

Appendix B

Technical Memorandum # 2 – Phase 2 Alternative Solutions

Municipal Class Environmental Assessment and Conceptual Design

Technical Memorandum #2 - Phase 2 Alternative Solutions

Main & Whitney (HD17A) Water Pumping Station City of Hamilton, Ontario



Prepared for the City of Hamilton

Arcadis Professional Services (Canada) Inc.

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October 2023



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October 31, 2023

Reference No. 136546

Udo Ehrenberg., P.Eng.
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Public Works Department, Hamilton Water Division
City of Hamilton
100 King Street West, 9th Floor
Hamilton, ON L8P 1A2

Dear Mr. Ehrenberg,

Re: Main & Whitney (HD17A) Water Pumping Station Municipal Class Environmental Assessment
and Conceptual Design

Technical Memorandum #2 - Phase 2 Alternative Solutions

Arcadis Professional Services (Canada) Inc. (Arcadis) was retained by the City of Hamilton to prepare this Technical Memorandum #2 (TM #2) as part of the Main & Whitney (HD17A) Water Pumping Station Municipal Class Environmental Assessment and Conceptual Design Study.

This project is classified as a Schedule B and is being undertaken in accordance with the planning process outlined in the Municipal Engineers Association Municipal Class Environmental Assessment document (March 2023).

Should you have any questions or require additional information, please feel free to contact us.

Yours truly,

Arcadis Professional Services (Canada) Inc

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cc: Margaret Parkhill and Shveta Shukla - Arcadis

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1 Introduction

The City of Hamilton is undertaking a Municipal Class Environmental Assessment (Class EA) to construct a new Water Pumping Station (WPS) to replace the existing station (HD17A WPS) currently located at Main Street West and Whitney Avenue.

The purpose of this Technical Memorandum (TM #2) is to introduce the expansion of the Study Area and address Phase 2 of the Class EA process. The purpose of Phase 2 is to identify alternative solutions and select a preferable alternative based on a thorough evaluation of the options against a rigorous set of criteria. These criteria include taking an inventory of the natural, social, economic environment and hydraulic considerations and identifying any adverse impacts or effects and their associated mitigating measures.

The recommended alternative identified in this report is preliminary only; its purpose is to facilitate discussion at the upcoming Public Information Centre (PIC) No. 2. Such public consultations are held to review issues and opportunities and propose alternative solutions. This is done to gather feedback to inform the selection of the recommended alternative. It is also an opportunity to outline any environmental issues and needs as well as the approvals and permits required by the relevant authorities.

The recommended alternative presented here may be amended based on input from the review agencies and the public.

2 Background

This study was formally introduced to the public and review agencies via a public notice (Notice of Study Commencement) and the first PIC. The notice was distributed to those on the study mailing list via mail or email and was also published in the “Hamilton Spectator” local newspaper. The first PIC was held virtually from May 12, 2022, to June 2, 2022. It presented the study background, an overview of the Class EA process, the extent of the Study Area, and the problem and opportunity statement.

3 Study Area Expansion

One of the alternative solutions (alternative 2: separate pumping station upgrades) presented in the 2015 study prepared by WSP (formerly GENIVAR) proposed that the new WPS for Pressure District 17 (PD17) be located hydraulically close to the existing pumping station. This was suggested to provide for similar hydraulic conditions and minimal linear infrastructure.

The initial Study Area was presented in Technical Memorandum #1 (TM #1) and at the first PIC. It was defined by the existing PD17 service area boundary plus up to an additional 500m radius buffer around a potential alternative location/site.

Following the first PIC, 10 potential alternative locations (9 along Osler Drive and Main Street West from Osler Drive and Filman Road plus 1 alternative site is located adjacent to and SW of 130 Osler Drive (site adjacent to existing Osler WPS, HD011) were identified based on the initial study area. These 10 alternative sites were presented at the meetings with City staff held in the middle of 2022. As a result of discussions at these meetings as well as other input from City staff, the initial Study Area was expanded to include a larger area (i.e., along Whitney Avenue, Lower Horning Road, and Rifle Range Road plus the location at Ainslie Wood Park). As such, 11 additional locations (for a total of 21) were identified and added to the long list of alternatives for evaluation. **Section 4** provides further details on the selection of the alternative sites.

Through the evaluation and screening of the potential alternative sites, 7 sites have been placed on the short list. Among these, 2 are outside the initial Study Area presented at the first PIC. Since then, the Study Area has been expanded east to Bowman Street and includes a buffer area of approximately 500m radius from each of the 7 sites. The Class EA Study Area has thus been expanded to include the initial Study Area and the Study Area expansion shown in **Figure 3-1**.

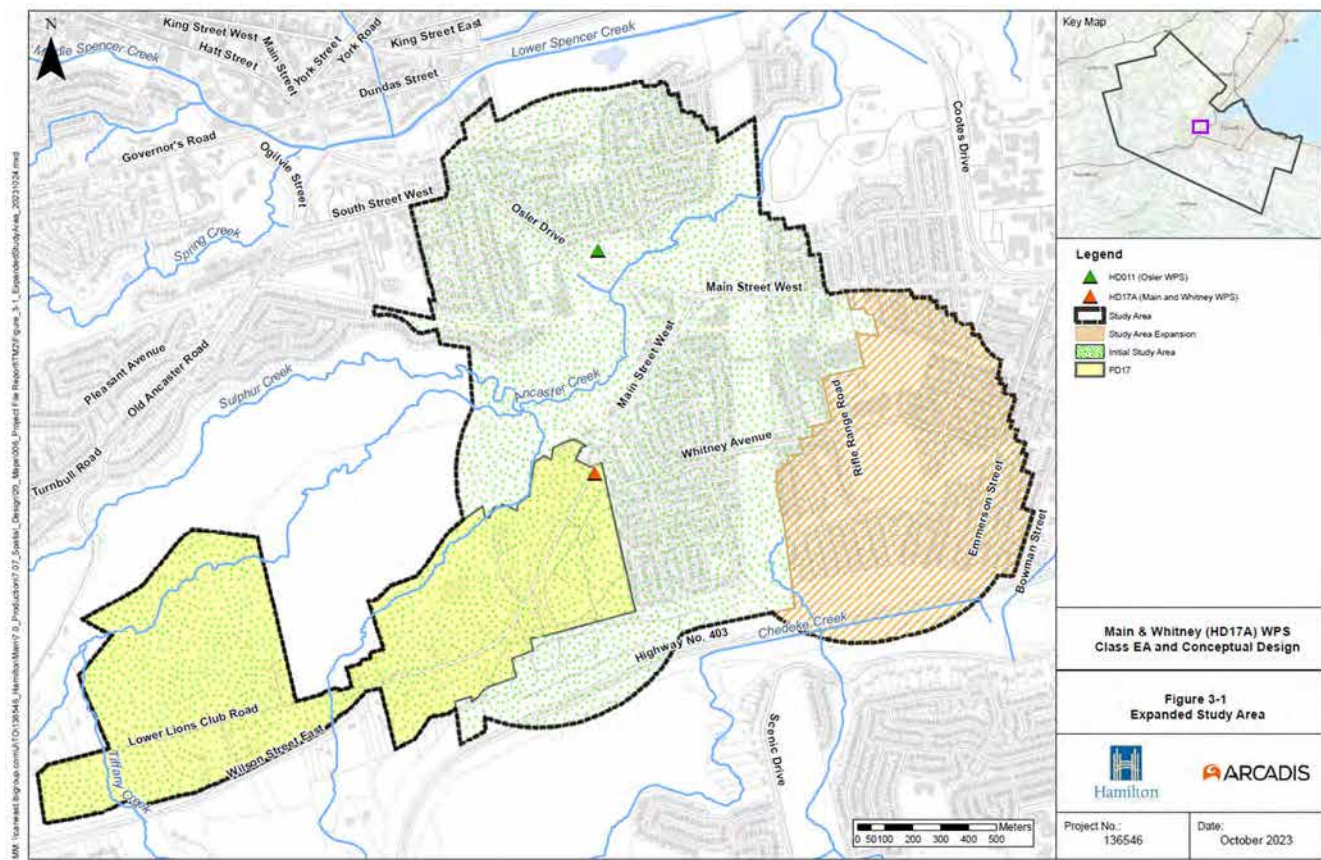


Figure 3-1 Expanded Study Area

4 Alternative Concept Generation

The following section outlines the development and evaluation of the concepts for the alternative sites.

4.1 Overview

The development of the list of alternative sites was based on previous studies. This includes the facility condition assessment of the existing HD17A WPS (WSP, 2012) and the feasibility study for a new WPS (WSP, 2015) as well as the as-built drawings for the Highland Gardens Park WPS (WSP, 2016), a review of the system, and input from the City.

Building on this knowledge, the initial long list of alternative sites was developed, and each site was pre-screened qualitatively to identify the short-listed alternative sites, which locations had the best opportunity to meet the needs of the new WPS for PD17.

Next, a short list of the most promising and feasible alternative sites was created based on the pre-screening evaluation. The alternative sites on the short list then underwent a detailed assessment on the natural, social/cultural and technical aspects including the hydraulic performance, requirement for new linear infrastructure, land ownership, and costs (see **Sections 5 and 6** for details).

4.2 “Do Nothing” Scenario

The “Do Nothing” alternative, which considers replacing HD17A WPS ‘like-for-like’.

This “Do Nothing” alternative was identified as Alternative 1- Status Quo in the feasibility study (WSP, May 2015) and it was screened out as it does not meet current design standards, or eliminate existing health and safety

risks, or meet future servicing needs, and the existing HD17A WPS is not feasible to rehabilitate as it is beyond its recommended useful life.

The “Do Nothing” scenario is not a viable alternative. This alternative is eliminated from further consideration.

The selection for potential locations of the new WPS is detailed in the following sections.

4.3 Key considerations for Selection of Potential Sites

Based on the review of the system and discussions with the City, the key considerations for selection of the potential sites are as follows:

- A publicly owned land (preferable)
- An open space (or no existing building)
- A larger land parcel
- Near a larger watermain, and
- Proximity to the existing HD17A WPS (or PD17).

4.4 Long-Listed Alternative Sites

The initial long list of alternative sites comprises 21 locations, which are identified in **Figure 4-1**.

The open area within PD17 and along Main Street West and/or Lower Lion Club Road were also reviewed. These lands were identified as Significant Woodlands and/or Escarpment Protection Areas (Natural Heritage system (NHS) Area), which are to be avoided as recommended in the Niagara Escarpment Plan (2017). Thus, no alternative sites were selected within PD17 and west of Site 10 – See Appendix C of Project Report File (PFR) for details.

The following is an overview of the long list of 21 alternative sites that were considered and subsequently undertaken pre-screening evaluation. A brief description of the elements associated with each site is provided in the following sections and **Attachment A**. The objective of this pre-screening was to compare and identify those alternative sites that have the greatest potential to serve as the future location of the new WPS for PD17. No detailed assessment was done at this stage.

4.4.1 Pre-screening Criteria for Long-Listed Alternative Sites

The pre-screening of the 21 alternative sites involved 2 criteria categories: **must meet** and **should meet**.

Following the background review and discussions with City staff, the design of the recently constructed Highland Gardens Park WPS (HD03A) was used as the basis for the site area requirement for the new WPS for PD17. Thus, the most important mandatory criterion was that each site had to be at least 35m by 22m, including a building footprint of 20m by 12m plus a parking area. These dimensions are considered for the new WPS for PD17 and are deemed sufficient for preliminary screening/site selection. However, these dimensions, as well as orientation of the site, are subject to change during subsequent design phases.

Evaluation criteria were developed to assess the alternative sites, identify the potential environmental effects, and assess the advantages and disadvantages of each potential site. Criteria included various considerations (social, cultural, natural environment, and technical overview). **Table 4.1** presents the criteria used for pre-screening.

Table 4.1 Pre-screening Criteria for Long-Listed Alternative Sites

The site must...	The site should...
• Meet the size requirement	• Minimize the impact on the natural environment
	• Minimize the impact on social/cultural environment
	• Be relatively close to the existing HD17A WPS (or PD17)

4.4.2 Evaluation of Long-Listed Alternative Sites

Using the pre-screening criteria, each long-listed alternative site was evaluated and scored where:

- ✗ indicates it does not satisfy the criterion (not considered further)
- ◆ indicates it satisfies the criterion (considered further)

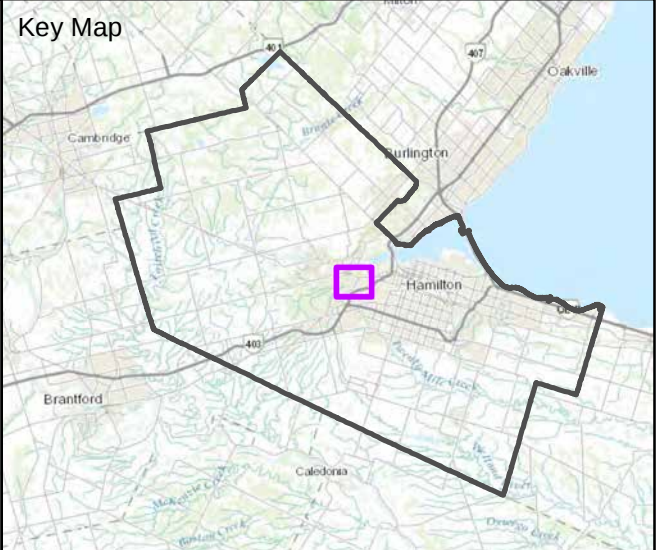
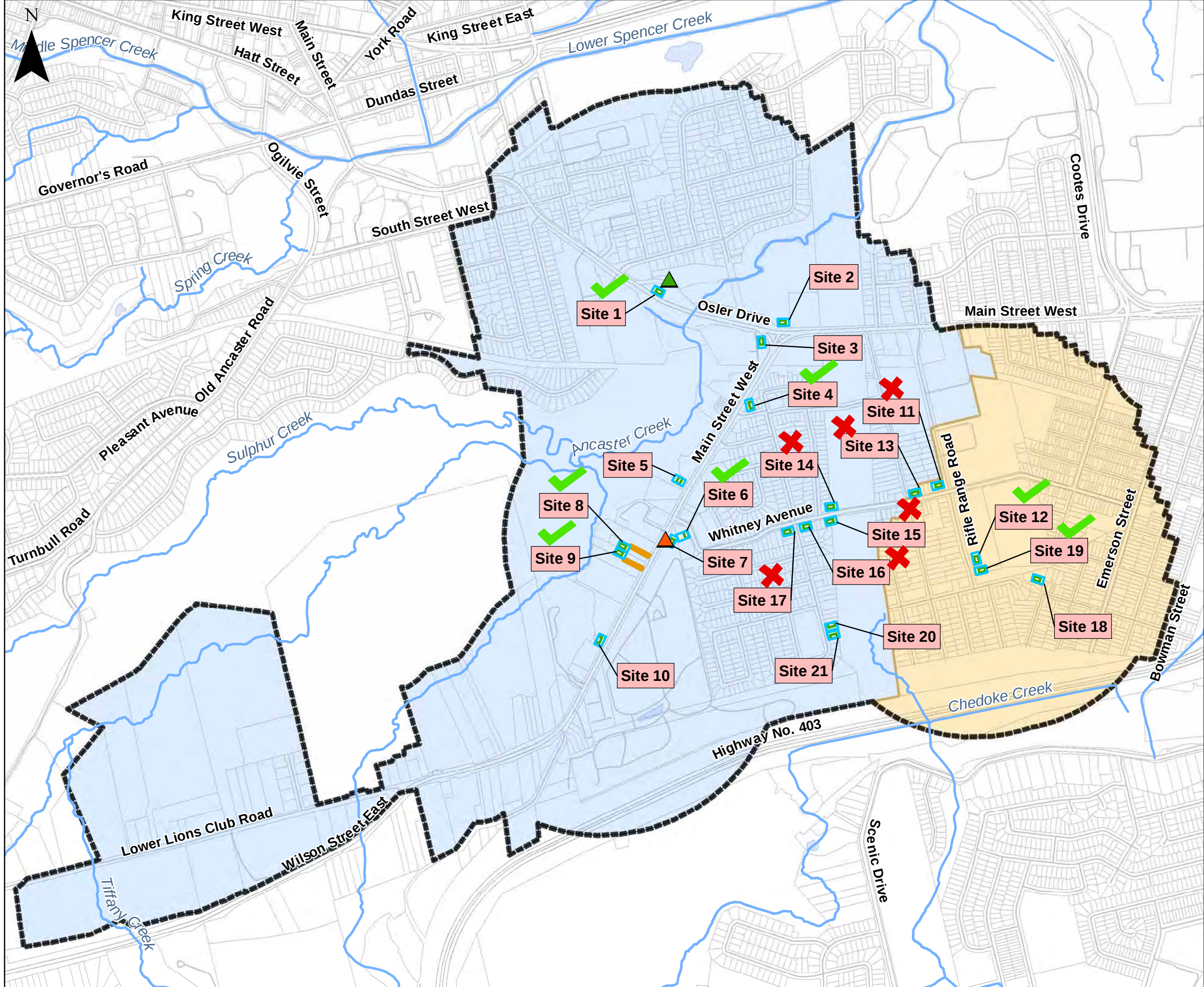
The pre-screening evaluation of each of the 21 long-listed alternative (potential) sites is reported in **Table 4.2**. The purpose of pre-screening was to identify those alternative sites that have the greatest potential to serve as the future location of the new WPS for PD17.

The pre-screening criteria as identified in **Table 4.1** was used to assess each of the alternative sites in the long list. Whenever a site failed to meet any mandatory (must meet) criteria, it was no longer considered. Following the pre-screening evaluation, six of the 21 alternative locations were found to be too small (Sites 11, 13, 14, 15, 16, and 17), were each assigned a red cross mark (✗) and were thus not evaluated further (see **Table 4.2** for the alternative sites and details). Although a publicly owned land is preferable, but it was not used for the pre-screening evaluation.

The remaining 15 sites were each assigned a blue diamond (◆) and considered further, as presented in **Figure 4-1** and **Table 4.2** below.

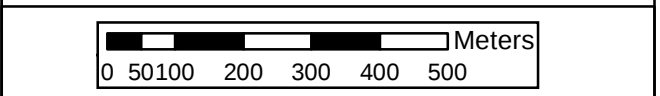
Next, the preliminary comparative evaluation or trade-off method was undertaken for the 15 alternative sites with blue diamonds (◆) and are shown in the following sections. A brief description of the elements associated with each site is provided; however, as mentioned previously, a detailed technical assessment was not done at this stage. Only once an alternative site was short-listed it will be carried forward and assessed for land ownership and hydraulic performance considerations and costs.

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Legend

- HD011 (Osler WPS)
- HD17A (Main and Whitney WPS)
- Watercourse
- Waterbodies
- Buildings
- Property Boundary
- Easement
- Study Area
- Alternative Location Construction Component**
- Lot Area
- Building Footprint
- Parking Lot
- Short-Listed Alternative Site
- Long-Listed Alternative Site does not consider further



**Main & Whitney (HD17A) WPS
Class EA and Conceptual Design**

**Figure 4-1
Overview of Long-Listed
Alternative Sites**



Project No.: 136546	Date: October 2023
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Table 4.2 Pre-Screening of Long-Listed Alternative Sites

SITE LOCATION AND OWNERSHIP				PRE-SCREENING CRITERIA							
SITE NO.	ADDRESS	LANDUSE	OWNERSHIP	SITE AREA SUITABLE (PRE-SCREENING)	NATURAL ENVIRONMENT		SOCIO/CULTURAL ENVIRONMENTS		TECHNICAL CONSIDERATIONS		SCORE SUMMARY
1	adjacent to and SW of 130 Osler Drive (Adjacent to existing Osler WPS, HD011)	Open Space	City		- Adjacent to Environmentally Sensitive Area (ESA) - Within Hamilton Conservation Authority (HCA) regulated Area		Minimal Impact to local area and traffic		Away from existing HD17A WPS		
2	1688 Main St W	Agriculture	City		- Within HCA regulated Area. - Significant wooded area		Medium Impact to local area		- Away from existing HD17A WPS - Steep slope		
3	Osler Dr and Main St W	Open Space	City		Mature trees		- Closure of an informal path through site to intersection. - Adjacent to residential - Negative impacts to traffic sight lines		- Away from existing HD17A WPS - Potential watermain relocation - Adjacent to a private underground sewer pumping station		
4	88 Ofield Rd	Residential	Private		Minimal Impact		- Adjacent to residential - Insufficient setback at rear yard - A minor variance may be required		Near existing HD17A WPS		
5	On Main St–W - between 1770 and 1830 Main St W	Open Space	City		- Within HCA regulated area. - Significant wooded area part of Dundas Valley		Minimal Impact		- Near existing HD17A WPS - Steep slope		
6	1845 Main St W	Commercial (The Treehouse Cannabis)	Private		Minimal Impact		Adjacent to Cultural Heritage Landscapes (CHL)–7 - White Chapel Cemetery and would require additional cultural heritage reporting and development of mitigation measures.		Adjacent to existing HD17A WPS		

Table 4.2 Pre-Screening of Long-Listed Alternative Sites

SITE LOCATION AND OWNERSHIP				PRE-SCREENING CRITERIA							
SITE NO.	ADDRESS	LANDUSE	OWNERSHIP	SITE AREA SUITABLE (PRE-SCREENING)	NATURAL ENVIRONMENT		SOCIO/CULTURAL ENVIRONMENTS		TECHNICAL CONSIDERATIONS		SCORE SUMMARY
7	1895 Main St W	Cemetery	Private		Mature trees		Within CHL-7 - White Chapel Cemetery and would require additional cultural heritage reporting and development of mitigation measures.		- Adjacent to existing HD17A WPS - Require new address and new entrance		
8	1870 Main St W	Commercial (Haven Inn)	Private		Minimal Impact		Easements that are near the cemetery (CHL 7) may trigger additional cultural heritage work and development of mitigation measures.		Near existing HD17A WPS		
9	1872 Main St W	Commercial (Westdale Car Service)	Private		Potential soil contamination which requires additional studies and development of mitigation measures		Easements that are near the cemetery (CHL 7) may trigger additional cultural heritage work and development of mitigation measures		Near to existing HD17A WPS		
10	1940 Main St W	Commercial -Your Wellness Centre	Private		Minimal Impact		- Near CHL 7 (White Chapel Cemetery), and this would require additional cultural heritage reporting and development of mitigation measures. - Insufficient setback at rear yard - A minor variance may be required		- Near existing HD17A WPS - Steep slope at rear yard		

Table 4.2 Pre-Screening of Long-Listed Alternative Sites

SITE LOCATION AND OWNERSHIP				PRE-SCREENING CRITERIA							
SITE NO.	ADDRESS	LANDUSE	OWNERSHIP	SITE AREA SUITABLE (PRE-SCREENING)	NATURAL ENVIRONMENT		SOCIO/CULTURAL ENVIRONMENTS		TECHNICAL CONSIDERATIONS		SCORE SUMMARY
11	252/254 Whitney Ave	Commercial (Hamilton Hydro Inc. / Alectra Utilities Corporation)	Private	X	-	-	-	-	-	-	X
12	125 Rifle Range Rd	Institutional - Open Space (Conseil Scolaire Viamonde (French School Board))	Private	◆	• Minimal Impact	⊕	• Adjacent to Alexander Park (CHL 11), and this would require additional cultural heritage reporting and development of mitigation measures	⊕	• Away from existing HD17A WPS	⊕	⊕⊕⊕
13	107 Ewen Ave	Residential	Private	X	-	-	-	-	-	-	X
14	340 Whitney Ave plus Hydro Corridor	Residential	Private	X	-	-	-	-	-	-	X
15	341 Whitney Ave plus Hydro Corridor	Residential	Private	X	-	-	-	-	-	-	X
16	91 Lower Horning Rd	Residential	Private	X	-	-	-	-	-	-	X
17	90 Lower Horning Rd	Residential	Private	X	-	-	-	-	-	-	X
18	At Clifford St. and Ainslie Ave. (Adjacent to 102 & 106 Ainslie Ave)	Ainslie Wood Park		◆	• Wooded area	⊕	• Minimal Impact	⊕	• Away from existing HD17A WPS • Require site access and/or an easement to the site	⊕	⊕⊕
19	161 Rifle Range Rd	Residential/ Institution - Trustees of Meeting Rooms Association Hamilton-Burlington Area	Private	◆	• Minimal Impact	⊕	• Adjacent to Alexander Park (CHL 11), and this would require additional cultural heritage reporting and development of mitigation measures	⊕	• Away from existing HD17A WPS	⊕	⊕⊕⊕
20	Roadway plus 159 Lower Horning Rd	Roadway and Residential	City/Private	◆	• Minimal Impact	⊕	• Adjacent to Residential	⊕	• Away from existing HD17A WPS	⊕	⊕⊕

Table 4.2 Pre-Screening of Long-Listed Alternative Sites

SITE LOCATION AND OWNERSHIP				PRE-SCREENING CRITERIA							
SITE NO.	ADDRESS	LANDUSE	OWNERSHIP	SITE AREA SUITABLE (PRE-SCREENING)	NATURAL ENVIRONMENT		SOCIO/CULTURAL ENVIRONMENTS		TECHNICAL CONSIDERATIONS		SCORE SUMMARY
21	Roadway plus 163 Lower Horning Rd	Roadway and Residential	City/Private		Minimal Impact		- Adjacent to residential - Adjacent to an existing easement to Ontario Hydro		Away from existing HD17A WPS		

Legend

				
Not considered further	Considered further	Acceptable	Preferrable	Most Preferrable

- Notes:
- A total of 21 alternative sites have been reviewed and evaluated.
 - Six (6) alternative sites have indicated land restrictions through pre-screening and are not considered further; These are: Sites 11, 13, 14, 15, 16, and 17 indicated by a red cross mark (X) in **Figure 4-1**.
 - Fifteen (15) alternative sites are large enough indicated by a blue diamond (◆) in **Table 4.2** and considered for further evaluation.
 - Seven (7) alternative sites have scores at least 2-1/4 pies and are short-listed for detailed evaluation; These are: Sites 1, 4, 6, 8, 9, 12, and 19 indicated by a green checkmark (✓) in **Figure 4-1**.

Site 1: Adjacent to and SW of 130 Osler Drive
(Adjacent to existing Osler WPS, HD011)

Advantages:

- open space
- City-owned land
- no additional property required

Disadvantages:

- adjacent to an environmentally sensitive area
- within an HCA-regulated area
- not close to either the existing HD17A WPS or PD17, which results in the need for more linear infrastructure works

Site 1 is short-listed and considered further.



Site 2: 1688 Main Street West

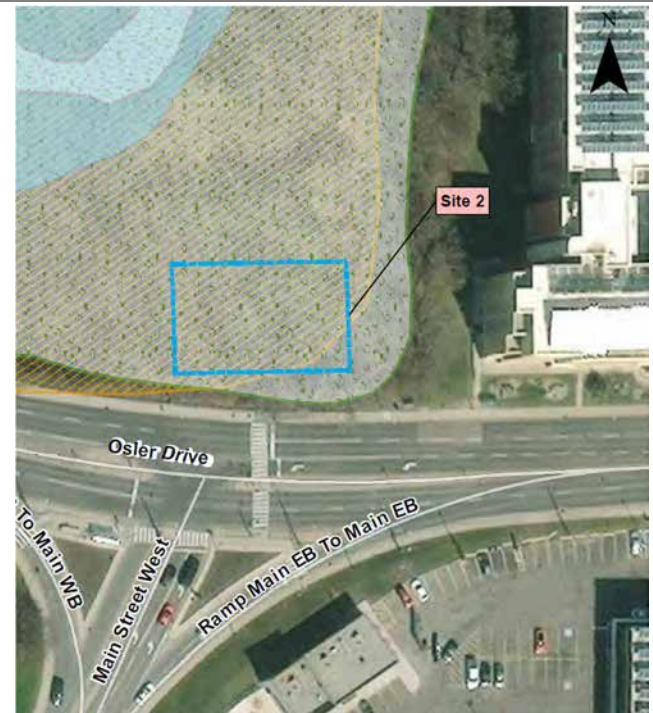
Advantages:

- open-space agricultural
- City-owned land
- no additional property required

Disadvantages:

- adjacent to an environmentally sensitive area
- within an HCA-regulated area
- wooded area
- not close to either PD17 or the existing HD17A WPS, which results in the need for more linear infrastructure works
- site is on a steep slope, which would present some challenges during design and construction

Site 2 is not considered further.



Site 3: Osler Drive and Main Street West

Advantages:

- open space
- City-owned land
- no additional property required

Disadvantages:

- clearing of mature trees
- closure of informal pathway to the intersection
- adjacent to residential area
- high impact on traffic and the local area
- negative impact on traffic sight lines
- potential need to relocate watermain
- adjacent to a private underground sewer pumping station
- not close to either PD17 or the existing HD17A WPS, which results in the need for more linear infrastructure works

Site 3 is not considered further.



Site 4: 88 Ofield Road

Advantages:

- close to WPS HD17, which results in less need for linear infrastructure works

Disadvantages:

- residential site
- adjacent to residential area
- privately owned land
- additional property required
- insufficient setback of rear yard; thus, a minor variance may be required

Site 4 is short-listed and considered further.



Site 5: Between 1770 and 1830 Main Street West

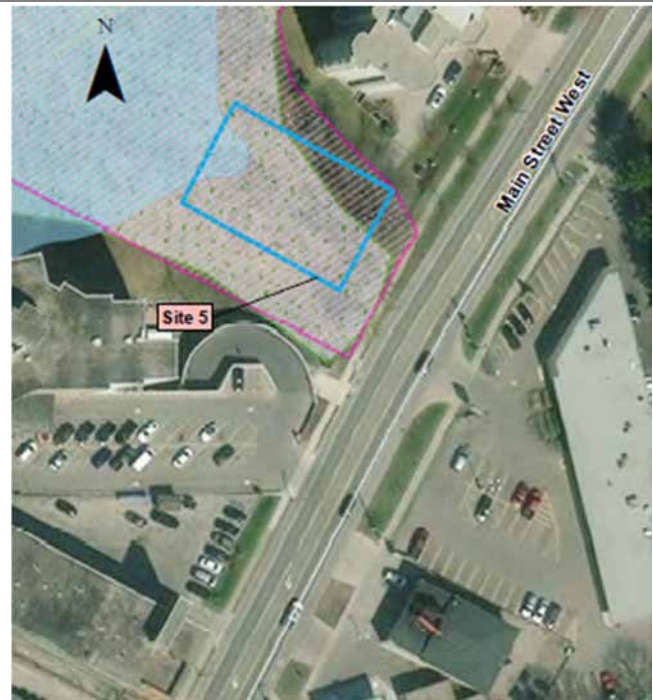
Advantages:

- open space
- City-owned land
- minimal impact on local area
- near existing HD17A WPS, which reduces the need for linear infrastructure works

Disadvantages:

- within an HCA regulated area
- significant wooded area that is part of Dundas Valley
- clearing trees required
- site is on a steep slope, which would present some challenges during the design and construction phases

Site 5 is not considered further.



Site 6: 1845 Main Street West

Advantages:

- lowest impact on natural environment
- adjacent to the existing HD17A WPS, which reduces the need for linear infrastructure works

Disadvantages:

- commercial space (The Treehouse Cannabis Company)
- privately owned land
- additional property required
- property is adjacent to White Chapel Memorial Gardens (CHL-7); thus, additional cultural heritage reporting would be required, and mitigation measures would have to be developed

Site 6 is short-listed and considered further.



Site 7: 1895 Main Street West

Advantages:

- adjacent to the existing HD17A WPS, which reduces the need for linear infrastructure works

Disadvantages:

- site of a cemetery (White Chapel Memorial Gardens, CHL-7)
- privately owned land
- additional property required
- removal of mature trees
- site is within CHL-7, additional cultural heritage reporting would be required, and mitigation measures would have to be developed
- the new WPS for PD17 would need a new address and new entrance, resulting in a more onerous approval process

Site 7 is not considered further.



Site 8: 1870 Main Street West

Advantages:

- minimal impact on the natural environment
- near the existing HD17A, which reduces the need for linear infrastructure works

Disadvantages:

- commercial (Haven Inn)
- privately owned land
- additional property required
- additional land for the easement may be required
- easement is near CHL-7 (White Chapel Memorial Gardens); thus, additional cultural heritage reporting would be required, and mitigation measures would have to be developed

Site 8 is short-listed and considered further.



Site 9: 1872 Main Street West

Advantages:

- near the existing HD17A WPS, which reduces the need for linear infrastructure works

Disadvantages:

- commercial site (Westdale Car Service)
- privately owned land
- additional property required
- additional land for the easement may be required
- potential soil contamination would require additional studies and mitigation measures
- easement is near White Chapel Memorial Gardens (CHL-7); thus, additional cultural heritage reporting would be required, and mitigation measures would have to be developed

Site 9 is short-listed and consider further.



Site 10: 1940 Main Street West

Advantages:

- near the existing HD17A WPS, which results in less need for linear infrastructure works

Disadvantages:

- commercial site (Your Wellness Centre)
- privately owned land
- additional property required
- near CHL-7 (White Chapel Cemetery), and this would require additional cultural heritage reporting and development of mitigation measures.
- insufficient setback at rear yard; thus, a minor variance may be required
- steep slope at rear yard, which would present some challenges during the design and construction phases

Site 10 is not considered further.



Site 12: 125 Rifle Range Road

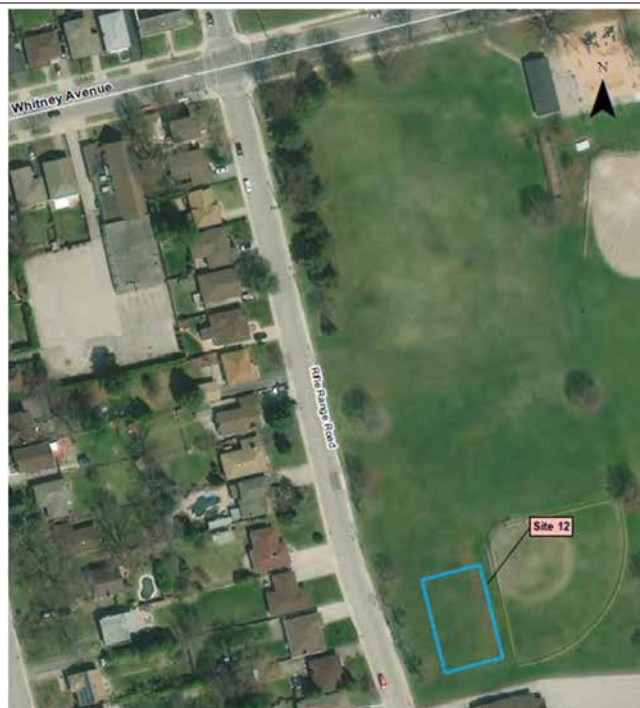
Advantages:

- open-space institutional
- minimal impact on the natural environment

Disadvantages:

- privately owned land (Conseil Scolaire Viamonde/French School Board)
- additional property required
- adjacent to Alexander Park (CHL-11); thus, additional cultural heritage reporting would be required, and mitigation measures would need to be developed
- not close to the existing HD17A WPS or PD17, which results in the need for more linear infrastructure works

Site 12 is short-listed and consider further.



Site 18: At Clifford Street and Ainslie Avenue (adjacent to 102 and 106 Ainslie Avenue)

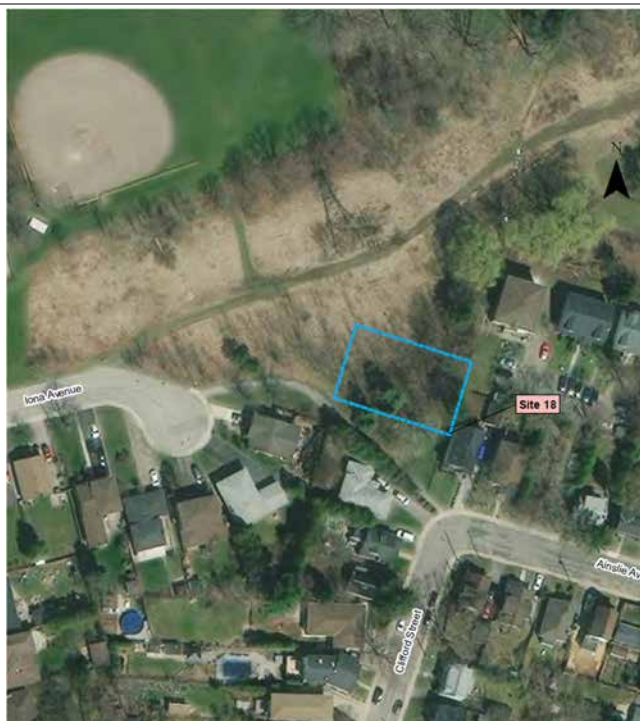
Advantages:

- City-owned land (Ainslie Wood Park)
- no additional property required
- minimal impacts on social and cultural environments

Disadvantages:

- wooded area
- not close to either the existing HD17A WPS or PD17, which results in the need for more linear infrastructure works
- would require a road access and/or an easement to the site

Site 18 is not considered further.



Site 19: 161 Rifle Range Road

Advantages:

- minimal impact on natural environment

Disadvantages:

- residential/institutional site
- privately owned land (Trustees of Meeting Rooms Association Hamilton-Burlington Area)
- additional property required
- adjacent to Alexander Park (CHL-11); thus, additional cultural heritage reporting would be required, and mitigation measures would need to be developed
- not close to either the existing HD17A WPS or PD17, which results in the need for more linear infrastructure works

Site 19 is short-listed and considered further.



Site 20: Comprises a roadway plus 159 Lower Horning Road

Advantages:

- minimal impact on the natural environment

Disadvantages:

- roadway and residential site
- includes both City-owned and privately owned land
- additional property required
- some sociocultural impact because it is adjacent to a residential area
- not close to either the existing HD17A WPS or PD17, which results in the need for more linear infrastructure works

Site 20 is not considered further.



Site 21: Comprises a roadway plus 163 Lower Horning Road

Advantages:

- minimal impact on the natural environment

Disadvantages:

- roadway and residential site
- includes both City-owned and privately owned land
- additional property required
- some sociocultural impact because it is adjacent to a residential area and an Ontario Hydro Ontario easement
- not close to either the existing HD17A WPS or PD17, which results in the need for more linear infrastructure works

Site 21 is not considered further.



This method highlights the relative advantages and disadvantages of each alternative site. This allowed for a clear presentation of the key trade-offs between the pre-screening criteria and the reasons why one alternative site is preferred over another. As a result, a traceable rationale to select the more preferable sites and alternative sites (Sites, 1, 4, 6, 8, 9, 12, and 19) indicated by green checkmarks (✓) were short-listed and considered were short-listed for further evaluations. The other 14 locations were not carried forward, either because they did not meet the minimum size requirement (6 of the 14 sites) or because they scored lower than the 7 short-listed alternative sites.

The overview of the short-listed alternative sites is presented in **Figure 4-2**. The locations and details for the 21 alternative sites are shown in **Attachment A** (14 alternative sites) plus the 7 short-listed alternative sites (Sites 1, 4, 6, 8, 9, 12, and 19) as shown **Figure 4-3** to **Figure 4-9**.

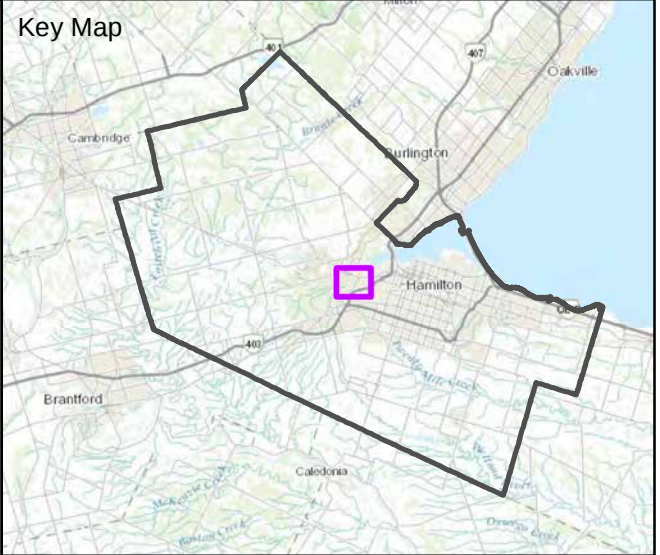
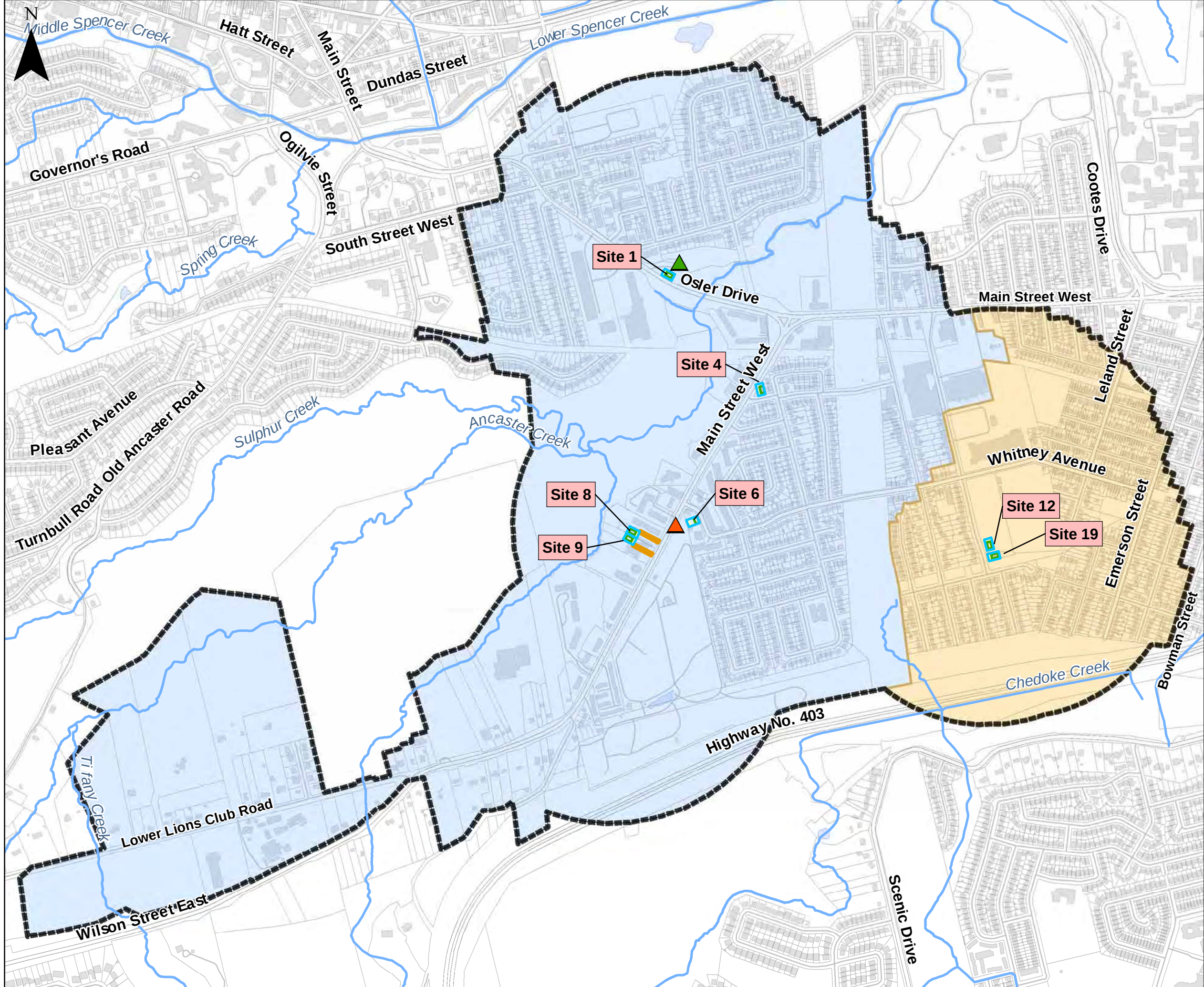
4.5 Short-Listed Alternative Sites

Seven (7) most promising alternative sites were short-listed (**Figure 4-2**) and carried forward to the next level of assessment:

- Site 1: adjacent to and SW of 130 Osler Drive (Adjacent to existing Osler WPS, HD011) (Open Space)
- Site 4: 88 Ofield Road (Residential)
- Site 6: 1845 Main Street West (Commercial)
- Site 8: 1870 Main Street West (Commercial)
- Site 9: 1872 Main Street West (Commercial)
- Site 12: 125 Rifle Range Road (Open Space/Institutional)
- Site 19: 161 Rifle Range Road (Residential/Institutional)

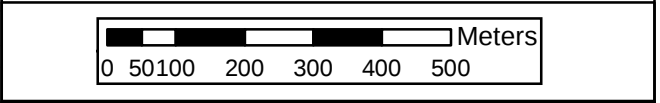
Figure 4-3 to **Figure 4-9** present details for the 7 short-listed alternative sites. Further evaluations for the short-listed alternative sites are presented in **Section 5**.

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Legend

- HD011 (Osler WPS)
- HD17A (Main and Whitney WPS)
- Watercourse
- Waterbodies
- Buildings
- Property Boundary
- Easement
- Study Area
- Study Area Expansion
- Initial Study Area
- Alternative Location Construction Component**
- Lot Area
- Building Footprint
- Parking Lot



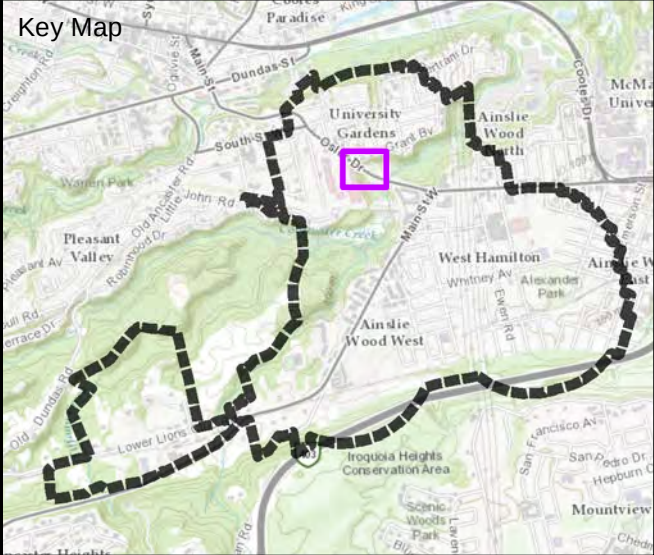
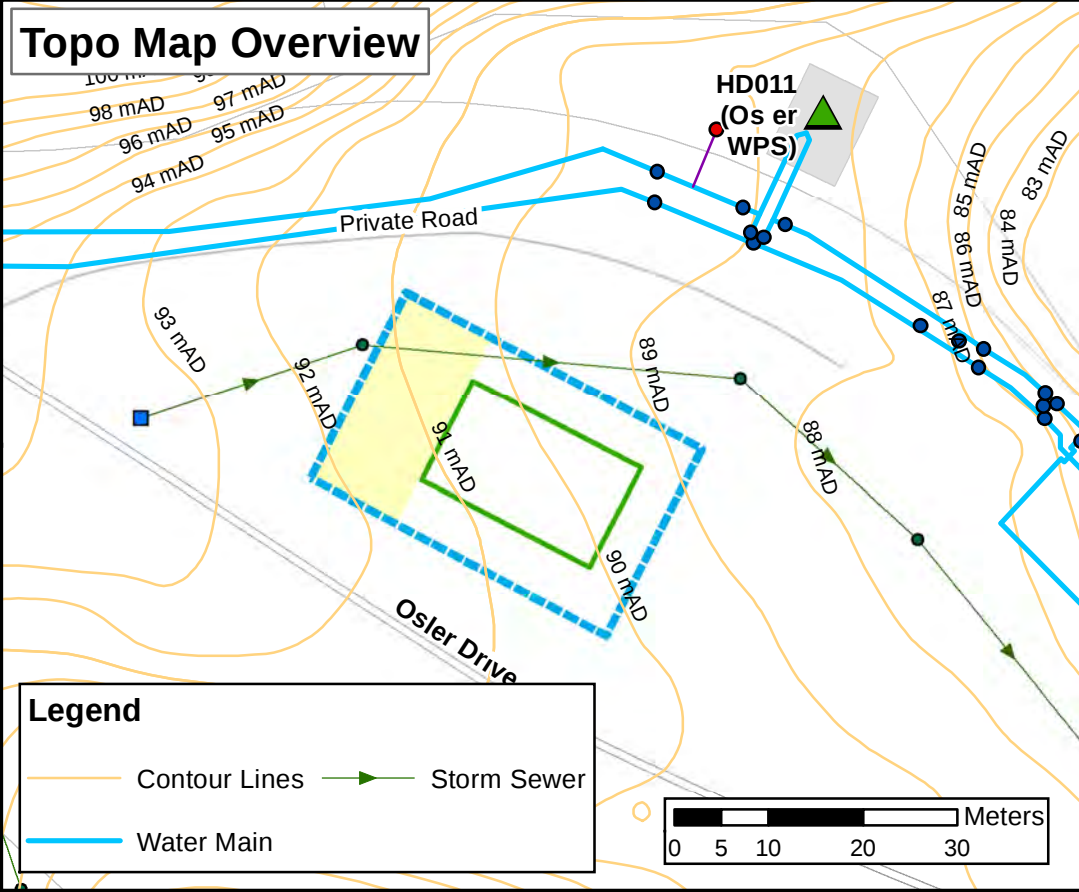
**Main & Whitney (HD17A) WPS
Class EA and Conceptual Design**

**Figure 4-2
Overview of Short-Listed Alternatives**



Project No.: 136546	Date: October 2023
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Topo Map Overview



Legend

- HD011 (Osler WPS)
- Watercourse
- Waterbodies
- Niagara Escarpment Parks and Open Spaces
- Regional Event Floodplain
- Significant Wooded Area
- Environmentally Sensitive Area
- Unevaluated Wetland
- Study Area
- Alternative Location Construction Component
 - Lot Area
 - Building Footprint
 - Parking Lot

Note: Shape, orientation and layout of the new Pumping Station lot/building are subject to change.

Main & Whitney (HD17A) WPS
Class EA and Conceptual Design

Figure 4-3
Location of Alternative Site 1



Project No.: 136546
Date: October 2023

Topo Map Overview

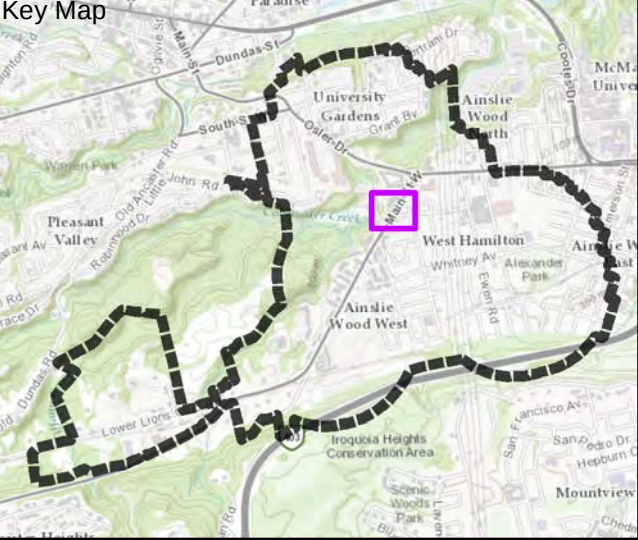
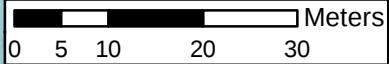
Legend

Contour Lines

Water Main

Combined Sewer

Storm Sewer



Legend

Watercourse

Waterbodies

Niagara Escarpment Parks and Open Spaces

Regional Event Floodplain

Significant Wooded Area

Environmentally Sensitive Area

Unevaluated Wetland

Study Area

Alternative Location Construction Component

Lot Area

Building Footprint

Parking Lot

Note: Shape, orientation and layout of the new Pumping Station lot/building are subject to change.

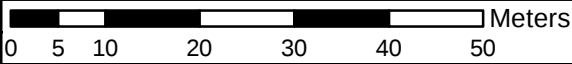
Main & Whitney (HD17A) WPS
Class EA and Conceptual Design

Figure 4-4
Location of Alternative Site 4



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136546

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October 2023



Topo Map Overview

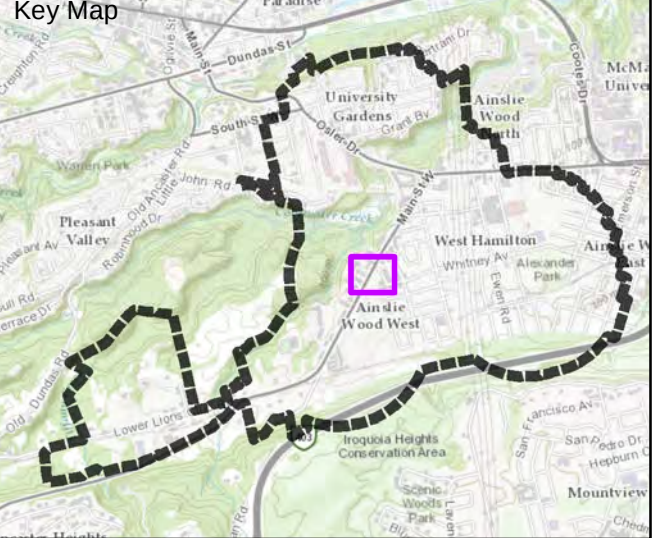
Legend

Contour Lines

Water Main

Combined Sewer

Storm Sewer



Legend

- HD17A (Main and Whitney WPS)
- Watercourse
- Waterbodies
- Niagara Escarpment Parks and Open Spaces
- Regional Event Floodplain
- Significant Wooded Area
- Environmentally Sensitive Area
- Unevaluated Wetland
- Study Area
- Alternative Location Construction Component
 - Lot Area
 - Building Footprint
 - Parking Lot

Note: Shape, orientation and layout of the new Pumping Station lot/building are subject to change.

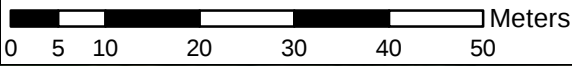
Main & Whitney (HD17A) WPS
Class EA and Conceptual Design

Figure 4-5
Location of Alternative Site 6

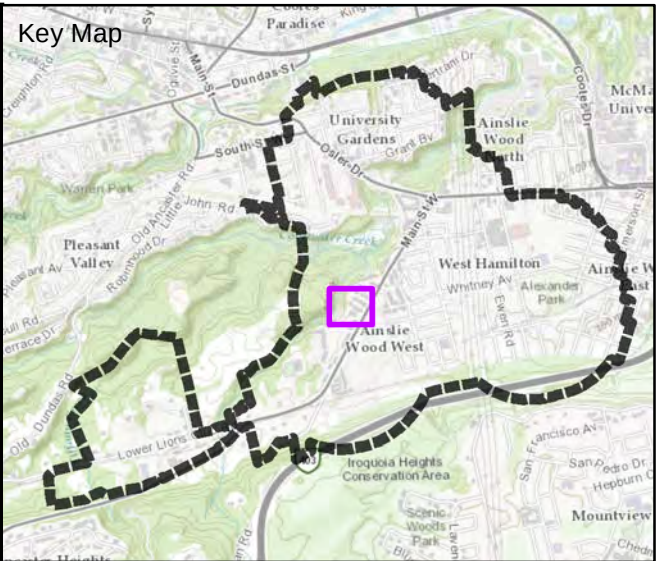
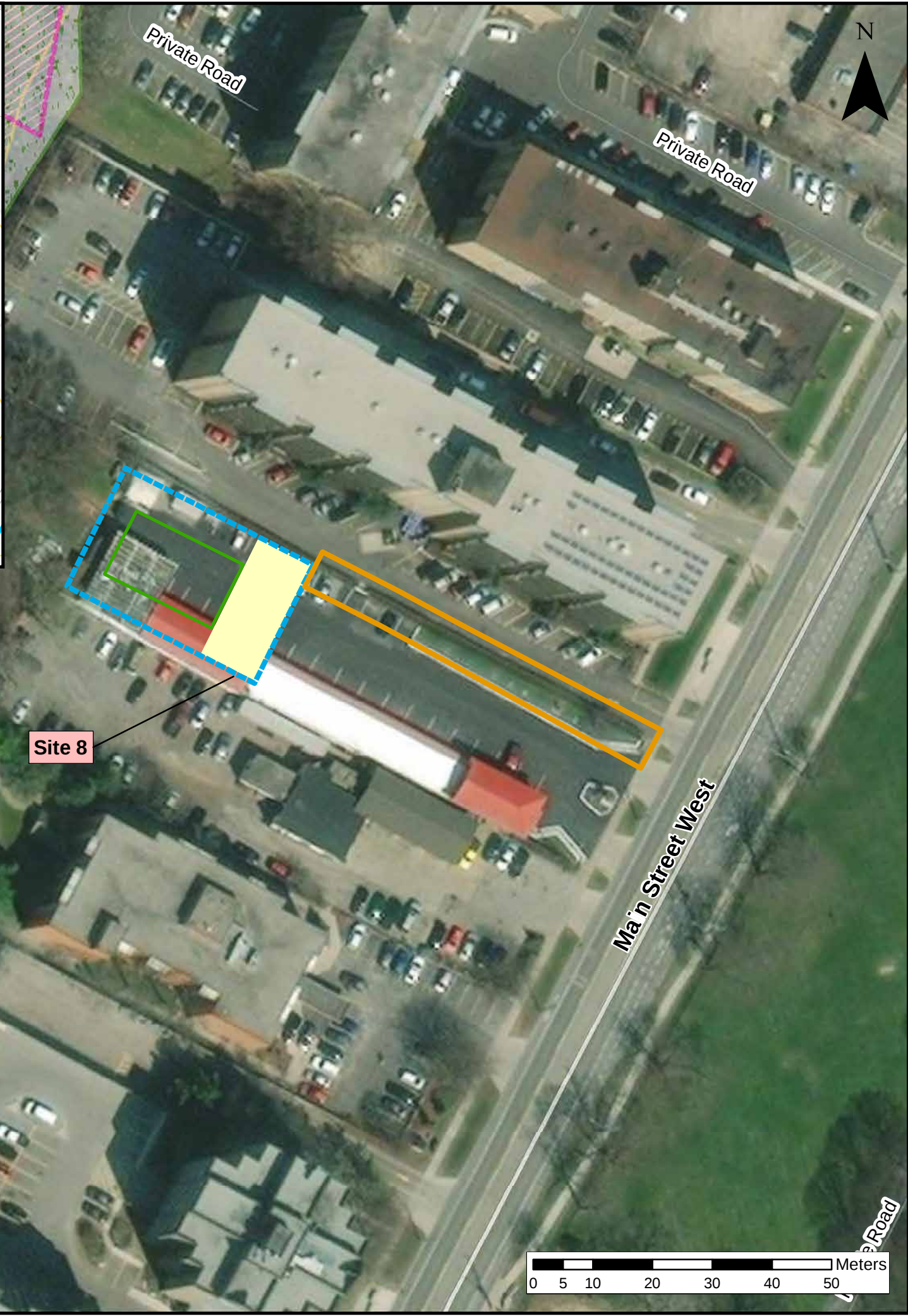
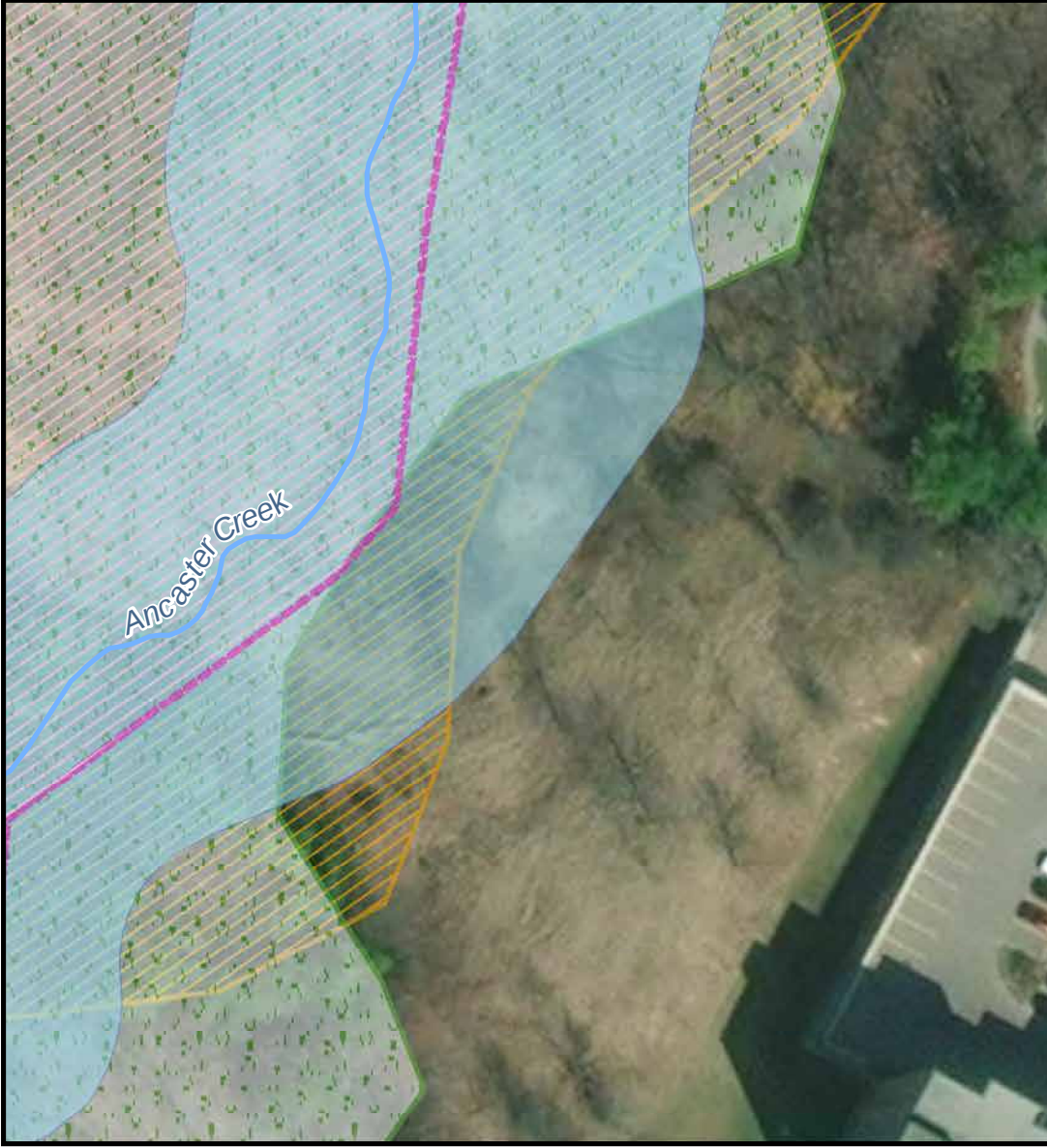
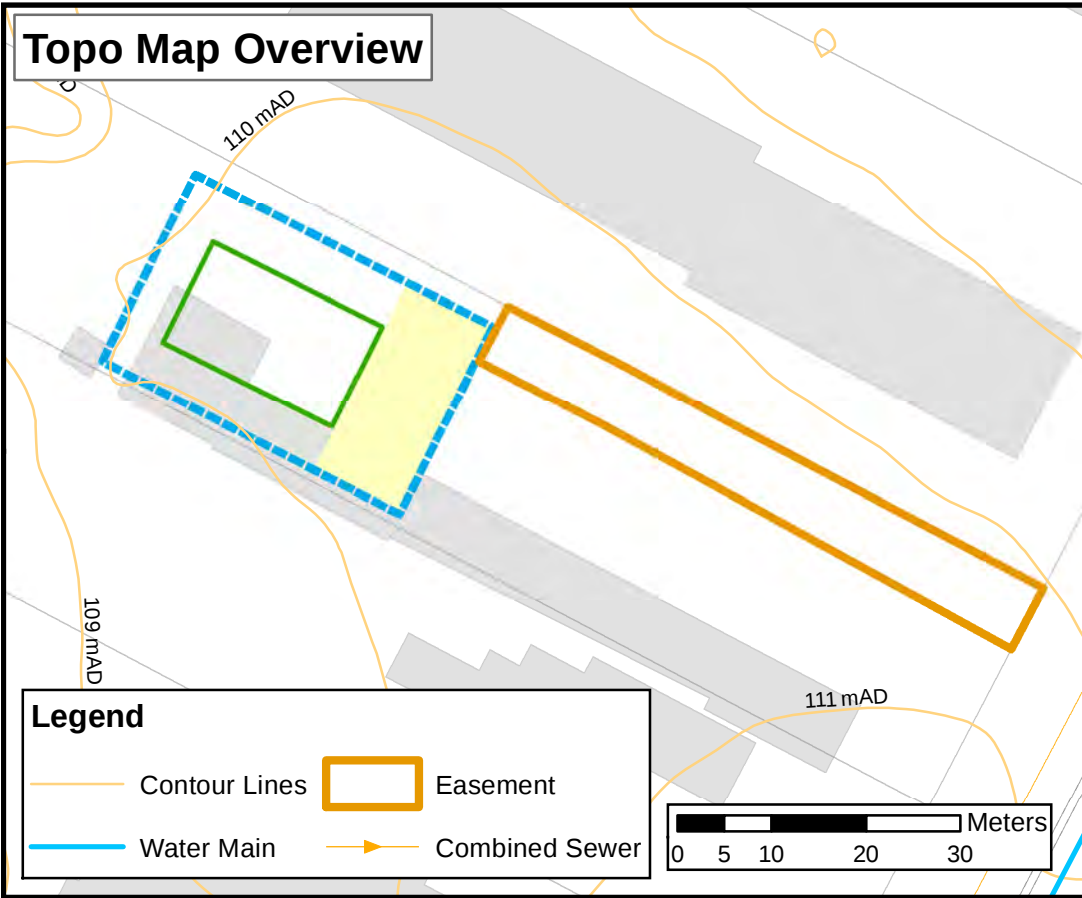


Project No.:
136546

Date:
October 2023



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Legend

- Easement
- Watercourse
- Waterbodies
- Niagara Escarpment Parks and Open Spaces
- Regional Event Floodplain
- Significant Wooded Area
- Environmentally Sensitive Area
- Unevaluated Wetland
- Study Area

Alternative Location Construction Component

- Lot Area
- Building Footprint
- Parking Lot

Note: Shape, orientation and layout of the new Pumping Station lot/building are subject to change.

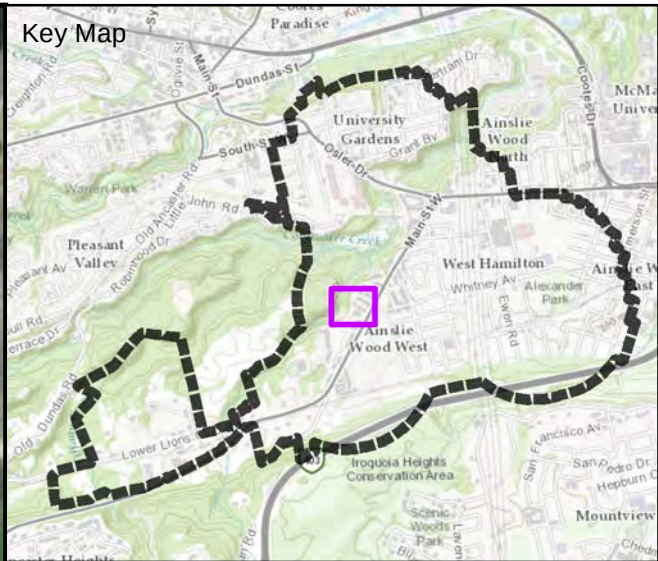
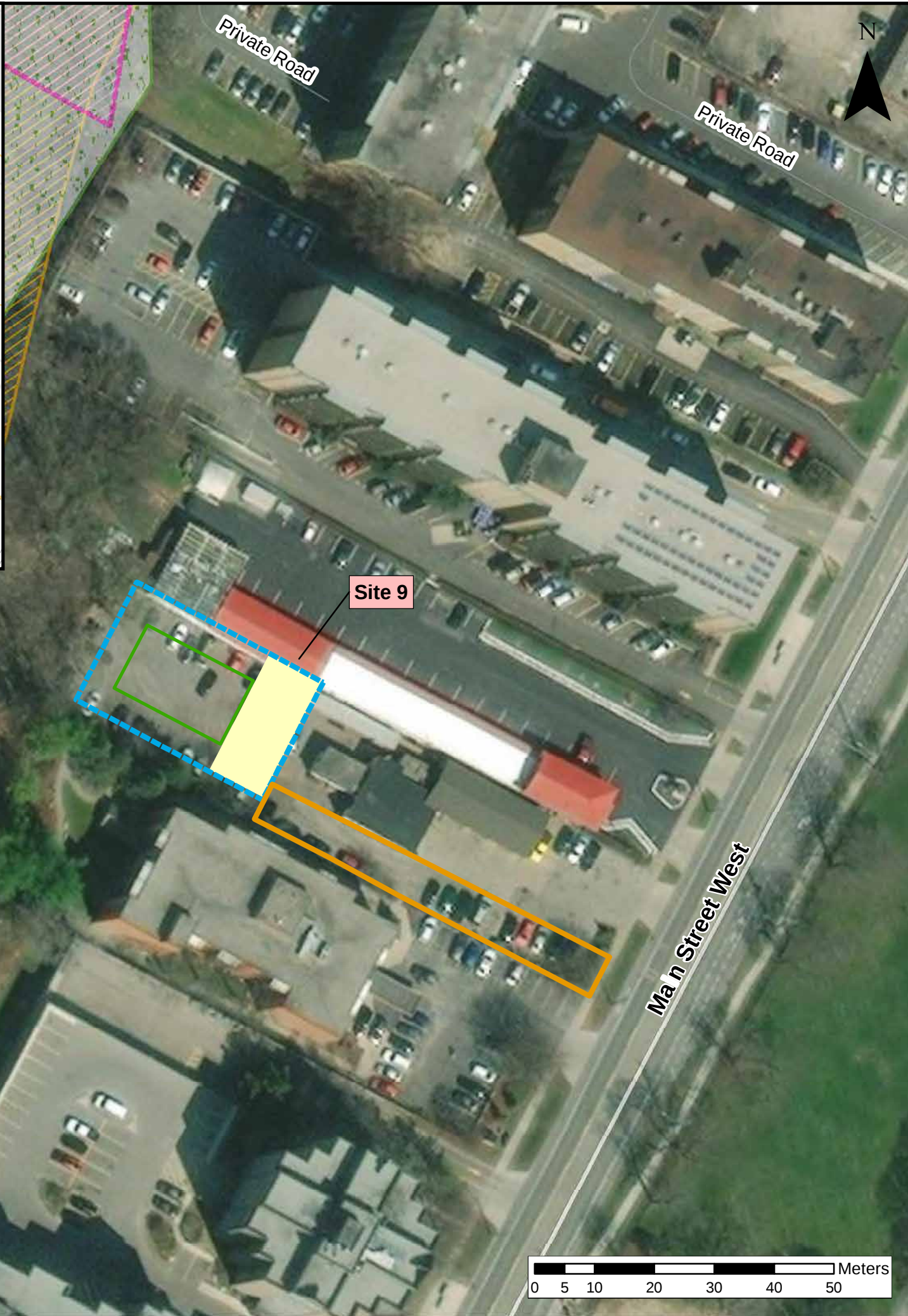
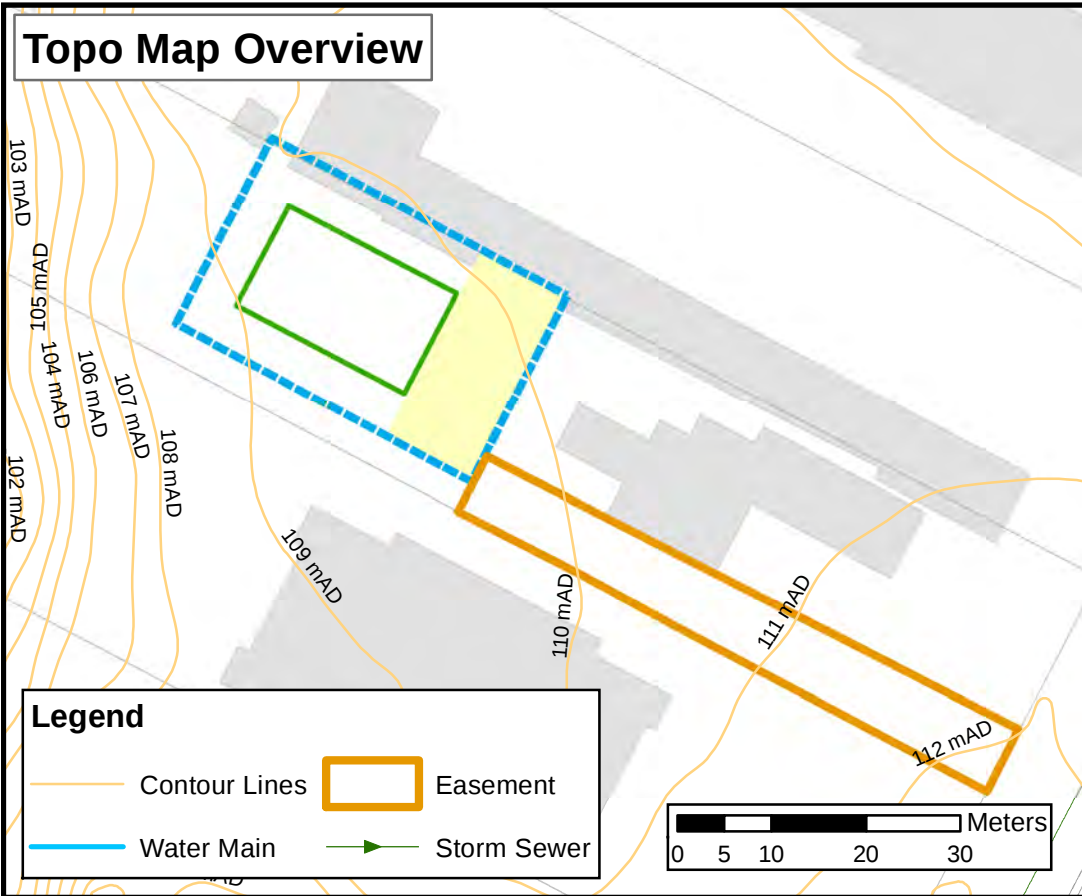
Main & Whitney (HD17A) WPS Class EA and Conceptual Design

Figure 4-6 Location of Alternative Site 8



Project No.: 136546	Date: October 2023
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Legend

- Easement
- Watercourse
- Waterbodies
- Niagara Escarpment Parks and Open Spaces
- Regional Event Floodplain
- Significant Wooded Area
- Environmentally Sensitive Area
- Unevaluated Wetland
- Study Area

Alternative Location Construction Component

- Lot Area
- Building Footprint
- Parking Lot

Note: Shape, orientation and layout of the new Pumping Station lot/building are subject to change.

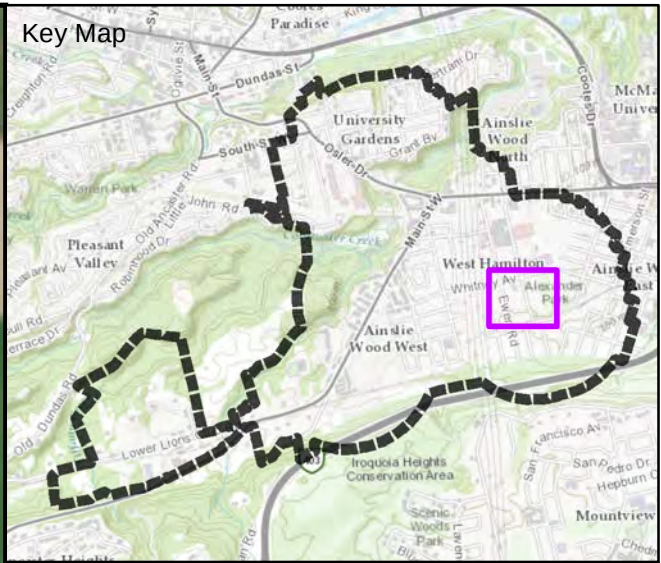
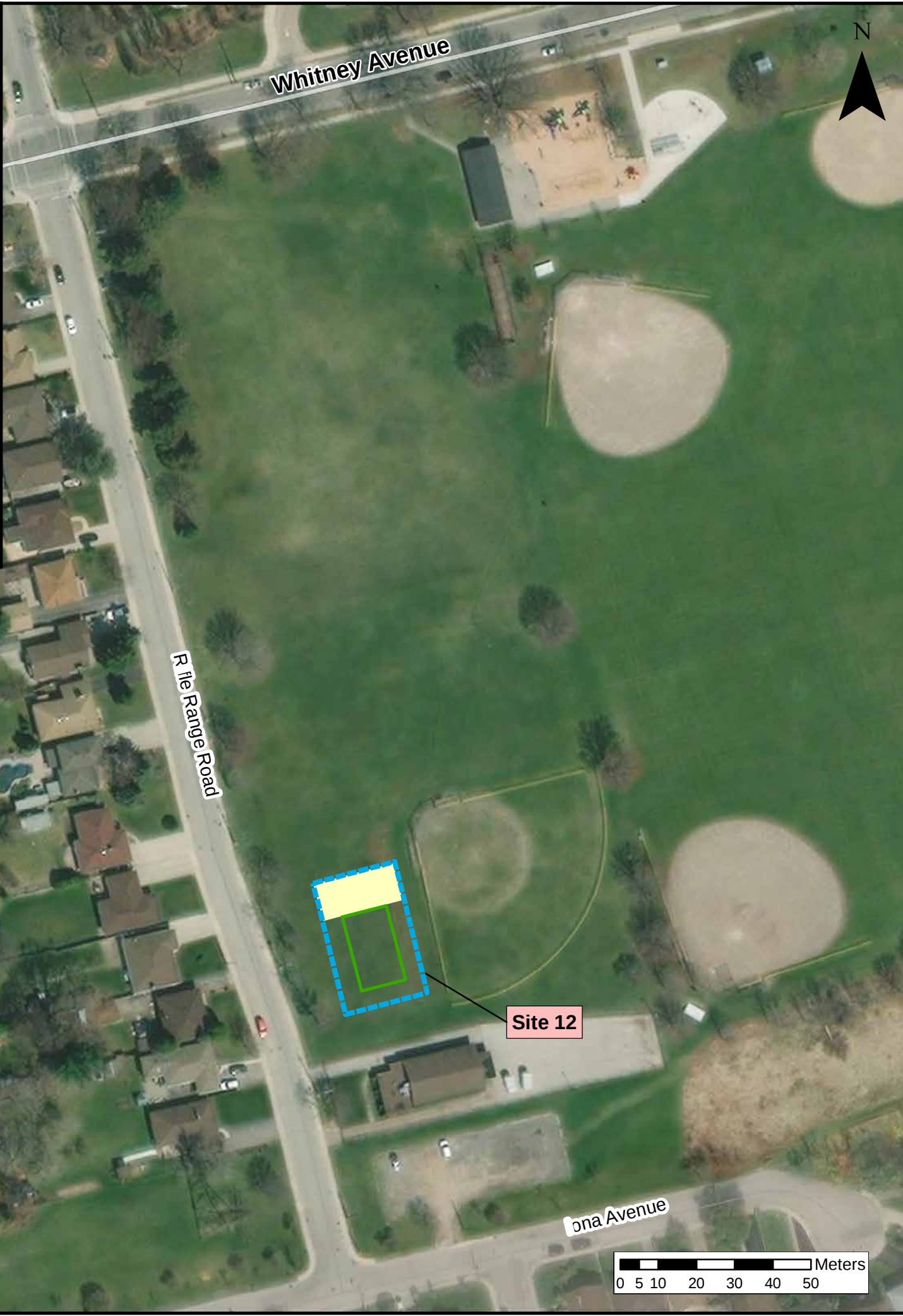
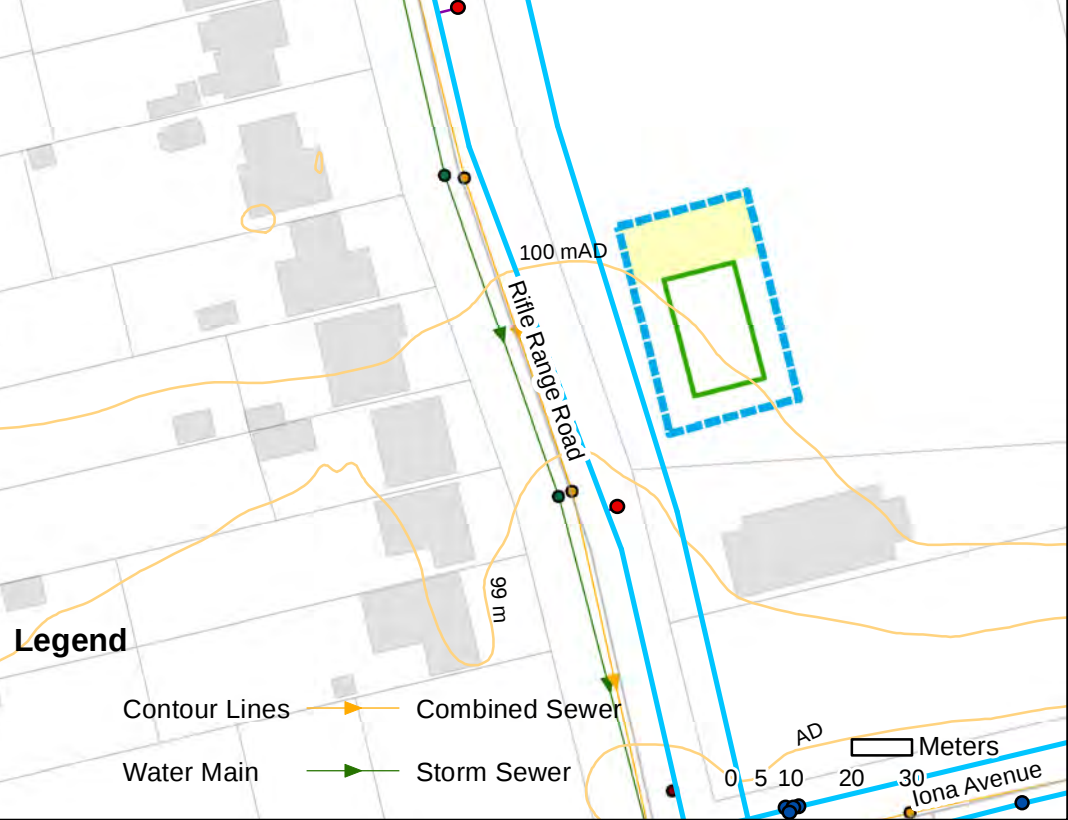
**Main & Whitney (HD17A) WPS
Class EA and Conceptual Design**

**Figure 4-7
Location of Alternative Site 9**



Project No.: 136546	Date: October 2023
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Topo Map Overview



Legend

- Watercourse
- Waterbodies
- Niagara Escarpment Parks and Open Spaces
- Regional Event Floodplain
- Significant Wooded Area
- Environmentally Sensitive Area
- Unevaluated Wetland
- Study Area
- Alternative Location Construction Component**
 - Lot Area
 - Building Footprint
 - Parking Lot

Note: Shape, orientation and layout of the new Pumping Station lot/building are subject to change.

**Main & Whitney (HD17A) WPS
Class EA and Conceptual Design**

**Figure 4-8
Location of Alternative Site 12**



Project No.:
136546

Date:
October 2023

Topo Map Overview

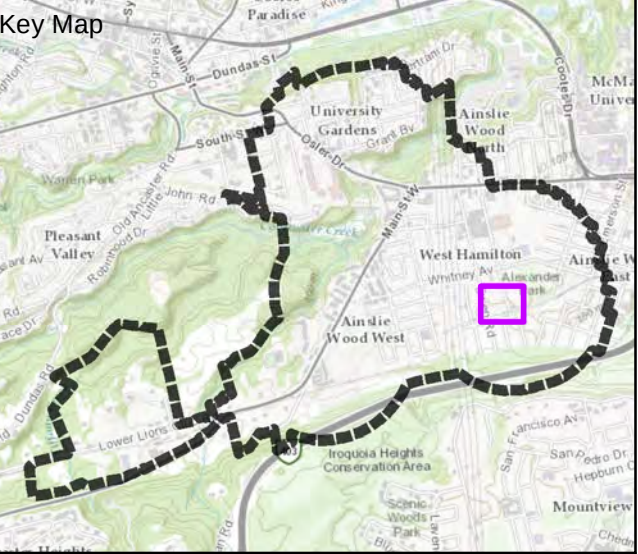
Legend

- Contour Lines
- Water Main
- Combined Sewer
- Storm Sewer

0 5 10 20 30 Meters



Key Map



Legend

- Watercourse
- Waterbodies
- Niagara Escarpment Parks and Open Spaces
- Regional Event Floodplain
- Significant Wooded Area
- Environmentally Sensitive Area
- Unevaluated Wetland
- Study Area
- Alternative Location Construction Component
 - Lot Area
 - Building Footprint
 - Parking Lot

Note: Shape, orientation and layout of the new Pumping Station lot/building are subject to change.

Main & Whitney (HD17A) WPS
Class EA and Conceptual Design

Figure 4-9
Location of Alternative Site 19



Project No.:
136546

Date:
October 2023

0 5 10 20 30 40 50 Meters

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5 Alternative Refinement and Evaluation

Based on the results of the screening process described in **Section 4**, the 7 short-listed alternative sites for the new WPS for PD17 were carried forward for further analysis and evaluation. The purpose of this evaluation was to develop a conceptual plan for each alternative site to assess hydraulic performance, watermain requirements and costs.

An overview of the conceptual plans for the 7 short-listed alternative sites and their associated discharge watermain is shown in **Figure 5-1**.

5.1 Description of Short-Listed Alternative Sites

The following section presents the detailed assessment for the short-listed alternative sites.

All of the short-listed alternative sites have some common elements and assumptions. These include:

- All potential alternative sites utilize the road right-of-way (ROW) for the construction of the required linear infrastructures; thus, no additional land is required for the installation of the watermain.
- The layout and locations of the new WPS (including requirement of lot area, building footprint area and parking lot) identified in this report is preliminary only. The layout of the new WPS presented here may be amended based on input from the review agencies and the public.
- Modelling and analysis exercises were completed for all 7 alternative sites. It was assumed that the requirement for a designated discharge watermain (450mm in diameter) would be from the new WPS to the connection for the PD17 system (which is located near the existing HD17A WPS). The size of the watermain will be determined at the design stage.
- In addition, modelling and analysis exercises were completed for Sites 12 and 19 to determine the feasibility of a shorter discharge watermain and/or pressure district conversion. A shorter discharge watermain would be required if the existing PD2 watermain along Whitney Avenue is used as the discharge pipeline to PD17. A few isolation valves (along Ewen Road) to convert the existing PD2 area west of Ewen Road to PD17 would also be required. The results of these exercises indicated a reduction in supply flow to HD011 and a significant pressure increase to the discharge header of the new WPS under the fire-flow conditions. This shorter watermain and/or pressure district conversion option was not recommended nor considered further.
- Costs for acquiring the land for each alternative site are based on the land requirement (35m by 22m) or lot frontage of 20m for the new WPS and may not reflect the actual cost of purchasing the entire property. The costs for Sites 8 and 9 have included the land requirement for the easements.

The 7 short-listed alternative sites are discussed separately below.

5.1.1 Site 1 - Adjacent to and SW of 130 Osler Drive (Adjacent to existing Osler WPS, HD011) (Open Space)

The conceptual plan for alternative Site 1 is presented in **Figure 5-1**. This plan is consistent with the conceptual design for the preferred alternative outlined in the WSP 2015 feasibility study. This alternative would involve the following:

- Purchasing the site is not required, as it is City owned.
- A new watermain (approximately 1km in length) would need to be installed from Site 1 to the connection of the PD17 system, which is located near the existing HD17A WPS.
- The new watermain would have to cross under a creek and a railway. The railway has been replaced by a recreational trail (Hamilton Brantford Rail Trail1) and is no longer active. This trail is jointly owned and maintained by the Hamilton and Grand River Conservation Authorities. Permits and approvals would be required from the Hamilton Conservation Authority (HCA) and Grand River Conservation Authorities (GRCA). The creek crossing would present some challenges during design and construction and would require additional approvals.
- A watermain would need to be constructed along Osler Drive. It would turn south along Main Street West and connect to the existing PD17 system, within the proximity of the existing HD17A WPS.

5.1.2 Site 4 - 88 Ofield Road (Residential)

The conceptual plan for Site 4 is presented in **Figure 5-1**. This alternative would involve the following:

- Purchasing the site, as it is privately owned.
- Constructing a new watermain along Main Street West (approximately 0.5 km in length) from Site 4 to the connection for the PD17 system, which is located within the proximity of the existing HD17A WPS.

5.1.3 Site 6 - 1845 Main Street West (Commercial)

The conceptual plan for Site 6 is presented in **Figure 5-1**. This alternative would involve the following:

- Purchasing a part (approximately half) of the property, as it is privately owned and currently leased to a commercial tenant (The Treehouse Cannabis Company).
- Construction of a new WPS in the parking lot area of Site 6.
- A new watermain will be constructed along Whitney Avenue and would then turn south along Main Street West and connect to the existing PD17 system. The required works would be minimal, as the site is located within the proximity of the existing HD17A WPS.

5.1.4 Site 8 - 1870 Main Street West (Commercial)

The conceptual plan for Site 8 is presented in **Figure 5-1**. This alternative would involve the following:

- Purchasing a part (or all) of the property, as it is privately owned (Haven Inn).
- Removal of the back portion of the existing building within Site 8.
- Construction of a new WPS within Site 8.
- A new watermain will be constructed underneath the proposed easement within Site 8 and connected to the existing PD17 system. The required works would be minimal, as the site is located within the proximity of the existing HD17A WPS.

5.1.5 Site 9 - 1872 Main Street West (Commercial)

The conceptual plan for Site 9 is presented in **Figure 5-1**. This alternative would involve the following:

- Purchasing a part (or all) of the property, as it is privately owned (Westdale Car Service).
- A new watermain will be constructed underneath the proposed easement within Site 9 and connected to the existing PD17 system. The required works would be minimal, as the site is located within the proximity of the existing HD17A WPS.

5.1.6 Site 12 - 125 Rifle Range Road (Institutional)

The conceptual plan for Site 12 is presented in **Figure 5-1**. This alternative would involve the following:

- Purchasing a part of the property, as it is privately owned (Conseil Scolaire Viamonde - French School Board).
- Construction of a new WPS within Site 12, which is a relatively large site that is adjacent to Alexander Park, which means the proposed location for the new WPS might have some potential sociocultural impacts; however, the final location will be determined during the conceptual design stage.
- A new watermain (approximately 1.3km in length) will be constructed along Rifle Range Road which would turn west along Whitney Avenue, and then southwest along Main Street West before connecting to the existing PD17 system, which is located within the proximity of the existing HD17A WPS.
- Installing the watermain will have some technical challenges (as a result of the proposed watermain having to cross under an existing high-pressure gas line).

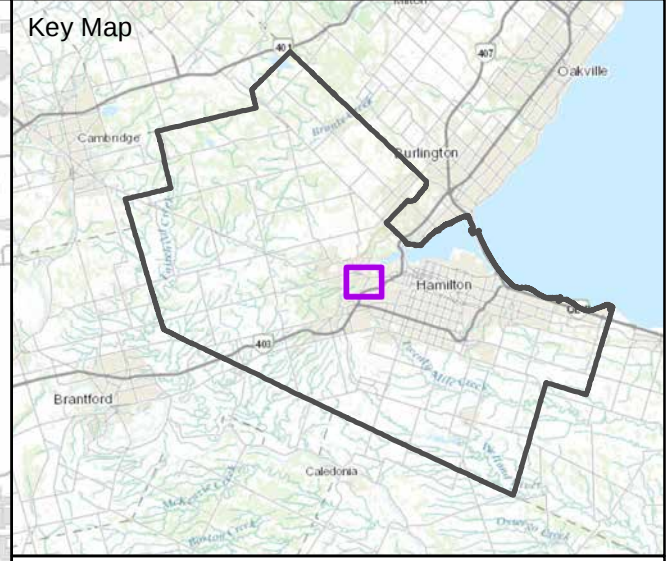
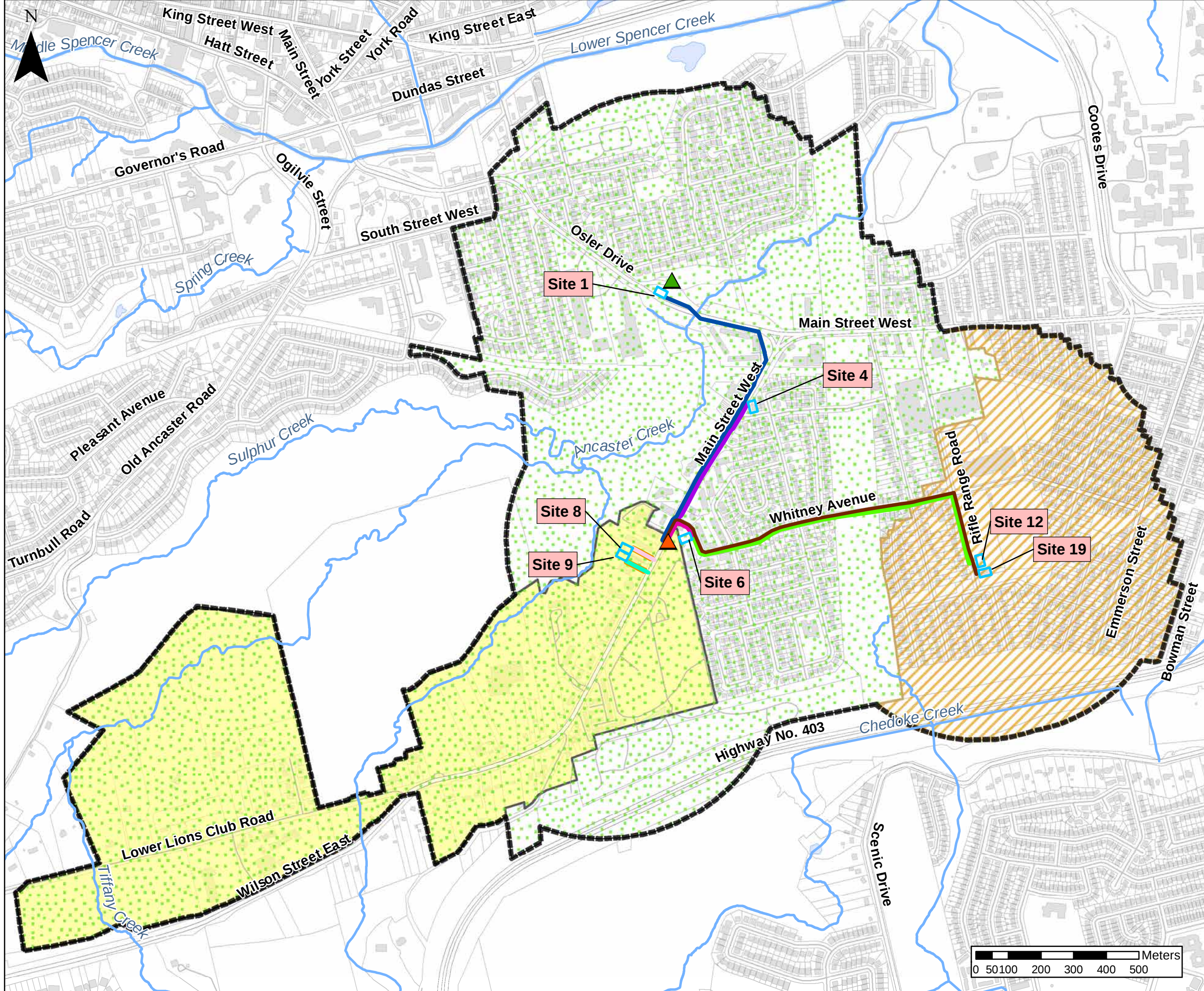
5.1.7 Site 19 - 161 Rifle Range Road (Residential/Institutional)

The conceptual plan for Site 19 is presented in **Figure 5-1**. This alternative would involve the following:

- Purchasing of the property, as it is privately owned (Trustees of Meeting Rooms Association Hamilton-Burlington Area).

- A new watermain (approximately 1.3km in length) will be constructed along Rifle Range Road which would turn west along Whitney Avenue, and then southwest along Main Street West before connecting to the existing PD17 system, which is located within the proximity of the existing HD17A WPS.
- Installing the watermain will have some technical challenges (as a result of the proposed watermain having to cross under an existing high-pressure gas line).

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Legend

- HD011 (Osler WPS)
- HD17A (Main and Whitney WPS)
- Alternative Location Watermain**
 - WM 1
 - WM 4
 - WM 6
 - WM 8
 - WM 9
 - WM 12
 - WM 19
- Easement
- Study Area
- PD17
- Study Area Expansion
- Initial Study Area
- Alternative Location Construction Component**
 - Lot Area

**Main & Whitney (HD17A) WPS
Class EA and Conceptual Design**

**Figure 5-1
Overview of Conceptual Plans
for Short-Listed Alternative Sites**



Project No.: 136546	Date: October 2023
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5.2 Evaluation of Short-Listed Alternative Sites

To evaluate the alternative pumping station sites, including potential watermain requirements, each evaluation criterion (as presented **Table 5.1** descriptively). A numerical or weighted ranking system was not used; instead, the evaluation concentrated on the strengths and weaknesses of each alternative to identify the best possible solution. While set weightings for the evaluation criteria were not assigned, these criteria are not necessarily equal; therefore, professional judgment and knowledge of the area and related issues were used to determine preferences. The potential effects on the environment (natural, social, etc.) were identified for each criterion for each proposed alternative. The selection of the preferred site for this criterion is thus based on the relative advantages and disadvantages of each location in relation to the potential environmental impacts.

The alternative sites were assessed for each evaluation criterion using a colour-coded system where green indicates most preferred and yellow indicates least preferred. The comparison of each criterion was made horizontally between the alternatives (i.e., within a category, such as natural environment) and then vertically between categories to identify the preferred site. Based on the relative advantages or disadvantages of the net environmental effects, including the results of applying mitigating measures, the location that received the greatest number of most-preferred ratings and/or the fewest number of least-preferred ratings was identified as the preferred site.

Taking into consideration the potential environmental impacts of a new WPS at each of the sites, the 7 short-listed pumping station sites were comparatively evaluated to consider the suitability of each. A qualitative evaluation (descriptive assessment) is performed using criteria that were developed based on the broad definition of environment described in Ontario's *Environmental Assessment Act* and other sources. Specifically:

- Natural environment: Having regard for protecting the natural and physical components of the environment (e.g., air, land, water, and biota).
- Sociocultural environment: Having regard for residents, neighbourhoods, businesses, community character, social cohesion, community features and land uses, property requirements, historical and archaeological resources, and heritage features.
- Technical environment: Having regard for the constructability, operability, and potential conflicts as well as other engineering aspects associated with the alternatives.
- Economic/Financial environment: Having regard for the cost implications associated with the alternatives.

The natural heritage study, cultural heritage resource assessment and Stage 1 Archaeological Assessment were completed for the 7 short-listed alternative sites. These are summarized in the following sections.

5.2.1 Natural Environmental Considerations

ASI completed the natural heritage study including field investigations to evaluate the potential impact of the natural environment. The evaluations for the 7 short-listed alternative sites include vegetation and tree, wildlife, aquatic and Species at Risk (SAR). The findings are summarized **Table 5.1** down below and details are provided in ASI report (Appendix C of PFR):

5.2.2 Sociocultural Considerations

ASI completed the cultural heritage resource assessment for the existing conditions and preliminary impact assessment for the preferable alternative site. The objective is to present a built heritage and cultural landscape inventory of cultural heritage resources, identify existing conditions of the study area, identify impacts to cultural heritage resources, and propose appropriate mitigation measures. The findings are summarized as follows:

- Site 1: Potential negative impact to CHL-5 (Coldwater Creek). A Heritage Impact Assessment is required if this site is selected.
- Site 4: this site is a potential Built Heritage Resources (BHR-21) with potential cultural heritage value or interest, the removal of the residence would be a direct negative, irreversible impact. Site 4 is the least preferred location from a cultural heritage perspective and should be eliminated from further consideration in the selection of the preferred site location.

- Sites 8 and 9: No negative impacts to identified cultural heritage resources. No further concern regarding cultural heritage resources.
- Sites 12 and 19: Potential negative impact to CHL-11 (Alexander Park). A Heritage Impact Assessment is required if either site is selected.
- Site 6: Potential impact to CHL-7 (White Chapel Memorial Gardens Cemetery and Crematorium). A Heritage Impact Assessment was recommended if this site is selected in preliminary cultural assessment. It was determined through the EA process, after PIC2, that this is the preferred location. Subsequently, a preliminary Impact Assessment was conducted and the findings are as follows:
 - No direct adverse impacts to the CHL-7 are anticipated the limits of the construction for Site 6 will be confined to the property.
 - Indirect adverse impacts due to construction related vibrations are possible as there are gravestones that sit within 50 m of the proposed work for Site 6. These impacts are anticipated to be limited and temporary.
 - The HIA may result in additional study or mitigations measures and must be completed prior to implementation.

For additional information, refer to the Cultural Heritage Resource Assessment: Built Heritage and Cultural Heritage Landscapes report (Appendix D of PFR) completed by ASI.

5.2.3 Archaeological Heritage

ASI completed a Stage 1 Archaeological Assessment (Appendix E of PFR). The objective was to determine the presence or absence of known archaeological sites in the study area and in proximity to the alternative sites for the proposed PD17 WPS and to identify the need for Stage 2 archaeological assessments for areas identified during the Stage 1 assessment as having potential archaeological planning concerns. The findings are as follows:

- Sites 4, 9 and 12: There are potential for archaeological resources. A Stage 2 archaeological assessment is required if either site is selected.
- Site 1, 6, 8 and 19: There are no retained archaeological potential at these sites.

The evaluation of the 7 short-listed alternative sites for the new WPS of PD17 is presented in **Table 5.1**.

Table 5.1 Evaluation of Short-Listed Alternative Sites

EVALUATION CRITERIA			ALTERNATIVE SITES						
			SITE 1	SITE 4	SITE 6	SITE 8	SITE 9	SITE 12	SITE 19
			Adjacent to and SW of 130 OSLER DRIVE (Adjacent to existing Osler WPS, HD011)	88 OFIELD ROAD	1845 MAIN STREET WEST	1870 MAIN STREET WEST	1872 MAIN STREET WEST	125 RIFLE RANGE ROAD	161 RIFLE RANGE ROAD
NATURAL ENVIRONMENT	Vegetation and Tree Impacts	Requirement of vegetation and/or tree removals	- Adjacent to natural area of Cootes Paradise Environmental Sensitive Area (ESA). - Some amenity tree removals may be required.	Minor vegetation removals associated with amenity trees.	No vegetation or tree impacts anticipated.	- Adjacent to natural area, no vegetation or tree impacts anticipated within the proposed footprint area. - Possible impacts to amenity trees for site access.	- Adjacent to natural area, no vegetation or tree impacts anticipated within the proposed footprint area. - Possible impacts to amenity trees for site access.	- No vegetation or tree impacts anticipated within the proposed footprint area. - Possible impact to amenity trees depending on orientation of site within the property.	- No vegetation or tree impacts anticipated within the proposed footprint area. - Possible impact to amenity trees for site access.
	Wildlife Impacts	Potential impacts to wildlife	- Potential for indirect impacts through construction disturbance and noise. - Disturbance expected to be temporary in nature.	Limited wildlife habitat removal is proposed within the hedgerow along Main Street West.	Wildlife habitat impact not anticipated, as proposed footprint entirely within a paved area.	Wildlife habitat removal anticipated to be limited to amenity trees on the lot as required. It is assumed no intrusion to the natural feature to the north.	Wildlife impact minimal and limited to possibly amenity trees.	Vegetation impacts minimal and limited to manicured lawn and possibly amenity trees.	Wildlife impact minimal and limited to possibly amenity trees.
	Groundwater/Aquifer Vulnerability	Proximity to areas of high aquifer vulnerability	Medium, requirement of watermain crossing under creek	Minimal	Minimal	Minimal	Potential soil contamination which requires additional studies and more mitigation measures	Minimal	Minimal
	Aquatic Impacts	Potential impacts to aquatic	- No direct aquatic impacts anticipated. This is regulated in part under O.Reg. 161/06. - approximately 110 meters from open aquatic habitat of Coldwater Creek. - Best Management Practices and a robust Erosion and Sediment Control plan will minimize risk of indirect impact during construction. - Special construction method (e.g., directional drill) for watermain installation under Coldwater Creek to minimize impacts to aquatic.	- No direct aquatic impacts anticipated. - Approximately 148 meters from open aquatic habitat of Coldwater Creek. - Best Management Practices and a robust Erosion and Sediment Control plan will minimize risk of indirect impact during construction.	- No direct aquatic impacts anticipated. - Approximately 244 meters from open aquatic habitat of Coldwater Creek. - Best Management Practices and a robust Erosion and Sediment Control plan will minimize risk of indirect impact during construction.	- No direct aquatic impacts anticipated. - Approximately 87 meters from open aquatic habitat of Coldwater Creek. - Best Management Practices and a robust Erosion and Sediment Control plan will minimize risk of indirect impact during construction.	- No direct aquatic impacts anticipated. - Approximately 79 meters from open aquatic habitat of Coldwater Creek. - Best Management Practices and a robust Erosion and Sediment Control plan will minimize risk of indirect impact during construction.	- No direct aquatic impacts anticipated. - Not near an open aquatic habitat, but likely near a catch basin. - Best Management Practices and a robust Erosion and Sediment Control plan will minimize risk of indirect impact during construction.	- No direct aquatic impacts anticipated. - Not near an open aquatic habitat, but likely near a catch basin. - Best Management Practices and a robust Erosion and Sediment Control plan will minimize risk of indirect impact during construction.
	Species at Risk (SAR) Impacts	Potential impacts to SAR or SAR habitat	No SAR or SAR habitat identified, therefore no anticipated impact.	No SAR or SAR habitat identified, therefore no anticipated impact.	No SAR or SAR habitat identified, therefore no anticipated impact.	No SAR or SAR habitat identified, therefore no anticipated impact.	No SAR or SAR habitat identified, therefore no anticipated impact.	No SAR or SAR habitat identified, therefore no anticipated impact.	No SAR or SAR habitat identified, therefore no anticipated impact.
SOCIOCULTURAL	Construction impacts	Potential for dust, traffic and noise issues stemming from construction activities with proximity to nearby communities	- High, near residential areas and potential traffic disrupting to a larger area during construction. - Requirement of more linear infrastructures.	- Medium, near residential areas and potential traffic disrupting to the local area during construction. - Requirement of less linear infrastructures.	- Low, near commercial areas and potential traffic disrupting to a smaller area during construction. - Requirement of the least linear infrastructures.	- Low, near commercial areas and potential traffic disrupting to a smaller area during construction. - Requirement of the least linear infrastructures.	- Low, near commercial areas and potential traffic disrupting to a smaller area during construction. - Requirement of the least linear infrastructures.	- High, near residential areas and potential traffic disrupting to a larger area during construction. - Requirement of the most linear infrastructures.	- High, near residential areas and potential traffic disrupting to a larger area during construction. - Requirement of the most linear infrastructures.
	Archaeological Potential	Construction activities within undisturbed areas with proximity to archaeological sites	Does not retain archaeological potential.	Archaeological potential and requires Stage 2 archaeological assessment by test pit survey at five metre intervals, prior to any proposed construction activities on these lands.	Does not retain archaeological potential	Does not retain archaeological potential	Archaeological potential and requires Stage 2 archaeological assessment by test pit survey at five metre intervals, prior to any proposed construction activities on these lands.	Archaeological potential and requires Stage 2 archaeological assessment by test pit survey at five metre intervals, prior to any proposed construction activities on these lands.	Does not retain archaeological potential

Table 5.1 Evaluation of Short-Listed Alternative Sites

EVALUATION CRITERIA		DESCRIPTION	ALTERNATIVE SITES						
			SITE 1	SITE 4	SITE 6	SITE 8	SITE 9	SITE 12	SITE 19
			Adjacent to and SW of 130 OSLER DRIVE (Adjacent to existing Osler WPS, HD011)	88 OFIELD ROAD	1845 MAIN STREET WEST	1870 MAIN STREET WEST	1872 MAIN STREET WEST	125 RIFLE RANGE ROAD	161 RIFLE RANGE ROAD
	Proximity to Cultural Heritage Resources	Potential impact of construction activities on cultural heritage resources potentially located within proximity of construction site.	- Coldwater Creek (Cultural Heritage Landscapes, CHL-5) is located approximately 110 metres east of Site 1, However direct or indirect negative impacts are not anticipated due to the distance from the site to the creek. - A HIA is required if Site 1 is selected as the preferable site.	- Site 4 is a potential Built Heritage Resources (BHR-21) with potential cultural heritage value or interest, the removal of the residence would be a direct negative, irreversible impact. - Site 4 is the least preferable location from a cultural heritage perspective and should be eliminated from further consideration in the selection of the preferable site.	- Adjacent to White Chapel Memorial Gardens Cemetery and Crematorium (CHL-7), - Direct or indirect negative impacts are possible. - A HIA is required if Site 6 is selected as the preferable site.	Not adjacent to any identified BHRs or CHLs and so there would be no impacts from a cultural heritage perspective.	Not adjacent to any identified BHRs or CHLs and so there would be no impacts from a cultural heritage perspective.	- Adjacent to Alexander Park (CHL-11) - Direct or indirect negative impacts are possible. - A HIA is required if Site 12 is selected as the preferable site.	- Adjacent to Alexander Park (CHL-11) - Direct or indirect negative impacts are possible. - A HIA is required if Site 19 is selected as the preferable site.
TECHNICAL	Construction Site Access	Ease of access to location of planned construction activities	Accessible by medium traffic road Osler Drive	Accessible by light traffic local road Ofield Road	Accessible by light traffic road Whitney Avenue	Accessible by medium traffic road Main Street West	Accessible by medium traffic road Main Street West	Accessible by light traffic local road Rifle Range Road	Accessible by light traffic local road Rifle Range Road
	Geotechnical/Ease of Construction	The potential for encountering problems with the construction of the alternative (i.e., soil stability, geotechnical considerations, ease of excavation)	Mild slope -Typical foundation and construction works	Mild slope - Typical foundation and construction works	Mild slope - Typical foundation and construction works	Mild slope - Typical foundation and construction works	Mild slope - Typical foundation and construction works	Mild slope - Typical foundation and construction works	Mild slope - Typical foundation and construction works
	Proximity to PD17	Distance of site to existing HD17A WPS (or connection point of PD17)	1km	0.5km	<0.1km	<0.1km	<0.1km	1.3km	1.3 km
	Hydraulic Suitability	Head losses through the proposed watermain	Least preferable hydraulically due to the long distance to the PD17, which system results in the greater head losses along the watermain	Preferrable hydraulically	Most preferable hydraulically	Most preferable hydraulically	Most preferable hydraulically	Least preferable hydraulically due to the longest distance to the PD17, which system results in the greatest head losses along the watermain	Least preferable hydraulically due to the longest distance to the PD17, which system results in the greatest head losses along the watermain
	Operations and Maintenance Considerations	Operation and maintenance efforts/costs (e.g., inspections/repair)	High operation and maintenance efforts/costs due to longer watermains	Low operation and maintenance efforts/costs due to requirement of shorter watermains	Lowest operation and maintenance efforts/costs due to shorter watermain	Lowest operation and maintenance efforts/costs due to shorter watermain	Lowest operation and maintenance efforts/costs due to shorter watermain	Highest operation and maintenance efforts/costs due to the longest watermain	Highest operation and maintenance efforts/costs due to the longest watermain
	Approvals and Implementation	Requirement of approval and implementation during construction	Constructing a watermain under a creek and under a medium traffic road (Osler Drive) may require special construction techniques, such as horizontal directional drilling, and additional approvals	Typical approval and Implementation	Typical approval and Implementation	Typical approval and Implementation	Typical approval and Implementation	Constructing a watermain under a high-pressure gas line may require special construction techniques, and additional approvals.	Constructing a watermain under a high-pressure gas line may require special construction techniques, and additional approvals.

Table 5.1 Evaluation of Short-Listed Alternative Sites

EVALUATION CRITERIA		DESCRIPTION	ALTERNATIVE SITES						
			SITE 1	SITE 4	SITE 6	SITE 8	SITE 9	SITE 12	SITE 19
			Adjacent to and SW of 130 OSLER DRIVE (Adjacent to existing Osler WPS, HD011)	88 OFIELD ROAD	1845 MAIN STREET WEST	1870 MAIN STREET WEST	1872 MAIN STREET WEST	125 RIFLE RANGE ROAD	161 RIFLE RANGE ROAD
FINANCIAL	Land acquisition for new water pumping station	Capital costs determined by purchasing property for a new water pumping station	Negligible to None	\$0.8M	\$0.6M	\$1.0M	\$1.0M	\$0.6M	\$0.8M
	Linear infrastructures	Capital costs determined by installation of watermain	\$1.0M	\$0.5M	\$0.1M	\$0.1M	\$0.1M	\$0.8M	\$0.8M
	Due diligence costs	Capital Costs due to additional studies, and demolition, etc.)	<\$0.1M	\$0.1M	\$0.1M	\$0.1M	\$0.1M	\$0.1M	\$0.1M
	New pumping station	Capital costs determined by construction of a new water pumping station	\$8M	\$8M	\$8M	\$8M	\$8M	\$8M	\$8M
	Estimated total Capital Costs including Land Acquisition	Total capital costs determined by construction of new water pumping station (including land acquisition, as applicable) and watermain	\$9.1M	\$9.4M	\$8.8M	\$9.2M*	\$9.2M*	\$9.5M	\$9.7M
PROPERTY ACQUISITION	Ownership and Landuse		City - open space	Private - residential	Private – commercial (Parking lot area for the Treehouse Cannabis Company)	Private – commercial (Haven Inn)	Private – commercial (Westdale Car Service)	Private – institutional (Open space, Conseil Scolaire Viamonde - French School Board)	Private – Residential/Institutional (Trustees of Meeting Rooms Association Hamilton-Burlington Area)
	Property Acquisition	Potential for property acquisition requirements	No additional property required	Property acquisition required	Property acquisition required	Property acquisition required	Property acquisition required	Property acquisition required	Property acquisition required
Summary/Recommendation			- While having little potential for natural environment impacts during construction and some potential for sociocultural impacts, this alternative presents technical challenges for watermain installation, but does not require property acquisition and is a moderately cost-effective option. - Site 1 is the second-most preferable site	- While having little to no potential for natural environment impacts, this site has potential for the highest sociocultural impacts (This residence is a Built Heritage Resources site), therefore property acquisition would be required. This alternative is technically moderately attractive and relatively expensive. - Site 4 is the least preferable site.	- While having the lowest potential for natural environment impacts and some potential for sociocultural impacts, this alternative requires property acquisition and is the most cost effective, and technically sound option. - Site 6 is the most preferable site.	- While having little to no natural environment and/or sociocultural impacts, this alternative requires property acquisition and is a moderately cost-effective and technically sound option. *However, the total capital cost for the new WPS could be significantly higher (e.g., \$2M higher), if the entire property must be purchased, making it a more expensive and less preferable alternative. - Site 8 is the fifth-most preferable site, due to the potential high cost in purchasing the entire property.	- While having some potential natural environment impact but low to no sociocultural impacts, this alternative requires property acquisition and is a moderately cost-effective; and technically sound option. *However, the total capital cost for the new WPS could be significantly higher (e.g., \$3M higher), if the entire property must be purchased, making it a more expensive and less preferable alternative. - Site 9 is the sixth-most preferable site, due to the potential high cost in purchasing the entire property.	- While having little to no potential for natural environment impacts, this alternative has high potential for sociocultural impacts, requires property acquisition and is technically un-attractive and relatively expensive. - However, since Site 12 consists of a relatively large parcel, it might have little sociocultural impacts if the new WPS is relocated at a location (within Site 12) further away from the Alexander Park (CHL-11). - Site 12 is the third-most preferable site.	- While having little to no potential for natural environment impacts, this alternative has high potential for sociocultural impacts, requires property acquisition and is technically un-attractive and expensive. - Site 19 is the fourth-most preferable site.
Ranking			2	7	1	5	6	3	4

Preferable  Most  Least

5.3 Recommended/Preferrable Alternative

The 7 short-listed alternative sites below are listed in order, from most preferable to least preferable, together with the rationale for this ranking, which is based on the results of the evaluation as shown **Table 5.1**.

5.3.1 Most-preferable and recommended alternative - Site 6

Site 6 is located at 1845 Main Street West and currently leased to a commercial tenant, the Treehouse Cannabis Company.

Rationale:

- Presence of a commercial parking lot
- Located adjacent to the existing HD17A WPS (or PD17)
- Lowest impact on local neighbourhoods during construction
- Lowest potential for natural environment impact
- Most hydraulically sound option
- Most cost-effective option

Considerations:

- The City would need to acquire at least part of the property
- Some potential for sociocultural impacts (location is adjacent to White Chapel Memorial Gardens, a cemetery and crematorium CHL-7); however, these can be mitigated

5.3.2 Second-most preferable alternative - Site 1

Site 1 is located adjacent to and SW of 130 Osler Drive (adjacent to existing Osler WPS, HD011).

Rationale:

- Open space
- The City owned property
- No need to acquire the property
- Low potential for natural environment impact
- Moderately cost-effective

Considerations:

- Not located close to either the existing HD17A WPS or PD17 which results in the need for more linear infrastructure works
- Adjacent to an environmentally sensitive area
- Some potential for sociocultural impacts during construction; however, these can be mitigated
- Installing the watermain will have some technical challenges (as a result of the proposed watermain having to cross under an existing creek and a road with moderate traffic (Osler Drive))
- Less hydraulically sound option

5.3.3 Third-most preferable alternative - Site 12

Site 12 is located at 125 Rifle Range Road and owned by the Conseil Scolaire Viamonde - French School Board.

Rationale:

- Open-space institutional property
- Low potential for natural environment impact
- Moderately cost-effective

Considerations:

- Not located close to the existing HD17A WPS (or PD17)
- The City would need to acquire part of the property
- Some potential for sociocultural impacts (e.g., adjacent to Alexander Park [CHL-11]) and construction activities within undisturbed areas; this can be mitigated, although additional studies may be required

- Installing the watermain will have some technical challenges (as a result of the proposed watermain having to cross under an existing high-pressure gas line).
- Less hydraulically sound option

5.3.4 Fourth-most preferable alternative – Site 19

Site 19 is located at 161 Rifle Range Road and owned by the Trustees of Meeting Rooms Association Hamilton-Burlington Area (Residential/institutional property).

Rationale:

- Low potential for natural environment impact

Considerations:

- Not located close to the existing HD17A WPS (or PD17)
- The City would need to acquire the property
- Some potential for sociocultural impacts (e.g., adjacent to Alexander Park [CHL-11]) and other impacts (construction activities within undisturbed areas); these can be mitigated, although additional studies may be required;
- Installing the watermain will have some technical challenges (as a result of the proposed watermain having to cross under an existing high-pressure gas line).
- Less hydraulically sound option
- Less cost-effective

5.3.5 Fifth-most preferable alternative - Site 8

Site 8 is located at 1870 Main Street, site of Haven Inn (commercial site).

Rationale:

- Located at 1870 Main Street, site of Haven Inn (commercial site)
- Located adjacent to the existing HD17A WPS (or PD17)
- Hydraulically sound option
- Low potential for sociocultural impacts
- Low potential for natural environment impact

Considerations:

- The City would need to acquire the property
- Moderately cost-effective; however, land acquisition cost could be significantly higher if the entire property must be purchased, making it a more expensive and less preferable alternative

5.3.6 Sixth-most preferable alternative - Site 9

Site 9 is located at 1872 Main Street West, site of Westdale Car Service (commercial site)

Rationale:

- Located near the existing HD17A WPS (or PD17)
- Low potential for natural environment impact
- Hydraulically sound option

Considerations:

- The City would need to acquire at least part of the property
- Some potential for sociocultural impacts (e.g., construction activities within undisturbed areas); however, these can be mitigated, although additional studies may be required
- Moderately cost-effective; however, land acquisition cost could be significantly higher if the entire property must be purchased, making it a more expensive and less preferable alternative

5.3.7 Least preferable alternative - Site 4

Site 4 is located at 88 Ofield Road, a residential site.

Rationale:

- Low potential for natural environment impact
- Moderate hydraulically sound option
- Moderately cost-effective
- Located near the existing HD17A WPS (or PD17)

Considerations:

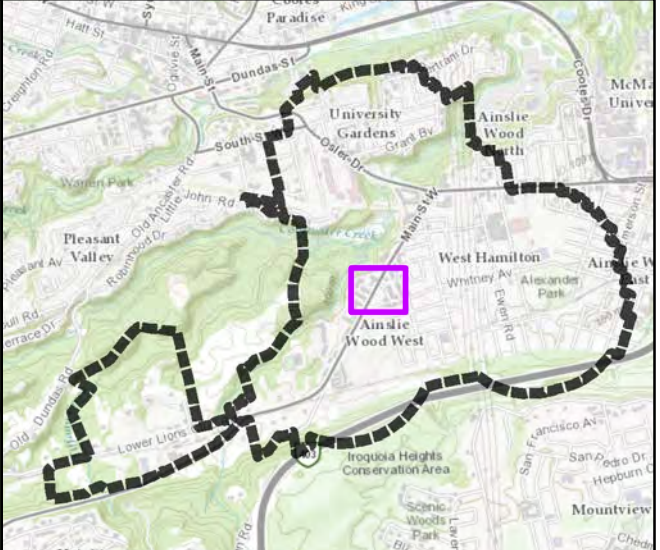
- The City would need to acquire the property
- High potential for sociocultural impacts; Site 4 is a potential Built Heritage Resources site (BHR-21) with potential cultural heritage value or interest; thus, the removal of the residence would have a direct, negative, and irreversible impact.
- Least preferable alternative from a cultural heritage perspective and should be eliminated from further consideration in the selection of the recommended/preferred alternative site.

6 Conclusions and Recommendations

All seven short-listed sites, except for Site 4, are feasible for the new WPS. As shown above and presented in PIC No 2, Site 6 is the most preferable and recommended alternative as it offers the most cost effective and technically sound option, while having the lowest potential for natural environment impact compared to the other alternative sites. This was presented in PIC No. 2, which was held from April 28, 2023 to May 19, 2023.

There were no concerns raised during or after PIC No. 2. Therefore Site 6 is carried forward as the preferred location for the new WPS of PD17. The conceptual plan for the preferred alternative Site 6 is shown in **Figure 6-1**.

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- Legend**
- HD17A (Main and Whitney WPS)
 - Watercourse
 - Waterbodies
 - Niagara Escarpment Parks and Open Spaces
 - Regional Event Floodplain
 - Significant Wooded Area
 - Environmentally Sensitive Area
 - Unevaluated Wetland
 - Study Area
 - Alternative Watermain Location**
 - WM 6
 - Alternative Location Construction Component**
 - Lot Area
 - Building Footprint
 - Parking Lot

**Main & Whitney (HD17A) WPS
Class EA and Conceptual Design**

**Figure 6-1
Conceptual Plan for
Preferred Alternative Site 6**



Project No.:
136546

Date:
October 2023

7 References

- AMEC Earth & Environmental. (2007, December 18). *Geo-environmental Investigation Road Reconstruction and Municipal Service Replacement, Main Street West, Osler Drive to Lower Lions Club Road, Hamilton ON* (Report No. GTR_1281).
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- WSP (May 2015). *Osler & Main/Whitney Pump Station Feasibility Study: Feasibility of Combining HD17A (Main/Whitney PS) and HD011 Osler PS* (Report No. 141-25216-00).
- WSP (January 2016) *New Highland Gardens Park Water Booster Pumping Station, As-Built Drawings.*

Attachment A

Long-Listed Alternative Sites

(Excluding 7 Short-Listed Alternative Sites:
Sites 1, 4, 6, 8, 9, 12, and 19, which were presented
in Figures 4-3 to 4-9)

7 References

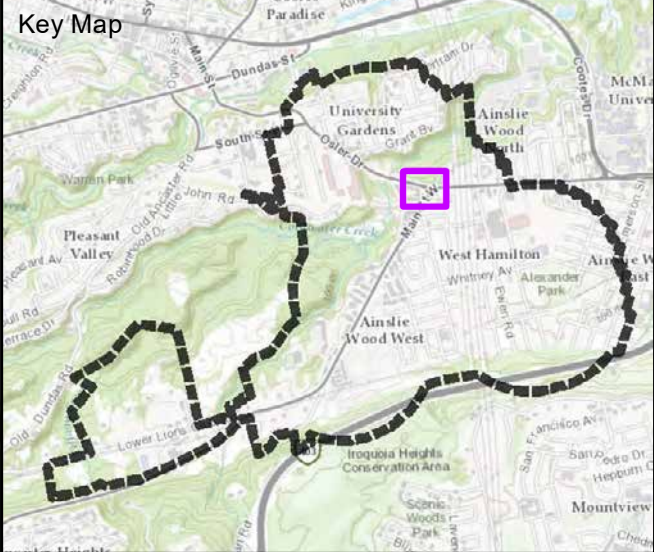
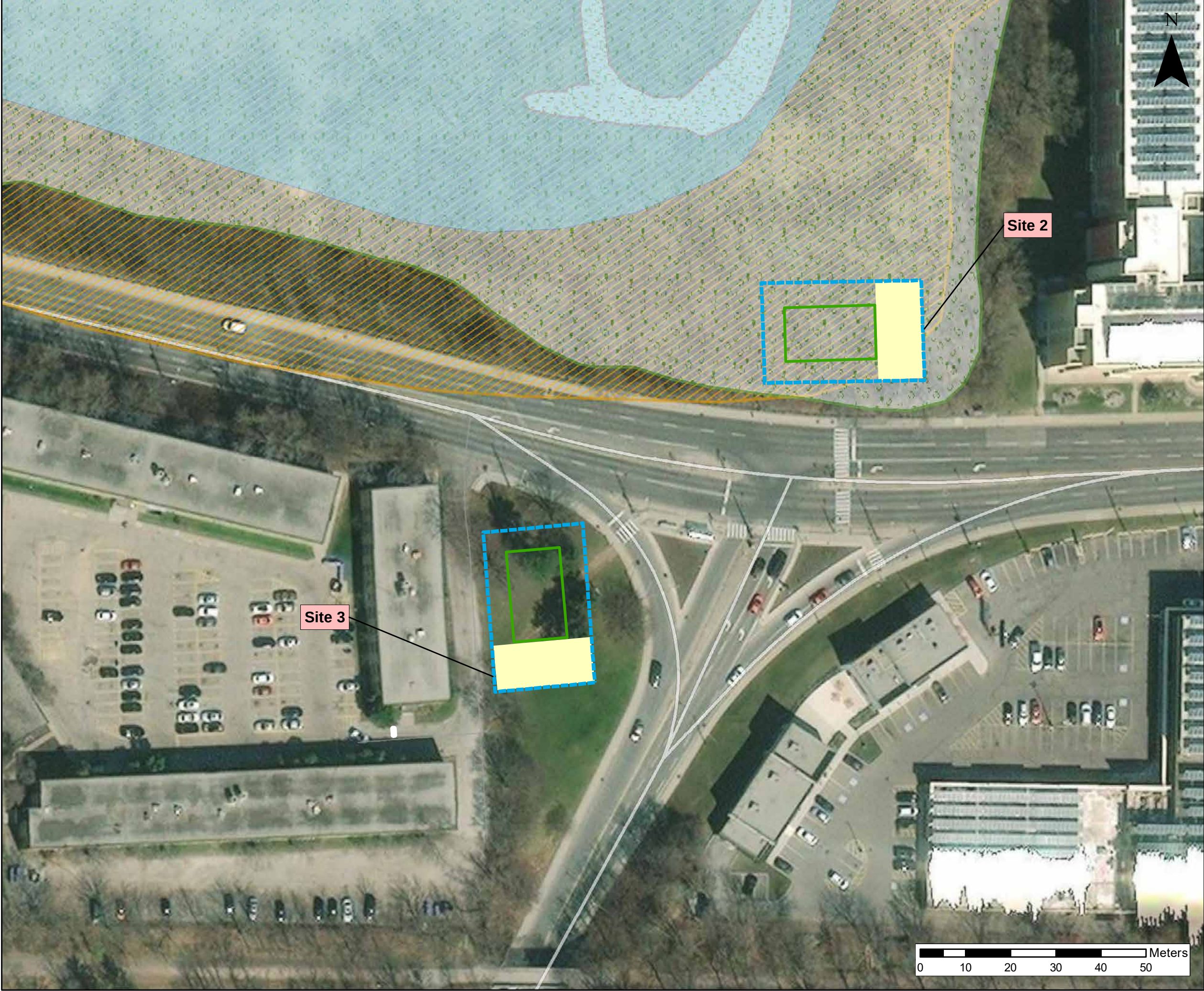
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- ASI (October 20, 2023). *Final Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment, Main & Whitney (HD17A) Water Pumping Station Class Environmental Assessment and Conceptual Design*
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- WSP (May 2015). *Osler & Main/Whitney Pump Station Feasibility Study: Feasibility of Combining HD17A (Main/Whitney PS) and HD011 Osler PS* (Report No. 141-25216-00).
- WSP (January 2016) *New Highland Gardens Park Water Booster Pumping Station, As-Built Drawings.*

Attachment A

Long-Listed Alternative Sites

(Excluding 7 Short-Listed Alternative Sites:
Sites 1, 4, 6, 8, 9, 12, and 19, which were presented
in Figures 4-3 to 4-9)

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Legend

- Watercourse
- Waterbodies
- Niagara Escarpment Parks and Open Spaces
- Regional Event Floodplain
- Significant Wooded Area
- Environmentally Sensitive Area
- Unevaluated Wetland
- Study Area

Alternative Location Construction Component

- Lot Area
- Building) RSUQ
- Parking Lot

**Main & Whitney (HD17A) WPS
Class EA and Conceptual Design**

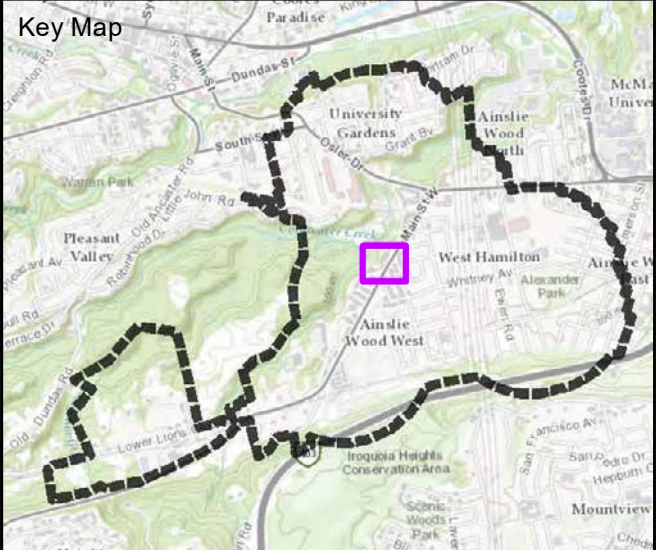
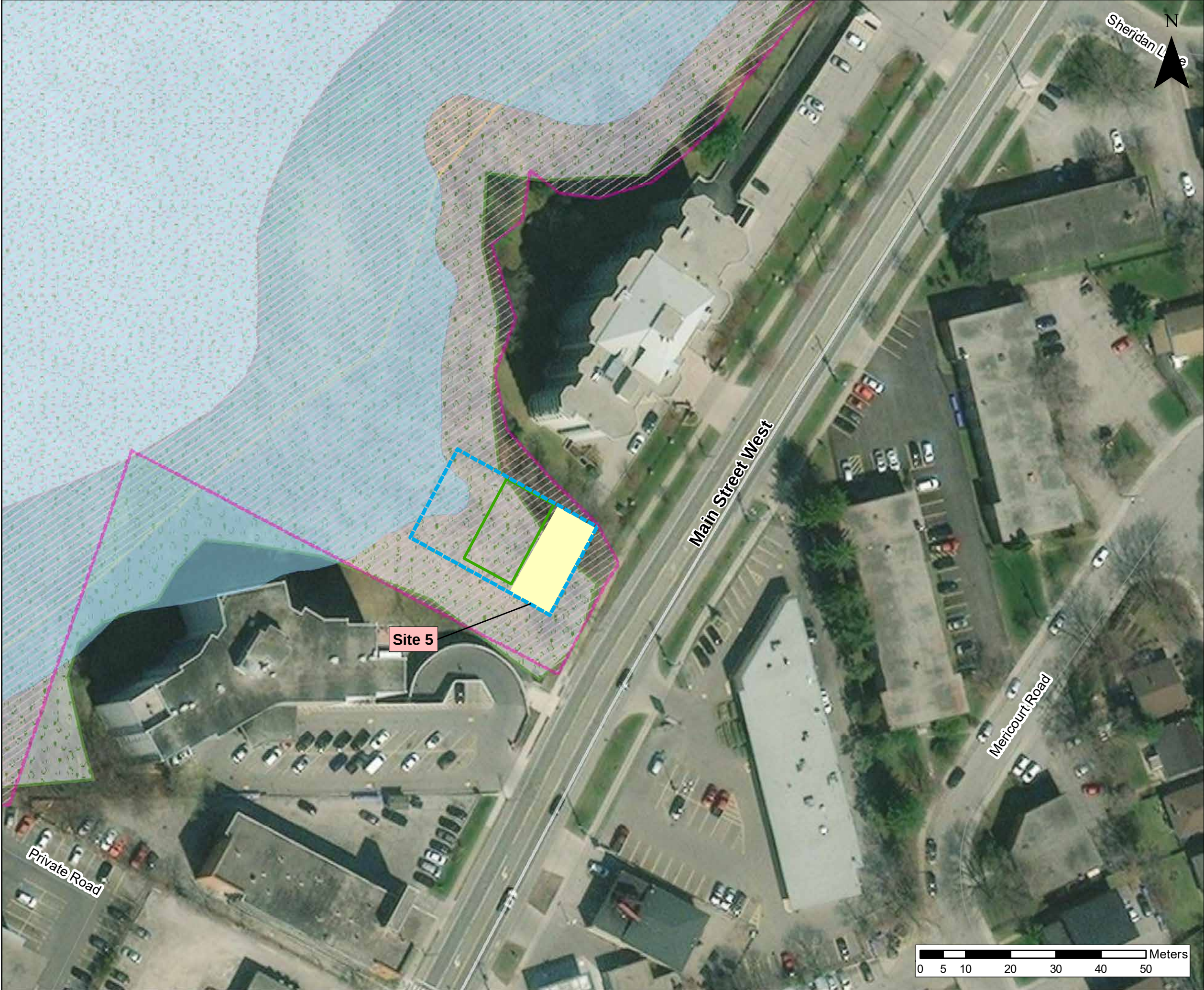
**Attachment A-1
Alternative Location
Sites 2 and 3**



Project No.:
136546

Date:
October 2023

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Legend

Watercourse

Waterbodies

Niagara Escarpment Parks and Open Spaces

Regional Event Floodplain

Significant Wooded Area

Environmentally Sensitive Area

Unevaluated Wetland

Study Area

Alternative Location Construction Component

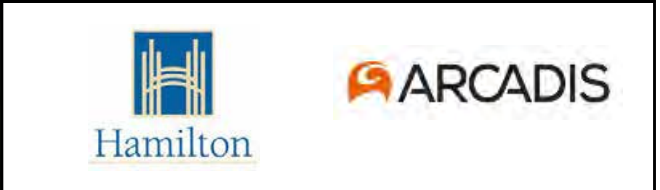
Lot Area

Building) RSUQ

Parking Lot

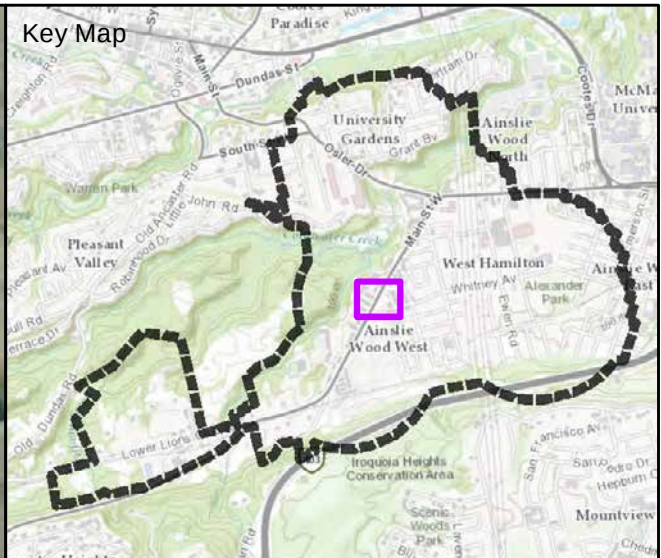
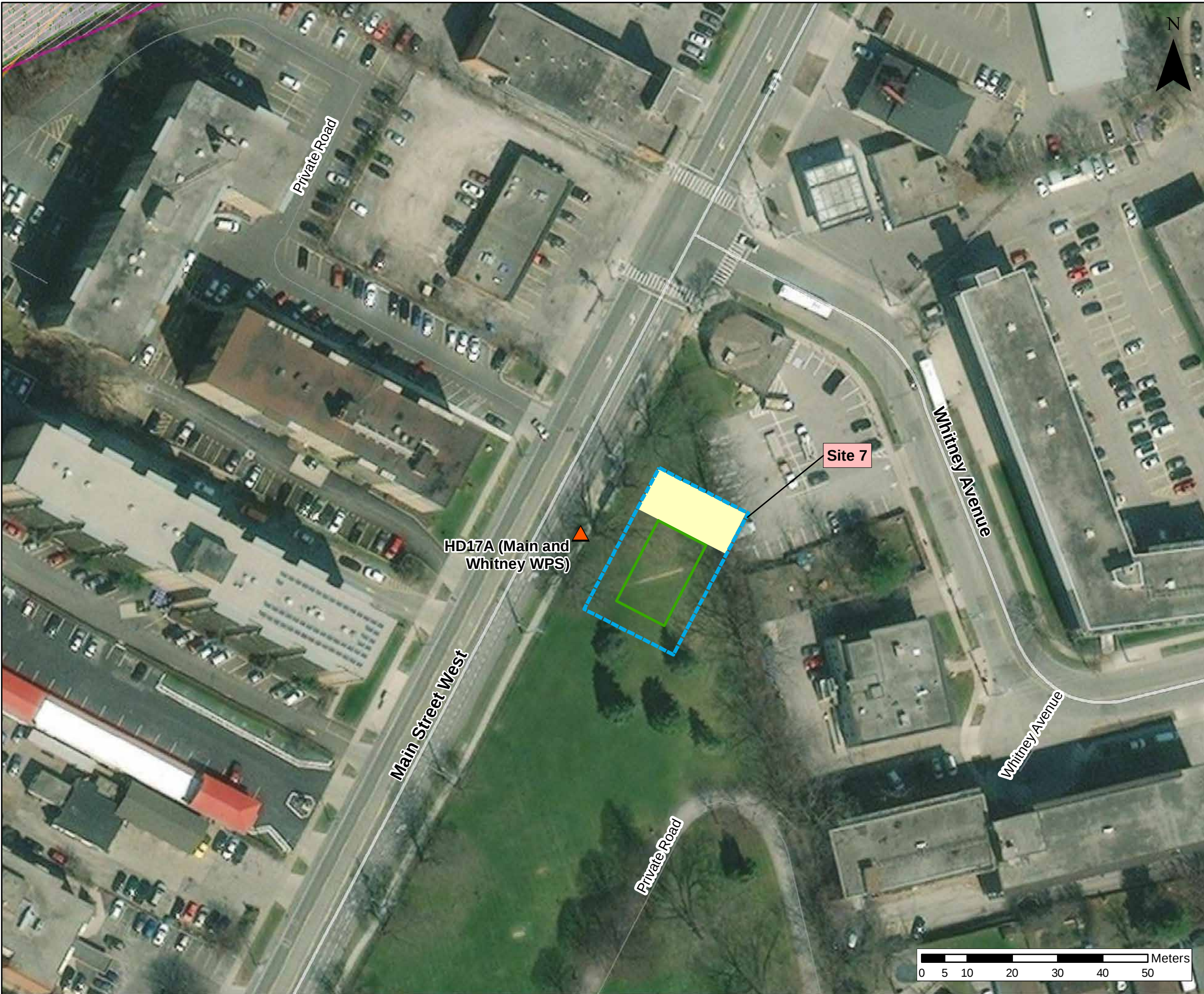
**Main & Whitney (HD17A) WPS
Class EA and Conceptual Design**

**Attachment A-2
Alternative Location
Site 5**



Project No.: 136546	Date: October 2023
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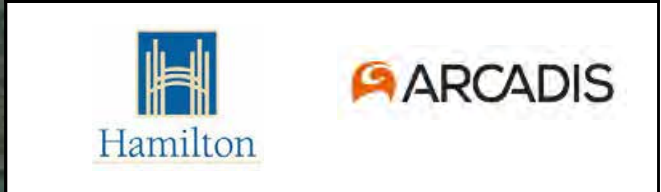
- HD17A (Main and Whitney WPS)
- Watercourse
- Waterbodies
- Niagara Escarpment Parks and Open Spaces
- Regional Event Floodplain
- Significant Wooded Area
- Environmentally Sensitive Area
- Unevaluated Wetland
- Study Area

Alternative Location Construction Component

- Lot Area
- Building) PROPOSED
- Parking Lot

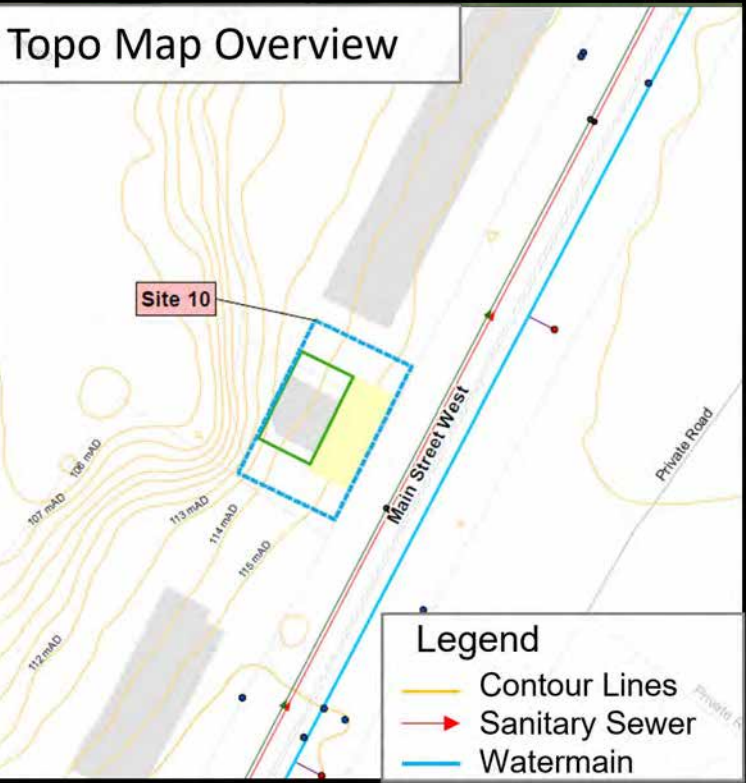
**Main & Whitney (HD17A) WPS
Class EA and Conceptual Design**

**Attachment A-3
Alternative Location
Site 7**

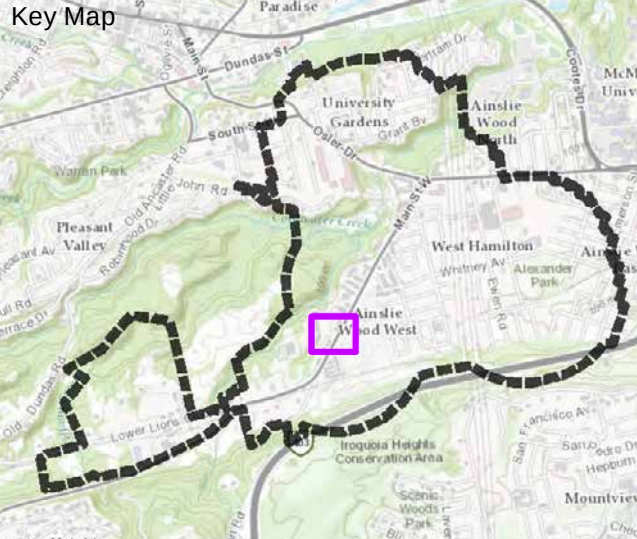


Project No.: 136546	Date: October 2023
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Topo Map Overview



- Legend**
- Contour Lines
 - Sanitary Sewer
 - Watermain



- Legend**
- Watercourse
 - Waterbodies
 - Niagara Escarpment Parks and Open Spaces
 - Regional Event Floodplain
 - Significant Wooded Area
 - Environmentally Sensitive Area
 - Unevaluated Wetland
 - Study Area
- Alternative Location Construction Component**
- Lot Area
 - Building Footprint
 - Parking Lot

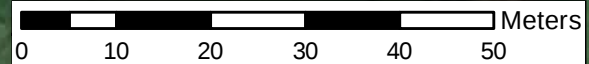
**Main & Whitney (HD17A) WPS
Class EA and Conceptual Design**

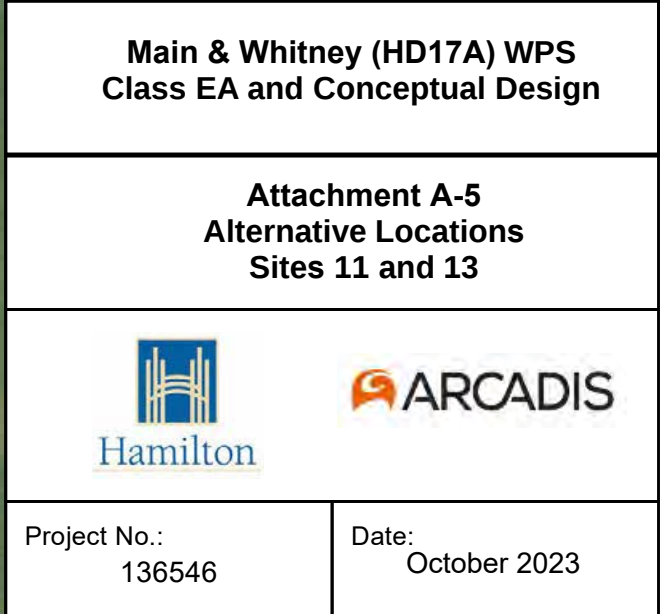
**Attachment A-4
Alternative Location
Site 10**



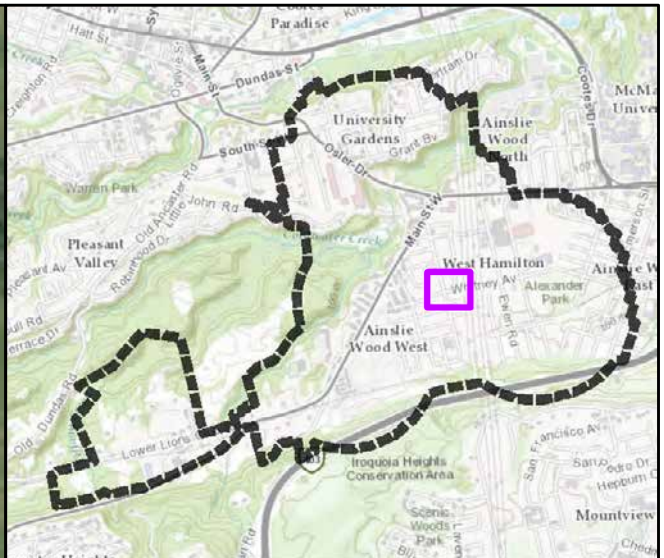
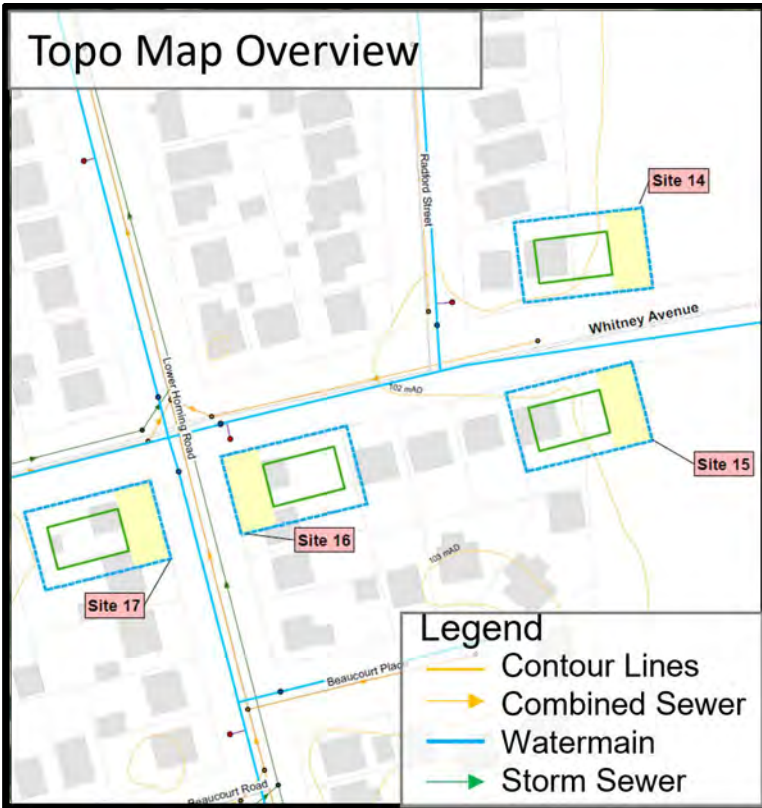
Project No.:
136546

Date:
October 2023





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Legend

- Watercourse
- Waterbodies
- Niagara Escarpment Parks and Open Spaces
- Regional Event Floodplain
- Significant Wooded Area
- Environmentally Sensitive Area
- Unevaluated Wetland
- Study Area

Alternative Location Construction Component

- Lot Area
- Building)
- Parking Lot

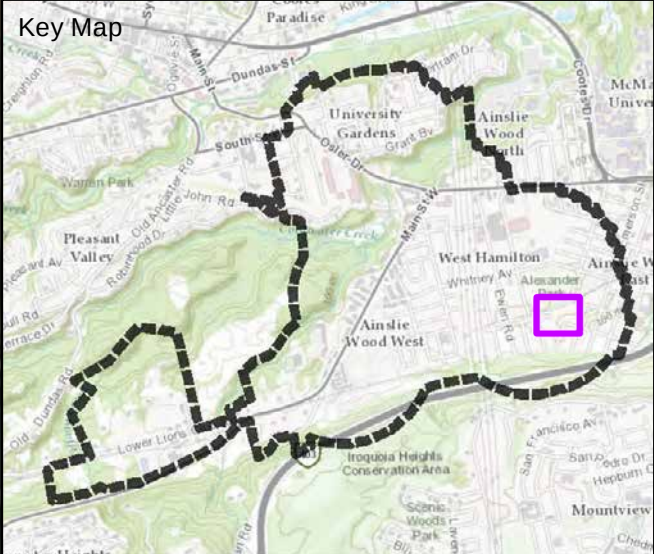
Main & Whitney (HD17A) WPS Class EA and Conceptual Design

Attachment A-6 Alternative Locations Sites 14, 15, 16, and 17



Project No.: 136546	Date: October 2023
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Legend

Watercourse

Waterbodies

Niagara Escarpment Parks and Open Spaces

Regional Event Floodplain

Significant Wooded Area

Environmentally Sensitive Area

Unevaluated Wetland

Study Area

Alternative Location Construction Component

Lot Area

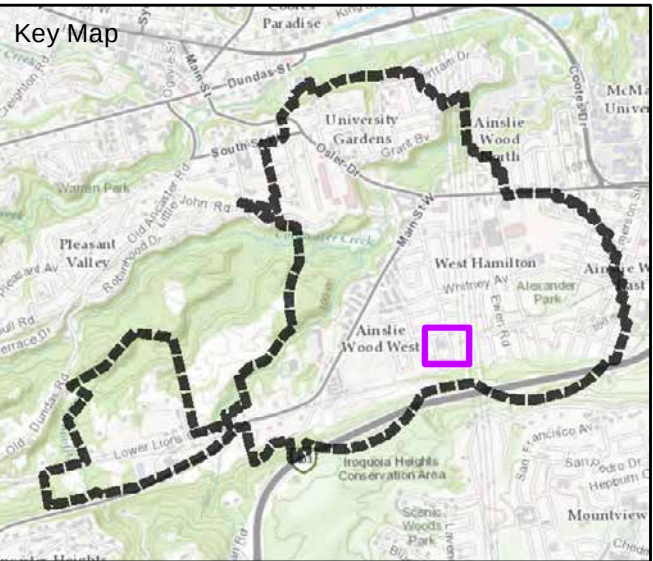
Building) RESID

Parking Lot

**Main & Whitney (HD17A) WPS
Class EA and Conceptual Design**

**Attachment A-7
Alternative Location
Site 18**

Project No.: 136546	Date: October 2023
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Legend

- Watercourse
- Waterbodies
- Niagara Escarpment Parks and Open Spaces
- Regional Event Floodplain
- Significant Wooded Area
- Environmentally Sensitive Area
- Unevaluated Wetland
- Study Area

Alternative Location Construction Component

- Lot Area
- Building) PROPOSED
- Parking Lot

**Main & Whitney (HD17A) WPS
Class EA and Conceptual Design**

**Attachment A-8
Alternative Locations
Sites 20 and 21**



Project No.: 136546	Date: October 2023
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