical Rescue Personnel Professional Qualifications*, 2017 edition.

The Service Standards table provides levels of service/training for various specialized services and makes reference to an appropriate level of training for that service based upon NFPA training levels. NFPA levels of competency are hierarchical, meaning you shall be trained and qualified in the very basic level, (Awareness) before you are eligible to move up to the next level (Operations) and you shall be trained in the Operations level before one can move onward to the Technician level.

What is interesting in the COGE-007 policy is that in the table, for some services, Awareness level and Operations level are required but for other services only Operations level is required and Awareness level is marked "*Not Applicable*." Referencing the previous paragraph, Awareness level is required before one is eligible to acquire an Operational level qualification or certification.

Haz Mat Operations

In speaking with fire service stakeholders there is much confusion and lack of understanding as it relates to the service and training requirements for Hazardous Materials Operations as identified in the COGE-007 Policy table.

The Policy references NFPA-472; *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, 1997 edition. However, NFPA had already released a new personnel qualifications standard for Haz Mat responses; i.e. NFPA-1072; *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*, 2017 edition.

NFPA, in the nineties, amended NFPA-1001 Level I competencies/qualifications/certifications to include skills and knowledge contained within NFPA-1072, Operations (sections 6.2 and 6.6 only). The competencies defined will provide firefighter responders who respond to motor vehicle accidents with the requisite skill sets (as required in the referenced sections) so as to minimize hazards while protecting themselves from potential harm from fluid leaks and spills while wearing only their bunker gear.

Basically, the Haz Mat Operations sections 6.2 and 6.6 requirements provides one with the necessary skills to control fuel spills or anything that can be done in firefighting bunker gear. There is no plugging, no patching skills required as these are required competencies of a full Haz Mat Operational training program. The competencies in 6.2 and 6.6 include product damming, diking, and motor vehicle accident clean up.

Whereas only two sections of the NFPA-1072 training standard are required to complete NFPA-1001 Level I firefighter program, any so called Haz Mat Operation courses solely provided to address sections 6.2 and 6.6 are non-core and non-accredited courses. However, they are required to obtain Firefighter Level I Qualification or Certification. These sections of Haz Mat training do require the participant to obtain either the NFPA-472 or 1072 Awareness level training.

The Nova Scotia Firefighters school's thirty-two-hour Haz Mat Course, for Level I Firefighter includes Awareness Level training as well as Haz Mat Ops Core training which only covers 6.2 and 6.6 sections. The Haz Mat course referenced here does not qualify anyone to be a Core Hazardous Material Responder as per the intent of the NFPA-full 472 or 1072 standards.

Training/Courses Required by Fire Department Position

Due to the mere fact that the Region's firefighters are volunteers and their time commitment is strained, training requirements must be very judicious and only required on a "as needed" basis. Often the term "minimum" is used. This term must be used in the context of the actual training required to meet the need of the skill sets in order to perform the duties and tasks required of the particular volunteer's position and responsibilities within his/her organization.

A basic Level I firefighter qualification course requires a time commitment of 168 hours plus an additional 32 hours for Haz Mat Operations section 6.2 and 6.6 for a total of 200 hours of volunteer time. If the course was spread out over several sixteen (16) hour weekends this would equate to approximately twelve (12) weekends.

Such a time requirement is very onerous for the volunteer recruit. What is a reasonable interval for a volunteer to acquire their Level I firefighter complete with NFPA-1072, Haz Mat Ops section 6.2 and 6.6? If the interval requirement is too restrictive, a department may lose volunteers, if there is too long of a period of time to meet the qualification, standards can change and the ability for the department to meet it needs may not be met if ever.

GA recommends that a three-year period be considered a reasonable period of time for a new recruit to become NFPA-1001 Level I qualified if that recruit aspires to attain a higher rank.

Once a firefighter has obtained their Level I qualification, they are eligible to acquire a Level II firefighter qualification. This training requires an additional commitment of eighty (80) hours or five (5) weekends.

There are a number of agencies, associations and organizations that provide recommendations for each of the positions within a fire department. These recommendations are general in nature in an attempt to cover a broad spectrum of communities and fire service organizations. The base line for any trained firefighter is the Level I.

In addition to the Level I fire fighter qualification, there will be additional training requirements for the volunteer based upon the services and programs offered by the community fire department.

- Vehicle extrication
- Apparatus operator/driver
- Specialized rescue
- Medical First Responder and associated courses i.e. establishing Helicopter landing zones
- Proper Radio Communication Procedures
- DNR Basic Forest Fire Suppression Course

Fire Officer Training

All fire officers, beyond their response skills, should receive training in the management of personnel (soft skills). These skills can be acquired from recognized and authorized personnel/management programs and should be made available to Fire Officers interested in participating in such programs. Most important aspects of their role will be leading and managing volunteers.

Training Challenges

All positions within a fire organization require continuous skill and knowledge retention after initially obtaining their qualifications. This requirement is the mainstay of weekly training sessions for the volunteer fire services.

There are a number of challenges for the local fire service to conduct training which mostly occurs during a two (2) hour session one evening a week. Keeping all of the attendees engaged, especially with members with a wide range in years of experience, is a challenge.

Firefighters, after completing the specific topic KSAs need to focus on team exercises and developing team skills. Engaging experienced firefighters to assist with less experienced personnel (mentoring) can go a long way in personnel and team development and meeting personal satisfaction needs of those involved.

Based upon a years of service survey, (66.6% return rate) the following table is the combined experience of personnel found in the area fire stations.

Years of Service	0-2	3-5	6-10	11-24	25+
Per Centage	12.23%	21.5%	22.56%	25.5%	15.23%

As one can see, the are challenges in meeting the needs of the various levels of experience throughout the group. The challenge is how best to keep everyone interested and engaged.

Another challenge facing the Regional fire stations is that of the various type of department memberships. In particular those that have veteran, veteran driver, mutual-aid multiple fire department memberships.

With veteran memberships, depending upon the station one belongs to, regular training is not a requirement. For veteran drivers their only requirement is to maintain the appropriate class of driver's license.

GA recommends a minimum mandatory training of six (6) hours per quarter to maintain Veteran driver status, plus an annual 8-hour training day. This is required to maintain skill proficiencies and teamwork skills.

Another challenge on the fireground is knowing who has what training and experience. Especially with so called mutual-aid and multiple-station type memberships, how does the incident commander, or others, know what qualifications that personnel on scene have? Of particular importance is who is a qualified firefighter and who is not.

One department uses a different colour helmet to distinguish the variation; which is a costly way to distinguish the differences. Other departments in other jurisdictions use a more cost-effective method and that is the use of different reflective coloured stickers and or letters.

GA recommends that all stations use the same method, specifically to employ the same colour helmets by rank, and standardize on vinyl reflective qualification stickers.

During GA's stakeholder meetings the issue was raised of firefighters travelling long distances to training, especially for those stations that are considered outside the main stream locations where training is held. The issue is the travel time involved especially after a long day at work, and then having to drive a considerable distance to attend training sessions. The issue can be remedied by having more training delivered at these stations or at alternate locations on a weekly basis or develop more in house capabilities.

Training Officers/Instructors.

The responses to GA's survey suggested that regionally there are a total of nine (9) Level I trained instructors. and nine (9) certified Level 1 instructors.

What is interesting is that none of the stations within their bylaws nor their Honourarium program or department rank structure identify a Training Officer/Instructor position.

In some stations training is managed by committee and it appears the majority of training is station oriented.

GA recommends that there be at last one certified Training Instructor (Minimum Level I Instructor) at each of the region's six stations.

Fire Marshal's Local Assistant Training

Each fire department has at least one if not two or more senior positions within the department appointed by the provincial fire marshal as a Local Assistant under the authority of §14.1 of the *Fire Safety Act*. Their role as Local Assistant is to assist in carrying out the provisions of the *Act* and the Fire Code. To ensure the Local Assistants have basic knowledge of their duties and responsibilities the Office of the Fire Marshal provides cost free training. As a result of changes in polices within the OFM and regulations all Local Assistants are required to attend refresher training in 2020.

Training Methodology/Programs

Delivery of training and education in today's world, is many faceted. Today's educational environment encompasses self-study, online programs, instructor lead classroom sessions, attendance at higher learning institutions such as colleges, accredited fire schools etc.

NFPA-1500; *Standard on Fire Department Occupational Safety, Health, and Wellness Program*, 2018 Edition - requires all departments to:

- Prepare and maintain written policies and standard operating procedures that document training requirements,
- Establish and maintain a training, education, and professional development program with a goal of preventing occupational deaths, injuries, and illnesses.
- Provide training, education, and professional development for all department members commensurate with the duties and functions that they are expected to perform.
- Establish training and education programs that provide new members initial training, proficiency opportunities, and a method of skill and knowledge evaluation for duties assigned to the member prior to engaging in emergency operations.
- Develop a recurring proficiency cycle with the goal of preventing skill degradation and potential for injury and death of members.

- Develop and maintain a system to monitor and measure training progress and activities of its members.
- Provide an annual skill check to verify minimum professional qualifications of its members.

In today's environment there are a number of courses available on line including courses that one can lead to certification. The programs still require time commitment for the students. However, depending upon the course or program the student is able to proceed at their own pace and in the comfort of their home, so long as they have a computer and internet.

As stated previously, a good portion of training is conducted in the local fire station delivered by experienced firefighters with a training background. However, due to the nature of the business, field training exercises and out of classroom training experiences are essential to maintain skillsets. It appears that a majority of the training involving live burning occurs at the Nova Scotia Firefighters School in Waverley, Nova Scotia. For the student this involves time away from home and travel.

There are two options to address this issue. One is to develop a centrally located training facility that has the ability for live fire training or the other is to use the fire school's mobile burn unit. Previously there were scheduling issues for booking the mobile burn unit, those issues have now been addressed. The school is also in the midst of acquiring a mobile vehicle burn unit, to provide programs involving live vehicle fire extinguishing techniques.

A centrally located training area for the region is needed to provide many of the practical skill sets required not only for the individual firefighter, but also for team skill sets, and inter-station and mutual-aid departments to practice joint operating procedures and inter-departmental taskings together.

GE recommends that the Region invest in construction of a properly designed, central training facility can meet most of the training needs of the Regional fire service.

GA does not recommend the inclusion of a live fire training facility. Due to the high risk of firefighter injury and liability associated with live burn scenarios, and given the associated costs of building and maintaining a live fire facility (that must be built, maintained and operated in accordance with NFPA-1403; *Standard on Live Fire Evolutions*) and with the availability of the

Fire School's mobile unit to travel to the Windsor – West Hants region, the Region should take advantage of the school's mobile burn units. Use of the mobile burn units will meet the needs of the local fire services, will be more cost effective and reduce risk to the department or municipality.

IN addition, the Nova Scotia Fire School offers a number of non-accredited but free courses at their facility. The courses available (2019) at no charge are as follows:

- Introduction to Haz Mat
- Operations at Haz Mat incidents
- Vehicle Extrication
- Incident Scene Safety Officer
- Emergency Vehicle Driver Training
- Managing Company Tactical Operations
- Emergency Responders Traffic Management Guidelines
- Incident Command System, (ICS 100 & ICS 200).

In conversation with the fire school management, almost any and all courses can be delivered locally. In some cases, they are able to fast-track (i.e. compress) courses based upon need. A fast-track course was delivered to a local department within the last couple of years.

Annual Regional Training Weekend.

GA recommends that an annual 3-day Regional Training Weekend be established and organized on an annual basis. Such a weekend could be rotated annually amongst the six station locations, each playing host in turn.

Another tool in the tool box featured by many departments is organizing and developing an annual three-day training and symposium weekend. Such a weekend can involve invited subject matter experts from outside the area and is an opportunity for all of the regional firefighters to attend classroom plenary educational sessions and also practical exercises. Such opportunities may allow for the testing of large operational procedures such as tanker shuttles or long pumper relays that may have not been practiced for a period of time or practical for a single station to test, and permit (especially) newer members to participate who previously may not have had an opportunity to do so.

These weekends promote camaraderie, allow firefighters to intermix, and expose attendees to new and different trainers/instructors and topics. Such weekends are invaluable in building trust amongst fire services team members as well as an opportunity to meet and know newer members. There is an old fire service metaphor "*It is always better to know your neighbor before you need them*."

Medical First Responder

Medical first responders (MFR) must complete MFR training through one of the EHS approved Medical First Responder training agencies; i.e. St. John Ambulance ($400) or Canadian Red Cross ($499). Anyone who is 19 years of age or older, has successfully completed MFR training by an EHS approved MFR training agency, is a current resident of Nova Scotia, and is associated with an EHS MFR response agency is eligible for this training. Each consecutive year, a fully sponsored EHS MFR agency is entitled to receive partial reimbursement for MFR training of two (2) persons at a maximum rate of $150/person.

MFRs are required over a three-year period to maintain their EHS/MFR competencies. Competency training is available free through the EHS/MFR program. The program has the ability to provide to the department a volunteer paramedic, free of charge, to deliver the required maintenance training locally.

Training Summary

Inadequate or deteriorating knowledge and skills due to improper training, or lack of on-going competency assessment, is an issue with any organization. Successful operations require continuing education and skills enhancement training.

All team members must make a commitment to lifelong learning. Periodic competency assessments foster deeper understanding of skills and encourage individual pride through safely completing operational tasks.

The fire services should research available programs to meet the needs of the department so as to meet the needs of the community and take a cost-effective approach to developing individual and

team Knowledge, Skills and Abilities. A cooperative and collaborative approach with others is always recommended. This promotes standardization amongst the many stations.

Each station should have its own assigned training officer with the responsibility to ensure standards and training needs are being met and to coordinate the training and educational activities with the station's training committee if one exits.

GA recommends that an individual, at least on a part time basis, be hired Regionally (Division Chief) to guide and assist in the development and delivery of Region-wide, standardized, focused, and appropriate training and personnel development to the fire departments and firefighters. If the desire is to have a regional single focused fire operational service, then all associated training must also be singularly focused. For this to occur, a regional-wide program, with homogenous training policies and procedures, with common goals, and common objectives needs to be implemented and managed.

SUCCESSION PLANNING

Succession planning is a process for identifying and developing new leaders who can replace old leaders when they leave, retire, or die. Succession planning increases the availability of experienced and capable employees that are prepared to assume these roles as they become available.

The typical succession planning program is achievable in a full-time work place where certain individuals who are considered potential leaders are targeted and placed on a career development path. In an organization in which the top senior positions (District Fire Chief or District Deputy Chief) and the various officer positions are elected every two or three or so years, by the membership, and where there may be minimum requirements to qualify for the chance of being elected, or in some cases no required qualifications, then succession planning in the true sense of the definition is not really achievable in the traditional sense.

What is achievable is to ensure that the organization has programs in place that provide educational opportunities for those individuals with an interest, at some point in the future, to take on a leadership role. With clearly defined organizational goals, objectives, along with defined position requirements and opportunities for training and education to meet those requirements; that is really all of the succession planning that a volunteer organization is able to accomplish. This is especially so in an organization where the more senior positions are elected and have the ability to oversee who receives the training and educational opportunities.

However, depending upon organizational model chosen along with numbers and type of supportive career staff, then at that time a proper succession plan can be evaluated and implemented.

ORGANIZATION AND STAFFING

OVERVIEW OF CURRENT FIRE SERVICES

The fire departments in the regional area of Windsor and West Hants (W/WH) have a very long history of proudly serving the citizens within the area. Windsor fire department was established in 1881, other departments have been providing emergency services to their communities and the surrounding area for over 100 years.

Currently, within the new Region of Windsor and West Hants Municipality there are four independent volunteer fire departments (Summerville, Brooklyn, Windsor and Hantsport) with six fire stations, one is considered a municipal department (Hantsport).

The three departments of the Municipality of West Hants, serve a population of approximately, 15,368 in an area of approximately 1,244 square kilometers. The Windsor Fire Department provides services to a population of 3,068 in an area of 9.11 square kilometers. There are also significant numbers of tourists and the travelling public on the 100 series highway or local road networks.

Brooklyn Volunteer Fire Department operates out of two stations, one located in Brooklyn, the second located in Garland's Crossing. Hantsport volunteer fire department provides and manages fire service operations from the Southwest Hants Society fire station located in Vaughan. The Windsor Fire Department provides fire services to the Town of Windsor.

In order to provide reasonable fire service coverage in the outer reaches of the western and eastern part of the municipal boundary, the Municipality of West Hants has quasi-agreements for response services with two Municipality of East Hants Fire Departments, Walton Shores to the west and Mount Uniacke and District Fire Department to the east.

The Brooklyn Volunteer fire department provides contract response services to the South Rawdon area of the Municipality of East Hants on behalf of that Municipality. The Municipality of West Hants has a service agreement with the Municipality of Kings County for the delivery of fire service to the Hantsborder area of Kings County as well as providing services the First Nations people of Glooscap. Glooscap First Nation is located halfway between the towns of

Wolfville and Windsor, not far from Blomidon Provincial Park. The fire service to that area of Kings County is provided by the Hantsport Volunteer Fire Department.

As shown on the accompanying map, taken from the West Hants municipal website, each fire department currently has their own geographic response district. Also shown are the areas covered by the Windsor Fire Department, Walton Shore VFD and Uniacke and District VFD

Summerville, Brooklyn and Windsor fire departments are managed by registered societies under the Societies Act of Nova Scotia. Hantsport, is solely a municipally operated and managed department.

There is a volunteer Fire Chief with volunteer deputies and corresponding volunteer rank and file for each district/department. Each of the departments have part-time cleaners and some are equipment maintainers, some of whom are also volunteer fire department members.

In 2018, all the fire departments within the Municipality of West Hants signed a mutual-aid response agreement with each other. In 2019, the Windsor Fire Department was added to the agreement. The Brooklyn Volunteer Fire Department signed a mutual-aid agreement with the East Hants Fire Service Association. The Hantsport Fire Department signed a mutual-aid agreement with the Municipality of Kings County in 2001 (before dissolution).

In August, 2019, a draft auto-aid agreement was introduced involving the Windsor, Brooklyn and Hantsport fire services. This agreement established what the departments would send simultaneously to an incident in any of their jurisdictions. It specified what type and number of apparatus which is based on the location and type of incident. Although not formally executed, this draft agreement appears to be operational at this time and helps ensure that the three stations, together, adequately staff incidents.

Services Provided

Fire departments were initially formed to provide what is typically defined as core fire services. Core services are the basic services directly linked to the term fire, such as firefighting, rescuing

people from fires, the provision of regulated fire prevention activities such as fire inspections and Fire Code enforcement, and public fire prevention education activities.

Over the years, the addition of non-core services has expanded the fire department's role and there are now multiple services provided by modern fire services. Currently, departments within the Municipality of West Hants and the Town of Windsor provide core fire services (except for fire inspections and code enforcement) along with responses to environmental incidents, motor vehicle collisions/entrapment, water rescue, ice rescue, and medical first response. It is also usually the fire department that is called to natural disasters and other emergencies, whether or not they are specifically trained and equipped to deal with them

Standardization

A review of the individual fire services within the region has revealed that there is little that is standardized. From recruiting practices, firefighter classifications, promotions, service levels, other areas; each department has their own methodology.

Organizational Design and Staffing Models

To design an organization for the delivery of fire services, a number of questions must be asked and answered.

- What are the organization's core and subsidiary services?
- What will be the staffing profile in the delivery of the services?
- What line and staff functions are required in achieving and in supporting the organization's goal and objectives?
- How will the organization be funded?

Typically fire services are divided into two basic organizational functions, Line and Staff.

A Line function (aka Operations) is one that directly advances the organization in its core work as it interfaces with the customer, i.e. the public. For the modern fire service, the primary core work is emergency response to and mitigation of incidents using appropriately trained and equipped personnel. Property Inspection and Fire Code Enforcement are also core components of

the typical fire services line function. Both emergency response and inspection work are regulated under provincial legislation.

A Staff function supports the achieving of organizational goals by supporting the line functions, as well as overall corporate goals, through specialized advisory and support functions. For example:

- Administration (Mgt of records/data, reports, budget, inter-government relations)
- Fire Prevention education, incident investigation
- Training
- Health & Safety
- Equipment maintenance
- Communications
- Research & Planning
- Community Relations/Public Information
- Financial management
- Human Resources and personnel management

Once line and staff functions are identified, the next question is how should the individual line and staff positions be staffed.

Staffing Models

In the fire service there are many possible combinations for staffing a local department. Staffing combinations include: full-time paid, part-time paid, paid on call, and volunteer, or combinations of these. The choice of how to staff the fire department, what staffing model to use, is determined by the community based on a number of factors. What works well for one community may not work well in another.

There are a number of factors worth considering that may influence the preferred fire department staffing model.

- Financial resources of the municipality.
- Range of fire services expected.
- The availability and skill set of volunteer personnel.

- Frequency of and type of incidents.
- Workload load created by the objectives for Staff functions
- The type of department preferred by the community.

The experience in Windsor-West Hants has been for many generations, emergency response services have been delivered by volunteer firefighters, and citizens. This basic staffing model for line functions seems to work well and we found no suggestions that it be changed. We note that volunteer firefighter skill levels are rising, and they need to, as the type of incidents continues to evolve, and thereby demands higher level and sometimes different skill sets.

The one main concern is that in today's litigious society it is becoming more common for fire department errors to be challenged in court. One part of a municipality's defense is to ensure that firefighter skills meet best practices, which generally means meeting established standards; one example is NFPA-1001[18] Level I. These standards need to be recognized and established through policy. Firefighters need to achieve the standard skills, and the achievements must be well documented. This is not currently happening in a sufficiently consistent manner even though the fire department registration process with the municipality demands it.

As for staff position, i.e. senior officers, we note that these positions seem to be struggling with the work load imposed on them. Currently, all fire chiefs and deputies are volunteers. In the recent past the fire chief in Windsor was a full-time position, but this has lapsed. Several comments were made by chiefs that more assistance from the municipality is needed.

In the RACI[19] survey that was conducted as part of this Review it was noted that quite a few required programs have either not been introduced or are not being accomplished as expected. Some of this may be due to lack of knowledge but some is due to lack of available time.

During stakeholder meetings with firefighters, line officers, and chief officers, there were several themes. One was that the volunteer firefighters did not want to be responsible for Fire Code

[18] National Fire Protection Association, NFPA-1001; Standard for Firefighter Professional Qualifications. Level I is the basic level. The standard includes a more advanced Level II.

[19] RACI (Responsibility, Accountability, Communicate, Inform) is a means to decipher who is doing what in the establishment, management, review, direction and providing leadership for necessary programs and processes in the fire department. All of these programs/processes are either best practices or established through legislation.

inspections and enforcement in their communities. Inspections and enforcement are currently a function of full-time municipal staff.

Another theme was that the chief officers were desirous of reducing their administrative responsibilities. They required assistance, including the provision of municipal assistance with HR issues.

In our opinion they need assistance in other areas as well where administrative loads can be high and/or where municipal standards demand that a particular process be followed for the expenditure of public funds, for example major purchases.

Current Staffing at Stations

The current staffing levels in the W/WH fire departments are as follows;

Position	Windsor	Hantsport	South-West	Brooklyn	Three Mile Plains	Summerville
Fire Chief	1	1	0	1	0	1
Deputy Chief	2	2	0	1	2	1
Captain	5	4	1	7	3	2
Lieutenant	4	1	1	0	0	2
Firefighter	13	20	10	29	19	18
Safety Officer	0	1	2	1	1	0
Mutual-aid firefighter	0	3	2	0	0	2
Veteran/Driver	6	0	0	0	0	2
Veteran	5	4	0	0	0	7
Dispatcher	0	1	0	0	0	0
Totals: (188)	36	37	16	39	25	35

Veterans are former firefighters who continue to participate in a non-firefighting role, usually as support personnel at major fires, doing odd jobs. Veteran/Drivers are veterans who drive and operate the fire trucks when needed but have no further firefighting role.

FIRE SERVICE LINE FUNCTION STAFFING/POSITIONS; EXISTING AND PROPOSED

Typically, the fire service hierarchy includes senior officers in the positions of Fire Chief and Deputy or Assistant Fire Chief. These positions function as both line and staff positions, having responsibility in both areas. At emergency incidents, typically larger or more complex ones, they are expected to assume overall responsibility for the conduct of operations.

Front line officers typically consist of Captains and Lieutenants. These positions are primarily focused on the preparation for and response to incidents, both emergency and non-emergency. They have first-line supervisory roles at the station as well as at the incident scene. At an emergency incident, a line officer is usually in charge of the response to the incident including all other firefighters, and under legislation of the public also. When relieved by a more senior officer (Chief/Deputy) the line officer retains similar responsibility at the incident, but for a smaller portion of it.

There are other formal staff positions in the fire department than those already mentioned. These positions also have line and staff functions, in varying degrees according to their assignments.

The following section outlines the responsibilities of each formal staff position in the fire department. Except as noted, all are currently filled by volunteer firefighters.

Fire Chief

In the Municipality of West Hants each of the four fire chiefs is responsible for emergency response in their specified response District, as previously noted on the map. The fire chief is responsible for;

- the executive management and direction of a department,
- strategic and master planning,
- budget preparation,
- establishment of legislated and best practice programs,
- personnel and equipment management,
- safety initiatives, and
- incident management, which is hands-on at larger incidents.

The fire chief is appointed as a local Assistant to the Provincial Fire Marshal, which is the fire department's conduit for provincial authority under the Fire Safety Act.

Deputy Fire Chief

The Deputy Fire Chief(s) is the second in command of a fire department. The deputy is responsible for;

- Assisting the Fire Chief in all aspects of department operations and management,
- assuming the role of the Fire Chief in the latter's absence,
- responding to emergencies,
- ensuring proper training is delivered,
- ensuring department policies and procedures are followed, and
- managing line officers as direct reports.

The position includes a combination of administrative work and time spent in the field to keep operations running efficiently in the fire department. A deputy chief may have a specific area of the fire department function that he/she is specifically responsible for; for example, administrative functions like fire reports.

Assistant Chief

Some fire organizations use the title Assistant Chief in lieu of Deputy Chief. Typically, they are assigned to oversee and manage particular function such as the firefighter training program or administrative duties.

Similar to the deputy fire chief, an assistant fire chief may act as the Fire Chief in the absence of the Fire Chief, assuming the Fire Chief's roles, responsibilities and authorities. There are currently no Assistant Chiefs in Windsor-West Hants.

Division Chief

This position is one that is between the rank of Captain and that of either, an Assistant Chief or Deputy Chief. The role of the Division Chief is specific to his Division; and includes the administration, management, planning, organizing and implementing of specified programs.

Some typical assignments for a Division Chief include the Training and Safety Division, Communications Division, Fire Prevention Division, and Maintenance Division.

There are currently no Division Chiefs in Windsor-West Hants.

Fire Inspector

The Nova Scotia *Fire Safety Act* §19 requires all municipalities to appoint at least one fire-inspector and to "*establish a system of fire-safety inspections…*" Also, in the *Act*, are stipulated requirements for record keeping and minimum inspection schedules.

The *Act* does not specifically stipulate that municipally appointed fire-inspectors be qualified, but elsewhere in the *Act* such a stipulation is there for the Fire Marshal's appointed fire-inspectors and for local assistants who also have the powers of fire-inspectors.

In the *Act*, §3(ad) *"'qualified' means acceptable to the Fire Marshal.*" This suggests that fire-inspectors in Nova Scotia should meet the requirements of NFPA-1031[20] as detailed by the Nova Scotia Professional Qualifications Board.[21] The Fire Inspectors Association of Nova Scotia (FIANS) offers, in cooperation with the Nova Scotia Fire Marshal's office, a Fire Inspector Certification Program.

In the Windsor-West Hants region the responsibility for providing a municipal fire-inspector has varied, but is currently undertaken by building officials in the West Hants Planning and Development Department. The building officials split building and fire inspection tasks amongst their qualified staff. Fire inspection is a secondary responsibility. Personnel assigned fire-inspection duties have taken the FIANS course.

A fire-inspector is responsible for inspection of properties and determining if the properties meet the minimum requirements of the National Fire Code, as required by the provincial *Fire Safety*

[20] National Fire Protection Association; NFPA-1031, Standard for Qualifications for Fire Inspector and Plan Examiner.

[21] Minimum competencies are laid out by the Nova Scotia Fire Service Professional Qualifications Board (NSFSPQB), an organization that is sponsored by the Fire Marshal's office.

Act and associated Regulations and according to the municipal policy on fire inspection schedules.

Some of the specific responsibilities of a fire-inspector are;

- to inspect buildings to locate hazardous conditions and Fire Code violations,
- inform the owner/occupant the corrective actions necessary to bring properties into compliance with the Fire Code,
- conduct follow-up inspections to ensure that corrective actions have been taken,
- make and keep records of every fire inspection performed,
- review and approve fire emergency plans, and
- lay charges for offenses contained in the *Act* pertaining to fire-inspections and Fire Code violations, and support the charges through the court system as might be required.

This position ideally will have a firefighting background or experience to better inform the fire-inspector to issues relating to firefighting access and operations, especially where interpretation of fire department issues is stipulated in the Fire Code.

Fire Investigator

The Nova Scotia *Fire Safety Act*[22] §32 requires that the *Local Assistant* to the fire marshal;

> *"immediately, and in no case later than twenty-four hours following a fire, investigate, or cause to be investigated, the cause, origin and circumstances of every fire by which property has been destroyed or damaged…"*

Under §14 of the *Act*, the Local Assistant is "*a qualified fire chief or, with the consent of the fire chief, another qualified member of the fire chief's fire department."* In Windsor-West Hants each fire department's fire chief is the local assistant within their response jurisdiction. We have been advised the fire chief, and in some cases the deputy fire chief(s) conduct the required fire investigations.

[22] Nova Scotia *Fire Safety Act*. 2002, c. 6, s.1.

As stated in the *Act*, fire investigation should be conducted by qualified[23] personnel. This means persons who meet the job performance requirements of NFPA-1033.[24] Fire investigation is a highly sophisticated process and must follow another recognized standard, NFPA-921,[25] for the results of the investigation to be valid and defensible. Qualified fire and explosion investigators are designated as a Certified Fire and Explosion Investigator (CFEI).

Fire Training Officers

Currently there are no dedicated training officers in the Windsor-West Hants fire services organizational charts, as such. However, Captains have been tasked with the delivery of training and there are a number of training committees.

Typically, training officers research training needs, identify resources, and developing training programs as required to meet the needs of emergency services delivery. Training is a critical component of the delivery of fire services. It helps to ensure the effectiveness, and efficiency of the service, and is key component in firefighters' safety.

The Nova Scotia Fire Service Professional Qualifications Board has established a qualification standard for fire service instructors that is based on NFPA-1041[26], levels I and II. In the standard, level I is a person who delivers instruction to firefighters, and level II is someone who is responsible for "*The management of instructional resources, staff, facilities, and records and reports.*"

In W/WH the level of training officer qualifications is inconsistent; with two department reporting persons qualified to level I and no departments reporting persons qualified to level II.

Typically, the station training officer, qualified to level I would;

- provide advice to the Fire Chief regarding training needs,

[23] According to the *Act* the incumbent must meet the Fire Marshal's requirements for competence. Minimum competencies are laid out by the Nova Scotia Fire Service Professional Qualifications Board (NSFSPQB), an organization that is sponsored by the Fire Marshal's office.

[24] National Fire Protection Association, NFPA-1033, Standard for Professional Qualifications for Fire Investigators

[25] National Fire Protection Association, NFPA-921, Guide for Fire and Explosion Investigations

[26] National Fire protection Association, NFPA-1041, Standard for Fire Service Instructor Professional Qualifications

- coordinate weekly training sessions at the station and/or assist the line-officers in the conduct of training,
- provide logistical coordination for local training,
- resource and/or develop lesson plans,
- maintain the training data base of all training, and
- prepare training safety-plans for all hands-on training sessions.

The last two bullet items are particularly critical.

Captain

Currently in W/WH, the fire Captain position is the senior operational officer. Every station has at least one Captain. There is currently a total of 22 Captains in W/WH departments.

At an emergency incident there must be enough Captains at the scene to maintain an effective span-of-control (SOC). Ideally this means that each Captain has three to no more than five direct reports. There is insufficient data to determine the current situation re SOC at emergency incidents in W/WH. However, looking at the station staffing numbers we can make some reasonable assumptions that the ratios seen in the station will also be seen at incidents.

The SOC ratio is inconsistent in W/WH, with current station staffing numbers suggesting that the SOC for Captains varies significantly between as low as 3:1 to as high as 10:1. Numbers exceeding 5 are undesirable and suggest that coordination and control of firefighting actions at incidents will suffer. Some stations need to train and appoint more Captains.

The Captain is responsible for the direct supervision of firefighters and other duties, as follows;

- the welfare and performance of their assigned personnel,
- may oversee multiple lieutenants,
- directs a firefighter team at incidents,
- reports to the incident commander on conditions and resource needs,
- firefighter safety at all times,
- is the incident commander unless relieved by a more senior officer,
- participate and/or deliver training to their assigned personnel (company), and
- discipline and conformance to department policies and procedures by subordinates as the first line supervisor.

The Nova Scotia Professional Qualifications Board has established a certification program for fire officers. The standards are based on NFPA-1021[27] and include qualification Levels I through Level IV. Roughly speaking, a Fire Officer Level I is a Lieutenant, a Fire Officer Level II is a Captain, a Fire-Officer Level III is a Deputy/Assistant/Divisional Chief, and a Fire Officer Level IV is a Deputy Chief/Fire Chief.

According to the data we have gathered, in W/WH the qualifications of fire officers is inconsistent. At least one department has certified some of their fire officers at Level I and trained others to that level also (but not yet certified). Another department has trained some of their fire officers to Level I.

Lieutenant

A Lieutenant is a rank between that of a firefighter and Captain. It is the entry level officer position. Lieutenant is a rank that is present in all W/WH fire departments, except Brooklyn and consequently in Three Mile Plains station.

- The Lieutenant is a transition role between that of an experienced/senior firefighter and a Captain. It provides an opportunity for the person in this position to learn new skills and the role of fire officer through one-on-one mentoring and coaching by a Captain, to ready them for their future role as a Captain.
- In the absence of Captain, the Lieutenant assumes the Captain's responsibilities and duties.
- A Lieutenant can also participate in training firefighters and assist the Captain in completing their assigned duties.
- At an incident scene, a Lieutenant is expected to be a team leader and helps maintain a manageable span-of-control.

Incident Safety officer (ISO)

An Incident Safety Officer (ISO) is not a line-officer per se although this position is most prominent at the scene of emergency incidents. The main function is as an extra pair of eyes and ears for the incident commander, with a specific focus on mitigating hazards to firefighters.

In W/WH the formal recognition of the ISO as an organizational position is inconsistent. Regardless, at all major emergencies there is a high likelihood of a senior firefighter or officer

[27] National Fire Protection Association, NFPA-1021, Standard for Fire Officer Professional Qualifications

acting in the capacity of ISO and assisting the incident commander. Almost all of the W/WH fire departments reported that they had numbers of firefighters trained (not certified) as ISOs. All departments should have enough officers or senior firefighters trained/qualified such that there is a high probability that a qualified ISO will be in attendance at every incident.

Typically, this position is a well experienced Captain who has both extensive emergency response experience and experience as an incident commander. It is also advantageous that the ISO has building construction knowledge.

The ISO monitors incident operations and advises the incident commander on all matters relating to safety and health of all responders at the emergency. In particular the ISO;

- is responsible to the incident commander for the operations of systems and procedures necessary to ensure ongoing assessment of hazardous environments, including development of the incident safety plan, and the coordination of multi-agency safety efforts,
- exercises emergency authority during an incident to stop and/or prevent unsafe acts,
- initiates preliminary investigation of accidents within the incident area, and
- assists in the development of department safety standards.

There is a recognized standard for the ISO position, NFPA-1521.[28] However, certification as a safety officer is not currently available in Nova Scotia. The Nova Scotia Firefighters School, in Waverley, does offer their Incident Scene Safety Officer course free of charge to volunteer firefighters. This course is based on NFPA-1521 and provides a qualification certificate for successful completion. The next step would be to the Firefighters School achieve accreditation for the course so that participants could apply for certification.

[28] National Fire Protection Association, NFPA-1521, Fire Department Safety Officer Professional Qualifications

Occupational Health & Safety Officer (HSO)[29]

This position is different than the Incident Safety Officer and is an organizational appointment in accordance with best practices. This appointment can be any individual with an interest in occupational health & safety and who is adequately trained in this field.

This position addresses;

- the day to day health and safety of the individual firefighters,
- recognizes and takes action to control occupational health and safety issues that impact firefighters, such as unsafe conditions in the fire station,
- insures and plans that required testing and inspections of apparatus, PPE, SCBA, ladders, fire extinguishers, and etc. are completed,
- conducts facility and equipment inspections, maintains records and takes corrective action to minimize risks and exposure of firefighters and staff to hazards,
- chairs station OH&S committee,
- monitors OH&S programs, and
- instructs/monitors firefighters in OH&S issues and procedures, i.e. proper cleaning of PPE after an event.

The basis of the recommended occupational safety and health program is NFPA-1500[30] and applicable provincial legislation. Firefighter safety and health must be a strong focus for fire department management. There is currently some inconsistency in how this is interpreted and understood across the W/WH fire departments.

Firefighter

The firefighter position is, on the one hand, the entry level to firefighting and, on the other hand, also can be the most senior and experience person in the fire department. There are consequently many practical levels of firefighters, reflecting the training, skills, and experience of each person.

[29] The Nova Scotia Fire Services Occupational Health and Safety Reference Guide, 2003, recommends the appointment of a Health and Safety Officer "*that performs the duties and responsibilities as stated in section 29 of the Nova Scotia Health and Safety Act.*" This guide is a consensus guide (participation of career, volunteer, composite fire services and the OFM) that was developed and "recommended to be considered a minimum standard for safe operations."

[30] National Fire Protection Association; NFPA-1500, Standard on Fire Department Occupational Safety and Health Program

The widely accepted standard for firefighter qualifications is NFPA-1001[31]. The Nova Scotia Fire Service Professional Qualifications Board has recognized certification levels as a Firefighter I and Firefighter II, which matches the NFPA-1001 job performance requirements.

In W/WH every fire department has persons in the firefighter ranks. The current total is approximately 110 with that specific designation. Some of these firefighters have designations in accordance with their skills and knowledge and responsibilities, as follows;

- Probationary or Recruit firefighter (not fully qualified)
- Driver/Operator (of specified heavy vehicles)
- Veteran and/or Veteran Driver (semi-retired former firefighters, not in the 110 total)
- Junior/cadet firefighter (young people learning to be firefighters not in the 110 total)

More generally a firefighter;

- follows the directions and orders of department officers
- is the principal hands-on working member of the fire department at incidents,
- uses all available tools, machines, and equipment to achieve objectives,
- administers emergency medical care and saves lives.
- applies knowledge of numerous technologies and methodologies,
- does search and rescue activities in burning buildings or hazardous conditions.

Driver/Operator, Engineer

A driver/operator, sometimes called a fire department engineer (a hangover from early days of fire service nomenclature), is a firefighter who mainly drives and operates the fire apparatus' water pumps, aerial devices, and in a volunteer, department is not always required to be a trained firefighter. Their main role is to;

- do minor maintenance on the apparatus and equipment,
- do the daily or pre-trip safety inspection,
- bring any safety issue to the OH&S officer or company officer,
- drive the apparatus in a safe manner,
- respond to incidents with their assigned vehicle, and

[31] National Fire Protection Association; NFPA-1001, Standard for Fire Fighter Professional Qualifications

- operate the fire pump and other vehicle-based devices as required.

Fire Service Coordinator

A review of this position was conducted for its role and value to the fire service within the new Regional Municipality. This position is not a regulated/required position in NS.

Several interviews were conducted with Fire Service Coordinators from across the province and from these it was learned that none had any authority within their fire departments. The coordinators' roles and responsibilities greatly varied and in some cases the role of coordinator was not accepted by the volunteer chiefs and the position was really only of any value to the municipal administration, presumably.

We conclude that was there was little to no real value going forward to propose a fire coordinator position within the organizational structure for the new regional municipality.

Administrative Assistant

The Administrative Assistant is primarily responsible for administrative support to assist the Director of Protective Services/Fire Chief and Assistant Fire Chief. The position will also assist the Divisional Chief and the District Chiefs in carrying out their respective administrative responsibilities

The Administrative Assistant assists senior management with a wide variety of complex administrative duties. Key responsibilities include planning, coordinating and reviewing assigned activities, administrative programs and functions, including data management and reporting; budget preparation and monitoring; fiscal and expenditure auditing; submitting payroll information and processing accounts payable, accounts receivable, deposits and petty cash for the Fire Department. Other responsibilities include administering and customizing Records Management Systems; liaising with inside/outside contacts on behalf of the Fire Chief; creating/typing/formatting reports, presentations, correspondence; facilitating prompt attention to telephone/visitor/email inquiries and complaints; participating on project teams; and other duties as assigned.

Rotational ON-CALL Opportunities

There are certain services that the fire departments throughout the region provide that can lead to volunteer burnout, unnecessary overstaffing for certain types of incidents and inappropriate use of qualified firefighting personnel. A way to manage these issues is to provide an on-call rotational period for each of the targeted services so as to address the current and ongoing issues.

Currently the three services recommended for the possibility of rotational on-call program are:

- Medical First Responder (MFR)
- Fire Investigations
- Incident Traffic Control

Medical First Responder

During the many stakeholder meetings, many raised the issue of volunteer burnout, especially with regards to Medical First Responder (MFR) calls. The majority of the MFR incidents can be responded to and managed with no more than three responders. There have been call reports which indicated six or ten volunteers responded to the fire hall for a two or three responder event, where the excess personnel are left standing in the fire station. Doing this hundreds of times annually can lead to dissatisfaction.

There are two methodologies to reduce the potential for MFR burnout, one is reducing the call volume by changing the level of service offered or offer an alternative to the current method of responding.

The reason for high number of responders is that at certain times no one really knows who is available at any given moment. To lessen the burden on volunteers and the potential for burnout, a rotational system of three-four volunteers per a shift period, (to be determined), per station would be on call and if an MFR response is required, only the on-call group would be the volunteers to respond.

Investigations

During the many meetings others were concerned over fire investigations and the lack of support from the Fire Marshal's office and the length of time some investigations can absorb from a

volunteer's day or days. In review of available training data, for those who have been trained as a fire investigator, the majority are also the same individuals who have active roles in commanding the fire scene. One cannot perform both at the same time. Investigations should start during the incident.

As part of the hybrid model, it allows for a group of volunteers on a regional basis to be placed on rotational call periods. The on-call investigators would be on call for the entire regional municipality. On-call staffing requires only one investigator to be on-call per shift. (Rotational Shift period to be determined). If a confirmed detailed fire investigation is needed, then an additional fire-investigator(s) would also be called to assist as necessary.

Incident Traffic Control

Other than residential MFR calls, every incident, especially motor vehicle collisions along the 101 and higher speed secondary highways, require traffic control to protect the emergency responders. This traffic control requirement for the most part is provided by frontline volunteer firefighters. In conversation with the RCMP they are simply too under staffed to provide traffic control services and look towards the fire service to provide. Whereas scene safety is a priority function of the fire service, they have taken this role on. The Nova Scotia Government in cooperation with policing services and fire have developed a Traffic Management Training Program and Guide.

The real issue is how to appropriately staff this service. Currently it is the front-line firefighting personnel that provide this service using very expensive frontline fire apparatus. The other issue, as witnessed during the review, a structure fire had a qualified frontline fire captain directing traffic, instead of working at the fire incident.

There is an opportunity to provide this safety service on a regional basis, operating out of two stations. It is recommended that Windsor and Brooklyn stations be the ideal location for the provision of this safety service. Their communities may have the best opportunity to be able to recruit non-firefighting volunteers to provide this service. Each traffic control unit only requires two to three volunteer staff and each incident would require responses by both units.

To ease in the staffing issue and volunteer burnout, this is another service that could benefit from the on call rotational program.

FIRE PREVENTION

Overview of Services Provided

Fire departments were initially formed to provide what is typically defined as *core fire services.* Thus, the reason for inclusion in Model 3; Hybrid Regional Fire Services. Core services are the basic services directly linked to the term *fire*, such as firefighting, rescuing people from fires, and fire prevention. The provision of regulated fire prevention activities such as fire-inspections, Fire Code enforcement, fire-investigation, and public fire-safety education activities are now collectively called fire prevention.

Fire prevention consists of the three focus areas

- Public fire-safety education,
- Post-fire investigations to determine cause, origin, and circumstances, and
- Fire-inspection/enforcement of the Fire Code;

Fire-safety education to the public is intended to warn persons of potentially hazardous conditions, what to look for. It is also intended to encourage changes in behaviour, behaviours that are known to cause fires. Fire-safety education usually includes training, often of children and other particularly vulnerable groups, on how to behave in a fire emergency. The *Fire Safety Act* §16 expands on these concepts.

The consequences of fires can be devastating, including loss of irreplaceable personal items, loss of home, loss of employment, loss of life and serious injury to self and others. There are many standardized programs in existence, through several sources, to assist in the development of programs that are properly targeted to the community's fire safety challenges. If these challenges are known. One big component of a successful fire-safety education program is to determine the community fire risks.

Post-fire incident investigation is a mandated[32] service under the NS *Fire Safety Act*. All fires must be investigated immediately after the fire but in no case later than 24-hours after. Completed reports of the fires must be filed with the NS Fire Marshal's office no later than seven days after the fire. It is the responsibility of every fire chief and/or other appointed Local Assistant to the Fire Marshal to investigate fires.

The objective of the investigation is to discover the area of origin of the fire and what caused it, and the circumstances under which that combination started a fire. The intention is to discover if the fire was caused by;

- Nature (e.g. lightning);
- Human caused: accidental, deliberate, criminal, negligent, malicious, etc.;
- Equipment malfunction: used incorrectly, neglected, overheated, etc.;
- Caused by another fire: sparks, radiation, conduction, convection;
- Or other combination.

The investigation also determines if there is contribution to economic or life loss/injury because the occupancy did not meet Fire Code requirements at the time. For example; in a hotel the doors at the top and bottom of the stairs are part of a fire separation and are required to be closed at all times (that someone is not walking through them) to prevent the spread of smoke and heated gasses/flame. If a fire occurred on the first floor, trapping persons on the second floor because smoke and fire travelled through these stairwell doors that were blocked open with wedges, then the secondary cause of any deaths or injury, and fire/smoke damage to the second floor was Fire Code violations.

Discovery of these circumstances would be cause for further investigation into similar occupancies in the community that are equipped with stairwell doors. This provides an appropriate focus for resources. Proper investigations apportion responsibility properly.

[32] Fire Safety Act, 2002, c. 6, s. 1., as amended, see §32

Property fire-safety inspection and Fire Code enforcement are also mandated[33] by the NS *Fire Safety Act*. All municipalities are required to appoint a fire-inspector. Municipalities are required to keep records of the inspections made by the inspector.

The *Act's* associated Regulations[34] require inspections every three years for all assembly occupancies (Group A). The municipality must also carry out a scheduled program of inspection in all buildings containing residential occupancies of more than three-units, and in business, personal services, mercantile, and industrial occupancies. The implication is the schedule be based on the results of the fire-inspections, and the risk of fire in the community.

Money spent on fire prevention is well spent on many levels. Effective fire prevention can avoid some fire-response costs by lowering emergency incident volumes (i.e. fires) and their severity/impact on the property owner, and on the economy and social fabric of the community. It can also lower insurance rates community wide.

Fire-Inspection

GA was able to manually determine the occupancy classifications for some of the approximately 13,300 properties in the Region. Sorted by current fire station district the following table shows this distribution. It is very likely that this information is not complete.

The C classifications shown are for multi-unit buildings and do not include any single-family residences. They are not parsed for greater or lesser than 3-unit buildings, because that data was not known or provided.

[33] Fire Safety Act, 2002, c. 6, s. 1., as amended, see §19

[34] Fire Safety Regulations, N.S. Reg.48/2003

FIGURE: DISTRIBUTION OF IDENTIFIED OCCUPANCIES

Station	A	B	C	D	E	F
Windsor	30	8	33	11	8	6
Hantsport	25	2	20	4	1	17
South West	9				1	1
Brooklyn	28		8	3	6	14
Three Mile Plains	18	1	8	3	8	28
Summerville	9		1	1		3
Uniacke						
Walton Shore	3					2
Totals:	**107**	**11**	**62**	**22**	**21**	**57**

West Hants introduced the *Policy Respecting a System of Municipal Fire Inspections* in 2010. In that policy they set out the following fire-inspections schedule.

- Assembly occupancies (Group A) will be inspected every three years.
- Residential occupancies (Group C) with more than three units will be inspected every three years unless the fire-inspector deems risk of fire and loss of life requires a more frequent inspection of one or more buildings.
- Mercantile occupancies (Group E) will be inspected every five years unless the fire-inspector deems risk of fire and loss of life requires a more frequent inspection of one or more buildings.
- Business and Personnel service occupancies (Group D) will be inspected every five years unless the fire-inspector deems risk of fire and loss of life requires a more frequent inspection of one or more buildings.
- Industrial occupancies (Group F) will be inspected every five years unless the fire-inspector deems risk of fire and loss of life requires a more frequent inspection of one or more buildings.

West Hants fire-inspectors inspected a total of 56 assembly occupancies in 2017 and 2018. Assembly occupancies appear to be the focus and the work is likely approaching the three-year required cycle. For other occupancy types the inspection numbers suggest that they will not meet the minimum 5-year cycle in the policy. According to fire incident records and Provincial/National statistics the most fires/injuries/deaths occur in residential (Group C) occupancies and not Group A.

In 2017 the Windsor fire-inspector inspected 7 assembly occupancies. Based on the incomplete data for number of occupancies of various Groups inspected, in Windsor the 2017 inspection rate for A occupancies appears to fall significantly short of producing the required inspections every three years. GA does not have sufficiently complete data to draw any other conclusions.

The provision of fire-inspection services has been dynamic over the past few years. Both Windsor and West Hants have had their own inspectors, but combined with other responsibilities. Windsor once shared with Wolfville, and then with a split role as part-time fire chief, part-time inspector. West Hants shares building and fire inspection duties distributed amongst several staff, and currently provides these services to Windsor also. Fire-inspection is a secondary priority for the building officials in West Hants, and currently they have one vacant position.

Enforcement

For every building owner or occupant, failure to be in compliance with the *Fire Safety Act*, by currently having violations of the National Fire Code is a summary offence in Nova Scotia. Under §17 of the *Act*,

> "…every owner of land or premises, or a part thereof, and every person shall take every precaution that is reasonable in the circumstances to achieve fire safety and to carry out the provisions of this Act, the regulations and the Fire Code."

Furthermore, under §44(1) of the *Act*;

> " Every person who …
>
> (g) fails to comply with an order made pursuant to this Act, the regulations or the Fire Code; or
>
> (h) otherwise contravenes this Act, the regulations or the Fire Code,
>
> is guilty of an offence."

What the above means is that, under the law, any owner or occupant of a building where there are Fire Code violations has already broken the law and is subject to summary offense proceedings. This is similar to speeding on a town street. If you are caught, you will in all likelihood get a speeding ticket, unless the infraction was trivial, and then you were lucky.

The fire-inspection practice in W/WH is probably similar to most jurisdictions in NS, but is potentially flawed. As GA understands the currently practiced process in W/WH; upon a fire-inspection being conducted in an occupancy, violations are noted by the fire-inspector and submitted in writing to the owner/occupant with a demand that the violations be rectified within a specified time-period.

The fire-inspector should be immediately issuing an Order under the provisions of the *Act.* An Order lists the offences and stipulates their correction, and can include a period of time to accomplish the correction. Such Orders are required to be filed with the Fire Marshal's office, and are appealable.

Furthermore, in circumstances where a fire-inspector;

> "…determines that there is a significant risk that a fire will occur, or a likelihood that a person will be killed or injured if a fire does occur, the fire official, with the approval of the Fire Marshal, and upon such terms and conditions as the Fire Marshal considers proper, may
>
> *(a) order that an owner of the land or premises close the land or premises and prevent persons from entering until the corrective actions ordered … are completed;*"

It is important to note that the *Act* requires the issuance of an Order according to the rules under §25, and §26. According to the *Act*, the owner/occupant has already broken the law. The *Act* stipulates the offenses and refers the fire-inspector to the *Summary Offenses Act* for process.

The *Act* provides the Order process, which is part of a legal process, and is the means to commence the process of correcting offences. Orders are not a substitute for prosecution, they are a parallel step along the way.

It's GA's understanding that few if any owners or occupants have been prosecuted for violations of the *Fire Safety Act* - Fire Code. We note in the Fire Inspection Report for the Year 2017 various inspections with the dates of the inspections and the dates for follow-up inspections. Follow-up inspections means that there were violations noted at the original inspection and that the owner was instructed to fix them. Most of these follow-up dates are about six weeks after the original inspection, but some were 12 weeks, and one was just shy of eight months.

GA does not know if any Orders under the *Act* were issued, but suspects not many were. There should have been Orders issued in every inspection where violations were found. Failing to use the tools in the *Act* to issue Orders and prosecute owners for violations can incur negligence liability for the municipality and for the fire-inspector. If a deadly fire occurred within the grace period, the fire-inspector provided the owner, between inspection and re-inspection(s) the fire-inspector would be held proportionately liable if the condition in violation was material to the

loss/death. This liability is vicariously shared with the municipality and the municipalities liability insurance carrier.

GA recommends that a thorough evaluation of current fire-inspection practices and procedures be conducted to determine compliance with the *Act*. Changes should be immediately made where discrepancies are found or practices open up the municipality to avoidable liability.

Fire Investigation

Fire investigation, as mentioned, is a mandated activity after every fire. The person currently responsible for doing the investigation is the district fire chief, who is generally automatically appointed as a *Local Assistant to the Fire Marshal*. The *Act* allows other members of the fire department to be delegated as Local Assistants and to do fire investigations.

GA interviewed the district fire chiefs and they do own the responsibility for investigations. However, they also expressed that with time and energy expended fighting the fire, and with being responsible for the department during and after the fire; often they are not well motivated to spend more time the next day at a fire doing a detailed investigation. They lean on the Fire Marshal's office (OFM), and in several noted cases have leaned on an insurance company adjuster to provide investigation of the fire.

The Fire Marshal's fire investigators will investigate fires, but only do a fraction of the province number of fires every year. There must be a death, serious injury, very large loss, or suspicion there is something of provincial interest, for the OFM to accept doing an investigation. The catch is, in order to know if these triggers are present, some investigation needs to be done locally first.

Insurance companies are motivated to avoid paying out dubious or fraudulent claims; which is understandable. Unfortunately, this makes them an inherently biased source for fire investigation services. Most use contracted services, who are hopefully competent. GA was told of one prominent case in the area where two insurance companies were in dispute over the cause of a fire, and the apportioning of responsibility. Fire investigation is a science, and must be conducted accordance to forensic investigation rules. Conclusions must be supportable in court.

The RCMP is responsible for prosecuting Criminal Code offenders for arson. To do this they need evidence from a fire to build a case for prosecution. Usually, the RCMP work with the OFM in obtaining this evidence, if OFM accepted the fire for investigation.

Under the rules of the *Canada Evidence Act*, the police need probable cause to obtain a warrant before they can start taking physical evidence from the fire scene in a criminal investigation. If the OFM is not involved in an investigation, then the probable cause must come from the fire department's investigator. Probable cause is most effective when it comes early in a case, and not 24-36 hours later after potential evidence is lost, destroyed or altered. It is also more valuable, and secure, if it comes from a credible source; i.e. a qualified fire-investigator. It is GA's experience that a successful fire investigation should start while the fire is still in progress.

Fire investigation is a professional skill, and takes considerable training and experience to become competent. This is a deterrent for Local Assistants (fire chiefs) to take on the role that they have forced on them, and is a deterrent to getting a well processed and informed investigation that will withstand scrutiny. For the average citizen who experiences a fire loss, the value is the insurance company will more likely pay-out the loss. For the municipality, the value of an opportunity to focus fire-safety education and inspection programs appropriately.

GA recommends that qualified fire-investigators be retained by the Regional fire service for the purposes of investigating all fires for their origin, cause, and circumstances.

Fire-Safety Education

The local fire departments currently do some fire-safety education in their communities. Some of these activities include open houses where children and parents have the opportunity to visit the fire station and fire trucks and possibly pick up a smoke alarm pamphlet. For a number of years one station went out into the community once a year and did home smoke alarm checks and friendly home risk inspections. This initiative eventually morphed into a fund-raising activity and so was dropped.

Anecdotally, GA heard the following comments on station based "fire prevention." Many firefighters do not enjoy participating in fire prevention (i.e. fire-safety education) activities.

Those that do, do so as time permits, often as an individual initiative. Some stations have firefighters go to schools and nursing homes. Some stations are against doing a smoke alarm program where the firefighters go out into the community and visit homes. One group mentioned a possible partnership with ground search and rescue where GSAR could get fundraising support in exchange for assistance with fire-safety education assistance.

GA saw no evidence that there is any Regional coordination and resourcing for these activities, although there are modest funds in the budget for this purpose. West Hants Policy COGE-007.00, under which the local fire departments are registered to provide their services, expressly states a desire for the above to happen, as follows;

> *"The purpose of this policy is:*
>
> *d) To provide for other matters necessary and expedient for the provision of fire and emergency services, including: …*
>
> *(3) To create the framework by which the participating Service Providers and the Municipality can explore opportunities to* ***standardize the delivery*** *of fire and non-fire emergency services including* ***fire prevention activities*** *such as promoting awareness and providing education, …*" {emphasis added}

GA recommends that more resources, coordination, and emphasis be placed on fire-safety education activities. These activities should be delivered locally but coordinated regionally and in accordance with risks in the community.

THE FIRE SERVICES ORGANIZATIONAL REVIEW OBJECTIVE

The Review was intended to determine a cost effective and efficient organization for the delivery of fire services throughout the new Regional Municipality.

The Review included all of the current services being offered, current service levels, staffing, staffing types and staff functions. Recommendations were requested that would enable the new regional municipality to establish a fire protection service delivery program that would be homogeneous across the entire regional municipality. Part of the goal was to consider the valued history and individuality of the local community culture of each of the current fire departments.

Change is implied when a fire service is reviewed as a result of municipal evolution. Sometimes it is hard to accept the changes needed to provide better fire and emergency services. Although the status quo may need to change, change is never easy and is not universally acceptable, especially to those who are heavily invested in the present.

However, sometimes the expectations of the public, who receive and pay for the services, will push the need for change. In that case it is better for those who provide the services to understand the need for progress and to embrace and become part of the change. The service providers contributions past and present are appreciated.

In general, the fire services have believed that the solution to new and developing challenges was to apply more resources; i.e. more money, more staff, more equipment, and etc. A study of the true needs to meet new demands for service can show in some cases that the *need more resources* approach is not the only solution, and may in fact not be the appropriate solution as there are inherent challenges for the organization in adding resources, not to mention the financial strain on taxpayers.

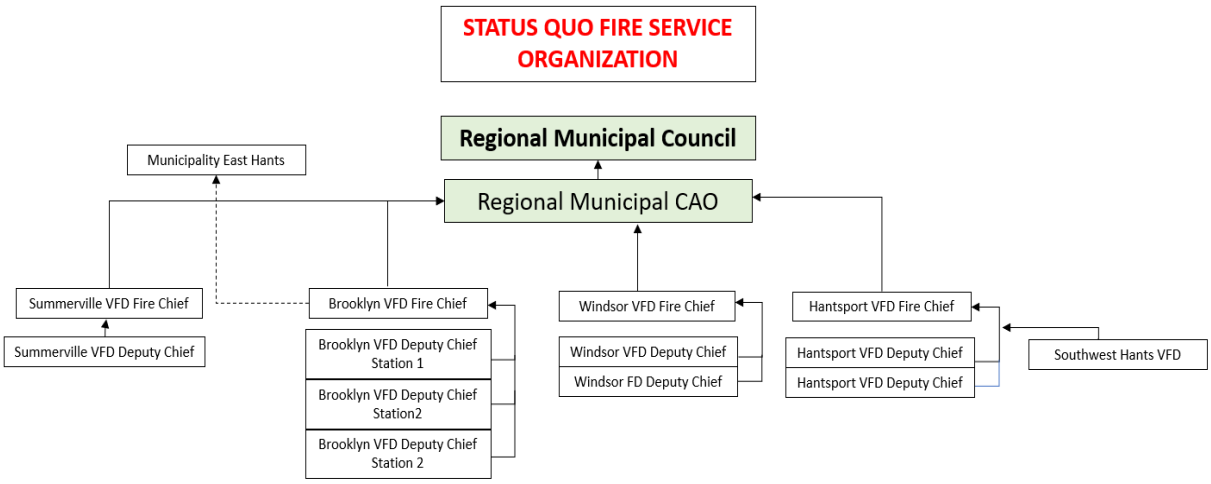
One of the fundamental questions posed as part of this Fire Services Review was whether or not the current fire department resourcing was sufficient to meet service demands. In our opinion the resources are adequate, but should be considered within the context of optimizing their access for use. In other words, current resources should be used more efficiently, as part of a better coordinated system of service delivery.

To that end, three organizational models were evaluated to determine if they would meet the stated objectives and goals of the Review. In any organizational structure it takes great collaborative leaders and support from within the organization to meet the organization's objectives. With the caveat that it is most unlikely that any proposed organization will work without the right leadership, GA has developed for consideration the following three organizational models.

***Model 1**: The Status Quo*

One of the main goals of this Review was to propose how to provide a more homogeneous service. The evidence of the past and current procedures, policies, interdepartmental relationships, and department competitiveness distracts from any true standardized service delivery. There have been steps taken to address a few of the issues, but much more needs to be done, if there is to be any real progress.

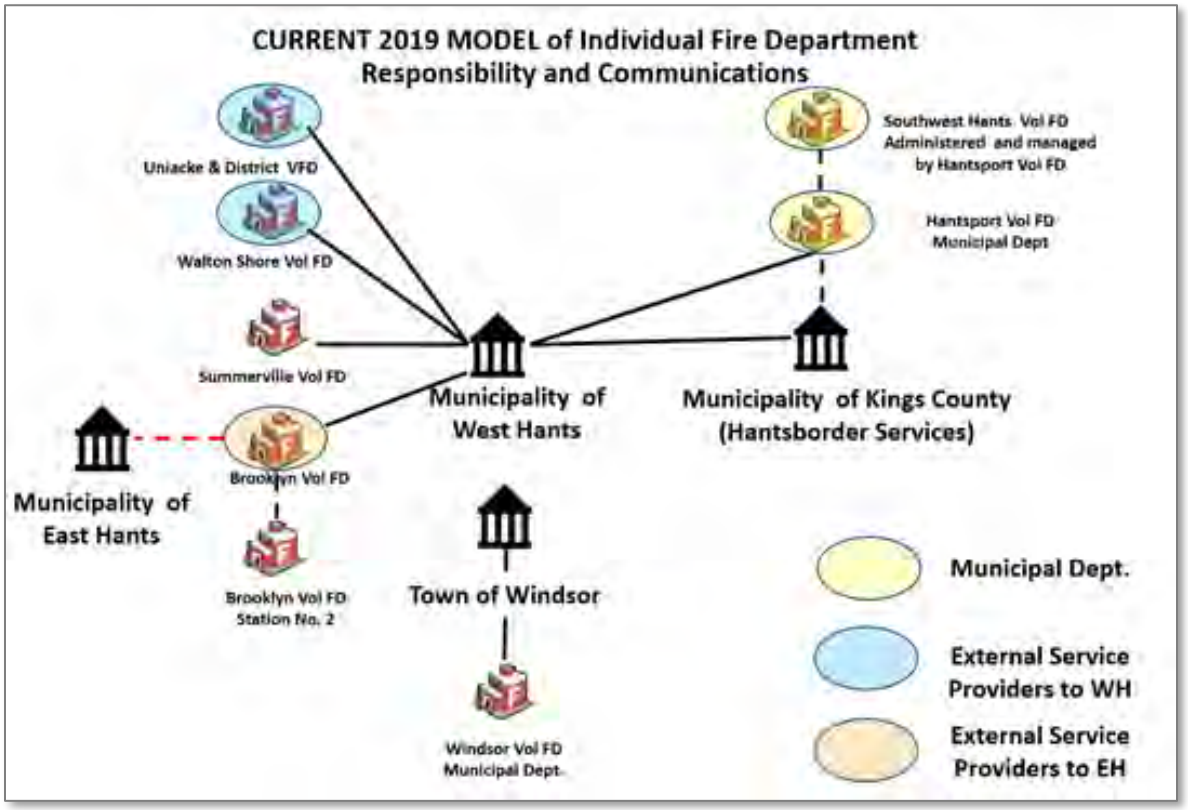
In the current situation, all but one department is managed by a registered society. The following represents the current/existing organizational model



The reporting relationships of this model are complex and largely tenuous. Many relationships are at arms-length from the municipality, and indeed may not be known to the administration and

may not be formalized although they likely carry liability. The following diagram illustrates these relationships.

***Model 1**; Relationship Diagram*



An analysis helps to clarify the pros/cons of this model. The results are captured in a S.W.O.T. (Strengths, Weakness, Opportunities, Threats) analysis chart, as follows on the next page:

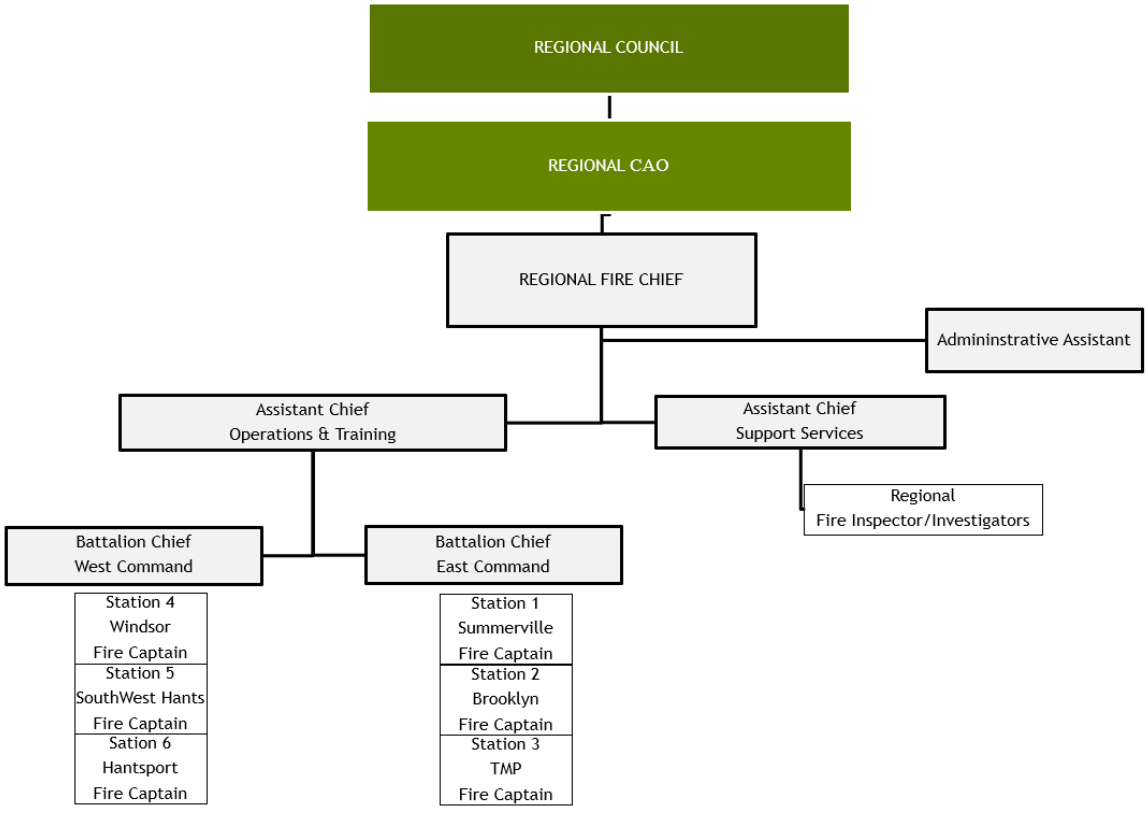
***Model 1**; S.W.O.T. Analysis*

	STRENGTHS		WEAKNESSES
1	Because Societies have responsibility for the administration, management, and operation of their departments, within municipal set rules, there is little municipal overhead required on a day to day basis	1	Lack of Municipal oversight for those that are Society Departments, and who are accountable to their society and local community residents
2	The current model has provided 60 plus years of service to the communities.	2	Lack of complete Accountability & Transparency Funding issues are problematic
3		3	Perpetuates the possibility of self-serving interests
4		4	Lack of Collaborative Leadership
5		5	Often big picture of service delivery is lost
6		6	Possibility of differing service levels throughout the Regional Municipality
7		7	Could possibly create an over or under funded department, exceeding or not meeting needs of the local community
8		8	Lack of overall Regional strategic focus
		9	Only responsible to deliver a service level to local area.
9		10	Not all polices and procedures between departments are compatible; possibly causing operational challenges and personnel issues
	OPPORTUNITIES		**THREATS**
1	Opportunity for change to permit effective collaboration so as to meet the needs of the Regional Municipality	1	Liability Risk to Regional Municipality is high
2		2	Must negotiate with service provider on any proposed changes to service delivery methodology and accountability
3		3	Often suggested alterations to current conditions are perceived as a threat to individual organization's viability and possibly impact business relationship and political fallout
4		4	Major disagreement may threaten provision of services and municipality may have to scramble to find alternative solution
5		5	Costs to municipality may continue to increase with little ability to find alternative cost model due to lack of true insight into needs

***Model 2**: Integrated Regional Service*

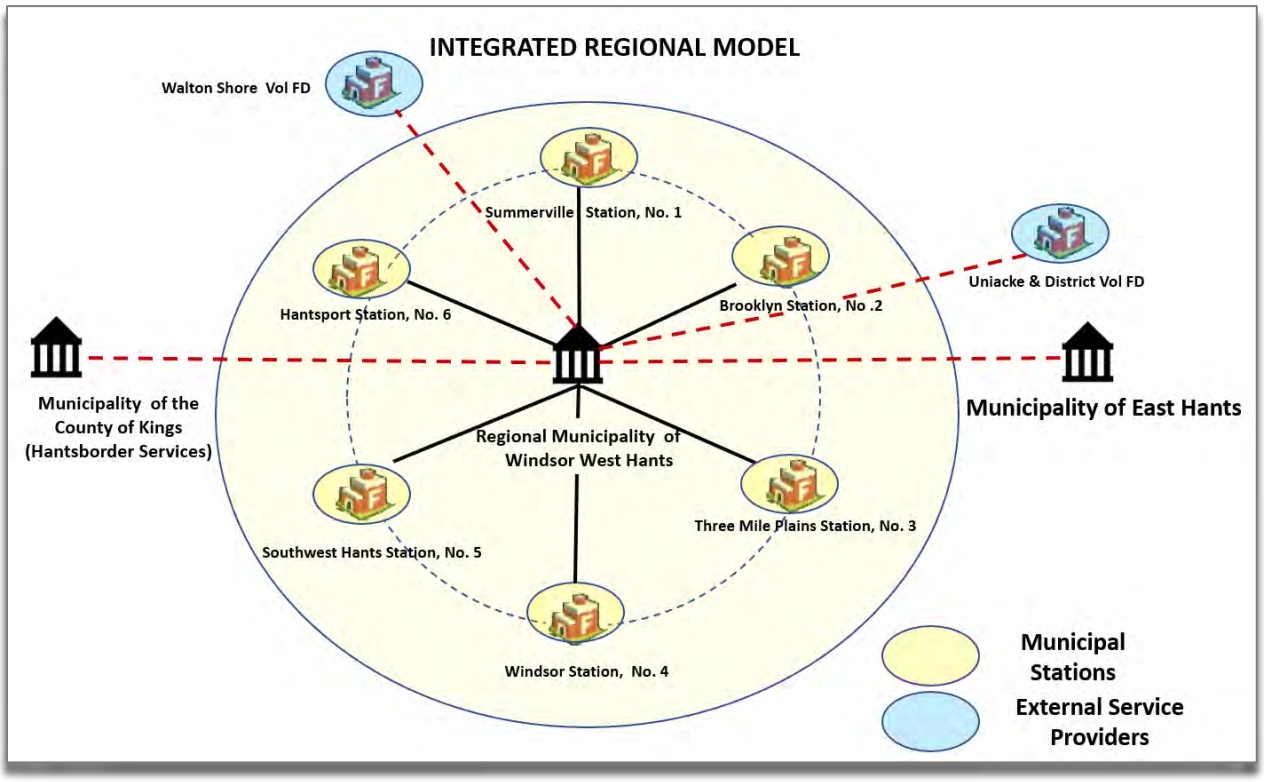
This model is similar to the HRM (Halifax Regional Municipality) Model. It is a fully integrated municipal fire service model featuring a single management group that is part of the municipal management structure; supported by line and staff positions, and with each station having a senior Fire Captain in charge, reporting to the consolidated management group.

Complete and full responsibility, accountability, and funding for the service rests solely with the Regional Municipality. Establishing this model would require the Municipality to buy-out or displace the existing Society run services.



The reporting relationships of this model are well known and defined. All relationships are direct to the municipal management team, with each municipal department contributing its expertise as with any other municipal operational department. Accountability and transparency are subject to administration and Council oversight. The following diagram illustrates these relationships.

***Model 2**; Relationship Diagram*



An analysis helps to clarify the pros/cons of this model. Analysis results are captured in a S.W.O.T. (Strengths, Weakness, Opportunities, Threats) analysis chart, as follows on the next page:

***Model 2**; S.W.O.T. Analysis*

	STRENGTHS		WEAKNESSES
1	Provides Municipal oversight	1	Drastic change will put exteme stress on volunteer/Corporate relationship
2	Provides Accountability & Transparency	2	Lacks recognition of individual department history and contribution to their local residents and the community at large.
3	Accountability to all regions and citizens of the municipality	3	Lacks redundancy with in the operating function of the organization
4	All departments provide service, without mutual aid or auto-aid agreements, to all areas of the Regional Municipality	4	Potential impact on volunteer recruitment and retention as there are few promotional positions/opportunities with the service
5	Provides for big picture overview of entire fire and emergency service delivery. Stronger Corporate understanding of issues and challenges	5	
6	Provides one Regional strategic focus in service delivery	6	
7	Standardizes, administrative, management and operational policies, including , training, safety, service delivery, HR and volunteer benefits	7	
8	Reduces Municipality's liability in service provision	8	
	OPPORTUNITIES		**THREATS**
1	Opportunity for change to permit effective administration and management of the fire service so as to meet the needs of the Regional Municipality	1	Remote management could lead to mass resignations of volunteers
2		2	Negative Political impact likely in near term
3		3	Potential lessening of integration with the local community

***Model 3**: Hybrid Regional Fire Service*

This model is a blend of the current (status quo) and the integrated regional model. It is a partially integrated municipal service featuring a distributed management group that includes; a Director of Protective Services/Fire Chief (DPS/FC) who is part of the municipal management structure, some regional staff positions to support administration and regional priorities, and a management committee of district fire chiefs representing local fire station management.

The role of the Director of Protective Services also includes responsibility for the Region's Emergency Management Program and will act as its Regional Emergency Management Officer when called upon. In addition, the role of Protective Services Director, on behalf of the CAO/Council, is the main liaison between the Region and Emergency Health Services and Policing.

This model provides better responsibility and accountability to the Regional Municipality than the status quo while still recognizing a semi-autonomous role for local management of fire stations.

Individual district fire chiefs, within their respective response districts, will have responsibility for local issues and will ensure that their station and volunteer firefighter staff are ready and able to respond to incidents as required. The regional DPS/FC will have responsibility for the overall fire services delivery, including operational and financial management of the fire services and responsibility for implementing Council's directives on standards and levels of service. His/her responsibility will be to ensure the provision of an effective, efficient, and safe emergency response service that meets best practices and that is accountable to the municipality's Chief Administrative Officer and Council.

It is recommended that individual fire stations maintain their individual community names in order to maintain that local connection to the community. For this reason, we are also recommending that all six W/WH stations operate as individual entities within their communities, not as substations.

This model features a District Fire Chiefs' Management committee that meets with and reports to the Director of Protective Services/Fire Chief. This committee is recommended to not only improve communications throughout the W/WH fire service, but to also achieve consensus on issues of importance.

This model is anticipated to provide full accountability and transparency, and will take advantage of the benefits of standardization of service, equipment, training, and response procedures. One of the benefits will be cost-efficiencies in region-wide purchasing of equipment and also the better use of unique equipment region-wide.

The recommendation is to include a part-time Divisional Chief of Training, Safety and Communications. The role of this part-time position is to develop standardize programs, and to implement and manage those programs across the regional fire service.

This organizational model also proposes to enhance the current positions of part-time station maintenance and cleaning personnel to include the duties of a firefighter/driver. This will enhance response during those times of the day and days of the week where volunteer response is low.

This model provides for an Assistant Chief position that, in addition to filling in for the Director of Protective Services/Fire Chief his during absences, is also responsible for the Regional Municipality's Fire Prevention initiatives; i.e. fire safety-education, and regulated fire-inspection, and fire-investigation services.

It is proposed that the current practice of fire-safety education, delivered to the public by their local stations, continue. What we have heard during this study is that this initiative is in need of coordination across the Region and better support. It is not essential that active firefighters provide this service. Interested civilians, seniors, or retired firefighters are often interested in participating in these programs, and this model improves that opportunity.

Currently fire-inspection services are being performed by the West Hants building inspection personnel. There are currently insufficient resources assigned to this task to meet legislated and bylaw requirements for fire-inspection. Fire-inspection is a secondary priority for the busy

building inspectors and there needs to be more focus on what is in fact a potentially life-saving service and overall cost saving program. For this reason, we are proposing that fire-inspection and Fire Code enforcement services be delivered by the Regional fire services. Effective communications with building and planning staff is required to continue. GA has worked with the proposed model in several jurisdictions and it does work well.

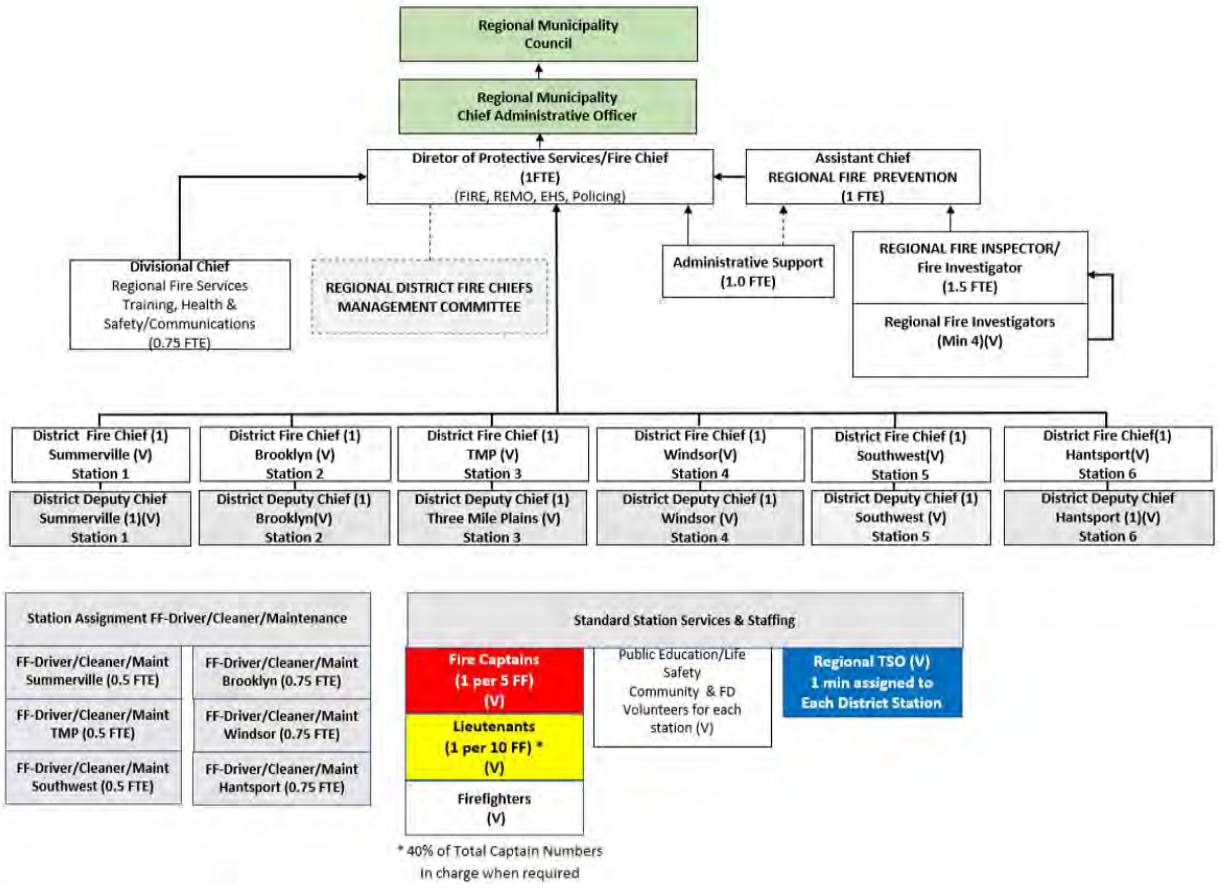
The model provides for 1.5 FTE fire-inspectors. The inspectors will also have a role to play in fire-investigations. Very often Fire Code violations become evident during a fire investigation to those who know the requirements well, i.e. fire-inspectors. These violations are often contributory to loss and injury suffered during the fire.

Currently, fire-investigations are not meeting best practices nor the requirements of legislation. Adequate numbers of properly trained staff are required to ensure that every fire is investigated within the legislated time-lines, and that the required fire incident reports are completed and filed with the Fire Marshal's office, also within the legislated time-lines. We are proposing that a small cadre of interested volunteers be trained as part-time fire-investigators, and that they be deployed region-wide, on an on-call basis, and as-needed to support the incident commander by providing effective fire investigation resources in a timely manner.

We are suggesting that for radio communication effectiveness and personnel safety that the stations and assigned apparatus be assigned a unique number/ID. That concept is incorporated in the proposed model.

The following diagram shows the basic features of the proposed organization model.

***Model 3**; Organization Chart*

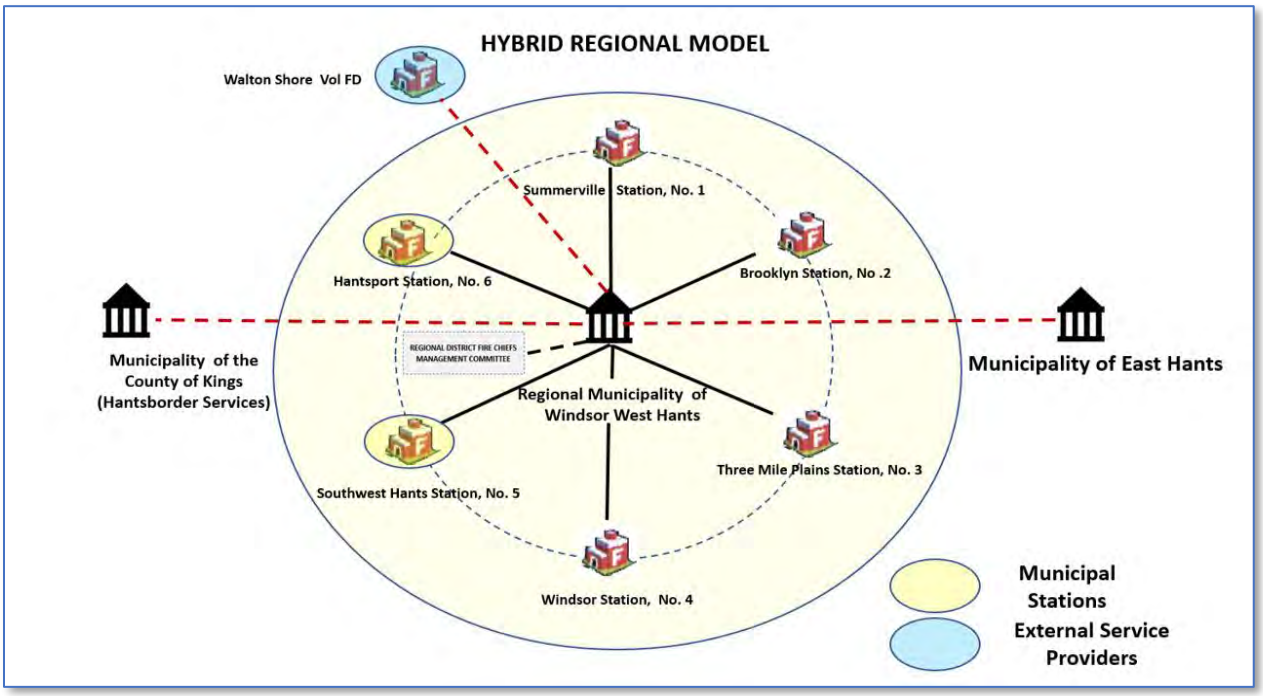


The reporting relationships of this proposed model are well known and defined. All relationships are direct to the municipal management team through the DPS/FC. Each municipal department will be able to contribute its expertise as with any other municipal operational department. Accountability and transparency are subject to administration and Council oversight. The following diagram illustrates these relationships. With this model, the part time contract position of REMO will become the responsibility of the Regional Fire Services most senior position.

In addition, an Assistant Chief of Fire Prevention will also be required to carry out the responsibilities of the Fire Safety Act/Regulations but also act as the Director during the Director's absences.

This model requires an administrative support position to support both the Director and the District Fire Chiefs.

***Model 3**; Relationship Diagram*



An analysis helps to clarify the pros/cons of this model. The results of the analysis are captured in a S.W.O.T. (Strengths, Weakness, Opportunities, Threats) analysis chart, as follows on the next page:

***Model 3**; S.W.O.T. Analysis*

	STRENGTHS		WEAKNESSES
1	Provides Municipal oversight by the CAO and Director of Protective Services	1	Not being able to fill the positions with persons having the correct skill set and willingness to accept role responsibilities.
2	Provides protective services, i.e. fire, REMO, fire inspections, fire prevention , Emergency Communications and liaison with emergency services partners , i.e. EHS, RCMP under one roof.	2	Certain positions identified as requiring Certifications may not being accepted.
3	Retains, department individuality & Recognizes within current department districts the role of District Fire Chief	3	Initial start up costs
4	Provides District Fire Chiefs direct input to the overall administration and management of the Regional service to the Director of Protective Services and ultimately the CAO; via the District Fire Chiefs Management Committee	4	Time is needed to obtain buy-in and plan implementation.
5	Provides Accountability & Transparency	5	
6	Accountability to all regions and citizens of the municipality	6	
7	Provides for big picture overview of entire fire and emergency service delivery.	7	
8	Provides one Regional strategic focus in service delivery	8	
9	Standardizes, administrative, management and operational policies, including , training, safety, service delivery, HR and volunteer benefits	9	
##	Provides redundancy across fire service positions across the region thereby reducing volunteer stress and burnout. Improving retention rates		
##	Significantly Reduces Municipality's liability in service provision		
	OPPORTUNITIES		**THREATS**
1	Opportunity for change to permit effective administration and management of the fire service so as to meet the needs of the Regional Municipality	1	Often suggested alterations to current conditions are perceived as a threat to their organizations viability and possibly impact department morale and business relationships
2	Provide volunteers and staff growth opportunities within the organization	2	Lack of buy-in
3	Provides the opportunity to provide a best practice , affordable service, meeting the needs of not only the municipality but the needs of the volunteers and staff of the fire service organization.	3	Lack of funding to implement all crucial objectives in a timely manner

Sample Fire Services Job Descriptions

To assist the reader in understanding and appreciating some of the fire services positions more fully, draft sample duties/job descriptions are attached as **Appendix VII; Sample Job Duties and Descriptions** to this report.

The positions included are:

- The Director of Protective Services/Fire Chief
- Assistant Chief of Fire Prevention
- Divisional Chief of Training, OHS, and Communications
- Regional Fire Inspector/Investigator

Organization Conclusion, Recommendations

F. Buckminster Fuller is quoted as saying: "*You never change things by fighting against the existing reality. To change something, build a new model that makes the old one obsolete.*"

Can we use technology to gain efficiencies in service delivery? Can we use existing, not commonly used, resources from varying, sometimes competing, entities to meet the need rather than buying more?

The organization just needs to put things together differently and better. The organization needs to focus on wholistic service delivery. The results/outcomes would possibly achieve the very thing claimed to be desirous in the first place; i.e. a change for the better. Individuals know *what* needs to be done; the deeper question is *how*. If there is one dominant theme which runs through all of today's challenges, it is awareness that the way things have been done is no longer acceptable in today's environment.

Collaborative leadership needs to create a space in which each of the leaders and professionals come together to design and build the new model for systematic program delivery.

Collaborative leadership can be implemented at any time and can resolve the problem of silo-thinking and achieve cost-effective goals and objectives.

Successful change requires time and relationship intensive consensus building with due sensitivity to, and the broad-based participation of, key stakeholders. Highlighting to all stakeholders the need to manage liability and risk issues is an important component of any regionalization/consolidation process. Seasoned leadership and support staff are key success factors to the successful initiation of this strategy and to sustain it over the long run.

There are two key challenges in managing organizational change; developing trust and consensus among key stakeholders, and managing diverse volunteer fire department desires.

GA recommends the implementation of Model 3; Hybrid Regional Fire Service, for all of the reasons discussed starting on page **120** above.

GA recommends the hiring of a full-time Director of Protective Services/Fire Chief.

GA recommends the hiring of a full-time Assistant Fire Chief.

GA recommends the hiring of a part-time Divisional Chief.

GA recommends the hiring of a full-time Administrative Assistant.

GA recommends the hiring of four part-time paid on call fire-investigators.

GA recommends the transfer of 1.5 FTE Fire-Inspectors from Planning & Development, Building, to the regional fire services.

OPERATIONS

EMERGENCY CALL TAKING AND FIRE SERVICE RADIO COMMUNICATIONS

911 CALL TAKING AND ROUTING

The *Emergency "911" Act* was enacted in 1992;

> "The purpose of this Act is to establish the number "911" as the primary emergency telephone number for use in the Province and to implement a Province-wide system for the reporting of emergencies to emergency service agencies. 1992, c. 4, s. 2."

It is useful to pull some definitions out of the Act for our discussion, as follows;;

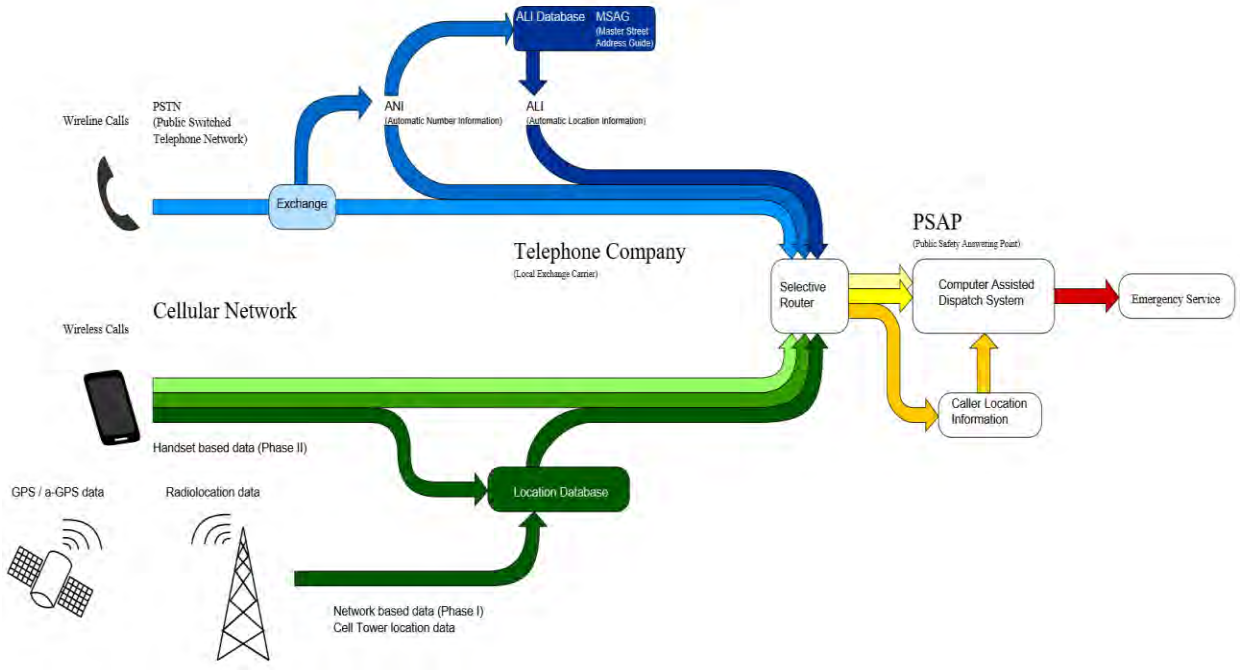
> "3 In this Act,
>
> (h) "primary public safety answering point" a primary public safety answering point means a communication centre that is normally the first point of reception of emergency calls;
>
> (i) "public safety answering point" means a communication centre that functions to receive emergency calls and to dispatch such calls to the appropriate emergency service agency;
>
> …
>
> (k) "secondary public safety answering point" means a communication centre to which emergency calls are transferred from a primary public safety answering point that is normally the agency responsible for dispatching emergency personnel;"

Windsor/West Hants 911 Service

The 911 system (E-911) service for the Windsor/West Hants fire departments commences with a caller in need dialing 911. This 911 call is routed to the Primary Public Safety Answering Point (PSAP). The PSAP for Windsor/West Hants is Truro RCMP in Truro, NS. If they are too busy then Valley Communications picks up the overflow, followed by HRM, and finally CBRM.

Due to the technology of telephone and cellular service providers and the capabilities of the E-911 system, two key pieces of information are immediately provided, the telephone number from the caller's telephone (called an ANI, Automated Number Identification) and the address and/or location (either the civic address if call is made by landline or the closest cellular tower if by cellular phone) from which the call is being made (called an ALI, Automated Location Identifier).

These two very important pieces of automated information assists the E-911 operator in determining to which emergency service the call should be transferred to, in a timelier fashion.

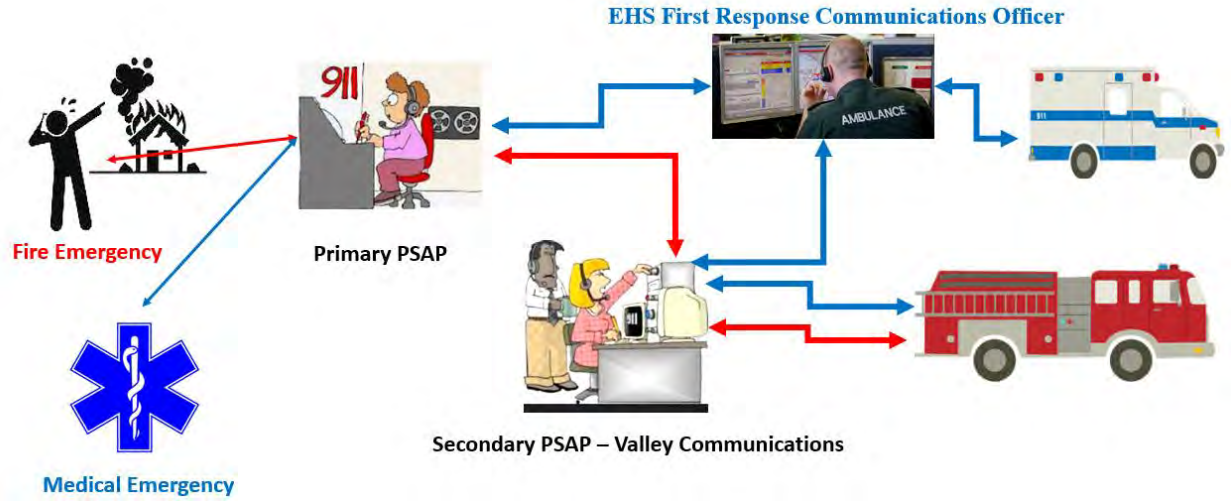


For fire incidents, once the Primary PSAP call taker determines the nature of the emergency (police/fire/ambulance) and confirms the location against the ALI information, the call taker then transfers the call to the Secondary PSAP/Dispatch centre for fire services in that area. The above graphic from Wikipedia[35] illustrates the process.

In the Windsor/West Hants region the fire dispatch service is operated by Valley Communications. For medical emergencies, medical calls received by 911 Primary PSAP are transferred to an EHS First Response Communications Officer (FRCO) located in their communications center in Dartmouth. EHS then triages the nature of the medical emergency, and will dispatch the closest ambulance and contact a secondary PSAP to dispatch the closest fire department; in accordance with provincial EHS and local Fire Department Medical First Responder protocols.

[35] https://en.wikipedia.org/wiki/9-1-1

Once Valley Communications determines the nature of the service required, i.e. Medical First Responder, fire, rescue, and etc., they will dispatch the appropriate fire department(s).



VALLEY COMMUNICATIONS

Valley Communications (VComms) was established in 1959, then known as the 'Kentville Telephone Answering Service', to provide emergency call taking with dispatch service to the Kentville Volunteer Fire Department. Other areas of the business developed to provide service to other agencies that required around the clock coverage.

At present, Valley Communications operate as one of four 911 PSAP's (Public Safety Answering Points) in the province of Nova Scotia. They act as a Primary PSAP for the town of Kentville and the surrounding area cellular towers and act as a Secondary PSAP for the Town of Windsor and the Municipality of West Hants. They also provide fire dispatch for about 94 fire departments in the counties of Kings, Annapolis, Hants, Lunenburg, Queens, Colchester and Cumberland, and act as a secondary 911 answering point for these areas. This translates to 8,000 fire calls per year or 20 to 30 calls per day. Valley Communications also provides telephone answering service to over 100 clients and monitors over 2,000 security alarms province wide.

The Town of Windsor and the Municipality of West Hants both have active service contracts with Valley Communications. Both of which expire June 30, 2020. (Ref. Appendices II and III). The contracts, although for basically the same services, are different.

Communications/Dispatch Service Contract Notes

The following are some observations related to the service level agreements reviewed between the municipalities and the supplier that should be addressed to ensure an appropriate level of service is maintained. The contracts differ between the two municipalities. One references the provision of dispatch services, the other communication services.

GA recommends that future communications/dispatching contracts reference all services required, for example; "*provision of fire department dispatching and emergency communication services*".

The following notes are for the current services being provided;

- There is no clarification on how Valley Communications are to keep the records, who has access, who does the auditing of the records and who manages quality control related to records management.
- There are no service level performance requirements,[36] such as time required to process receipt of a 911 call to time of dispatching the appropriate services.
- No required level of training and or qualification of operators.
- There is no record or copy of a signed Non-Disclosure agreement.
- The recording of all emergency calls with accurate time and date is required "*when at all possible*". (West Hants Contract). Question why would it not be possible?
- A copy of digital recordings, "*if available*", are to be kept on site for the duration of the Agreement. (West Hants Contract) Why would the digital recordings not be available?
- The West Hants contract permits the Municipality to periodically review Standard Operating Guidelines and update from time to time. The term periodically is not defined.

[36] Fire Service Association of Nova Scotia (FSANS) Fire Dispatch Standards requires that the number of Call-Taker/Dispatchers on duty to be determined by the following performance benchmarks: C(i) 95% of emergency calls shall be answered within 15 seconds and 99% within 40 seconds. C(ii) 95% of emergency dispatching shall be completed within 60 seconds.

Valley Communications Operations

Communication Facility

The most recognized standard for communications facilities is NFPA-1221; *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*. This is a very stringent standard. In 2017, the Fire Services Association of Nova Scotia (FSANS) produced a *Fire Dispatch Minimum Standards* document that is based upon the NFPA-1221 standard, while recognizing modified requirements for existing structures.



The current facility is a vintage converted residential above ground structure, featuring offices and the communications center, complete with a backup power generator for the comms center. It is located at 218 Belcher Street in Kentville, NS.

Staffing

Day time hours (8:00 am to 4:00 pm) there are three (3) to five (5) staff on duty, if the center gets extremely busy some of the office administration staff are able to assist. The 4:00 pm to 8:00 pm shift, three (3) staff are on duty and the 8:00 pm to 8:00 am shift two (2) staff are on duty.

The minimum staff on duty are still required to provide primary and secondary PSAP services as well as being the backup Primary PSAP for Truro and Cape Breton Regional Municipality as well as process and dispatch fire calls on behalf of 94 fire departments (20 to 30 calls per day), acknowledge security alarms, and do client paging services. Depending upon time of day and work volume, off-hour staffing could become very challenged to meet demand in an effective and efficient manner.

Call Taker/Dispatcher Training

Training is all done internally and features a six (6) month mentorship program with a competent dispatcher, 911 is the last part of the training program. All new personnel start off as part-time staff.

Valley Communications (VComms) has developed their own training manual; employing a lot of the Halifax Regional Municipality information. Training includes seven (7) days of PSAP training conducted by provincial EMO staff at their Dartmouth PSAP. Local training includes operation of communications equipment and related software. Every Two (2) years refresher training for all staff is required with E-911 for PSAP operations. PSAP operation follows provincial operating procedures.

GA recommends that Valley Communications have one or two staff attend a recognized certification program such as offered by the Association of Public-Safety Communications Officials (APCO). Such courses are offered in a number of colleges in Ontario. Extensive training is also available through APCO online.[37]

The FSANS Dispatch Service Standards (2017) requires the following;

> "9) Trainee Call Taker/Dispatchers shall successfully complete a Call Takers/Dispatchers training program recognized by APCO or other authority"

NFPA-1061[38] also establishes qualification requirements for "*Telecommunications*" personnel, and is a good resource for additional training needs and programs.

Dispatch Facility

Standards for Dispatch Facilities are provided in the Fire Services Association of Nova Scotia (FSANS) Dispatch Service Standards and some of which are highlighted below.

[37] https://www.apcointl.org/training-and-certification/course-options/institute-online/

[38] National Fire Protection Association; NFPA-1061, Standard for Professional Qualifications for Public Safety Telecommunications Personnel

BACKUP FACILITY

FSANS Fire Dispatch Standard requires;

> 1) Every Comm Centre providing emergency dispatch or notification services shall have a reliable, fully functional backup facility sufficiently geographically separated from the primary facility so as to minimize dependence on the same electrical distribution, sanitation and transportation infrastructure.
>
> 2) A backup facility shall be maintained in full standby mode such that dispatchers can be relocated to it on short notice and immediately resume full service to clientele.
>
> 3)The backup facility communications equipment shall be tested at least once a month. At least once every six months the backup facility shall be operated for one full shift.

Valley Communications has a backup facility located in the Kentville Fire Station. According to the supplier, the facility has never been tested.

GA recommends that the backup dispatch/communications facility's communications equipment be tested at least monthly.

GA recommends that at least once every six months the communications/dispatch backup facility shall be operated for one full shift as per FSANS standard and that records of all testing and operations of the backup facility be created and maintained, including all maintenance provided.

BUSINESS CONTINUITY-SUCCESSION PLANNING

> 1) The owner or manager of a Comm Centre providing emergency call taking, dispatching, or notification shall develop and maintain a business continuity plan to acknowledge the possibility of catastrophic events either physical or human.
>
> 2) The owner or manager of a Comm Centre shall develop and maintain a succession plan for continuation of service for a reasonable period of time in the event of a loss of any key personnel from the organization.

GA recommends that the dispatch/communications service provider undertake the development and implementation of business continuity plans and successions plans, if they have not already been made, as soon as possible.

Call Taking and Dispatching Operational Issues

An operational review was conducted of the Valley Communications Services (VComms) and their interaction with the fire services within the Region of Windsor and West Hants Municipality. A total of twenty-seven areas of service topics were reviewed. Both the fire services and VComms raised issues during the Review that impact efficient and effective services. Both had an equal part in some of the deficiencies. The good news is with collaborative efforts between all the parties involved, the Municipality, Valley Communications and the fire services the issues are all fixable.

Some of the findings of the review include the following.

- Quality Control of incident reports and data appears to be inconsistent
- Data entry errors, missing data. Some of the missing data can be attributed to the fire departments not reporting properly, or completely, or in a timely manner to Valley Communications (VComms).
- VComms time data entry is occasionally wrong (i.e. "*Depart Time*" and "*Time at Scene*" times reversed) & other time recording issues. These appear to be human operator errors, but a good CAD system would not permit such anomalies to occur, i.e. error trapping.
- Use of nonstandard time terms in the electronic CAD system; i.e. "*Time at Scene*" instead of "*Arrival Time*." In the majority of FD CAD/reporting systems "*Time at Scene*" is total elapsed time the FD actually spent at the scene. "*Depart*" time is the term used by VComms for the industry standard "*Enroute*" term, and etc. Although not fatal flaws, they are disconcerting because they do not meet standard understandings.
- Incident call classifications are non-industry standard. In some cases they do not allow a fine enough understanding on the part of the responder, and later the reviewer, into the true nature of the incident.
- Incident type dispatched by VComms vs their report tables at times do not match up. This is likely a symptom of the previous bullet point.
- Lack of E-911 automated ANI/ALI information populating the CAD and therefor fire departments' RMS.
- Valley Comms CAD reportedly does not record all 911 calls.
- Reportedly the back up facility is not being tested according to any recognized standard.

VComms has access to language translation services provided by ATT in Toronto; who have the ability to translate 70 languages. The time it takes to connect and translate is unknown, and reportedly has never been measured.

The transfer of calls between PSAPs is all verbal no ANI/ALI data available. Reportedly, VComms does not have the necessary equipment.

Computer Aided Dispatch

VComms uses a Computer Aided Dispatch (CAD) software program, developed in Nelson BC, called Fire Pro2 (FP2). Windsor Fire Department also uses FP2 for their Records Management system (RMS) and call tracking and service analytics. However, reportedly, as a result of VComms inability to receive the E-911 ANI/ALI information, all caller information received from the Primary PSAP is by voice only. This requires the VComms call taker/dispatcher to re-enter the call information manually by typing the information into their CAD system, which has led to many typographical errors, which in turns produces incomplete and erroneous incident data.

The Windsor Fire Department FP2 Records Management System, includes the module that permits downloading all incident data information from the VComms CAD system. This could permit the hands-off automated downloading of the Date, time, dispatch, response times, type of incident, responding units, and etc. This data could then be stored in an incident records module that permits future data mining and analyzing of the information. Data analysis allows the fire service to review and adjust service delivery programs in an effective, efficient manner.

Unfortunately, as a result of manual data manipulation and entry errors the information downloaded in many cases was incorrect and created additional effort on behalf of the fire service to correct the errors. Errors such as misspelling of addresses (e.g. Gray versus Grey) creates duplicate calls to civic addressing that were in fact not duplicate calls. Other data has been corrupted, which had nothing to do with ANI/ALI data, was discovered causing RMS errors that had to be manually corrected. Some examples are apparatus Enroute times were actually apparatus Arrival times and Arrival times being Enroute times. Meaning (nonsensically) the apparatus arrived before being dispatched. As a result of the data entry errors, the automated data download feature was turned off by the fire service.

Analytics in today's fire service delivery is of the utmost importance; but is only effective if it is timely and accurate. Analytics is needed to review fire and rescue trends developing within

communities. With a good understanding of service demands and issues, adjustments in service delivery can be made in real time and budget planning can be more accurate.

Fire RMS also make modules available for almost every aspect of the fire service. These can assist in managing the fire service delivery programs for each station, Modules include incident reports, equipment management/inventory, training records, personnel records, and etc.

There are several Canadian software programs available that integrate with E-911 data, are map based, include CAD capabilities and provide holistic RMS.

GA recommends that the Regional Municipality investigate a cost-effective fully integrated Fire CAD/RMS program. It is recognized that with the large client base of VComms that it may not be possible to reach consensus on a single CAD/RMS system for all fire departments. However, a possible and attainable goal is to have VComms' system operate properly, provide accurate data, and be able to interface and reliably data-dump, with error checking, to the RMS system that the Regional Municipality choses.

The other benefit to this research and acquisition is that depending upon the CAD/RMS program preferred, the other 80+ fire departments that VComms services might be interested in joining a larger client base for acquisition and maintenance of the preferred CAD/RMS and this may provide lower costs to the Regional Municipality.

Municipality Responsibilities

The contract requires the Municipality of West Hants to supply the equipment, tools and software ("Equipment") to the Supplier, or appropriate replacement Equipment, and may provide such additional Equipment as it deems necessary.

The contract requires the Town of Windsor and/or the Windsor Fire Department to supply the transmitters and receivers for the provision of Communication Services and the Town is responsible for all costs and charges for its own telephone linkage and any other costs and charges associated with the installation, repair and upkeep of equipment.

911 Call Taking and Dispatch Recommendations

GA recommends that Valley Communications adhere to FSANS Fire Dispatch Standards

GA recommends that the Regional municipality and Valley Communications acquire the required software and firmware/hardware to enable the capture of any and all ANI/ALI data from the Primary PSAP.

GA recommends that the Regional municipality appoint a single contact person to manage emergency dispatch/records management, radio communications, and be the primary liaison between the municipality and Valley Communications.

GA recommends that Valley Communications test, and time, Language Translation services provided by ATT in Toronto.

GA recommends that the Municipality and Valley Communications implement a proper and ongoing incident call reporting and auditing program.

FIRE SERVICES RADIO COMMUNICATIONS

The various fire stations across the region use two types of radio systems, a) their own private Very High Frequency System (VHF) and the province-wide multiagency Trunk Mobile Radio (TMR) system.

Several issues were raised by Stakeholders, as follows:

- Proper radio etiquette is an issue,
- Overkill on Medical calls. Reportedly, 3 departments paged for one medical incident.
- EHS dispatch lacks information when transferring calls to Valley Comms
- Fire Services switching back and forth between TMR and VHF frequencies during an incident.
- Not all channels being used are recorded
- Fire Services take over full radio control.

Current practice is for the fire departments to use both their VHF paging system, as a fire ground radio, and the TMR system, simultaneously. The fire services switching back and forth between different operating systems is a major safety issue and causes lack of continuity between the Dispatcher and the fire service during an emergency incident. This will be further discussed in the Fire Services Communications Section below.

IamResponding Application/Software

In addition to the radio communications all stations employ a software communications program called IamResponding.[39] This platform is a web-based system which saves critical time for fire departments, when responding to emergencies. When paging firefighters over the radio system, the dispatcher also routes the page to this application. After receiving a dispatch notification through the existing VHF radio system (or through IamResponding to any mobile device), responders simply speed dial one number on any phone, or press a button on IaR's free apps. On a computer screen in the stations (or accessed through any computer or mobile device with internet access), the station, chiefs, team leaders, and dispatchers immediately see who is

[39] https://iamresponding.com/v3/Pages/Default.aspx

responding, their level of certification/qualification, the time that they are responding, and the location where they are responding (station or scene).

IamResponding also provides: supplemental dispatch notifications to members (if data has been previously collected and inputted by the fire department) via app push notifications, text messages, emails and alpha-pagers (all simultaneously, and all managed by the members themselves). The supplemental information available includes; mapping and routing to the scene of the incident, customizable mapping layers showing the real-time location of all of your responding members, hydrant and water source locations, pre-plans, hazards, road closures, AED and FDC locations, and other customized map markers. It also features an internal mass-messaging system for easy and fast communications with all department members, records management tools for certification tracking, training records, incident reporting, and attendance.

GA does not know what if any additional features are being employed by the various stations.

Radio Hardware Inventory.

A review of the current radio inventory of the various stations throughout the region indicates that all stations have a mix of two manufacturers' radio hardware, with a multitude of differing models. Motorola by far outweighs the second supplier Kenwood in volume of product. Pagers are all manufactured by Motorola, and are of two different model versions. The following table provides a summary of the current inventory as provided by the individual fire stations.

			Summerville	Brooklyn	TMP	Windsor	Southwest Hants	Hantsport	
TMR	Motorola	Portables	14	17	0	5	4	13	53
		Mobiles	0	3	1	9	3	6	22
	Kenwood	Portables	0	0	1	0	0	0	1
		Mobiles	0	0	0	0	0	0	0
VHF	Motorola	Portables	16	35	33	22	5	27	138
		Mobiles	0	0	7	13	3	10	33
	Kenwood	Portables	2	7	0	0	0	0	9
		Mobiles	0	6	0	1	0	0	7
		Sub Total	32	68	42	50	15	56	263

Total Portables 201 Total Mobiles= 62. Windsor has 1 Marine Radio, plus 1 VHF Motorola repeater which brings the total radio compliment. 265 being reported.
TMP has 1 mobile base radio included in the VHF mobile number of 7.
NOTE: Summerville reports no base stations nor mobile radios.

In addition to two-way radio hardware all stations use VHF pagers for emergency response notifications. These Motorola pagers are ubiquitous in the fire service and, by necessity, operate on a VHF radio system. There are few, if any, suitable alternatives for firefighter pagers.

Dept Pagers	Freq Type	Manufacturer	Models	Channels	Number	Sub Total
Summerville	VHF	Motorola	Minitor 5		22	
	VHF	Motorola	Minitor 6		10	32
Brooklyn	VHF	Motorola	Minitor 5		27	
	VHF	Motorola	Minitor 6	1	4	
	VHF	Motorola	Minitor 6	5	28	59
TMP	VHF	Motorola	Minitor 5		1	
	VHF	Motorola	Minitor 6	1	1	
	VHF	Motorola	Minitor 6	5	24	26
Windsor	VHF	Motorola	Minitor 5		51	51
Southwest Hants	VHF	Motorola	Minitor V		12	
Hantsport	VHF	Motorola	Minitor V		34	46
					TOTAL	**214**

According to Industry Canada, as a standard rule in Canada, about 85% of radios sold are either in the UHF, or higher frequencies like 700 MHz (for public safety) or 900 MHz. The TMR2 system in Nova Scotia is 700 MHz, P25 compatible (i.e. digital).

The W/WH fire departments each have their own licensed VHF radio channels, as follows;[40]

Municipality of West Hants

Brooklyn

Frequency	License	Type	Tone	Alpha Tag	Description	Mode	Tag
152.30000	XJI515	RM	71.9 PL	Brooklyn FD Ops	Fire Operations	FM	Fire Dispatch
154.62000		M		Brooklyn FD Simp	Fire Simplex	FM	Fire-Tac

Hantsport

Frequency	License	Type	Tone	Alpha Tag	Description	Mode	Tag
150.95000		M		Hantsport PW	Public works	FM	Public Works
154.34000	VAC765	RM	71.9 PL	Hantsport FD	Fire department	FM	Fire Dispatch

Summerville

Frequency	License	Type	Tone	Alpha Tag	Description	Mode	Tag
154.71000	XJI517	M		Summerv. FD	Fire department	FM	Fire Dispatch

Vaughan

Frequency	License	Type	Tone	Alpha Tag	Description	Mode	Tag
152.63000	CFA680	RM	88.5 PL	SW-Hants FD	South West Hants fire department (Hantsport station #2)	FM	Fire Dispatch

Windsor

Frequency	License	Type	Tone	Alpha Tag	Description	Mode	Tag
151.46000	XJW400	RM	107.2 PL	Windsor FD	Fire department	FM	Fire Dispatch
153.98000		M		Windsor PWks	Public works	FM	Public Works

Currently, as a reality check, to meet standards VComms needs the ability to monitor, respond/communicate, and record conversations on all of the above noted VHF channels (six) plus the various TMR channels that the W/WH fire departments could use.

If one station is assisting another, some of a responding trucks' conversation will at some point jump from their own VHF channel to the other station's VHF channel, and very possibly back and forth if they continue to communicate with other trucks or stations that may be still on their own or TMR channels. It is easy to understand why this issue is a concern.

[40] https://www.radioreference.com/apps/db/?ctid=4699 Note: only the scanner frequency is shown. Most of the channels use a pair of frequencies for repeater operation (i.e. unless labelled simplex)

KPIs

To aid in fire service delivery's program performance analysis, Key Performance Indicators (KPIs, aka Fire Ground Bench Marks) must be documented during an incident by announcing and recording the pre-defined KPIs. This process is often referred to as benchmarking. Benchmarking also assists those in command and dispatch as to the status of the incident and helps determine if additional resources or a change in tactics is required.

Some examples of KPIs required during an incident are:

- On Scene, this is the time captured by the Dispatcher, as transmitted, by the first arriving unit of a dispatched call.
- Conditions on arrival (Sit Rep), a brief description of the incident upon arrival of the first unit; e.g. nothing showing, or house fully involved, heavy smoke showing etc. This helps all responding personnel understand what to expect upon arrival and if additional help is required.
- Water on Fire, this is important as it determines the time it took from arrival of the first crew(s) to the time they start minimizing loss. This is important as there are many response time standards and bench marks used in litigation that consider time of call to time of intervention. This equates to service delivery performance standards being met. Internally, this leads to investigating what circumstances led to delays, and whether there are tactics possible to address them for the next time.

There are others such as primary search complete, secondary search complete, under control, loss stopped, all clear, and a few other less common ones.

Why is the foregoing referenced here? The issue is that all of the bench marks should be broadcasted over the radio system as they occur, and should be recorded by the radio recording system along with a time-stamp, be manually noted/recorded by the Dispatcher (in CAD), and thereby entered (dumped) into the incident report.

Times, and sequence of events can be critical to post-incident analysis for fire service managers and personnel. It is a great training tool. However, it serves a larger purpose also if there is litigation over an incident. One of the consultants is currently participating in a post-incident analysis associated with a large lawsuit; and the recorded events and time-stamps are critical pieces of evidence for the defence of the municipal fire service.

Who is Listening?

The main issue that is of concern in W/WH is that the fire departments are using two different radio systems (and possibly up to six VHF channels plus TMR channels) at the scene of an emergency and often alternate their radio transmissions between their individual department's VHF and the province's TMR radio systems. GA has noted fire officers and others carrying and simultaneously using two different radios. Anecdotally, fire officers have related occurrences where halves of conversations occurred on each system. This not only leads to confusion, frustration and missed key information during a fire, it makes recording of radio transmission virtually meaningless, and it is also a serious firefighters safety and efficiency issue.

If a firefighter(s) is in need of urgent assistance and requests immediate assistance over the radio system (Mayday Call), what radio system do they use, will the incident commander and others hear the call for help? Anecdotally, stakeholders have related trying to answer a radio transmission and used the wrong radio and had missed parts of transmissions. In GA's opinion this is a serious issue, that was also expressed as a concern by several officers.

During GA's review of communications systems and procedures/practices, both the VComms and the fire department officers complained about missed information, wrong information being recorded, the Dispatcher not responding to calls on the radio in a timely manner and the VComms complaining that when their Dispatcher attempt to contact the on-scene fire department there is no response.

There appear to be a small number of actions that have led to the issues highlighted. First let's consider the contractual role of Valley Communications for the provision of dispatching and communications services. The contract[41] between West Hants and VComms is for the provision of;

> "Emergency Dispatch Services and shall keep full and complete records of incoming and out-going dispatch communications."

[41] Please see **Appendix II; West Hants /Valley Communications Contract** starting on page **320** for more details of this contract.

The contract between Windsor and VComms is different, and does not speak to any intent to record transmissions. The entire service is contained in the first clause as follows;

> "The Communication Service shall provide communications services for the use and benefit of the Town."

What is the intent of these contracts? GA believes that the intent of the contracts, at least on the part of the fire departments, is to provide full dispatching and emergency communications between VComms and the response firefighting personnel at scene and to maintain records of the communications and the incident. However, the use of multiple radio systems is a serious complication.

Some of the noted anomalies in the use of the communications services are noted below;

- Some incidents, the responding fire department take over full control of radio communications by placing a "dispatcher" in the fire station and using the station's base radio.
- Some departments have designated volunteer radio operators who operate as the main emergency radio communication center for incidents; but only when they are available. There is an inevitable delay in them responding from home/wherever to the fire hall to perform their duties and there is a consequential loss of critical dispatch information. Once they take over control VComms looses continuity in radio traffic as the fire department switches from TMR to VHF radio channels. Important dispatch and communication traffic data may be missing and is needed to properly complete required incident reports.
- Using two radio systems simultaneously causes lack of continuity, and if VComms is busy, the Dispatcher looses track of the incident flow. The Dispatcher is dealing with other fire departments who also need communication services and are not hopping around between systems.
- With the fire departments taking, for some incidents, control of communications during an incident, it make it unclear who has responsibility for those communications. This could have serious consequences if it is necessary to determine responsibility or track the sequence and timing of events in the case of litigation, or even an enquiry; e.g. by the coroner if there is a fire related death.
- Not all communications channels are recorded and time-stamped.

All of the foregoing leads to dysfunctional and missing radio communications that may lead to serious consequences. Not to mention the financial burden of needing to equip, maintain, and train on two operating system at an emergency.

The resolve should be simply to use the contracted services as intended and a single emergency radio system for all dispatching and the TMR system for emergency scene communications.

Radio System Related Recommendations

GA recommends that VComms acquire the necessary radio transmission recording equipment to record all fire department used channels.

GA recommends that the Regional fire departments operate on TMR channel 23 for all incident dispatches and incident operations, and TMR channel 22 for water shuttle and Traffic Control operations, etc.

GA recommends that the Municipality maintain the current VHF system for fire service paging only. The Municipality should strike a committee of the fire services to examine if there are any compelling reasons why the VHF system must be maintained for other than paging use.

GA recommends that the fire departments permit VComms to provide the contracted services for dispatching and communications as required by the service contract, by discontinuing the practice of taking over radio communications from fire stations.

GA recommends that the fire departments and VComms implement the use of industry standard radio transmitted benchmarks (KPIs) for all fire incidents.

GA recommends that dispatch protocols for MFR incidents be revised so that only one MFR capable unit is dispatched to single patient incidents.

GA recommends that the fire departments collectively develop and implement a standardized training program to make all personnel aware of required radio operating procedures, benchmarks, channel usage, and all other aspects critical for effective and efficient radio system usage.

Alternative Service Providers

GA was asked to look at alternatives to the current service provider. Consideration was given to other dispatch/communication opportunities. However, given the combined service costs for services of the two municipalities for the current provider, ($44,443/annum) it was highly unlikely that a more cost-effective service could be found. The other consideration moving forward is that there have been ongoing discussions between the Fire Services Association of Nova Scotia and the Provincial Government for a single province wide fire dispatch and communication system, to include all fire departments except for HRM, and CBRM. It is being suggested to GA that within the next couple of years movement on this possibility will take place.

Given that the issues that require some form of addressing are not insurmountable nor terribly costly, are not unique to any one communications service, and there is currently the ability to make procedural and equipment changes;

GA recommend that the new regional municipality negotiate with VComms in 2020 for a new service agreement. The agreement should address the issues raised in this report. With the province possibly moving forward with fire dispatch services, the idea to seek an alternative provider should be placed on hold for the next while.

FIRE SERVICE RADIO AND UNIT IDENTIFICATION SYSTEM

A system of standardized identification of trucks and personnel is needed to avoid errors in radio communications that could lead to confusion or lack of understanding; and thereby to deadly consequences. To aid in standardization across the Region, fire apparatus unit numbers and radio assignments by rank and position should be established.

A review of neighbouring municipality's unit and radio assignment numbering programs was conducted. From that review, and considering the current methodology within the Windsor/West Hants region, the following program is being recommended.

Fire Station Numbering

The purpose of numbering fire stations is to assist in the associated fire apparatus and personnel radio identification. Ease of communications and a standard structure and is the basis for the program. The numbering system chosen starts with a single digit station number; commencing with the Summerville fire station and moving clockwise. This results in the following station number assignments.

- Summerville Fire Station 1
- Brooklyn Fire Station 2
- Three Mile Plains Fire Station 3
- Windsor Fire Station 4
- Southwest Hants Fire Station 5
- Hantsport Fire Station 6

Fire Apparatus Identification

Each current unit will be assigned a new unit classification/type.

Current Unit Nomenclature	**New Unit Nomenclature**	**Class**	**Unit Numbering Series**
Squad/Engine/Pumper	Engine	Water tank less than 650 Igal	11-15
Squad/Engine/Pumper	Engine	Water tank 651 - 1,000 Igal	15-19
Pumper-Tanker & Tanker	Tanker	Water tank 1,100-2,000 Igal	21-25
Pumper-Tanker & Tanker	Tanker	Water tank 2,100+ Igal	26-29
Rescue	Rescue	Light capacity	31-35
Rescues	Rescue	Medium or Heavy capacity	36-39
Aerial Ladder/Snorkel/Platform, etc.	Aerial	All	41-45
Quint	Quint	All	46-49
Utility	Utility	All	50
ATV/RTV/UTV w/wo trailer	RTV	All	60
Special Vehicles (dedicated purpose only): i.e. Command, Rehab, Tactical	Unit Type + ###	Example; Command 271	70
Boats	Marine	Example; Marine 1 (i.e. Summerville)	Station number

Each unit number will be prefaced by its assigned station number. Please see the following examples.

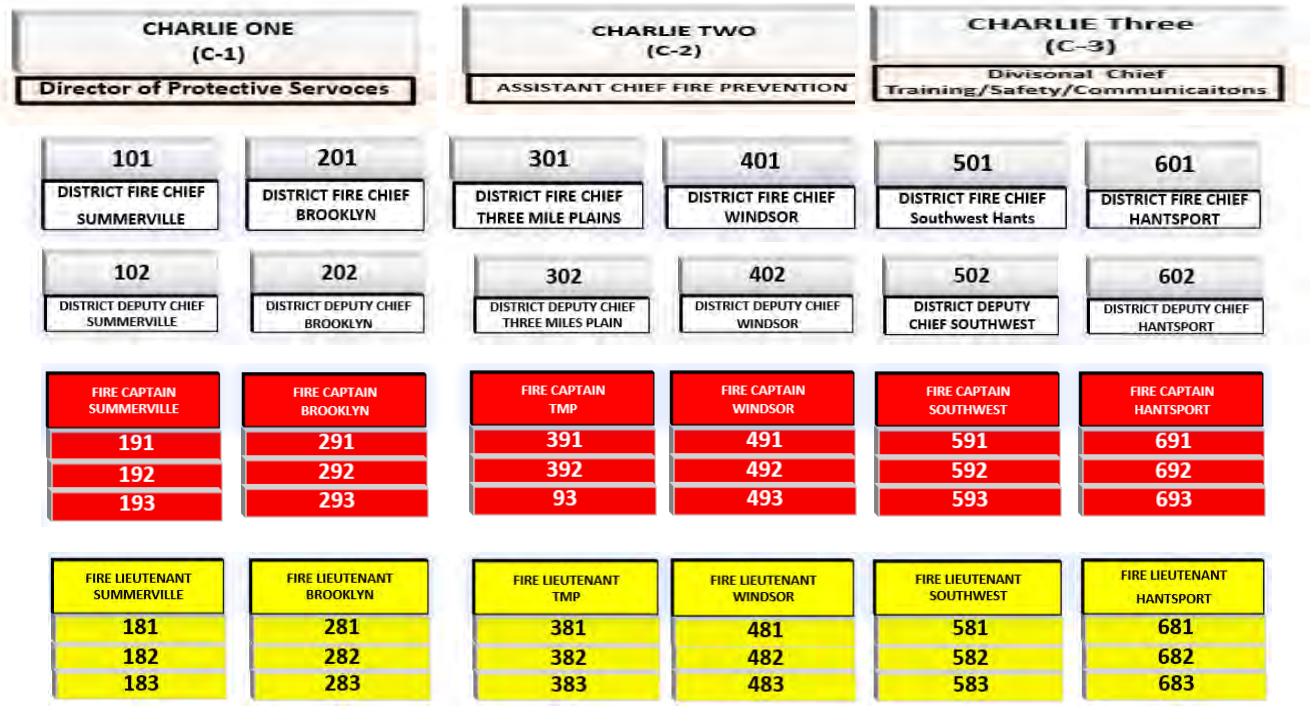
Examples

Station	Old ID	New ID
Hantsport	11	Engine 611
Hantsport	12	Engine 615
Summerville	Truck 1	Engine 115
Brooklyn	Squad 3	Engine 211
Windsor	Aerial 4	Aerial 441
South West	14	Tanker 526

Position Radio Call Signs

As with any fire organizations there are several identifiable positions within the organization, which is especially important at an incident. All positions need to be clearly identified (position ID) and standardized across the region. Whereas the fire service is a hierarchical and paramilitary organization, so must be the radio call signs.

Again, the use of fire station numbers come into play. The following Position IDs are premised upon the selection of the hybrid organizational chart. The use of phonetic lettering and numbers are used jointly in some of the radio identifications.



Firefighters

Firefighters radio identification will be based upon their unit number that they responded on. Under the proposed system of radio identification it might look like the following chart for the particular fire apparatus chosen for the example. The choice of a captain or lieutenant was arbitrary in the examples; just depends who got on the truck. Also, not every seat might be filled. For Aerial 441, it only seats five, and 526 only seats three.

Station	Apparatus ID	Capt.	Lieut.	FF ID	FF ID	FF ID	FF ID	FF ID
Hantsport	Engine 611	691		611-1 (driver/operator)	611-2	611-2	611-2	611-2
Hantsport	Engine 615	692		615-1	615-2	615-3	615-4	615-5
Summerville	Engine 115		181	115-1	115-2	115-3	115-4	115-5
Brooklyn	Engine 211	291		211-1	211-2	211-3	211-4	211-5
Windsor	Aerial 441	493		441-1	441-2	441-3	441-4	
South West	Tanker 526			526-1	526-2	526-3		

Firefighters arriving on scene with personal vehicles will be assigned radio call signs by the Accountability Officer or Command following the radio ID standard.

Other Functional Radio IDs

The following are some standard radio identification protocols that should be adapted for use Region-wide.

Person/Position/Function	Radio ID	Condition, Example
Valley Communications	FIRE CONTROL	
Incident Commander	Location + COMMAND	Example: Burlington Street COMMAND
Accountability Officer	ACCOUNTABILITY	Once the position is established
Entry Control Officer	ENTRY + Location	Example: ENTRY East Side
Incident Safety Officer	SAFETY	Charlie 3 assumes this ID once on-scene as the ISO
Incident Safety Officer, station based	SAFETY + Stn ID+1st, 2nd, etc.	SAFETY 4-1, SAFETY 4-2, SAFETY 3-1, etc.
Water Supply Officers	WATER SUPPLY + Stn ID	WATER SUPPLY 4, WATER SUPPLY 3, etc.
Fire-Investigators	INVESTIGATOR 1, 2, etc.	Investigators are not station based
Fire-Inspectors	INSPECTOR 1, 2, etc.	Inspectors are not station based
Traffic Control	TRAFFIC + Stn ID + 1st, 2nd, etc.	TRAFFIC 4-1, TRAFFIC 4-2
Staging officer	STAGING + Location	Example: STAGING Burlington Street
Planning Officer	PLANNING	Larger incident IMS model
Logistics Officer	LOGISTICS	Larger incident IMS model
Administration Officer	ADMIN	Larger incident IMS model
Sector Officer	Location + SECTOR	Example: BETA SECTOR, ROOF SECTOR

Summary and Recommendation Radio IDs

All requests for emergency services commences with a 911 call. Once the call is placed the expectations of the public are extremely high and demanding. Emergency Call taking, dispatching and radio communications must be efficient, timely and very effective.

If any part of the process goes awry, a multiple chain cascade of events can occur that could cost either a citizen's or a responder's life. A delay in response, or responders sent to an incorrect address, or a responder's missed May-Day call are all possible consequences of not having adequate and reliable equipment, training, procedures, and having people not adhering to them. Effective and efficient communications is the incident commanders' best tool in his/her tool box to manage an incident and to protect citizens and responders alike.

Communications must be a disciplined process right from the time a call is received for service to completion of the event. It is a total collaborative process. In addition to being a tool and process that permits talking and listening, the process, if properly equipped and managed, allows for analytics that permits the organization to establish key performance indicators and adjust service needs and levels according to past history of events. A good quality computer aided dispatch software integrated fire department records management system, permits an efficient means for not only capturing data, analyzing data, but will likely aid in the defense of any civil suit or investigation. If the system, equipment, and processes are not robust, nor meet best practices, it can become a liability.

As a result of the review of the dispatch and communication systems and procedures, a number of recommendations are provided for consideration in addressing some of the issues referenced. They are fixable and relatively inexpensive to address.

GA recommends that fire stations be numbered starting with Summerville as number 1 and going clockwise from there.

GA recommends that a standard system of IDs be utilized for identifying functional positions on the fire-ground, starting with the regional staff and extending down through to all apparatus seat positions and to firefighters who arrive on-scene in a private vehicle.

GA recommends that standard radio protocol titles be established for all regular positions at an incident scene.

INCIDENT RESPONSE OPERATIONS

EXISTING OPERATIONS

Fire Stations, existing

There are currently six fire stations in the Region, as follows;

FIGURE: STATIONS

Station	Location	Apparatus Space	Firefighters[42]
Windsor	King St. Windsor	5,955 sqft	36
Hantsport	5 Oak St. Hantsport	2,338 sqft	37
South West Hants	1870 Highway 14, Vaughan	1,558 sqft	16
Brooklyn	995 Highway 215, Brooklyn	8,000 sqft	39
Three Mile Plains	5984 Highway 14, Garlands Crossing	3,400 sqft	25
Summerville	59 Wharf Rd. Summerville	2,840 sqft	35

Fire Apparatus, existing

In those stations are the following numbers and types of fire apparatus and utility vehicles;

FIGURE: CURRENT APPARATUS INVENTORY

Station	Pumper	Tanker *	Aerial	Rescue	Utility	RTV	Boat
Windsor	3	1	2	1	2	1	1
Hantsport	2	1	0	1	2	0	0
SWH	0	1	0	1	0	0	0
Brooklyn	2	1	1	1	1	1	0
TMP	2♦	1	0	0	1	0	0
Summerville	1	2	0	0	1	1	1
Totals:	**10**	**7**	**3**	**4**	**7**	**3**	**2**

* All current tankers have large pumps, equivalent to that of a pumper
♦ One of these pumpers is currently out of service

Several of the existing vehicles are long past their replacement date, both in age and condition. Both aerials in Windsor should no longer be in the fleet. One has an aerial device failure (structural) and will not pass the aerial device certification inspection. It is not equipped with a pump or water tank. It serves no useful purpose and is almost 31 years old.

[42] Included in the overall total of 188 staff are: 16 veterans, (none firefighting), 1 dispatcher, 7 who respond to more than one station, 8 drivers only.



The other aerial is a Snorkel, an articulating-arm platform design, which is no longer a common aerial device type. This apparatus has a pump that will not pass ULC testing and is no longer certified. The pump was a proprietary design by the apparatus manufacturer, who went out of business in 1985 (one year after this apparatus was built). It is very likely that to rebuild the pump there will need to be custom machined parts made, if a successful and reliable rebuild is even possible. The apparatus is over 35 years old and is obsolete.

FIGURE: CURRENT APPARATUS DETAILS

ID	Type of Apparatus	Seats	Age 2019	Builder Chassis/Body/Aerial	Engine	Built NFPA	Pump Brand	Pump Capy	Tank Volume	Station
A-8	Aerial-Ladder	2	30 ¾	ALF/ALF/ALF	DET 6V-92	Yes	N/A	N/A	0	Windsor/OOS
Twr-6	Aerial-Platform	6	3 ½	Pierce/Pierce/Pierce	CUM ISL	Yes	Waterous	1,750	325	Brooklyn
A-4	Aerial-Platform	5	35 ½	King/King/King	DET 6V-92	Yes	King	1,099	0	Windsor
S-3	Pumper	6	3 ½	Pierce/Pierce	CUM ISL	Yes	Darley	1,250	640	Brooklyn
11	Pumper	6	17 ¾	EOne/EOne	DET DD13	Yes	Hale	1,050	600	Hantsport
12	Pumper	6	4 ¼	Pierce/Pierce	CUM ISM	Yes	Waterous	1,250	662	Hantsport
Tr-1	Pumper	6	3 ¼	Freightliner/Fort Garry	CUM ISL	Yes	Darley	1,319	800	Summerville
S-9	Pumper	6	4	Pierce/Pierce	CUM ISL	Yes	Waterous	1,543	634	TMP
P-1	Pumper	5	32 ½	Ford/Hub	CAT 3208	Yes	Waterous	1,050	800	TMP/OOS
E-1	Pumper	6	26 ½	EOne/Superior	DET 6V-92	Yes	Waterous	1,500	800	Windsor
E-5	Pumper	6	19 ½	EOne/Superior	CUM ISM	Yes	Hale	1,500	800	Windsor
E-11	Pumper, Wildland	5	14 ½	International/Superior	IHC DT570	Yes	Hale	1,050	600	Windsor
P/T-2	Pumper-Tanker	2	17 ¼	Freightliner/LRB	MER MBE4000	Yes	Darley	840	3,200	Brooklyn
P/T-4	Pumper-Tanker	6	15	ALF/ALF	DET DD15	Yes	Hale	1,750	2,000	Brooklyn
21	Pumper-Tanker	2	16 ¼	Peterbilt/Superior	CAT 3126	Yes	Hale	840	2,000	Hantsport
Tr-3	Pumper-Tanker	3	12 ¾	Sterling/Fort Garry	CAT C13	Yes	Darley	1,319	2,350	Summerville
14	Pumper-Tanker	3	4 ¾	Freightliner/Pierce	DET DD13	Yes	Waterous	1,250	2,500	SWH
T-10	Pumper-Tanker	2	4	Freightliner/Pierce	CUM ISL	Yes	Hale	840	2,842	TMP
T-2	Pumper-Tanker	2	16	International/Superior	CUM ISM	Yes	Hale	1,500	2,000	Windsor
Tr-2	Tanker (vacuum)	2	8 ½	International/EOne	IHCMaxxforce13	Yes	Hale	1,099	2,950	Summerville
R-5	Rescue	5	4 ½	Dodge/Lantz	CUM ISB	No	N/A	N/A	N/A	Brooklyn
31	Rescue	6	3 ¼	Freightliner/Lantz	CUM ISB	No	N/A	N/A	N/A	Hantsport
33	Rescue	5	18 ¾	Ford/Lantz	Powerstroke 7.3	No	N/A	N/A	N/A	SWH
R-6	Rescue	2	28 ¾	International/Lantz	IHC DT366	No	N/A	N/A	N/A	Windsor
R-7	Utility	5	5	Dodge Ram	Hemi 5.7	N/A	N/A	N/A	N/A	Brooklyn
32	Utility	2	15 ½	Ford F-150	NR	N/A	N/A	N/A	N/A	Hantsport
51	Utility	5	11 ¾	Dodge Ram	CUM ISB	N/A	N/A	N/A	N/A	Hantsport
Tr-4	Utility	5	16 ¾	Dodge Ram	Powerstroke 6L	No	N/A	N/A	N/A	Summerville
R-11	Utility	5	4 ¼	Dodge Ram	Hemi 5.7	N/A	N/A	N/A	N/A	TMP
U-9	Utility	5	11 ¾	Dodge Ram	CUM ISB	N/A	N/A	N/A	N/A	Windsor

ID	Type of Apparatus	Seats	Age 2019	Builder Chassis/Body/Aerial	Engine	Built NFPA	Pump Brand	Pump Capy	Tank Volume	Station
V-7	Passenger van	8	11 ¾	GMC	Vortec 6L	N/A	N/A	N/A	N/A	Windsor
Boat	Rescue Boat	NR	11 ½	Zodiac	Yamaha 60	N/A	N/A	N/A	N/A	Summerville
Boat	Rescue Boat	9	14 ¾	Zodiac	Yamaha 60	N/A	N/A	N/A	N/A	Windsor
RTV	Rough Terrain	4	8 ¾	Kubota	NR	N/A	N/A	N/A	N/A	Windsor
RTV-8	Rough Terrain	2	4 ½	Polaris	NR	N/A	Honda	250	80	Brooklyn
RTV	Rough Terrain	4	7 ½	Polaris	NR	N/A	N/A	N/A	N/A	Summerville
NR	Trailer	N/A	NR	NR	N/A	N/A	N/A	N/A	N/A	Brooklyn
	Totals:	159						24,049	26,583	

NR = not reported OOS = out of service

Brooklyn has a pumper that is out of service for mechanical reasons (unspecified) and is also 32 years old. It is currently parked at the Three Mile Plains station, and is shown on their inventory.

One of the pumper trucks in Windsor was designed as a wildland/urban interface truck for the Vaughan station. It is unsuited for use in Windsor and of questionable value even in South West Hants due to features making it very difficult to work with.

In total, there are seven fire apparatus that require replacement and/or retirement in 2020 based on their serviceability and/or their age. These include two aerials, three pumpers, one rescue and one rescue/utility. They are yellow highlighted in the above table. Except for the Brooklyn pumper (P-1) and one Windsor aerial (A-4) these are all still in service.

Generally, a standard make and model of fire pump should be specified for all fire apparatus equipped with a pump.

- Servicing a greatly reduced variety of pumps will reduce the need for unique parts and knowledge, peculiar to each make and model. This reduces servicing costs and down-time.
- Generally, standardize on fire pump capacity. Reducing the variety of pump capacities[43] in pumpers and pumper-tankers will facilitate coordination in pumper relays and improve the effectiveness, and therefore value, of this equipment.
- Standardization on the engine, or engine family, used in the heavy vehicles is recommended. Although generational development of engines will continue, standardization will decrease servicing time/costs and down-time.
- Standardization of custom cab/chassis specification will improve the access to proprietary, manufacturer's parts that all custom cabs/chassis use. It will also improve maintenance efficiency, thereby reducing time/costs and down-time.

[43] Typically aerials have larger pumps due to the need to force water through aerial master streams. A pumper of slightly small capacity will usually feed an aerial adequately.

- Standardization of commercial cab/chassis specification will improve the access to proprietary, manufacturer's parts that all commercial cabs/chassis use. It will also improve maintenance efficiency, thereby reducing time/costs and down-time.

The Windsor rescue boat is almost 15 years old. In GA's experience, these inflatable boats are prone to leaking and sudden deflation and/or rupture once they reach a certain age, the fabric rots. This makes them unreliable and even dangerous to use.

GA recommends that fire apparatus specifications be standardized[44] across the region, by type and class of apparatus.

GA recommends that the Windsor boat be professionally inspected to determine its need for replacement.

GA recommends that a standardized, and coordinated, scheme of unique fire apparatus number identifications be established Region-wide, as follows;

- There be established a coordinated apparatus ID scheme between all the W/WH stations/departments. The current uncoordinated approach detrimentally affects coordination at incidents where stations are working together.
- The ID scheme should reveal the apparatus' primary purpose either through including the purpose in the name (e.g. pumper-31) or through a standard format, similar to what Hantsport has done where IDs ending in 1 are pumpers. This will improve coordination at incidents where apparatus from different stations are working together.

Incident Responses

GA was provided, and analysed, incident response data from January 2014 through to December 2018. The provided data was incomplete and many key indicators, valuable for statistical analysis and program development, were missing.

GA recommends that steps be immediately taken to establish a robust internal data collection protocol for all incidents, not just fires, including;

[44] See **The Value of Fire Apparatus Standardization** on page **218**.

- The gathering of all key benchmarks as required by the NS Fire Marshal, and according to best practices,[45] and as needed for fire department's internal programs related to; staffing needs, training needs, apparatus needs, equipment needs, performance times, safety and health, costs and cost recovery, fire safety education, fire investigation, code compliance, liability, and preplanning for performance and business continuity;
- instruction to the Fire Dispatch contractor on data to be benchmarked by their communicators;
- the purchase of a good data records (RMS) software;
- providing firefighters access to computers at every station;
- the training of firefighters in how and what data to collect;
- the maintenance of oversight of data collected for the purposes of ensuring data collection occurs, data error checking, and data analysis;
- the immediately filing of fire reports with the provincial Fire Marshal's office after every fire call, as required by legislation.

GA, attempted an analysis of incident data using the provided incident data, which was largely provided by the fire dispatching contractor Valley Communications. Fire Chiefs were also requested to provide missing data for all incidents reported as fires for the years 2014-2018. Some additional information was provided.

The following tables are summaries of the analysed data on incidents during that time span.

Valley Communications does not separate page-outs for Three Mile Plains from Brooklyn, so the data is largely entangled for both stations. For fire incidents, those that occurred in TMP's home district (based on incident address) are identified in an abbreviated table below. It should be

noted that in the majority of these fire incidents it was a joint Brooklyn/TMP response. This joint use of resources helps ensure sufficient personnel and equipment are provided.

For each station in the tables below, totals are shown for each category line (left side buff cells) and for each year column (buff cells across the top). Pale green cells show the proportional breakdown of incidents.

[45] There are some good benchmarks for data collection. The NFPA 900 series is extremely comprehensive, the Ontario Fire Marshal's *Standard Incident Report* (SIR) addresses all incident types (which is important) and is an excellent example of an effective system.

There appears to be a pretty clear upward trend in total incident numbers across the five years of data that was examined. There is no clear indicator of the driver for this increase, and GA advises caution in deriving too much inference from annual changes, as in our experience annual statistics can be significantly variable year over year. Longer term trends are a better indicator coupled with regression analysis.

What can be clearly seen is the impact on the 2016 decoupling of Windsor from providing fire services into West Hants that shows most clearly in the Windsor, Brooklyn numbers, and to a lesser degree on Hantsport.

At the end of the tables is a summarization for the entire region.

FIGURE: TABLE OF INCIDENT DISPATCHES BY STATION

Category	Totals	2014	2015	2016	2017	2018	By station
WINDSOR	**858**	**251**	**229**	**123**	**136**	**119**	
Fires	**153**	59	42	33	7	12	17.8%
Pre-Fire Conditions	**292**	88	69	39	52	44	34.0%
Rescues	**141**	50	51	12	18	10	16.4%
Hazards	**28**	5	7	5	8	3	3.3%
Assists	**104**	12	9	19	33	31	12.1%
MFR	**125**	33	43	13	18	18	14.6%
N/A	**15**	4	8	2		1	1.7%
HANTSPORT	**825**	**135**	**149**	**165**	**185**	**191**	
Fires	**161**	27	21	45	30	38	19.5%
Pre-Fire Conditions	**116**	11	12	29	34	30	14.1%
Rescues	**144**	16	18	41	35	34	17.5%
Hazards	**22**	3	7	3	4	5	2.7%
Assists	**151**	7	3	24	51	66	18.3%
MFR	**229**	70	88	23	30	18	27.8%
N/A	**2**	1			1		0.1%

Category	Totals	2014	2015	2016	2017	2018	By station
SOUTH WEST	**139**		**6**	**51**	**54**	**28**	
Fires	**35**		2	18	5	10	25.2%
Pre-Fire Conditions	**15**		1	11	1	2	10.8%
Rescues	**16**			6	6	4	11.5%
Hazards	**2**		1	1			1.4%
Assists	**45**		1	4	36	4	32.4%
MFR	**24**		1	9	6	8	17.3%
N/A	**2**			2			1.4%
BROOKLYN	**1,709**	**204**	**213**	**408**	**444**	**442**	
Fires	**298**	37	39	98	65	61	17.4%
Pre-Fire Conditions	**148**	10	17	41	44	36	8.7%
Rescues	**305**	33	29	73	82	88	17.8%
Hazards	**28**	1	2	10	10	5	1.6%
Assists	**244**	5	17	28	96	98	14.3%
MFR	**672**	114	106	152	146	154	39.3%
N/A	**14**	4	3	6	1		0.8%
THREE MILE PLAINS							
Fires	**83**		2	26	25	30	
Pre-Fire Conditions							
Rescues		Remaining data is combined with Brooklyn					
Hazards							
Assists							
MFR							
N/A							
SUMMERVILLE	**401**	**77**	**67**	**80**	**90**	**87**	
Fires	**72**	20	17	13	13	9	18.0%
Pre-Fire Conditions	**14**	5	3	1	3	2	3.5%
Rescues	**22**	3	1	7	6	5	5.5%
Hazards	**2**			2			0.5%
Assists	**55**		10	12	22	11	13.7%
MFR	**231**	46	35	44	46	60	57.6%
N/A	**5**	3	1	1			1.2%

FIGURE: INCIDENT DISPATCHES, ALL WWH STATIONS

WWH All Stations	3,932	667	664	825	909	867	
Fires	**719**	143	121	205	120	130	18.3%
Pre-Fire Conditions	**585**	114	102	121	134	114	14.9%
Rescues	**628**	102	99	139	147	141	16.0%
Hazards	**82**	9	17	21	22	13	2.1%
Assists	**599**	24	40	87	238	210	15.2%
MFR	**1,281**	263	273	241	246	258	32.6%
N/A	**38**	12	12	11	2	1	1.0%
Variation vs. Average:	786.4	-15.2%	-15.6%	+4.9%	+15.6%	+10.2%	

Details on Incident Types

For the sake of convenience, the 61 incident types that Valley Communications uses have been grouped into six groups, as shown in the above tables. The N/A group is not actually a group, but represents incidents that were not categorized; i.e. are of an uncategorized or unknown type. The following is a summary of the incident types that GA has assigned to each group. These type descriptions are as assigned by Valley Communications when they dispatch firefighters to incidents.

FIGURE: INCIDENT TYPE GROUPINGS

Group	Incident Type
Fires	Bales of hay, chimney fires, commercial vehicle fire, flammable liquid fire, grass/brush, passenger vehicle fire-car/van, power lines down/arcing, power pole on fire, structure-barn/warehouse, structure-commercial, structure-industrial/factory, structure-other, structure-residential/house/garage/shed, transformer on fire, trash/garbage bin fire, vehicle fire-other, woods/trees
Pre-Fire Conditions	Commercial fire alarm, electrical, electrical appliance, investigation, other alarm, residential fire alarm, smoke condition
Rescues	Building collapse, commercial/industrial accident, confined space, grain bin/silo, multi-casualty event, MVA-confirmed entrapment/unknown, MVA-no entrapment, off-road vehicle, other rescue, persons trapped, residential accident, vehicle extrication, water/ice rescue, water rescue
Hazards	CO gas-carbon monoxide, CO2 gas, flood, fuel spill-diesel, fuel spill-gas, other gasses-ammonia/chlorine/etc., other response, other spills, propane, public assistance, suspicious odour, toxic chemical spill
Assists	Assistance to another fire department, assistance to other agencies, assistance to police, mutual-aid to the scene, stand-by at another station, stand-by at own station
MFR	Assistance to EHS, lift assist, medical

MFR (medical first response) incidents consist of two contributors; lift assists and medical responses in support of the EHS system (i.e. ambulance). Lift assists are calls to assist residents who have fallen and cannot get up. These are a very small contributor to the total numbers, about 4% of MFR calls overall.

MFR is the most prevalent type of incident that the W/WH fire services attend, at 32.6% overall. That varies from station to station; from as low as 14.6% (Windsor) to as high as 57.6% (Summerville). In large measure these variations are due to the choice of Response Level that the individual fire department has chosen.

EHS defines these response levels as follows;

FIGURE: EHS ASSIGNED RESPONSE LEVELS FOR VOLUNTEER FIRE DEPARTMENTS

Level 1	Do Not Notify my department/agency for medical calls.
Level 2	Only notify my department/agency if requested by the responding paramedics.
Level 3	Notify my department/agency for "Time Critical" emergency calls only, as determined by EHS Communications Officer.
Level 4	Notify my department/agency for all emergency calls in our community.
Level 5	Notify my department/agency for cardiac arrests, motor vehicle collisions and lift assists only.
Level 6	Notify my department/agency if requested by the responding paramedics and for all cardiac arrests and motor vehicle collisions.

The choice of level has an impact on the fire department, the number of incidents generated by MFR calls, and the overall activity level of the station. The following table shows which station is providing what level of MFR service.

FIGURE: CURRENT CHOSEN LEVELS FOR MFR RESPONSE

Station	Level	Description	Incident Number Impacts
Windsor	**5**	Life threatening medical conditions/situations, plus assistance to mostly senior citizens in distress	Lower incident number impact while ensuring notification of life-threatening incidents. Will generate non-emergency incidents for lift assistance of people who have fallen.
Hantsport	**6**	Life threatening medical conditions/situations	Lowest incident number impact while ensuring notification of life-threatening incidents
South West	**4**	Life and not-life threatening medical conditions/situations, plus assistance to mostly senior citizens in distress	Highest incident number impact. If the ambulance is responding then an incident is generated for the fire service. Incidents will be only about 20-30% critical life threatening.
Brooklyn	**4**	Life and not-life threatening medical conditions/situations, plus assistance to mostly senior citizens in distress	Highest incident number impact. If the ambulance is responding then an incident is generated for the fire service. Incidents will be only about 20-30% critical life threatening.
Three Mile Plains	**5**	Life threatening medical conditions/situations, plus assistance to mostly senior citizens in distress	Lower incident number impact while ensuring notification of life-threatening incidents. Will generate non-emergency incidents for lift assistance of people who have fallen.
Summerville	**4**	Life and not-life threatening medical conditions/situations, plus assistance to mostly senior citizens in distress	Highest incident number impact. If the ambulance is responding then an incident is generated for the fire service. Incidents will be only about 20-30% critical life threatening.

From stakeholder interviews there is a range of opinion on the provision of MFR services. Some firefighters do not like them and others feel the contribution to the community is of value. Some chiefs feel it is an essential service and others feel it is burning out their firefighters and changes are needed to avoid alerting more firefighters than necessary for these types of incidents calls. There is undoubtedly some costs associated with these incident calls, integrated into existing budgets.

Fires and Pre-Fire Conditions together represent the largest number of incident types for all stations, collectively (33.2%). This is particularly so in the more urban stations (Windsor,

Hantsport) where the selected lower MFR level generates fewer medical incident calls. South West is the anomaly in this case.

The two incident groups (fire/pre-fire) are lumped together in this analysis because all fires transition through a pre-fire condition before they become a fire, so they are often linked.

One possible exception is false fire alarm incidents. Of the 585 pre-fire conditions incidents in the last five years, 374 (64%) were associated with commercial/residential/other alarm system triggers. It is very likely that a lot of these alarm system incidents were not associated with an actual fire/pre-fire event, but were due to malicious, mistaken, maintenance, and environmental causes. Some alarms would certainly have identified some genuine pre-fire conditions; for example, motorized equipment failing in an HVAC system that triggers a smoke detector connected to an alarm system; undetected a fire would have resulted.

In the GAs' experience the percentage of fire alarm system false alarms is of concern to the fire departments. In Windsor, which has 57.8% (216) of the alarm system generated incidents, there is a false alarm by-law which penalizes owners of buildings where there are excessive false alarms.

GA recommends that a Region-wide False Fire-Alarm by-law be developed and enforced.

Enforcement reduces the number of false alarms and; benefits occupants who can become inured to alarms sounding and ignore them in a real fire, reduces costs for fire departments by reducing incident volumes (by incentivizing the reduction in false alarms), and allows some cost recovery, and reduces frustration/complacency on the part of firefighters.

With a total of 719 fire incidents of all types, fire incidents represent the second largest group of incidents, after MFR. Responding to fires is a core component of a fire department's reason for being. There are a few main drivers of these numbers which the following table identifies. Some types have been combined in the following table since they are, semantically, the same broad type of incident.

FIGURE: PREDOMINANT FIRE INCIDENTS BY TYPE

Type	Number	%
Structure-Residential + Chimney	147+134 = 281	39.1%
Grass/Brush + Woods/Trees (aka Wildland fires)	107+45 = 152	21.1%
Power Lines Down/Arcing + Power Pole on Fire	74+30 = 104	14.5%
Passenger Vehicle Fire/car/van	68	9.5%
All others	114	15.9%
	719	
Breakdown by Fire Station	***Residential/Chimney***	***Wildland***
Windsor	55	24
Hantsport	80	35
South West	18	5
Brooklyn	64	44
Three Mile Plains	28	Inc Brooklyn
Summerville	32	18

The data shows that over the last five years the leading location for fires is in or associated with dwellings. Not all of these incidents likely had an active fire, some would have been reported in error. This includes data potentially includes single family, multi-family, attached, semi-detached homes, apartments, flats, and both owned and rental dwellings. Dwelling fires are the leading type of fires Nationally.

Rescues appears to be a group that is increasing. Almost all rescues are motor vehicle accident (MVA) type related. During this same five-year period there were seven water rescues reported. The following tables shows what might be an upward trend; further years' data is needed to verify.

FIGURE: RESCUE TYPES

Type	2014	2015	2016	2017	2018	Totals
MVA-Confirmed Entrapment/ Unknown	55	45	56	63	71	**290**
MVA-No Entrapment	47	47	79	82	69	**324**
	102	**92**	**135**	**145**	**140**	**614**

FIGURE: MVA RELATED INCIDENT DISTRIBUTIONS (2014-18)

Station	Number	%
Windsor	135	22.0%
Hantsport	141	23.0%
South West	16	2.6%
Brooklyn/Three Mile Plains	302	49.2%
Summerville	20	3.3%
	614	

Assists as a group are almost totally related to mutual-aid between the four-fire departments (and six stations) inside W/WH. About 75 (12.5%) were actually outside the Region. Mutual-aid either involves travelling to the scene of the incident, or providing stand-by at the station of a fire department who has provided resources to the scene. The following table shows the mutual-aid data;

FIGURE: MUTUAL-AID DISTRIBUTION, MUTUAL-AID GIVEN

Station	2014	2015	2016	2017	2018	Totals	%
Windsor	12	7	18	33	30	**100**	17.7%
Hantsport	7	2	21	47	65	**142**	25.1%
South West			4	35	4	**43**	7.6%
Brooklyn/TMP *	5	17	28	93	96	**239**	42.3%
Summerville		7	7	17	10	**41**	7.3%
	24	**33**	**78**	**225**	**205**	**565**	

* Brooklyn station #1 responses into station #2's (TMP) area have been classified as mutual-aid responses.

Assistance incidents that involve intra-regional incidents actually do not represent unique W/WH incidents; they are an appendage to a pre-existing Regional incident. In that sense, they distort the number of actual incidents, and instead they represent the number of fire department page-outs. In other words, over the five-year period of data, the total number of discrete incidents is less than the 3,932-number suggested by the Valley Communications statistics. The total number of discrete incidents is more closely represented as 3,393.[46]

[46] Valley Communications reported they made 3,932 incident pages, minus the 539 internal mutual-aid calls (i.e. 614 -75).

Incident Responses by Community, Growth

Examining incident numbers by community is necessary for the projection of potential changes in incident response demand.

FIGURE: RESPONSES BY COMMUNITY, 2014-18

Community	Station	2014	2015	2016	2017	2018	Totals	%	Properties in Community	Annual[47] Response Rate
Ardoise	Brooklyn	19	11	19	29	35	**113**	**3.3%**	586	3.9
Ashdale	Brooklyn		1	2	7	2	**12**	**0.3%**	48	5.0
Avondale	Brooklyn	3	2	5	13	6	**29**	**0.8%**	167	3.5
Belmont	Brooklyn	4	3	7	3	11	**28**	**0.8%**	131	4.3
Brooklyn	Brooklyn	52	47	46	54	34	**233**	**6.7%**	449	10.4
Ellershouse	Brooklyn	22	18	30	25	25	**120**	**3.5%**	378	6.3
Five Mile Lake	Brooklyn						**0**	**0%**	19	0
Greenhill	Brooklyn	11	10	14	6	8	**49**	**1.4%**	135	7.3
Hillsvale	Brooklyn	5	1	3	6	3	**18**	**0.5%**	121	3.0
Mantua	Brooklyn	1	1	1	11	3	**17**	**0.5%**	37	9.2
McKay Section	Brooklyn	9	3	7	8	4	**31**	**0.9%**	131	4.7
Miller Creek	Brooklyn						**0**	**0%**	1	0
Mosherville	Brooklyn	6	8	3	8	8	**33**	**0.9%**	78	8.5
Newport Corner	Brooklyn	14	19	24	14	23	**94**	**2.7%**	166	11.3
Poplar Grove	Brooklyn	9	2	9	4	11	**35**	**1.0%**	96	7.3
Scotch Village	Brooklyn	9	20	18	16	12	**75**	**2.2%**	252	6
Union Corner	Brooklyn	10	13	20	17	14	**74**	**2.1%**	179	8.3
Upper Burlington	Brooklyn	6	14	10	11	21	**62**	**1.8%**	178	7
Woodville	Brooklyn	4	7	4	2	8	**25**	**0.7%**	90	5.6
Bishopville	Hantsport	14	3	4	9	2	**32**	**0.9%**	58	11
Falmouth	Hantsport	25	48	45	103	63	**284**	**8.2%**	1,195	4.8
Hants Border	Hantsport	25	29	16	15	17	**102**	**2.9%**	100	20.4
Hantsport	Hantsport	43	63	26	28	28	**188**	**5.4%**	595	6.3
Leminster	Hantsport	3	3	8	9	3	**26**	**0.7%**	139	3.7
Mount Denson	Hantsport	13	5	12	27	10	**67**	**1.9%**	355	3.8
Upper Falmouth	Hantsport	2	15	16	21	31	**85**	**2.4%**	469	3.6
Mill Section	South West	4		9		6	**19**	**0.5%**	48	7.9
Panuke Lake	South West						**0**	**0%**	7	0
Upper Vaughan	South West	2	8	19	9	21	**59**	**1.7%**	207	5.7
Vaughan	South West	9	10	33	20	37	**109**	**3.1%**	877	2.5
Wile Settlement	South West	1	1	5	3		**10**	**0.3%**	71	2.8
Bramber	Summerville	18	12	11	5	11	**57**	**1.6%**	308	3.7
Centre Burlington	Summerville	14	8	12	9	14	**57**	**1.6%**	215	5.3
Cheverie	Summerville	9	13	16	20	11	**69**	**2.0%**	333	4.1
Kempt Shore	Summerville	5	7	5	8	12	**37**	**1.1%**	150	4.9
Lower Burlington	Summerville	14	10	8	9	10	**51**	**1.5%**	150	6.8
Riverside	Summerville	1		3	2	5	**11**	**0.3%**	83	2.7
Summerville	Summerville	10	3	12	12	12	**49**	**1.4%**	180	5.4
Garlands Crossing	TMP	8	12	8	18	22	**68**	**2.0%**	445	3.1

[47] This rate is expressed as the average annual number of incidents per 100 properties occurring over the five years of data in the table. The overall average rate for all of W/WH is shown at the bottom of the table, and is 5.2 incidents per 100 properties.

Community	Station	2014	2015	2016	2017	2018	Totals	%	Properties in Community	Annual[47] Response Rate
Gypsum Mines	TMP	2	5	3	3	2	**15**	**0.4%**	62	4.8
Martock	TMP	7	5	6	13	8	**39**	**1.1%**	267	2.9
Newport Station	TMP	3	9	10	9	3	**34**	**1.0%**	239	2.8
St. Croix	TMP	11	16	27	20	30	**104**	**3.0%**	244	8.5
Sweets Corner	TMP	9	6	4	7	7	**33**	**0.9%**	111	5.9
Three Mile Plains	TMP	23	23	24	40	37	**147**	**4.2%**	816	3.6
Wentworth Creek	TMP	4	4	9	3	4	**24**	**0.7%**	99	4.8
Windsor Forks	TMP	7	4	6	16	11	**44**	**1.3%**	239	3.7
Lakelands	Uniacke		1	2			**3**	**0.1%**	2	30
Cambridge	Walton	5	7	1	5	2	**20**	**0.6%**	180	2.2
Cogmagun	Walton	3		15	11	5	**34**	**1.0%**	97	7
Pembroke	Walton	1	2	2	4		**9**	**0.3%**	95	1.9
Walton	Walton	1		3	3	5	**12**	**0.3%**	71	3.4
Curry's Corner	Windsor	7	8	4	10	10	**39**	**1.1%**	146	5.3
Windsor	Windsor	103	78	108	106	95	**490**	**14.1%**	1,436	6.8
	Totals:	**590**	**598**	**714**	**811**	**762**	**3,475**		**13,331**	**Avg. 5.2**

Note: In the above data, strict interpretation of the data as a reliable indicator of fire risk in the community should be undertaken with caution. The incident numbers in the table include responses to all incident types, including responses to motor vehicle accidents (MVA) on transiting highways (e.g. Highway-101) as well as mutual-aid[48] call-outs. In communities with few properties, even a small number of incidents can calculate to a large rate.

SERVICE DEMAND GROWTH

Population

Growth in population and consequently housing growth is usually the largest driver for increases in service demand for fire departments. Service demand means the number of incidents that occur annually. Incident numbers are largely driven by population size, and secondarily by travellers and visitors; in other words, by people.

[48] See the section on mutual-aid responses starting on page **165** of this report.

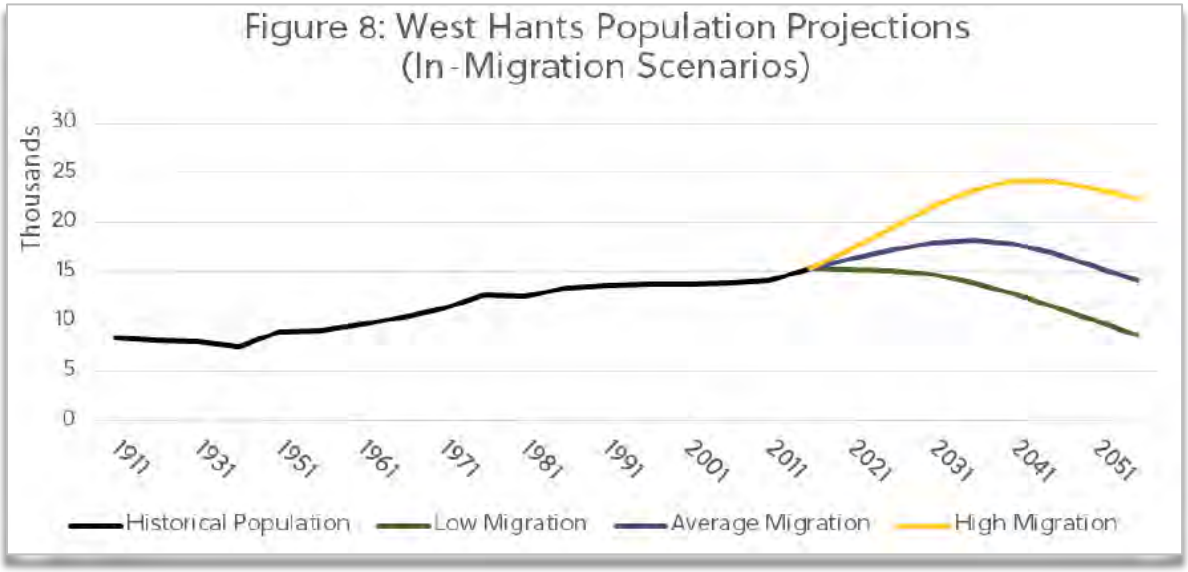
Population projections[49] by West Hants Planning and Development Department show that a significant increase in West Hants population is unlikely over the next 10 years. See the chart from the Population Report that follows on page **168**.

One extreme of the projections actually shows a decline in population by 2031, which is just beyond the threshold of our projection mandate. There is, unfortunately, a several-hundred-% difference between the lower and upper projections.

The chart's "average" projection for 2031 shows a modest population increase to 18,120 which is up almost 2,800 (+18%) from the 15,350 reported by StatsCan in 2016. After 2031 the population is projected, in this version also, to level off and decline.

The most optimistic scenario shows a population increase to as high as 24,166 (+57%) by 2041; before then declining. All three projection scenarios predict a declining population, over the long term, starting at or before 2041.

FIGURE: WEST HANTS POPULATION PROJECTION CHART



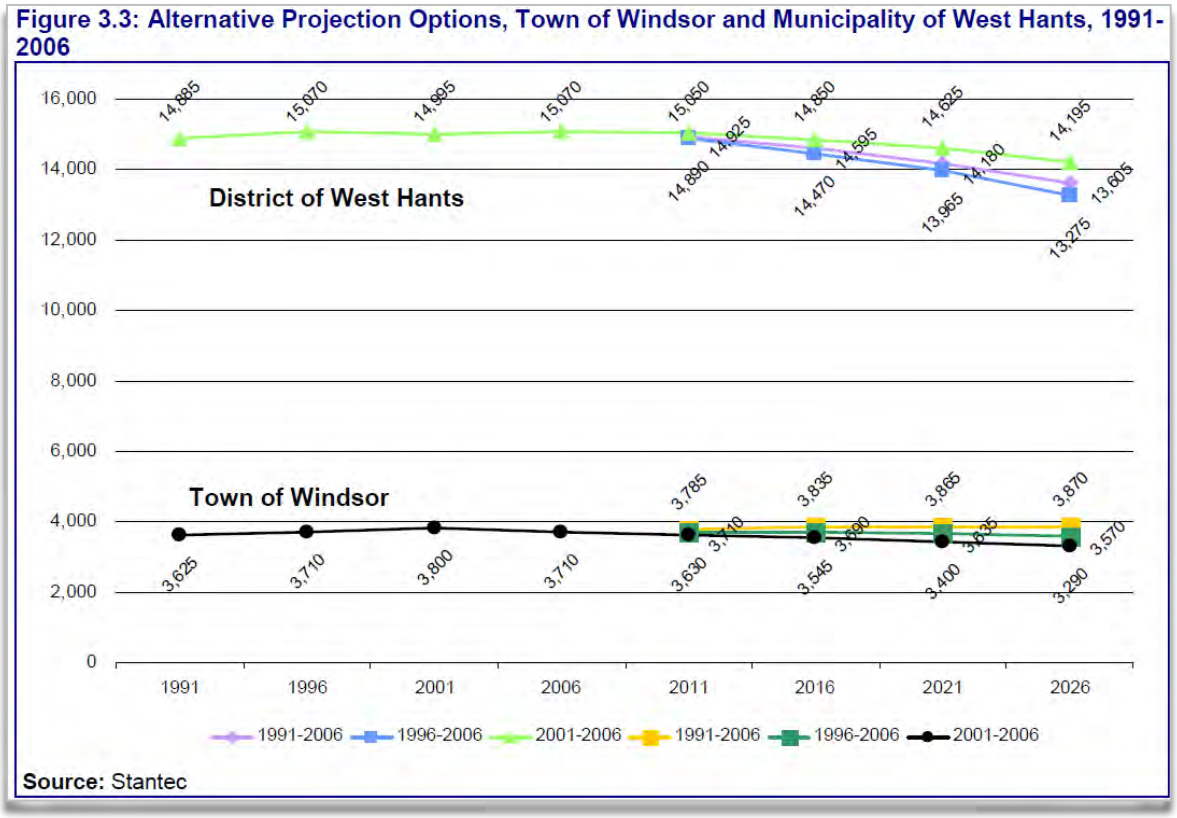
[49] West Hants Planning and Development Department, Background Report: Population, March 2018, page 8.

A further study[50] by Stantec, done in 2010, shows a less optimistic population projection for West Hants, and includes the Town of Windsor as well as West Hants. See the chart on page **169**.

In this chart, the population for West Hants is projected to be below 14,000 by 2026 while the Windsor population holds flat. This Stantec study is relatively consistent with the West Hants study, done 8 years later, in that growth projections for the Region appear to be relatively flat.

For the Town of Windsor, StatsCan[51] reports that between 2011 and 2016 the population of Windsor contracted 3.6%, down from 3,785 in 2011 to 3,648. This actual data corresponds well to the median prediction on the Stantec chart, six years after it was written.

FIGURE: STANTEC POPULATION PROJECTION CHART



[50] Windsor Integrate Community Sustainability Plan, 2010, page 3.21

[51] https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?B1=All&Code1=1208002&Code2=12&Data=Count&Geo1=CSD&Geo2=PR&Lang=E&SearchPR=01&SearchText=Windsor&SearchType=Begins&TABID=1

Planned Growth Areas, West Hants

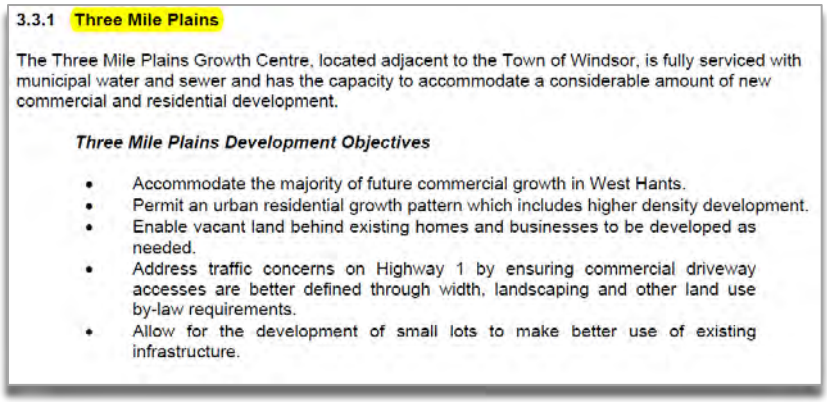
West Hants in their updated Municipal Planning Strategy[52] (WHMPS) has established growth goals for West Hants as follows;

> *"3.3 Growth Centres*
>
> *Growth Centres are intended to accommodate most of the future non-rural development which will occur in West Hants, thereby relieving development pressure from non-renewable resource lands. It is expected that a full range of municipal services, including water and sewer, recreation facilities, street lights and sidewalks, will eventually be provided in these communities as they become necessary. Concentrated development makes the provision of such services more economical. Because of the expense involved in constructing, extending and maintaining municipal water and sewer infrastructure, these services will be provided only in the two existing Growth Centres of* ***Three Mile Plains*** *and* ***Falmouth****, as well as the* ***Windsor-West Hants Joint Industrial Park****."* {emphasis added}

Significantly, from a fire protection point of view, these areas of preferred growth are adjacent to the Town of Windsor. Having development in a more concentrated area contributes to fire protection planning efficiency.

Three Mile Plains

For Three Mile Plains, West Hants had identified some specific development goals, as shown in the accompanying snapshot from the WHMPS document;



3.3.1 Three Mile Plains

The Three Mile Plains Growth Centre, located adjacent to the Town of Windsor, is fully serviced with municipal water and sewer and has the capacity to accommodate a considerable amount of new commercial and residential development.

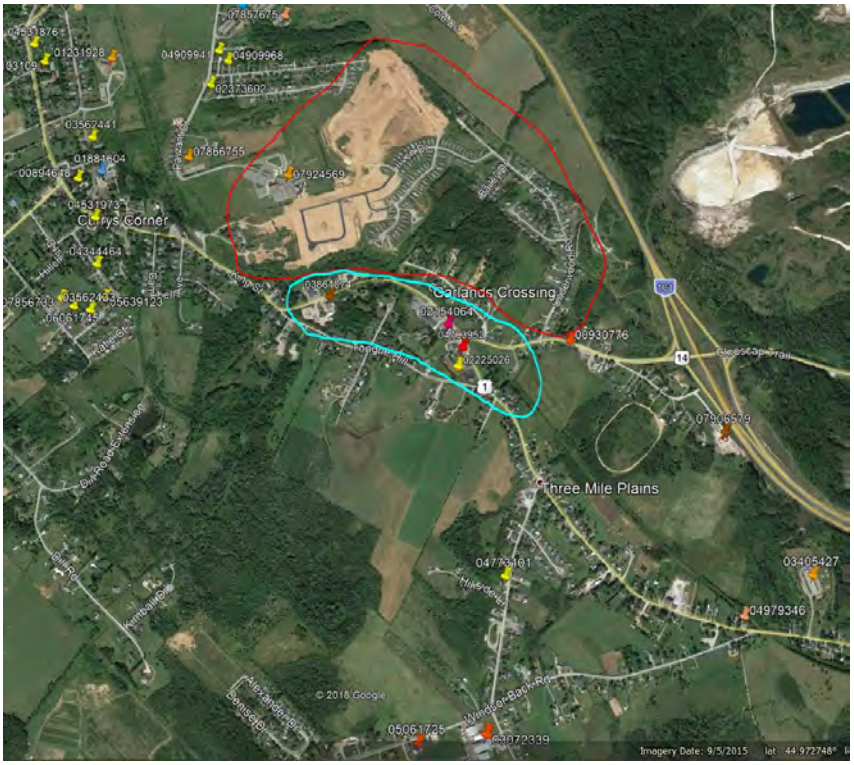
Three Mile Plains Development Objectives

- Accommodate the majority of future commercial growth in West Hants.
- Permit an urban residential growth pattern which includes higher density development.
- Enable vacant land behind existing homes and businesses to be developed as needed.
- Address traffic concerns on Highway 1 by ensuring commercial driveway accesses are better defined through width, landscaping and other land use by-law requirements.
- Allow for the development of small lots to make better use of existing infrastructure.

[52] Municipality of the District of West Hants, Municipal Planning Strategy, May 13, 2008, updated December 25, 2018.

The area where residential development is primarily occurring is called Garlands Crossing. A snapshot of the Garlands Crossing area from Google Earth shows where development is currently occurring. The red circled area is residential development. This image is from 2015 and many more homes have been constructed than the image shows. The teal coloured area is an existing area of commercial buildings.

There is also a new fire station in that area, called the Three Mile Plains (TMP) station throughout this study. The red stick pin, with PIN number ending in 776 is the fire station.



The accompanying graphic from the WHMPS shows the TMP designated commercial core;



Falmouth

In Falmouth, residential growth has also been observed. The WHMPS had identified some specific development goals, as shown in the following snapshot from the report;

***Falmouth* Development Objectives**

- Provide for the development of Falmouth as a predominantly residential community, with a defined growth boundary based on the Municipality's ability to provide necessary services.
- Accommodate rural lifestyle activities to the extent that such activities are compatible with a moderate density of residential development.
- Monitor the extension of services and, when necessary, limit service extension to ensure the capacity of the municipal sewer and water systems is not exceeded.
- Encourage street design in new residential developments that separates local traffic from through traffic.

A 2015 Google Earth snapshot shows some of the Falmouth growth areas. The red circle is current residential development and the teal colour is part of designated commercial area.





This accompanying graphic from the WHMPS more clearly shows the designated Falmouth commercial hub.

If population/residential and accompanying commercial growth does occur in West Hants, it is likely to be in the two designated growth centres as described above.

Windsor

In 2010 Windsor commissioned Stantec to produce the ICSP[53] study. The main focus of recommendations seemed to be the renewal/improvement of infrastructure and services, and the enhancement of lifestyle and natural assets of the Town. Redevelopment of existing vacant industrial lands was a priority as well as enhanced cooperation with West Hants, and others. Regarding municipal population growth, the ICSP made the following comments;

Stantec

TOWN OF WINDSOR INTEGRATED COMMUNITY SUSTAINABILITY PLAN

Potential Municipal Planning Strategy Changes

March 17, 2010

ICSP Goal/Action(s)	MPS Status	Future Considerations
Attract young adults and families 1. Encourage affordable, quality residential development. 2. Maintain related services, particularly schools. 3. Enhance recreation options.	The MPS recognizes that population in Windsor is aging but does not contain any policy directly addressing the encouragement of population growth.	No change.

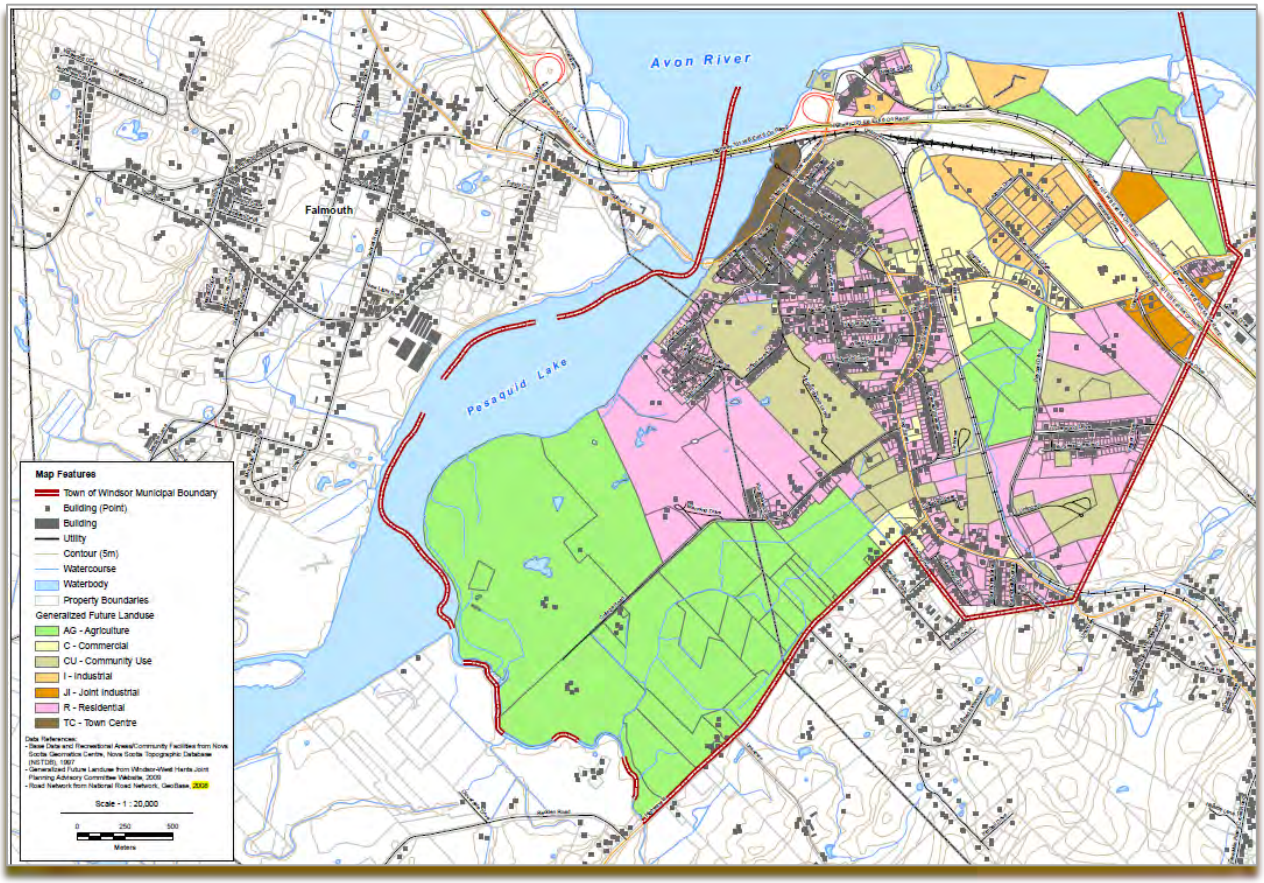
The above does not seem to reflect a focus on the part of the Town of Windsor in 2010 towards residential growth. This idea is supported by several other focus areas in the ICSP.

There are, however, still significant undeveloped and designated residential areas and infill space within the Town boundary that could support significant residential development, if such were to occur.

The space for residential growth is shown in pink on the accompanying land-use planning map snapshot from the ICSP.

[53] Town of Windsor Integrated Community Sustainability Plan, March 17, 2010

FIGURE: WINDSOR LAND USE MAP



Conclusion, Population Growth Service Demands

It is GA's conclusion that there is land available for residential growth. However, population projections do not support any significant long-term population growth. It is therefore likely that population growth will be small within the ten-year span of interest for this fire services review.

However, residential construction may continue as it has for the past few years, but it is likely that this construction will be mainly for rehousing of downsized families, some new to the area, which is a common occurrence in many communities where the average number of persons per household is slowly declining as the population ages and children leave the home, and as senior partners pass-on.

Modern home construction does not attract as many calls for fire services as does older construction. New codes, techniques, and materials are less prone to fire events. However, as the population ages, it can be expected that ambulance service calls will increase. If the fire department continues to support EHS in the provision of pre-hospital emergency health care, then it can be expected that the proportion of medical related calls will continue to climb.

With most of any population increase happening in and around Windsor, the impact of any growth will be felt by the closest fire stations. These are located in Windsor and in Garlands Crossing.

GA recommends that the Windsor and Three Mile Plains stations be appropriately resourced to deal with any population and residential growth that creates increased service demand.

With the "average" projected population[54] increase of 18% applied to the growth areas in West Hants, and also applied to Windsor, the following chart shows potential impacts on annual incident volumes by 2031. An increase for Brooklyn is applied, at 4.5%, as it is a designated Village in the WHMPS with modest growth supported. Hantsport is not included since housing starts there are low and population numbers have been stable/contracting.

FIGURE: SELECTED COMMUNITY HISTORIC INCIDENT NUMBERS AND POTENTIAL RESIDENTIAL GROWTH

Community	2014	2015	2016	2017	2018	Totals	%[55]	2031 (projected annual)
Brooklyn	52	47	46	54	34	**233**	**6.7%**	**36**
Curry's Corner	7	8	4	10	10	**39**	**1.1%**	**12**
Falmouth	25	48	45	103	63	**284**	**8.2%**	**74**
Garlands Crossing	8	12	8	18	22	**68**	**2.0%**	**26**
Three Mile Plains	23	23	24	40	37	**147**	**4.2%**	**44**
Wentworth Creek	4	4	9	3	4	**24**	**0.7%**	**5**
Windsor	103	78	108	106	95	**490**	**14.1%**	**112**
Sub-total:	**222**	**220**	**244**	**334**	**265**	**1,285**	**37.2%**	**313**
W/WH Totals, all communities:	**586**	**598**	**705**	**811**	**756**	**3,456**		

[54] Expressed in the Planning and Development Department Population Background Report.

[55] Percentage of the Region's 3,456 incident volume total for the five years of data shown.

For this projection it is assumed that the increase/growth would occur proportionally to all communities, although in fact this is unlikely. However, with the exception of Brooklyn, all the above communities are closest to the TMP and Windsor fire stations, so fluctuation amongst the growth communities is irrelevant from an impact perspective.

The salmon column titled 2031 shows the increase applied to the 2018 annual totals for each community. It should be noted that the annual projected numbers for 2031 are completely or nearly within the annual variations already seen for each community, and for the annual totals for these communities. This suggests that there is currently the capacity/ability to service these projected incident numbers.

DEVELOPMENT GROWTH, FIRE SERVICE CAPABILITY

The development of large commercial, industrial, and residential facilities can increase the demand for service capability. In this circumstance, service capability means the ability of the fire service to mitigate the incidents that occur in buildings larger or with more complex risks than they are currently equipped to handle.

For example; the development of high-rise[56] apartment buildings can place a high demand on manpower, processes, training, and technology for the fire department. This is especially so if the fire department has no prior experience with such buildings. This would be the case in W/WH where there buildings heights are typically 3-4 stories, and the tallest are churches.

To mitigate fire incidents in new development that is outside of the capability envelop of the fire service requires specialized equipment, specific procedures, diligent fire safety enforcement, and usually higher staffing numbers on-scene at an incident. The municipality does have a significant degree of control over allowing these types of development, and consideration of the impact on the fire services and the costs of increasing capability should be part of municipal development plans.

[56] High-rise buildings are buildings that are 6 stories and above in height.

West Hants Planning and Development Department reports[57] that it is unlikely that big box retailers and power centres[58] will be developing in W/WH, without a larger population to attract them. Such a development would be outside the current capability of the fire departments.

Industrial and resource-based development is reportedly[59] not booming in West Hants. Permits and values have been low. A Windsor-West Hants shared industrial park is the preferred location for industrial development, and there are currently a few industries located there, although none are very large. The number of commercial development permits is trending downward, although the value of these may be upwards.

Growth in the commercial, industrial, and resource sectors is unlikely to increase substantially over the next 10 years. It is therefore unlikely that an increase in fire services capability will be driven by extraordinary development.

GA recommends that the new Regional government carefully consider potential impacts on fire service capability with every new industrial, large commercial, or large residential planning application. The fire service should not be opposed to such developments, but must speak clearly about needs and plan accordingly for any such large-scale development.

[57] West Hants Planning and Development Department, Background Report: Economic Development, March 2018, page 16.

[58] IBID; in 2010 power centres had an average of 25 tenants, including several big-box retailers.

[59] West Hants Planning and Development Department, Background Report: Industry and Resource, March 2018, page 4.

COMMUNITY FIRE RISK FACTORS

Risk can be simply described as a combination of incident frequency and incident consequences. The best predictor of incident frequency is statistics, i.e. the fire experience in the community. The assumption is that unless something is done proactively to change the root causes of fires, then they will continue to occur at a similar frequency.

Incident consequences are often limited to the persons directly involved (i.e. a family's home), but consequences can also impact the community at large. A significant fire in a major employer can result in negative economic consequences to the community through job loss, damage to infrastructure, loss of viability for suppliers, and loss of tax base. These consequences can also be social as the community may lose hope in a secure future, former workers may be forced to seek employment elsewhere, often outside the community, and sadness over the loss of a long-established bastion.

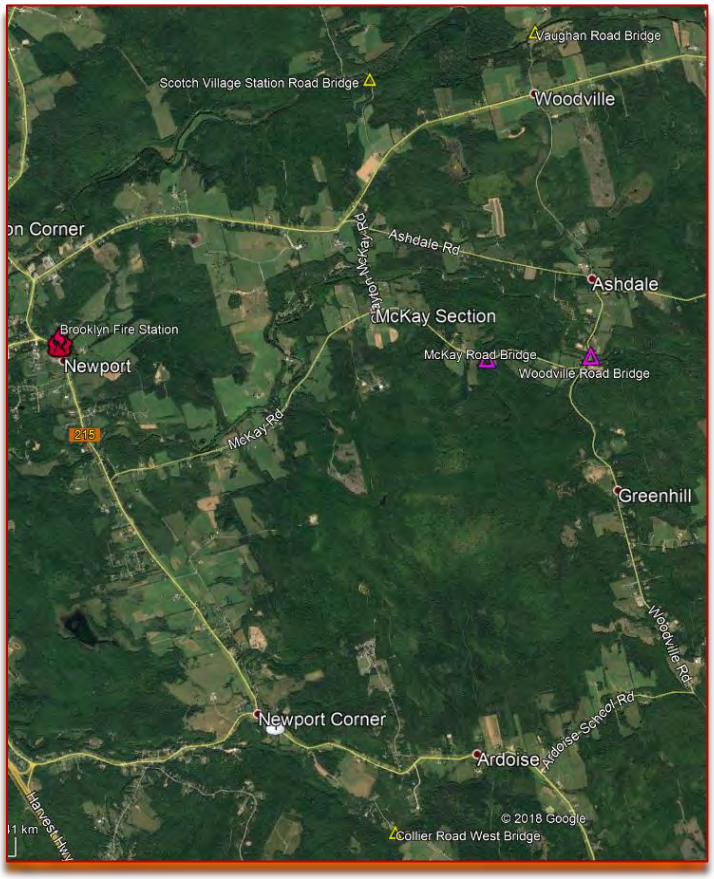
The current role of the Regional fire departments in addressing community fire risk is mainly in responding to incidents and attempting to mitigate the consequences of fires that are already in progress. There are a number of factors that affect the efficiency and effectiveness of this role. These will be addressed in the following section.

Bridges

Access to incidents by the fire department occurs along public roads. Fire apparatus ca be large and heavy, and restrictions in the roads can determine the route used to travel to the incident. Bridges are one difficulty for fire apparatus.

GA issued to the fire departments a request for information on restrictive bridges. The query returned information on seven bridges, as identified by the fire departments, with weight restrictions which might limit transit by the heaviest fire apparatus. Two of these bridges are avoided by the fire departments for that reason. One of theses bridges was noted as a private bridge of unknown capacity.

- Cogmagun Road bridge across the Cogmagun River, not posted but 20 Tonnes advised maximum (Summerville FD).
- Benny Muckle Road, private single lane bridge of unknown capacity (about 5.5 km east of Bramber) (Summerville FD).
- McKay Section Road, single lane bridge posted 20 Tonnes, rated as poor condition, avoided.
- Vaughan Road, Woodville, single lane bridge posed as 20 Tonnes, rated as good condition.



- Scotch Village Station Road, single lane bridge posed as 20 Tonnes, rated as good condition.
- Woodville Road, Ashdale/Greenhill, single lane bridge posed as 20 Tonnes, rated as fair condition, avoided.
- Collier Rd. West, Newport Corner, single lane bridge posed as 20 Tonnes, rated as poor condition, not avoided since it is the only access.

The accompanying Google snapshot shows the bridges in the Brooklyn response district.

GA recommends that there be response plans developed to ensure that all personnel Region-wide are well aware of bridge restrictions where fire apparatus cannot cross. This is particularly important for fire stations in other fire districts who may be contributing pumpers, tankers, or aerial apparatus to assist at a fire in another jurisdiction. A typical pumper weighs 25 Tonnes, a

tanker weighs 30+ Tonnes, and an aerial weighs 35 Tonnes, and an aerial-platform typically weighs over 40 Tonnes.

Rural Water Supply Infrastructure

Rural water supplies are used to provide a source of firefighting water in areas of the Region where there is no public water supply and fire hydrants. These sources can also be significantly useful where there are fire hydrants, during very large fires, where the public water supply is not able to cope with required flow rates or total water demands.

Fire Underwriter Survey recognizes[60] approved alternative water supplies (i.e. not municipal hydrant systems) for properties if the water supply point is within 2.5 km by road for commercial risks and 5 km by road for residential risks. Essentially, this means that dry-hydrants or static drafting locations should be available within those distances to most if not all properties in the Region, according to their type of property.

GA issued a request to the fire departments for information on their established rural water supply sources. The rural water supply query returned information on 18 rural water supply sites;

- seven dry-hydrants on a lake/river/pond,
- one dry-hydrant on a cistern,
- one wet-hydrant gravity fed from a pond,
- two private water systems, and
- seven drafting sites on a lake/pond/river.

All of the identified sites were rated excellent to good, except one that was rated adequate. The information revealed that not every site is tested[61] and flowed/maintained regularly. One site is established in downtown Windsor and will be useful in supplementing the Town's water supply in a large fire or during water interruption.

[60] Fire Underwriters Survey, Alternative Water Supplies for Public Fire Protection, an Informative Reference Guide for use in Insurance Grading.

[61] National Fire Protection Association, NFPA-1142, Standard on Water Supplies for Suburban and Rural Fire Fighting.

NFPA-1142 is the standard for rural water supplies. The standard requires that dry-hydrants be inspected and maintained at least quarterly and flow tested at least annually, and that records be kept of all maintenance and testing. It also requires that all static water sources be equipped with a dry-hydrant.

Although there are a number of rural water sources established, the number is insufficient to provide adequate coverage for all populated areas of the Region.

GA recommends that dry-hydrants be installed at all planned rural water supply points in the Region. Water supply points should be established within 5 kilometers by road to all hamlets and clusters of residential housing, and within 2.5 kilometers to all commercial risks. All dry-hydrants should be developed in accordance with the requirements of NFPA-1142, and should also be maintained in accordance with the standard.

GA recommends that good records of all dry-hydrant maintenance, inspections, and testing should be kept as protection against liability and for reference and pre-planning purposes.

GA recommends that all dry-hydrants or other static water sources that are established on private property be accompanied by an executed agreement defining rights, duties, and liabilities.

Residential Fire Risk

STATISTICS CANADA RESIDENTIAL DATA

Statistics Canada[62] provides the following information for the Region;

line	Item	Windsor		West Hants		W/WH	%		Hantsport[63]	
1	Population 2016	3,648		15,368		**19,016**			1,124	
2	Total private dwellings	2,367		7,175		**9,542**			519	
3	Private Dwellings occupied by usual residents[64]	2,214	93.5%	6,426	89.6%	8,640	90.5%		494	95.2%
4	Population density, persons per km^2	500.0		12.4					528.2	
5	Land area, km^2	10.5	0.8%	1,244	99.2%	1,255			2.13	
6	Single detached homes	1,310	59.3%	5,750	89.4%	7,060	81.7%		385	78.6%
7	Apartment in building five or more stories	5	0.2%	0	0.0%	5	0.1%		0	0.0%
8	Semi-detached house	115	5.2%	65	1.0%	180	2.1%		10	2.0%
9	Row house	45	2.0%	25	0.4%	70	0.8%		10	2.0%
10	Apartment or flat in a duplex	40	1.8%	55	0.9%	95	1.1%		20	4.1%
11	Apartment in a building fewer than five stories	575	26.0%	165	2.6%	740	8.6%		65	13.3%
12	Other single-attached house	15	0.7%	10	0.2%	25	0.3%		0	0.0%
13	Moveable dwelling	105	4.8%	360	5.6%	465	5.4%		0	0.0%
14	Household sizes; 1 person	765	34.5%	1,470	22.9%	2,235	25.9%		140	28.3%
15	2 person	780	35.2%	2,700	42.0%	3,480	40.3%		185	37.4%
16	3 person	320	14.4%	1,035	16.1%	1,355	15.7%		95	19.2%
17	4 person	250	11.3%	865	13.5%	1,115	12.9%		55	11.1%
18	5 or more person	100	4.5%	355	5.5%	455	5.3%		20	4.0%
19	Number persons in private households	4,815	91.7%	15,345	99.9%	**20,160**	97.8%		1,115	99.2%
20	Average household size	2.2		2.4					2.3	
21	Owned dwellings	1,260	56.4%	5,540	86.2%	6,800	78.5%		380	75.2%
22	Condominium dwellings	45	2.0%	30	0.5%	75	0.9%		0	0.0%
23	Rented dwellings	930	41.6%	855	13.3%	1,785	20.6%		125	24.8%
24	Occupied private dwellings by construction period. 1960 or before	835	37.3%	1,910	29.7%	2,745	31.7%		280	55.4%
25	1961 – 1980	535	23.9%	1,860	28.9%	2,395	27.6%		130	25.7%
26	1981 – 1990	335	15.0%	905	14.1%	1,240	14.3%		25	5.0%
27	1991 – 2000	175	7.8%	785	12.2%	960	11.1%		35	6.9%
28	2001 – 2005	50	2.2%	305	4.7%	355	4.1%		25	5.0%
29	2006 – 2010	165	7.4%	375	5.8%	540	6.2%		0	0.0%
30	2011 – May 2016	145	6.5%	290	4.5%	435	5.0%		10	2.0%
31	Occupied private dwellings - major repairs needed	195	8.7%	670	10.4%	865	10.0%		35	6.9%

[62] https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?B1=All&Code1=1208002&Code2=12&Data=Count&Geo1=CSD&Geo2=PR&Lang=E&SearchPR=01&SearchText=Windsor&SearchType=Begins&TABID=1

[63] Hantsport was dissolved on July 1, 2015, after which it became an integral part of West Hants. Hantsport numbers are included in the West Hants and W/WH total numbers. They are shown here for reference.

[64] From StatsCan: "'Private dwelling occupied by usual residents' refers to a private dwelling in which a person or a group of persons is permanently residing."

Dwellings are defined by the National Building Code: "*Dwelling unit means a suite operated as a housekeeping unit, used or intended to be used by one or more persons and usually containing cooking, eating, living, sleeping and sanitary facilities.*"

An examination of the above data leads to a few observations related to fire protection.

- The percentages shown in the salmon coloured analysis column refer to the data (uncoloured cells) to their immediate left, and refer to totals in that column only. For example; line 3 for Windsor, 93.5% of the 2,367 total private dwellings are occupied by usual residents.
- The green total column in the W/WH (Windsor West Hants) column is the sum of the Windsor and West Hants data columns.
- Line 3: Of the 9,542 private dwellings, 9.5% (900 dwellings) are not occupied permanently. These are either seasonal, vacant, or housing transients. The occupancy rates are lower in West Hants than in either Windsor or Hantsport. Vacant buildings are a hazard to the community and firefighters.
- Line 4: The average population density in Windsor and Hantsport is more than 40 times that it is for West Hants. Denser populations are cheaper to service but are more susceptible to devasting fires that affect multiple buildings/occupancies.
- Line 6: The percentage of single detached homes in the region is high at 81.7% overall, but this is very much skewed towards West Hants. In Windsor the percentage is much lower at 59.3%. A fire or similar incident in a home in Windsor is 40% more likely to affect more than one dwelling. Consequently the fire risk is higher.
- Line 7: Although there is apparently one building that is 5-stories or taller in Windsor, all residential buildings in the region are 4-stories or lower. Five stories is classified as a mid-rise building; while 4-stories or less are low-rise buildings and can be laddered by the longest ground ladders.
- Line 23: Region-wide 20.6% of households live in rented accommodation. This is particularly so in Windsor, where 41.6% of households are in rental accommodations. The insurance industry claims that only about half of renters carry fire insurance. Fires in rental dwellings can be even more devastating to residents without insurance.
- Line 25: In Hantsport 55.4% of the occupied residential building stock (505 units) was built in or before 1960. Older buildings are more prone to fires since they have older utilities and systems.
- Lines 28-30: Since 2001 only 35 of these new dwellings have been built in Hantsport.
- Line 31: Shows that region-wide almost 10% of dwellings are in need of major repairs. Fire occurrences can increase in under-maintained structures.

The residential fires are the main risk for fire occurrences in most communities. They are also the main risk for injuries, and deaths, both of civilians and of firefighters.

According to national statistics[65] for Canada;

> *"Fires in residential properties accounted, on average, for 69% of all structural fires and 79% of all structural fire deaths. ... Homes representing one/two family dwellings, apartments and mobile homes accounted for 82% of all fires in residential properties*

[65] Fire Losses in Canada Year 2007 and Selected Years, Wijayasinghe, September 2011, presented to the Canadian Council of Fire Commissioners and Fire Chiefs, http://www.ccfmfc.ca/stats.html

and 83% of all residential fire deaths. …. In Canada, home fires accounted for 30% of all fires and 67% of all fire deaths."

As shown on the chart on page **164**, and partially repeated below, in the Region residential fires are the leading occupancy where fires are occurring. In the Region, according to the statistics received, the occurrence of residential fires (at 39.1% of all fire incidents) is above the national average of 30%.

FIGURES: REGIONAL DWELLING FIRES

Type	Number	%
Structure-Residential + Chimney	147+134 = **281**	39.1%
Breakdown by Fire Station	***Residential/Chimney***	
Windsor	55	
Hantsport	80	
South West	18	
Brooklyn	64	
Three Mile Plains	28	
Summerville	32	

Dwelling Fires	2014	2015	2016	2017	2018	Total
Combined	61	57	69	45	49	281
Chimney	26	17	38	29	24	134
Structure	35	40	31	16	25	147

The following table shows statistics from Windsor relating to all reported structure fire losses. One civilian and one firefighter injuries were reported for the five years. Both injuries occurred at residential fires. No fire loss amounts or injuries were reported by the other fire departments.

FIGURE: STRUCTURE FIRE LOSSES (WINDSOR)

Fires (Windsor)	2014	2015	2016	2017	2018	Total	# incidents
Residential	$131,500	$91,000	$76,500	$5,000	$6,000	$310,000	**281**
Barn/Warehouse	$0	$380,000	$0	$0	$0	$380,000	**25**
Commercial	$0	$0	$1,600,000		$1,500	$1,601,500	**15**
Industrial/Factory					$0	$0	**1**
Other	$100	$0	$0	$0		$100	**18**
	$131,600	**$471,000**	**$1,676,500**	**$5,000**	**$6,500**	**$2,291,600**	**340**

From the limited statistics available it is clear that in W/WH the risk of fire is greatest in residential properties. There is no breakdown on responses to residential fires by building type; i.e. single detached, semi-detached, row, multi-unit, owned, rented, number of stories, number of units, etc. Such a breakdown is very useful in better understanding the underlying risks associated with each building type, and can assist in determining fire prevention priorities.

GA recommends that complete fire statistics be collected and records kept, including all information requested by the NS Fire Marshal for inclusion in the provincial database. Records retention rules generally do not require retention of such data beyond five or seven years. It is further recommended that fire statistics be kept at least 15 years in order for trends to be clearly seen and analysed.

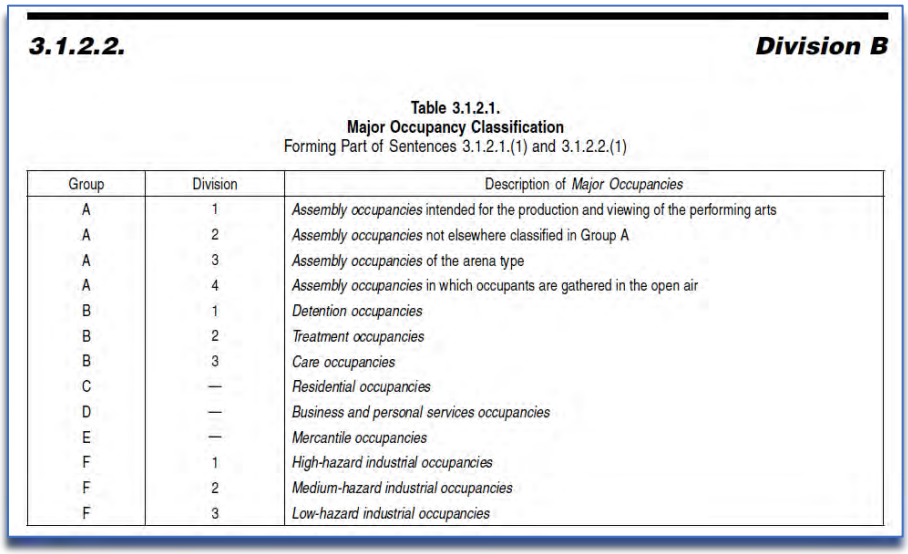
Fires in other property types are not as frequent as residential fires. However, even from the Windsor data, it can be clearly seen that fires in commercial and industrial properties can be of high loss values. The Windsor data shows that almost all of the commercial loss in the five years of data is attributable to a single fire in a low-rise apartment building on King Street.

Fires in commercial/mercantile/industrial buildings can be much more demanding to combat than fires in typical dwellings. They are generally larger fuel loads, larger in area and height, often require specialized equipment like aerial ladder apparatus, have limited access, and have more hidden spaces in which fire can spread. Additional occupants can add to the pressure on the firefighters to perform rescues and to search for persons who might be inside. The risk per incident to firefighters is much higher at these larger building fires than it is in a single-family residence.

Large Building Fire Risks

The National Building Code[66] (NBC) categorizes every building or part of building (occupancy) according to its Major Occupancy Classification. The accompanying table shows these classifications. For some examples of this;

- schools are classified as A2,
- the shopping mall is an E,
- a nursing home is a B2, and
- both single family residences and apartment buildings are classified as C.



3.1.2.2. **Division B**

Table 3.1.2.1.
Major Occupancy Classification
Forming Part of Sentences 3.1.2.1.(1) and 3.1.2.2.(1)

Group	Division	Description of *Major Occupancies*
A	1	*Assembly occupancies* intended for the production and viewing of the performing arts
A	2	*Assembly occupancies* not elsewhere classified in Group A
A	3	*Assembly occupancies* of the arena type
A	4	*Assembly occupancies* in which occupants are gathered in the open air
B	1	*Detention occupancies*
B	2	*Treatment occupancies*
B	3	*Care occupancies*
C	—	*Residential occupancies*
D	—	*Business and personal services occupancies*
E	—	*Mercantile occupancies*
F	1	*High-hazard industrial occupancies*
F	2	*Medium-hazard industrial occupancies*
F	3	*Low-hazard industrial occupancies*

The major reason for this classification system is to identify common fire safety concerns, and therefore common fire safety measures/requirements. This method carries over into the National Fire Code (NFC) and is used for identifying building inspections and Code enforcement requirements. Within each classification Group there are also special rules for specific types of occupancies. For example; even though a private family house and a 20-unit apartment building are both classified as a C occupancy, there are different fire safety requirements for both of them. So the occupancy classification isn't the whole story.

For firefighters, building classification tells them about the built-in fire protection systems and construction measures. It also informs on the risks and the needs to pre-plan for an incident at that location. For example; a fire in a B2 is probably at a nursing home or a hospital. Such a fire has the potential to be very challenging with many persons to evacuate or rescue. Many nursing homes are old and not sprinklered. Therefore, fires can be fast moving and residents are slow moving. Staffing numbers at the nursing home, during the overnight, may not be sufficient to evacuate all patients in a timely manner without assistance from firefighters and other first

[66] National Building Code of Canada, 2015 edition

responders. If firefighters assist with searching and rescuing, then firefighting is delayed because of limited staff within the first few critical minutes. The fire may then progress and threaten more people, etc. Knowledge in advance is valuable.

In the above example, it seems obvious that firefighters would be aware of a nursing home in their community. However that may be, firefighters are not necessarily aware of all the converted old homes, that used to be large single family, 2-3-story residences, and that now contain several rented rooms and/or apartments. These types of C occupancies are prone to serious fires and search and rescue is very challenging.

In an effort to identify some of the risks associated with the existing building stock, property data from Windsor and West Hants was analysed and some of the properties were classified in accordance with the NBC. Although W/WH was unable to provide an already populated database with this information, GA was able to manually classify 294 of the properties in the database out of the 600 top-valued assessment properties. Past fire inspections and building permit data assisted in identifying some of these properties. This limited data will be referred to in analysis that follows in this report.

Assessments and Property Counts

The total assessed value of all property in W/WH is $1.6B. There are 13,335 properties. According to the address of the properties, thereby identifying the community, the following shows approximately how the properties are currently distributed to the fire departments and their associated assessment values. Kings or East Hants properties are not included in the following table.

Fire Department	Properties	Value	%
Windsor	1,582	$333,228,500	21%
Hantsport	2,911	$397,645,000	25%
South West	1,210	$126,156,700	8%
Brooklyn	3,242	$352,598,900	22%
Three Mile Plains	2,522	$273,877,100	17%
Summerville	1,419	$78,890,600	5%
Uniacke and District	2	$15,200	0%
Walton Shore	443	$32,434,600	2%
Unclassified	4	$170,800	0%
Totals:	**13,335**	**$1,595,017,400**	

The above distribution is based on the current fire districts.

The assignment of occupancy classifications allowed GA to observe the distribution of risks in the communities, and by current fire station district. The following table shows this distribution. The C classifications shown are for multi-unit buildings and do not include any single-family residences. The following data is not a complete capture of the occupancies that should be assigned their classifications. That data does not apparently currently exist. Please see the previous page for a description on how this was done.

FIGURE: DISTRIBUTION OF IDENTIFIED OCCUPANCIES

Station	A	B	C	D	E	F
Windsor	30	8	33	11	8	6
Hantsport	25	2	20	4	1	17
South West	9				1	1
Brooklyn	28		8	3	6	14
Three Mile Plains	18	1	8	3	8	28
Summerville	9		1	1		3
Uniacke						
Walton Shore	3					2
Totals:	**107**	**11**	**62**	**22**	**21**	**57**

Windsor in particular, and Hantsport to a lesser degree, appear to be the business, apartment, and service centres in the Region. Windsor and Brooklyn have the bulk of buildings associated with halls, schools, and/or restaurants (A classification). Windsor has most of the care and treatment facilities (B classification), multi-unit rental accommodations (C classification), and personal service and business (D classification).

Three Mile Plains has a large industrial base because the joint Windsor/West Hants industrial park (Wentworth Creek) falls into Three Mile Plains' response district; but there is still a lot of risk in Hantsport.

More so than detached dwelling fires, fires in the above identified occupancies have the potential for significant community impact. Such fires can also be challenging for the fire department. Fortunately, occurrence rates are relatively low.

Community Fire Risk Profile

A risk profile chart is useful in visually highlighting various risk factors. The following table identifies risk factors that influence firefighting tactics, manning, apparatus, and equipment needs. Every community/fire department will have a few occurrences of almost everything in the following table. However in this table, the ✕ indicates where the factor is often or usually a governing factor in a fire/rescue incident.

FACTOR	Windsor	Hantsport	Southwest	Brooklyn	TMP	Summerville
Older building stock (prone to fire development, pre-Code, combustible construction)	✕	✕				
Higher incident volumes (simultaneous calls more possible)	✕	✕		✕		
Large area occupancies (special tactics, equipment)	✕	✕				
Employment occupancies (economic impact)	✕	✕			✕	
Population density (high, more people at risk)	✕	✕				
Building density high (i.e. exposures to other buildings)	✕					
Conflagration potential (contiguous blocks)	✕					
Converted homes (apartments, rooming/boarding, difficult fires)	✕	✕				
Apartment buildings (many residents impacted)	✕	✕				
High Hazard use occupancies (F, firefighter/community hazards)		✕			✕	
Vulnerable person occupancies (B, occupants fragile)	✕					
Large Assembly occupancies (special tactics, equipment)	✕	✕			✕	
Buildings above 3-stories in height (too tall for ground ladders)	✕	✕				
Travel times long (fire development with time)		✕	✕	✕		✕
Bridge restrictions (heavy vehicles cannot cross)				✕		✕
Wildland -Urban Interface (homes in the woods at risk)			✕	✕		✕
Recreational waterways (water/ice rescue demand)	✕		✕			✕
Rural water supply predominant (tanker shuttle relay needed)			✕	✕		✕
Highway (100+kmph) (high speed MVC, hazard for firefighters)	✕	✕		✕	✕	
Growth area, changes in district (keeping up with changes)	✕			✕	✕	
High required fire flow incidents (pumper relays needed)	✕	✕			✕	
High staff demand incidents (large responses, multi-stations)	✕	✕				

Windsor's response district, and to a lesser degree Hantsport's, both exhibit typical characteristics of an urbanized fire risk environment. In urban areas, especially older ones, fire departments must be prepared for fires that are; difficult to extinguish, large, that can consume entire blocks, difficult to access, that cost the community anxiety, lost businesses, lost housing.

Pumpers, strong water systems, multiple ground ladders, aerial ladders, as well as sufficient staff to operate all of these and to fight fires in several buildings simultaneously is what urbanized firefighting environments demand. These fires can extend for several days, so depth of resources is also important.

Brooklyn has high incident[67] volumes, but this is somewhat distorted. If you look at the combined fire and pre-fire incident numbers, they are virtually the same as Windsor's combined totals. The records also show that Brooklyn has high numbers of rescue incidents, virtually all of which are MVCs, with about 20% being on Highway-101. Windsor's rescue responses dropped significantly and Brooklyn's jumped about the same amount after the Windsor response boundary changeover in 2016. With a regionalized service this should partly rebalance.

Brooklyn also has a high number of region-internal mutual-aid incidents, to other fire-district's fires. Brooklyn also carries the highest MFR incident load of any Regional fire department, due to their election to respond to every ambulance incident in their territory. Brooklyn is a busy station, but its core-service incident demand is similar to Windsor's.

Brooklyn and Summerville's response districts exhibit all the characteristics of a rural fire risk environment. Travel distances are long, water supply is established through tanker shuttles, occupancies are widely spaced, there are likely some wildland/urban interface issues. There are a few larger occupancies; e.g. churches, farm buildings, isolated commercial/industrial, schools, and etc. The primary fire risk is residential.[68]

Rural fire environments require pumpers for fire attack and tanker operations, tankers to transport water, ground ladders, and off-road vehicles for wildland fire incidents.

South West is also a rural fire risk environment, but they have very few larger occupancies. What they do have in abundance is cottages and year-round occupied homes built in the woods. South West's major challenge is long access on smaller roads to remote areas, winter weather challenges, wildland/urban interface issues, and the potential for a wildland fire to threaten numbers of residents and homes, with limited escape roads.

Three Mile Plains is essentially in a suburban fire risk environment. They are located in a housing growth area. Congestion and population density are higher than the rural areas of the Region, but lower than Windsor/Hantsport. They do have responsibility for most of the industrial park and are in proximity to Highway-101.

Three Mile Plains close proximity to Windsor makes them an ideal partner to supply the additional equipment and manpower resources needed to deal with fires in Windsor's urban environment.

[67] Reference the Figure: Table of Incident Dispatches by Station starting on page **159** of this chapter.

[68] See **Residential Fire Risk** starting on page **182**.

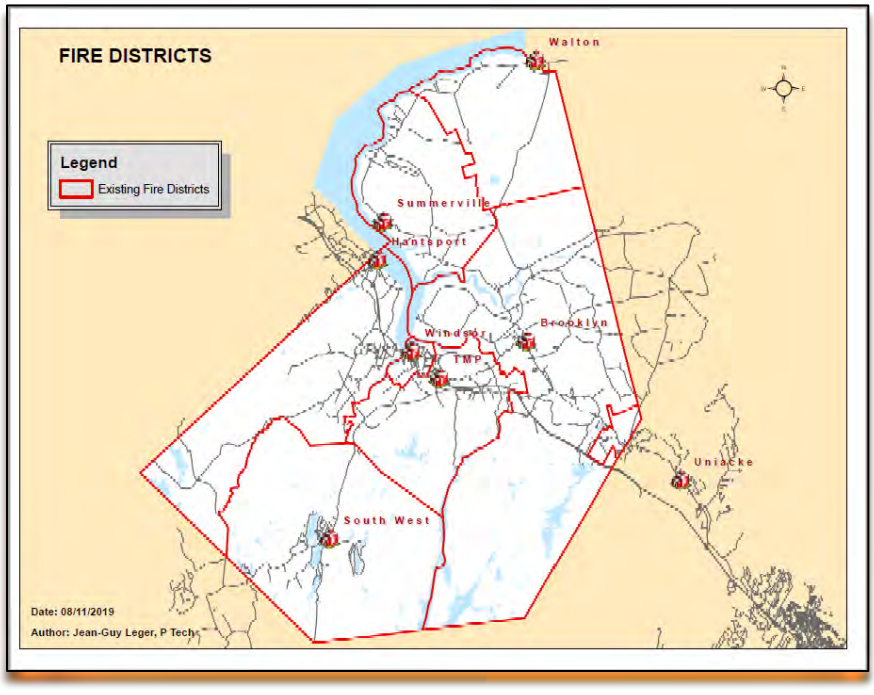
FIRE DISTRICT REVISIONS

Current Fire Districts

The fire districts in existence when this Fire Services Review was commissioned reflect decisions made after the withdrawal of fire protection services by Windsor Fire Department; previously Windsor fire department responded into large parts of West Hants Regional Municipality. From a more recent perspective, that of a consolidated municipality, these existing fire districts are not optimum and require adjusting for efficiency and effectiveness.

The determination of fire districts should be based on a seemingly simple principal. For any incident the closest appropriate resources should be sent first. Appropriate means a resource (fire apparatus, manpower, equipment, knowledge, etc.) that can and will be used to mitigate the situation.

FIGURE: EXISTING FIRE DISTRICT MAP



The existing response districts were based on responding to fire incidents. Windsor's fire district was the Town boundary. For West Hants, the assigned fire districts divided up the municipal area amongst the five West Hants fire stations, plus the Walton Shore fire department, and the Uniacke and District fire department. These last two provided coverage of areas within West Hants although they are actually located in East Hants.

For West Hants, with Windsor being in the middle this caused some challenges in drawing the response maps. Road network and obstacles affected the fire districts boundaries.

Revising Fire Districts

GA was tasked with redrawing the fire district response map, this time including all six W/WH fire stations, and considering the potential contributions of Uniacke and Walton Shore departments. The objective was optimized fire response districts with all resources considered.

GA utilized a map-based computer simulation program. GA estimated travel times over the existing road networks; from each existing fire station to all parts of the new Region. Road speed-limits, congestion, grades, traffic, obstacles, and fire apparatus capabilities were accounted in the simulations. The estimates were then compared against historical response times to emergency incidents, and adjustments made as necessary.

Response Factors

It is desirable to achieve the best response-times possible to reports of emergency incidents. This is particularly so in circumstances of life or property threatening incidents. Fires are one such incident type.

FIGURE: NFPA-1710 FIRE PROPAGATION CURVE

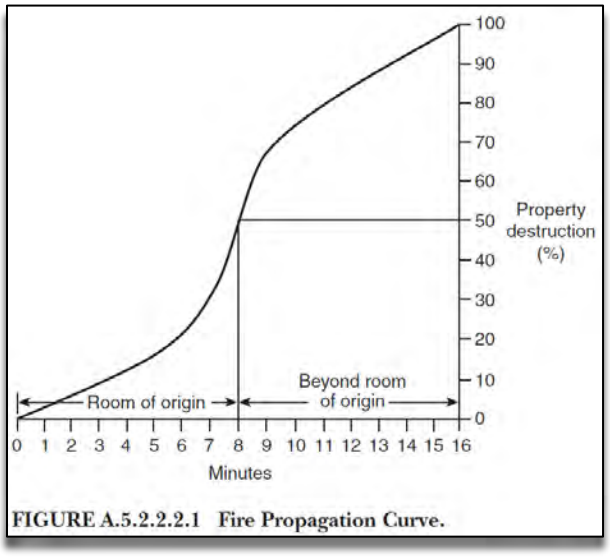
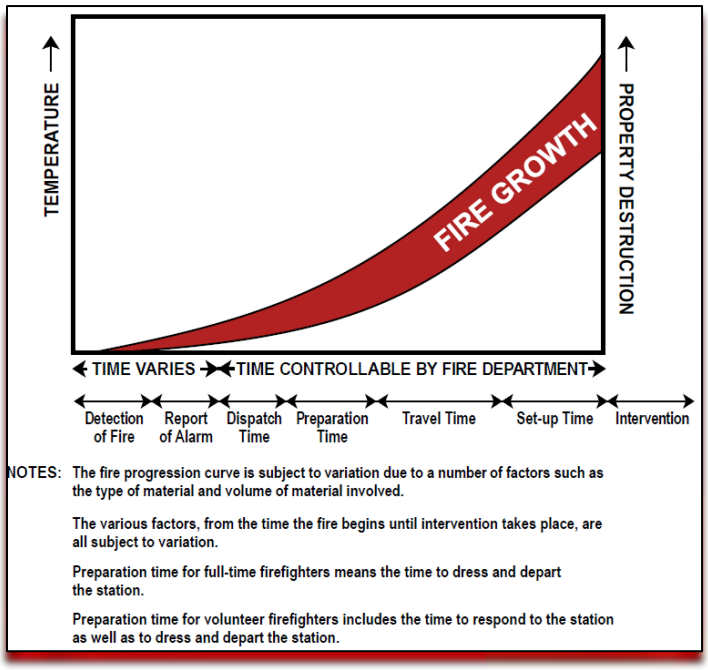


FIGURE A.5.2.2.2.1 Fire Propagation Curve.

Fire grows over time. All fires start small, and grow (if unchecked) until such time as they run out of fuel. In a structure, there are other factors involved as well. Particularly the availability of oxygen. This means that in a closed building, an unchecked fire will consume all the available oxygen, and thereby slow down its growth, until such time as additional oxygen is introduced by opening doors/windows or by fire burning through part of the structure. Survivability of persons inside is unlikely by this point.

The time at which the fire department starts to respond to the fire is not at time zero on the Fire Propagation Curve. Several other processes must occur first.

FIGURE: FIRE PROGRESSION AND RESPONSE CURVE



This timeline chart illustrates these processes. Someone, or a detection system, must discover the fire. The fire discovery must be transmitted to a 9-1-1 call-centre, or alarm monitoring agency. The fire department dispatch centre must be informed. The dispatch centre must page the volunteer firefighters to respond to their fire station. The volunteers must prepare and respond to the station and get into their personal protective equipment. Sufficient personnel must be available to man the fire apparatus as appropriate, typically at least four persons.

The travel-time response portion of the entire response-time sequence then begins. Firefighters travel to the incident location in the fire apparatus. When they arrive, they must set-up by getting organized and understanding the situation, make a plan, deploy equipment and staff to address the emergency. For a fire this means (in part) deploying hoses and charging them with water, and gaining entry to the building. At that point, fire suppression/intervention starts. Thereafter, the fire is expected to be mitigated, i.e. the curve levels off and diminishes. Sometimes if insufficient resources or tactics are applied, the fire continues to grow.

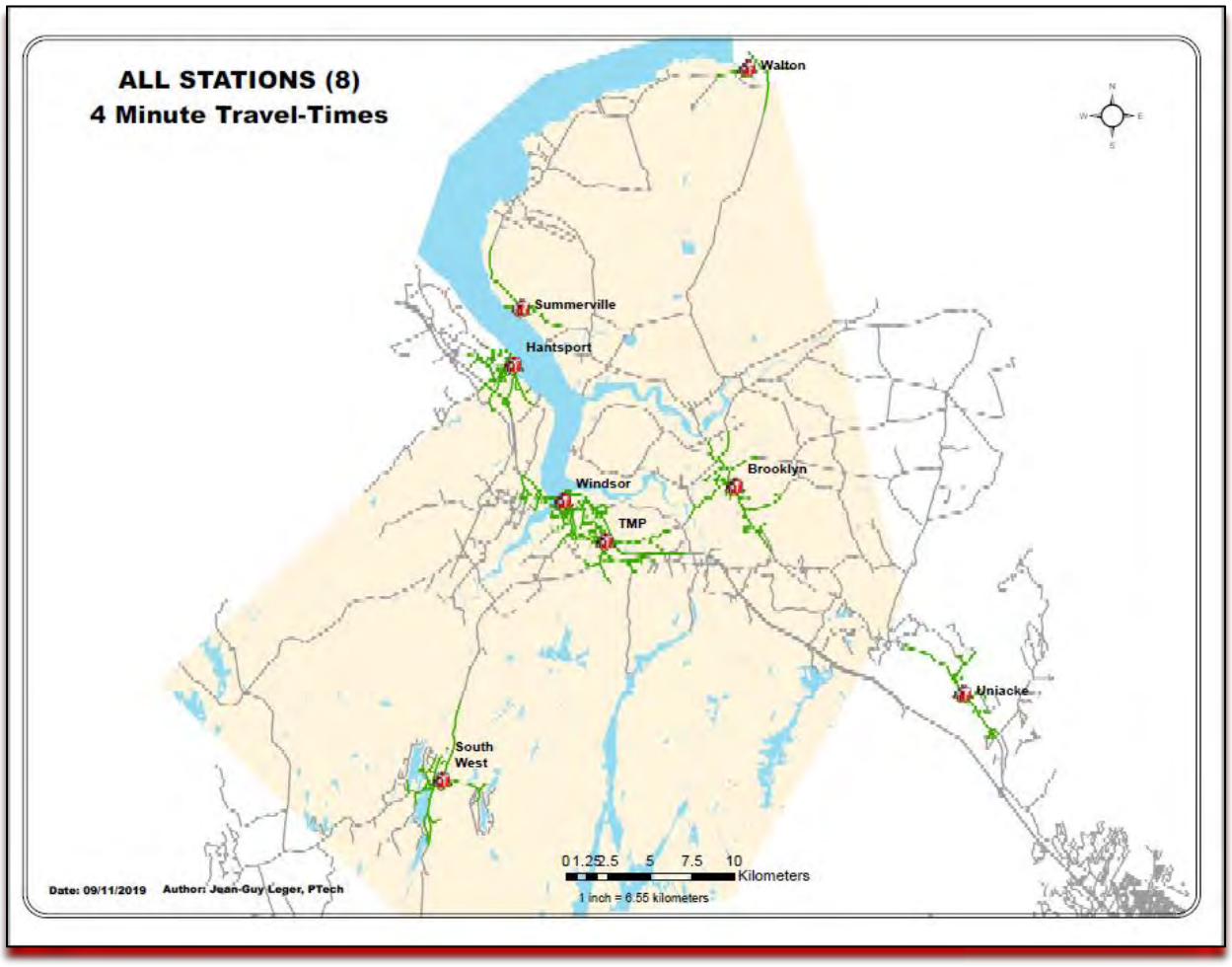
Firefighters, might however not start fire suppression right away. The first arriving crew may be committed to victim search and rescue instead, in which case the fire continues to grow.

Travel-time can be a big component of the above response-time sequence. Therefore, identifying efficient fire station response districts based on travel-times is important.

Travel-Time Details

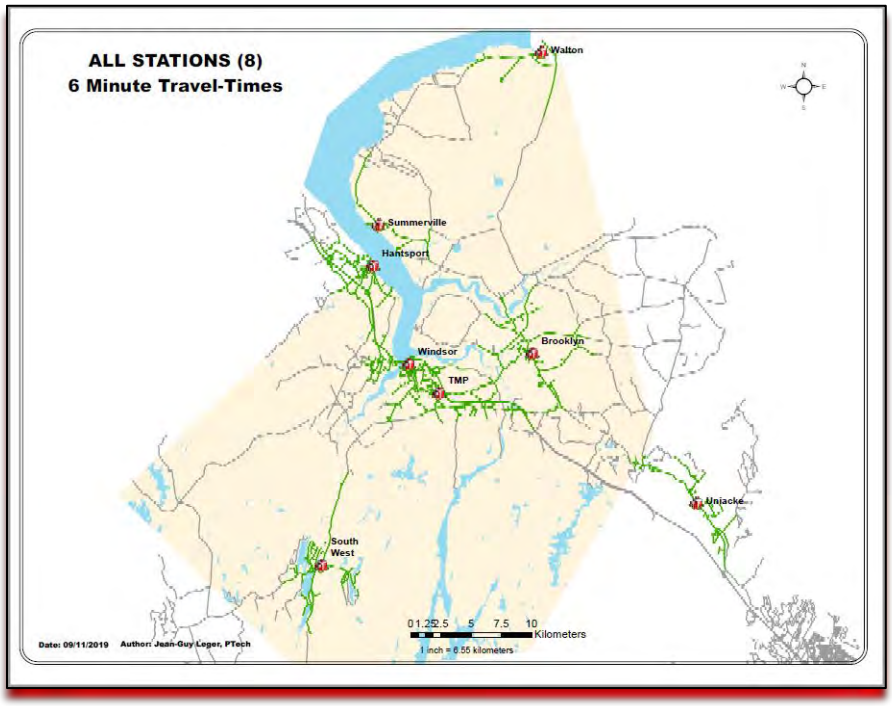
Travel-time predictions from the various existing stations was calculated by GA and revealed the following. Maps were produced that show estimated distances travelled in 2-minute intervals; i.e. at 4, 6, 8, and 10 minutes of travel-time.

FIGURE: 4-MINUTES TRAVEL-TIME



The green colours on the road segments represent how far fire apparatus are predicted to travel in 4 minutes after leaving the fire station.

FIGURE: 6-MINUTES TRAVEL-TIME



The green colours on the road segments represent how far fire apparatus are predicted to travel in 6 minutes after leaving the fire station.

FIGURE: 8-MINUTES TRAVEL-TIME

The green colours on the road segments represent how far fire apparatus are predicted to travel in 8 minutes after leaving the fire station.

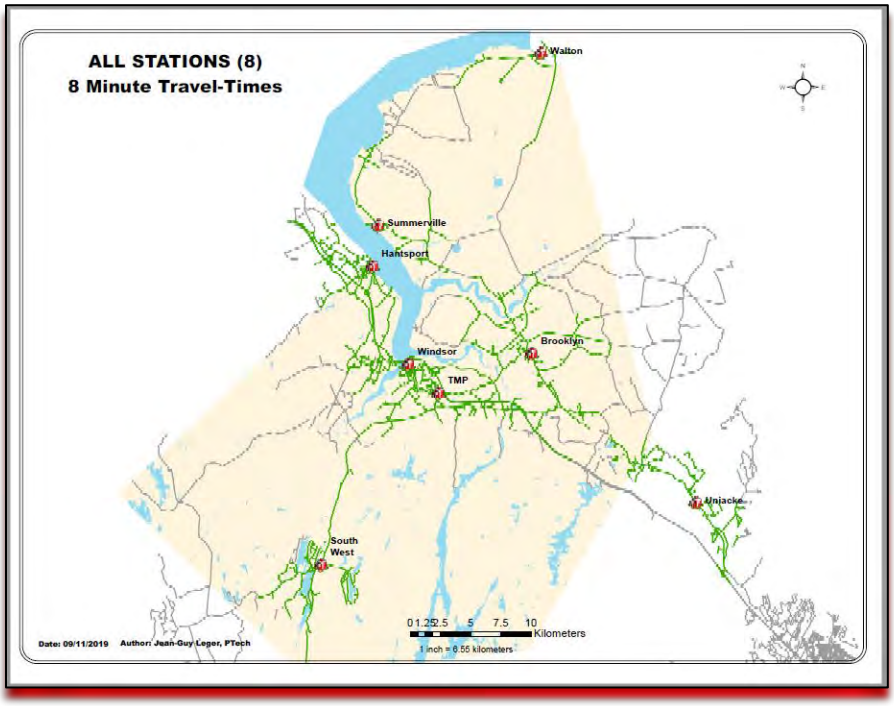
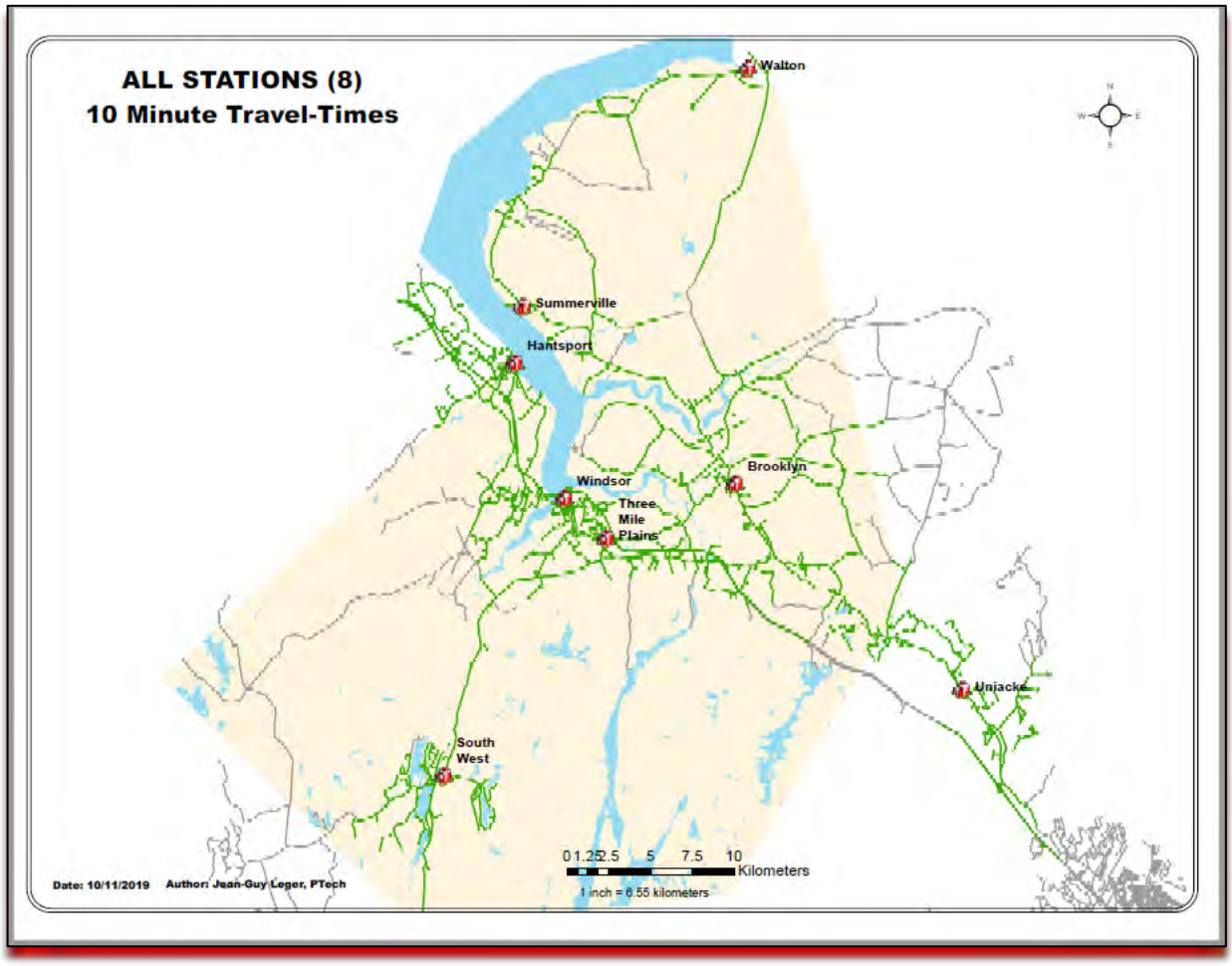


FIGURE: 10-MINUTES TRAVEL-TIME

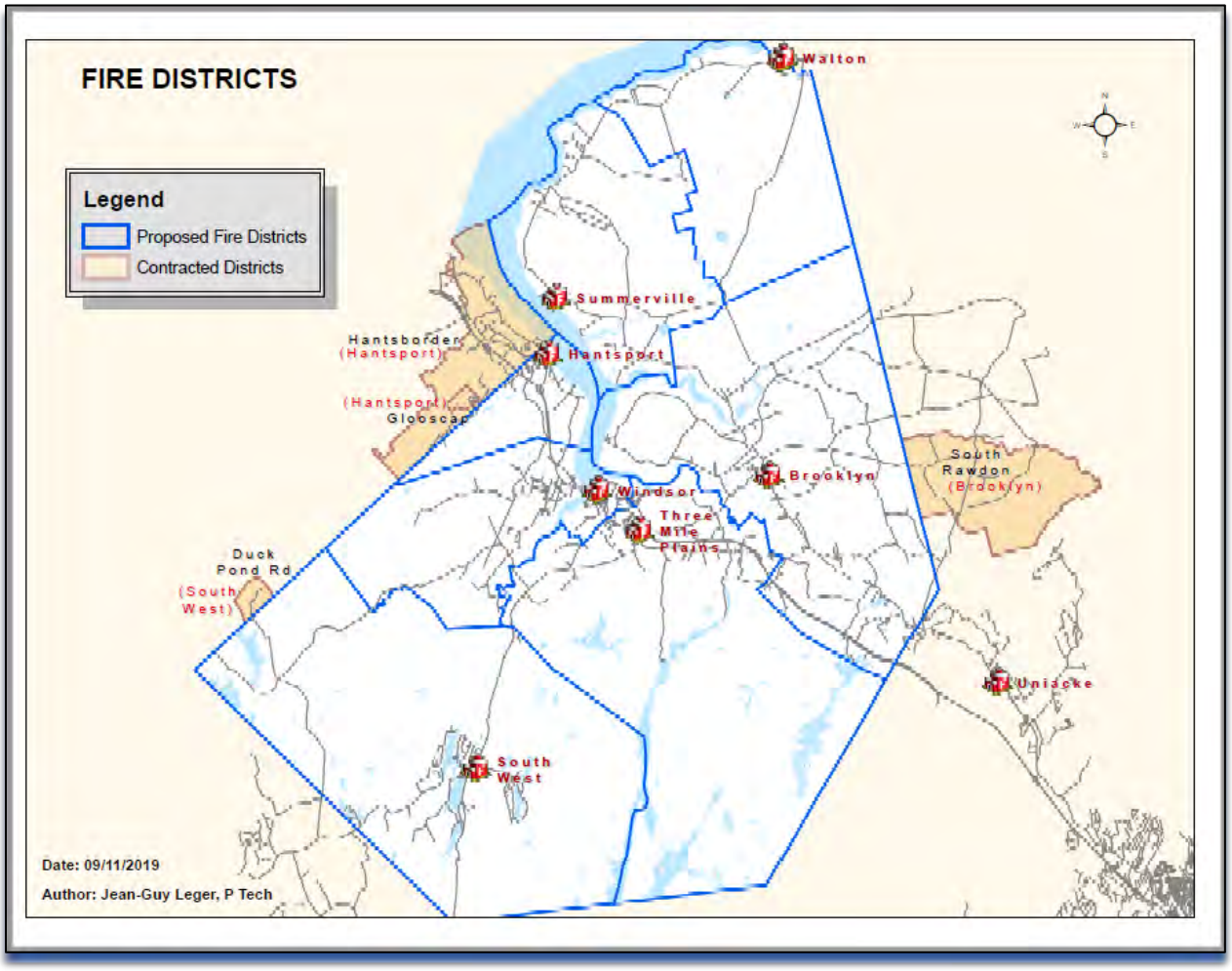


The green colours on the road segments represent how far fire apparatus are predicted to travel in 10 minutes after leaving the fire station.

Revised Fire Districts

GA recommends, based on the travel-time predictions, the following fire station response districts.

FIGURE: RECOMMENDED FIRE DISTRICT MAP



In the recommended fire district map, please note the following clarifications;

- Contracted districts are areas where W/WH fire departments are currently offering emergency response services under contract, outside of the W/WH boundaries.
- These contract areas include portions of Kings County assigned to Hantsport station and noted as Hantsborder on the map. Also included is the Glooscap first nations territory.
- Also included in Hantsport's current coverage is Duck Pond Road (Black River Lake) area in the south west of the municipality.

- Brooklyn currently provides contract services into the area of East Hants known as South Rawdon.

GA recommends that where Uniacke previously responded into the east Ardoise area that this arrangement not continue. Analysis revealed that the travel-time to that area is virtually the same for both Brooklyn and for Uniacke. The additional complication, cost, and inefficiency of managing an additional fire service in that sparsely occupied area does not contribute measurably to potential outcomes.

GA recommends that the Duck Pond Road - Black River Lake area be serviced from the South West fire station.

STANDARDS FOR PROVISION OF APPARATUS AND MANPOWER

NFPA-1720, BENCHMARKS

NFPA-172069 is the recognized standard for volunteer fire departments providing fire and rescue services. The standard recommends[70] the following staffing and response time objectives;

Ref. Obj.	Demand Zone	Demographics	Minimum Staff to Respond	Response Time (minutes)	Meets Objective(%)
A	Urban area[71]	>386 people/km^2	15	9	90% of responses
B	Suburban area	193-386 people/km^2	10	10	80% of responses
C	Rural area	<193 people/km^2	6	14	80% of responses
D	Remote area[72]	Travel distance ≥ 12.9 km	4	Distance determined	90% of responses
E	Special risks	As determined by AHJ[73] policy	Based on risk	AHJ determined	90% of responses

GA recommends that the following first-response objective staff/time benchmarks for each of the following communities be established; in accordance with the recommended revised fire districts.

Community	Response Station	Ref. Obj.	Community	Response Station	Ref. Obj.	Community	Response Station	Ref. Obj.
Ardoise	Brooklyn	*C, D*	Upper Burlington	Brooklyn	*C*	Summerville	Summerville	*C*
Ashdale	Brooklyn	*C*	Woodville	Brooklyn	*C*	Curry's Corner	Three Mile Pl.	*B*
Avondale	Brooklyn	*C, D*	Bishopville	Hantsport	*D*	Garlands Crossing	Three Mile Pl.	*B*
Belmont	Brooklyn	*C*	Hants Border	Hantsport	*C*	Gypsum Mines	Three Mile Pl.	*C*
Brooklyn	Brooklyn	*C*	Hantsport	Hantsport	*A*	Martock	Three Mile Pl.	*C*
Ellershouse	Brooklyn	*C*[74]	Mount Denson	Hantsport	*C*	Newport Station	Three Mile Pl.	*C*
Five Mile Lake	Brooklyn	*D*	Leminster	South West	*D*	St. Croix	Three Mile Pl.	*C*
Greenhill	Brooklyn	*C*	Mill Section	South West	*C*	Sweets Corner	Three Mile Pl.	*C*
Hillsvale	Brooklyn	*D*	Panuke Lake	South West	*D*	Three Mile Plains	Three Mile Pl.	*B, C*
Lakelands	Brooklyn	*D*	Upper Vaughan	South West	*C*	Wentworth Creek	Three Mile Pl.	*B, C*
Mantua	Brooklyn	*C*	Vaughan	South West	*C*	Windsor Forks	Three Mile Pl.	*C*
McKay Section	Brooklyn	*C*	Wile Settlement	South West	*C*	Cambridge	Walton Shore	*C, D*
Miller Creek	Brooklyn	*C*	Bramber	Summerville	*C, D*	Cogmagun	Walton Shore	*D*
Mosherville	Brooklyn	*D*	Centre Burlington	Summerville	*C*	Pembroke	Walton Shore	*C*

[69] National Fire Protection Association; NFPA-1720 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments.

[70] Areas and distances converted to kilometers from miles.

[71] Population densities (StatsCan): Windsor (2011) 500 / km^2, Hantsport (2011) 528.2 / km^2, West Hants (2006) 11.2 / km^2

[7272] With relative accuracy, these areas can be quickly identified in the Fire District maps as areas which are beyond the 10-minute travel times from rural fire stations. See **Figure: 10-Minutes Travel-Time** on page **196** of this chapter.

[73] AHJ = authority having jurisdiction.

[74] Large areas of this community district, and there are other districts as well, are unpopulated or very sparsely populated and those areas would be categorized as D, or even inaccessible except by boat or bush road/trail. The referenced response objective for Ellershouse (in this example) is for the populated and road accessible portion of the community district.

Community	Response Station	Ref. Obj.	Community	Response Station	Ref. Obj.	Community	Response Station	Ref. Obj.
Newport Corner	Brooklyn	*C*	Cheverie	Summerville	*C*	Walton	Walton Shore	*C*
Poplar Grove	Brooklyn	*C*	Kempt Shore	Summerville	*C*	Falmouth	Windsor	*B*
Scotch Village	Brooklyn	*C*	Lower Burlington	Summerville	*C*	Upper Falmouth	Windsor	*C*
Union Corner	Brooklyn	*C*	Riverside	Summerville	*C*	Windsor	Windsor	*A*

Effectively, the first four NFPA-1720 response objectives apply to some part of the new Regional Municipality.

GA recommends that for planning purposes related to staffing, apparatus, and public information that these response objectives be implemented.

With an assumed 25% average attendance rate to incident calls, which is in several of the fire departments policies for recognition for full honourarium, the following volunteer numbers would need to be recruited, trained, equipped and be on the fire stations' active duty rosters; i.e. capable of providing first response firefighting service to incidents.

These following numbers are <u>not</u> the total number of volunteers needed to mitigate the incident, these are just the first arriving contingent, who must arrive at the scene within the response time objective. Total numbers required at the incident for mitigation will exceed the first response numbers.

FIGURE: ACTIVE VOLUNTEERS REQUIRED ON-ROSTER TO MEET FIRST RESPONSE OBJECTIVES

Station	**Minimum Station Roster**	**Influential Objective**
Windsor	60	*A*
Hantsport	60	*A*
South West	24	*C*
Brooklyn	24	*C*
Three Mile Plains	40	*B*
Summerville	24	*C*
Totals:	**232**	

Achieving these active numbers will be challenging, and exceed the current complements. In addition, note that the 25% response attendance is an average estimate. There will be times during weekdays when that percentage number will not be met.

Part of the solution is to immediately co-page appropriate stations for fire incidents especially during times/days when volunteer turn-out numbers are expected to be low.

GA recommends that the Regional fire department develop Run-Cards to specify when and where certain types of incidents occur that the appropriate closest stations and appropriate resources are simultaneously dispatched. Simultaneous dispatch should occur for all fire/suspected fire events in all response areas. Simultaneous dispatch should occur for all other incidents, other than MFR incidents, in all Rural and Remote areas.

FIRE UNDERWRITERS SURVEY; TABLE OF EFFECTIVE RESPONSE

The Fire Underwriters Survey (FUS) uses a *Table of Effective Response* to match fire risks in the community with their requirements for fire apparatus for initial response to the incident, and also for the total response for incident mitigation; including required fire-water flow rates (RFF) and fire apparatus needs.

FIGURE: FUS TABLE OF EFFECTIVE RESPONSE

Table 7.2-1 Fire Underwriters Survey - Table of Effective Response

The following Table aids in the determination of Engine and Ladder Company distribution and total members needed. It is based on availability within specified response travel times in accordance with the fire potential as determined by calculation of required fire flows, but requiring increases in availability for severe life hazard.

RISK RATING	BUILDING DISTRICT EXAMPLES	FIRE FLOW		INITIAL RESPONSE TO ALARMS		1st DUE	2nd DUE	1st DUE	TOTAL AVAILABILITY NEEDED			
		L/min X1000	Approx. Igpm Range	Engine Companies	Ladder Companies	Engine Company, Minutes	Engine Company, Minutes	Ladder Company, Minutes	Engine Companies.		Ladder Companies	
									No.	Min.	No.	Min.
1 (a)	Very small buildings, widely detached buildings.	2	400	1	0	7.5	-	*9	1	7.5	*1	9
(b)	Scattered development (except where wood roof coverings).	3	600	1	0	6	-	*7.5	1	6	*1	7.5
2	Typical modern, 1 - 2 storey residential subdivision 3 - 6 m 10 - 20 ft. detached).	4-5	800-1,000	2	0	4	6	*6	2	6	*1	6
3 (a)	Close 3 - 4 storey residential and row housing, small mercantile and industrial.	6-9 10-13	1,200-2,000 2,200-2,800	2 2	1 (if required by Hazards)	3.5 3.5	5 5	*4 *4	2 3	5 6	*1 *1	4 4
3 (b)	Seriously exposed tenements. Institutional. Shopping Centres Fairly large areas, fire loads, and exposures.	14-16 17-19	3,000-3,600 3,800-4,200	2 2	1 1	3.5 3.5	5 5	4 4	4 5	7 7	1 **1	4 4
4 (a)	Large combustible institutions, commercial buildings, multi- storey and with exposures.	20-23 24-27	4,400-5,000 5,200-60,00	2	1	2.5 2.5	4 4	3.5 3.5	6 7	7.5 7.5	2 2	5 5
4 (b)	High fire load warehouses and buildings like 4(a).	28-31 32-35	6200-6800 7000-7600	3	1	2.5 2.5	3.5 3.5	3.5 3.5	8 9	8 8	3 3	7 7
5	Severe hazards in large area buildings usually with major exposures. Large congested frame districts.	36-38 39-42 43-46	7,800-8,400 86,00-9,200 9,400-10,000	3	3	2 2 2	3.5 3.5 3.5	2.5 2.5 2.5	10 12 14	8 9 9	4 5 6	7.5 8 9

To use this table effectively it is necessary to correlate occupancies (buildings) with their level of risk. FUS does that through calculating required fire flows (RFF). However, that is not the whole story, and does not speak to total manpower needs for mitigation.

MATCHING RESOURCE DEPLOYMENT AND RISK

The Ontario Fire Marshal's office (ON-OFM) developed a workbook for benchmarking a fire department's staffing needs at fire incidents. The workbook identified various *Effective Response Levels*, that correlated with different fire incident risk levels. This incident risk level approach is similar to the FUS Risk Rating. The workbook then identifies *Fireground Critical Tasks*, including standard tasks at all fire incidents, and those that are common at more complex (higher risk/challenge) incidents. The task list generates fireground staffing required to perform the tasks. The process was called Matching Resource Deployment and Risk[75] (MRDR).

Combining the requirements of the FUS table with the tasks and manning matrix of the MRDR workbook will provide a fuller picture of the resourcing needs at any size fire incident. The following snapshot shows the generic critical task list.

FIGURE: FIREGROUND CRITICAL TASKS

Fireground Critical Tasks
Incident Command
Pump Operator
Attack Line (Confine & Extinguish)
Additional Pump Operator(s)
Additional Attack Line (Confine & Extinguish) + Backup
Search and Rescue
Initial Rapid Intervention Team (IRIT)
Ventilation
Water Supply - pressurized
Water Supply - non-pressurized
Forceable Entry Team
Utility Control
Laddering (Ground Ladders)
Laddering (Aerial or elevating device operator)
Exposure Protection
Incident Safety Officer
Accountability
Entry Control
Rehabilitation
Salvage
Lighting
Directing Occupants
Scribe
Sector Officers
Air Management (air refilling station, etc.)
Logistics Officer
Administrative and/or Finance Officer
Planning Officer
Evacuations (large scale)
Public Information Officer
Overhaul
Additional Firefighters

The firefighters assigned to tasks on the MRDR list are scalable, meaning that different incidents and different occupancy circumstances can require assigning different numbers of staff to tasks as needed. For example; *Additional Pump Operator(s)* will vary depending on how many pumpers are required at the incident. The number of pumpers will increase as the amount of RFF demand increases, and etc.

Generally, pre-planning of specific occupancies will identify these needs beforehand.

GA developed two scenarios. One for a fire in a hydranted area (urban/suburban) and the other for a fire in a rural area (tanker-shuttle). Manpower needs will escalate with

[75] Ontario Fire Marshal's Office, Operational Planning: An official Guide to Matching Resource Deployment and Risk, January 24, 2011.

the need to shuttle water, as will the need for additional pumpers and for tankers to source and deliver that water. In fact, there is a practical/logistical limit to how big a fire can be successfully mitigated, and it's a lower limit in a rural setting due to water supply issues.

Fire in a Hydranted Area

FIGURE: STAFFING & FIRE FLOW RANGES IN AN URBAN/SUBURBAN SETTING

Fireground Critical Tasks	Low Risk		Moderate Risk		High Risk		Extreme Risk	
	LERL	UERL	LERL	UERL	LERL	UERL	LERL	UERL
Incident Command	1	1	1	1	1	1	1	1
Pump Operator	1	1	1	1	1	1	1	1
Attack Line (Confine & Extinguish)	2	2	2	2	2	2	2	2
Additional Pump Operator(s)	0	0	0	1	2	3	4	5
Additional Attack Line (Confine & Extinguish) + Backup				4	4	8	8	12
Search and Rescue			2	4	2	6	2	8
Initial Rapid Intervention Team (IRIT)			4	6	8	10	12	14
Ventilation		2	2	2	2	4	2	8
Water Supply - pressurized		1	1	1	1	1	1	2
Water Supply - non-pressurized								
Forceable Entry Team						1		1
Utility Control		1	1	1	1	1	1	1
Laddering (Ground Ladders)		2		2		4		6
Laddering (Aerial or elevating device operator)	0	0	1	2	2	3	4	5
Exposure Protection				4	2	6	2	6
Incident Safety Officer				1	1	1	1	1
Accountability			1	1	1	1	1	1
Entry Control				2	1	4	2	4
Rehabilitation				1	1	1	2	2
Salvage				2	2	2	2	2
Lighting						2	1	2
Directing Occupants					1	4	2	4
Scribe					1	1	1	1
Sector Officers					1	4	2	4
Air Management (air refilling station, etc.)							1	2
Logistics Officer					1	1	1	1
Administrative and/or Finance Officer							1	1
Planning Officer				1	1	1	1	1
Evacuations (large scale)					1	1	1	1
Public Information Officer					1	1	1	1
Overhaul								
Additional Firefighters								
Incident Staffing Totals:	4	10	16	39	41	74	59	100

Table of Effective Response (FUS)

Risk Rating	Fire Flow in USA gpm							
1(a)	400	400						
1(b)	600	600						
2	800	1,000						
3(a)			1,200	2,800				
3(b)					3,000	4,200		
4(a)					4,400	6,000		
4(b)							6,200	7,600
5							7,800	10,000

Referring back to **Figure: FUS Table of Effective Response** on page **236** we are reminded of the descriptions for the Risk Ratings. In the above table, the RFF amounts in the blue section,

corresponding to each Risk Rating, are placed under the corresponding column in the MRDR matrix above.

The following table will equate the MRDR risk columns with the FUS Risk Ratings.

FIGURE: FUS - MRDR CROSS REFERENCE

FUS Risk	MRDR Risk	Examples of Occupancies
1(a)	Low	Unattached garage or shed, small farm out building. At least 10 meters to exposures.
1(b)	Low	Cottages or small homes not in a subdivision, not with wood shingles.
2	Low	Typical residential housing, bungalow, 2-story, 2-4,000 sqft in area, 10-20 feet separation.
3(a)	Moderate	Large residential, townhouses, single story motels, corner store, rural service garage, smaller-medium sized community hall or church, Victorian homes, single-story schools.
3(b)	High	2-4 story apartment or senior complex, nursing homes, hospital, shopping centre, bus garage, large schools, large agricultural structures, factories.
4(a)	High	Large timber framed residential school complex, large century churches, big box general merchandise store, old timber-framed school, large hay-barn.
4(b)	Extreme	Building supply warehouse (large), general merchandise warehouse (large), shipping terminal (large)
5	Extreme	Paper mill, knitting mill, large clothing mill, downtown Windsor with crowded mixed commercial/residential timber-frame construction.

The table on page **236** provides both the required fire flows (RFF) and manning needs. The variation between the Lower and the Upper Effective Response Level (LERL/UERL) in the manning portion of the table provides allowance for specific occupancy conditions when pre-planning for a response to the occupancy. The RFF changes also.

The next step is to determine the number of pumpers and aerial apparatus that are needed to provide the RFF in the table. The FUS Table of Effective Responses makes recommendations, but these are minimums. The capacities of the water-pumps in the pumpers that are responding is critical.

In the following table, the average pumper capacity is set at 1,500 Imp gallons per minute (IGPM). The average capacity of the current fleet of fire apparatus equipped with fire pumps is 1250 Igpm. The table does not include the number of pumpers needed to do relay-pumping from distant hydrants. This requirement can almost double the total number of pumpers needed, depending on the water supply situation.

FIGURE: REQUIRED PUMPERS & AERIALS

	Low Risk		Moderate Risk		High Risk		Extreme Risk	
	LERL	UERL	LERL	UERL	LERL	UERL	LERL	UERL
Incident Staffing Totals:	4	10	16	39	41	74	59	100

Table of Effective Response (FUS)

Risk Rating	Fire Flow in USA gpm							
1(a)	400	400						
1(b)	600	600						
2	800	1,000						
3(a)			1,200	2,800				
3(b)					3,000	4,200		
4(a)					4,400	6,000		
4(b)							6,200	7,600
5							7,800	10,000

Apparatus Needs for Manning and Fire Flow

Pumers Required:

AVG Capacity
1,801 USgpm
6,818 lpm
1,500 lgpm

(110% capacity not accounted)
Standard pumper capacity:

* FOR A HYDRANT SERVICED AREA
Note: if area is NOT serviced by hydrants, then additional pumpers will likely be needed for water sourcing, relaying, etc.

Attack* PUMPERS								GROUP
1	1							1(a)
1	1							1(b)
1	1							2
		1	2					3(a)
				2	3			3(b)
				3	4			4(a)
						4	5	4(b)
						5	6	5

Aerials required:

	GA Recommendation	
TOEB	LERL	UERL
0	0	0
0	0	0
0	0	1
1	1	2
1	2	2
1	2	3
1	3	4
3	4	6

AERIALS								GROUP
0	0							1(a)
0	0							1(b)
0	1							2
		1	2					3(a)
				2	2			3(b)
				2	3			4(a)
						3	4	4(b)
						4	6	5

Based on the above table calculations, the number of attack pumpers needed can range between one and six, and the number of aerials varies between zero and six, depending on the fire risk of the involved occupancy. Additional pumpers will likely be needed to relay pump from distant hydrants or other water sources. Likewise, the actual incident can indicate higher or lower numbers of aerials needed.

The number of fire apparatus operators needed is reflected in the MRDR table on page **237**, not including relay pump operators.

Fire in a Rural Area

The entire exercise was repeated for a fire in a rural area without hydrants. In this case water supply is dependent on pumpers drafting from a water source, filling tankers who deliver the water to the fire area and dump it into dump-tanks, where another pumper takes the water and relays it to the attack pumper who is near the fire building. Typical for rural fires, access driveways require the attack pumper to leave the public road and enter the fire property.

FIGURE: STAFFING & FIRE FLOW RANGES IN A RURAL SETTING

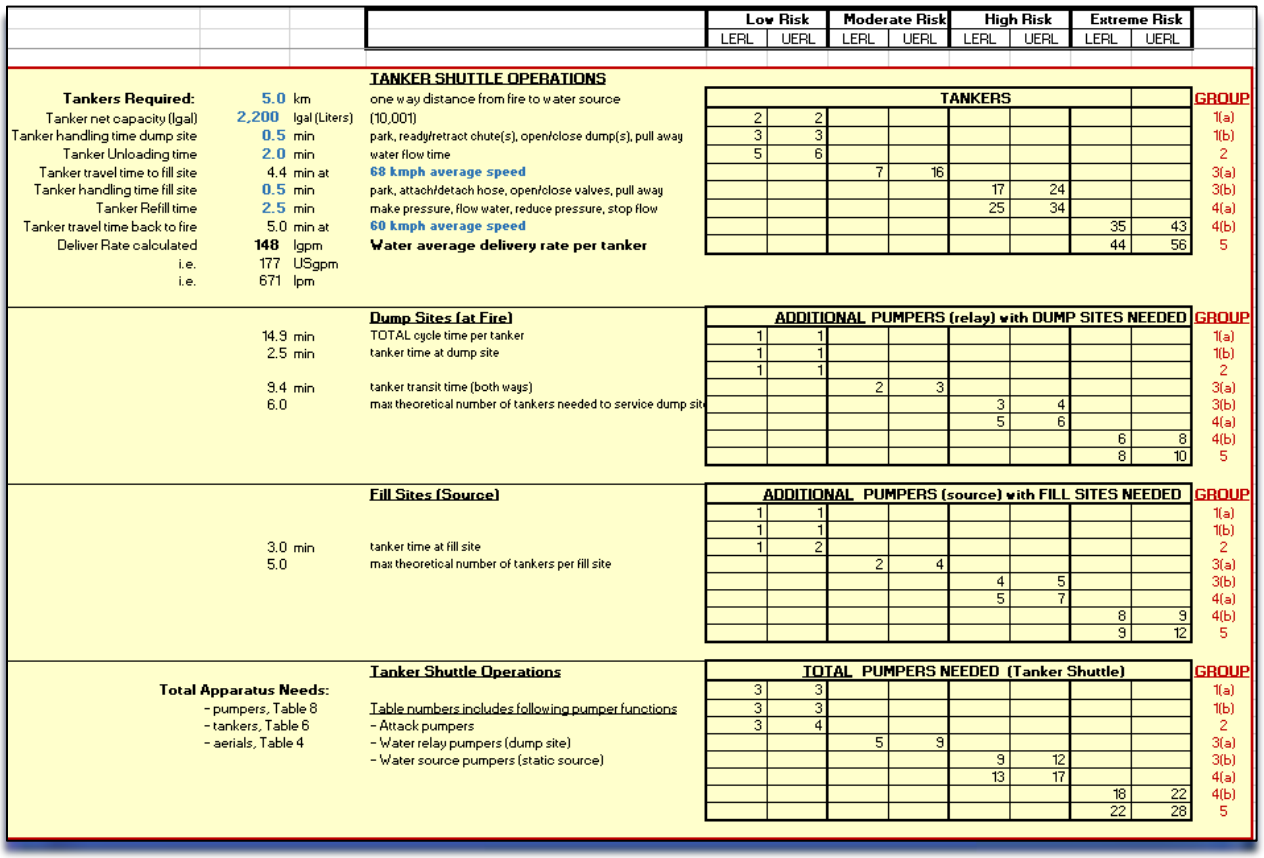
	Low Risk		Moderate Risk		High Risk		Extreme Risk	
Fireground Critical Tasks	LERL	UERL	LERL	UERL	LERL	UERL	LERL	UERL
Incident Command	1	1	1	1	1	1	1	1
Pump Operator	1	1	1	1	1	1	1	1
Attack Line (Confine & Extinguish)	2	2	2	2	2	2	2	2
Additional Pump Operator(s)	2	2	4	8	10	14	19	24
Additional Attack Line (Confine & Extinguish) + Backup				4	4	8	8	12
Search and Rescue			2	4	2	6	2	8
Initial Rapid Intervention Team (IRIT)			4	6	8	10	12	14
Ventilation		2	2	2	2	4	2	8
Water Supply – pressurized		1	1	1	1	1	1	2
Water Supply – non-pressurized	2	2	4	7	9	11	16	20
Forceable Entry Team						1		1
Utility Control		1	1	1	1	1	1	1
Laddering (Ground Ladders)		2		2		4		6
Laddering (Aerial or elevating device operator)	0	0	1	2	2	3	4	5
Exposure Protection				4	2	6	2	6
Incident Safety Officer				1	1	1	1	1
Accountability			1	1	1	1	1	1
Entry Control				2	1	4	2	4
Rehabilitation				1	1	1	2	2
Salvage				2	2	2	2	2
Lighting						2	1	2
Directing Occupants					1	4	2	4
Scribe					1	1	1	1
Sector Officers			1	1	1	4	2	4
Air Management (air refilling station, etc.)							1	2
Logistics Officer					1	1	1	1
Administrative and/or Finance Officer							1	1
Planning Officer			1	1	1	1	1	1
Evacuations (large scale)					1	1	1	1
Public Information Officer					1	1	1	1
Overhaul								
Additional Firefighters								
Incident Staffing Totals:	8	15	26	54	58	96	90	139

The required fire flow (RFF) rate table does not changed whether the occupancy is hydrant protected or requires a rural water supply. It is determined by the occupancy that is burning. The objective is control and extinguishment.

What does change is the water supply chain. There is a need to provide pumpers and tankers to provide the RFF. This requires additional staff, and these are reflected in the above MRDR table.

The additional pumpers and tankers are shown in the following tables.

FIGURE: REQUIRED WATER SUPPLY PUMPERS AND TANKERS



				Low Risk		Moderate Risk		High Risk		Extreme Risk		
				LERL	UERL	LERL	UERL	LERL	UERL	LERL	UERL	
			TANKER SHUTTLE OPERATIONS									
Tankers Required:	5.0	km	one way distance from fire to water source	TANKERS								GROUP
Tanker net capacity (Igal)	2,200	Igal (Liters)	(10,001)	2	2							1(a)
Tanker handling time dump site	0.5	min	park, ready/retract chute(s), open/close dump(s), pull away	3	3							1(b)
Tanker Unloading time	2.0	min	water flow time	5	6							2
Tanker travel time to fill site	4.4	min at	**68 kmph average speed**			7	16					3(a)
Tanker handling time fill site	0.5	min	park, attach/detach hose, open/close valves, pull away					17	24			3(b)
Tanker Refill time	2.5	min	make pressure, flow water, reduce pressure, stop flow					25	34			4(a)
Tanker travel time back to fire	5.0	min at	**60 kmph average speed**							35	43	4(b)
Deliver Rate calculated	**148**	lgpm	**Water average delivery rate per tanker**							44	56	5
i.e.	177	USgpm										
i.e.	671	lpm										
			Dump Sites (at Fire)	ADDITIONAL PUMPERS (relay) with DUMP SITES NEEDED								GROUP
	14.9	min	TOTAL cycle time per tanker	1	1							1(a)
	2.5	min	tanker time at dump site	1	1							1(b)
				1	1							2
	9.4	min	tanker transit time (both ways)			2	3					3(a)
	6.0		max theoretical number of tankers needed to service dump site					3	4			3(b)
								5	6			4(a)
										6	8	4(b)
										8	10	5
			Fill Sites (Source)	ADDITIONAL PUMPERS (source) with FILL SITES NEEDED								GROUP
				1	1							1(a)
				1	1							1(b)
	3.0	min	tanker time at fill site	1	2							2
	5.0		max theoretical number of tankers per fill site			2	4					3(a)
								4	5			3(b)
								5	7			4(a)
										8	9	4(b)
										9	12	5
			Tanker Shuttle Operations	TOTAL PUMPERS NEEDED (Tanker Shuttle)								GROUP
Total Apparatus Needs:				3	3							1(a)
- pumpers, Table 8			Table numbers includes following pumper functions	3	3							1(b)
- tankers, Table 6			- Attack pumpers	3	4							2
- aerials, Table 4			- Water relay pumpers (dump site)			5	9					3(a)
			- Water source pumpers (static source)					9	12			3(b)
								13	17			4(a)
										18	22	4(b)
										22	28	5

In the above figure are four tables. The top table calculates the number of tankers required to deliver the RFF. A tanker's ability/rate of water delivery is based on the maximum allowed FUS travel distance for a residential fire risk (5 kilometers). The tanker volume capacity is set at 2,200 Imperial gallons[76] for these calculations and some assumptions about handling and travel time are made. These assumptions come from the consultant's experience for a highly efficient tanker shuttle operation. Shorter distances and more efficient tankers will lower times and increase delivered water.

[76] Currently there are 7 tanker/pumpers in the fire fleet, average tank capacity is 2,500 Igal. Only one is set up for high efficiency tanker shuttle rapid water dumping; i.e. side dumping.

The second table calculates the number of required dump sites (near the fire) and a corresponding number of pumpers to move the water to the attack pumper(s). The third table calculates the number of fill sites and corresponding pumpers needed to draft water and fill tankers.

The bottom table sums up the pumper resource needs, including the number of attack pumpers previously determined.

It is GA's opinion that it is impractical to depend on a tanker shuttle to fight a fully-involved rural fire that is above FUS Risk Rating 3(a) at the MRDR UERL level. The ability to effectively coordinate as many as 16 tankers and commensurate pumpers would be rare. Typically in these cases, exposure protection of other structures becomes the objective in a defensive strategy.

GA recommends that for potential large fire risk occupancies in rural areas, that adequate on-site water supplies be provided by the owner, such that relay pumping from draft can replace or strongly supplement water shuttled by tankers. These sites should be large all-weather access ponds meeting NFPA-1142.

RECOMMENDED FRONT-LINE STAFFING AND EQUIPMENT

GA recommends the following staffing complement of active volunteer firefighters for each station, and the recommended fleet of fire apparatus.

Windsor:

Highest normally expected risk 4(a), possible 5 (downtown conflagration)

ACTIVE Volunteer Firefighters	Pumpers	Pumper-Tankers	Aerials	Rescues	Utility	Other
60	2	1	1 (110 ft)	1, Regional Heavy Rescue Support	1	1, Regional personnel transporter

Windsor currently has a boat and a tracked off-road vehicle (RTV). Water rescue events are rare, but the risk to firefighters without a boat is considerable, especially on a body of water the size of Pisquid Lake. With the revised response districts, it is likely that Windsor firefighters will make good use of the RTV in rural areas.

Hantsport:

Highest normally expected risk 3(b), possible 5 (CKF)

ACTIVE Volunteer Firefighters	Pumpers	Pumper-Tankers	Quint	Rescues	Utility
60	1	1	1 (75 ft)	1, Regional SCBA Support	1

South West

Highest normally expected risk 2, possible 3(a) (small stores)

ACTIVE Volunteer Firefighters	Pumpers	Pumper-Tankers
24	1	1

Brooklyn

Highest normally expected risk 3(b), possible 4(a) (large church)

ACTIVE Volunteer Firefighters	Pumpers	Pumper-Tankers	Rescues	Utility	Other
40	2	1	1, Regional Command Support	1	RTV

Three Mile Plains

Highest normally expected risk 3(b), possible 4(b) (building supply with exposures)

ACTIVE Volunteer Firefighters	Pumpers	Pumper-Tankers	Aerials	Utility
40	1	1	1, (100 ft platform)	1

Summerville

Highest normally expected risk 3(a), possible 3(b) (farm complex)

ACTIVE Volunteer Firefighters	Pumpers	Pumper-Tankers	Rescues	Utility	Other
24	1	1	1, Regional mass-casualty Support	1	Boat, RTV

Changes in Assessments and Property Counts, Revised Fire Districts

There are 13,335 properties in W/WH. The revised fire districts proposed will change the distribution of protected properties, by fire station, from the existing distribution as estimated on page **187**.

According to the address of the properties, thereby identifying the community, the following shows approximately how the properties are will be distributed to the fire departments. Note that Hantsport numbers do not include the areas in Kings County, nor are East Hants properties protected by Brooklyn.

Fire Department	Current Properties	Revised Properties	Revised Value	%
Windsor	1,582	3,100	$562,755,300	35%
Hantsport	2,911	1,108	$129,443,800	8%
South West	1,210	1,349	$135,545,000	9%
Brooklyn	3,242	3,244	$352,614,100	22%
Three Mile Plains	2,522	2,668	$303,163,200	19%
Summerville	1,419	1,419	$78,890,600	5%
Uniacke and District	2	0	$0	0%
Walton Shore	443	443	$32,434,600	2%
Unclassified	4	4	$170,800	0%
Totals:	**13,335**		**$1,595,017,400**	

Also affected is the distribution of identified major occupancies, as follows.

FIGURE: DISTRIBUTION OF IDENTIFIED OCCUPANCIES, REVISED FIRE DISTRICTS

Station	A	B	C	D	E	F
Windsor	38	9	35	14	8	14
Hantsport	14	1	14	1	1	9
South West	11				1	1
Brooklyn	28		8	3	6	14
Three Mile Plains	19	1	12	3	8	28
Summerville	9		1	1		3
Uniacke						
Walton Shore	3					2
Totals:	**107**	**11**	**62**	**22**	**21**	**57**

APPARATUS RECOMMENDATIONS

REPLACING FIRE TRUCKS

A review of the current state of major fire department assets in W/WH shows a need to replace vehicles (fire apparatus) on a regular schedule that meets needs and best practices. NFPA-1911[77] recommends;

> *"In the last 10 to 15 years, much progress has been made in upgrading functional capabilities and improving the safety features of fire apparatus. Apparatus more than 15 years old might include only a few of the safety upgrades required by the recent editions of the NFPA fire department apparatus standards … It is recommended that apparatus more than 15 years old that have been properly maintained and that are still in serviceable condition be placed in reserve status; be upgraded in accordance with NFPA-1912; and incorporate as many features as possible of the current fire apparatus standard (see Section D.3). This will ensure that, while the apparatus might not totally comply with the current editions of the automotive fire apparatus standards, many of the improvements and upgrades required by the current editions of the standards are available to the fire fighters who use the apparatus."*

NFPA-1911 goes on to say that the original purchase of good quality, with good ongoing maintenance, and periodic upgrading to keep pace with safety and function improvements, can extend apparatus serviceable life somewhat.

[77] National Fire Protection Association; NFPA-1911, Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles, 2017 edition; Annex D.1.

The other major arbiter of fire apparatus age and condition is the Fire Underwriters Survey (FUS), who published[78] the following guidance table;

Table 1 Service Schedule for Fire Apparatus For Fire Insurance Grading Purposes

Apparatus Age	Major Cities [3]	Medium Sized Cities [4]	Small Communities [5] and Rural Centres
0 – 15 Years	First Line Duty	First Line Duty	First Line Duty
16 – 20 Years	Reserve	2nd Line Duty	First Line Duty
20 – 25 Years [1]	No Credit in Grading	No Credit in Grading *or* *Reserve [2]*	No Credit in Grading *or* *2nd Line Duty [2]*
26 – 29 Years [1]	No Credit in Grading	No Credit in Grading *or* *Reserve [2]*	No Credit in Grading *or* *Reserve [2]*
30 Years +	No Credit in Grading	No Credit in Grading	No Credit in Grading

[1] All listed fire apparatus 20 years of age and older are required to be service tested by recognized testing agency on an annual basis to be eligible for grading recognition. (NFPA 1071)

[2] Exceptions to age status may be considered in a small to medium sized communities and rural centres conditionally, when apparatus condition is acceptable and apparatus successfully passes required testing.

[3] Major Cities are defined as an incorporated or unincorporated community that has:
- *a populated area (or multiple areas) with a density of at least 400 people per square kilometre; AND*
- *a total population of 100,000 or greater.*

[4] Medium Communities are defined as an incorporated or unincorporated community that has:
- *a populated area (or multiple areas) with a density of at least 200 people per square kilometre; AND/OR*
- *a total population of 1,000 or greater.*

[5] Small Communities are defined as an incorporated or unincorporated community that has:
- *no populated areas with densities that exceed 200 people per square kilometre; AND*
- *does not have a total population in excess of 1,000.*

FUS is the organization that conducts detailed surveys of municipal fire protection capabilities for the purposes of recommending fire protection grades to the insurance industry. FUS recommendations are highly regarded as a consistent yardstick for comparison to past and future capabilities in fire protection, and their conclusions (ratings) can affect fire insurance costs for individual property owners.

It is clear that both NFPA and FUS consider 15 years as the maximum front-line serviceable age of fire apparatus. However, FUS does recognize that low incident volumes, quality purchases, and good maintenance, proved by testing, can extend the front-line serviceable age to 20 years, followed by up to 5 years in reserve for smaller communities. Front-line means that the apparatus is relied on to be a mainstay for fire protection. Reserve means that it is not so relied on, but can periodically step into a front-line role when needed (e.g. as a maintenance spare).

[78] Fire Underwriters Survey/OPTA, Technical Bulletin, Insurance Grading Recognition of Used or Rebuilt Fire Apparatus, 2014.

GA recommends that the following replacement schedule be adopted for the purposes of determining fire apparatus suitability for continued service.

RECOMMENDED SERVICE LENGTH FOR FIRE APPARATUS

Type	Condition	Max Age	Service
Pumper	Purchased to NFPA-1901 standard, certified and periodically tested in accordance with FUS/ULC	20 years	First-line duty
Pumper	Purchased to NFPA-1901 standard, certified and periodically tested in accordance with FUS/ULC	25 years	Reserve use
Aerial/Quint	Purchased to NFPA-1901 standard, certified and periodically tested in accordance with FUS/ULC	20 years	First-line duty
Aerial/Quint	Purchased to NFPA-1901 standard, certified and periodically tested in accordance with FUS/ULC	25 years	Reserve use
Rescue	Purchased to appropriate portions of NFPA-1901 standard	25 years	First-line duty
Rescue	Purchased to appropriate portions of NFPA-1901 standard	30 years	Reserve use
Utility vehicles	Light duty chassis	15 years	First-line duty
Utility vehicles	Light duty chassis	20 years	Reserve use
All other vehicles/apparatus	RTV, rescue boat, trailers, etc.	Case-by-case basis	First-line duty or reserve

GA is recommending the following numbers and types of **first-line duty** fire apparatus allocations. These numbers can be accomplished through attrition as current apparatus age-out.

RECOMMENDED FIRST-LINE DUTY FIRE APPARATUS AND ASSIGNMENT

Station	Pumper	Pumper/Tanker*	Quint	Aerial	Rescue	Utility	RTV	Boat
Windsor	2	1	0	1	1	2	1	1
Hantsport	1	1	1	0	1	1	0	0
SWH	1	1	0	0	0	0	0	0
Brooklyn	2	1	0	0	1	1	1	0
TMP	1	1	0	1	0	1	0	0
Summerville	1	1	0	0	1	1	1	1
Totals:	8	6	1	2	4	6	3	2

GA is further recommending that two older (no longer first-line) pumpers and a tanker be kept serviceable as maintenance reserves. The purpose of reserves is to temporarily replace apparatus that are out of service for a day or more. They will also remain available for major incidents.

GA recommends that a reserve pumper be placed in Brooklyn and Windsor stations, and the reserve Tanker be placed in Summerville.

Two new apparatus types have been introduced in the above recommendation table in comparison to the table[79] of current apparatus.

The term Pumper-Tanker is a better description of the apparatus recommended to replace the current Tanker apparatus. In truth, all current tanker apparatus are equipped with a large pump.

GA recommends that replacement Tanker apparatus also include all components necessary to qualify as a pumper and a tanker. This includes little to no significant change from the current apparatus in some cases, but in other cases means the inclusion of adequate equipment and hose carrying capacity.

GA recommends a standardized vehicle specification be used Region-wide. Standardized apparatus descriptions are included in **Appendix IX; Standardized Fire Apparatus Features** starting on page **377**.

The second new apparatus type is the Quint. The Quint is a combination of a pumper that is outfitted with an aerial ladder device. An example is shown in the photo to the right.



A quint is fully functional as a pumper, with similar capabilities to the recommended Standard Regional Pumper. It can also serve as an aerial apparatus when needed since it is outfitted with a 75-foot aerial device. This apparatus will address the need for quick access to an aerial in Hantsport's urban/industrial environment. It also has the pumping capacity of a second pumper

[79] See **Figure: Current Apparatus Inventory** starting on page **154**.

when needed. It will be an additional aerial available in Windsor, or elsewhere in the Region, at incidents involving larger or complex buildings, or for exposure protection.

THE VALUE OF FIRE APPARATUS STANDARDIZATION

The following is intended to provide some insight into areas where performance, safety, economy, and effectiveness can intersect in a standardized fire apparatus specification format; a format that can generate savings through bulk purchasing and streamlined maintenance, as well as improved operability for firefighters.

First, a review of the current fire fleet. Major components installed in the current fire fleet are as follows;

- Fire pumps; Hale is the most common fire pump manufacturer (8), Waterous is next (6), followed by Darley (3) and Pierce (1).
- Engines; Cummins is the most common diesel engine manufacturer (12), Detroit is next (5, but three of these are obsolete engines in trucks that need immediate replacement due to advanced age), followed by International (4), CAT (3, but CAT has left the truck engine business), and Mercedes (1, which was only, and is no longer, available in Freightliner chassis).
- Chassis custom; Pierce is the most common *Custom* cab/chassis manufacturer (4), E-One is next (3), followed by American LaFrance (2, no longer in business and both overdue for replacement), and King-Seagrave (1, no longer in business and overdue for replacement).
- Chassis commercial; Freightliner is the most common heavy/medium truck Commercial cab/chassis manufacturer (5), tied with International, and followed by Ford (2) and Peterbilt (1).

The significance of the above information is that there is a large variety of pump, chassis, and engine manufacturers currently in the fire fleet. This strongly suggests that there is an opportunity for standardization of fire apparatus specification and purchasing between the four existing fire departments and internally within each. This standardization will reduce inefficiencies in servicing and repair. Reducing the variety of apparatus specifications will facilitate consolidation of servicing for these vehicles, thereby gaining an advantage of economies of scale from commonality of parts and consolidated knowledge.

There are significant advantages in purchasing, serviceability, and costs, to say nothing of in-depth knowledge accumulation, when a standardized chassis/cab, pump, and powertrain is used for all vehicles of a class in a fleet. Such advantages will surface in cost of ownership with lower parts stock costs and more efficient servicing; thereby reducing service time/cost, with consequent reduction in down-time, and better preventive maintenance knowledge.

Cost savings in purchasing can be achieved with a common specification across multiple vehicles. It then becomes possible to establish multi-year, multi-vehicle contracts, from multiple provider choices; contracts that can attract better pricing and reduce municipal administrative time.

GA recommends that specifications for the major classes of fire apparatus be standardized across all stations in the new regional municipality. This will generate savings in total cost of ownership for the municipality.

The standard apparatus specification should include a standard make and model of fire pump, which is a major component of most fire apparatus, and is a major maintenance cost component and cause of down-time. Based on the existing fleet, it is clear that Hale is the predominant pump manufacturer. Hale is a highly reputable pump manufacturer and makes an excellent and reliable product. Hale is probably the most widely specified fire pump in North America.

The Hale Qmax family of pumps offers capacity scalability to suit various needs of the new Regional fire service. The recommended standardized version (for pumpers) is the Hale Qmax rated at 1250 Imp gpm. This pump will produce flows well in excess of its rating, provided there is adequate horsepower to drive the pump and adequate water supply. Horsepower will be addressed by our recommendation on engines.

For aerial devices, the ability to produce a maximum volume water stream from the top of the aerial ladder requires a larger pump due to friction and height losses. For that application, the Qmax in the 1750 Imp gpm rating is recommended.

The standard apparatus specification should also include a standard make and model of engine. Based on the existing fleet, it is clear that Cummins is the predominant engine manufacturer. Indeed, it is one of only a couple choices left in the truck market. Cummins is a highly reliable and fuel-efficient engine manufacturer with excellent power availability, and a choice of power models. Cummins is a standard offering in most fire truck chassis.

In the Regional fire service, there is a need for three different Cummins engines, with different horsepower and torque capabilities. For pumpers and tankers, the Cummins X12-500 is

recommended. This engine is powerful enough to get all the available water flow from the recommended pump and will move these heavy vehicles down the road with good hill climbing and highway performance.

For aerial apparatus, the Cummins X15-605 is recommended. This engine has slightly higher horsepower and significantly more torque. Aerial apparatus are significantly heavier than pumpers and have larger auxiliary power demands from large hydraulic systems that operate the aerial device. The more powerful engine is needed to ensure adequate performance.

Rescue style trucks are generally smaller and lighter and should be based on a commercial chassis. The smaller Cummins ISL9-450 is recommended for this service.

It is desirable that the cab/chassis also be standardized. There is justification for both custom cab/chassis as well as commercial cab/chassis.

The current trend for heavy fire apparatus (pumpers, tankers, aerials) is to specify custom cab/chassis models that are specifically designed for the fire service vocational application. These heavy fire apparatuses incorporate pumps, foam systems, heavy electrical and hydraulic draws, complex electrical systems and other specialized features (e.g. aerial devices). Custom chassis have the advantage over commercial platforms in several ways.

Custom chassis are designed for higher horsepower engines than are available in the commercial chassis, that are suitable for fire service application. Where the apparatus is intended to be stationary and demanding high power output from its engine (i.e. pumping/aerial), engine heat dissipation is a major concern. Custom fire apparatus cab/chassis are specifically designed for this application, whereas commercial cab/chassis are specifically not designed for this application.

In commercial chassis the engine selection is limited, for example the Freightliner M2-106 chassis model is not available with the larger Cummins engines (X12), and neither is the International HV chassis. The Freightliner uses a Detroit engine for higher horsepower applications. The International uses a MANN engine from Europe. Both chassis offer the Cummins ISL9 engine.

Custom chassis are prewired and equipped for fire apparatus applications. Commercial chassis are not, and require significantly more work (time/cost) and materials (cost) on the part of the fire body manufacturer to integrate the chassis with the fire service body, mechanical, electrical, compressed air, and hydraulic systems. The purpose-built aspect of the custom chassis assures a more suitable and reliable final constructed vehicle for pumpers, pumper-tankers and aerials.

Large aerial devices are only available on custom chassis, due to the need for stronger and stiffer frames and specialized systems that integrate into a purpose-built chassis. The chassis and aerial are designed together as an integrated machine.

Having illuminated the value of custom chassis above, there is one difficulty with using custom chassis. It may restrict who the municipality can purchase their fire apparatus from. There are a few manufacturers of custom chassis, and almost all limit their availability for use by independent fire apparatus (body) builders. For those manufacturers, to buy their chassis you must also buy their entire apparatus.

This is not necessarily a bad thing if the manufacturer offers quality apparatus at competitive pricing that meets the municipality's needs, and will continue to do so into the future. In that case, the municipality must be satisfied at a sole source supplier process. Brooklyn/Three Mile Plains is the best example of this, currently operating three custom chassis and one commercial chassis apparatus built by Pierce. Hantsport also has one Pierce custom and SW-Hants one Pierce commercial apparatus.

GA was able to identify nine custom fire-chassis builders in North America;

- **Pierce** (USA-Wisconsin): captive chassis for their own apparatus builder, with a wide range of apparatus types. In Canada has exclusive contract with Maximetal (QC) to build for the Canadian market.
- **Sutphen** (USA-Ohio): captive chassis for their own apparatus builder, with a limited range of apparatus types.
    - Sutphen has sold some chassis to SVI (USA-Colorado) who specializes in rescue and wildland trucks, strategically filling a gap in Sutphen's product lineup

- **E-One** (USA-Florida): captive chassis for their own apparatus builder, with a wide range of apparatus types.
- **KME** (USA-Pennsylvania): captive chassis for their own apparatus builder, with a wide range of apparatus types.
- **Ferrara** (USA-Louisiana): captive chassis for their own apparatus builder, with a wide range of apparatus types.
    - E-One, KME, and Ferrara are all owned by the REV Group
- **HME Aherns-Fox** (USA-Michigan): captive chassis for their own apparatus builder, with a wide range of apparatus types.
- **Seagrave** (USA-Wisconsin): captive chassis for their own apparatus builder, with a range of apparatus types, limited rescue options.
    - Seagrave has sold some chassis to two large independent builders that we know of;
        - SVI (USA-Colorado) who specializes in various role rescue type and wildland trucks, strategically filling a gap in Seagrave's product lineup; and
        - Rescue-1 (USA-NJ) who specializes in various rescue type trucks, strategically filling a gap in the Seagrave product lineup in the eastern states.
    - Both those independent builders predominantly use Spartan chassis.
- **Rosenbauer** (USA-South Dakota): captive chassis for their own apparatus builder group, with a very wide range of apparatus types.
- **Spartan** (USA-Michigan): available chassis for their own and independent apparatus builders. They are primarily a custom chassis builder in many markets with a wide range of chassis types. Spartan also builds complete fire apparatus with a range of apparatus types.

In GA's opinion, without standardizing on the custom chassis manufacturer, it is possible that over time the Regional fire service could conceivably have up to nine different custom chassis manufacturers in the fleet; each significantly different from each other.

One challenge is that all but one of the manufacturers listed above restricts access to their chassis, with most providing them only to their own integrated apparatus builder network or to strategic partners. These owned/contract builders take the chassis and construct the body, install major components like the pump and piping, the water tank, electrical systems, hydraulic systems, air systems, storage systems, and paint and prep the entire vehicle. Standardizing on one of these restricted access chassis could mean being forced to forgo the competitive purchasing process for the balance of the apparatus. With the chassis representing only from ¼ to ⅓ of the total cost of the entire fire apparatus, this could be a concern.

The one exception is the Spartan custom chassis. Although there are surprisingly no Spartan custom chassis currently in the current Regional fire service's inventory, it would make sense to explore standardizing on Spartan as the custom chassis of choice for the majority of the fleet. The advantage is that Spartan markets their custom chassis to the large as well as small independent apparatus builders all over the world. Many of these builders are in Canada as well as in the USA. It is a very competitive market.

For the above reasons, we recommend standardizing on the Spartan Gladiator chassis, medium 4-door (MFD) cab, with 10 inch raised roof and galvanized frame. The galvanized frame is an exclusive Spartan feature that protects the single weakest point affecting a chassis' lifespan, chassis corrosion. This is another reason for considering Spartan.



Standardizing on Spartan would have several advantages. It would lower the overall cost of ownership as noted above. It would also open-up the municipality's choices for purchasing from independent fire apparatus builders across Canada and the USA, of which there are a significant number of choices. In this way, the features wanted in the fire apparatus are available through a competitive bidding process, in addition to the value of standardization of all major components.

In Canada there are the following well-known builders who, except for Maximetal, all build on Spartan chassis;

- **Lantz** (Port Williams, NS): Long noted for their very high-quality rescue trucks and tankers; they also build pumpers. Sells direct to municipalities (no dealer overheads).
- **Metalfab** (Centreville NB): Builds pumpers, tankers and rescue trucks. Sells through dealers.
- **Fort Gary** (Winnipeg, MB): Builds pumpers, tankers and rescue trucks. Sells through dealers.
- **Carl Thibault** (Pierreville, QC): Builds pumpers, tankers, aerials, and rescue trucks. Sells through dealers.
- **Maximetal** (Saint-Georges, QC): Builds pumpers, tankers and rescue trucks. Sells through dealers. Also has exclusive strategic access to Pierce chassis in Canada.
- **Dependable** (Brampton, ON): Builds pumpers, tankers and rescue trucks. Sells direct. Dealer for Spartan aerials.
- **Hub** (Abbotsford, BC): Builds pumpers, tankers and rescue trucks. Sells through dealers.

  …
- There are also across Canada a number of smaller firms (smaller than those mentioned above) who build fire apparatus for their regional market.
- Buyers also have access to a large number of USA fire truck manufacturers who build on Spartan chassis. Some are available through Canadian fire truck dealers. Access to service and support becomes a critical factor in making these out-of-country purchases.

For other needed Regional vehicles, specifically rescue style vehicles, the most common fire service chassis used is the Freightliner M2-112, with a raised roof crew-cab. Based on local preferences, some other commercial brands are sometimes used for medium/heavy fire trucks (e.g. International, Ford, Volvo, Peterbilt). Only Freightliner, Ford, and International offer production crew-cabs, and only Freightliner offers a raised roof crew-cab that provides the required space for firefighters, similar to that available in smaller custom cabs. The Freightliner has become ubiquitous in this service, and almost every fire apparatus builder offers fire trucks constructed on this chassis.

We recommend the Freightliner M2 chassis as the standard commercial chassis used for lighter duty fire apparatus in the municipality; in a 2-door (as shown), or preferably a crew-cab with raised roof format so the crew does not need to ride in the box. The specific application is variable.



Standardization of major components on fire apparatus has other benefits as well.

Standardization helps to ensure that all assigned drivers are familiar with all fire apparatus in the fleet, not just the ones they normally operate. It reduces training time and effort. Skills learned on one apparatus are directly applicable to another. This reduces the risk of incidents and improves operator skill levels and performance outcomes. It also simplifies the ability to relieve the apparatus operator (at long duration incidents) by any trained operator, even one who is not familiar with that specific apparatus, but who is trained and experienced with other members of the apparatus family.

When apparatus are removed from service for repairs, the replacement spare apparatus will be highly similar to the one being repaired, which improves the effectiveness and efficiency of the use of the spare apparatus. Training will not be required before the *foreign* apparatus can be utilized safely; training and familiarity that is often overlooked.

The integration of standardized apparatus will take upwards of 20 years to completely achieve as attrition drives the replacement of older apparatus. Some vehicles in the current fleet are only a few years old. However, there are also a significant number of apparatus in need of replacement almost immediately; and that will get the process started. Failure to standardize will continue and exacerbate the uncoordinated nature of apparatus purchasing, with all its downsides.

There is yet another initiative possible and recommended that is associated with standardized apparatus. Training and effectiveness for all firefighters is further simplified and enhanced if

along with standardized fire apparatus there is a move to standardized the configuration of equipment carried on the trucks, i.e. what and where.

Although this initiative is simplified when all apparatus are configured the same way, this process can start sooner, even with the current fleet. The benefit is that a firefighter from one station, working at an incident scene alongside a vehicle from another station, will know what and where to find the needed equipment on virtually any apparatus. This speeds operations in time-critical situations.

Although complete standardization of equipment placement is the panacea and cannot be 100% accomplished due to differences in current apparatus, there is much that can be accomplished since most apparatus have similar layouts.

Starting on page 268 are outlines of standard features recommended for all Regional fire apparatus. They are by no means a full specification suitable for the purchase of fire apparatus. More detail on local needs and desired features/standards is required to ensure that a high quality, reliable, and good value apparatus is purchased that will meet the needs and expectations of the purchaser.

There will always be the need to accommodate local needs based on specific risks in the community. Some adjustment in detailed specification may be needed from one standard apparatus to another, one fire district to another. However, these accommodations should not include the major components recommended, but may impact some more minor details.

See **Appendix IX; Standardized Fire Apparatus Features** starting on page **377** for a list of recommended standardized features for fire apparatus.

THE VALUE OF MAJOR EQUIPMENT STANDARDIZATION

There are a number of important types of equipment that are critical to the delivery of, in particular, fire and rescue services. This equipment is used frequently, in all stations, and by virtually every firefighter, on an as need basis. They are all important for life safety, both for the firefighter and for the public being served.

Currently there is significant variety between stations on this equipment. This is an issue for equipment exchangeability, for example with placing Regional spares in service while front line equipment is being serviced. Every station must either go short when equipment is out of service, or have their own inventory of spares. The first-choice downgrades service and tends to result in excess equipment being purchased to avoid that occurrence, which is needlessly expensive.

It is an issue for group purchasing as well, where best pricing can come from the largest volume purchases, and multi-year contracts. It is also a training issue. For instance, at a large incident where firefighters from different stations are working together, there is an issue with understanding how another station's equipment works, if you have not enough of the equipment the firefighter is familiar with at hand.

The equipment that should be strongly considered for standardization across all stations I the Region are as follows.

Self Contained Breathing Apparatus (SCBA)

Currently Windsor is in the final stages of purchasing SCBA manufactured by MSA. It is GA's understanding that all other stations use SCBA manufactured by Scott. There are some significant differences between these manufacturers, so much so that no Chief would consider allowing a firefighter to wear an SCBA that the firefighter was not thoroughly trained on. Misuse can literally kill the firefighter.

At a fire the masks and air tanks (bottles) of SCBA are commonly switched out, either when the SCBA is passed on to another firefighter, or much more commonly when the air bottle is changed for a full one. Air bottles cannot be exchanged between SCBA brands. To do so (if

possible) violates the approvals for the SCBA and creates a large liability if the SCBA is related to an injury.

In order to support fire operations, any regional resource configured for such a use (e.g. Hantsport Rescue 31) would need to carry twice as many $1,600 air bottles than might otherwise be necessary (some of each brand), even if there was space to do so.

GA recommends that the Regional fire service strike a committee to investigate a standard brand and model series of SCBA with which to outfit all fire stations in the Region. Consideration should be given to the types of SCBA being used by mutual-aid partners as well, but in any case the SCBA used Regionally should be standardized.

GA recommends that every structural firefighter be provided with his/her own personal SCBA face mask. Provision of a properly fitting mask is necessary to achieve a pass in annual legislated quantitative Fit-Testing. A variety of mask sizes and models is usually necessary to achieve Fit Test performance.

Hydraulic Extrication/Rescue Equipment

Currently there is a mixture of Holmatro conventional hydraulics, Hurst conventional hydraulics, and Hurst eDraulic hydraulic rescue/extrication equipment in service. There may be other types that GA is not aware of. Conventional means the cutters/spreaders/rams are operate through hoses pressurized by a gasoline powered pump that generates the hydraulic force/pressure.

Conventional hydraulics are heavy, take up a lot of compartment space, and are high maintenance; with hoses that easily kink or cut, a pump/motor unit that requires fuel, an engine that must be exercised regularly, and small engine repair/service annually at least.

The multiple brand/type units in service are also a training challenge that only firefighters trained and familiar with that specific piece of equipment can operate safely.

GA recommends that the Regional fire service standardize on Hurst eDraulic hydraulic extrication/rescue equipment, and phase in replacement of the current equipment that is not eDraulic.

GA recommends that all fire stations be equipped with eDraulic Combi-Tools and that Windsor station be equipped with a set of heavy hydraulic jaws, cutters, and rams such that Windsor can provide Regional Heavy Rescue support to all stations. Details on the specific eDraulic equipment that is recommended is on page **291** of this report.

Bunker Gear (firefighter PPE)

Bunker gear is expensive and is certified for use for only ten years. It consists of a firefighter's coat ad trousers, gloves, balaclava, boots and helmet. Typical per firefighter costs are around $2,000. Annual purchasing of some or all bunker gear components will occur annually. Significant savings can be obtained if all PPE is standardized across the Region and central purchases are made.

Bunker gear coats and trousers must be worn as a set. The coat from one make and model cannot be interchanged with another. Every make and model is designed to fit together precisely. Mixing will get firefighters injured and create large liability risks. With standardized PPE it is possible to purchase a coat or a pair of trousers if the other component is damaged. It is also possible to utilize spare gear to replace a damaged item if it is all the same make/model of PPE.

GA recommends that the Regional fire service immediately strike a committee to determine bunker gear needs and to test manufacturers' offerings, and to settle on one make. one model, one colour, and on standard features.

GA recommends that Proposals from vendors of the selected manufacturer be entertained and that a multi-year contract be negotiated with the vendor, allowing the DPS/FC to requisition PPE from the vendor at contract prices on an annual basis.

Gas Detection

Gas detection devices are manufactured by several firms and each offers various features. From a training perspective it is advantages that every fire station use the same make and model of multi-gas detector except for the need for one specialized unit for Haz Mat incidents or fire investigation. In this way any trained firefighters will be able to effectively use any gas detector.

GA recommends that the Regional fire service standardize on one make and model of general use multi-gas detector for the fire stations.

Hose

GA did not inventory the hose in use at the fire stations, but did notice there is a great variety. There is a tendency to purchase hose on the misunderstanding that all hose is the same. It most certainly is not. Hose must be purchased by make and model based on thorough evaluation of performance and value (life cycle cost). It is much cheaper if bought in bulk Region wide. By doing this it will be possible to purchase high performance, long lasting hose at competitive prices. Never buy hose based on price alone.

Different hose has different performance characteristics. One important one is the pressure loss per length when flowing water. The higher the loss the higher the pump operator must push his pump. With mixed or unknown hose connected together it is impossible to get the pump pressure right. This affects available water flow rates, and can result in firefighter injury or unnecessary fire loss.

GA recommends that the Regional fire service strike a committee to evaluate all the available makes and models of hose in the utilized sizes. The evaluation should include performance factors of weight, friction loss, kink resistance, abrasion resistance, liner separation, grip, quality, availability, construction, quality control at the factory. After ranking then price should be evaluated for those makes/models that have tied in the evaluation. Once selected that make/model should become standard for future purchases.

Thermal Imaging Cameras

Similar SCBA and hydraulic extrication equipment, firefighter training and competence are critical in the use of Thermal Imaging Cameras (TIC). Every TIC make/model operates differently, and mistakes can be very costly in firefighter health and safety as well as in property loss and liability. A firefighter who fails to understand what the TIC is telling him can mistake a dangerous high heat condition and lead to a firefighter injury or entrapment by overtaking fire. A

firefighter who does not understand how to calibrate the TIC may bot spot a hot spot, resulting in the fire department returning again to a rekindle, and potential lawsuit.

GA recommends that the Regional fire service strike a committee to evaluate the available makes and models of thermal imaging cameras. The evaluation should include all recognized performance factors. Testing of demonstration equipment should be involved. Standardization on future purchases of TICs should be based on the successful candidate, and be phased into all stations.

FIRE STATION FACILITIES AND FUTURE NEEDS

STATION LOCATION

An area to be protected by a proposed station is the most important factor in determining fire station locations. Some areas in the community will contain higher risk potential than others, i.e. those containing primarily business, industrial, mercantile, institutional, and multi-family residences. In some cases, it may not be desirable to locate a station in a high-risk area. The station should therefore be located within a reasonable response distance on the perimeter of the high-risk area. Distribution should provide a concentration of response equipment for response into a high-risk area without depleting other areas of the community (draw down) should a second incident occur.

In other areas of the community with equal risk throughout, such as residential, fire stations should be equidistant from all parts of the area. Where stations are staffed by volunteer fire fighters, consideration must be given to locating the fire stations in or near areas where those fire fighters live and work in order to facilitate quick response. The analysis for the fire station location study consisted of preparing and reviewing various mapping models to facilitate exploring options for fire station locations such that the 4 km, 6 km, 8 km and 10 km travel distances are met for the major growth areas, as well as areas beyond the growth areas where possible. The impact of historical emergency call data and volunteer firefighter residence locations were also considered.

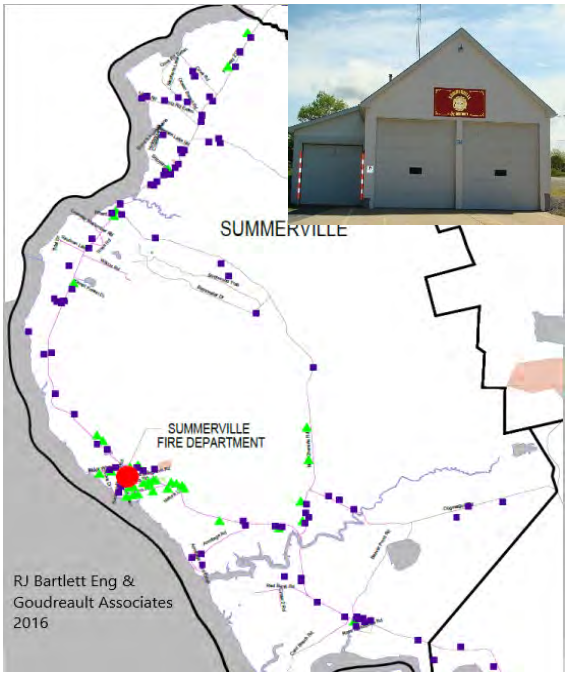
To analyze station locations in particular volunteer staffed stations, as previously stated, the following considerations need to be reviewed and scrutinized.

- Level of Community Risk
- Call volumes by type of incident
- Mutual-aid/Auto aid availability and location
- Road networking and roadway conditions, i.e. bridge capacities and locations
- Community growth or decline
- Population Density
- High value development areas

- Land availability, Municipal or other.
- Flood Zones

Summerville Volunteer Fire Station

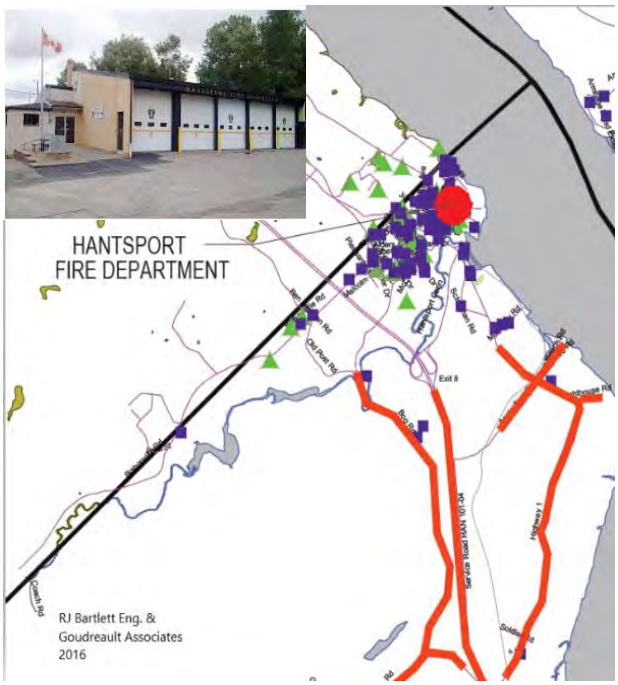
The location for this department's station is ideal. when considering incident locations ■ and the residence locations ▲ of the volunteer responders.



Best practices by the National Board of Fire Underwriters Standards recommends a station location close to and leading into major or secondary thoroughfares. The Summerville Station meets this location standard.

Based upon future development and community growth, over the next decade the location for this station should remain the same.

Hantsport Volunteer Fire Station



This department's station is funded in the 2020 capital budget for replacement.

The question for this station is where to locate it given its area of coverage for Hantsport, Hantsborder and Glooscap First Nations.

The majority of incident locations ■ and the residence locations ▲ of the volunteer responders are very near to the department's current station location.

Previous discussions considered locations in the Mount Denson area and possibly the Hantsport connector to Highway 101 to aid in response to the community of Falmouth.

The main issue with these locations is where the residences of the volunteers are. If either of the Mount Denson or the Hantsport connector were chosen, it would increase response time responding to the station and the high probability that the responders would have to drive away from the emergency to obtain the required apparatus and then return to the incident , which based upon 2016 and current call records, are near the community center.

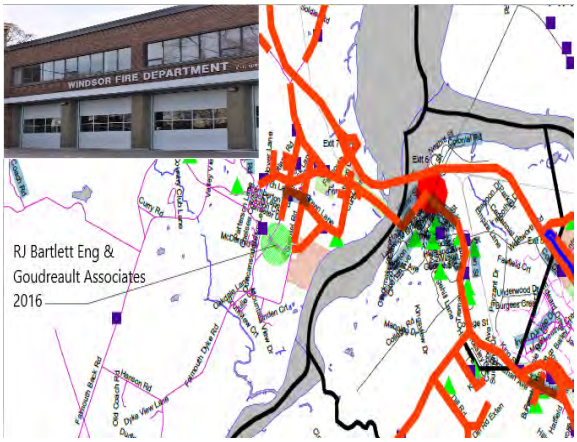
It is recommended that the location for the new Hantsport station remain as close as possible to the densely populated, high-risk area in the center of the community.

Three Mile Plains Station



The Three Mile Plains Fire Station was opened on November 25th, 2017. The location was determined by a previous study based upon the needs at that time. The location allows for easy and quick access to the West Hants Industrial Park and Highway 101.

Town of Windsor Fire Station



The Town of Windsor Fire Station is located in the downtown area of the municipality and is ideally situated for a quick response to the heart of the economic and business engine of the community.

The 2016 map showing the locations of incidents ■ and locations of firefighter's residences ▲ supports the current location of the station, which is ideally situated to quickly respond to not only incidents within the town, but to parts of neighbouring Falmouth. The King Street location also allows for quick access and response to incidents along the Highway 101 corridor.

Community of Falmouth

A previous study provided two possible locations for the community of Falmouth to acquire its own fire station. The recommendation was based upon information at that time indicating the Town of Windsor Fire Department was not in a position to provide first response coverage to the community.

The two options at that time were:

Option A:

A location being in close proximity to Highway 101, Exit 7 which allows for provision of coverage to the Falmouth major growth area.

The Option B:

A Falmouth fire station, located within the Village of Falmouth, approximately 2 km southwest of Highway 101 Exit 7, which would provide coverage to the major growth area as well as an additional area southwest of the major growth area.

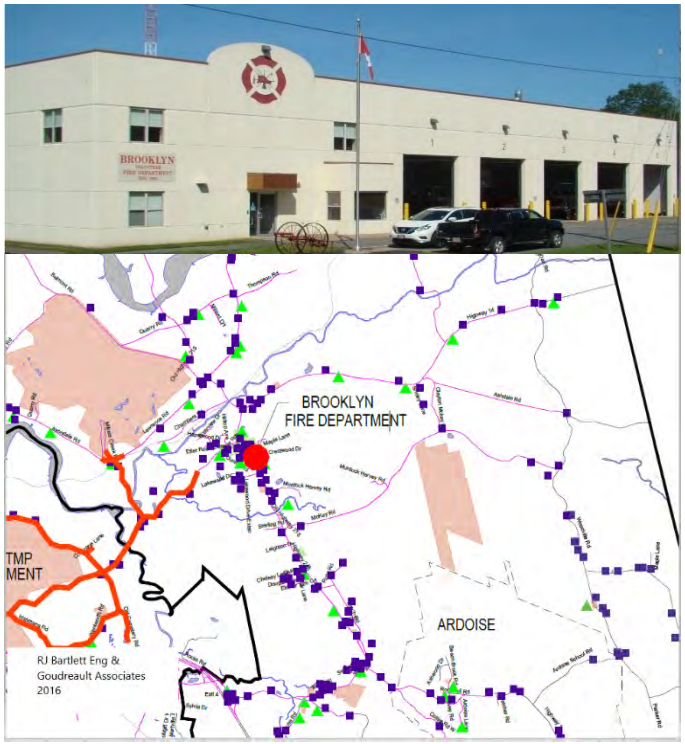
There is a possible third option and that is to relocate the Windsor Fire Station to a location near the Bridge on Evangeline Trail that crosses over from Windsor to Falmouth. However, this moves the Windsor station away from its volunteer base and the high-risk area of the Town.

Current Travel time modeling shown here indicates the coverage available to Falmouth within eight (8) minutes, (green lines on map) from both Hantsport and Windsor stations.



When considering call volume and the number of volunteers residing in the area and with the Windsor and Hantsport Fire Departments being able to provide emergency response to this community in a reasonable response time, a fire station for Falmouth at this time is not being recommended. However, if and when there is a consideration to replace the current Windsor Fire Station or if there is significant growth in Falmouth, a revisit of this recommendation should be conducted.

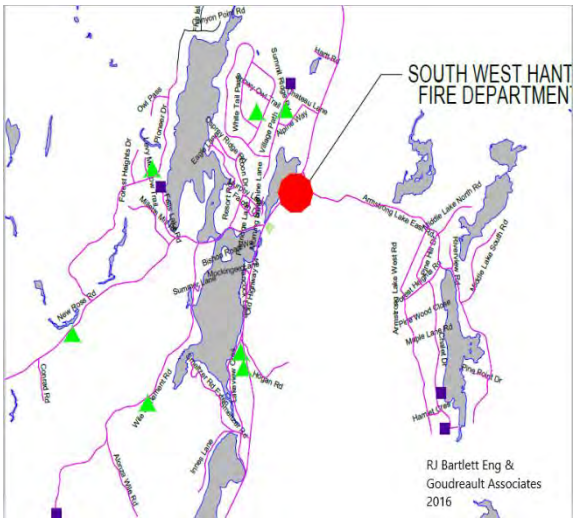
Brooklyn Fire Station



Located on Highway 215, near the intersection of Highway 14, this location provides ample coverage in multiple directions. A good portion of incidents ■ and the location of the residences ▲ of this department's volunteers are near the station's current address. The current station was built in 2009 near the same spot the previous station was located.

The 2016 study was asked to review the Forest Lakes development area and make any recommendations as to the need for a station in that area of the Brooklyn fire coverage district. The recommendation at that time was not to proceed with an additional station but to monitor the growth and if the area develops sufficiently over the years to justify the addition, then revisit the need. The Forest Lake development and area, based upon anecdotal information and an area site visit by the consultants, appears to have stalled. With development in this area being slowed and the majority of the area being forested land, and few volunteers residing in that area, the need for a station at this time is not warranted. If development grows sufficiently enough and the call volume increases, (currently fire incidents in this area average about three per year), then at that time, a revisit of the recommendation should be considered.

Southwest Hants Fire Station



This station is located along Highway 14, near the Armstrong Lake East Road. It is near the high value properties built amongst the heavily forested area and features a helicopter landing pad for medical emergencies and a small training area.

The location of this area is fairly remote from the mainstream stations such as Hantsport, Windsor and Three Mile Plains.



Given its location to the high value residential risk in the area, there is no requirement for relocation of this station for the foreseeable future.

FIRE STATION FACILITIES

Apparatus and Equipment

What type and size of apparatus will be used - current and future?

While the exact size of future equipment cannot be determined twenty or fifty years from now, a mix of large, medium and small equipment can be anticipated. The current mix of equipment includes large, medium, and small pieces of equipment throughout the region. Overcrowding is an issue in three of the stations. This is as a result of fire apparatus standards changing resulting in bigger sized vehicles. and the acquiring needs of various types of equipment more so than what was required in the past. Right sizing is a term that is now made its way into the fire service. It translates into do we really need all of this equipment in this station.

Equipment Bay Configuration

Drive-through bays

Drive-through bays would be desirable to provide additional ease of maneuvering equipment. Discussions with other fire departments have determined that while desirable, they are not essential. Care needs to be given to ensure that the range of response situations can be accommodated without the need of moving equipment out of the way of other equipment. An adequate quantity of bays with strategic stacking of response vehicles can meet the needs of the station without the use of drive through bays. Drive through bays are often not appropriately utilized as designed and thus eliminates the benefit of the extra costs associated with such a configuration.

Current Equipment sizing

The fire departments currently have a mix of mixed small equipment, including ½ ton, ¾ ton vehicles, trailers to tow boats and all-terrain vehicles, medium size pumpers and tankers and rescue trucks, larger sized tankers and aerial devices. These vehicles and their on-board equipment need to be stored out of the elements to protect not only the vehicles but the onboard equipment. The vehicles today are highly sensitive to the elements due to their onboard vehicle

electronics and many microprocessors. Most of the apparatus today as a result of the onboard electronics and air brakes, are required t be continuously connected to 120 V electrical systems and external air compressors.to keep the air brakes fully charged at all times.

The diagrams below will provide a rough estimate of current apparatus sizing of the region's fire departments. The pictograms do not allow for an extended front bumper that often carries fire hose and an inlet for fire hydrant connections. These front bumpers can range from twenty -four (24) to thirty (30) inches) Note: There are no known measurements for the Windsor Fire Department 1984 Snorkel. However, in the proposed, Capital vehicle replacement program it is scheduled for replacement in 2020. It is being recommended that a ladder type of aerial device be acquired. The typical dimensions for a rear mount aerial device are included in the pictograms below.

The average size of a ½ or ¾ ton four door vehicle bumper to bumper is approximately thirteen (13) feet, and an accompanying trailer for an all-terrain vehicle with space for related equipment and fuel ranges from ten (10) to twelve (12) feet. Trailers for RTV/UTVs and Rescue boats average 14 to 16 feet in length. Added together the overall lengths can be twenty-nine (29) or thirty (30) feet.

Typical recommended practices for apparatus space requirements such as the Fire Underwriter Services (FUS) require ten (10) feet of spacing between vehicles in front and rear of the vehicle and from the nearest station wall. The space permits load and unloading fire hose and equipment from the vehicle and permits this to take place simultaneously between vehicles.

Based upon the average overall lengths and widths of the fire apparatus outlined below and the required space around the vehicle, the overall space requirements can be summarized as follows.

Sq. Ft per unit	Med Size Pumper	Med Size Tanker	Large Size Tanker	Aerial Device	Utility Vehicle & Trailer
1000 sq. ft.					
1400 sq. ft					

Apparatus Floor and Miscellaneous Off Floor Service Rooms Sizing

It is no longer permissible, as per NFPA's safety standard *NFPA-1500 Standard on Fire Department Occupational Safety, Health, and Wellness Program,* to have any storage or equipment on the apparatus floor other than the apparatus itself for safety reasons. The square footage presented for apparatus does not include rooms directly off the apparatus floor that are often considered part of the apparatus floor/bay area, rooms such as SCBA compressors, PPE storage, fire hose storage and drying maintenance rooms, equipment storage, laundry rooms, or a decontamination room. Rooms that are necessary for daily operations.

Maintenance, Repair, Storage and Support Space Requirements

The item of greatest concern that has developed over the past many years is that of the rate of cancer in firefighters. Some cancers have been attributed to vehicle exhaust within fire station and the off gassing of contaminated/not properly cleaned PPE (bunker gear). In one station as soon as a person walks through the station's main doors into a public foyer, one can smell the PPE off gassing, while another station the PPE storage is in the training/meeting room of the station adjacent to the facility's kitchen.

Thus, the requirements for isolated and ventilated PPE storage areas directly off the apparatus (Bay) floors.

A fire station facility is more than a truck garage with some storage and a meeting room. In many communities it is the focal point and pride of the community as well as the volunteer firefighters. A reasonably built and maintained station will contribute to retention of volunteers.

There no actual standards for space requirements of fire station but there are recommended guidelines. Fire Underwriters establishes square footage areas per fire units based upon type and size of unit. To assist with determining facility space requirements for fire stations references, established guidelines as per the Whole Building Design Guide (WBDG) a program of the National Institute of Building Sciences and the architect firm of Mitchell Associates Architects NY. This firm has extensive experience in fire station design work and recommendations put forth by F.I.E.R.O. (Fire Industry Education Resource Organization).

The National Fire Protection Association standards, offer requirements for station facilities, as to safety requirements required, but do not offer space requirements for example;

NFPA-1500: Standard on Fire Department Occupational Safety, Health, and Wellness Program

"10.1.2 Fire departments shall provide facilities for disinfecting, cleaning, and storage in accordance with NFPA-1581."

NFPA-1581: Standard on Fire Department Infection Control Program, Chapter 10 addresses Facility Safety

"5.5 Equipment Storage Areas.

5.5.1 Emergency medical supplies and equipment stored in fire department facilities, other than those stored on vehicles, shall be stored in a dedicated, enclosed area to protect them from temperature degradation, contamination, and other physical damage.

5.5.4 Potentially Contaminated Personal Protective Equipment.

5.5.4.1 Potentially contaminated personal protective equipment shall be stored in a dedicated, well-ventilated area or room.

5.5.5 Contaminated Storage.

5.5.5.1 Areas or containers for the temporary storage of contaminated medical supplies or equipment prior to disinfection or disposal shall be separated physically from members in facilities or on vehicles."

Facility Space Guidelines

For this example, the Hantsport fire apparatus floor space requirement was used.

	Required Space	Sq Ft		
Firematics	Total Apparatus Bay	5800		
	Radio Room/Watch Desk	110		
	Parts, Equipment & Tool Storage	200		
	EMS Storage	100		
	Workshop	216		
	Firefighting Agent Storage	300		
	Hose Storage & Drying	250		
	SCBA Maintenance/StorageCompressor	520		
	PPE Storage	340		
	PPE Laundry	219		
	Janitors Closet	64		
	Decontamination/Disinfection	150		
	Subtotal		8,269	
Administration	Entry/Lobby	120		
	Coat Storage	20		
	Rest Rooms (2)	130		
	Conference/Meeting	361		
	A/V and training Storage	80		
	Officers	144		
	District Fire Chief	288		
	Records Storage	90		
	Subtotal		1,233	
Firefighters	Training/Meeting	450		
	Exercise	230		
	Kitchen	200		
	Showers (4 + 2)	324		
	Rest Rooms	271		
	Subtotal		1,475	
Miscellaneous	Houskeeping Storage	50		
	File Server	48		
	Mechanical	270		
	Subtotal		368	
	Total Space Needs			**11,345**

Current Facility Observations

Observations are a as result of station tours and completed surveys. Many of the stations do not comply with NFPA-1500 or 1581. This is understandable given the age and the standards at the time of construction. This same understanding must be applied to the following observations.

- All of the stations within the region do not comply with for the storage of PPE (Bunger Gear). nor do they comply with the same standard for infection control.
- The Summerville and South West fire stations require a vehicle exhaust extraction system.
- Lack of proper maintenance and testing facilities (Many of the stations must place tables in open areas to accomplish maintenance and testing of different types of devices and equipment and some of this takes place in the apparatus floor bays in one particular station this takes place in vehicle wash bays.
- Lack of proper storage areas
- Lack of appropriate cleaning stations for protective equipment, (one station uses buckets)
- Lack of proper workshops
- Multiple uses of areas or equipment that are not designed for multiple purposes.

Some of the observations found may be able to be addressed with properly designed/engineered alterations to current facilities.

Current Fire Stations.

- **Hantsport** fire station: Whereas this station is scheduled for a much-needed replacement, comments on its current condition would be moot at this time.
- **Summerville** fire station: This station was built in 1883, was modified in 2013.
- **Windsor** Fire Station: This station was built in 1962, some modifications occurred in 2019. This station should, with a few modifications, meet address NFPA-1581 requirements, and should service the municipality into the foreseeable future. The only issue is the dimensions of the overhead doors that service the apparatus bays. The overall height of the doors is 11 feet,7 inches. With the newer standards for fire apparatus, particularly aerial devices, require door openings being 14 feet wide by 14 feet high. The current clearance height of the doors makes acquiring an aerial device very challenging. Instead of possibly obtaining a device to meet the needs of the community it may require a device that will fit into the current station door configuration.

GA recommends that an architect familiar with fire station requirements, guidelines and applicable NFPA standards or a construction engineer be acquired to conduct an assessment to determine the feasibility of any required alterations for the Summerville and Windsor fire stations.

Apparatus Floor Space Requirements

A typical volunteer fire station in the region has a minimum of four emergency vehicles needed to service their designated area. Based upon the typical apparatus sizing two scenarios will be presented, one without an aerial device and one with an aerial device. Identified stations will also have a single spare apparatus, either a medium sized tanker or medium sized pumper. All bays will be single depth. If a doubling of vehicles in a single bay is required then a doubling of the square footage is required for that single bay.

The following total square footage for the apparatus floor area is for the ***apparatus only***.

Typical Rural Station – Apparatus Floor Space Only								
Sq. Ft Per Unit	**Med Size Pumper**	**Med Size Tanker 800- 1200 gals**	**Large Size Tanker >1200 gals**	**Reserve Med Sized Tanker**		**Rescue**	**Utility Veh. + Vehicle/Boat & Trailer**	**Sub Total Space sq. ft.**
1000 sf	1	1		1		1	1	5,000
1400 sf			1					1,400
Total	1000	1000	1400	1000		1000	1000	**6.400 sf**
Typical Urban Station Apparatus Floor Space Only								
Per unit Square Feet	**Med Size Pumper**	**Med Size Tanker 800 - 200 gals**	**Large Size Tanker >1200 gals**	**Reserve Medium pumper**	**Rescue Medium**	**Aerial**	**Utility Veh +/Boat & Trailer**	**Total Space Sq. ft.**
1000 sf.	2	1		1	1	0	1	6,000
1400 sf						1		1,400
Total	2000	1000		1,000	1,000	1,400	1,000	**7,400 sf**

Station	Pumper	Pumper /Tanker	Quint	Aerial	Rescue	Utility	RTV	Boat	Current Actual	Truck Total Space
Windsor	2 +1 R	1	0	1	1	2	1	1	5954	8800
Hantsport	1	1	1	0	1	1	0	0	2338	5800
SWH	1	1	0	0	0	0	0	0	1558	2400
Brooklyn	2+ 1R	1	0	0	1	1	1	0	8000	6400
TMP	1	1	0	1	0	1	0	0	3400	3900
Summerville	1	1 +1R	0	0	1	1	1	1	2840	4800
Totals:	8 + 2R	6 +1R	1	2	4	6	3	2		

Projected space needs based upon recommended Apparatus placement.
Needs based upon FUS, other Fire Service Organization Standards/Guidelines and Best Practices
R = Reserve Unit

Storage Needs

What are the present and future storage needs?

Storage is always an issue within any structure. Fire Stations over time require additional storage space as a result in changes to service levels, types of services offered and changes in fire service and safety standards. Currently storage of some fire and medical equipment, limited foam supplies, uniforms, parts and materials for maintenance, response gear, and seasonal items are being stored in the individual stations. Space for storage in the majority of the stations is inadequate to meet the needs. This has added to the overcrowding in the majority of stations. There is a need to provide distinct and appropriately located storage rooms and closets with proper controlled access. It is essential that appropriately designed storage is provided and other purposefully designed functional spaces are not just employed to accommodate ad hoc storage. This could become a safety issue. Recommended storage room types and sizing were provided previously in this chapter.

In a regional concept there is an opportunity to create a central store for bulky items and large volume items. A certain number of stores and equipment will always be required to be retained at the individual stations. In a regional setting, with the possibility of standardized equipment and consumables, a central stores program can assist with any potential bulk purchasing program by permitting bulk storage and drawn as required. Thus, creating savings to all.

A central store should be centrally located, be accessible twenty-four hours per day, be secured and environmentally controlled. Central stores would ideally maintain a reasonable supply of fire hoses of varying sizes, replacement PPE, spare SCBA cylinders and a number of SCBA units, Foam supplies both Class A and Class B, fire department uniforms, safety vests, hard hats, firefighting helmets, gloves, fire boots, batteries, helmet lights and flashlights etc. A complete needs analysis would need to be conducted to determine quantities and type of stores that a central facility should warehouse to meet the needs of the region's fire services.

What type of structure could be used or repurposed as a central store facility? An example of repurposing could be as simple as a designated area within a municipal public works maintenance garage which an area could have a caged off area set aside for the fire department with appropriate security measures, or recycle a smaller municipal structure (a replaced fire station) or garage that would allow for the use of a fork lift, one would be needed for the offloading bulk foam and large delivery of fire hose for example.

If a central stores program is to be put into place then appropriate policies and operating procedures will need to be developed and implemented, to cover all aspects of who has control, who manages and who has access, accounting practices, and large volume purchasing procedures.

Summary

In summary, all fire stations require some space for storage of routinely and frequently used supplies and equipment, supplies such as office supplies, washroom supplies, cleaning and maintenance supplies, limited fire hose and SCBA air cylinders to name a few. With the implementation of a central stores it has the ability to reduce operational costs for each station as a result of the ability to purchase and store in bulk. Due to the nature of certain types of materials that would be of a cost saving benefit if purchased in bulk such as firefighting foam, the central stores facility needs to be environmentally controlled. A bulk store also provides a central location for those once and awhile emergencies that require large volumes of supplies, rather than attempting to travel around the region or outside the region with multiple vehicles to acquire what is needed when time is of the essence.

BUDGETS AND FORECASTS

FINANCIAL ANALYSIS AND BUDGET FORECASTS

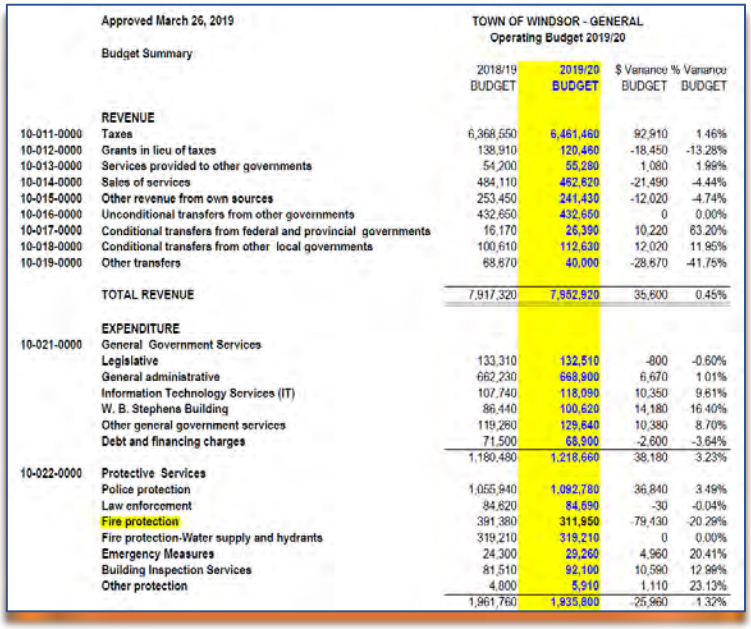
CURRENT ANNUAL OPERATING BUDGET

As part of the fire service review, GA was asked to establish benchmarks for the operational and capital budgets. For this purpose, GA examined the budgets for the years 2016/2017 through to 2019/2020; i.e. 4-years of budgets.

Dealing with two different municipal methodologies and with the budgets of three societies proved somewhat challenging. In the end GA chose to take the West Hants approved budget format for the mentioned years, and fit everything into that format. Even that approach was not entirely consistent as the format changed slightly over the years. As a consequence, not everything may be exactly as the original budget authors understood things to be, but the numbers do balance, with the exception of Windsor. GA was able to draw some relevant conclusions as a starting point for a go forward benchmark estimate of the 2020/2021 and 2030/2031 budgets, as mandated.

As mentioned for Windsor, GA was not able to exactly balance the budget estimates with extracted numbers. For example; in the *2019/20 Windsor Operating Budget and Summaries* (as approved March 29, 2019), under budget line 10-022-0000 (on page 15) the rolled-up budget estimate for Fire Protection is stated as $311,950, as shown in the snapshot.

However, from the budget details on pages 23, 24, 25, and 38 of the same budget documents, the expected cost was slightly more, at $340,460. It was a similar situation for the prior years.



	Approved March 26, 2019	TOWN OF WINDSOR - GENERAL Operating Budget 2019/20			
	Budget Summary	2018/19 BUDGET	2019/20 BUDGET	$ Variance BUDGET	% Variance BUDGET
	REVENUE				
10-011-0000	Taxes	6,368,550	6,461,460	92,910	1.46%
10-012-0000	Grants in lieu of taxes	138,910	120,460	-18,450	-13.28%
10-013-0000	Services provided to other governments	54,200	55,280	1,080	1.99%
10-014-0000	Sales of services	484,110	462,620	-21,490	-4.44%
10-015-0000	Other revenue from own sources	253,450	241,430	-12,020	-4.74%
10-016-0000	Unconditional transfers from other governments	432,650	432,650	0	0.00%
10-017-0000	Conditional transfers from federal and provincial governments	16,170	26,390	10,220	63.20%
10-018-0000	Conditional transfers from other local governments	100,610	112,630	12,020	11.95%
10-019-0000	Other transfers	68,670	40,000	-28,670	-41.75%
	TOTAL REVENUE	7,917,320	7,952,920	35,600	0.45%
	EXPENDITURE				
10-021-0000	General Government Services				
	Legislative	133,310	132,510	-800	-0.60%
	General administrative	662,230	668,900	6,670	1.01%
	Information Technology Services (IT)	107,740	118,090	10,350	9.61%
	W. B. Stephens Building	86,440	100,620	14,180	16.40%
	Other general government services	119,260	129,640	10,380	8.70%
	Debt and financing charges	71,500	68,900	-2,600	-3.64%
		1,180,480	1,218,660	38,180	3.23%
10-022-0000	Protective Services				
	Police protection	1,055,940	1,092,780	36,840	3.49%
	Law enforcement	84,620	84,590	-30	-0.04%
	Fire protection	391,380	311,950	-79,430	-20.29%
	Fire protection-Water supply and hydrants	319,210	319,210	0	0.00%
	Emergency Measures	24,300	29,260	4,960	20.41%
	Building Inspection Services	81,510	92,100	10,590	12.99%
	Other protection	4,800	5,910	1,110	23.13%
		1,961,760	1,935,800	-25,960	-1.32%

It is possible that allocated costs for fire protection have been misinterpreted; i.e. costs allocated to the Windsor Fire Department. That being said, GA continued on with extracted numbers, understanding that the results possibly overstate the actual costs.

For fire services, like any operation-oriented service, costs are of two main components, fixed and variable.

Fixed costs include debt servicing, equipment purchases, staffing, training, and other costs that reoccur on a regular basis. These costs remain relatively constant regardless of the incident activity levels of the fire department. They are based on the established capacity of the fire department. There are always opportunities to reduce fixed costs, and most cost cutting initiatives are and should be aimed at fixed costs.

Variable costs include items like; fuel for the vehicles and motorized equipment, equipment maintenance, wear & tear related depreciation (or destruction), and expendables such as meals and medical gloves. Variable costs change in accordance with the activity levels of the fire department.

Generally speaking, it is difficult to establish cost cutting initiatives on variable costs. Such initiatives, if attempted, tend to actually affect capacity and can create hazardous conditions for responders. For example; an initiative to reduce the use of firefighting foam can reduce the costs of foam purchases, but will definitely increase the extinguishment time and effort required at incidents where foam use is indicated. It may also generate a secondary incident where firefighters have to re-respond to the original incident to deal with a rekindle; and it is likely that the firefighting foam will then be used, to avoid having to return a third time.

One real potential for variable cost savings is to ensure that purchases of materials and equipment that might be expended are good value. Often this means purchasing good quality materials to start with as well as doing group purchasing.

Based on the consultants' experience GA offers the following specific example; in the early 2000's most American fire hose makers decided to source their fire hose production offshore. This reduced their manufacturing costs substantially, although customers did not necessarily see

these savings. Shortly after, it became quickly noticeable that fire hose was not as durable and was being damaged (and no longer serviceable) at a much faster rate, sometimes at the first fire. An investigation into alternatives discovered a Canadian made hose that was marginally more expensive (about 5%) but was extremely durable, and also offered better performance characteristics. This hose was subsequently purchased as the fire department standard, and the annual cost of fire hose replacement decreased.

Annual Operations Budget Analysis

The annual fire department budgets include accounts for the Windsor, Brooklyn, Summerville, and Hantsport fire departments, including the stations in Three Mile Plains (Brooklyn managed) and Vaughan (Hantsport managed). They also include the Walton Shore and Uniacke fire departments; i.e. the West Hants portion of their budgets.

An analysis of the consolidated budgets for the past four years reveals a few trends. These are discussed on the following pages.

Revenue:

			2016-2017	2017-2018	2018-2019	2019-2020	ANALYSIS 4-Year Total	4-Year AVG	3-Year AVG	2-Year AVG	4-Year Trend
	REVENUE										
1	CONTRIBUTION - Hantsport/WH TAX BASE		81,777	0	0	0	81,777				
2	CONTRIBUTION - OPERATIONS GRANT - West Hants		930,442	1,725,925	1,729,501	1,602,941	5,988,809	1,497,202	1,686,122	1,666,221	
3	CONTRIBUTION - GRANTS - East Hants		66,633	66,739	69,417	84,545	287,334	71,834	73,567	76,981	
4	CONTRIBUTION - OPERATIONS GRANT - Kings County		64,400	84,248	57,578	59,955	266,181	66,545	67,260	58,767	
5	CONTRIBUTION - GRANTS - Glooscap		7,064	7,064	7,064	7,065	28,257	7,064	7,064	7,065	
6	CONTRIBUTION - CAPITAL FIRE GRANT - West Hants		37,079	53,650	55,390	188,249	334,368	83,592	99,096	121,820	
7	CONTRIBUTION - CAPITAL FIRE GRANT - Kings County		25,980	26,425	21,540	83,003	156,948	39,237	43,656	52,272	
8	CONTRIBUTION - Grant (SW Society)		43,500	43,500	43,500	27,036	157,536	39,384	38,012	35,268	
9	CONTRIBUTION - Windsor Society (building upgrades)		23,000	22,080	19,830	0	64,910	16,228	13,970	9,915	
10	CONTRIBUTION - Town of Windsor		0	0	0	26,783	26,783				
11	Municipal Costs		0	38,250	31,350	72,600	142,200	35,550	47,400	51,975	
12	Hantsport/Windsor AREA RATE		35,906	34,331	32,863	46,194	149,294	37,324	37,796	39,529	
13	BUILDING RESERVE		22,000	0	0	0	22,000				
14	Surplus (SW)		4,000	6,000	6,000	1,300	17,300	4,325	4,433	3,650	
15	PROVINCIAL FUNDING		39,900	29,630	29,630	29,640	128,800	32,200	29,633	29,635	
16	Donations		2,600	2,600	2,100	5,300	12,600	3,150	3,333	3,700	
17	OTHER - FUNDRAISING/Rent/Auxiliary		76,900	61,085	53,000	40,729	231,714	57,929	51,605	46,865	
18		TOTAL INCOME	1,461,181	2,201,527	2,158,763	2,275,340	8,096,811	2,024,203	2,211,877	2,217,052	
19											
20	Income	NON-WWH Sources Funding:	24.0%	15.6%	14.1%	14.8%					
21	Sources	Donations: % Revenue:	0.2%	0.1%	0.1%	0.2%					
22		Fundraised: % Revenue:	9.8%	5.8%	5.4%	3.0%					

As shown in the above snapshot, over the past three years revenues have been fairly steady, although trending upwards slightly.

There is a caveat about the revenues reported in our analysis. The majority of revenues identified in our spreadsheet originated with West Hants. Revenues for Windsor are not fully accounted in our analysis since it appears that Windsor's fire protection has been largely funded from general revenues and not designated particularly for the fire department.

Windsor did identify relatively small revenues from their *Fire Protection Area Rate* ($27,040 in 2019/20) and from Provincial grants in lieu of taxes, for *Fire Protection Services* ($29,640 in 2019/20). In 2016/17 Hantsport reported a $10k provincial contribution.

In budget years 2016-2018 Windsor also reported a miscellaneous revenue from *own sources* related to *fire department facility upgrades* ($0.0 in 2019/20). This line represents a grant from the Windsor Fire Society for building upgrades.

Expenditures:

Fire department annual expenses were broken into a number of different categories;

- Firefighting Operations,
- Other Operational Expenses,
- Long Term Debt Payments, and
- Capital Expenditures.

Each will be discussed in the following pages.

FIREFIGHTING OPERATIONS

Over the past three years (2017-2019) the trend in this category of expenses has been downward slightly, after an initial sharp rise from the 2016/17 budget year. The following snapshot shows that in 2019/20 the total in this category was $691,937.

		2016-2017	2017-2018	2018-2019	2019-2020		ANALYSIS 4-Year Total	4-Year AVG	3-Year AVG	2-Year AVG	4-Year Trend
24	**EXPENSES**										
25	FIREFIGHTING OPERATIONS										
26	**APPARATUS:**										
27	Regular Maintenance	87,522	108,366	94,466	108,266		398,620	99,655	103,699	101,366	
28	Fuel	40,400	37,700	35,500	47,500		161,100	40,275	40,233	41,500	
29	Major Repairs	28,333	23,664	26,333	27,833		106,163	26,541	25,943	27,083	
30	Annual Safety Inspections	8,669	12,367	11,867	14,867		47,770	11,942	13,034	13,367	
31	EQUIPMENT:	5,500	1,500	0	0		7,000				
32	Insurance	33,033	73,163	79,379	77,853		263,428	65,857	76,798	78,616	
33	**sub-total**	**203,457**	**256,760**	**247,545**	**276,319**		984,081	246,020	260,208	261,932	
34	**EQUIPMENT:**										
35	Personnel Protection	108,051	108,466	108,466	103,924		428,907	107,227	106,952	106,195	
36	Hose/Ladders	23,500	7,000	7,000	7,000		44,500	11,125	7,000	7,000	
37	SCBA Test & Inspections	27,633	29,633	29,333	25,533		112,132	28,033	28,166	27,433	
38	Fire Suppression Equipment	22,500	118,097	110,290	84,240		335,127	83,782	104,209	97,265	
39	Rescue Equipment	11,100	0	12,000	12,000		35,100	8,775	8,000	12,000	
40	Testing Repair & Maintenance	49,000	42,300	42,300	40,500		174,100	43,525	41,700	41,400	
41	Air Equipment	10,567	17,567	22,067	18,667		68,868	17,217	19,434	20,367	
42	Uniforms	0	17,000	12,000	11,500		40,500	10,125	13,500	11,750	
43	Other/Meals for Major Calls	27,800	18,800	8,000	15,750		70,350	17,587	14,183	11,875	
44	**sub-total**	**280,151**	**358,863**	**351,456**	**319,114**		1,309,584	327,396	343,144	335,285	
45	**COMMUNICATIONS:**										
46	Dispatch	38,867	40,307	45,367	41,367		165,908	41,477	42,347	43,367	
47	Pagers/Portable Radios	41,167	38,667	38,667	38,167		156,668	39,167	38,500	38,417	
48	Maintenance & Testing	11,800	10,400	11,700	11,000		44,900	11,225	11,033	11,350	
49	Industry Canada Licenses/Air Time	861	0	0	0		861				
50	Publications/Subscriptions	0	1,660	1,660	1,060		4,380	1,095	1,460	1,360	
51	Other	401	3,675	2,814	4,910		11,800	2,950	3,800	3,862	
52	**sub-total**	**93,096**	**94,709**	**100,208**	**96,504**		384,517	96,129	97,140	98,356	
53											
54	TOTAL FIREFIGHTING OPERATIONS	**576,704**	**710,332**	**699,209**	**691,937**		2,678,182	1,071,273	700,493	695,573	

Included in this category is three groups of expenditures; Apparatus, Equipment, and Communications. Apparatus is specific reference to the costs of operating the fire trucks and associated vehicles. Equipment refers to the many other types of equipment (e.g. fire hose, ladders, breathing air, jaws-of-life, and etc.) that a fire department needs to deliver services. Communications refers to radios, pagers, and associated costs with dispatching.

Peppered throughout this category, in various groups, are certain budget lines that include (but perhaps not exclusively) the purchase of smaller capital items used in firefighting and rescue; such as fire hose, firefighter protective clothing (bunker gear), self-contained breathing apparatus (SCBA) components, rescue rope, and etc. In the budgets, these lines are described as; *equipment* (line 31), *personal protection* (line 35), *hoses/ladders* (line 36), *fire suppression* (line 38), *rescue equipment* (line 39), and *air equipment* (line 41). Similarly, in the communications group *pagers/portable radios* (line 47) contains the costs for replacing these items.

Collectively, the items listed above are small, reoccurring, and minor capital expenses. They occur regularly and are of a relatively small dollar amount for a capital item. In our experience these types of items are considered capital because they are not a typical consumable like fuel or bathroom tissue. They are more durable and can last several years before being replaced. They are usually not durable enough to warrant rehabilitation, like a fire truck or a fire station might be, and in that sense are consumed. Fire hose for example may last 10 years or more depending on how hard it has been used. GA has also seen cases where fire hose was destroyed very shortly after it was purchased and placed in service. There is a recurring need, on an annual basis to make these types of expenditures.

GA recommends that these **Minor Capital** expenditures be treated differently in future budgets and will address this recommendation in the benchmark portion of this analysis.

Under the communications group, *Dispatch* (line 46) includes the approximately $36k annual contracted costs for Valley Communications who dispatches and communicates with the volunteer firefighters via radio.

Line 49, *Industry Canada Licenses/air time*, should include the more than $9k annual cost of federal radio channel licensing, but these costs appear to be included instead in various other places in the budgets, some under line 50. The current amounts being spent are uncertain since not all radios may be individually licensed as required, which is not an un-typical situation.

OTHER OPERATIONAL EXPENSES

This category includes all remaining costs for operating the fire departments, with the exclusion of debt servicing and capital expenditures. The costs for this category shows a downward trend over the past four years. The budgeted amount in 2019/20 is almost 14% lower than the four-year high that was seen in 2017/18.

The category is divided into the following groups; Training, Fire Station, and Administration. Please refer to the snapshot on the following page when making reference to the following discussions.

Training captures the costs of training firefighters in accordance with the fire departments training plan and to the standards agreed in the fire departments' registration documents with the municipality. The line Fire School (line 58) refers to the Nova Scotia Firefighters School (NSFS) in Waverley (HRM). NSFS is the main resource in NS for the provision of qualified training in numerous subjects relating to fire and rescue operations. Many of their programs are geared towards providing certification level instruction. The NSFS also has a field extension component that will deliver training locally.

		2016-2017	2017-2018	2018-2019	2019-2020	4-Year Total	ANALYSIS 4-Year AVG	3-Year AVG	2-Year AVG	4-Year Trend
56	OTHER OPERATIONAL EXPENSES									
57	**TRAINING:**									
58	Fire School Level I	62,133	63,633	65,633	69,133	260,532	65,133	66,133	67,383	
59	Medical First Responder	17,500	12,500	13,500	10,000	53,500	13,375	12,000	11,750	
60	Seminars/Materials	15,267	16,067	16,067	16,767	64,168	16,042	16,300	16,417	
61	Travel/Meals/Etc.	10,333	12,833	12,333	13,333	48,832	12,208	12,833	12,833	
62	Firefighter Honorariums	0	143,000	143,000	150,500	436,500		145,500	146,750	
63	**sub-total**	**105,232**	**248,033**	**250,533**	**259,733**	863,531	215,883	252,766	255,133	
64										
65	**FIRE STATION:**									
66	Light & Power	49,321	54,828	52,053	52,853	209,055	52,264	53,245	52,453	
67	Heating	34,968	33,090	30,590	30,000	128,648	32,162	31,227	30,295	
68	General Maintenance	28,300	34,500	34,300	51,300	148,400	37,100	40,033	42,800	
69	Emergency Equipment	8,700	9,200	9,450	8,950	36,300	9,075	9,200	9,200	
70	Snow Removal/Grounds	24,217	28,972	29,467	38,767	121,423	30,356	32,402	34,117	
71	Janitorial/Cleaning	74,589	93,149	43,089	44,014	254,841	63,710	60,084	43,552	
72	Maintenance/Apparatus Superintendent	0	0	50,000	30,000	80,000			40,000	
73	Renovations/Major Repairs	79,003	81,693	74,193	41,663	276,552	69,138	65,850	57,928	
74	Uniforms	9,500	0	0	0	9,500				
75	Office Furniture/New Construction	5,000	0	0	0	5,000				
76	Insurance	22,613	25,113	13,500	16,000	77,226	19,306	18,204	14,750	
77	Other	152,400	161,660	109,470	85,260	508,790	127,197	118,797	97,365	
78	**sub-total**	**488,610**	**522,205**	**446,112**	**398,807**	1,855,734	463,934	455,708	422,460	
79										
80	**ADMINISTRATION:**									
81	Salary/Benefits	107,900	108,350	61,180	55,123	332,553	83,138	74,884	58,152	
82	Telephone	18,873	19,473	19,773	25,873	83,992	20,998	21,706	22,823	
83	Office Supplies	8,353	10,053	9,953	6,983	35,342	8,836	8,996	8,468	
84	Publications/Subscriptions	2,560	0	0	33	2,593	648	11	17	
85	Membership	1,583	2,083	2,668	2,335	8,669	2,167	2,362	2,502	
86	Legal/Audit Fees	17,500	6,500	32,200	13,950	70,150	17,538	17,550	23,075	
87	Bank Charges/Interest	1,650	1,621	2,080	5,200	10,551	2,638	2,967	3,640	
88	Insurance	37,370	41,835	44,265	48,385	171,855	42,964	44,828	46,325	
89	Uniforms	5,000	0	0	0	5,000				
90	Meals for Major Fires	1,000	0	0	0	1,000				
91	Computer Services	8,917	9,917	12,037	9,617	40,488	10,122	10,524	10,827	
92	Public Events	16,800	15,900	12,600	17,800	63,100	15,775	15,433	15,200	
93	Honourarium	177,000	45,000	45,600	49,600	317,200	79,300	46,733	47,600	
94	Fire Prevention	10,000	8,000	1,100	700	19,800	4,950	3,267	900	
95	Other	41,020	35,031	28,011	31,150	135,212	33,803	31,397	29,581	
96	**sub-total**	**455,527**	**303,763**	**271,467**	**266,749**	1,297,506	324,376	280,660	269,108	
97										
98	**Total Other Operational Expenses**	**1,049,369**	**1,074,001**	**968,112**	**925,289**	4,016,771	1,004,193	989,134	946,701	

Line 62, Honourariums, refers to the volunteer firefighter payments that are funded annually by the municipalities. Over the four-year period some station honourarium accounts were also allocated under line 93 in the Administration group. For a more complete picture the lines need to be added together.

The following chart shows the total honourarium amounts, by station, that have been reported in the last four W/WH annual budgets. Not included is any honourarium, or other compensation, that might have been paid from other sources of income, i.e. not W/WH municipal.

HONOURARIUMS FROM MUNICIPAL BUDGET

Department	Members[80]	2016-17	2017-18	2018-19	2019-20
Windsor	36	$53,000	$45,000	$45,600	$49,600
Hantsport	37	$25,000	$40,000	$40,000	$40,000
South West	16	$4,000	$8,000	$8,000	$10,500
Brooklyn	39	$60,000	$60,000	$60,000	$65,000
TMP	25	$20,000	$20,000	$20,000	$20,000
Summerville	35	$15,000	$15,000	$15,000	$15,000
Uniacke	35	$0	$0	$0	$0
Walton Shore	26	$0	$0	$0	$0
Totals:		**$177,000**	**$188,000**	**$188,600**	**$200,100**

Line 59 refers to the cost of training firefighters to the Medical First Responder (MFR) standard so that they can respond with EHS to medical emergencies in their jurisdictions, under the province-wide MFR program.

The budget group Fire Station includes the usual costs associated with the operation of a building, in this case the six fire stations in W/WH and a number of associated meeting/community halls. Also included are costs for Walton Shore and Uniacke fire departments' buildings.

Line 69, Fire Station – Emergency Equipment, refers to back-up generator maintenance and, in at least one fire department, to maintenance of automated external defibrillators.

Lines 71 and 72 capture the costs of the part-time employees who clean the stations and equipment, and in some stations also do minor maintenance and inspections on firefighters' equipment. The line also includes some costs for cleaning and like supplies.

Line 77, Fire Station – Other, includes some large amounts. The major contributor to this line is the Windsor Fire Department where a share of the overall operating costs of the WB Stevens

[80] The number of members receiving Honourarium varies from year to year. This member number also includes all ranks and positions, some of which are not active firefighters and only receive a nominal amount.

building is allocated to the fire department. Over the four-year period this WFD cost totals to just over $438k, of the line total of almost $509k.

Line 74 Fire Station – Uniforms, line 89 Administration – Uniforms, and line 42 Equipment – Uniforms all contain the costs to provide station and dress uniforms for the volunteer firefighters.

Line 81, Administration – Salary/Benefits, includes the costs of the Windsor Fire Chief and station maintenance person. In 2019/20 a portion of the West Hants fire coordinators salary and benefits were also carried here. Firefighters in Hantsport/SWH and Windsor also have WCB and EAP benefits; the others do not.

Line 92, Administration – Public Events, includes items like an annual awards event that some stations have, and the Santa Clause parade.

LONG TERM DEBT PAYMENTS

The following snapshot summarizes this category.

		2016-2017	2017-2018	2018-2019	2019-2020	ANALYSIS 4-Year Total	4-Year AVG	3-Year AVG	2-Year AVG	4-Year Trend
100	**LONG TERM DEBT PAYMENTS**									
101	Principle	454,040	606,103	605,803	797,627	2,463,573	615,893	669,844	701,715	
102	Interest	118,848	157,213	153,951	169,309	599,321	149,830	160,158	161,630	
103	Long Term Debt	179,266	57,906	107,737	107,737	452,646	113,162	91,127	107,737	
104	**Total Long Term Debt:**	**752,154**	**821,222**	**867,491**	**1,074,673**	3,515,540	878,885	921,129	971,082	

In some budgets this category was broken down into its principal and interest components, in others it was not. The totals in this category, servicing existing debt, are rising with the 2019/20 total ($1.075M) almost 43% above the 2016/17 total.

A snapshot of the West Hants 2019/20 budget, Municipal Fire Budget section, shows some of these payments in more detail. The balance of costs shown in the summary above are tracked in some of the individual station 2019/20 budgets; these snapshots follow.

CAPITAL SERVICING; MUNICIPAL FIRE BUDGET;

Long Term Debt Payments	Projected 2018-2019	Budget 2018-2019	Estimates 2019-2020
Principal - BFD/CC	$ 89,000	$ 89,000	$ 89,000
Term Loan Interest - BFD/CC	$ 29,778	$ 29,778	$ 28,537
Brooklyn Pumper Principal	$ 74,000	$ 74,000	$ 74,000
Brooklyn Pumper Interest	$ 12,378	$ 12,378	$ 11,453
Summerville Pumper Principal	$ 40,000	$ 42,200	$ 42,200
Summerville Pumper Interest	$ 10,501	$ 10,501	$ 9,770
Aerial Truck Principal	$ 80,000	$ 80,000	$ 80,000
Aerial Truck Interest charges	$ 24,986	$ 24,986	$ 23,986
Fire Transition MFC Principal	$ 193,603	$ 193,603	$ 193,682
Fire Transition MFC Interest	$ 35,821	$ 35,821	$ 34,176
TMP Fire Station RBC Principal	$ -	$ 60,000	$ 49,944
TMP Fire Station RBC Interest	$ 20,149	$ 25,245	$ 39,783
Long Term Debt Payments	*$ 610,216*	*$ 677,512*	*$ 676,531*

CAPITAL SERVICING; HANTSPORT;

Long Term Debt Payments			
Hantsport Pumper Principal	$ 25,000	$ 25,000	$ 25,000
Hantsport Pumper Interest	$ 6,075	$ 6,075	$ 4,412
Fire Truck Chassis Principal	$ 17,500	$ 17,500	$ 17,500
Fire Truck Chassis Interest	$ 4,355	$ 4,355	$ 4,051
Truck Box Principal (Area Rate)	$ 20,000	$ 20,000	$ 12,500
Truck BoxInterest (Area Rate)	$ 4,000	$ 4,000	$ 1,436
Fire Hall Roof Principal (Area Rate)	$ 4,500	$ 4,500	$ 4,500
Fire Hall Roof Interest (Area Rate)	$ 812	$ 812	$ 718
Fire Hall Principal	$ -	$ -	$ 192,801
Fire Hall Interest	$ -	$ -	$ 8,676
Breathing Apparatuses Principal	$ -	$ -	$ 16,500
Breathing Apparatuses Interest	$ -	$ -	$ 2,311
Total Long Term Debt Payments	*$ 82,242*	*$ 82,242*	*$ 290,406*

CAPITAL SERVICING; SUMMERVILLE;

Long Term Debt Payments	$ -	$ -	$ -
Total Fire Service Operations	**$ 268,844.33**	**$ 208,000.00**	**$ 205,500.00**
Capital & Reserve Expenses			
Long Term Debt - New Tanker	$ 43,902.56	$ 50,000.00	$ 50,000.00
Long Term Debt - New Pumper	$ -	$ -	$ -
Payout - Credit Union Loan	$ -	$ -	$ -
Capital & Reserve Expenditures Sub Total	*$ 43,902.56*	*$ 50,000.00*	*$ 50,000.00*

CAPITAL SERVICING; WALTON SHORE;

Long Term Debt Payments	*$ 2,430*	*$ 5,832*	*$ 5,832*	Add on structure to building

CAPITAL SERVICING; BROOKLYN;

No details.

Long Term Debt Payments	*$ 44,000*	*$ 44,000*	*$ 44,000*

CAPITAL SERVICING; UNIACKE;

No details.

Long Term Debt Payments	*$ 6,000*	*$ 7,905*	*$ 7,905*

There was no long-term debt servicing shown for Windsor; i.e. that was specifically earmarked for the fire department.

CAPITAL EXPENDITURES ROLL-UP

The following snapshot summarizes this category.

		2016-2017	2017-2018	2018-2019	2019-2020	ANALYSIS 4-Year Total	4-Year AVG	3-Year AVG	2-Year AVG	4-Year Trend
110	CAPITAL EXPENDITURES									
111	Capital expense current year	123,000	184,285	49,135	14,540	370,960	92,740	82,653	31,838	
112	Accumulated Capital	6,097	0	0	0	6,097				
113	Pay Out Credit Union Loan	4,500	0	0	0	4,500				
114	RESERVES/Misc. Capital	81,000	77,000	28,810	14,110	200,920	50,230	39,973	21,460	
115	**Total Capital Expenditures**	**$ 214,597**	**$ 261,285**	**$ 77,945**	**$ 28,650**	582,477	145,619	122,627	53,298	

The expenditures on capital projects appear to have sharply declined in the past two years, at least in comparison to the amounts in the prior two years.

Roll-Up of Expenses

The following snapshot shows a roll-up of the total expenses associated with the annual operations of the fire service in W/WH. The numbers are based on the approved budget estimates for West Hants and for Windsor, as approved by Councils in the indicated budget years.

		2016-2017	2017-2018	2018-2019	2019-2020	ANALYSIS 4-Year Total	4-Year AVG	3-Year AVG	2-Year AVG	4-Year Trend
24	**EXPENSES**									
25	FIREFIGHTING OPERATIONS									
26	APPARATUS:	203,457	256,760	247,545	276,319	984,081	246,020	260,208	261,932	
34	EQUIPMENT:	280,151	358,863	351,456	319,114	1,309,584	327,396	343,144	335,285	
45	COMMUNICATIONS:	93,096	94,709	100,208	96,504	384,517	96,129	97,140	98,356	
54	TOTAL Firefighting Operations:	576,704	710,332	699,209	691,937	2,678,182	1,071,273	700,493	695,573	
56	OTHER OPERATIONAL EXPENSES									
57	TRAINING:	105,232	248,033	250,533	259,733	863,531	215,883	252,766	255,133	
65	FIRE STATION:	488,610	522,205	446,112	398,807	1,855,734	463,934	455,708	422,460	
80	ADMINISTRATION:	455,527	303,763	271,467	266,749	1,297,506	324,376	280,660	269,108	
98	TOTAL Other Operational Expenses:	1,049,369	1,074,001	968,112	925,289	4,016,771	1,004,193	989,134	946,701	
99										
100	LONG TERM DEBT PAYMENTS									
104	Total Long Term Debt:	752,154	821,222	867,491	1,074,673	3,515,540	878,885	921,129	971,082	
105										
106	TOTAL FIRE SERVICE OPERATIONAL EXPENSES	$ 2,378,227	$ 2,605,555	$ 2,534,812	$ 2,691,899	10,210,493	2,552,623	2,610,755	2,613,356	
107										
110	CAPITAL EXPENDITURES									
115	Total Capital Expenditures:	$ 214,597	$ 261,285	$ 77,945	$ 28,650	582,477	145,619	122,627	53,298	
116										
117	TOTAL PROJECTION / BUDGET / ESTIMATE	$ 2,592,824	$ 2,866,840	$ 2,612,757	$ 2,720,549	10,792,970	2,698,243	2,733,382	2,666,653	

The above costs also include financial assistance to Walton Shore VFD and to Uniacke and District VFD; in exchange for their provision of firefighting and rescue services in defined areas of West Hants.

The roll-up totals do not include the associated costs with fire-inspections, which are currently the responsibility of the West Hants building officials in the Planning and Development Department, and are understood to be cost shared with Windsor.

The Planning and Development department Building Inspection notes in the West Hants **2019/20** approved budget book (page 31) comments on this arrangement as shown on the following snapshot from the budget book;

BUILDING INSPECTION BUDGET HIGHLIGHTS:

2018-19 Building Inspection Budget Highlights

- The 2018-19 budget included the addition of a full-time Fire Inspector/ Building Official. Staff hired to fill this position could not be retained at the salary offered. This position has been removed for the 2019-2020 fiscal year as the Consolidation legislation prohibits offering a position past March 31, 2020.
- In November of 2018, the Windsor Building/Fire Official began working for West Hants half-time under the service agreement; in April of 2019, West Hants will provide full Building/Fire Inspection services to Windsor under the service agreement. At this point West Hants will again be one full inspector short of requirements.

No breakdown is provided on the portion of inspector costs that might be associated with fire-inspector duties. The Building Inspection budget is provided on page 81 of the West Hants approved 2019/20 budget book.

BENCHMARK FOR FUTURE BUDGETS

Annual Operations Budget Benchmark

The following is the recommended benchmark operations budget, starting in year 2020. A number of pre-existing accounts have been combined and moved to better reflect their relationship to the budget category. The benchmark budget is presented in sections with discussion.

It should be noted that 2020/21 is a transition year and that through the consolidation period the expenditures may not match the benchmark budget. There has been no accounting for extraordinary transition costs nor reduction taken for partial year expenditures that might not fully mature in the budget year. The benchmark budget assumes none of the above costs or reductions. It is based on full year costs in a non-consolidation year.

Revenues

Revenue from area rates, general revenues, own sources, etc. have not been estimated. The new regional municipality will likely be harmonizing and adjusting these sources.

	BENCHMARK OPERATIONS BUDGET		PROPOSED	$ INC/(DEC)	+/-	NOTES
		2019-2020	2020-2021	ref 2019-2020	%	
	REVENUE					
1	CONTRIBUTION - Hantsport/WH TAX BASE	0				
2	CONTRIBUTION - OPERATIONS GRANT - West Hants	1,602,941				
3	CONTRIBUTION - GRANTS - East Hants	84,545	84,600	55	0%	Brooklyn services ($52K) to South Rawdon,+ EH share of WSFD
4	CONTRIBUTION - OPERATIONS GRANT - Kings County	59,955	60,000	45	0%	
5	CONTRIBUTION - GRANTS - Glooscap	7,065	7,065	0	0%	
6	CONTRIBUTION - CAPITAL FIRE GRANT - West Hants	188,249				
7	CONTRIBUTION - CAPITAL FIRE GRANT - Kings County	83,003	83,000	(-3)	-0%	
8	CONTRIBUTION - Grant (SW Society)	27,036				
9	CONTRIBUTION - Windsor Society (building upgrades)	0	-			
10	CONTRIBUTION - Town of Windsor	26,783				
11	Municipal Costs	72,600				
12	Hantsport/Windsor AREA RATE	46,194				
13	BUILDING RESERVE	0				
14	Surplus (SW)	1,300				
15	PROVINCIAL FUNDING (Windsor "Fire Protection")	29,640	29,600	(-40)	-0%	
16	Firefighters 50% co-pay; off-duty AD&D benefit		6,270	6,270		Principal benefit amount is $200,000
17	Donations	5,300				
18	OTHER - FUNDRAISING/Rent/Auxiliary	40,729				
19	TOTAL INCOME:	2,275,340	270,535			
24						

There is also an opportunity for additional revenue generated from cost-recovery fees. These are not shown in the above budget benchmark.

GA's analysis shows that almost 10% of the approximately 3,640 incidents that W/WH fire departments responded to, and that occurred from January 2, 2014 to August 5, 2019 (5-½ years), were responses to Highway 101 or to its interchanges. This trend[81] is increasing.

GA recommends that the new Regional Municipality implement service fees for reasonable cost recovery to highway responses.

Such fees are permitted by legislation. The Insurance[82] Act, §107B(7) states;

> "For greater certainty, nothing in this Section prevents a fire department from making a claim for costs incurred in responding to a motor vehicle accident."

[81] Responses to Hwy-101: 2014 (45), 2015 (47), 2016 (68), 2017 (64), 2018 (81), and 2019 (54 in period Jan-July).

[82] Nova Scotia, Insurance Act, R.S., c.231, s.1.

In Ontario, the province has a program to reimburse fire departments at a rate of $465.42/hour, per fire truck (maximum 3 trucks). Ontario fire departments can also opt out of the provincial program and charge drivers directly for higher costs. The insurance companies typically pay the fees. At Ontario rates, W/WH might have collected[83] (2-truck response) as much as $330k, over the mentioned period.

In Newfoundland & Labrador, the Province reimburses fire departments for responses outside municipal boundaries. As stated in the Province's 2015/16 annual report,[84] they paid $65,050 for 133 incidents (average 489.10 per incident). At NL rates, W/WH might have collected $175.6k.

GA recommends that the new Regional Municipality identify suitable services, and implement cost-recovery fees for these services. The rationale is that although the costs for basic fire protection and rescue services are paid by all residents through their property taxes/area rates, some services are only provided to a few residents and usually for their own benefit, not to the general welfare. An example is the application for a liquor license; which requires a fire inspection where the applicant is the main beneficiary of the license and the municipality is essentially subsidizing this process.

Under §49 of the *Municipal Government Act*,[85] the Municipality has the power to make policies for the setting of fees to be paid for inspections, permits, applications, approvals pursuant to a by-law or legislation. Also, under §79 of the *Act*, the Municipality has the power to prescribe charges for the provision of services.

Some examples of eligible services where cost-recovery fees might be appropriate could include the following;

- Fire inspection of occupancy on request
- Liquor license inspection
- Inspection for occupancy load certificate

[83] Realistically, it is unlikely there would be a 100% collection rate. It is also suggested that fees only be applied to non-resident service recipients.

[84] Fire and Emergency Services-Newfoundland and Labrador, 2015-16 Annual Report, page 16.

[85] Nova Scotia, Municipal Government Act. 1998, c. 18, s. 1

- Inspection of day-care centre
- Mobile food/beverage truck inspections
- Tent and special occasion inspections
- Response to provincial highways (non-residents)
- Inspection of trade shows and other special events
- Municipal open-fire (burning) permits
- Fire extinguisher training
- Request for smoke or carbon monoxide alarm installation
- Request for report on a fire incident (usually related to an insurance claim)
- Request for assistance in review of plans and/or development consultation (hourly rate)
- Incurred extraordinary costs as a result of an incident (e.g. excavation/demolition equipment, security, fencing, investigation, damage to infrastructure, environmental abatement, and etc.)
- Paid duty (e.g. standby for hot-work)
- False-alarm responses (preventable and excessive)

GA recommends that the municipality pursue prosecution and seek fines for violations of the Fire Code, in accordance with the provisions in the *Fire Safety Act*.

Expenses

FIREFIGHTING OPERATIONS:

This category includes the same three groups as in the historical budgets. Some changes in budget line details are suggested from those prior budgeted amounts. The budget notes opposite each item briefly explain the reasons for changes. Further discussion on selected budget line items follows on the next few pages.

				PROPOSED	$ INC/(DEC)	+/-	NOTES
			2019-2020	2020-2021	ref 2019-2020	%	
25	**EXPENSES**						
26	**FIREFIGHTING OPERATIONS:**						
27	**APPARATUS:**						
28		Regular Maintenance	108,266	115,000	6,734	6%	Vehicles are aging and require more maintenance. Some annual and semi-annual inspection and testing is not currently being done.
29		Fuel	47,500	42,000	(-5,500)	-12%	Implement fuel saving program, eliminate unneeded idling
30		Major Repairs	27,833	30,000	2,167	8%	Increase to get Brooklyn E1 serviceable, designate as a reserve pumper
31		Annual Safety and Functional Inspections	14,867	14,000	(-867)	-6%	Legislated. Need to increase inspections to annual major and semi-annual minor
32		**sub-total:**	**198,466**	**201,000**	2,534	1%	
33	**EQUIPMENT:**						
34		SCBA Testing and Servicing	25,533	35,000	9,467	37%	Legislated: All SCBA, PPE, must be inspected and tested annually. Implement an annual fit-testing program for all firefighters.
35		Testing, Maintenance, & Repair	40,500	52,000	11,500	28%	Legislated: All fire hose must be tested annually. Standards requires testing of ladders, appliances annually.
36		Other	15,750	14,000	(-1,750)	-11%	Reduce unspecified other amounts
37		**sub-total:**	**81,783**	**101,000**	19,217	23%	
38	**COMMUNICATIONS:**						
39		Dispatch Services	41,367	40,000	(-1,367)	-3%	Valley Communications ($36,053.33 annual) Contract expires June/2020
40		Radio Testing, Maintenance, & Repair	11,000	25,440	14,440	131%	Radio equipment maintenance contract ($120/radio)
41		Pager Testing, Maintenance, & Repair		4,000			Pager servicing, approximately 20 per yr @ $200
42		**sub-total:**	**52,367**	**69,440**	17,073	33%	
43							
44		**TOTAL Firefighting Operations:**	**332,616**	**371,440**	38,824	12%	

Regular Maintenance: Repairs and maintenance should be done in accordance with the requirements in NFPA-1911[86], which is the industry benchmark and best practice. A certified Emergency Vehicle Technician should be servicing all the firefighting related components on the apparatus. The standard also requires certain testing be done annually, and different levels of condition assessments be done semi-annually. Not all fire apparatus is currently be inspected and tested to meet the standard.

[86] National Fire Protection Association; NFPA-1911, Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles.

GA recommends that one qualified and experienced fire apparatus maintenance service provider do all the servicing on all fire fleet vehicles.

Annual Safety and Functional Inspections: This is closely related to the regular maintenance of the fire apparatus. Safety inspections are mandated by the Province. Functional Inspections are done by a third-party fire apparatus inspector and these inspections verify/certify the condition of the powertrain, pump, foam system, and aerial ladder device; and that these components continue to meet their certified performance capabilities. Not all fire apparatus is currently being annually functional inspected by a third-party expert as is required.

SCBA Testing and Servicing: NS occupational health and safety legislation requires annual testing of all breathing equipment, and fit-testing of all persons who will be required to wear this equipment. Not all firefighters are being fit-tested and it is not clear that all equipment is being properly annually tested. A rigorous program is needed to ensure compliance. Increased costs are anticipated in meeting the regulations.

Equipment, Testing Maintenance and Repair: NS occupational health safety and safety legislation requires the annual inspection and testing of all fire hose and associated appliances in accordance with NFPA-1962[87]. It appears that this is not being done. Legislation also requires the annual inspection and testing of all ground-ladders[88] in accordance with NFPA-1932[89]. Neither of these inspection regimes is being consistently undertaken. Increased costs are anticipated in meeting the regulations.

Dispatch Services: The two contracts with Valley Communications expire in June 2020. A new contract will establish the final cost of this service.

[87] National Fire Protection Association; NFPA-1962, Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances.

[88] There are two basic categories of ladders used by the fire services. Aerial ladders are powered and mounted to a vehicle. Ground ladders are set on the ground and leaned against the structure. Ground ladders fall into many types (extension, roof, stay-pole, folding, combination, and etc.), but collectively all are called ground-ladders.

[89] National Fire Protection Association; NFPA-1932, Standard on Use, Maintenance, and Service Testing of In-Service Fire Department Ground Ladders.

Radio Testing Maintenance and Repair: The cost of purchasing radios, pagers, and associated batteries has been moved to Minor Capital. What remains is the cost of an annual service contract for the testing and maintenance of mobile, portable, repeater, and base station radios.

Pager Testing Maintenance and Repair: The cost of maintaining pagers is stated in its own budget line. Pager maintenance can either be done on a parts and labour basis or through a flat rate per pager repair service contract. The flat rate is generally more economical. Previous experience indicates that approximately 10% of pagers will need servicing in any given year.

OTHER OPERATIONAL EXPENSES

This category contains the same four groups as historical budgets. Some changes are suggested from the prior budgeted amounts. The budget notes opposite each item briefly explains the reasons.

				PROPOSED	$ INC/(DEC)	+/-	NOTES
			2019-2020	2020-2021	ref 2019-2020	%	
46	**OTHER OPERATIONAL EXPENSES:**						
47	**TRAINING:**						
48		Fire School	69,133	60,000	(-9,133)	-13%	NS Firefighter School (Waverley), third-party training, conventions and conferences
49		Medical First Responder Program	10,000	10,000	0	0%	MFR program in support of EHS
50		Seminars/Training Materials	16,767	16,000	(-767)	-5%	In-house training costs, reference/student materials
51		Travel/Meals/Misc Expenses	13,333	12,000	(-1,333)	-10%	Associated costs
52		**sub-total:**	**109,233**	**98,000**	(-11,233)	-10%	
53	**FIRE STATION:**						
54		Light & Power	52,853	52,000	(-853)	-2%	8 fire stations
55		Heating	30,000	32,000	2,000	7%	8 fire stations
56		General Maintenance	51,300	37,000	(-14,300)	-28%	General Maintenance of facilities (8 stations), water costs
57		Emergency Equipment M&R	8,950	9,000	50	1%	Backup Generator maintenance
58		Snow Removal/Grounds Keeping	38,767	31,000	(-7,767)	-20%	Competitive contract needed
59		Renovations and Large Repairs	41,663	35,000	(-6,663)	-16%	Unknown what is needed here, majority of costs is WFD share of Stephens building
60		Other	85,260	85,000	(-260)	-0%	Majority of this cost is WFD allocated share of the Stephens building
61		**sub-total:**	**308,793**	**281,000**	(-27,793)	-9%	

Fire School: Previously this category was termed Fire School Level I which was a misnomer. Courses taken at the Fire School include more than Level I, so the name has been changed to include all Fire School and third-party sourced training. Costs and travel are anticipated to be lower if the Fire School extension courses are used to bring more training to the Region instead of firefighters traveling to Waverley as often.

GA has not audited the current Fire School costs but would not be surprised if they also contain the cost of conventions and conferences, and other similar professional development events, since there is no pre-existing budget line for these items. If correct, then these costs should be broken out in future budgets for better tracking.

General Maintenance: The maintenance costs for the Windsor fire station are not broken out but are instead provided as a percentage of the entire WB Stephens building.

GA recommends that a better understanding be undertaken on Windsor fire station actual costs as part of a possible justification for a new facility. Water costs for serviced stations (Windsor, Hantsport) do not have a separate budget line and are therefore unknown.

Snow Removal/Grounds Keeping: It may be possible to reduce these costs by use of Regional staff and/or a negotiated contract for all fire/regional facilities that will lower costs.

Renovations and Large Repairs, and *Other*: These budget lines are significantly driven by the allocated costs for the Windsor fire station. The comment made under the General Maintenance budget line applies here as well.

ADMINISTRATION:

			2019-2020	PROPOSED 2020-2021	$ INC/(DEC) ref 2019-2020	+/- %	NOTES
62	**ADMINISTRATION:**						
63		Salaries: Full-Time, Part-Time	129,137	517,260	388,123	301%	Director/Chief (FT), Assistant Chief (FT), Admin Assist (FT), Inspector (1.5 FT), Div Chief (.75 PT), Stn Mtce (3.75 PT), Investigators (20% PT)
64		Benefits: Full-Time, Part-Time		94,784			25% of FT salary, 7.5% of PT
65		Volunteer Firefighter Honourarium	200,100	225,000	24,900	12%	Harmonization may increase costs
		Volunteer Benefits (WCB, AD&D, MFAP, off	48,385	85,146	36,761	76%	Volunteer WCB ($291.4x190); VFIS ($30k) for $200 AD&D, MFAP, 24/7 coverage for 100 ffs at $114, 50% copay.
66		Telephone	25,873	22,000	(-3,873)	-15%	Corporate phone rate?
67		Industry Canada Radio Licenses	1,060	9,400	8,340		Collected from various accounts. Fully licensed
68		Radio Lease (TMR), Cell Phones	38,167	38,000	(-167)	-0%	Radio lease (TMR $5000), and pager leasing, cell phone costs (details unknown).
69		Office Supplies	6,983	8,000	1,017	15%	Supply through corporate accounts
70		Publications/Subscriptions	33	2,000	1,967		NFPA subscription for the Fire Department
71		Memberships Professional Assn's	2,335	2,200	(-135)	-6%	FIANS ($350), FSANS ($40x8), CAFC ($280), NFPA ($225), CAFI ($550 for 10 members), MFCA ($50),
72		Legal/Audit fees	13,950	12,000	(-1,950)	-14%	Do not know what is currently in this account for highly variable historical value. There will be title search costs, prosecutor costs, court costs, society auditor fees
73		Bank fee/Interest	5,200	2,500	(-2,700)	-52%	Society costs. Benefits to a negotiated single provider?
75		Insurance: Liability/Fire/Theft/3rd Party	16,000	16,000	0	0%	Corporate 3rd party insurance, fire & theft. Fire Department individual liability insurance, fire & theft. Is there overlap currently?
76		Insurance: Vehicles	77,853	70,000	(-7,853)	-10%	Corporate fleet insurance should reduce costs. Coverage should be examined. Own risk/deductible can reduce costs
77		Computers and Software	14,527	10,000	(-4,527)	-31%	Includes software costs for I am Responding ($800pa)
78		Public Events	17,800	15,000	(-2,800)	-16%	Annual honours and service awards event. Parades
79		Fire Prevention	700	4,000	3,300	471%	Fire Prevention Week blitz, smoke alarm program
80		Other	31,150	30,000	(-1,150)	-4%	Has included WCB in past. This has been a catch-all account. Contents unknown. Costs need to be redistributed to specific accounts.
81		**sub-total:**	**629,253**	**1,163,290**	534,037	85%	

Salaries: Full-Time, Part-Time: All salaries for recommended positions associated with *Organizational Option #3* appear on this line as indicated in the budget notes. Currently there are staffing costs that includes the Windsor fire chief, a number of part-time maintenance staff who continue to work at the various fire stations in W/WH, and 1.5 fire-inspectors currently with Planning and Development. Please see **ORGANIZATION AND STAFFING** starting on page **83** for a full discussion on GA's recommendation for staffing.

Volunteer Firefighter Honourarium: GA is recommending that a fair and equitable honourarium policy be established that applies to all volunteer firefighters across the Region. The chart shown on page **295** suggests that the past practice may not be equitable.

GA recommends that a fair and equitable honourarium policy be established that applies to all volunteer firefighters across the Region.

Volunteer Benefits: This is a new budget line. It covers the cost of recommended volunteer firefighter benefits, some of which are available now to some of the firefighters, but not all, and there currently is variability in the amount of benefit provided.

GA recommends that the following benefits be provided by the municipality to all volunteer firefighters; Provincial Workers Compensation Benefits ($62k insured amount), VFIS AD&D and disability coverage ($200k on-duty principal amount, disability weekly $700 maximum), VFIS MFAP (member and family assistance program for mental health), VFIS 24/7 (off-duty accident and sickness, 50/50 co-pay with firefighter who subscribes).

Industry Canada Radio Licenses: There are federal fees associated with the use of the radio spectrum in Canada. The annual fee for portable and mobile radios is $40.80 per radio. Currently the fire departments in the region have 161 VHF radios and 38 TMR radios that require licensing. The annual fee for base stations and repeaters is $52.80 per frequency, meaning the minimum annual fee is $105.60, and likely more since every channel adds this amount to the fee, and W/WH fire departments use six VHF channels. It is our understanding there are 6 bases and 3 repeaters in W/WH.

It was not possible to identify the current costs for radio licensing since these costs were not broken out of the various places in the budget that they appeared to have been included. The benchmark budget calculates the costs based on known numbers of current radios.

TMR portable/mobile radios that were provided (seeded) to the fire departments by the province do not require licensing. That is provided by the province. Currently the fire departments have 54 seeded radios.

Radio Lease: The fire departments currently own an additional 38+/- TMR radios; in addition to those provided by the province. The annual access fee for using these on the TMR system is $120 per radio (approximate annual total $4,560). Also included is cell and pager lease costs. The details of these are unknown and should be examined for need and costs.

Memberships: It is important for the fire service to network and keep abreast of developments in the industry, many of which deal with developing liability and health/safety issues. Membership

in some key organizations is recommended: FIANS Fire Inspectors Association of Nova Scotia, FSANS Fire Services Association of Nova Scotia, CAFC Canadian Association of Fire Chiefs, NFPA National Fire Protection Association, CAFI Canadian Association of Fire Investigators, MFCA Maritime Fire Chiefs Association.

Legal Audit fees: This budget line likely previously included costs associated with the fire departments annual financial audit. Now included in this benchmark budget is costs related to issuing Orders and swearing of information/summons under the Fire Prevention Act related to Fire Code enforcement (for example; title searches, summons servers, prosecution services).

Insurance Vehicles: A corporate fleet coverage policy for all fire fleet/municipal fleet vehicles could secure savings vs several policies.

GA recommends that an insurance specialist be hired to review insurance policies and coverage options in order to prepare an RFP that obtains needed/desired coverage at best value. Self-insurance (i.e. deductible) risk assessments should be considered.

Computers and Software: Computer services are averaging over $10k annually. GA is uncertain if this is good value. Now included in this line is the annual subscription rate for "IamResponding" which is software/application that allows the volunteer firefighter to use their smart-phone to advise that they are responding to the incident. This is useful information for the incident commander and station officers.

Fire Prevention: Basic fire prevention activities has traditionally been done at the local level. Further support for these activities is needed and encouraged.

Administration; Other: Not all stations are contributing to this budget line, however some are contributing between 10% and 20% of their administration budget and one up to 40%. Fire departments should be encouraged to better discriminate funding needs.

Minor Capital Expense Needs

A review of the inventory of Minor Capital equipment in the fire departments of W/WH indicates there is a need to replenish a portion of these items on an annual basis. These items do not include large capital assets such as vehicles, buildings, and other long lasting and higher-dollar capital projects. They are instead smaller-cost, semi-durable, assets that would be counted in an assessment of current assets, but are on the other-hand of relatively short life span (less than +/-15 years) and of relatively low cost. This subject is first discussed on page **254** of this chapter.

A four-year average of recent W/WH expenditures on Minor Capital projects is $243,625 and this amount has been declining, with the 2019/20 contribution below the average.

GA recommends that expenditures on minor capital equipment be increased since they are currently below sustainable service-requirements.

						ANALYSIS			
		2016-2017	2017-2018	2018-2019	2019-2020	4-Year Total	4-Year AVG	3-Year AVG	2-Year AVG
82	MINOR CAPITAL:								
83	Fire/Rescue Equipment, PPE	181,218	252,630	259,823	225,831	919,502	229,875	246,095	242,827
84	Uniforms	14,500	17,000	12,000	11,500	55,000	13,750	13,500	11,750
85	**sub-total:**	**195,718**	**269,630**	**271,823**	**237,331**	974,502	243,625	259,595	254,577

GA recommends that the need for the purchase of minor capital items be evaluated on the basis of the required inventory of items (e.g. how many 2½-inch fire hoses are needed) and each items' expected life-span. Such an evaluation would reveal the needed replacement rate for all such items. Coupled with their current individual costs, it is possible to calculate an average minor capital expenditure demand for budgeting purposes. This analysis has been done; please see **Details of Minor Capital** starting on page **275**.

One of the big benefits of this annual minor capital replacement concept, for management and Council, is it facilitates a steady budget contribution on an annual basis, and thereby avoids a substantial increase in one budget year, to address a critical shortfall in equipment, followed by a corresponding drop the following year, an undesirable cycle that can be avoided.

For a specific example, firefighter protective clothing (PPE) costs about $2,000 per firefighter and has a maximum lifespan of 10 years, some components much less (e.g. gloves). There is a need to replace some of this every year to provide PPE for new firefighters and to replace expired or damaged gear. Largely, this is a very dynamic challenge and difficult to accurately plan.

There are two possible strategies to approach the need to replace PPE. One is to allow the demand for replacement/new PPE to build up as the current equipment is destroyed/ages, and also as new firefighters join; then apply through the budget process for a substantial capital budget item to replace large portions or all of the 190+/- sets needed. To replace all sets would cost approximately $380k, and would have to be approved as a first priority. The consequences of this strategy are a steady reduction in service as current gear expires or is no longer useable, and/or an increase in firefighter risk (municipal liability) as their PPE no longer does its job.

GA recommends that a number of bunker gear sets be purchased annually. Blanket purchasing contracts should be signed that permit the fire department to purchase/requisition annually, say over a 5 or 7-year period, estimated maximum/minimum numbers of firefighters' PPE components, at agreed prices. This strategy allows the fire department to quickly react to unplanned changes in the status of their critical PPE inventory and immediately take pre-approved action to address the need. It also smooths out large variations in the annual budgeting process.

The above recommended strategy should be applied to all minor capital equipment in the fire department. The same needs and advantages would apply.

DETAILS OF MINOR CAPITAL RECOMMENDATIONS

The spreadsheet analysis, that starts on the following page, shows the scope of minor capital needs and the annual estimated costs of applying the above recommended strategy. The spreadsheet shows ten years of projected spending, starting in the year 2020.

MINOR CAPITAL PAGE 1:

The following is an explanation of what is in this workbook,

- Column D is the life expectancy, in years, of the particular item.
- Column E is the recommended inventory, of the particular item, that the six W/WH fire stations should collectively have in service.
- Column F is the estimated individual cost of each item. Pricing may vary from that noted, and often better pricing is available when obtaining quotations from competing vendors for the same item, especially when group purchasing of standardized equipment, as a Region.
- Column G is the recommended quantity that, on average, should be purchased annually for each item. It is largely based on the inventory divided by the service life.
- Under each year column is a number opposite the items. These are the annual numbers of that item that GA proposes be purchased in that year. Some items are grouped in the same year, for example lines 53-56, because these items when purchased together form a system and will attract better pricing if purchased that way.

Annual Minor Capital Needs: (20-year projected)

A	B	C	D	E	F	G	Annual Average cost (2020 - 2039): $					316,160		+/- vs avg: Surplus / (-Deficit)		
	Station:	ALL STATIONS, REGION-WIDE			Estimated YEAR 2019 Costs for Items	+/- avg:	(-$27,160)	(-$10,900)	(-$6,660)	(-$920)	$4,136	$2,100	(-$5,260)	$3,800	(-$40,980)	$8,496
	2019 dollars					Annual $:	343,320	327,060	322,820	317,080	312,024	314,060	321,420	312,360	357,140	307,664
	Class	Item	Life	INV	Unit Cost	Ann'l QTY	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
1	Respiratory:	SCBA Paks (Scott X3, 4.5, no botttle)(6	15	97	$ 6,500	6.5	7	6	7	6	7	6	7	6	7	6
2		SCBA Bottles (30 min, 4.5, carbon)	15	204	$ 1,600	13.6	13	14	13	14	13	14	13	14	13	14
3		SCBA Masks (AV-3000HT spares)	15	107	$ 600	3.2	3	3	3	3	3	3	3	3	3	3
4		PAPRs	7	4	$ 1,200	0.6	2	2						2	2	
5		Fit Tester	15	1	$ 17,000	0.1		1								
6		Cascade Bottles	15			0.0										
7		PASS Alarms (not integrated)	15			0.0										
8		Air Pak upgrade Kits	15	40	$ 3,000	2.7	3	3	3	3	3	3	3	3	3	3
9																
10					Class Sub-TOTAL:		79,500	91,600	77,100	72,200	77,100	72,200	77,100	74,600	79,500	72,200
11	Firefighting:	Ground Ladders, 40'	25	2	$ 2,100	0.1										1
12		Ground Ladders, 35'	25	6	$ 1,800	0.2					1					1
13		Ground Ladders, 24'	25	17	$ 1,300	0.7		1		1		1		1		1
14		Ground Ladders, 14'	25	34	$ 600	1.4			2			2			2	
15		1-1/2" hose (forestry, Mercedes Firebr	10	50	$ 225	5.0	5	5	5	5	5	5	5	5	5	5
16		1-3/4" hose (Kraken EXO, 50')	10	300	$ 325	30.0	30	30	30	30	30	30	30	30	30	30
17		2-1/2" hose (Kraken EXO, 50')	10	300	$ 460	30.0	30	30	30	30	30	30	30	30	30	30
18		3" hose	10	0												
19		4" hose (legacy)	10	0	$ 1,000											
20		5" hose (Mercedes MegaFlo, 100')	15	180	$ 1,150	12.0	12	12	12	12	12	12	12	12	12	12
21		Hard Suction Hose, 6"	25	26												
22		Hard Suction Hose, 5"	25	13												
23		Hard Suction Hose, 4"	25													
24		Hard Suction Hose, 2-1/2"	25	1												
25		Port-A-Tanks (3500 USAgal)	15	5	$ 3,000	0.3		1			1			1		
26		Drafting Equipment (misc.)	25		$ 1,500			1			1			1		
27		Portable Pumps, Large (CET)	7	1	$ 7,500	0.1		1		1						
28		Portable Pumps, Small (wildland)	15	2	$ 5,000	0.1			1							1
29		Portable Generators	20	11	$ 1,500	0.6				1				1		
30		Chain Saws	7	4	$ 3,000	0.6	1							1		
31		K-12 Saws	7	5	$ 3,000	0.7		1							1	
32		Forcible Entry Tools (misc.)	25		$ 350	0.0	1	1	1	1	1	1	1	1	1	1
33		Firefighting Nozzles	25	98	$ 975	3.9	4	4	4	4	4	4	4	4	4	4
34		Hose Appliances	25		$ 900	0.0	1	1	1	1	1	1	1	1	1	1
35		Ventilation Fans	15	6	$ 5,554	0.4					1					1
36		Firefighting Tools (misc.)	25		$ 500	0.0	1	1	1	1	1	1	1	1	1	1
37		Thermal Imaging Cameras	7	6	$ 10,000	0.9	3								6	
38		Rechargeable Flash Lights	7	74	$ 50	10.6	10	10	10	10	10	10	10	10	10	10
39		Floodlights, portable	10		$ 950	0.0	2		2		2		2		2	
40		Electrical Equip. (misc.)	10		$ 100	0.0	1	1	1	1	1	1	1	1	1	1
41		Foam Application equipment	15			0.0										
42		Deck guns	30	10	$ 3,500	0.3										
43		TIC Battery	5	7	$ 200	1.4	1	1	1	1	1	1	1			
44																
45					Class Sub-TOTAL:		79,825	61,225	53,025	55,225	58,679	47,425	46,825	55,025	110,825	60,479

MINOR CAPITAL PAGE 2:

	Class	Item	Life	INV	Unit Cost	Ann'l QTY	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
46	**Rescue:**	Hydraulic Power Unit	15	4		0.3										
47		Hydraulic Spreaders (edraulic)	20	4	$ 18,000	0.2										
48		Hydraulic Cutters (edraulic)	20	4	$ 15,500	0.2										
49		Hydraulic Ram (edraulic)	20	5	$ 11,000	0.3										
50		Hydraulic Combi-Tool (edraulic)	20	2	$ 16,000	0.1										
51		Hydraulic tools (misc.)	20			0.0										
52		Stabilization Struts (Rescue 42 kit)	20	4	$ 7,500	0.2				1				1		
53		Air Bags Large	20	4	$ 2,000	0.2						2				
54		Air Bags Small	20	4	$ 1,500	0.2						2				
55		Air Bag Controls	20	4	$ 1,500	0.2						2				
56		Air Bag Hoses	10	8		0.8			2			2			2	
57		Blocking/Cribbing (misc.)	25	6		0.2										
58		Hand Tools (misc.)	25		$ 500	0.0	1	1	1	1	1	1	1	1	1	1
59		AutoEx Tools (misc.)	15	1	$ 500	0.1	1	1	1	1	1	1	1	1	1	1
60		Rescue Rope (NFPA)	7	5	$ 400	0.7				4					4	
61		Utility Rope	7	6	$ 130	0.9				4					4	
62		Hi/Lo Angle Hardware (misc.)	10		$ 1,000	0.0				4					4	
63		Throw Bags	7	6	$ 75	0.9					2					2
64		Inflatable Rescue Boat (Oceanid RI	10	1	$ 7,500	0.1						1				
65																
66					Class Sub-TOTAL:		1,000	1,000	1,000	14,620	1,150	18,500	1,000	8,500	7,120	1,150
67	**PPE/Safety:**	Bunker Gear (Coat/Pants)	10	200	$ 2,500	20.0	20	20	20	20	20	20	20	20	20	20
68		Bunker Gloves	7	200	$ 125	28.6	30	30	30	30	30	30	30	30	30	30
69		Bunker Boots	10	200	$ 550	20.0	20	20	20	20	20	20	20	20	20	20
70		Helmets, firefighting	10	200	$ 400	20.0	20	20	20	20	20	20	20	20	20	20
71		Balaclavas	7	200	$ 100	28.6	30	30	30	30	30	30	30	30	30	30
72		Wildland Coveralls	10	100	$ 350	10.0	10	10	10	10	10	10	10	10	10	10
73		AutoEx Gloves	7	100	$ 85	14.3	10	10	10	10	10	10	10	10	10	10
74		Chemical Suits Level A (encap for	10	0	$ 1,850	0.0										
75		Chemical Suits Level B (encap, SC	10	0	$ 800	0.0										
76		Chemical Suits Level C (splash, SC	10	6	$ 200	4.0	4	4	4	4	4	4	4	4	4	4
77		HazMat Gloves (nitrile, box 12)	5	6	$ 30	8.0	8	8	8	8	8	8	8	8	8	8
78		HazMat Boots	5	0	$ 85	0.0										
79		Water Rescue Suits	10	15	$ 2,000	1.5	2	2	2	2	2	2	2	2	2	2
80		Water Rescue Helmets	10	15	$ 200	1.5	2	2	2	2	2	2	2	2	2	2
81		PFDs (rescue)	15	15	$ 500	1.0	2		2		2		2		2	
82		Rescue Helmets	10	3	$ 180	0.3		3		3		3		3		3
83		Rescue 5-point Harness	10	6	$ 450	0.6						6				
84		Ladder Belts	10	12	$ 350	1.2					4					8
85		Traffic Vests	10	100	$ 25	10.0	10	10	10	10	10	10	10	10	10	10
86		Traffic Control Equipment	10			0.0										
87		Traffic Cones (5 per vehicle to mee	15	155	$ 60	10.3	8	8	8	8	8	8	8	8	8	8
88		Accountability Equipment	15		$ 300	0.3	1			1			1			1
89		Incident Command (misc)	15		$ 1,500	0.3	1			1			1			1
90		Helmet lights	7	50	$ 75	7.1	3	3	3	3	3	3	3	3	3	3
91																
92					Class Sub-TOTAL:		89,295	87,035	87,495	88,835	88,895	89,735	89,295	87,035	87,495	91,635

MINOR CAPITAL PAGE 3:

	Class	Item	Life	INV	Unit Cost	Ann'l QTY	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
93	**Haz-Mat:**	Gas Detection (1 per station plus 1 s	7	7	$ 3,000	1.0			1				7			
94		Overpak Drums/Pails	15			0.0										
95		Decon Equipment	10			0.0										
96		Leak Kits	15			0.0										
97		Tents	10			0.0										
98																
99					Class Sub-TOTAL:		-	-	3,000	-	-	-	21,000	-	-	-
100	**Communica**	Portable Radios (TMR)	10	160	$ 3,500	16.0	20	20	20	20	20	20	20	20	16	16
101		Portable Radios (VHF, MARINE)	10	6	$ 1,500	0.6					3					
102		Radio Batteries (portabe radios)	4	166	$ 100	41.5	48	48	48	48	48	48	48	48	48	48
103		Mobile Radios (TMR)	25	31	$ 4,500	1.2										
104		Mobile Radios (VHF MARINE)	25	6	$ 900	0.2										
105		Base Radios (TMR, 1 per station)	25	6	$ 4,500	0.2										
106		Repeater Radios (VHF paging)	20	3	$ 10,000	0.2										1
107		Radio Towers (small)	30		$ 75,000	0.0										
108		Pagers	7	215	$ 600	30.7	24	24	24	24	24	24	24	24	24	24
109		Fax Machines	7		$ 300	0.0										
110		Modems	5			0.0										
111		Routers	5			0.0										
112		Hubs, etc.	5			0.0										
113		Pager batteries	3	190	$ 30	63.3	60	60	60	60	60	60	60	60	60	60
114					Class Sub-TOTAL:		86,200	86,200	86,200	86,200	86,200	86,200	86,200	86,200	72,200	82,200
115	**Medical:**	AEDs	5	10	$ 1,500	2.0										
116		Oxygen Equipment	5			0.0										
117		Backboards	25		$ 300	0.0										
118		Stokes Baskets (1 per aerial)	25	3	$ 1,000	0.1								1		
119		Medical **Equipment** (misc.)	5			0.0										
120																
121					Class Sub-TOTAL:		-	-	-	-	-	-	-	1,000	-	-
122	**Station Equ**	Shop Tools (misc.)	20			0.0										
123		Computers and Accessories	5		$ 2,500	0.0	1									
124		Furniture	25		$ 200	0.0										
125		Extractor/Washers for PPE (1 per s	20	6	$ 15,000	0.3			1							
126		Bunker Gear Dryers (2 per station)	20	12	$ 2,500	0.6										
127		Pressure Washers	20		$ 500	0.0										
128		Hose Washers (one for Region)	20	1	$ 15,000	0.1										
129		Hose Testers (one for Region)	20	1	$ 5,000	0.1	1									
130		File Cabinets	30			0.0										
131		Flammable Liquids Cabinets	30			0.0										
132		Battery Chargers	15		$ 200	0.0										
133		Utility Air Compressors	15		$ 3,000	0.0										
134		Exhaust Extractor Misc.	10			0.0										
135																
136					Class Sub-TOTAL:		7,500		15,000							

Based on our analysis, minor capital purchases have been underfunded over the past four years. The workbook actually extends out to the year 2039 (not shown) and produces a 20-year average

of $316k; i.e. the amount of sustainable funds needed annually (in 2019 dollars) for minor capital purchases.

GA recommends that $300k (2019 dollars) be the target as a long-term plan for annual minor capital budgeting, until experience proves this is/not sufficient. However, as shown in the workbook that requirement for funds appears to be front-end loaded based on the expressed current needs of the fire departments. In the short term, Council may want to consider a temporary increase in that amount for the first three years. The benchmark budget shows $340k in 2020/21 for this reason.

GA recommends that the Director of Public Safety/Fire Chief manage the purchasing of minor capital equipment, for several reasons. With advice from the District Chief Management Committee he should set priorities on what equipment will be purchased that year.

GA recommends that the Director of Public Safety/Fire Chief have discretionary powers to make adjustments, within the approved minor capital budget total, to annually determine the exact mix of minor capital purchases according to immediate need. In this way, the fire department will be able to more quickly reset priorities as equipment is lost or damaged during the year or after a major fire/incident, balanced with other equipment expiry deadlines.

GA recommends that any surplus minor capital funds at the end of the fiscal year (if any) be placed into a revolving reserve account for the future purchase of minor capital equipment.

GA recommends that the surplus minor capital revolving reserve account have a set maximum amount of approximately $100,000. If in any given future year there is an unprecedented or emergency need to make minor capital purchases and there are insufficient budgeted funds, a mechanism should be in place for the Director of Public Safety/Fire Chief to request Council to release additional funds to cover the need.

The regional fire chief should manage the purchasing process. In this way municipal purchasing procedures will be followed, region-wide purchasing of standardized equipment will occur, and best value for public funds should result.

The following shows the minor capital benchmark budget recommendation.

				PROPOSED	$ INC/(DEC)	+/-	NOTES
			2019-2020	2020-2021	ref 2019-2020	%	
82	**MINOR CAPITAL:**						
83		Fire/Rescue Equipment, PPE	225,831	330,000	104,169	46%	Reference the Minor Capital budget forecast
84		Uniforms	11,500	10,000	(-1,500)	-13%	
85		**sub-total:**	**237,331**	**340,000**	102,669	43%	

Long Term Debt

The benchmark budget carries-forward the existing debt servicing amounts. The details of the debts were not investigated, so it is not reported here when they will be cleared.

				PROPOSED	$ INC/(DEC)	+/-	NOTES
			2019-2020	2020-2021	ref 2019-2020	%	
89	LONG-TERM DEBT PAYMENTS:						
90		Principle	797,627	797,000	(-627)	-0%	Outstanding debt servicing
91		Interest	169,309	170,000	691	0%	Outstanding debt servicing
92		Long Term Debt	107,737	107,700	(-37)	-0%	Outstanding debt servicing
93		**Total Long Term Debt:**	**1,074,673**	**1,074,700**	27	0%	

Major Capital Needs

As shown in the snapshot on page **261**, the four-year average of recent W/WH direct expenditures on Major Capital projects is $145,619, and this amount has been declining, with the 2019/20 contribution at $28,650. In part, this variability is due to the nature of capital projects; they do not necessarily reoccur annually and some can be very costly. In addition, the municipal consolidation's spending freeze has undoubtably affected current spending.

Replacing Fire Trucks

One recurring demand for capital monies is the purchase of fire apparatus and utility vehicles. Once the requirement to have particular types of fire apparatus/support vehicles, and the number thereof is determined, it becomes possible to project into future years the capital funding demands for their replacement. This means, there is the opportunity to plan for the upcoming expenditures, to know fairly accurately what the costs will be, and to decide the funding strategy by which the capital demands will be met.

A brief discussion on fire apparatus replacement criteria will assist with understanding GA's budget recommendations on this subject.

A review of the current state of major fire department assets in W/WH shows a need to replace vehicles (fire apparatus) on a regular schedule that meets needs and best practices. NFPA-1911[90] recommends;

> "In the last 10 to 15 years, much progress has been made in upgrading functional capabilities and improving the safety features of fire apparatus. Apparatus more than 15 years old might include only a few of the safety upgrades required by the recent editions of the NFPA fire department apparatus standards … It is recommended that apparatus more than 15 years old that have been properly maintained and that are still in serviceable condition be placed in reserve status; be upgraded in accordance with NFPA-1912; and incorporate as many features as possible of the current fire apparatus standard (see Section D.3). This will ensure that, while the apparatus might not totally comply with the current editions of the automotive fire apparatus standards, many of the improvements and upgrades required by the current editions of the standards are available to the fire fighters who use the apparatus."

NFPA-1911 goes on to say that the original purchase of good quality, with good ongoing maintenance, and periodic upgrading to keep pace with safety and function improvements, can extend apparatus serviceable life somewhat.

[90] National Fire Protection Association; NFPA-1911, Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles, 2017 edition; Annex D.1

The other major arbiter of fire apparatus age and condition is the Fire Underwriters Survey (FUS), who published[91] the following guidance table;

Table 1 Service Schedule for Fire Apparatus For Fire Insurance Grading Purposes

Apparatus Age	Major Cities [3]	Medium Sized Cities [4]	Small Communities [5] and Rural Centres
0 – 15 Years	First Line Duty	First Line Duty	First Line Duty
16 – 20 Years	Reserve	2nd Line Duty	First Line Duty
20 – 25 Years [1]	No Credit in Grading	No Credit in Grading *or* *Reserve [2]*	No Credit in Grading *or* *2nd Line Duty [2]*
26 – 29 Years [1]	No Credit in Grading	No Credit in Grading *or* *Reserve [2]*	No Credit in Grading *or* *Reserve [2]*
30 Years +	No Credit in Grading	No Credit in Grading	No Credit in Grading

[1] All listed fire apparatus 20 years of age and older are required to be service tested by recognized testing agency on an annual basis to be eligible for grading recognition. (NFPA 1071)

[2] Exceptions to age status may be considered in a small to medium sized communities and rural centres conditionally, when apparatus condition is acceptable and apparatus successfully passes required testing.

[3] Major Cities are defined as an incorporated or unincorporated community that has:
- *a populated area (or multiple areas) with a density of at least 400 people per square kilometre; AND*
- *a total population of 100,000 or greater.*

[4] Medium Communities are defined as an incorporated or unincorporated community that has:
- *a populated area (or multiple areas) with a density of at least 200 people per square kilometre; AND/OR*
- *a total population of 1,000 or greater.*

[5] Small Communities are defined as an incorporated or unincorporated community that has:
- *no populated areas with densities that exceed 200 people per square kilometre; AND*
- *does not have a total population in excess of 1,000.*

FUS is the organization that conducts detailed surveys of municipal fire protection capabilities for the purposes of recommending fire protection grades to the insurance industry. FUS recommendations are highly regarded as a consistent yardstick for comparison to past and future capabilities in fire protection, and their conclusions (ratings) can affect fire insurance costs for individual property owners.

It is clear that both NFPA and FUS consider 15 years as the maximum front-line serviceable age of fire apparatus. However, FUS does recognize that low incident volumes, quality purchases, and good maintenance, proved by testing, can extend the front-line serviceable age to 20 years, followed by up to 5 years in reserve for smaller communities. Front-line means that the apparatus is relied on to be a mainstay for fire protection. Reserve means that it is not so relied on, but can periodically step into a front-line role when needed (e.g. as a maintenance spare).

[91] Fire Underwriters Survey/OPTA, Technical Bulletin, Insurance Grading Recognition of Used or Rebuilt Fire Apparatus, 2014.

GA recommends that the following fire apparatus replacement schedule be adopted for the purposes of determining fire apparatus suitability for continued service and as a budget planning tool for fire apparatus replacement.

RECOMMENDED SERVICE LENGTH FOR FIRE APPARATUS

Type	Condition	Max Age	Service
Pumper	Purchased to NFPA-1901 standard, certified and periodically tested in accordance with FUS/ULC	20 years	First-line duty
Pumper	Purchased to NFPA-1901 standard, certified and periodically tested in accordance with FUS/ULC	25 years	Reserve use
Aerial/Quint	Purchased to NFPA-1901 standard, certified and periodically tested in accordance with FUS/ULC	20 years	First-line duty
Aerial/Quint	Purchased to NFPA-1901 standard, certified and periodically tested in accordance with FUS/ULC	25 years	Reserve use
Rescue	Purchased to appropriate portions of NFPA-1901 standard	25 years	First-line duty
Rescue	Purchased to appropriate portions of NFPA-1901 standard	30 years	Reserve use
Utility vehicles	Light duty chassis	15 years	First-line duty
Utility vehicles	Light duty chassis	20 years	Reserve use
All other vehicles/apparatus	RTV, rescue boat, trailers, etc.	Case-by-case basis	First-line duty or reserve

Currently there are in service in the fire departments of W/WH the following numbers of fire apparatus and utility vehicles;

CURRENT APPARATUS INVENTORY AND ASSIGNMENT

Station	Pumper	Tanker *	Aerial	Rescue	Utility	RTV	Boat
Windsor	3	1	2	1	2	1	1
Hantsport	2	1	0	1	2	0	0
SWH	0	1	0	1	0	0	0
Brooklyn	2	1	1	1	1	1	0
TMP	2♦	1	0	0	1	0	0
Summerville	1	2	0	0	1	1	1
Totals:	**10**	**7**	**3**	**4**	**7**	**3**	**2**

***** All current tankers have large pumps, equivalent to that of a pumper
♦ One of these pumpers is currently out of service

Several of the existing vehicles are long past their replacement need, both in age and condition. Both aerials in Windsor should no longer be in the fleet. One has an aerial device failure (structural) and will not pass the aerial device certification inspection. The other has a pump that

will not pass ULC[92] testing and is no longer certified. One of these aerials is 35 years old and the other is 30 years old. Both manufacturers are long out of business and the aerials are obsolete.

Brooklyn has a pumper that is out of service for mechanical reasons (unspecified) and is also 32 years old. It is currently parked at the Three Mile Plains station, and is shown on their inventory in the table just above.

In total, there are six vehicles that require immediate replacement based on their serviceability and/or their age. These include an aerial, three pumpers, and two rescues. In addition to these six;

GA recommends that Windsor's other aerial (ALF) be scrapped without direct replacement (more on that later) and an unsuitable wildland/urban interface pumper be sold.

GA recommends for the future, the following numbers and types of **first-line duty** fire apparatus allocations. These numbers can be accomplished through attrition as current apparatus age-out.

RECOMMENDED FIRST-LINE DUTY FIRE APPARATUS AND ASSIGNMENT

Station	Pumper	Pumper/Tanker	Quint	Aerial	Rescue	Utility	RTV	Boat
Windsor	2	1	0	1	1	2	1	1
Hantsport	1	1	1	0	1	1	0	0
SWH	1	1	0	0	0	0	0	0
Brooklyn	2	1	0	0	1	1	1	0
TMP	1	1	0	1	0	1	0	0
Summerville	1	1	0	0	1	1	1	1
Totals:	**8**	**6**	**1**	**2**	**4**	**6**	**3**	**2**

GA recommends that two older (no longer first-line) pumpers and a tanker be kept serviceable/operational as maintenance reserves. The purpose of reserves is to temporarily replace apparatus that are out of service for a day or more. They will also remain available for major incidents. The recommended capital budget reflects all of the above dispositions.

[92] Underwriters Laboratories of Canada, CAN/ULC-S515 Standard for Automobile Fire Fighting Apparatus. All new fire apparatus equipped with a fire pump must pass the ULC acceptance tests. Other ULC tests are applied to other fire apparatus types (e.g. aerial apparatus). Two types of in-service tests are also required. An annual in-service test and inspection. When new or after a rebuild the pump/aerial/systems require a full performance test. Aerials require a detailed NDE test/inspection ever 5-years.

GA recommends that a reserve pumper be placed in Brooklyn and Windsor stations, and the reserve Tanker be placed in Summerville.

More specific information on the recommended fire apparatus can be found in the Operations chapter of this report.

Other Capital Needs

There are a number of proposed new facility, and facility repair, demands on Capital funds. The main one is the replacement of the Hantsport fire station at $2,620,800. As part of this review GA has not examined in detail the need for a new fire station in Hantsport but concur with the justifications as presented to previous West Hants Council. This project should proceed when funds are available.

DETAILS OF MAJOR CAPITAL RECOMMENDATIONS

Starting on the next page are snapshots of the recommended benchmark Major Capital budget projection for the years 2020-2039. The projections are based on requested facility and equipment needs, and the calculated needs for the scheduled renewal of the fire apparatus fleet.

Overall, capital requirements are largely driven by fire apparatus replacements, but another major item in 2020 is the Hantsport fire station replacement. The total projected capital funds requirement for 2020, if every project was to proceed, is estimated at $6.794 million. The cash-flow for all capital expenditures would not all occur in the budget year as some projects would carryover into 2021 or possibly 2022.

The peak in 2020 is almost entirely a result of the pent-up need for fire apparatus replacement and the proposed Hantsport fire station. There are several smaller capital maintenance and health and safety related projects in 2020 as well. After 2020, the annual average capital demand is $660k, which includes a projected revenue of $200k in 2023 with the sale of a surplus pumper.

GA recommends an annual contribution of approximately $650k to a fire capital reserve fund to reduce the annual capital fluctuations in the fire department budgets to a minimal amount.

Adequate reserve funds would greatly reduce the need to debenture these predictable capital costs, thereby reducing the overall cost of capital purchases.

Major Capital Forecast

Starts on the next page.

Annual MAJOR Capital Needs: (20-year projected)

Recommendations - All Stations

2019 dollars

TOTAL By Decade ($k):

Total 2020-2029:	$ 11,248
Total 2030-2039:	$ 8,090

	Class	Station	New Item Description	Replacing Current Item	Remarks	Justification	Estimated Costs for Items (2019 $) Unit Cost	<<< Annual Totals ($k) >>>																		
								6,795	654	1,194	1,000	780	30	20	90	505	90	154	750	-	780	-	3,070	3,070	50	-	216
								2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
1	Apparatus	Windsor	Standard Aerial specification	**A4:** Aerial Platform; Kling/Kling/Snorkel (1984)	Large quantities of industrial, mixed commercial, and old stock homes/apartment conversions require quick access to aerial capability. Narrow streets, urban wiring, building size and setbacks require 110' ladder format.	Replace A4 (OOG pump failure). Current is well past end of front line service life (20 years) and reserve life (5 years). Current truck not justified for refurbishment. RETIRE CURRENT Chassis and aerial are no longer produced, company is long out of business.	$1,350,000	1																		
2	Apparatus	Windsor	Do not replace.	**A8:** Aerial Ladder; American LaFrance/American LaFrance/American LaFrance (1989)	Second aerial device in Windsor is no longer justified with Aerial/Platform now in Brooklyn and recommended Quint in Hantsport	A8 (OOG with ladder failure) and well past end of front line service life (20 years) and reserve life (5 years). Not justified for refurbishment. RETIRE CURRENT Chassis and aerial are no longer produced, company is long out of business. Aerial device was modified/refurbished before purchased second-hand.	(-$1,000)		-1																	
3	Apparatus	Windsor	Standard Pumper specification	**P6:** Pumper; E-One/Superior (2000)	Town is extensively hydrant serviced so smaller tank allows more equipment to be carried	Replacement at end of front line service life (20 years). Transfer to reserve	$750,000	1																		
4	Apparatus	Windsor	Standard Pumper-Tanker specification	**PT2:** Pumper-Tanker; International/Superior (2003)	Tanker primary mission. Can operate as a pumper when needed for large fires or secondary incidents	Replacement at end of front line service life (20 years). Transfer to reserve	$780,000				1															
5	Apparatus	Windsor	Standard rescue chassis specification. Refurbish rescue body, modernize lighting, hydraulic generator, scene lighting.	**R8:** Rescue; International/Lantz (1991)	**Regional** Heavy Rescue resource and support vehicle for the municipality; in addition to local use	Chassis beyond 25 year end of life. Refurbishment of body with new chassis is economical solution to still needed function.	$225,000				1															
6	Apparatus	Windsor	Standard Pumper specification (Rural)	**P1:** Pumper; E-One/Superior (1993)	Extensive non-hydranted response area surrounds town and requires larger water tank on first due pumper.	Replacement, well beyond its end of front line service life (20 years). Retire (too old for reserve)	$760,000	1																		
7	Apparatus	Windsor	Standard specification pickup, 4x4, plow package, bed fuel tank	**SSV9:** Utility; Dodge Ram 4x4 crew cab pickup (2009)	Utility, towing, hose carrying, equipment hauler, personnel hauler, emergency refueling of apparatus, plow can be added in future when needed.	Replacement at end of life (15 years) Personnel and equipment transport, and local operations support	$90,000				1															
8	Apparatus	Windsor	SUV (suburban) or passenger van, gasoline, AWD, 7+ seats	**V7:** Utility; Chev passenger van 2WD (2008)	**Regional** Personnel transport	Replacement at end of life (15 years)	$45,000				1															
9	Apparatus	Windsor	Do not replace. Sell	**P11:** Pumper-WUI; International/Superior (2005)	Current vehicle is not a well configured vehicle. Very hard to work from, impracticable, tank too small, 4x4, does not carry adequate pumper equipment.	Underutilized in current format. Replacement at or before end of front line service life (20 years). Recommend Sell asap while still has residual value	(-$200,000)				-1															
10	Apparatus	Windsor	Similar to current capabilities. Re-evaluate as replacement time approaches	**RTV;** Kubota off-road vehicle, tracked (2011)	Local and **Regional** off-road support	Replacement at end of life (25 years)	$50,000																	1		
11	Apparatus	Windsor	Similar to current capabilities. Re-evaluate as replacement time approaches	**Rescue Boat:** Zodiac inflatable (2005)	Inflatable boats degrade causing leaks and inflation failures and are not economically repairable. **Regional** water rescue support.	Replacement at end of life (15 years) Condition may need assessment for shorter/longer life expectancy. Outboard motor is separate issue and may last longer. Cost not included	$40,000	1																		
12	Apparatus	Hantsport	Standard specification pickup, 3500, diesel, SRW, 4x4, plow package, bed fuel tank	**R32:** Utility; Dodge Ram 3500 4x4 (2008)	Utility, towing, hose carrying, equipment hauler, personnel hauler, emergency refueling of apparatus, plow can be added in future when needed.	Replacement at end of life (15 years) Personnel and equipment transport, and local operations support	$90,000				1															
13	Apparatus	Hantsport	Standard rescue chassis specification. Refurbish rescue body, modernize lighting, hydraulic generator, scene lighting.	**R31:** Rescue; Freightliner M2/Lantz (2016)	**Regional** SCBA support unit, local use rescue	Replace chassis at end of life (25 years). Refurbishment of body with new chassis is economical solution to still needed function.	$190,000																			1
14	Apparatus	Hantsport	Standard Pumper specification (Rural)	**E12:** Pumper; Pierce Saber/Pierce (2015)	Significant rural areas (as well as intown hydranted areas) requires a larger water tank on first due engine	Replacement at end of front line service life (20 years). Transfer to reserve	$760,000																1			
15	Apparatus	Hantsport	Standard Pumper-Tanker specification	**T21:** Tanker-Pumper; Peterbilt/Superior (2013)	Tanker is primary mission. Can operate as a pumper when needed for large fires or second incidents	Replacement at end of front line service life (20 years). Transfer to reserve	$780,000														-1					

				TOTAL By Decade ($k):																											
				Total 2020-2029:	$	11,248																									
				Total 2030-2039:	$	8,090																									
								Estimated Costs for Items (2019 $)	<<< Annual Totals ($k) >>>																						
									6,796	654	1,194	1,090	780	30	20	90	605	60	154	750	-	780	-	3,070	3,070	50	-	216
	Class	Station	New Item Description	Replacing Current Item	Remarks	Justification		Unit Cost	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
16	Apparatus	Hantsport	Standard Quint specification	**E11:** Pumper; E-One/E-One (2002)	Industrial and old stock homes/apartment conversions require quick access to aerial capability Quint provides pumper capabilities with secondary capability as an aerial equipped vehicle	Replacement at end of front line service life (20 years). Transfer to reserve. Replaces Windsor A8 aerial capability Replaces Hantsport E11 pumper		$1,000,000			1																		
17	Apparatus	Hantsport	Do not replace, sell/scrap	**OSUS2:** Utility; Ford F-150 (2004)	Not required	Retire at end of life (15 years); beyond that point now		(-$1,000)	1																				
18	Apparatus	SWH	Standard Pumper-Tanker specification	**E14:** Pumper/Tanker; Freightliner SD/Pierce (2015)	Tanker is primary mission. Can operate as a pumper when needed for large fires or second incidents	Replacement at end of front line service life (20 years). Transfer to reserve		$780,000																1				
19	Apparatus	SWH	Mid-Pumper/Rescue standard specification	**R33:** Rescue; Ford F450/Lantz (2001)	A smaller yet capable pumper is required for access to narrow cottage roads and private lanes. Paired with the pumper-tanker it will be a potent first strike capable combination until further assistance can arrive **Regional** support for severe weather and wildland/off-road firefighting support	Large tracts of difficult access cottage country with access challenges, especially in winter/spring. There is an immediate need for this vehicle. Assign current truck to reserves		$650,000		1																		
20	Apparatus	Brooklyn	Standard Pumper specification	**P1:** Pumper; Ford/Hub (1997) OOG-unspecified mechanical issues	Although Brooklyn district is un-hydranted, the increased compartment capacity is needed for fire/rescue equipment	Replacement at end of front line service life (20 years). Too old to Transfer to reserve Sell/Scrap		$750,000	1																		
21	Apparatus	Brooklyn	Standard Pumper specification (Rural)	**B3:** Pumper; Pierce/Pierce PUC (2016)	Significant rural areas requires a larger water tank on first due engine	Replacement at end of front line service life (20 years). Transfer to reserve		$760,000																	1			
22	Apparatus	Brooklyn	Standard Pumper-Tanker specification	**PT4:** Pumper-Tanker; American LaFrance/American LaFrance (2004)	Tanker is primary mission. Can operate as a pumper when needed for large fires or second incidents	Replacement well past end of front line service life (20 years) and reserve life. Not justified for refurbishment. Chassis is no longer produced, company is long out of business.		$780,000					1													
23	Apparatus	Brooklyn	Standard rescue chassis specification. New rescue body, **Regional** command support	**R5:** Utility; Dodge 550/Lantz (2010)	A 12 foot rescue body outfitted as a **Regional** Command support primary role can also be multi-role for Brooklyn for local use.	Replacement at end of life (15 years) **Regional** Command Support		$500,000									1									
24	Apparatus	Brooklyn	Standard Aerial specification, addition of platform	**Tower6:** Aerial Platform: Pierce/Pierce (2016)	The main use of this vehicle is for rescue from high buildings and firefighter access to the roof or upper floors of large/tall buildings. Tertiary use is as a water tower	Replacement at end of front line service life (20 years). Transfer to reserve		$1,500,000																1				
25	Apparatus	Brooklyn	Standard specification pickup, 3500, diesel, SRW, 4x4, plow package, bed fuel tank	**R7:** Utility; Dodge Ram 3500 (2015)	Utility, towing, hose carrying, equipment hauler, personnel hauler, emergency refueling of apparatus, plow can be added in future when needed.	Replacement at end of life (15 years) Personnel and equipment transport, and local operations support		$90,000										1								
26	Apparatus	Brooklyn	Do not replace, transfer to reserves	**PT2:** Pumper-Tanker; Freightliner/LRB (2002)	A third pumper or a second tanker is not required if stations coordinate responses Manning is insufficient to operate this vehicle	At end of front line service life (20 years). Transfer to reserve		$0			1																
27	Apparatus	Brooklyn	Similar to current capabilities. Re-evaluate as replacement time approaches	**RTV8:** Polaris off-road vehicle (2015)	Local and **Regional** off-road support	Replacement at end of life (25 years)		$26,000																				1
28	Apparatus	TMH	Standard Pumper specification	**B8:** Pumper; Pierce/Pierce (2015)	Large part of response area is hydrant serviced so smaller tank allows more equipment to be carried	Replacement at end of front line service life (20 years). Transfer to reserve		$750,000																1				
29	Apparatus	TMH	Standard Pumper-Tanker specification	**PT10:** Pumper-Tanker; Freightliner/Pierce (2015)	Tanker is primary mission. Can operate as a pumper when needed for large fires or second incidents	Replacement at end of front line service life (20 years). Transfer to reserve		$780,000																1				
30	Apparatus	HMH	Standard specification pickup, 3500, diesel, SRW, 4x4, plow package, bed fuel tank	**R11:** Utility; Dodge Ram 3500/Lantz (2015)	Utility, towing, hose carrying, equipment hauler, personnel hauler, emergency refueling of apparatus, plow can be added in future when needed.	At end of life (15 years), transfer to reserves		$90,000											1								
31	Apparatus	Summerville	Standard Pumper specification (Rural)	**P1:** Pumper; Freightliner/Fort Gary (2016)	Significant rural areas requires a larger water tank on first due engine	Replacement at end of front line service life (20 years). Transfer to reserve		$760,000																	1			

TOTAL By Decade ($k):

Total 2020-2029:	$ 11,248
Total 2030-2039:	$ 8,090

	Class	Station	New Item Description	Replacing Current Item	Remarks	Justification	Estimated Costs for Items (2019 $) Unit Cost	<<< Annual Totals ($k)										>>>								
								6,795	654	1,194	1,090	780	30	20	90	505	60	154	750	-	780	-	3,070	3,070	50	-	216
								2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
32	Apparatus	Summerville	Standard Pumper-Tanker specification	T2: Pumper-Tanker; International/E-One "Water-Master" (2011)	Tanker is primary mission. Can operate as a pumper when needed for large fires or second incidents Current Vacuum Tanker does not fit well with quick dump/fill tankers of conventional design.	Replacement at end of front line service life (20 years). Bell	$750,000												1								
33	Apparatus	Summerville	Do not replace	PT3: Pumper-Tanker; Sterling/Fort Gary (2007)	A second pumper or a second tanker is not required if stations coordinate responses	At end of front line service life (20 years). Transfer to reserve	$0								1												
34	Apparatus	Summerville	Standard rescue chassis specification. New rescue body	R4: Utility; Ford F350/Tr-Star (2003)	A 12 foot rescue body outfitted as a Regional mass-causality and rescue support primary role can also be multi-role for Summerville in a limited capacity.	Replacement at end of life (15 years)	$400,000	1																			
35	Apparatus	Summerville	Standard specification pickup, 3500, diesel, SRW, 4x4, plow package, bed fuel tank	NEW: Utility	Utility, towing, hose carrying, equipment hauler, personnel hauler, emergency refueling of apparatus, plow can be added in future when needed.	Personnel and equipment transport, and local operations support	$90,000								1												
36	Apparatus	Summerville	Similar to current capabilities. Re-evaluate as replacement time approaches	Rescue Boat; Zodiac(2008)	Inflatable boats degrade causing leaks and inflation failures and are not economically repairable. Regional water rescue support.	Replacement at end of life (15 years) Condition may need assessment for shorter/longer life expectancy. Outboard motor is separate issue and may last longer. Cost not included	$60,000				1																
37	Apparatus	Summerville	Similar to current capabilities. Re-evaluate as replacement time approaches	RTV: Polaris Ranger 6x6 ATV, tracked (2012)	Local and Regional off-road support	Replacement at end of life (25 years)	$50,000																	1			
38	Equipment	Windsor	Hydraulic Spreaders (eDRAULIC)	Various makes and models and capabilities	Standardize on Hurst eDRAULIC	Hydraulic heavy extrication equipment is needed. Standardization on Hurst eDRAULIC will get better pricing and eliminate the purchase cost of power units and hoses and associated operating and maintenance costs. Also more compact than older technology, making better use of precious truck compartment space.	$18,000			2																	
39	Equipment	Windsor	Hydraulic Cutters (eDRAULIC)	Various makes and models and capabilities	Standardize on Hurst eDRAULIC		$15,500			2																	
40	Equipment	Windsor	Hydraulic Ram (eDRAULIC)	Various makes and models and capabilities	Standardize on Hurst eDRAULIC		$11,000			2																	
41	Equipment	Brooklyn, TMP, SWH, Hantsport, Windsor	Hydraulic Combi-Tool (eDRAULIC)	Various makes and models and capabilities	Standardize on Hurst eDRAULIC Summerville already has eDRAULIC Combi-Tool Eventually every pumper should have one	The bulk of the heavy extrication equipment will be with the Regional Heavy Rescue unit in Windsor. However, there is still a need for immediate access to a capable hydraulic rescue/forceable entry tool at each incident response. The eDRAULIC combiTool should be the standard hydraulic tool in each station. It is more than capable of handling typical incidents with support from the Regional unit when needed for extreme incidents.	$16,000			6							4									
42	Facilities	Hantsport	Fire Station	Fire station, Hantsport	Location not determined		$2,620,800	1																			
43	Facilities	Summerville	Vehicle exhaust extraction system for station	N/A	This is a health and safety matter	Diesel exhaust is a known carcinogen. Summerville station is open from the apparatus bays through to every part of the station, including meeting and equipment service rooms, so diesel exhaust particulates are settling everywhere.	$65,000	1																			
44	Facilities	Summerville	Truck Bay Roof Shingle Replacement			End of life, maintain capital asset	$20,000	1																			
45	Facilities	Summerville	Reside Main Station			End of life, maintain capital asset	$30,000					1															
46	Facilities	Summerville	Pave Truck bay Entrance			End of life, maintain capital asset	$25,000			1																	
47	Facilities	Summerville	Furnace Oil Storage Tank			End of life, maintain capital asset	$5,000		1																		
48	Facilities	Summerville	Generator Fuel Supply Storage Tank			End of life, maintain capital asset	$5,000									1											
49	Facilities	Summerville	Main Station Roof Shingle Replacement			End of life, maintain capital asset	$20,000						1														
50	Facilities	SWH	Vehicle exhaust extraction system for station	N/A	This is a health and safety matter	Diesel exhaust is a known carcinogen. Diesel exhaust particulates are settling and continue to contaminate even when trucks are not running.	$40,000	1																			

Fire Apparatus:

In date and priority order, the following table lists the recommended fire-fleet capital projects over the next 20 years (2002-2039). The details for each item are shown on the spreadsheet on the previous three pages.

GA recommends the following table of scheduled fire apparatus replacements.

FIRE APPARATUS RECOMMENDED REPLACEMENTS, 2020-2039

Item	Cost ($2019)	Budget Year
Replace Windsor Aerial-4 with new standard aerial	$1,350,000	2020
Replace Brooklyn Pumper-1 with new standard pumper	$750,000	2020
Replace Windsor Pumper-1 with new standard pumper (rural)	$760,000	2020
Replace Windsor Pumper-5 with new standard pumper	$750,000	2020
Replace Summerville Rescue-4 with new standard chassis and new rescue body	$400,000	2020
Replace Windsor rescue boat with new Zodiac inflatable	$40,000	2020+
Replace SWH Rescue-33 with new standard midi-pumper/rescue	$650,000	2021
Replace Hantsport Engine-11 with new quint	$1,000,000	2022
Replace Windsor Pumper-Tanker-2 with new standard pumper-tanker	$780,000	2023
Refurbish Windsor Rescue-6, new standard chassis, refurbish rescue body	$225,000	2023
Replace Windsor SSV-9 with new standard utility	$90,000	2023
Replace Windsor V-7 with new passenger carrying SUV/van	$45,000	2023
Replace Hantsport R-32 with new standard utility	$90,000	2023
Replace Summerville rescue boat with new Zodiac inflatable	$60,000	2023+/-
Replace Brooklyn Pumper-Tanker-4 with new standard pumper-tanker	$780,000	2024
Summerville new standard utility	$90,000	2027
Replace Brooklyn Rescue-5 with new rescue body on new standard chassis	$500,000	2028
Replace Brooklyn Rescue-7 with new standard utility	$90,000	2029
Replace TMP Rescue-11 with new standard utility	$90,000	2030
Replace Summerville Tanker-2 with new standard pumper-tanker	$750,000	2031
Replace Hantsport Tanker-21 with new standard tanker-pumper	$780,000	2033
Replace Hantsport Engine-12 with new standard pumper (rural)	$760,000	2035
Replace SWH Engine-14 with new standard tanker-pumper	$780,000	2035
Replace TMP Squad-9 with new standard pumper	$750,000	2035
Replace TMP Pumper-Tanker-10 with new standard pumper-tanker	$780,000	2035
Replace Windsor RTV with new similar tracked off-road vehicle	$50,000	2036
Replace Brooklyn Squad-3 with new standard pumper (rural)	$760,000	2036
Replace Brooklyn Tower-6 with new standard aerial, platform version	$1,500,000	2036
Replace Summerville Pumper-1 with new standard pumper (rural)	$760,000	2036
Replace Summerville RTV with new similar tracked off-road vehicle	$50,000	2037
Refurbish Hantsport Rescue-31, new standard chassis, refurbish rescue body	$190,000	2039
Replace Brooklyn RTV-8 with new similar off-road vehicle	$26,000	2039
Fire Apparatus/Utility Vehicles 20-year Total:	**$16,476,000**	

Other Projects:

GA recommends that the Regional fire departments standardize on the heavy hydraulic equipment purchased and utilized.

GA recommends that Hurst eDRAULIC equipment be utilized exclusively. The major advantage of standardization is the training of firefighters on only one system, thereby improving the interoperability between departments at major incidents.

GA recommends that not every station needs a full set of heavy hydraulic equipment. See more detail on this subject on page **228**.

GA recommends that Windsor's rescue truck be designated as the Regional heavy rescue support apparatus, and be provisioned with multiple hydraulic rescue tools. All other stations should have a more modest set of hydraulics.

Standardization on Hurst eDRAULICS is recommended because they are battery powered. This eliminates the cost of a hydraulic power unit (pump) and the ongoing maintenance costs and safety concerns of the associated hydraulic hoses. eDRAULICS are also more powerful and versatile. Finally, eDRAULICS take considerably less compartment space on fire apparatus, and thereby increase the efficiency of the trucks to carry other equipment.

As part of this initiative, the following purchasing schedule is recommended and included in the Major Capital budget recommendation. Details are provided in lines 38-41 in the budget worksheet.

HEAVY HYDRAULIC REPLACEMENT PROGRAM

Item	Cost	Year
Two spreaders (SP777, SP333)	$36,000	2022
Two cutters (S799, S788)	$31,000	2022
Two Rams (R421, R422)	$22,000	2022
Five Combi-Tool (SC758)	$80,000	2022
Four Combi-Tool (SC758)	$64,000	2030

Two fire stations currently do not have vehicle exhaust capture systems. The other four stations are using a system made by Plymovent. Diesel soot and fumes are known carcinogens. The fire

station in Summerville and the one in South West both require exhaust capture systems to abate this risk to everyone who enters the station.

GA recommends that exhaust extraction systems for Summerville and South West stations be funded as soon as possible. They are scheduled for 2020 in the benchmark budget. The total estimated cost of these systems is $105k.

The Summerville station has a number of capital maintenance items required to protect the structure and prevent degradation due to weather infiltration. They are detail listed on the Capital worksheet on lines 44-49. The total estimated cost of these repairs is $105k.

BENCHMARK, 2020 CAPITAL

				PROPOSED	$ INC/(DEC)	+/-	NOTES
			2019-2020	2020-2021	ref 2019-2020	%	
99	CAPITAL EXPENDITURES						
100		Capital expense current year	14,540	7,019,800	7,005,260		Reference the Major Capital forecast budget, 2020 forecast items.
101		Contribution To Reserves	14,110	650,000	635,890		Annual Fire Capital Reserve contribution to finance vehicle replacements and other major capital forecast items. Reference the Major Capital forecast budget.
102		**Total Capital Expenditures:**	**$ 28,650**	**$ 7,669,800**	7,641,150		

Benchmark Budget 2020, Roll-Up

The following roll-up includes the costs of all the items discussed in the preceding pages.

				BENCHMARK	$ INC/(DEC)	+/-
			2019-2020	2020-2021	ref 2019-2020	%
25	**EXPENSES**					
26	**FIREFIGHTING OPERATIONS:**					
27	APPARATUS:	sub-total:	198,466	201,000	2,534	1%
33	EQUIPMENT:	sub-total:	81,783	101,000	19,217	23%
44		TOTAL Firefighting Operations:	332,616	371,440	38,824	12%
46	**OTHER OPERATIONAL EXPENSES:**					
47	TRAINING:	sub-total:	109,233	98,000	(-11,233)	-10%
53	FIRE STATION:	sub-total:	308,793	281,000	(-27,793)	-9%
62	ADMINISTRATION:	sub-total:	629,253	1,163,290	534,037	85%
82	MINOR CAPITAL:	sub-total:	237,331	340,000	102,669	43%
87		TOTAL Other Operational Expenses:	1,284,610	1,882,290	597,680	47%
89	**LONG-TERM DEBT PAYMENTS:**					
93		Total Long Term Debt:	1,074,673	1,074,700	27	0%
94						
95	TOTAL FIRE SERVICE OPERATIONAL EXPENSES:		$ 2,691,899	3,328,430	636,531	24%
96						
99	**CAPITAL EXPENDITURES**					
102		Total Capital Expenditures:	$ 28,650	7,669,800	7,641,150	
103						
104	TOTAL PROJECTION / BUDGET / ESTIMATE		$ 2,720,549	10,998,230	8,277,681	304%

Not including the projected Capital Expenditures, the base recommended benchmark budget shows an overall increase in fire service operational expenses (projected) of $636,531, up 24% over the 2019/20 approved budget. This increase is driven by the following items.

- Equipment servicing costs are projected to increase 23% ($19,217) because of the need to increase equipment inspections and testing to meet legislated standards.
- Communications costs are projected to increase 33% ($17,073) with the settlement of a new Valley Communications dispatching contract and the implementation of radio and pager maintenance contracts.
- Administration – Salaries and Benefits are projected to increase 301% ($388,123) with the addition of a full-time Director/Fire Chief, Assistant Chief, and Admin Assistant; and with the addition of a part-time Division Chief, and the moving of 1.5 FTE fire-inspectors from the Planning and Development Department. Salary rates were assumed, so the final cost of these staffing positions has not yet been determined.

- Volunteer benefits are projected to increase by 76% ($36,761), in part with the introduction of mandatory WSIB coverage.
- The costs for the annual purchase of minor capital equipment is projected to increase by 43% ($102,669). The projected costs are based on achieving sustainable service delivery.

GA recommends that the new Regional municipality elect the highest WSIB protection. The addition of Region-wide firefighter accident, sickness and disability (AD&D) benefits, MFAP, and off-duty AD&D coverage is included in the projected cost increase.

PROJECTED 10-YEAR BUDGET IMPACTS

As part of the fire service study GA was asked to project the impacts on the budget of service changes over the next 10-year period. Of course, any such projection is partly conjecture, based on estimates of changes in service over the projected period of time. Such service changes can be related to changes in;

- the volume of incidents,
- the types of incidents, and/or
- the staffing model (volunteer/composite/career).

Money spent on fire prevention is well spent on many levels. With respect to budgets, fire prevention can avoid some fire-response costs. An effective fire prevention program consisting of;

- public fire-safety education,
- post-fire investigations, and
- fire-inspection/enforcement.

Fire prevention can lower emergency incident volumes (i.e. fires) and their severity/impact on the property owner, and on the economy and social fabric of the community. The overall result of effective fire prevention is to lower the cost of fire losses in the community, lower insurance rates, and lower incident volumes; and thereby reduce costs for fire suppression.

The following table shows historical incident volumes in W/WH, by type;

HISTORICAL INCIDENTS BY TYPE

Type	2014	2015	2016	2017	2018	Totals	%
Fire	143	119	187	115	120	684	18%
Pre-Fire Conditions	114	101	110	133	112	570	15%
Rescue	102	99	133	141	137	612	16%
Hazard to Public/Environment	9	16	20	22	13	80	2%
Assistance	24	39	83	202	206	554	15%
Medical Assistance (MFR)	263	272	232	240	250	1,257	33%
Unclassified	12	12	9	2	1	36	1%
Totals:	**667**	**658**	**774**	**855**	**839**	**3,793**	

Incident numbers overall are trending upwards over the five years of data studied. The main drivers are rescues (mostly motor-vehicle related), pre-fire conditions (smoke in the building, etc.), and assistance (mostly mutual assistance between fire station).

The national trend with increasing medical incidents is endemic, but not apparently in W/WH where the annual medical incident volume is relatively steady. As the population continues to age, it is expected that these numbers will start to creep upwards. Medical incidents are not a core part of fire services, but a selected add-on service that Council has decided to support financially for the benefit of citizens. This support could be changed in future if found to be unsustainable. The municipality is not compelled to provide it.

Population Growth

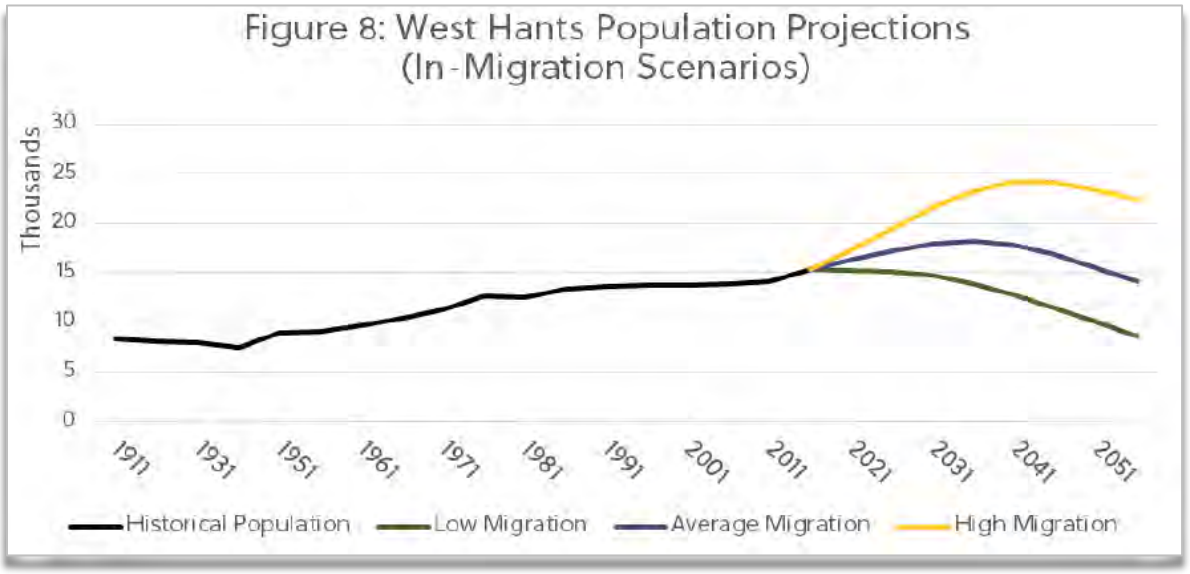
Growth in population and consequently in housing is usually the largest driver for increases in service demand for fire departments. Service demand means the number of incidents that occur annually. Incident numbers are largely driven by population size, and secondarily by travellers and visitors; in other words, by people.

Population projections[93] by West Hants Planning and Development Department show that a significant increase in West Hants population is unlikely over the next 10 years. One extreme of the projections actually shows a decline in population by 2031, which is just beyond the threshold of our projection mandate. There is a several-hundred-% difference between the lower and upper projections.

The chart on the next page shows these projections graphically.

[93] West Hants Planning and Development Department, Background Report: Population, March 2018, page 8

WEST HANTS POPULATION PROJECTION



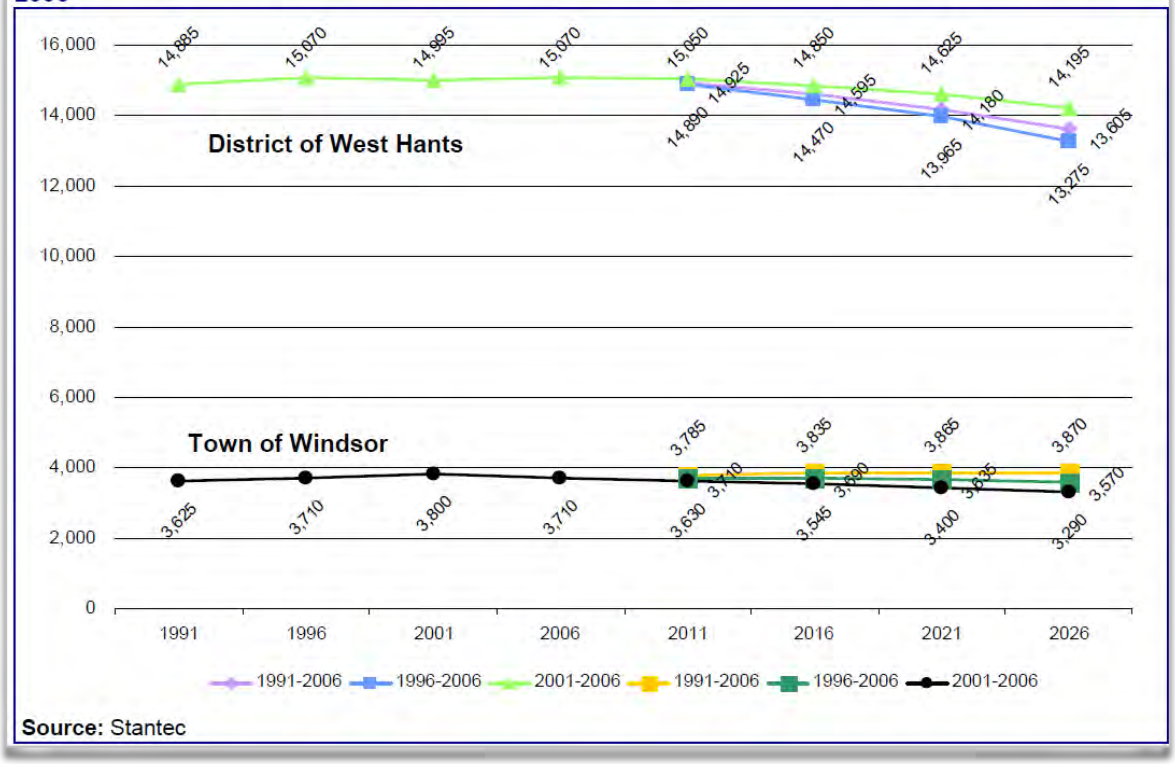
The chart's "average" projection for 2031 shows a modest population increase to 18,120 which is up almost 2,800 (+18%) from the 15,350 reported by StatsCan in 2016. After 2031 the population is projected, in this version, to level off and decline.

The most optimistic scenario shows a population increase to as high as 24,166 (+57%) by 2041; before then declining. All three projection scenarios predict a declining population, over the long term, starting at or before 2041.

Based on the predicted "average" and "low" population changes GA does not predict any significant changes in incident volumes over the next 10 years. If the "high" prediction proves accurate then it can be expected that over 20 years there will be a commensurate increase in incident volumes, and a proportional increase over the 10-year fire-services study window.

A further study[94] by Stantec, done in 2010, shows a less optimistic population projection and includes the Town of Windsor as well as West Hants. In this chart the population for West Hants is projected to be below 14,000 by 2026 while the Windsor population holds flat. This Stantec

Figure 3.3: Alternative Projection Options, Town of Windsor and Municipality of West Hants, 1991-2006



Source: Stantec

study is relatively consistent with the West Hants study, done 8 years later, in that growth projections for the Region appear to be relatively flat.

For the Town of Windsor, StatsCan[95] reports that between 2011 and 2016 the population of Windsor contracted 3.6%, down from 3,785 in 2011 to 3,648. This actual data corresponds well to the median prediction on the Stantec projection, six years after it was written.

[94] Windsor Integrate Community Sustainability Plan, 2010, page 3.21

[95] https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?B1=All&Code1=1208002&Code2=12&Data=Count&Geo1=CSD&Geo2=PR&Lang=E&SearchPR=01&SearchText=Windsor&SearchType=Begins&TABID=1

Development Growth

The development of large commercial, industrial, and residential facilities can increase the demand for service capacity. In this circumstance, service capacity means the ability of the fire service to mitigate the incidents that occur in buildings larger than they are currently equipped to handle. For example; the development of high-rise[96] apartment buildings can place a high demand on manpower, processes, training, and technology for the fire department. This is especially so if the fire department has no prior experience with such buildings, like W/WH that has no structure taller than 4-stories.

To mitigate fire incidents in high-rise buildings requires specialized equipment, specific procedures, diligent fire safety enforcement, and high staffing numbers on-scene at an incident. The municipality does have a significant degree of control over allowing these types of development, and consideration of the impact on the fire services and the costs of increasing capacity should be part of municipal development plans.

West Hants Planning and Development Department reports[97] that it is unlikely that big box retailers and power centres[98] will be developing in W/WH, without a larger population to attract them. The number of commercial development permits is trending downward, although the value of these may be upwards.

Industrial and resource-based development is reportedly[99] not booming in West Hants. Permits and values have been low. A Windsor-West Hants shared industrial park is the preferred location for industrial development, and there are a few industries located there.

Growth in the commercial, industrial, and resource sectors is unlikely to increase substantially over the next 10 years. It is therefore unlikely that an increase in fire services costs will be driven by increasing incident volumes or requirements for capacity increase in these sectors.

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[96] High-rise buildings are buildings that are 6 stories and above in height.

[97] West Hants Planning and Development Department, Background Report: Economic Development, March 2018, page 16.

[98] IBID; in 2010 power centres had an average of 25 tenants, including several big-box retailers.

[99] West Hants Planning and Development Department, Background Report: Industry and Resource, March 2018, page 4.

Other Threats

There are two other threats to fire service costs, going forward from 2020, that in GA's opinion have the real risk to cause change.

The USA/Canada dollar exchange rate affects the cost of almost every item in the minor capital and major capital budgets. Almost all equipment is either made in the USA or is priced in USA dollars. Fire apparatus may be manufactured in Canada, if one of the Canadian manufacturers is chosen, but the major components of chassis, pump, water tank, materials (aluminum), fittings, and on-board equipment are sourced south of the border. At the present time the dollar exchange rate is around 0.75. Any change, up or down, will affect the purchasing power of the budget, also up or down. Similar affects are felt on other world priced commodities, such as fuel/energy costs.

The second threat to the budget going forward is the staffing model. Currently the fire emergency service is staffed by volunteer firefighters. Declining[100] school enrollments, declining fertility rates and the disproportionate in-migration of seniors is pushing up the average age of the population.

The ability to attract/recruit and retain volunteer firefighters is, in part, a demographic challenge. Prospective volunteers must be fit enough and available. Generally, fit means a healthy adult who is not too young nor too old. The aging population means there are fewer younger persons in the community, and current volunteers eventually get too old to withstand the rigours of being a firefighter.

A secondary demographic problem is local employment. Volunteer firefighters with jobs that are distant from their fire station are less likely to remain volunteer firefighters. They are not able to effectively respond to incidents while at work; and they spend more time commuting and therefore have less time available for volunteer firefighting. A volunteer firefighter should expect to contribute between 100 and 300 hours per year in scheduled activities; training, equipment maintenance, fund-raising, meetings, and in going to incidents.

[100] West Hants Planning and Development Department, Background Report: Population, March 2018, pages 9, 7, 6, 5.

Without adequate numbers of volunteer firefighters available there will be a gradual transition to part-time or full-time paid firefighters. This will start with a decision to staff one centrally located fire station during week days, and may eventually progress over time to additional hours and additional stations.

Benchmark Budget Growth Conclusion:

In the forecast period 2020-2030, GA concludes the following expected threats to the fire services budget:

- Incident numbers will increase slightly due to expected modest population increases, with a consequent increase in the use of consumables like diesel fuel.
- The proposed staffing and apparatus inventory and type will be adequate for the period.
- Costs will generally creep upwards along with the consumer price index (CPI) and wage/benefit settlements.
- The capacity of the fire service will be adequate to address new developments, so investments in new technology will not likely be driven by new risks in the community, but may be driven by safety, health, and efficiency goals.
- The Canadian vs USA dollar exchange rate will affect the operational costs of the fire service to some degree, but its impact will mostly be felt on capital purchases.
- Upgrades in safety and health requirements for firefighter equipment and fire apparatus have historically pushed capital purchase costs upwards well above CPI increases.
- The changing demographics of the community, particularly aging, will place additional strain on recruiting and retaining volunteer firefighters. A strategy should be developed to recruit non-traditional candidates, and also for non-firefighting but still essential roles.
- Incentives to retain good volunteer members must be developed and implemented; for example, health insurance, disability coverage, and access to mental counselling.
- Failure to attract or retain adequate numbers of qualified volunteer firefighters will likely force the transition to a costlier composite fire service.

APPENDICES

APPENDIX I; MODEL FIRE SERVICE REGISTRATION POLICY

[Fire Department and Emergency Services Provider Registration Policy]

1. The **[Municipality]** shall register a Fire Department or Emergency Services Provider, with or without conditions, in accordance with Section 294 or Section 295 of the *Municipal Government Act*, as applicable, if:

   (1) The applicant is a body corporate (a society under the *Societies Act* of Nova Scotia, a company under the *Companies Act* of Nova Scotia, or a body corporate pursuant to other legislation);

   (2) The Municipality is satisfied that the applicant is capable of providing the services being offered, based upon the information provided in the application and upon other information received by the Municipality;

   (3) The applicant carries a minimum of **[$5,000,000]** in liability insurance for the vehicles it owns or operates and a minimum of **[$5,000,000]** in liability for insurance for claims brought against it for wrongful acts or omissions respecting the fire services and/or emergency services which it provides;

   (4) The applicant does not provide fire response and/or emergency services for profit;

   (5) The Municipality does not otherwise provide, assist or work with others to provide the same services for the same coverage area unless the Municipality and two or more fire service and/or emergency service providers (one of which is the applicant) have expressly agreed to have overlapping primary service providers;

   (6) The applicant has completed and signed an application in the form provided by the Municipality (Appendix A);

(7) The applicant has provided a list of its active volunteers and their training record in a format acceptable to the Municipality;

(8) The applicant has provided a schedule of mutual-aid agreements with identification of approval details from the Municipality.

2. The CAO or their designate may approve the registration for the Fire Department or Emergency Services Provider to provide all of the services outlined in the application form, or may limit the services by making revisions to the application form. The Municipality may also include conditions to the approval.

3. The Municipality shall provide a copy of the approved and signed unamended or amended application form along with any conditions to the applicant, or if the application is not approved, shall notify the applicant accordingly.

4. Registration as a Fire Department or Emergency Services Provider is effective upon approval of the application by the CAO or their designate.

5. A registered Fire Department or Emergency Services Provider may provide the services outlined in its approved application, subject to any conditions imposed by the Municipality.

6. By no later than April 1 of each year, each registered Fire Department and Emergency Services Provider must apply to renew its registration by submitting a new application for registration in the form at Appendix A and providing the information required in paragraph 1 of this Policy. The CAO or their designate shall process the application in accordance with paragraphs 2 and 3 by no later than April 30.

7. If a registered Fire Department or Emergency Services Provider fails to apply to renew its registration as required by paragraph 6, its registration as a Fire Department or Emergency Services Provider shall be automatically be withdrawn for cause.

8. In the event an applicant is dissatisfied with a decision of the CAO or their designate to refuse a registration or a registration renewal, or to impose conditions or amendments upon the

registration, the applicant may appeal to Council by written notice to the Municipality's Clerk within 15 days of receiving notification under paragraph 3.

9. In addition to any other cause for revoking registration, non-compliance with any conditions of registration or with the terms of this Policy, or failure or inability to perform the services to the standards established pursuant to this Policy or otherwise mandated by Council or other regulatory authorities, shall be cause for revocation of registration as a Fire Department or Emergency Services Provider, or for imposing additional conditions upon the registration.

Appendix A:

[Insert Name Here]

Application for Registration as a

Primary Fire Response or

Emergency Services Provider

Applicant: _____

Contact Person & Phone #:

_____

Address: _____

Incorporated body under: *Societies Act* OR *Companies Act* (circle one)

Registry of Joint Stock Companies Registration # _____

Registration Expiry Date: _____

Number of Department members:

_____

Insurance Provider:

_____

Insurance Policy Period:

_____

Motor Vehicle Liability Limit: _____-

_____

General Liability Insurance Policy Limit (minimum 2 million):

_____

Complete financial statements from the previous fiscal year are required as part of the Application for Registration.

Boundaries of Primary Service Territory:

_____

Please indicate the service that the department will endeavor to provide by placing an X in the appropriate box. N/A denotes a service not being provided by the Applicant

	Structural Offensive	Structural Offensive with Mutual-aid	Structural Defensive	N/A
1. Fire and Fire Related Emergencies	☐	☐	☐	☐

** Registration as Structural Offensive requires your department to have a minimum of four (4) firefighters trained Level 1 with Fire Control. Alternatively, you do have the option to register as Structural Offensive with Mutual-aid. Please indicate the names of those trained to this standard below. If more space is required, please use the back of this page.*

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

9 _____

10 _____

Please indicate the level of service that the department is equipped and trained to perform, and will endeavor to provide by placing an X in the appropriate box. N/A denotes a service not being provided by the Applicant.

Applicants should be aware of NFPA-1670 Standards for Rescue and limit the service they provide to the qualification they possess relevant to the technical categories of Technician, Operational, and

	Technician	Operational	Awareness	N/A
2. Vehicle Rescue	☐	☐	☐	☐
3. Water Rescue	☐	☐	☐	☐
4. Ice Rescue	☐	☐	☐	☐
5. Structural/Excavation Collapse	☐	☐	☐	☐
6. High Angle Rescue	☐	☐	☐	☐
7. Hazardous Materials	☐	☐	☐	☐

8. Other (1)	☐	☐	☐	☐
9. Other (2)	☐	☐	☐	☐
	Provider	Assistance		
10. Ground Search and Rescue	☐	☐		☐

11. Please indicate any other man-made and/or natural disasters for which your department has the training, equipment, and command system to undertake:

_____

_____

12. Are there limits to the level of service that will be provided (for example, limited number of responders at certain times, lack of equipment, lack of qualifications) in respect to any of the services checked above? If so, please indicate what these are:

_____

_____

_____

_____

APPLICANT

As Chief of the _____

(Name of Department)

I have read and understand the Departments' role in the registration process and the "Definitions of Terms Used in the Registration Form" in Appendix B, attached.

I understand by signing this I am not committing my department to any guaranteed level of service or response. [As a volunteer organization there may be circumstances where inadequate response to an emergency may occur. We do actively participate in an automatic mutual-aid response, however, there is no assurance that mutual-aid response will be adequate.]

I declare that the information provided in response to this Application for Registration as a Primary Fire Response or Emergency Services Provider under the *Municipal Government Act* with the [Name of Municipality] is true to the best of my knowledge, information, and belief.

Date: _____

_____

Name of Chief – ***Please Print***

_____

Signature of Chief

MUNICIPALITY

Date of Approval of Registration Application: _____

_____

Name of Chief Administrative Officer (CAO) – ***Please Print***

_____

Signature of CAO or his or her designate

Please note: Explanation of the terminology used in this registration form is provided in the Information from the Office of the Fire Marshal included as Addendum "B" in the Guide Respecting Fire and Emergency Services in the *Municipal Government Act* Resource Binder, a copy of which is attached for your reference. To register, a department must be incorporated and hold any valid liability insurance that is required by municipal policy. The department must operate on a not-for-profit basis. The registration does not make the department an agent of the **[Municipality]**. This registration may be modified by notifying the Municipality thirty days in advance. The **[Municipality]** may revoke this registration for cause.

Appendix B:

Evaluation of Services Provided and Level of Service for Use with Application for Registration as a Fire Department or Emergency Services Provider under the Municipal Government Act

Spelling out the specific parameters of services to be provided allows the fire department to plan, staff, equip, train, and deploy members to perform these duties. It also gives the governing body an accounting of the costs of services and allows it to select those services they can afford to provide. Likewise, the governing body should identify services it cannot afford to provide and that it cannot register the department to deliver.

To assist the fire service and the municipal units, the Department of Municipal Affairs has developed a sample registration form that includes a check list for key services and level of abilities. The use of this form is not compulsory. Each municipality should develop its own registration process in accordance with the *Municipal Government Act.*

The Office of the Fire Marshal will not be evaluating fire departments; the registration process is between the municipality and the fire department.

The industry standards most widely used and accepted for the fire service are from the National Fire Protection Association (NFPA). Standard 1500 for Firefighter Occupational Health and Safety is the cornerstone upon which each fire department attempts to meet a standard of safety. The key to this standard is that, “no activity is undertaken unless the benefit outweighs the risk.” There are sections such as physical fitness requirements and recruiting that may require a different approach by individual fire departments.

NFPA standards are updated on a 3-6-year frequency and it is recommended that the most recent version of any particular standard be used when referenced.

Definition of Terms Used in the Registration Form

1 to 3. Fire and Fire Related Emergencies:

> **Structural Offensive**: means the activities of rescue, fire suppression, and property conservation **in** buildings, enclosed structures, vehicles, vessels, or like

properties that are involved in a fire or emergency situation. Departments should have firefighters trained to NFPA-1001, protective personal equipment, man-down alarms, an accountability system, adequate water supply, adequate pumping capacity and an incident command system. Departments should also have the proper training and protective clothing for wild land fires in accordance with the Department of Natural Resources' provincial standard. Shipboard firefighting, if provided, should be carried out following the NFPA standard 1405 Guide for Land-Based Fire Fighters Who Respond to Marine Vessel Fires. Protection of Aircraft at airports by volunteers, if provided, should be in accordance with Transport Canada guidelines.

Structural Defensive: means actions that are intended to control a fire by limiting its spread to a defined area, avoiding the commitment of personnel and equipment to dangerous areas. Defensive operations are generally performed from the exterior of structures and are based on determination that the risk to personnel exceeds the potential benefits of offensive actions.

Such determining factors may include, but not limited to, the extent of fire within the structure, existing water supply for fire load, number of trained personal on site and foremost, risk of personnel versus reward. Also, be advised that an attack strategy may change from defensive to offensive should any or all of the fore mentioned factors change. Fire departments without the ability to carry out structural firefighting may register as providing property protection through defensive strategies. Training for defensive fire operation personal is extensive but less rigorous than NFPA-1001 (a guideline is provided on the Fire Service Association of NS website). Rescue may be undertaken if the benefit warrants the risk. Departments should have proper training and protective clothing for wild land fires in accordance with the Department of Natural Resources' provincial standard.

N/A: means the department does not respond to these calls.

Structural Offensive with Mutual-aid: means that on its own, a fire department meets the requirements of Structural Defensive only and can meet the

requirements of Structural Offensive with additional specific resources identified in through a Mutual-aid agreement. The expectation would be that upon arrival, such a department would conduct Defensive operations only and if required, could change to offensive once additional resources arrived on scene and were deployed.

4. Medical Emergencies: response to known medical emergencies.

Registered First Responder: means responders registered with the Department of Health through EHS first responder program and respond to medical calls or provide medical assistance at the scene of an incident.

Medical Assistance: means responders who have standard or emergency first aid and respond to medical emergencies or provide medical assistance at a response incident to that level only. Equipment includes a first aid kit.

5.to 9. The following terminology is used in respect to vehicle rescue, water rescue, ice rescue, structural/excavation collapse and high angle rescue:

These activities should be carried out in accordance with NFPA-1670 Standard for Rescue, 2017 edition or other comparable standard adopted by the municipal unit.

Generally, these terms mean:

Technician: First responders at the technician level are those persons who respond, as either initial call out or as a mutual-aid response to contain and control the incident. This level of service usually will provide a high degree of intervention.

Operations: First responders at the operations level are those persons who respond as the initial response to an incident for the purpose of protecting nearby persons, the environment, or property from the effects of the incident. First responders at the operations level are expected to respond in a defensive fashion to control, prevent a worsening of the incident and provide services within their capabilities.

Awareness: First responders at the awareness level are those persons who, in the course of their normal duties, could be the first on the scene of an emergency. First responders at the awareness level are expected to recognize the situation, call for trained personnel, secure the area and provide minimum intervention.

Refer to NFPA-1670 for specifics for each type of rescue.

10. Hazardous Materials: Response to chemical incidents.

All levels should be in accordance with NFPA-1072 Standard on Professional Competence of Responders to Hazardous Materials Incidents. Fuel spills such as oil, gas and diesel may be handled by all three levels if the spill is minor and stabilized. There is a wide range of service, from a domestic oil spill to an upset gasoline tanker. The important fact is knowing the departments limitations.

Technician: Hazardous materials technicians are those persons who respond to releases or potential releases of hazardous materials for the purpose of controlling the release. Hazardous materials technicians are expected to use specialized chemical protective clothing and specialized control equipment.

Operations: First responders at the operations level are expected to respond in a defensive fashion to control the release from a safe distance and keep it from spreading. (Note: Firefighters trained to the Level 1 standard are required to be trained to the Operations Level of Hazardous Awareness)

Awareness: First responders at the awareness level are those persons who, in the course of their normal duties, could be the first on the scene of an emergency involving hazardous materials. First responders at the awareness level are expected to recognize the presence of hazardous materials, protect themselves, call for trained personnel and secure the area.

13. Ground Search and Rescue: self-explanatory.

Provider: meets the Nova Scotia Emergency Management Office's provincial standard for SAR teams.[1]

Assistance: members are under the control of a SAR team.[2]

Fire Department and Emergency Services Provider Registration Policy - Editor's Annotations

Enabling Legislation

Municipal Government Act, R.S.N.S. 1998, c.18:

3 In this Act,

(ac) "emergency services" means services related to the provision of emergency services, including fire services, emergency medical services, search and rescue, water rescue and assistance and protection for people and property in the event of disasters including, but not limited to, floods, hurricanes, motor vehicle accidents and chemical spills;

(af) "fire department" means an incorporated body that provides fire services and that may, at its option, provide one or more other emergency services, and includes a fire or emergency services department of a municipality, village, fire protection district or other body corporate;

….

294 **(1)** A body corporate may apply to a municipality for registration as a fire department.

(2) A municipality shall not refuse to register a body corporate that complies with this Act if the

(a) municipality is satisfied that the body corporate is capable of providing the services it offers to provide;

(b) body corporate carries liability insurance, as required by the municipality;

(c) body corporate does not provide the fire services for profit; and

(d) municipality does not provide the same services for the same area.

(3) A fire department, including a fire department of a municipality, village or fire protection district, shall register in each municipality in which it provides emergency services.

(4) A registered fire department shall provide the municipality with a list of specific emergency services it will endeavour to provide and the area in which the services will be provided.

(5) Registration continues in force until withdrawn by the municipality for cause or the fire department requests that the registration be revoked.

(6) A municipality may grant or lend money to, or guarantee a loan for, a registered fire department for operating or capital purposes.

(7) A municipality may grant or lend assets, without charge, to a registered fire department.

(8) Registration does not make a fire department an agent of a municipality.

(9) A registered fire department is not a municipal enterprise pursuant to the *Municipal Finance Corporation Act*.

…

295 (1) A body corporate may apply to a municipality for registration an emergency services provider to provide emergency services other than fire services.

(2) A municipality shall not refuse to register a body corporate that complies with this Act if the

(a) municipality is satisfied that the body corporate is capable of providing the services it has undertaken to provide;

(b) body corporate carries liability insurance, as required by the municipality;

(c) body corporate does not provide the emergency services for profit; and

(d) municipality does not provide the same services for the same area.

(3) A body corporate that applies pursuant to subsection (1) shall register in each municipality in which it provides emergency services.

(4) A registered emergency services provider shall provide the municipality with a list of specific emergency services it will endeavour to provide and the area in which the services will be provided.

(5) Registration continues in force until withdrawn by the municipality for cause or the fire department requests that the registration be revoked.

(6) A municipality may grant or lend money to, or guarantee a loan for, a registered emergency services provider for operating or capital purposes.

(7) A municipality may grant or lend assets, without charge, to a registered emergency services provider.

(8) Registration does not make an emergency services provider an agent of a municipality.

(9) A registered emergency services provider is not a municipal enterprise pursuant to the *Municipal Finance Corporation Act*.

Important Notice

The reader is cautioned that editorial and drafting choices involve interpretation of the law.

Municipal units should consult with their own legal advisors before relying upon, and applying to their own circumstances, the comments or drafts contained in this Manual.

Comment

- This Policy deals with municipal registration of bodies corporate as a fire department or emergency service provider.
- The *Municipal Government Act* s. 294(2) requires that a municipality register a body corporate as a fire department if the body corporate meets the requirements of the Act. Identical requirements are set out for emergency service providers by s. 295(2) of the Act. The Act requires that a body corporate:
  - be capable of providing the services it offers;
  - carry liability insurance;
  - that fire or emergency services be not-for-profit; and
  - not duplicate services provided by the municipality in the same area.

  These requirements are incorporated into s. 1(2), (3), (4) and (5) of the model Policy. The municipality may set out minimum liability insurance requirements in s. 1(3) of this Policy.
- The Policy provides in s. 1(6) for the use of an application form. A model application form is included with the Policy as Appendix A.
- Section 6 of the Policy requires that a Service Provider register annually with the municipality. Although annual registration is not a requirement of the Act, it is recommended as a best practice. Annual registration helps to guarantee that the municipality has the information necessary to make informed decisions with respect to the safety of firefighters and the public. However, annual registration requires more diligence by both the Municipality and Service Providers, so be sure the resources are in place to manage annual registrations.
- Section 8 of the Policy is designed to provide the body corporate with an avenue for appeal to Council should the CAO decide to refuse to register the body corporate as a fire department or as an emergency services provider.

The chapter # in the policy title bar should be replaced by each municipal unit with the chapter # it assigns to this Policy.

APPENDIX II; WEST HANTS /VALLEY COMMUNICATIONS CONTRACT

THIS AGREEMENT made this 10 day of May,2017 between:

PARTIES:

THE MUNICIPALITY OF WEST HANTS, a body corporate pursuant to the *Municipal Government Act*, S.N.S. 1998, chapter 18, as amended, having its chief place of business at 67 Morison Drive, Hants County, Nova Scotia (hereinafter called the "Municipality")

OF THE FIRST PART

- and -

VALLEY COMMUNICATIONS INCORPORATED, a body corporate pursuant to the Companies Act, R.S.N.S.,1989, Chapter 81, as amended, having its registered office and chief place of business at 217 Belcher Street, Kentville, Kings County, Nova Scotia (hereinafter called "Supplier")

OF THE SECOND PART

WHEREAS fire and emergency dispatch services are required for departments serving the geographic area comprising the Municipality of West Hants;

AND WHEREAS the Supplier wishes to enter into an agreement with the Municipality pursuant to Sections 65(e) and 47(5) of the Municipal Government Act to provide fire and emergency services for the fire departments as follows:

NOW THEREFORE BY THESE PRESENTS, IT IS AGREED AS FOLLOWS:

1. **TERM OF AGREEMENT**

The term of this Agreement is for three years commencing at noon on July 1, 2017 and ending on June 30, 2020, as set out in 'Schedule A'.

2. **SERVICES TO BE PROVIDED BY SUPPLIER**

For the term of this Agreement, the Supplier shall provide Emergency Dispatch Services for the Municipality twenty-four (24) hours per day for each and every day of the year, including Sundays and Statutory Holidays and shall keep full and complete records of in-coming and out-going dispatch communications. Dispatch communications to emergency response units shall be provided quickly, clearly and effectively, including relating all appropriate information to the emergency response unit to maximize the effectiveness of the emergency response. The Supplier will comply with the standards or guidelines regarding emergency dispatch which may be set by the Province of Nova Scotia or the Municipality from time to time. The Supplier will, where appropriate, unless otherwise agreed, use any technology, equipment, software, computer hardware that may be provided by the Municipality to the Supplier for such purposes and shall follow such additional practices and procedures, in respect of telephone answering, emergency dispatch and record keeping as may be requested by the Municipality from time to time.

3. PRICE ADJUSTMENT

The contract price herein shall be subject to an automatic price adjustment of 2% beginning in year three on the first day of July,2019, with an adjustment to per capita numbers effective April 1, 2017, based on the 2016 federal census numbers. This price adjustment is contingent on the Municipality signing a one year extension letter with the Supplier.

4. PRICE

Subject to price adjustments as provided for herein, the Municipality shall pay the Supplier $2,561.33 per month, plus all applicable taxes for the period July 1, 2017 to June 30,2019 for fire dispatch in the West Hants coverage areas.

5. PAYMENT

The Municipality will pay the monthly amount within 45 days of receipt of a monthly invoice from the supplier and will pay interest to the supplier on any amount overdue to the Supplier at a rate of 2% per annum.

6. SET-OFF

The Municipality may set-off from any sums payable under this Agreement any sums due and owing or reasonably estimated to be due and owing to the Municipality by VCI whether arising under this Agreement or otherwise.

7. EMPLOYMENT OF DISPATCHERS

The Supplier may employ such dispatchers and managers as it deems necessary to perform the services required of the Supplier under this Agreement. The Municipality may not control, direct or supervise the Supplier's employees. The Supplier shall not hold out to third parties that its employees are officers or employees of the Municipality, or that any of the services provided by the Supplier are provided as agents of and for the Municipality, except with the express written consent of the Municipality.

8. EQUIPMENT AND SUPPLIES

The Municipality shall supply the equipment, tools and software ("Equipment") to the Supplier, or appropriate replacement Equipment, and may provide such additional Equipment as it deems necessary. This Equipment shall be used solely for emergency dispatch services for the Municipality. The Supplier shall be responsible for the operation of such Equipment during the term of the Agreement and for the cost of replacing any Equipment damaged by the Supplier beyond ordinary, reasonably expected wear and tear. The Municipality shall retain ownership over all Equipment that is paid for or supplied by the Municipality, including replacement or additional Equipment.

9. STANDARD OPERATING GUIDELINES

Standard Operating Guidelines (SOGs) will be reviewed and updated from time to time. During the term of the contract the SOGs may be reviewed further by the Municipality, which may result in some procedural changes which the Supplier will be required to implement. In the event that significant cost increases result from such changes the Supplier will be entitled to a reasonable price adjustment to be agreed or failing agreement to be determined by arbitration.

10. TRAINING

The Supplier will be responsible for all costs associated with their employees attending fire dispatch related training.

11. RECORD KEEPING/REPORTING REQUIREMENTS

The Municipality will require that monthly reports be completed and forwarded to the Municipality and its respective fire departments ("brigade") providing service to the Municipality, as well as retained by the Supplier during the term of the Agreement. The types of records shall include, but not limited to, the number of calls taken, calls dispatched, and incident types. All emergency calls, with accurate time and date, must be recorded when at all possible. A copy of digital recordings, if available, are to be kept on site for the duration of the Agreement, and copies are to be made available upon the request of any brigade, when a recording contains information related directly to them, or an investigation.

12. INSURANCE

The Supplier shall provide to the Municipality proof that the Supplier has Liability Insurance naming the Municipality as an additional named insured in the minimum amount of Five Million Dollars ($5,000,000), providing coverage to the Supplier for any negligent or wrongful acts or omissions regarding the services provided pursuant to this agreement, within 30 days of the signing of the Agreement. The Supplier shall maintain insurance coverage as described herein and this clause shall not be construed to prevent or inhibit a claim by the Municipality or its insurers against the Supplier or its insurers which would be available in the absence of this paragraph.

13. CAUSE FOR TERMINATION OF THIS AGREEMENT

This Agreement may be terminated at the election of the other party in the event of bankruptcy or insolvency of a party or a material breach of any of the terms of this Agreement by a Party or in the event the Province of Nova Scotia adopts a province-wide fire emergency dispatch system. In the event of exercise of this clause pertaining to provincial adoption of a province-wide fire/emergency dispatch system, by the Municipality, one year's notice or pay in lieu of notice for one year, totalling one year, shall be given to the Supplier. Failure to comply with any standards required of the Supplier by the Municipality shall constitute a material breach if the Supplier has been given seven days notice to rectify the problem and has failed to do so to the reasonable satisfaction of the Municipality.

14. EFFECT OF TERMINATION

In the event of termination, including termination ultimately determined to be wrongful, the Supplier shall forthwith deliver over to the Municipality all Equipment owned by the Municipality under Paragraph 8 of this Agreement. In the event of termination for breach of contract, an arbitrator may award damages as an additional remedy. An arbitrator may award damages in the event the Agreement was wrongfully terminated by a Party, but shall not have authority to reinstate the Agreement.

15. GOVERNING LAW

This Agreement shall be governed by and construed in accordance with the laws of the Province of Nova Scotia.

16. AMENDMENT

This Agreement may be replaced, renewed or amended during its term by the duly executed written agreement of both parties and only in that manner.

17. ARBITRATION

In the event of disagreement between the parties as to the amount payable hereunder or as to the interpretation, application or administration of this Agreement, such disagreement shall be submitted to arbitration pursuant to the provisions of the *Arbitration Act,* with each party appointing one arbitrator who in turn shall appoint a third arbitrator unless the parties agree on a single arbitrator or to some other form of dispute resolution.

18. WAIVER

No action or failure to act, and no payment of money shall constitute a waiver of any right or an approval of any breach of duty except as may be specifically agreed in writing.

19. ENTIRE AGREEMENT

This Agreement contains the entire Agreement between the parties and it may only be amended by written agreement. Each party acknowledges that the parties have made no representations which it would be reasonable for the other party to rely upon or which have induced the other party to enter this Agreement and each party accepts as its own the risk of relying upon oral representations or promises, irrespective of whether such representations or promises be made before or after the execution of this Agreement. Each party acknowledges and agrees that the collateral contracts that exist in connection with the three county fire departments of Hantsport, Brooklyn, and Summerville, will become null and void during the term of this Agreement, namely on June 30, 2017.

20. ASSIGNMENT

No Party shall assign this Agreement without the written consent of the other Party, which shall not be unreasonably withheld.

21. SUCCESSORS

This Agreement shall be binding upon the parties hereto, their successors and assigns. No Party shall assign this Agreement without the written consent of the other Party.

22. MUTUAL INDEMNITY

Each Party shall indemnify and save harmless the other from all liabilities, damages, losses or expenses attributable to, but only to the extent it is attributable to any breach by the indemnifying Party of any covenant or condition in this Agreement, or any act of negligence by the indemnifying Party. Such indemnity shall survive the termination of this Agreement, and anything in this Agreement to the contrary notwithstanding. Notwithstanding anything to the contrary, the Municipality shall not be liable for, in any event, any indirect or consequential damages suffered by the Supplier, including without limitation loss of income and loss of profits. Further, the obligation to indemnify pursuant

to this paragraph does not extend to or include any obligation to indemnify the Supplier for any act or omission of any brigade, other emergency service provider, or the 911 service, including negligence.

IN WITNESS WHEREOF the parties of have executed this Agreement by the hands of their duly authorized representatives.

SIGNED AND DELIVERED:

May 10, 2017
Date

Witness

MUNICIPALITY OF WEST HANTS

Chief Administrative Officer

Municipal Clerk

SIGNED AND DELIVERED:

June 5/2017
Date

Witness

VALLEY COMMUNICATIONS INC.

Per:

President

SCHEDULE 'A'

6

CONTRACT PRICE

The Municipality covenants to pay the following amounts to the supplier for provision of fire emergency dispatch and emergency call-taking services. The period of July 1, 2017 to June 30,2020 is based on emergency call-taking and dispatch for the entire Municipality of West Hants, excluding the Town of Windsor, and based on the 2016 federal census. From April 1, 2017 - March 31, 2020, the costing will be adjusted to reflect the 2016 federal census numbers, with a 2% increase in the third-year of this contract. Existing contracts with individual fire departments will become null and void, effective June 30, 2017.

July 1, 2017 – June 30, 2018
$2.00 per capita per annum based on the 2016 Federal Census numbers of 15368 persons $2561.33/mo

July 1, 2018 – June 30, 2019
$2.00 per capita per annum based on the 2016 Federal Census numbers $2561.33

July 1, 2019 – June 30, 2020
$2.04 per capita per annum based on the 2016 Federal Census numbers $2612.56

u:\fire services\fire services policy 2017\dispatchwest hants v1may92017.docx

APPENDIX III; TOWN OF WINDSOR /VALLEY COMMUNICATIONS CONTRACT

THIS AGREEMENT made in duplicate on the 16th day of May, 2019

BETWEEN: **VALLEY COMMUNICATIONS INCORPORATED,** in Kentville, in the County of Kings and Province of Nova Scotia,

Hereinafter referred to as the **"COMMUNICATION SERVICE"**

OF THE ONE PART

-and-

TOWN OF WINDSOR, in the County of Hants and Province of Nova Scotia

Hereinafter referred to as the **"TOWN"**

OF THE OTHER PART

IN CONSIDERATION of the covenants, agreements, and conditions contained herein, the Parties hereto agree as follows:

1. The Communication Service shall provide communication services for the use and benefit of the Town. Said services to be by utilization of equipment and operators of the Communication Service interconnected with equipment owned or leased by the Town.

2. The term of this Agreement shall be for One (1) year, and shall commence on the 1st day of July, 2019 and end on the 30th day of June, 2020 subject to provisions for prior termination as hereinafter contained.

3. The Parties acknowledge that charges for Communication Services for the term commencing on the 1st day of July, 2019 and ending on the 30th day of June, 2020 shall be as follows:

   (i) A flat monthly rate of $608.00 (six hundred eight dollars and zero cents) and any applicable taxes.
   (ii) The sum payable for communication services for each month or part thereof shall be due and payable on or before the 1st day of each and every month during the term or until termination of this Agreement, beginning on the 1st day of July, 2019.
   (iii) In respect to payment due and in arrears for more than Thirty (30) days, there will be an additional charge of two percent (2%) per month interest on the unpaid balance.

4. The Town and/or the Windsor Fire Department will supply the transmitters and receivers for the provision of Communication Services and will be responsible for all costs and charges for its own telephone linkage and any other costs and charges associated with the installation, repair, and upkeep of such equipment.

5. The Communication Service will maintain a high standard of service and strict confidentiality with respect to its performance of its services under this Agreement.

6. During the term of this Agreement, the Communication Service will not be liable for interruptions, interference or termination of communication services in event that such interruption, interference or termination is caused by an act of God, fire, unavoidable casualty, or any other cause of any kind whatsoever beyond the reasonable control of the Communication Service.

7. Any changes in the usual operation of the Communication Service or the Town that may affect the other party, and any complaints of any sort shall be communicated by the President of Valley Communications Incorporated to the Chief of the Fire Department and by the Chief of the Fire Department to the President of Valley Communications Incorporated and to no other persons.

8. This Agreement may be terminated by either party by notice of such intention in writing sent by registered mail addressed to the other party at its business address and the effective date of termination shall be three (3) months after date of mailing such notice, PROVIDED HOWEVER, that in the event of termination of communication services by reason of such causes as set out in Clause 6 herein, this Agreement shall terminate on the 1st day of the month immediately subsequent to such termination of communication services.

9. Time shall be of the essence in this Agreement.

10. In this Agreement, the singular shall include the plural and the masculine shall include the feminine, with the intent that this Agreement shall be read with all appropriate changes of number and gender.

11. This Agreement shall inure to the benefit of and be binding upon the parties hereto, their heirs, administrators, successors and assigns.

IN WITNESS WHEREOF the Parties hereto have properly executed and placed their respective seals on this Agreement on the day, month, and year first written above.

SIGNED, SEALED AND DELIVERED
In the presence of:

Katie MacKay

J Goudreault

VALLEY COMMUNICATIONS INCORPORATED

PER: Joan M. Garden
JOAN M. GARDEN
PRESIDENT

TOWN OF WINDSOR

PER:

PER:

APPENDIX IV; PROVINCIAL LEGISLATION

The Region of Windsor and West Hants Municipality Act

All municipalities are creations of the province and are an extension of provincial jurisdiction. The Region of Windsor and West Hants Municipality was created under Bill 55 *"An Act to Incorporate "The Region of Windsor and West Hants Municipality,*" dated October 9, 2018. On April 1, 2020, the consolidation (regionalization) of the two municipalities will come into effect.

The Municipal Government Act

The *Municipal Government Act* provided for the establishment and governance of fire protection in the new Regional Municipality. The main provisions are as follows;

"2 The purpose of this Act is to

(a) give broad authority to councils, including broad authority to pass by-laws, and to respect their right to govern municipalities in whatever ways the councils consider appropriate within the jurisdiction given to them;

(b) enhance the ability of councils to respond to present and future issues in their municipalities; and (c) recognize the purposes of a municipality set out in Section 9A. 1998, c. 18, s. 2; 2019, c. 19, s. 1."

"9A The purposes of a municipality are to

(a) provide good government;

(b) provide services, facilities and other things that, in the opinion of the council, are necessary or desirable for all or part of the municipality; and

(c) develop and maintain safe and viable communities. 2019, c. 19, s. 2."

"3 Interpretation

In this Act

(o) "council" means the council of a municipality, except as otherwise defined in this Act;

(ac) "emergency services" means services related to the provision of emergency services, including fire services, emergency medical services, search and rescue, water rescue and assistance and protection for people and property in the event of disasters including, but not limited to, floods, hurricanes, motor vehicle accidents and chemical spills;

(af) “fire department” means an incorporated body that provides fire services and that may, at its option, provide one or more other emergency services, and includes a fire or emergency services department of a municipality, village, fire protection district or other body corporate;

(ah) “fire services” means services related to the prevention and suppression of fires;”

“Power to make by-laws

174 Without limiting the generality of Section 172, a council may make by-laws respecting

(b) the prevention and fighting of fires;

(d) fire and burglar alarms;”

“293 The Regional Municipality may maintain and provide fire and emergency services by providing the service, assisting others to provide the service, working with others to provide the service or a combination of means.”

“294 (1) A body corporate may apply to a municipality for registration as a fire department.”

The Act restricts the municipality from refusing a corporate body for the provision of fire services if certain conditions are met.

“(2) A municipality shall not refuse to register a body corporate that complies with this Act if the,

(a) municipality is satisfied that the body corporate is capable of providing services it offers to provide;

(b) body corporate carries liability insurance, as required by the municipality;

(c) body corporate does not provide the fire services for profit; and

(d) municipality does not provide same services for the same area.

(3) A fire department, including a fire department of a municipality, village or fire protection district, shall register in each municipality in which it provides emergency services.

(4) A registered fire department shall provide the municipality with a list of specific emergency services it will endeavour to provide and the area in which the services will be provided.

(5) Registration continues in force until withdrawn by the municipality for cause or the fire department requests that the registration be revoked.

(6) A municipality may grant or lend money to, or guarantee a loan for, a registered fire department for operating or capital purposes. 1998, c. 18 municipal government 171

(7) A municipality may grant or lend assets, without charge, to a registered fire department.

(8) Registration does not make a fire department an agent of a municipality.

(9) A registered fire department is not a municipal enterprise pursuant to the Municipal Finance Corporation Act. 1998, c. 18, s. 294."

"296 (1) The council may make policies respecting full-time, volunteer and composite fire departments and emergency service providers in the municipality.

(2) Policies for fire departments and emergency service providers may include

(a) requirements and procedures for registration;

(b) personnel policies with respect to those members who are employees of the municipality;

(c) the manner of accounting to the council for the use of funds provided by the municipality;

(d) an annual meeting to report to the public respecting fire and emergency services;

(e) such other matters as are necessary and expedient for the provision of emergency services in the municipality.

(3) The council may require proof of compliance with its policies before advancing any funds."

Sections 294 and 295 (not quoted above) established the procedures for registering incorporated independent fire departments (body corporate) as well as other than firefighting emergency services (§295), for example ice and water rescue. Such additional services require the acceptance of the Municipality.

Note that the MGA provides in §296 the power to regulate all fire service providers through policy of Council.

Further powers were provided that gave the Municipality broad authority in the provision and regulation of fire services;

"Power to make by-laws

172 (1) A council may make by-laws, for municipal purposes, respecting (a) the health, well being, safety and protection of persons; (b) the safety and protection of property;

174 The council shall make decisions in the exercise of its powers and duties by resolution, by policy or by by-law."

The MGA provides powers directly to firefighters to assist their activities;

"Powers where fire

297 (1) When any fire, rescue or emergency occurs, the fire chief or other officer in charge, and any person under the direction of that officer, shall endeavour to extinguish the fire and prevent it

from spreading, conduct the rescue or deal with the emergency {emphasis added} and, for that purpose, may:

(a) command the assistance of persons present and any inhabitant of the Municipality;

(b) remove property from buildings on fire or in danger of fire;

(c) take charge of property;

(d) enter, break into or tear down any building;

(e) exclude and remove persons and vehicles from the building or vicinity; and

(f) generally, do all things necessary to respond to the emergency.

(2) It is an offence to disobey any lawful order or command of the officer in charge.

(3) Where a fire alarm is given or the officer in charge has reason to believe that a fire exists on any premises, the officer in charge and any person under the direction of that officer may enter or break into any building for the purpose of ascertaining whether a fire exists.

(4) The officer in charge may direct that a building be pulled down or otherwise destroyed if, in the judgment of that officer, doing so will tend to contain a fire or protect the public from a dangerous condition.

(5) A Municipality, a fire department, an emergency services provider and an officer in charge, and a person acting under the direction or authority of that officer, are not liable for an act done in the exercise of any of the powers conferred by this Section. 2008, c. 39, s. 308."

As quoted above, § 297 (1) of *the MGA* said that there is a duty and thereby an expectation placed upon firefighters. This duty was described as: "…*shall endeavour to extinguish the fire and prevent it from spreading, conduct the rescue or deal with the emergency…*" This duty also comes with some considerable powers and protections, thereby facilitating the firefighters in their endeavours, including §299 which made it an offense to interfere with firefighters and fire protection systems.

The MGA also provides some specific protection against liability;

"No Liability

300 The Municipality, an employee of the Municipality, a member of the fire department of the Municipality, a registered fire department, a member of a registered fire department, a registered emergency services provider and a member of a registered emergency services provider are not liable for an act or omission in providing, or failing to provide, an emergency service, unless they are grossly negligent."

It is not uncommon for §300 to be interpreted as "fire departments/municipalities cannot be sued," but that is an erroneous idea. They can be sued, and so can all others who have any level of responsibility in an alleged act or omission. What is certain is that such a suit will be successful if the plaintiff can successfully establish gross negligence.

Restriction on where action may or may not lie with respect to liability was provided in §301, not quoted here.

The MGA permits the Municipality or a fire department to provide or to receive assistance from other municipalities. Particular protection are provided, as follows;

> "Mutual-aid
>
> 302 (1) The Municipality may assist at fires, rescues or other emergencies occurring outside its boundaries.
>
> (2) A municipality may agree with municipalities, villages, fire protection districts, federal and provincial departments and agencies or others to provide assistance at fires, rescues and other emergencies and to receive assistance at fires, rescues and other emergencies.
>
> (3) A fire department that assists a registered fire department pursuant to a mutual-aid agreement is not required to register and is entitled to all of the protections provided by this Act for the assisted fire department.
>
> (4) An emergency services provider that assists a registered fire department or registered emergency services provider pursuant to a mutual-aid agreement is not required to register and is entitled to all of the protections provided in this Act for the assisted fire department or emergency services provider. 1998, c. 18, s. 302."

The Fire Safety Act

The Fire Safety Act[101], 2002, c. 6, was enacted in early 2003 and primarily dealt with issues surrounding fire safety in buildings and public places. However, *the Fire Safety Act* had the potential to have wide affects on the delivery of fire services; primarily fire prevention but also fire suppression services.

Fire Marshal

The *Fire Safety Act* continued the office of the provincial Fire Marshal (**NSFM**) from previous Acts. The NSFM is the leading official/authority in fire protection in Nova Scotia. The NSFM is responsible for implementing and enforcing the provisions in the *Fire Safety Act*, and in §13(4) has authority over other acts;

> "Personnel
>
> 9 (1) Such persons as are necessary for the administration and enforcement of this Act and the regulations shall be appointed in accordance with the Civil Service Act, except where this Act provides otherwise.
>
> (2) The Minister[102] shall designate from among those persons appointed pursuant to subsection (1), a Fire Marshal and one or more deputy fire marshals to perform the duties and functions, and exercise the powers and authorities, imposed or conferred upon them by this Act, the regulations and the Fire Code.
>
> …"
>
> "Powers and duties of Fire Marshal
>
> 13 (1) The Fire Marshal may
>
> (a) promote, encourage and co-operate with any body or person interested in developing and promoting the principles and practices of fire prevention and the protection of life and property against fire, including promoting, encouraging and delivering public fire-safety education programs and training and supporting and assisting others to provide public fire-safety education programs and training;
>
> (b) advise persons or organizations interested in developing or promoting the principles and practices of fire suppression, fire prevention, fire-safety education, emergency services and related communication systems, and the delivery of those services and systems;
>
> (c) investigate conditions under which fires occur;

[101] Chapter 6 of the acts of 2002, "An Act to Promote and Encourage Fire Safety," short title; *Fire Safety Act*.

[102] The Fire Safety Act; §3(y) ""Minister" means the Minister of Environment and Labour"

(d) require such reports as the Fire Marshal deems necessary from persons authorized or required to inspect, investigate or examine;

(e) maintain in the Fire Marshal's office a statistical record of all fires reported to the Fire Marshal;

(f) collect and disseminate information with respect to fires in the Province;

(g) study methods of fire safety;

(h) make recommendations, including guidelines, respecting

(i) fire suppression, fire prevention, fire protection and the training of persons involved in the provision of these services as well as rescue and emergency services and the delivery of these services and matters related to any of them,

(ii) the establishment of fire departments and fire brigades,

(iii) the provision of adequate water supply, and

(iv) fire-hose couplings and connections for fire-fighting equipment.

(2) The Fire Marshal shall exercise such other powers and perform such duties as are assigned to the Fire Marshal

(a) pursuant to this Act, the regulations or the Fire Code; or

(b) by the Minister.

(3) The Fire Marshal shall submit, annually to the Minister in each year, a detailed report for the twelve months ending on March 31st, in such form as the Minister may prescribe.

(4) The Fire Marshal has the power and authority to enforce compliance with

(a) this Act, the regulations and the Fire Code; and

(b) all other Acts of the Province relating to the prevention and suppression of fires and all regulations and by-laws made thereunder, including any codes and enactments incorporated by reference therein {emphasis added}."

Fire Marshal Authority over the Regional Municipality

The powers granted to the NSFM gave this official significant authority to direct municipal fire services and their personnel in the execution of their duties particularly in the areas addressed by the *Fire Safety Act*. These areas are primarily related to fire code enforcement through inspection and related fire safety activities to be undertaken by Regional Municipal personnel.

As quoted above, we note that §13(4)(b) in the *Fire Safety Act* permits the NSFM to "*enforce compliance*" with fire prevention *and* suppression[103] activities undertaken by *Regional Municipal* personnel. For clarity, the NSFM's authority extends to legislation other than just *the Fire Safety Act*, which would include for example; municipal by-laws insofar as they address fire safety concerns.

As quoted above, §13(1)(h) states that the NSFM also has the power to enact guidelines for all aspects of fire prevention and suppression activities, including the training of personnel. In this regard, the NSFM has wide discretionary power to affect the standard of care in providing fire services.

Municipal By-Laws Permitted

The municipality can, at its discretion, enhance its ability to regulate fire safety by enacting more by-laws, as follows;

> "Municipal by-laws
>
> 5 (1) Subject to subsection (2), nothing in this Act prevents a municipality from making and
>
> enforcing by-laws relating to matters dealt with by this Act, the regulations or the Fire Code, including by-laws that impose or prescribe higher or more stringent standards or requirements than those provided for by this Act, the regulations or the Fire Code.
>
> (2) Where a by-law of a municipality conflicts with this Act, the regulations or the Fire Code, this Act, the regulations and the Fire Code prevail to the extent of the conflict. 2002, c. 6, s. 5."

Local Assistant to the Fire Marshal

The *Fire Safety Act* permits the NSFM to appoint *Regional Municipal* officials to assist in carrying out some of the powers assigned to the NSFM within the jurisdictional boundaries of *the Regional Municipality*. As a practical measure, most municipalities have one or several members of the fire department designated as a *Local Assistant to the Fire Marshal* assigned to fire safety duties.

[103] The *Fire Safety Act* states in the Interpretation section that ""fire suppression" means an organized emergency response for controlling and extinguishing fires."

Usually (in addition to the fire chief), these persons are qualified members of the fire prevention division of a fire department. These officials take point position for this work in the municipality and they needed to obey directions from the NSFM as well as their organizational superiors.

> "Local Assistant to Fire Marshal
>
> 14(1) The Fire Marshal may appoint as a local assistant to the Fire Marshal a qualified fire chief or, with the consent of the fire chief, another qualified member of the fire chief's fire department.
>
> …
>
> (4) Local assistants to the Fire Marshal shall, within their territorial jurisdiction and, subject to the directions of the Fire Marshal, assist in administering this Act, the regulations and the Fire Code.
>
> …"

Fire Safety Inspections Required

The Fire Safety Act required municipalities to perform fire-safety inspections of properties, as follows;

> "Duties of a municipality
>
> 19 (1) A municipality shall
>
> (a) establish a system of fire-safety inspections of land and premises situate within its jurisdiction, as required by the regulations, to provide for compliance with this Act, the regulations and the Fire Code;
>
> (b) appoint a municipal fire inspector who shall carry out the inspections; and
>
> (c) ensure that the Fire Marshal is notified, in writing, of the appointment of the municipal fire inspector and the revocation of any such appointment.
>
> (2) A municipality that is required to establish and conduct a system of inspections pursuant to subsection (1) shall ensure that
>
> (a) a record is made of every inspection undertaken by the municipality;
>
> (b) the records are made available, on request, to the Fire Marshal or a deputy fire marshal; and
>
> (c) unless otherwise prescribed by the regulations, the records are kept for at least five years."

Fire Safety Regulations, NS Reg 48/2003, state in §13 and §14 the municipal responsibilities for inspection of occupancies;[104]

> "Responsibility of municipality to inspect
>
> 13 … a municipality must, within the specified time periods, inspect the following occupancies for compliance with the Act and these regulations:
>
> (a) within 12 months of the coming into force of these regulations, assembly occupancies (Group A) …
>
> …
>
> 14 (1) A municipality must inspect an assembly occupancy (Group A) once every 3 years
>
> after the inspection under Section 13.
>
> (2) A municipality must carry out a system of fire inspections on all buildings containing
>
> the following occupancies:
>
> (a) a residential occupancy (Group C) that has more than 3 units and is not regulated under the Homes for Special Care Act;
>
> (b) a business and personal services occupancy (Group D);
>
> (c) a mercantile occupancy (Group E); and
>
> (d) an industrial occupancy (Group F)."

The Regional Municipality has a duty to inspect certain occupancies on a regular basis, as noted above, for determining compliance to the *Fire Safety Act* and regulations and correcting any issues found.

[104] The Nova Scotia Building Code Act. R.S., c. 46, s. 1 defines in the Interpretation section; "2(n) "occupancy" or "class of occupancy" means the use or intended use of a building, as defined in the Building Code"

Note: In brief, despite there being multiple sub-classifications, each major classification contains; Group A is assembly (i.e. public gathering), Group B is institutional (e.g. jail, hospital), Group C is residential, Group D is business or personal service (e.g. bank, dental office), Group E is mercantile (e.g. department store, shops), and finally Group F is industrial. The Building Code defines the classifications and the Fire Code repeats the definitions.

Fire Code

The Fire Safety Act adopted into Nova Scotia law the National Fire Code[105] (NFC), with appropriate modifications. The NFC concerns itself with building fire safety, ensuring that provisions required by the National Building Code are maintained and operated properly.

Power to Enter

There is another significant provision in *the Fire Safety Act.* It is the extraordinary power (when justified) for the fire department to enter on lands or premises to save a life. It is important to note that these powers are not restricted to buildings.

> "Emergency entry
>
> 28 (1) Where the Fire Marshal, a deputy fire marshal, a local assistant or a fire chief or other officer of a fire department in charge of directing fire-suppression activities has reasonable grounds to believe that a risk of fire poses an immediate threat to the life of a person, the fire official may, without a warrant and at any time, enter upon and inspect land or premises and may
>
> (a) call upon a police officer;
>
> (b) use such force as is necessary, to make the entry or exercise the powers authorized by this Section.
>
> (2) On an entry pursuant to subsection (1), a fire official may
>
> (a) remove persons from the land or premises;
>
> (b) order orally, or in writing, that no person, other than a person permitted by the fire official making the entry, shall be permitted to be, or be, present on the land or premises identified in the order until the fire official otherwise orders;
>
> (c) post a fire watch;
>
> …
>
> (h) do anything that the fire official reasonably believes is required to remove or reduce the threat to life.
>
> …"

[105] From https://www.nrc-cnrc.gc.ca/eng/publications/codes_centre/2015_national_fire_code.html "The National Fire Code of Canada 2015 (NFC), published by NRC and developed by the Canadian Commission on Building and Fire Codes, sets out the technical provisions regulating activities related to the construction, use or demolition of buildings and facilities, the condition of specific elements of buildings and facilities, and the design or construction of specific elements of facilities related to certain hazards as well as the protection measures for the current or intended use of buildings."

It is the powers contained in §28 of *the Fire Safety Act* that permitted firefighters, either themselves or with the assistance of the police, to evacuate people who were in danger from a fire.

Fire Investigation

Under §32 of *the Fire Safety Act* it was required that the municipality investigate fires, as follows;

> "**32 (1)** Subject to subsections (4) and (5), the local assistant shall *immediately*, and in no case later than twenty-four hours following a fire, investigate, or cause to be investigated, the *cause*, *origin* and *circumstances* of every fire by which property has been destroyed or damaged that occurs within the municipality or part thereof for which the person is a local assistant, unless otherwise directed by the Fire Marshal.
>
> …"

Local Assistants to the Fire Marshal have the power and the duty to take possession of a fire scene and conduct an investigation, involving the local police or Fire Marshal investigators when indicated, and report the results of the investigation to the Fire Marshal. They also must maintain custody of the scene in order for any evidence obtained in an investigation to be valid.

Forests Act

The Forests Act[106], RS., c. 179, s. 1, contains several provisions relating to fire protection. The province takes responsibility for the protection of forests in Nova Scotia, including from fire;

> "Protection of forests
>
> 21 (1) The Minister[107] shall undertake all measures which the Minister determines to be reasonable to provide for effective protection of the forests whether Crown lands, other land vested in the Crown or privately-owned land from various injurious agents, including fires, insects and diseases.
>
> (2) The Minister shall undertake programs to ensure that the capability to detect and suppress forest fires is enhanced."
>
> "Prevention and suppression of fires
>
> 22 (1) Subject to subsection (2), the Minister has control over the prevention and suppression of fires in the woods[108].
>
> (2) Every city or incorporated town, and a regional municipality with respect to that area of the regional municipality that was a city or town immediately prior to the incorporation of the regional municipality, shall at its own expense take reasonable steps to extinguish fires in the woods within its boundaries and, where a conservation officer deems the action being taken is not adequate, the Minister may take reasonable steps to control and extinguish the fire.
>
> (3) Nothing in this Act imposes any obligation on the Minister to fight fires on any land or the Crown to pay compensation for any property destroyed or damaged by fire or as a result of fighting a fire. R.S., c. 179, s. 22; 1998, c. 18, s. 559."

Section 21 of *the Forests Act* shows that the province is invested in the protection of crown and private forests from fire and will take all reasonable steps to protect the forests. Subsection 22(2) of the Act delegated fire protection within incorporated boundaries to municipalities. In the case of regional municipalities, the subsection says that this delegation only applied to the boundaries of the pre-existing incorporated components of the new regional municipality.

[106] Chapter 179 of the revised statutes of 1989, "An Act Respecting Forests," short title; the *Forests Act*.

[107] The *Forests Act;* §**3(o)** ""Minister" means the Minister of Lands and Forests"

[108] The *Forest Fire Protection Regulations*; §2(k) ""woods" means forest land and rock barren, brushland, dry marsh, bog or muskeg."

Subsection 22(2) further states that the Province may takeover firefighting activities within municipal boundaries if provincial conservation staff are not satisfied with the way the municipality is fighting the fire.

The Town of Windsor has a legislated duty under *the Forests Act* to "*take reasonable steps to extinguish fires in the woods*" inside the boundaries of the Town of Windsor. With the Regionalization of the municipality of Windsor and West Hants Municipality, Windsor will no longer exist as a town but will be come part of a regional municipality. Yet as per the *Act*, the responsibility for fires in the woods will become the responsibility of the new Regional Municipality but only for the area which was formerly the boundaries of the Town of Windsor.

The province has the power to restrict the lighting of fires in the woods and to restrict persons from entering the woods when the risk of fires was high enough to be of concern.

> "Fire proclamation
>
> 24 (1) Notwithstanding any other provision of this Act, the Minister may, whenever the Minister deems it necessary for the protection of woods, by proclamation, prohibit the setting of fires for any purpose in woods or within one thousand feet of woods in any part or parts of the Province during the period specified in the proclamation.
>
> (2) Where a proclamation is made pursuant to subsection (1), no person shall ignite or cause to be ignited a fire in the woods or within one thousand feet of woods in a part or parts of the Province during the period specified in the proclamation."
>
> "Restricted travel zone
>
> 25 (1) Whenever deemed necessary for the protection of the woods, the Minister may at any time by proclamation set aside for any period of time a restricted travel zone in any area of woods upon which no person shall enter for the purpose of travelling, camping, fishing or picnicking, or any other purpose, without a travel permit."

The *Forests Act* also had provisions for fire suppression and fire prevention, as follows;

> "Fire fighting
>
> 26 (1) For the purpose of controlling and extinguishing a fire in the woods, a conservation officer may requisition the use of any privately-owned equipment and encourage people to assist in extinguishing a fire.
>
> …

(4) Every person who is aware that a fire has started and exists in any woods shall notify a conservation officer or the Department and any person who neglects or refuses to do so is guilty of an offence. R.S., c. 179, s. 26."

"Fire prevention

27 (1) No person who is in the woods or within one thousand feet of the woods during the fire season shall throw, drop or otherwise deposit any burning match, cigarette, cigar or smoking material, live coals, hot ashes or burning substance, or fail to extinguish any such thing.

(2) Where a person is permitted to ignite a fire pursuant to this Act, that person shall take every reasonable effort to prevent the fire from spreading and shall not leave the fire unattended until it is completely extinguished.

(3) No person shall ignite or cause to be ignited a fire on privately owned land without the permission of the owner or occupier except in an emergency situation for cooking or warmth or as a distress signal and only if the fire is made in a suitable place and precautions taken against the spreading of the fire.

…

(8) During the fire season, any person in charge of a group entering the woods for any purpose shall ensure that that person and any persons under that person's charge are fully informed of the provisions of this Act and the regulations pertaining to forest fire protection. R.S., c. 179, s. 27."

Forest Fire Protection Regulations

The regulations pertaining to fire protection arising from the Forests Act are the Forest Fire Protection Regulations.[109] These regulations set the "fire season" in the Regional Municipality and the appropriate restriction, as follows;

"3 (1) The fire season for the counties of Yarmouth, Digby, Shelburne, Kings, Annapolis, Queens and Lunenburg shall be the period of time during each year from the first day of April to the fifteenth day of October, both dates inclusive.

(2) The fire season for all other counties in the Province shall be the period of time during each year from the fifteenth day of April to the fifteenth day of October, both dates inclusive.

(3) Except as provided in the Act, during the fire season as prescribed in subsections (1) and (2), no person shall set, start, kindle or maintain a fire in the woods or within one thousand feet of the woods without a valid permit to burn."

[109] "*Forest Fire Protection Regulations* made under subsection 23(2) and Section 40 of the Forests Act, RSNS 1989, c. 179, NS Reg 55/87, NS Reg 167/2008," short title; *Forest Fire Protection Regulations.*

Summary of Duties and Powers, Provincial Legislation

The following is a summary of the fire protection related legal duties and discretionary powers of each responsible party as found in the various provincial legislation noted above in this chapter.

Party	Legislation	§	Type	Summary
Municipality	MGA	174	Power	May make by-laws respecting fire prevention and fighting of fires
Municipality	MGA	293	Power	May maintain and provide fire & emergency services
Municipality	MGA	294 295	Power	May accept fire department registrations
Municipality	MGA	296	Power	May make policies for governance of fire and emergency service providers
Municipality, etc.	MGA	300	Protection	Protection against liability for powers
Municipality, etc.	MGA	300	Protection	No liability unless grossly negligent
Municipality	MGA	302	Power	May assist at fires, etc., outside municipality
Firefighters		297	Duty	Shall endeavour to extinguish fire, etc.
Firefighters		297	Power	Generally, may do all things necessary to respond to the emergency, etc.
Firefighters		297	Power	Right to enter break into building if fire suspected
Firefighters		297	Power	Destroy buildings to contain fire or protect public from danger
Province	Fire Safety Act	9	Duty	Shall appoint Fire Marshal and staff
Fire Marshal	Fire Safety Act	13(1)	Power	Promote, advise, investigate, direct, collect information, study, recommend, etc.
Fire Marshal	Fire Safety Act	13(2)	Duty	Duties as assigned by Minister
Fire Marshal	Fire Safety Act	13(3)	Duty	Submit annual report to Minister
Fire Marshal	Fire Safety Act	13(4)	Power	Enforce compliance Acts and Fire Code
Fire Marshal	Fire Safety Act	14(1)	Power	May appoint local assistant to the Fire Marshal, may require Fire Chief consent if local assistant is fire department employee
Municipality	Fire Safety Act	5	Power	May make by-laws on matters in the Fire Safety Act, unless conflicts
Municipality	Fire Safety Act	13	Duty	Must inspect Group A premises during Act implementation schedule
Municipality	Fire Safety Act	14	Duty	Must inspect premises according to schedule
Municipality	Fire Safety Act	19	Duty	Appoint inspector, inspect land/premises for Act/Regulation compliance, keep records
Local Assistant (Firefighter)	Fire Safety Act	14(4)	Duty	Local assistant takes direction from Fire Marshal, assist in administering Act and Fire Code
Firefighter, Fire Marshal, etc.	Fire Safety Act	28(1)	Power	Entry without warrant in case of immediate threat to life of a person
Firefighter, Fire Marshal, etc.	Fire Safety Act	28(2)	Power	Remove persons, bar entry, do anything reasonably believes necessary to remove/reduce threat to life
Local Assistant (Firefighter), Fire Marshal	Fire Safety Act	32(1)	Duty	Immediately investigate fires for origin, cause and circumstances
Province	Forests Act	21(1)	Duty	Take all reasonable measures to protect forests from fire, injurious agents, etc.
Province	Forests Act	21(2)	Duty	Shall undertake programs to enhance detection and suppression forest fires
Province	Forests Act	22(1)	Power	Control over prevention and suppression fires in woods
Province	Forests Act	22(2)	Power	May take over firefighting inside municipal boundaries if deemed necessary

Party	Legislation	§	Type	Summary
Province	Forests Act	22(3)	Protection	Not obligated to fight any fire on any land or pay compensation
Province	Forests Act	24(1)	Power	Proclaim the prohibition of setting fires in the woods for protection of woods
Province	Forests Act	24(3)	Duty	Notice of Proclamation shall be issued publicly
Province	Forests Act	25	Power	Proclamation to close the woods to persons
Province	Forests Act	26(1)	Power	Requisition assistance in fighting woods fires
Municipality	Forests Act	22(2)	Duty	Shall take reasonable steps within boundaries to extinguish woods fires (i.e. boundaries
Public	Forests Act	26(4)	Duty	Must report any woods fire
Public	Forests Act	27	Duty	No person through act or carelessness shall start a fire in the woods or cause it to spread, etc.

APPENDIX V; MODEL; VOLUNTEER RECRUITMENT AND SELECTION PROCESS

NOTE: First Define position(s) advertised for and have in place appropriate position job function descriptions.

Purpose

The purpose of this policy is to set out guidelines and procedures regarding recruitment and selection of volunteer firefighters across the Regional Municipality.

Selection Criteria

Definitions:

Applicant: A person who applies for a volunteer position with the Region of Windsor and West Hants Municipality, but has not been accepted into the selection process.

Candidate: An Applicant who has met the minimum requirements and is being considered through the selection process.

Recruit: An entry level firefighter who has been offered an available volunteer position by virtue of successfully challenging the selection process.

Probationary: A volunteer who has successfully completed required training and is on active duty but is still within his/her probationary period.

Permanent: A volunteer who has completed all Probationary requirements.

Requirements

All available openings for Volunteer positions shall be advertised in the local media and posted within The Region of Windsor and West Hants Municipality.

All Applicants for a volunteer position in The Region of Windsor and West Hants Municipality. shall, as a minimum, meet all of the following criteria:

1. Complete the application form and truthfully include all information requested.

2. Be at least 19 years of age at the date of closing for applications.
3. Have completed high school or have a substantial equivalent in education or experience such as a recognized community college certificate in a trade with a standing that demonstrates academic ability.
4. Be available to attend training, and if the position applied for requires, attend emergencies, and to participate, as required.
5. Hold a valid unrestricted Nova Scotia driver's license (Class 5)
6. Have access to a reliable vehicle or means of transportation so that he/she may attend to the fire station or emergency scene as required or needed.

All Candidates in order to be considered for appointment to an available position as a volunteer shall meet as a minimum all of the following criteria:

1. Have good oral and written communication skills.
2. Be of sound mind and body as required to perform the duties required of the position applied for.
3. Be of good character, be strongly motivated, and exhibit a positive attitude.
4. Be willing and able to learn, to take direction, and to be a team player.
5. Successfully complete the Applicant selection process.
6. Submit acceptable criminal and vulnerability reference check and driver's abstract record.

All Probationary firefighters in order to receive a permanent appointment as a volunteer firefighter must meet all of the following requirements.

1. Successfully complete all learning and participation expectations.
2. For active firefighting positions Within two (2) years of appointment obtain a class "3" license with "f" endorsement.
3. Demonstrate that they can meet the requirements of the job description.

Selection Process Overview

In general, an Applicant who meets minimum criteria will pass into the selection process and become a Candidate under consideration. All Candidates who pass the selection process shall be placed on a list for possible appointment as a volunteer. Volunteer vacancies will be filled from such a list and any remaining listed Candidates will be considered for appointment over the 12-month life of the list if there are further vacancies and the Candidate remains suitable and available.

An Applicants or Candidates participating in the application and selection process will not be eligible for reimbursement or compensation of any costs or for any loss of income. An Applicant or Candidate is not considered a Recruit until such time as he/she is formally appointed and meets all conditions of the appointment.

Newly recruited volunteers who are appointed and meet the requirements of the appointment shall be placed on Probation for a period of one calendar year from the effective date of the appointment. Probationary requirements include the completion of all required training and exams as are set down, and the receiving of good reports on quarterly evaluations. Probationary volunteers not meeting these requirements may be subject to dismissal.

Thereafter the first year, Probationary firefighters may be conditionally placed on Permanent status pending their obtaining a 3f driver's license no later than the end of their second year. The new firefighter who fails to obtain a Nova Scotia Class "3" driver's license with "f" endorsement by the end of his/her second year shall be deemed to have not completed the probationary requirements and shall be subject to dismissal.

Procedural Steps and Requirements

1. Information on the selection process and application forms shall always be made available at all Fire Stations within the Region of Windsor and West Hants Municipality.
2. When active recruiting is taking place, an orientation meeting shall be held at a designated time and location for all prospective Applicants, and at least two weeks prior to the deadline for the receiving of applications. Meeting attendance by Applicants is not mandatory but all Applicants and spouses will be encouraged to take advantage of this opportunity to ask questions and to get more information on what it takes to be a Volunteer with the Regional Fire Service.
3. Candidates considered for appointment as a Volunteer shall reside in the fire district for which he/she is applying and in which he/she will serve. In the case of the Applicant who lives relatively near district boundaries, and where there is a greater need for firefighters in one district over another district, at the discretion of the Director of Protective Services an application may be received and a subsequent appointment of a successful Candidate may be made to other than the Candidate's home district.
4. All completed applications and relevant certifications will be submitted to the Regional Fire Service's office before the posted deadline. No consideration of late applications will be made.
5. Each station that requires new volunteers to fill available vacancies shall strike a Selection Committee consisting of not less than three, and not more than four. For firefighter positions the committee shall be comprised of, senior firefighters and officers. The Committee for volunteer firefighter positions shall contain at least one senior firefighter not of officer rank. Committee members from other stations are permitted.

6. Candidate selection shall be on the basis of qualifications, ability and potential. At each stage in the screening process the Candidate will be evaluated for eligibility based upon the volunteer position applied for, to proceed to the next step. All Candidates shall be screened through the following steps of the selection process:
    (a) Screening of Applicant's basic requirements through the application form.
    (b) Completion of an individual interview with the Candidate where factors such as character, motivation and team skills will be evaluated. This is a subjective interview based on pre-set questions and with a structured evaluation scheme and will be scored.
    (c) Through the use of the established evaluation system the Selection Committee shall select Candidates at each evaluation stage, deciding who are eligible to proceed to the next step. Where several stations are recruiting at the same time combined testing events will be scheduled where possible.
7. The successful Candidates from the selection process shall be ranked and the list of all successful Candidates shall be recommended by the Selection Committee to the applicable District Fire Chief. The District Fire Chief shall review the selection documents of all the Candidates for errors in process.
8. The District Fire Chief shall present to the Director of Protective Services a list of recommended Candidates for Recruitment, and a list of waiting-listed Candidates. The Director of Protective Services shall review the District Fire Chief's recommendations and may issue conditional letters of appointment to sufficient Candidates to fill available vacancies in the particular station. Any remaining ranked Candidates shall be notified that they are placed on a 12-month waiting list for further vacancies that might appear over that period.
9. Candidates receiving conditional offers of appointment shall have 14 days to provide the following required documentation:
    (a) At least a "Class 5" Driver's License
    (b) A satisfactory Criminal Reference Check
    (c) A satisfactory Driver's Abstract
    (d) A Doctor's certificate of health using the Municipality's recommended form.
10. The Candidate who provides satisfactory documentation within the time allotted will be required to sign an Acceptance-of-Offer form and shall be placed on the list as a Recruit Firefighter. He/she will be signed onto the Municipality's benefit programs.
11. All Recruit Firefighters shall attend and shall successfully achieve a program of recruit training as is laid down by the Training Division. Recruit Firefighters failing to successfully achieve the recruit program will be terminated.
12. The Recruit Firefighter who successfully completes the Recruit Training Program shall be accepted for service in his/her station as a Probationary Firefighter with limited duties and expectations. For the balance of his/her first year after accepting his/her appointment, the Probationary Firefighter will be expected to pass such tests and to acquire such skills and knowledge as are laid down by the station Training Officer and the Training Division. Failure to satisfactorily achieve these or failure to maintain adequate attendance will be cause for dismissal.
13. Probationary Firefighters will be formally evaluated by the station Training Officer and the station District Fire Chief at the completion of 3 months, 6 months, 9 months, and 12 months of his/her first year. These reviews shall evaluate the Probationary Firefighter's progress and

potential in meeting the Job Requirements of a volunteer firefighter. Concerns identified in these evaluations shall be resolved before the subsequent evaluation. Failure to resolve concerns within those periods will be cause for dismissal.

14. The Probationary firefighter who successfully completes his/her first year shall be appointed as a Permanent volunteer firefighter. However, such appointment shall be conditional on the firefighter obtaining his/her 3f Driver's License prior to the expiry of the second year. Failure to obtain the Driver's License will be cause for dismissal.

Applicants with previous firefighting experience.

An Applicant who has previous firefighting experience may, at the discretion of the Director of Protective Services, be recruited through a modified evaluation process as follows:

1. The Applicant shall submit an application, and if suitable shall participate in the Candidate selection process in the normal manner, and if successful shall be ranked as are other Candidates.
2. Credit shall be provided for previous experience that is deemed relevant and significant.
3. If the Candidate is suitable for appointment, he/she may be offered a conditional appointment to a vacancy in the normal manner.
4. The experienced Recruit may be excused from recruit training to the extent that the station Training Officer determines is acceptable and provided the Candidate submits suitable records of previous training and experience for review by the Selection Committee, the station Training Officer and the Divisional Chief of Training and Safety.
5. The experienced Recruit may be immediately placed on 12-month probation, and is subject to periodic mandatory review in the normal manner.
6. The experienced Probationary firefighter shall be assigned tasks in accordance with demonstrated ability, which may exceed those of other Probationary firefighters without previous experience.

Volunteers transferring to another station.

Any Permanent Regional volunteers who moves his/her principal domicile from the fire district in which he/she is a volunteer to another fire district may apply for a transfer from one station to another. Such transfer is subject to the following:

1. The volunteer receives a suitable recommendation from the District Fire Chief of the station to which the firefighter currently belongs.
2. The District Fire Chief of the station to which the volunteer is requesting transfer interviews the firefighter and recommends his/her transfer.
3. There is a vacancy in the receiving station.

The Director of Protective Services reviews and approves the transfer.

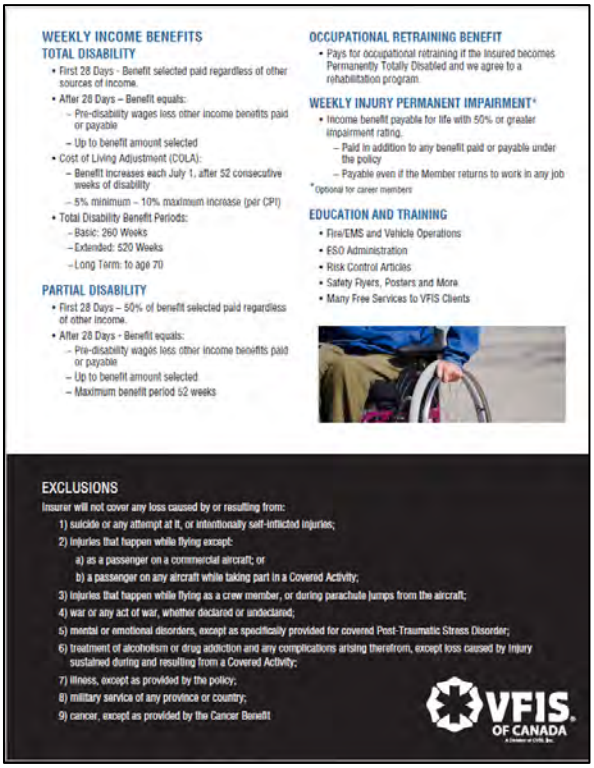
APPENDIX VI; VFIS PLANS AND COVERAGES (FOR REFERENCE)

VFIS Coverage, General

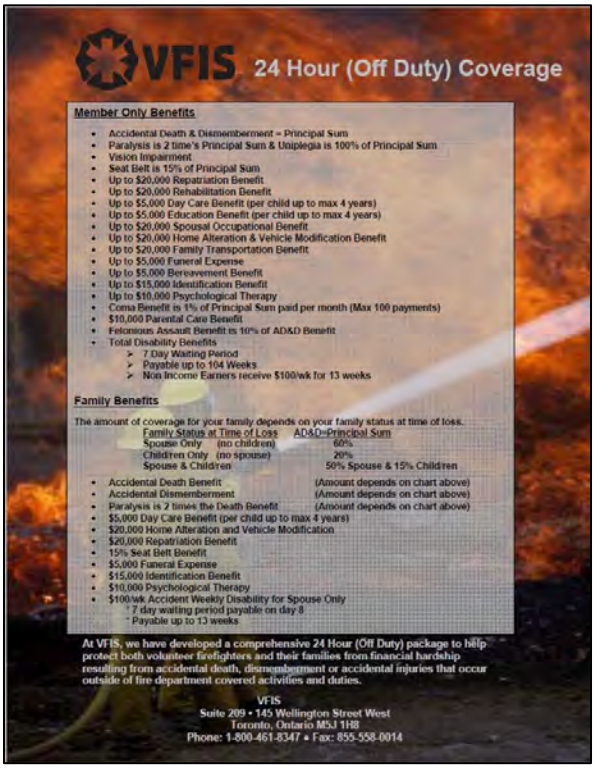


VFIS Coverage, On-Duty & Off-Duty Coverage









VFIS Coverage, Member and Family Assistance Program (MFAP)



Volunteer Firefighter Member and Family Assistance Program (MFAP) Solutions

Harness the power of full-scale employee/firefighter and workplace support solutions through an exclusive MFAP arrangement through VFIS of Canada a division of CVIS, Inc.

DID YOU KNOW?

- Mental and nervous disorders have replaced musculoskeletal conditions as the top conditions causing long-term disability.

Source: Canadian Council on Integrated Healthcare

- The mounting costs of maintaining unhealthy employees/firefighters, coupled with the expense and disruption associated with staff turnover, is leading many employers to implement a health promotion strategy. Thanks to a growing body of evidence, today's workplace health programs are no longer viewed as just a good idea, but rather a crucial investment in an organization's long-term success.

Source: The Case for Comprehensive Workplace Health Promotion, Centre for Health Promotion, University of Toronto

Member and Family Assistance Programs (MFAPs) are employer paid benefits that support both the members and the workplace. These services are designed to enable members to resolve personal and work issues so that optimal productivity is maintained. They include health, wellness and other strategic solutions for smaller employers/municipalities.

Homewood Health offers Volunteer Fire Departments the same services as some of Canada's largest employers at **a preferred**

VFIS of Canada member rate of $2.00 per member per month (non-member rate $3.00).

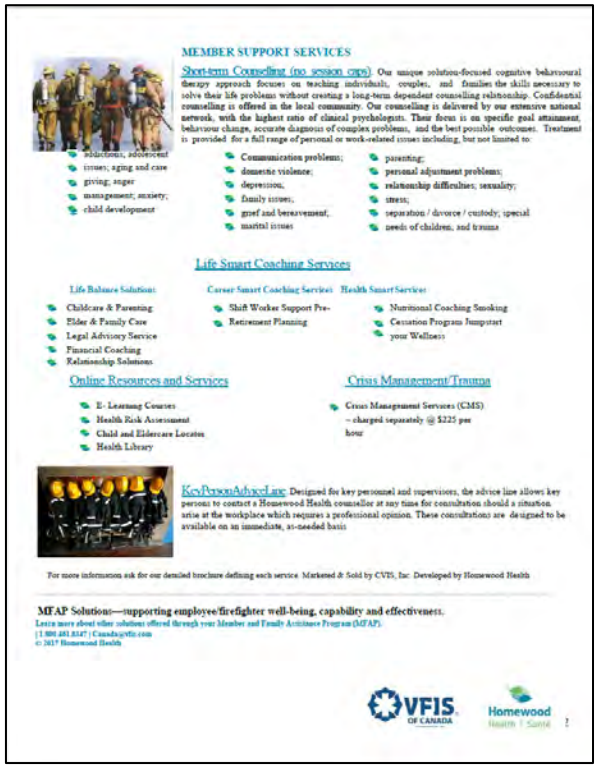
1 **Ease of use**
All of our services are simple and intuitive to use, so all members can benefit (e.g. online solutions allow easy and secure access anywhere and anytime, clinical response is fast and available 24/7 in both official languages, counselling is short-term and solution-focused, and we have counselling offices across the country).

2 **Prevention focused**
Homewood Health takes a comprehensive and prevention-focused approach to a members well-being and productivity. Our healthy workplace strategy targets the member, workplace and organization. Our prevention focus strengthens the resiliency of your workforce.

3 **Appealing and relevant messaging**
MFAP and related services are only useful to the extent that they are utilized by members and key personnel (managers, supervisors, etc). We craft our messages to appeal to members in different stages of their life and career, ensuring that promotion efforts are relevant, appealing, and successful.

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1



MEMBER SUPPORT SERVICES

Short-term Counselling (no session caps): Our unique solution-focused cognitive behavioural therapy approach focuses on teaching individuals, couples, and families the skills necessary to solve their life problems without creating a long-term dependent counselling relationship. Confidential counselling is offered in the local community. Our counselling is delivered by our extensive national network, with the highest ratio of clinical psychologists. Their focus is on specific goal attainment, behaviour change, accurate diagnosis of complex problems, and the best possible outcomes. Treatment is provided for a full range of personal or work-related issues including, but not limited to:

- addictions; adolescent issues; aging and care giving; anger management; anxiety; child development
- Communication problems; domestic violence; depression; family issues; grief and bereavement; marital issues
- parenting; personal adjustment problems; relationship difficulties; sexuality; stress; separation / divorce / custody; special needs of children; and trauma

Life Smart Coaching Services

Life Balance Solution:
- Childcare & Parenting
- Elder & Family Care
- Legal Advisory Service
- Financial Coaching
- Relationship Solutions

Career Smart Coaching Services:
- Shift Worker Support Pre-
- Retirement Planning

Health Smart Services:
- Nutritional Coaching Smoking
- Cessation Program Jumpstart your Wellness

Online Resources and Services
- E- Learning Courses
- Health Risk Assessment
- Child and Eldercare Locator
- Health Library

Crisis Management/Trauma
- Crisis Management Services (CMS) – charged separately @ $225 per hour

KeyPersonAdviceLine: Designed for key personnel and supervisors, the advice line allows key persons to contact a Homewood Health counsellor at any time for consultation should a situation arise at the workplace which requires a professional opinion. These consultations are designed to be available on an immediate, as-needed basis.

For more information ask for our detailed brochure defining each service. Marketed & Sold by CVIS, Inc. Developed by Homewood Health

MFAP Solutions—supporting employee/firefighter well-being, capability and effectiveness.

Learn more about other solutions offered through your Member and Family Assistance Program (MFAP).

[1.800.461.8347 | Canada.vfis.com

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2

VFIS Coverage, Trauma Care



Homewood Health™

Trauma Care

Post-Traumatic Stress Disorder (PTSD) is a serious condition that can affect anyone who has experienced a traumatic episode or repeated exposure to traumatic episodes.

It can leave a person debilitated by severe anxiety, nightmares, flashbacks and uncontrollable thoughts about an ordeal. Left untreated, symptoms can worsen and leave an individual unable to cope with everyday life.

Studies show that accurately and effectively addressing symptoms and distressed functioning early can have significant impact on successful recovery and return to normal functioning.

A New Response

Homewood Health™, in partnership with VFIS, is offering Trauma Care Program—a new mid- to long-term treatment option for Firefighters experiencing trauma symptoms.

This unique program model is designed to utilize industry best practices such as Cognitive Behavioural Therapy, resiliency training and a wide range of online mindfulness tools for individuals who remain on the job but are struggling with acute or long-term trauma symptoms.

The program provides up to 20 hours of individual treatment.

Our Unique Partnership

VFIS is offering Firefighters the opportunity to take advantage of this program through their Post Traumatic Stress Disorder Benefit. Through this benefit, Firefighters are eligible for covered access to Homewood's treatment for trauma experienced on the job.

VFIS OF CANADA

VFIS of Canada
145 Wellington Street West, Suite 209
Toronto, Ontario, M5J1H8
1.800.461.8347 | canada@vfis.com

www.vfiscanada.com

Homewood Health | Santé



Trauma Care

Program Access

This fee for service program must be initiated through VFIS in order to be eligible for reimbursement. Firefighters must first meet the definition of traumatic incident*.

To initiate a claim, Firefighters can access the initial claim report and Attending Physician Statement form online at www.vfiscanada.com

Completed forms can be returned to VFIS by fax at 1.855.558.0014 or electronically to Canada@vfis.com. Once approved, a Firefighter has the option to be contacted by a member of Homewood Health's Trauma Care intake team to initiate services, or to call Homewood Health directly at 1.800.663.1142 and request Trauma Care services.

*__Traumatic Incident__ – means an abnormal experience, outside the range of usual human experiences and includes, but is not limited to:

1. Line-of-duty death or serious injury to other **Insured Persons;**
2. A single incident having multiple casualties;
3. Death or serious injury of a child; and
4. Dealing with victims known to the **Insured Person.**

Specialized Clinicians

Clinicians are specifically selected for this service. They have expertise and specific training in evidence-based psychotherapy, particularly Cognitive Behavior Therapy, relating to PTSD, as well as mood and anxiety disorders. Trauma Care clinicians also have experience working with military personnel and first responders and have undergone additional training regarding the cultural perspectives shared by many individuals in these occupations.

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APPENDIX VII; SAMPLE JOB DUTIES AND DESCRIPTIONS

Director of Protective Services/Fire Chief Draft Job Description

IMMEDIATE SUPERVISOR: CHIEF ADMINISTRATIVE OFFICER

Position Summary: (ILLUSTRATIVE PURPOSES ONLY)

Reporting to the Chief Administrative Officer, you will lead the Regional Fire Service and manage the many necessary changes in the organization and operations to meet the ever-changing demographics of the community and regulatory requirements. Key focus area is the development of an overall strategy and plan in developing a path toward greater integration of services, facilitate change and support the volunteer fire services.

The position includes responsibility for the Regional Fire Service, Regional Emergency Management, liaison with local RCMP and EHS. The Regional Fire Service is designed to deliver the best possible fire protection and emergency service in order to avoid loss of life and property through prevention, code enforcement, preparedness and response. The Regional fire Service is primarily a volunteer fire service consisting of some part time positions. This staffing model meets the needs of the Region and reflects the commitment of both the Region and that of its various communities and residents. This commitment to a primarily volunteer model is unwavering and must be understood and embraced by all personnel. The position will be responsible for the coordination of a uniform and integrated team of Fire Departments, each possessing an uncompromised identity.

As part of the Corporate management team, participates in the overall stewardship of the municipality. This position has corporate and department responsibilities for emergency and business continuity planning. The Regional Municipality expects all employees to work in an environmentally friendly way in all the tasks that they do; to work in a manner that is safe for themselves and others and to be aware of their health & safety obligations; to continually look for opportunities to improve their job that will result in excellence in municipal government and; to recognize the uniqueness of the individuals they come into contact with, and to treat them with dignity and respect.

PURPOSE OF JOB:

The Director of Protective Services/Fire Chief position is a senior management position responsible to plan, organize, direct, control and evaluate all aspects required of modern-day emergency services which include fire and rescue services, code enforcement, emergency management, medical first responder programs and activities of the Region. The Director/Fire Chief is required to analyze and consult with the CAO and other Regional officials and emergency services in developing recommendations for the protection of life and property within the Region. Administrative duties including planning, development of policies and procedures, directing and controlling activities of the work unit, long term planning, recruitment and retention of personnel, purchase of equipment, control of expenditures, management of budgets and the assignment of personnel and equipment, human resources as it relates to those personnel under his/her comm **Responsibilities as the Regional Emergency Measures Organization Coordinator.**

The Director of Protective Services/Fire Chief includes responsibilities as the Regional Emergency Measures Organization coordinator. Responsibilities include but are not limited to

and. Further the position is responsible to keep current any mutual-aid, auto-aid agreements and annual fire department registrations.

1. Responsible for the development of Emergency Management Plans.
2. Provides assistance to municipal departments, non-governmental and volunteer agencies develop plans and procedures.
3. Ensure that current pans and procedures align and compliment with those of NS EMO
4. Facilitates inter and intra-agency cooperation.
5. Coordinate municipal operations with provincial and Federal governments in the event of an emergency.
6. Responsible to ensure that the Emergency Coordination Centers (ECC) and associated equipment are fully functional and ready for use 24/7.
7. Responsible for semi-annual preparedness exercises.

FIRE SERVICE Job Duties and Tasks:

1. Promote the missions and values of the Regional Municipality.

2. Ensures that Council approved policies and procedures are adhered to in the department and that other departments observe policies within the jurisdiction of the Fire department.

3. Interacts with other departments on a regular basis as many of the Fire department's daily responsibilities require an integrated corporate approach.

4. Actively promote the Municipality's health and safety program. Lead by example in the areas of health and wellness and work life balance.

5. Responsible for ensuring that employees of the department are provided with a safe and healthy workplace consistent with corporate standards and the healthy workplace initiatives.

6. Provide supervision for the activities of the Regional Fire Service department including the performance of staff.

7. Develop, implement and maintain short- and long-term planning to ensure effective services.

8. Create financial budgets to meet the needs of the department. Routinely monitor the budget expenditures, advising the CAO of variances and significant deviations.

9. Review and make recommendations to the CAO as to the type of fire and emergency services, including equipment and human resources (recruitment and retention of personnel).

10. Keep abreast of changing local conditions in firefighting, fire prevention, inspections and develop recommendations for the provision of fire services.

11. Provide leadership and communication through regular meetings (i.e. the Fire Chiefs Advisory Board) and delegation responsibilities.

12. Promote effective employee/employer relations.

13. Encourages participation by subordinates in departmental projects and teams.

14. Develop and mentor senior officers to provide leadership to the department.

15. Represent the Regional Fire Service department in communications with the media and the public, in coordination with the CAO.

16. Establish and maintain effective working relationships with members of the public, residents, Councillors and staff.

17. Manage emergency service contracts, mutual-aid and auto aid agreements.

18. As required, report to Council on Regional Fire Service activities.

19. As part of the Emergency Coordination Centre (ECC), be available for call backs to emergencies.

20. Respond on scene to large scale emergencies/fires in an incident command role as required.

21. Other related duties as assigned.

Supervision:

Supervision Given:

Provides policy direction. Organizes programs and goals and objectives for the department. Provides direction for all staff in the department. Must be able to maintain an effective working relationship with volunteer firefighters. Must be able to motivate and maintain active volunteer fire fighting force.

Responsibility:

Supervision Received:

Accountable for own actions, and those of subordinates.

Effect of Errors: Strategic errors made by this position can result in loss of life and property in the community. The Director of Protective services/Fire Chief has technical expertise that does

not allow for senior positions to be able to assist in some of the critical strategic decision making for the department.

Freedom to Make Decisions: Employee makes operating decisions between alternative courses of actions which have long lasting effects. Must be prepared to make decisions with a limited information base or decisions that may have political overtones.

Interpersonal Contacts:

Purpose: Contacts are a major portion of the job. Provides leadership for staff in the department, and advises staff at all levels.

Performs a public relations function for the municipality and must use tact with the media.

Is involved in Emergency Response, which calls for skill in human relations and dealing with people in emergency situations.

Ingenuity: Must originate policies for the Fire Department where there may be no precedent. Must consider political ramifications of decisions to change staffing requirements at different locations. Must be open to new ideas, equipment, potential cost savings to the Corporation. The position works on long-term planning for the department, including deployment of resources to reflect changes in population growth.

Assistant Chief of Fire Prevention

Immediate Supervisor: Director of Protective Services/Fire Chief

Direct Reports: Regional Fire Inspectors/Investigators, Station Volunteer Fire Investigators and Station Public/Life Safety Educators.

Position Purpose: (ILLUSTRATIVE PURPOSES ONLY)

The Assistant Chief Position is responsible for the establishment, organization, coordination and administration of the Regional Fire Inspections/Investigations Division. Division personnel will enforce and interpret all Fire Department related by-laws of the Municipality, National Building and Fire Code, Nova Scotia's Fire Safety Act and various Provincial and Federal Acts, Regulations and Codes. Manages Division so that fire inspections and life safety studies meet the requirements of relevant legislation, codes and standards; fire risk analyses are completed and compliant with building and life safety legislation. Manage and ensures all incidents of fires are properly investigated, coordinate investigations and cooperate with other investigative authorities and agencies. Establish and maintain a Fire service photographic capability. Develop and administer business and information systems related to Division programs and activities. Acts as an Assistant to the Fire Marshal of Nova Scotia under the provisions of the Provincial Fire Safety Act. This position may from time to time perform support roles during emergencies. Participates in the formulation of departmental policies, procedures, regulations and program objectives along with providing administrative and technical advice to the Director of Protective Services/Fire Chief.

Key duties include:

FIRE INSPECTIONS/CODE ENFORCEMENT

1. Maintains all files in accordance with the file classification system and records retentions policies.
2. Assess development plans for all occupancies for compliance with relevant codes and standards by liaising with the Chief Building Official, architects and engineers.

3. In conjunction with the CBO, oversees interactions with developers, architects, engineers and building owners to ensure compliance with the provisions of applicable acts and regulations in order to meet adequate fire safety in new and existing buildings.
4. Ensures the highest standards of confidentiality and integrity at all times.
5. Cause information to be laid and prosecutes infractions of all applicable By-laws, codes, acts, standards and statutes, when required.
6. Hold regular team meetings and encourage team building.
7. Formulates departmental policies, procedures, regulations and program objectives along with providing administrative and technical advice to the Director of Protective Services/Fire Chief
8. Ensures appropriate training and skill development for staff
9. Monitor and manage usage of the designated budget.
10. Draft Operational and Capital Budget of Divisional needs for the Director of Protective Services/Fire Chief
11. Actively participates in Fire inspections/Code Enforcement
12. Prepares necessary documentation and reports in support of any code enforcement issue including meetings with the Crown, if required.

F**IRE INVESTIGATION:**

Key duties include:

1. Ensures all incidents of fires are investigated
2. Examine fire scenes (when required) for the purpose of investigation of the origin and cause of the fire / explosion and report same to the Provincial Fire Marshal of required by the Fire Safety Act.
3. Coordinates and cooperates with other investigative agencies such as the Office of the Fire Marshal, the RCMP and Insurance Investigators and or their contractors.
4. Author investigative reports detailing the incident and investigative findings.
5. Attend court as required.
6. Ensures appropriate training and skill development for all staff including volunteer staff
7. Hold regular team meetings and encourage team building.
8. Performs other related duties as assigned

PUBLIC EDUCATION and LIFE SAFETY

The Assistant Chief manages and promotes public relations, public education and media relations programs and activities focusing on public and Life Safety in an effective manner. Reviews and analysis past incidents of fires to develop an appropriate program and target audience.

Key duties include:

1. Utilizes fire loss data in the development and design of appropriate fire safety education programs

2. Utilizes analytics and data in the development and delivery of targeted public education messages

3. Provides Assistance to the Community and fire service volunteers in the design and the delivery of public safety education presentations and seminars to a variety of audiences

including community groups, dwelling unity owners/residents, elementary school students, seniors, and workplace employees

4. Provides assistance in the development of special events, media campaigns and other activities to promote and provide education on fire prevention and safety awareness
5. Provides fire safety materials to support program delivery, including lessons plans, PowerPoint presentations, and brochures
6. Utilizes all forms of media to support effective fire safety messaging to the public and undertakes media related activities as required to such as interviews (print, radio, television, and social media) and the preparation of media advisories and releases
7. Engages with various internal and external stakeholders
8. Work with the Regional fire departments for school fire drill programs, station tours, and community events
9. Develop and implement fire department and community volunteers for the delivery of Public Education and Life Safety Programs.
10. Insures appropriate training and skill development for volunteer staff
11. Hold regular team meetings and encourage team building.
12. Maintains all files in accordance with the file classification system and records retentions policies
13. Monitor and manage usage of the designated budget.
14. Prepare Division operating and capital budgets for the Director.
15. Demonstrates a commitment to personal and professional development

EMERGENCIES:

Participates in a rotational on-call schedule with Fire Prevention /Investigative staff and volunteer staff as the fire services on call fire investigator.

The Divisional Chief may be asked to attend, as required by the Director of Protective Services/Fire Chief, emergencies either to the Municipality's Emergency Control Center, in a support role to the Director, or act as the REMO in his absence. The Assistant Chief may be also asked to report to the scene of the emergency and provide a support role to the Incident Commander.

DUTIES

Divisional Chief of Training, Occupational Health & Safety, & Communications

Immediate Supervisor: Director of Protective Services/Fire Chief

Direct Reports: Regional and Departmental Training and Safety Officers

Position Purpose: ILLUSTRATIVE PURPOSES ONLY

The Divisional Chief Position is responsible for the establishment, organization, coordination and administration of the Regional Training, Health, Safety & Wellness Policy and Programs as well as the department's communications, including maintenance and documentation. Participates in the Board of Fire Chiefs meeting as required.

Key duties include:

Training:

Researching, developing and preparing a variety of training programs. Coordinating training programs, manuals, lessons and syllabus for volunteer, part time and full-time fire department personnel; providing motivation and mentoring of department members for professional growth;

coordinating and scheduling the delivery of fire service-related training programs such as recruit training, officer development, inspection and investigation, emergency care, vehicle driver/operator training etc.; coordinate assigned activities with other divisions and outside agencies;

researching and evaluating fire department policies, procedures, techniques and equipment; assisting with recruitment and evaluation - screening resumes, arranging interviews, and creating new hire documents for Volunteer; managing MFR, Ice/Water and specialized training such as Trench Rescue, Confined Space and Hazmat; maintaining training records for all fire department employees; and other duties as assigned.

1. Performs an assessment of needs

2. Consults with the District Fire Chiefs Advisory Committee
3. Determines best practice in the development & implementation plans for program delivery
4. Manages Direct Reports, assign and distribute workloads
5. Produces an annual training plan and develops curriculum and lesson plans in all required areas.
6. Develop fire officer soft skill development opportunities
7. Develop personnel for future roles to meet the projected needs of Regional Fire Service (Succession planning)
8. Look for training opportunities with outside jurisdictions, agencies and private corporations.
9. Develops and maintains a comprehensive training records management system data base.
10. Coordinates and oversees the annual recruit training program.
11. Develops and implements Pre-fire Planning and Post-Incident Analysis and Review programs.
12. Authors a variety of reports involving complex and confidential matters, and Standard Operating Guidelines and Training Directives
13. Select instructional staff that assists with meeting department policies and instructional goals.
14. Review and approves all Practical Training Safety Plans
15. Develops and implements standardized new fire service member orientation.
16. Construct a performance-based instructor evaluation plan so that instructors are evaluated at regular intervals. The evaluation needs to identify areas of strengths and weaknesses.
17. Recommend changes to improve instructional style and communication methods. In addition, provide an opportunity for instructor feedback.

18. Develop an evaluation plan to collect, analyze and report data for program validation and participant feedback.

19. Proctor written and performance tests according to procedures in addition to maintaining security of the testing materials.

20. Draft training equipment purchasing specifications that support the training program goals.

21. Prepare annual operational and capital budget that supports the needs of the Regional Service for the Director of Protective Services/Fire Chief

Safety, Health, Safety & Wellness Policy and Programs:

1. Applicant Medicals
2. Infection & Disease Control
3. Fire Ground Safety Command (Participates in a rotational on-call schedule with volunteer staff.
4. Establishes programs and protocols to meet the needs NFPA-1500 requirements
5. Establishes programs and protocols to meet the needs of NFPA-1521
6. Scene Safety
7. Traffic Control Safety
8. CISD
9. Liaises with medical and mental health professionals
10. Supervises Direct Reports
11. Prepare annual operational and capital budget that supports the needs of the Regional Service for the Director of Protective Services/Fire Chief

Develops, Implements and Enforces the Regional Fire Service's Risk Management Plan in the following areas:

1. Administration
2. Facilities
3. Training

4. Vehicle operations, both emergency and non-emergency
5. Protective clothing and equipment
6. Operations at emergency incidents
7. Schedules and participates in an on-call rotation as a Fire Safety Officer for emergencies.
8. Operations at non-emergency incidents
9. Products of combustion, carcinogens, fireground contaminants, and other incident-related health hazards
10. Other related activities

Occupational Health & Safety Committee

1. Establish and Co-chairs the Reginal Fire Services Occupational Health & Safety Committee, as the management representative.
2. Track, record, Trend and publish LTI and Near Misses
3. Responsible to ensure that committee minutes are recorded, and distributed throughout the organization.
4. Establish and Keep current fire station Safety Bulletin Boards.

COMMUNICATIONS

1. Liaises with the appointed PSAP and Fire Dispatch Service provider.
2. Manages the Reginal Fire Service Fire Dispatch contract on behalf of the Regional Municipality.
3. Keep inventory of all radio equipment.
4. Manages Radio call sign assignments both apparatus and personnel.
5. Manages communications and related supplier contracts, on behalf of the fire services and departments.
6. Prepares operating and capital budgets for the Director of Protective Services/Fire Chief.

Emergencies:

Participates in a rotational on-call schedule with full time and volunteer staff as an Incident Safety Officer.

The Divisional Chief may be asked to attend emergencies, as required by the Director of Protective Services/Fire Chief, either to the Municipality's Emergency Control Center, in a

support role to the Director or to the scene of the emergency in a support role to the Incident Commander.

APPENDIX VIII; ADMINISTRATIVE OFFICE SPACE AND COSTS

ADMINISTRATION OFFICE SPACE REQUIREMENTS

GA's recommendations to provide central administrative staffing for a regional fire services HQ means that there will be a need to establish office space for this staff. GA recognizes that industry standards may not be achievable as there are constraints with existing buildings which will, by economic necessity, be repurposed through the consolidation process and afterwards; until such time as new structures are justified.

The one main caveat is that there be effort made to keep the fire services personnel together in one location in order to ensure proper coordination and communications at all levels and functions; this is critical for success.

The following is offered for assistance in understanding what industry standards are for office spaces. It may be useful as a planning tool.

Office Functional Requirements and Location

Office space must be flexible and have a technologically-advanced working environment that is safe, healthy, comfortable, durable, aesthetically-pleasing, and accessible. It must be able to accommodate the specific space and equipment needs of the office function.

The single biggest issue that impacts on facility cost effectiveness is that of location. There are a number of options to consider in determining location. For the purposes of this exercise, the assumptions made are that this will be the regional headquarters for the fire services, and current municipal facilities cannot accommodate the additional office functions and space. Current fire stations across the region are not able to accommodate the additional office function and space. If a new municipal office building is planned for the new regional municipality then this would present an ideal opportunity to incorporate the fire services administrative offices into that new facility. Some location options might exist, as follows;

- As a regional headquarters, ideally, the offices should be centrally located, close to the majority of stations and municipal offices.

- Incorporate the required offices into a new fire station. Location may not be ideal.
- If renting or leasing space, availability that meets the needs, budget and location.
- Construct a separate office building, if land availability at reasonable costs.

Space Types and Functional Requirements

An office such as a fire department headquarters incorporates a number of space types to meet the needs of staff and visitors. These include:

- Offices both private and semi-private
- Visiting fire station service personnel and committee work areas
- A conference room
- Washrooms
- Reception area
- Wait area
- Small kitchenette
- Space for printer and communications
- General storage for office supplies
- Storage for investigation equipment and evidence lock-up
- IT , and security closet
- Maintenance Closet

In addition to the foregoing, the headquarters would require security features i.e. cameras and parking spaces for no less than 10 vehicles for the office staff, visiting fire station members and the public.

Based upon the required functionality of department administration, meetings that would include municipal staff, fire department personnel, public, and others, and given that the staff organization is that of a regional service it is being proposed that an office space of approximately between 2,700 and 3,000 square feet is required.

Office Cost Estimates

The following office requirement is based upon the new Regional Fire Service organization. Requiring approximately 3,000 sq. feet (278.7 sq., m).

References used in the cost estimates are:

- ALTLUS Construction COST Guide 2018
- Quebec Hydro Study of 2018 (1 April)
- REMAX Real Estate Services – Windsor NS
- BDC.CA
- Prevost Fire Station Cost Calculator

The costing does not include the following:

- Utilities
- Insurance
- Fit up
- Furnishings
- Data/IT/Communications
- Maintenance

Rental /Lease:

REMAX – Office Space Rental or lease Windsor

Rental or Lease average cost OFFICE SPACE 3000 sq. ft. - $3/sq. ft

($3.00 sq. ft per month +HST = $10,350/mo. *10 yrs. = $1.242 mil.)

Office costing does not include utilities, fit up, furniture, data, electronic equipment, security, communications equipment, telephones.

ALTUS Construction Guide 2018

Halifax Leasing rates as per Altus 2018 Construction Guide,

Market net effective rate for suburban Class A office space averages $9/sq. ft.

Buildings Costs

When calculating the total construction area for a private sector building, unit costs should be applied exclusively to the Gross Construction Area (GCA). This assumes that GCA comprises 70% of the Total Construction Area (TCA)

The costs assume base building construction only, including mechanical and electrical services, washrooms, and finishing of ground floor entrance lobby and elevator lobbies to upper floors.

The cost of tenant partitioning and finishes, with the exception of ceiling and column finishes, are excluded. The cost of finishing this space can fluctuate depending on the density of partitioning and the quality of finishes. Costs assume standalone buildings and are not representative of a component within a mixed-use building

The costs given assume single-storey buildings with the exception of enclosed malls. The cost of providing parking facilities is excluded from the unit costs provided. The Commercial Rental Unit (CRU) space is considered shell. The public space is finished. Costs assume standalone buildings and are not representative of a component within a mixed-use building.

Fire Stations exclude any costs associated with training buildings.

- Fire Station Cost for Halifax = $250-315 per sq. ft. (land and site costs not included)
- Commercial Halifax $165 to $210 per sq. ft.
- Strip plaza HFX = $100 to $150 per sq. ft.

BDC Conventional Commercial Loan fixed rate (Sample, for Illustrative Purposes Only)
(Municipal Finance Corporation rates may be somewhat lower)

Build (land and site costs not included)

- Commercial Office Space
- $525,000 (3000 sq. ft at $175 per sq. ft)
- 5% interest
- 10 years total cost = $668,212.75
- Total interest = $143,212.75
- Monthly payments of $5,568.44

Commercial Office space $525,000 (3000 sq. ft at $175 per sq. ft)

- 4.3 % interest
- 10 years total cost = $621,506.44
- Total interest = $96,506.44
- Monthly payments of $5,179.22

Commercial Office space at $525,000 (3000 sq. ft at $175 per sq. ft)

- 3.45 % interest
- 10 years total cost = $621,506.44
- Total interest = $96,506.44
- Monthly payments of $5,179.22

Commercial Office space at $600,000 (3000 sq. ft at $200 per sq. ft)

- 3.45 % interest
- 10 years total cost = $710,293.08
- Total interest = $110,293.08
- Monthly payments of $5,919.11

Fire Station Office space at $900,000 (3000 sq. ft at $300 per sq. ft) Note: Fire Stations are now required to be built to disaster seismic standards contained within Part 4 of the NBC. This increases the square footage costs.

- 3.45 % interest
- 10 years total cost = $1,065,439.62
- Total interest = $165,439.62
- Monthly payments of $8,878.66

Office costing does not include utilities, fit up, furniture, data, electronic equipment, security, communications equipment, maintenance nor insurance costs.

Electricity Costs

Quebec Hydro Study of 2018 (1 April) Hydro Costs of Major Cities, cites Halifax, Commercial customers 1000, kWh/month with a power demand of 500kW avg bill = $142/mo. including taxes.

Water Costs (Town of Windsor 2017/2018)

Base Charge 1" meter

- $166.51 quarterly
- $666.04 Annually

Consumption Rate $6.69 per 1,000 imperial gallons (1.47 cubic meter)

Rates for Fire Sprinkler: 6" pipe or less $200 annually.

Total Capital layout for administration office space over a twenty-year period and depending upon the interest rate of capital loans, what is the best financial option for the municipality? There are a number of additional variables not included in this report, is land costs and associated site development costs and the estimated property value at the end of its life cycle use for the regional fire service.

There are a number of options for consideration:

- If there is a need/plan in the near future to acquire a new regional municipal office, then the option perhaps is to lease or rent appropriate facilities until the new municipal offices, that include required fire service office space, can be completed.
- An alternative solution would be to plan for space within a new fire station. Depending upon location it may not be central to other stations or municipal offices, not to mention the timeliness of construction and occupancy.
- The lease or rent option may be an alternative. However, appropriate office space may not be available within the Windsor West Hants area. The associated costs of renting and leasing, not to mention fit up costs to meet the needs of the fire service offices over a twenty-year period may be more costly.
- The last option is to purchase land and build a separate fire service headquarters building.

APPENDIX IX; STANDARDIZED FIRE APPARATUS FEATURES

STANDARD PUMPER, KEY STANDARDIZED FEATURES

CUSTOM SPARTAN MODEL GLADIATOR CAB AND CHASSIS;

- Medium-length four-door (MFD) cab with 10" raised roof, aluminum cab construction
- Seating for 6 firefighters with 5 SCBA seats (i.e. all except the driver)
- Seating in rear, four forward-facing, two outer position with flip up seats
- Air-bag package for all occupant protection in front or side impacts
- Cabinets behind driver and officer seats, external and internal access
- Cummins diesel engine model X12-500; rated at 500 hp, 1695 lb-ft torque.
- Allison automatic transmission model series 4000 EVS
- Locking rear differential
- PTO for hydraulic generator drive

CUSTOM BODY, ALUMINUM CONSTRUCTION;

- Full height and depth compartments on both sides of body before and after rear axle and full height/width compartments over the wheel arches (sometimes called rescue style body)
- Continuous roll-up doors for body side compartments
- Amdoor brand roll-up doors, painted body colour, with integral compartment lighting
- Adjustable shelving on tracks in compartments, minimum 14 in side compartments
- Rear of body compartment
- SCBA bottle storage compartments in sealed wheel arch compartments (4)
- Aluminum double-door hinged hose bed cover

EQUIPMENT STORAGE;

- Minimum 350 cubic feet of compartment storage in body
- Design of hose beds and body for access to hose and compartments within easy reach of firefighters standing on ground or wide tailboard, without the need to climb
- Ladder storage through the tank, on beam, 24'/14'/10' attic, plus pike poles
- Main hose bed capacity;
    - One division of 12 lengths @ 100' ea. of 5" supply,
    - Three divisions of 8 lengths @ 50' ea. of 2-1/2" double jacket (pre-connected),
    - One division of 12 lengths @ 50' ea. of 2-1/2" double jacket

- Pre-connected attack line capacity at pumphouse;
    - Two divisions of 6 lengths @ 50' ea. of 2-1/2" double jacket (pre-connected)
- Hard suction hose storage enclosed above side compartments with door at back of body, one 13+/-foot length per side (maximum that will fit).

PUMP:

- Hale pump model Q-Max rated at 1500 IGPM at 150 psi, from draft
- Hale transfer case model "K", midship split shaft drive
- All discharges/suctions minimum size 3-inch stainless steel piping
- Steamer inlets equipped with MIV, both sides, front suction
- Front suction with minimum 6-inch stainless steel piping, swivel elbow, suitable for drafting
- Tank to pump (TTP) minimum 4-inch size automated valve and piping
- Side-panel controls, electronic governor, manual valve controls except MIVs, TTP, deck-gun
- Deck-gun discharge 4-inch size piping and automated valve with 3-inch size flange for gun mount
- RHS discharges, 2 @ 2-1/2", and 1 @ 4"
- LHS discharges, 2 @ 2-1/2"
- FoamPro 2001 metered injection foam system, piped to both cross-lay pre-connects and one rear pre-connect, with external foam pick-up and onboard tank

TANKS:

- Water/booster tank manufactured from welded polypropylene, by UPF
- Water tank size; 550 Imp gal net capacity
- Class A foam tank size; 25 Imp gal net capacity

FEATURES:

- Hydraulic generator for 120/240 volts A/C power on and off the truck, Harrison Hydra-Gen rated at 10kw
- 220 Volt LED floodlights on sides of body and front of cab for night-time incidents (FRC Spectra SPA260-J15)
- 12 Volt LED scene lights on sides and back of body (FRC Spectra 900)

STANDARD PUMPER, KEY STANDARDIZED FEATURES; FOR RURAL AREAS

CUSTOM SPARTAN MODEL GLADIATOR CAB AND CHASSIS;

- Medium-length four door (MFD) cab with 10" raised roof, aluminum cab construction
- Seating for 6 firefighters with 5 SCBA seats (i.e. all except the driver)
- Seating in rear, four forward-facing, two outer position with flip up seats
- Air-bag package for all occupant protection in front or side impacts
- Cabinets behind driver and officer seats, external and internal access
- Cummins diesel engine model X12-500; rated at 500 hp, 1695 lb-ft torque.
- Allison automatic transmission model series 4000 EVS
- Locking rear differential
- PTO for hydraulic generator drive

CUSTOM BODY, ALUMINUM CONSTRUCTION;

- Full depth, width, and available height compartments below the tank-tee on both sides of body before and after rear axle
- Full height width and available depth high-side compartments above the lower compartments, and over the wheel arches on both sides of the body
- Continuous height roll-up doors for body side compartments where lower and upper compartments coincide
- Amdoor brand roll-up doors, painted body colour, with integral compartment lighting
- Adjustable shelving on tracks in compartments, minimum 14 in side compartments
- Rear of body compartment
- SCBA bottle storage compartments in sealed wheel arch compartments (4)
- Aluminum double-door hinged hose bed cover

EQUIPMENT STORAGE;

- Minimum 300 cubic feet of compartment storage in body
- Design of hose beds and body for access to hose and compartments within easy reach of firefighters standing on ground or wide tailboard, without the need to climb
- Ladder storage through the tank, on beam, 24'/14'/10' attic, plus pike poles
- Main hose bed capacity;
    - One division of 12 lengths @ 100' ea. of 5" supply,
    - Three divisions of 8 lengths @ 50' ea. of 2-1/2" double jacket (pre-connected),
    - One division of 12 lengths @ 50' ea. of 2-1/2" double jacket
- Pre-connected attack line capacity at pumphouse;

  - Two divisions of 6 lengths @ 50’ ea. of 2-1/2” double jacket (pre-connected)
- Hard suction hose storage enclosed above side compartments with door at back of body, one 13+/-foot length per side (maximum that will fit).

PUMP:

- Hale pump model Q-Max rated at 1500 IGPM at 150 psi, from draft
- Hale transfer case model “K”, midship split shaft drive
- All discharges/suctions minimum size 3-inch stainless steel piping
- Steamer inlets equipped with MIV, both sides, front suction
- Front suction with minimum 6-inch stainless steel piping, swivel elbow, suitable for drafting
- Tank to pump (TTP) minimum 4-inch size automated valve and piping
- Side-panel controls, electronic governor, manual valve controls except MIVs, TTP, deck-gun
- Deck-gun discharge 4-inch size piping and automated valve with 3-inch size flange for gun mount
- RHS discharges, 2 @ 2-1/2”, and 1 @ 4”
- LHS discharges, 2 @ 2-1/2”
- FoamPro 2001 metered injection foam system, piped to both cross-lay pre-connects and one rear pre-connect, with external foam pick-up and onboard tank

TANKS:

- Water/booster tank manufactured from welded polypropylene, by UPF
- Water tank size; 850 Imp gal net capacity
- Class A foam tank size; 25 Imp gal net capacity

FEATURES:

- Hydraulic generator for 120/240 volts A/C power on and off the truck, Harrison Hydra-Gen rated at 10kw
- 220 Volt LED floodlights on sides of body and front of cab for night-time incidents (FRC Spectra SPA260-J15)
- 12 Volt LED scene lights on sides and back of body (FRC Spectra 900)

STANDARD MIDI-PUMPER/RESCUE, KEY STANDARDIZED FEATURES

COMMERCIAL CAB AND CHASSIS

- Freightliner M2-106 crew-cab with raised roof
- Four-wheel-drive, traction tires all wheel positions
- Seating for 5 firefighters with 4 SCBA seats (i.e. all positions except the driver)
- Air-bag package for all occupant protection in front or side impacts
- Reinforced bumper in front
- Cummins diesel engine model ISL9-450; rated at 450 hp, 1250 lb-ft torque.
- Allison automatic transmission model series 3000 EVS
- Locking rear differential
- PTO for water pump drive

CUSTOM BODY, ALUMINUM CONSTRUCTION;

- Full depth, width, and available height compartments on both sides of body before and after rear axle
- Full height width and available depth high-side compartments above the lower compartments, and over the wheel arches on both sides of the body
- Continuous height roll-up doors for body side compartments where lower and upper compartments coincide
- Amdoor brand roll-up doors, painted body colour, with integral compartment lighting
- Adjustable shelving on tracks in compartments, minimum 10 in side compartments
- SCBA bottle storage compartments in sealed wheel arch compartments (4)
- Aluminum double-door hinged hose bed cover

EQUIPMENT STORAGE;

- Minimum 150 cubic feet of compartment storage in body
- Design of hose beds and body for access to hose and compartments within easy reach of firefighters standing on ground or wide tailboard, without the need to climb
- Ladder storage through the tank, on beam, 15’ combo/10’ roof/10’ attic, plus pike poles
- Main hose bed capacity;
    - One division of 6 lengths @ 100’ ea. of 5” supply,
    - Two divisions of 8 lengths @ 50’ ea. of 2-1/2” double jacket (one pre-connected),
- Pre-connected attack line capacity at pumphouse;
    - Two divisions of 6 lengths @ 50’ ea. of 2-1/2” double jacket (pre-connected)

- Hard suction hose storage enclosed above side compartments with door at back of body, one 10+/-foot length per side (maximum length that will fit).

PUMP:

- Hale pump model RSD rated at 1050 IGPM at 150 psi, from draft
- Hydraulic PTO driven from transmission
- All discharges/suctions minimum size 3-inch stainless steel piping
- Steamer inlets equipped with MIV, both sides
- Tank to pump (TTP) minimum 4-inch size automated valve and piping
- Side-panel controls, electronic governor, manual valve controls except MIVs, TTP, deck-gun
- Deck-gun discharge 3-inch size piping and automated valve with 3-inch size flange for gun mount
- RHS discharges, 2 @ 2-1/2", and 1 @ 4"
- LHS discharges, 2 @ 2-1/2"
- FoamPro 2001 metered injection foam system, piped to both cross-lay pre-connects and one rear pre-connect, with external foam pick-up and onboard tank

TANKS:

- Water/booster tank manufactured from welded polypropylene, by UPF
- Water tank size; 400 Imp gal net capacity
- Class A foam tank size; 25 Imp gal net capacity

FEATURES:

- 12 Volt LED scene lights on sides and back of body (FRC Spectra 900)

PUMPER/TANKER, KEY FEATURES

CUSTOM SPARTAN MODEL GLADIATOR CAB AND CHASSIS;

- Long two-door (LTD) cab with 10" raised roof, aluminum construction
- Seating for 2 firefighters with no SCBA seats
- Exterior access cab cabinets on both sides
- 12" extended and reinforced front bumper
- Tandem axles
- Cummins diesel engine model X12-500; rated at 500 hp, 1695 lb-ft torque.
- Allison automatic transmission model series 4000 EVS
- Locking rear differentials, locking inter-differential

CUSTOM BODY, ALUMINUM CONSTRUCTION;

- Lower full-depth compartments on both sides of the body both before and after the rear axle
- Full height half-depth compartments on full length of the RHS of body
- Full height half-depth compartment above the LHS forward compartment
- Continuous roll-up doors for body side compartments RHS and front compartment LHS
- Hinged doors for LHS compartment behind rear axle
- Roll out tray for 23 hp portable pump in LHS behind rear axle compartment
- Flat deck above compartment and wheel well on remainder of LHS of body for 3000 US-gal porta-tank rack
- SCBA bottle storage compartments in sealed wheel arch compartments (4)
- Roll-up doors Amdoor brand, painted body colour, with integral compartment lighting
- Adjustable shelving on tracks in compartments, minimum 10 in side compartments
- Aluminum double-door hinged hose bed cover

EQUIPMENT STORAGE;

- Minimum 250 cubic feet of compartment storage in body
- Hose beds and body design kept low and hose and compartments within reach of firefighters standing on ground or wide fixed steps
- Ladder storage through the tank, on beam, 35'/16'/10' attic, plus pike poles
- Main hose bed capacity;
    - One division of 8 lengths @ 100' ea. of 5" supply,
    - Two divisions of 8 lengths @ 50' ea. of 2-1/2" double jacket (pre-connected),
- Pre-connected attack line capacity at pumphouse;

  - Two divisions of 6 lengths @ 50’ ea. of 2-1/2” double jacket (pre-connected)
- Hard suction hose storage enclosed above RHS compartments with door at back of body, two @15-foot length each.

PUMP;

- Hale pump model Q-Max rated at 1500 IGPM at 150 psi, from draft
- Hale transfer case model “K”, midship split shaft drive
- All discharges/suctions minimum size 3-inch stainless steel piping
- Steamer inlets equipped with MIV, both sides, front suction
- Front suction with minimum 6-inch stainless steel piping, swivel elbow, suitable for drafting
- Tank to pump (TTP) minimum 4-inch size valve and piping
- Side-panel controls, electronic governor, manual valve controls except MIV, TTPs, and deck-gun
- Deck-gun discharge 4-inch size piping and automated valve with 3-inch size flange for gun mount
- RHS discharges, 2 @ 2-1/2”, 1 @ 4”
- LHS discharges, 2 @ 2-1/2”

WATER TANK;

- Water/booster tank manufactured from welded polypropylene, UPF brand only
- Water tank size; 2200 Imp gal net capacity
- Dump valves on both sides of body and at rear
- Dumps 12” x 12’ square with powered extension chutes (Newton)
- Dump valves and chute extensions operable from in-cab controls
- Rear dump equipped with 180-degree side to side swivel

FEATURES;

- 12 Volt LED scene lights on both sides and back of body, and forward facing on cab (FRC Spectra SPA260-Q15)

AERIAL, KEY FEATURES

CUSTOM SPARTAN MODEL GLADIATOR CAB AND CHASSIS;

- Medium four door (MFD) cab with no raised roof, aluminum cab construction
- Seating for 6 firefighters with 5 SCBA seats (i.e. all except the driver)
- 12" extended and reinforced front bumper
- Tandem axles
- Air-bag package for all occupant protection in front or side impacts
- Cummins diesel engine model X15-605; rated at 605 hp, 2050 lb-ft torque.
- Allison automatic transmission model series 4000 EVS
- Locking rear differentials, locking inter-differential
- PTO for hydraulic generator drive
- PTO for aerial hydraulic drive
- In-cab cabinets on both sides (aka medical cabinets)

CUSTOM BODY, ALUMINUM CONSTRUCTION;

- Maximum compartmentation
- Roll-up doors for body side compartments
- Amdoor brand roll-up doors, painted body colour, with integral compartment lighting
- Adjustable shelving on tracks in compartments
- SCBA bottle storage compartments in sealed wheel arch compartments (4)
- Aluminum hinged hose bed cover

EQUIPMENT STORAGE;

- Minimum 300 cubic feet of compartment storage in body
- Ladder storage plus pike poles, rear access, minimum 180 feet of ground ladders in body: 40'/35'/28'/28'/16'/10'
- Main hose bed capacity;
    - One division of 8 lengths @ 100' ea. of 5" supply,
- Pre-connected attack line capacity at pumphouse;
    - Three divisions of 6 lengths @ 50' ea. of 2-1/2" double jacket (pre-connected)

PUMP;

- Hale pump model Q-Max rated at 1750 IGPM at 150 psi, from draft
- Hale transfer case model "K", midship split shaft drive

- All discharges/suctions minimum size 3-inch stainless steel piping
- Steamer inlets equipped with MIV, both sides, rear feed
- Tank to pump (TTP) minimum 4-inch size automated valve and piping
- Side-panel controls, electronic governor, manual or electronic valve controls except MIVs, ladder pipe which shall be electronic
- RHS discharges, 2 @ 2-1/2", and 1 @ 4"
- LHS discharges, 2 @ 2-1/2"
- FoamPro 2001 metered injection foam system, piped to two cross-lay pre-connects with external foam pick-up and onboard tank

TANKS:

- Water/booster tank manufactured from welded polypropylene, by UPF
- Water tank size; 200 Imp gal net capacity
- Class A foam tank size; 25 Imp gal net capacity

AERIAL:

- 110'+ aerial ladder, mid-mount
- Minimum tip capacity, unlimited, of 500 pounds wet/dry
- Pinable waterway for water tower operation or rescue operation
- 1250 Imp gpm flow capacity from master stream
- Ladder tip control of master stream
- Galvanized torque-box and stabilizers
- Stable set-up in any position under full load in any rotational angle, any achievable elevation
- Travel height below 11'-1"

FEATURES:

- Hydraulic generator for 120/240 volts A/C power on and off the truck, Harrison Hydra-Gen rated at 12kw
- 220 Volt LED floodlights on sides of body, front of cab, aerial operator station ladder tip for night-time incidents (FRC Spectra SPA260-J15, SPA100-J20)
- 12 Volt LED scene lights on sides and back of body, ladder tip (FRC Spectra SPA900, SPA100-Q15)

QUINT, KEY FEATURES

CUSTOM SPARTAN MODEL GLADIATOR CAB AND CHASSIS;

- Medium four door (MFD) cab with no raised roof, aluminum cab construction
- Seating for 6 firefighters with 5 SCBA seats (i.e. all except the driver)
- 12" extended and reinforced front bumper
- Single rear axle
- Air-bag package for all occupant protection in front or side impacts
- Cummins diesel engine model X15-605; rated at 605 hp, 2050 lb-ft torque.
- Allison automatic transmission model series 4000 EVS
- Locking rear differential
- PTO for hydraulic generator drive
- PTO for aerial hydraulic drive
- In-cab cabinets on both sides (aka medical cabinets)

CUSTOM BODY, ALUMINUM CONSTRUCTION;

- Maximum compartmentation
- Roll-up doors for body side compartments
- Amdoor brand roll-up doors, painted body colour, with integral compartment lighting
- Adjustable shelving on tracks in compartments
- SCBA bottle storage compartments in sealed wheel arch compartments (4)
- Aluminum hinged hose bed cover

EQUIPMENT STORAGE;

- Minimum 300 cubic feet of compartment storage in body
- Ladder storage plus pike poles, rear access, minimum 85 feet of ground ladders in body: 35'/28'/16'/10'
- Main hose bed capacity;
    - One division of 8 lengths @ 100' ea. of 5" supply,
    - One division of 12 lengths @ 50' ea. of 2-1/2" double jacket (pre-connected),
- Pre-connected attack line capacity at pumphouse;
    - Three divisions of 6 lengths @ 50' ea. of 2-1/2" double jacket (pre-connected)Pump;

PUMP;

- Hale pump model Q-Max rated at 1750 IGPM at 150 psi, from draft

- Hale transfer case model “K”, midship split shaft drive
- All discharges/suctions minimum size 3-inch, stainless steel piping
- Steamer inlets equipped with MIV, both sides, rear feed
- Tank to pump (TTP) minimum 4-inch size automated valve and piping
- Side-panel controls, electronic governor, manual or electronic valve controls except MIVs, ladder pipe which shall be electronic
- RHS discharges, 2 @ 2-1/2”, and 1 @ 4”
- LHS discharges, 2 @ 2-1/2”
- FoamPro 2001 metered injection foam system, piped to two cross-lay pre-connects with external foam pick-up and onboard tank

TANKS:

- Water/booster tank manufactured from welded polypropylene, by UPF
- Water tank size; 400 Imp gal net capacity
- Class A foam tank size; 25 Imp gal net capacity

AERIAL:

- 75’ aerial ladder, rear mount
- Minimum tip capacity of 500 pounds wet/dry, any angle
- Pinable waterway for water tower operation or rescue operation
- 1250 Imp gpm flow capacity from master stream at tip
- Ladder tip control of master stream
- Galvanized torque-box and stabilizers
- Stable set-up in any position under full load in any rotational angle, any achievable elevation

FEATURES:

- Hydraulic generator for 120/240 volts A/C power on and off the truck, Harrison Hydra-Gen rated at 12kw
- 220 Volt LED floodlights on sides of body, front of cab, aerial operator station ladder tip for night-time incidents (FRC Spectra SPA260-J15, SPA100-J20)
- 12 Volt LED scene lights on sides and back of body, ladder tip (FRC Spectra SPA900, SPA100-Q15)

RESCUE, KEY FEATURES

COMMERCIAL CAB AND CHASSIS

- Freightliner M2-112 crew cab with raised roof
- Seating for 5 firefighters
- Air-bag package for all occupant protection in front or side impacts
- Reinforced bumper in front
- Cummins diesel engine model ISL9-450; rated at 450 hp, 1250 lb-ft torque.
- Allison automatic transmission model series 3000 EVS
- Locking rear differential
- PTO for hydraulic generator drive

UTILITY, KEY FEATURES

COMMERCIAL CAB AND CHASSIS

- Dodge Ram 3500, crew-cab, pick-up with 6 foot +/- box
- Cummins diesel engine 6.7HO; rated at 400 hp, 1000 lb-ft torque
- Aisin automatic transmission
- Four-wheel drive, SRW
- Front suspension with snow-plow upgrade
- Option: Snow plow attachment and plow
- Option: Small bed fuel tank for emergency refuelling of fire apparatus at the scene

APPENDIX X; TABLE OF RECOMMENDATIONS

	Recommendations	Report Page
	MAJOR RECOMMENDATIONS	
1	GA recommends the hybrid organizational model because it is the best compromise in providing regional coordination and efficiencies yet maintains the local volunteer character of the fire department.	xiv
2	GA recommends providing centralized administration support, management and leadership. A full-time Director of Public Safety Services – Regional Fire Chief, and a full time Assistant Fire Chief with primary responsibilities for fire prevention are recommended. A part-time Divisional Chief is also recommended to take responsibility for developing and coordinating of firefighter qualifications and training.	xiv
3	GA recommends a District Fire Chief management committee as a key recommendation, to bring together all the local fire district management personnel; so that plans and decisions on common issues of concern and service delivery can be made.	xiv
4	GA recommends better accountability and standardization of policies, procedures, major equipment, training and qualification standards, and levels of service. Accompanying this is revised response districts that minimize travel times to all portions of W/WH. To help ensure maximum efficiency and effectiveness of resource utilization, recommendation are made to develop response scenarios where all resources are available to respond as needed and are not bounded by fire department district silos.	xiv
5	GA recommends the benchmark annual operating budget as a starting point going forward.	xiv
6	GA recommends the proposed 20-year capitalization plan, primarily for fire apparatus replacements, using a standardized approach to specification and group purchasing.	xiv
7	GA recommends that all purchasing of significant-cost items be coordinated.	xiv
8	GA recommends minimum standards for training and qualifications of firefighters; in order to achieve a consistent service level throughout the new municipality that meets public expectations. Also recommended is a benefits package for the volunteer firefighters that recognizes the long term physical and mental health risks that fire/rescue first-responders are exposed to. Recommendations include a fair and uniform honourarium system.	xiv
9	GA recommends that all fire prevention activities, including fire-inspection, fire-investigation, and fire-safety education be brought inhouse. These are mandated services and require coordination, proper execution, and prioritizing in order to meet legislative mandates.	xv
10	GA recommends that the current 1.5 FTE fire-inspectors in Planning and Development be reassigned to the regional fire service.	xv
11	GA recommends that four on-call fire-investigators be trained and equipped to investigate all fires and to gather necessary information on origin, cause and circumstances, and to liaise with the office of the Fire Marshal and RCMP in securing evidence as necessary.	xv
12	GA recommends that better coordination and support of local fire department efforts in fire-safety education be provided, including the possible involvement of non-firefighting personnel from the community in this activity.	xv
	DETAILED RECOMMENDATIONS	
13	GA recommends that when the new regional municipality officially comes into being April 1, 2020, that all the fire departments, municipal or otherwise, providing fire and rescue services within the region, including those that are contracted by the municipality, register with the new municipality on an annual basis.	11
14	GA recommends that the municipality include a multi-lateral automatic aid provision in their service agreement with each of the society fire departments. This provision will simplify utilizing the closest, appropriate, and adequate resources to incidents in all of the geographic area of the Region, irrespective of registered protection area (aka fire districts).	12
15	GA recommends that a review of the current registration form used by the Municipality of West Hants be used as the base registration document, and that it be amended to reflect the new regional municipality and its needs.	12
16	GA recommends the Kings County registration, clause 3.c. be edited for clarity. If the intention here is simply to require fires to be investigated then that should be stated clearly.	13
17	GA recommends that in the Kings County registration; either a) replace the term "*fire suppression*" with "*fire extinguisher training*" or b) delete the reference to "*fire suppression.*"	14

	Recommendations	Report Page
18	GA recommends in the Kings County registration, one of two options; a) delete cause 7.c. or b) reword the clause to reflect the following; *"The municipality and the Hantsport fire station will endeavour to amend its operating procedures and guidelines to meet the objectives of the Regional Municipality of Windsor -West Hants and Municipality of the County of Kings Fire service agreement"*	14
19	GA recommends that Duck Pond Road area of Kings County, as indicated on the map noted as Schedule 'A' of the Kings County agreement, be serviced by Southwest Hants. The Southwest Hants fire station is the closest station and the Duck Pond Road will fall within their recommended fire response district.	15
20	GA recommends that the arrangement with Glooscap FN be formalized through a service agreement between the two entities to establish the fire service programs and service levels that will be provided by West Hants.	15
21	GA recommends that a formal service agreement be established with the Walton Shore Volunteer Fire Department that specifies the services and service levels and other expectations that the Regional municipality has.	15
22	GA recommends that a consumables cost recovery clause be developed and considered for inclusion in any mutual-aid agreement.	18
23	GA recommends that any model the Council chooses that maintains the existence of individual incorporated fire departments (i.e. Status Quo model-1 or Hybrid model-3) should have a multi-lateral mutual-aid agreement in place between the municipality and each fire department, as well as with all other municipalities that the fire department might provide assistance to if they are to enjoy all the protections provided under §302 of the MGA. This would likely include Kings County, The Municipal District of East Hants, the District of Chester (Lunenburg County), and Halifax Regional Municipality.	18
24	GA recommends that the East Hants fire departments of Walton Shores and Uniacke should execute a Mutual-aid Agreement with the Regional Municipality. By virtue of being a Regional Municipality and employing a Regional fire service model if so chosen, the municipality will be signing mutual-aid agreements with other parties on behalf of all of the Regional fire stations.	19
25	GA recommends that the Kings County mutual-aid agreement should be reviewed and updated with any required amendments since the last update for this agreement is from 2001, and include execution by W/WH.	19
26	GA recommends that the new Regional municipality enter into a mutual-aid agreement with the Municipality of the District of Chester (MDC) in Lunenburg County and the New Ross and Chester Volunteer Fire Departments. MDC shares a border with the Region and with the fire districts of the New Ross Fire Department and the Chester Fire Department.	19
27	GA recommends that all mutual-aid agreements be signed by the municipalities involved, not only by the individual fire departments. The mutual-aid agreements currently in force are standard across the region. The main difference is who are the signatories to the agreements. Whereas the municipality has ownership of the majority of the capital investment of the regional fire services then the municipality has significant responsibility in providing mutual-aid services. Whereas there will be a new regional municipality commencing April 2020 all the mutual-aid agreements will require amending to reflect the new regional municipality.	19
28	GA recommends that regardless of the organizational model chosen by council, that a review and standardization of all policies, procedures, and guidelines of all types, that apply to the fire departments is undertaken quickly. The goal should be to produce consistency and fairness, and to meet the best practices of a collaborative fire and emergency service delivery program for the Region.	21
29	GA recommends that policy COGE007 be amended to more appropriately place responsibilities on station custodial staff. Sentence 4 of the policy has the potential to place a number of people and organizations at risk, not to mention the responders themselves.	23
30	GA recommends that the Windsor and West Hants false alarm, fire protection, burn permit and outdoor fires by-laws be reviewed and harmonized. The Bylaws relating to out of doors burning may need to address differing needs by area due to the rural nature of the Municipality of West Hants vs the very urban nature of Windsor.	23
31	GA recommends that if the false fire-alarm by-law is not enforced, that the by-law should be repealed.	24
32	GA recommends that the new fire department administration conduct a human resource needs assessment of the fire service in the Region. The recommendations on active front-line firefighter numbers is contained in Recommended Front-Line Staffing and Equipment starting on page 210 of this report, but there are numerous support (staff) positions not identified there.	31

	Recommendations	Report Page
33	GA recommends a review of the current recruitment and selection process, including currency with best practices, modifications required to meet the real needs of the organization, compliance with current Human Rights requirements, and alignment with corporate human resource policies.	31
34	GA recommends a review of fire department job descriptions, ensuring there is a job description for every position, volunteer or otherwise. Job descriptions should be complete with expectations and rewards. They outline necessary qualifications, time commitments (frequency and length), responsibilities and activities involved, the organization's accountability structure, and the performance evaluation methods.	31
35	GA recommends that membership in a fire department be restricted to those volunteer firefighters who actual reside in the fire district. Moving forward, the current practice of selectively choosing the fire department you prefer should no longer be permitted. As this practice robs the community of which a volunteer resides of a valuable resource. It also increases the risk of an accident as the volunteer rushes longer than necessary distances to attend the fire station when the pager goes off.	32
36	GA recommends that volunteer firefighter recruitment be a region-wide program for the regional fire service and that successful applicants be assigned to a regional station, based upon the closest station (i.e. fire district) to their residence.	33
37	GA recommends that the recruitment process commence with a properly designed marketing program throughout the region. This coordinated approach to recruiting will help to ensure standards are met and will ease the burden on individual stations. Turnover in volunteer fire departments is typically as much as 20% annually, but GA does not have the actual figures for WWH. It is likely that there is a need for an annual recruitment process, managed regionally with direct input and assistance from each of the stations.	33
38	GA recommends that the Regional Municipality invest in developing the leadership and management skills in the officers of all fire departments in the Region, as appropriate to their respective roles.	35
39	GA recommends that the Regional municipality register their volunteer firefighters with WCB before the eventual requirement for such registration occurs.	38
40	GA recommends the following recruitment and retention initiatives be implemented as part of a Region-wide program aimed at volunteer firefighter retention and in recognition of the special needs of volunteer firefighters; {see details on page}	40
41	GA recommends that the new Regional Municipality strike a committee of the appropriate fire service and municipal personnel, including finance personnel, to establish a fair, equitable, and affordable honourarium program across the region. The program should meet the following points; {see details on page}	47
42	GA recommends that the following table of qualifications be implemented as a standard baseline for officer promotions in all fire departments in the Region. {see details on page}	53
43	GA recommends the following promotional process. {see details on page}	54
44	GA recommends that performance evaluations be done by the immediate supervisor annually.	54
45	GA recommends that standard operating procedures/guidelines (SOP/Gs) be developed that outline a systematic approach for the rehabilitation of members operating at incidents and training exercises; in accordance with NFPA-1584. The procedures need to address cooling and warming, medical monitoring, Emergency Medical Care, member accountability, and documentation.	57
46	GA recommends that separate roles for ISO and OHS be established at each fire station.	60
47	GA recommends that; as required by regulations and standards that an official written occupational safety, health, and wellness policy be developed for the Regional Fire Services that that identifies specific goals and objectives; {see details on page}	60
48	GA recommends that the fire service evaluate the effectiveness of the occupational safety, health, and wellness program at least once every 3 years and submit an audited report of the findings to the DPS/FC and corporate CAO.	61
49	GA recommends acquiring a proper records management system (RMS). If related recommendations throughout this report are accepted, then an RMS training module adhering to NFPA-1401; *Recommended Practice for Fire Service Training Reports and Records* can be acquired as part of an overall Records Management System.	70
50	GA recommends that a three-year period be considered a reasonable period of time for a new recruit to become NFPA-1001 Level I qualified if that recruit aspires to attain a higher rank.	74

	Recommendations	Report Page
51	GA recommends a minimum mandatory training of six (6) hours per quarter to maintain Veteran driver status, plus an annual 8-hour training day. This is required to maintain skill proficiencies and teamwork skills.	76
52	GA recommends that all stations use the same method, specifically to employ the same colour helmets by rank, and standardize on vinyl reflective qualification stickers.	76
53	GA recommends that there be at last one certified Training Instructor (Minimum Level I Instructor) at each of the region's six stations.	77
54	GA recommends that an annual 3-day Regional Training Weekend be established and organized on an annual basis. Such a weekend could be rotated annually amongst the six station locations, each playing host in turn.	79
55	GA recommends that an individual, at least on a part time basis, be hired Regionally (Division Chief) to guide and assist in the development and delivery of Region-wide, standardized, focused, and appropriate training and personnel development to the fire departments and firefighters. If the desire is to have a regional single focused fire operational service, then all associated training must also be singularly focused. For this to occur, a regional-wide program, with homogenous training policies and procedures, with common goals, and common objectives needs to be implemented and managed.	81
56	GA recommends that a thorough evaluation of current fire-inspection practices and procedures be conducted to determine compliance with the *Act*. Changes should be immediately made where discrepancies are found or practices open up the municipality to avoidable liability.	110
57	GA recommends that qualified fire-investigators be retained by the Regional fire service for the purposes of investigating all fires for their origin, cause, and circumstances.	111
58	GA recommends that more resources, coordination, and emphasis be placed on fire-safety education activities. These activities should be delivered locally but coordinated regionally and in accordance with risks in the community.	112
59	GA recommends the implementation of Model 3; Hybrid Regional Fire Service, for all of the reasons discussed starting on page 120.	127
60	GA recommends the hiring of a full-time Director of Protective Services/Fire Chief.	127
61	GA recommends the hiring of a full-time Assistant Fire Chief.	127
62	GA recommends the hiring of a part-time Divisional Chief.	127
63	GA recommends the hiring of a full-time Administrative Assistant.	127
64	GA recommends the hiring of four part-time paid on call fire-investigators.	127
65	GA recommends the transfer of 1.5 FTE Fire-Inspectors from Planning & Development, Building, to the regional fire services.	127
66	GA recommends that future communications/dispatching contracts reference all services required, for example; "*provision of fire department dispatching and emergency communication services*".	132
67	GA recommends that Valley Communications have one or two staff attend a recognized certification program such as offered by the Association of Public-Safety Communications Officials (APCO).	134
68	GA recommends that the backup dispatch/communications facility's communications equipment be tested at least monthly.	135
69	GA recommends that at least once every six months the communications/dispatch backup facility shall be operated for one full shift as per FSANS standard and that records of all testing and operations of the backup facility be created and maintained, including all maintenance provided.	135
70	GA recommends that the dispatch/communications service provider undertake the development and implementation of business continuity plans and successions plans, if they have not already been made, as soon as possible.	135
71	GA recommends that the Regional Municipality investigate a cost-effective fully integrated Fire CAD/RMS program.	138
72	GA recommends that Valley Communications adhere to FSANS Fire Dispatch Standards	139
73	GA recommends that the Regional municipality and Valley Communications acquire the required software and firmware/hardware to enable the capture of any and all ANI/ALI data from the Primary PSAP.	139

	Recommendations	Report Page
74	GA recommends that the Regional municipality appoint a single contact person to manage emergency dispatch/records management, radio communications, and be the primary liaison between the municipality and Valley Communications.	139
75	GA recommends that Valley Communications test, and time, Language Translation services provided by ATT in Toronto.	139
76	GA recommends that the Municipality and Valley Communications implement a proper and ongoing incident call reporting and auditing program.	139
77	GA recommends that VComms acquire the necessary radio transmission recording equipment to record all fire department used channels.	147
78	GA recommends that the Regional fire departments operate on TMR channel 23 for all incident dispatches and incident operations, and TMR channel 22 for water shuttle and Traffic Control operations, etc.	147
79	GA recommends that the Municipality maintain the current VHF system for fire service paging only. The Municipality should strike a committee of the fire services to examine if there are any compelling reasons why the VHF system must be maintained for other than paging use.	147
80	GA recommends that the fire departments permit VComms to provide the contracted services for dispatching and communications as required by the service contract, by discontinuing the practice of taking over radio communications from fire stations.	147
81	GA recommends that the fire departments and VComms implement the use of industry standard radio transmitted benchmarks (KPIs) for all fire incidents.	147
82	GA recommends that dispatch protocols for MFR incidents be revised so that only one MFR capable unit is dispatched to single patient incidents.	147
83	GA recommends that the fire departments collectively develop and implement a standardized training program to make all personnel aware of required radio operating procedures, benchmarks, channel usage, and all other aspects critical for effective and efficient radio system usage.	147
84	GA recommends that fire stations be numbered starting with Summerville as number 1 and going clockwise from there.	152
85	GA recommends that a standard system of IDs be utilized for identifying functional positions on the fire-ground, starting with the regional staff and extending down through to all apparatus seat positions and to firefighters who arrive on-scene in a private vehicle.	153
86	GA recommends that standard radio protocol titles be established for all regular positions at an incident scene.	153
87	GA recommends that fire apparatus specifications be standardized across the region, by type and class of apparatus.	157
88	GA recommends that the Windsor boat be professionally inspected to determine its need for replacement.	157
89	GA recommends that a standardized, and coordinated, scheme of unique fire apparatus number identifications be established Region-wide, as follows; {detail on page}	157
90	GA recommends that steps be immediately taken to establish a robust internal data collection protocol for all incidents, not just fires. {detail on page}	158
91	GA recommends that a Region-wide False Fire-Alarm by-law be developed and enforced.	163
92	GA recommends that the Windsor and Three Mile Plains stations be appropriately resourced to deal with any population and residential growth that creates increased service demand.	175
93	GA recommends that the new Regional government carefully consider potential impacts on fire service capability with every new industrial, large commercial, or large residential planning application. The fire service should not be opposed to such developments, but must speak clearly about needs and plan accordingly for any such large-scale development.	177
94	GA recommends that there be response plans developed to ensure that all personnel Region-wide are well aware of bridge restrictions where fire apparatus cannot cross.	179
95	GA recommends that dry-hydrants be installed at all planned rural water supply points in the Region. Water supply points should be established within 5 kilometers by road to all hamlets and clusters of residential housing,	181

	Recommendations	Report Page
	and within 2.5 kilometers to all commercial risks. All dry-hydrants should be developed in accordance with the requirements of NFPA-1142, and should also be maintained in accordance with the standard.	
96	GA recommends that good records of all dry-hydrant maintenance, inspections, and testing should be kept as protection against liability and for reference and pre-planning purposes.	181
97	GA recommends that all dry-hydrants or other static water sources that are established on private property be accompanied by an executed agreement defining rights, duties, and liabilities.	181
98	GA recommends that complete fire statistics be collected and records kept, including all information requested by the NS Fire Marshal for inclusion in the provincial database. Records retention rules generally do not require retention of such data beyond five or seven years. It is further recommended that fire statistics be kept at least 15 years in order for trends to be clearly seen and analysed.	185
99	GA recommends, based on the travel-time predictions, the following fire station response districts. {detail on page}	197
100	GA recommends that where Uniacke previously responded into the east Ardoise area that this arrangement not continue. Analysis revealed that the travel-time to that area is virtually the same for both Brooklyn and for Uniacke. The additional complication, cost, and inefficiency of managing an additional fire service in that sparsely occupied area does not contribute measurably to potential outcomes.	198
101	GA recommends that the Duck Pond Road - Black River Lake area be serviced from the South West fire station.	198
102	GA recommends that the following first-response objective staff/time benchmarks for each of the following communities be established; in accordance with the recommended revised fire districts. {detail on page}	199
103	GA recommends that for planning purposes related to staffing, apparatus, and public information that these response objectives be implemented.	200
104	GA recommends that the Regional fire department develop Run-Cards to specify when and where certain types of incidents occur that the appropriate closest stations and appropriate resources are simultaneously dispatched. Simultaneous dispatch should occur for all fire/suspected fire events in all response areas. Simultaneous dispatch should occur for all other incidents, other than MFR incidents, in all Rural and Remote areas.	201
105	GA recommends that for potential large fire risk occupancies in rural areas, that adequate on-site water supplies be provided by the owner, such that relay pumping from draft can replace or strongly supplement water shuttled by tankers. These sites should be large all-weather access ponds meeting NFPA-1142.	209
106	GA recommends the following staffing complement of active volunteer firefighters for each station, and the recommended fleet of fire apparatus. {detail on page}	210
107	GA recommends that the following replacement schedule be adopted for the purposes of determining fire apparatus suitability for continued service. {detail on page}	215
108	GA recommends that a reserve pumper be placed in Brooklyn and Windsor stations, and the reserve Tanker be placed in Summerville.	215
109	GA recommends that replacement Tanker apparatus also include all components necessary to qualify as a pumper and a tanker. This includes little to no significant change from the current apparatus in some cases, but in other cases means the inclusion of adequate equipment and hose carrying capacity.	216
110	GA recommends a standardized vehicle specification be used Region-wide. Standardized apparatus descriptions are included in Appendix IX; Standardized Fire Apparatus Features starting on page 377.	216
111	GA recommends that specifications for the major classes of fire apparatus be standardized across all stations in the new regional municipality. This will generate savings in total cost of ownership for the municipality.	219
112	GA recommends that the Regional fire service strike a committee to investigate a standard brand and model series of SCBA with which to outfit all fire stations in the Region. Consideration should be given to the types of SCBA being used by mutual-aid partners as well, but in any case the SCBA used Regionally should be standardized.	228
113	GA recommends that every structural firefighter be provided with his/her own personal SCBA face mask. Provision of a properly fitting mask is necessary to achieve a pass in annual legislated quantitative Fit-Testing. A variety of mask sizes and models is usually necessary to achieve Fit Test performance.	228
114	GA recommends that the Regional fire service standardize on Hurst eDraulic hydraulic extrication/rescue equipment, and phase in replacement of the current equipment that is not eDraulic.	228

	Recommendations	Report Page
115	GA recommends that all fire stations be equipped with eDraulic Combi-Tools and that Windsor station be equipped with a set of heavy hydraulic jaws, cutters, and rams such that Windsor can provide Regional Heavy Rescue support to all stations. Details on the specific eDraulic equipment that is recommended is on page 291 of this report.	**229**
116	GA recommends that the Regional fire service immediately strike a committee to determine bunker gear needs and to test manufacturers' offerings, and to settle on one make. one model, one colour, and on standard features.	**229**
117	GA recommends that Proposals from vendors of the selected manufacturer be entertained and that a multi-year contract be negotiated with the vendor, allowing the DPS/FC to requisition PPE from the vendor at contract prices on an annual basis.	**229**
118	GA recommends that the Regional fire service standardize on one make and model of general use multi-gas detector for the fire stations.	**230**
119	GA recommends that the Regional fire service strike a committee to evaluate all the available makes and models of hose in the utilized sizes. The evaluation should include performance factors of weight, friction loss, kink resistance, abrasion resistance, liner separation, grip, quality, availability, construction, quality control at the factory. After ranking then price should be evaluated for those makes/models that have tied in the evaluation. Once selected that make/model should become standard for future purchases.	**230**
120	GA recommends that the Regional fire service strike a committee to evaluate the available makes and models of thermal imaging cameras. The evaluation should include all recognized performance factors. Testing of demonstration equipment should be involved. Standardization on future purchases of TICs should be based on the successful candidate, and be phased into all stations.	**231**
121	GA recommends that an architect familiar with fire station requirements, guidelines and applicable NFPA standards or a construction engineer be acquired to conduct an assessment to determine the feasibility of any required alterations for the Summerville and Windsor fire stations.	**244**
122	GA recommends that these Minor Capital expenditures be treated differently in future budgets and will address this recommendation in the benchmark portion of this analysis.	**254**
123	GA recommends that the new Regional Municipality implement service fees for reasonable cost recovery to highway responses.	**264**
124	GA recommends that the new Regional Municipality identify suitable services, and implement cost-recovery fees for these services. {detail on page}	**265**
125	GA recommends that the municipality pursue prosecution and seek fines for violations of the Fire Code, in accordance with the provisions in the *Fire Safety Act*.	**266**
126	GA recommends that one qualified and experienced fire apparatus maintenance service provider do all the servicing on all fire fleet vehicles.	**268**
127	GA recommends that a better understanding be undertaken on Windsor fire station actual costs as part of a possible justification for a new facility.	**270**
128	GA recommends that a fair and equitable honourarium policy be established that applies to all volunteer firefighters across the Region.	**271**
129	GA recommends that the following benefits be provided by the municipality to all volunteer firefighters; Provincial Workers Compensation Benefits ($62k insured amount), VFIS AD&D and disability coverage ($200k on-duty principal amount, disability weekly $700 maximum), VFIS MFAP (member and family assistance program for mental health), VFIS 24/7 (off-duty accident and sickness, 50/50 co-pay with firefighter who subscribes).	**272**
130	GA recommends that an insurance specialist be hired to review insurance policies and coverage options in order to prepare an RFP that obtains needed/desired coverage at best value. Self-insurance (i.e. deductible) risk assessments should be considered.	**273**
131	GA recommends that expenditures on minor capital equipment be increased since they are currently below sustainable service-requirements.	**274**
132	GA recommends that the need for the purchase of minor capital items be evaluated on the basis of the required inventory of items (e.g. how many 2½-inch fire hoses are needed) and each items' expected life-span. {detail on page}	**274**

	Recommendations	Report Page
133	GA recommends that a number of bunker gear sets be purchased annually. Blanket purchasing contracts should be signed that permit the fire department to purchase/requisition annually, say over a 5 or 7-year period, estimated maximum/minimum numbers of firefighters' PPE components, at agreed prices. {detail on page}	275
134	GA recommends that $300k (2019 dollars) be the target as a long-term plan for annual minor capital budgeting, until experience proves this is/not sufficient. However, as shown in the workbook that requirement for funds appears to be front-end loaded based on the expressed current needs of the fire departments. In the short term, Council may want to consider a temporary increase in that amount for the first three years. The benchmark budget shows $340k in 2020/21 for this reason.	278
135	GA recommends that the Director of Public Safety/Fire Chief manage the purchasing of minor capital equipment, for several reasons. With advice from the District Chief Management Committee he should set priorities on what equipment will be purchased that year.	278
136	GA recommends that the Director of Public Safety/Fire Chief have discretionary powers to make adjustments, within the approved minor capital budget total, to annually determine the exact mix of minor capital purchases according to immediate need.	278
137	GA recommends that any surplus minor capital funds at the end of the fiscal year (if any) be placed into a revolving reserve account for the future purchase of minor capital equipment.	278
138	GA recommends that the surplus minor capital revolving reserve account have a set maximum amount of approximately $100,000. If in any given future year there is an unprecedented or emergency need to make minor capital purchases and there are insufficient budgeted funds, a mechanism should be in place for the Director of Public Safety/Fire Chief to request Council to release additional funds to cover the need.	278
139	GA recommends that the following fire apparatus replacement schedule be adopted for the purposes of determining fire apparatus suitability for continued service and as a budget planning tool for fire apparatus replacement. {detail on page}	283
140	GA recommends that Windsor's other aerial (ALF) be scrapped without direct replacement and an unsuitable wildland/urban interface pumper be sold.	284
141	GA recommends for the future, the following numbers and types of first-line duty fire apparatus allocations. These numbers can be accomplished through attrition as current apparatus age-out. {detail on page}	284
142	GA recommends that two older (no longer first-line) pumpers and a tanker be kept serviceable/operational as maintenance reserves. The purpose of reserves is to temporarily replace apparatus that are out of service for a day or more. They will also remain available for major incidents.	284
143	GA recommends that a reserve pumper be placed in Brooklyn and Windsor stations, and the reserve Tanker be placed in Summerville.	285
144	GA recommends an annual contribution of approximately $650k to a fire capital reserve fund to reduce the annual capital fluctuations in the fire department budgets to a minimal amount. Adequate reserve funds would greatly reduce the need to debenture these predictable capital costs, thereby reducing the overall cost of capital purchases.	285
145	GA recommends the following table of scheduled fire apparatus replacements. {detail on page}	290
146	GA recommends that the Regional fire departments standardize on the heavy hydraulic equipment purchased and utilized.	291
147	GA recommends that Hurst eDRAULIC equipment be utilized exclusively.	291
148	GA recommends that not every station needs a full set of heavy hydraulic equipment. See more detail on this subject on page 228.	291
149	GA recommends that Windsor's rescue truck be designated as the Regional heavy rescue support apparatus, and be provisioned with multiple hydraulic rescue tools. All other stations should have a more modest set of hydraulics.	291
150	GA recommends that exhaust extraction systems for Summerville and South West stations be funded as soon as possible. They are scheduled for 2020 in the benchmark budget. The total estimated cost of these systems is $105k.	292
151	GA recommends that the new Regional municipality elect the highest WSIB protection. The addition of Region-wide firefighter accident, sickness and disability (AD&D) benefits, MFAP, and off-duty AD&D coverage is included in the projected cost increase.	294

END

May 7, 2021

Windsor West Hants Regional Municipality
100 King Street
Windsor, NS B0N 2T0
Attention: Todd Richard, Director of Public Works

RE: Fire Station Sites in Hantsport Nova Scotia

Further to your request, I have reviewed the two Geotechnical Reports for the two fire station sites that are being considered in Hantsport Nova Scotia.

1. 5 Oak Street, Hantsport, Geotechnical Report by Harbourside Geotechnical Consultants, dated September 23, 2020; and

2. 19 Chittick Avenue Hantsport, Geotechnical Report by ABLE Engineering Service Inc., dated November 27, 2019.

It is important to note that I am not a Geotechnical Engineer, but I am a Civil Engineer experienced in reviewing geotechnical reports for purposes of completing site civil designs and assessing sites for suitability. My work regularly includes review of geotechnical reports and determining if a site is suitable for the intended purpose and if so, what civil / excavation work needs to be done, including cost estimates for that work.

My review of these two sites are as follows:

Site 1 – 5 Oak Street

The geotechnical study for this site included 3 boreholes to a depth of approximately 40 feet. The boreholes show gravel with silt and sand fill material for the top 1.4m to 2.0m that would need to be removed or compacted. No organics were found in the boreholes of this site. This can be prepared for footings and slab, by removing the top layer of gravels and asphalt (300mm) and compacting the gravel silty sand layer. Minimal removal of unsuitable material at this site is expected. The existing grade of this site is close to the finished grade that the new building would be placed at therefore, no significant fills or cuts are required.

Site 2 – 19 Chittick Avenue

The worked completed on the geotechnical study for this site included 4 test pits to a depth of 3 feet to 5 feet. Test pits 1 to 3 show gravelly fill, ranging from compact to loose and containing organics.

Test pit #4 only went to a depth of 3 feet and the test pit record indicates gypsum at 3 feet. The record is unclear if this gypsum is mixed in with the second layer, or if gypsum bedrock is encountered. Because the test pit is only 3 feet deep and the other 3 test pits were 5 feet deep, it is possible that gypsum bedrock was encountered.

This site is a low-lying area, next to a stream, and is subject to flooding. The site would need to be raised up a minimum of 3.5 to 4 feet. Additionally, the top 4 feet of soil contains loose material with organics. This material should be removed and a total of up to 8 feet of imported structural fill would be required.

It is unclear if there is gypsum bedrock near the surface. Based on the test pit #4 data only being 3 feet deep and the test pit record simply stopping at 3 feet and saying “Gypsum” a follow up with ABLE would be needed to answer these questions. If gypsum is close to the surface, this would require further study to mitigate the risk of karst topography.

It should be noted that the test pits are only 3 to 5 feet deep, and this is less then what is typical for a geotechnical study.

Based on the two reports it is my opinion that site 1 (5 Oak Street) has significantly less risk and cost for the civil site works to have the building pad constructed.

If you have any questions or require additional information, please contact me.

Thank you,
DesignPoint Engineering & Surveying Ltd.

Glenn Woodford

Glenn Woodford, P.Eng.
Senior Engineer & Principal

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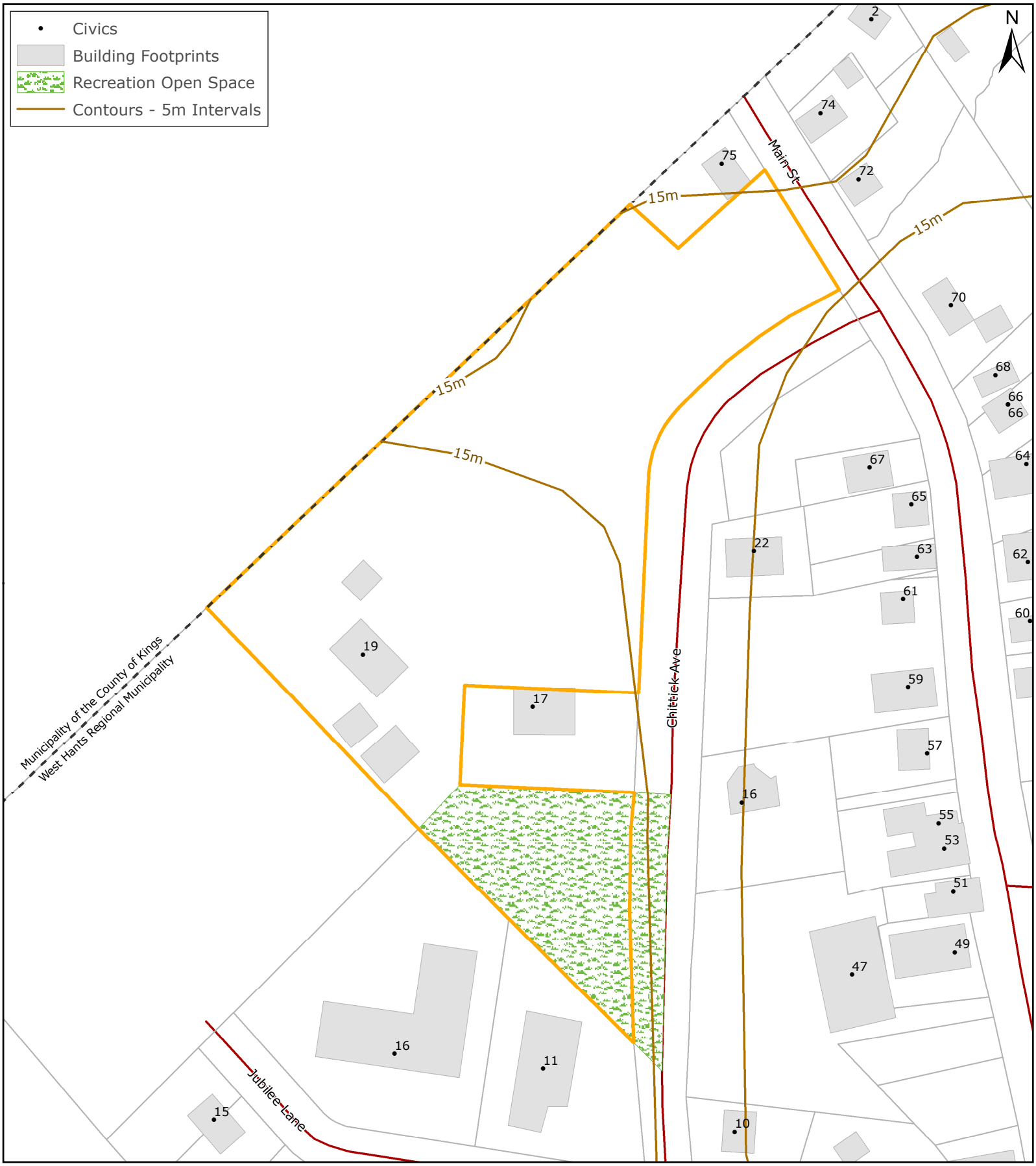
This map is a graphical representation and is not intended for legal descriptions or to calculate exact dimensions or area.

Prepared by: West Hants Regional Municipality Planning and Development Department May 2021

Hantsport, Chittick Avenue Site

0 30 60
Metres
Scale: 1:1,500

Subject Lot
Communities
Parcels
Roads



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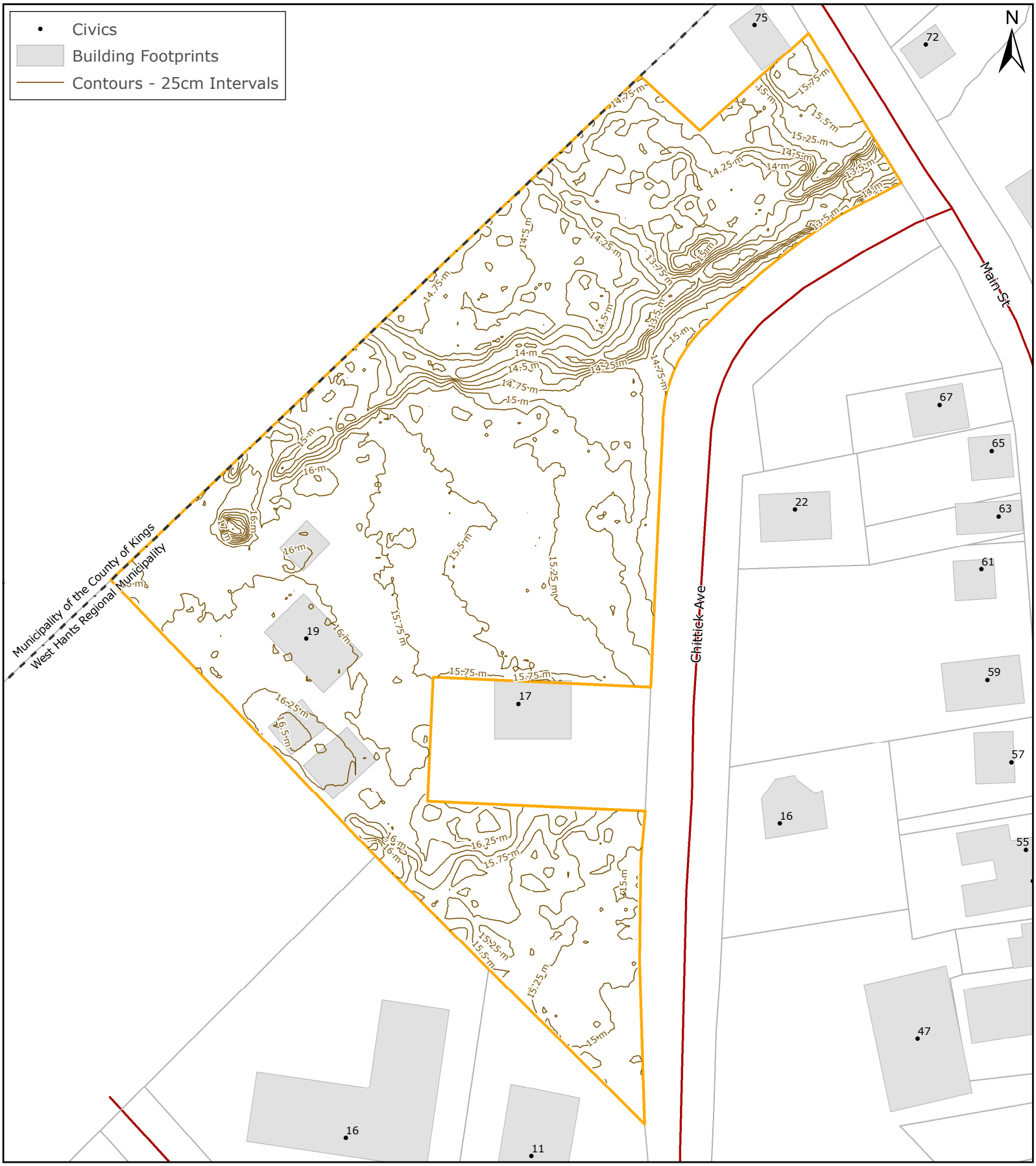
This map is a graphical representation and is not intended for legal descriptions or to calculate exact dimensions or area.

Prepared by: West Hants Regional Municipality Planning and Development Department May 2021

Hantsport, Chittick Avenue Site Contours

0 25 50
Metres
Scale: 1:1,200

Subject Lot
Communities
Parcels
Roads



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Prepared by: West Hants Regional Municipality Planning and Development Department May 2021

Hantsport, Chittick Avenue Site Orthophoto

0 30 60

Metres

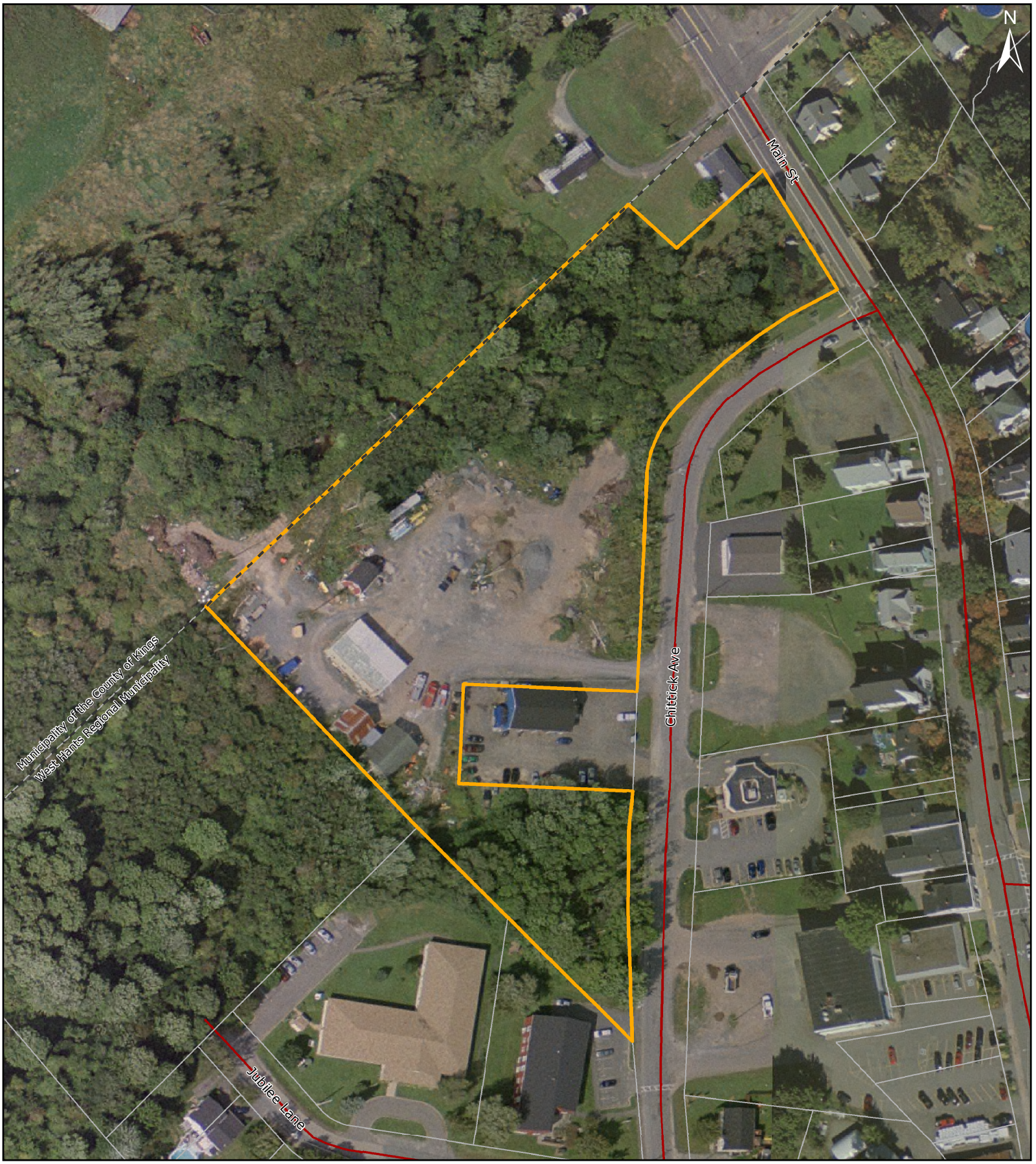
Scale: 1:1,500

Subject Lot

Communities

Parcels

Roads



Hantsport, Oak Street Site

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This map is a graphical representation and is not intended for legal descriptions or to calculate exact dimensions or area.

Prepared by: West Hants Regional Municipality Planning and Development Department May 2021

0 10 20
Metres
Scale: 1:800

Subject Lot
Parcels
Roads



Potential Fire Station Location
Fire Station
Civics
Building Footprints
Recreation Open Space
Rail
Contours - 5m Intervals

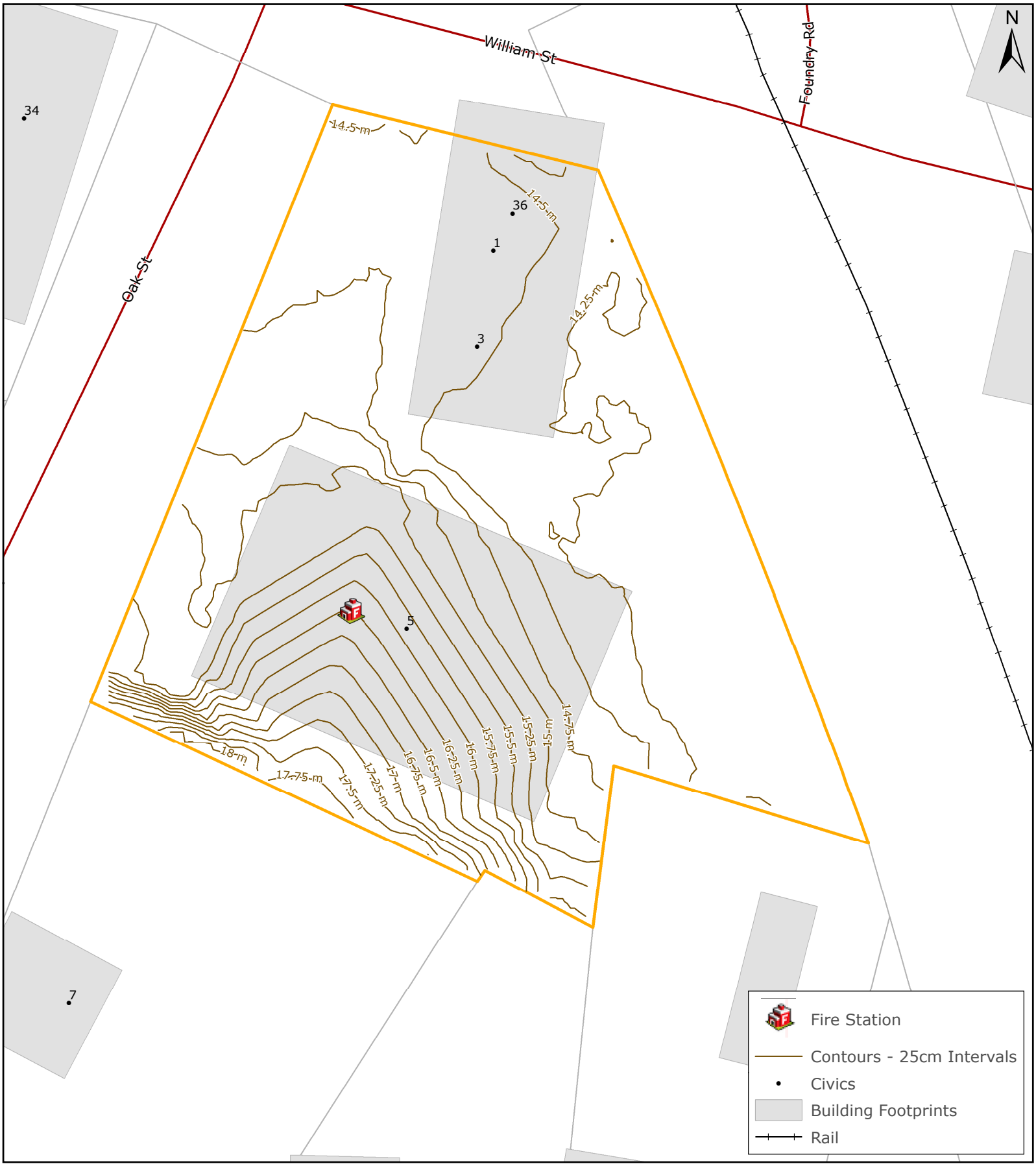
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This map is a graphical representation and is not intended for legal descriptions or to calculate exact dimensions or area.

Prepared by: West Hants Regional Municipality Planning and Development Department May 2021

Hantsport, Oak Street Site Contours

0 5 10
Metres
Scale: 1:400



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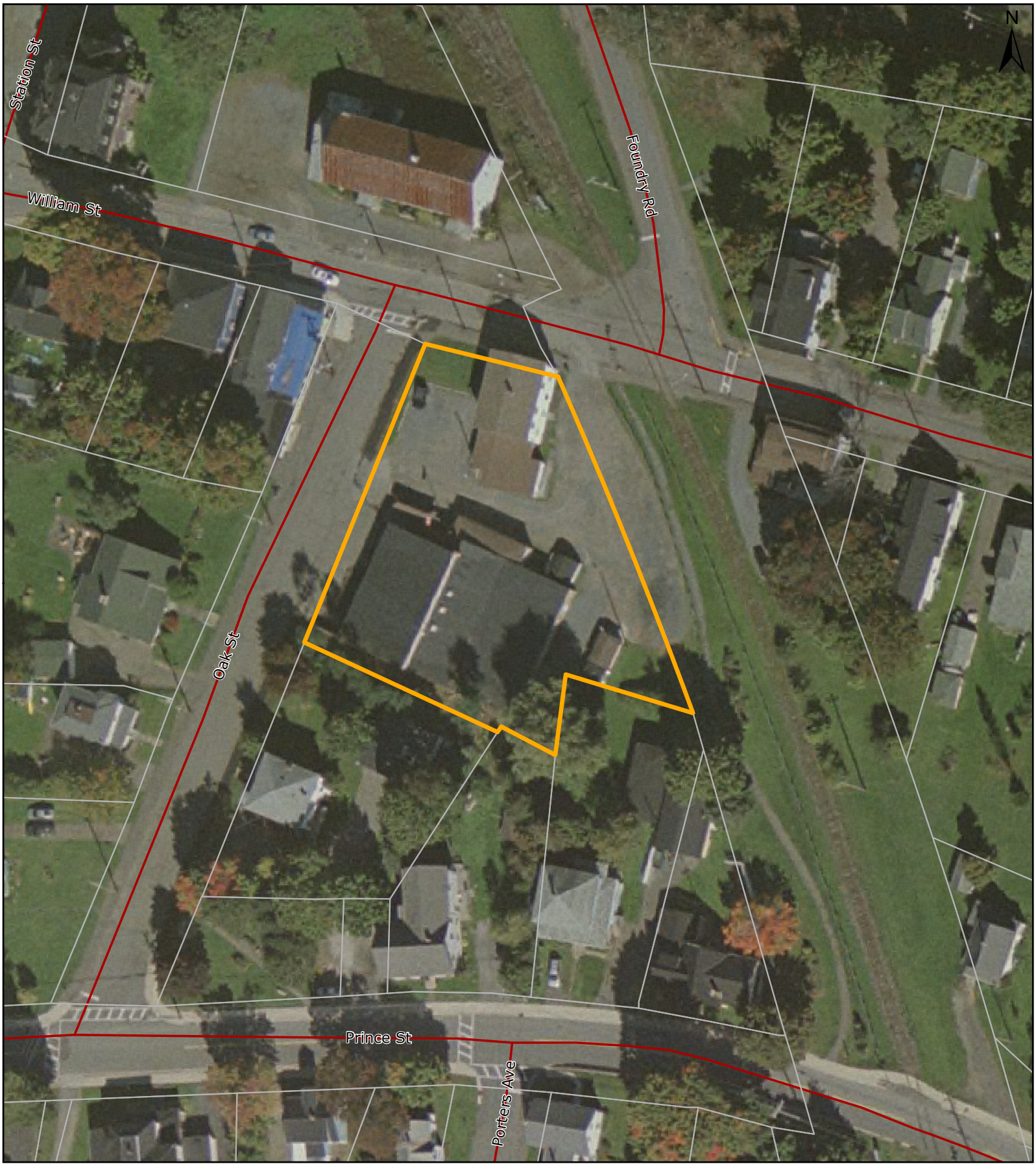
This map is a graphical representation and is not intended for legal descriptions or to calculate exact dimensions or area.

Prepared by: West Hants Regional Municipality Planning and Development Department May 2021

Hantsport, Oak Street Site Orthophoto

0 10 20
Metres
Scale: 1:800

Subject Lot
Parcels
Roads



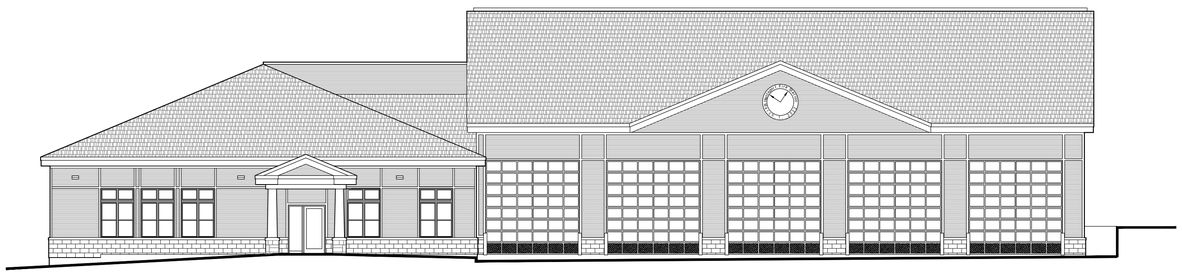
Hantsport Fire Station Site Characteristics – May 19, 2021
Jointly Prepared
Submitted by: Chief Administrative Officer, Mark Phillips

		5 Oak Street, Hantsport	**19 Chittick Ave, Hantsport**	
1	Lot Size	-26,051 Sq.Ft.	-8 Acre Parcel of Land minus PWs Operations, Chittick Park Space, Willow Brook and northern side of the lot. - It is assumed 26,051 Sq.Ft. is available on the site for dedicated use for the Fire Service for equal comparison. - Historic discussions included the demolition of the PWs buildings and redeveloping the site to include new buildings for PWs and Fire Services. That POV has not been expressed by the current WHRM Council nor currently included in discussions.	
2	5 Bay Station Accommodation	-14,353 Sq.Ft. (Building Footprint)	-14,353 Sq.Ft. (Building Footprint)	-26,051 Sq.Ft. lot size assumed square area for both sites for the building footprint and dedicated fire service needs.
3	Geotechnical Rating	-Completed by Harbourside Geotechnical Consultants, dated September 23, 2020.	-Completed by ABLE Engineering Services Inc, dated November 27, 2019. -Additional test holes were dug onsite on May 14th.	-Letter of Opinion provided by Design Point Senior Engineer and Principal, Glenn Woodford dated May 7, 2021. -If the Chittick site is further investigated a more thorough geotechnical assessment is recommended by staff.
4	Building Hazardous Materials	-Materials as identified by Strum Consulting Oct 2020 -No breakdown of costs provided in tenders specific to this portion of the work. The project was bid as a Lump Sum Contract "Fixed Rate".	-N/A -No existing buildings scheduled for demolition.	Materials identified in Food Bank and existing HFD noted as typical levels of hazardous materials for age of building(s).
5	Demolition	-Existing Fire Station -Food Bank (former Town Hall) -Estimated $66,982.00 in Class D Estimate. -No breakdown of costs provided in tenders specific to this portion of the work. The project was quoted as a whole	N/A	Demolition Cost Examples -22,000 Sq.Ft. Kentville Robinson / Edge Building (built in 1950s). Asbestos Abatement $47,000. Demolition in an urban setting $200,000. -KCA Elementary $110,000
6	Flood Risk	Less Vulnerable to Flooding -No known historic flooding or storm water backup events	Vulnerable to Localized Flooding -Historic localized flooding and storm water back up.	-Refer to attached reports provided regarding storm water and flood mitigation. -Field survey work will be conducted on May 19th to provide additional support.
7	Social / Community Challenges	No Known Challenges	No Known Challenges	
8	Sharing of Site	No Shared Use of Space	Shared Use of Space with PWs Operations	
9	Municipally Owned	Yes	Yes	
10	Proximity to Industry	Comparable	Comparable	
11	Site Soil Removal	No significant cuts / removal required	Remove 4ft of soils and replace with structural soil	26,051 Sq.Ft. assumed for both sites
12	Site Soil Additions	No significant fills are required.	-Add 4ft of structural soil to elevate 4ft above current grade -4' + 4' = 8' of structural fill over 26,051Sq.Ft. *(this could be reduced)* -(2.44m of structural fill) = 5,905m3 Estimated cost - $118,100 to $177,150	-ABLE – add addition 5' beyond building footprint at Chittick. We have assumed @6,051 Sq.Ft. -If the Chittick site were to be raised to this elevation it would create elevation conflicts with existing PW's buildings, material stockpiles and lot drainage. -Costs to remediate these noted Chittick site issues are not part of the estimate and unknown at this time.
13	Spread Footing Accommodation	Yes	Yes with structural fill.	

		5 Oak Street, Hantsport	**19 Chittick Ave, Hantsport**	
14	Post Disaster Compliance	N/A	N/A	
15	Traffic Impacts	No known impacts	Impacted due to potential flooding of Chittick Ave	Members responding to Chittick site may be impacted / restricted due to potential localized flooding.
16	Dedicated Parking	Oak Street for fire department only 8 dedicated	-Dedicated parking assumed to be the same as Oak Street location and mirrored 26,051 Sq.Ft. lot formation. -Additional spill over parking may be available on PWs sections of the lot.	
17	Parking	Secondary street parking on adjacent streets.	Secondary street parking on adjacent streets.	
18	Temporary HFD Relocation Renovation Costs Operating Costs Response Time	-Upgrades to the PWs building on Chittick Ave were carried out by PWs staff (in-kind). -Reno cost estimates for materials and supplies $7,500. -PWs Building renos will serve as a temporary location and not a full reno. Exhaust units and various other fire station specific features will not be added for the temporary period. -Operating costs will be shared between traditional PWs occupation and HFD. There is a potential for net neutral costs or decreased costs as the station on Oak Street will not be operated once it is vacated. -Response time is not anticipated as being impacted at a level that will impact traditional service delivery.	-N/A as the existing station would remain operational until the new station is built.	
19	HFD Membership Preference	-The membership is currently focused on the construction of the new station at Oak Street		
20	Option #1 Design – Approved January 26, 2021. 14,353 Sq.Ft. $3,307,167 estimate $66,962 demo estimate **$3,374,149 total estimate before taxes**			<u>Recommendation to approve Building Tender pending Council approval on May 25, 2021.</u> $3,186,861 “all in” before taxes including environmental abatement, demolition and glazing on bay doors. Diff = $187,558 under budget estimate or (5.9% contingency)

HANTSPORT FIRE STATION

HANTSPORT, NS



DRAWINGS:

CIVIL:
C-101 SITE SERVICING PLAN
C-102 GRADING PLAN
C-103 CONSTRUCTION DETAILS
C-104 VEHICLE MOVEMENT PROFILES

STRUCTURAL:
S-001 NOTES
S-002 TYPICAL DETAILS
S-101 FOUNDATION PLAN
S-102 FLOOR FRAMING PLAN
S-103 ROOF FRAMING PLAN
S-201 ELEVATIONS
S-301 FOUNDATION SECTIONS
S-310 FRAMING SECTIONS

ARCHITECTURAL:
A-101 FLOOR PLAN
A-102 ROOF PLAN
A-103 REFLECTED CEILING PLAN
A-201 ELEVATIONS
A-301 WALL SECTIONS
A-302 WALL SECTION 3
A-303 CROSS SECTIONS
A-401 WASHROOM PLANS
A-402 WASHROOM ELEVATIONS
A-403 ADMINISTRATION PLAN
A-404 MILLWORK
A-405 STAIR PLANS & SECTIONS
A-406 STAIR PLANS & SECTIONS
A-407 STAIR DETAILS
A-408 KITCHEN PLAN, ELEVATIONS & SCHEDULE
A-501 WINDOW ELEVATIONS & DETAILS
A-502 DOOR & FRAME ELEVATIONS
A-601 DOOR, FRAME & HARDWARE SCHEDULE
A-602 ROOM FINISH SCHEDULE

MECHANICAL:
M-100 MECHANICAL LEGEND
P-101 PLUMBING PLANS - DRAINAGE
P-102 PLUMBING PLANS - DOMESTIC WATER
P-103 PLUMBING SCHEDULES & DETAILS
M-101 VENTILATION PLAN
M-102 HEATING PIPING PLAN
M-103 INFLOOR TUBING PLAN
M-104 PROPANE GAS PLAN
M-200 MECHANICAL SCHEDULES
M-201 MECHANICAL DETAILS
M-202 MECHANICAL CONTROL DETAILS
M-203 HEATING PIPING SCHEMATIC
M-300 MECHANICAL SPECIFICATION
M-301 MECHANICAL SPECIFICATION

ELECTRICAL:
E-000 ELECTRICAL LEGEND
E-100 ELECTRICAL SITE PLAN
E-101 LIGHTING PLAN
E-102 POWER AND COMMUNICATIONS PLAN
E-200 RISER AND DETAILS
E-201 RISERS AND PANEL SCHEDULES
E-202 SCHEDULES
E-203 SITE DETAILS
E-300 SPECIFICATION

ISSUED FOR RFP 2021.04.20

harveyARCHITECTURE

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Fax: 902-893-3670
www.mcw.com

DESIGN POINT
ENGINEERING & SURVEYING

GENERAL CONSTRUCTION NOTES:

1. **SAFETY IS PARAMOUNT AND THE CONTRACTOR MUST USE SAFE WORK PRACTICES IN ACCORDANCE WITH THE NOVA SCOTIA OCCUPATIONAL HEALTH AND SAFETY ACT.**
2. ALL WORKS TO BE IN ACCORDANCE WITH WEST HANTS REGIONAL MUNICIPALITY DESIGN AND CONSTRUCTION SPECIFICATIONS (CURRENT EDITIONS).
3. ALL WORKS TO BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATION FOR MUNICIPAL SERVICES" PREPARED JOINTLY BY THE NOVA SCOTIA ROADBUILDERS ASSOCIATION AND THE CONSULTING ENGINEERS OF NOVA SCOTIA (CURRENT EDITION).
4. ALL WORKS TO BE IN ACCORDANCE WITH REQUIREMENTS OF ALL PERMITS AND REGULATIONS AS ISSUED BY THE NOVA SCOTIA DEPARTMENT OF ENVIRONMENT.
5. CONTRACTOR TO NOTIFY DESIGNPOINT AND WEST HANTS REGIONAL MUNICIPALITY REGARDING CONSTRUCTION SCHEDULING 2 WEEKS PRIOR TO COMMENCING CONSTRUCTION.
6. CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF NATURAL WATERCOURSES FROM DAMAGE DUE TO SILT LADEN RUNOFF FROM THE CONSTRUCTION SITE. ACCEPTABLE CONSTRUCTION PROCEDURES MAY BE OBTAINED FROM 'EROSION AND SEDIMENTATION CONTROL HANDBOOK FOR CONSTRUCTION SITES" (CURRENT EDITION), BY THE NOVA SCOTIA DEPARTMENT OF ENVIRONMENT.
7. ALL DISTURBED AREAS NOT STABILIZED BY GRAVEL, ASPHALT, CONCRETE, OR SOD ARE TO BE STABILIZED WITH 100mm TOPSOIL AND HYDROSEEDED. HYDROSEEDED AREAS TO BE COVERED WITH HAY MULCH (MIN. 3500 kg/Ha). HYDROSEEDED AREAS THAT DO NOT SHOW ACTIVE GROWTH WITHIN THE FIRST GROWING SEASON TO BE RE-STABILIZED.
8. MATERIALS SHALL NOT BE SUBSTITUTED UNLESS PRIOR APPROVAL IS PROVIDED BY THE ENGINEER.
9. SHOP DRAWINGS TO BE PROVIDED FOR REVIEW AND APPROVAL BY THE ENGINEER PRIOR TO CONSTRUCTION.
10. CONTRACTOR TO OBTAIN ALL NECESSARY PERMITS REQUIRED TO PERFORM WORKS AND TO COMPLY WITH ALL PERMIT REQUIREMENTS AND CONDITIONS.
11. LOCATIONS OF EXISTING INFRASTRUCTURE IS BASED ON BEST AVAILABLE INFORMATION, INCLUDING RECORD INFORMATION. CONTRACTOR TO CONFIRM LOCATIONS OF EXISTING INFRASTRUCTURE AND NOTIFY ENGINEER OF ANY DISCREPANCIES IMMEDIATELY. CONTRACTOR TO ALLOW A 1 WEEK REVIEW PERIOD BY THE ENGINEER.
12. CONTRACTOR TO VERIFY ALL EXISTING UTILITY LOCATIONS, SUCH AS HERITAGE GAS, NOVA SCOTIA POWER, BELL ALIANT, EASTLINK, AND MUNICIPALITY OF THE DISTRICT OF WEST HANTS. CONTRACTOR TO VISIT CLICKBEFOREYOUDIG.COM TO REQUEST LOCATES PRIOR TO COMPLETING ANY EXCAVATION. CONTRACTOR SHALL ADHERE TO ALL OCCUPATIONAL HEALTH AND SAFETY REGULATIONS FOR WORKING AROUND LIVE GAS MAINS.
13. ALL POWER AND COMMUNICATION INFRASTRUCTURE TO BE INSTALLED AS PER NSPI AND COMMUNICATION PROVIDER (I.E. BELL) SPECIFICATIONS. CONTRACTOR TO CONFIRM AND COORDINATE WITH UTILITIES AS REQUIRED.
14. PERMISSION FROM LANDOWNER(S) REQUIRED TO WORK ON PRIVATE PROPERTY.
15. CONTRACTOR TO NOTIFY PROPERTY OWNERS WHO WILL EXPERIENCE DISRUPTION DURING THE WORK (PROPERTY ACCESS, MUNICIPAL SERVICE LOSS, POWER/COMMUNICATION LOSS, ETC.) AT LEAST 48 HOURS PRIOR TO THE DISRUPTION.
16. ALL ELEVATIONS ARE METRIC AND GEODETIC. TOPOGRAPHICAL SURVEY COMPLETED BY DESIGNPOINT ON OCT. 15, 2020. CONTRACTOR TO CONTACT DESIGNPOINT FOR CONSTRUCTION LAYOUT CONTROL INFORMATION 2 WEEKS PRIOR TO CONSTRUCTION.
17. ALL EARTHWORK (INCLUDING SUBGRADE), TRENCH WORK, PIPE BEDDING, AND SURFACE TREATMENT (INCLUDING GRAVELS, ASPHALT, AND CONCRETE) TO BE REVIEWED AND CERTIFIED BY PROJECT GEOTECHNICAL ENGINEER.
18. DRAWINGS SUBJECT TO CONSTRUCTION APPROVAL BY THE APPLICABLE APPROVAL AGENCIES (i.e. MUNICIPALITY OF THE DISTRICT OF WEST HANTS, NOVA SCOTIA DEPARTMENT OF ENVIRONMENT) PRIOR TO CONSTRUCTION.
19. CONTRACTOR RESPONSIBLE FOR ALL TRAFFIC CONTROL MEASURES REQUIRED FOR THE PROJECT. ALL TEMPORARY TRAFFIC CONTROL MEASURES TO BE IN ACCORDANCE WITH THE LATEST EDITION OF THE NOVA SCOTIA TRANSPORTATION AND INFRASTRUCTURE RENEWAL TEMPORARY WORKPLACE TRAFFIC CONTROL MANUAL AND THE LATEST EDITION OF THE TRANSPORTATION ASSOCIATION OF CANADA MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR CANADA.
20. INSULATION TO BE 50mm THICK HI40 RIGID STYROFOAM (ROAD AND TRAFFIC RATED). WATER MAIN TO BE INSULATED WHERE MIN. 1.5 m COVER IS NOT MAINTAINED. STORM AND SANITARY PIPES TO BE INSULATED WHERE MIN. 1.2 m COVER IS NOT MAINTAINED.
21. CONTRACTOR MAY REQUEST GRADE ADJUSTMENTS SUBJECT TO REVIEW AND APPROVAL BY ENGINEER AND APPLICABLE APPROVAL AGENCIES. CONTRACTOR RESPONSIBLE FOR COSTS ASSOCIATED WITH DRAWING REVISIONS AND APPROVALS.
22. ALL TEMPORARY ROAD CLOSURES WILL REQUIRE A ROAD CLOSURES PERMIT.
23. AT THE COMPLETION OF CONSTRUCTION, THE CONTRACTOR IS TO COMPLETE AND PROVIDE A COPY OF A CCTV INSPECTION AND REPORT TO THE ENGINEER FOR REVIEW OF ALL GRAVITY SEWERS 150 mm Ø OR LARGER.
24. ALL TESTING OF SEWERS TO BE IN ACCORDANCE WITH THE MUNICIPALITY OF THE DISTRICT OF WEST HANTS SPECIFICATIONS, INCLUDING MANHOLE VACUUM TEST. PRESSURE TEST TO BE COMPLETED FOR ENTIRE PIPE LENGTH. TEMPORARY END CAPS TO BE INSTALLED AS REQUIRED TO FACILITATE TESTING.
25. ALL TESTING OF WATER MAINS TO BE IN ACCORDANCE WITH THE MUNICIPALITY OF THE DISTRICT OF WEST HANTS SPECIFICATIONS, INCLUDING PRESSURE TEST AND CHLORINATION FOR ALL SERVICE LATERALS 100 mm Ø AND LARGER. BASE LIFT OF GRAVEL TO BE PLACED OVER WATER MAINS AND SERVICES PRIOR TO TESTING (PUBLIC AND PRIVATE INFRASTRUCTURE).
26. ANY FIELD MANHOLE CONNECTIONS (IF REQUIRED) TO BE MADE USING CORE DRILL AND KOR-N-SEAL (SUBJECT TO APPROVAL BY UTILITY AND ENGINEER).
27. ALL GRAVITY PIPE TO BE INSTALLED IN AN UPSTREAM DIRECTION. CONTRACTOR TO BEGIN PIPE INSTALLATION AT THE MOST DOWNSTREAM LOCATION. INSTALLING TEMPORARILY ORPHANED PIPE SECTIONS IS NOT ACCEPTABLE (UNLESS APPROVED BY THE UTILITY AND THE ENGINEER).
28. CONTRACTOR TO PROVIDE 24 HOURS NOTICE TO THE MUNICIPALITY OF THE DISTRICT OF WEST HANTS AND THE ENGINEER OF PIPE AND MANHOLE TESTING, INCLUDING CCTV INSPECTION AND DEFLECTION TESTING.
29. AREAS NOT FINISHED WITH CONCRETE, ASPHALT, OR GRAVEL TO BE REINSTATED WITH 150 mm TOPSOIL AND SOD.



LEGEND

EXISTING		PROPOSED
	VERTICAL PROFILE	
	APPROXIMATE 1 IN 100 YEAR FLOOD LIMIT	100 YR
	EASEMENT	
WAT-E	WATER PIPE	WAT WAT
SAE	SANITARY PIPE	SA SA
ST-E	STORM PIPE	ST ST
GAS-E	NATURAL GAS MAIN	GAS
	WATER LATERAL	
	SANITARY LATERAL	
	STORM LATERAL	
	NATURAL GAS LATERAL	
	SIDEWALK	
	WALKWAY/A.T. TRAIL	
	GUARDRAIL	
	TOP OF SLOPE	
	BOTTOM OF SLOPE	
X X	FENCELINE	X X

	EXISTING	PROPOSED		EXISTING	PROPOSED
CURB CUT/RAMP			AIR RELEASE VALVE		
CURBSTOP			WATER VALVE		
REDUCER			HYDRANT		
PRECAST HEADWALL			CATCHBASIN		
STREET SIGN			UTILITY POLE w/ GUY WIRE		
STREET TREE			GLB		
			URD		

8 0 4 8 METRES

1:150

ISSUE	DATE	DESCRIPTION
2	APR. 20, 2021	ISSUED FOR RFP
1	MAR. 12, 2021	ISSUED FOR REVIEW

CONSULTANT

DESIGN POINT ENGINEERING & SURVEYING
PHONE: 902.832.5597 www.designpoint.ca

REGISTERED PROFESSIONAL ENGINEER * PROVINCE OF NOVA SCOTIA * DATE APR. 20, 2021 A.S. FORSYTHE 7386

CLIENT

harveyARCHITECTURE

PROJECT DESCRIPTION

HANTSPORT FIRE STATION

HANTSPORT, NOVA SCOTIA

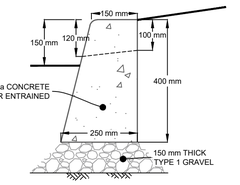
SHEET DESCRIPTION

SITE SERVICING PLAN

Drawn	Engineer	Project No.	Drawing No.
T. ARMOUR	A. FORSYTHE	20-221	C-101
Scale 1:150	Filename 20-221_Base.dwg		1 or 4

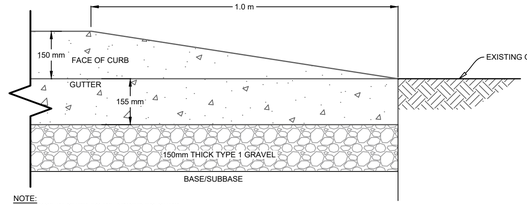
TYPICAL CURB DETAIL A/1

N.T.S



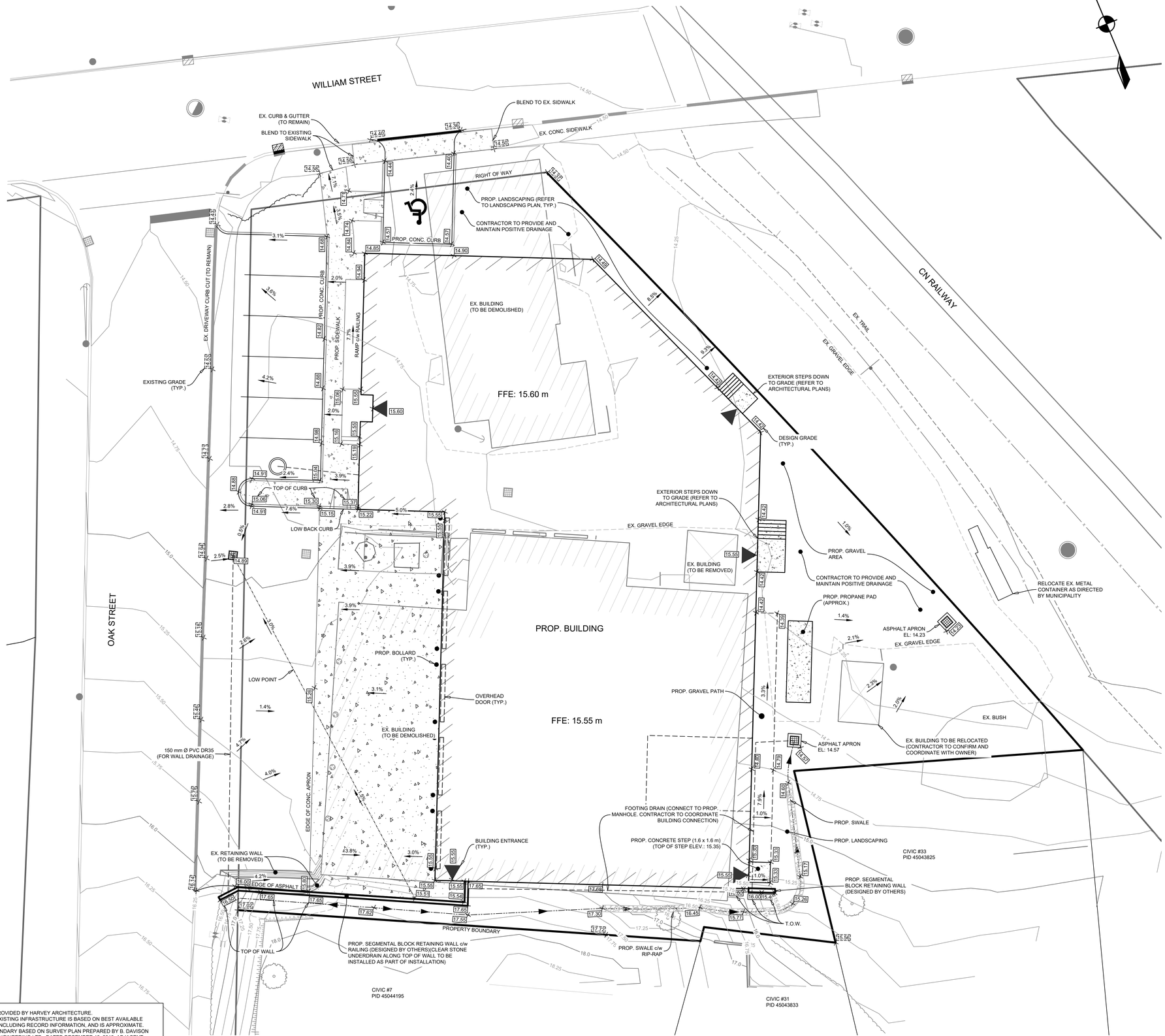
TYPICAL CURB TERMINATION DETAIL B/1

N.T.S

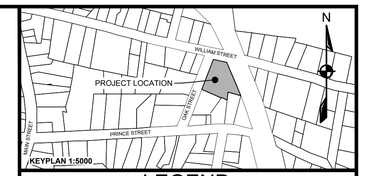


NOTE:
BULLNOSE IN CURB TO BE ADDED TO CURB TERMINATIONS WHERE THERE IS NO EX. CURB.

NOTES:
1. SITE LAYOUT PROVIDED BY HARVEY ARCHITECTURE.
2. LOCATION OF EXISTING INFRASTRUCTURE IS BASED ON BEST AVAILABLE INFORMATION, INCLUDING RECORD INFORMATION, AND IS APPROXIMATE.
3. PROPERTY BOUNDARY BASED ON SURVEY PLAN PREPARED BY B. DAVISON SURVEYING & ENGINEERING LTD., DATED DECEMBER 19, 2018. ADJACENT PROPERTY LINES ARE BASED ON PROVINCIAL MAPPING AND ARE APPROXIMATE, AND SUBJECT TO LEGAL SURVEY.
4. TOPOGRAPHIC SURVEYS COMPLETED BY DESIGNPOINT ON OCTOBER 15, 2020. CONTOUR INTERVAL = 0.25 m.



NOTES:
1. SITE LAYOUT PROVIDED BY HARVEY ARCHITECTURE.
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4. TOPOGRAPHIC SURVEYS COMPLETED BY DESIGNPOINT ON OCTOBER 15, 2020. CONTOUR INTERVAL = 0.25 m.



LEGEND

EXISTING		PROPOSED
10	MAJOR CONTOUR	10
10	MINOR CONTOUR	10
	EASEMENT	
	RIGHT OF WAY	
	LOT LINE	

	EXISTING	PROPOSED		EXISTING	PROPOSED
PRECAST HEADWALL			CATCHBASIN		
SURFACE GRADE	0.00	0.00	FLOW ARROW		
SURFACE SLOPE		2.0%	CURB CUT		

1:150

ISSUE	DATE	DESCRIPTION
2	APR. 20, 2021	ISSUED FOR RFP
1	MAR. 12, 2021	ISSUED FOR REVIEW

CONSULTANT

DESIGN POINT ENGINEERING & SURVEYING
PHONE: 902.832.5597
www.designpoint.ca

REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF NOVA SCOTIA — DATE APR. 20, 2021 — A.S. FORSYTHE — 7386

CLIENT

harveyARCHITECTURE

PROJECT DESCRIPTION

HANTSPORT FIRE STATION

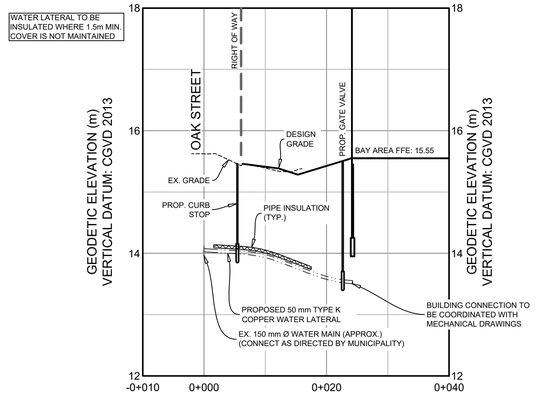
HANTSPORT, NOVA SCOTIA

SHEET DESCRIPTION

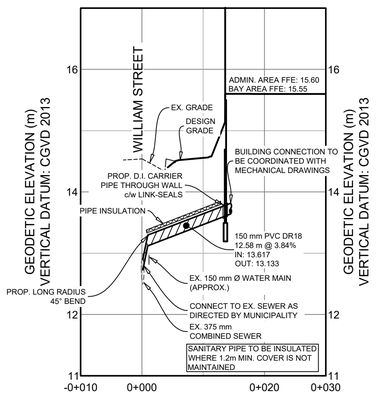
GRADING PLAN

Drawn	Engineer	Project No.	Drawing No.
T. ARMOUR	A. FORSYTHE	20-221	C-102
Scale	Filename		2 of 4
1:150	20-221_Base.dwg		

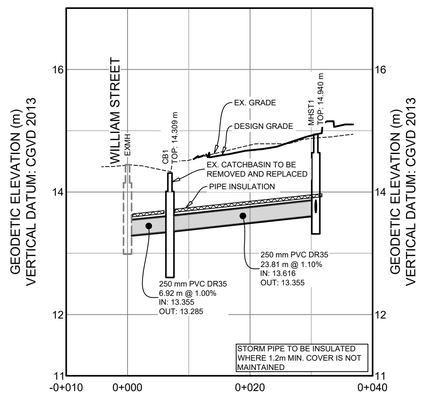
WATER SERVICE
(1:500)



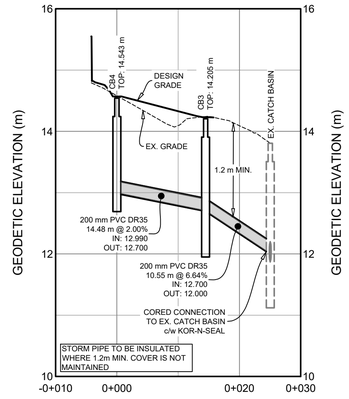
SANITARY SERVICE
(1:500)



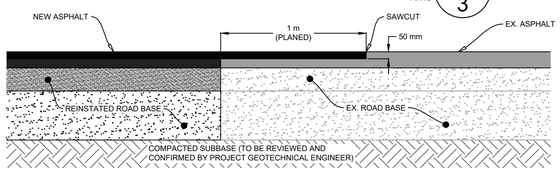
FRONT STORM SEWER
(1:500)



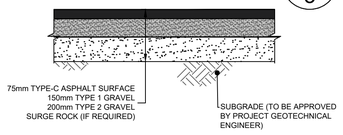
REAR STORM SEWER
(1:500)



PAVEMENT REINSTATEMENT DETAIL
A / 3
N.T.S

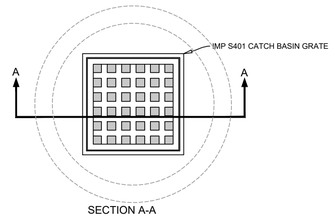


TYPICAL ASPHALT STRUCTURE
B / 3
N.T.S.

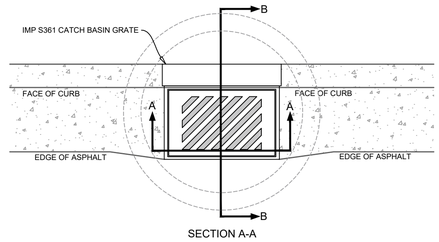


NOTE:
REFER TO PROJECT GEOTECHNICAL REPORT PREPARED BY HARBOURSIDE GEOTECHNICAL CONSULTANTS, DATED SEPTEMBER 23, 2020, FOR PLACEMENT AND COMPACTION DETAILS. ASPHALT AND GRAVEL THICKNESS TO BE REVIEW AND CONFIRMED BY PROJECT GEOTECHNICAL ENGINEER PRIOR TO CONSTRUCTION.

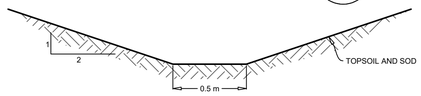
TYPICAL CATCH BASIN DETAIL
(FOR NON-CURB INSTALLATION)
C / 3
N.T.S.



TYPICAL CATCH BASIN DETAIL
(FOR CURB INSTALLATION)
D / 3
N.T.S

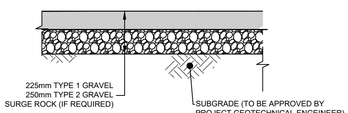


TYPICAL SWALE AND DETAILS
E / 3
N.T.S.



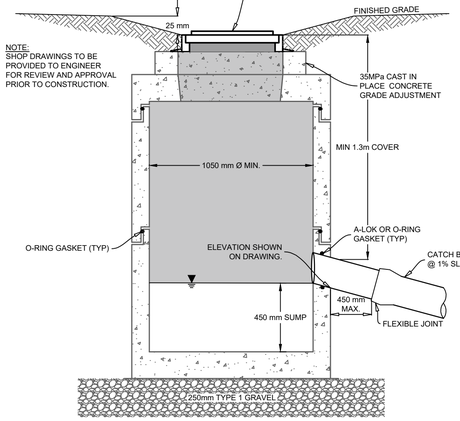
NOTE: SWALE TO BE ROCK LINED WHERE SWALE SLOPE EXCEEDS 4%

TYPICAL GRAVEL STRUCTURE
G / 3
N.T.S.

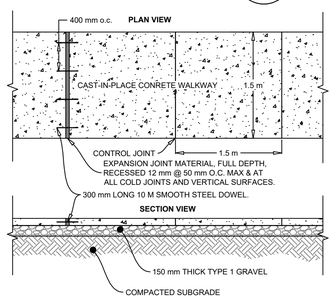


NOTE:
REFER TO PROJECT GEOTECHNICAL REPORT PREPARED BY HARBOURSIDE GEOTECHNICHAL CONSULTANTS, DATED SEPTEMBER 23, 2020, FOR PLACEMENT AND COMPACTION DETAILS. GRAVEL THICKNESSES TO BE REVIEW AND CONFIRMED BY PROJECT GEOTECHNICAL ENGINEER PRIOR TO CONSTRUCTION.

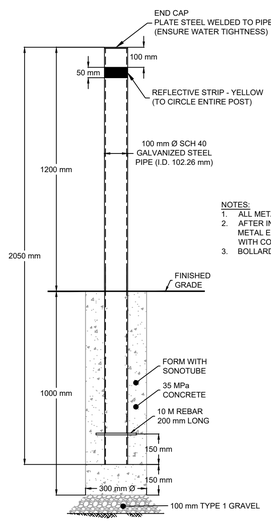
NOTE:
SHOP DRAWINGS TO BE PROVIDED TO ENGINEER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.



CONCRETE WALKWAY
F / 3
N.T.S.

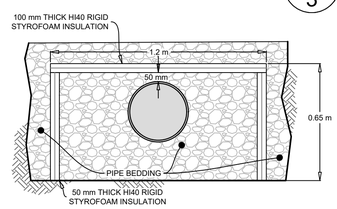


PERMANENT BOLLARD DETAIL
I / 3
N.T.S



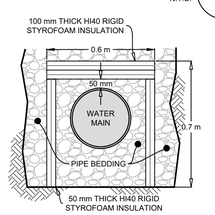
NOTES:
1. ALL METAL TO BE HOT DIP GALVANIZED.
2. AFTER INSTALLATION, ANY EXPOSED METAL EDGES SHALL BE PROTECTED WITH COLD GALVANIZING.
3. BOLLARDS ARE TO BE NON-REMOVEABLE.

SEWER PIPE INSULATION DETAIL
J / 3
N.T.S.

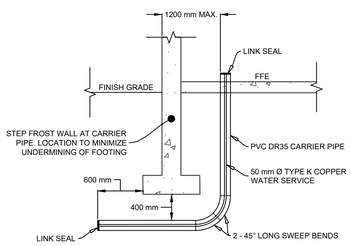


NOTE: PIPE INSULATION DETAIL FOR STORM AND SANITARY PIPE ONLY

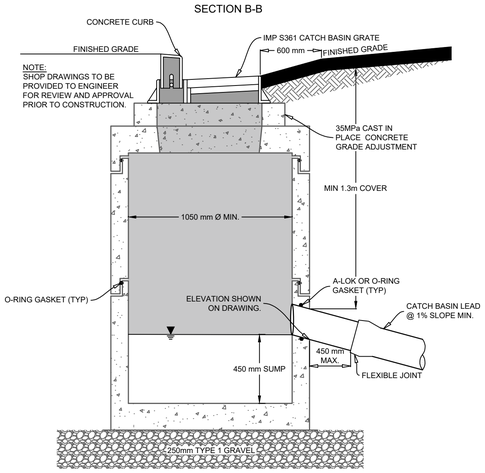
PIPE INSULATION DETAIL
K / 3
N.T.S.

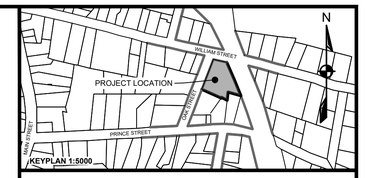


WATER CONNECTION DETAIL
J / H
N.T.S.



SECTION B-B





ISSUE	DATE	DESCRIPTION
2	APR. 20, 2021	ISSUED FOR RFP
1	MAR. 12, 2021	ISSUED FOR REVIEW

CONSULTANT

DESIGN POINT ENGINEERING & SURVEYING
PHONE: 902 832 5597
www.designpoint.ca

REGISTERED PROFESSIONAL ENGINEER * PROVINCE OF NOVA SCOTIA *
DATE APR. 20, 2021
A.S. FORSYTHE
7386

CLIENT

harveyARCHITECTURE

PROJECT DESCRIPTION

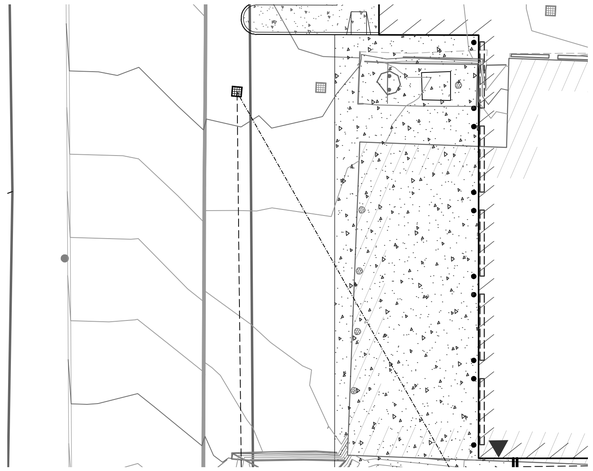
HANTSPORT FIRE STATION

HANTSPORT, NOVA SCOTIA

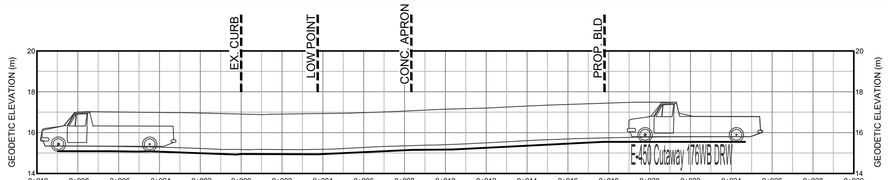
SHEET DESCRIPTION

CONSTUCTION DETAILS

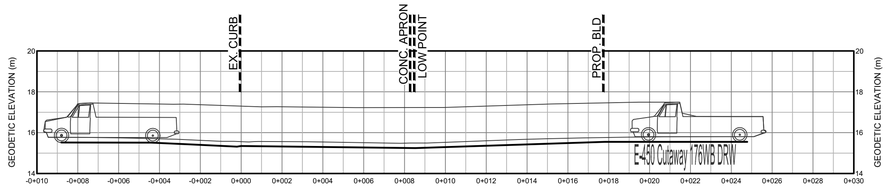
Drawn	Engineer	Project No.	Drawing No.
T. ARMOUR	A. FORSYTHE	20-221	C-103
Scale	Filename		3 or 4
N.T.S.	20-221_Base.dwg		



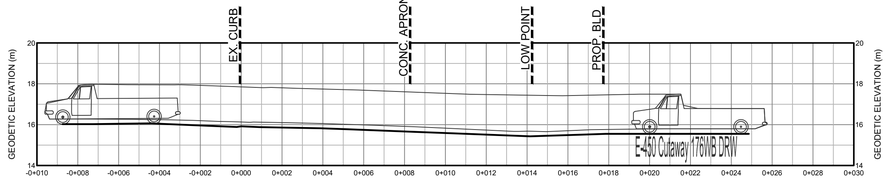
A-A

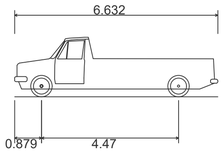


B-B

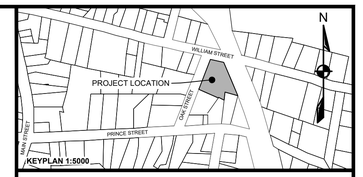


C-C

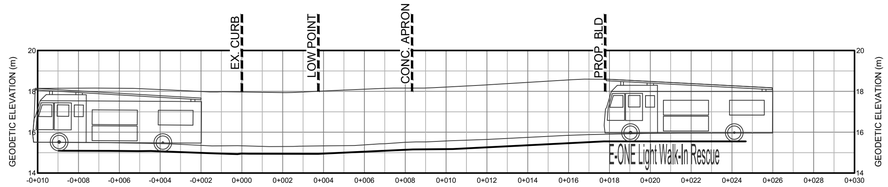




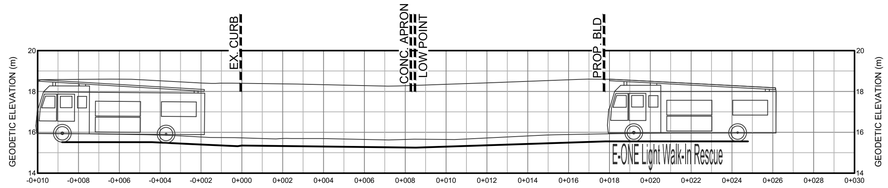
E-450 Cutaway 176WB DRW
Overall Length
Overall Width
Overall Body Height
Min Body Ground Clearance
Track Width
Lock-to-lock time
Curb to Curb Turning Radius



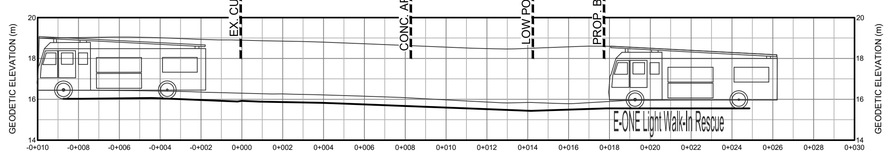
A-A

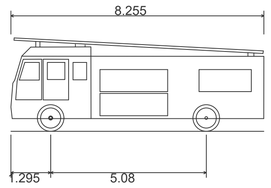


B-B



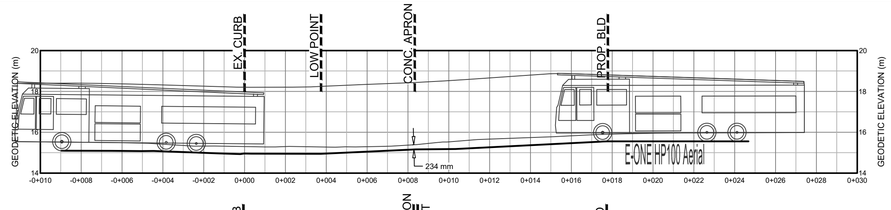
C-C



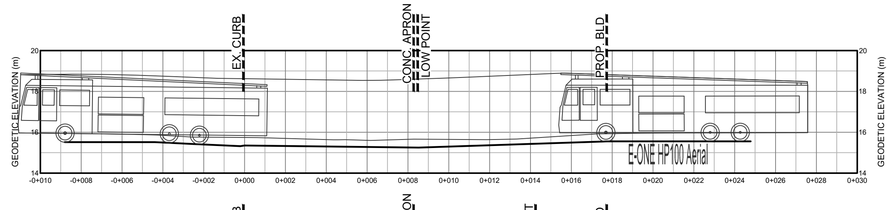


E-ONE Light Walk-In Rescue
Overall Length
Overall Width
Overall Body Height
Min Body Ground Clearance
Track Width
Lock-to-lock time
Curb to Curb Turning Radius

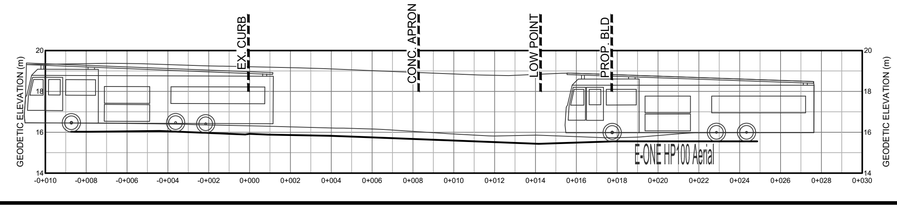
A-A

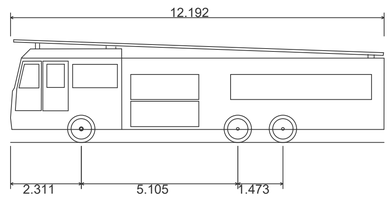


B-B



C-C





E-ONE HP100 Aerial
Overall Length
Overall Width
Overall Body Height
Min Body Ground Clearance
Track Width
Lock-to-lock time
Max Wheel Angle

ISSUE	DATE	DESCRIPTION
2	APR. 20, 2021	ISSUED FOR RFP
1	MAR. 12, 2021	ISSUED FOR REVIEW

CONSULTANT

DESIGN POINT ENGINEERING & SURVEYING
PHONE: 902.832.5597
www.designpoint.ca

REGISTERED PROFESSIONAL ENGINEER
DATE APR. 20, 2021
A.S. FORSYTHE
7386
PROVINCE OF NOVA SCOTIA

CLIENT

harveyARCHITECTURE

PROJECT DESCRIPTION

HANTSPORT FIRE STATION

HANTSPORT, NOVA SCOTIA

SHEET DESCRIPTION

VEHICLE MOVEMENT PROFILES

Drawn	Engineer	Project No.	Drawing No.
T. ARMOUR	A. FORSYTHE	20-221	C-104
Scale	Filename		4 of 4
1:150	20-221_Base.dwg		

P:\2020\20-221 Harvey - Hantsport Fire Station\01 - Drawings\Eng Design\20-221_Base.dwg, Plot Date: 2021-Apr-20, Plot Size: ISO FULL BLEED A1 (841.00 X 594.00 MM)

FOUNDATION NOTES

1. INFORMATION RELATING TO THE VALUE OF THE BEARING CAPACITY UNDER FOOTINGS IS BASED ON INFORMATION SPECIFIED IN THE GEOTECHNICAL REPORT PREPARED BY HARBOURSIDE DATED SEPT. 23, 2020. THE CONTRACTOR IS TO FOLLOW ALL RECOMMENDATIONS WITHIN THE GEOTECHNICAL REPORT INCLUDING REMOVALS OF ALL NON-ACCEPTABLE SOILS AND REPLACEMENT WITH APPROVED STRUCTURAL FILLS, ETC. UNLESS SPECIFICALLY NOTED OTHERWISE. ALL ENGINEERED (STRUCTURAL) FILL & BACKFILLING IS TO BE PLACED UNDER THE CONTINUOUS SUPERVISION OF THE GEOTECHNICAL ENGINEER.

2. ALL FOOTINGS SHALL BEAR ON UNDISTURBED SOIL, STRUCTURAL FILL OR SOUND CLEAN BEDROCK HAVING A MINIMUM ALLOWABLE BEARING CAPACITY OF 2200 psf. ALTERNATELY THE FACTORED ULTIMATE LIMITS STATES (ULS) BEARING CAPACITY SHALL BE A MINIMUM OF 6500 psf AND THE SERVICEABILITY LIMITS STATES (SLS) BEARING CAPACITY SHALL BE A MINIMUM OF 2200 psf. DO NOT PLACE CONCRETE IN FOOTING FORMS UNTIL BEARING CAPACITIES ARE CHECKED AND APPROVED IN WRITING BY THE GEOTECHNICAL ENGINEER. FOOTINGS MAY HAVE TO BE LOWERED TO ACHIEVE PROPER BEARING. DURING COLD WEATHER, SOILS SHALL BE PROTECTED AGAINST FREEZING TO PREVENT FROST HEAVE, LOSS OF BEARING CAPACITY, OR OTHER DAMAGE TO STRUCTURAL MEMBERS, SLABS ON GRADE, MASONRY, FORMWORK, AND OTHER ITEMS SUPPORTED THEREON.

3. ALL FOOTINGS SUBJECT TO FREEZING CONDITIONS SHOULD HAVE A MINIMUM OF 4'-0" OF SOIL COVER FOR FROST PROTECTION UNLESS NOTED OTHERWISE.

4. REMOVE ALL LOOSE ROCK DOWN TO SOUND BEDROCK TO MAXIMUM REFUSAL DEPTH POSSIBLE WITH MECHANICAL EQUIPMENT. OBTAIN GEOTECHNICAL ENGINEER'S APPROVAL, IN WRITING, OF ROCK BEARING CAPACITY BEFORE PLACING FOOTINGS.

5. ANY EXCAVATION IN PROXIMITY OF EXISTING FOOTINGS MUST BE APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO COMMENCEMENT AND COMPLETED UNDER THEIR CONTINUAL SUPERVISION.

6. ANY FOOTING ELEVATIONS INDICATED ON THE DRAWINGS ARE GENERAL AND SHALL BE USED FOR ESTIMATING AND BIDDING PURPOSES ONLY. FOOTINGS MAY HAVE TO BE PLACED AT DIFFERENT ELEVATIONS AS A RESULT OF LOCAL SOIL CONDITIONS, UNDERGROUND SERVICES, AND TO ACCOMMODATE OTHER MECHANICAL AND ELECTRICAL SERVICES. FOLLOW TYPICAL DETAILS SHOWN ON THE DRAWINGS FOR FOOTING PLACEMENT RELATIVE TO ADJACENT FOOTINGS AND OTHER STRUCTURES/SERVICES AND LOCATE AS DIRECTED BY TYPICAL DETAILS.

7. COORDINATE CONSTRUCTION WITH UNDERSLAB SERVICES AS SHOWN ON MECHANICAL, ELECTRICAL, ARCHITECTURAL, AND CIVIL DRAWINGS.

8. ALL GEOTECHNICAL MATERIALS BENEATH SLABS ON GRADE (INCLUDING REMOVAL OF NON-ACCEPTABLE MATERIALS AND REPLACEMENT WITH APPROVED MATERIALS) SHALL BE PREPARED AS DETAILED IN THE GEOTECHNICAL REPORT UNLESS SPECIFICALLY NOTED OTHERWISE. SUB BASE UNDER SLABS ON GRADE SHALL BE COMPACTED TO 100% STANDARD PROCTOR DENSITY. COMPACTION SHALL BE VERIFIED IN WRITING BY THE GEOTECHNICAL ENGINEER PRIOR TO CASTING OF SLABS.

9. BACKFILLING AGAINST WALLS ON ONE SIDE ONLY SHALL NOT BE STARTED UNTIL TEMPORARY BRACING OR FLOOR/ROOF STRUCTURES PROVIDING SUPPORTS ARE IN PLACE. OTHERWISE, BACKFILLING AGAINST WALLS TO PROCEED IN APPROXIMATELY EQUAL LIFTS ON EACH SIDE OF WALL.

10. BACKFILL BEHIND RETAINING WALLS SHALL BE CARRIED OUT IN LIFTS. LIFT THICKNESS AND COMPACTION EQUIPMENT MUST BE COMPATIBLE TO PROVIDE ADEQUATE COMPACTION.CONTRACTOR IS RESPONSIBLE TO ENSURE COMPACTION EQUIPMENT AND PROCEDURES DO NOT OVERLOAD RETAINING WALL DURING CONSTRUCTION. FREE STANDING RETAINING WALLS ARE DESIGNED FOR ACTIVE EARTH PRESSURES AND RETAINING/FOUNDATION WALLS WHICH ARE PART OF A BUILDING ARE DESIGNED FOR AT REST EARTH PRESSURE UNLESS NOTED OTHERWISE.

FORMWORK NOTES

1. REFER TO ARCHITECTURAL DRAWINGS FOR CHAMFERS ON CORNERS OF COLUMNS, BEAMS AND WALLS. USE 20mm x 20mm [3/4" x 3/4"] FORMED CHAMFERS ON EXPOSED CORNERS UNLESS CHAMFERS OF OTHER SIZES ARE SHOWN ON DRAWINGS.

2. FORMWORK MUST NOT BE REMOVED UNTIL CONCRETE HAS ATTAINED SUFFICIENT STRENGTH TO SUSTAIN ALL LOADING. FORMS FOR SLABS MAY BE REMOVED AFTER NORMAL CURING CONDITIONS (SEE BELOW), PROVIDED THAT RESHORING IS INSTALLED IMMEDIATELY AT NO MORE THAN 10'-0" SPACINGS AND MAINTAINED UNTIL THE CONCRETE HAS ATTAINED ITS 28 DAY STRENGTH. RESHORING SHALL NOT BE REMOVED BEFORE 21 DAYS AFTER SLAB WAS CAST. IN MULTI STOREY CONSTRUCTION, RESHORING MUST REMAIN IN PLACE UNTIL SLABS HAVE ADEQUATE STRENGTH & STIFFNESS TO SUPPORT ALL LOADS FROM GREEN CONCRETE, FORMWORK, CONSTRUCTION LOADS ETC. RE-SHORING TO REMOVE FORMS SHALL BE DONE IN ACCORDANCE WITH CSA S269.1.
   FORMS SHALL NOT BE REMOVED BEFORE THE CONCRETE HAS SET AND REACHED 70% OF ITS DESIGN STRENGTH AND AS FOLLOWS:
   2.1. BEAM SOFFITS 7 DAYS – RESHORE 28 DAYS
   2.2. SLABS 7 DAYS – RESHORE 28 DAYS
   2.3. SIDES OF BEAMS, COLUMNS, AND WALLS – 3 DAYS

3. THE DESIGN OF ALL FORMWORK, FALSEWORK, SCAFFOLDING, SHORING, ETC. SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND COMPLETED IN ACCORDANCE WITH CAN/CSA S269.1. ALL FORMWORK MUST BE DESIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF CONSTRUCTION. UPON REQUEST OF THE CONSULTANT, THE PROFESSIONAL ENGINEER MUST SUPPLY WRITTEN CONFIRMATION THAT ALL FORMWORK HAS BEEN DESIGNED TO SUPPORT ALL APPROPRIATE LOADS AND IN ACCORDANCE WITH APPLICABLE STANDARDS.

4. FABRICATE AND ERECT FORMWORK IN ACCORDANCE WITH CAN/CSA S269.1 TO PRODUCE FINISHED CONCRETE CONFORMING TO SHAPE, DIMENSIONS, LOCATIONS AND LEVELS INDICATED WITHIN TOLERANCES REQUIRED BY CSA A23.1/A23.2.

5. ALIGN FORM JOINTS AND MAKE WATERTIGHT. KEEP FORM JOINTS TO A MINIMUM.

6. BUILD IN ANCHORS, SLEEVES, AND OTHER INSERTS REQUIRED TO ACCOMODATE WORK SPECIFIED IN OTHER SECTIONS. ASSURE THAT ANCHORS AND INSERTS WILL NOT PROTRUDE BEYOND SURFACES DESIGNATED TO RECEIVE APPLIED FINISHES, INCLUDING PAINTING. NO REINFORCING STEEL SHALL BE CUT TO PLACE SLEEVES, ETC.

7. FOR OPENINGS REQUIRED BY OTHER TRADES, SEE CONSULTANTS DRAWINGS. NO OPENINGS SHALL BE MADE IN FLOOR SLABS NEAR A COLUMN OR A WALL WITHOUT SPECIFIC APPROVAL FROM THE STRUCTURAL ENGINEER. WHERE SMALL DIAMETER PIPING IS ALLOWED, IT SHALL BE INDIVIDUALLY SLEEVED AND LOCATED SO THAT NO REINFORCING STEEL IS CUT.

TIMBER FRAMING NOTES

1. ALL TIMBER AND LUMBER SHALL COMPLY WITH DESIGN STANDARD CSA-086 AND ALL DIMENSION LUMBER SHALL COMPLY WITH CSA-O141.

2. ALL PLYWOOD AND OSB SHEATHING SHALL COMPLY WITH CSA-O325 CONSTRUCTION SHEATHING.

3. ROOF SHEATHING SHALL BE ¾" EXTERIOR GRADE PLYWOOD OR ¾" EXTERIOR GRADE OSB MIN. U/NOTED. REFER TO ARCHITECTURAL DWGS., IF MORE STRINGENT REQUIREMENTS ARE INDICATED ON ARCHITECTURAL, THESE APPLY AS MINIMUM.

4. ALL LUMBER USED FOR STUD BEARING WALLS, LINTELS AND POSTS SHALL BE NUMBER ONE GRADE S.P.F. UNLESS NOTED.

5. ALL EXTERIOR WALL SHEATHING SHALL BE ½" EXTERIOR GRADE PLYWOOD OR ½" EXTERIOR GRADE OSB MIN. U/NOTED. REFER TO ARCHITECTURAL DWGS., IF MORE STRINGENT REQUIREMENTS ARE INDICATED ON ARCHITECTURAL, THESE APPLY AS MINIMUM.

6. PRESERVATIVE-TREATED LUMBER OF 38 mm (1.5") SMALLER DIMENSION SHALL NOT BE INCISED.

7. CUTTING OF HOLES OR REMOVAL OF STRUCTURAL FRAMING BY TRADES FOR INSTALLATION OF PIPING, DUCTWORK, ELECTRICAL, ETC. SHALL NOT BE PERMITTED WITHOUT WRITTEN APPROVAL FROM BMR STRUCTURAL ENGINEERING.

8. ALL ROOF TRUSSES SHALL BE SPACED NOT MORE THAN 2'-0" c/c UNLESS NOTED OTHERWISE.

9. TRUSS SHOP DRAWINGS BY TRUSS SUPPLIER SHALL SHOW ALL STRUCTURAL INFORMATION INCLUDING MEMBER LOADS, MEMBER SIZES, CONNECTION DETAILS, BRACING, TRUSS PLACEMENT, FRAMING AROUND OPENINGS, ETC. AND MUST BE STAMPED AND SIGNED BY AN ENGINEER REGISTERED TO PRACTICE IN THE PROVINCE OF CONSTRUCTION AND SUBMITTED TO THE CONSULTANT FOR REVIEW PRIOR TO FABRICATION OF THE TRUSSES.

10. TRUSS SUPPLIER TO SUBMIT DETAILS AND CAPACITIES OF ALL TRUSS CONNECTIONS (HANGERS, UPLIFT ANCHORS, ETC.) FOR APPROVAL BEFORE TRUSS FABRICATION.

11. ROOF TRUSS SUPPLIER SHALL PROVIDE TRUSS BEARING SHOES WHERE REQUIRED IF ALLOWABLE STRESS PERPENDICULAR TO GRAIN IS EXCEEDED. SUBMIT DETAILS FOR REVIEW.

12. HANGING OF SERVICES FROM CHORDS OF TRUSSES MUST BE STAGGERED AND APPROVED BY THE ENGINEER.

13. INSTALL WOOD SHEATHING TO STUD WALLS AND ROOF FRAMING WITH JOINTS STAGGERED AND ENDS BUTTED OVER FRAMING. NAIL WOOD SHEATHING WITH 3" Lg. COMMON NAILS AT 6" c/c ALONG EDGES AND 12" c/c ON INTERMEDIATE SUPPORTS.

14. TRUSSES SHALL BE FASTENED TO TOP PLATES WITH 18 gauge ZINC COATED TIE DOWN ANCHORS TYPICAL EACH END (BY TRUSS SUPPLIER).

15. TRUSSES SHALL BE HANDLED, INSTALLED AND TEMPORARILY AND PERMANENTLY BRACED IN ACCORDANCE WITH BUILDING COMPONENT SAFETY INFORMATION'S GUIDE TO GOOD PRACTICE FOR HANDLING, INSTALLING, RESTRAINING AND BRACING OF METAL PLATE CONNECTED WOOD TRUSSES – LATEST EDITION.

16. STRUCTURAL COMPOSITE LUMBER (SCL) SHALL BE EITHER LAMINATED VENEER LUMBER (LVL) OR PARALLAM (PSL) OR APPROVED EQUIVALENT, MINIMUM DESIGN PROPERTIES SHALL BE:
   16.1. Fb: 4805 psi
   16.2. Fv: 530 psi
   16.3. E: 2 000 000 psi

17. REPLACEMENT OF SCL WITH A HIGHER GRADE IS NOT ALWAYS A SUITABLE EQUIVALENT. CONTACT BMR STRUCTURAL ENGINEERING FOR ADEQUATE SUBSTITUTIONS.

CONCRETE COVER OVER REINFORCING

EXPOSURE CONDITION	COVER
EXPOSURE CLASS N CONCRETE THAT IS NOT EXPOSED TO CHLORIDES OR FREEZING & THAWING, OR SULPHATES EXAMPLES: FOOTINGS & INTERIOR SLABS, WALLS AND COLUMNS	
CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH, INCLUDING FOOTINGS AND PILES	3" (75mm)
BEAMS, GIRDERS, AND COLUMNS	1 1/4" (30mm)
SLABS, WALLS, AND JOISTS	1" (25mm)
MIN. RATIO OF COVER TO NOMINAL BAR DIAMETER. INCREASE COVER AS REQUIRED TO MEET THIS REQUIREMENT	1.0
EXPOSURE CLASS F, S, R CONCRETE THAT IS EXPOSED TO FREEZING & THAWING, OR SULPHATES EXAMPLES: EXTERIOR WALLS AND COLUMNS, FOUNDATION WALLS, RESIDENTIAL CONSTRUCTION	
CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH, INCLUDING FOOTINGS AND PILES	3" (75mm)
BEAMS, GIRDERS, AND COLUMNS	1 1/2" (40mm)
SLABS, WALLS, AND JOISTS	1 1/2" (40mm)
MIN. RATIO OF COVER TO NOMINAL BAR DIAMETER. INCREASE COVER AS REQUIRED TO MEET THIS REQUIREMENT	1.5
EXPOSURE CLASS C-1 (PARKING STRUCTURES) CONCRETE THAT IS EXPOSED TO CHLORIDES AND/OR FREEZING & THAWING EXAMPLES: INTERIOR / EXTERIOR PARKING STRUCTURES	
SLABS, TOP BARS	1 3/4" (45mm)
SLABS, BOTTOM BARS	1 1/4" (30mm)
BEAMS, GIRDERS, AND COLUMNS	2 1/4" (60mm)
MIN. RATIO OF COVER TO NOMINAL BAR DIAMETER. INCREASE COVER AS REQUIRED TO MEET THIS REQUIREMENT	2.0
EXPOSURE CLASS A, C (EXCEPT PARKING STRUCTURES) CONCRETE THAT IS EXPOSED TO FREEZING & THAWING OR SEAWATER OR CHLORIDES OR SEWAGE EXAMPLES: EXTERIOR SLABS, SIDEWALKS, CURB & GUTTER, BRIDGE DECKS, SEWAGE TANKS	
CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH, INCLUDING FOOTINGS AND PILES	3" (75mm)
BEAMS, GIRDERS, AND COLUMNS	2 1/4" (60mm)
SLABS, WALLS, AND JOISTS	2 1/4" (60mm)
MIN. RATIO OF COVER TO NOMINAL BAR DIAMETER. INCREASE COVER AS REQUIRED TO MEET THIS REQUIREMENT	2.0

STRUCTURAL STEEL NOTES

1. ALL STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH CSA S16. CONTRACTOR SHALL MAINTAIN ERECTION BRACING UNTIL COMPLETION OF ENTIRE STRUCTURE, INCLUDING FLOOR/ROOF DECKS AND OTHER ELEMENTS WHICH ARE PART OF THE LATERAL LOAD RESISTING SYSTEM.

2. ALL STRUCTURAL STEEL SHALL BE NEW STOCK AND CONFORM TO THE FOLLOWING GRADES AND STANDARDS:
   2.1. CSA-G40.21 TYPE 350W UNLESS NOTED.
   2.2. HOLLOW STRUCTURAL SECTIONS: ASTM A500 GRADE C.
   2.3. COLD FORMED SECTIONS: CSA S136, 350 MPa MIN. YIELD STRENGTH.
   2.4. CHANNELS, ANGLES, PLATE & ROD MATERIAL TYPE 300W.

3. ALL WELDING SHALL BE CARRIED OUT IN ACCORDANCE WITH CSA W59 AND W55.3 BY A FABRICATOR FULLY APPROVED UNDER CSA W47.1 DIVISION No.1 OR No.2.

4. ALL BOLTS, NUTS AND WASHERS FOR STRUCTURAL STEEL CONNECTIONS SHALL CONFORM TO ASTM F3125.

5. ALL ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO CSA-G40.21 TYPE 300W.

6. ALL STEEL SHEAR STUDS SHALL CONFORM TO ASTM A108.

7. INSPECTION AND TESTING OF STRUCTURAL STEEL FRAME WORK (SUCH AS BOLT TORQUE, SHEAR STUDS, ALIGNMENT, ETC.) SHALL BE IN ACCORDANCE WITH CSA S16 BY A QUALIFIED INSPECTION COMPANY ENGAGED BY THE OWNER. COST OF RETESTING DEFECTIVE WELDS SHALL BE BORNE BY THE STRUCTURAL STEEL FABRICATOR.

8. SPLICES IN STEEL MEMBERS, OTHER THAN THOSE SHOWN ON THE DRAWINGS, SHALL BE DESIGNED TO DEVELOP THE FULL CAPACITY OF THE MEMBER AT THE POINT OF THE SPLICE. MEMBERS SHALL NOT BE SPLICED AT POINTS OF MAXIMUM STRESS AND SHALL NOT BE PERMITTED WITHOUT THE WRITTEN PERMISSION OF BMR STRUCTURAL ENGINEERING.

9. NO STRUCTURAL STEEL SHALL BE CUT IN THE FIELD UNLESS REVIEWED AND APPROVED BY BMR STRUCTURAL ENGINEERING.

10. ALL WELDED JOINTS IN ARCHITECTURALLY EXPOSED STRUCTURAL STEEL SHALL BE GROUND SMOOTH AND SHALL HAVE ALL WELD SPLATTER REMOVED.

11. STEEL COATINGS – UNLESS NOTED OTHERWISE ALL STRUCTURAL STEEL SHALL BE CLEANED AND PREPARED:
   11.1. ALL INTERIOR STEEL THAT IS TO BE PROTECTED BY A SPRAY APPLIED CEMENTITIOUS FIRE PROOFING SHALL BE CLEANED TO CISC/CPMA 2-75 AND REMAIN UNCOATED STEEL.
   11.2. ALL INTERIOR STRUCTURAL STEEL NOT TO RECEIVE FINISH PAINTING ON SITE SHALL BE SHOP PRIME PAINTED AS PER CSA/CAN-S-16. SHOP PRIMER SHALL CONFORM TO CISC/CPMA 1-73A.
   11.3. ALL INTERIOR STRUCTURAL STEEL TO RECEIVE FINISH PAINTING ON SITE SHALL BE SHOP PRIME PAINTED AS PER CSA/CAN-S-16. SHOP PRIMER SHALL CONFORM TO CISC/CPMA 2-75.
   11.4. ALL STEEL EXPOSED TO WEATHER IS TO BE HOT DIP GALVANIZED IN ACCORDANCE TO CSA G164. TOUCH UP OF WELDS, CUTS OR SCRATCHES TO GALVANIZING SHALL BE DONE WITH A MINIMUM OF 3 COATS OF ZINC RICH PAINT.
   11.5. HOT DIPPED GALVANIZED STEEL REQUIRING AN ADDITIONAL FINISH PAINT COAT SHALL BE PREPARED TO ASTM D6386 STANDARDS.

12. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS TO BE PAINTED OR UNPAINTED.

13. LIVE LOAD DEFLECTIONS OF STEEL JOISTS AND STEEL DECK SHALL NOT EXCEED L/240 FOR ROOFS AND L/360 FOR FLOORS UNLESS NOTED.

14. ALL STEEL DECK SHALL BE COATED TO ZF001 (A01) AS DESCRIBED BY ASTM A653. ALL STEEL DECK SHALL BE TRIPLE SPAN MINIMUM, U.N.O.

15. STEEL DECK FASTENING REQUIREMENTS U/NOTED ON DRAWINGS:
   15.1. ROOF/FLOOR DECK:
      15.1.1. 3/4" DIA. TRANSVERSE PUDDLE WELDS @ 12" c/c
      15.1.2. CLINCH SIDE LAPS @ 24" c/c
      15.1.3. WELD DECK TO PERIMETER ANGLE OR SPANDREL BEAMS WITH 3/4" DIA. PUDDLE WELDS @ 12" c/c
   15.2. INVERTED AND NON-INVERTED COMPOSITE DECK IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

16. WHERE STEEL DECK DIRECTION CHANGES PROVIDE 1/4" THICK CONTINUOUS ANGLE. (VERTICAL LEG TO EQUAL DEPTH OF JOIST SHOE.)

17. STEEL FABRICATOR, JOIST SUPPLIER, AND METAL DECK SUPPLIER SHALL SUBMIT SHOP DRAWINGS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF CONSTRUCTION PRIOR TO COMMENCEMENT OF FABRICATION.

18. AT SLOTTED HOLE CONNECTIONS, BOLTS MUST BE INSTALLED SO AS TO ALLOW FREE MOVEMENT IN THE CONNECTION. SET NUT WITH A COLD CHISEL OR OTHER MEANS.

19. DESIGN ALL BEAM TO BEAM AND BEAM TO COLUMN CONNECTIONS FOR SHEAR CALCULATED FROM BEAM LOADED TO FLEXURAL CAPACITY WITH UDL LOAD BASED ON SPAN OF BEAM U/NOTED. BEAMS WITH SIGNIFICANT CONCENTRATED LOADS SHALL BE DESIGNED FOR ADDITIONAL SHEAR CONNECTIONS AS REQUIRED.

20. ALL BEAMS CANTILEVERED OR CONTINUOUS OVER A COLUMN OR OTHER SUPPORT, AND BEAMS SUPPORTING CONCENTRATED LOAD, SHALL HAVE A MIN. OF 2-10 mm (3/8") STIFFENERS EACH SIDE OF WEB UNLESS OTHERWISE NOTED.

21. BOLT WOOD NAILERS TO STEEL BEAMS WHERE REQUIRED USING 1/2" DIAMETER BOLTS AT 24" c/c STAGGERED.

DESIGN NOTES

1. ALL REINFORCED CONCRETE ELEMENTS HAVE BEEN DESIGNED IN ACCORDANCE WITH CSA STANDARD A23.3. ALL STRUCTURAL STEEL ELEMENTS HAVE BEEN DESIGNED IN ACCORDANCE WITH CAN/CSA-S16. ALL STRUCTURAL TIMBER ELEMENTS HAVE BEEN DESIGNED IN ACCORDANCE WITH CSA STANDARD 086. ALL STRUCTURAL MASONRY ELEMENTS HAVE BEEN DESIGNED IN ACCORDANCE WITH CSA STANDARD S304.1.

2. ALL LOADS INDICATED ON DRAWINGS ARE SERVICE (UNFACTORED) LOADS UNLESS NOTED.

3. THE STRUCTURE HAS NOT BEEN DESIGNED FOR ANY FUTURE EXTENSIONS U/N.

4. DESIGN LOAD CRITERIA:

   IMPORTANCE CATEGORY: POST DISASTER

   EARTHQUAKE DESIGN FACTORS:
   Sa(0.2)= 0.118 Sa(0.5)= 0.086 Sa(1.0)= 0.055 Sa(2.0)= 0.030
   Sa(5.0)= 0.0078 Sa(10.0)= 0.0034 PGA= 0.069 PGV= 0.071
   Rd= 1.5 Ro= 1.3
   SITE CLASS= D
   Ie FaSa(0.2)= 0.21948 (SEISMIC HAZARD INDEX)

   ALL NON-STRUCTURAL COMPONENTS & EQUIPMENT AND THEIR CONNECTIONS TO THE STRUCTURE (ALL BY OTHERS) AS DEFINED IN CLAUSE 4.1.8.18 OF THE 2015 NBCC SHALL BE DESIGNED TO ACCOMMODATE DEFLECTIONS AND LOADS NOTED THEREIN FOR THE IMPORTANCE FACTOR NOTED ABOVE.

   WIND LOAD:
   q 1/10 = 0.42 kPa
   q 1/50 = 0.54 kPa

   SNOW LOADING: Ss= 2.6 kPa
   RAIN LOAD: Sr= 0.6 kPa

REINFORCED CONCRETE NOTES

1. ALL CONCRETE STRUCTURES SHALL CONFORM TO CSA-A23.3 UNLESS NOTED OTHERWISE.

2. ALL CONCRETE, CONCRETE MATERIAL, FORMS, PRACTICE, ETC., SHALL CONFORM TO CSA-A23.1 UNLESS NOTED OTHERWISE.

3. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS:
   3.1. CONCRETE ELEMENTS UNLESS NOTED OTHERWISE – 4000 psi
   3.2. EXTERIOR CONCRETE ELEMENTS EXPOSED TO WEATHER – 5,000 psi
   3.3. MUD SLAB – 2,000 psi
   3.4. FOOTINGS – 3,000 psi

4. ALL CONCRETE TESTING SHALL CONFORM TO CSA-A23.2.

5. FOR COMPRESSIVE STRENGTH TESTING OF CONCRETE A MINIMUM OF 3 CYLINDERS ARE REQUIRED FOR:
   5.1. EACH DAYS POUR
   5.2. EACH TYPE OR GRADE OF CONCRETE
   5.3. EACH CHANGE OF SUPPLIER
   5.4. EACH 20 cu. yd. OR FRACTION THEREOF FOR COLUMNS.
   5.5. EACH 100 cu. yd. OR FRACTION THEREOF FOR ALL OTHER CONCRETE.
   5.6. ADDITIONAL TEST SPECIMENS SHALL BE TAKEN WHENEVER REQUESTED BY THE ENGINEER OR THE SUPERVISOR TO VERIFY THE CONCRETE QUALITY.

6. USE 3/4" MAX. AGGREGATE SIZE THROUGHOUT UNLESS NOTED. SLUMP TO BE 3" (±1") THROUGHOUT UNLESS NOTED OR OTHERWISE REQUIRED IN CSA-A23.1.

7. ALL CONCRETE EXPOSED TO WEATHER OR FREEZING CONDITIONS SHALL BE AIR ENTRAINED TO 6.5% (±1.5%) UNLESS NOTED OR OTHERWISE REQUIRED IN CSA-A23.1. HOT AND COLD WEATHER CONCRETING SHALL COMPLY WITH ALL REQUIREMENTS OF CSA STANDARD A23.1. CALCIUM CHLORIDE ADDITIVES WILL NOT BE PERMITTED WITHOUT WRITTEN APPROVAL FROM BMR.

8. AT LEAST ONE SLUMP TEST SHALL BE TAKEN WITH EACH COMPRESSIVE STRENGTH TEST. AT LEAST ONE AIR ENTRAINMENT TEST SHALL BE TAKEN WITH EACH COMPRESSIVE STRENGTH TEST AS APPLICABLE.

9. NO ADMIXTURES SHALL BE USED WITHOUT PRIOR APPROVAL FROM THE STRUCTURAL ENGINEER. DO NOT ADD WATER TO CONCRETE ON SITE. IF HIGHER SLUMP CONCRETE IS DESIRED, CONCRETE SUPPLIER SHALL DESIGN AND SUPPLY ACCORDINGLY.

10. ALL BARS IN SLABS MUST BE SUPPORTED ACCURATELY ON CHAIRS TO GIVE SPECIFIED CONCRETE COVER. WHERE U/S OF SLAB IS TO BE EXPOSED, USE PLASTIC COATED CHAIRS OR APPROVED EQUAL TO SUPPORT TOP AND BOTTOM BARS.

11. ELECTRICAL CONDUITS SHALL NOT PASS THROUGH A COLUMN. CONDUITS IN SLABS OR WALLS SHALL NOT BE LARGER THAN 1.5" OUTSIDE DIAMETER AND SHALL BE SPACED NO CLOSER THAN 6" ON CENTRE. CONDUIT PARALLEL TO REINFORCING STEEL SHALL BE CENTRED BETWEEN BARS. CONDUIT TO BE PLACED IN AN ORGANIZED MANNER.

12. CONDUIT SHALL HAVE A MINIMUM CONCRETE COVER OF 25mm (1") AND UNLESS SPECIFICALLY PERMITTED OTHERWISE, SHALL NOT RUN HORIZONTALLY IN A CONCRETE WALL.

13. THE CONTRACTOR SHALL PROVIDE CONTINUOUS SUPERVISION DURING THE PLACEMENT OF CONCRETE TO ENSURE THAT THE REINFORCING STEEL IS MAINTAINED IN ITS CORRECT POSITION.

14. CONSTRUCTION JOINTS SHALL BE LOCATED SO AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE.

15. AT LEAST SEVEN (7) DAYS SHALL ELAPSE AFTER CASTING CONCRETE WALLS BEFORE FLOOR MEMBERS OR ROOF MEMBERS SUPPORTED THEREON ARE PLACED.

16. ALL ABUTTING MASONRY SHALL BE ANCHORED TO THE CONCRETE STRUCTURE. DO NOT INSTALL DOVETAIL ANCHOR SLOTS IN STRUCTURAL SLABS, BEAMS, COLUMNS OR WALLS.

17. ALL REINFORCING STEEL SHALL HAVE A MINIMUM YIELD STRENGTH OF 400 MPa AND SHALL CONFORM TO CSA G30.18. WHERE WELDING OF REBAR IS INDICATED, WELDABLE GRADE REBAR IS TO BE USED AND SHALL CONFORM TO CSA W186.

18. ALL WELDED WIRE MESH (WWM) SHALL CONFORM TO ASTM A-185. ALL WELDED WIRE PRODUCTS ARE TO BE SUPPLIED AS FLAT SHEETS AND SHALL BE LAPPED A MINIMUM OF 6" (150mm) AT JOINTS U.N.O.

19. ALL REINFORCING LAP SPLICES SHALL CONFORM TO THE LATEST CSA STANDARD A23.3 AND ALL BAR SPLICES SHALL BE CLASS 'B' TENSION SPLICES U.N.O.

20. ALL REINFORCING STEEL SHALL BE DETAILED, FABRICATED, PLACED AND SUPPORTED IN ACCORDANCE WITH "REINFORCING STEEL MANUAL OF STANDARD PRACTICE" BY THE REINFORCING STEEL INSTITUTE OF CANADA. SUBMIT SHOP DRAWINGS TO BMR STRUCTURAL ENGINEERING FOR REVIEW, INCLUDING PLACING OF REINFORCEMENT. INDICATE ON SHOP DRAWINGS, BAR BENDING DETAILS, LISTS, QUANTITIES OF REINFORCEMENT, SIZES, SPACING, LOCATION OF REINFORCEMENT TO PERMIT CORRECT PLACEMENT WITHOUT REFERENCE TO STRUCTURAL DRAWINGS, INDICATE SIZES, SPACING AND LOCATIONS OF CHAIRS, SPACERS AND HANGERS.

21. WHEN PLACING "THIN" CONCRETE SLABS OVER METAL DECK/PAN FORMS, MEASURE CONCRETE FLATNESS/THICKNESS WITH A LASER OR SIMILAR DEVICE. TOP SURFACE OF SLAB IS TO BE "FLAT".

22. WHEN PLACING REINFORCED CONCRETE SLABS OVER FORMWORK THAT WILL BE REMOVED, MEASURE CONCRETE THICKNESS WITH A SUITABLE THICKNESS GAUGE USED LOCALLY, UNLESS NOTED OTHERWISE. WHERE A CAMBER IS SPECIFIED ON STRUCTURAL DRAWINGS FOR CONCRETE SLABS/BEAMS, THIS IS MEANT TO INDICATE THE INCREASED ELEVATION OF THE TOP SURFACE OF THE SLAB/BEAM AFTER SLAB IS FINISHED.

23. ALL OIL, GREASE, MUD, AND DEBRIS SHALL BE ENTIRELY REMOVED FROM THE REINFORCING, ANCHOR BOLTS, AND FORM SURFACES PRIOR TO PLACEMENT OF CONCRETE.

GENERAL NOTES

1. ALL WORK AND MATERIALS SHALL CONFORM TO THE 2015 EDITION OF THE NATIONAL BUILDING CODE OF CANADA (NBCC). ALL WORK TO BE CARRIED OUT IN FULL ACCORDANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT OF NOVA SCOTIA, LATEST EDITIONS OF APPLICABLE CSA AND ALL APPLICABLE SAFETY STANDARDS.

2. THE DRAWINGS DO NOT INDICATE ELEMENTS THAT MAY BE NECESSARY FOR CONSTRUCTION SAFETY. THE CONTRACTOR IS RESPONSIBLE FOR ALL SAFETY MEASURES PERTAINING TO THE PROJECT.

3. DO NOT SCALE THE DRAWINGS. NO ALTERATIONS TO STRUCTURAL DETAILS SHALL BE MADE WITHOUT PERMISSION OF THE STRUCTURAL ENGINEER. CONSTRUCTION ERRORS ARE TO BE DOCUMENTED AND REPORTED TO THE STRUCTURAL ENGINEER BEFORE PROCEEDING WITH SUBSEQUENT WORK.

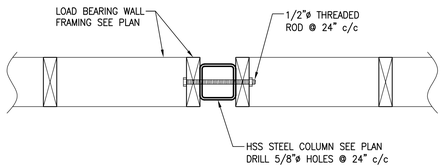
4. THE ELECTRONIC FILE REPRESENTS DRAWINGS WHICH WERE PREPARED FOR THE PURPOSE OF DEPICTING GENERAL LAYOUT CONDITIONS. THE DRAWINGS MAY OR MAY NOT INCORPORATE REVISIONS FROM PREVIOUS DESIGN DRAWINGS, OR REVISIONS RESULTING FROM THE CONSTRUCTION PROCESS. CONSTRUCTED CONDITIONS RESULTING FROM THE USE OF THE DRAWINGS MAY VARY FROM THE DRAWING INFORMATION. BMR STRUCTURAL ENGINEERING ASSUMES NO LIABILITY FOR ERRORS OR OMISSIONS IN THE ELECTRONIC DRAWING FILES. THE RECIPIENT ASSUMES ALL RISK AND EXPENSE INCURRED WITH THE USE OF THE ELECTRONIC DRAWING FILES IN THE PRODUCTION OF THEIR WORK.

5. THE CONTRACTOR SHALL REVIEW ALL THE CONTRACT DRAWINGS & SPECIFICATIONS AND CHECK/COORDINATE DIMENSIONS/ELEVATIONS BEFORE CONSTRUCTION. REPORT ANY DISCREPANCIES BETWEEN STRUCTURAL AND OTHER DISCIPLINE'S DRAWINGS & SPECIFICATIONS FOR CLARIFICATION PRIOR TO PROCEEDING WITH WORK. ALL BUILDING DIMENSIONS, ELEVATIONS, DRAINAGE SLOPES, ETC. SHOWN ON STRUCTURAL DRAWINGS SHALL BE FULLY COORDINATED BY THE CONTRACTOR WITH THE OTHER CONSULTANTS DRAWINGS.

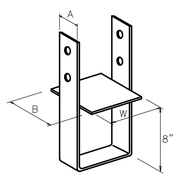
6. THE CONTRACTOR SHALL EXAMINE ALL DRAWINGS AND CHECK ALL DIMENSIONS AGAINST SITE CONDITIONS AND REPORT ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK.

7. DO NOT IMPOSE CONSTRUCTION LOADS ON THE STRUCTURE IN EXCESS OF THE DESIGN LOADS.

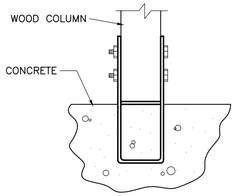
8. FOR OPENINGS THROUGH FLOORS, ROOFS, AND WALLS, SEE OTHER CONSULT



TYPICAL STEEL COLUMN IN WOOD WALL



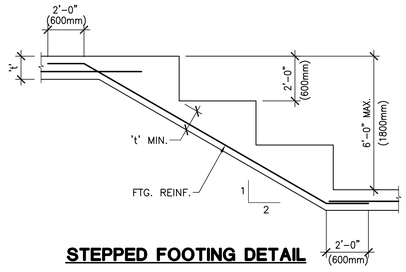
WOOD COLUMN BASE



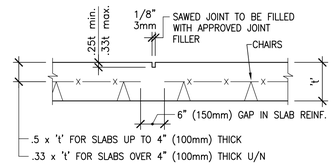
WOOD COLUMN BASE INSTALLED

POST SIZE	MATERIAL	DIMENSIONS (inches)			BOLTS	UPLIFT LOADS (lbs.)
		A	B	W		
4"x4"	3/16"	2"	3 9/16"	3 9/16"	2-5/8"ø	5125
4"x6"	3/16"	2"	5 1/2"	3 9/16"	2-5/8"ø	5125
4"x8"	3/16"	2"	7 1/4"	3 9/16"	2-5/8"ø	5125
6"x6"	3/16"	3"	5 1/2"	5 1/2"	2-5/8"ø	5125
6"x8"	3/16"	3"	7 1/4"	5 1/2"	2-5/8"ø	5125

TYPICAL CONNECTION FOR EXTERIOR WOOD POST TO FOUNDATIONS

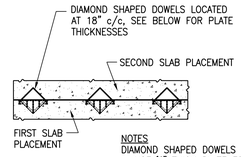


STEPPED FOOTING DETAIL



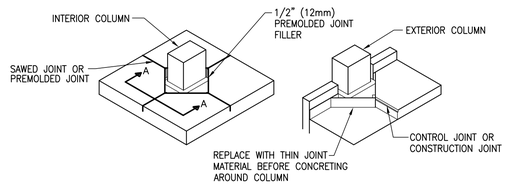
NOTE:
SPACING OF CONTROL JOINTS SHALL BE A MAXIMUM OF 30 TIMES THE SLAB THICKNESS IN BOTH DIRECTIONS

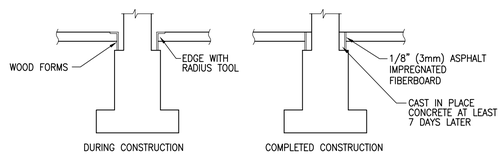
SECTION- CONTROL JOINT SLAB ON GRADE



NOTES
DIAMOND SHAPED DOWELS
- USE ¼" THICK PLATE FOR 6" SLAB
- USE ⅜" THICK PLATE FOR 8" SLAB
- USE ⅜" THICK PLATE FOR 10" SLAB

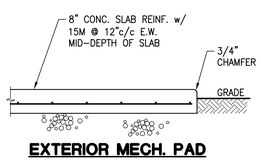
PLAN - CONSTRUCTION JOINT SLAB ON GRADE



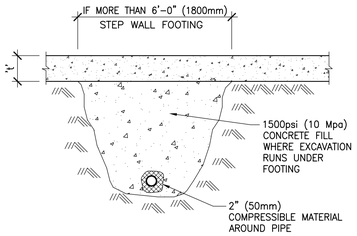


SECTION A-A

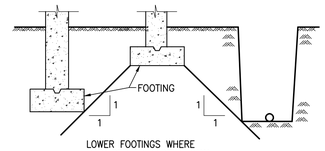
ISOLATION JOINT -INT. AND EXT. COLUMN



EXTERIOR MECH. PAD

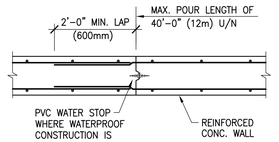


BACKFILL DETAIL UNDER FTG.

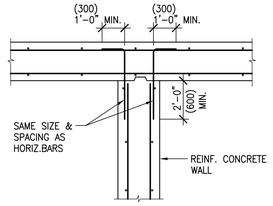


LOWER FOOTINGS WHERE
REQUIRED TO MAINTAIN MAX.
1 IN 1 SLOPE AS SHOWN.

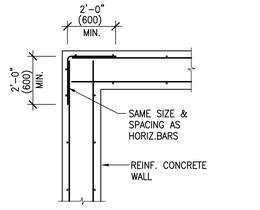
FTG. OR EXCAVATION ADJACENT TO FTG.



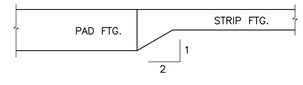
PLAN- WALL CONSTRUCTION JOINT



PLAN -WALL INTERSECTION



PLAN -WALL CORNER



PAD FOOTING TO STRIP FOOTING TRANSITION

WINDSOR / WEST HANTS TOGETHER

BMR Structural | Engineering
5413 Doyle Street
Halifax, Nova Scotia B3J 1H9
ph. (902) 429-3321 fax (902) 422-8650
BMR Project No. 2020-322

General Notes:
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No.	Description	Date
1	ISSUED FOR RFP	20.APR.21

harveyARCHITECTURE
7071 Bayers Rd. Suite 3004
Halifax, NS B3L 2C2
Email: mike@harch.ca
Phone: 444-0555
Fax: 444-7522

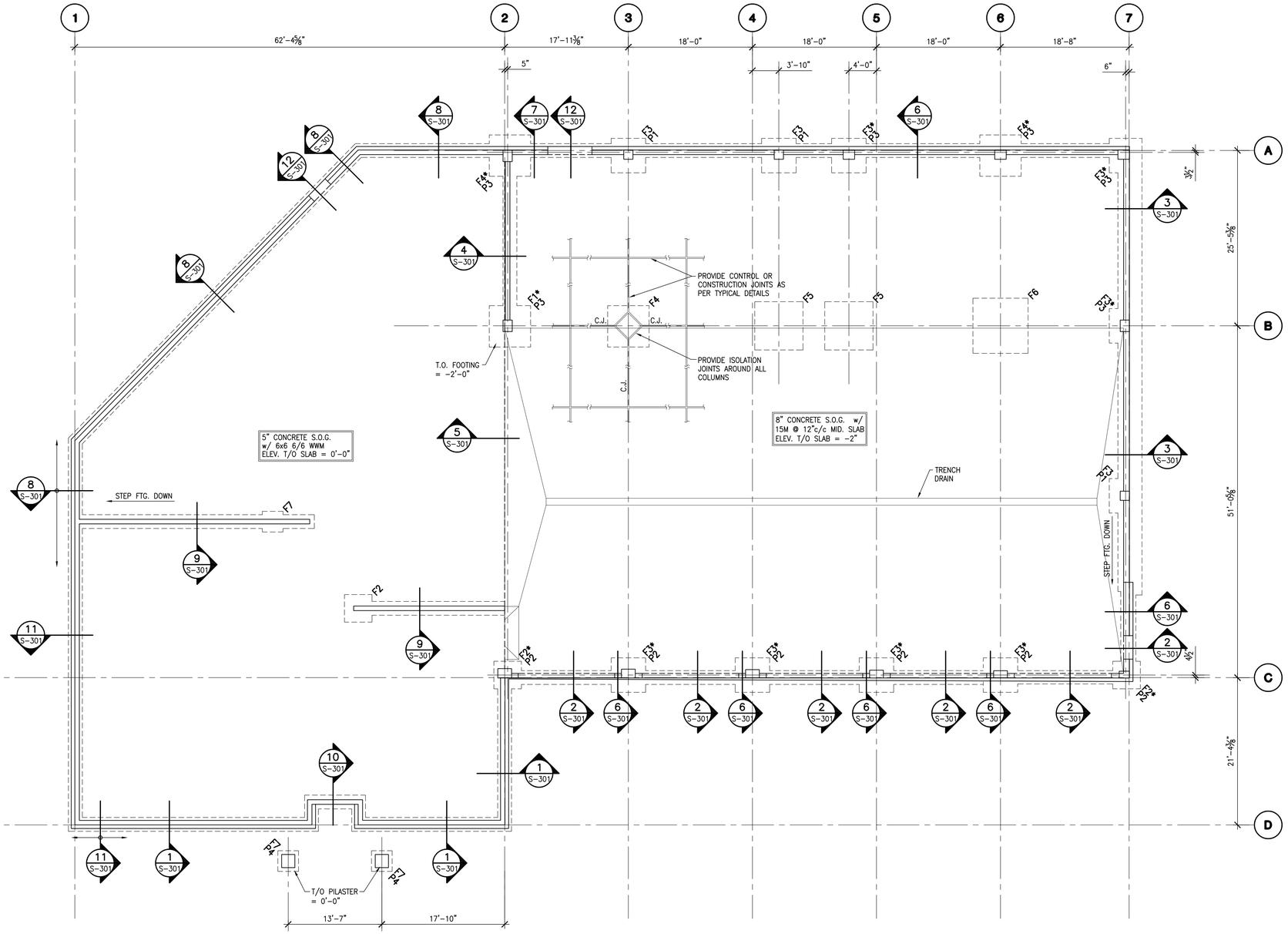
HANTSPORT FIRE STATION
HANTSPORT, NS

TYPICAL DETAILS

Project Number	20068
Date	2020.10.07
Drawn By	TD
Checked By	NB

S-002

Scale	N.T.S.



NOTES:

1. ELEV. TOP OF PILASTER FOR TYPICAL COLUMN = -12" U/NOTED.
2. C.J. REPRESENTS CONTROL JOINT
3. ALL INTERIOR FOOTINGS TO BE 14" BELOW TOP OF SLAB ON GRADE UNLESS NOTED OTHERWISE.
4. REFER TO DRAWING S-001 FOR TYPICAL DETAILS AND NOTES.
5. PROVIDE P1 PILASTER AS REQUIRED TO LOWER INTERIOR FOOTINGS FOR SERVICES.

FOOTING SCHEDULE
2200 psf SERVICE (SLS)
6500 psf ULTIMATE (ULS)

MARK	SIZE	REINFORCING
F1	6'-0" x 6'-0" x 24" Dp.	8-20M E.W.B.
F2	4'-0" x 4'-0" x 12" Dp.	5-15M E.W.B.
F3	5'-0" x 5'-0" x 14" Dp.	6-15M E.W.B.
F4	6'-0" x 6'-0" x 16" Dp.	8-15M E.W.B.
F5	7'-0" x 7'-0" x 18" Dp.	7-20M E.W.B.
F6	8'-0" x 8'-0" x 20" Dp.	9-20M E.W.B.
F7	3'-0" x 3'-0" x 10" Dp.	4-15M E.W.B.

* DENOTES FOOTINGS TO HAVE TOP AND BOTTOM REINFORCING

P1: 16"x16" CONCRETE PILASTER 8-15M VERTICALS w/ 10M TIES @ 12" c/c. DOUBLE TOP TIE. DOWELS INTO FOOTING TO MATCH VERTICALS

P2: 24"x18" CONCRETE PILASTER 12-15M VERTICALS w/ 10M TIES @ 12" c/c. DOUBLE TOP TIE. DOWELS INTO FOOTING TO MATCH VERTICALS

P3: 20"x16" CONCRETE PILASTER 8-20M VERTICALS w/ 10M TIES @ 12" c/c. DOUBLE TOP TIE. DOWELS INTO FOOTING TO MATCH VERTICALS

P4: 23"x23" CONCRETE PILASTER 12-15M VERTICALS w/ 10M TIES @ 12" c/c. DOUBLE TOP TIE. DOWELS INTO FOOTING TO MATCH VERTICALS

WINDSOR / WEST HANTS TOGETHER

BMR Structural|Engineering
5413 Doyle Street
Halifax, Nova Scotia B3J 1H9
ph. (902) 429-3321 fax (902) 422-8650
BMR Project No. 2020-322

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No.	Description	Date
1	ISSUED FOR RFP	20.APR.21



harveyARCHITECTURE
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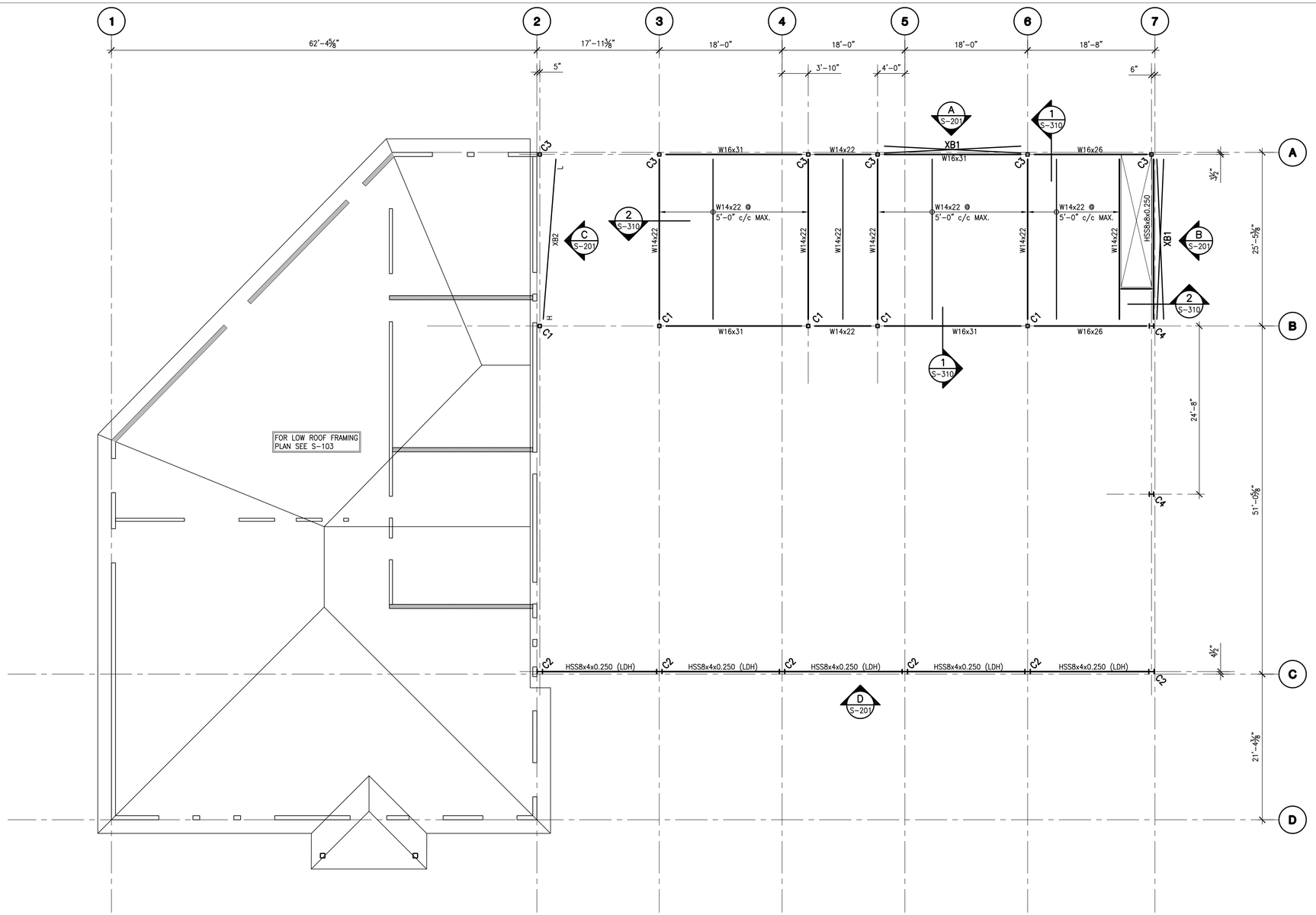
HANTSPORT FIRE STATION
HANTSPORT, NS

FOUNDATION PLAN

Project Number	20068
Date	2020.10.07
Drawn By	TD
Checked By	NB

S-101

Scale 1/8" = 1'-0"



NOTES:

1. DESIGN LOADS:
   DL = 50 psf U/NOTED ON PLAN
   LL = 100 psf U/NOTED ON PLAN
2. ALL EXTERIOR WALLS TO BE 2x8 @ 16" c/c SPF No. 1/2. PROVIDE DOUBLE TOP PLATE AND SINGLE SILL PLATE. U/N
3. ALL INTERIOR BEARING WALLS ARE 2x6 @ 16" c/c SPF No. 1/2. PROVIDE DOUBLE TOP PLATE AND SINCLE SILL PLATE. U/N
4. u/s OF DECK AT MEZZANINE TO BE 10'-6". FINISH FLOOR ELEVATION TO BE 10'-10".
5. ALL CAP PLATES TO BE 1/2" THICK MINIMUM.
6. ALL BASE PLATES TO HAVE 4-3/4"ø ANCH. BOLTS UNLESS NOTED. (12" EMBED. OR FTG. THK. -3")
7. ANY MODIFICATIONS AFFECTING THE STRUCTURE MUST BE APPROVED IN WRITING BY THE ENGINEER.
8. ALL BASE PLATES AT X-BRACE LOCATIONS TO HAVE 4-1 1/4" ø ANCHORS U/NOTED. (3'-0" 6")
9. U/S OF ALL BASE PLATES = -13" u/n.
10. COORDINATE ALL EDGE OF DECK DIM's (ON ALL STRUCT. DRAWINGS) WITH ARCH. DRAWINGS.

COLUMN SCHEDULE		
MARK	SIZE	BASE PLATE
C1	HSS 6x6x0.375	7"x12"x3/4" Thk.
C2	W10x45	10"x16"x3/4" Thk.
C3	HSS 6x6x0.250	7"x12"x3/4" Thk.
C4	W8x40	8"x12"x3/4" Thk.

XB1: ⅞"ø 44W ROD X-BRACE. CONNECT FOR +20 kips (FACTORED)

XB2: HSS6x6x0.250 BRACE. CONNECT FOR ±20 kips (FACTORED)

WOOD LINTEL SCHEDULE		
MARK	SIZE	SUPPORT ON EACH END
L1	3 - 2x8	1 J.S. 1 F.H.S. U/NOTED ON PLAN
L2	3 - 2x6	2 J.S. 1 F.H.S. U/NOTED ON PLAN
L3	3 - 2x10	2 J.S. 1 F.H.S. U/NOTED ON PLAN
L4	4 - 2x10	2 J.S. 1 F.H.S. U/NOTED ON PLAN
L5	3 - 1¾"x9¼" 2.0E LVL	2 J.S. 1 F.H.S. U/NOTED ON PLAN

WALL TYPE SCHEDULE:

- 2x8 WOOD STUDS @ 12" c/c
- 8" STEEL STUDS @ 16" c/c

WINDSOR / WEST HANTS TOGETHER

BMR Structural|Engineering
5413 Doyle Street
Halifax, Nova Scotia B3J 1H9
ph. (902) 429-3321 fax (902) 422-8650
BMR Project No. 2020-322

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No.	Description	Date
1	ISSUED FOR RFP	20.APR.21

REGISTERED PROFESSIONAL ENGINEER PROVINCE OF NOVA SCOTIA — DATE 4/20/21 — M. L. BMR — 7287

harveyARCHITECTURE
707-1 Bayers Rd. Suite 3004
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Fax: 444-7522

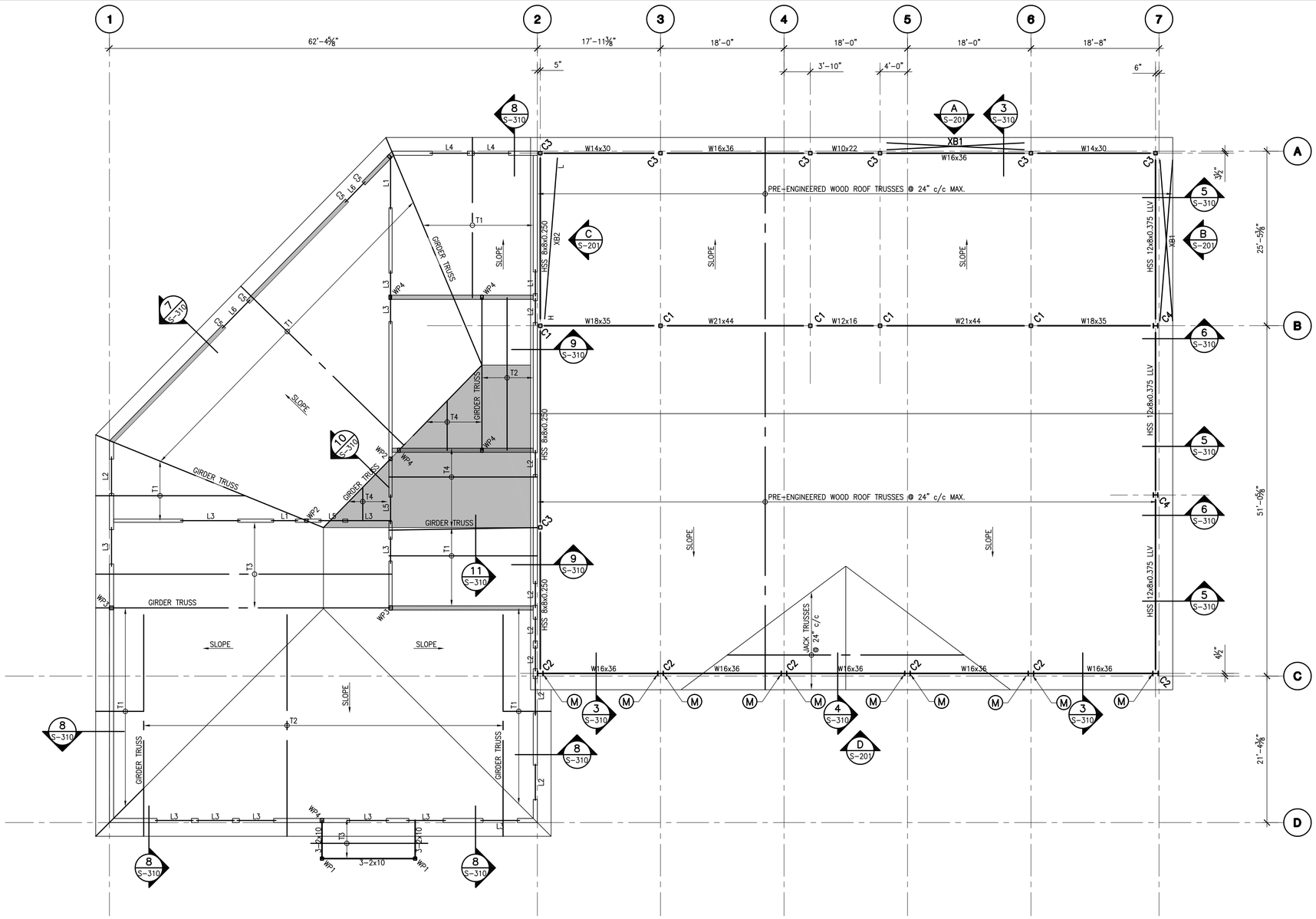
HANTSPORT FIRE STATION
HANTSPORT, NS

FLOOR FRAMING PLAN

Project Number	20068
Date	2020.10.07
Drawn By	TD
Checked By	NB

S-102

Scale 1/8" = 1'-0"



T1: PRE-ENGINEERED WOOD ROOF TRUSSES @ 24" c/c MAX.

T2: PRE-ENGINEERED WOOD ROOF TRUSSES @ 24" c/c MAX.

T3: PRE-ENGINEERED WOOD ROOF TRUSSES @ 24" c/c MAX.

T4: PRE-ENGINEERED WOOD ROOF TRUSSES @ 24" c/c MAX.

NOTES:

1. DESIGN LOADS:
   DL = 15 psf + ADDITIONAL 5 psf AT JACK TRUSS LOCATIONS U/NOTED ON PLAN
   LL = 70 psf U/NOTED ON PLAN
   DEAD LOAD DUE TO CONC. PAVERS AN ADDITIONAL 5 psf. (AROUND ROOF TOP UNITS)
   GROSS WIND UPLIFT = 35 psf U/NOTED
   GROSS WIND UPLIFT = 40 psf ON CANOPY ROOFS
2. ALL EXTERIOR WALLS TO BE 2x8 @ 16" c/c SPF No. 1/2. U/NOTED PROVIDE DOUBLE TOP PLATE AND SINGLE SILL PLATE.
3. u/s OF TRUSS ELEVATION TO BE 13'-0" AFF FROM GRIDS 1 TO 2, AND 18'-0" FROM GRIDS 2-7 U/NOTED
4. ALL CAP PLATES TO BE 1/2" THICK MINIMUM.
5. ALL BASE PLATES TO HAVE 4-3/4"ø ANCH. BOLTS UNLESS NOTED.
6. ANY MODIFICATIONS AFFECTING THE STRUCTURE MUST BE APPROVED IN WRITING BY THE ENGINEER.
7. ALL BASE PLATES AT X-BRACE LOCATIONS TO HAVE 4-1 1/4" ø ANCHORS U/NOTED.
8. U/S OF ALL BASE PLATES = -13" u/n.
9. COORDINATE ALL EDGE OF DECK DIM's (ON ALL STRUCT. DRAWINGS) WITH ARCH. DRAWINGS.
10. ALL INTERIOR BEARING WALLS ARE 2x6 @ 16" c/c U/N

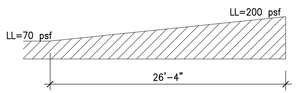
12" EMBED. OR FTG. THK. -3"

3'-0" 6"

COLUMN SCHEDULE		
MARK	SIZE	BASE PLATE
C1	HSS 6x6x0.375	7"x12"x3/4" Thk.
C2	W10x45	10"x16"x3/4" Thk.
C3	HSS 6x6x0.250	7"x12"x3/4" Thk.
C4	W8x40	8"x12"x3/4" Thk.
C5	HSS4x4x0.250	5"x12"x3/4" Thk.

WOOD POST SCHEDULE		
MARK	SIZE	BASE PLATE
WP1	6x6 SPF No. 1/2	7"x12"x3/4" Thk.
WP2	4 - 2x6	10"x16"x3/4" Thk.
WP3	4 - 2x8	7"x12"x3/4" Thk.
WP4	3 - 2x8	8"x12"x3/4" Thk.

LINTEL SCHEDULE		
MARK	SIZE	SUPPORT ON EACH END
L1	3 - 2x8	1 J.S. 1 F.H.S. U/NOTED ON PLAN
L2	3 - 2x6	2 J.S. 1 F.H.S. U/NOTED ON PLAN
L3	3 - 2x10	2 J.S. 1 F.H.S. U/NOTED ON PLAN
L4	4 - 2x10	2 J.S. 1 F.H.S. U/NOTED ON PLAN
L5	3 - 1¾"x9¼" 2.0E LVL	2 J.S. 1 F.H.S. U/NOTED ON PLAN
L6	C8x11.5	HSS4x4x0.250



TYP. SNOW DRIFT ALONG GRID 2
SNOW DRIFT ADJACENT TO HIGH ROOF

Ⓜ = BEAMS ALONG GRID C TO BE CONNECTED FOR A MOMENT OF 140 ft-kips (FACTORED)

WALL TYPE SCHEDULE:

2x8 WOOD STUDS @ 12" c/c

800S162-54 STEEL STUDS @ 12" c/c. PROVIDE STRUCTURAL SHEATHING ON INSIDE FACE.

XB1: ⅞"ø 44W ROD X-BRACE. CONNECT FOR ±20 kips (FACTORED)

XB2: HSS6x6x0.250 BRACE. CONNECT FOR ±20 kips (FACTORED)

WINDSOR / WEST HANTS TOGETHER

BMR Structural Engineering

5413 Doyle Street
Halifax, Nova Scotia B3J 1H9
ph. (902) 429-3321 fax (902) 422-8650
BMR Project No. 2020-322

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No.	Description	Date
1	ISSUED FOR RFP	20.APR.21

REGISTERED PROFESSIONAL ENGINEER
DATE 4/20/21
NAME UNDERHILL
7287
PROVINCE OF NOVA SCOTIA

harveyARCHITECTURE
707-1 Bayers Rd. Suite 3004
Halifax, NS B3L 2C2
Email: mike@harch.ca
Phone: 444-0555
Fax: 444-7522

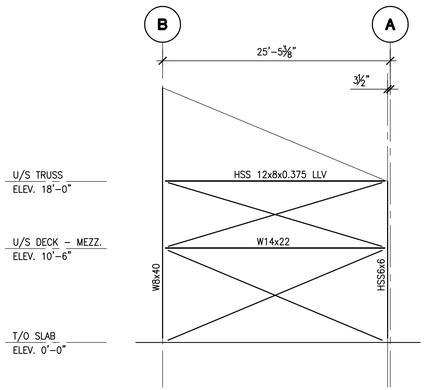
HANTSPORT FIRE STATION
HANTSPORT, NS

ROOF FRAMING PLAN

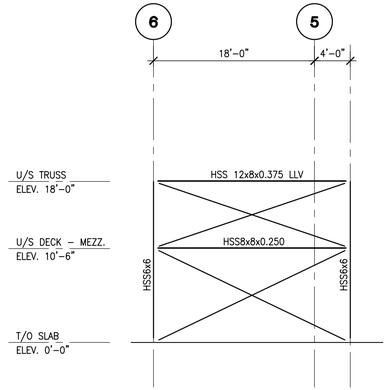
Project Number	20068
Date	2020.10.07
Drawn By	TD
Checked By	NB

S-103

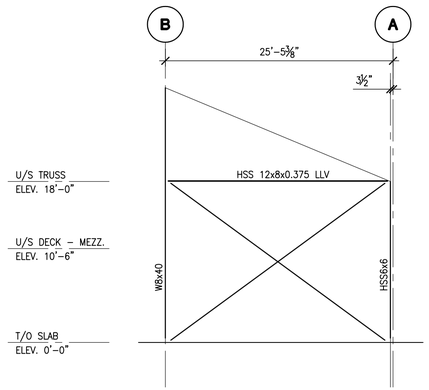
Scale 1/8" = 1'-0"



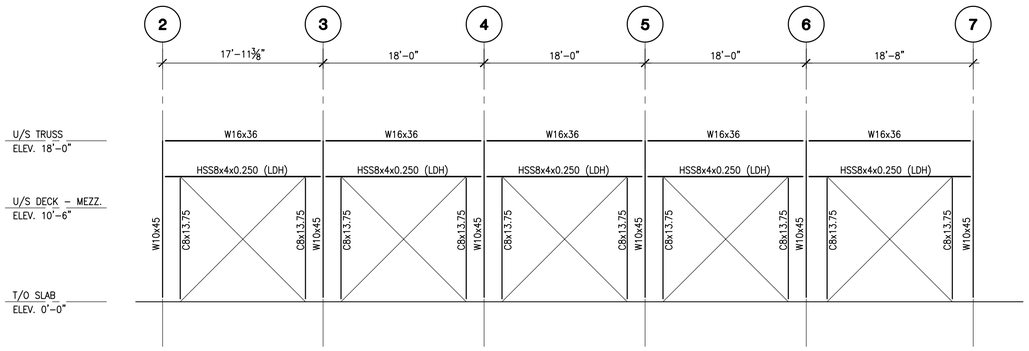
ELEVATION A — SCALE: 1/8" = 1'-0" — S-102 / S-103



ELEVATION B — SCALE: 1/8" = 1'-0" — S-102 / S-103



ELEVATION C — SCALE: 1/8" = 1'-0" — S-102 / S-103



ELEVATION D — SCALE: 1/8" = 1'-0" — S-102 / S-103

WINDSOR / WEST HANTS TOGETHER

BMR Structural | Engineering

5413 Doyle Street
Halifax, Nova Scotia B3J 1H9
ph. (902) 429-3321 fax (902) 422-8650
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REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF NOVA SCOTIA — DATE 4/20/21 — M. LEE FRASER — 7287

7071 Bayers Rd. Suite 3004
Halifax, NS B3L 2C2
Email: mike@harch.ca
Phone: 444-0555
Fax: 444-7522
harveyARCHITECTURE

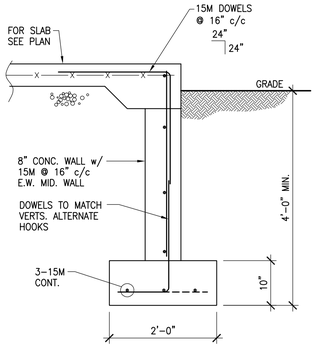
HANTSPORT FIRE STATION
HANTSPORT, NS

ELEVATIONS

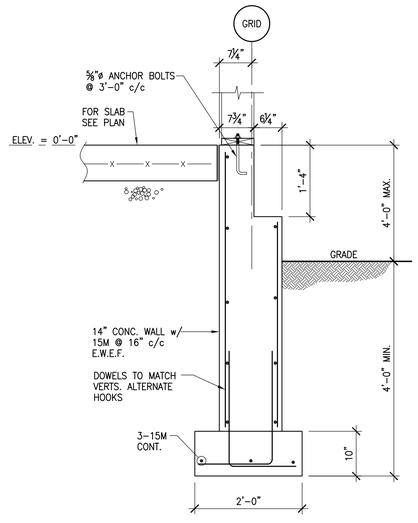
Project Number	20068
Date	2020.10.07
Drawn By	TD
Checked By	NB

S-201

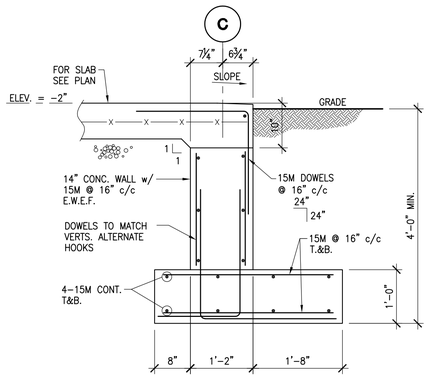
Scale 1/8" = 1'-0"



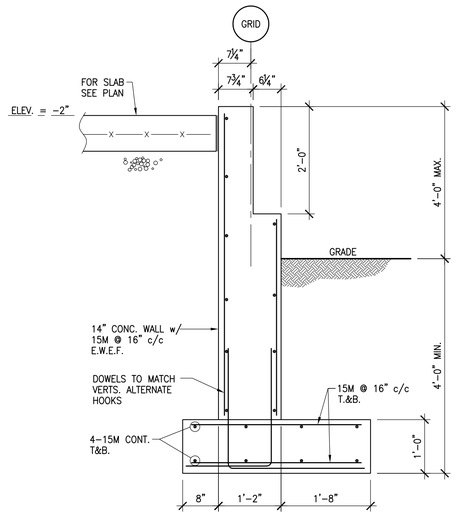
SECTION 10 — SCALE: 3/4" = 1'-0" — S-101



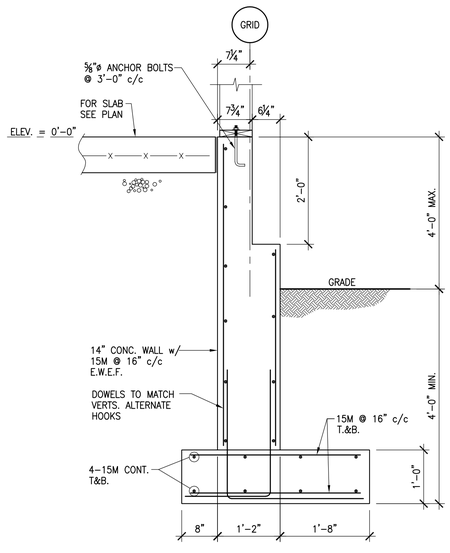
SECTION 11 — SCALE: 3/4" = 1'-0" — S-101



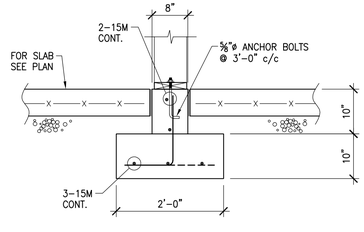
SECTION 12 — SCALE: 3/4" = 1'-0" — S-101



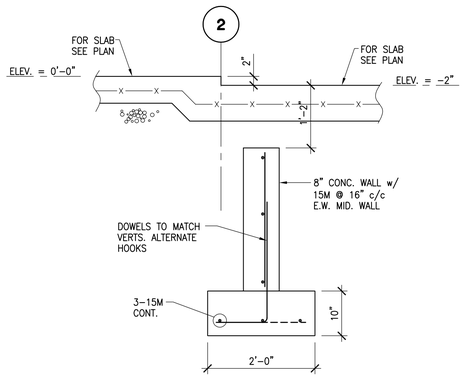
SECTION 7 — SCALE: 3/4" = 1'-0" — S-101



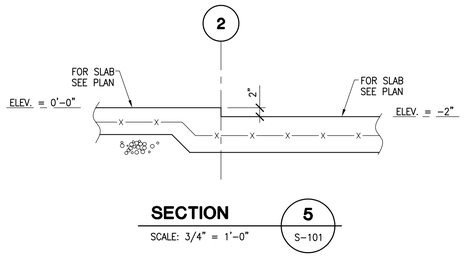
SECTION 8 — SCALE: 3/4" = 1'-0" — S-101



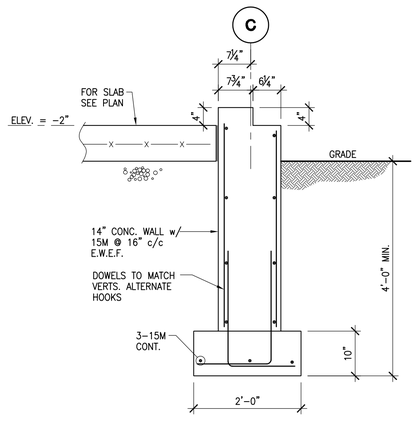
SECTION 9 — SCALE: 3/4" = 1'-0" — S-101



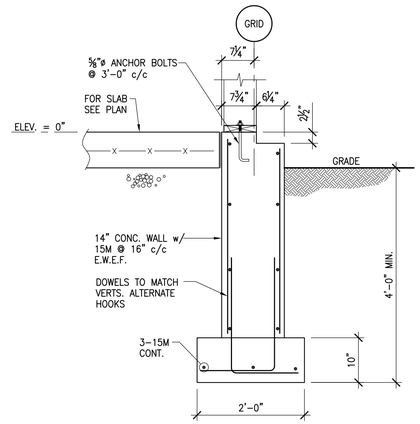
SECTION 4 — SCALE: 3/4" = 1'-0" — S-101



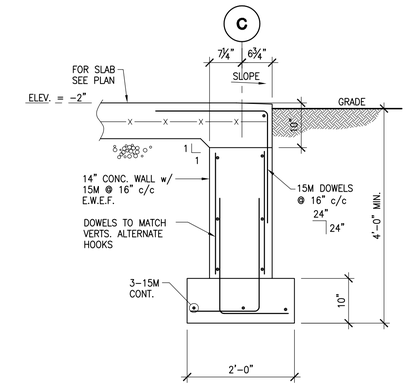
SECTION 5 — SCALE: 3/4" = 1'-0" — S-101



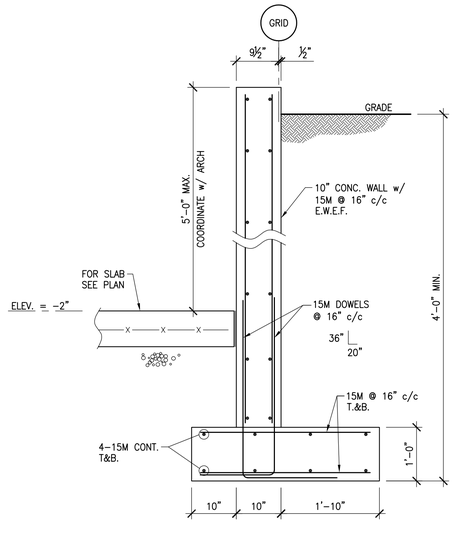
SECTION 6 — SCALE: 3/4" = 1'-0" — S-101



SECTION 1 — SCALE: 3/4" = 1'-0" — S-101



SECTION 2 — SCALE: 3/4" = 1'-0" — S-101



SECTION 3 — SCALE: 3/4" = 1'-0" — S-101

WWH
WINDSOR / WEST HANTS
TOGETHER

BMR
Structural|Engineering

5413 Doyle Street
Halifax, Nova Scotia B3J 1H9
ph. (902) 429-3321 fax (902) 422-8650
BMR Project No. 2020-322

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REGISTERED PROFESSIONAL ENGINEER
DATE 4/20/21
M.E. UNDERHILL
7287
PROVINCE OF NOVA SCOTIA

harveyARCHITECTURE
707-1 Bayers Rd. Suite 3004
Halifax, NS B3L 2C2
Email: mike@harch.ca
Phone: 444-0555
Fax: 444-7522

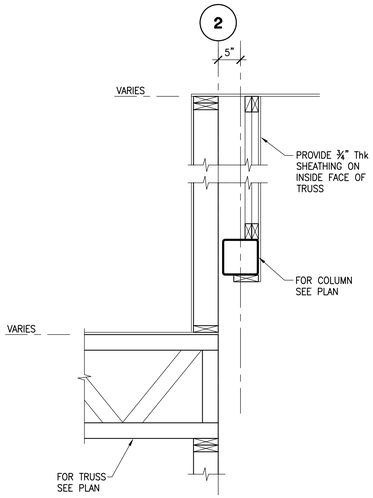
HANTSPORT FIRE STATION
HANTSPORT, NS

FOUNDATION SECTIONS

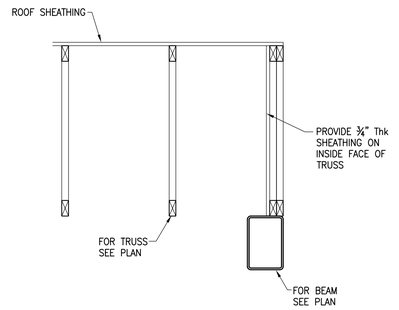
Project Number	20068
Date	2020.10.07
Drawn By	TD
Checked By	NB

S-301

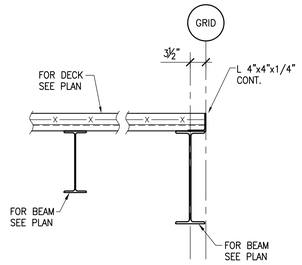
Scale 3/4" = 1'-0"



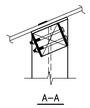
SECTION 9 — S-103
SCALE: 3/4" = 1'-0"

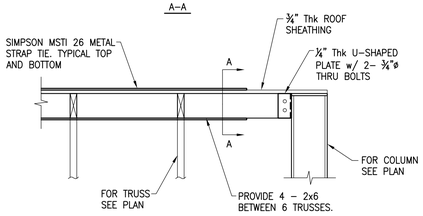


SECTION 5 — S-103
SCALE: 3/4" = 1'-0"

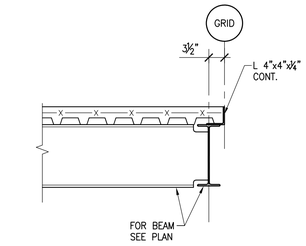


SECTION 1 — S-102
SCALE: 3/4" = 1'-0"

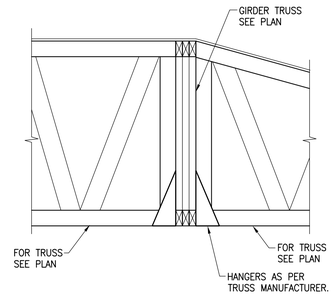




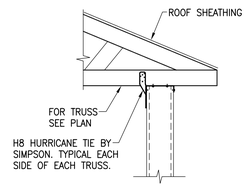
SECTION 6 — S-103
SCALE: 3/4" = 1'-0"



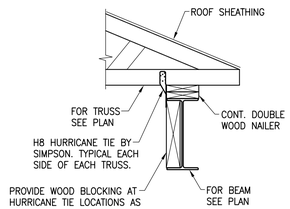
SECTION 2 — S-102
SCALE: 3/4" = 1'-0"



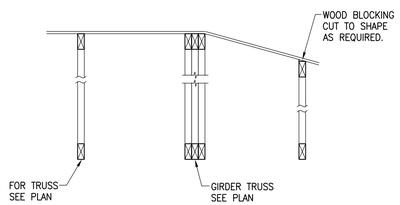
SECTION 10 — S-103
SCALE: 3/4" = 1'-0"



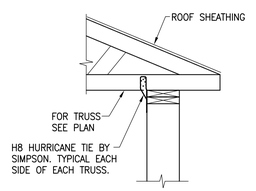
SECTION 7 — S-103
SCALE: 3/4" = 1'-0"



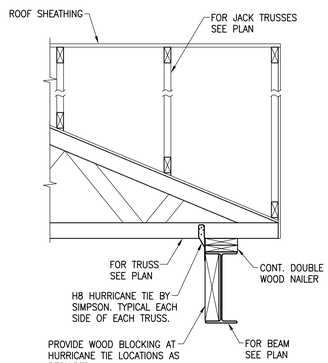
SECTION 3 — S-103
SCALE: 3/4" = 1'-0"



SECTION 11 — S-103
SCALE: 3/4" = 1'-0"



SECTION 8 — S-103
SCALE: 3/4" = 1'-0"



SECTION 4 — S-103
SCALE: 3/4" = 1'-0"

WINDSOR / WEST HANTS TOGETHER

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REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF NOVA SCOTIA — DATE 4/20/21 — M. D. HARVEY — 7287

harveyARCHITECTURE
7071 Bayers Rd. Suite 3004
Halifax, NS B3L 2C2
Email: mike@harch.ca
Phone: 444-0555
Fax: 444-7522

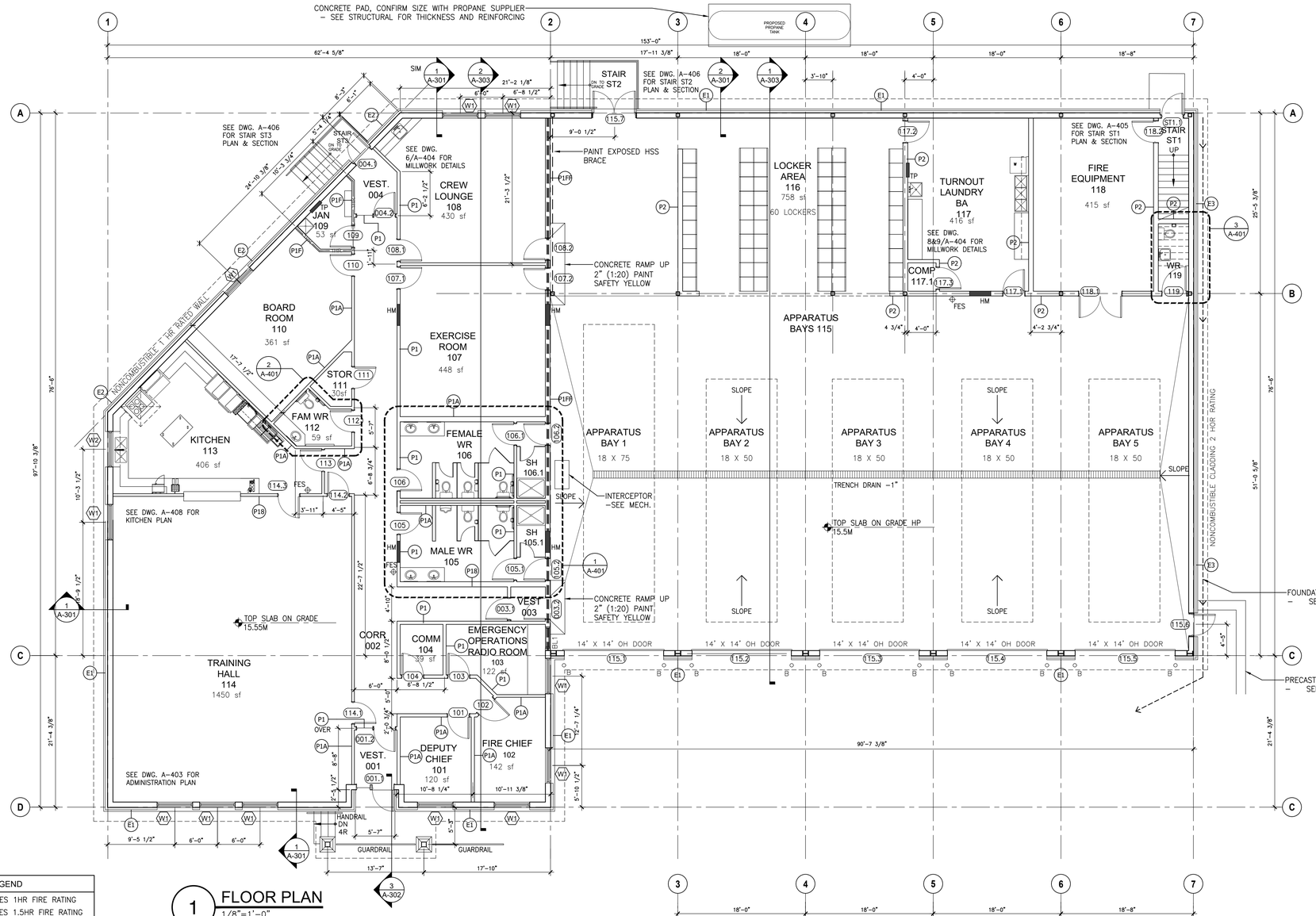
HANTSPORT FIRE STATION
HANTSPORT, NS

FRAMING SECTIONS

Project Number	20068
Date	2020.10.07
Drawn By	TD
Checked By	NB

S-310

Scale 3/4" = 1'-0"



1 FLOOR PLAN

1/8"=1'-0"

12,343 GFS

LEGEND

1HR —— INDICATES 1HR FIRE RATING

▬▬▬▬ INDICATES 1.5HR FIRE RATING

WALL TYPE LEGEND

E1 –PREFINISHED METAL SIDING –7/8" CORRUGATED OR MASONRY VENEER
–AIR SPACE
–TREATED 1X3 WOOD STRAPPING
–1½" RIGID INSULATION
–AIR BARRIER
–1/2" PLYWOOD SHEATHING (GYPSUM BASED SHEATHING BOARD WHERE NOTED)
–2x8 WOOD STUDS SEE STRUCTURAL DRAWINGS
–R28 SPRAY FOAM INSULATION INTEGRAL VAPOUR BARRIER
–5/8" GYPSUM BOARD, TAPED, FILLED & PAINTED (TYPE X WHERE NOTED)

E2 –PREFINISHED METAL SIDING –7/8" CORRUGATED OR MASONRY VENEER
–AIR SPACE
–METAL STRAPPING
–1½" ROCKWOOL INSULATION
–AIR BARRIER
–1/2" GYPSUM BASED SHEATHING BOARD TYPE X
–LB STEEL STUDS SEE STRUCTURAL DRAWINGS
–ROCKWELL INSULATION INTEGRAL VAPOUR BARRIER
–5/8" TYPE X GYPSUM BOARD, TAPED, FILLED & PAINTED

E3 AS FOR E2 BUT 2 LAYERS TYPE X GYP. BD, EACH FACE

P1 5/8" GYPSUM BOARD TAPED & FILLED, PAINTED WHERE EXPOSED
3½" WOOD STUDS @ 16" OC (5½" WHERE REQUIRED FOR MECH SERVICES)
5/8" GYPSUM BOARD TAPED & FILLED, PAINTED WHERE EXPOSED
FULL HEIGHT TO U/S ROOF TRUSSES
(MOISTURE BOARD AT KITCHEN, WASHROOMS, SHOWERS & JANITOR)

P1A AS FOR P1 BUT ACOUSTIC BATT INSULATION AND SEALANT FULL HEIGHT TO U/S ROOF TRUSSES

P1F AS FOR P1 OR P1F BUT TYPE X GYPSUM BOARD C/W FIRESTOPPING 1 HOUR RATING

P1FF AS FOR P1 BUT 2 LAYERS TYPE X GYPSUM BOARD C/W FIRESTOPPING 1.5 HOUR RATING

P18 AS FOR P1 BUT 2 x 8 FRAMING SEE STR

P2 8" CONCRETE BLOCK

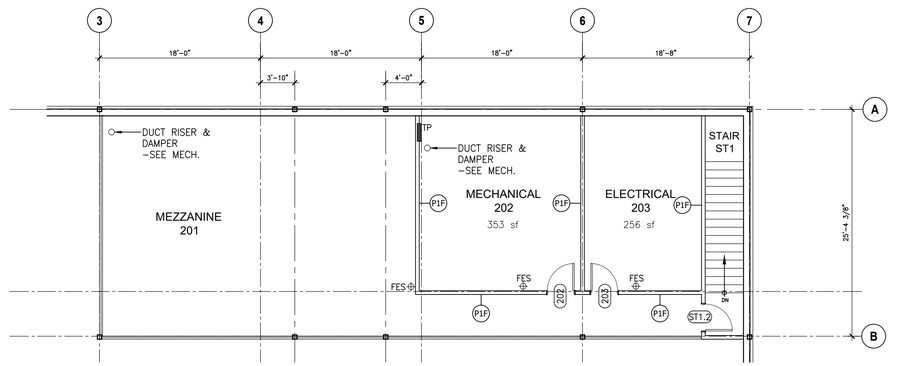
ICON LEGEND

B BOLLARD – SEE DRAWING C-101

FES 10 LB ABC TYPE FIRE EXTINGUISHER C/W ENAMELLED WALL BRACKET MOUNT W/ TOP APPROX. 1220 AFF

HM HEATING MANIFOLD RECESSED IN WALL –SEE MECHANICAL

TP TRAP PRIMER –SEE MECHANICAL



2 UPPER FLOOR PLAN

1/8"=1'-0"

WINDSOR / WEST HANTS TOGETHER

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No.	Description	Date
5	ISSUED FOR RFP	2021.04.20
4	FOR PRICING	2021.03.31
3	MEETING UPDATE, CLASS D	2020.11.15
2	MEETING	2020.10.29
1	MEETING	2020.10.15

LICENSED ARCHITECT NOVA SCOTIA ASSOCIATION OF ARCHITECTS MICHAEL A. HARVEY

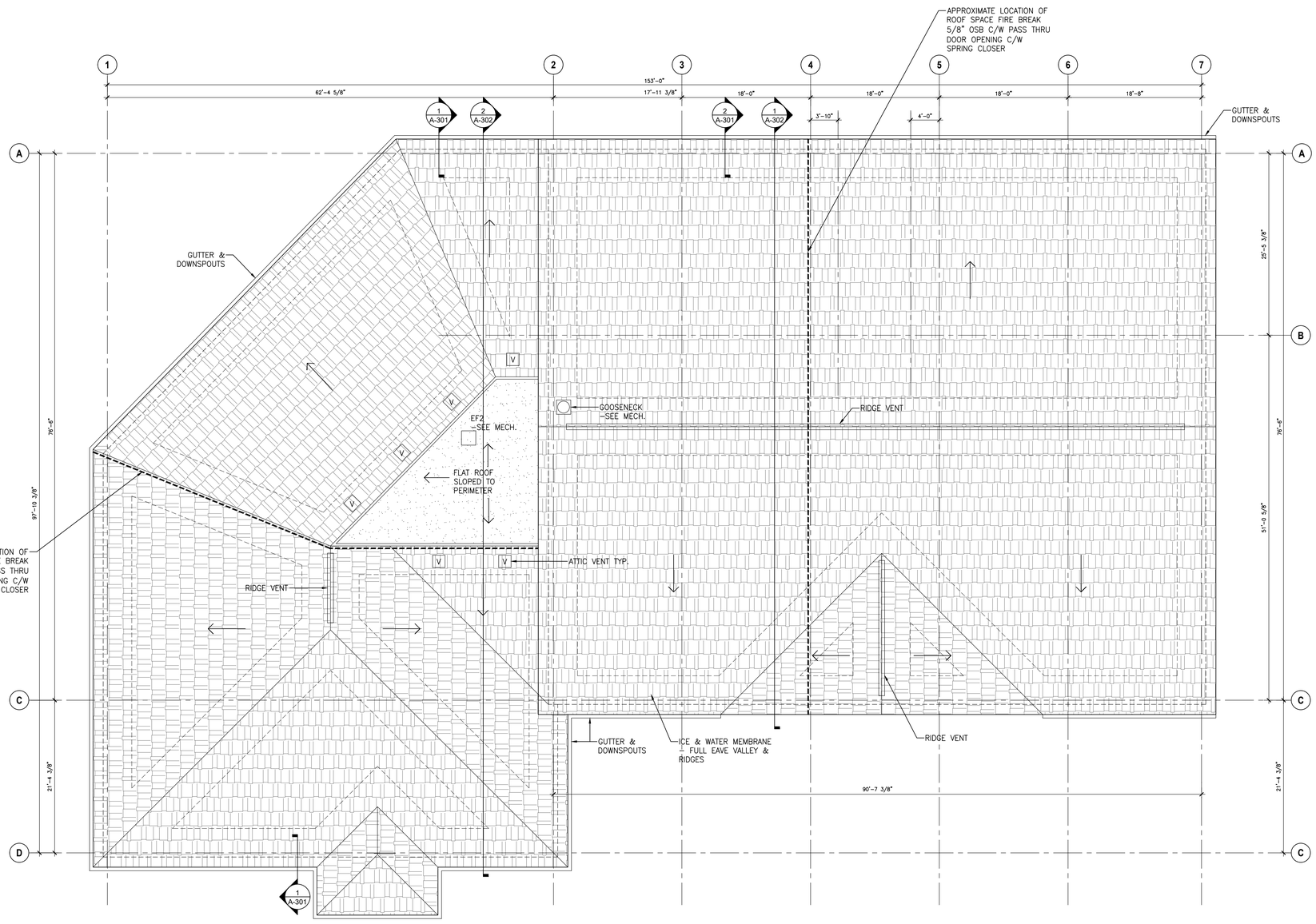
7071 Bayers Rd. Suite 3004
Halifax, NS B3L 2C2
Email: mike@harch.ca
Phone: 444-0555
Fax: 444-7522
harveyARCHITECTURE

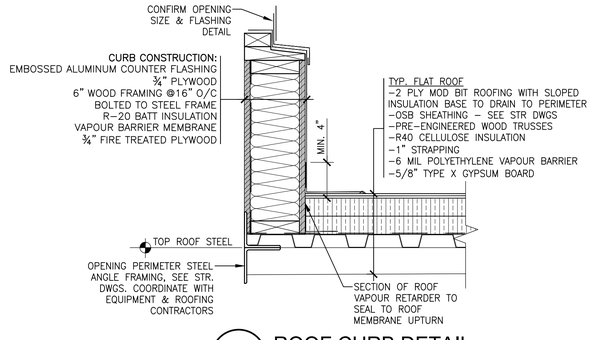
HANTSPORT FIRE STATION
HANTSPORT, NS

FLOOR PLAN

Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	WN
Scale	1/8"=1'-0"

A-101





1 ROOF CURB DETAIL
1 1/2"=1'-0"

TYP. SLOPED ROOF
-ASPHALT SHINGLES
-EAVE SHIELD AT EAVES, RIDGES & VALLEYS
-UNDERLAY DECK-ARMOUR OR EQUIVALENT
-OSB SHEATHING - SEE STR DWGS
-PRE-ENGINEERED WOOD TRUSSES
-R40 CELLULOSE INSULATION
-1" STRAPPING
-6 MIL POLYETHYLENE VAPOUR BARRIER
-5/8" TYPE X GYPSUM BOARD

TYP. FLAT ROOF
-2 PLY MOD BIT ROOFING WITH SLOPED INSULATION BASE TO DRAIN TO PERIMETER
-OSB SHEATHING - SEE STR DWGS
-PRE-ENGINEERED WOOD TRUSSES
-R40 CELLULOSE INSULATION
-1" STRAPPING
-6 MIL POLYETHYLENE VAPOUR BARRIER
-5/8" TYPE X GYPSUM BOARD

WINDSOR / WEST HANTS TOGETHER

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No.	Description	Date
4	ISSUED FOR RFP	2021.04.20
3	FOR PRICING	2021.03.31
2	CLASS D COSTING	2020.11.15
1	MEETING	2020.10.15

LICENSED ARCHITECT MICHAEL A. HARVEY NOVA SCOTIA ASSOCIATION OF ARCHITECTS

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Phone: 444-0555
Fax: 444-7522
harveyARCHITECTURE

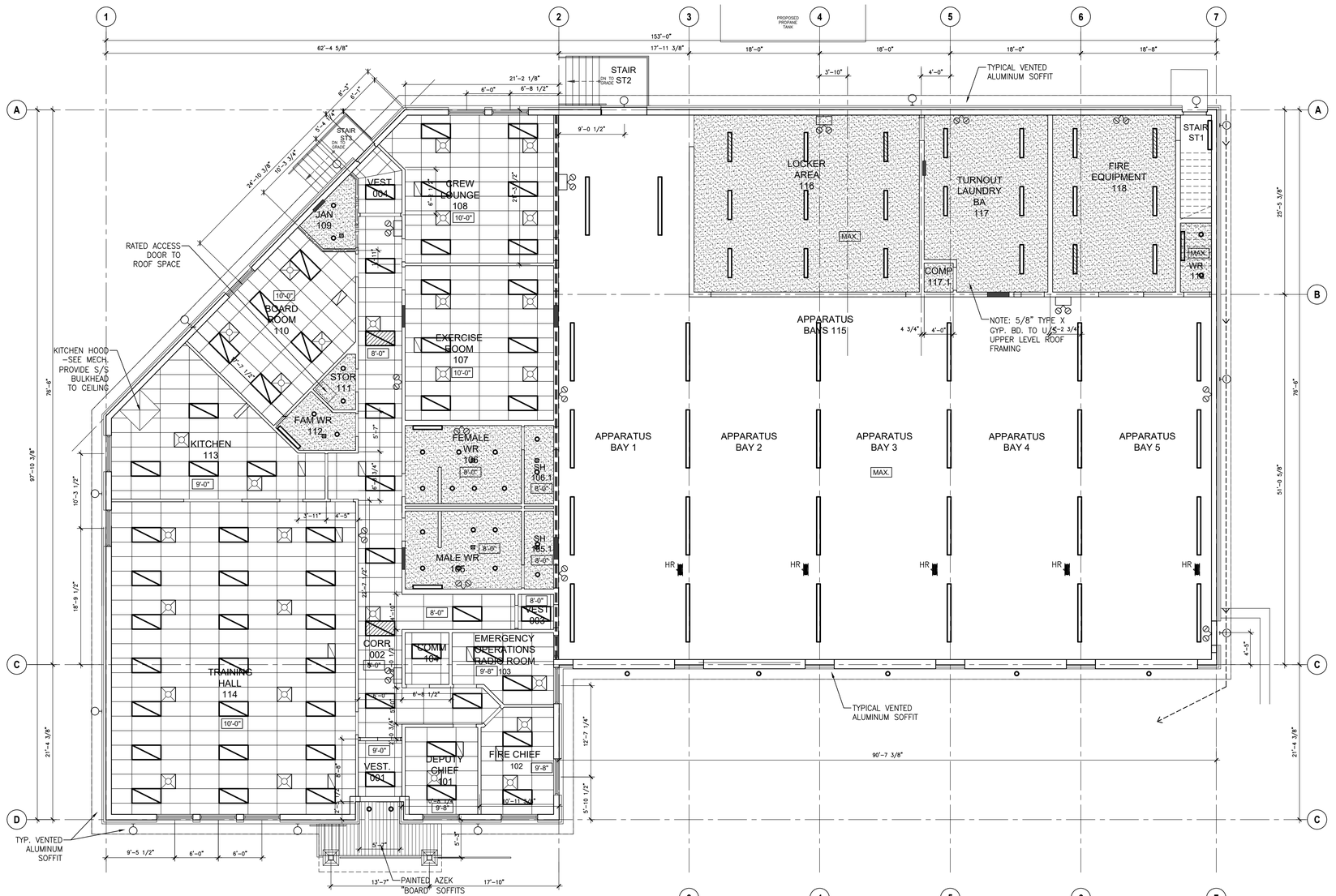
HANTSPORT FIRE STATION
HANTSPORT, NS

ROOF PLAN

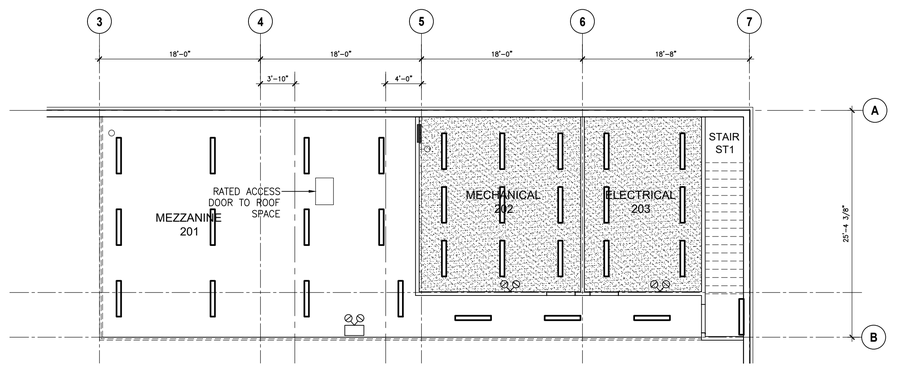
Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	WN

A-102

Scale 1/8"=1'-0"



1 REFLECTED CEILING PLAN
1/8"=1'-0"



2 UPPER FLOOR REFLECTED CEILING PLAN
1/8"=1'-0"

NOTE: APPARATUS BAYS AND REMAINDER OF MEZZANINE TO HAVE 5/8" TYPE X GYP. BD. TAPED, FILLED & PAINTED TO U/S ROOF TRUSSES

NORTH

CEILING LEGEND

- GYPSUM BOARD CEILING
- 24" X 48" ACOUSTIC TILE IN METAL SUSPENSION SYSTEM
- EXPOSED STRUCTURE
- LIGHT FIXTURES – SEE ELEC.
- DIFFUSERS – SEE MECH
- 0'-0" CEILING HEIGHT
- HR HOSE REEL –SEE PLUMBING DWGS.

WINDSOR / WEST HANTS TOGETHER

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2	CLASS D COSTING	2020.11.15
1	MEETING	2020.10.15

LICENSED ARCHITECT MICHAEL A. HARVEY NOVA SCOTIA ASSOCIATION OF ARCHITECTS

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Halifax, NS B3L 2C2
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harveyARCHITECTURE

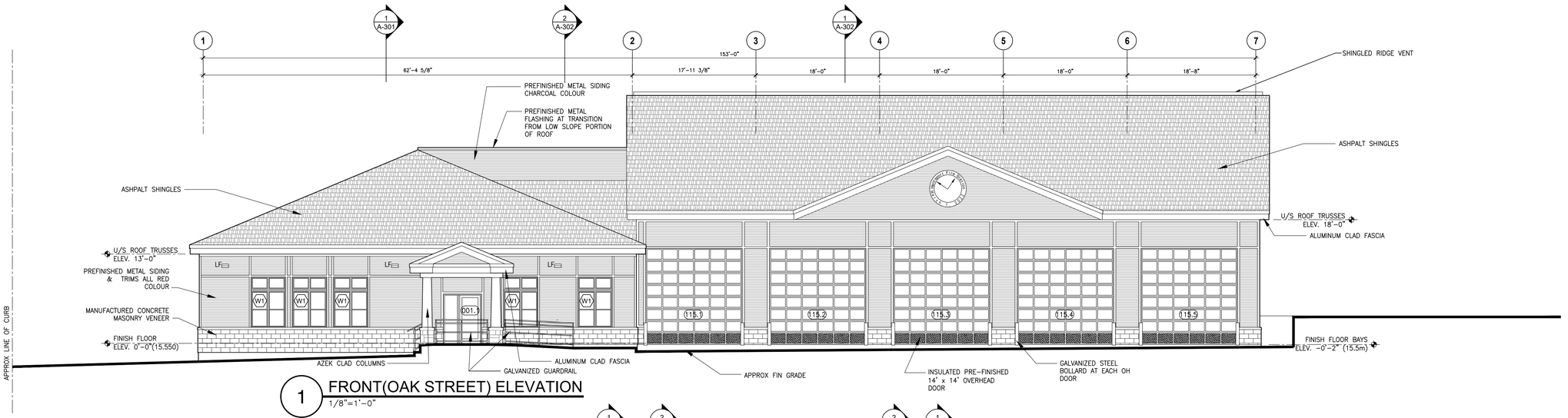
HANTSPORT FIRE STATION
HANTSPORT, NS

REFLECTED CEILING PLAN

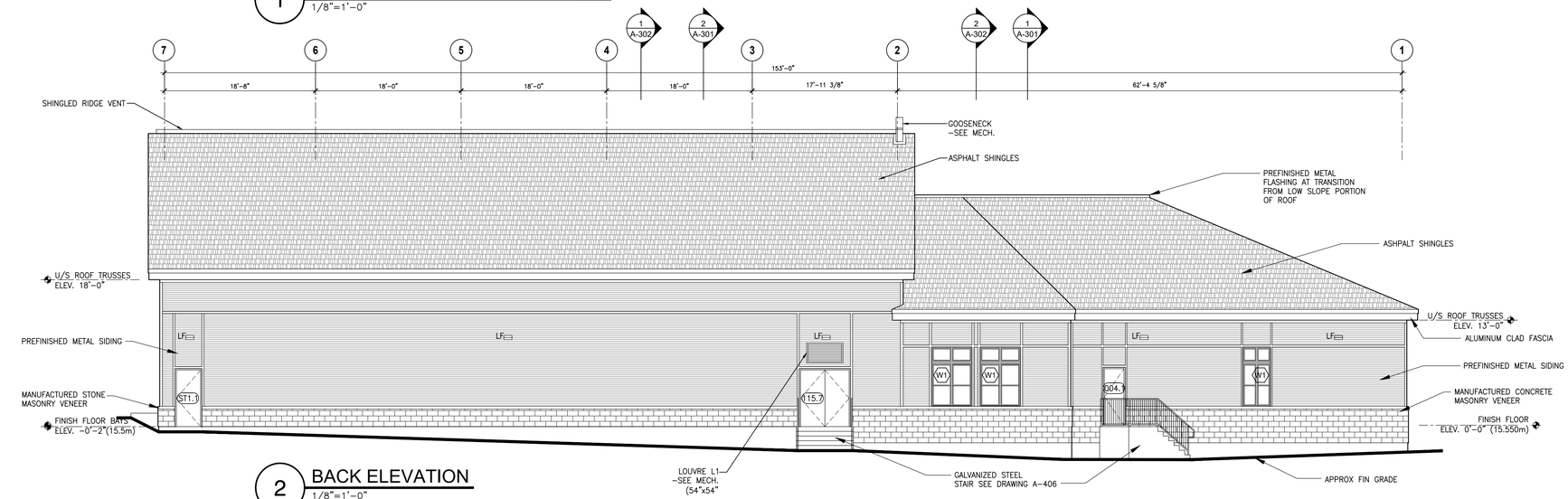
Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	WN

A-103

Scale 1/8"=1'-0"

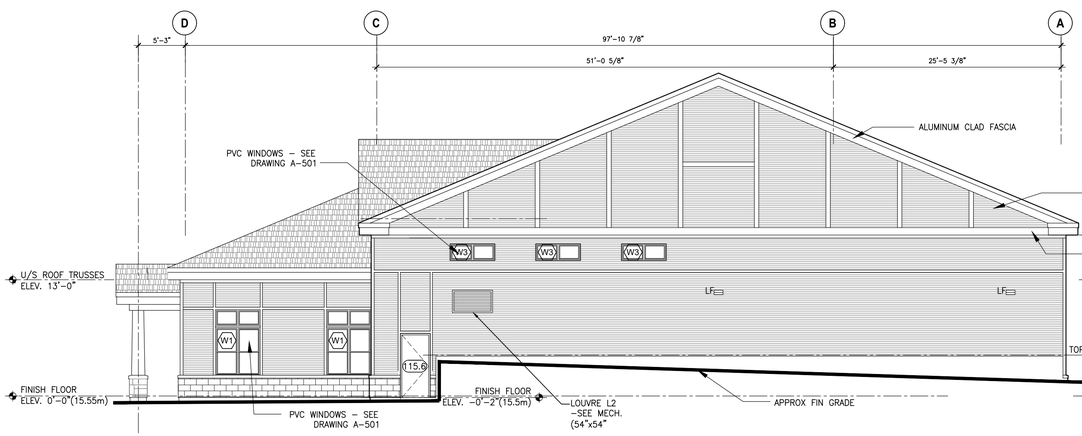


1 FRONT(OAK STREET) ELEVATION
1/8"=1'-0"

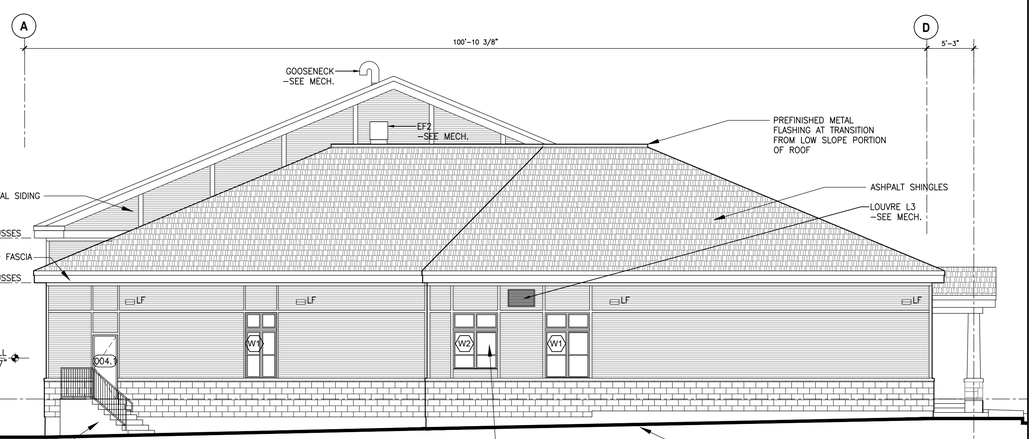


2 BACK ELEVATION
1/8"=1'-0"

NOTE:
1. FOR MISCELLANEOUS ROOF & WALL PENETRATIONS -SEE MECH.
2. FOR HOSE CONNECTIONS -REFER TO MECH.



3 RIGHT ELEVATION
1/8"=1'-0"



4 LEFT ELEVATION
1/8"=1'-0"

WINDSOR / WEST HANTS TOGETHER

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6	ISSUED FOR RFP	2021.04.20
5	FOR PRICING	2021.03.31
4	MEETING UPDATES, CLASS D	2020.11.15
3	FINISH GRADES	2020.11.07
2	MEETING	2020.10.29
1	MEETING	2020.10.15

LICENSED ARCHITECT NOVA SCOTIA ASSOCIATION OF ARCHITECTS MICHAEL A. HARVEY

7071 Bayers Rd. Suite 3004
Halifax, NS B3L 2C2
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harveyARCHITECTURE

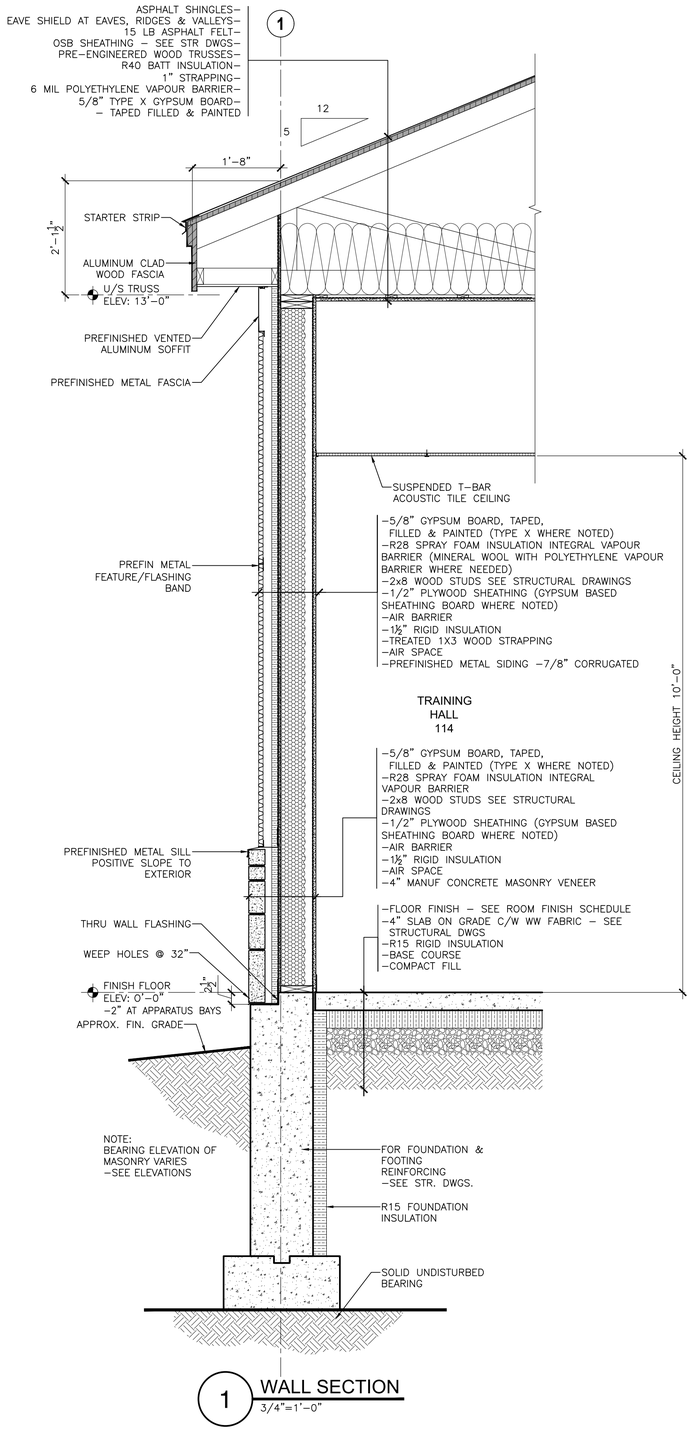
HANTSPORT FIRE STATION
HANTSPORT, NS

ELEVATIONS

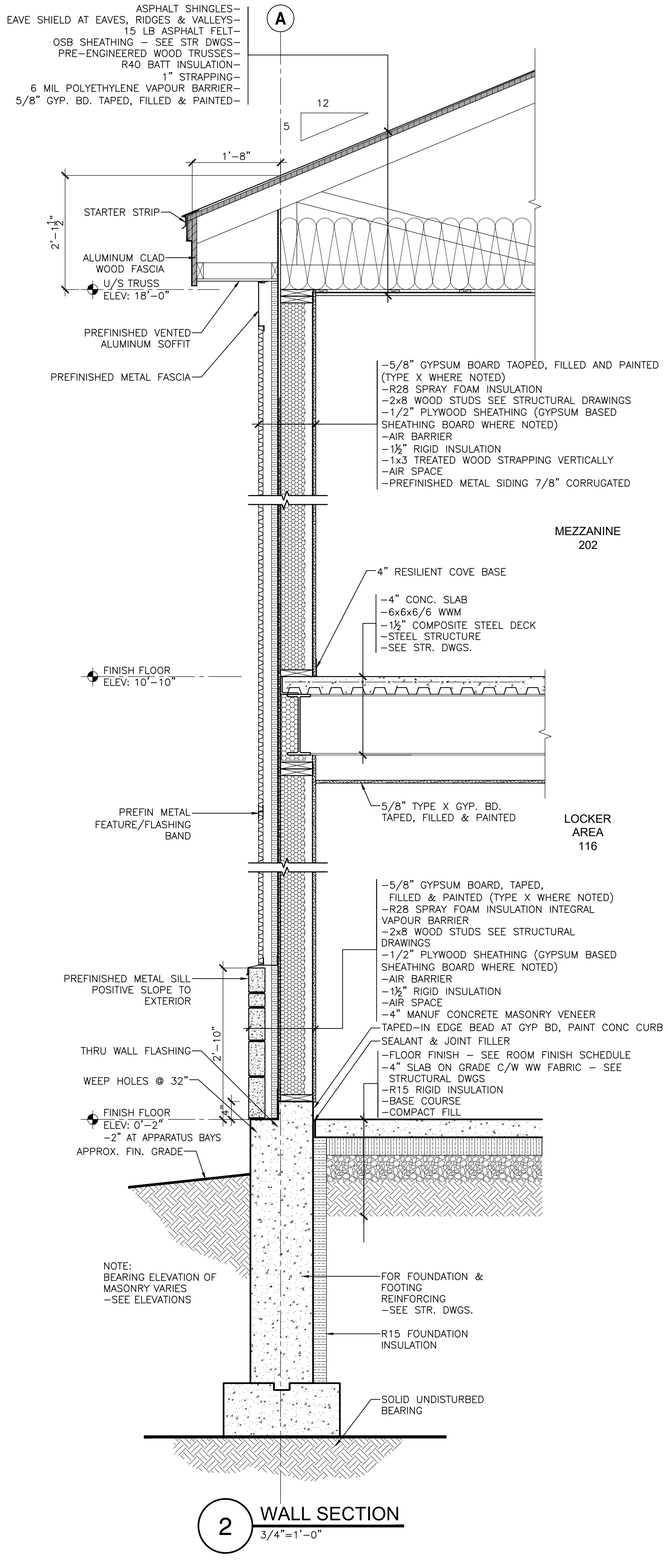
Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	MAH

A-201

Scale 1/8"=1'-0"



1 WALL SECTION
3/4"=1'–0"

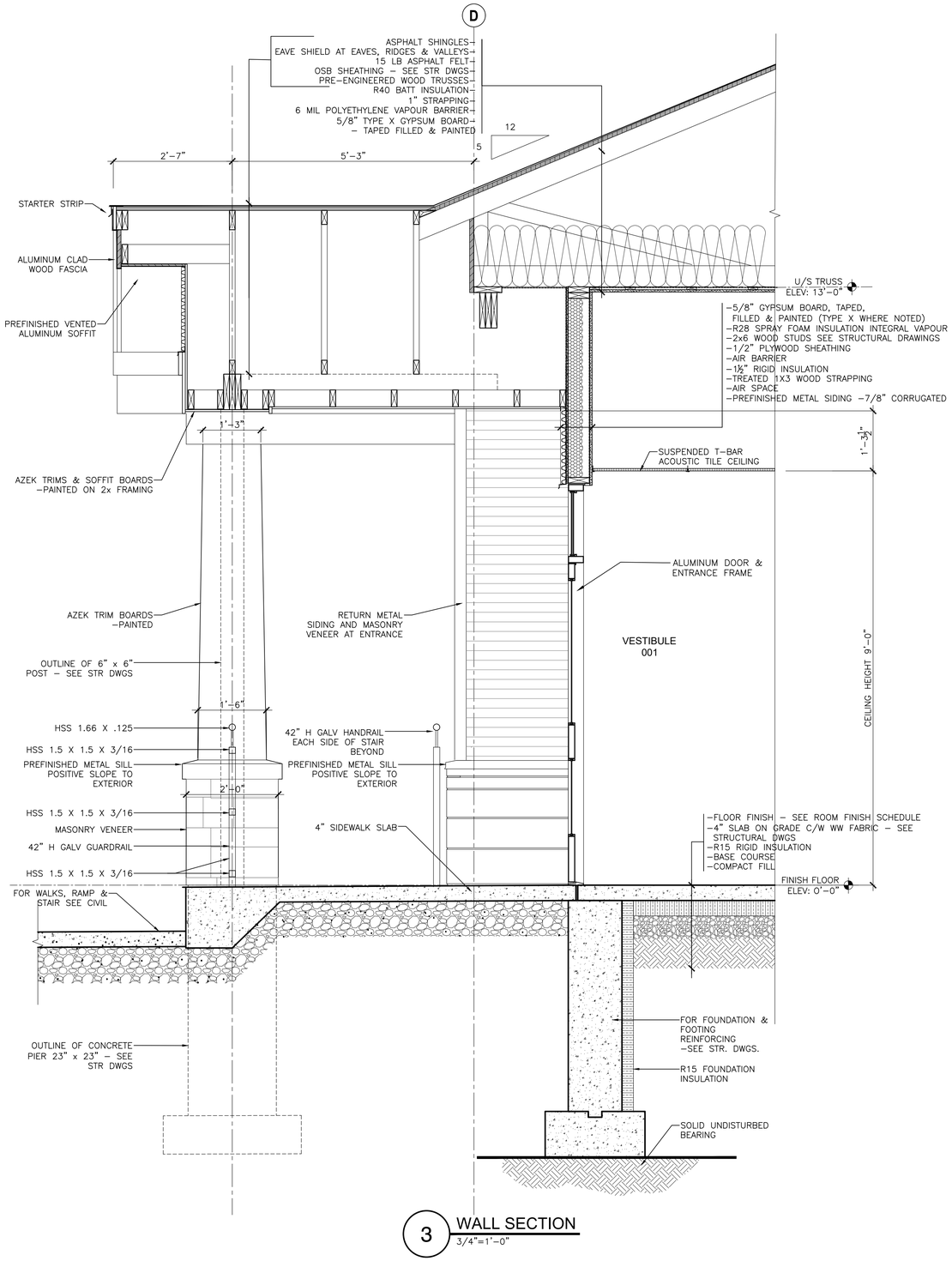


2 WALL SECTION
3/4"=1'–0"

WINDSOR / WEST HANTS TOGETHER

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No.	Description	Date



3 WALL SECTION
3/4"=1'–0"

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1	FOR PRICING	2021.03.31

LICENSED ARCHITECT
MICHAEL A. HARVEY
NOVA SCOTIA ASSOCIATION OF ARCHITECTS

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Phone: 444-0555
Fax: 444-7522
harveyARCHITECTURE

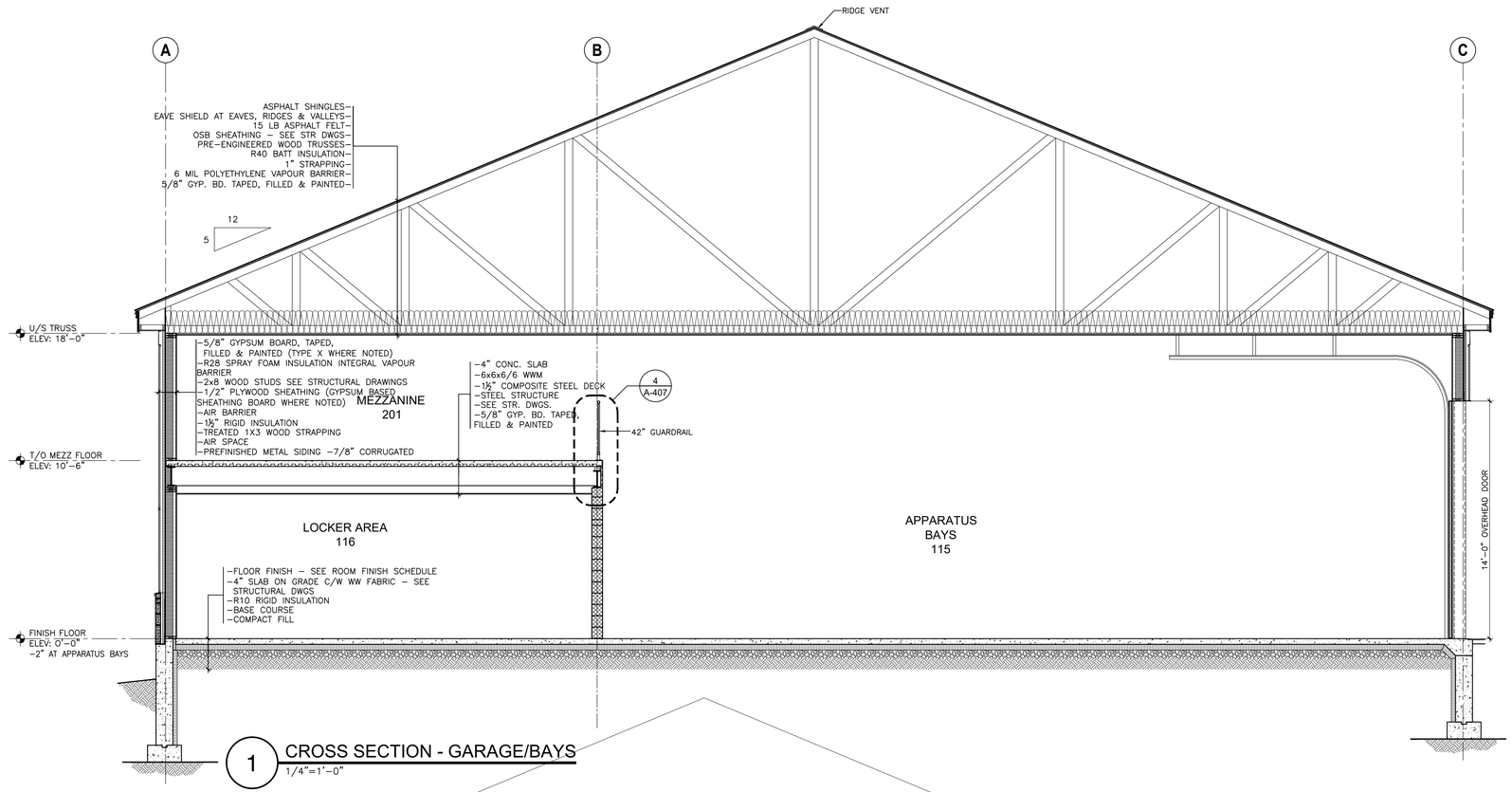
HANTSPORT FIRE STATION
HANTSPORT, NS

WALL SECTION 3

Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	WN

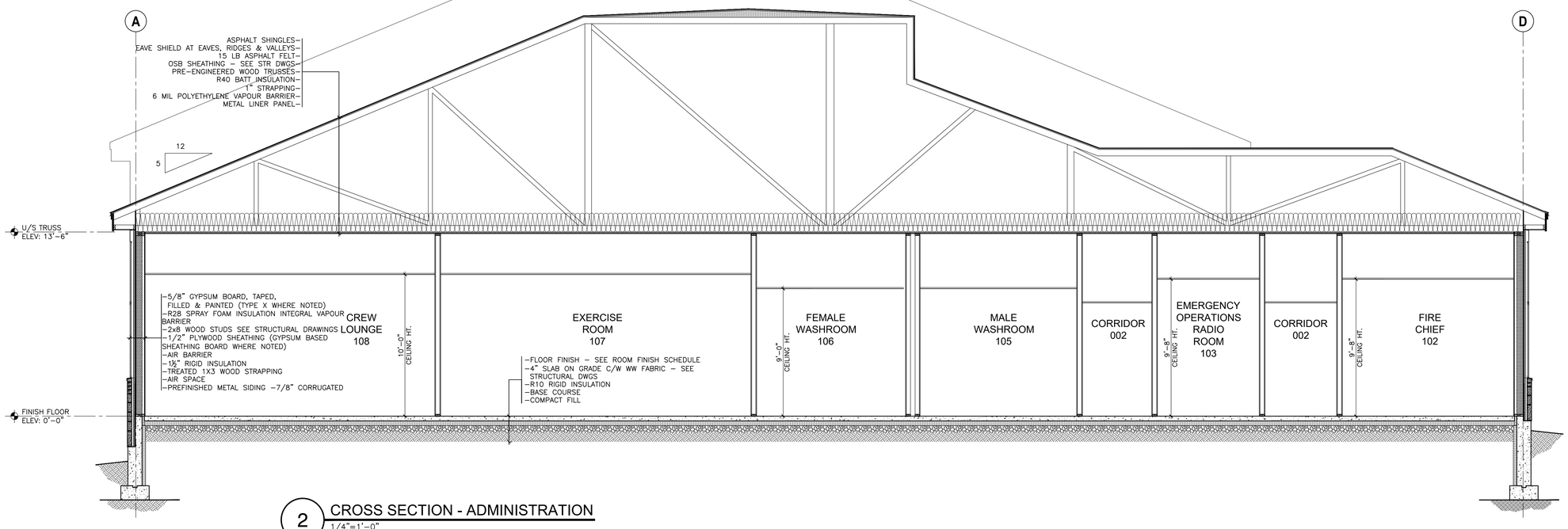
A-302

Scale 3/4"=1'–0"



1 CROSS SECTION - GARAGE/BAYS

1/4"=1'-0"



2 CROSS SECTION - ADMINISTRATION

1/4"=1'-0"

WINDSOR / WEST HANTS TOGETHER

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3	ISSUED FOR RFP	2021.04.20
2	FOR PRICING	2021.03.31
1	CLASS D	2020.11.15

LICENSED ARCHITECT
M. A. HARVEY
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7071 Bayers Rd. Suite 3004
Halifax, NS B3L 2C2
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harveyARCHITECTURE

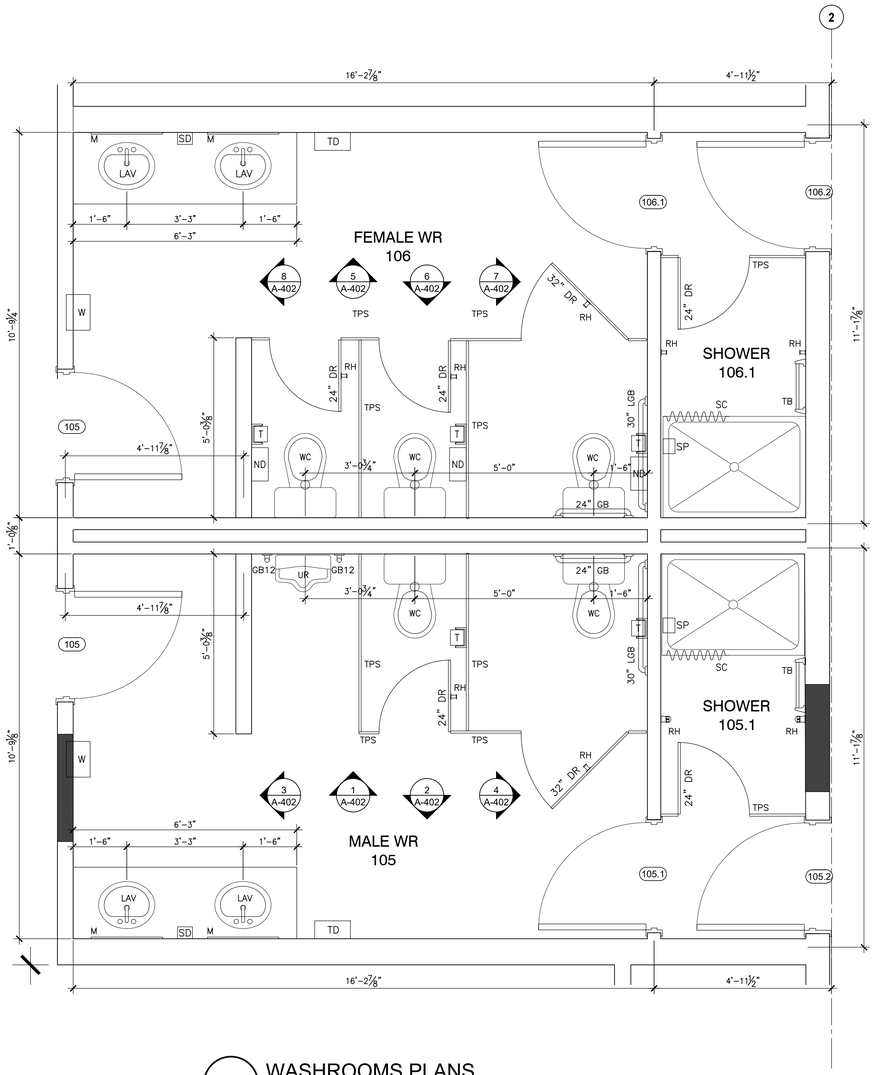
HANTSPORT FIRE STATION
HANTSPORT, NS

CROSS SECTIONS

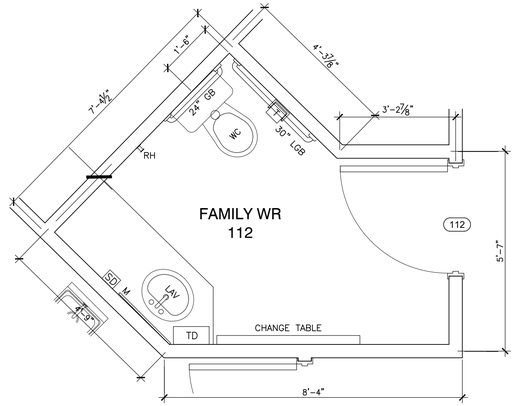
Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	WN

A-303

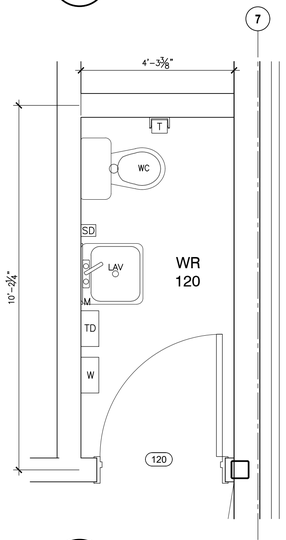
Scale 1/4"=1'-0"



1 WASHROOMS PLANS
1/2"=1'-0"



2 WASHROOM PLAN
1/2"=1'-0"



3 WASHROOM PLAN
1/2"=1'-0"

WASHROOM VANITY & SINK HEIGHTS

1. ALL WASHROOM VANITIES & SINKS TO BE 2'-10" AFF

ACCESSORY LEGEND:

GB – GRAB BAR
LGB – 30" X 30" 90 DEGREE GRAB BAR
LAV – SINK
M – MIRROR
ND – SANITARY NAPKIN DISPOSAL
SC – SHOWER CURTAIN & ROD
SD – SOAP DISPENSER
SP – SOAP HOLDER
T – TOILET TISSUE DISPENSER
TPS – TOILET PARTITION SYSTEM
TD – PAPER TOWEL DISPENSER
WC – TOILET
W – WASTE RECEPTACLE
RH – ROBE HOOK
UR – URINAL

WINDSOR / WEST HANTS TOGETHER

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LICENSED ARCHITECT
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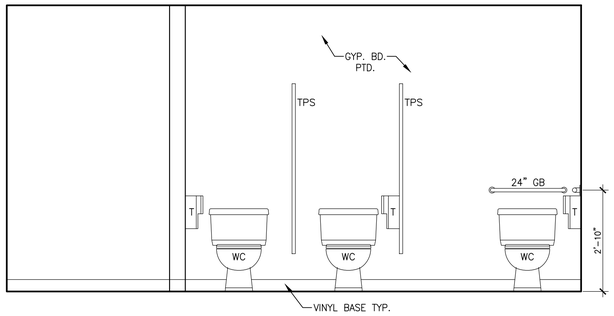
HANTSPORT FIRE STATION
HANTSPORT, NS

WASHROOM PLANS

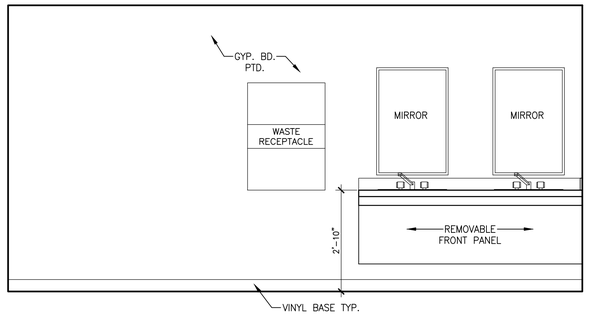
Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	WN

A-401

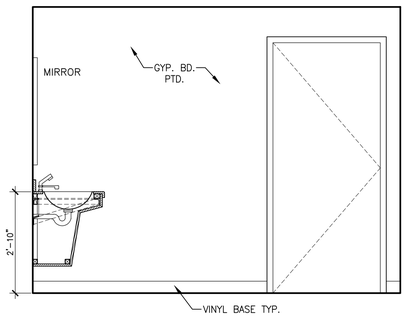
Scale 1/2"=1'-0"



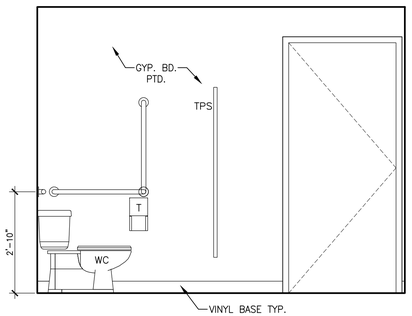
1 MALE WR 105
1/2"=1'-0"



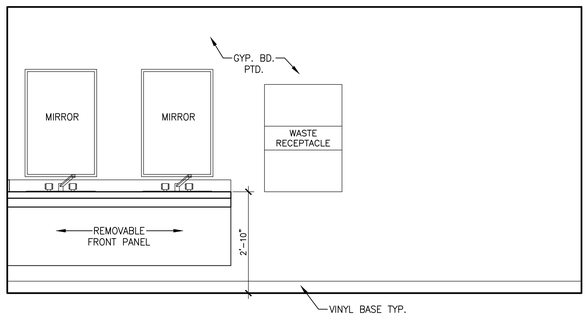
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1/2"=1'-0"



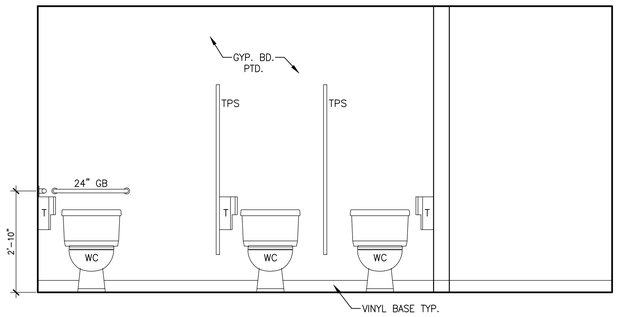
3 MALE WR 105
1/2"=1'-0"



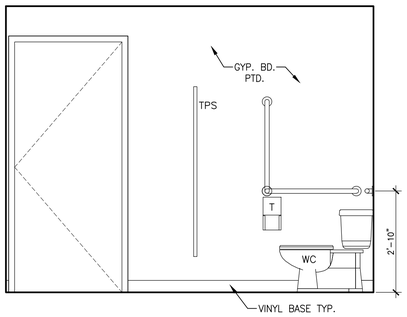
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1/2"=1'-0"



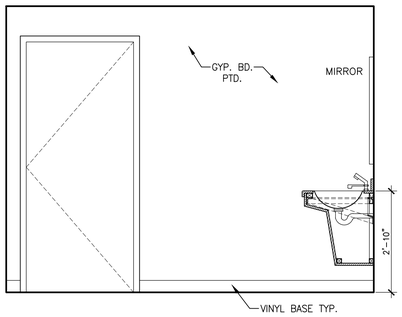
5 FEMALE WR 106
1/2"=1'-0"



6 FEMALE WR 106
1/2"=1'-0"



7 FEMALE WR 106
1/2"=1'-0"



8 FEMALE WR 106
1/2"=1'-0"

WINDSOR / WEST HANTS
TOGETHER

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1	MEETING	2020.10.15

LICENSED ARCHITECT
MICHAEL A. HARVEY
NOVA SCOTIA ASSOCIATION OF ARCHITECTS

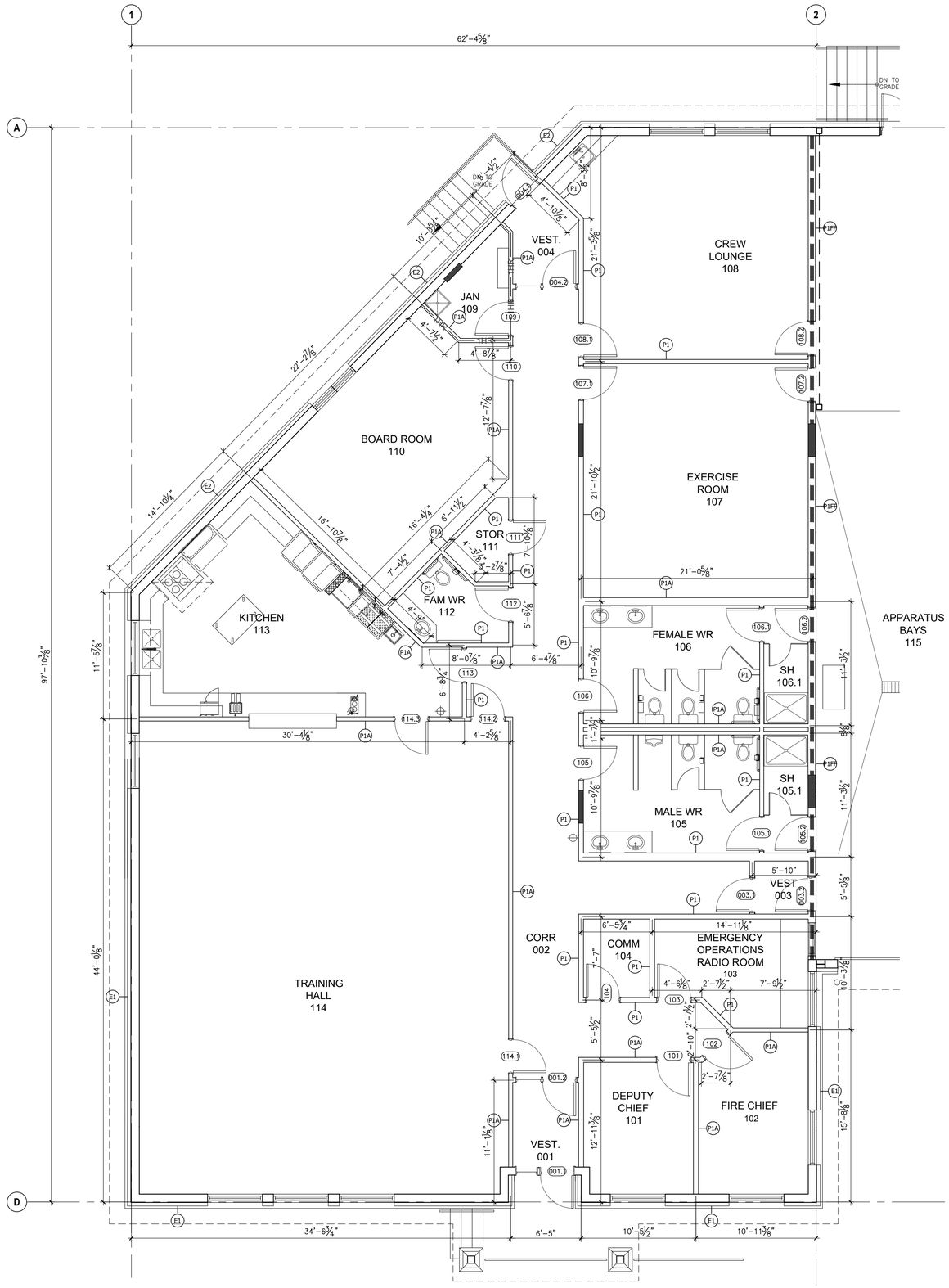
7071 Bayers Rd. Suite 3004
Halifax, NS B3L 2C2
Email: mike@harch.ca
Phone: 444-0555
Fax: 444-7522
harveyARCHITECTURE

HANTSPORT FIRE STATION
HANTSPORT, NS

WASHROOM ELEVATIONS

Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	WN
Scale	1/2"=1'-0"

A-402



LEGEND	
—1HR—	INDICATES 1HR FIRE RATING
▬ ▬ ▬ ▬ ▬	INDICATES 1.5HR FIRE RATING

WALL TYPE LEGEND

E1 –PREFINISHED METAL SIDING –7/8" CORRUGATED
–AIR SPACE
–TREATED 1X3 WOOD STRAPPING
–1½" RIGID INSULATION
–AIR BARRIER
–1/2" PLYWOOD SHEATHING (GYPSUM BASED SHEATHING BOARD WHERE NOTED)
–2x8 WOOD STUDS SEE STRUCTURAL DRAWINGS
–R28 SPRAY FOAM INSULATION INTEGRAL VAPOUR BARRIER
–5/8" GYPSUM BOARD, TAPED, FILLED & PAINTED (TYPE X WHERE NOTED)

E2 –PREFINISHED METAL SIDING –7/8" CORRUGATED
–AIR SPACE
–TREATED 1X3 WOOD STRAPPING
–1½" RIGID INSULATION
–AIR BARRIER
–1/2" PLYWOOD SHEATHING (GYPSUM BASED SHEATHING BOARD WHERE NOTED)
–2x8 WOOD STUDS SEE STRUCTURAL DRAWINGS
–R28 SPRAY FOAM INSULATION INTEGRAL VAPOUR BARRIER
–5/8" GYPSUM BOARD, TAPED, FILLED & PAINTED (TYPE X WHERE NOTED)

P1 5/8" GYPSUM BOARD TAPED & FILLED, PAINTED WHERE EXPOSED
3⅝" WOOD STUS @ 16" OC (5½" WHERE REQUIRED FOR MECH SERVICES)
5/8" GYPSUM BOARD TAPED & FILLED, PAINTED WHERE EXPOSED
FULL HEIGHT TO U/S ROOF TRUSSES

P1A AS FOR P1 BUT ACOUSTIC BATT INSULATION AND SEALANT FULL HEIGHT TO U/S ROOF TRUSSES

P1F AS FOR P1 OR P1F BUT TYPE X GYPSUM BOARD C/W FIRESTOPPING 1 HOUR RATING

P1FF AS FOR P1 BUT TYPE X GYPSUM BOARD C/W FIRESTOPPING 1.5 HOUR RATING

P2 8" CONCRETE BLOCK

WINDSOR / WEST HANTS TOGETHER

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No.	Description	Date
5	ISSUED FOR RFP	2021.04.20
4	FOR PRICING	2021.03.31
3	MEETING UPDATE, CLASS D	2020.11.15
2	MEETING	2020.10.29
1	MEETING	2020.10.15

LICENSED ARCHITECT
MICHAEL A. HARVEY
NOVA SCOTIA ASSOCIATION OF ARCHITECTS

harveyARCHITECTURE
7071 Bayers Rd. Suite 3004
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Fax: 444-7522

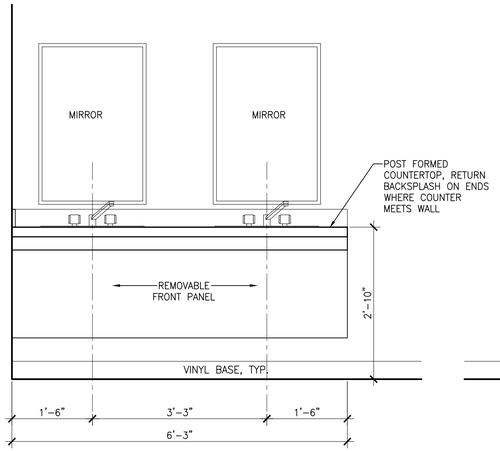
HANTSPORT FIRE STATION
HANTSPORT, NS

ADMINISTRATION PLAN

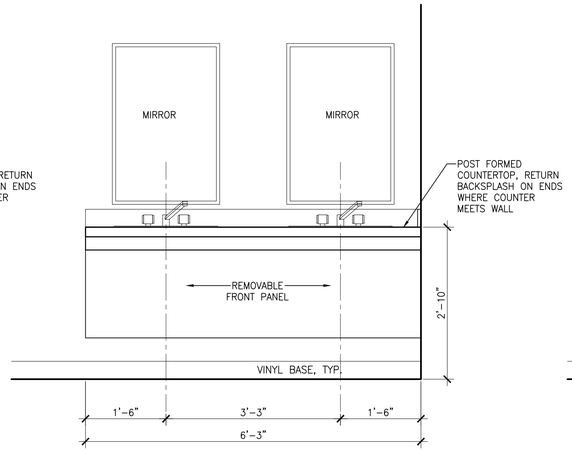
Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	WN

A-403

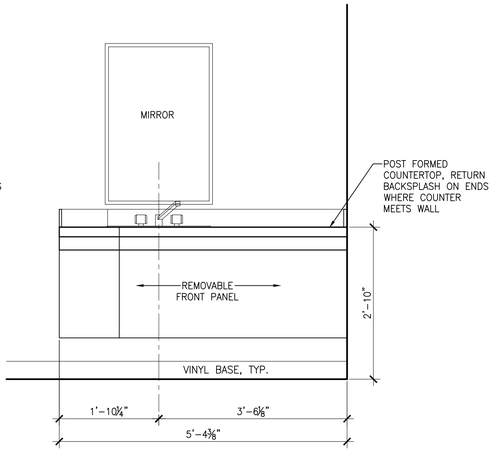
Scale 3/16"=1'-0"



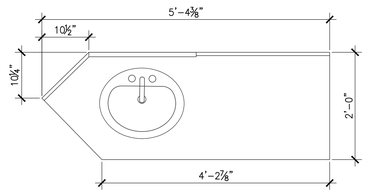
1 FEMALE WASHROOM 106
3/4"=1'-0"



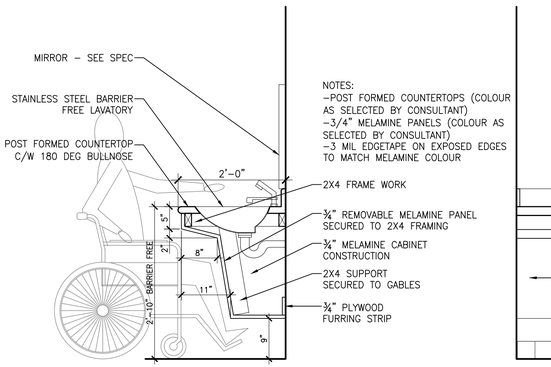
2 FEMALE WASHROOM 105
3/4"=1'-0"



3 FAMILY WR 112 - ELEVATION
3/4"=1'-0"

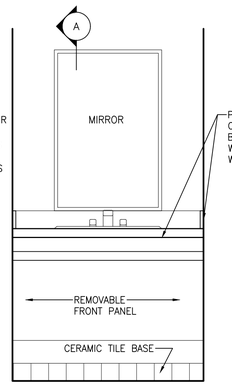


4 FAMILY WR 112 - PLAN
3/4"=1'-0"



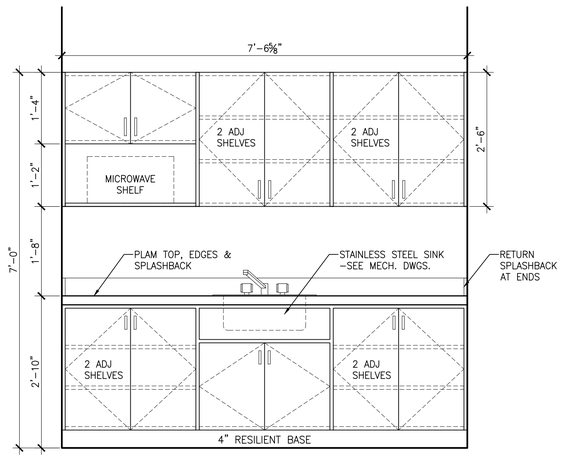
SECTION 'A'

NOTES:
–POST FORMED COUNTERTOPS (COLOUR AS SELECTED BY CONSULTANT)
–3/4" MELAMINE PANELS (COLOUR AS SELECTED BY CONSULTANT)
–3 MIL EDGETAPE ON EXPOSED EDGES TO MATCH MELAMINE COLOUR



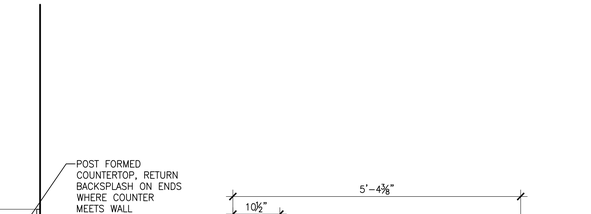
ELEVATION

5 TYP. VANITY SECTION & ELEVATION
3/4"=1'-0"



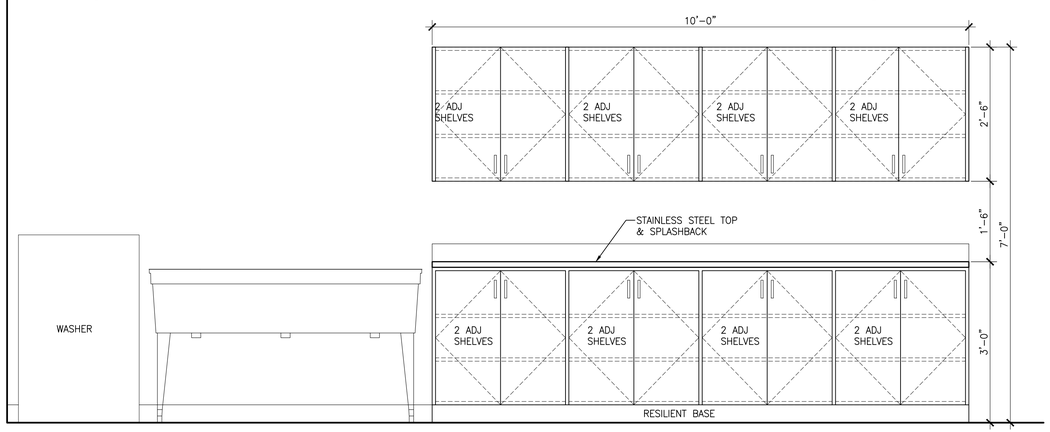
NOTES:
– UPPER CABINETS TO BE 12" DEEP
– LOWER CABINETS TO BE 24" DEEP

6 CREW LOUNGE 108
3/4"=1'-0"



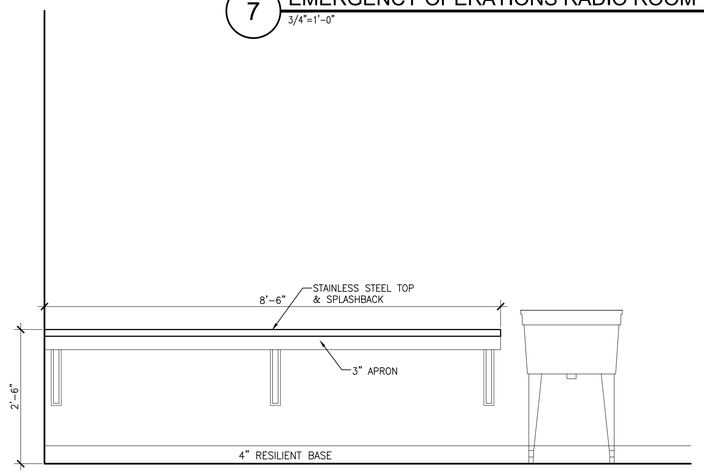
NOTE:
– 24" DEEP

7 EMERGENCY OPERATIONS RADIO ROOM 103
3/4"=1'-0"



NOTES:
– UPPER CABINETS TO BE 12" DEEP
– LOWER CABINETS TO BE 24" DEEP

8 LAUNDRY TURNOUT BA 117
3/4"=1'-0"



NOTES:
24" DEEP

9 LAUNDRY TURNOUT BA 117
3/4"=1'-0"

WINDSOR / WEST HANTS TOGETHER

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No.	Description	Date
3	ISSUED FOR RFP	2021.04.20
2	FOR PRICING	2021.03.31
1	CLASS D	2020.11.15

LICENSED ARCHITECT – MICHAEL A. HARVEY – NOVA SCOTIA ASSOCIATION OF ARCHITECTS

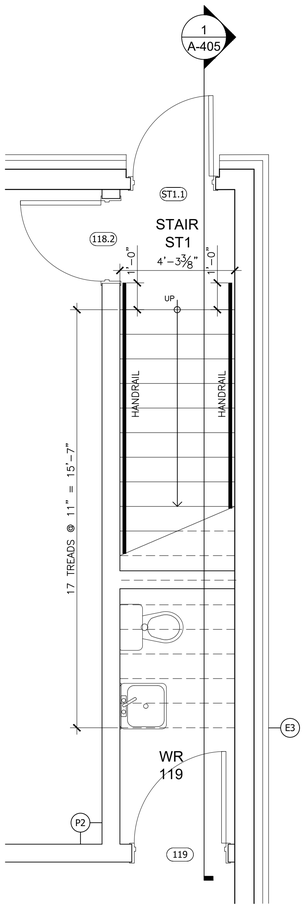
7071 Bayers Rd. Suite 3004
Halifax, NS B3L 2C2
Email: mike@harch.ca
Phone: 444-0555
Fax: 444-7522
harveyARCHITECTURE

HANTSPORT FIRE STATION
HANTSPORT, NS

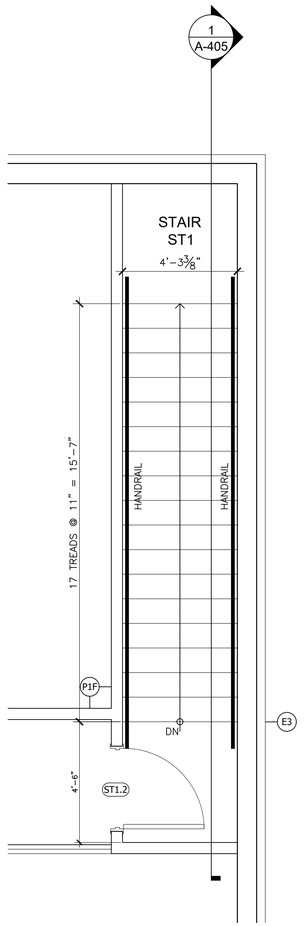
MILLWORK

Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	WN
Scale	AS NOTED

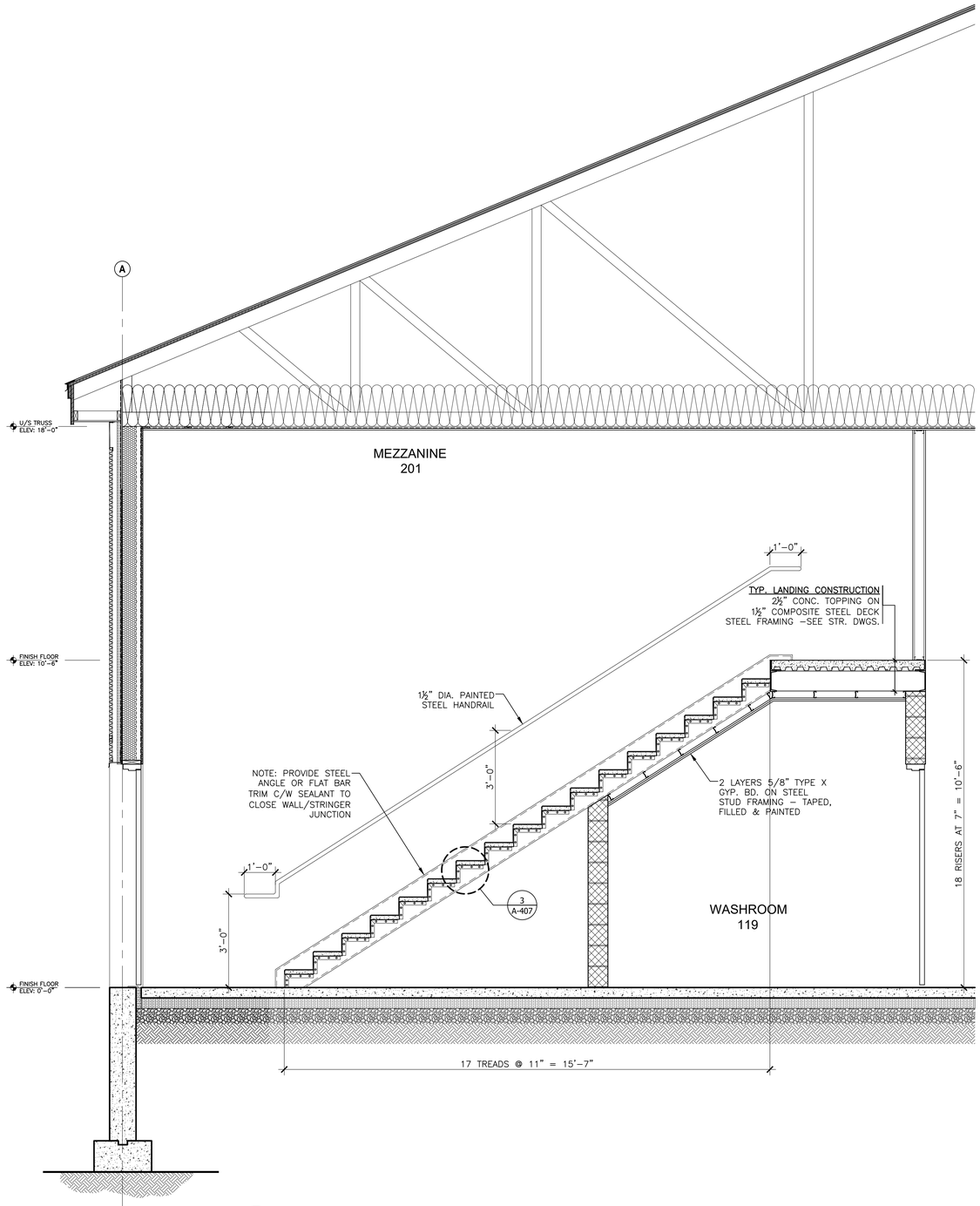
A-404



1 STAIR ST1 - MAIN LEVEL
3/8"=1'-0"



2 STAIR ST1 - UPPER FLOOR
3/8"=1'-0"



3 STAIR ST1 - SECTION
1/2"=1'-0"

WINDSOR / WEST HANTS
TOGETHER

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LICENSED ARCHITECT
MICHAEL A. HARVEY
NOVA SCOTIA ASSOCIATION OF ARCHITECTS

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Fax: 444-7522
harveyARCHITECTURE

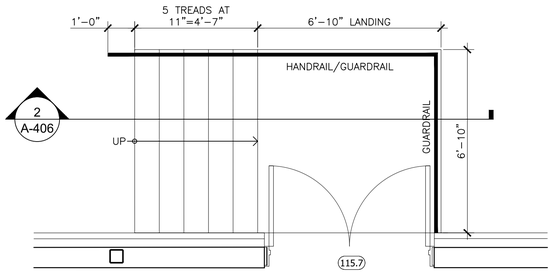
HANTSPORT FIRE STATION
HANTSPORT, NS

STAIR PLANS
& SECTIONS

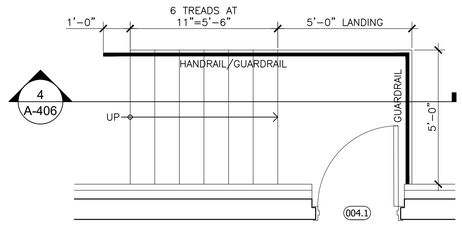
Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	WN

A-405

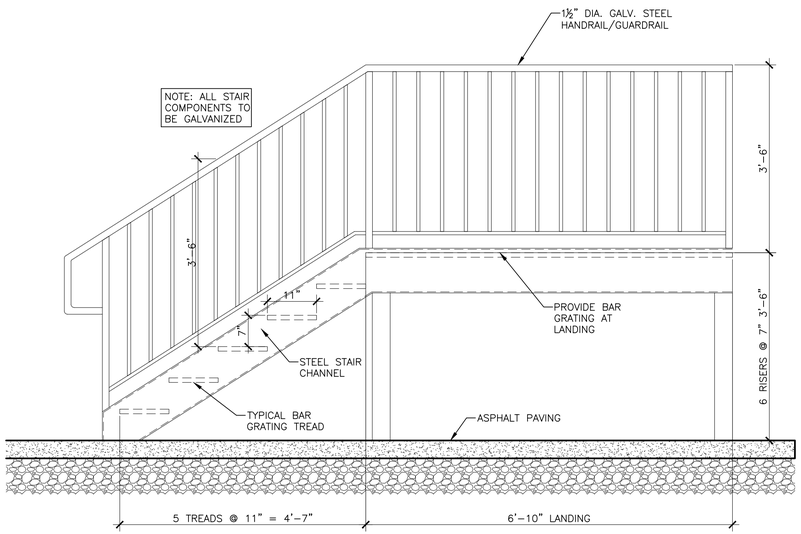
Scale AS NOTED



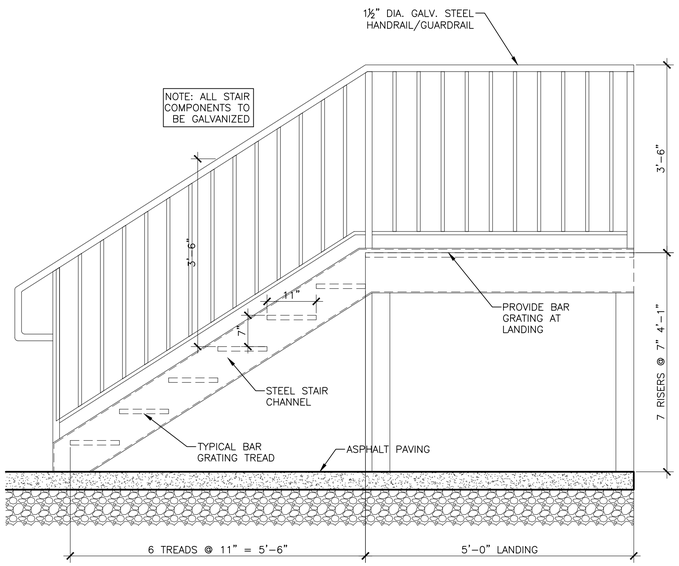
1 STAIR ST2 - PLAN
3/8"=1'-0"



3 STAIR ST3 - PLAN
3/8"=1'-0"



2 STAIR ST2 - SECTION
3/4"=1'-0"



4 STAIR ST3 - SECTION
3/4"=1'-0"

WINDSOR / WEST HANTS
TOGETHER

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1	CLASS D	2020.11.15

LICENSED ARCHITECT
MICHAEL A. HARVEY
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harveyARCHITECTURE

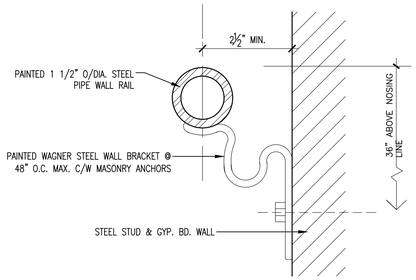
HANTSPORT FIRE STATION
HANTSPORT, NS

STAIR PLANS
& SECTIONS

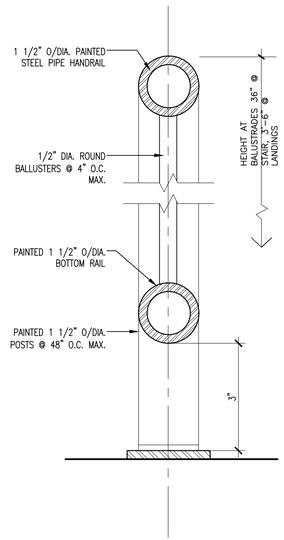
Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	WN

A-406

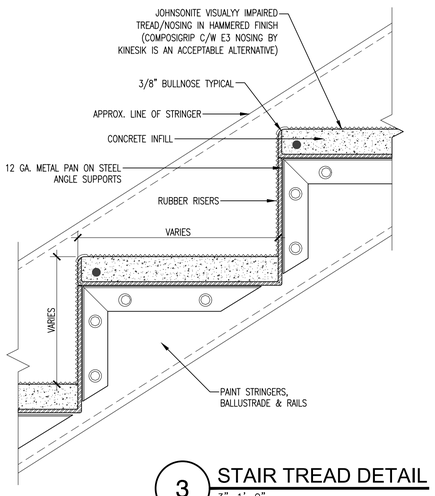
Scale AS NOTED



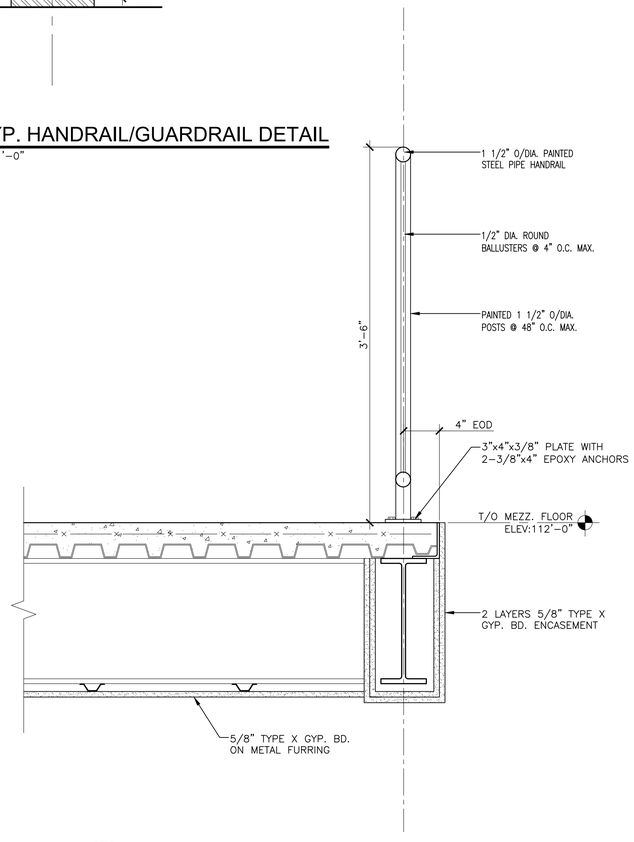
1 TYP. HANDRAIL DETAIL
6"=1'-0"



2 TYP. HANDRAIL/GUARDRAIL DETAIL
6"=1'-0"



3 STAIR TREAD DETAIL
3"=1'-0"



4 GUARDRAIL AT MEZZANINE
1 1/2"=1'-0"

WINDSOR / WEST HANTS TOGETHER

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2	FOR PRICING	2021.03.31
1	CLASS D	2020.11.15

LICENSED ARCHITECT
MICHAEL A. HARVEY
NOVA SCOTIA ASSOCIATION OF ARCHITECTS

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Email: mike@harch.ca
Phone: 444-0555
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harveyARCHITECTURE

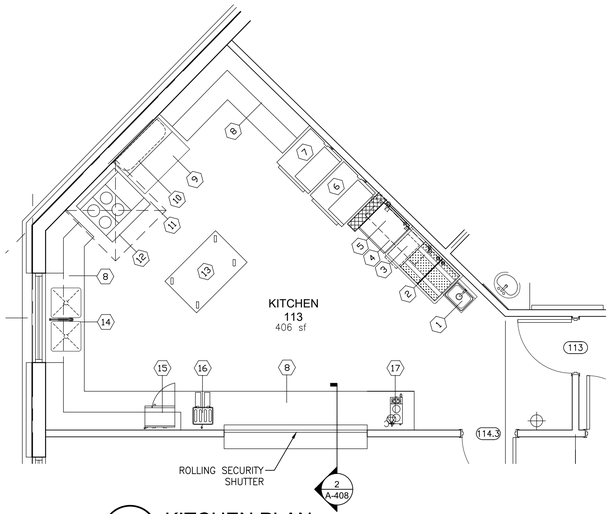
HANTSPORT FIRE STATION
HANTSPORT, NS

STAIR DETAILS

Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	WN

A-407

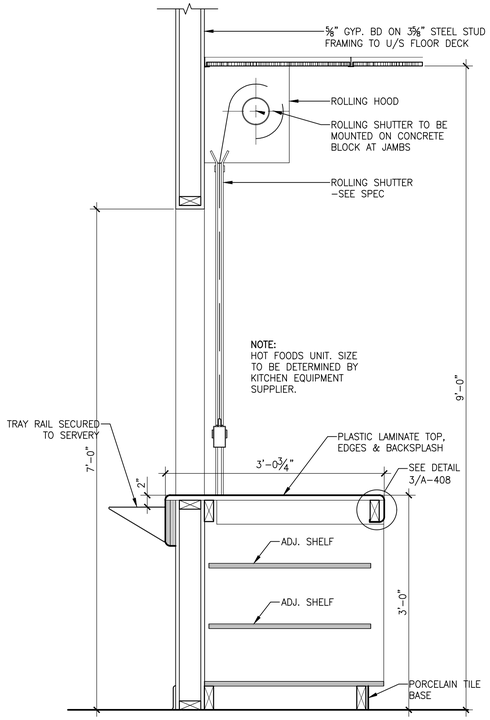
Scale AS NOTED



1 KITCHEN PLAN
1/4"=1'-0"

No	DESCRIPTION	Qty	MANUF'R.	MODEL No	SUPPLIER	MECHANICAL SERVICES						ELECTRICAL SERVICES						REMARKS
						HOT WATER	COLD WATER	DIRECT DRAIN	INDIRECT DRAIN	PROPANE BTU	PROPANE CONN.	VOLTS	PHASE	CONN.	HP	Kw	AMPS	
1	HAND SINK	1	BY OTHERS		MECH	1/2"	1/2"	1 1/2"										
2	SOILED DISHTABLE/POT SINKS	1	CUSTOM		FSC	1/2"	1/2"	1 1/2"										
3	RECYCLE BINS	3	R'MAID	9569	FSC													
4	DISHWASHER	1	STERO	SUH-1	FSC	3/4"		1 1/2"				120/208	1	DIR		6.5	30.5	SINGLE POINT CONNECTION
5	WALL SHELF	1	CUSTOM		FSC													
6	FREEZER	1	EFI	F1-28CC	FSC							120	1	C&P	1/2		7.2	NEMA-5-15R
7	REFRIGERATOR	1	EFI	C1-28CC	FSC							120	1	C&P	1/5		2.6	NEMA-5-15R
8	MILLWORK COUNTERS	1LOT	MILLWORK		FSC/MILL													
9	WORK TABLE	1	CUSTOM		FSC													
10	WALL SHELF & POT UTENSIL RACK	1	CUSTOM		FSC													
11	EXHAUST HOOD, FAN & FIRE PROTECTION	1	MECHANICAL		MECH													
12	RANGE	1	GARLAND	S686	FSC							208	3	DIR		15	48	
13	WORK TABLE	1	CUSTOM		FSC													
14	DOUBLE S/S SINK C/W OVERHEAD SPRAY	1	CUSTOM		FSC	1/2"	1/2"	1 1/2"				120	1	C&P				TWO PER SIDE UNDER
15	MICROWAVE OVEN	1	PANASONIC	NE1064C	FSC							120	1	C&P			13.1	
16	TOASTER	1	HATCO	TPT208	FSC							208	1	C&P		1.83	8.8	NEMA-6-15R
17	COFFEE MAKER	1	BUNN	CWTF 2/2	FSC							120/208	1	DIR		6.65	27.7	

KITCHEN EQUIPMENT SCHEDULE



2 SECTION AT KITCHEN
1"=1'-0"

WINDSOR / WEST HANTS TOGETHER

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3	FOR PRICING	2021.03.31
2	CLASS D	2020.11.15
1	MEETING NOV 12	2020.11.10

LICENSED ARCHITECT
NOVA SCOTIA ASSOCIATION OF ARCHITECTS
MICHAEL A. HARVEY

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Halifax, NS B3L 2C2
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Fax: 444-7522
harveyARCHITECTURE

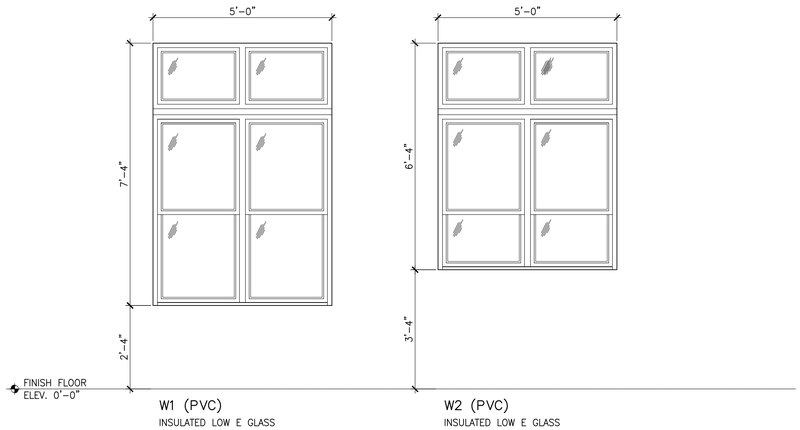
HANTSPORT FIRE STATION
HANTSPORT, NS

KITCHEN PLAN, ELEVATIONS & SCHEDULE

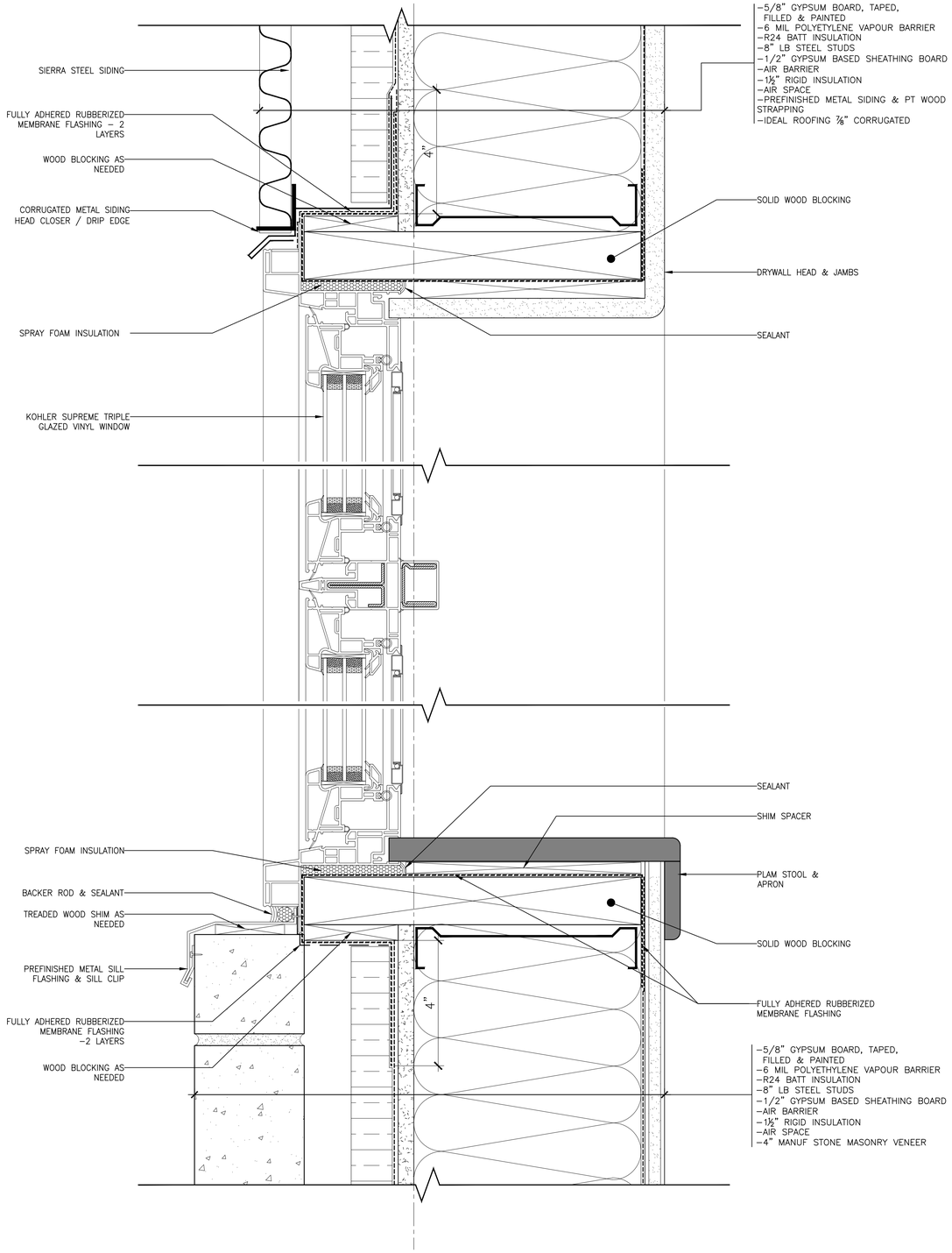
Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	WN

A-408

Scale AS NOTED



1 WINDOW ELEVATIONS
1/2"=1'-0"



2 W1 WINDOW DETAILS
6"=1'-0"

WINDSOR / WEST HANTS TOGETHER

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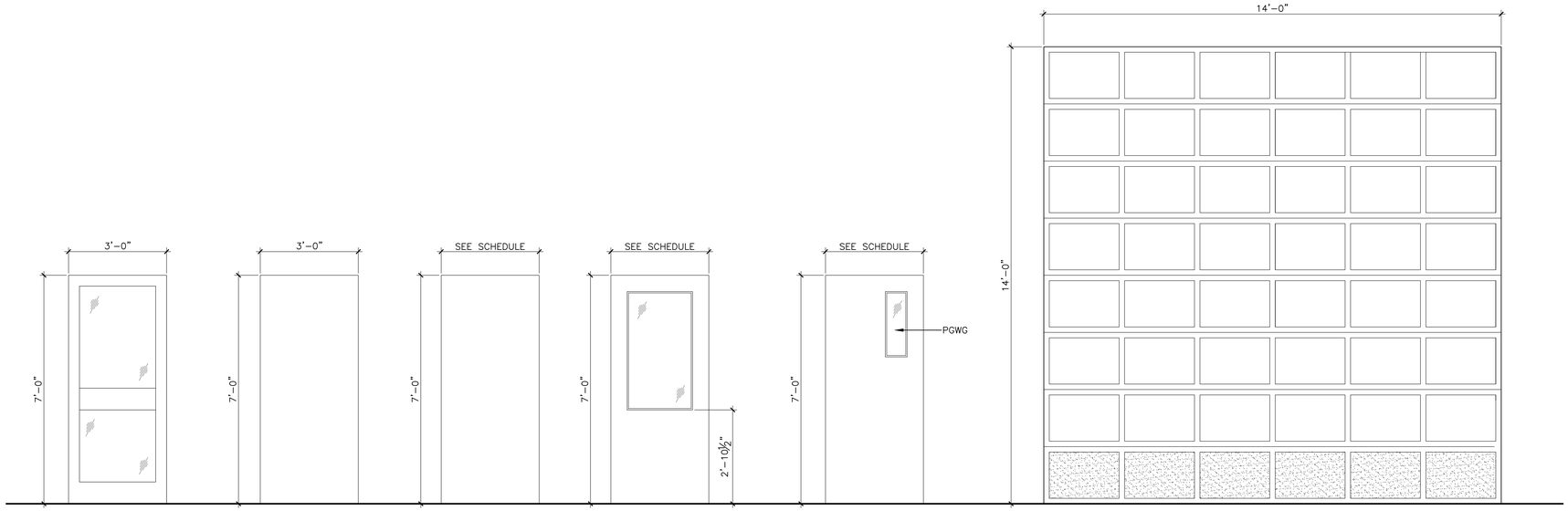
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Fax: 444-7522
harveyARCHITECTURE

HANTSPORT FIRE STATION
HANTSPORT, NS

WINDOW ELEVATIONS & DETAILS

Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	WN
Scale	AS NOTED

A-501



A
- ALUMINUM
- CLEAR TEMPERED
- CLEAR ANODIZED
- INSULATED AT EXTERIOR

B
- HOLLOW METAL INSULATED AT EXTERIOR
- PAINT FINISH
- RATED PER SCHEDULE

C
- SOLID CORE WOOD
- PAINT FINISH
- RATING WHERE NOTED

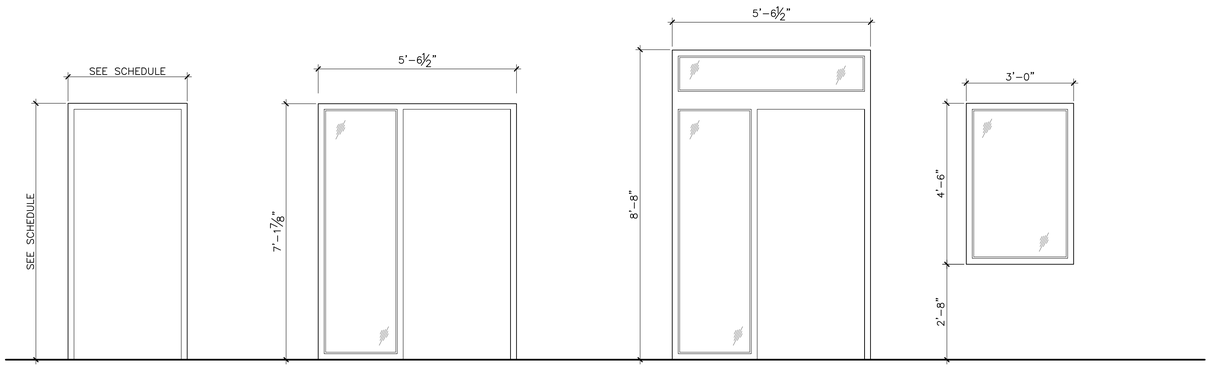
D
- SOLID CORE WOOD OR HOLLOW METAL
- PAINT FINISH
- CLEAR TEMPERED GLASS
- RATING WHERE NOTED W/ RATED GLASS

E
- HOLLOW METAL
- PRESSED STEEL FRAME
- 60 MIN FIRE RATING

F
- PREFINISHED STEEL, INSULATED
- CLEAR INSULATED GLAZING

NOTE:
GLAZED ALUMINUM DOOR SHOWN.
THIS IS AN ALTERNATE TO BASE BID OF INSULATED STEEL
-SEE SPECIFICATION

DOOR ELEVATIONS



PSF1
PRESSED STEEL FRAME
INSULATED AT EXTERIOR

PSF AT VESTIBULE DOORS 001.2, 004.2
CLEAR INSULATED TEMPERED GLASS

ALUM 1
ALUMINUM
CLEAR INSULATED TEMPERED GLASS

BL1
PRESSED STEEL FRAME
CLEAR TEMPERED GLASS
C/W FIRE SHUTTER

FRAME ELEVATIONS

BORROWED LITES

WINDSOR / WEST HANTS TOGETHER

General Notes:
All levels and dimensions are to be checked on site by the contractor prior to fabrication, and any discrepancies must be reported immediately to the Architect.
All dimensions are to be read off this drawing and NOT scaled.
All work to be executed in strict accordance with the by-laws and regulations of the local authorities and in accordance with Building Construction Standards.
All work to conform to applicable standards as referenced within the master specifications or as indicated in the drawing.
Where indicated / required, all drawings are to be read in conjunction with all other documents issued.
This drawing is only to be used for obtaining Local Authority Consents and should not be used for any other purpose unless otherwise stated on drawing.

No.	Description	Date
3	ISSUED FOR RFP	2021.04.20
2	FOR PRICING	2021.03.31
1	CLASS D	2020.11.15

LICENSED ARCHITECT
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HANTSPORT FIRE STATION
HANTSPORT, NS

DOOR & FRAME ELEVATIONS

Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	WN

A-502

Scale

UNIT No.	LOCATION FROM	RM No.	LOCATION TO	RM No.	UNIT No.	DOORS WIDTH	HEIGHT	SWING	MAT'L	TYPE	HDWR SET #	FRAME MAT'L	RATING	GLAZING	UNIT No.	REMARKS	SIGNAGE No.	TEXT	LOGO
MAIN FLOOR																			
001.1	EXTERIOR	--	VESTIBULE	001	001.1	3'-0"	7'-0"	RHR	ALUM	A	H-1	ALUM	--	CTI	001.1	POWER ASSIST OPERATOR	--	--	--
001.2	VESTIBULE	101	CORRIDOR	002	001.2	3'-0"	7'-0"	RHR	HM	D	H-2	PSF	--	CT	001.2	POWER ASSIST OPERATOR	--	--	--
003.1	CORRIDOR	002	VESTIBULE	003	003.1	3'-0"	7'-0"	RHR	SCW	D	H-3	PSF	--	CT	003.1		--	--	--
003.2	APPARATUS BAYS	115	VESTIBULE	003	003.2	3'-0"	7'-0"	LH	SCW	E	H-4	PSF	60 MIN	PGWG	003.2		--	--	--
004.1	EXTERIOR	--	VESTIBULE	004	004.1	3'-0"	7'-0"	LHR	HMI	D	H-5	PSFI	--	CTI	004.1		--	--	--
004.2	CORRIDOR	002	VESTIBULE	004	004.2	3'-0"	7'-0"	RH	HM	D	H-2	PSF	--	CT	004.2		--	--	--
101	CORRIDOR	002	DEPUTY CHIEF	101	101	3'-0"	7'-0"	LH	SCW	C	H-6	PSF	--	--	101		101	DEPUTY CHIEF	--
102	CORRIDOR	002	FIRE CHIEF	102	102	3'-0"	7'-0"	LH	SCW	C	H-6	PSF	--	--	102		102	CHIEF	--
103	CORRIDOR	002	EMERGENCY OPERATIONS RADIO ROOM	103	103	3'-0"	7'-0"	LH	SCW	C	H-7	PSF	--	--	103		103	OPERATIONS	--
104	CORRIDOR	002	COMM	104	104	3'-0"	7'-0"	LH	SCW	C	H-8	PSF	--	--	104		104	COMMUNICATIONS	--
105	CORRIDOR	002	MALE WASHROOM	105	105	3'-0"	7'-0"	LH	SCW	C	H-9	PSF	--	--	105		105	--	MALE WR LOGO BF
105.1	MALE WASHROOM	105	SHOWER	105.1	105.1	3'-0"	7'-0"	RHR	SCW	C	H-9	PSF	--	--	105.1		105.1	--	SHOWER LOGO
105.2	APPARATUS BAYS	115	SHOWER	105.1	105.2	3'-0"	7'-0"	LH	SCW	B	H-4	PSF	60 MIN	--	105.2		105.2	--	SHOWER LOGO
106	CORRIDOR	002	FEMALE WASHROOM	106	106	3'-0"	7'-0"	RH	SCW	C	H-9	PSF	--	--	106		106	--	FEMALE WR LOGO BF
106.1	FEMALE WASHROOM	106	SHOWER	106.1	106.1	3'-0"	7'-0"	LHR	SCW	C	H-9	PSF	--	--	106.1		106.1	--	SHOWER LOGO
106.2	APPARATUS BAYS	115	SHOWER	106.1	106.2	3'-0"	7'-0"	RH	SCW	B	H-4	PSF	60 MIN	--	106.2		106.2	--	SHOWER LOGO
107.1	CORRIDOR	002	EXERCISE ROOM	107	107.1	3'-0"	7'-0"	LH	SCW	D	H-10	PSF	--	--	107.1		107	FITNESS	--
107.2	APPARATUS BAYS	115	EXERCISE ROOM	107	107.2	3'-0"	7'-0"	RH	SCW	B	H-4	PSF	60 MIN	--	107.2		107	FITNESS	--
108.1	CORRIDOR	002	CREW LOUNGE	108	108.1	3'-0"	7'-0"	RH	SCW	D	H-10	PSF	--	--	108.1		108	CREW ROOM	--
108.2	APPARATUS BAYS	115	CREW LOUNGE	108	108.2	3'-0"	7'-0"	LH	SCW	B	H-4	PSF	60 MIN	--	108.2		108	CREW ROOM	--
109	CORRIDOR	002	JANITOR	109	109	3'-0"	7'-0"	LH	SCW	B	H-11	PSF	45 MIN	--	109		109	CUSTODIAL	--
110	CORRIDOR	002	BOARD ROOM	110	110	3'-0"	7'-0"	RH	SCW	C	H-6	PSF	--	--	110		110	BOARD ROOM	--
111	CORRIDOR	002	STORAGE	111	111	3'-0"	7'-0"	RHR	SCW	C	H-12	PSF	--	--	111		111	STORAGE	--
112	CORRIDOR	002	FAMILY WASHROOM	112	112	3'-0"	7'-0"	RH	SCW	C	H-13	PSF	--	--	112		112	FAMILY WASHROOM	MALE/FEMALE WR LOGO BF
113	CORRIDOR	002	KITCHEN	113	113	3'-0"	7'-0"	RH	SCW	C	H-10	PSF	--	--	113		113	KITCHEN	--
114.1	CORRIDOR	002	TRAINING HALL	114	114.1	3'-0"	7'-0"	LHR	SCW	C	H-10	PSF	--	--	114.1		114	TRAINING ROOM	--
114.2	CORRIDOR	002	TRAINING HALL	114	114.2	3'-0"	7'-0"	RHR	SCW	C	H-10	PSF	--	--	114.2		114	TRAINING ROOM	--
114.3	KITCHEN	113	TRAINING HALL	114	114.3	3'-0"	7'-0"	LH	SCW	C	--	PSF	--	--	114.3		114	TRAINING ROOM	--
115.1	EXTERIOR	--	APPARATUS BAYS	115	115.1	14'-0"	14'-0"	OVERHEAD	DOOR	F	--	--	--	--	115.1		--	--	--
115.2	EXTERIOR	--	APPARATUS BAYS	115	115.2	14'-0"	14'-0"	OVERHEAD	DOOR	F	--	--	--	--	115.2		--	--	--
115.3	EXTERIOR	--	APPARATUS BAYS	115	115.3	14'-0"	14'-0"	OVERHEAD	DOOR	F	--	--	--	--	115.3		--	--	--
115.4	EXTERIOR	--	APPARATUS BAYS	115	115.4	14'-0"	14'-0"	OVERHEAD	DOOR	F	--	--	--	--	115.4		--	--	--
115.5	EXTERIOR	--	APPARATUS BAYS	115	115.5	14'-0"	14'-0"	OVERHEAD	DOOR	F	--	--	--	--	115.5		--	--	--
115.6	EXTERIOR	--	APPARATUS BAYS	115	115.6	4'-0"	7'-0"	RHR	HMI	B	H-15	PSFI	--	--	115.6		--	--	--
115.7	EXTERIOR	--	APPARATUS BAYS	115	115.7	2-3'-0"	7'-0"	RHR/LHR	HMI	B	H-16	PSFI	--	--	115.7		--	--	--
117.1	APPARATUS BAYS	115	TURNOUT LAUNDRY BA	117	117.1	3'-0"	7'-0"	RH	SCW	B	H-9	PSF	--	--	117.1		117	TURNOUT LAUNDRY	--
117.2	LOCKER AREA	116	TURNOUT LAUNDRY BA	117	117.2	3'-0"	7'-0"	LH	SCW	B	H-9	PSF	--	--	117.2		117	TURNOUT LAUNDRY	--
117.3	TURNOUT LAUNDRY BA	117	COMP. 117.1	117.1	117.3	3'-0"	7'-0"	LHR	SCW	B	H-17	PSF	--	--	117.3		117.1	COMPUTER	--
118.1	APPARATUS BAYS	115	FIRE EQUIPMENT STORAGE	118	119.1	2-3'-0"	7'-0"	RHR/LHR	SCW	B	H-18	PSF	--	--	118.1		118	EQUIPMENT	--
118.2	STAIR	ST1	FIRE EQUIPMENT STORAGE	118	119.2	3'-0"	7'-0"	RH	SCW	B	H-10	PSF	--	--	118.2		118	EQUIPMENT	--
119	APPARATUS BAYS	115	WASHROOM	119	120	3'-0"	7'-0"	RH	SCW	B	H-13	PSF	--	--	119		119	WASHROOM	MALE/FEMALE WR LOGO
ST1.1	EXTERIOR	--	STAIR	ST1	ST1.1	3'-0"	7'-0"	LHR	SCW	B	H-19	PSF	--	--	ST1.1		--	--	--
ST1.2	MEZZANINE	201	STAIR	ST1	ST1.2	3'-0"	7'-0"	RH	SCW	B	H-20	PSF	45 MIN	--	ST1.2		ST1	STAIR	STAIR LOGO
202	MEZZANINE	201	MECHANICAL	202	202	3'-0"	7'-0"	RH	SCW	B	H-11	PSF	45 MIN	--	202		202	MECHANICAL	--
203	MEZZANINE	201	MECHANICAL	203	203	3'-0"	7'-0"	LH	SCW	B	H-11	PSF	45 MIN	--	203		203	MECHANICAL	--

LEGEND:

LH	– SWING – LEFT HAND
RH	– SWING – RIGHT HAND
LHR	– SWING – LEFT HAND REVERSE
RHR	– SWING – RIGHT HAND REVERSE
PSF	– PRESSED STEEL FRAME
ALUM	– ALUMINUM
CT	– CLEAR TEMPERED
CTI	– CLEAR TEMPERED INSULATED
PGWG	– POLISHED GEORGIAN WIRED GLASS
PSF	– PRESSED STEEL FRAME
PSFI	– PRESSED STEEL FRAME INSULATED
HMI	– HOLLOW METAL INSULATED
HM	– HOLLOW METAL
SCW	– SOLID CORE WOOD

HARDWARE SETS (REFER ALSO TO SPECIFICATION)

HARDWARE SET # H-1 – SINGLE DOOR # 001.1; EACH TO HAVE:

1 CONTINUOUS HINGE IVES 027XY X 83" – 628
1 EXIT DEVICE FALCON CD–RX–25–R–L–NL X 510L–NL–DANE X 36" DR. – 626
1 RIM CYLINDER FALCON C953 X C606 X CMK'D – 626
1 MORTISE CYLINDER FALCON C987 X C606 X CMK'D – 626
1 AUTOMATIC DOOR OPERATOR LCN 9542 REG (PUSH) X HL/B–36 – 689
2 FULL LENGTH ACTUATORS LCN 8310–836T – 630
1 DOOR STOP (WALL) IVES WS407CVX – 630
1 ELECTRIC POWER TRANSFER VON DUPRIN EPT–10 – SP28
1 ELECTRIC STRIKE VON DUPRIN 6300 FSE X 12/24V – 630
1 POWER SUPPLY SCHLAGE PS902 X 900–8F X 900–BBK (2 DOORS)
1 THRESHOLD DRAFTSEAL DSS5000 X 914 MM – ALUM
**WIRE, CONDUIT & CONNECTION BY ELECTRICAL – DIVISION 26
BALANCE OF WEATHERSTRIP & DOOR SWEEP BY DOOR SUPPLIER
CARD READER & CONTROLLER – SUPPLIED BY SECTION 28

HARDWARE SET # H-2 – SINGLE DOORS # 001.2, 004.2; EACH TO HAVE:

3 HINGES IVES 5BB1 4 ½ X 4 – 630
1 DUMMY TOUCH BAR FALCON 250DT X SHIM KIT SK25–R X 36" DR. – 626
1 DOOR PULL FALCON 510L–DT–DANE X T/B 1 ¼" – 626
1 AUTOMATIC DOOR OPERATOR LCN 9542 REG (PUSH) X HL/B–36 – 689
2 FULL LENGTH ACTUATORS LCN 8310–836T – 630
1 KICKPLATE IVES 8400B4E– 10 X 34" – 630
1 DOOR STOP (FLOOR) IVES FS439 – 626
1 SET DOOR SEAL DRAFTSEAL DSS66D X 17 FT. – BN

HARDWARE SET # H-3 – SINGLE DOORS # 003.1; EACH TO HAVE:

3 HINGES IVES 5BB1 4 ½ X 4 – 630
1 PUSH PLATE IVES 8200– 4 X 16 – 630
1 PULL PLATE IVES 8302–0 X 10"– 4 X 16 PLATE – T/B – 630
1 DOOR CLOSER FALCON SC81 – RW/PA–REG–FC X TB/SN – 689
1 KICKPLATE IVES 8400B4E– 10 X 34" – 630
1 FLOOR STOP IVES FS439 – 626
1 SET DOOR SEAL DRAFTSEAL DSS11D X 17 FT. – BR

HARDWARE SET # H-4 – SINGLE DOORS # 003.2, 105.2, 106.2, 107.2, 108.2; EACH TO HAVE:

3 HINGES IVES 5BB1 4 ½ X 4 – 630
1 LEVER LOCKSET FALCON T511HD6–QUANTUM X ASA – 626
1 DOOR CLOSER FALCON SC81 – RW/PA–REG–FC X TB/SN – 689
1 KICKPLATE IVES 8400B4E– 10 X 34" X 8401 TAPE – 630
1 FLOOR STOP IVES FS439 – 626
1 SET DOOR SEAL DRAFTSEAL DSS11D X 17 FT. – BR
1 DOOR SWEEP DRAFTSEAL DS149CNB X 36" – AN

HARDWARE SET # H-5 – SINGLE DOOR # 004.1; EACH TO HAVE:

3 HINGES IVES 5BB1 4 ½ X 4 NRP – 630
1 EXIT DEVICE FALCON 25–R–L–NL X 510L–NL–DANE X 36" DR. – 626
1 RIM CYLINDER FALCON C953 X C606 X CMK'D – 626
1 DOOR CLOSER FALCON SC71 RW/PA–T/J MTG. X MTG. PLATE SC70–18 – 689
1 KICKPLATE IVES 8400B4E– 10 X 34" – 630
1 O/H DOOR STOP GLYNN–JOHNSON 904S – 630
1 MOUNTING BRACKET IVES MB2 – TO SUIT – 689
1 THRESHOLD DRAFTSEAL DS178AN X 36" – AL
1 SET DOOR SEAL DRAFTSEAL DS132CN X 17 FT. – AN
1 DOOR SWEEP DRAFTSEAL DS138CN X 36" – AN
1 DOOR POSITION SWITCH SCHLAGE 679–05HM
1 ELECTRIC STRIKE VON DUPRIN 6300 FSE X 12/24V – 630
1 POWER SUPPLY SCHLAGE PS902 X 900–8F X 900–BBK
**WIRE, CONDUIT & CONNECTION BY ELECTRICAL – DIVISION 26
CARD READER & CONTROLLER – SUPPLIED BY SECTION 28

HARDWARE SET # H-6 – SINGLE DOORS # 101, 102, 110; EACH TO HAVE:

3 HINGES IVES 5BB1 4 ½ X 4 – 652
1 LEVER LOCKSET FALCON T511HD6–QUANTUM X ASA – 626
1 KICKPLATE IVES 8400B4E– 10 X 34" – 630
1 FLOOR STOP IVES FS439 – 626
1 SET DOOR SEAL DRAFTSEAL DSS11D X 17 FT. – BR

HARDWARE SET # H-7 – SINGLE DOOR # 103; EACH TO HAVE:

3 HINGES IVES 5BB1 4 ½ X 4 – 652
1 LEVER LOCKSET FALCON T581HD6–QUANTUM X ASA – 626
1 DOOR CLOSER FALCON SC81 – RW/PA–REG–FC X TB/SN – 689
1 KICKPLATE IVES 8400B4E– 10 X 34" – 630
1 FLOOR STOP IVES FS439 – 626
1 SET DOOR SEAL DRAFTSEAL DSS11D X 17 FT. – BR
1 DOOR SWEEP DRAFTSEAL DS149CNB X 36" – AN
1 ELECTRIC STRIKE VON DUPRIN 6400 FSE X 12/24V – 630
1 POWER SUPPLY VON DUPRIN PS902 X 900–2RS X 900–BBK
**WIRE, CONDUIT & CONNECTION BY ELECTRICAL – DIVISION 26
CARD READER & CONTROLLER – SUPPLIED BY SECTION 28

HARDWARE SET # H-8 – SINGLE DOORS # 104, 117A.1; EACH TO HAVE:

3 HINGES IVES 5BB1 4 ½ X 4 – 652
1 LEVER LOCKSET FALCON T581HD6–QUANTUM X ASA – 626
1 DOOR CLOSER FALCON SC81 – RW/PA–REG–FC X TB/SN – 689
1 KICKPLATE IVES 8400B4E– 10 X 34" – 630
1 FLOOR STOP IVES FS439 – 626
1 SET DOOR SEAL DRAFTSEAL DSS11D X 17 FT. – BR

HARDWARE SET # H-9 – SINGLE DOORS # 105, 105.1, 106, 106.1, 117.1, 117.2; EACH TO HAVE:

3 HINGES IVES 5BB1 4 ½ X 4 – 630
1 PUSH PLATE IVES 8200– 6 X 16 – 630
1 PULL PLATE IVES 8302–0 X 10"– 6 X 16 PLATE – T/B – 630
1 DOOR CLOSER FALCON SC81 – RW/PA–REG–FC X TB/SN – 689
1 KICKPLATE IVES 8400B4E– 10 X 34" – 630
1 FLOOR STOP IVES FS439 – 626
1 SET DOOR SEAL DRAFTSEAL DSS11D X 17 FT. – BR

HARDWARE SET # H-10 – SINGLE DOORS # 107.1, 108.1, 113, 114.1, 114.2, 118.2; EACH TO HAVE:

3 HINGES IVES 5BB1 4 ½ X 4 – 652
1 LEVER LOCKSET FALCON T511HD6–QUANTUM X ASA – 626
1 DOOR CLOSER FALCON SC81 – RW/PA–REG–FC X TB/SN – 689
1 KICKPLATE IVES 8400B4E– 10 X 34" – 630
1 FLOOR STOP IVES FS439 – 626
1 SET DOOR SEAL DRAFTSEAL DSS11D X 17 FT. – BR

HARDWARE SET # H-11 – SINGLE DOORS # 109, 202, 203; EACH TO HAVE:

3 HINGES IVES 5BB1 4 ½ X 4 – 652
1 LEVER LOCKSET FALCON T581HD6–QUANTUM X ASA – 626
1 DOOR CLOSER FALCON SC81 – RW/PA–REG–FC X TB/SN – 689
1 KICKPLATE IVES 8400B4E– 10 X 34" X 8401 TAPE – 630
1 FLOOR STOP IVES FS439 – 626
1 SET DOOR SEAL DRAFTSEAL DSS11D X 17 FT. – BR
1 DOOR SWEEP DRAFTSEAL DS149CNB X 36" – AN

HARDWARE SET # H-12 – SINGLE DOOR # 111; EACH TO HAVE:

3 HINGES IVES 5BB1 4 ½ X 4 – 652
1 LEVER LOCKSET FALCON T581HD6–QUANTUM X ASA – 626
1 O/H DOOR STOP GLYNN–JOHNSON 904S – 630

HARDWARE SET # H-13 – SINGLE DOORS # 112, 119; EACH TO HAVE:

3 HINGES IVES 5BB1 4 ½ X 4 – 652
1 LEVER PRIVACY SET FALCON T301S–QUANTUM X ASA X E/K – 626
1 DOOR CLOSER FALCON SC81 – RW/PA–REG–FC X TB/SN – 689
1 KICKPLATE IVES 8400B4E– 10 X 34" – 630
1 FLOOR STOP IVES FS439 – 626
1 SET DOOR SEAL DRAFTSEAL DSS11D X 17 FT. – BR

HARDWARE SET # H-14 – NOT USED

HARDWARE SET # H-15 – SINGLE DOOR # 115.6; EACH TO HAVE:

1 CONTINUOUS HINGE IVES 112HD X 83" – 628
1 EXIT DEVICE FALCON 25–R–L X 511L–DANE X 48" DR. – 626
1 MORTISE CYLINDER FALCON C987 X C606 X CMK'D – 626
1 DOOR CLOSER LCN 4040XP REG–T/J MTG. X MTG. PLATE 4040–18 – 689
1 KICKPLATE IVES 8400B4E– 10 X 46" – 630
1 O/H DOOR STOP GLYNN–JOHNSON 906S – 630
1 MOUNTING BRACKET IVES MB2 – TO SUIT – 689
1 THRESHOLD DRAFTSEAL DS178AN X 48" – AL
1 SET DOOR SEAL DRAFTSEAL DS132CN X 18 FT. – AN
1 DOOR SWEEP DRAFTSEAL DS138CN X 48" – AN
1 DOOR POSITION SWITCH SCHLAGE 679–05HM
1 ELECTRIC STRIKE VON DUPRIN 6300 FSE X 12/24V – 630
1 POWER SUPPLY SCHLAGE PS902 X 900–8F X 900–BBK
**WIRE, CONDUIT & CONNECTION BY ELECTRICAL – DIVISION 26
CARD READER & CONTROLLER – SUPPLIED BY SECTION 28

HARDWARE SET # H-16 – PAIR DOORS # 115.7; EACH TO HAVE:

6 HINGES IVES 5BB1 4 ½ X 4 NRP – 630
1 EXIT DEVICE FALCON MEL–25–V–L X 511L–QUA X 36" DR. (RHR DR.) – 626
1 EXIT DEVICE FALCON 25–V–EO X 36" DR. (LHR DR.) – 626
1 MORTISE CYLINDER FALCON C987 X C606 X CMK'D – 626
2 DOOR CLOSERS FALCON SC71 RW/PA–T/J MTG. X MTG. PLATE SC70–18 – 689
2 KICKPLATES IVES 8400B4E– 10 X 34" – 630
2 O/H DOOR STOPS GLYNN–JOHNSON 904S – 630
2 MOUNTING BRACKETS IVES MB2 – TO SUIT – 689
1 THRESHOLD DRAFTSEAL DS178AN X 72" – AL
1 SET DOOR SEAL DRAFTSEAL DS132CN X 20 FT. – BR
2 DOOR SWEEPS DRAFTSEAL DS138CN X 36" – AN
1 SET ASTRAGALS DRAFTSEAL DS163CNB X 7 FT. (2 PCS.) – AN
1 DOOR POSITION SWITCH SCHLAGE 679–05HM
1 ELECTRIC POWER TRANSFER VON DUPRIN EPT–10 – SP28
1 POWER SUPPLY SCHLAGE PS914 X 900–2RS X 900–BBK
**WIRE, CONDUIT & CONNECTION BY ELECTRICAL – DIVISION 26
CARD READER & CONTROLLER – SUPPLIED BY SECTION 28

HARDWARE SET # H-17 – SINGLE DOOR # 117.3; EACH TO HAVE:

3 HINGES IVES 5BB1 4 ½ X 4 – 652
1 LEVER PASSAGE SET FALCON T101S–QUANTUM X ASA – 626
1 DOOR CLOSER FALCON SC81 – RW/PA–REG–FC X TB/SN – 689
1 FLOOR STOP IVES FS439 – 626
1 SET DOOR SEAL DRAFTSEAL DSS11D X 17 FT. – BR

HARDWARE SET # H-18 – PAIR DOORS # 118.1; EACH TO HAVE:

6 HINGES IVES 5BB1 4 ½ X 4 – 630
1 SET C/L FLUSH BOLTS IVES FB61P X UL (LHR DR.) – 626
1 DUST PROOF STRIKE IVES DP2 – 626
1 LEVER LOCKSET FALCON T511HD6–QUANTUM X ¾" THROW L/B X RHR DR. – 626
2 DOOR CLOSERS FALCON SC81 – RW/PA REG FC X TB/SN – 689
2 KICKPLATES IVES 8400B4E– 10 X 34" – 630
2 O/H DOOR STOPS GLYNN–JOHNSON 904S – 630
2 MOUNTING BRACKETS IVES MB2 – TO SUIT – 689
1 SET DOOR SEAL DRAFTSEAL DS132CN X 20 FT. – BR
2 DOOR SWEEPS DRAFTSEAL DS138CN X 36" – AN
1 SET ASTRAGALS DRAFTSEAL DS163CNB X 7 FT. (2 PCS.) – AN
1 COORDINATING DEVICE IVES COR52 X FL20 – 626

HARDWARE SET # H-19 – SINGLE DOOR # ST1.1; EACH TO HAVE:

3 HINGES IVES 5BB1 4 ½ X 4 NRP – 630
1 LEVER LOCKSET FALCON T581HD6–QUANTUM X ASA – 626
1 DOOR CLOSER FALCON SC71 RW/PA–T/J MTG. X MTG. PLATE SC70–18 – 689
1 O/H DOOR STOP GLYNN–JOHNSON 904S – 630
1 MOUNTING BRACKET IVES MB2 – TO SUIT – 689
1 THRESHOLD DRAFTSEAL DS177N X 36" – AL
1 SET DOOR SEAL DRAFTSEAL DS132CN X 17 FT. – AN
1 DOOR SWEEP DRAFTSEAL DS138CN X 36" – AN
1 DOOR POSITION SWITCH SCHLAGE 679–05HM
1 LOCK GUARD IVES LG10 – 630

HARDWARE SET # H-20 – SINGLE DOOR # ST1.2; EACH TO HAVE:

3 HINGES IVES 5BB1 4 ½ X 4 – 652
1 LEVER PASSAGE SET FALCON T101S–QUANTUM X ASA – 626
1 DOOR CLOSER FALCON SC81 – RW/PA–REG–FC X TB/SN – 689
1 KICKPLATE IVES 8400B4E– 10 X 34" X 8401 TAPE – 630
1 FLOOR STOP IVES FS439 – 626
1 SET DOOR SEAL DRAFTSEAL DSS11D X 17 FT. – BR
1 DOOR SWEEP DRAFTSEAL DS149CNB X 36" – AN

WINDSOR / WEST HANTS TOGETHER

General Notes:
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No.	Description	Date
3	ISSUED FOR RFP	2021.04.20
2	FOR PRICING	2021.03.31
1	CLASS D	2020.11.15

LICENSED ARCHITECT — NOVA SCOTIA ASSOCIATION OF ARCHITECTS — MARK A. HARVEY

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HANTSPORT FIRE STATION

HANTSPORT, NS

DOOR, FRAME & HARDWARE SCHEDULE

Project Number	20068
Date	2020.10.07
Drawn By	BPA/MAH
Checked By	WN

A-601

Scale

| | | | FLOORS | | | | | | | | | | | | | | BASE | | WALLS | | | | | | | | | | | | | | | | CEILINGS | | | | | | | | | | | | | | | |

VALVES

EXISTING DEMO NEW

- GATE VALVE
- BALL VALVE
- BUTTERFLY VALVE
- GLOBE VALVE (TOP / SIDE)
- CIRCUIT BALANCING VALVE
- HORIZONTAL VALVE
- ANGLE GLOBE VALVE
- AUTO-FLOW BALANCING VALVE
- TWO-WAY CONTROL VALVE
- TERMINAL CONTROL AND BALANCE VALVE
- PRESSURE INDEPENDENT CONTROL VALVE (PICV)
- THREE-WAY CONTROL VALVE
- SOLENOID OPERATED VALVE
- PLUG VALVE
- SHUTOFF COCK
- MANUAL THREE-WAY VALVE
- HAND WHEEL - RISING STEM (OS&Y)
- HAND WHEEL - NON-RISING STEM
- HAND WHEEL - SUPERVISED
- GEAR OPERATED MANUAL VALVE
- PINCH VALVE
- NEEDLE VALVE
- QUICK OPEN VALVE
- QUICK CLOSE VALVE
- BACK FLOW PREVENTOR
- SWING CHECK VALVE
- SPRING TYPE CHECK VALVE
- INLINE MULTIPURPOSE VALVE
- ANGLE MULTIPURPOSE VALVE
- REDUCED PRESSURE BACKFLOW PREVENTER
- DOUBLE CHECK VALVE ASSEMBLY
- DIFFERENTIAL PRESSURE CONTROL VALVE
- DIFFERENTIAL PRV REGULATOR
- REDUCING REGULATOR
- GAS PRV
- SAFETY OR RELIEF VALVE
- HOSE BIBB VALVE

STEAM TRAPS

- INVERTED BUCKET
- FLOAT AND THERMOSTATIC
- THERMOSTATIC
- THERMODYNAMIC (DISK)
- VARIABLE ORIFICE (PITON)
- FIXED ORIFICE

PIPE FITTINGS

- 90 DEGREE ELBOW
- 45 DEGREE ELBOW
- ELBOW UP
- ELBOW DOWN
- PIPE CAP
- TEE
- TEE UP
- TEE DOWN
- BOTTOM BRANCH
- TOP BRANCH
- FLANGE
- SCREWED UNION
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER (FLAT ON BOTTOM)
- ECCENTRIC REDUCER (FLAT ON TOP)
- QUICK CONNECT

PIPE ACCESSORIES

- SIGHT GLASS
- VACUUM BREAKER
- GAS METER
- WATER METER
- MAGNETIC FLOW METER
- FLEXIBLE CONNECTION
- HEAT TRACE (INSULATED)
- HEAT TRACE (NON-INSULATED)
- THRUST BLOCK
- PIPE ANCHOR
- PIPE GUIDES
- EXPANSION COMPENSATOR
- AUTO VENT
- MANUAL VENT
- AIR SEPARATOR
- PIPE SPRING HANGER
- PUMP SUCTION DIFFUSER
- BASKET STRAINER
- PIPE STRAINER
- PIPE STRAINER - WITH BLOWDOWN
- PIPE STRAINER - WITH BALL VALVE BLOWDOWN AND HOSE CONNECTION

MULTI-LINE VALVE SYMBOLS

- PIPE CAP
- REDUCER: CONCENTRIC
- REDUCER: ECCENTRIC
- TEE
- PIPE
- PIPE HANGER
- PIPE SLEEVE
- FLANGES: SLIP ON
- FLANGES: WELD NECK
- FLANGES: BLIND
- ELBOW DOWN (90°)
- ELBOW UP (90°)
- 11.25° ELBOW
- 22.5° ELBOW
- 45° ELBOW
- 90° ELBOW
- BUTERFLY VALVE (WITH WELDNECK FLANGES)
- BUTERFLY VALVE (WITH BLIND FLANGES)

PLUMBING FIXTURES

- TANK WC
- WALL WC (FLUSH VALVE) / FLOOR WC (FLUSH VALVE)
- URINAL
- SERVICE SINK / LAUNDRY TUB
- SINGLE BOWL SINK
- DOUBLE BOWL SINK
- WALL HUNG LAVATORY
- COUNTER MOUNT LAVATORY
- WASH FOUNTAIN
- WALL HUNG HANDICAPPED SINK
- DRINKING FOUNTAIN
- EMERGENCY EYEWASH
- BATHTUB
- SHOWER
- SINGLE GAS SUPPLY VALVE
- DOUBLE GAS SUPPLY VALVE

SITE ELEMENTS:

- SPLASH PAD
- CATCH BASIN
- CATCH BASIN (HALF)
- MANHOLE

FIRE PROTECTION

NOTE: DEMOLISHED ITEMS WITH "R" DENOTES "SAVE FOR REINSTALLATION IN NEW LOCATION"

- PENDANT
- PENDANT (EXISTING TO REMAIN)
- PENDANT (DEMOLISHED)
- PENDANT (REMOVE AND REINSTALL IN NEW LOCATION)
- RECESSED
- UPRIGHT
- CONCEALED
- DRY PENDANT
- DRY PENDANT (EXISTING)
- PRE-ACTION
- SIDEWALL
- CONCEALED SIDEWALL
- RECESSED SIDEWALL
- FIRE HOSE CABINET
- FIRE HOSE CABINET WITH HOSE REEL
- FIRE VALVE CABINET
- FIRE EXTINGUISHER
- FIRE EXTINGUISHER (EXISTING)
- SURFACE MOUNTED F.E. CABINET
- SEMI-RECESSED F.E. CABINET
- FULLY RECESSED F.E. CABINET
- FIRE HYDRANT (SINGLE OUTLET)
- FIRE HYDRANT (DOUBLE OUTLET)
- FIRE HYDRANT (TRIPLE OUTLET)
- FIRE HYDRANT (QUAD OUTLET)
- FIRE DEPARTMENT CONNECTION
- FIRE DEPARTMENT TEST CONNECTION
- WET ALARM VALVE
- DRY ALARM VALVE
- PRE-ACTION ALARM VALVE
- FIRE HAZARD LEVEL

CONTROLS AND CONTROL POINTS

- CONTROL WIRE
- THERMOSTAT / SPACE TEMPERATURE SENSOR
- THERMOSTAT WITH GAURD
- HUMIDISTAT / HUMIDITY SENSOR
- CO2 SENSOR
- SWITCH
- PUSH BUTTON
- FLOW SWITCH
- PRESSURE SWITCH
- CONTROL POINT - ANALOG INPUT
- CONTROL POINT - ANALOG OUTPUT
- CONTROL POINT - DIGITAL INPUT
- CONTROL POINT - DIGITAL OUTPUT
- CONTROL POINT - BACNET COMMUNICATIONS
- VARIABLE FREQUENCY DRIVE
- END SWITCH
- DAMPER MOTOR
- TEMPERATURE PROBE
- FLOW TRANSMITTER
- HUMIDITY PROBE
- DIFFERENTIAL PRESSURE
- FREEZE STAT
- OUTSIDE AIR TEMPERATURE SENSOR
- VARIABLE FREQUENCY DRIVE
- PRESSURE SENSOR
- BTU METER

PIPE INSTRUMENTS

- FLOW MEASUREMENT PORT
- INSTRUMENT WELL
- PRESSURE GAUGE
- TEMPERATURE OR PRESSURE TAP
- TEMPERATURE GAUGE

EXISTING/DEMOLISHED PIPING:

- [TYPE] EXISTING PIPEWORK TO BE DEMOLISHED
- [TYPE] EXISTING PIPEWORK TO REMAIN
- DCW EXISTING DOMESTIC COLD WATER
- DHW EXISTING DOMESTIC HOT WATER
- DHWR EXISTING DOMESTIC HOT WATER RECIRC.

PLUMBING:

- CA COMPRESSED AIR PIPE
- CV CENTRAL VAC - DRY MOP
- CV-W CENTRAL VAC - WET
- DCW DOMESTIC COLD WATER
- DHW DOMESTIC HOT WATER
- DHWR DOMESTIC HOT WATER RECIRC.
- PB DOMESTIC COLD WATER - PRESSURE BOOSTED
- SW SOFTENED DOMESTIC WATER
- TW DOMESTIC TEMPERED WATER
- NPW NON-POTABLE WATER PIPE
- SAN SANITARY DRAINAGE
- SAN SANITARY DRAINAGE (BELOW)
- V SANITARY VENT
- STW STORM WATER DRAINAGE
- STW STORM WATER DRAINAGE (BELOW)
- AW ACID WAST DRAINAGE PIPE
- AV ACID VENT PIPE
- GW GREY WATER DRAIN
- WT WEEPING TILE

FUEL PIPING:

- G NATURAL GAS - LOW PRESSURE
- MG NATURAL GAS - MEDIUM PRESSURE
- HG NATURAL GAS - HIGH PRESSURE
- P PROPANE
- FOF FUEL OIL SUPPLY
- FOS FUEL OIL SUPPLY
- FOR FUEL OIL RETURN
- FOV FUEL VENT

HEATING/COOLING PIPING:

- HWS HEATING WATER SUPPLY
- HWR HEATING WATER RETURN
- HGS HEATING GLYCOL SUPPLY
- HGR HEATING GLYCOL RETURN
- DTWS DUAL TEMPERATURE WATER SUPPLY
- DTWR DUAL TEMPERATURE WATER RETURN
- CWS CHILLED WATER SUPPLY
- CWR CHILLED WATER RETURN
- CS CONDENSER WATER SUPPLY
- CR CONDENSER WATER RETURN
- GWS GROUND WATER SUPPLY
- GWR GROUND WATER RETURN
- CGS CHILLED GLYCOL SUPPLY
- CGR CHILLED GYLCOL RETURN
- BS BRINE SUPPLY
- BR BRINE RETURN
- BV BRINE VENT
- RL REFRIGERANT LIQUID SUPPLY
- RV REFRIGERANT VAPOUR RETURN
- LPS LOW PRESSURE STEAM
- LPC LOW PRESSURE CONDENSATE
- MV MEDIUM PRESSURE STEAM
- MV MEDIUM PRESSURE CONDENSATE
- HPS HIGH PRESSURE STEAM
- HPC HIGH PRESSURE CONDENSATE

LAB GAS:

- LCA LAB COMPRESSED AIR
- CO2 LAB CARBON DIOXIDE GAS
- H2 LAB HYDROGEN GAS
- LN2 LIQUID NITROGEN
- N2 LAB NITROGEN GAS
- O2 LAB OXYGEN GAS
- VAC LAB VACUUM PIPING

MEDICAL GAS:

- MA MEDICAL AIR
- CO2 MEDICAL CO2
- N2 MEDICAL NITROGEN
- N2O MEDICAL NITROUS OXIDE
- O2 MEDICAL OXYGEN
- MGS MEDICAL GAS SCAVEGING
- MV MEDICAL VACUUM

SPRINKLER AND FIRE PROTECTION

- FIRE PROTECTION ZONE
- FIRE PROTECTION RATING
- F FIRE PROTECTION PIPE
- SP SPRINKLER MAIN
- SPRINKER BRANCH PIPING
- DSP DRY SPRINKLER PIPING
- PA PRE-ACTION SPRINKLER PIPING
- IG INERT GAS (CLEAN AGENT) PIPE

VENTILATION:

- TERMINAL BOX / WITH ATTENUATOR / AND REHEAT COIL (DROP / RISE)
- S/A SUPPLY AIR DUCT
- R/A RETURN AIR DUCT
- T/A TRANSFER AIR DUCT
- O/A OUTDOOR AIR DUCT
- G/E GENERAL EXHAUST DUCT
- W/E WASHROOM EXHAUST DUCT
- K/E KITCHEN EXHAUST DUCT
- F/E FUME HOOD EXHAUST DUCT
- RECTANGULAR DUCTS UP: (SUPPLY / RETURN / EXHAUST)
- RECTANGULAR DUCTS DOWN: (SUPPLY / RETURN / EXHAUST)
- MOTORIZED DAMPER / BALANCING DAMPER
- FIRE DAMPER / SMOKE DAMPER / COMBINATION FIRE-SMOKE DAMPER
- ROUND ELBOWS - 45°: R1.0 / R1.5 / R2.0
- ROUND ELBOWS - 90°: R1.0 / R1.5 / R2.0
- RECTANGULAR ELBOWS - 45°: R1.0 / R1.5
- RECTANGULAR ELBOWS - 90°: R1.0 / R1.5
- RECTANGULAR ELBOWS WITH TURNING VANES: (90° R1.0 / 45° R1.0 / 90° SQUARE)
- ACCOUSTICLY LINED DUCT
- GRILLES AND DIFFUSERS: SUPPLY / RETURN / EXHAUST
- SUPPLY DIFFUSERS: SQUARE / ROUND PLAQUE OR CONE
- HORIZONTAL OR WALL GRILLES / DIFFUSER: SUPPLY / RETURN OR EXHAUST.

PLUMBING & DRAINAGE

- SQUARE FLOOR DRAIN
- FUNNEL FLOOR DRAIN / FLOOR DRAIN / FLOOR DRAIN WITH TRAP
- HUB DRAIN / WITH TRAP
- ROOF DRAIN
- CLEAN OUT PLUG / FLOOR
- P-TRAP / SINK TRAP / P-TRAP BELOW GRADE
- HOT / DRAIN / COLD CONNECTIONS
- WATER HAMMER ARRESTOR
- PLUMBING EQUIPMENT - INTERCEPTOR
- PLUMBING EQUIPMENT - WATER HEATER

- PIPEWORK SHORTENED FOR CLARITY
- PIPEWORK CONTINUED ELSEWHERE
- PIPEWORK SHORTENED FOR CLARITY (ALTERNATE SYMBOL)
- PIPE FLOW ARROW (SMALL)
- PIPE FLOW ARROW (LARGE)

- PUMP
- RADIANT PANEL
- UNIT HEATER (HORIZONTAL)
- UNIT HEATER (VERTICAL)
- SCHEMATIC INLET/OUTLET
- TYPE PLUMBING FIXTURE TYPE TAG
- TYPE / SIZE / FLOW GRILLE / DIFFUSER TAG
- TYPE / LENGTH / OUTPUT FIN TUBE RADIATION TAG
- TYPE / OUTPUT RADIANT PANEL TAG
- XXXX EQUIPMENT IDENTIFICATION TAG
- TP / # TIE-IN POINT

EQUIPMENT ACRONYMS:

ACU-	AIR CONDITIONING UNIT
AHU-	AIR HANDLING UNIT
CAV-	CONSTANT AIR VOLUME TERMINAL UNIT
CH-	CHILLER
CP-	CONDENSATE PUMP
CU-	CONDENSING UNIT
CSG-	CLEAN STEAM GENERATOR
CUH-	CABINET UNIT HEATER
EAHU-	EXHAUST AIR HANDLING UNIT
EFC-	EVAPORATIVE FAN COOLER
ERV-	ENERGY RECOVERY VENTILATOR
ET-	EXPANSION TANK
EX-	EXAUST FAN
FCU-	FAN COIL
HRC-	HEAT RECOVERY COIL
HVU-	HEATING/VENTILATING UNIT
HX-	HEAT EXCHANGER
UH-	UNIT HEATER
VAV-	VARIABLE AIR VOLUME TERMINAL BOX
VFD-	VARIABLE FREQUENCY DRIVE
P-	PUMP
HC-	HEATING COIL
CC-	COOLING COIL
RHC-	REHEAT COIL
SC-	STEAM COIL
PF-	PRE-FILTER
FF-	FINAL FILTER
EF-	EXHAUST FAN
SF-	SUPPLY FAN
RF-	RETURN FAN
SAV-	SUPPLY AIR VALVE
EAV-	RETURN AIR VALVE

- UP FROM BELOW / UP TO ABOVE
- DOWN TO BELOW / DOWN FROM ABOVE
- VENT UP FROM BELOW / UP TO ABOVE
- VENT UP FROM BELOW / UP TO VENT CAP

ACD	AUTOMATIC CONTROL DAMPER
AD	ACCESS DOOR
AP	ACCESS PANEL
AS	AIR SEPARATOR
BD	BALANCING DAMPER
BDD	BACKDRAFT DAMPER
FD	FIRE DAMPER
FSD	FIRE/SMOKE DAMPER
FT	FLASH TANK
FTR	FINNED TUBE RADIATOR
H	HUMIDIFIER
MD	MOTORIZED DAMPER
OBD	OPPOSED BLADE DAMPER
PRV	PRESSURE REDUCING VALVE
SA	SOUND ATTENUATOR
SD	SMOKE DAMPER
SRV	SAFETY RELIEF VALVE

DRAWING LIST

NUMBER	TITLE
M-100	MECHANICAL LEGEND
P-101	PLUMBING PLANS - DRAINAGE
P-102	PLUMBING PLANS - DOMESTIC WATER
P-103	PLUMBING SCHEDULES AND DETAILS
M-101	VENTILATION PLAN
M-102	INFLOOR HEATING PLAN
M-200	MECHANICAL SCHEDULES AND DETAILS

WINDSOR / WEST HANTS TOGETHER

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Truro, Nova Scotia
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Tel: 902-893-8455
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F-19-132

No.	Description	Date
3	ISSUED FOR RFP	2021/04/20
2	ISSUED FOR TENDER	2021/03/31
1	ISSUED FOR 75% REVIEW	2021/02/17

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7071 Bayers Rd. Suite 3004
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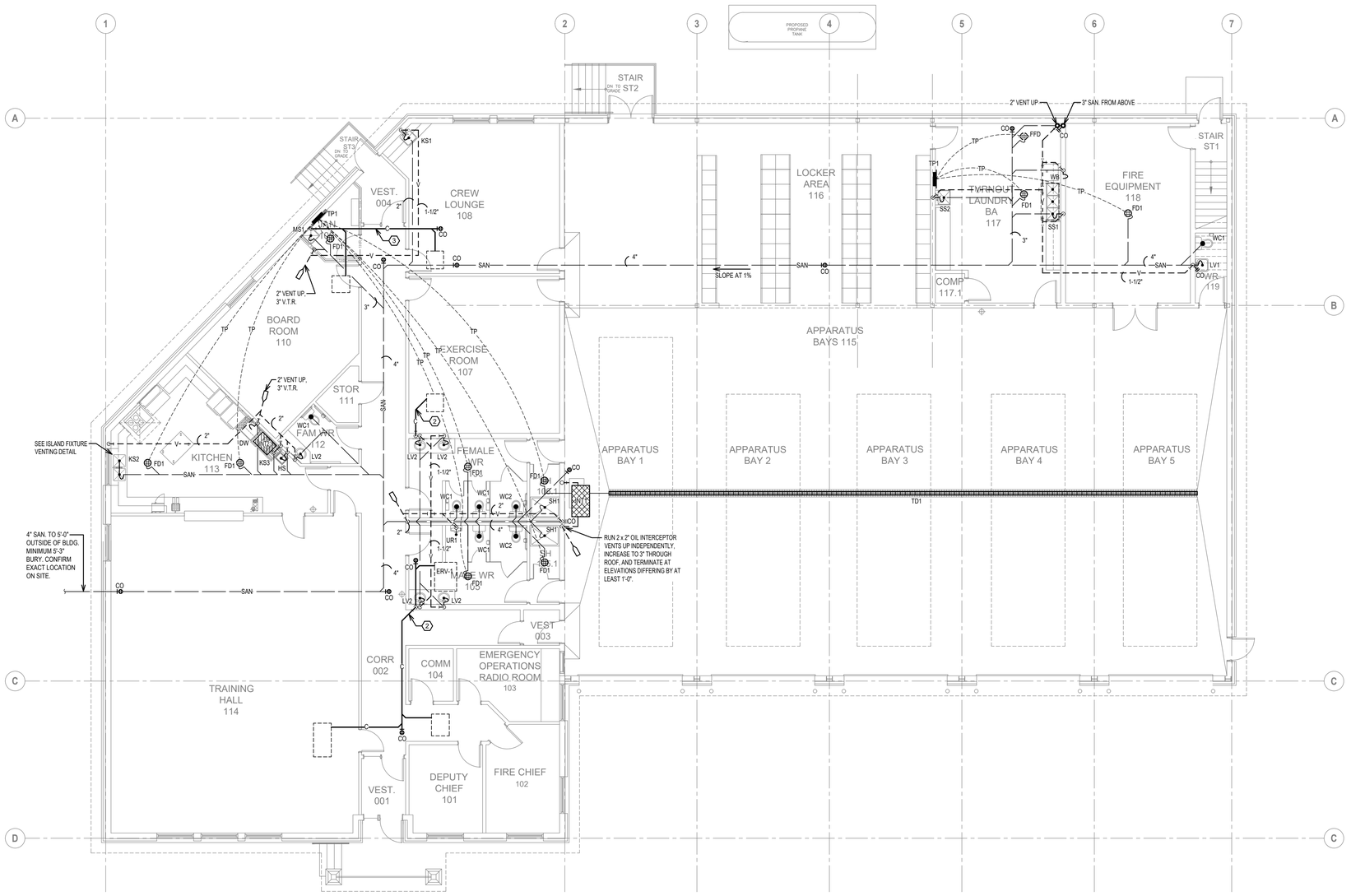
HANTSPORT FIRE STATION
HANTSPORT, NS

MECHANICAL LEGEND

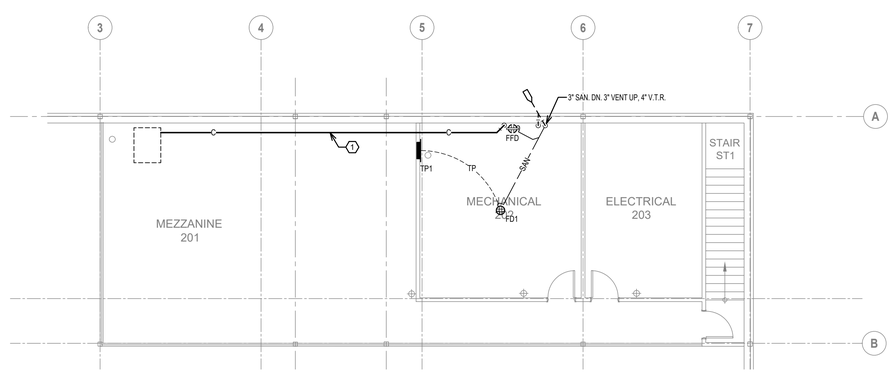
Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	
Checked By	

M-100

Scale AS NOTED



1 MAIN FLOOR PLAN - DRAINAGE
1/8"=1'-0"



2 UPPER FLOOR PLAN - DRAINAGE
1/8"=1'-0"

NOTES:

1	PIPE HVAC EQUIPMENT CONDENSATE DRAIN TO FUNNEL FLOOR DRAIN. TERMINATE WITH AIR GAP ABOVE FUNNEL.
2	PIPE HVAC EQUIPMENT CONDENSATE DRAIN TO SINK DRAIN AND CONNECT INDIRECTLY TO TAILPIECE THROUGH AIR GAP. SEE DETAIL 8/P-103.
3	PIPE HVAC EQUIPMENT CONDENSATE DRAIN TO JANITOR SINK. TERMINATE WITH AIR GAP ABOVE SINK FLOOD LEVEL RIM.

GENERAL NOTES:

1. THIS DRAWING IS THE PROPERTY OF MCW CONSULTANTS LTD. AND SHALL BE USED FOR THE DESIGNATED PROJECT ONLY. DO NOT SCALE THIS DRAWING UNLESS PERMITTED BY THE ENGINEER. USE DIMENSIONS WHERE SHOWN. VERIFY ALL DIMENSIONS WITH ANY RELEVANT ARCHITECTURAL AND/OR STRUCTURAL DRAWINGS AND REPORT ANY ERRORS OR OMISSIONS IN WRITING TO THE ENGINEERS.
2. ALL WORK SHALL CONFORM WITH APPLICABLE CODES, STANDARDS & LOCAL REGULATIONS.
3. OBTAIN AND PAY FOR ALL PERMITS AND FEES REQUIRED FOR THE EXECUTION AND INSPECTION OF THE MECHANICAL WORK.
4. CO-OPERATE AND CO-ORDINATE WORK WITH ALL OTHER TRADES. COORDINATE INSTALLATION OF ELECTRICAL DEVICES AND WIRING FOR MECHANICAL EQUIPMENT WITH THE ELECT. CONTRACTOR.
5. USE NEW MATERIALS AND EQUIPMENT UNLESS OTHERWISE NOTED.
6. EQUIPMENT SPECIFIED ON DRAWING ESTABLISHES STANDARD OF ACCEPTANCE. ACCEPTABILITY OF ALTERNATES SHALL BE AT THE DISCRETION OF THE ENGINEER.
7. VISIT AND INSPECT SITE. NO ALLOWANCES WILL BE MADE FOR FAILURE TO DO SO. CONFIRM EXACT LOCATION OF ALL EXISTING MECHANICAL SERVICES.
8. ALL CUTTING AND PATCHING REQUIRED BY THE MECHANICAL CONTRACTOR SHALL BE PROVIDED BY THE GENERAL CONTRACTOR.
9. PROVIDE A WRITTEN GUARANTEE THAT ALL WORK SHALL BE FREE OF DEFECTS IN MATERIAL & WORKMANSHIP FOR A PERIOD OF 1 (ONE) YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION OF THE PROJECT.
10. MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL, STRUCTURAL & ELECTRICAL DRAWINGS.
11. PROVIDE ONE SET OF AS-BUILT DRAWINGS FOR THE MECHANICAL WORK WHERE CHANGES HAVE OCCURRED TO THE ORIGINAL DESIGN.
12. ALL DRAINAGE PIPING UP-STREAM & VENT PIPING FROM OIL INTERCEPTOR SHALL BE PVC OR CAST IRON.
13. ALL PIPING, INSULATION AND ACCESSORIES INSTALLED IN CEILING RETURN PLENUMS SHALL HAVE A MAX. FLAME SPREAD RATING OF 25 AND A MAX. SMOKE DEVELOPMENT RATING OF 50.
14. ALL PENETRATIONS THROUGH FIRE RATED ASSEMBLES TO BE FIRE SEALED TO NFPA STANDARDS.

WINDSOR / WEST HANTS TOGETHER

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14-1b-132

No.	Description	Date
4	ISSUED FOR RFP	2021/04/20
3	ISSUED FOR TENDER	2021/03/31
2	ISSUED FOR COORDINATION	2021/03/26
1	ISSUED FOR 75% REVIEW	2021/02/17

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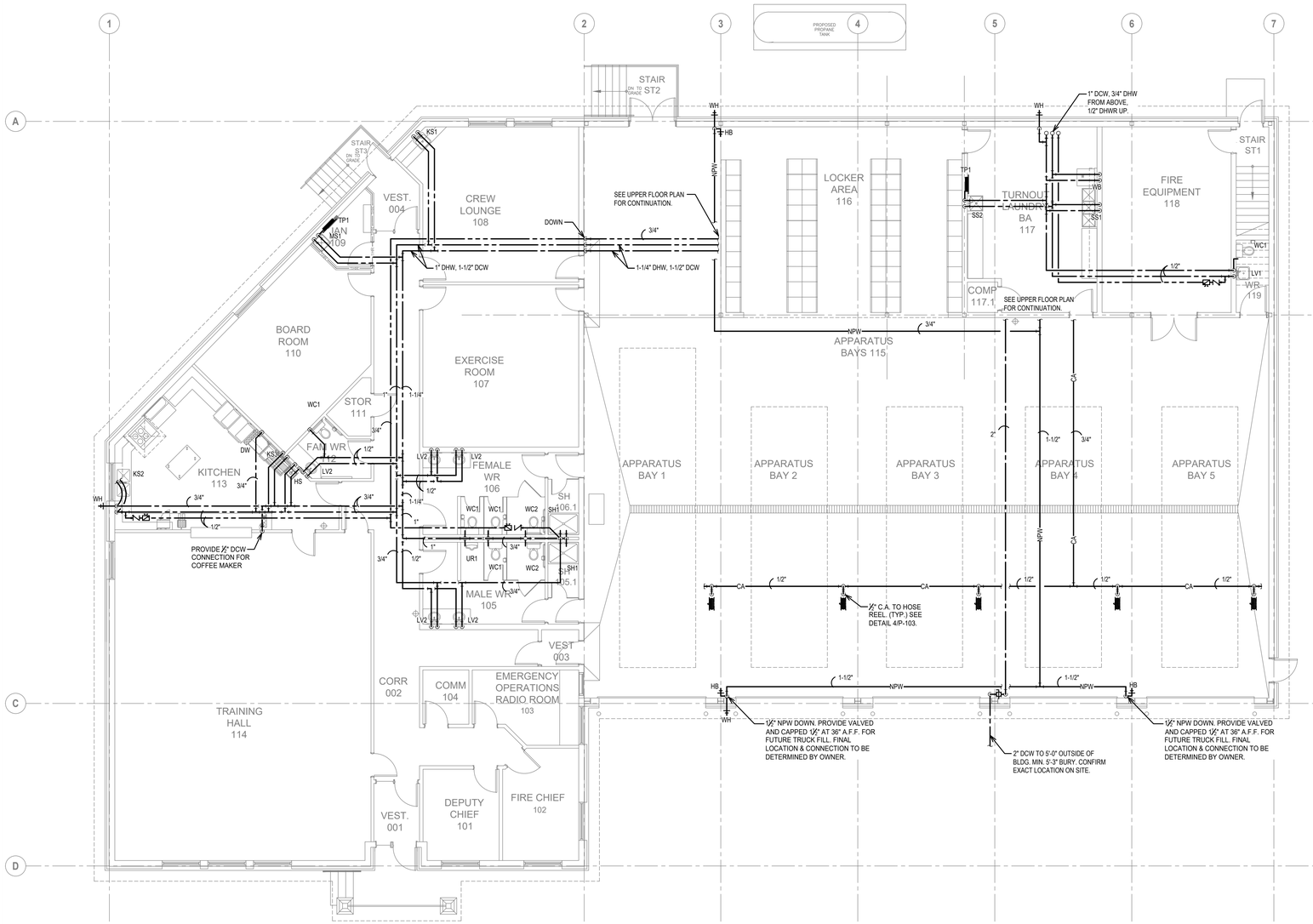
HANTSPORT FIRE STATION
HANTSPORT, NS

PLUMBING PLANS - DRAINAGE

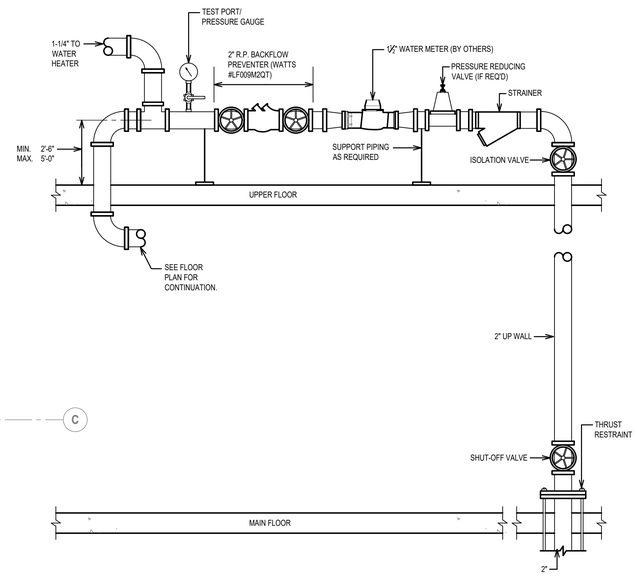
Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	
Checked By	

P-101

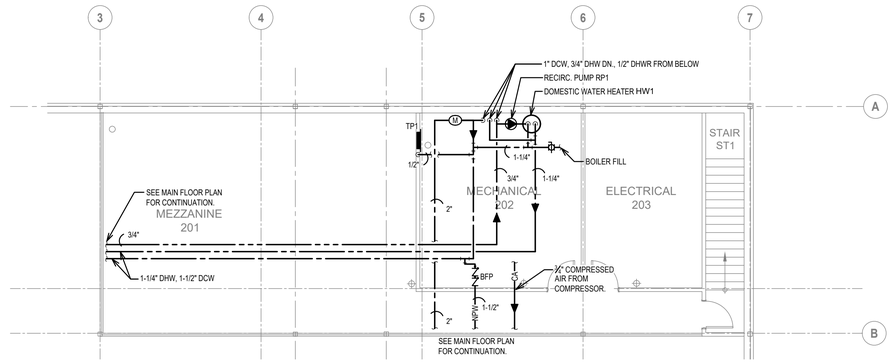
Scale AS NOTED



1 FLOOR PLAN - DOMESTIC WATER
1/8"=1'-0"



3 DOMESTIC WATER ENTRANCE DETAIL
N.T.S.



2 UPPER FLOOR PLAN - DOMESTIC WATER
1/8"=1'-0"

WINDSOR / WEST HANTS TOGETHER

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14-1x-132

No.	Description	Date
4	ISSUED FOR RFP	2021/04/20
3	ISSUED FOR TENDER	2021/03/31
2	ISSUED FOR COORDINATION	2021/03/26
1	ISSUED FOR 75% REVIEW	2021/02/17

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HANTSPORT FIRE STATION
HANTSPORT, NS

PLUMBING PLANS - DOMESTIC WATER

Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	
Checked By	

P-102

Scale AS NOTED

PLUMBING FIXTURE SCHEDULE

TAG	MANUFACTURER / MODEL	PIPE SIZE (Øin)					REMARKS
		DCW	DHW	TP	W	V	
WC1	6L, FLOOR MOUNTED WATER CLOSET ELONGATED, ZURN #Z5530-IN-VL	½"	-	-	3"	2"	c/w LINED TANK, OFS, S1, VANDAL-PROOF LOCKING LID
WC2	6L, FLOOR MOUNTED B.F. WATER CLOSET ELONGATED, ZURN #Z5550-IN-VL	½"	-	-	3"	2"	16½" HIGH c/w LINED TANK, OFS, S1, VANDAL-PROOF LOCKING LID
UR1	0.5L, WALL HUNG URINAL ZURN #Z5755-U	⅜"	-	-	2"	2"	3/4" TOP SPUD c/w FV1, CC1
LV1	WALL HUNG CHINA LAVATORY ZURN #Z5364	½"	½"	-	1¼"	1½"	c/w F1, OSD, S2, PT1. INSTALL THERMOSTATIC MIXING VALVE.
LV2	COUNTERTOP CHINA LAVATORY ZURN #Z5110	½"	½"	-	1¼"	1½"	c/w F1, OSD, S2, PT1. INSTALLTHERMOSTATIC MIXING VALVE.
HS	WALL HUNG S.S. HAND SINK ADVANCE TABCO #7-PS-44	½"	½"	-	1¼"	1½"	c/w GOOSENECK FAUCET, MIXING VALVE, S2, PT1
DW	DISHWASHER (SUPPLIED BY OWNER)	-	¾"	-	1½"	1½"	SUPPLIED BY OWNER, INSTALLED BY MECHANICAL CONTRACTOR
KS1	SINGLE BOWL COUNTERTOP S.S. SINK FRANKE #LBS4610-1	½"	½"	-	1½"	1½"	c/w F2, S2, PT2
KS2	DOUBLE BOWL CONTERTOP S.S. SINK (SUPPLIED BY OWNER)	½"	½"	-	1½"	1½"	SUPPLIED BY OWNER, INSTALLED BY MECHANICAL CONTRACTOR
KS3	DISHTABLE/POT SINKS (SUPPLIED BY OWNER)	½"	½"	-	1½"	1½"	SUPPLIED BY OWNER, INSTALLED BY MECHANICAL CONTRACTOR. PIPE DRAIN TO GREASE INTERCEPTOR.
MS1	JANITORS MOP SINK ZURN #Z-1996-24-BS-HH-MH-SD-WG	½"	½"	-	3"	2"	c/w F3, S.S. BUMPER GUARD, HOSE AND HOSE BRACKET, MOP HANGER, S.S. DRAIN WITH DOME STRAINER, S.S. WALL GUARD.
SH1	SHOWER MAAX CARLTON I #100961	½"	½"	-	2"	2"	c/w DRAIN KIT, MOEN #TB346EP15 HANDHELD SHOWER SYSTEM WITH PRESSURE BALANCING VALVE & ADJUSTABLE TEMP. LIMIT STOP
SS1	TRIPLE BOWL S.S. SERVICE SINK WITH LEGS FRANKE #TL2454	½"	½"	-	1½"	1½"	c/w F3, PT2, BASKET STRAINER & TAILPIECE
SS2	SINGLE BOWL S.S. SERVICE SINK WITH LEGS FRANKE #SL2424	½"	½"	-	1½"	1½"	c/w F4, PT2, BASKET STRAINER & TAILPIECE
WB	WASHING MACHINE SUPPLY/DRAIN BOX ZURN #WM2961	½"	½"	-	2"	1½"	c/w SINGLE LEVER HANDLE VALVE, HEAVY DUTY MOUNTING STRAPS
FD1	HEAVY DUTY FLOOR DRAIN ZURN #ZXN-415-A-P	-	-	½"	3"	-	c/w NICKEL BRONZE STRAINER
FFD	FUNNEL FLOOR DRAIN ZURN #ZN-415-BF-P	-	-	½"	3"	-	c/w OVAL NICKEL BRONZE OPEN THROAT FUNNEL STRAINER
TD1	PREFORMED TRENCH DRAIN (80" LENGTHS) ZURN #Z886	-	-	-	3"	-	c/w HEAVY DUTY METAL GRATE
CO	HEAVY DUTY CLEAN OUT ZURN #ZXN-1612	-	-	-	-	-	c/w COVER STYLE TO MATCH FLOORING
TP1	ELECTRONIC TRAP PRIMER ZURN #Z-1020	½"	-	-	-	-	c/w MOUNTING BOX & COVER, STOP VALVE, SOLENOID, TRANSFORMER & VACUUM BREAKER
HB	HOSE BIBB, ANTI-SIPHON ZURN #Z-1341	¾"	-	-	-	-	c/w VACUUM BREAKER
WH	ENCASED, ANTI-SIPHON, NON-FREEZE WALL HYDRANT ZURN #Z-1300	¾"	-	-	-	-	c/w INTEGRAL BACKFLOW PREVENTER

OFS = OPEN-FRONT SEAT LESS COVER (ZURN #Z5955SS-EL)
FV1 = EXPOSED, MANUAL OPERATED, URINAL FLUSH VALVE (ZURN #Z6003AV-ULF)
CC1 = CONCEALED WALL CARRIER FOR URINAL
OSD = CHROME-PLATED OFFSET CAST DRAIN (ZURN #Z8702-PC)
S1 = CHROME-PLATED CLOSET SUPPLIES c/w SCREWDRIVER STOPS (DELTA #47T1316SD)
S2 = CHROME-PLATED LAV SUPPLIES c/w SCREWDRIVER STOPS (DELTA #47T2312SD)
B.F. = BARRIER-FREE

F1 = TWO HANDLE, DECKMOUNT FAUCET, 4" CENTERS, LEAD FREE & LOW FLOW AERATOR (ZURN #Z81104-3M)
F2 = TWO HANDLE, DECKMOUNT FAUCET, 4" CENTERS, LEAD FREE & LOW FLOW AERATOR (ZURN #Z81284-3F)
F3 = TWO HANDLE, WALLMOUNT PRE-RINSE SERVICE FAUCET, 8" CENTERS, LEAD FREE (ZURN #Z842X1-XL-AF)
F4 = TWO HANDLE, DECKMOUNT PRE-RINSE SERVICE FAUCET, 8" CENTERS, LEAD FREE (ZURN #Z842X1-XL-AF-DM)
PT1 = 1¼" POLISHED CHROME-PLATED CAST BRASS P-TRAP (ZURN #Z8995-PC)
PT2 = 1½" POLISHED CHROME-PLATED CAST BRASS P-TRAP (ZURN #Z8996-PC)

MAKE AND MODEL SPECIFIED INDICATE STANDARD OF ACCEPTANCE:

FIXTURES: ZURN, AMERICAN STANDARD, KOHLER, GERBER, TOTO, KINDRED, ELKAY, NOVANNI, ELJER, FIAT, STERN-WILLIAMS, CONTRAC, ARE ACCEPTABLE ALTERNATES.

TRIM: ZURN, AMERICAN STANDARD, CHICAGO, DELTA, SLOAN, SYMMONS, MCQUIRE, ARE ACCEPTABLE ALTERNATES.

ACCESSORIES AND DEVICES: ZURN, MIFAB, WATTS, WILKINS, LAWLER, BRADLEY, GUARDIAN, PPP, J.R. SMITH, BEMIS, CENTOCO, ARE ACCEPTABLE ALTERNATES.

INTERCEPTOR SCHEDULE

TAG	MANUFACTURER / MODEL	APPLICATION	SIZE	FLOW (USgpm)	CONNECTION (NPS)	REMARKS
INT1	ZURN / Z1186-ST	OIL INTERCEPTOR	600	25	4	c/w TRAFFIC RATED COVER & EXTENSIONS AS REQUIRED
INT2	ZURN / Z1171	GREASE INTERCEPTOR	500	20	3	LOW PROFILE, c/w INTEGRAL FLOW CONTROL

APPROVED ALTERNATES: WATTS, J.R. SMITH

DOMESTIC WATER HEATER SCHEDULE

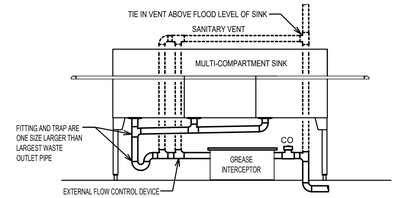
TAG	MANUFACTURER / MODEL	DIMENSIONS (IN.)		CAPACITY (USGAL)	RECOVERY (GAL/H)	TEMP. (°F)	ELECTRICAL				REMARKS
		H	DIA.				kW	V	Ph	MOCP	
HW1	RHEEM / CELD66	59	23	65	--	140	3.0	208	1	--	c/w T&P RELIEF VALVE PIPED TO FLOOR DRAIN

APPROVED ALTERNATE: BRADFORD WHITE

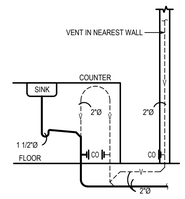
EXPANSION TANK SCHEDULE

TAG	MANUFACTURER / MODEL	APPLICATION	TOTAL VOL. (USGAL)	ACCEPT. VOL. (USGAL)	DIMENSIONS (INCHES)			REMARKS
					H	DIA.	CONN.	
ET3	ARMSTRONG / AST-5	DOMESTIC HOT WATER SYSTEM	3.5	2.3	14	10	¾	POTABLE WATER, DIAPHRAGM TYPE

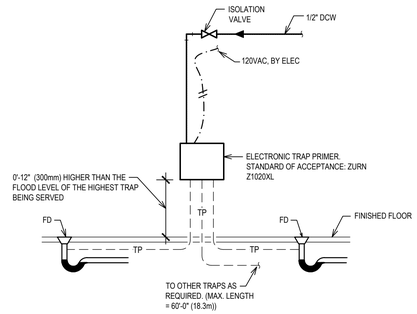
APPROVED ALTERNATE: AMTROL



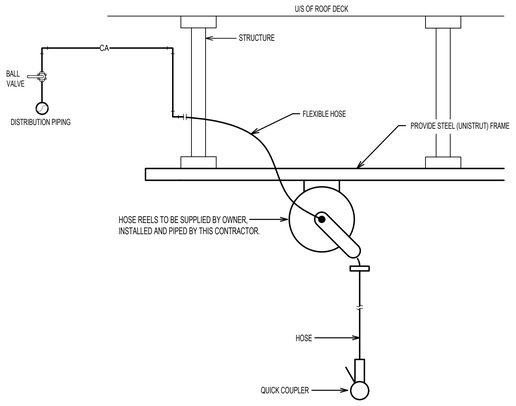
1 GREASE INTERCEPTOR PIPING DETAIL
N.T.S.



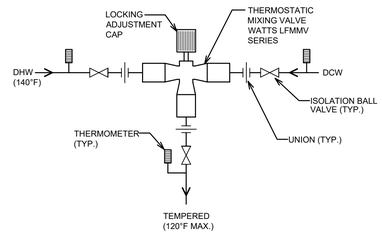
2 ISLAND FIXTURE VENTING DETAIL
N.T.S.



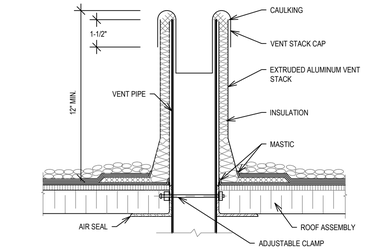
3 ELECTRONIC TRAP PRIMER DETAIL
N.T.S.



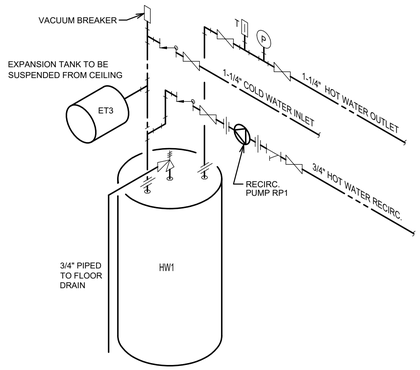
4 OVERHEAD HOSE REEL DETAIL
N.T.S.



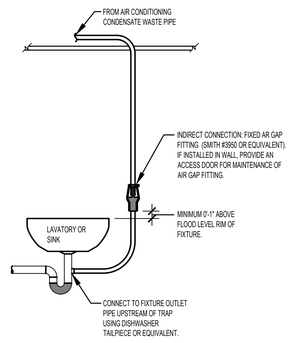
5 MIXING VALVE DETAIL
N.T.S.



6 VENT THROUGH ROOF DETAIL
N.T.S.



7 DOM. WATER HEATER DETAIL
N.T.S.



8 CONDENSATE DRAIN DETAIL
N.T.S.

WINDSOR / WEST HANTS TOGETHER

General Notes:
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14-19-132

No.	Description	Date
4	ISSUED FOR RFP	2021/04/20
3	ISSUED FOR TENDER	2021/03/31
2	ISSUED FOR COORDINATION	2021/03/26
1	ISSUED FOR 75% REVIEW	2021/02/17

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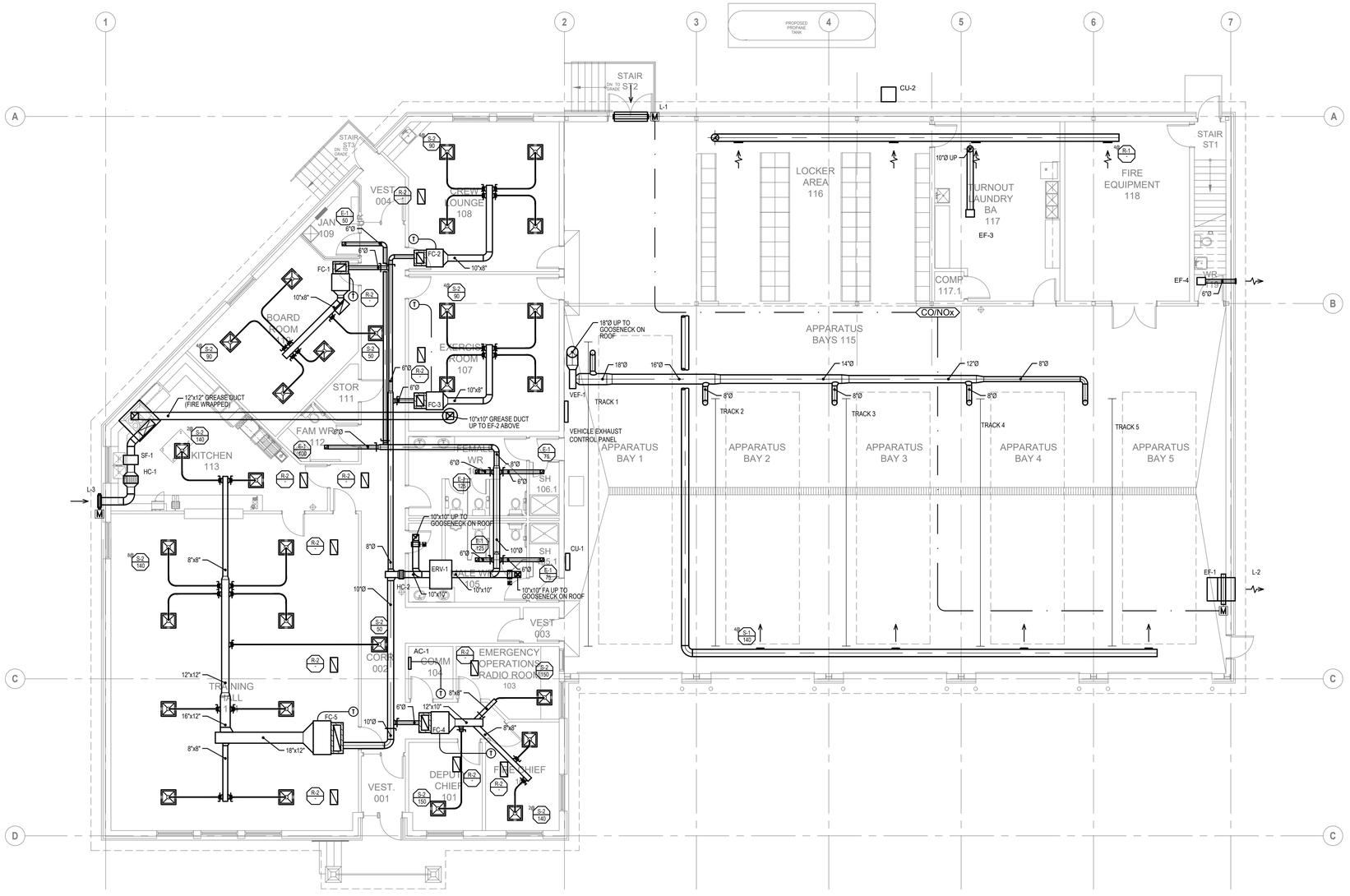
HANTSPORT FIRE STATION
HANTSPORT, NS

PLUMBING SCHEDULES AND DETAILS

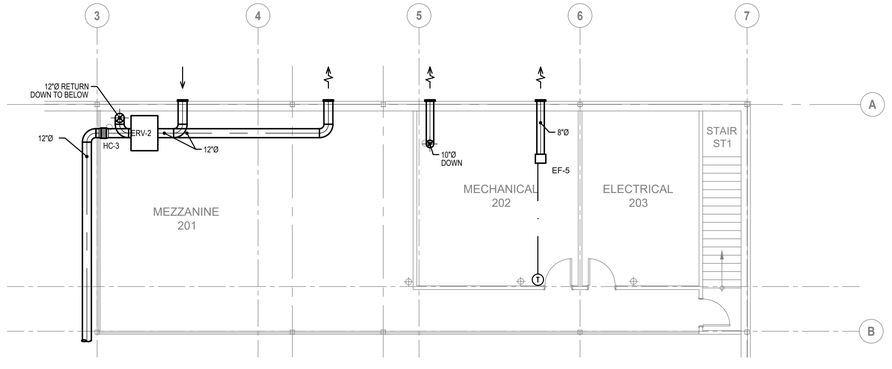
Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	
Checked By	

P-103

Scale AS NOTED



1 FLOOR PLAN - VENTILATION
1/8"=1'-0"



2 UPPER FLOOR PLAN - VENTILATION
1/8"=1'-0"

WINDSOR / WEST HANTS TOGETHER

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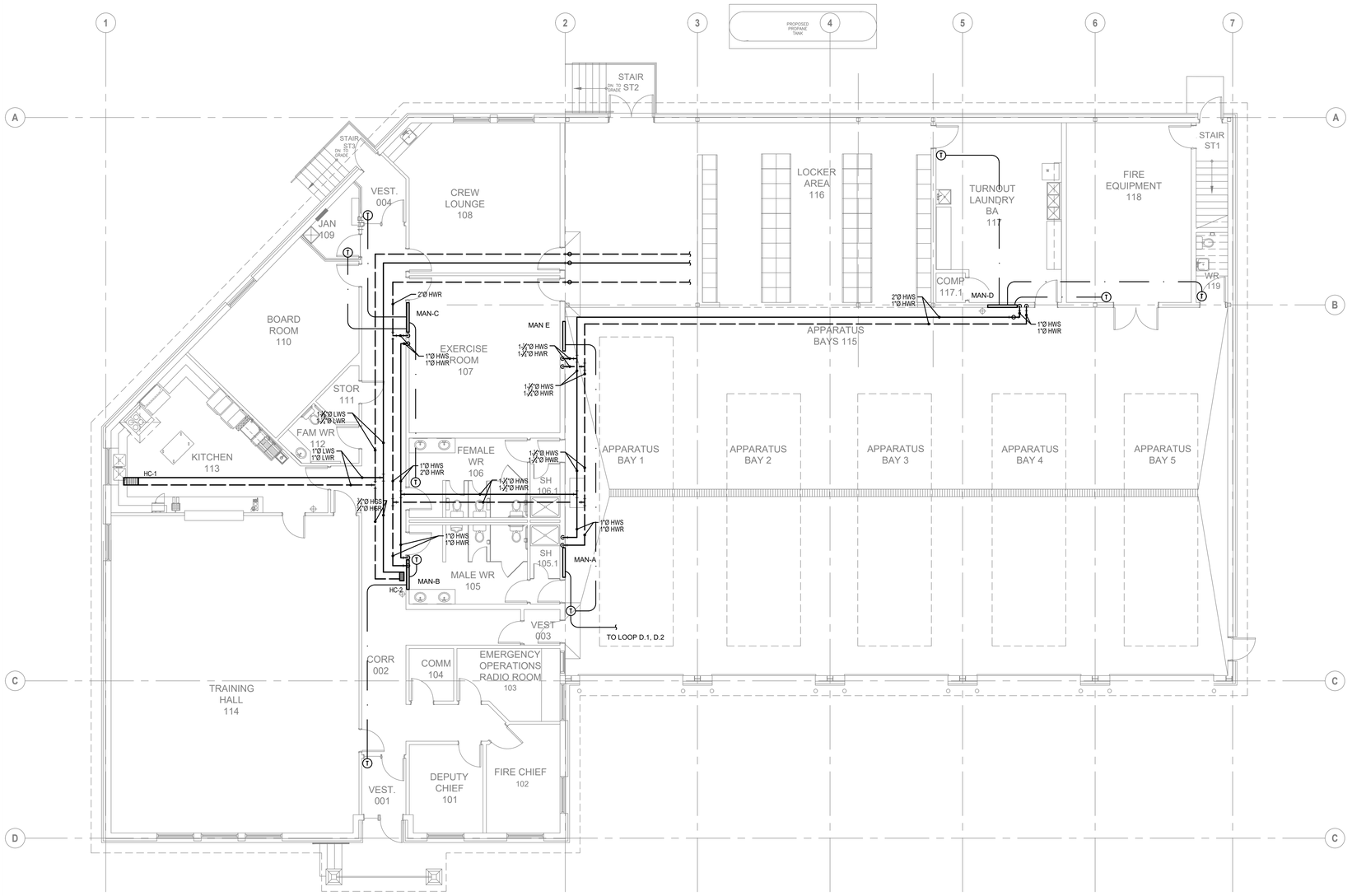
HANTSPORT FIRE STATION
HANTSPORT, NS

VENTILATION PLAN

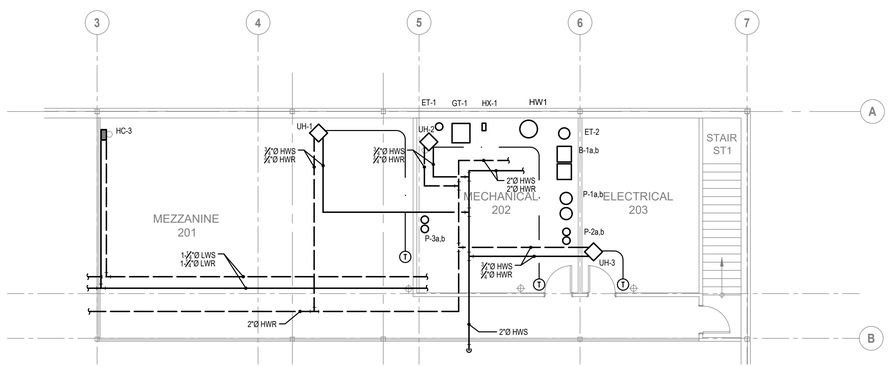
Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	CM
Checked By	RP

M-101

Scale AS NOTED



1 MAIN FLOOR PLAN - HEATING
1/8"=1'-0"



2 UPPER FLOOR PLAN - HEATING
1/8"=1'-0"

WINDSOR / WEST HANTS TOGETHER

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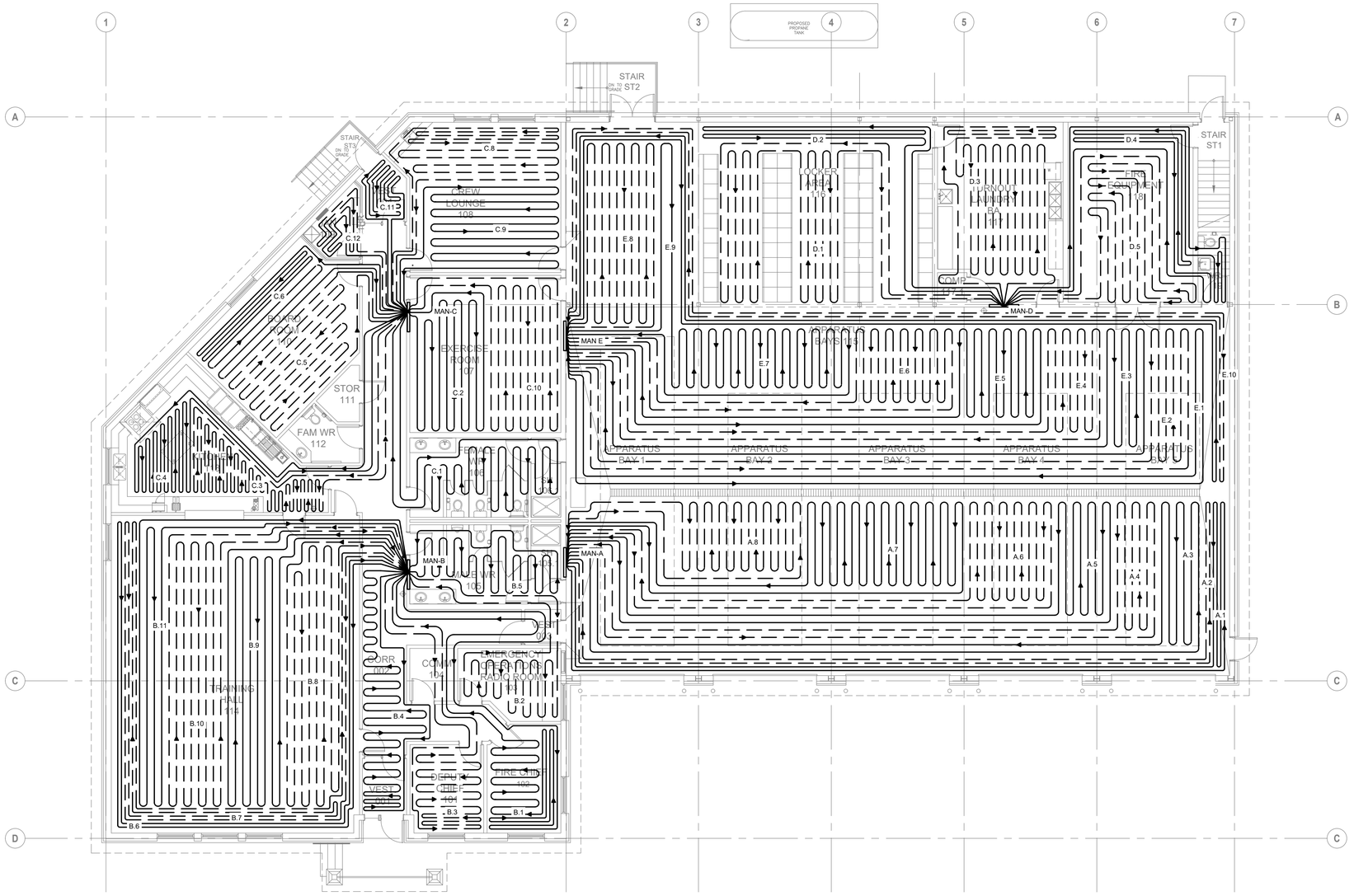
HANTSPORT FIRE STATION
HANTSPORT, NS

HEATING PIPING PLAN

Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	CM
Checked By	RP

M-102

Scale AS NOTED



1 MAIN FLOOR PLAN - INFLOOR
1/8"=1'-0"

LEGEND:

PEX TUBING 12" CENTER

PEX TUBING 6" CENTER

WWH
WINDSOR / WEST HANTS TOGETHER

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HANTSPORT, NS

INFLOOR TUBING PLAN

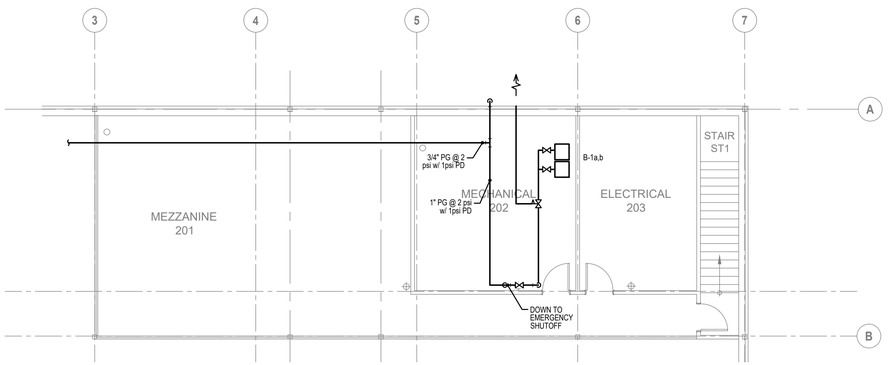
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M-103

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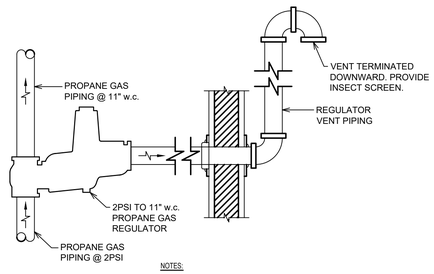
1 MAIN FLOOR PLAN - INFLOOR
1/8"=1'-0"



2 UPPER FLOOR PLAN - INFLOOR
1/8"=1'-0"

PROPANE GAS LOAD		
EQUIPMENT NUMBER	DESCRIPTION	FUEL LOAD (MBH)
B-1a	BOILER	311
B-1b	BOILER	311
-	KITCHEN FUTURE ALLOWANCE	500
TOTAL		1122

NOTES:
1. PROVIDE 2 PSI PROPANE GAS SERVICE, METER, AND DISTRIBUTION
2. GAS DISTRIBUTION IS BASED ON 200 FT PIPE LENGTH FROM METER TO FARTHEST DEVICE.



NOTES:
1. ALL REGULATORS SHALL BE PROPANE GAS TYPE (ACTARIS B3MR).
2. REGULATOR MANUFACTURER SHALL VERIFY ORIFICE AND SPRING SPECIFICATIONS BASED ON LOAD AND PRESSURE SELECTION PRIOR TO ORDERING EQUIPMENT

3 GAS REGULATOR DETAIL
NTS

WINDSOR / WEST HANTS TOGETHER

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HANTSPORT FIRE STATION
HANTSPORT, NS

PROPANE GAS PLAN

Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	CM
Checked By	RP

M-104

Scale AS NOTED

INTAKE / EXHAUST LOUVRE SCHEDULE

ITEM	UNIT NUMBER	UNIT DESCRIPTION (SERVICE)	MANUFACTURER	MODEL	FREE AREA	ACTIVE AREA (ft^2)	ACTIVE LOUVRE SIZE (W x H) or (L x W x H)	AIR FLOW (CFM)	PRESSURE DROP (W.G.)	DESCRIPTION / REMARKS
1	L-1	APPARATUS BAYS	PRICE	DE635	57%	11	54x54	9000	0.1	EXTRUDED ALUMINIUM, DRAINABLE LOUVRE. CONTINUOUS BLADE. COLOUR BY ARCHITECT. MOTORIZED DAMPER (120V)
1	L-2	APPARATUS BAYS	PRICE	DE635	57%	11	54x54	9000	0.1	EXTRUDED ALUMINIUM, DRAINABLE LOUVRE. CONTINUOUS BLADE. COLOUR BY ARCHITECT. MOTORIZED DAMPER (120V)
3	L-3	MAKEUP AIR	PRICE	DE635	57%	1.5	20x20	800	0.1	EXTRUDED ALUMINIUM, DRAINABLE LOUVRE. CONTINUOUS BLADE. COLOUR BY ARCHITECT. MOTORIZED DAMPER (120V)

FAN SCHEDULE

MECHANICAL INFORMATION											ELECTRICAL INFORMATION		
ITEM	UNIT NUMBER	UNIT DESCRIPTION (SERVICE)	LOCATION	MANUFACTURER	MODEL	CAPACITY (CFM)	S.P. (in)	FAN R.P.M.	BHP	MECHANICAL DESCRIPTION / REMARKS	MOTOR (HP)	VOLT	Ø
1	EF-1	APPARATUS BAY CO/NOx EXHAUST	APPARATUS BAY	GREENHECK	SBE-2H30	9000	0.5	1044	1.61	c/w DISCONNECT SWITCH, MOTORIZED DAMPER (120V), BIRD SCREEN, INTERLOCKED WITH CO/NOx SYSTEM	2	208	3
2	EF-2	KITCHEN HOOD EXHAUST	ROOF	CAPTIVEAIRE	DU50HFA	800	0.75	1286	0.22	GREASE FAN INTERLOCKED WITH SF-1	0.5	208	3
3	EF-3	TURNOUT EXHAUST	TURNOUT ROOM	GREENHECK	CUE-090-VG	300	0.5	1380	FR	c/w FLEX CONNECTOR, WALL CAP, INSECT SCREEN, GRAVITY DAMPER, MANUAL ON/OFF	FR	120	1
4	EF-4	WASHROOM EXHAUST	WASHROOM 119	GREENHECK	CUE-060-VG	75	0.25	1321	FR	c/w FLEX CONNECTOR, WALL CAP, INSECT SCREEN, GRAVITY DAMPER, INTERLOCKED WITH LIGHTS	FR	120	1
5	EF-5	MECH ROOM EXHAUST	MECHANICAL 202	GREENHECK	CUE-080-VG	150	0.5	1438	FR	c/w FLEX CONNECTOR, WALL CAP, INSECT SCREEN, GRAVITY DAMPER, BAS CONTROL	FR	120	1
6	VEF-1	VEHICLE EXHAUST	APPARATUS BAYS	PLYMOVENT	TEV-559	2500	6	3500	5	c/w FLEX CONNECTOR, BIRD SCREEN, VEHICLE EXHAUST SYSTEM CONTROLS	5	208	3
7	SF-1	MAKEUP AIR SUPPLY FAN	KITCHEN	GREENHECK	CUE-095-VG	800	0.5	1723	0.17	c/w FLEX CONNECTOR, BAS CONTROL	FR	120	1

FAN COIL SCHEDULE

MECHANICAL INFORMATION										ELECTRICAL		
ITEM	UNIT NUMBER	UNIT DESCRIPTION (SERVICE)	LOCATION	MANUFACTURER	MODEL	SUPPLY AIR (CFM)	FRESH AIR (CFM)	MIN. CAPACITY (BTU/hr)	MECHANICAL DESCRIPTION / REMARKS	VOLT	Ø	AMP
1	FC-1	CEILING CONCEALED	BOARD ROOM	MITSUBISHI	PEFY-P12	370	60	12000	c/w FILTER BOX, THERMOSTAT CONTROLLER, CONTROL WIRING, AUXILIARY HEAT RELAY	230	1	0.66
2	FC-2	CEILING CONCEALED	CREW LOUNGE	MITSUBISHI	PEFY-P12	370	60	12000	c/w FILTER BOX, THERMOSTAT CONTROLLER, CONTROL WIRING, AUXILIARY HEAT RELAY	230	1	0.66
3	FC-3	CEILING CONCEALED	EXERCISE ROOM	MITSUBISHI	PEFY-P12	370	60	12000	c/w FILTER BOX, THERMOSTAT CONTROLLER, CONTROL WIRING, AUXILIARY HEAT RELAY	230	1	0.66
4	FC-4	CEILING CONCEALED	OFFICES	MITSUBISHI	PEFY-P18	600	60	18000	c/w FILTER BOX, THERMOSTAT CONTROLLER, CONTROL WIRING, AUXILIARY HEAT RELAY	230	1	0.77
5	FC-5	CEILING CONCEALED	TRAINING HALL	MITSUBISHI	PEFY-P48	1400	300	42000	c/w FILTER BOX, THERMOSTAT CONTROLLER, CONTROL WIRING, AUXILIARY HEAT RELAY	230	1	2.08

CONDENSING UNIT SCHEDULE

MECHANICAL INFORMATION									ELECTRICAL INFORMATION				
ITEM	UNIT NUMBER	UNIT DESCRIPTION (SERVICE)	MANUFACTURER	MODEL	CAPACITY (MBH)	AMBIENT (°C)	CONTROL	REFRIGERANT	MECHANICAL DESCRIPTION / REMARKS	ITEM	KW	VOLT	Ø	AMP
1	CU-2	VRF CONDENSER	MITSUBISHI	PURY-P96TNU-A	96	32	THERMOSTAT	R-134a	c/w DISCONNECT SWITCH, INSULATED REFRIGERATION PIPING, CONTROL WIRING, BACNET COMPATIBLE	CONDENSING UNIT	6.5	208	3	40

DUCTLESS SPLIT AIR CONDITIONING UNIT

MECHANICAL INFORMATION										ELECTRICAL INFORMATION			
ITEM	UNIT NUMBER	UNIT DESCRIPTION (SERVICE)	LOCATION	MANUFACTURER	MODEL	CAPACITY (MBH)	SEER/EER	AIR FLOW (CFM)	REFRIGERANT	REMARKS	ITEM	VOLT	Ø	MOCP
1	AC-1/CU-1	COMM ROOM	COMM ROOM	DAIKIN	FTXR18/RX18RM	18	14.5/9.6	-	R410A	VARIABLE COMPRESSOR SPEED, R-410A REFRIGERANT, BACNET COMPATIBLE	SPLIT SYSTEM	208	1	20

ENERGY RECOVERY VENTILATOR SCHEDULE

MECHANICAL INFORMATION										ELECTRICAL INFORMATION			
ITEM	UNIT NUMBER	UNIT DESCRIPTION (SERVICE)	LOCATION	MANUFACTURER	MODEL	CAPACITY (CFM)	EXTERNAL STATIC PRESSURE (IN)	UNIT WEIGHT (lbs)	REMARKS	ITEM	HP	VOLT	Ø
1	ERV-1	STATION	MECH ROOM	ALDES	E1100-FI-EC-N	550	1.0	214	C/W MOTORIZED DAMPER (120V), DISCONNECT SWITCH, WALL CAP, BACNET CONTROLLER	E.R.V.	FR	208	1
2	ERV-2	TRUCK BAYS	MECH ROOM	ALDES	E1100-FI-EC-N	550	1.0	214	C/W MOTORIZED DAMPER (120V), DISCONNECT SWITCH, WALL CAP, BACNET CONTROLLER	E.R.V.	FR	208	1

AIR OUTLET SCHEDULE

ITEM	UNIT TYPE	MANUFACTURER	MODEL	FLOW	FACE SIZE	NECK SIZE	FINISH	CEILING TYPE	DESCRIPTION / REMARKS
1	S-1	PRICE	SDGE/A/B12	140	12x4	-	WHITE	DUCT MOUNTED	SPIRAL DUCT MOUNTED SUPPLY GRILLE
2	S-2	PRICE	SPD/A/B12	50-150	24x24	6	WHITE	T-BAR OR GYPSUM BOARD	SQUARE PLAQUE SUPPLY DIFFUSER
3	R-1	PRICE	SDGR/A/B12	140	14x4	-	WHITE	DUCT MOUNTED	SPIRAL DUCT MOUNTED RETURN GRILLE
4	R-2	PRICE	#80/B12	-	24x12	-	WHITE	T-BAR OR GYPSUM BOARD	EGGCRATE RETURN GRILLE
5	E-1	PRICE	#80/B12	50-125	6x6	-	WHITE	T-BAR OR GYPSUM BOARD	EGGCRATE EXHAUST GRILLE

TANK SCHEDULE

ITEM	UNIT NUMBER	UNIT DESCRIPTION (SERVICE)	LOCATION	MANUFACTURER	MODEL	CAPACITY (gal)	ACCEPTANCE VOLUME (gal)	DIAMETER	LENGTH	WORKING PRESSURE (psi)	DESCRIPTION/REMARKS
1	ET-1	GLYCOL HEATING	MECH. ROOM	ARMSTRONG	30	4.8	3.0	10.6	13.7	100	DIAPHRAGM TYPE (APPROVED ALTERNATE: AMTROL)
2	ET-2	INFLOOR	MECH. ROOM	ARMSTRONG	90	13.2	8.2	15.0	21.1	100	DIAPHRAGM TYPE (APPROVED ALTERNATE: AMTROL)
3	GT-1	GLYCOL FILL TANK	MECH. ROOM	ARMSTRONG	GLA-S-HP-1	53	-	-	-	125	c/w HOA SWITCH AND CONTACTS FOR REMOTE INDICATION OF HIGH AND LOW LEVELS ALARM, 120V, 15A RECEPTACLE.

BOILER SCHEDULE

MECHANICAL INFORMATION														
ITEM	UNIT NUMBER	UNIT DESCRIPTION (SERVICE)	LOCATION	MANUFACTURER	MODEL	INPUT (MBH)	OUTPUT (MBH)	MEDIA	FLOW (gpm)	MECHANICAL DESCRIPTION / REMARKS	HP	VOLT	Ø	AMP
1	B-1a	HEATING BOILER	MECH ROOM	VIESSMANN	VITODENS 200-W	311	294	40% PROP. GLYCOL	25	c/w BOILER PUMP, LOW LOSS HEADER, CONDENSATE NEUTRALIZATION TANK, BACNET CONTROLS	FR	120	1	12
2	B-1b	HEATING BOILER	MECH ROOM	VIESSMANN	VITODENS 200-W	311	294	40% PROP. GLYCOL	25	c/w BOILER PUMP, LOW LOSS HEADER, CONDENSATE NEUTRALIZATION TANK, BACNET CONTROLS	FR	120	1	12

PUMP SCHEDULE

MECHANICAL INFORMATION											ELECTRICAL INFORMATION		
ITEM	UNIT NUMBER	UNIT DESCRIPTION (SERVICE)	LOCATION	MANUFACTURER	MODEL	CAPACITY (USgpm)	HEAD PRESS. (ft. H2O)	MOTOR R.P.M.	MOTOR HP	MECHANICAL DESCRIPTION / REMARKS	ITEM	VOLT	Ø
1	P-1a,b	INFLOOR	MECH ROOM	ARMSTRONG	4380 1205-001.0	35	50	3233	1	SENSORLESS SPEED CONTROL, STARTER BY ELEC. HIGH EFFICIENCY MOTOR	PUMP	208	3
2	P-2a,b	HEATING LOOP	MECH ROOM	GRUNDFOS	MAGNA3 32-120F	18	35	-	FR	SENSORLESS SPEED CONTROL, STARTER BY ELEC. HIGH EFFICIENCY MOTOR	PUMP	208	1
3	P-3a,b	NOT USED	-	-	-	-	-	-	-	-	-	-	-
3	P-4a,b	BOILER PUMPS	MECH ROOM	GUNDFOS	UPS 26-99FC	33	29	-	1/6	SUPPLIED WITH BOILER CASCADE	PUMP	115	1

COIL SCHEDULE

ITEM	UNIT NUMBER	UNIT DESCRIPTION (SERVICE)	LOCATION	MANUFACTURER	MODEL	FINNED DIMENSIONS	FIN SPACING (FINS/INCH)	ROWS	AIR					CAPACITY (MBH)	FLUID					DESCRIPTION / REMARKS
									E.D.B. (°F)	E.W.B. (°F)	L.D.B. (°F)	L.W.B. (°F)	FLOW (CFM)		FLUID	E.T. (°F)	L.T. (°F)	FLOW (gpm)	P.D. (in wg)	
1	HC-1	KITCHEN MUA	KITCHEN	DAIKIN	5WS0604A	16-1/2x19-1/2	9	8	4	-	85.9	-	688	0.2	61.1	40% PROP. GLYCOL	115	95	6.6	2.4	c/w MERV 7 FILTER UPSTREAM, FLANGED DUCT CONNECTIONS, PRESSURE INDEPENDENT CONTROL VALVE
2	HC-2	ERV-1 SUPPLY AIR	CORRIDOR	DAIKIN	5BS0702B	12x18	11	2	20	-	51.7	-	550	0.09	20.8	40% PROP. GLYCOL	115	95	2.0	2.0	c/w FLANGED DUCT CONNECTIONS, PRESSURE INDEPENDENT CONTROL VALVE
3	HC-3	ERV-2 SUPPLY AIR	MEZZANINE	DAIKIN	5BD1402C	12x18	14	2	20	-	68.2	-	550	0.23	30.0	40% PROP. GLYCOL	115	95	3.0	9.1	c/w FLANGED DUCT CONNECTIONS, PRESSURE INDEPENDENT CONTROL VALVE

KITCHEN HOOD SCHEDULE

ITEM	UNIT NUMBER	SERVICE	MANUFACTURER	MODEL	AIR FLOW (CFM)	DIMENSIONS (LxDxH)	AIR PRESSURE DROP (in wg)	DESCRIPTION/REMARKS
1	EH-1	KITCHEN EXHAUST HOOD	CAPTIVEAIRE	4824 ND-2-PSP-F	800	60x48x24	0.58	c/w LIGHTS, FILTER, END PANELS, SUPPLY AIR PLENUM, NFPA 96 RATED BACKDRAFT DAMPER, CONTROL PANEL, INTERLOCKED WITH EF-3 AND SF-1

1. ALL NFPA 96 KITCHEN HOOD EXHAUST DUCTWORK SHALL BE CONSTRUCTED OF AND SUPPORTED BY WELDED, LIQUID-TIGHT No. 16 MSG CARBON STEEL IN ACCORDANCE WITH THE LATEST EDITION OF NFPA 96 OR A LISTED GREASE DUCT SYSTEM.
2. WHERE CLEARANCE TO COMBUSTIBLES FROM ALL HOODS, GREASE REMOVAL DEVICES, EXHAUST FANS, AND DUCTS IS LESS THAN 18", CLEARANCE TO COMBUSTIBLES MAY BE REDUCED TO 3" BY PROTECTION AS FOLLOWS: 22 GAUGE SHEET METAL ON 1" MINERAL WOOL BATTS WITH WIRE MESH OR EQUIVALENT SPACED OUT 1" ON NON-COMBUSTIBLE SPACES

HYDRONIC UNIT HEATER SCHEDULE

MECHANICAL INFORMATION											ELECTRICAL INFO		
ITEM	UNIT NUMBER	LOCATION	MANUFACTURER	MODEL	FAN				HEATING		MECHANICAL DESCRIPTION / REMARKS	VOLT	Ø	MOCP
					FAN RPM	MOTOR HP	CAPACITY (CFM)	STATIC PRESSURE (IN)	SENSIBLE OUTPUT (MBH)	WATER FLOW (gpm)				
1	UH-1	MEZZANINE	ENGINEERED AIR	H1	1500	FR	550	0.1	15	1.5	E.W.T = 120°F	120	1	15
2	UH-2	MECH ROOM	ENGINEERED AIR	H1	1500	FR	550	0.1	15	1.5	E.W.T = 120°F	120	1	15
3	UH-3	ELEC ROOM	ENGINEERED AIR	H1	1500	FR	550	0.1	15	1.5	E.W.T = 120°F	120	1	15

IN-FLOOR LOOP SCHEDULE

Manifold	Number	Tube Size	Head Loss (ft)	Length (ft)	Flow (US gpm)	Total Load (BTU/hr)
A	A.1	1/2"	7.6	301	0.79	7,283
A	A.2	1/2"	4.5	250	0.65	6,031
A	A.3	1/2"	9	319	0.84	7,734
A	A.4	1/2"	7.1	295	0.77	7,090
A	A.5	1/2"	7.5	301	0.78	7,202
A	A.6	1/2"	8.9	320	0.83	7,671
A	A.7	1/2"	14.7	381	1	9,216
A	A.8	1/2"	4.1	244	0.62	5,737
B	B.1	1/2"	6.5	301	0.72	6,941
B	B.2	1/2"	1.8	175	0.47	4,261
B	B.3	1/2"	2.7	211	0.54	5,090
B	B.4	1/2"	3.5	226	0.6	5,325
B	B.5	1/2"	1.5	152	0.47	4,075
B	B.6	1/2"	3.2	238	0.55	5,230
B	B.7	1/2"	11.3	370	0.87	8,293
B	B.8	1/2"	6.9	311	0.73	6,928
B	B.9	1/2"	8.2	332	0.78	7,363
B	B.10	1/2"	10.6	365	0.85	8,072
B	B.11	1/2"	3.4	241	0.56	5,302
C	C.1	1/2"	4.7	225	0.7	6,137
C	C.2	1/2"	2.9	196	0.58	5,238
C	C.3	1/2"	3.8	288	0.54	5,253
C	C.4	1/2"	3.5	278	0.52	5,044
C	C.5	1/2"	4.4	231	0.67	6,034
C	C.6	1/2"	2	210	0.46	4,359
C	C.7	-	-	-	-	NOT USED
C	C.8	1/2"	4.3	268	0.61	5,766
C	C.9	1/2"	5.6	257	0.72	6,543
C	C.10	1/2"	5.7	247	0.75	6,741
C	C.11	1/2"	0.2	110	0.7	1,710
C	C.12	1/2"	0.2	104	0.7	1,596
D	D.1	1/2"	20.1	366	1.22	10,491
D	D.2	1/2"	2.1	203	0.47	4,334
D	D.3	1/2"	6.6	316	0.83	7,046
D	D.4	1/2"	4.9	316	0.59	5,667
D	D.5	1/2"	6.9	263	0.8	7,085
E	E.1	1/2"	4.5	256	0.64	5,976
E	E.2	1/2"	8.3	314	0.81	7,506
E	E.3	1/2"	6.5	286	0.74	6,859
E	E.4	1/2"	6.5	285	0.74	6,903
E	E.5	1/2"	7.4	295	0.78	7,240
E	E.6	1/2"	5.4	263	0.7	6,488
E	E.7	1/2"	10.4	331	0.89	8,267
E	E.8	1/2"	5.8	272	0.71	6,631
E	E.9	1/2"	9.4	327	0.85	7,893
E	E.10	1/2"	9.8	333	0.86	7,983
				12173	**32**	**285,634**

WINDSOR / WEST HANTS TOGETHER

General Notes:
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14-1s-132

No.	Description	Date
4	ISSUED FOR RFP	2021/04/20
3	ISSUED FOR TENDER	2021/03/31
2	ISSUED FOR COORDINATION	2021/03/26
1	ISSUED FOR 75% REVIEW	2021/02/17

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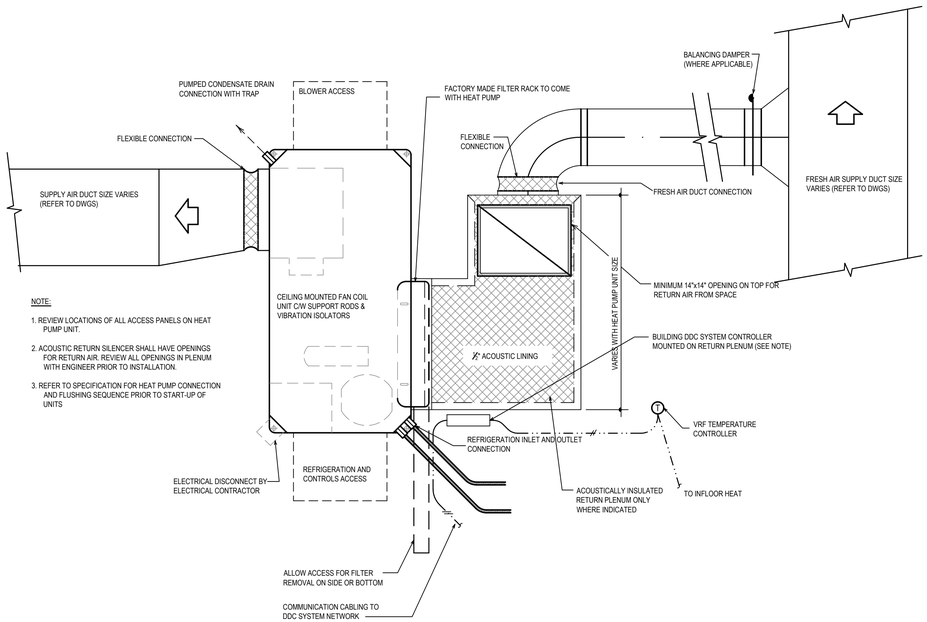
HANTSPORT FIRE STATION
HANTSPORT, NS

MECHANICAL SCHEDULES

Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	CM
Checked By	RP

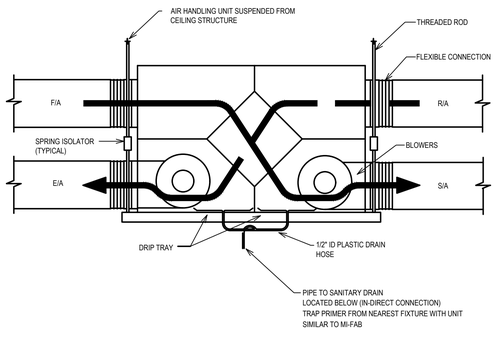
M-200

Scale AS NOTED



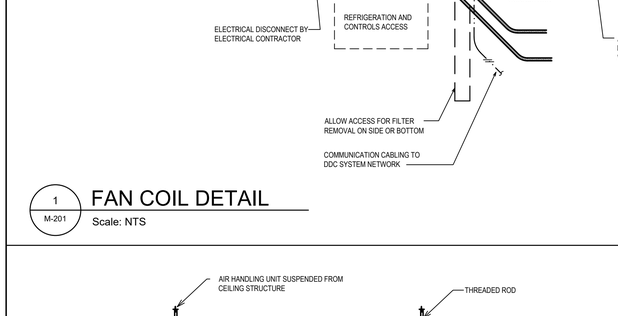
1 M-201 **FAN COIL DETAIL**

Scale: NTS



2 M-201 **ERV DETAIL**

Scale: NTS

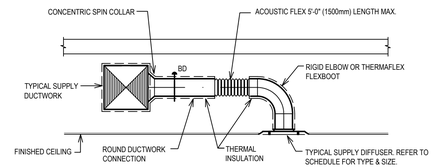


5 M-201 **INFLOOR TUBING DETAIL**

Scale: NTS

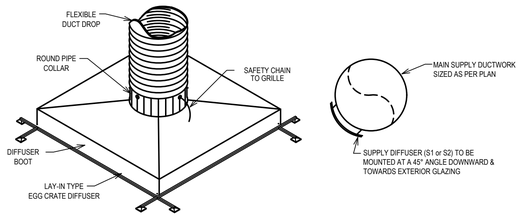
NOTE:

HVAC CONTRACTOR SHALL COORDINATE INSTALLATION OF ALL DUCTWORK WITH OTHER SERVICES INSTALLED IN THE ABOVE CEILING SPACE AND PROVIDE DUCT OFFSETS WHERE NECESSARY TO AVOID CONFLICTS WITH OTHER SYSTEMS.



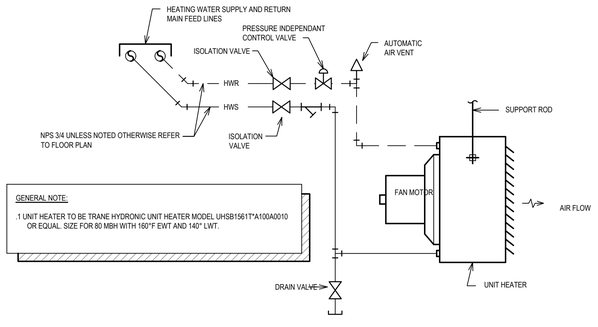
4 M-201 **DIFFUSER CONNECTION DETAIL**

Scale: NTS



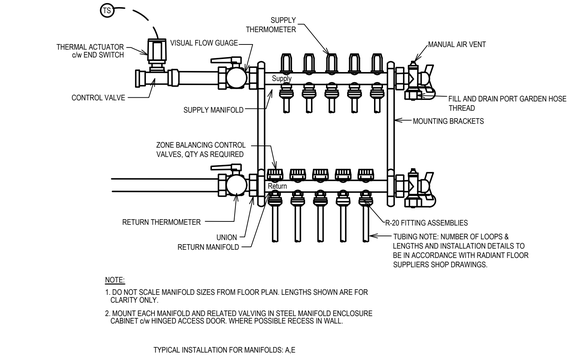
3 M-201 **TYPICAL DIFFUSER DETAIL**

Scale: NTS



2 M-201 **UNIT HEATER DETAIL**

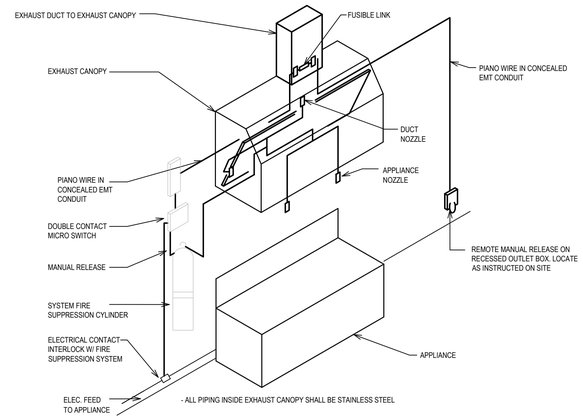
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TYPICAL INSTALLATION FOR MANIFOLDS: A,E

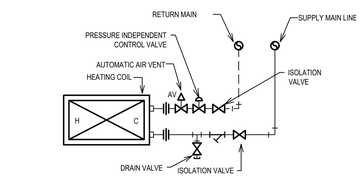
8 M-201 **INFLOOR MANIFOLD DETAIL**

Scale: NTS



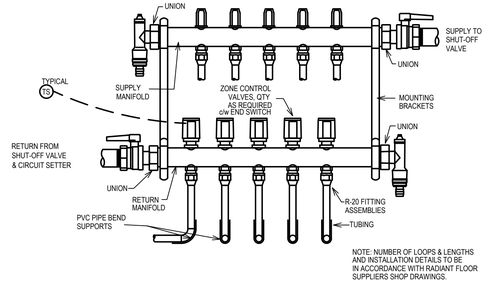
10 M-201 **KITCHEN HOOD DETAIL**

Scale: NTS



2 M-201 **HEATING COIL PIPING DETAIL**

Scale: NTS



TYPICAL INSTALLATION FOR MANIFOLDS: B,C,D

WINDSOR / WEST HANTS TOGETHER

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44-1s-132

No.	Description	Date
4	ISSUED FOR RFP	2021/04/20
3	ISSUED FOR TENDER	2021/03/31
2	ISSUED FOR COORDINATION	2021/03/26
1	ISSUED FOR 75% REVIEW	2021/02/17

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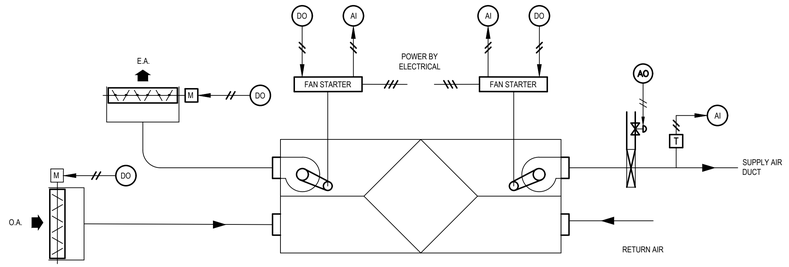
HANTSPORT FIRE STATION
HANTSPORT, NS

MECHANICAL DETAILS

Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	CM
Checked By	RP

M-201

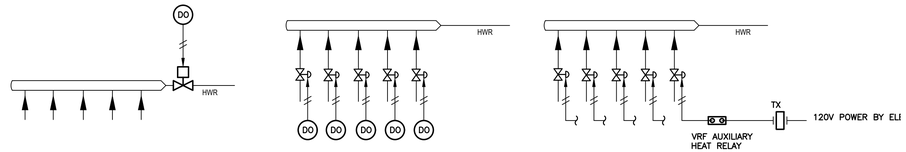
Scale AS NOTED



1 M-202

ERV CONTROLS

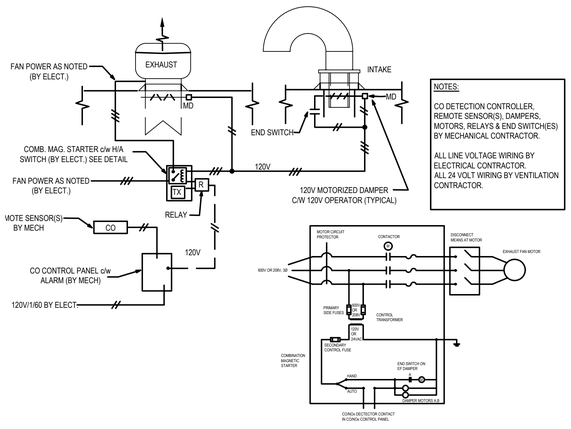
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4 M-202

INFLOOR MANIFOLD CONTROLS

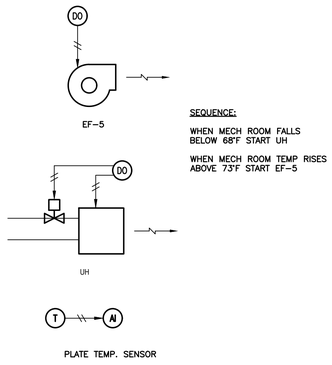
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2 M-202

CO/NOx CONTROLS

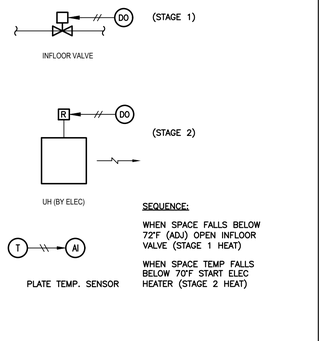
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5 M-202

MECH ROOM CONTROLS

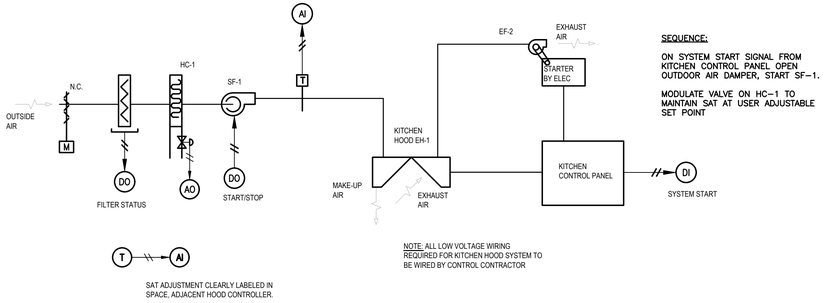
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6 M-202

VEST/STAIR CONTROLS

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3 M-202

MAKEUP AIR CONTROLS

Scale: NTS

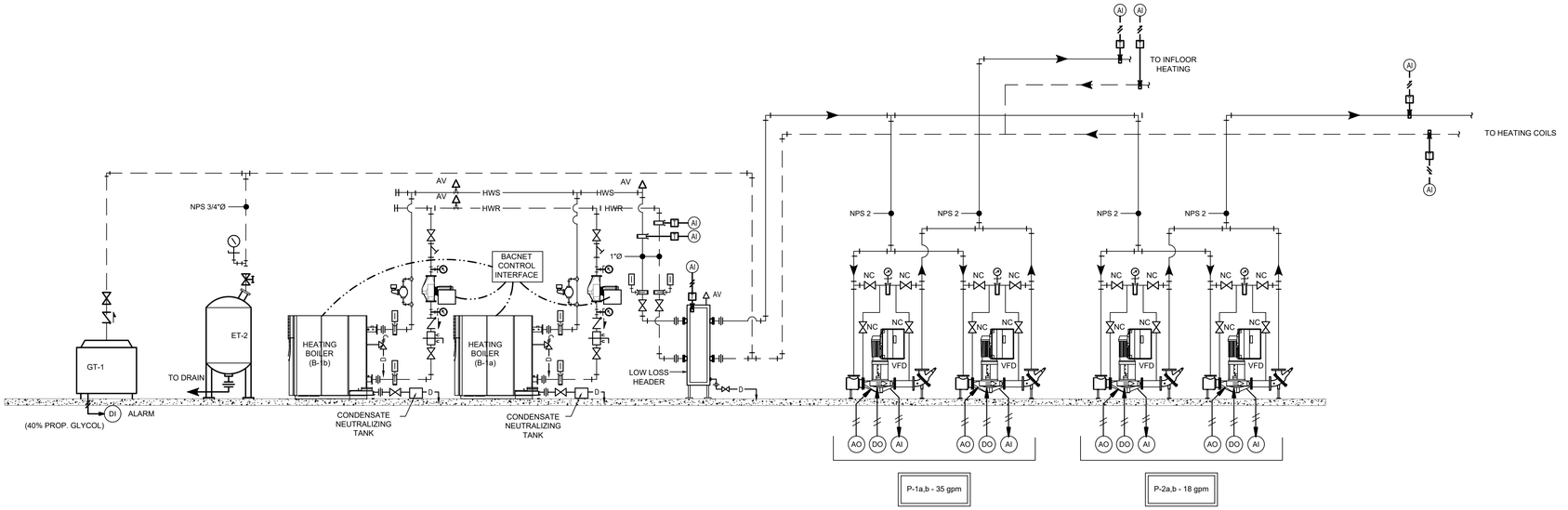
WINDSOR / WEST HANTS TOGETHER

General Notes:
All levels and dimensions are to be checked on site by the contractor prior to fabrication, and any discrepancies must be reported immediately to the Architect.
All dimensions are to be read off this drawing and NOT scaled.
All work to be executed in strict accordance with the by-laws and regulations of the local authorities and in accordance with Building Construction Standards.
All work to conform to applicable standards as referenced within the master specifications or as indicated in the drawing.
Where indicated / required, all drawings are to be read in conjunction with all other documents issued.
This drawing is only to be used for obtaining Local Authority Consents and should not be used for any other purpose unless otherwise stated on drawing.

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14-19-132

No.	Description	Date



1
M-203

HYDRONIC HEATING LOOP SCHEMATIC

Scale: NTS

WINDSOR / WEST HANTS TOGETHER

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14-19-132

No.	Description	Date
4	ISSUED FOR RFP	2021/04/20
3	ISSUED FOR TENDER	2021/03/31
2	ISSUED FOR COORDINATION	2021/03/26
1	ISSUED FOR 75% REVIEW	2021/02/17

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HANTSPORT FIRE STATION
HANTSPORT, NS

HEATING PIPING SCHEMATIC

Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	CM
Checked By	RP

M-203

Scale AS NOTED

GENERAL CONDITIONS

.1 GENERAL
THE FOLLOWING GENERAL CONDITIONS SHALL BE READ IN CONJUNCTION WITH THE GENERAL CONDITIONS AND SPECIAL CONDITIONS ISSUED BY THE PROJECT MANAGER.

.2 SCOPE OF WORK
THE CONTRACTOR SHALL INCLUDE ALL LABOR, MATERIALS, EQUIPMENT AND ASSOCIATED SERVICES NECESSARY FOR, AND REQUIRED BY THE INSTALLATION OF COMPLETELY FINISHED, TESTED, BALANCED AND PROPERLY OPERATING MECHANICAL SYSTEMS AS SPECIFIED HEREAFTER AND SHOWN ON THE DRAWINGS. THE INTENTION IS TO PROVIDE FOR FINISHED WORK COMPLETE IN ALL ESSENTIALS AS CALLED FOR BY THE DOCUMENTS AND ACCEPTED GOOD PRACTICE.

.3 PERMITS AND BY–LAWS
THE CONTRACTOR SHALL ABIDE BY ALL CODES AND BY-LAWS RELATING TO THIS INSTALLATION. PROVIDE NECESSARY NOTICES, OBTAIN PERMITS AND PAY ALL FEES, IN ORDER THAT WORK SPECIFIED MAY BE CARRIED OUT. CHANGES AND ALTERATIONS REQUIRED BY AUTHORIZED INSPECTOR OF ANY AUTHORITY HAVING JURISDICTION, TO BE CARRIED OUT WITHOUT CHARGE OR EXPENSE TO OWNER.

.4 SITE VISIT
BEFORE TENDERING THE CONTRACTOR SHALL VISIT THE SITE AND FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS AT THE SITE WHERE THE WORK HAS TO BE DONE. NO EXTRA WILL BE ALLOWED DUE TO FAILURE TO TAKE SITE CONDITIONS INTO CONSIDERATION.

.5 COORDINATION OF WORK
THIS CONTRACTOR SHALL COORDINATE HIS WORK WITH THE PROJECT MANAGER AND WITH ALL OTHER SUB-CONTRACTORS. COOPERATE WITH THE OWNER AND OTHER CONTRACTORS. WORK SHALL BE EXECUTED IN A MANNER SO AS TO CAUSE MINIMUM DISRUPTION. ALL SERVICES INTERRUPTIONS SHALL BE SCHEDULED OUTSIDE NORMAL WORKING HOURS. THIS CONTRACTOR SHALL INCLUDE IN HIS TENDER, COSTS FOR ALL OVERTIME WORK INVOLVED WITH THE CONSTRUCTION.

.6 GUARANTEE
THE CONTRACTOR SHALL GUARANTEE ALL WORK AND NEW EQUIPMENT PROVIDED AND INSTALLED UNDER THIS SPECIFICATION AGAINST ANY DEFECTS OF WORKMANSHIP AND MATERIAL FOR A PERIOD OF ONE YEAR AFTER ACCEPTANCE OF SAME BY OWNER. REPAIR AND MAKE GOOD ALL DAMAGE TO BUILDING INCURRED AS A RESULT OF FAILURE OF MECHANICAL WORK.

.7 DRAWINGS
THE DRAWINGS FOR THE WORK ACCOMPANYING THESE SPECIFICATIONS ARE MADE AS ACCURATELY AS POSSIBLE, BUT ABSOLUTE ACCURACY OF DIMENSIONS CANNOT BE GUARANTEED. THEY ARE INTENDED TO SUPPLEMENT AND SIMPLIFY THE GENERAL CONTRACT DRAWINGS. NO CLAIM FOR EXTRA PAYMENT ON ACCOUNT OF DIFFERENCE OF ACTUAL AND ESTIMATED DIMENSIONS SHALL BE ALLOWED. IN THE CASE OF DISCREPANCY OF FIGURE DIMENSIONS ON THE DRAWINGS, THE MATTER SHALL BE IMMEDIATELY SUBMITTED TO THE ENGINEER FOR HIS DECISION. WITHOUT THE DECISION, THE DISCREPANCY SHALL NOT BE ADJUSTED BY THE CONTRACTOR SAVE AT HIS OWN RISK, AND IN THE SETTLEMENT OF ANY COMPLICATIONS ARISING FROM SUCH ADJUSTING, THE CONTRACTOR SHALL BEAR ALL EXTRA EXPENSE INVOLVED. INTERPRETATION OF ALL DOCUMENTS SHALL BE BY THE ENGINEER.

.8 EXTRA WORK
NO ADDITIONAL MONEY OVER CONTRACT PRICE SHALL BE PAID UNLESS CONTRACTOR RECEIVES A SIGNED APPROVAL IN ACCORDANCE WITH THE GENERAL CONDITIONS. NO ADDITIONAL MONEY SHALL BE PAID FOR USE OF EQUAL PRODUCTS.

.9 CUTTING AND PATCHING
THE CONTRACTOR IS TO LOCATE THE EXACT DIMENSIONS AND POSITIONS OF OPENINGS AND HOLES WHERE CUTTING AND PATCHING ARE NECESSARY, IT SHALL BE COORDINATED BY THIS CONTRACTOR IN ADVANCE OR COMPLETED BY THE MECHANICAL CONTRACTOR. EXCAVATION AND BACKFILL WILL BE THE RESPONSIBILITY OF THE SITEWORK CONTRACTOR.

.10 SLEEVES
THE CONTRACTOR IS TO SUPPLY AND SET IN PLACE PIPE AND/OR DUCT SLEEVES IN FLOOR, ROOF, OR FIRE WALLS BEFORE CONCRETE IS POURED.

.11 SHOP DRAWINGS
CONTRACTOR SHALL SUBMIT, WITHIN TWO WEEKS AFTER BEING AWARDED THE CONTRACT, A MINIMUM OF 6 COPIES OF CERTIFIED SHOP DRAWINGS FOR REVIEW BY THE ENGINEER OF ALL EQUIPMENT AND MATERIAL SPECIFIED AND SHALL NOT PROCEED WITH ANY OF THIS WORK UNTIL THE DRAWINGS HAVE BEEN RETURNED STAMPED AND SIGNED. THIS REVIEW DOES NOT RELIEVE THE CONTRACTOR OF THE OBLIGATION OF CHECKING THE DRAWINGS HIMSELF OR FURNISHING THE MATERIALS SPECIFIED.

.12 CLEANING UP
THE CONTRACTORS SHALL, AT ALL TIMES, KEEP THE SITE NEAT, CLEAN AND FREE FROM ACCUMULATION OF WASTE, MATERIALS AND RUBBISH WHICH ARISE OUT OF THEIR WORK.

.13 REMOVALS
ALL MATERIAL DESIGNATED TO BE REMOVED SHALL BE DISPOSED OF OFF SITE BY THIS CONTRACTOR.

.14 EQUIVALENT
EQUIPMENT OF THE FOLLOWING MANUFACTURERS, PROVIDING THE EQUIPMENT HAS EQUAL CHARACTERISTICS TO THAT SPECIFICALLY MENTIONED IN THIS SPECIFICATION, IS CONSIDERED AS EQUAL AND WILL BE ACCEPTED. THE ENGINEER HAS THE SOLE RIGHT TO DETERMINE AND INTERPRET THE `EQUAL' QUALITIES. ANY MODIFICATIONS REQUIRED FOR INSTALLATION OF EQUAL PRODUCTS SHALL BE THE CONTRACTOR'S RESPONSIBILITY

EQUIPMENT OF MANUFACTURERS NOT MENTIONED IN THE `REVIEWED EQUALS LIST', WHO WISH TO HAVE THEIR EQUIPMENT LISTED AS EQUAL, MAY QUALIFY FOR THE `REVIEWED EQUALS LIST'. SUBMIT ALL REQUIRED TECHNICAL DATA THROUGH THE OFFICE OF THE PROJECT MANAGER A MINIMUM OF TEN (10) DAYS PRIOR TO TENDER CLOSING.
AC UNITS: YORK, LENNOX, TRANE, CARRIER
GRILLES AND DIFFUSERS : AIRVECTOR, KRUEGER, TITUS, E. H. PRICE, NAILOR
HRV'S: VENMAR, LIFEBREATH, FANTECH, NU-AIR, RENEWAIRE
PLUMBING FIXTURES: CRANE, AMERICAN STANDARD, KOHLER

.15 OPERATING AND MAINTENANCE INSTRUCTIONS
CONTRACTOR SHALL INSTRUCT THE OWNER IN OPERATION OF MAINTENANCE OF ALL EQUIPMENT AND SYSTEMS INSTALLED. ALL SAFETY AND CONTROL FEATURES SHALL BE THOROUGHLY EXPLAINED. THREE COPIES OF OPERATING AND MAINTENANCE INSTRUCTIONS, TOGETHER WITH ALL APPROVED SHOP DRAWINGS AND SPARE PARTS LIST FASTENED IN A BINDER, SHALL BE SUBMITTED TO THE OWNER.

.16 AS BUILT DRAWINGS
CONTRACTOR SHALL MAINTAIN, AT THE JOB SITE, ONE SET OF PLANS ON WHICH HE SHALL CLEARLY NOTE ALL CHANGES OR DEVIATIONS FROM THE CONTRACT DOCUMENTS, AS THE JOB PROGRESSES. CONTRACTOR SHALL AT THE TIME OF FINAL INSPECTION SUBMIT TO THE OWNERS REPRESENTATIVE, ONE SET OF FINAL `AS-BUILT' WHITE PRINT DRAWINGS.

.17 LABEL AND TAGGING
ALL EQUIPMENT, VALVES, SWITCHES, PIPES, ARE TO BE CLEARLY LABELED BY THE CONTRACTOR.

.18 FIRE STOPPING
MECHANICAL CONTRACTORS SHALL PROVIDE AND INSTALL A ULC LISTED FIRE STOPPING MATERIAL AT PENETRATION OF MECHANICAL SYSTEMS WHERE SUCH SYSTEMS PENETRATE FIRE AND SMOKE SEPARATIONS AND RATED ASSEMBLIES IN THE STRUCTURE AS INDICATED ON ARCHITECTURAL DRAWINGS OR AS REQUIRED BY AUTHORITIES HAVING JURISDICTION. FIRE STOPPING SHALL BE INSTALLED AS PER MANUFACTURES APPROVED INSTALLATION REQUIREMENTS AND SHALL BE INSPECTED PRIOR TO ENCLOSING WALLS OR CEILING WHERE FIRE STOPPING HAS BEEN INSTALLED.

PLUMBING SYSTEMS

.1 GENERAL
CONTRACTOR SHALL CONDUCT AND PAY FOR ALL PIPING TESTS. ALL TESTS SHALL BE CARRIED OUT IN THE PRESENCE OF THE ENGINEER OR HIS REPRESENTATIVE.

DRAINAGE PIPING SHALL BE SECURELY CLOSED BY MEANS OF APPROVED PLUGS AND THE ENTIRE PIPING SYSTEM INCLUDING RISING STACKS AND BRANCHES TO FIXTURES AND ALL HORIZONTAL MAINS AND DRAINS, SHALL BE FILLED WITH WATER UP TO THE TOP OF THE HIGHEST OPENING AND THIS WATER SHALL STAND AT THE SAME LEVEL FOR NOT LESS THAN TWO HOURS.

ALL DOMESTIC COLD AND HOT WATER PIPES SHALL BE TESTED FOR TWENTY-FOUR (24) HOURS AT 860 KPA (125 PSI) PRESSURE AND SHOW NO SIGNIFICANT PRESSURE DROP OR APPARENT LEAKS.

PLUMBING SYSTEMS CONT'D

.2 PIPE MATERIALS
PIPE MATERIALS SHALL BE AS SPECIFIED BELOW:

BELOW GROUND	M.W. CAST IRON CLASS 4000, PVC–DWV
ABOVE GROUND 17mm (3") & LARGER	M.W. CAST IRON CLASS 4000 C.S.A. B70-1970. PVC-DWV*
ABOVE GROUND 62mm (2") & SMALLER	COPPER DWV, PVC-DWV* CSA B-181.2
SANITARY VENTS	COPPER DWV, PVC-DWV* CSA B-181.2
DOMESTIC HOT & COLD WATER (INSIDE BUILDING)	COPPER TYPE 'L' HARD, POTABLE WATER APPROVED PEX PIPING.
COMPRESSED AIR, WASTE OIL, LUBE OIL AND WASHER FLUID.	SCHEDULE 40 BLACK STEEL, THREADED OR WELDED TO ASTM A53 ABOVE GRND.
PRESSURE WASH PIPING SYSTEM	SCHEDULE 80 GALVANIZED PIPING & FITTINGS- 1500 LB.

* IF CEILING SPACE IS TO BE USED AS A RETURN AIR PLENUM, PVC PIPING SHALL NOT BE USED UNLESS IT IS RATED FOR CEILING PLENUM USE. IPEX XFR SYSTEM IS RATED FOR PLENUM INSTALLATION

.3 UNIONS
PROVIDE UNIONS ON HOT AND COLD WATER LINES CONNECTED TO ALL EQUIPMENT.

.4 VALVES & GAUGES
DOMESTIC HOT & COLD WATER:
GATE VALVE - CRANE # 1320
BALL - CRANE # 9322
GLOBE VALVE - CRANE # 1312
CHECK VALVE - CRANE # 1343
PRESSURE GAUGE - WEKSLER EA14 0-100 PSI
THERMOMETER WITH WELL - WEKSLER EGSH9 30-180°F

.5 PIPE SUPPORTS
PIPING SHALL BE SUSPENDED FROM THE BUILDING STRUCTURE WITH GRINNELL, OR EQUAL, PIPE HANGERS AND STEEL RODS ATTACHED TO THE STEEL STRUCTURE BY MEANS OF "C" CLAMPS.
USE FIG. 269 FOR HORIZONTAL HOT AND COLD WATER PIPES,
FIG. CT-121C FOR VERTICAL HOT AND COLD WATER PIPES,
FIG. 260 FOR HORIZONTAL CAST IRON PIPES AND
FIG. 261 FOR VERTICAL CAST IRON PIPES.

HANGER SPACING SHALL BE AS PER THE FOLLOWING SCHEDULE:

PIPE DIAMETER	MAX. SPACING	STEEL RODS DIA.
12mm (1/2")	1500mm (5'-0")	9mm (3/8")
19mm (3/4")	1500mm (5'-0")	9mm (3/8")
25mm (1")	1800mm (6'-0")	9mm (3/8")
32mm (1-1/4")	2100mm (7'-0")	9mm (3/8")
37mm (1-1/2")	2400mm (8'-0")	12mm (1/2")
50mm (2")	2400mm (8'-0")	12mm (1/2")
62mm (2-1/2")	3000mm (10'-0")	12mm (1/2")
3"	3000mm (10'-0")	12mm (1/2")

SUPPORT ALL DRAINAGE PIPES ABOVE GROUND AT EVERY JOINT WITH APPROVED SUPPORTS DESIGNED FOR DRAINAGE.

BED SEWER PIPING ON 75mm (3") LAYER OF SAND OR STONE DUST. PIPING SHALL BE EVENLY SUPPORTED THROUGHOUT ITS LENGTH. BACKFILL WITH SAND OR STONE DUST.

.6 GRADING OF PIPES
WASTE AND SOIL PIPING SHALL BE GRADED IN DIRECTION OF THE FLOW, WITH A PITCH OF NOT LESS THAN 3mm (1/8") IN 300mm (1'-0") UNLESS OTHERWISE INDICATED. ALL HORIZONTAL BRANCHES OF VENT PIPING SHALL BE PITCHED 6mm (1/4") IN 300mm (1'-0") TOWARDS THE FIXTURES. ALL HORIZONTAL LINES OF HOT AND COLD WATER SHALL BE PITCHED SO THAT THEY MAY BE COMPLETELY DRAINED THROUGH RISERS, FIXTURES, OR DRIPS.

.7 INSULATION
INSULATE ALL DOMESTIC HOT, COLD AND RECIRCULATION WATER PIPING: 25mm (1") THICK OF FIBERGLASS, HEAVY DENSITY PIPE INSULATION, WITH FACTORY APPLIED ALL SERVICE JACKET (ASJ). WHERE INSULATED PIPING IS EXPOSED TO VIEW WRAP WITH A WHITE PVC JACKET AND PRE-FORMED PVC FITTINGS. SECURE JACKET AS PER MANUFACTURERS INSTALLATION INSTRUCTIONS.

.8 ESCUTCHEON PLATES
SUPPLY AND INSTALL ESCUTCHEON PLATES AS REQUIRED AT PIPE PENETRATIONS OF FINISHED BUILDING ELEMENTS.

.9 WATER HAMMER ARRESTORS
SUPPLY AND INSTALL WATER HAMMER ARRESTORS ON HOT AND COLD WATER PIPING AT ENDS OF HORIZONTAL BRANCHES TO EACH FIXTURE TO PREVENT WATER HAMMER, EQUAL TO PPP INC.

VENTILATION SYSTEMS

.1 DUCTWORK
ALL DUCTWORK SHALL BE CONSTRUCTED FROM LOCK FORMING QUALITY STEEL WITH G90 DESIGNATION ZINC COATING TO ASTM A-525 M-80 IN ACCORDANCE WITH THE LATEST EDITION OF ASHRAE GUIDE AND SMACNA STANDARDS. DUCT LEAKAGE SHALL NOT EXCEED 3% MAXIMUM. SEAL ALL DUCTS WITH APPROVED SEALANT.

HANGER SPACING SHALL BE AS THE FOLLOWING SCHEDULE:

LONGEST SIDE	GAUGE US	TYPE OF JOINTS				
		HEIGHT	SLIP	BAR SLIP	LOCK	"T"
UP TO 11" (275mm)	26	25	24	-	24	-
12" (300mm) TO 24" (600mm)	24	25	22	-	22	-
25" (625mm) TO 60" (1500mm)	22	25	-	22	22	22
61" (1525mm) TO 108" (2700mm)	20	37	-	22	22	22

REINFORCING MUST BE APPLIED ON ALL FOUR SIDES AND FASTENED TOGETHER AT EACH CORNER BY WELDING, BOLTING OR RIVETING. SIDES OF DUCTS OVER 18" (450 mm) WIDE SHALL BE STIFFENED BY CROSS BREAKING UNLESS THEY ARE TO BE INSULATED OR LINED. DUCT SIZES SHOWN ON DRAWINGS ARE INTERIOR DIMENSIONS. WHEN ACOUSTIC INSULATION IS ADDED INSIDE OF DUCT, SIZES SHALL BE INCREASED ACCORDINGLY. SEAL ALL JOINTS AND CONNECTIONS WITH POLYMER TYPE, FLAME RESISTANT HIGH VELOCITY DUCT SEALING COMPOUND, DURO- DYNE S-2 OR EQUAL TO MAKE DUCTWORK AIRTIGHT.

.2 HANGERS
SUPPORT EACH SECTION OF THE DUCTWORK WITH STEEL RODS, ANGLE IRON, "C" CLAMPS AND OR CONCRETE INSERTS ALL AS PER SCHEDULE BELOW:

DUCT SIZE	ANGLE DIM.	RODS DIA.	SPACING
UP TO 24" (750mm)	1"x1"x1/8" (24x25x3mm)	1/4" (6mm)	108" (2700mm)
31" (775mm) TO 48" (1200mm)	1"x1"x1/8" (37x37x3mm)	1/4" (6mm)	108" (2700mm)
49" (1225mm) TO 72" (1800mm)	1"x1"x1/8" (37x37x3mm)	3/8" (9mm)	108" (2700mm)
73" (1825mm) TO 96" (2400mm)	2"x2"x1/8" (50x50x3mm)	3/8" (9mm)	108" (2700mm)

DUCTS UP TO 18" (450 mm) MAY BE SUPPORTED WITH GALVANIZED STEEL STRAP HANGERS MANUFACTURED TO SMACNA STANDARDS, SCREWED AT THE TOP AND ON THE BOTTOM OF DUCT. DO NOT BREAK CONTINUITY OF INSULATION VAPOR BARRIER BY HANGERS OR RODS.

AIRCRAFT CABLE HANGERS ACCEPTABLE FOR ROUND DUCT INSTALLATIONS.

.3 FLEXIBLE CONNECTIONS
PROVIDE AT FANS AND AT ALL FAN POWERED UNITS, NEOPRENE COATED GLASS FABRIC, DURO-DYNE OR EQUAL, NOT MORE THAN 4" (100 mm) LONG BETWEEN METAL PARTS AND INSTALLED WITH SUFFICIENT SLACK TO PREVENT VIBRATION TRANSMISSION.

.4 DUCT INSULATION – THERMAL
DUCT INSULATION SHALL BE 1" THICK FIBERGLASS BLANKET INSULATION WITH FOIL FACING. INSULATE ALL CONDITIONED SUPPLY AIR DUCT.
INSULATE THE FOLLOWING DUCTS:
1. ALL DUCTWORK WITHIN 10FT OF ANY EXTERIOR OPENING.
2. SUPPLY AIR DUCTWORK CONNECTED TO ANY FAN COIL
REPAIR DAMAGED INSULATION AND LOOSE AREAS. RE-TAPE AS REQUIRED. CONFIRM QUANTITY ON SITE WITHIN AREAS OF CONSTRUCTION. INSTALL DUCT INSULATION WITH WELD PINS AND CLIPS. SEAL ALL JOINTS AND PENETRATIONS WITH FOIL TAPE. INSULATE AFTER ALL DUCTWORK HAS BEEN SEALED AND INSPECTED. ALL DUCT HANGERS AND ANGLE IRON SUPPORTS SHALL BE LOCATED OUTSIDE OF DUCT INSULATION. DUCT WORK EXPOSED IN CONDITIONED SPACE NOT REQUIRED TO BE INSULATED.

.5 FIRE DAMPERS
PROVIDE DYNAMIC FIRE DAMPERS WHERE SHOWN AND WHERE REQUIRED BY AUTHORITIES HAVING JURISDICTION TO MAINTAIN FIRE WALL OR CEILING INTEGRITY.
ACCEPTABLE MANUFACTURER: CONTROLLED AIR MFG LTD MODEL "B", OR EQUAL.

FIRE DAMPERS SHALL BE LISTED AND BEAR THE LABEL OF ULC AND SHALL MEET REQUIREMENTS AND BE INSTALLED TO NFPA 90A-1978 AND SMACNA STANDARD `FIRE DAMPER GUIDE FOR AIR HANDLING SYSTEMS'.

.6 BALANCING DAMPERS
PROVIDE BALANCING DAMPERS IN DUCTWORK WHERE SHOWN AND WHERE REQUIRED FOR PROPER ADJUSTMENT OF AIR QUANTITIES. ALL DAMPERS SHALL BE EQUIPPED WITH A LOCKING QUADRANT SOLIDLY MOUNTED ON THE EXTERIOR OF THE DUCT. CLOSED POSITIONS MUST BE CLEARLY MARKED. PROVIDE SHAFT AND BEARING ON EACH SIDE OF DAMPER.
.1 SPLITTER DAMPERS SHALL BE AIRFOIL SHAPE DOUBLE THICKNESS, ONE GAUGE HEAVIER THAN DUCT (MINIMUM 22 GAUGE) MOUNTED ON A ROUNDED EDGE PIANO HINGE. THE LENGTH OF THE DAMPER SHALL BE 1.5 TIMES THE WIDTH OF THE SMALLEST DUCT.
.2 BUTTERFLY DAMPER WITH A SINGLE 22 GAUGE BLADE MAY BE USED IN ROUND DUCTS OF 12" (300 mm) AND LESS.
.3 MULTI-LEAF OPPOSED BLADE DAMPERS DESIGNED TO SMACNA STANDARDS SHALL BE USED IN SQUARE DUCTS.

.7 MOTORIZED DAMPER
LOW LEAKAGE ALUMINUM SEALED AND INSULATED WITH OKRA BEARINGS, FLANGED TYPE, C/W DDC 120V MOTOR.
ACCEPTABLE MANUFACTURER: TAMCO 1000, BELIMO ACTUATORS

.8 ACCESS DOORS
PROVIDE AS INDICATED AND WHERE REQUIRED FOR ACCESS TO FIRE OR OTHER DAMPERS AND FOR SERVICE OR INSPECTION OF EQUIPMENT CAM-LEVER TYPE ACCESS PANEL 12" x 18" (300 x 450 mm) UNLESS OTHERWISE STATED, COMPLETE WITH TWO SASH LOCKS.

PANELS ON INSULATED DUCT WORK SHALL BE OF DOUBLE PANEL CONSTRUCTION WITH INSULATION FILLER AND SHALL HAVE AN EXTENDED METAL COLLAR TO BE FLUSH WITH FACE OF FINISHED INSULATION.

.9 ACOUSTIC INSULATION/TRANSFER OPENINGS
ACOUSTIC INSULATION SHALL BE 1" (25 mm) FIBERGLASS RIGID COATED DUCT LINER OR EQUAL RATED AT 25 OR LESS FOR FLAME SPREAD. IT SHALL BE INSTALLED ON THE FOUR INTERIOR FACES OF THE DUCT AND ADHERED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. COAT ALL EXPOSED EDGES WITH MASTIC SEALANT AND METAL NOSING ON LEADING EDGES. ACCEPTABLE MANUFACTURER: KNAUF, JOHN MANVILLE, FIBGLAS INC.

.10 FLEXIBLE DUCTS
FLEXIBLE DUCTS SHALL BE THERMAFLEX MAKE OR APPROVED EQUAL. (MAXIMUM LENGTH 5' (1500 mm. EXCEPT WHERE PERMITTED OR SHOWN).

.11 CLEANING AND STARTING
SYSTEMS SHALL BE CLEANED OF ALL DIRT, ETC., AND SHALL THEN BE STARTED UP. ALL EQUIPMENT SHALL BE FULLY SERVICED BEFORE STARTUP, AS PER MANUFACTURERS RECOMMENDATIONS. FILTERS SHALL BE REPLACED AFTER TEST RUN.

.11A CLEANING
ALL DUCTWORK AND EQUIPMENT SHALL BE PROTECTED FROM DUST DURING CONSTRUCTION AND CLEANED AT THE COMPLETION OF THE PROJECT.

.12 AIR BALANCING
AIR BALANCING SHALL BE DONE BY A PROFESSIONAL TEST AND BALANCING FIRM. AIR QUANTITIES AT EACH OUTLET SHALL BE AS INDICATED ON THE DRAWINGS. A REPORT SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. THIS REPORT SHALL SHOW THE CFM (l/s), VELOCITIES AND AREA OF EACH OUTLET, TYPE AND MODEL NUMBER OF FANS AND MOTORS INSTALLED, ACTUAL AIR DELIVERED BY THE FAN WITH TOTAL STATIC PRESSURE, VOLTAGE AND AMPERAGE DRAWN BY THE MOTORS. AFTER FINAL APPROVED BALANCE, PROVIDE INDEPENDENT REPORT TO THE OWNER FOR THEIR USE.

.13 GRILLE SCHEDULE
REFER TO VENTILATION LEGEND ON DRAWINGS.

.14 DUCT SEALING
ALL NEW SHEET METAL DUCTWORK SHALL BE DUCT SEALED WITH DUCT SEALANT INCLUDING CONNECTIONS TO EXISTING DUCTWORK. DUCT SEALANT: DUR-DYNE WT.

.15 EQUIPMENT
AS INDICATED ON SCHEDULES.

.16 SPARE BELTS AND KEYS
PROVIDE A SPARE SET OF BELTS FOR ALL EQUIPMENT BEING SUPPLIED UNDER THIS CONTRACT. EACH SPARE BELT SHALL BE MARKED WITH SIZE, MODEL, ETC... AND WHICH PIECE OF EQUIPMENT IT SERVES. PROVIDE A SET IN DUPLICATE, OF KEYS FOR THERMOSTATS, KEY OPERATED SWITCHES, ETC... EACH KEY SHALL BE MARKED CONCERNING ITS USE.

.17 VEHICLE EXHAUST SYSTEM
.1 CONTRACTOR SHALL SUPPLY AND INSTALL A COMPLETE SOURCE CAPTURE EMERGENCY VEHICLE EXHAUST SYSTEM FOR FOUR(4) EMERGENCY RESPONSE VEHICLES COMPLETE WITH BLOWER, CONTROL PANEL AND AUTOMATIC DISCONNECT TYPE NOZZLES.
.2 SOURCE CAPTURE EMERGENCY VEHICLE EXHAUST SYSTEM SHALL BE SLIDING BALANCER TRACK (SBT) TYPE AS MANUFACTURED BY PLYMOVENT OR APPROVED EQUAL. ALL PRODUCTS SHALL BE OF ONE(1) MANUFACTURER AND BE ULC LISTED FOR THE SPECIFIED USE.
.3 VEHICLE EXHAUST FAN: VEF-1
FAN SHALL BE DIRECT DRIVE CENTRIFUGAL TYPE HIGH PRESSURE. IMPELLER WHEEL SHALL BE SPARK RESISTANT.
MANUFACTURER: PLYMOVENT
MODEL: TEV-559-60
CAPACITY: 945 L/s @ 2MPa
ELECTRICAL: 208V/3Ø/60Hz; 3.73Kw

REFRIGERANT EQUIPMENT

.1 GENERAL

.1 SCOPE
THE WORK UNDER THIS SECTION OF THE SPECIFICATIONS SHALL INCLUDE THE FURNISHING OF ALL APPARATUS, EQUIPMENT, TOOLS, LABOR AND MATERIAL REQUIRED FOR A COMPLETE REFRIGERATION INSTALLATION AS INCLUDED ON THE DRAWINGS OR SPECIFIED HEREIN, INCLUDING BU NOT LIMITED TO THE FOLLOWING.
.1 CONDENSING UNITS, EVAPORATORS/FAN COIL UNITS, INTERCONNECTING PIPING AND ALL APPURTENANCES.
.2 PIPE AND EQUIPMENT INSULATION.
.3 TESTING, CHARGING, ADJUSTING AND OPERATING OF SYSTEM THROUGH TEMPERATURE PULL DOWN OF ALL REFRIGERATED SPACES.
.4 INSTRUCTION OF OWNER'S OPERATING AND MAINTENANCE PERSONNEL.
.5 SECURING AND PAYING FOR ALL PERMITS, CERTIFICATIONS AND APPROVALS REQUIRED.
.6 CUTTING, PATCHING, PAINTING, SEALING, FLASHING AND COUNTER FLASHING OF ALL WALL AND ROOF PENETRATIONS, AND COOLER PENETRATIONS.

REFRIGERANT EQUIPMENT CONT'D

.2 REGULATIONS
.1 ALL WORK AND MATERIALS SHALL BE IN FULL ACCORDANCE WITH THE LATEST LOCAL RULES AND REGULATIONS. THE SAFETY ORDERS OF THE DIVISIONS OF INDUSTRIAL SAFETY, THE PROVINCIAL FIRE MARSHAL, THE ELECTRICAL CODE, AND ALL ELEMENTS. APPLICABLE STATE AND LOCAL REQUIREMENTS PLANS AND SPECIFICATIONS IS TO BE CONSTRUED TO PERMIT WORK NOT. CONFORMING TO THESE REQUIREMENTS. PLANS AND SPECIFICATIONS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE REQUIREMENTS.
.2 WHEREVER THE SPECIFICATIONS CALL FOR OR DESCRIBE MATERIALS OR CONSTRUCTION OF BETTER QUALITY OR LARGER SIZE THAN ARE REQUIRED BY THE ABOVE RULES AND REGULATIONS, THE SPECIFICATIONS SHALL GOVERN. SHOULD THERE BE ANY DIRECT CONFLICT BETWEEN THE ABOVE RULES AND THESE SPECIFICATIONS, THE RULES SHALL GOVERN.
.3 APPLICABLE PUBLICATIONS: THE PUBLICATIONS LISTED BELOW FORM A PART OF THIS SPECIFICATION TO THE EXTENT REFERENCED. THE PUBLICATIONS ARE REFERRED TO IN THE TEXT BY THE BASIC DESIGNATION ONLY
.1 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) PUBLICATION: ANSI B31.5-83 - REFRIGERATION PIPING.
.2 AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)PUBLICATION: SEC8-D-1-83 - PRESSURE VESSELS - DIVISION 1.
.3 AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIRCONDITIONING ENGINEERS (ASHRAE) PUBLICATION: 15-1989 - SAFETY CODE FOR MECHANICAL REFRIGERATION.

.3 SHOP DRAWINGS
.1 SHALL BE COMPLETE AS ONE SUBMITTAL AND INCLUDE THE FOLLOWING:
.1 CONDENSING UNITS.
.2 EVAPORATORS/FAN COIL UNITS.
.3 HAND VALVES.
.4 CONTROL VALVES.
.5 SUCTION FILTERS.
.6 SIGHT GLASSES.
.7 PRESSURE GAUGES.
.8 THERMOSTATS.
.9 PIPE HANGING ACCESSORIES.

.4 COORDINATION
.1 ASSUME FULL RESPONSIBILITY FOR LAYING OUT THIS WORK TO AVOID CONFLICT WITH OTHER TRADES. EQUIPMENT TO BE POSITIONED IN AREAS DESIGNATED ONDRAWING(S), CLEAR OF STOCK AND STACKER OPERATIONS. MOUNT EVAPORATORS AND ALL PIPING AS HIGH AS POSSIBLE AS NOTED.
.2 WORK SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE CODES, REGULATIONS, AND BY-LAWS.
.3 WORK SHALL BE DONE BY REFRIGERATION MECHANICS EXPERIENCED IN INSTALLATION OF SIMILAR TYPES OF SYSTEMS AND EQUIPMENT.

.5 CLASSES AND MAXIMUM WORKING PRESSURES
.1 EXCEPT AS SPECIFIED OTHERWISE, EQUIPMENT AND PIPING COMPONENTS SHALL BE SUITABLE FOR USE UNDER THE MAXIMUM WORKING PRESSURE INDICATED. EXCEPT AS MODIFIED HEREIN, THE PRESSURE TEMPERATURE LIMITATIONS SHALL BE AS SPECIFIED IN THE REFERENCED STANDARDS AND SPECIFICATIONS. ALL PRESSURES IN THIS SPECIFICATION ARE PRESSURES IN POUNDS PER SQUARE INCH (PSI) ABOVE ATMOSPHERE PRESSURE, AND TEMPERATURE ARE IN DEGREES FAHRENHEIT (F).

.2 PRODUCTS
.1 SEE SCHEDULE AND SCHEMATIC OF DRAWINGS.

.3 EXECUTION
.1 MOISTURE TREATMENT REQUIREMENT
.1 THE HIGH PRESSURE SIDE OF THE SYSTEM SHALL BE TESTED WITH DRY NITROGEN AT 2068 KPA (300 PSIG).
.2 THE LOW PRESSURE SIDE OF THE SYSTEM SHALL BE TESTED WITH DRY NITROGEN AT 1034 KPA (150 PSIG).
.3 CONTROLS AND OTHER EQUIPMENT OR APPARATUS THAT MAY BE DAMAGED BY THE TEST PRESSURE EMPLOYED SHALL BE REMOVED OR MADE INOPERATIVE BEFORE THE TESTS ARE MADE AND THE OPENINGS SHALL BE PLUGGED OR CAPPED.
.4 A PRESSURE LIMITING OR REDUCING VALVE WITH PRESSURE GAUGE SHALL BE USED ON THE HIGH PRESSURE GAS TANK TO LIMIT THE PRESSURE IN THE SYSTEM TO THE TEST PRESSURE.

.2 EVACUATING REFRIGERATION SYSTEMS
.1 AFTER COMPLETION OF TESTING OF REFRIGERANT SYSTEM FOR LEAKS, REMOVE ALL AIR AND MOISTURE FROM THE SYSTEM BY USING A HIGH VACUUM PUMP. THE PUMP SHALL BE CAPABLE OF REDUCING THE ABSOLUTE PRESSURE IN THE SYSTEM TO A POINT WHERE ANY WATER PRESENT IN THE LINES WILL VAPORIZE AT A TEMPERATURE APPRECIABLY BELOW THE AMBIENT TEMPERATURE AND WILL BE WITHDRAWN FROM THE SYSTEM. BEFORE CONDUCTING THE EVACUATION TEST, INSPECT THE VACUUM PUMP OIL FOR PURITY AND PROVIDE NEW OIL CHARGE IF EXISTING CHARGE IS CONTAMINATED. EVACUATE THE SYSTEM TO A MAXIMUM ABSOLUTE PRESSURE OF 500 MICRONS (20 MIL) OF MERCURY OR LOWER, DURING THE EVACUATION, THE AMBIENT TEMPERATURE SHALL NOT BE LESS THAN 2°C (35°F). ELECTRONIC INSTRUMENTS SHALL BE USED FOR MEASUREMENT OF PRESSURE. UPON ACHIEVING EVACUATION OF SYSTEM, VALVE OFF THE VACUUM PUMP FROM THE SYSTEM FOR A PERIOD OF AT LEAST 6 HOURS. THE SYSTEM SHALL BE CONSIDERED TIGHT AND DRY AND FREE OF AIR IF THE ABSOLUTE PRESSURE HAS NOT INCREASED BY MORE THAN 200 MICRONS (8MIL) Hg AT THE EXPIRATION OF THIS PERIOD. REPEAT THE PRESSURE TEST IF THE PRESSURE RISE EXCEEDS 200 MICRONS (8MIL) Hg, WHICH INDICATES A LEAK IN THE SYSTEM OR PRESENCE OF MOISTURE. IF NO LEAKS ARE FOUND, RESUME THE EVACUATION TEST AND CONTINUE UNTIL DRYNESS OF SYSTEM IS ACHIEVED. WHEN A SATISFACTORY VACUUM HAS BEEN OBTAINED, IT SHALL BE BROKEN WITH THE INTRODUC

HEATING SYSTEMS

1.1. GENERAL

CONTRACTOR SHALL CONDUCT AND PAY FOR ALL PIPING TESTS. ALL TESTS SHALL BE CARRIED OUT IN THE PRESENCE OF THE ENGINEER OR THEIR REPRESENTATIVE. INSTALL DRAINS AT LOW POINTS IN PIPING SYSTEMS, AT EQUIPMENT AND AT SECTION ISOLATING VALVES. INSTALL AIR VENTS AT HIGH POINTS IN PIPING SYSTEM AND AS INDICATED. PROVIDE PRESSURE TEST AND FLUSHING OUT OF NEW SYSTEMS. PROVIDE FLUSHING, CLEANING AND WATER TREATMENT TEST REPORT.

1.2. PIPE MATERIAL

PIPE MATERIAL SHALL BE SIMILAR TO THE EXISTING INSTALLATION OR AS SPECIFIED BELOW:

- HEATING SYSTEM HOT WATER PIPING.
  - SCHEDULE 40 BLACK STEEL, THREADED FITTINGS OR WELDED.

1.3. UNIONS

PROVIDE UNIONS ON HOT AND COLD WATER LINES CONNECTED TO ALL EQUIPMENT.

1.4. PRESSURE GAUGES

PROVIDE PRESSURE GAUGES AT INLET AND OUTLET OF PUMPS.
ACCEPTABLE MANUFACTURER: TRERICE.

1.5. VALVES

HEATING SYSTEM HOT WATER:

	THREADED	FLANGED
GATE VALVE	JENKINS: 810J	JENKINS: 452J
CHECK VALVE	JENKINS: 4041TJ	JENKINS: 587J
BALL VALVE	JENKINS: 201J	-

APPROVED ALTERNATE MANUFACTURER: CRANE.

1.6. HEATING

CONTROL VALVES:

- ELECTRONIC ACTUATOR, SPRING RETURN
- 3-WAY MIXING
- NORMALLY: HEATING "ENABLE" POSITION, FAIL: HEATING "ENABLE" POSITION
- 24V DC POWER, 0-10V DC CONTROL SIGNAL, PROPORTIONAL CONTROL
- FLANGE CONNECTIONS
- c/w POSITION FEEDBACK
- SIZE AS PER PLAN
- CV = 101
- APPROVED PRODUCT: BELIMO AF24 SERIES
  SIEBE VB-9313 SERIES

1.7. HEATING SYSTEM STRAINERS

- SIZE AS INDICATED ON DRAWINGS
- c/w DRAIN AND DRAIN VALVE
- STEEL BODY
- APPROVED PRODUCT: SPIRAX SARCO FIG. 34

1.8. PIPING FLEXIBLE CONNECTIONS

- STAINLESS STEEL BRAIDED
- FLANGED CONNECTIONS
- APPROVED PRODUCT: MASON INDUSTRIES 75x225

1.9. PIPE SUPPORTS

PIPING SHALL BE SUSPENDED FROM THE BUILDING STRUCTURE WITH GRINNELL, OR EQUAL, PIPE HANGERS AND STEEL RODS ATTACHED TO THE STEEL STRUCTURE BY MEANS OF 'C' CLAMPS.
USE GRINELL FIG. 269 FOR HORIZONTAL HOT AND COLD WATER PIPES, GRINELL FIG. CT-121C FOR VERTICAL HOT AND COLD WATER PIPES, GRINELL FIG. 260 FOR HORIZONTAL CAST IRON PIPES AND GRINELL FIG. 261 FOR VERTICAL CAST IRON PIPES. HANGER SPACING SHALL BE AS PER THE FOLLOWING SCHEDULE:

PIPE DIA.	MAX. SPACING	STEEL ROD DIA.
12mm (NPS 1/2)	1500mm (5'-0")	9mm (3/8")
19mm (NPS 3/4)	1500mm (5'-0")	9mm (3/8")
25mm (NPS 1)	1800mm (6'-0")	9mm (3/8")
32mm (NPS 1-1/4)	2100mm (7'-0")	9mm (3/8")
37mm (NPS 1-1/2)	2400mm (8'-0")	12mm (1/2")
50mm (NPS 2)	2400mm (8'-0")	12mm (1/2")
62mm (NPS 2-1/2)	3000mm (10'-0")	12mm (1/2")
75mm (NPS 3)	3000mm (10'-0")	12mm (1/2")

SUPPORT ALL DRAINAGE PIPES ABOVE GROUND AT EVERY JOINT WITH APPROVED SUPPORTS DESIGNED FOR DRAINAGE.

1.10. GRADING OF PIPES

DRAINAGE PIPING SHALL BE GRADED IN DIRECTION OF THE FLOW, WITH A PITCH OF NOT LESS THAN 3mm IN 300mm UNLESS OTHERWISE INDICATED. ALL HORIZONTAL LINES OF HEATING WATER SHALL BE PITCHED SO THAT THEY MAY BE COMPLETELY DRAINED THROUGH RISERS OR LOW POINT DRAINS.

1.11. INSULATION

INSULATE ALL NEW HEATING HOT WATER PIPING, VALVES AND FITTINGS WITH 25mm THICK OF FIBERGLASS, HEAVY DENSITY PIPE INSULATION WITH CANVAS JACKET. TO MATCH EXISTING, SEAL ALL JOINTS. PROVIDE NEW INSULATION UP TO EXISTING TO MAKE COMPLETE.

1.12. IDENTIFICATION

IDENTIFY CONTENTS BY BACKGROUND COLOR MARKING, PICTOGRAMS (AS NECESSARY), LEGEND,
DIRECTION OF FLOW BY ARROWS.

BACKGROUND COLOR MARKING AND LEGENDS FOR PIPING SYSTEMS:

CONTENT	BACKGROUND COLOR MARKING	LEGEND
HEATING HOT WATER SUPPLY	YELLOW	H.W. SUPPLY
HEATING HOT WATER RETURN	YELLOW	H.W. RETURN

1.13. REMOVALS

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND DISPOSAL OF EXISTING EQUIPMENT, PIPING AND ACCESSORIES MADE REDUNDANT BY THIS CONTRACT.

RADIANT FLOOR HEATING

PRODUCTS

1.1. TUBING

1.1.1. MATERIAL: ALL RADIANT FLOOR HEATING PIPE SHALL BE HIGH-DENSITY CROSS-LINKED POLYETHYLENE MANUFACTURED USING THE HIGH-PRESSURE PEROXIDE METHOD OF CROSS-LINKING (PEXA) WITH A MINIMUM DEGREE OF CROSS-LINKING OF 80% WHEN TESTED IN ACCORDANCE WITH ASTM D 2765, METHOD B. PIPE SHALL CONFORM TO ASTM F 876, F877 AND CSA B 137.5, AND BE CERTIFIED BY CSA OR EQUIVALENT THIRD-PARTY TESTING ORGANIZATION. ALL TUBING SHALL BE ½" I.D. UNLESS NOTED.

1.1.2. TEMPERATURE AND PRESSURE RATING: TUBING SHALL BE RATED FOR NOT LESS THAN 82°C WORKING TEMPERATURE AND 690 KPA WORKING PRESSURE. OXYGEN DIFFUSION BARRIER: TUBING SHALL HAVE A CO-EXTRUDED OXYGEN DIFFUSION BARRIER CAPABLE OF LIMITING OXYGEN DIFFUSION THROUGH THE TUBE AT NO GREATER THAN 0.10/G/M3/DAY AT 40°C WATER TEMPERATURE.

1.1.3. BEND RADIUS: THE MINIMUM BEND RADIUS FOR COLD BENDING OF THE TUBE SHALL NOT BE LESS THAN FIVE (5) TIMES THE OUTSIDE DIAMETER. BENDS WITH A RADIUS LESS THAN STATED SHALL REQUIRE THE USE OF A BENDING TEMPLATE AS SUPPLIED BY THE TUBE MANUFACTURER

1.1.4. FLAME AND SMOKE SPREAD: PIPE TO HAVE A FLAME SPREAD INDEX OF LESS THAN 25, AND A SMOKE DEVELOPED INDEX OF LESS THAN 50, WHEN TESTED IN ACCORDANCE WITH ASTM E 84 (US) OR CAN/ULC S102.2 (CANADA).

1.1.5. PIPE TO BE MANUFACTURED IN AN ISO 9001 CERTIFIED PRODUCTION FACILITY.

1.1.6. STANDARD OF ACCEPTANCE: REHAU PEXA.

1.2. FITTINGS

1.2.1. FITTINGS SHALL BE MANUFACTURED OF BRASS AND SHALL BE SUPPLIED BY THE TUBING MANUFACTURER AS PART OF A PROVEN CATALOGUED SYSTEM.

1.2.2. TUBE COUPLINGS EMBEDDED WITHIN THE THERMAL MASS SHALL BE BRASS, COMPRESSION TYPE WITH RIBBED INSERT AND COMPRESSION SLEEVE.

1.2.3. FITTINGS SHALL BE THIRD-PARTY CERTIFIED TO APPLICABLE STANDARDS ASTM F877, F 2080 AND CSA B 137.5 AS PART OF THE MANUFACTURER'S PEX PIPING SYSTEM. WITH INDEPENDENT LISTINGS FROM IAPMO AND ICC, AS APPLICABLE.

1.2.4. FITTINGS EMBEDDED WITHIN THE THERMAL MASS OR ENCASED BEHIND WALLS OR CEILINGS SHALL BE COLD-EXPANSION COMPRESSION-SLEEVE FITTINGS CERTIFIED TO ASTM F 2080. COMPRESSION-SLEEVE FITTINGS TO HAVE MINIMUM INSIDE DIAMETER OF 82% OF PIPE INSIDE DIAMETER.

1.3. RADIANT HEATING MANIFOLDS

1.3.1. MATERIAL: DISTRIBUTION MANIFOLDS SHALL BE MANUFACTURED OF BRASS AND BE SUPPLIED BY THE PIPING MANUFACTURER AS A PROVEN CATALOGUED PART OF THE MANUFACTURER'S SYSTEM.

1.3.2. BRASS MANIFOLDS SHALL BE PRODUCED FROM EXTRUDED BRASS ROUND PIPE WITH TAPPED HOLES FOR CONNECTIONS, BE PRE-ASSEMBLED AND 100% AIR TESTED BY THE MANUFACTURER.

1.3.3. BRASS BALANCING MANIFOLDS SHALL BE EQUIPPED WITH INTEGRAL VISUAL FLOW GAUGES THAT READ TO 2 USGPM FOR EACH CIRCUIT, CIRCUIT BALANCING AND FLOW CONTROL VALVES, ISOLATION VALVES WITH INTEGRAL THERMOMETER HOUSINGS AND AIR VENT/FILL PORTS. EACH CIRCUIT VALVE SHALL BE SUPPLIED WITH A MANUAL ACTUATING HANDLE FOR FILLING/PURGING OPERATION. STANDARD OF ACCEPTANCE: REHAU PRO-BALANCE MANIFOLDS.

1.4. CAPACITY

1.4.1. AS INDICATED ON DRAWINGS PREPARED AS PART OF EXISTING DESIGN.

1.5. ACCEPTABLE MANUFACTURERS

1.5.1. REHAU - PexA
1.5.2. HEAT LINK - PexA
1.5.3. UPONOR - PexA

EXECUTION

1.6. PREPARATION

1.6.1. CONCRETE SLAB ON GRADE: SUBSOIL SHOULD BE COMPACTED, FLAT AND SMOOTH TO PREVENT DAMAGE TO TUBE OR INSULATION.

1.6.2. PREPARING THE WALL CAVITY FOR MANIFOLD INSTALLATION. SEE DRAWINGS PREPARED AS PART OF EXISTING DESIGN TO DETERMINE THE WIDTH OF THE WALL CABINET AND REQUIRED WALL OPENING DIMENSIONS. MOUNT THE MANIFOLD CABINET ALLOWING SPACE FOR THE SCREED TO FILL UP THE FRONT OF THE TUBE OPENING.

1.7. INSTALLATION

1.7.1. INSTALL IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TECHNICAL MANUAL.

1.7.2. ROUTE TUBING IN ORDERLY MANNER, ACCORDING TO LAYOUT AND SPACING SHOWN IN APPROVED SUBMITTAL DRAWINGS. ALL NOTES ON DRAWINGS SHALL BE FOLLOWED.

1.7.3. AT JOINTS AND FITTINGS, SQUARE AND CLEAN END OF TUBE, USING A PLASTIC TUBE CUTTER AND JOIN IMMEDIATELY OR CAP WITH TAPE TO SEAL FROM CONTAMINANTS. WHERE FITTINGS ARE INSTALLED WITHIN THE THERMAL MASS THEY SHALL BE WRAPPED IN CHLORIDE-FREE TAPE.

1.7.4. REMOVE ALL TWISTS PRIOR TO SECURING TUBE. FASTEN TUBING AT NO MORE THAN 914 MM INTERVALS (EXCEPT IN THIN CONCRETE SLABS), BEING CAREFUL NOT TO TWIST THE TUBE.

1.7.5. TUBING THAT MUST PASS THROUGH EXPANSION JOINTS SHALL BE SLEEVED 254 MM ON EACH SIDE OF THE JOINT.

1.7.6. WHERE TUBING EXITS THE FLOOR, A SLEEVE SHALL BE PLACED AROUND THE TUBE, WITH THE SLEEVE EXTENDING A MINIMUM OF 254 MM INTO THE FLOOR AND EXITING BY A MINIMUM OF 254 MM.

1.7.7. AFTER LAYING EACH CIRCUIT, CAP THE END OF THE TUBE WITH TAPE AND LABEL THE TUBE'S CIRCUIT NUMBERS (SUPPLY AND RETURN) OR CONNECT TO ASSOCIATED MANIFOLD AND LABEL TUBE LENGTH FOR BALANCING.

1.7.8. THE FOLLOWING PRECAUTIONS SHALL BE TAKEN IN AREAS INTENDED FOR CARPET:

- NOTIFY CARPET LAYER THAT HYDRONIC FLOOR HEATING HAS BEEN INSTALLED.
- INSTALL METAL GUARDS WHERE CARPET TACK STRIPS WILL BE INSTALLED.

1.7.9. THE HEATING SYSTEM SHOULD BE PUT INTO OPERATION AFTER THE POURED CONCRETE THERMAL MASS HAS CURED A MINIMUM OF 28 DAYS. IF IT IS NECESSARY TO OPERATE THE HEATING SYSTEM TO PREVENT FREEZING, A MAXIMUM FLOW TEMPERATURE OF 15°C MUST NOT BE EXCEEDED WHILE THE THERMAL MASS IS CURING. GRADUALLY INCREASE THE FLOW TEMPERATURE BY 5°C EACH DAY UNTIL IT REACHES THE MAXIMUM OPERATING TEMPERATURE.

1.8. FIELD QUALITY CONTROL

1.8.1. FILLING, TESTING AND BALANCING:

1.8.1.1. TESTS OF HYDRONIC HEATING SYSTEMS SHALL COMPLY WITH LOCAL CODES AND WHERE REQUIRED, SHOULD BE WITNESSED BY THE BUILDING OFFICIAL.

1.8.1.2. PRESSURE GAUGES USED MUST SHOW PRESSURE INCREMENTS OF 7 KPA AND SHOULD BE LOCATED AT OR NEAR THE LOWEST POINTS IN THE DISTRIBUTION SYSTEM.

1.8.1.3. CHARGE THE COMPLETE, YET UNCONCEALED TUBES WITH WATER. PURGE ALL AIR FROM TUBES. CHECK THE SYSTEM FOR LEAKAGE, ESPECIALLY AT ALL TUBE JOINTS. TAKE NECESSARY PRECAUTIONS TO PREVENT WATER FROM FREEZING.

1.8.1.4. PERFORM A PRELIMINARY PRESSURE TEST PRESSURIZING THE SYSTEM TO 1.5 TIMES THE MAXIMUM OPERATING PRESSURE OR 690 KPA WHICHEVER IS GREATER FOR 30 MINUTES. AS THE TUBING EXPANDS, RESTORE PRESSURE, FIRST AT 10 MINUTES INTO THE TEST AND AGAIN AT 20 MINUTES. AT THE END OF THE 30 MINUTE PRELIMINARY TEST, PRESSURE MUST NOT FALL BY MORE THAN 55 KPA FROM THE MAXIMUM AND THERE SHALL BE NO LEAKAGE.

1.8.1.5. AFTER THE PERFORMING THE PRELIMINARY TEST, PERFORM THE MAIN PRESSURE TEST IMMEDIATELY. THE MAIN PRESSURE TEST SHALL LAST 2 HOURS. THE TEST PRESSURE SHOULD BE RESTORED AND MUST NOT FALL MORE THAN 20 KPA (3 PSIG) AFTER 2 HOURS. NO LEAKAGE SHOULD BE DETECTED.

1.8.1.6. PRESSURE SHALL BE MAINTAINED DURING INSTALLATION OF THE THERMAL MASS.

1.8.1.7. COMPLETE ALL INSPECTION AND TEST REPORTS AS SUPPLIED BY THE MANUFACTURER OF THE SYSTEM.

PROPANE GAS SYSTEMS

.1 GENERAL

CONTRACTOR SHALL CONDUCT AND PAY FOR ALL PIPING TESTS. ALL TESTS SHALL BE CARRIED OUT IN THE PRESENCE OF THE ENGINEER OR THEIR REPRESENTATIVE.

.2 PROPANE GAS SYSTEM

THE PROPANE GAS SYSTEM SHALL BE INSTALLED IN STRICT ACCORDANCE WITH CAN/CGA-B149.1-15 "NATURAL GAS AND PROPANE INSTALLATION CODE". THIS CONTRACTOR SHALL SUBMIT DOCUMENTS FOR OFFICIAL STAMP TO THE N.S. DEPARTMENT OF LABOUR PRIOR TO COMMENCING THE INSTALLATION. THE ENTIRE INSTALLATION SHALL BE TESTED AT A TEST PRESSURE OF 100 PSI FOR A MINIMUM PERIOD OF TWO HOURS WITHOUT ANY LOSS BEFORE ANY PIPING IS ENCLOSED. TEST SHALL BE WITNESSED AND APPROVED N.B. DEPARTMENT OF LABOUR. WHEN ALL OUTLETS HAVE BEEN CONNECTED, THE WHOLE SYSTEM SHALL BE TESTED AT A PRESSURE OF 15 PSI FOR A PERIOD OF TWO HOURS WITHOUT ANY LOSS. TEST SHALL BE WITNESSED AND APPROVED BY THE NEW-BRUNSWICK DEPARTMENT OF LABOUR.

.3 INSPECTIONS AND CERTIFICATES

INSPECTION AND CERTIFICATES OF PROPANE GAS SYSTEM SHALL BE OBTAINED BY THIS CONTRACTOR.

.4 MANUAL VALVES

PROVIDE ISOLATION VALVES FOR MAINS AND BRANCH PIPING TO FIXTURES AND EQUIPMENT. LUBRICATED BALL VALVES TO PROVINCIAL CODE APPROVAL. INSTALL AT BRANCH TAKE-OFF TO ISOLATE PIECES OF EQUIPMENT, AND AS INDICATED.

THE MANUAL SHUT-OFF VALVES SHALL BE REGO SERIES 7500 GLOBE VALVES, CSA AND ULC APPROVED FOR PROPANE GAS SHUT-OFF SERVICE.

.3 UNIONS

PROVIDE UNIONS ON LINES CONNECTED TO ALL EQUIPMENT, INCLUDING REGULATORS.

.5 PIPE MATERIAL

PIPING SHALL BE AS REQUIRED BY CSA/CGA-B149.1-15.

- STEEL PIPE: TO ASTM A53/A 53M-02, SCHEDULE 40 AS FOLLOWS:
  .1 NPS 1/2 TO 2, SCREWED.
  .2 OVER NPS 2, PLAIN END, WELDED

- JOINTING MATERIAL:
  .1 SCREWED FITTINGS: PULVERIZED LEAD PASTE.
  .2 WELDED FITTINGS: TO CSA W47.1-92 (R2001).
  .3 FLANGE GASKETS: NONMETALLIC FLAT.
  .4 SOLDERED: TO ASTM B 32-00E1, 50/50.

- INSTALLATION TO BE IN ACCORDANCE WITH B149.1-15

- INSTALL DRIP POINTS:

  .1 AT LOW POINTS IN PIPING SYSTEMS.

  .2 AT CONNECTIONS TO EQUIPMENT.

- FIELD QUALITY CONTROL: TEST SYSTEM IN ACCORDANCE WITH B149.1-15 AND REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.

- PURGING: PURGE AFTER PRESSURE TEST IN ACCORDANCE WITH B149.1-15

- PRE-START-UP INSPECTIONS:

  .1 CHECK VENTS FROM REGULATORS, CONTROL VALVES, TERMINATE OUTSIDE BUILDING IN APPROVED LOCATION, PROTECT AGAINST BLOCKAGE, DAMAGE.

  .2 CHECK GAS TRAINS, ENTIRE INSTALLATION IS APPROVED BY AUTHORITY HAVING JURISDICTION.

.6 PIPING FLEXIBLE CONNECTIONS

- STAINLESS STEEL BRAIDED
- FLANGED CONNECTIONS
- APPROVED PRODUCT: MASON INDUSTRIES 75x225

.7 PIPE SUPPORTS

PIPING SHALL BE SUSPENDED FROM THE BUILDING STRUCTURE WITH GRINNELL, OR EQUAL, CLEVIS TYPE PIPE HANGERS AND STEEL RODS ATTACHED TO THE STEEL STRUCTURE.

SUPPORTS TO BE IN ACCORDANCE WITH B149.1-15 OR SCHEDULE BELOW, WHICHEVER IS MORE STRINGENT.

HANGER SPACING SHALL BE AS PER THE FOLLOWING SCHEDULE:

PIPE DIA.	MAX. SPACING	STEEL ROD DIA.
NPS 1/2 (12mm)	5'-0" (1500mm)	3/8" (9mm)
NPS 3/4 (19mm)	5'-0" (1500mm)	3/8" (9mm)
NPS 1 (25mm)	6'-0" (1800mm)	3/8" (9mm)
NPS 1-1/4 (32mm)	7'-0" (2100mm)	3/8" (9mm)
NPS 1-1/2 (37mm)	8'-0" (2400mm)	1/2" (12mm)
NPS 2 (50mm)	8'-0" (2400mm)	1/2" (12mm)
NPS 2-1/2 (62mm)	10'-0" (3000mm)	1/2" (12mm)
NPS 3 (75mm)	10'-0" (3000mm)	1/2" (12mm)

.8 INDENTIFICATION

PROVIDE AND INSTALL ON PIPING SYSTEMS, IDENTIFICATION CONSISTING OF DESCRIPTION AND FLOW DIRECTION. TO BE IN ACCORDANCE WITH B149.1-15.

.9 PAINTING

PROVIDE FINISH PAINTING FOR ALL NEW AND EXISTING PIPING SYSTEMS. COLOUR TO MATCH EXISTING INSTALLATIONS.

WINDSOR / WEST HANTS TOGETHER

General Notes:
All levels and dimensions are to be checked on site by the contractor prior to fabrication, and any discrepancies must be reported immediately to the Architect.
All dimensions are to be read off this drawing and NOT scaled.
All work to be executed in strict accordance with the by-laws and regulations of the local authorities and in accordance with Building Construction Standards.
All work to conform to applicable standards as referenced within the master specifications or as indicated in the drawing.
Where indicated / required, all drawings are to be read in conjunction with all other documents issued.
This drawing is only to be used for obtaining Local Authority Consents and should not be used for any other purpose unless otherwise stated on drawing.

Maricor
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14-19-132

4	ISSUED FOR RFP	2021/04/20
3	ISSUED FOR TENDER	2021/03/31
2	ISSUED FOR COORDINATION	2021/03/26
1	ISSUED FOR 75% REVIEW	2021/02/17
No.	Description	Date

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HANTSPORT FIRE STATION
HANTSPORT, NS

MECHANICAL SPECIFICATION

Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	CM
Checked By	RP

M-301

Scale AS NOTED

LIGHTING

- LINEAR LUMINAIRE - RECESSED
- LINEAR LUMINAIRE - RECESSED - EMERGENCY / NIGHT LIGHTING
- LINEAR LUMINAIRE - SURFACE MOUNTED
- LINEAR LUMINAIRE - SURFACE MOUNTED - EMERGENCY / NIGHT LIGHTING
- CEILING MOUNTED LUMINAIRE: NORMAL / NIGHT LIGHTING
- WALL MOUNTED LUMINAIRE
- DOUBLE SURFACE MOUNTED EMERGENCY LIGHTING - REMOTE HEADS
- H BBB — EMERGENCY LIGHTING BATTERY UNIT C/W DUPLEX RECEPTACLE AND DOUBLE REMOTE HEADS.

SECURITY AND ACCESS SYSTEMS

- SCP — SECURITY SYSTEM CONTROL PANEL
- IR — INFRARED FOB READER
- EM — EGRESS MOTION DETECTOR
- DC — DOOR CONTACT
- ES — ELECTRIC STRIKE
- PTZ C — CLOSED CIRCUIT CAMERA: 'PTZ' - DENOTES PAN TILT ZOOM
- M — SECURITY SYSTEM MONITOR

GENERAL NOTES:

1. MINIMUM CONDUIT SIZE SHALL BE 21 mm UNLESS NOTED OTHERWISE.
2. MOUNTING HEIGHT OF ALL EQUIPMENT/DEVICES SHOWN IN SYMBOL LEGEND ABOVE SHALL BE MEASURED WITH RESPECT TO THE CENTER OF THE RELATED EQUIPMENT/DEVICE.
3. PROVIDE LOCKABLE ENCLOSURES WITH COMMON KEY ON ALL STARTERS AND DISCONNECT SWITCHES LOCATED IN PUBLIC AREAS. KEYS SHALL BE HANDED OVER TO OWNER AT END OF PROJECT.
4. COORDINATE/CONFIRM EXACT LOCATIONS AND QUANTITIES OF ITEMS SUPPLIED BY MECHANICAL WITH THE MECHANICAL DRAWINGS

LIGHTING CONTROL

- $ — ONE GANG SINGLE POLE TOGGLE SWITCHES
- 3 $ — 3-WAY SWITCH
- 4 $ — 4-WAY SWITCH
- $ — SWITCH MOUNTED VACANCY SENSOR - 'D' DENOTES C/W DIMMER
- D — DIMMER SWITCH
- VS — CEILING MOUNTED VACANCY SENSOR
- OS — CEILING MOUNTED OCCUPANCY SENSOR
- M $ — LOW VOLTAGE MASTER SWITCH TO CONTROL ALL APPARATUS BAY LIGHTING. ANY ONE SWITCH WILL TURN ALL LIGHTS ON.

GENERAL POWER

- 15A, DUPLEX RECEPTACLE
- (5-20R) T-SLOT DUPLEX RECEPTACLE
- 15A, DUPLEX RECEPTACLE - ABOVE COUNTER
- 20A ,TYPE — SINGLE SPECIAL RECEPTACLE - AMPACITY AND TYPE AS INDICATED
- 15A, DUPLEX RECEPTACLE C/W GROUND FAULT CIRCUIT INTERRUPTER
- 15A, DUPLEX RECEPTACLE C/W GROUND FAULT CIRCUIT INTERRUPTER - ABOVE COUNTER
- 15A, U-GROUND DUPLEX RECEPTACLE - FLUSH FLOOR MOUNTED

COMMUNICATIONS

- TV — TELEVISION OUTLET - WALL MOUNTED
- DATA OUTLET - WALL MOUNTED
- DATA OUTLET - FLUSH FLOOR MOUNTED
- COMBINATION VOICE/DATA OUTLET - WALL MOUNTED
- HDMI — HDMI CONNECTION
- LMR — LMR400 LOW LOSS COAXIAL CABLE DROP FOR RADIOS - WALL MOUNTED
- RG — RG214 COAXIAL CABLE DROP FOR RADIOS - WALL MOUNTED

FIRE ALARM SYSTEM

- PULL STATION
- HS — FLUSH MOUNTED HORN - 'HS' DENOTES HORN STROBE COMBINATION
- AUTOMATIC FIXED TEMPERATURE HEAT DETECTOR - CEILING MOUNTED
- SMOKE DETECTOR - CEILING MOUNTED
- FACP — RECESS MOUNTED FIRE ALARM CONTROL PANEL
- FAA — RECESS MOUNTED - FIRE ALARM ANNUNCIATOR PANEL

ELECTRIC HEATING

- FF1 — RECESS MOUNTED - ELECTRIC FORCE FLOW HEATER, TYPE 'FFH1' AS INDICATED

EQUIPMENT CONNECTIONS AND CONTROLS

- DIRECT CONNECTION - 120 OR 208V AS INDICATED
- DIRECT CONNECTION C/W UNFUSED DISCONNECT SWITCH - 120 OR 208V AS INDICATED
- MOTOR CONNECTION AS INDICATED
- MAGNETIC MOTOR STARTER AS INDICATED
- UNFUSED DISCONNECT SWITCH
- POWER ACTIVATED DOOR EXIT BUTTON SUPPLIED BY DOOR HARDWARE SUPPLIER, WIRED BY ELECTRICAL
- RECESS MOUNTED - CARBON MONOXIDE CONTROL PANEL
- RECESS MOUNTED ELECTRICAL PANEL

WINDSOR / WEST HANTS TOGETHER

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1	75% REVIEW	2021.02.17

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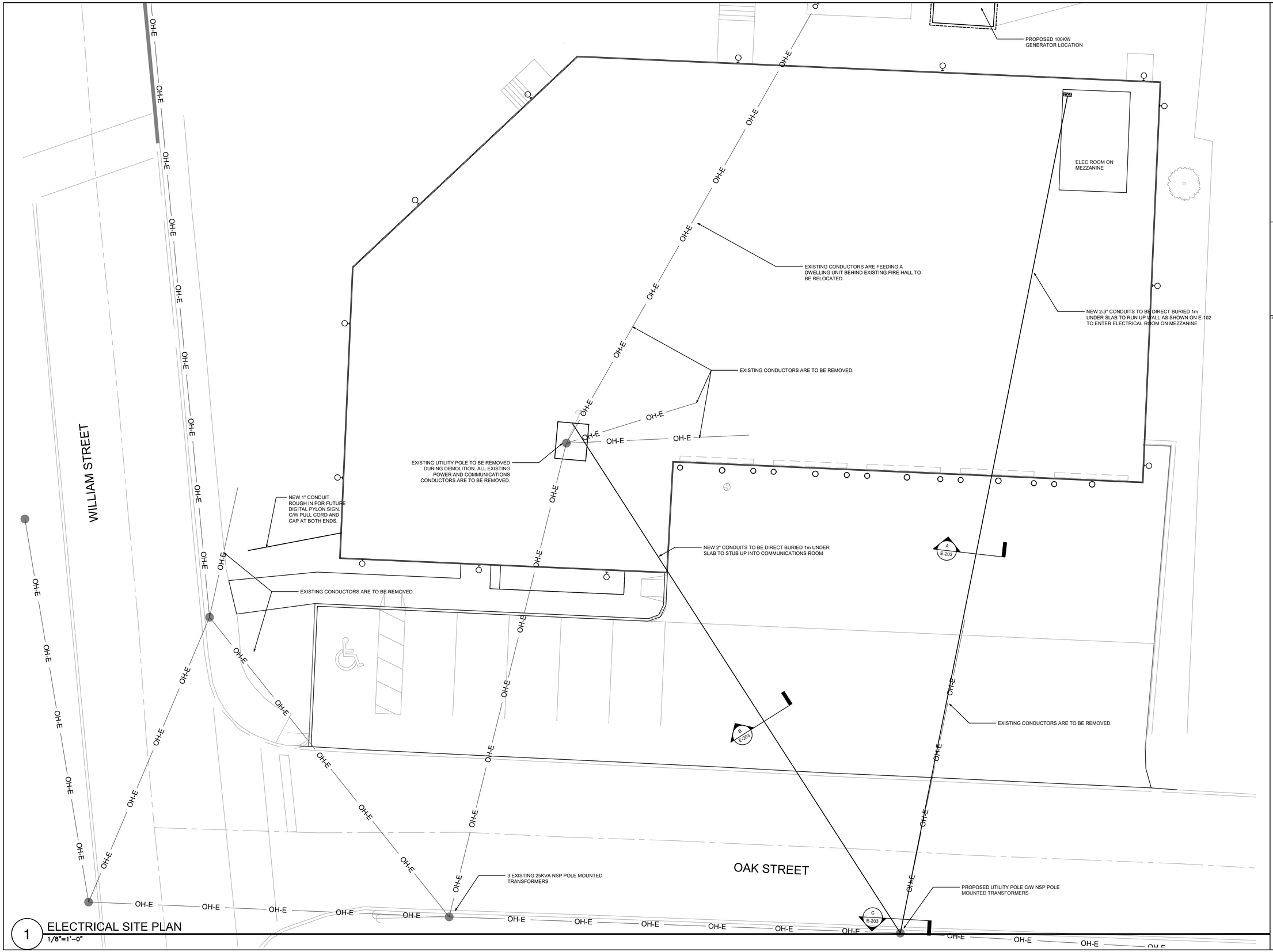
HANTSPORT FIRE STATION
HANTSPORT, NS

ELECTRICAL LEGEND

Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	HKS
Checked By	BLT

E-000

Scale: AS NOTED



1 ELECTRICAL SITE PLAN
1/8"=1'-0"

WINDSOR / WEST HANTS TOGETHER

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HANTSPORT, NS

ELECTRICAL SITE PLAN

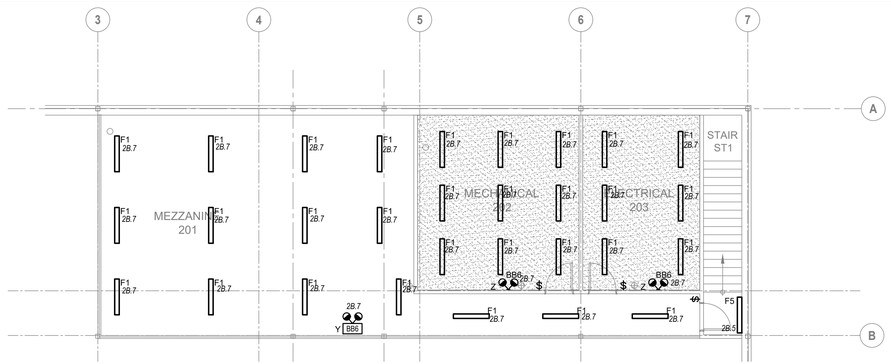
Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	HKS
Checked By	BLT

E-100

Scale AS NOTED



1 MAIN FLOOR PLAN - LIGHTING
1/8"=1'-0"



3 MEZZANINE FLOOR PLAN - LIGHTING
1/8"=1'-0"

NOTES:

1. FIXTURES TO NOT BE SWITCHED AND C/W INTEGRAL OCCUPANCY SENSOR FOR NIGHT LIGHTING.
2. BANK OF 6 LOW VOLTAGE SWITCHES TO CONTROL EACH ROW OF APPARATUS BAY LIGHTS SEPARATELY.

2 SPECIFIC NOTES

WINDSOR / WEST HANTS TOGETHER

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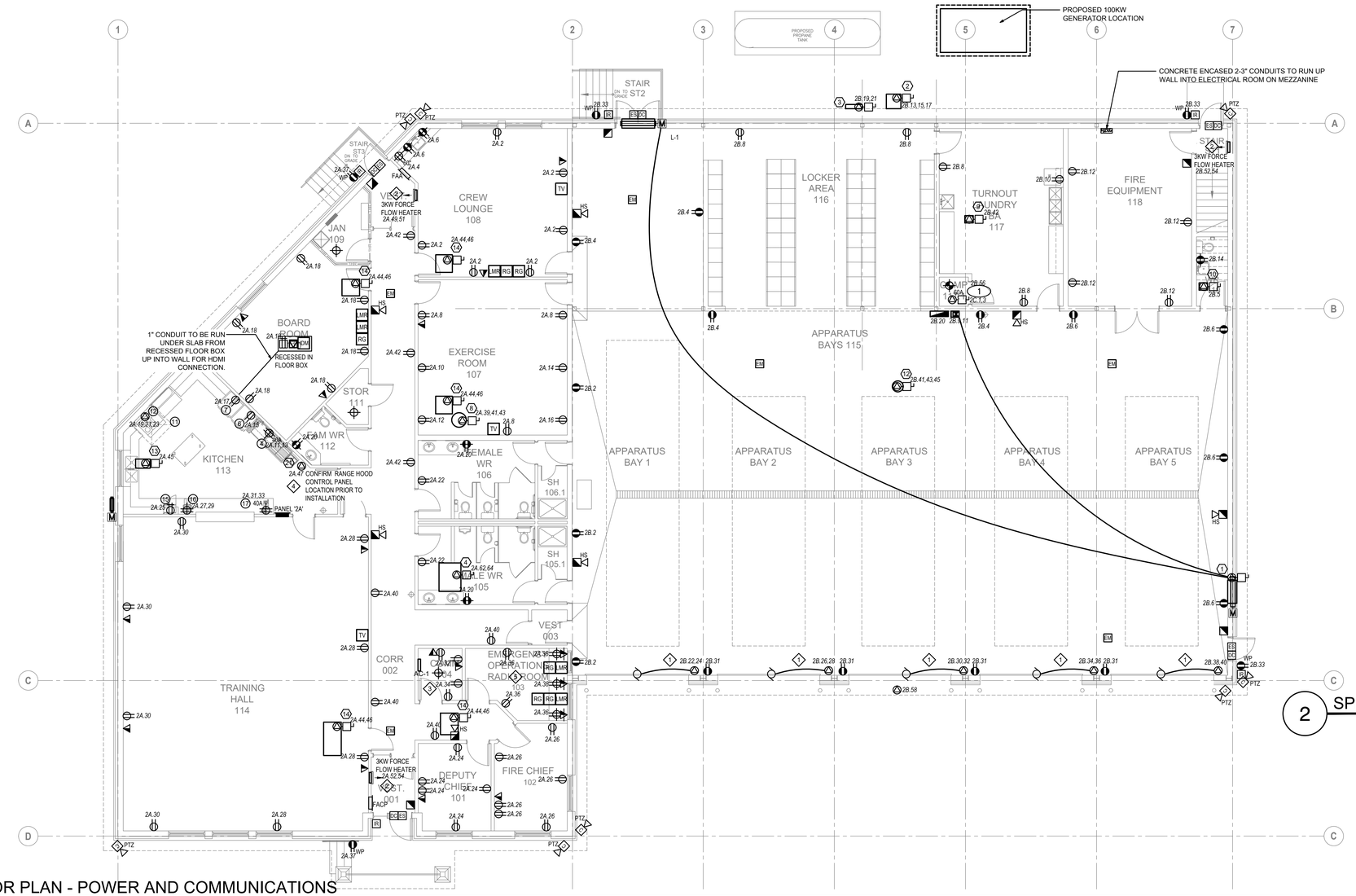
HANTSPORT FIRE STATION
HANTSPORT, NS

LIGHTING PLAN

Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	HKS
Checked By	BLT

E-101

Scale AS NOTED



1 MAIN FLOOR PLAN - POWER AND COMMUNICATIONS
1/8"=1'-0"

3 MEZZANINE FLOOR PLAN - POWER AND COMMUNICATIONS
1/8"=1'-0"

NOTES:

1. CONFIRM ELECTRICAL REQUIREMENT AND LOCATION OF OVERHEAD DOOR CONTROLLERS.
2. FORCE FLOW HEATER TO BE C/W 24V RELAY TO BE CONTROLLED VIA MECHANICAL SYSTEMS.
3. FIBRE NETWORK TO BE TERMINATED IN THIS LOCATION.
4. THIS CONTRACTOR TO WIRE LIGHTS IN KITCHEN HOOD FROM JB ON TOP OF CONTROL PANEL WITH 2#12AWG. THIS CONTRACTOR TO WIRE A NEW FIRE ALARM ADDRESSABLE RELAY TO NORMALLY CLOSED CONTACT IN CONTROL PANEL TO SHUT DOWN MUA AND EF-2 UPON FIRE. RANGE POWER TO BE INTERLOCKED WITH CONTROL PANEL TO SHUT OFF UPON FIRE. THIS CONTRACTOR TO WIRE MOTORIZED DAMPER FROM HOOD CONTROL PANEL WITH 2#12AWG.
5. CONFIRM IF RADIO DROP CABLES RUN TO ROOF INDIVIDUALLY OR GROUP TOGETHER IN RADIO ROOM FOR ONE RUN UP TO ROOF. PLATFORM REQUIRED FOR MOUNTING ANTENNA ON ROOF.

2 SPECIFIC NOTES

WINDSOR / WEST HANTS TOGETHER

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1	75% REVIEW	2021.02.17

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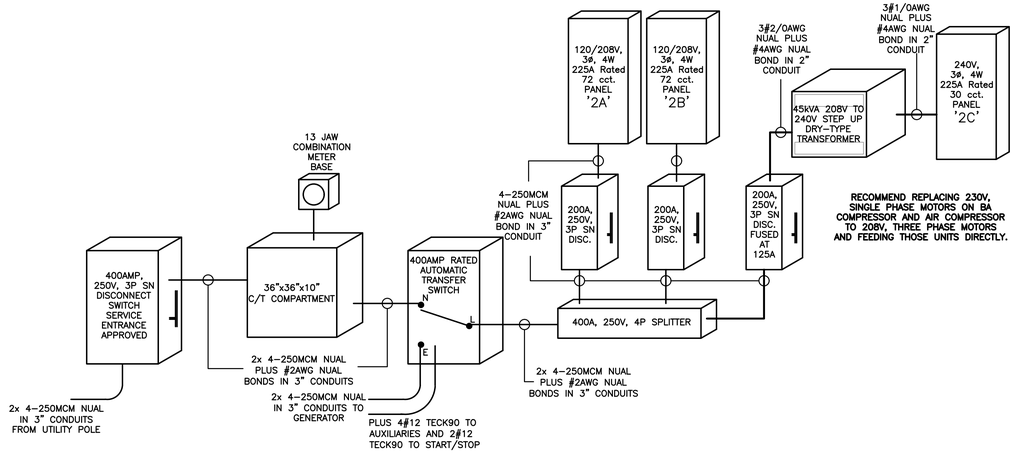
HANTSPORT FIRE STATION
HANTSPORT, NS

POWER AND COMMUNICATIONS PLAN

Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	HKS
Checked By	BLT

E-102

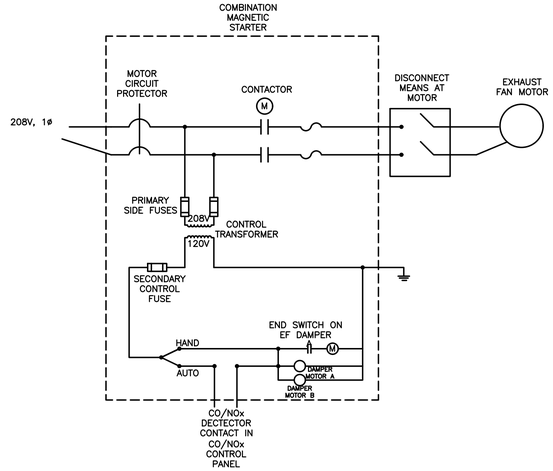
Scale AS NOTED



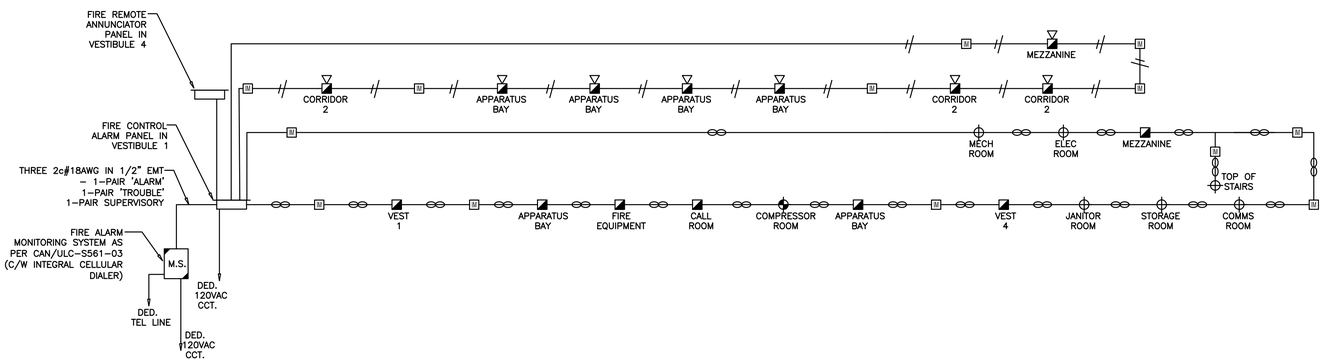
LOAD CALCULATION		
		CALC.
BASE BLDG. ($1251m^2$ X $30W/m^2$)		37.5kW
MECH. EQUIP.	25.6kW	25.6kW
ELECT. HEAT	9.0kW	9.0kW
KITCHEN EQUIP	30.0kW @ 75%	22.5kW
OWNER EQUIP	17.7kW @ 75%	13.3kW
TOTAL		107.9kW
107.9kW @ 208V/3P =299.7A RECOMMEND 400AMP SERVICE		

ALL ELECTRICAL EQUIPMENT SHALL BE FIELD-MARKED TO WARN PERSONS OF POTENTIAL ELECTRIC SHOCK AND ARC-FLASH HAZARDS
ADEQUATE WORKING SPACE SHALL BE MAINTAINED ABOUT ALL ELECTRICAL EQUIPMENT
PARALLEL CONDUCTORS TO BE IDENTIFIED & BONDED TOGETHER FOR SERVICE INSPECTION
ALL CONDUCTORS TO BE RW90 XLPE

1 SINGLE LINE DIAGRAM



2 CO/NOx CONTOLS DETAIL



3 FIRE ALARM RISER DIAGRAM

PANEL VOLTAGE: 230					PANEL TYPE: 230V, 3ø, 3W, 225A MAINS, NEMA 1							PANEL '2C'	
CCT	DESCRIPTION	WATTAGE A	WATTAGE B	WATTAGE C	BRKR P	BRKR AMP	ø	BRKR AMP	BRKR P	WATTAGE A	WATTAGE B	WATTAGE C	DESCRIPTION	CCT
1	POWER - BA COMPRESSOR	5290			2	50	A	15	2	345			POWER - AIR DRYER	2
3			5290				B				345			4
5							C	40	2			3220	POWER - AIR COMPRESSOR	6
7							A			3220				8
9							B							10
11							C							12
13							A							14
15							B							16
17							C							18
PHASE LOADS		5290	5290	####						3565	345	3220		
TOTAL PHASE LOADS		8855			5635					3220				
TOTAL CONNECTED LOAD		17710												
TOTAL AMPERAGE		45 AMPS												

4 PANEL '2C' SCHEDULE

WINDSOR / WEST HANTS TOGETHER

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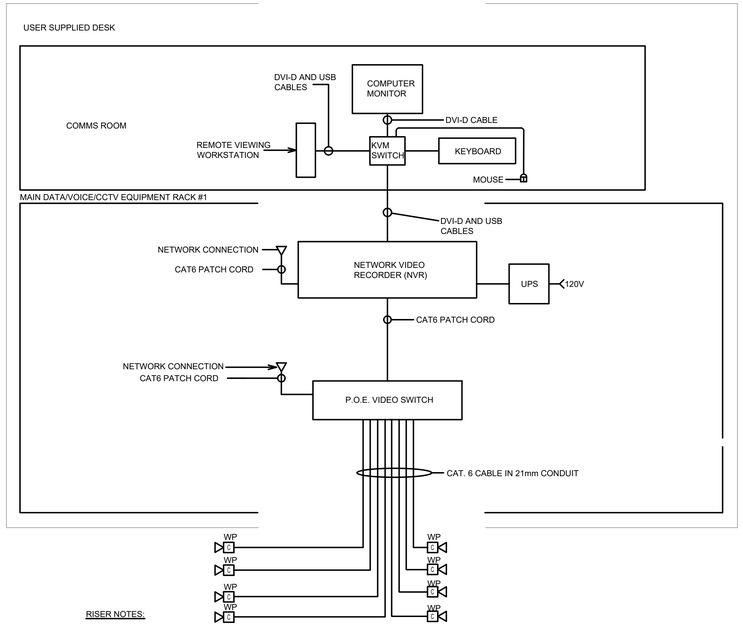
HANTSPORT FIRE STATION
HANTSPORT, NS

RISERS AND DETAILS

Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	HKS
Checked By	BLT

E-200

Scale AS NOTED



RISER NOTES:

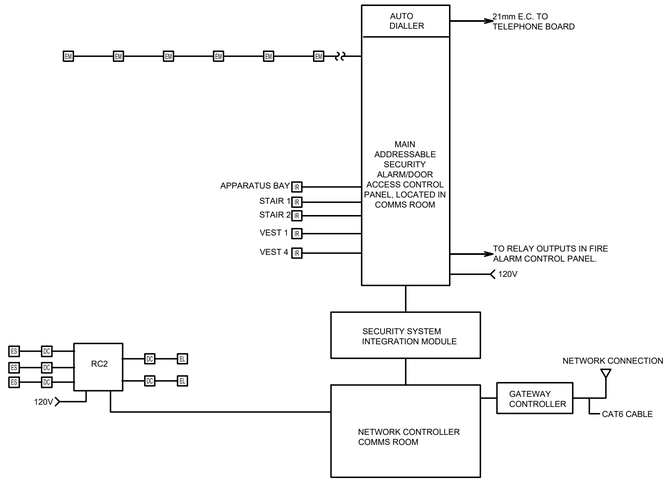
1. COORDINATE EXACT LOCATION AND QUANTITIES OF CCTV EQUIPMENT WITH PLANS AND ON SITE PRIOR TO ROUGH-IN.
2. ALL CCTV COMMUNICATIONS WIRING SHALL BE ORANGE AND IN CONDUIT TO CABLE TRAY. POWER CABLING SHALL BE RUN IN 16mm CONDUIT.
3. CONFIRM EXACT LOCATION OF DEVICES IN NEW RACK PRIOR TO ROUGH-IN.
4. SYSTEM SHALL BE VERIFIED BY A FACTORY TRAINED TECHNICIAN AND A CERTIFICATE OF VERIFICATION SHALL BE SENT TO ENGINEER FOR APPROVAL AND INCLUDED IN MAINTENANCE MANUALS.

1 CCTV RISER DIAGRAM

TO ELECTRONIC ASTRONOMICAL TIME CLOCK (MINUS LIGHTS OVER STATION DOORS CONTROLLED BY DIMMER)

PANEL VOLTAGE: 208		PANEL TYPE: 120/208V, 3ø, 4W, 225A MAINS, NEMA 1										PANEL '2A'	
CCT	DESCRIPTION	WATTAGE A	WATTAGE B	WATTAGE C	P	BRKR AMP	ø	BRKR AMP	P	WATTAGE A	WATTAGE B	WATTAGE C	DESCRIPTION	CCT
1	LIGHTS – ROOMS	900			1	15	A	15	1	1000			RECEPTS – LOUNGE	2
3	LIGHTS – ROOMS		1000		1	15	B	20	1		1500		RECEPTS – MICROWAVE	4
5	LIGHTS – ROOMS			700	1	15	C	15	1			600	GF RECEPTS – LOUNGE	6
7	EXTERIOR LIGHTS	140			1	15	A	15	1	400			RECEPTS – EXERCISE ROOM	8
9	EXTERIOR LIGHTS		170		1	15	B	15	1		400		RECEPTS – EXERCISE ROOM	10
11	RECEPTS – DISHWASHER			3250	2	40	C	15	1			400	RECEPTS – EXERCISE ROOM	12
13		3250					A	15	1	400			RECEPTS – EXERCISE ROOM	14
15	RECEPTS – FREEZER		860		1	15	B	15	1		400		RECEPTS – EXERCISE ROOM	16
17	RECEPTS – FRIDGE			300	1	15	C	15	1			1200	RECEPTS – BOARDROOM	18
19	POWER – RANGE	5000			3	60	A	15	1	600			GF RECEPTS – BATHROOMS	20
21			5000				B	15	1		400		RECEPTS – BATHROOMS	22
23				5000			C	15	1			1000	RECEPTS – DEPUTY CHIEF	24
25	RECEPTS – MICROWAVE	1570			1	20	A	15	1	1200			RECEPTS – FIRE CHIEF	26
27	RECEPTS – TOASTER		785		2	15	B	15	1		800		RECEPTS – TRAINING ROOM	28
29				785			C	15	1			800	RECEPTS – TRAINING ROOM	30
31	RECEPTS – COFFEE MAKER	3325			2	40	A	15	1	400			RECEPTS – COMMS ROOM	32
33			3325				B	15	1		400		RECEPTS – COMMS ROOM	34
35	SPARE				1	15	C	15	1			600	RECEPTS – RADIO ROOM	36
37	GF RECEPTS – EXTERIOR	400			1	15	A	15	1	400			RECEPTS – RADIO ROOM	38
39	POWER – EF–2		288		3	15	B	15	1		800		RECEPTS – CORRIDOR	40
41				288			C	15	1			600	RECEPTS – CORRIDOR	42
43		288					A	15	2	500			POWER – FC UNITS	44
45	POWER – SF–1		700		1	15	B				500			46
47	RANGE HOOD CONTROL PANEL				1	15	C	15	1				POWER – TRAP PRIMER TX	48
49	POWER – FORCE FLOW HEATER	1500			2	20	A	15	1				POWER – FIRE ALARM	50
51			1500				B	20	2		1500		POWER – FORCE FLOW HEATER	52
53	POWER – SECURITY SYSTEM				1	15	C					1500		54
55	SPARE				1	15	A	15	1				CONTROLS	56
57	SPARE				1	15	B	15	1				CONTROLS	58
59	SPARE				1	15	C	15	1				CONTROLS	60
61	SPARE				1	15	A	15	2				POWER – ERV–1	62
63	SPARE				1	15	B							64
65	SPARE				1	15	C							66
67	SPARE				1	15	A							68
69	SPARE				1	15	B							70
71	SPARE				1	15	C							72
	PHASE LOADS	16373	13628	10323						4900	6700	6700		
	TOTAL PHASE LOADS	21273			20328				17023					
	TOTAL CONNECTED LOAD	58624												
	TOTAL AMPERAGE	163 AMPS												

1 PANEL SCHEDULES



RISER NOTES:

1. COORDINATE EXACT LOCATION AND QUANTITIES OF ALL SECURITY ALARM / DOOR ACCESS DEVICES AND EQUIPMENT WITH PLANS AND ON SITE PRIOR TO ROUGH-IN.
2. ALL SECURITY ALARM / DOOR ACCESS SYSTEM WIRING SHALL BE RUN IN EMT CONDUIT WIRING AS RECOMMENDED BY MANUFACTURER.
3. SYSTEM SHALL BE VERIFIED BY A FACTORY TRAINED TECHNICIAN AND A CERTIFICATE OF VERIFICATION SHALL BE SENT TO ENGINEER FOR REVIEW AND INCLUDED IN MAINTENANCE MANUALS.
4. SECURITY SYSTEM SHALL BE CONNECTED TO FIRE ALARM SYSTEM AND PROGRAMMED TO F.A. SYSTEM DIALER.

2 ACCESS CONTROL RISER DIAGRAM

CONTACTORS TO LIGHTING CONTROL RELAY PANEL

PANEL VOLTAGE: 208		PANEL TYPE: 120/208V, 3ø, 4W, 225A MAINS, NEMA 1										PANEL '2B'	
CCT	DESCRIPTION	WATTAGE A	WATTAGE B	WATTAGE C	P	BRKR AMP	ø	BRKR AMP	P	WATTAGE A	WATTAGE B	WATTAGE C	DESCRIPTION	CCT
1	LIGHTS – APPARATUS BAY	1260			1	15	A	15	1	600			GF RECEPTS– APPARATUS BAY	2
3	LIGHTS – APPARATUS BAY		1080		1	15	B	15	1		800		GF RECEPTS– APPARATUS BAY	4
5	LIGHTS – UTILITY ROOMS			1000	1	15	C	15	1			800	GF RECEPTS– APPARATUS BAY	6
7	LIGHTS – MEZZANINE	1350			1	15	A	15	1	800			RECEPTS – LOCKER/LAUNDRY	8
9	POWER – EF–1				2	20	B	15	1		1000		RECEPTS – WASHER	10
11							C	15	1			800	RECEPTS – FIRE EQUIP.	12
13	POWER – CU–2	2166			3	40	A	15	1	200			GF RECEPTS – WASHROOM	14
15			2166				B	15	1		600		RECEPTS – MEZZANINE ROOMS	16
17				2166			C	15	1			1000	RECEPTS – MEZZANINE	18
19	POWER – CU–1	1250			2	20	A	15	1				POWER – CO/NOX PANEL	20
21			1250				B	20	2				POWER – OH DOOR *	22
23	RECEPTS – GLYCOL FILL TANK				1	15	C							24
25	POWER – RP–1	100			1	15	A	20	2				POWER – OH DOOR *	26
27	POWER – HW–1		2250		2	30	B							28
29				2250			C	20	2				POWER – OH DOOR *	30
31	GF RECEPTS– APPARATUS BAY	800			1	15	A							32
33	GF RECEPTS – EXTERIOR		600		1	15	B	20	2				POWER – OH DOOR *	34
35	POWER – BLOCK HEATER				1	20	C							36
37	POWER – BATTERY CHARGER				1	15	A	20	2				POWER – OH DOOR *	38
39	POWER – WINDING HEATER				1	15	B							40
41	POWER – VF–1			2004	3	15	C	15	1			300	POWER – EF–3, EF–5	42
43		2004					A	15	2				POWER – P2–A,B	44
45			2004				B							46
47	POWER – B1–A			1440	1	15	C	15	1				POWER – P4–A,B	48
49	POWER – B1–B	1440			1	15	A	15	1				UNIT HEATERS	50
51	CONTROLS				1	15	B	20	2		1500		POWER – FORCE FLOW HEATER	52
53	CONTROLS				1	15	C					1500		54
55	CONTROLS				1	15	A	15	1				POWER – TRAP PRIMER TX	56
57	POWER – P1–A,B				3	15	B	20	1				POWER – CLOCK	58
59							C	15	1				SPARE	60
61							A	15	1				SPARE	62
63	POWER – ERV–2				2	15	B	15	1				SPARE	64
65							C	15	1				SPARE	66
67							A	15	1				SPARE	68
69							B	15	1				SPARE	70
71							C	15	1				SPARE	72
	PHASE LOADS	10370	9350	8860						1600	3900	4400		
	TOTAL PHASE LOADS	11970			13250				13260					
	TOTAL CONNECTED LOAD	38480												
	TOTAL AMPERAGE	107 AMPS												

*CONFIRM EQUIPMENT REQUIREMENTS AND BREAKER SIZE PRIOR TO INSTALLATION.

WINDSOR / WEST HANTS TOGETHER

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19-132

No.	Description	Date
4	ISSUED FOR RFP	2021.04.20
3	TENDER	2021.03.31
2	COORDINATION	2021.03.26
1	75% REVIEW	2021.02.17

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HANTSPORT FIRE STATION
HANTSPORT, NS

RISERS AND PANEL SCHEDULES

Project Number	20068/14–19–132
Date	FEBRUARY 2021
Drawn By	HKS
Checked By	BLT

E-201

Scale AS NOTED

LUMINAIRE SCHEDULE

TYPE	MANUFACTURER	DESCRIPTION	VOLTAGE	MOUNTING	LAMP	NOTES
F1	CFI# FSI455L840-UNV-DIM	4' LED STRIP FIXTURE, 0-10V DIMMABLE LUMINAIRE	120	SURFACE MOUNTED	45W LED 4000K 5500 LUMENS CRI 80 (MIN)	.
F2	CFI# FSI8110L840-UNV-DIM	8' LED CHAIN HUNG FIXTURE, 0-10V DIMMABLE LUMINAIRE TO BE HUNG TO 16" A.F.F.	120	CHAIN HUNG	90W LED 4000K 11000 LUMENS CRI 80 (MIN)	.
F3	CFI# 2CAXG43L840-4-DS-UNV-DIM	2'x4' LED RECESSED PANEL 0-10V DIMMABLE LUMINAIRE.	120	RECESSED IN T-BAR	36W LED 4300K 4000 LUMENS CRI 80 (MIN)	.
F4	LIGHTOLER #SD5R079301W	6" LED WET LOCATION LISTED DOWNLIGHT; DIMMABLE LUMINAIRE	120	SURFACE MOUNTED	10W LED 3000K 700 LUMENS CRI 90 (MIN)	.
F5	DAY-BRITE #SF-4-C-42-40-U-D2T-US	STAIRWELL LIGHTING, BI-LEVEL DIMMING	120V	SURFACE MOUNTED	39W 4200lm 4000K CRI 80MIN	.
E1	STONCO# LPW16-20-NW-G3-3-120-BZ	LED WALLPACK TO BE MOUNTED 11' ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED.	120	WALL MOUNTED	20W LED 4000K 2300 LUMENS CRI 70 (MIN)	.
E2	SPEC LIGHT# #SGSC6XT2040KLMDDS101CR + SC65XTOB	LED EXTERIOR POT LIGHT TO BE MOUNTED IN SOFFIT	120	RECESSED	25W LED 4000K 2000 LUMENS CRI 80 (MIN)	.
BU-1 Y	AIMLITE #EBST12036-2SM5WLJWHT	CUBE EMERGENCY DUAL HEAD BATTERY UNIT. AUTOMATIC SOLID-STATE CHARGER, LOW VOLTAGE BATTERY DISCONNECT, BROWNOUT PROTECTION, INTEGRAL TEST SWITCH AND LED AC-ON PILOT LIGHTS.	120/ 12V DC	WALL MOUNTED	12V-6W LED	1
Z	AIMLITE #RMMD2-06-245WLAWHT	DUAL REMOTE DECORATIVE HEADS, LED LAMPS	12V	WALL OR CEILING MOUNTED AS INDICATED ON FLOOR PLANS	12V-6W LED	1

NOTES:
1. EMERGENCY LIGHTING DUAL HEAD REMOTE BATTERY UNITS SHALL BE CONNECTED TO THE LIGHTING CIRCUIT OF THE AREA IT SERVES AS PER CEC 46-404(4).

1 LIGHTING SCHEDULE

KITCHEN SCHEDULE

ITEM	DESCRIPTION	LOAD	VOLTS	ø	BRKR	FEEDER	PANEL	NOTES
4	DISHWASHER	6.5KW	208V	1	40A	3#8AWG	2A.11,13	.
6	FREEZER	7.2A	120V	1	15A	2#12AWG	2A.15	.
7	REFRIGERATOR	2.6A	120V	1	15A	2#12AWG	2A.17	.
11	RANGE HOOD	-	120V	1	15A	2#12AWG	2A.47	.
12	RANGE	15KW	208V	3	60A	4#6AWG	2A.19,21,23	.
15	MICROWAVE OVEN	13.1A	120V	1	20A	2#12AWG	2A.25	.
16	TOASTER	1.8KW	208V	1	15A	3#12AWG	2A.27,29.	.
17	COFFEE MAKER	6.65KW	208V	1	40A	3#8AWG	2A.31,33	.

NOTES:
1.

3 KITCHEN SCHEDULE

OWNER'S EQUIPMENT SCHEDULE

ITEM	DESCRIPTION	LOAD	VOLTS	ø	BRKR	FEEDER	PANEL	NOTES
1	BA COMPRESSOR	10HP	230V	1	50A	3#8AWG	'2C.1,3'	1
2	DRYER	FRACTIONAL HP	230V	1	15A	3#12AWG	'2C.2,4'	.
3	AIR COMPRESSOR	10HP	230V	1	40A	3#8AWG	'2C.6,8'	.
4	.	.	.	.	.	.	.	.
5	.	.	.	.	.	.	.	.

NOTES:
1. C/W 1-15A CIRCUIT FOR CONTROLS (2B.56).

2 OWNER EQUIPMENT SCHEDULE

MECHANICAL EQUIPMENT SCHEDULE

NO.	ITEM	DESCRIPTION	LOCATION	LOAD	VOLTS	ø	BREAKER	FEEDER	DISCONNECT	STARTER	PANEL	NOTES
1	EF1	CO/NOx EXHAUST FAN	APPARATUS BAY	2HP	208V	1	20A	2#12AWG	30A DISCONNECT	HA BY ELEC	2B.9,11	.
2	CU2	VRF SYSTEM CONDENSER	EXTERIOR	6.5KW	208V	3	40A	3#8AWG	30A DISCONNECT	.	2B.13,15,17	.
3	AC1/CU1	COMMS ROOM MINI SPLIT CONDENSER	EXTERIOR	2.5KW	208V	1	20A	2#12AWG	30A DISCONNECT	.	2B.19,21	.
4	ERV-1	ENERGY RECOVERY SYSTEM	MENS WASHROOM	FRACTIONAL HP	208V	1	15A	2#12AWG	30A DISCONNECT	.	2A.62,64	.
5	ERV-2	ENERGY RECOVERY SYSTEM	MEZZANINE	FRACTIONAL HP	208V	1	15A	2#12AWG	30A DISCONNECT	.	2B.63,65	.
6	HW-1	HOT WATER HEATER	MECH ROOM	4.5KW	208V	1	30A	3#10AWG	30A DISCONNECT	.	2B.27,29	.
7	RP-1	RECIRCULATION PUMP	MECH ROOM	FRACTIONAL HP	120V	1	15A	2#12AWG	TOGGLE SWITCH	.	2B.25	.
8	EF-2	EXHAUST FAN	ROOF ABOVE EXERCISE ROOM	0.5HP	208V	3	15A	3#12AWG	30A DISCONNECT	MAG BY ELEC	2A.39,41,43	.
9	EF-3	EXHAUST FAN	TURNOUT ROOM	FRACTIONAL HP	120V	1	15A	2#12AWG	30A DISCONNECT	TOGGLE BY ELEC	2B.42	.
10	EF-4	EXHAUST FAN	BATHROOM 119	FRACTIONAL HP	120V	1	15A	2#12AWG	30A DISCONNECT	TO BE INTERLOCKED WITH LIGHTS	2B.5	.
11	EF-5	EXHAUST FAN	MECH ROOM	FRACTIONAL HP	120V	1	15A	2#12AWG	30A DISCONNECT	CONTACTOR BY ELEC	2B.42	.
12	VEF-1	VEHICLE EXHAUST	APPARATUS BAY	5HP	208V	3	25A	3#10AWG	30A DISCONNECT	MAG BY ELEC	2B.41,43,45	.
13	SF-1	MAKE UP AIR SUPPLY FAN	KITCHEN	0.25HP	120V	1	15A	2#12AWG	30A DISCONNECT	CONTACTOR BY ELEC	2A.45	.
14	FC UNITS	FAN COIL UNITS (MULTIPLE)	VARIOUS	FRACTIONAL HP	208V	1	15A	2#12AWG	30A DISCONNECT	.	2A.44,46	.
15	B1-a	BOILER	MECH ROOM	FRACTIONAL HP	120V	1	15A	2#12AWG	30A DISCONNECT	.	2B.47	.
16	B1-b	BOILER	MECH ROOM	FRACTIONAL HP	120V	1	15A	2#12AWG	30A DISCONNECT	.	2B.49	.
17	P1-a,b	IN FLOOR PUMP	MECH ROOM	1HP	208V	3	15A	3#12AWG	30A DISCONNECT	.	2B.57,59,61	.
18	P2-a,b	HX HOT SIDE PUMP	MECH ROOM	FRACTIONAL HP	208V	1	15A	2#12AWG	30A DISCONNECT	.	2B.44,46	.
19	UH	UNIT HEATERS (MULTIPLE)	MEZZANINE	FRACTIONAL HP	120V	1	15A	2#12AWG	TOGGLE SWITCH	.	2B.50	.
20	P4-a,b	BOILER PUMPS	MECH ROOM	1/6HP	120V	1	15A	2#12AWG	30A DISCONNECT	.	2B.48	.
21	RANGE HOOD CONTROL PANEL	RANGE HOOD CONTROL PANEL	KITCHEN	-	120V	1	15A	2#12AWG	-	.	2A.47	.
22	GT-1	GLYCOL FILL TANK	MECH ROOM	FRACTIONAL HP	120V	1	15A	2#12AWG	-	.	2B.23	.

NOTES:
1.

STARTER LEGEND

MS= MANUAL TYPE MOTOR STARTER c/w O/L PROTECTION
HOA= MAGNETIC STARTER C/W HAND/OFF/AUTO SELECTOR SWITCH
VSD= VARIABLE SPEED DRIVE, SUPPLIED BY MECHANICAL CONTRACTOR, WIRED BY ELECTRICAL CONTRACTOR

4 MECHANICAL SCHEDULE

WINDSOR / WEST HANTS TOGETHER

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14-19-132

No.	Description	Date
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3	TENDER	2021.03.31
2	COORDINATION	2021.03.26
1	75% REVIEW	2021.02.17

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7071 Bayers Rd. Suite 3004
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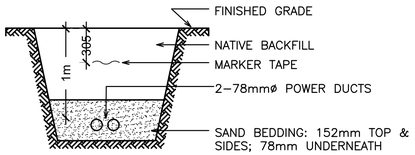
HANTSPORT FIRE STATION
HANTSPORT, NS

SCHEDULES

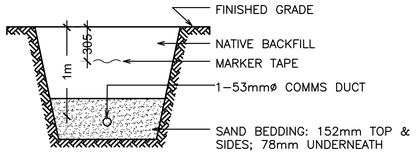
Project Number	20068/14-19-132
Date	FEBRUARY 2021
Drawn By	HKS
Checked By	BLT

E-202

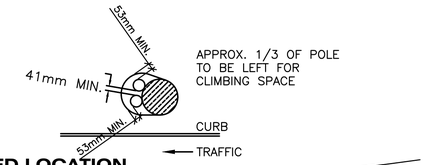
Scale AS NOTED



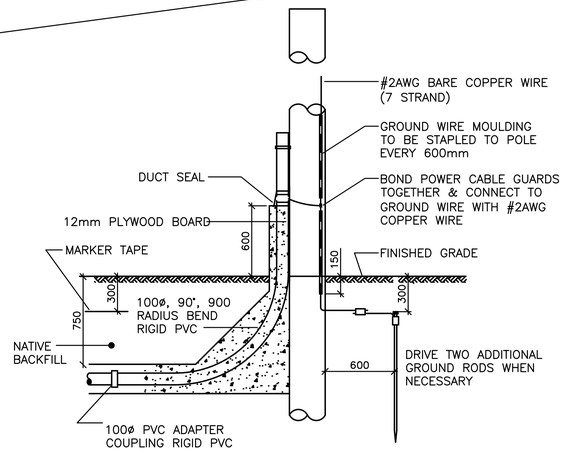
A POWER SECONDARY DUCT DETAIL



B COMMUNICATIONS DUCT DETAIL



PREFERRED LOCATION
Scale: N.T.S.

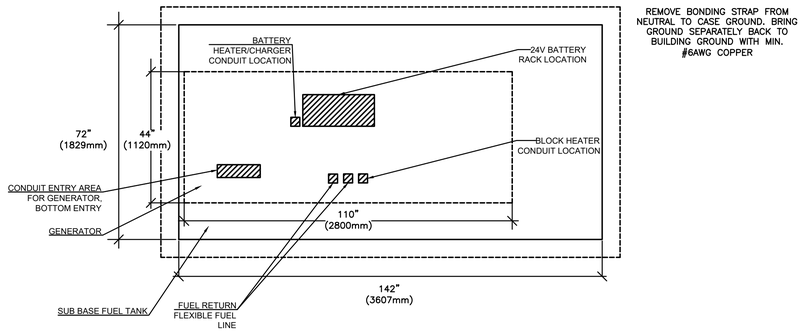


C UTILITY TERMINATION POLE DETAIL

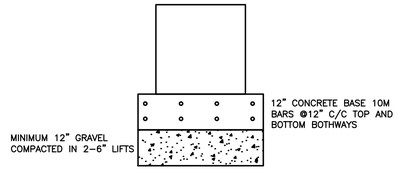
DIMENSIONS BASED OFF STANDARD OF ACCEPTANCE KOKLER DIESEL 100REOZJF. CONFIRM EXACT DIMENSIONS WITH EQUIPMENT PURCHASED PRIOR TO INSTALLATION. GENERATOR TO BE C/W WEATHERPROOF LEVEL 2 ALUMINUM SOUND ENCLOSURE AND SUB BASED FUEL TANK.

GENERATOR PAD TO BE 12" THICK AND 6" LARGER ON ALL SIDES THAN THE ENCLOSURE

REMOVE BONDING STRAP FROM NEUTRAL TO CASE GROUND. BRING GROUND SEPARATELY BACK TO BUILDING GROUND WITH MIN. #6AWG COPPER

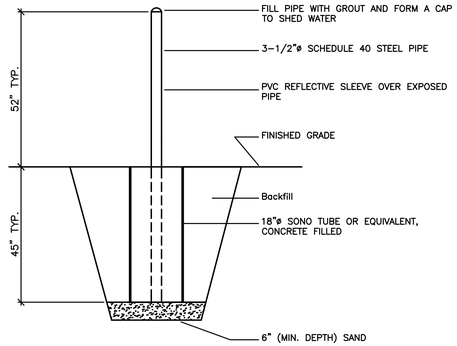


1 GENERATOR PAD DETAIL



2 GENERATOR REINFORCING DETAIL

PROTECTIVE BOLLARDS TO BE PLACED 24" FROM EDGE OF CONCRETE PAD



3 PROTECTIVE BOLLARD DETAIL

WINDSOR / WEST HANTS TOGETHER

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HANTSPORT FIRE STATION
HANTSPORT, NS

SITE DETAILS

Project Number	20068/14–19–132
Date	FEBRUARY 2021
Drawn By	HKS
Checked By	BLT

E-203

Scale AS NOTED

1. GENERAL REQUIREMENTS

1.1. THESE ELECTRICAL SPECIFICATIONS SHALL BE READ IN CONJUNCTION WITH: GENERAL REQUIREMENTS, ARCHITECTURAL SPECIFICATIONS, ELECTRICAL DRAWINGS AND OTHER CONTRACT DOCUMENTS.

1.2. SCOPE OF WORK
1.2.1. THIS CONTRACTOR SHALL PROVIDE ALL LABOUR, MATERIALS, EQUIPMENT AND SERVICES NECESSARY FOR THE INSTALLATION OF COMPLETELY FINISHED, TESTED, BALANCED AND PROPERLY OPERATING ELECTRICAL SYSTEMS AS SPECIFIED HEREIN AND AS INDICATED ON DRAWINGS, THE INTENT IS TO PROVIDE FOR FINISHED WORK COMPLETE IN ALL ESSENTIALS AS CALLED FOR BY THE CONTRACT DOCUMENTS, IN A MANNER CONSISTENT WITH GOOD WORKMANSHIP. THE WORK INCLUDES, BUT, IS NOT LIMITED TO:
1.2.2.1. SERVICE ENTRANCE
1.2.2.2. WIRING OF EQUIPMENT SUPPLIED BY OTHERS
1.2.2.3. POWER DISTRIBUTION
1.2.2.4. BRANCH CIRCUIT WIRING
1.2.2.5. WIRING DEVICES
1.2.2.6. LUMINAIRES AND LAMPS
1.2.2.7. EMERGENCY LIGHTING AND EXIT SIGNS
1.2.2.8. ELECTRIC HEATING AND CONTROLS
1.2.2.9. VOICE SYSTEM
1.2.2.10. DATA COMMUNICATION SYSTEM
1.2.2.11. FIRE ALARM SYSTEM
1.2.2.12. INTRUSION ALARM SYSTEM
1.2.2.13. ACCESS CONTROL SYSTEM
1.2.2.14. VIDEO SURVEILLANCE SYSTEM

1.3. CODES AND STANDARDS
1.3.1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH CSA C22.1-18, CANADIAN ELECTRICAL CODE, PART 1. (2018 EDITION) AND THE NATIONAL BUILDING CODE OF CANADA 2015.
1.3.2. CONTRACTOR MUST BE FAMILIAR WITH AND ADHERE TO THE REQUIREMENTS OF CAN Z462-15 AT ALL TIMES.

1.4. PERMIT AND BY-LAWS
1.4.1. OBTAIN PERMITS AND CERTIFICATIONS PRIOR TO START OF WORK. SUBMIT DRAWINGS TO INSPECTION AUTHORITY. COORDINATE SERVICES WITH NS POWER. PAY ALL ASSOCIATED FEES.
1.4.2. ALL WORK PERFORMED BY THIS CONTRACTOR SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE CODES, LOCAL BY-LAWS, STANDARDS AND THEIR AMENDMENTS.

1.5. SITE VISIT
1.5.1. PRIOR TO TENDER CLOSE, THIS CONTRACTOR SHALL VISIT SITE AND FAMILIARIZE THEMSELVES WITH THE EXISTING SITE CONDITIONS. NO ALLOWANCE SHALL BE MADE FOR PROBLEMS REVISE DUE TO LACK OF KNOWLEDGE OF EXISTING CONDITIONS THAT COULD REASONABLY HAVE BEEN ASCERTAINED BY A CAREFUL INSPECTION.

1.6. COORDINATION OF WORK
1.6.1. THIS CONTRACTOR SHALL COORDINATE THEIR WORK WITH THE GENERAL CONTRACTOR AND WITH ALL OTHER SUB-CONTRACTORS.
1.6.2. COOPERATE WITH OTHER TRADES, OWNER AND OWNER'S FORCES IN CARRYING OUT WORK. REPORT ANY DEFICIENCIES OR DEFECTS IN WORK PERFORMED BY OTHERS THAT AFFECT THIS CONTRACT'S WORK TO ENGINEER IMMEDIATELY.

1.7. GUARANTEE
1.7.1. THIS CONTRACTOR SHALL PROVIDE, IN WRITING, A GUARANTEE COVERING ALL LABOR AND MATERIAL FOR A PERIOD OF ONE YEAR FROM DATE OF SUBSTANTIAL COMPLETION. REPAIR AND MAKE GOOD ALL DEFECTS DURING THE GUARANTEE PERIOD, INCLUDING ANY DAMAGE TO BUILDING INCURRED AS A RESULT OF FAILURE OF ELECTRICAL WORK AND/OR EQUIPMENT INSTALLED.

1.8. DRAWINGS
1.8.1. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC ONLY. SEE ARCHITECTURAL DRAWINGS FOR EXACT DIMENSIONS AND LOCATIONS OF ALL WALLS AND OPENINGS. MAINTAIN ONE SET OF PLANS ON WHICH SHALL BE CLEARLY NOTED ALL CHANGES OR DEVIATIONS FROM THE CONTRACT, AND SUBMIT THEM AT THE END OF THE PROJECT MARKED 'AS-BUILT', SIGNED AND DATED BY THIS CONTRACTOR. THESE DRAWINGS SHALL BE KEPT ON SITE DURING CONSTRUCTION, UPDATED, AND MADE AVAILABLE FOR REVIEW BY ENGINEER, IF REQUESTED.
1.8.2. REVIEW MECHANICAL DRAWINGS AND PROVIDE POWER TO ALL MECHANICAL EQUIPMENT. SEE MECHANICAL EQUIPMENT SCHEDULE, CONFIRM EXACT REQUIREMENTS WITH MECHANICAL CONTRACTOR. REPORT ANY DISCREPANCY TO ENGINEER FOR DIRECTIVE PRIOR TO START OF WORK. COORDINATE AND ASSIST MECHANICAL CONTRACTOR WITH TESTING OF MECHANICAL EQUIPMENT.

1.9. EXTRA WORK
1.9.1. NO ALLOWANCE SHALL BE MADE BEYOND CONTRACT PRICE UNLESS CONTRACTOR RECEIVES SIGNED APPROVAL IN ACCORDANCE WITH GENERAL CONDITIONS.

1.10. CUTTING, PATCHING AND FIRESTOPPING
1.10.1. ALL CUTTING, PATCHING AND FIRESTOPPING SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR. THIS CONTRACTOR SHALL LOCATE THE EXACT DIMENSIONS AND POSITIONS OF OPENINGS AND HOLES WHERE CUTTING IS REQUIRED.

1.11. SITE WORK
1.11.1. ALL TRENCHING, BACKFILLING AND CONCRETE WORK SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
1.11.2. ALL UNDERGROUND SERVICES ARE TO BE LOCATED PRIOR TO EXCAVATION. ANY DAMAGE TO SUCH SERVICES SHALL BE THE RESPONSIBILITY OF, AND CORRECTED AT THE EXPENSE OF, THE CONTRACTOR CAUSING DAMAGE.
1.11.3. THE CONTRACTOR SHALL NOTIFY AND MAKE THE NECESSARY ARRANGEMENTS WITH THE OWNER AND UTILITY COMPANIES PRIOR TO ANY EXCAVATION.
1.11.4. ALL SURFACES SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AFTER EXCAVATION IS COMPLETE.

1.12. SHOP DRAWINGS
1.12.1. THIS CONTRACTOR SHALL SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH THE GENERAL REQUIREMENTS. WORK SHALL NOT PROCEED AND EQUIPMENT/MATERIAL SHALL NOT BE ORDERED UNTIL THE SHOP DRAWINGS HAVE BEEN RETURNED STAMPED AND SIGNED. THIS REVIEW DOES NOT RELIEVE THE CONTRACTOR OF THE OBLIGATION OF CHECKING THE DRAWINGS THEMSELVES OR FURNISHING THE MATERIALS SPECIFIED.
1.12.2. WHEN SUBMITTED, SHOP DRAWING MUST BEAR CONTRACTOR'S STAMP REPRESENTING THAT THEY HAVE DETERMINED AND VERIFIED ALL FIELD MEASUREMENTS, FIELD CONSTRUCTION CRITERIA, MATERIALS, CATALOGUE NUMBERS AND SIMILAR DATA AND THAT THEY HAVE CHECKED AND COORDINATED EACH SHOP DRAWING WITH REQUIREMENTS OF WORK AS INDICATED ON DRAWINGS AND SPECIFICATIONS.
1.12.3. SHOP DRAWINGS REQUIRED FOR: LUMINAIRES, LAMPS, CONTROLS, EMERGENCY LIGHTING, PANELBOARDS, MOTOR STARTERS, DISCONNECT SWITCHES AND WIRING DEVICES. INFORMATION REQUIRED: MANUFACTURER, MODEL, DIMENSIONS, CONSTRUCTION DETAILS, ACCESSORIES, INSTALLATION DETAILS, CAPACITIES, PERFORMANCE DATA, FINISHES. INCLUDE WIRING SINGLE LINE AND SCHEMATIC DIAGRAMS WHERE APPLICABLE.
1.12.4. ALL MATERIAL SUPPLIED SHALL BE NEW AND CARRY C.S.A. CERTIFICATION OR OTHER CERTIFICATIONS APPROVED BY LOCAL INSPECTION AUTHORITY.

1.13. CLEANING UP
1.13.1. THIS CONTRACTOR SHALL, AT ALL TIMES, KEEP THE SITE NEAT, CLEAN AND FREE FROM ACCUMULATION OF WASTE MATERIALS.

1.14. NAMEPLATES
1.14.1. SUPPLY AND INSTALL ENGRAVED 1/8"(0.125mm) THICK PLASTIC LAMACOID NAMEPLATES, WHITE FACE-BLACK CORE, FOR ELECTRICAL EQUIPMENT INCLUDING, BUT NOT LIMITED TO: STARTERS, DISCONNECT SWITCHES, PANELBOARDS, AND SPLITTERS. ATTACH WITH SELF-TAPPING SCREWS IN CONSPICUOUS LOCATIONS. WORDING SHALL INDICATE DEVICE NAME, VOLTAGE, PHASE, AMPERAGE AND POWER SOURCE.
1.14.2. PROVIDE LAMICOID NAMEPLATES FOR ALL RECEPTACLES AND SWITCHES INDICATING PANEL AND CIRCUIT NUMBERS.

1.15. OPERATION AND MAINTENANCE INSTRUCTIONS
1.15.1. THIS CONTRACTOR SHALL INSTRUCT THE OWNER IN OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND SYSTEMS INSTALLED SUCH AS DIMMING SYSTEM, FIRE ALARM SYSTEM, SAFETY AND CONTROL FEATURES SHALL BE THOROUGHLY EXPLAINED. THREE COPIES OF OPERATION AND MAINTENANCE INSTRUCTIONS, TOGETHER WITH ALL APPROVED SHOP DRAWINGS AND SPARE PARTS LIST FASTENED IN A BINDER, SHALL BE SUBMITTED TO THE OWNER. MANUALS COMPLETE WITH:
-DETAILS OF DESIGN ELEMENTS, CONSTRUCTION FEATURES, COMPONENT FUNCTION AND MAINTENANCE REQUIREMENTS, TO PERMIT EFFECTIVE START-UP, OPERATION, MAINTENANCE, REPAIR, MODIFICATION, EXTENSION AND EXPANSION OF ANY PORTION OR FEATURE OF INSTALLATION.
-TECHNICAL DATA, PRODUCT DATA, SUPPLEMENTED BY BULLETINS, DESCRIPTIONS OF ITEMS, AND PARTS LISTS. ADVERTISING OR SALES LITERATURE IS NOT ACCEPTABLE.
-WIRING AND SCHEMATIC DIAGRAMS AND PERFORMANCE CURVES.
-NAME AND ADDRESS OF LOCAL SUPPLIERS.
-COPY OF REVIEWED SHOP DRAWINGS.
-COPY OF ALL TEST CERTIFICATES.
-COPY OF ALL FINAL NEW AND REVISED PANELBOARD SCHEDULES.

1.16. DISPOSALS
1.16.1. ADVISE OWNER OF AVAILABILITY OF SURPLUS MATERIAL. TURN OVER ITEMS REQUESTED BY OWNER AND DISPOSE OF REMAINDER IN ACCORDANCE WITH ALL BY LAWS AND LOCAL AUTHORITIES HAVING JURISDICTION.

2. BASIC MATERIAL AND METHODS

2.1. EQUIPMENT AND PROPERTY
2.1.1. ANY ALTERNATE PRODUCT PROPOSED SHALL MEET SAME STANDARDS AS PRODUCT SPECIFIED BUT SHALL BE CONSIDERED ACCEPTABLE ONLY IF APPROVED PRIOR TO INSTALLATION BY ENGINEER. SUCH APPROVAL WILL NOT BE UNREASONABLY WITHHELD.
2.1.2. SPECIFIED PRODUCTS PROVIDED BY THIS CONTRACTOR SHALL BE NEW AND CAPABLE OF PROPER OPERATION. UNSPECIFIED PRODUCTS PROVIDED SHALL BE OF QUALITY BEST SUITED TO THEIR PURPOSE, CSA OR LOCAL INSPECTION AUTHORITY APPROVED AND CAPABLE OF PROPER OPERATION.
2.1.3. CLEAN VISIBLE PORTIONS OF ALL DEVICES AND COVER PLATES AS RECOMMENDED BY MANUFACTURER TO RESTORE FACTORY FINISH.
2.1.4. PROTECT WORK AND OWNER'S PROPERTY FROM DAMAGE THAT MAY ARISE AS A RESULT OF THIS CONTRACTOR'S PERFORMANCE OF WORK. PROMPTLY MAKE GOOD ANY DAMAGES TO WORK AND OWNER'S PROPERTY ARISING FROM THIS CONTRACTOR'S PERFORMANCE OF WORK.
2.1.5. ARRANGE DELIVERIES AND STORAGE WITH OWNER AND AUTHORITIES HAVING JURISDICTION AS APPROPRIATE. PROTECT NEW AND REUSED MATERIALS FROM ABUSE, DAMAGE AND ENVIRONMENTAL CONDITIONS WHICH THEY ARE NOT INTENDED TO WITHSTAND. NOTWITHSTANDING FOREGOING, FOLLOW MANUFACTURER'S RECOMMENDATIONS.
2.1.6. ELECTRICAL EQUIPMENT TO BE CERTIFIED BY AN ACCREDITED CERTIFICATION ORGANIZATION AND BEAR THAT ORGANIZATIONS CERTIFICATION MARK AS EVIDENCE OF HAVING CONFORMED TO THE APPROPRIATE CANADIAN STANDARDS ASSOCIATION (CSA) STANDARDS ESTABLISHED UNDER THE PROVISIONS OF THE CANADIAN ELECTRICAL CODE.
2.1.7. LOCKOUT AND TAGOUT ALL ELECTRICAL AND OTHER EQUIPMENT BEFORE PERFORMING WORK AS PER CAN/CSA Z460-13.

2.2. WIRING METHODS
2.2.1. FOR POWER WIRING, MAINTAIN PHASE SEQUENCE AND COLOR CODING THROUGHOUT. COLOR CODING TO CSA C22.1.
2.2.2. LOCATE, DIMENSION AND MAKE ELECTRICAL SERVICES OPENINGS. PROVIDE NECESSARY SLEEVES, ESCUTCHEONS AND COVERS.
2.2.3. DRILL AND PROVIDE ANCHORS AS REQUIRED FOR EXPANSION BOLTS, HANGER RODS, BRACKETS AND SUPPORTS.

2.3. TESTING
2.3.1. MEGGER CIRCUITS UP TO 350V WITH A 500V INSTRUMENT.
2.3.2. CHECK RESISTANCE TO GROUND BEFORE ENERGIZING ANY PART OF THE WORK.
2.3.3. TEST ALL LUMINAIRES, CONTROLS, WIRING DEVICES, ELECTRIC HEATERS, CIRCUIT BREAKERS, DISCONNECT SWITCHES, MOTOR STARTERS, AND EMERGENCY LIGHTING UNIT EQUIPMENT FOR CORRECT OPERATION AND ABSENCE OF SHORTS OR GROUNDS.
2.3.4. CONTRACTOR SHALL COORDINATE INSPECTION DATE WITH ENGINEER AND SHALL PROVIDE LABOR FOR ACCESS TO ALL EQUIPMENT FOR INSPECTION. SUCH ACCESS SHALL INCLUDE REMOVAL OF PANEL COVERS, OPENING OF DISCONNECT SWITCHES JUNCTION/PULL BOXES, STARTERS AND LUMINAIRES, TO CONFIRM WORK METHOD.

3. CONDUIT AND FITTINGS

3.1. EMT CONDUIT WITH SET SCREW CONNECTORS THROUGHOUT UNLESS NOTED OTHERWISE.

3.2. SUPPORT ALL BOXES INDEPENDENTLY OF CONNECTING CONDUITS.

3.3. DO NOT USE SUPPORTS OR EQUIPMENT INSTALLED FOR OTHER TRADES FOR CONDUIT (OR CABLE) SUPPORT, EXCEPT WITH PERMISSION OF OTHER TRADES AND APPROVAL OF ENGINEER.

3.4. DO NOT USE WIRE LASHING OR PERFORATED STRAPPING TO SUPPORT OR SECURE RACEWAYS (OR CABLES).

3.5. PROVIDE ADEQUATE SUPPORT FOR RACEWAYS (AND CABLES) DROPPED VERTICALLY TO EQUIPMENT, WHERE THERE IS NO WALL SUPPORT.

3.6. FASTEN EXPOSED CONDUIT (OR CABLES) TO BUILDING CONSTRUCTION OR SUPPORT SYSTEM USING ONE OR TWO HOLE STEEL STRAPS.

3.7. INSTALL CONNECTORS ON SURFACE CONDUITS, SO THAT SCREW HEADS DO NOT POSE A DANGER TO OCCUPANTS.

3.8. RIGID PVC DUCT SHALL BE USED FOR ALL DIRECT BURIED UNDERGROUND WORK.

4. WIRE AND CABLE

4.1. ALL WIRING SHALL BE RUN IN CONDUIT CONCEALED IN FINISHED AREAS AND SHALL BE RUN PARALLEL TO BUILDING LINES.

4.2. WIRING:
4.2.1. AC90
4.2.2. AC90 OR TECK CABLE FOR TEMPORARY WORK.
4.2.3. AC90 C/W ANTI-SHORT BUSHINGS FOR LUMINAIRE DROPS IN T-BAR CEILINGS AND IN WALLS WHERE CONDUIT IS NOT POSSIBLE.
4.2.4. TECK 90 CABLE.
4.2.5. RW90 IN PVC DUCT (UNDERGROUND)
4.2.6. RW90 IN EMT CONDUIT, C/W STEEL SET-SCREW CONNECTORS AND COUPLINGS
4.2.7. RW90 IN LIQUID TIGHT FLEXIBLE. CONDUIT FOR CONNECTION TO MECHANICAL EQUIPMENT.
4.2.8. CONDUCTORS; #12 RW90, 600V, CU, MINIMUM, IN EMT CONDUIT.
4.2.9. FAS90 (FIRE ALARM HARDWIRED DEVICES)(SECUREX)
4.2.10. MINIMUM #12 AWG (#18 FOR FIRE ALARM, #14 FOR FIRE ALARM SIGNALS).

4.3. ASSURE THAT ALL CONDUCTORS ARE SIZED FOR MAXIMUM VOLTAGE DROP:
4.3.1. BRANCH CIRCUITS - MAX. 2%
4.3.2. PANEL FEEDERS - MAX. 2%
4.3.3. DISTRIBUTION - MAX. 1%

4.4. TV CABLES SUPPLIED BY CABLE TV SUPPLIER.

4.5. ELECTRICAL CONTRACTOR SHALL COORDINATE COMMUNICATIONS PROVIDER PRE-WIRING. ADVISE WHEN BUILDING IS READY FOR PRE-WIRING.

4.6. ALL SOLID COPPER CONDUCTORS WITH THERMOPLASTIC INSULATION (TYPE RW90, 600V) BRANCH WIRING SHALL BE MINIMUM #12 AWG (MAXIMUM 70' [21.4m]); #10 AWG (MAXIMUM 120'[36.6m]); FOR RUNS EXCEEDING 120'[36.6m] VOLTAGE DROP SHALL BE CALCULATED AT THE MAXIMUM OF 2%. #8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED COPPER. USE CONNECTORS, CLAMPS AND SUPPORTS TO SUIT.

5. OUTLET, PULL & JUNCTION BOXES

5.1. PROVIDE ELECTRO-GALVANIZED STEEL SINGLE OR MULTIPLE GANG BOXES FOR FLUSH INSTALLATION FOR ALL DEVICES AND COMMUNICATIONS OUTLETS AS INDICATED. BOXES SHALL BE CODE GAUGE AND SIZED TO MEET THE CANADIAN ELECTRICAL CODE REQUIREMENTS. EQUIP ALL BOXES WITH EXTENSION AND PLASTER RINGS AS REQUIRED.

5.2. PROVIDE ELECTRO-GALVANIZED STEEL 'FS' TYPE UTILITY BOXES FOR OUTLETS CONNECTED TO SURFACE-MOUNTED CONDUIT. BOXES SHALL BE CODE GAUGE AND SIZED TO MEET THE CANADIAN ELECTRICAL CODE REQUIREMENTS. PROVIDE PROPER 'FS' STYLE COVERPLATES FOR SAID BOXES.

5.3. PROVIDE 4"(100mm) SQUARE OR OCTAGONAL OUTLET BOXES FOR FLUSH LIGHTING FIXTURES.

5.4. PROVIDE WELDED STEEL JUNCTION/PULL BOXES WITH HINGED COVERS FOR SURFACE MOUNTING AS REQUIRED TO FACILITATE CONDUCTOR INSTALLATION. GENERALLY SUCH BOXES WILL BE LOCATED SO AS NOT TO EXCEED 100' (30.5m) OF CONDUIT RUN AND 2-90 DEGREE BENDS BETWEEN PULL BOXES. PROVIDE ADDITIONAL JUNCTION/PULL BOXES AS REQUIRED. ENSURE ALL JUNCTION/PULL BOXES ARE ACCESSIBLE WHEN ALL WORK IS COMPLETE.

5.5. SUPPORT ALL BOXES INDEPENDENTLY OF CONNECTING CONDUITS.

5.6. FOR FLUSH INSTALLATIONS, MOUNT OUTLETS FLUSH WITH FINISHED WALL USING TILE RINGS TO PERMIT WALL FINISH TO COME WITHIN 1/4" (6mm) OF OPENING.

5.7. DO NOT INSTALL OUTLET BOXES BACK-TO-BACK IN HOLLOW WALLS; ALLOW MINIMUM 6"(150mm) HORIZONTAL DISTANCE BETWEEN BOXES LOCATED ON OPPOSITE SIDES OF SAME WALL.

5.8. INSTALL POLYETHYLENE VAPOUR BARRIER BOX ON ALL EXTERIOR WALL OUTLETS TO MAINTAIN VAPOUR BARRIER INTEGRITY OR ACOUSTICAL INTEGRITY, WHERE INDICATED.

6. WIRING DEVICES

6.1. CHANGE LOCATION OF OUTLETS, INCLUDING SERVICE POLES, AT NO EXTRA COST OR CREDIT, PROVIDING DISTANCE DOES NOT EXCEED 3m FROM THAT INDICATED, AND DIRECTIVE IS GIVEN PRIOR TO INSTALLATION.

6.2. ADJUST OUTLET AS REQUIRED TO SUIT FINAL FINISHES.

6.3. EQUIPMENT MOUNTING HEIGHT IS FROM FINISHED FLOOR TO EQUIPMENT CENTERLINE UNLESS SPECIFIED OR INDICATED OTHERWISE.

6.4. IF EQUIPMENT MOUNTING HEIGHT IS NOT INDICATED, VERIFY WITH ENGINEER BEFORE PROCEEDING WITH INSTALLATION.

6.5. INSTALL ELECTRICAL EQUIPMENT AT FOLLOWING HEIGHTS UNLESS INDICATED OTHERWISE (REFER ALSO TO ARCHITECTURAL DRAWINGS);
6.5.1. LOCAL SWITCHES: 48" (1200mm) (LIGHTS, FANS)
6.5.2. DOOR RELEASE PUSHBUTTON: 40" (1000mm)
6.5.3. POWER RECEPTACLES - WALL: 18" (450mm)
6.5.4. POWER RECEPTACLES - ABOVE COUNTERTOP SPLASHBACK: 6" (150mm).
6.5.5. COMMUNICATIONS OUTLETS: 18" (450mm)
6.5.6. EMERGENCY BATTERY & REMOTE UNITS: 90" (2250mm),12" (300mm) ABOVE DOOR FRAME
6.5.7. FIRE ALARM SIGNALING DEVICES: 84" (2100mm)
6.5.8. FIRE ALARM PULL STATIONS: 44" (1100mm)
6.5.9. FIRE ALARM CONTROL PANEL: 60" (1520mm) TO TOP OF PANEL.
6.5.10. INTRUSION ALARM KEY PAD: 48" (1200mm).
6.5.11. PANELBOARDS: 72" (1375mm) TO TOP.
6.5.12. SWITCHES (BARRIER FREE): 42" (1052mm)

6.6. SWITCHES:
6.6.1. TOGGLE TYPE 15A, 120V AS INDICATED, SINGLE POLE, 3-WAY MANUALLY OPERATED SPECIFICATION GRADE AS INDICATED.
6.6.2. COLOUR: WHITE
6.6.3. ACCEPTABLE SWITCH MANUFACTURERS:
6.6.3.1. BRYANT, COOPER, HUBBELL, LEVITON, PASS AND SEYMOUR.

6.7. SENSORS:
6.7.1. AUTOMATIC WALL SWITCHES: 1500 WATT, 120 VOLT PASSIVE INFRARED VACANCY DETECTOR. TIME DELAY ADJUSTABLE FROM 30 SECONDS TO 30 MINUTES. PHOTOCELL ADJUSTABLE LIGHT LEVEL SENSOR ADJUSTABLE FROM 3 TO 300 FOOT CANDLES. SINGLE GANG BACK BOX MOUNTING.
6.7.2. AUTOMATIC ULTRASONIC SENSORS, 24 DC VOLT, 1000 SQUARE FOOT COVERAGE AREA, TIME DELAY ADJUSTABLE FROM 15 SECONDS TO 15 MINUTES COMPLETE WITH POWER PACK AS REQUIRED.
6.7.3. ACCEPTABLE SENSOR MANUFACTURERS:
6.7.3.1. SENSOR SWITCH, WATTSTOPPER, LEVITON, HUBBELL.

6.8. GROUND FAULT AND DUPLEX RECEPTACLES:
6.8.1. CSA TYPE 5-15R, 5-20R, 125V, 15/20A, ROUND AND GROUND SPECIFICATION GRADE. COLOR: TO BE DETERMINED AT SHOP DRAWING.
6.8.2. GROUND FAULT RECEPTACLES TO MEET CSA 22.2-144
6.8.3. ACCEPTABLE RECEPTACLE MANUFACTURERS:
6.8.3.1. COOPER, HUBBELL, LEVITON, PASS AND SEYMOUR.

6.9. PROVIDE COVER PLATES FROM ONE MANUFACTURER FOR EACH TYPE OR ASSEMBLY OF OUTLETS THROUGHOUT PROJECT. OPENINGS TO SUIT TYPE AND GANGING OF DEVICES.

6.10. THERMOPLASTIC COVER PLATES FOR WIRING DEVICES MOUNTED IN A FLUSH-MOUNTED OUTLET BOX. COLOR: TO MATCH DEVICE.

6.11. ONE PIECE WEATHERPROOF COVER, COMMERCIAL GRADE, ZINC DIECAST, VERTICAL POSITION, DEVICE MOUNT, SELF CLOSING & GASKETED, FOR USE WITH GFCI RECEPTACLES, LISTED FOR WET LOCATION. ACCEPTABLE MANUFACTURER: PASS AND SEYMOUR #WIUCAST1 OR APPROVED EQUAL.

6.12. PROVIDE SURFACE MOUNTED RACEWAY FOR EXPOSED RUNS WHERE INDICATED WITH ALL NECESSARY FITTINGS. PAINT TO MATCH SUPPORTING SURFACES. ACCEPTABLE MANUFACTURERS: HUBBELL, WIREMOLD.

6.13. TIME CLOCK: ELECTRONIC TIME SWITCH, 7 DAY, HOLIDAY AND FULL YEAR PROGRAMMABLE CONTROL. NON VOLATILE MEMORY. FULLY AUTOMATIC DAYLIGHT SAVINGS TIME. LEAP YEAR AND ASTRO ADJUSTMENT c/w FOUR INDEPENDENTLY PROGRAMMABLE 20A CIRCUITS. ACCEPTABLE TIME CLOCK MANUFACTURERS: INTERMATIC, PARAGON, TORK.

6.14. WIRING DEVICES IN LEGEND ARE INTENDED TO SET A STANDARD BELOW WHICH EQUIPMENT WILL NOT BE ACCEPTED.

6.15. RECEPTACLES SHALL BE INSTALLED WITH THE 'U' GROUND AT THE TOP.

6.16. GROUND FAULT RECEPTACLES TO MEET CSA 22.2-144

6.17. LOCATE LIGHT SWITCHES AS INDICATED. VERIFY EXACT LOCATIONS WITH OWNER PRIOR TO ROUGHING-IN.

7. MOTOR AND CONTROLS

7.1. MAGNETIC AND COMBINATION MAGNETIC MOTOR CONTROLLERS: SOLENOID OPERATED FVNR NEMA CONTACTORS IN EEMAC 1 ENCLOSURES. MANUALLY RESETTABLE BI-METALLIC OVERLOAD RELAYS AND HEATERS IN EACH PHASE TO SUIT MOTOR CONTROLLED. UNITS c/w CONTROL TRANSFORMER, 1 N-O AND 1 N-C AUXILIARY CONTACTS. H-O-A SELECTOR SWITCH AND GREEN 'RUN' AND RED 'STOPPED' PILOT LIGHTS. COMBINATION TYPES TO INCLUDE DISCONNECT SWITCH WITH ON/OFF LOCKING PROVISIONS AND UL CLASS J HRC-I TIME DELAY FUSES TO SUIT MOTOR CONTROLLED.

7.2. NEMA-1 ALUMINUM ENCLOSURE WITH PADLOCK GUARD FOR LOCKING IN THE OFF OR STOP POSITION. CUTLER HAMMER #B230AG.

7.3. ACCEPTABLE MANUFACTURERS: ALLEN BRADLEY, EATON, FURNAS, SQUARE D.

7.4. ALL EQUIPMENT SHALL BE SUITABLE FOR THE ENVIRONMENT IN WHICH IT IS INSTALLED; IE WEATHERPROOF, DUSTPROOF, SPLASH PROTECTION (SPRINKLERED BUILDING) AND EXPLOSION PROOF.

8. DISCONNECT SWITCHES

8.1. FUSIBLE AND NON-FUSIBLE HEAVY DUTY, SPECIFICATION GRADE DISCONNECT SWITCHES AS INDICATED. PROVISION FOR PADLOCKING IN 'OFF' POSITION. MECHANICALLY INTERLOCKED DOOR TO PREVENT OPENING IN 'ON' POSITION. QUICK-MAKE, QUICK-BREAK ACTION. 'ON-OFF' INDICATION ON COVER. FUSES SHALL BE HRC-J.

8.2. ACCEPTABLE MANUFACTURERS; EATON, SIEMENS, SQUARE-D.

9. GROUNDING

9.1. THE ENTIRE ELECTRICAL SYSTEM, AS PERTAINS TO THIS INSTALLATION, SHALL, BE GROUNDED IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE SECTION 10 AND LOCAL AUTHORITY HAVING JURISDICTION OVER INSTALLATION.

9.2. MAKE GROUNDING CONNECTIONS IN RADIAL CONFIGURATION ONLY, WITH CONNECTIONS TERMINATING AT SINGLE GROUNDING POINT. AVOID LOOP CONNECTIONS.

9.3. ALL METAL PIPING SUCH AS, BUT NOT LIMITED TO, WATER, SEWAGE AND GAS, SHALL BE BONDED WITH MINIMUM #6 AWG TO THE MAIN SYSTEM GROUND.

10. PANELBOARDS

10.1. PANELBOARDS: VOLTAGE, PHASE, MAINS, CAPACITY, CIRCUIT BREAKERS AND MOUNTING AS INDICATED. ALUMINUM OR COPPER BUS WITH NEUTRAL OF SAME AMPERE RATING AS MAINS.

10.2. PROVIDE TYPE WRITTEN DIRECTORIES IN ALL PANELS SHOWING TYPE AND LOCATION OF EACH CIRCUIT.

10.3. EQUIP BREAKERS SERVING FIRE ALARM SYSTEM, INTRUSION ALARM SYSTEM, CCTV SYSTEM AND ALL EMERGENCY CIRCUITS WITH LOCK-ON DEVICES.

10.4. ACCEPTABLE MANUFACTURERS: EATON, SIEMENS, SCHNEIDER-ELECTRIC.

11. MECHANICAL EQUIPMENT

11.1. SEE MECHANICAL EQUIPMENT CONNECTION SCHEDULE AND LEGEND FOR ALL REQUIRED MECHANICAL EQUIPMENT ELECTRICAL CONNECTIONS. THE ELECTRICAL TRADE SHALL PROVIDE THE FOLLOWING:
11.1.1. THE NECESSARY POWER DISTRIBUTION EQUIPMENT AT THE ELECTRICAL ROOM.
11.1.2. THE NECESSARY CONDUIT AND WIRE TO THE MECHANICAL EQUIPMENT LOCATION.
11.1.3. A TERMINATING DISCONNECT SWITCH, UNLESS PROVIDED FOR BY THE EQUIPMENT MANUFACTURER.
11.1.4. ANY MISCELLANEOUS ITEMS NECESSARY TO COMPLETE THE WORK AS SHOWN ON THE DRAWINGS.
11.1.5. ALL CONDUIT AND WIRING FROM THE TERMINATING DISCONNECT SWITCH TO THE MECHANICAL EQUIPMENT UNLESS NOTED OTHERWISE. LOW VOLTAGE CONTROLS, SHALL BE PROVIDED BY THE MECHANICAL TRADE.
11.1.6. THE ELECTRICAL TRADE SHALL VERIFY ALL MOTOR CONNECTIONS FOR PROPER PHASE ROTATION, WHERE APPLICABLE.

12. LIGHTING (SEE LUMINAIRE SCHEDULE AND LEGEND)

12.1. PROVIDE LUMINAIRES AS INDICATED ON THE LUMINAIRE SCHEDULE AND/OR AS SPECIFIED UNDER THIS SECTION. THESE SHALL BE, COMPLETE WITH ALL NECESSARY PLASTER FRAMES, HANGERS, LAMPS, LOUVERS, DIFFUSERS, CANOPIES, SUPPORTS, BRACKETS, AND REQUIRED HARDWARE FOR A COMPLETE AND FINISHED INSTALLATION. LUMINAIRES IN SCHEDULE AND LEGEND ARE INTENDED TO SET A STANDARD BELOW WHICH EQUIPMENT WILL NOT BE ACCEPTED.

12.2. CONTRACTOR SHALL INCLUDE IN HIS TENDER, THE LUMINAIRE(S) THAT ARE BEING SPECIFIED. IF AN ALTERNATE MANUFACTURER IS NAMED, IT IS MANDATORY THAT THE LUMINAIRE BE EQUIVALENT IN ALL RESPECTS, I.E. SAME LENS, EQUIVALENT FRAME, PERFORMANCE, PAINT FINISH, LUMEN OUTPUT, CONSTRUCTION QUALITY, ETC. ALTERNATE MANUFACTURERS OR ALTERNATE LUMINAIRE TYPES MUST BE OFFERED AS AN ALTERNATIVE ONLY, TO THE BASE BID, WITH A SEPARATE PRICE STATED IN THE TENDER. LOW BIDDER WILL BE DETERMINED ON THE BASIS OF THE SPECIFIED ITEMS, NOT ON "ALTERNATE SAVINGS".

12.3. LED LAMPS: 50,000 HOURS RATED LIFE. COLOR RENDERING INDEX: 80 MIN. COLOR TEMPERATURE: AS INDICATED. ACCEPTABLE MANUFACTURERS: PRESCOLITE, LITHONIA, PHILIPS.

12.4. POSITION LIGHTS AS INDICATED. ADJUST LOCATIONS OF LUMINAIRES TO SUIT CEILING GRID AS INDICATED. ADVISE ENGINEER IF LOCATIONS SHOWN TO CHANGE MORE THAN 6" (150mm).

12.5. ACCEPTABLE MANUFACTURERS:
12.5.1. LINEAR; CFI, METALUX, LITHONIA, HUBBELL
12.5.2. DOWNLIGHTS; LIGHTOLIER, HALO, LITHONIA
12.5.3. TRACK LIGHTING CAPRI: COOPER, LIGHTOLIER, LITHONIA

13. EMERGENCY LIGHTING SYSTEM

13.1. EMERGENCY LIGHT BATTERY UNITS: AS SPECIFIED IN LUMINAIRE SCHEDULE.

13.2. EMERGENCY LIGHT HEADS: AS SPECIFIED IN LUMINAIRE SCHEDULE.

13.3. WIRE EMERGENCY BATTERY PACKS TO LINE SIDE OF AMBIENT LIGHTING CIRCUIT SERVING THE SAME AREA FOR AC POWER. WIRE REMOTE HEADS TO BATTERY PACK SERVING THE SAME AREA FOR DC POWER.

13.4. CONNECT HEADS TO EMERGENCY LIGHTING UNIT BATTERIES WITH MINIMUM #12 AWG CONDUCTORS AS INDICATED. SIZE CONDUCTORS FOR MINIMUM 3% VOLTAGE DROP AS PER CEC 2018.

14. ELECTRIC HEATING

14.1. FORCED AIR HEATERS: WALL MOUNTED, COMMERCIAL GRADE TYPE AS INDICATED. STEEL CABINET FINISHED 2 COATS BAKED ENAMEL MANUFACTURER'S STANDARD COLOR, TOTALLY ENCLOSED I