

November 19, 2025

Tender Period Addendum 01

Town of South Bruce Peninsula – New Town Hall Offices

370 William Street,
Wiarton, Ontario
N0H 2T0

Issued To: All Bidders

Re: Architectural, Mechanical and Civil Revisions

Part 1 - ATTACHMENTS:

1.1 G.M. DIEMERT ARCHITECT INC. ARCHITECTURAL SPECIFICATIONS:

- .1 For Architectural specifications, the content that is affected within the **MODIFIED** specification Sections attached has been marked with yellow highlighting. The Sections affected are further identified to be a part of Addendum 01 by inclusion in the page header of the words "Addendum 01" which is also marked with yellow highlighting.
- .2 **New** specification Sections which shall be **ADDED in their entirety** to the Project Manual are identified to be a part of Addendum 01 by inclusion in the page header of the words "Addendum 01" which is also marked with yellow highlighting. No other parts of the new Sections are marked with yellow highlighting.
- .3 **Attached, Revised Section 00 01 10 Project Manual-Table of Contents**, marked as part of Addendum 01, dated November 19, 2025, 5-pages. Modified or new Sections are marked with yellow highlight and changes are due to listing of additional, new, ADDED Sections or adjustment to page number counts.
- .4 **Attached NEW Project Information:**
 - .1 GSS Engineering Consultants Ltd. "Technical Memorandum for the Wiarton Water System Analysis" dated July, 2024 which provides fire flow data. The Memorandum contains 10-pages, 8.5" x 11" size consisting of an Introduction, description of the Existing Water Servicing System, Anticipated Watermain System Upgrades, Modelling Methodology, Modelling Results, Conclusions and Recommendations. Also attached are Appendices A and B and various Figures and Tables.
- .5 **Attached, Revised Section 08 44 13 Glazed Curtain Wall**, 14 pages, 8.5" x 11" size, marked in the header with "Addendum 01" which has yellow highlighting applied over it.
- .6 **Attached, NEW Section 10 22 26 Operable Partitions**: 6 pages, 8.5" x 11" size, marked in the header with "Addendum 01" which has yellow highlighting applied over it.

1.2 G.M. DIEMERT ARCHITECT INC. DRAWINGS, ARCH "E" SIZE OR 121.92 CM X 91.4 CM IN SIZE, ISSUED "02, ADD-01, ADDENDUM 01, 2025.11.19", 26 PAGES

- .1 A-002, titled "Site Plan",
- .2 A-003, titled "Site Plan Enlarged",
- .3 A-004, titled "Landscape Plan",
- .4 A-005, titled "site Plan – Demolition",
- .5 A-100, titled "Foundation Plan",
- .6 A-110, titled "Ground Floor Plan",

- .7 A-111, titled "Ground Floor Enlarged Plan",
- .8 A-130, titled "Roof Plan",
- .9 A-200, titled "Exterior Elevations – Demolition",
- .10 A-201, titled "Exterior Elevations",
- .11 A-301, titled "Existing Building Sections",
- .12 A-302, titled "Existing Wall Sections",
- .13 A-310, titled "Wall Sections",
- .14 A-311, titled "Wall Sections",
- .15 A-321, titled "North Canopy Details",
- .16 A-400, titled "Reception and Millwork Details",
- .17 A-401, titled "Coffee Station and Millwork Details",
- .18 A-402, titled "Main Entrance Enlarged Plans",
- .19 A-403, titled "Council Chambers – Enlarged Plans",
- .20 A-404, titled "Washrooms – Enlarged Plans",
- .21 A-405, titled "Corridor Elevations",
- .22 A-406, titled "Public Washroom Details",
- .23 A-406.1, titled "Public Washroom Details",
- .24 A-501, titled "Reflected Ceiling Plan",
- .25 A-502, titled "Reflected Ceiling Framing Plan",
- .26 A-701, titled "Ground Floor Finish Plan".

1.3 MECHANICAL AND ELECTRICAL ENGINEERING ADDENDUM ATTACHMENTS:

- .1 DEI Consulting Engineers "Addendum 01":
- .2 Electronic Document Identification: PDF file attached "20251107DEI-24099Adden01-M-StormPipe&dwgM401.pdf" containing the following documents.
 - .1 Mechanical Addendum: 1-page, 8.5"x11" size, dated "November 7, 2025", Engineers Job # 24099.
 - .2 Mechanical Drawing modified and listed as follows: DEI Consulting Engineers project number 24099, 1-page, ARCH E size (36x48"), Issued as "1, ISSUED FOR ADDENDUM 01", dated 2025.11.06 identified as follows:
 - .1 M401, titled "Ground Floor Plans Plumbing & Drainage – Renovation".
- .3 DEI Consulting Engineers "Addendum 02":
- .4 Electronic Document Identification: PDF file attached "20251114DEI-24099Addend02-M-ArchivesRm&GasMeter&reissueddwgs.pdf" containing the following documents.
 - .1 Mechanical Addendum: 1-page, 8.5"x11" size, dated "November 14, 2025", Engineers Job # 24099.
 - .2 Mechanical Drawing modified and listed as follows: DEI Consulting Engineers project number 24099, 4-pages, ARCH E size (36x48"), Issued as "1, ISSUED FOR ADDENDUM 02", dated 2025.11.14 identified as follows:
 - .2 M101, titled "Legend & Schedules (1 of 2)",
 - .3 M401, titled "Ground Floor Plans Plumbing & Drainage – Renovation",
 - .4 M501, titled "Heating & Ventilation - Renovation",
 - .5 M601, titled "Roof Plan - Renovation".

1.4 WITZEL DYCE ENGINEERING INC. "ADDENDUM 01" ATTACHMENTS:

- .1 Electronic Document Identification: PDF file attached "20251112WDE-Adden01-Civil.pdf" containing the following document.

- .2 Civil drawings **MODIFIED** and listed as follows: Witzel Dyce Engineering Inc. project number 17453-900, ARCH "E" size or 121.92 cm x 91.4 cm, 31 drawing sheets, Issued as "5, REVISED TO ADD SIDEWALK AT ENTRANCE, 2025.11.12" identified as follows:
 - .1 C2.0 titled "Grading and Servicing Plan".

Part 2 - Summary of Amendments to Bid Documents:

2.1 ARCHITECTURAL SPECIFICATION AMENDMENTS:

- .1 **Section 00 21 13 Instructions to Bidders – Mandatory Bidder Briefing Meeting:**
 - .1 **Delete** 00 21 13.1.3.1 entirely.
 - .2 **Substitute** 00 21 13.1.3.1 The Mandatory Bidder Briefing Meeting will occur on November 25, 2025 beginning at 1:00 PM at the Place of the Work.

2.2 AVAILABLE PROJECT INFORMATION:

- .1 Attached with Addendum 01 is the GSS Engineering Consultants Ltd. "Technical Memorandum for the Wiarton Water System Analysis" dated July, 2024 which provides fire flow data. The Memorandum contains 10-pages, 8.5" x 11" size consisting of an Introduction, description of the Existing Water Servicing System, Anticipated Watermain System Upgrades, Modelling Methodology, Modelling Results, Conclusions and Recommendations. Also attached are Appendices A and B and various Figures and Tables.
- .2 **Section 07 46 23 Wood Siding, Soffit and Trim:**
 - .1 **Delete** 07 46 23.1.2.1 Entirely. Western Red Cedar wood siding will no longer be specified.
 - .2 **Substitute** 07 46 23.1.2.1 "Eastern White Cedar, 38 mm x 140 mm boards, kiln dried and milled by Liverance Lumber located at Wilson Home Building Centre located at 3458 Highway 6, Lion's Head, Ontario".
 - .3 **DELETE** 07 46 23.2.1.2 entirely on page 3 of 7.
 - .4 **SUBSTITUTE** revised 07 46 23.2.1.2 as follows:
 - .2 Exterior Cedar Soffit and Siding:
 - .1 Material:
 - .1 Eastern White Cedar, locally harvested and milled by Liverance Lumber operating under Wilson Home Building Centre located at 3458 Highway 6, Lion's Head, Ontario.
 - .2 Rough sawn, kiln dried to maximum 19% moisture content.
 - .3 Shape: Square edge.
 - .4 Size: 2"x 6" (38 mm x 140 mm) nominal size.
 - .5 Fastener: concealed stainless steel, ring shank nails."
- .3 **Section 08 11 16 Aluminum Doors and Frames** is **MODIFIED** as follows:
 - .1 Date within the header of each page of the Section shall be changed from "October, 2025" to "November, 2025".
 - .2 **MODIFY** the following: 2.6.2 Finish – shall be adjusted as follows:
 - 2.6.2 Finish: Framing All materials exposed to view, both inside and outside of framing assemblies:
 - .1 PPG Duranar Extrusion Coating, High-Performance, Polyvinylidene Flouride:

- .1 Spray-applied, extrusion coatings: thermosetting acrylic enamel to meet or exceed standards of AAMA 603.8, colour from PPG standard colour range.
- .2 Colour: Duranar Millennium Blue UC136405 or alternative selected by Architect.

.4 Section 08 44 13 Glazed Curtain Wall:

- .1 **DELETE** previously issued Section 08 44 13 Glazed Curtain Wall dated October, 2025.
- .2 **SUBSTITUTE** attached Section 08 44 13 Glazed Curtain Wall dated November 17, 2025. The Section contains 14 pages and "Addendum 01" marked with yellow highlighting is placed in the header.

.5 Section 08 50 00 Aluminum Windows:

- .1 **DELETE** 08 50 00.2.6.1.1 and 08 50 00.2.6.1.2 regarding aluminum frame finishes.
- .2 **SUBSTITUTE** 08 50 00.2.6.1.1 and 08 50 00.2.6.1.2 as follows:
 - "1 Exterior Surfaces: Fluoropolymer paint Coating:
 - .1 PPG Duranar Extrusion Coating, High-Performance, Polyvinylidene Flouride:
 - .1 Spray-applied, extrusion coatings: thermosetting acrylic enamel to meet or exceed standards of AAMA 603.8, colour from PPG standard colour range.
 - .2 Colour: Duranar Millennium Blue UC136405 or alternative selected by Architect.
 - .2 Interior surfaces of frames: Fluoropolymer paint Coating:
 - .1 PPG Duranar Extrusion Coating, High-Performance, Polyvinylidene Flouride:
 - .1 Spray-applied, extrusion coatings: thermosetting acrylic enamel to meet or exceed standards of AAMA 603.8, colour from PPG standard colour range.
 - .2 Colour: Duranar Millennium Blue UC136405 or alternative selected by Architect."

.6 Section 09 21 16 Gypsum Board Assemblies:

- .1 **DELETE** 09 21 16.1.2.1.1 regarding paperless gypsum board used throughout all assemblies.
- .2 **SUBSTITUTE** 09 21 16.1.2.1.1 as follows:
 - "1 Gypsum Wall Board Panels will include the following products:
 - .1 Standard gypsum wall board panels, and
 - .2 moisture resistant, mould resistant, fiber reinforced, paperless gypsum board equivalent to Type X gypsum board and
 - .3 Type X gypsum board panels are applied to walls and ceilings and bulkheads as marked on drawings.
- .3 **DELETE** 09 21 16.1.6.4 regarding level 5 finish applied to locations where existing vinyl wall covering is removed.
- .4 **SUBSTITUTE** 09 21 16.1.6.4 "Apply Level 5 finishing to all paperless gypsum board that has a painted finish."
- .5 **DELETE** 09 21 16.2.2.1.5 which had referred to the paperless gypsum board panels used in all locations. Standard gypsum board will be used with the exception of tile backer panels and mould resistant, paperless panels used in housekeeping rooms and washrooms.
- .6 **DELETE** 09 21 16.2.2.2.1 which had referred to the paperless gypsum board panels used for all Type X gypsum board panels in all locations. Standard Type X gypsum board panels will be used for fire-rated partitions with the exception of tile backer panels and mould resistant, paperless panels used in housekeeping rooms and washrooms.
- .7 **ADD:** 09 21 16.2.15 Ceramic Tile Backer Panels as follows:

- “.1 Apply paperless gypsum board panels behind the following finishes whether the paperless substrate is referenced on not:
 - .1 All ceramic wall tiles,
 - .2 Behind stainless steel wall covering, Fiberglass Reinforced Panels (FRP) or behind semi-rigid wall protection such as Korogard, Acrovyn or similar wall protection products.
- .2 Ceramic Tile Backing Gypsum Panels:
 - .1 Non-combustible, moisture and mould resistant gypsum encased in moisture resistant facing that does not contain cellulosic material purpose made for tile backing.
 - .2 Complying with ASTM D3273, Standard Test Method for Resistance to Growth of Mould on the Surface of Interior Coatings in an Environmental Chamber, score of 10.
 - .3 Smooth, paintable surface suitable for application of ceramic tiles or cement board purpose made for tile backing.
 - .4 Complying with requirements for Type X or Fire Code C.
 - .5 Edges: Tapered.
 - .6 Thickness: 15.9 mm (5/8 inch) and 12.7 mm (1/2 inch) installed as shown on drawings.
 - .7 Acceptable products:
 - .1 USG/CGC Fiberock Aqua-Tough Interior Panels.
 - .2 Certainteed Diamond Back Tile Backer Type X.
 - .3 Georgia Pacific DensGuard Tile Backer, Type X.
 - .4 CGC Durock Cement Board Next Gen.”

.7 Section 10 22 26 OPERABLE PARTITIONS:

- .1 **ADD** Section 10 22 26 Operable Partitions, attached, consisting of 14-pages, 8.5” 11” size.

2.3 ARCHITECTURAL DRAWINGS ARE REVISED:

- .1 Site Plan Drawings A-002, A-003, A-004, and A-005 are **MODIFIED** as follows:
 - .1 Part 10 and part 11 code matrices are removed from drawing A-002. The building will be considered a new construction under OBC 3.2.53, part 3 matrix is revised to show permittance of combustible and non-combustible construction.
 - .2 The Concrete pad and gated enclosure for installation of the gas service are located and dimensioned in plan on drawings A-002 and A-003.
 - .3 Detail 11 is **ADDED** to drawing A-003 to provide clarity on size and location of concrete pad and enclosure in relationship to the building.
 - .4 Stairs are **ADDED** to the North terrace c/w handrails and guards.
 - .5 Detail 1 on drawing A-005 is **MODIFIED** to provide clarity about trees and planting to be removed at North site boundary.
- .2 Notes indicating STC rating of wall assemblies are **ADDED** to architectural notes and identified on drawings A-111, A-403.
- .3 Door schedules on drawings A-110 and A-111 are **MODIFIED** as follows:

- .1 Doors 002 and 038 are made up of two 1070mm wide panels, previously 965mm.
- .2 All doors into offices, meeting rooms, council chambers, and employee spaces are revised to be solid wood doors and frames. Door schedules are updated to indicate locations of wood doors.
- .4 Below are responses to email inquiry received on Nov. 10, 2025 from Percon Construction Inc. regarding landscaping:
 - .1 **Contractor Question:** *"PT count is not provided in the drawings."*
GMDA Response: Japanese Pachysandra is a ground cover, typically planted at a 200-300mm spacing which will fill in over time. Plans indicate an estimate of plant number where ground cover is to be provided but an exact count of these plants will have to be done after field verifying the area.
 - .2 **Contractor Question:** *"Plants on the North are not called out as well and its not clear if those are to be included or not."*
GMDA Response: Drawing A-004 is MODIFIED to include the number and description of plant at the North face of the building. Provide three compact winged burning bush, three big bluestem grasses, and five tufted hair grasses at these locations.
 - .3 **Contractor Question:** *"In some places, unilock pavers are called and in some, permacon. Could you please let us know which are the correct pavers for the project?"*
GMDA Response: Site legends on drawings A-002 and A-004 are MODIFIED to include Permacon pavers which are the intended paver for the project.
- .5 Drawing A-130 "Roof Plan" is **MODIFIED** to include W-04 window elevation for clarity and show walking path layout around updated rooftop units.
- .6 Drawing A-200, "Exterior Elevations – Demolition" is **MODIFIED** to include existing grades and footing depths to be confirmed.
- .7 Detail 10 on drawing A-321 is **MODIFIED** to indicate a face mounted guardrail at the perimeter of the North terrace.
- .8 Drawings A-301, A-302, A-310 and A-311 are revised as follows:
 - .1 Existing footing depths of 1500mm are provided, this dimension is to be field verified during excavation.
 - .2 Wall sections are **MODIFIED** to remove gypsum board from exterior wall assemblies.
- .9 Drawing A-321 is **MODIFIED** to include dimensions for face mounted guard at North patio.
- .10 Drawing A-400 is revised to include details 18, 19, 20, and 21 which provide clarity on the installation and dimensions of security grilles at reception areas.
- .11 Details 2, 3, 4, and 5 on drawing A-403 are **MODIFIED** to be at a 1:50 scale.
- .12 Detail 13 on drawing A-403 is **MODIFIED** to show steel column within the enclosure for the operable partition. Wall types are also revised to match updated floor plans.
- .13 Drawings A-400, A-401, A-402, A-403, and A-701 are revised as follows:
 - .1 All references to paint finish on walls, ceilings and doors are removed from drawings. Paint colours are provided in specifications for selection during construction.
- .14 Architectural notes are **ADDED** to Drawing A-404.
- .15 Drawing A-405 is **MODIFIED** as follows:
 - .1 Dimensions of reception area wood ceilings are provided for clarity.
 - .2 Window legend is **ADDED** to drawing sheet for clarity.
- .16 Drawing A-406 is **MODIFIED** as follows:

- .1 Tile is removed from shower areas in place of solid fiberglass insert. Details 5,6,8, and 9 are revised to reflect this change.
- .2 Detail 18 is **ADDED** to drawing to provide clarity on blocking required for the installation of shower inserts.
- .17 Drawing A-406.1 is **MODIFIED** as follows:
 - .1 Detail 4 is **ADDED** to provide clarity on attic framing over public washrooms.
 - .2 Notes are **ADDED** to detail 3 to describe the ceiling / floor assembly above public washrooms. Ensure 1-hour fire resistance rating is achieved.
- .18 Drawing A-501 "Reflected Ceiling Plan – Ground Floor" is **MODIFIED** as follows:
 - .1 Finished ceiling heights at Offices 026, 027, 028, and 029 are reduced by 100mm.
 - .2 Detail 14 on drawing A-501 is **MODIFIED** to include the approximate unit weight of the folding partition at the council chambers.
- .19 Drawing A-502 "Reflected Ceiling Framing Plan" is **ADDED** to provide clarity on ceiling conditions which are supported by metal stud walls. Metal stud framing is to be provided above offices and all other rooms indicated on the plan.
- .20 Drawing A-701 "Ground Floor Finish Plan" is revised to include paint finished notes. All walls not otherwise noted are to be PT-01 with eggshell finish. Finish schedule is revised to include all rooms not previously defined.

2.4 MECHANICAL ADDENDUM 1 REVISES:

- .1 Storm piping sizes as indicated on attached plan M401.

2.5 MECHANICAL ADDENDUM 2 REVISES:

- .1 Location of gas meter service and piping up to roof is MODIFIED to suit architectural.
- .2 Type of diffuser servicing Archives Room 016a is MODIFIED to suit architectural RCP.

End of Tender Addendum.

SPECIFICATIONS

Town of South Bruce Peninsula: Proposed New Town Hall

Town of South Bruce Peninsula

Architect's Project Number: 2404

Owner:

Town of South Bruce Peninsula

315 George Street, Wiarton, Ontario, N0H 2T0

Architect:

G. M. Diemert Architect Inc.

Suite 201 - 957 Fourth Avenue West, Owen Sound, Ontario, N4K 2N9

519- 376 - 1975

E: gdiemert@gmda.ca

October, 2025

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Index of Drawings:

Civil Engineering Drawings are entitled “**Proposed Renovations to: Town of South Bruce Peninsula, Wiarton Town Hall**, 369 William Street, **Warton, ON**”. Civil Engineering Project number is 17453-900. Civil Engineering drawings are 91.44 cm x 60.96 cm in size, prepared by Witel Dyce Engineering Inc. and they are listed below:

Drawing No.	Title	Issue No.....	Issue Note	Date
C1.0	Existing Conditions/Removals Plan	4	Revised Per Updated Site Plan 2025.10.23	
C2.0	Grading and Servicing Plan	4	Revised Per Updated Site Plan 2025.10.28	

Architectural Drawings are entitled **“Proposed Renovations to: Town of South Bruce Peninsula, New Townhall Offices, 369 William Street, Wiarton, ON”**. Architect's Project number is 2404. Architectural drawings are 36" x 48" in size, prepared by G. M. Diemert Architect Inc. and they are listed below:

Drawing No.	Title	Issue No.....	Issue Note	Date
A-002	Site Plan, OBC Matrices & Details	1	Issued for Tender	2025.10.28
A-003	Site Plan Enlarged	1	Issued for Tender	2025.10.28
A-004	Landscape Plan	1	Issued for Tender	2025.10.28
A-005	Site Plan – Demolition	1	Issued for Tender	2025.10.28
A-010	Foundation & Ground Floor Plans - Demolition	1	Issued for Tender	2025.10.28
A-011	2 nd Floor & Roof Plans - Demolition	1	Issued for Tender	2025.10.28
A-012	Roof Structure - Demolition	1	Issued for Tender	2025.10.28
A-100	Foundation Plan	1	Issued for Tender	2025.10.28
A-110	Ground Floor Plan	1	Issued for Tender	2025.10.28
A-111	Ground Floor Enlarged Plan	1	Issued for Tender	2025.10.28
A-120	2 nd Floor Plan	1	Issued for Tender	2025.10.28
A-130	Roof Plan	1	Issued for Tender	2025.10.28
A-200	Exterior Elevations - Demolition	1	Issued for Tender	2025.10.28
A-201	Exterior Elevations	1	Issued for Tender	2025.10.28
A-301	Existing Building Sections	1	Issued for Tender	2025.10.28
A-302	Existing Wall Sections	1	Issued for Tender	2025.10.28
A-303	Building Sections	1	Issued for Tender	2025.10.28
A-310	Wall Sections	1	Issued for Tender	2025.10.28
A-311	Wall Sections	1	Issued for Tender	2025.10.28
A-320	Entrance Canopy Details	1	Issued for Tender	2025.10.28
A-321	North Canopy Details	1	Issued for Tender	2025.10.28
A-400	Reception and Millwork Details	1	Issued for Tender	2025.10.28
A-401	Coffee Station and Millwork Details	1	Issued for Tender	2025.10.28
A-402	Main Entrance – Enlarged Plans	1	Issued for Tender	2025.10.28
A-403	Council Chambers – Enlarged Plans	1	Issued for Tender	2025.10.28
A-404	Washrooms – Enlarged Plans	1	Issued for Tender	2025.10.28
A-404.1	Washrooms – Enlarged Plans (1)	1	Issued for Tender	2025.10.28
A-405	Corridor Elevations	1	Issued for Tender	2025.10.28
A-406	Public Washroom Details	1	Issued for Tender	2025.10.28
A-406.1	Public Washroom Details	1	Issued for Tender	2025.10.28
A-501	Reflected Ceiling Plan – Ground Floor	1	Issued for Tender	2025.10.28
A-701	Ground Floor Finish Plan	1	Issued for Tender	2025.10.28

Structural Engineering Drawings are entitled **“Proposed Renovations to: Town of South Bruce Peninsula, South Bruce Peninsula New Town Hall Conversion, 370 William Street, Wiarton, ON”**. Structural Engineer's Project number is 2402330. Structural drawings are 91.44 cm x 60.96 cm in size, prepared by GEI Consultants Canada Ltd. and they are listed below:

Drawing No.	Title	Issue No.....	Issue Note	Date
S1.1	Structural Notes	4	Issued for Tender	2025.10.28
S1.2	Structural Notes & Schedules	4	Issued for Tender	2025.10.28
S2.1	Existing Foundation Plan	4	Issued for Tender	2025.10.28
S2.2	Existing Roof Framing Plan	4	Issued for Tender	2025.10.28
S2.3	Proposed Foundation Plan	4	Issued for Tender	2025.10.28
S2.4	Proposed Roof Framing Plan	4	Issued for Tender	2025.10.28
S3.1	Building Sections	4	Issued for Tender	2025.10.28
S4.1	Wall Sections	4	Issued for Tender	2025.10.28
S4.2	Wall Sections	4	Issued for Tender	2025.10.28
S4.3	Wall Sections	4	Issued for Tender	2025.10.28
S5.1	Section Details	4	Issued for Tender	2025.10.28
S5.2	Section Details	4	Issued for Tender	2025.10.28

S6.1	Rear Canopy Structure	4	Issued for Tender	2025.10.28
S6.2	Skylight Framing	4	Issued for Tender	2025.10.28
S6.3	Roof Stair Framing	4	Issued for Tender	2025.10.28
S6.4	Front Canopy Structure	4	Issued for Tender	2025.10.28

Mechanical Engineering Drawings are entitled **“Proposed Renovations to: Town of South Bruce Peninsula, New Townhall Offices, 370 William Street, Wiarton, ON”**. Mechanical Engineer's Project number is 2404. Mechanical drawings are 36" x 48" in size, prepared by D.E.I. Consulting Engineers Inc. and they are listed below:

Drawing No.	Title	Issue No.....	Issue Note	Date
M101	Legend & Schedules (1 of #)	3	Issued for Review	2025.10.15
M102	Schedules (2 of #)	3	Issued for Review	2025.10.15
M201	Plumbing & Drainage - Demolition	3	Issued for Review	2025.10.15
M202	Roof Plan - Demolition	3	Issued for Review	2025.10.15
M301	Fire Protection - Renovation	3	Issued for Review	2025.10.15
M401	Ground Floor Plans Plumbing & Drainage - Renovation	3	Issued for Review	2025.10.15
M501	Heating & Ventilation – Renovation	3	Issued for Review	2025.10.15
M601	Roof Plan – Renovation	3	Issued for Review	2025.10.15
M701	Details (1 of #)	3	Issued for Review	2025.10.15

Electrical Engineering Drawings are entitled **“Proposed Renovations to: Town of South Bruce Peninsula, New Townhall Offices, 370 William Street, Wiarton, ON”**. Electrical Engineer's Project number is 2404. Electrical drawings are 36" x 48" in size, prepared by D.E.I. Consulting Engineers Inc. and they are listed below:

Drawing No.	Title	Issue No.....	Issue Note	Date
E101	Site Plan and Legend	3	Issued for Review	2025.10.15
E201	Details and Schedules	3	Issued for Review	2025.10.15
E301	Ground Floor Plan Lighting - Renovation	3	Issued for Review	2025.10.15
E401	Ground Floor & Roof Plans Power & Systems - Reno	3	Issued for Review	2025.10.15
E501	Distribution Riser Diagram	3	Issued for Review	2025.10.15
E601	Fire Alarm Riser and Graphical	3	Issued for Review	2025.10.15

Reference Drawings:

Civil Reference Drawings are entitled **“Oxeden Waterworks Contract No. 1 Water Distribution System”**. File number is noted as 8-1821. Title block Issue Note referenced below is provided as the latest issued date for the Consultant's drawing and this date is not the date upon which the words “Record Drawings” had been added. The creation date for the As Built information is not known, but it will coincide with the completion of the Civil work during 1996 or 1997. These drawings are an undocumented size; numbered and entitled as listed below:

Drawing No.	Title	Issue No	Issue Note
4	Bay Street Plan & Profile	6	Nov. 29, 1996, Marked “Record Drawings”

As-Built Structural Reference Drawings are entitled **“Solway's Food Market Addition & Renovations”**. Project number is noted as C4080 and prepared by Gamsby and Mannerow Limited. These drawings are unidentified size; numbered and entitled as listed below:

Drawing No.	Title	Issue No	Issue Note
1	Site Plan	-	Feb. 12, 1999.
2	Foundation Plan & Details	-	Feb. 16, 1999.
3	Floor Plan	-	Feb. 22, 1999.
4	Floor Plans & Details	-	Mar. 05, 1999.
5	Elevations	-	Feb. 22, 1999.
6	Wall Sections	-	Mar. 05, 1999.
7	Wall Sections & Pyramid Framing	-	Mar. 02, 1999.

End of Project Manual Contents.



ENGINEERING
CONSULTANTS LTD

TECHNICAL MEMORANDUM
WIARTON WATER SYSTEM ANALYSIS
Town of South Bruce Peninsula

24-014

July, 2024

Prepared by:
GSS Engineering Consultants Ltd.
Suite 230, 945 3rd Avenue East
Owen Sound, Ontario N4K 2K8

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Table 4.1	Water Demand Classifications
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Technical Memorandum
Warton Water System Analysis

July, 2024

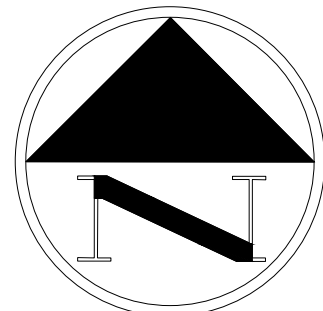
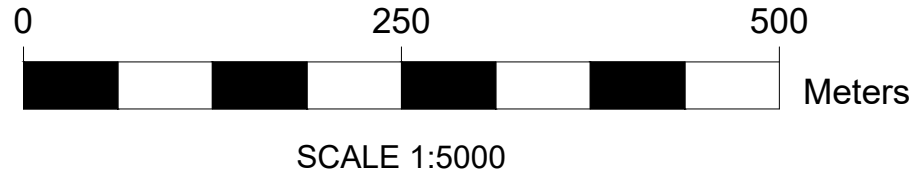
24-014

1 INTRODUCTION

GSS Engineering was retained by the Town of South Bruce Peninsula to analyze the water servicing system and sanitary sewage system for the community of Warton. The need for this study is to ensure that Warton can support future servicing population growth. This technical memo focuses solely on the analysis of the Warton water servicing system.

Warton is on the east side of the Bruce Peninsula, bordering Georgian Bay. The population of Warton is approximately 1,996 as per the 2021 census. Virtually all of Warton naturally slopes towards the bay (approximate elevation of 176.0 m) with high point elevations of 210.0 m in the south, 216.0 m in the west, and 236.0 m in the north. **Figure 1.1** overleaf provides an aerial view of Warton as well as topographic contours derived from LiDAR data.

The water system was evaluated for maximum day, peak hour, and fire flow demands based on an estimated future servicing population. Water system deficiencies causing inadequate pressures are identified and general mitigative solutions are proposed. Further, as requested by the Town, watermain sizes to support development in the southwest are proposed. The results of these analyses are summarized in this report.



CAUTION: THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS, PROPERTY LINES AND OTHER UNDERGROUND AND OVERGROUND UTILITIES ARE STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES, PROPERTY LINES & STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES, PROPERTY LINES & STRUCTURES, AND SHOULD ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

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945-3rd Ave. East, Unit #230, Owen Sound, ON, N4K 2K8
Telephone: (519) 372-4828

Title:
**AERIAL VIEW
WARTON
WATER SYSTEM ANALYSIS**

Client: **TOWN OF SOUTH BRUCE PENINSULA**

Design:	JTB	Scale:	1:5000
Drawn:	JTB	Approved:	Design Engineer
Checked:	RS		
Date:	MAY 2024		

Drawing No. **FIGURE 1.1**

2 EXISTING WATER SERVICING SYSTEM

The existing water distribution system spans approximately 3.0 km north to south and 2.3 km east to west.

The following sections provide details regarding the existing water servicing system.

2.1 Watermains

The water servicing system currently contains approximately 22.5 km of total watermain. The watermain ranges in size from 25 mm – 350 mm diameter and consists of various materials. **Table 2.1** and **Figure 2.1** overleaf provide the watermain broken down by size and **Table 2.2** and **Figure 2.2** provide a breakdown by material.

As per **Table 2.1** the most common watermain size is 150 mm diameter, accounting for 46% of the total watermain in the Wiarton distribution system. From **Table 2.2** the most common watermain material is PVC accounting for 61% of the total watermain. It is noted that minimum pipe size for water distribution system that supplied fire flow is 150mm diameter per MECP design guidelines

2.2 Water Treatment Plant / High Lift Pump Station

Water is supplied to Wiarton via a water treatment plant that receives raw water from Colpoy's Bay and has a rated capacity of 5,400 m³/day. The water treatment plant is located at the northernmost point in the water distribution system, at the end of Bayview Street. **Figures 2.1** and **2.2** provide the location of the water treatment plant.

The high lift pumps at the water treatment plant draw treated water from a pumping well with a high-water level of 179.6 m. As per the *Master Servicing Plan* (MSP) completed by GM Blueplan in 2015 the high lift pumping station contains two pumps (one duty and one standby) with each pump rated for 59.5 L/s (5,140 m³/day) at 77.7 m TDH (110.5 psi). The pump curve for the actual high lift pumps was not provided. Therefore, the pump curve in **Appendix A** titled "High Lift Pump" was used as an estimate of the Wiarton high lift pumps.

2.3 Water Standpipe

The water distribution system contains a standpipe located at the north end of Gould Street. **Figures 2.1** and **2.2** provide the location of the water standpipe.

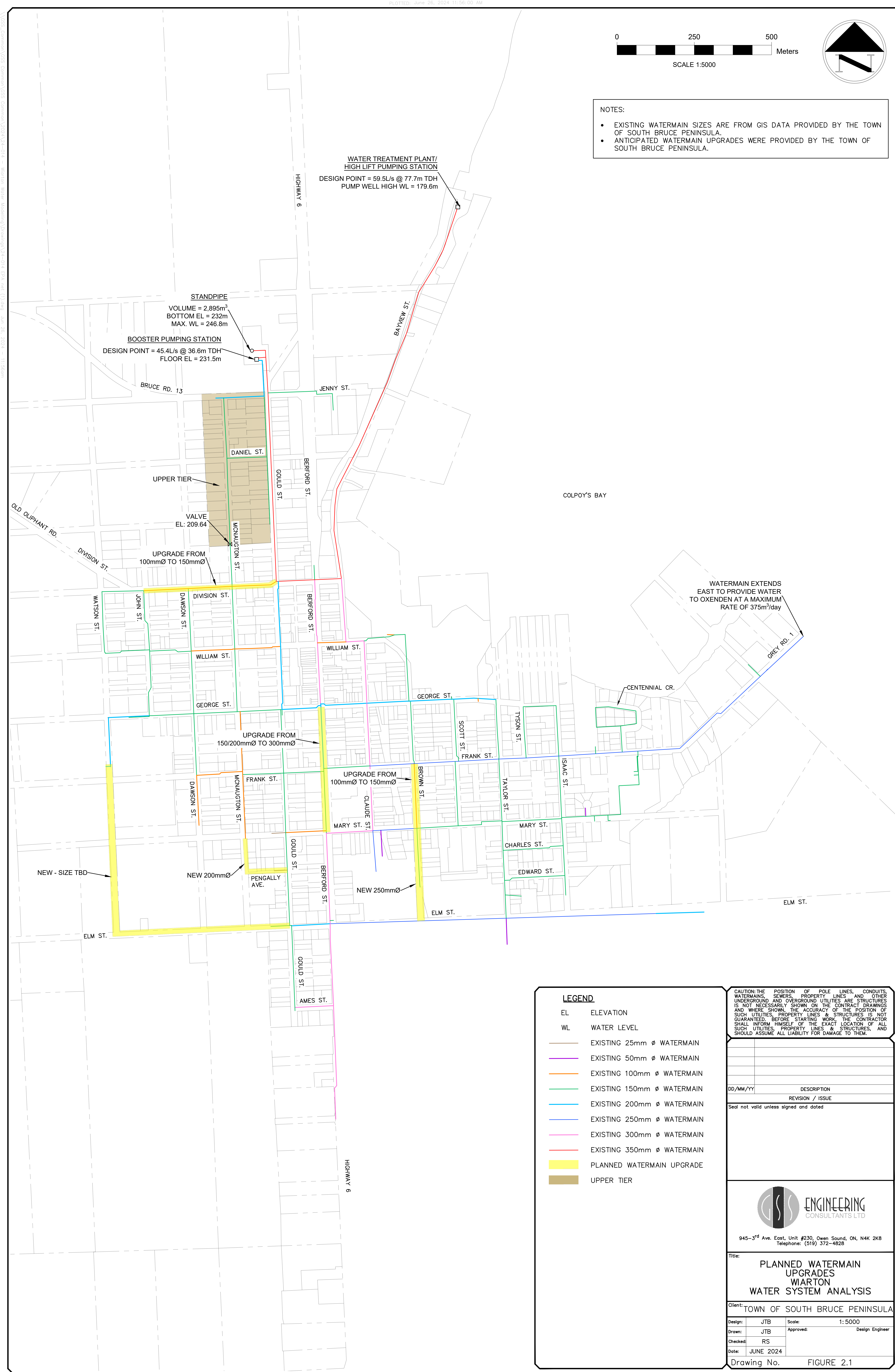
The water standpipe provides relatively constant pressure to the water system as well as treated water storage for equalization, firefighting, and emergencies. When the water in the standpipe reaches minimum level of equalization storage, it triggers the high lift pumps to turn on, pressurizing the water system and refilling the water standpipe.

The water standpipe has a total capacity of 2,895 m³, a diameter of 15.8 m, a height of 14.8 m, a base elevation of 232 m, and a maximum water level of 246.8 m. **Section 4.3** discusses the estimated volume and water level in the water standpipe for the equalization storage, fire storage, and emergency storage.

TABLE 2.1

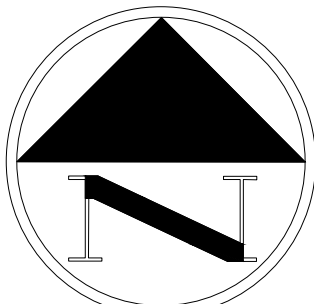
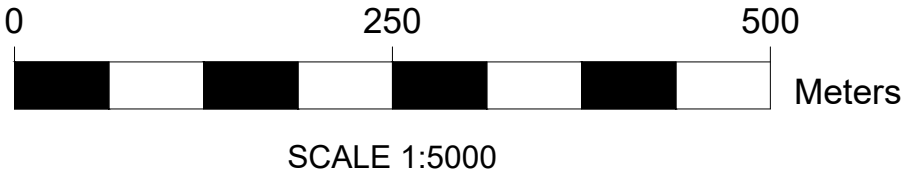
**Watermain Sizes and Lengths
Wiarton Water Servicing System**

Watermain Diameter (mm)	Total Length of Watermain (m)
25	45
50	205
100	1,250
150	10,410
200	2,273
250	3,200
300	2,818
350	2,273
Total	22,474



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- NOTES:
- EXISTING WATERMAIN SIZES ARE FROM GIS DATA PROVIDED BY THE TOWN OF SOUTH BRUCE PENINSULA.
 - ANTICIPATED WATERMAIN UPGRADES WERE PROVIDED BY THE TOWN OF SOUTH BRUCE PENINSULA.

COLPOY'S BAY

CENTENNIAL CR.

NEW - SIZE TBD

NEW 200mmØ

NEW 250mmØ

CENTENNIAL CR.

ELM ST.

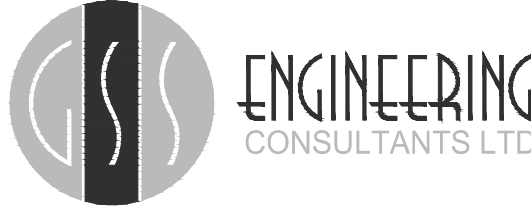
LEGEND

- EL ELEVATION
- WL WATER LEVEL
- EXISTING 25mm Ø WATERMAIN
- EXISTING 50mm Ø WATERMAIN
- EXISTING 100mm Ø WATERMAIN
- EXISTING 150mm Ø WATERMAIN
- EXISTING 200mm Ø WATERMAIN
- EXISTING 250mm Ø WATERMAIN
- EXISTING 300mm Ø WATERMAIN
- EXISTING 350mm Ø WATERMAIN
- PLANNED WATERMAIN UPGRADE
- UPPER TIER

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Telephone: (519) 372-4828

Title:
**PLANNED WATERMAIN
UPGRADES
WARTON
WATER SYSTEM ANALYSIS**

Client: TOWN OF SOUTH BRUCE PENINSULA

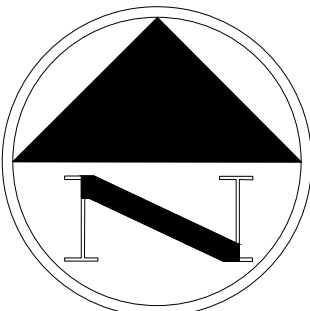
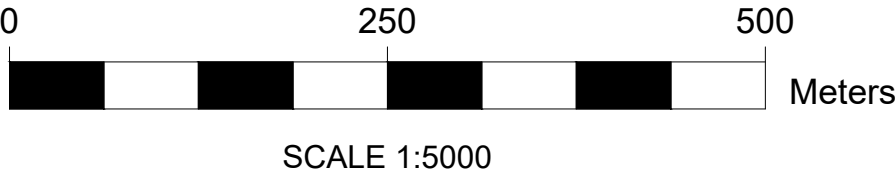
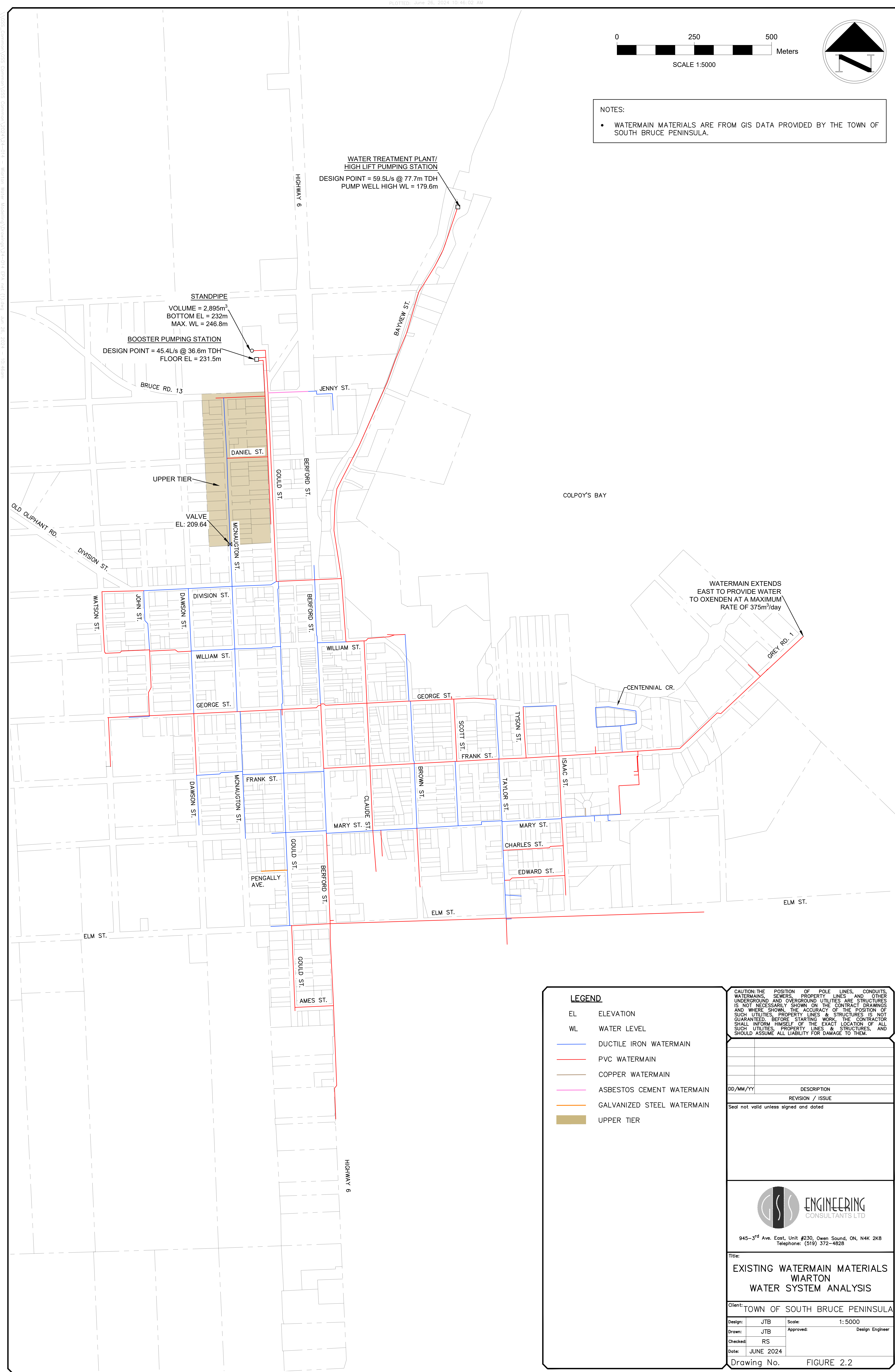
Design:	JTB	Scale:	1:5000
Drawn:	JTB	Approved:	Design Engineer
Checked:	RS		
Date:	JUNE 2024		

Drawing No. FIGURE 2.1

TABLE 2.2

**Watermain Materials and Lengths
Warton Water Servicing System**

Watermain Material	Total Length of Watermain (m)
PVC	13,703
Ductile Iron	8,544
Asbestos Cement	136
Galvanized Steel	68
Copper	23
Total	22,474



- NOTES:
- WATERMAIN MATERIALS ARE FROM GIS DATA PROVIDED BY THE TOWN OF SOUTH BRUCE PENINSULA.

- LEGEND**
- EL ELEVATION
WL WATER LEVEL
- DUCTILE IRON WATERMAIN
PVC WATERMAIN
COPPER WATERMAIN
ASBESTOS CEMENT WATERMAIN
GALVANIZED STEEL WATERMAIN
UPPER TIER

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Telephone: (519) 372-4828

Title:
**EXISTING WATERMAIN MATERIALS
WIARTON
WATER SYSTEM ANALYSIS**

Client: TOWN OF SOUTH BRUCE PENINSULA

Design:	JTB	Scale:	1:5000
Drawn:	JTB	Approved:	Design Engineer
Checked:	RS		
Date:	JUNE 2024		

Drawing No. FIGURE 2.2

2.4 Upper Tier / Booster Pumping Station

Given the large difference in elevation between the high northwest end of the water system (220.00 m) and the low portions of the system near the bay (176.00 m), there is complexity in providing water to the entirety of the Wiarton at an adequate pressure (between 40 – 100 psi). The upper tier portion in the northwest of Wiarton (portions of Jenny St., Daniel St., McNaughton St., and Gould St.) is serviced via a booster pumping station which draws water from the standpipe. The upper tier service area (shaded in light brown) and booster pumping station are shown on **Figure 2.1** and **2.2**.

As per the 2015 MSP, the booster pumping station contains 4 pumps (3 + 1). The smallest pump handles average day demand and the other three (2 + 1) handle higher peak and fire flow demands. The booster pumping station has a rated capacity of 45.4 L/s (3,920 m³/day) at 36.6 m TDH (52 psi).

2.5 Connection to Oxenden Water System

The Town has an agreement with the Township of Georgian Bluffs to provide water to the Oxenden water system via a connection to the Wiarton water system on Grey Road 1. Oxenden is a relatively small community approximately 4.5 km north-east of Wiarton along the shore of Georgian Bay. A maximum of 375 m³/day is to be provided to Oxenden.

3 ANTICIPATED WATERMAIN SYSTEM UPGRADES

The Town has planned a few watermain upgrades to be completed in the near future. The planned upgrades as provided by the Town have been included in the water system analysis. These upgrades are shown as highlighted in yellow on **Figure 2.1**.

4 MODELLING METHODOLOGY

EPA^{net} 2.2 software was used to model and evaluate the water system. The water system was evaluated for its ability to provide maximum day demand, peak hour demand and fire flow demands.

The pipe network, including watermain sizes and lengths, was modelled in accordance with **Figure 2.1**, derived from GIS data and planned upgrades provided by the Town. All watermains were assumed to be at an elevation 1.8 m (approximately 6 ft) below ground as determined from LiDAR topography data depicted on **Figure 1.1**.

For the purposes of modelling the water system, the water demand was split among 95 locations (referred to as junctions). These junction locations are shown on **Figure 4.1** overleaf. The water demand assigned to each junction is discussed in **Section 4.1** below.

4.1 Maximum Day, Peak Hour, and Fire Flow Demands

For the purposes of modelling, a worst-case future scenario in which maximum day demand is equal to the rated capacity of the high lift pumping station was assumed (maximum day demand = 5,140 m³/day). This was assumed as the worst-case scenario as a water treatment plant upgrade would be required to service a demand greater than 5,140 m³/day and this upgrade is not foreseen at this time. Peak hour demand was estimated to be 3 times the maximum day demand (peak hour demand = 642.5 m³/hour). The maximum day and peak hour demands must be provided at a pressure between 40 psi and 100 psi to be considered adequate. However, it is noted that some residential appliances (such as water heaters) are only rated up to 90 psi.

The fire flow, max day, and peak hour demand for each junction was based on the type of buildings in the vicinity of said junction. The fire flow demands from the 2015 MSP were used (37 L/s, 75 L/s, and 120 L/s); however, a greater fire flow classification (200 L/s) was assumed necessary to evaluate fire flows for large commercial/ industrial buildings or a grouping of commercial/industrial buildings (200 L/s). To be considered adequate, the fire flow must be available at each junction and a minimum pressure of 20 psi should be available throughout the water system. However, in existing distribution systems, 20 psi may not be achievable and therefore a 5 psi pressure can be used to avoid negative system pressure which may otherwise lead to water contamination. **Table 4.1** overleaf provides the demand classifications and **Figure 4.1** shows the classification given to each junction. For convenience it may be noted that water demand classification is colour coded.

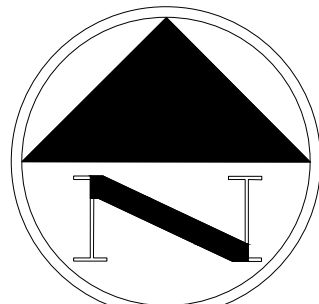
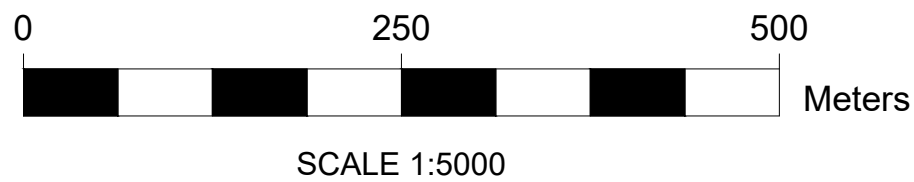
The demand for two junctions (J-18 and J-73) was not based on the aforementioned junction classifications. Junction 18 represents the connection between the water system and the Oxenden water system. This junction was given the maximum day demand of 375 m³/day (as per the agreement between the Town of South Bruce Peninsula and Township of Georgian Bluffs). Junction 73 represents anticipated development in the southwest of Warton. It is assumed that the anticipated development will include approximately 120 equivalent residential units (ERU) and therefore the maximum day demand for this node is assumed to be 120 m³/day (1 m³/day per ERU). The available fire flow for junction 73 is evaluated in **Section 5.4**.

4.2 Friction Factors and Pressure Testing

The watermains were modelled with friction factors (C-factor) in accordance with the *Warton South End Servicing Technical Memorandum No.1* prepared by BM Ross in 2016, as shown in **Table 4.2**.

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PLOTTED: June 26, 2024 10:46:16 AM



NOTES:

- ALL WATERMAIN JUNCTION ELEVATIONS ARE ASSUMED TO BE 1.8m (6ft) BELOW GROUND ELEVATION AS DERIVED FROM LIDAR TOPOGRAPHY DATA.
- MAXIMUM DAY DEMAND FOR THE SYSTEM IS ASSUMED TO BE THE RATED CAPACITY OF THE HIGH LIFT PUMPS (5,140m³/DAY) AND PEAK HOUR DEMAND IS ASSUMED TO BE THREE TIMES THE MAXIMUM DAY DEMAND.

WATER TREATMENT PLANT/
HIGH LIFT PUMPING STATION
DESIGN POINT = 59.5L/s @ 77.7m TDH
PUMP WELL HIGH WL = 179.6m

STANDPIPE
VOLUME = 2,895m³
BOTTOM EL = 232m
MAX. WL = 246.8m

BOOSTER PUMPING STATION
DESIGN POINT = 45.4L/s @ 36.6m TDH
FLOOR EL = 231.5m

UPPER TIER

VALVE
EL: 209.64

WATERMAIN EXTENDS
EAST TO PROVIDE WATER
TO OXENDEN AT A MAXIMUM
RATE OF 375m³/day

J-18
EL: 186.58
MAX. DAY =
375m³/DAY

LEGEND

- WATERMAIN
■ UPPER TIER
EL ELEVATION
WL WATER LEVEL

MODELLING JUNCTIONS

- SINGLE FAMILY HOME
FIRE FLOW = 37L/s
MAX. DAY DEMAND = 21.5m³/DAY
PEAK HOUR DEMAND = 2.69m³/HOUR

LARGE MULTI-FAMILY HOME
FIRE FLOW = 75L/s
MAX. DAY DEMAND = 43.0m³/DAY
PEAK HOUR DEMAND = 5.38m³/HOUR

COMMERCIAL/INDUSTRIAL BUILDING
FIRE FLOW = 120L/s
MAX. DAY DEMAND = 64.5m³/DAY
PEAK HOUR DEMAND = 8.10m³/HOUR

LARGE COMMERCIAL/INDUSTRIAL
BUILDING OR GROUPING
FIRE FLOW = 200L/s
MAX. DAY DEMAND = 86.0m³/DAY
PEAK HOUR DEMAND = 10.75m³/HOUR

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REVISION / ISSUE

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945-3rd Ave. East, Unit #230, Owen Sound, ON, N4K 2K8
Telephone: (519) 372-4828

Title:
WATER DEMAND (CLASSIFICATION)
LOCATION PLAN
WATER SYSTEM
WIARTON

Client: TOWN OF SOUTH BRUCE PENINSULA

Design: JTB Scale: 1:5000
Drawn: JTB Approved: Design Engineer
Checked: RS
Date: JUNE 2024

Drawing No. FIGURE 4.1

Since the friction factors are estimated based on general watermain size, this may introduce error in the modelling results. As watermains age, especially iron watermains, they tend to develop mineral and sediment deposits. These deposits increase friction and decrease hydraulic capacity. Hydrant flow testing by Town, will help in estimating friction factors more accurately and in calibration of the model.

4.3 Water Standpipe Levels

Municipal water systems must provide treated water storage for: fire storage, equalization storage and emergency storage.

The volume required for equalization, fire, and emergency storage in Warton (and subsequent water levels) were determined using the Ministry of Environment's *Design Guidelines for Drinking-Water Systems*, 2008 and the water demands outlined in **Section 4.1**.

The equalization storage for Warton is estimated to be 1,285 m³, with a minimum water level of 240.25 m.

The required fire storage for Warton is estimated as 1,440 m³, with a minimum water level of 232.95 m.

The required emergency storage is estimated as 681 m³. Given the required equalization storage and fire storage (1,285 m³ + 1,440 m³ = 2,725 m³), the water standpipe (2,895 m³ capacity) is not large enough to provide sufficient emergency storage for the future maximum day demand of 5,140 m³/day. It is possible that some equalization storage is available in clear wells at the water treatment plant. There is a need to obtain and review the design report for the water treatment plant. For modelling, the minimum equalization water level of 240.25 m was adopted, and the minimum fire water level of 232.95 m was adopted.

Detail A on **Figures 5.1** and **5.2** provides an elevation view of the water standpipe, highlighting operating water levels.

TABLE 4.1

**Water Demand Classifications
Warton Water Servicing System**

Building Type	Fire Flow Demand (L/s)	Maximum Day Demand (m³/day)	Peak Hour Demand (m³/hour)	Amount of Junctions
Single Family Home	37	21.5	2.7	38
Large or Multi-Family Home	75	43.0	5.4	12
Commercial/Industrial Building	120	64.5	8.1	18
Large Commercial/Industrial Building or Grouping	200	86.0	10.8	25

TABLE 4.2

**Watermain Friction Factors (C-Factor)
Warton Water Servicing System**

Water Main Diameter (mm)	Friction Factor (C-Factor)
150 or less	90
200-250	100
300 or more	110

5 MODELLING RESULTS

The system was evaluated for maximum day demand, peak hour demand, and fire flow demands following the methodology outlined in **Section 4**. The results are outlined in **Section 5.1 – 5.3** below. As noted in a previous section, modelling results relating to watermain sizes of an area of anticipated development in the southwest portion are also included in this section.

5.1 Maximum Day Demand Scenario

The water system was evaluated for the maximum day demand as depicted on **Figure 4.1**. Two scenarios were analyzed: high-lift pumps turned off (water system solely fed from the standpipe) and high-lift pumps turned on. Both scenarios considered the standpipe water level to be at the bottom of equalization storage (WL: 240.25 m).

Adequate pressure for maximum day demand is between 40 psi and 100 psi.
With the high-lift pumps off:

- 91 of 95 junctions experience adequate pressure.
- 4 locations experience < 40 psi pressure.
- These 4 locations are at a high ground elevation (> 210.0 m), thereby implying the need to expand the upper tier of the water system, if possible.

Modelling results for the maximum day demand scenario with the high-lift pumps off are shown on **Figure 5.1** and detailed results are on **Table 5.1a** in **Appendix B**. The results in **Figure 5.1** indicate the pressure available at a junction for the water demand scenario.

With the high-lift pumps on:

- 91 of 95 junctions experience adequate pressure.
- 1 location experiences < 40 psi pressure. This location is on the suction side of the booster pumping station and does not service any residences.
- 3 locations experience > 100 psi pressure. These are at low ground elevations < 176.15 m.
- 30 locations (ground elevations < 183.0 m), experience > 90 psi pressure. As indicated earlier, low areas should potentially be isolated with PRVs (pressure reducing valves).

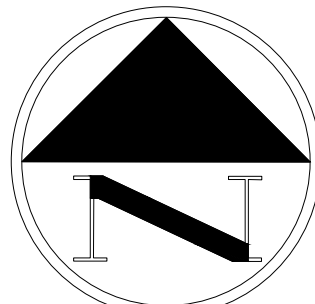
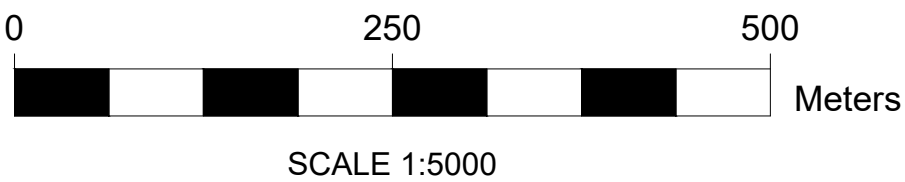
Modelling results for the maximum day demand scenario with the high-lift pumps turned on are shown on **Figure 5.1** and detailed results are on **Table 5.1b** in **Appendix B**.

5.2 Peak Hour Demand Scenario

The water system was also evaluated for the peak hour demand as per **Figure 4.2**. For this scenario, it was assumed that the high lift pumps are on and the water level in the standpipe is at the bottom of the equalization storage (240.25 m).

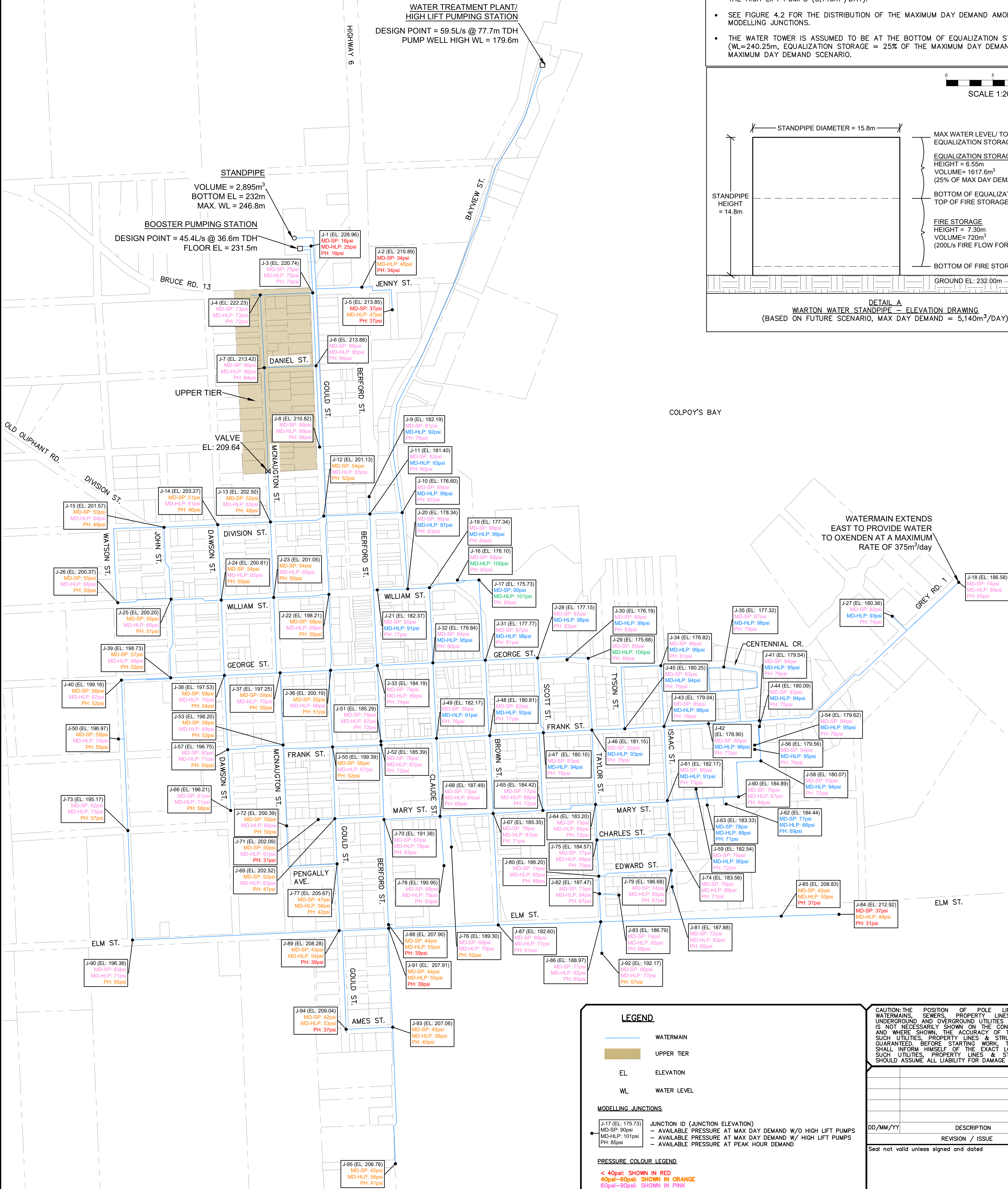
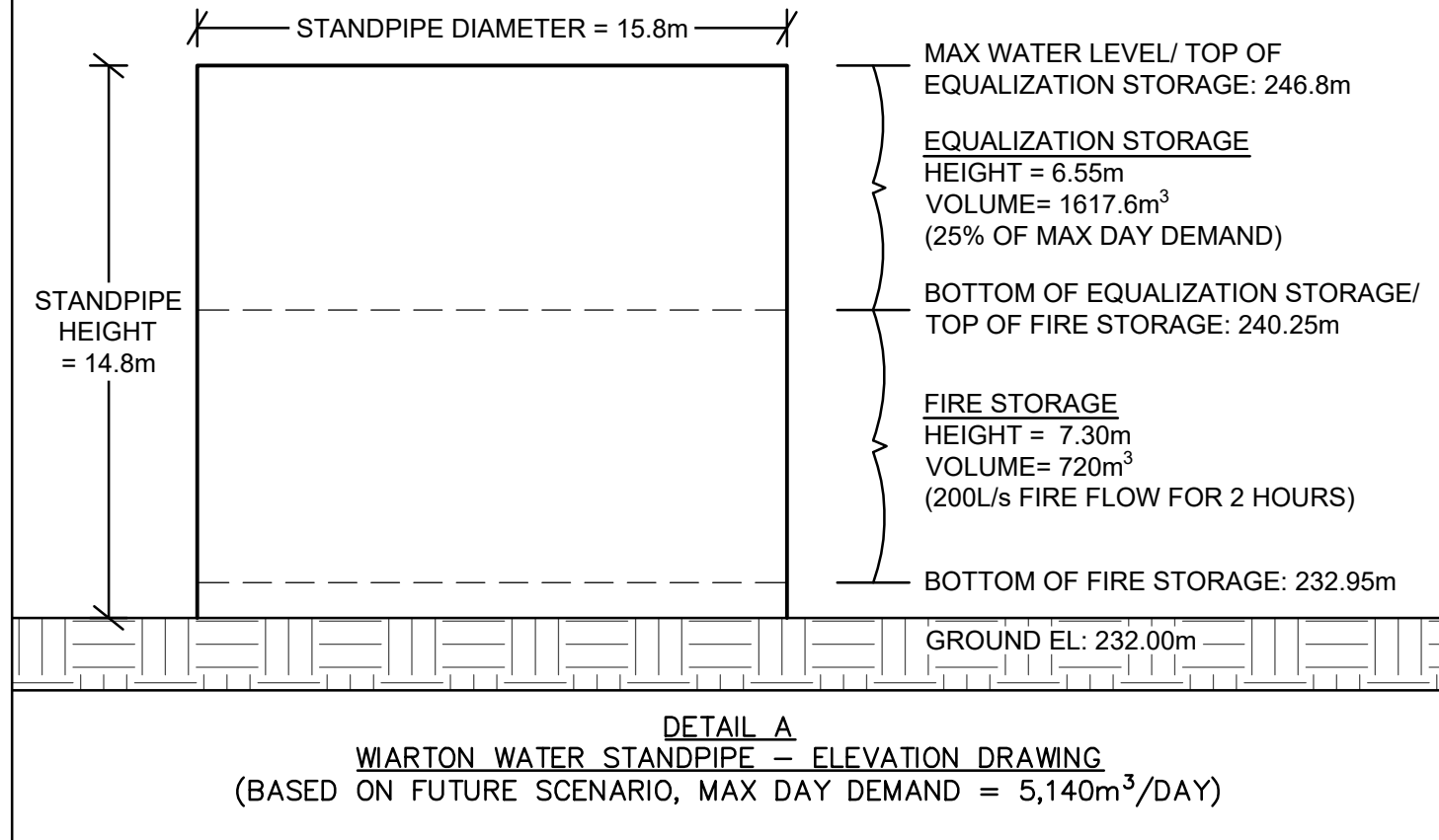
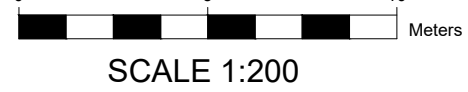
Similar to the maximum day demand scenarios discussed in **Section 5.1**, adequate pressure for the peak hour demand is between 40 psi and 100 psi.

- 85 of 95 locations experience adequate pressure.
- 10 locations experience < 40 psi pressure.
- 9 of the 10 locations are at a high ground elevation (> 207.5 m), thereby implying the need to expand the upper tier of the water system, if possible.
- 1 location with inadequate pressure is fed from a 25 mm diameter watermain.



NOTES:

- ALL WATERMAIN JUNCTION ELEVATIONS ARE ASSUMED TO BE 1.8m (6ft) BELOW GROUND ELEVATION AS DERIVED FROM LIDAR TOPOGRAPHY DATA.
- MAXIMUM DAY DEMAND FOR THE SYSTEM IS ASSUMED TO BE THE RATED CAPACITY OF THE HIGH LIFT PUMPS (5,140m³/DAY).
- SEE FIGURE 4.2 FOR THE DISTRIBUTION OF THE MAXIMUM DAY DEMAND AMONG THE MODELLING JUNCTIONS.
- THE WATER TOWER IS ASSUMED TO BE AT THE BOTTOM OF EQUALIZATION STORAGE (WL=240.25m, EQUALIZATION STORAGE = 25% OF THE MAXIMUM DAY DEMAND) FOR THE MAXIMUM DAY DEMAND SCENARIO.



LEGEND

- WATERMAIN
- UPPER TIER
- EL ELEVATION
- WL WATER LEVEL

MODELLING JUNCTIONS

- J-17 (EL: 175.73) MD-SP: 90psi MD-HLP: 101psi PH: 85psi
- JUNCTION ID (JUNCTION ELEVATION)
- AVAILABLE PRESSURE AT MAX DAY DEMAND W/O HIGH LIFT PUMPS
- AVAILABLE PRESSURE AT MAX DAY DEMAND W/ HIGH LIFT PUMPS
- AVAILABLE PRESSURE AT PEAK HOUR DEMAND

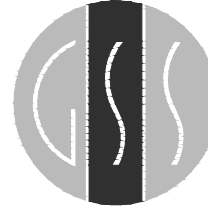
PRESSURE COLOUR LEGEND

- < 40psi: SHOWN IN RED
- 40psi-60psi: SHOWN IN ORANGE
- 60psi-90psi: SHOWN IN PINK
- 90psi-100psi: SHOWN IN BLUE
- > 100psi: SHOWN IN GREEN

CAUTION: THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS, PROPERTY LINES AND OTHER UNDERGROUND AND OVERGROUND UTILITIES ARE STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES, PROPERTY LINES & STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES, PROPERTY LINES & STRUCTURES, AND SHOULD ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

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 REVISION / ISSUE

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ENGINEERING
 CONSULTANTS LTD

945-3rd Ave. East, Unit #230, Owen Sound, ON, N4K 2K8
 Telephone: (519) 372-4828

Title:
 MAXIMUM DAY & PEAK HOUR
 DEMAND RESULTS
 WARTON
 WATER SYSTEM ANALYSIS

Client: TOWN OF SOUTH BRUCE PENINSULA

Design: JTB	Scale: 1:5000
Drawn: JTB	Approved: Design Engineer
Checked: RS	
Date: JUNE 2024	

Drawing No. FIGURE 5.1

As mentioned, the modelling of maximum day and peak hour demand implies the need to expand the upper tier and isolate low areas with PRVs. The potential areas for expansion and isolation are shown on **Figure 5.2**. Further study is required to determine the most efficient way to isolate portions of the system. Modelling results for the peak hour demand scenario are shown on **Figure 5.1** overleaf and detailed results are on **Table 5.1c** in **Appendix B**.

5.3 Fire Flow Demand Scenario

The water system was analyzed for providing target fire flows in accordance with **Section 4**. For locations that do not receive the target fire flow, the minimum fire flow was determined.

- 55 of 95 locations experience adequate pressure at different target fire flow.
- 26 locations experience < 5 psi pressure, which is undesirable.
- 7 locations experience 5 psi – 20 psi pressure.
- 86 of 95 locations experience adequate pressure at minimum fire flow (37 L/s).
- The 9 locations that cannot receive minimum fire flow are at a high ground elevation or are fed from a small watermain (< 100 mm diameter).

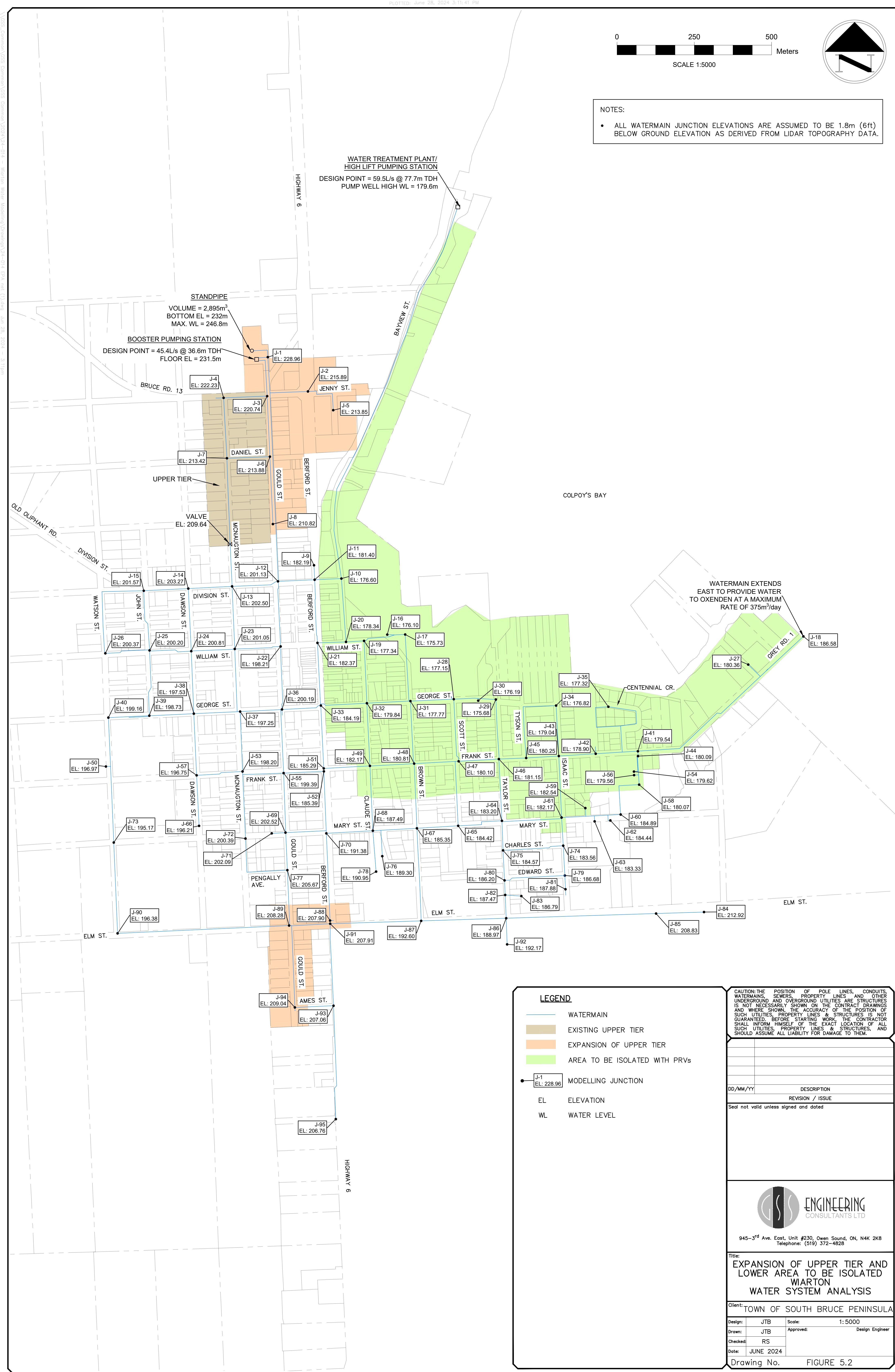
Modelling results for the fire flow demand scenarios are shown on **Figure 5.3** overleaf and detailed results are on **Table 5.2** in **Appendix B**.

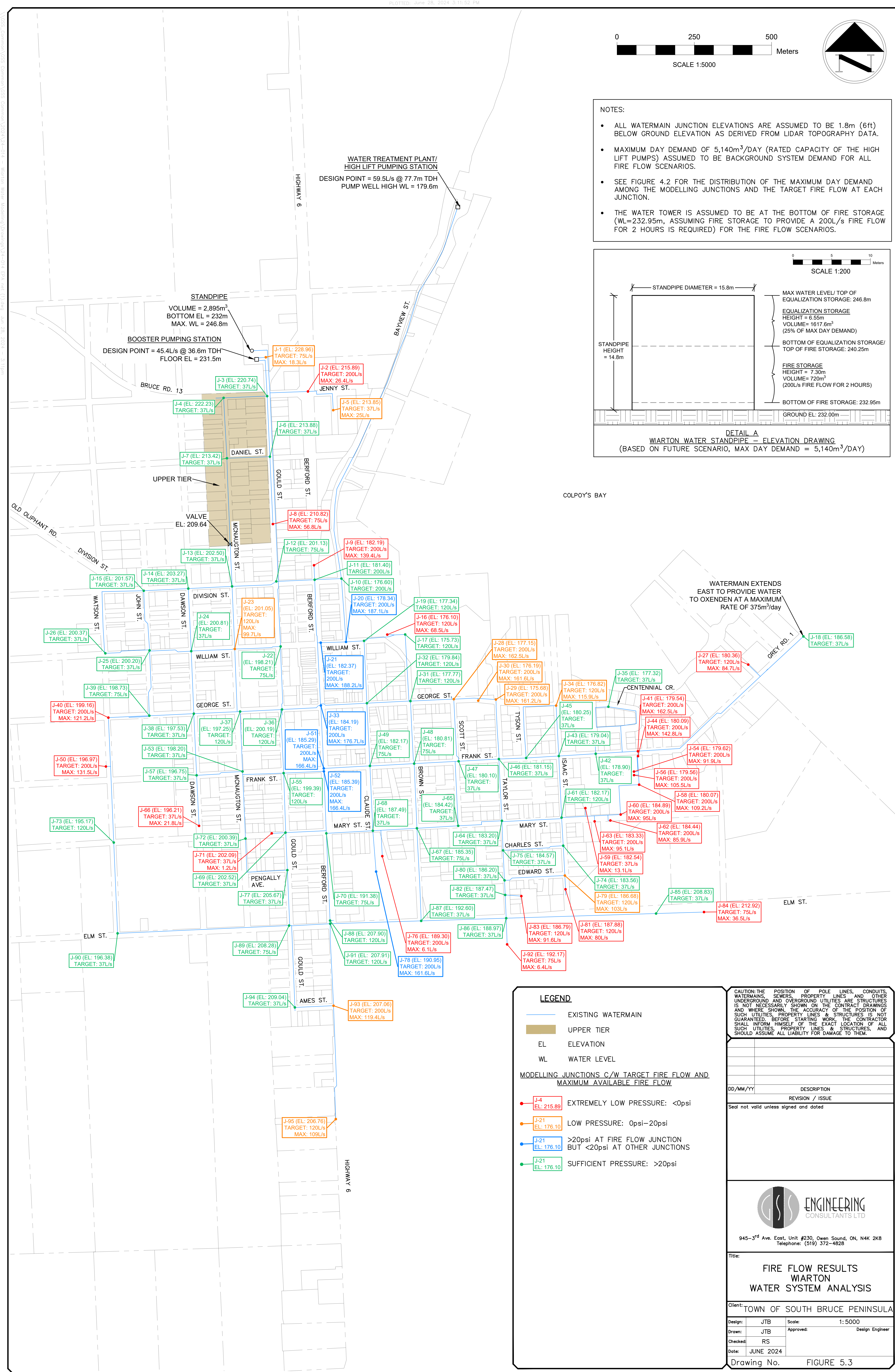
5.4 Watermain Sizing to Support Southwest Development

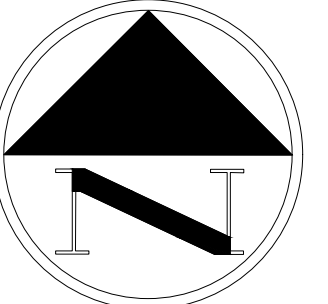
The Town anticipates development in the southwest portion of Warton. To support said development a new watermain loop is required. This watermain loop is highlighted in yellow, on **Figure 5.4** overleaf. In the water system model the target development is represented by junction 73.

The water demands that can be achieved at junction 73 were evaluated for three different watermain loop sizes: 200 mm, 250 mm, and 300 mm diameter. See **Table 5.3** overleaf for the results of this analysis.

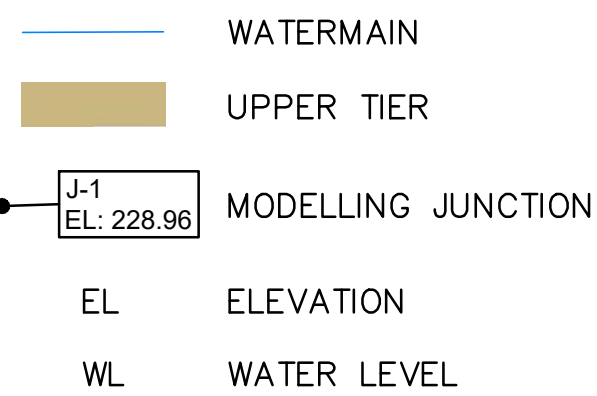
As per **Table 5.3** the size of the watermain loop has no effect on pressures for the maximum day demand or the peak hour demand. A 250 mm diameter watermain loop would provide 127 L/s fire flow for the proposed development. This is sufficient for the anticipated residential development. However, a 300 mm diameter watermain loop was considered to aid in servicing potential further development of the southwest portion of Warton.







- ALL WATERMAIN JUNCTION ELEVATIONS ARE ASSUMED TO BE 1.8m (6ft) BELOW GROUND ELEVATION AS DERIVED FROM LIDAR TOPOGRAPHY DATA.



Drawing No. FIGURE 5.4

6 CONCLUSIONS

- 1) The water system was modelled using EPAnet 2.2 software and was evaluated for the maximum day, peak hour, and fire flow demands. For modelling, the water system was divided into 95 locations (referred to as junctions) and water demand was allocated to each junction based on the surrounding buildings.
- 2) The majority of the water system was modelled based on existing conditions. Some select watermain upgrades planned in the near future (as per the Town) were incorporated into the model.
- 3) Without pressure or hydrant flow testing records, the watermains were modelled with assumed friction factors based on size. This may introduce error into the model especially due to older iron watermains that are more likely to develop sediment and mineral deposits.
- 4) The maximum day demand for Warton was assumed to be the capacity of the high lift pumps (5,140 m³/day) and the peak hour demand was assumed as three times the maximum day demand (642.5 m³/day). A fire flow demand was assigned to each junction depending on surrounding buildings (single family home = 37 L/s, multi-family home = 75 L/s, commercial/industrial building = 120 L/s, large commercial/industrial building or complex = 200 L/s).
- 5) Per modelling results, 91 of 95 junctions provide maximum day demand at adequate pressure. With the high lift pumps on, 3 low ground elevations junctions (16, 17, 29) provide unsafe pressure over 100 psi. With the high lift pumps off, 4 high ground elevation junctions provide insufficient pressure less than 40 psi (1, 2, 5, 84).
- 6) Modelling results indicate that 85 of 95 junctions provide peak hour demand at adequate pressure. The 10 remaining junctions provide less than 40 psi as they are at a relatively high ground elevation. There is a need to improve pressure by transferring them to upper tier distribution system.
- 7) Only 55 of 95 junctions provide target fire flow at an adequate pressure. However, 86 of the 95 junctions can provide a fire flow of 37 L/s. The locations that do not provide 37 L/s are at relatively high elevation or are fed from a 100 mm diameter or less un-looped watermain.

7 RECOMMENDATIONS

The following summarizes the interim recommendations:

- 1) The operations and maintenance manual for the water treatment plant should be located and provided to locate high lift pump (HLP) curves. The HLP curves will help refine the pumping station in the model.
- 2) Hydrant flow testing at select locations throughout the water distribution system should be completed to calibrate the model. Testing should also focus on areas with a high density of iron watermain.
- 3) The upper tier should be considered for expansion, to service all high-elevations areas in which maximum day, peak hour, and fire flow demands are not provided at the minimum required pressure. Further, the low elevation areas of the water system that are at risk of unsafe pressures (>100 psi) should be isolated with PRVs. PRVs could be installed on individual services or to isolate a section of watermain. The expanded upper tier and the low elevation areas are shown on **Figure 5.2**. Further study is recommended to determine the most efficient pressure zones for Warton.
- 4) To improve fire flow pressure to select areas, all un-looped watermain, 100 mm diameter or less, should be upsized and looped.
- 5) It is recommended that the watermain loop to support development in the southwest of Warton (highlighted on **Figure 5.3**) be sized at 300 mm diameter.

If you have any questions regarding this correspondence, please contact the undersigned.

Sincerely,

GSS ENGINEERING CONSULTANTS LTD.



Jacob Bartley, E.I.T.



Rakesh Sharma, P. Eng.
Designated Consulting Engineer

JB/RS/nc

APPENDIX A

High-Lift Pumping Station
Approximate Pump Curve

Item Number / Tags	: Default	Size	: 12M-SS
Service	:	Stages	: 3
Quantity	: 1	Based on curve number	: 12_TURB_2160_1800_SS Rev 180719
Quote number	:	Date last saved	: 21 Mar 2024 8:27 AM

Operating Conditions

Flow, rated	: 59.50 l/s
Head, rated (requested)	: 77.70 m
Head, rated (actual)	: 77.71 m
Suction pressure, rated / max	: 0.00 / 0.00 psi.g
NPSH available	: Ample
Site Supply Frequency	: 60 Hz

Performance

Speed criteria	: Synchronous
Speed	: 1770 rpm
Impeller dia.	: 9.07 in
Impeller diameter, maximum	: 9.16 in
Impeller diameter, minimum	: 7.75 in
Efficiency (bowl / pump)	: 79.86 / 79.36 %
NPSH required / margin required	: 16.07 / 0.00 ft
nq (imp. eye flow) / S (imp. eye flow)	: 42 / 136 Metric units
Minimum Continuous Stable Flow	: 42.17 l/s
Head max.	: 90.98 m
Head rise to shutoff (bowl / pump)	: 16.48 / 16.74 %
Flow, best eff. point (bowl / pump)	: 69.26 / 68.94 l/s
Flow ratio, rated / BEP (bowl / pump)	: 85.91 / 86.30 %
Diameter ratio (rated / max)	: 99.02 %
Head ratio (rated dia / max dia)	: 97.71 %
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
Selection status	: Acceptable

Liquid

Liquid type	: Water
Additional liquid description	:
Solids diameter, max	: 0.00 in
Solids size limit	: 0.94 in
Solids concentration, by volume	: 0.00 %
Temperature	: 68.00 deg F
Fluid density	: 1.000 / 1.000 SG
Viscosity	: 1.00 cP
Vapor pressure, rated	: 0.34 psi.a

Material

Material selected	: Cast Iron bowl Std impeller
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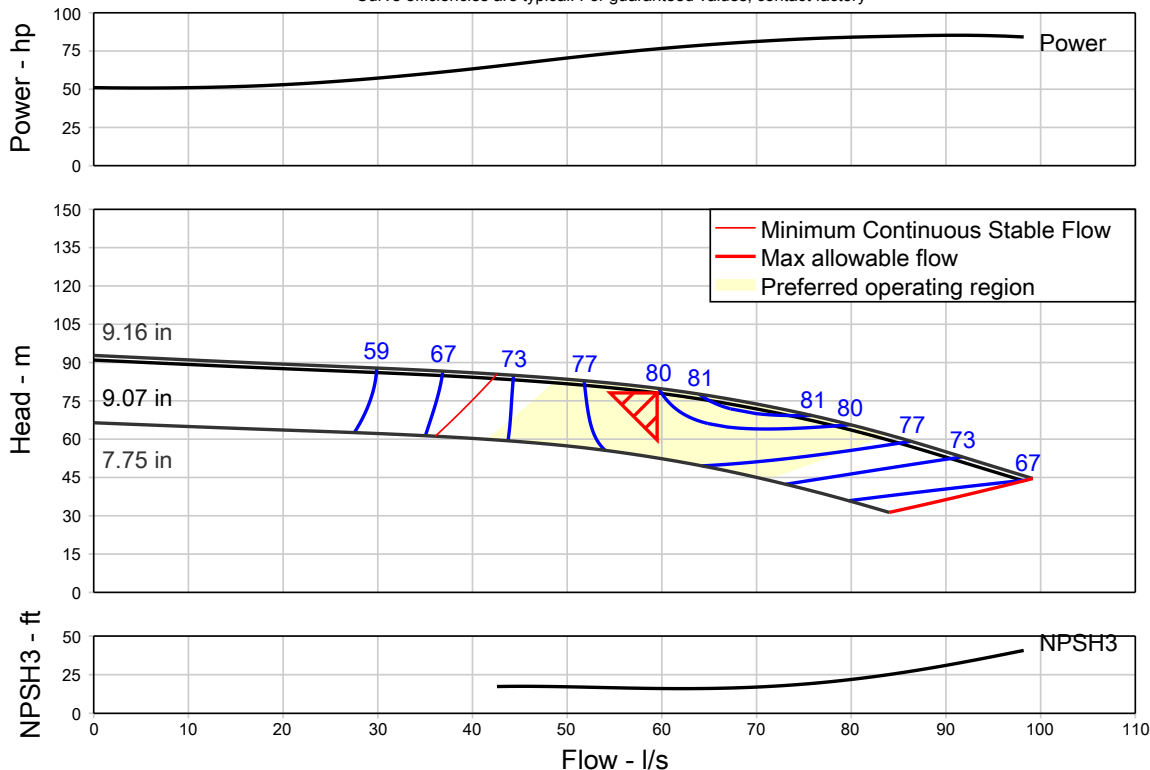
Pressure Data

Maximum working pressure	: See the Additional Data page
Maximum allowable working pressure	: See the Additional Data page
Maximum allowable suction pressure	: N/A
Hydrostatic test pressure	: See the Additional Data page

Driver & Power Data (@Max density)

Driver sizing specification	: Maximum power
Margin over specification	: 0.00 %
Service factor	: 1.00
Power, hydraulic	: 61.01 hp
Power (bowl / pump)	: 76.40 / 76.71 hp
Power, maximum	: 85.62 hp
Motor rating	: 100 hp / 74.57 kW

Bowl performance. Adjusted for construction and viscosity.
The duty point represents the head at the bowl.
Curve efficiencies are typical. For guaranteed values, contact factory



APPENDIX B

Detailed Modelling Results Tables

TABLE 5.2 Fire Flow Modelling Results (C/W 5,140 m³/day Max. Day Background Demand) Water Tower Level = 232.95m (Bottom of Fire Storage) Warton Water System											24-014
Junction ID	Location	Elevation (m)	Max. Day Demand (m³/day)	Maximum Fire Flow*		Target Fire Flow		Pressure (m)	Pressure at Target Fire Flow (psi)	Junctions Below 20 psi During Target Fire Flow	
				L/s	igpm	L/s	igpm				
1	At the booster pumping station	228.96	43.0	18.3	241.7	75	990	3.93	5.59	1	
2	Intersection of Jenny St. and Berford St.	215.89	86.0	26.4	348.4	200	2640	-160.14	-227.72	1, 2, 5	
3	Intersection of Bruce Rd. 13 and Gould St.	220.74	21.5	37.0	488.3	37	490	43.48	61.83	-	
4	Intersection of Bruce Rd. 13 and McNaughton St.	222.23	21.5	37.0	488.3	37	490	40.76	57.96	-	
5	East end of Jenny St.	213.85	21.5	25.0	330.2	37	490	2.5	3.56	1, 2, 5	
6	Intersection of Daniel St. and Gould St.	213.88	21.5	37.0	488.3	37	490	45.9	65.27	-	
7	Intersection of Daniel St. and McNaughton St.	213.42	21.5	37.0	488.3	37	490	46.22	65.72	-	
8	On Gould St. between Daniel St. and Division St.	210.82	43.0	56.8	749.1	75	990	-18.42	-26.19	8	
9	On Berford St. north of Division St.	182.19	86.0	139.4	1839.8	200	2640	-21.54	-30.63	1, 9, 84	
10	Intersection of Division St. and Bayview St.	176.60	86.0	200.0	2639.4	200	2640	47.09	66.96	1, 84	
11	Intersection of Division St. and Berford St.	181.40	86.0	200.0	2639.4	200	2640	42.59	60.56	1, 84	
12	Intersection of Division St. and Gould St.	201.13	43.0	75.0	989.7	75	990	30.94	31.08	1	
13	Intersection of Division St. and McNaughton St.	202.50	21.5	37.0	488.3	37	490	28.11	39.97	1	
14	Intersection of Division St. and Dawson St.	203.27	21.5	37.0	488.3	37	490	26.28	37.37	1	
15	Intersection of Division St. and John St.	201.57	21.5	37.0	488.3	37	490	26.82	38.14	1	
16	William St. between Claude St. and Brown St.	176.10	64.5	68.5	904.4	120	1585	-62.61	-89.03	1, 16	
17	Intersection of William St. and Brown St.	175.73	64.5	120.0	1583.7	120	1585	25.84	36.74	1	
18	East extent of system on Grey Rd. 1	186.58	375.00	37.0	488.4	37	490	39.1	55.60	1	
19	Intersection of William St. and Claude St.	177.24	64.5	120.0	1583.7	120	1585	50.98	72.49	1	
20	Intersection of William St. and Bayview St.	178.34	86.0	187.1	2469.1	200	2640	42.4	60.29	1, 84, 85, 88, 89, 91, 94	
21	Intersection of William St. and Berford St.	182.37	86.0	188.2	2484.4	200	2640	16.33	23.22	1, 84, 85, 88, 89, 91, 94	
22	Intersection of William St. and Gould St.	198.21	43.0	75.0	989.7	75	990	31.11	44.24	1	
23	Intersection of William St. and McNaughton St.	201.05	64.5	99.7	1316.1	120	1585	6.8	9.67	1, 23	
24	Intersection of William St. and Dawson St.	200.81	21.5	37.0	488.3	37	490	29.02	41.27	1	
25	Intersection of William St. and John St.	200.20	21.5	37.0	488.3	37	490	29.17	41.48	1	
26	Intersection of William St. and Watson St.	200.37	21.5	37.0	488.3	37	490	25.66	36.49	1	
27	Along Grey Rd. 1, east of Centennial Cr.	180.36	64.5	84.7	1118.2	120	1585	-18.52	-26.34	1, 18, 27, 84	
28	Intersection of George St. and Scott St.	177.15	86.0	162.5	2145.3	200	2640	12.61	17.93	1, 28, 84, 85, 88, 89, 91, 93, 94, 95	
29	Intersection of George St. and Taylor St.	175.68	86.0	161.2	2127.0	200	2640	1.34	1.91	1, 29, 30, 84, 85, 88, 89, 91, 93, 94, 95	
30	On George St. between Scott St. and Taylor St.	176.19	86.0	161.6	2133.1	200	2640	5.5	7.82	1, 29, 30, 84, 85, 88, 89, 91, 93, 94, 95	
31	Intersection of George St. and Brown St.	177.77	64.5	120.0	1583.7	120	1585	39.23	55.79	1	
32	Intersection of George St. and Claude St.	179.84	64.5	120.0	1583.7	120	1585	48.01	68.27	1	
33	Intersection of George St. and Berford St.	184.19	86.0	176.7	2331.6	200	2640	36	51.19	1, 84, 85, 88, 89, 91, 93, 94, 95	
34	Intersection of George St. and Isaac St.	176.82	64.5	115.9	1529.9	120	1585	11.44	16.27	1, 34	
35	North end of Centennial Cr.	177.32	21.5	37.0	488.3	37	490	43.91	62.44	1	
36	Intersection of George St. and Gould St.	200.19	64.5	120.0	1583.7	120	1585	25.47	36.22	1	
37	Intersection of George St. and McNaughton St.	197.25	64.5	120.0	1583.7	120	1585	17.8	25.31	1	
38	Intersection of George St. and Dawson St.	197.53	21.5	37.0	488.3	37	490	32.93	46.83	1	
39	Intersection of George St. and John St.	198.73	43.0	75.0	989.7	75	990	25.83	36.73	1	
40	Intersection of George St. and Watson St.	199.16	86.0	121.2	1600.0	200	2640	-15.57	-22.14	1, 13, 14, 15, 24, 25, 26, 38, 39, 40, 50, 57, 66, 73, 77, 84, 85, 88, 89, 90, 91, 93, 94, 95	
41	On Frank St. adjacent to "Gateway Haven"	179.54	86.0	162.5	2145.3	200	2640	-3.12	-4.44	1, 18, 27, 35, 41, 42, 44, 54, 56, 58, 59, 60, 62, 63, 77, 84, 85, 88, 89, 91, 93, 94, 95	
42	On Frank St. between Isaac St. and Centennial Cr.	178.90	21.5	37.0	488.3	37	490	50.8	72.24	1	
43	Intersection of Frank St. and Isaac St.	179.04	21.5	37.0	488.3	37	490	51.24	72.86	1	
44	At "Gateway Haven" Long Term Care Facility	180.09	86.0	142.8	1884.8	200	2640	-17.21	-24.47	1, 18, 27, 35, 41, 42, 44, 54, 56, 58, 59, 60, 62, 63, 77, 84, 85, 88, 89, 91, 93, 94, 95	
45	Intersection of Frank St. and Tyson St.	180.25	21.5	37.0	488.3	37	490	50.35	71.60	1	
46	Intersection of Frank St. and Taylor St.	181.15	21.5	37.0	488.3	37	490	49.85	70.89	1	
47	Intersection of Frank St. and Scott St.	180.10	21.5	37.0	488.3	37	490	51.26	72.89	1	
48	Intersection of Frank St. and Brown St.	180.81	43.0	75.0	989.7	75	990	48.66	69.19	1	
49	Intersection of Frank St. and Claude St.	182.17	43.0	75.0	989.7	75	990	48.38	68.80	1	
50	South end of Watson St. (Peninsula Shores District School)	196.97	86.0	131.5	1735.9	200	2640	-10.34	-14.70	1, 14, 15, 24, 25, 26, 39, 40, 50, 71, 73, 77, 84, 85, 88, 89, 90, 91, 93, 94, 95	
51	Intersection of Frank St. and Berford St.	185.29	86.0	166.4	2196.5	200	2640	33.06	47.01	1, 77, 84, 85, 88, 89, 91, 93, 94, 95	
52	Intersection of Frank St. and Berford St.	185.39	86.0	166.4	2196.5	200	2640	32.9	46.78	1, 77, 84, 85, 88, 89, 91, 93, 94, 95	
53	Intersection of Frank St. and McNaughton St.	198.20	21.5	37.0	488.3	37	490	29.85	42.45	1	
54	At "Gateway Haven" Long Term Care Facility	179.62	86.0	91.9	1213.5	200	2640	-104.26	-148.26	1, 18, 27, 35, 41, 42, 44, 54, 56, 58, 59, 60, 62, 63, 77, 84, 85, 88, 89, 91, 93, 94, 95	
55	Intersection of Frank St. and Gould St.	199.39	64.5	120.0	1583.7	120	1585	18.81	26.75	1	
56	At "Gateway Haven" Long Term Care Facility	179.56	86.0	105.5	1392.2	200	2640	-69.08	-98.23	1, 18, 27, 35, 41, 42, 44, 54, 56, 58, 59, 60, 62, 63, 77, 84, 85, 88, 89, 91, 93, 94, 95	
57	Intersection of Frank St. and Dawson St.	196.75	21.5	37.0	488.3	37	490	27.89	39.66	1	
58	At "Gateway Haven" Long Term Care Facility	180.07	86.0	109.2	1441.1	200	2640	-60.66	-86.26	1, 18, 27, 35, 41, 42, 44, 54, 56, 58, 59, 60, 61, 62, 63, 77, 81, 84, 85, 88, 89, 91, 93, 94, 95	
59	North end of Cordingley Cr.	182.54	21.5	13.1	172.4	37	490	-288.75	-410.60	1, 59	
60	East end of Mary St.	184.89	86.0	95.0	1253.2	200	2640	-79.6	-113.19	1, 18, 27, 41, 44, 54, 56, 58, 59, 60, 61, 62, 63, 77, 81, 84, 85, 88, 89, 93, 91, 94, 95	
61	Intersection of Mary St. and Isaac St.	182.17	64.5	120.0	1583.7	120	1585	28.27	40.20	1, 84	
62	At "Limpert Lodge" apartments on Mary St.	184.44	86.0	85.9	1134.1	200	2640	-106.78	-151.84	1, 18, 27, 44, 54, 56, 58, 59, 60, 61, 62, 63, 77, 79, 81, 84, 85, 88, 89, 91, 93, 94, 95	
63	Intersection of Mary St. and Cordingley Cr.	183.33	86.0	95.1	1254.7	200	2640	-84.5	-120.16	1, 18, 44, 54, 56, 58, 59, 60, 61, 62, 63, 74, 77, 79, 81, 84, 85, 88, 89, 91, 93, 94, 95	

<div> <div>TABLE 5.2</div> <div>Fire Flow Modelling Results (C/W 5,140 m³/day Max. Day Background Demand)</div> <div>Water Tower Level = 232.95m (Bottom of Fire Storage)</div> <div>Warton Water System</div> </div>										
June, 2024			24-014							
Junction ID	Location	Elevation (m)	Max. Day Demand (m ³ /day)	Maximum Fire Flow*		Target Fire Flow		Pressure (m)	Pressure at Target Fire Flow (psi)	Junctions Below 20 psi During Target Fire Flow
				L/s	igpm	L/s	igpm			
64	Intersection of Mary St. and Taylor St.	183.20	21.5	37.0	488.3	37	490	47.02	66.86	1
65	Intersection of Mary St. and Scott St.	184.42	21.5	37.0	488.3	37	490	45.95	65.34	1
66	South end of Dawson St.	196.21	21.5	21.8	288.0	37	490	-41.17	-58.54	1, 66
67	Intersection of Mary St. and Brown St.	185.35	43.0	75.0	989.7	75	990	44.29	62.98	1
68	Intersection of Mary St. and Claude St.	187.49	21.5	37.0	488.3	37	490	44.61	63.44	1
69	Intersection of Mary St. and Gould St.	202.52	21.5	37.0	488.3	37	490	26.93	38.29	1
70	Intersection of Mary St. and Berford St.	191.38	43.0	75.0	989.7	75	990	39.06	55.54	1
71	On Mary St. between McNaughton St. and Gould St.	202.09	21.5	1.2	15.4	37	490	-16686.87	-23728.73	1, 71
72	Intersection of Mary St. and McNaughton St.	200.39	21.5	37.0	488.3	37	490	27.24	38.74	1
73	Intersection of Mary St. and Watson St.	195.17	120.00	120.0	1583.8	120	1585	22.22	31.60	1
74	Intersection of Charles St. and Isaac St.	183.56	21.5	37.0	488.3	37	490	45.45	64.63	1
75	Intersection of Charles St. and Taylor St.	184.57	21.5	37.0	488.3	37	490	44.92	63.88	1
76	At Warton Hospital	189.30	86.0	6.1	80.5	200	2640	-23951.79	-34059.45	1, 76, 77, 84, 85, 88, 89, 91, 93, 94, 95
77	Intersection of Pengally Ave. and Gould St.	205.67	21.5	37.0	488.3	200	2640	23.76	33.79	1
78	South end of Claude St. at Warton Hospital	190.95	86.0	161.6	2133.1	200	2640	14.1	20.05	1, 77, 84, 85, 88, 89, 91, 93, 94, 95
79	Intersection of Edward St. and Isaac St.	186.68	64.5	103.0	1359.6	120	1585	5.54	7.88	1, 79, 81, 84
80	Intersection of Edward St. and Taylor St.	186.20	21.5	37.0	488.3	37	490	43.3	61.57	1
81	South end of Isaac St.	187.88	64.5	80.0	1056.4	120	1585	-19.04	-27.07	1, 79, 81, 84
82	On Taylor St. between Edward St. and Elm St.	187.47	21.5	37.0	488.3	37	490	42.08	59.84	1
83	East of Taylor St. between Edward St. and Elm St.	186.79	64.5	91.6	1209.1	120	1585	-6.23	-8.86	1, 83, 84, 85
84	East extent of system on Elm St.	212.92	43.0	36.5	482.2	75	990	-0.89	-1.27	1, 84, 85
85	On Elm St. east of Taylor St.	208.83	21.5	37.0	488.3	37	490	19.96	28.38	1
86	Intersection of Elm St. and Taylor St.	188.97	21.5	37.0	488.3	37	490	41.85	59.51	1
87	Intersection of Elm St. and Brown St.	192.60	21.5	37.0	488.3	37	490	38.91	55.33	1
88	Intersection of Elm St. and Berford St.	207.90	64.5	120.0	1583.7	120	1585	17.81	25.33	1, 84
89	Intersection of Elm St. and Gould St.	208.28	43.0	75.0	989.7	75	990	20.13	28.62	1
90	Intersection of Elm St. and Watson St.	196.38	21.5	37.0	488.3	37	490	34.67	49.30	1
91	Intersection of Elm St. and Berford St.	207.91	64.5	120.0	1583.7	120	1585	17.78	25.28	1, 84
92	South end of Taylor St.	192.17	43.0	6.4	84.9	75	990	-3768.79	-5359.22	1, 84, 92
93	Intersection of Ames St. and Berford St.	207.06	86.0	119.4	1575.5	200	2640	0.65	0.92	1, 77, 84, 85, 88, 89, 91, 93, 94, 95
94	Intersection of Ames St. and Gould St.	209.04	21.5	37.0	488.3	37	490	22.42	31.88	1
95	South extent of system on Berford St.	206.76	64.5	109.0	1438.3	120	1585	11.74	16.69	1, 84, 95

*Maximum fire flow that can be provided by the subject junction while maintaining 20 psi at all junctions (except those that do not provide adequate pressure during maximum day demand scenario)

Pressure Legend	
Negative: < 0 psi	
Extremely low: 0 - 5 psi	
Low: 5 - 20 psi	
Sufficient: > 20 psi	
(but other nodes fall below 20 psi)	
Sufficient: > 20 psi	

TABLE 5.1a
Maximum Day Demand (5,140 m³/day) Modelling Results w/o High Lift Pumps
Water Tower Level = 240.25m (Bottom of Eq. Storage = 25% of Max. Day Demand)
Warton Water System

June, 2024

24-014

Junction ID	Location	Elevation (m)	Max. Day Demand (m ³ /day)	Pressure (psi)
1	At the booster pumping station	228.96	43.0	15.93
2	Intersection of Jenny St. and Berford St.	215.89	86.0	34.26
3	Intersection of Bruce Rd. 13 and Gould St.	220.74	21.5	75.39
4	Intersection of Bruce Rd. 13 and McNaughton St.	222.23	21.5	73.28
5	East end of Jenny St.	213.85	21.5	37.16
6	Intersection of Daniel St. and Gould St.	213.88	21.5	85.15
7	Intersection of Daniel St. and McNaughton St.	213.42	21.5	85.80
8	On Gould St. between Daniel St. and Division St.	210.82	43.0	89.50
9	On Berford St. north of Division St.	182.19	86.0	80.80
10	Intersection of Division St. and Bayview St.	176.60	86.0	88.73
11	Intersection of Division St. and Berford St.	181.40	86.0	81.94
12	Intersection of Division St. and Gould St.	201.13	43.0	54.02
13	Intersection of Division St. and McNaughton St.	202.50	21.5	51.78
14	Intersection of Division St. and Dawson St.	203.27	21.5	50.57
15	Intersection of Division St. and John St.	201.57	21.5	52.96
16	William St. between Claude St. and Brown St.	176.10	64.5	89.09
17	Intersection of William St. and Brown St.	175.73	64.5	89.63
18	East extent of system on Grey Rd. 1	186.58	375.00	73.63
19	Intersection of William St. and Claude St.	177.24	64.5	87.51
20	Intersection of William St. and Bayview St.	178.34	86.0	86.13
21	Intersection of William St. and Berford St.	182.37	86.0	80.43
22	Intersection of William St. and Gould St.	198.21	43.0	57.95
23	Intersection of William St. and McNaughton St.	201.05	64.5	53.77
24	Intersection of William St. and Dawson St.	200.81	21.5	54.04
25	Intersection of William St. and John St.	200.20	21.5	54.89
26	Intersection of William St. and Watson St.	200.37	21.5	54.65
27	Along Grey Rd. 1, east of Centennial Cr.	180.36	64.5	82.49
28	Intersection of George St. and Scott St.	177.15	86.0	87.44
29	Intersection of George St. and Taylor St.	175.68	86.0	89.51
30	On George St. between Scott St. and Taylor St.	176.19	86.0	88.79
31	Intersection of George St. and Brown St.	177.77	64.5	86.61
32	Intersection of George St. and Claude St.	179.84	64.5	83.88
33	Intersection of George St. and Berford St.	184.19	86.0	77.73
34	Intersection of George St. and Isaac St.	176.82	64.5	87.74
35	North end of Centennial Cr.	177.32	21.5	86.91
36	Intersection of George St. and Gould St.	200.19	64.5	54.99
37	Intersection of George St. and McNaughton St.	197.25	64.5	59.13
38	Intersection of George St. and Dawson St.	197.53	21.5	58.69
39	Intersection of George St. and John St.	198.73	43.0	56.92
40	Intersection of George St. and Watson St.	199.16	86.0	56.30
41	On Frank St. adjacent to "Gateway Haven"	179.54	86.0	83.73
42	On Frank St. between Isaac St. and Centennial Cr.	178.90	21.5	84.71
43	Intersection of Frank St. and Isaac St.	179.04	21.5	84.57
44	At "Gateway Haven" Long Term Care Facility	180.09	86.0	82.93
45	Intersection of Frank St. and Tyson St.	180.25	21.5	82.90
46	Intersection of Frank St. and Taylor St.	181.15	21.5	81.68
47	Intersection of Frank St. and Scott St.	180.10	21.5	83.24
48	Intersection of Frank St. and Brown St.	180.81	43.0	82.32
49	Intersection of Frank St. and Claude St.	182.17	43.0	80.49
50	South end of Watson St. (Peninsula Shores District School)	196.97	86.0	59.40
51	Intersection of Frank St. and Berford St.	185.29	86.0	76.09
52	Intersection of Frank St. and Berford St.	185.39	86.0	75.93
53	Intersection of Frank St. and McNaughton St.	198.20	21.5	57.72

TABLE 5.1a
Maximum Day Demand (5,140 m³/day) Modelling Results w/o High Lift Pumps
Water Tower Level = 240.25m (Bottom of Eq. Storage = 25% of Max. Day Demand)
Warton Water System

June, 2024

24-014

Junction ID	Location	Elevation (m)	Max. Day Demand (m ³ /day)	Pressure (psi)
54	At "Gateway Haven" Long Term Care Facility	179.62	86.0	83.59
55	Intersection of Frank St. and Gould St.	199.39	64.5	56.03
56	At "Gateway Haven" Long Term Care Facility	179.56	86.0	83.67
57	Intersection of Frank St. and Dawson St.	196.75	21.5	59.78
58	At "Gateway Haven" Long Term Care Facility	180.07	86.0	82.95
59	North end of Cordingley Cr.	182.54	21.5	79.45
60	East end of Mary St.	184.89	86.0	76.09
61	Intersection of Mary St. and Isaac St.	182.17	64.5	80.12
62	At "Limpert Lodge" apartments on Mary St.	184.44	86.0	76.75
63	Intersection of Mary St. and Cordingley Cr.	183.33	86.0	78.32
64	Intersection of Mary St. and Taylor St.	183.20	21.5	78.75
65	Intersection of Mary St. and Scott St.	184.42	21.5	77.12
66	South end of Dawson St.	196.21	21.5	60.55
67	Intersection of Mary St. and Brown St.	185.35	43.0	75.91
68	Intersection of Mary St. and Claude St.	187.49	21.5	72.91
69	Intersection of Mary St. and Gould St.	202.52	21.5	51.53
70	Intersection of Mary St. and Berford St.	191.38	43.0	67.37
71	On Mary St. between McNaughton St. and Gould St.	202.09	21.5	49.97
72	Intersection of Mary St. and McNaughton St.	200.39	21.5	54.55
73	Intersection of Mary St. and Watson St.	195.17	120.00	61.96
74	Intersection of Charles St. and Isaac St.	183.56	21.5	78.17
75	Intersection of Charles St. and Taylor St.	184.57	21.5	76.79
76	At Warton Hospital	189.30	86.0	68.54
77	Intersection of Pengally Ave. and Gould St.	205.67	21.5	47.03
78	South end of Claude St. at Warton Hospital	190.95	86.0	67.99
79	Intersection of Edward St. and Isaac St.	186.68	64.5	73.73
80	Intersection of Edward St. and Taylor St.	186.20	21.5	74.48
81	South end of Isaac St.	187.88	64.5	72.02
82	On Taylor St. between Edward St. and Elm St.	187.47	21.5	72.72
83	East of Taylor St. between Edward St. and Elm St.	186.79	64.5	73.69
84	East extent of system on Elm St.	212.92	43.0	36.63
85	On Elm St. east of Taylor St.	208.83	21.5	42.45
86	Intersection of Elm St. and Taylor St.	188.97	21.5	70.70
87	Intersection of Elm St. and Brown St.	192.60	21.5	65.58
88	Intersection of Elm St. and Berford St.	207.90	64.5	43.85
89	Intersection of Elm St. and Gould St.	208.28	43.0	43.31
90	Intersection of Elm St. and Watson St.	196.38	21.5	60.24
91	Intersection of Elm St. and Berford St.	207.91	64.5	43.84
92	South end of Taylor St.	192.17	43.0	65.67
93	Intersection of Ames St. and Berford St.	207.06	86.0	45.05
94	Intersection of Ames St. and Gould St.	209.04	21.5	42.23
95	South extent of system on Berford St.	206.76	64.5	45.48

Pressure Legend	
Low: < 40 psi	
Sufficient: 40 - 60 psi	
Good: 60 - 90 psi	
High: 90 - 100 psi	
Extremely high: > 100 psi	

TABLE 5.1b
Maximum Day Demand (5,140 m³/day) Modelling Results w/ High Lift Pumps
Water Tower Level = 240.25m (Bottom of Eq. Storage = 25% of Max. Day Demand)
Wiarton Water System

June, 2024

24-014

Junction ID	Location	Elevation (m)	Max. Day Demand (m ³ /day)	Pressure (psi)
1	At the booster pumping station	228.96	43.0	25.06
2	Intersection of Jenny St. and Berford St.	215.89	86.0	43.64
3	Intersection of Bruce Rd. 13 and Gould St.	220.74	21.5	75.39
4	Intersection of Bruce Rd. 13 and McNaughton St.	222.23	21.5	73.28
5	East end of Jenny St.	213.85	21.5	46.54
6	Intersection of Daniel St. and Gould St.	213.88	21.5	85.15
7	Intersection of Daniel St. and McNaughton St.	213.42	21.5	85.80
8	On Gould St. between Daniel St. and Division St.	210.82	43.0	89.50
9	On Berford St. north of Division St.	182.19	86.0	91.76
10	Intersection of Division St. and Bayview St.	176.60	86.0	99.82
11	Intersection of Division St. and Berford St.	181.40	86.0	92.89
12	Intersection of Division St. and Gould St.	201.13	43.0	64.77
13	Intersection of Division St. and McNaughton St.	202.50	21.5	62.64
14	Intersection of Division St. and Dawson St.	203.27	21.5	61.47
15	Intersection of Division St. and John St.	201.57	21.5	63.88
16	William St. between Claude St. and Brown St.	176.10	64.5	100.08
17	Intersection of William St. and Brown St.	175.73	64.5	100.62
18	East extent of system on Grey Rd. 1	186.58	375.00	84.59
19	Intersection of William St. and Claude St.	177.24	64.5	98.53
20	Intersection of William St. and Bayview St.	178.34	86.0	97.15
21	Intersection of William St. and Berford St.	182.37	86.0	91.39
22	Intersection of William St. and Gould St.	198.21	43.0	68.81
23	Intersection of William St. and McNaughton St.	201.05	64.5	64.67
24	Intersection of William St. and Dawson St.	200.81	21.5	64.96
25	Intersection of William St. and John St.	200.20	21.5	65.81
26	Intersection of William St. and Watson St.	200.37	21.5	65.57
27	Along Grey Rd. 1, east of Centennial Cr.	180.36	64.5	93.45
28	Intersection of George St. and Scott St.	177.15	86.0	98.42
29	Intersection of George St. and Taylor St.	175.68	86.0	100.48
30	On George St. between Scott St. and Taylor St.	176.19	86.0	99.77
31	Intersection of George St. and Brown St.	177.77	64.5	97.59
32	Intersection of George St. and Claude St.	179.84	64.5	94.86
33	Intersection of George St. and Berford St.	184.19	86.0	88.69
34	Intersection of George St. and Isaac St.	176.82	64.5	98.70
35	North end of Centennial Cr.	177.32	21.5	97.88
36	Intersection of George St. and Gould St.	200.19	64.5	65.94
37	Intersection of George St. and McNaughton St.	197.25	64.5	70.06
38	Intersection of George St. and Dawson St.	197.53	21.5	69.62
39	Intersection of George St. and John St.	198.73	43.0	67.87
40	Intersection of George St. and Watson St.	199.16	86.0	67.25
41	On Frank St. adjacent to "Gateway Haven"	179.54	86.0	94.71
42	On Frank St. between Isaac St. and Centennial Cr.	178.90	21.5	95.67
43	Intersection of Frank St. and Isaac St.	179.04	21.5	95.54
44	At "Gateway Haven" Long Term Care Facility	180.09	86.0	93.89
45	Intersection of Frank St. and Tyson St.	180.25	21.5	93.87
46	Intersection of Frank St. and Taylor St.	181.15	21.5	92.64
47	Intersection of Frank St. and Scott St.	180.10	21.5	94.22
48	Intersection of Frank St. and Brown St.	180.81	43.0	93.30
49	Intersection of Frank St. and Claude St.	182.17	43.0	91.45
50	South end of Watson St. (Peninsula Shores District School)	196.97	86.0	70.35
51	Intersection of Frank St. and Berford St.	185.29	86.0	87.04
52	Intersection of Frank St. and Berford St.	185.39	86.0	86.90
53	Intersection of Frank St. and McNaughton St.	198.20	21.5	68.67

TABLE 5.1b
Maximum Day Demand (5,140 m³/day) Modelling Results w/ High Lift Pumps
Water Tower Level = 240.25m (Bottom of Eq. Storage = 25% of Max. Day Demand)
Warton Water System

June, 2024

24-014

Junction ID	Location	Elevation (m)	Max. Day Demand (m ³ /day)	Pressure (psi)
54	At "Gateway Haven" Long Term Care Facility	179.62	86.0	94.56
55	Intersection of Frank St. and Gould St.	199.39	64.5	66.99
56	At "Gateway Haven" Long Term Care Facility	179.56	86.0	94.63
57	Intersection of Frank St. and Dawson St.	196.75	21.5	70.73
58	At "Gateway Haven" Long Term Care Facility	180.07	86.0	93.91
59	North end of Cordingley Cr.	182.54	21.5	90.42
60	East end of Mary St.	184.89	86.0	87.07
61	Intersection of Mary St. and Isaac St.	182.17	64.5	91.08
62	At "Limpert Lodge" apartments on Mary St.	184.44	86.0	87.71
63	Intersection of Mary St. and Cordingley Cr.	183.33	86.0	89.32
64	Intersection of Mary St. and Taylor St.	183.20	21.5	89.71
65	Intersection of Mary St. and Scott St.	184.42	21.5	88.08
66	South end of Dawson St.	196.21	21.5	71.48
67	Intersection of Mary St. and Brown St.	185.35	43.0	86.87
68	Intersection of Mary St. and Claude St.	187.49	21.5	83.87
69	Intersection of Mary St. and Gould St.	202.52	21.5	62.50
70	Intersection of Mary St. and Berford St.	191.38	43.0	78.34
71	On Mary St. between McNaughton St. and Gould St.	202.09	21.5	60.93
72	Intersection of Mary St. and McNaughton St.	200.39	21.5	65.50
73	Intersection of Mary St. and Watson St.	195.17	120.00	72.91
74	Intersection of Charles St. and Isaac St.	183.56	21.5	89.15
75	Intersection of Charles St. and Taylor St.	184.57	21.5	87.77
76	At Warton Hospital	189.30	86.0	79.50
77	Intersection of Pengally Ave. and Gould St.	205.67	21.5	57.99
78	South end of Claude St. at Warton Hospital	190.95	86.0	78.95
79	Intersection of Edward St. and Isaac St.	186.68	64.5	84.71
80	Intersection of Edward St. and Taylor St.	186.20	21.5	85.45
81	South end of Isaac St.	187.88	64.5	83.00
82	On Taylor St. between Edward St. and Elm St.	187.47	21.5	83.68
83	East of Taylor St. between Edward St. and Elm St.	186.79	64.5	84.65
84	East extent of system on Elm St.	212.92	43.0	47.59
85	On Elm St. east of Taylor St.	208.83	21.5	53.41
86	Intersection of Elm St. and Taylor St.	188.97	21.5	81.67
87	Intersection of Elm St. and Brown St.	192.60	21.5	76.55
88	Intersection of Elm St. and Berford St.	207.90	64.5	54.82
89	Intersection of Elm St. and Gould St.	208.28	43.0	54.26
90	Intersection of Elm St. and Watson St.	196.38	21.5	71.19
91	Intersection of Elm St. and Berford St.	207.91	64.5	54.80
92	South end of Taylor St.	192.17	43.0	76.63
93	Intersection of Ames St. and Berford St.	207.06	86.0	56.00
94	Intersection of Ames St. and Gould St.	209.04	21.5	53.18
95	South extent of system on Berford St.	206.76	64.5	56.42

Pressure Legend	
Low: < 40 psi	
Sufficient: 40 - 60 psi	
Good: 60 - 90 psi	
High: 90 - 100 psi	
Extremely high: > 100 psi	

TABLE 5.1c
Peak Hour Demand (642.5 m³/hour = 3 x MDD) Modelling Results w/ High Lift Pumps
Water Tower Level = 240.25m (Bottom of Eq. Storage = 25% of Max. Day Demand)
Warton Water System

June, 2024

24-014

Junction ID	Location	Elevation (m)	Max. Day Demand (m ³ /day)	Peak Hour Demand (m ³ /hour)	Pressure (psi)
1	At the booster pumping station	228.96	43.0	5.38	15.77
2	Intersection of Jenny St. and Berford St.	215.89	86.0	10.75	33.63
3	Intersection of Bruce Rd. 13 and Gould St.	220.74	21.5	2.69	73.83
4	Intersection of Bruce Rd. 13 and McNaughton St.	222.23	21.5	2.69	71.70
5	East end of Jenny St.	213.85	21.5	2.69	36.53
6	Intersection of Daniel St. and Gould St.	213.88	21.5	2.69	83.53
7	Intersection of Daniel St. and McNaughton St.	213.42	21.5	2.69	84.20
8	On Gould St. between Daniel St. and Division St.	210.82	43.0	5.38	87.84
9	On Berford St. north of Division St.	182.19	86.0	10.75	78.71
10	Intersection of Division St. and Bayview St.	176.60	86.0	10.75	86.70
11	Intersection of Division St. and Berford St.	181.40	86.0	10.75	79.86
12	Intersection of Division St. and Gould St.	201.13	43.0	5.38	52.02
13	Intersection of Division St. and McNaughton St.	202.50	21.5	2.69	48.22
14	Intersection of Division St. and Dawson St.	203.27	21.5	2.69	46.46
15	Intersection of Division St. and John St.	201.57	21.5	2.69	48.68
16	William St. between Claude St. and Brown St.	176.10	64.5	8.06	84.54
17	Intersection of William St. and Brown St.	175.73	64.5	8.06	85.14
18	East extent of system on Grey Rd. 1	186.58	375.00	46.88	65.28
19	Intersection of William St. and Claude St.	177.24	64.5	8.06	84.25
20	Intersection of William St. and Bayview St.	178.34	86.0	10.75	83.13
21	Intersection of William St. and Berford St.	182.37	86.0	10.75	77.48
22	Intersection of William St. and Gould St.	198.21	43.0	5.38	54.90
23	Intersection of William St. and McNaughton St.	201.05	64.5	8.06	49.91
24	Intersection of William St. and Dawson St.	200.81	21.5	2.69	49.78
25	Intersection of William St. and John St.	200.20	21.5	2.69	50.57
26	Intersection of William St. and Watson St.	200.37	21.5	2.69	50.32
27	Along Grey Rd. 1, east of Centennial Cr.	180.36	64.5	8.06	74.26
28	Intersection of George St. and Scott St.	177.15	86.0	10.75	81.79
29	Intersection of George St. and Taylor St.	175.68	86.0	10.75	83.70
30	On George St. between Scott St. and Taylor St.	176.19	86.0	10.75	83.03
31	Intersection of George St. and Brown St.	177.77	64.5	8.06	81.30
32	Intersection of George St. and Claude St.	179.84	64.5	8.06	80.04
33	Intersection of George St. and Berford St.	184.19	86.0	10.75	74.04
34	Intersection of George St. and Isaac St.	176.82	64.5	8.06	80.87
35	North end of Centennial Cr.	177.32	21.5	2.69	79.32
36	Intersection of George St. and Gould St.	200.19	64.5	8.06	51.31
37	Intersection of George St. and McNaughton St.	197.25	64.5	8.06	55.10
38	Intersection of George St. and Dawson St.	197.53	21.5	2.69	54.36
39	Intersection of George St. and John St.	198.73	43.0	5.38	52.30
40	Intersection of George St. and Watson St.	199.16	86.0	10.75	51.55
41	On Frank St. adjacent to "Gateway Haven"	179.54	86.0	10.75	75.99
42	On Frank St. between Isaac St. and Centennial Cr.	178.90	21.5	2.69	77.40
43	Intersection of Frank St. and Isaac St.	179.04	21.5	2.69	77.67
44	At "Gateway Haven" Long Term Care Facility	180.09	86.0	10.75	75.07
45	Intersection of Frank St. and Tyson St.	180.25	21.5	2.69	76.35
46	Intersection of Frank St. and Taylor St.	181.15	21.5	2.69	75.52
47	Intersection of Frank St. and Scott St.	180.10	21.5	2.69	77.60
48	Intersection of Frank St. and Brown St.	180.81	43.0	5.38	77.26
49	Intersection of Frank St. and Claude St.	182.17	43.0	5.38	76.03
50	South end of Watson St. (Peninsula Shores District School)	196.97	86.0	10.75	54.59
51	Intersection of Frank St. and Berford St.	185.29	86.0	10.75	71.85
52	Intersection of Frank St. and Berford St.	185.39	86.0	10.75	71.68
53	Intersection of Frank St. and McNaughton St.	198.20	21.5	2.69	53.41
54	At "Gateway Haven" Long Term Care Facility	179.62	86.0	10.75	75.68
55	Intersection of Frank St. and Gould St.	199.39	64.5	8.06	51.73
56	At "Gateway Haven" Long Term Care Facility	179.56	86.0	10.75	75.71
57	Intersection of Frank St. and Dawson St.	196.75	21.5	2.69	55.46
58	At "Gateway Haven" Long Term Care Facility	180.07	86.0	10.75	74.98
59	North end of Cordingley Cr.	182.54	21.5	2.69	71.64
60	East end of Mary St.	184.89	86.0	10.75	68.16
61	Intersection of Mary St. and Isaac St.	182.17	64.5	8.06	73.19
62	At "Limpert Lodge" apartments on Mary St.	184.44	86.0	10.75	68.85

TABLE 5.1c

Peak Hour Demand (642.5 m³/hour = 3 x MDD) Modelling Results w/ High Lift Pumps
 Water Tower Level = 240.25m (Bottom of Eq. Storage = 25% of Max. Day Demand)
 Wiarton Water System

June, 2024

24-014

Junction ID	Location	Elevation (m)	Max. Day Demand (m ³ /day)	Peak Hour Demand (m ³ /hour)	Pressure (psi)
63	Intersection of Mary St. and Cordingley Cr.	183.33	86.0	10.75	70.62
64	Intersection of Mary St. and Taylor St.	183.20	21.5	2.69	72.49
65	Intersection of Mary St. and Scott St.	184.42	21.5	2.69	71.53
66	South end of Dawson St.	196.21	21.5	2.69	56.15
67	Intersection of Mary St. and Brown St.	185.35	43.0	5.38	71.09
68	Intersection of Mary St. and Claude St.	187.49	21.5	2.69	68.34
69	Intersection of Mary St. and Gould St.	202.52	21.5	2.69	46.94
70	Intersection of Mary St. and Berford St.	191.38	43.0	5.38	62.82
71	On Mary St. between McNaughton St. and Gould St.	202.09	21.5	2.69	30.94
72	Intersection of Mary St. and McNaughton St.	200.39	21.5	2.69	49.81
73	Intersection of Mary St. and Watson St.	195.17	120.00	15.00	57.14
74	Intersection of Charles St. and Isaac St.	183.56	21.5	2.69	71.47
75	Intersection of Charles St. and Taylor St.	184.57	21.5	2.69	70.46
76	At Wiarton Hospital	189.30	86.0	10.75	52.02
77	Intersection of Pengally Ave. and Gould St.	205.67	21.5	2.69	42.30
78	South end of Claude St. at Wiarton Hospital	190.95	86.0	10.75	63.41
79	Intersection of Edward St. and Isaac St.	186.68	64.5	8.06	67.05
80	Intersection of Edward St. and Taylor St.	186.20	21.5	2.69	68.23
81	South end of Isaac St.	187.88	64.5	8.06	65.33
82	On Taylor St. between Edward St. and Elm St.	187.47	21.5	2.69	66.72
83	East of Taylor St. between Edward St. and Elm St.	186.79	64.5	8.06	67.66
84	East extent of system on Elm St.	212.92	43.0	5.38	31.34
85	On Elm St. east of Taylor St.	208.83	21.5	2.69	37.17
86	Intersection of Elm St. and Taylor St.	188.97	21.5	2.69	65.43
87	Intersection of Elm St. and Brown St.	192.60	21.5	2.69	60.62
88	Intersection of Elm St. and Berford St.	207.90	64.5	8.06	39.08
89	Intersection of Elm St. and Gould St.	208.28	43.0	5.38	38.52
90	Intersection of Elm St. and Watson St.	196.38	21.5	2.69	55.43
91	Intersection of Elm St. and Berford St.	207.91	64.5	8.06	39.06
92	South end of Taylor St.	192.17	43.0	5.38	57.19
93	Intersection of Ames St. and Berford St.	207.06	86.0	10.75	40.26
94	Intersection of Ames St. and Gould St.	209.04	21.5	2.69	37.44
95	South extent of system on Berford St.	206.76	64.5	8.06	40.67

Pressure Legend

Low: < 40 psi	
Sufficient: 40 - 60 psi	
Good: 60 - 90 psi	
High: 90 - 100 psi	
Extremely high: > 100 psi	

Part 1 General**1.1 RELATED WORK**

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 21 16 Batt Insulation
- .3 Section 07 21 19 Foamed-in-Place Polyurethane
- .4 Section 07 27 10 Air Barrier and Transition Membrane
- .5 Section 07 62 00 Prefinished Metal Siding, Soffit, Flashing and Trim
- .6 Section 07 92 00 Joint Sealants
- .7 Section 08 42 29 Automatic Swinging Door Entrance Operators
- .8 Section 07 84 00 Fire Stopping
- .9 Section 08 80 00 Glass and Glazing

1.2 WORK INCLUDED IN THE SCOPE OF THIS SECTION

- .1 Furnish labour, materials and services for the complete fabrication, assembly and installation of 8200 Series High Performance Stick Built Curtain Wall system manufactured by Commdoor Aluminum with the following features:
 - .1 A Provide stick built, capped, pre-finished curtain wall system.
 - .2 Manufacturer shall design the system to perform as a thermally broken, open, pressure-equalized, rain screen system.
 - .3 Include in the system, sealed, insulated glass units and spandrel glass units with insulated back pans. Spandrel unit shall have back-painted glass outboard finished face.
 - .4 Include all necessary accessories, shims, reinforcements, anchors and sealants required.
 - .5 Maintain anchors within wall and ceiling assemblies shown on drawings.
 - .6 Select mullion depth to suit conditions shown on drawings and select reinforcing, if necessary, to meet or exceed wind loads and all other loads imposed on the system.
 - .7 Provide captured glass unit design with capped mullion and pressure plates. Utilize non-metallic pressure plates and sealed glass unit spacers as necessary in order to achieve where shown.
 - .8 Meet or exceed resistance to wind load applicable at the Place of the Work.
 - .9 Gaskets used for glazing must permit dry glazing and ease re-glazing following initial installation.

1.3 WORK EXCLUDED

- .1 Structural steel, wood blocking or framing, interior trims, concrete masonry, final cleaning, protection, related work specified elsewhere, convactor covers and trims and ceiling trims.

1.4 BASIS OF DESIGN

- .1 The Commdoor Aluminum 8200 Stick HP Series stick-built curtain wall system as follows:
 - .1 Glazed Aluminum Curtain Wall: Commdoor Aluminum, 471 Chrislea Road, Woodbridge, Ontario, L4L 8N6 Tel: 416.743.DOOR (3667); Fax: 416.746.0979; Toll Free: 1.800.565.1851; Email: info@commdooraluminum.com; Website: www.commdooraluminum.com.
 - .2 Substitutions: Not permitted, however requests for substitutions will be considered providing substitute products and methods of execution are submitted at least 10 days prior to bid closing date. For consideration, the following must be submitted:
 - .1 Accompany requests for substitution with evidence substantiating similarity in quality, including technical data sheet and formal 3-Part Specification.
 - .3 Standardized "U" value for glass and framing system for any proposed system shall not exceed 0.34 BTU/hr/ft.²/°F.

1.5 REFERENCE STANDARDS

- .1 Aluminum Association (AA)
 - .1 DAF 45 2003, Designation System For Aluminum Finishes.
- .2 American Architectural Manufacturers Association (AAMA).
 - .1 AAMA 501.1-05 Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure.
 - .2 AAMA-501.2 Field Check of Metal Curtain Walls for Water Leakage.
 - .3 AAMA-501-2005, Methods of Test for Exterior Walls.
 - .4 AAMA 501.4-09 Recommended Static Test Method for Evaluating Curtain Wall and Storefront Systems Subjected to Seismic and Wind Induced Interstorey Drifts.
 - .5 AAMA 501.5-07 Thermal Cycling of Exterior Walls.
 - .6 AAMA 507-12 Standard Practice for Determining the Thermal Performance Characteristics of Fenestration Systems Installed in Commercial Buildings.
 - .7 AAMA-2603-2013, Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
 - .8 AAMA-2604-2013, Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
 - .9 AAMA-2605-2013, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
 - .10 AAMA CW DG-1-96, Aluminum Curtain Wall Design Guide Manual.
 - .11 AAMA CW-10-2012, Care and Handling of Architectural Aluminum From Shop to Site.
 - .12 AAMA CW-11-1985, Design Windloads for Buildings and Boundary Layer Wind Tunnel Testing.
 - .13 AAMA-TIR A1-2004, Sound Control for Fenestration Products.
- .3 American Society for Testing Materials (ASTM)
 - .1 ASTM A653 / A653M – 09a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM B209-2010, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - .3 ASTM B221-2013, Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - .4 ASTM C612–2014, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
 - .5 ASTM E90-09 (or ASTM E1425) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - .6 ASTM E283-2012, Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - .7 ASTM E330/E330M-14 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
 - .8 ASTM E331-2009, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.
 - .9 ASTM E413–04, Classification for Rating Sound Insulation.
 - .10 ASTM E1105–2008, Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.
 - .11 ASTM D2240–2010, Standard Test Method for Rubber Property—Durometer Hardness.
- .4 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-12.8-97, Insulating Glass Units.
 - .2 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.
 - .3 CAN/CGSB-19.13-M87, Sealing Compound, One-Component, Elastomeric, Chemical Curing.
- .5 Canadian Standards Associations (CSA)
 - .1 CAN/CSA-S157-2005, Strength Design in Aluminum.

- .2 CAN/CSA-S136-2007, North American Specification for the Design of Cold-Formed Steel
- .3 Structural Members.
- .4 CAN/CSA W59.2-M1991(R2003), Welded Aluminum Construction.
- .6 Environmental Choice Program (ECP)
 - .1 CCD-45-1995, Sealants and Caulking Compounds.
- .7 National Fenestration Rating Council:
 - .1 NFRC 102-2004 Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems.
 - .2 NFRC 100-20-500 SSG-2014 Procedure for Determining Fenestration Product Solar Heat Gain.
- .8 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S710.1-2005, Standard for Thermal Insulation – Bead-Applied One Component Polyurethane Air Sealant Foam, Part 1: Materials Standard for Thermal Insulation - Bead - Applied One Component Polyurethane Air Sealant Foam, Part 1: Materials.

1.6 ADMINISTRATIVE REQUIREMENTS

- .1 Co-ordination:
 - .1 Notify concerned trades of items required to be incorporated into work of separate Sections. Certain components specified under this Section include items which are closely integrated with air/vapour barrier transitions, entrances, glazing components, flashing pieces and architectural metalwork specified under separate Section and consequently require close co-ordination with such allied trades. Perform total co-ordination required to ensure correct installation procedures and results.
 - .2 Co-ordinate and co-operate with metal panel system trades by installing panel system closures and trim supplied by such trades and installed directly into curtain wall system.
- .2 Pre-installation Meetings:
 - .1 Arrange pre-installation meeting 1 week prior to commencing work with parties associated with this trade as designated in Contract Documents or as requested by Consultant. Presided over by Contractor, include Consultant who may attend, Subcontractor performing work of this trade, testing company's representative and consultants of applicable discipline. Review Contract Documents for work included under this trade and determine complete understanding of requirements and responsibilities relative to work included, storage and handling of materials, materials to be used, installation of materials, sequence and quality control. Project staffing, restrictions on areas or work and other matters affecting construction, to permit compliance with intent of work of this Section.
 - .2 Review installation methods, procedures, time schedule and conditions under which work shall proceed, including manufacturer's written instructions and co-ordination required with related work.
 - .3 Review and finalize construction schedule, verify availability of materials, experienced installer, equipment and facilities needed to make progress and avoid delays.

1.7 ACTION AND INFORMATIONAL SUBMITTALS:

- .1 Make submittals in accordance with Contract Conditions and Section 01 33 00 - Submittal Procedures.
- .2 Product Data: Submit product data including manufacturer's literature for glazed aluminum curtain wall extruded members, panels, components and accessories, indicating compliance with specified requirements and material characteristics.
 - .1 Submit list on curtain wall manufacturer's letterhead of materials, components and accessories to be incorporated into Work.
 - .2 Include product names, types and series numbers.
 - .3 Include contact information for manufacturer and their representative for this Project.

- .3 Prior to Fabrication Submit Shop Drawings:
 - .1 Submit drawings stamped and signed by Professional Engineer registered or licensed in Province of Ontario, Canada.
 - .2 Include on shop drawings:
 - .1 Indicate with plans, sections, elevations and sufficient full-size details to indicate components and methods of assembly, materials, finishes, colour and their characteristics relative to their purpose and other fabrication information.
 - .2 Identify and describe material types and components being supplied, their manufacturers, wall thicknesses of extrusions and shapes including connections and grades, attachments, reinforcing, anchorage and locations of fastenings.
 - .3 Illustrate and dimension allowances for thermal and structural movement between components and thermal isolation materials.
 - .4 Illustrate and note the line of air-seal, water drainage, venting and water shed as continuous features; clearly show and define on drawings, including continuity of air seal and membrane flashing with adjacent trades.
 - .5 Include description of materials, metal finishing specifications and other pertinent information.
 - .6 Ensure a licensed engineer specified herein is responsible for:
 - .1 Production and review of Shop Drawings.
 - .2 Sealing and signing each Shop Drawing and any associated calculations performed.
 - .7 Provide copies of final review Shop Drawings as required for submission to authorities having jurisdiction.
 - .4 Prior to Fabrication Submit Samples:
 - .1 Submit duplicate 65 mm x 65 mm (2.5 x 2.5 inches) sample sections showing prefinished aluminum surface, finish, colour and texture, and including section of infill panel.
 - .2 Submit duplicate 300 x 300 mm (12 x 12 inches) sample sections of insulating glass unit showing glazing materials and edge and corner details and label with performance specification.
 - .3 Thermal Performance: Submit verification that Insulating Glass Units used in curtain wall system meet RSI (R) values required by SB-10 of the Ontario Building Code.
 - .5 Test Reports:
 - .1 Prior to fabrication of curtain wall, submit certified test data performed by an independent approved laboratory displaying results of testing program carried out on a typical curtain wall system.
 - .6 Manufacturer's Instructions:
 - .1 Written documentation of installation, storage and other related instructions for optimum installation.
 - .7 Warranty Documentation:
 - .1 Provide draft copy of Warranty.
 - .8 Record Documents and "As-Built" Drawings:
 - .1 As Work progresses, clearly mark changes and deviations from Shop Drawings onto a bound set of white prints.
 - .2 Keep prints available at site for periodic inspection throughout duration of work. Pay particular attention to accurately dimensioning the exact location of concealed work, noting work concealed in inaccessible locations.
 - .3 When work is complete and ready for review by Consultant, neatly transfer as-built information from marked-up prints mentioned above and onto a set of Contract Drawings on the most recent revision and submit to Consultant.
 - .9 Engineer's Inspection:

- .1 This Section shall engage a licensed structural engineering to inspect the work of this Section during erection. Following completion of the installation, the engineer shall prepare a project closeout letter stating that the curtain wall system is installed in accordance with the design of the system.

1.8 CLOSEOUT SUBMITTALS

- .1 Maintenance Data: For subsequent periodic maintenance, submit copy of AAMA 609 and 610-02 "Cleaning and Maintenance Guide for Architecturally Finished Aluminum".
- .2 Warranty Documentation: Include executed Warranty.
- .3 Record Documents and "As-Built" Drawings.
- .4 Engineer's Inspection: This Section shall engage a licensed structural engineering to inspect the work of this Section during erection. Following completion of the installation, the engineer shall prepare a project closeout letter stating that the curtain wall system is installed in accordance with the design of the system.

1.9 QUALITY ASSURANCE

- .1 Manufacturer shall have a minimum of five years' experience manufacturing curtain wall systems with the specified performance.
- .2 Installers providing the work of this Section, must be competent installers, trained by the manufacturer with a minimum of 10 years' experience in the application of curtain wall products, systems and assemblies specified and the installer shall provide evidence of the completed training of provided by the product manufacturer and evidence of the manufacturer's approval of the named installer.
- .3 Licensed Professionals: Employ a licensed engineer carrying minimum of \$2,000,000.00 professional liability insurance and ensure that they are registered in the Province of Ontario having minimum 5 years' experience in design of curtain wall and aluminum panels.
- .4 Sealant Certification:
 - .1 Submit written certification from sealant manufacturer that sealant applications in specified systems have been reviewed and approved as completely appropriate for their intended uses in systems as shown and detailed on Shop Drawings, designating drawing number, data and revision, with regard to design criteria and other requirements of the Contract Documents and compatibility with components and adjacent materials together with life expectancy of sealant materials detailed and specified. Ensure specific reference is made to compatibility of glass edge seal with adjacent materials, together with life expectancy of sealant materials detailed and specified.
 - .2 Submit Product information on the sealant to be used, complete with recommendations and installation instructions.
 - .3 Structural Silicone Design(if applicable): Provide statement and test data from silicone sealant manufacturer indicating stresses on silicone sealant, per dimensions shown on Shop Drawing details are in accordance with ASTM C1184 and ASTM C1401.
 - .4 Ensure sealants are verified by SWRI in accordance with ASTM C719 and ASTM C661.
 - .5 Provide to sealant manufacturer Shop Drawings showing size of lites, design loads and sealant dimensions for evaluation and statement on stress.
- .5 Sealed Glazed Units
 - .1 Submit to Consultant a written certification from sealed unit manufactured that sealed units of curtain wall assemblies have been reviewed as completely appropriate for their intended use in system shown. They are to be detailed on Shop Drawings, designating drawing number, data and requirements of the Contract Documents, compatibility with components and adjacent materials and thermal safety of glass constructions together with life expectancy of glazing materials detailed and specified in the glazing system.
 - .2 Take into account any stresses developing from solar radiation or other causes (prior to or during installation of the glass) and allow for protection or methods of handling and storage of glass to

- avoid such stresses and conform to safety requirements for glass application as set out in ASTM C1036.
- .3 Ensure sealed units are capable of being removed and replaced from exterior. Submit to Consultant detail drawing indicating procedure for removal and replacement of any damaged sealed unit of glass.
 - .6 Corrosion Analysis:
 - .1 Engage a licensed engineer, who is an expert in corrosion, to conduct a component-by-component analysis of potential corrosion resulting from galvanic action between materials, for components of curtain wall and aluminum panels and provide report.
 - .2 Submit Engineering Report to Consultant for review prior to submission of Shop Drawings. Ensure sample and test results are available upon request.
 - .3 Separate dissimilar metals to prevent electrolytic action. Provide letter of confirmation from licensed engineer specified herein that infill components, accompanying trims and flashings and attachments to adjacent work.
 - .7 MOCK-UP:
 - .1 Erect visual mock-up at designated location for Consultant's review, minimum 1 bay in width and include height sufficient to include 2 vision panels and 1 spandrel panel above and below such vision panels. Ensure mock-up is complete including but not necessarily limited to correct glass, spandrel glass panels, insulated metal air/vapour barrier, connections, firestopping, sealants, air seal gaskets and anchorage systems.
 - .2 Adjust mock-up at no extra cost to Owner as required to obtain acceptance.
 - .3 Mock-up when accepted becomes part of completed work and minimum standard in matching balance of work, subject to passing of tests.
 - .8 Engineer's Inspection: This Section shall engage a licensed structural engineering to inspect the work of this Section during erection. Following completion of the installation, the engineer shall prepare a project closeout letter stating that the curtain wall system is installed in accordance with the design of the system.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Store components to permit natural ventilation over finished surfaces.
- .2 Under conditions of high humidity, supply heating or forced air ventilation to prevent accumulation of surface moisture.
- .3 Do not use adhesive papers or sprayed coatings, which become firmly bonded when exposed to sun.
- .4 Do not leave coating residue on surfaces.
- .5 Material handling and storage: To AAMA CW-10.

1.11 SITE CONDITIONS

- .1 Ambient Conditions: Maintain surface of substrates and ambient temperatures constantly between 5° C (41° F) and 38° C (100° F) during application and curing of sealants, and during installation of glazing.

1.12 MANUFACTURER'S WARRANTY

- .1 Warrant work of this Section for a period of 5-years against defects and deficiencies in accordance with General Conditions of Contract. Promptly correct any defects of deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner.
 - .1 Defects include but are not limited to: weathertightness of curtain wall, structurally sound and free from distortion, deflection, misalignment, continuity of air/vapour barrier, insulating glass units are free from condensation, fogging of material, obstruction of vision, loosening of glazing and anchorage buckling, water penetration beyond air/vapour seal, fading, discolouration of finish,

- failure of glazing, joint sealant against staining, adhesion and cohesion, bond failure and extensive colour fading.
- .2 Warrant factory sealed insulating units against defects for a period of 10 years. Warrant factory sealed insulating units free from material obstruction of vision as a result of dust or film formation on internal glass surfaces by any cause, under normal conditions anticipated under this Project, other extrinsic glass breakage, but including breakage due to thermal shock and temperature differential due to inherent glass or glazing fault
 - .3 Provide sealant manufacturer's 20-year materials warranty and limited labour warranty, including statement that sealants used in the work will not cause porous substrates to become discoloured or change their appearance due to fluid migration.
- .2 Opaci-Coat-300 ICD High Performance Coating:
- .1 Warrant water-based silicone opacifier for a period of 10 years against defects and/or deficiencies in accordance with General Conditions of Contract. Promptly correct any defects or deficiencies that become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner.

1.13 WASTE MANAGEMENT:

- .1 Separate and recycle waste packaging materials in accordance with Section 01 74 19 - Construction Waste Management and Disposal.
- .2 Remove waste packaging materials from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper and plastic material in appropriate on-site storage containers for recycling in accordance with Waste Management Plan.

Part 2 PRODUCTS

2.1 SYSTEEMS:

- .1 Basis of Design: **Commddoor Aluminum Series 8200 Stick HP** and capped, 2.5" wide mullion.
 - .1 Manufacturer of Glazed Aluminum Curtain Wall: Commddoor Aluminum, 471 Chrislea Road, Woodbridge, Ontario, L4L 8N6 Tel: 416.743.DOOR (3667); Fax: 416.746.0979; Toll Free: 1.800.565.1851; Email: info@commddooraluminum.com; Website: www.commddooraluminum.com
- .2 Substitutions:
 - .1 Not permitted; however, requests for substitutions will be considered providing substitute products and methods of execution are submitted at least 10 days prior to bid closing date.
 - .1 To be considered, all such submissions shall have accompanied with them, evidence substantiating similarity in quality and performance, including technical data sheets, testing reports demonstrating thermal and wind-bearing characteristics and a formal 3-Part Specification.

2.2 MATERIAL

- .1 Aluminum Extrusion:
 - .1 All extruded aluminum sections to ASTM B221 and 6063-T6 alloy or equivalent.
 - .2 Frame members (back section) size will be based on published wind load charts to meet specified wind load and the depth shall be measured from shoulder behind neck to back side of mullion.
 - .1 Available back section sizes will be: 3" (76.2 mm), 4" (101.6 mm), 5.25" (133.4 mm), 6-5/8" (168.3 mm) and 10" (254 mm).
 - .3 Mullion depth will be selected for each circumstance by the designer of the system.
- .2 Thermal Break: 20 mm (13/16") polyamide thermal break strip.
- .3 Finish coatings:

- .1 Coatings shall meet or exceed FGIA/AAMA 2605 specification for performance in aluminum extrusion finishes and ASTM D6578/D6578M-13 (2024) standard practice for determination of graffiti resistance.
- .2 Formulated with a blend of 70% PVDF, acrylic resins, and advanced pigment technologies.
- .3 Minimum coating shall consist of a corrosion-inhibitive primer and a durable fluoropolymer color coat and a clear top coat.
- .4 Acceptable Coating Product:
 - .1 Meet or exceed standards of AAMA 2605, 3-coat, thermal setting enamel consisting of primer, colour coat and clear coat.
 - .2 PPG Duranar Extrusion Coating, High-Performance, Polyvinylidene Fluoride:
 - .1 Spray-applied, extrusion coatings: thermosetting acrylic enamel to meet or exceed standards of AAMA 603.8, colour from PPG standard colour range.
 - .3 Colour: Duranar Millennium Blue UC136405 or alternative selected by Architect.
- .4 Sheet aluminum: To ASTM B209, utility grade for unexposed surfaces.
- .5 Air barrier liner: Reinforce panels to maintain flat surface.
- .6 Concealed locations: 0.952 mm (20 gauge) steel sheet to CSA-S136M and ASTM A653/A653M with 458 g/m² (1.25 oz/sq.ft) galvanized coating and corners sealed at concealed locations.
- .7 Interior exposed locations: 1.588 mm (16 gauge) clear anodized aluminum sheet.
- .8 Fasteners, screws and bolts: Tamperproof, cadmium plated stainless steel 300 or 400 series to meet curtain wall requirements and as recommended by manufacturer.
- .9 Anchors: Ensure anchors have three-way adjustment.
- .10 **Insulating glass units:**
 - .1 Insulating glass units: To CAN/CGSB-12.8, double glazed, hermetically sealed, argon filled insulating glass units with low conductance black stainless steel warm edge spacer. 1" (25 mm) total, nominal thickness: 6 mm glass; 12.7 mm spacer, 6 mm glass.
 - .2 Outer lite: 6 mm (0.25 inches), tempered Guardian SunGuard SN 68 double-silver coating on surface 2 of clear, float glass.
 - .3 Inner lite: 6 mm (0.25 inches) tempered, clear float glass.
 - .4 Select tempered glass or laminated safety glass for interior window panes to meet or exceed Ontario Building Code load requirements for guards.
- .11 Spandrel Glass Units: 6 mm tempered or laminated glass, outer light, surface 2, opacifying coating, ICD High-Performance Glass Coatings, Opaci-Coat-300, colour from standard range.
- .12 Glazing Material
 - .1 Exterior Glazing: Extruded EPDM flexible gasket.
 - .2 Interior Glazing: Extruded EPDM flexible gasket.
- .13 Aluminum panels: 3 mm (0.125 inches) thick factory formed panels.
 - .1 Finish after forming to match curtain wall system.
 - .2 Thermal Break: Glass fibre reinforced polyamide porthole extrusion.
- .14 Curtain wall back pan insulation: 100 mm (4 inches) thick and 76mm (3") to suit mullion size.
 - .1 Density: 64 kg/m³ (4 lbs/cu ft) minimum.
 - .2 Thermal resistance: minimum RSI 3.0 (R 16.8).
- .15 Fasteners
 - .1 Fasteners shall be zinc plated or Stainless Steel.

2.3 DESIGN CRITERIA

- .1 Acceptable Product Characteristics:
 - .1 Air Infiltration (ASTM E283) 0.28 L/s/m² (0.04 cfm/ft²)

- .2 Water Resistance, Static (ASTM E331): No leakage at a static air pressure differential at 960 Pa (20 psf) and 436 PA (30 psf).
- .3 Uniform Load (applied in the positive and negative direction) and tested according to ASTM E331:
 - .1 At 3600 mm (144") span for stick system:
 - .1 100 mm (4") mullion 1.676 kPa (35 psi) SSG: 1.197 kPa (25 psf).
 - .2 100 mm (4") mullion captured: 1.436 kPa (30 psf).
 - .2 At 4063 mm (162-1/2") span for stick system:
 - .1 133 mm (5-1/4") mullion captured: 1.915 kPa (40 psf).
- .4 Structural (at test load equal to 1.5 times specified test load with the following result:
 - .1 No glass breakage occurred and no permanent deflection of framing members exceeded of 0.1% of the clear span of framing members.
- .5 Thermal Resistance, U-factor (AAMA 1503 or NFRC 100), thermal transmittance (U-factor) and Condensation Resistance (CRF):
 - .1 6 mm (1/4") Guardian SunGuard SN 68 coating on surface 2; 13 mm (1/2") space, argon filled; 6 mm (1/4") Clear; warm edge Spacer.
 - .1 U-value: 0.32 BTU/hr/ft²/°F.
- .6 Sound Transmission Loss:
 - .1 Meet or exceed ASTM E90 and ASTM E1425;
 - .2 STC and Outdoor/Indoor Transmission Class (OITC) shall not be less than:
 - .1 STC 33 or OITC 27 when tested with base 25 mm (1") insulating glass (i.e. 6 mm glass with SN68 coating; 12.7 mm air space, Argon filled; 6 mm (1/4", 1/2" AS, 1/4") glass.
- .7 Include cladding, glazing, insulation, air/vapour barriers, system components, metal trims, expansion joints, thermal breaks, firestoppping, smoke seals, closures, fascias, parapet fins, flashings, vents, anchorage, fixings, reinforcing and related items of work to provide a complete curtain wall system to meet design criteria.
- .8 Comply with requirements of Ontario Building Code (OBC) and regulations of authorities having jurisdiction, which shall be minimum, except where more stringent requirements are specified herein.
- .9 Design glazing systems and framing to prevent thermal shock and pressure fracture damage to glass.
- .10 Design aluminum work as shown to provide free and noiseless movement of components of assembly due to structural erection or dead loads, without buckling, oil canning of any component and/or transmitting of stresses to any members.
- .11 Co-ordinate maximum allowable reaction loads with Structural Drawings.
- .12 Ensure metal faces of panels, flashings, caps, bases, and soffits are visually flat under all lighting conditions to limitations specified hereinafter. Ensure finish on aluminum is uniform and consistent within each component and from component to component.
- .13 Locate sealants, gaskets, air/vapour seals, thermal separations, drainage slots and holes as shown or specified in this Section as required to obtain design requirements. Ensure components and assemblies exterior to air barrier drain to building exterior.
- .14 Design, assemble and secure Work in a manner that will keep any stresses on sealants within sealant manufacturer's recommended working range within factors of safety specified.
- .15 Accurately shape mullion and cover caps at intersecting joints to obtain hairline joints, just wide enough to permit thermal expansion and contraction.
- .16 Design and assemble curtain wall and aluminum panels to permit re-glazing without removal of structural mullion sections.
- .17 Ensure fasteners within curtain wall system are concealed.
- .18 Thermally break frame members, except where structural glazing is employed. Provide thermal breaks between exterior and interior components and sufficient metal on interior side of glass to

- provide total absence of condensation on interior metal surfaces under maintained design conditions at specified relative humidity.
- .19 Ensure design of curtain wall and aluminum framing and panels, with fixing devices to structure, accommodates building construction tolerances in accordance with those specified in AISC and Structural Drawings.
 - .20 Design work to withstand within acceptable deflection limitations, its own weight, forces applied by movements of building structure and attached adjacent components and maximum design loads due to pressure and suction of wind, snow, ice, rain, and hail.
 - .21 Design curtain wall and glazing systems (including accessories) to resist minimum wind pressure as required to meet design criteria and designated in OBC for this specific location of Project.
 - .22 For horizontal and vertical members retaining glass panels: deflection limits shall be such that integrity of glass and air seals are maintained at design loading. Permanent deformation of members due to applied loads is not permitted.
 - .23 Design anchors, fasteners, bracing and framing fastened directly to structure, structurally adequate in accordance with requirements of CSA S16 using Limit States Design. Where extra bracing and/or supports are required to stabilize curtain wall assembly, provide such structural members whether shown on Drawings or not. Provide reinforcement in mullions as required, without increasing sight lines of aluminum members.
 - .24 Ensure an air/vapour barrier consistent with rain screen principle is continuously installed at inner frame perimeter as an integral part of curtain wall system design to provide a complete and impervious air/vapour barrier. No detectable drafts are permitted.
 - .25 It is Contractor's responsibility to design and provide air/vapour seal between curtain wall, aluminum panels, trim and expansion joints at roof, base structure, masonry and other components of building.
 - .26 Aluminum Extrusions: shall meet or exceed ASTM B221M; wall thickness selected for performance in field; extruded aluminum alloy AA-6063-T6 for aluminum. Ensure surfaces are free from defects impairing appearance, strength and durability.
 - .27 Aluminum Sheet: ASTM B209M, minimum thickness 3 mm (1/8") of type and characteristics to match finished extrusions; ensure sheet, which is not exposed, is Utility Aluminum mill finished; for intricate forming with decorative finishes use AA-1100 and for siding and exposed panels use AA-3003 with specified finish.

2.4 FINISH

- .1 Exterior Surfaces: Fluoropolymer paint Coating:
 - .1 Based on PPG Duracron applied in accordance AAMA 2605.
 - .2 Exterior exposed aluminum surfaces: To AAMA 2605, 3-coat, thermal setting enamel consisting of primer, colour coat and clear coat with 70% minimum fluoropolymer resin and polvinylidene fluoride (PVDF), 0.03 mm (1.2 mil) minimum total thickness.
 - .1 PPG Industries Inc. Duranar Millennium Blue UC136405 or alternative selected by Architect.
- .2 Interior Surfaces: Fluoropolymer paint Coating:
 - .1 Interior exposed aluminum surfaces: AAMA 2604, 2-coat, thermal setting enamel consisting of primer and topcoat with 70% minimum fluoropolymer resin and polvinylidene fluoride (PVDF), 0.025 mm (1 mil) minimum total thickness
 - .1 PPG Industries Inc. Duranar Millennium Blue UC136405 or alternative selected by Architect.

2.5 ACCESSORIES

- .1 Sealant: To CAN/CGSB-19.13, Class 40, one-component, cold-applied, non-sagging silicone.
 - .1 Acceptable material: Dow Corning 795.
 - .2 Sealant Bond Breaker: Open cell foam backer rod sized to suit project requirements.

- .3 Flashings: 3 mm (0.125 inches) thick aluminum flashing to profiles indicated and in accordance with Section 07 62 00 - Sheet Metal Flashing and Trim.
- .4 Liquid Foam Insulation: Single component, moisture cure, low expansion rate spray-in-place polyurethane liquid foam insulation to ULC-S710.1 and in accordance with manufacturer's written recommendations.
- .5 Miscellaneous Components: Covers, copings, special flashings, filler pieces, termination pieces, cap closures, expansion joint covers, and metal bellows to match curtain wall system as indicated.

2.6 SHOP FABRICATION

- .1 Fabricate according to reviewed shop drawings with joints assembled tight and watertight sealed at moisture barrier using manufacturer provided assembly brackets to maintain integrity of joinery.

Part 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for curtain wall installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of the Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from the Consultant.
- .2 Commencement of work implies acceptance of previously completed work executed by others.

3.2 PREPARATION

- .1 Ensure masonry and concrete surfaces to receive adhesives and sealants are dry, firm, sound, smooth, suitable for bond, and free from loose material, projections, ice, frost, slick, grease, oil, and other matter detrimental to bond.
- .2 Remove dust and other loose material from openings.

3.3 INSTALLATION

- .1 Products shall be installed according to manufacturer's instructions and in conjunction with approved shop drawings. The work shall be performed by qualified skilled personnel ensuring proper equipment provided in order to expedite the project in an efficient professional manner.
- .2 Perform Work with skilled, qualified personnel using proper equipment to expedite project in an efficient professional manner.
- .3 Supply anchorage devices and inserts to appropriate trades where required for building in or casting-in-place and instruct as to proper location and position.
- .4 Erect Work plumb and true in proper alignment and relationship to established lines and grades.
- .5 Erection Tolerances - Maintain following tolerances:
 - .1 Maximum variation from plane or location shown on Shop Drawings: 1.6 mm (1/16") in 4420 mm (14'-6") of length.
 - .2 Maximum offset from true alignment between 2 identical members abutting end-to-end in line: 0.8 mm (1/32").
 - .3 Racking of face: 3 mm (1/8") maximum.
 - .4 Racking in elevation: nil.
 - .5 Deviation from true plumb over full height of building: maximum 6 mm (1/4").
 - .6 Deviation from true straightness in plane over full length of each building face; maximum 6 mm (1/4").
 - .7 Maximum variation in any column-to-column space or 6 m (20'-0") run: 3 mm (1/8").

- .8 Ensure tolerances of relationship of individual components are as follows:
 - .1 Member to member, maximum 0.4 mm (1/64").
 - .2 Out of plane between faces of 2 halves of split mullions, 0.8 mm (1/32").
- .9 Joint width, mullion snap-on cap to mullion snap-on cap; maximum 1.6 mm (1/16"). Ensure each joint is of uniform width.
- .10 Joint width between soffits and base and sill panels; maximum 3 mm (1/8") and of uniform width within a 3 m (10'-0") length. Do not apply sealants to joints between panels; use only "dry" gasket system of sealing.
- .11 Keep panel joints to a minimum and as shown. Ensure panel sizes are uniform and to direction of Consultant.
- .12 Tolerances are not cumulative.
- .13 Short length distortion ripples, edge distortions, "oil canning", "telegraphing of fasteners" and like will not be permitted. Make provisions to allow for differential thermal expansion between stiffeners, recessed slots and exposed metal of curtain wall system to take place without noise and without buckling of surface.
- .14 Dimensional tolerances of outer dimensions of panels: +/-0.8 mm in 1220 mm (+/-1/32" in 4'-0") measured at any point.
- .6 When elements are installed adjacent to one another, group components with such that shop-applied finishes most closely match one another with regard to colour and appearance.
- .7 Co-ordinate Work of this Section with and provide connection for compartmentalization of air spaces provided under other Sections. Co-operate and co-ordinate work of this Section with Section executing fire stopping and smoke seal work.
- .8 Provide thermal insulation and air/vapour barriers compatible and continuous with adjacent thermal and air/vapour barrier systems.
- .9 Ensure a uniform, continuous thermal and vapour barrier effect. Where adjacent insulation and vapour barriers are to be provided under other Sections, co-ordinate Work such that thermal and vapour barrier continuity is achieved.
- .10 Locate vapour barrier on warm-in-winter side of insulation.
- .11 Isolate metal air/vapour barriers with thermal breaks and spacers.
- .12 Gun-apply a continuous bead of sealant to joints and air/vapour barrier junctions with adjacent construction. Liberally butter screw fastenings with sealant.
- .13 Supply and install flexible, continuous membrane and gasket air/vapour barrier seals between work of this Section and adjacent construction and at deflection and expansion connections, where required. Apply membrane to concrete and masonry with adhesive and retain with continuous aluminum or galvanized steel plates or bars and non-corrosive mechanical fasteners. Vulcanize or overlap joints to ensure a continuous seal.
- .14 Provide air tight seals at penetrations in air/vapour barriers.
- .15 Cut insulation as required and fit snugly to penetrations, obstructions, openings and corners. Butt insulation boards tightly. Cut out back of board insulation as required to accommodate substrate irregularities and build up over cut out areas on other side as required to ensure thermal barrier uniformity unless otherwise indicated or approved.
- .16 Install insulation to thicknesses shown on Drawings.
- .17 Press insulation boards firmly and tightly to barrier or substrate impaling them on clips without bending clips. Butt insulation boards tightly at joints. Install retainers to clips.
- .18 Fill irregular shaped voids within assemblies with fibrous packing insulation to maintain continuity of thermal barrier.

- .19 Protect exterior finished surfaces by installing snap-on caps only when building is closed in and when possibility of damage due to construction has been minimized, to approval of Consultant.
- .20 Provide structural steel framing and supports required to support work of this Section.
- .21 Supply and install galvanized formed steel coping supports.
- .22 Supply and install flexible sheet waterproofing membrane at copings and parapets. Lap, adhere and seal joints in membrane in accordance with recommendations of membrane manufacturer to provide a watertight, continuous membrane.

3.4 GLAZING (CAPPED SYSTEM)

- .1 Clean rabbets, stops and glass edges of dust, dirt, moisture, oil and other foreign matter detrimental to glazing material adhesion. Ensure drainage holes are not blocked.
- .2 Mask surfaces subject to staining and wherever necessary to ensure neat appearance of glazing bead. Remove masking as work progresses.
- .3 Accurately size glass to fit openings allowing clearances following trade practises. Cut glass cleanly and carefully; nicks, damaged edge conditions will not be accepted. Replace glass that has nicked or otherwise damaged edges.
- .4 Replace defective materials and materials damaged due to faulty installation, careless handling or other causes resulting from work of this Section.
- .5 Remove glazing stops and replace in original locations, using original fasteners, securely set and accurately aligned.
- .6 Use shims, spacers and setting blocks of proper size to support and hold glass in position independent of glazing tape and gaskets. Place 2 setting blocks under each unit at quarter points. Place spacers located directly opposite each other on both sides of glass, at maximum 610 mm (24") centres and maximum 305 mm (12") from corners and uniformly spaced. Arrange shims, spacers, setting blocks and shims so as to avoid blocking water transfer inside frames.
- .7 Install preformed tapes to ensure complete contact on surface of glass, pressure plates and stops. Make joints only at corners of sash or frame. Fit tape accurately with tight joints, free from tension, without gaps and cracks.
- .8 Install glazing gaskets in continuous lengths between corners, not stretched and seal joints at corners to prevent entry of water and air movement.
- .9 At top of sealed glass units, at mid-point of rebate, supply and install 50 mm (2") wide finger compressible closed cell foam pad to prevent convection currents occurring within glazing rebate.
- .10 Set glass properly centred with uniform bite and face and edge clearance, free from twist, warp or other distortion likely to develop stress. Ensure bite is minimum 19 mm (3/4").
- .11 Handle and install glass in accordance with manufacturer's directions. Prevent nicks, abrasion and other damage likely to develop stress on edges.
- .12 Install glazing materials to obtain complete adhesion over full bite area of unit and to be free from gaps, air bubbles and embedded foreign matter. Use primer for elastomeric compounds. Use sufficient bedding compound so that when glass is pressed into place excess compound is forced well out around entire margin.
- .13 Ensure a weathertight and rattle-free seal for glass cushioning.
- .14 Ensure a continuous seal between glazed element and frame flush with sight line.
- .15 Sealants for this Section: Seal joints within glazed assemblies to maintain weather-tightness and integrity of air/vapour barrier. Seal junctions in sheet metal air/vapour barriers and between air/vapour barriers and adjacent construction.

- .16 Sealants if assigned by Contractor to this Section: Seal joints between frame assemblies and adjacent construction. Conform to requirements of Section 07 92 00.

3.5 FIELD QUALITY CONTROL

- .1 Field Inspection: Coordinate field inspection in accordance with Section 01 45 00 - Quality Control.
- .2 Structural Inspection: This Section shall engage a licensed engineer to inspect the work of this Section during erection and following completion, the engineer shall prepare a project closeout letter stating that the curtain wall system is installed in accordance with the design of the system.
- .3 Site Installation Tolerances:
 - .1 Variation from plumb: 12 mm per 30 m (0.5 inches per 100 feet) maximum.
 - .2 Misalignment of two adjacent panels or members: 0.8 mm (0.03 inches) maximum.
 - .3 Sealant space between curtain wall and adjacent construction: 13 mm (0.5 inches) maximum.

3.6 PROTECTION

- .1 Aluminium shall be isolated from concrete, mortar, plaster and dissimilar materials with a coating of Bituminous paint. Exposed aluminium surface shall be protected from long term contamination of mortar, concrete, paint, mud, etc. Doors and door frames shall be protected from impact damage by wood sheathing and plastic wraps.

3.7 NON-CONFORMING WORK

- .1 Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner

3.8 CLEANING

- .1 Progress Cleaning: Perform cleanup as work progresses in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave work area clean end of each day.
- .2 Final cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment [in accordance with Section 01 74 19 – Waste Management.
- .3 Waste Management:
 - .1 Co-ordinate recycling of waste materials with 01 74 19 - Construction Waste Management and Disposal.
 - .2 Collect recyclable waste and dispose of or recycle field generated construction waste created during construction or final cleaning related to work of this Section.
 - .3 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .4 Interim and final cleaning shall be performed in accordance with the general conditions listing methods outlined in AAMA 609 & 610-02 (2002)

END OF SECTION

Part 1 General**1.1 RELATED WORK**

- .1 Section 03 30 00 Concrete – footings, foundations and flatness tolerance for floor slab.
- .2 Section 05 12 23 Structural Steel For Buildings
- .3 Section 05 50 00 Metal Fabrications – independent fabrication for support of operable partition.
- .4 Section 06 10 00 Rough Carpentry
- .5 Section 09 22 16 Non-Structural Metal Framing
- .6 Section 09 22 17 Framing Ceiling and Bulkhead
- .7 Section 09 58 00 Ceiling Assemblies

1.2 WORK INCLUDED IN THE SCOPE OF THIS SECTION

- A. This Section includes the design, supply and installation of the following:
 - .1 Manually operated, paired panel operable partition.

1.3 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM E557 Standard Practice for Architectural Application and Installation of Operable Partitions.
 - .2 ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - .3 ASTM E84 - Surface Burning Characteristics of Building Materials.
 - .4 ASTM E413 - Classification for Rating Sound Insulation
- .2 Health Product Declaration Collaborative
 - .1 Health Product Declaration Open Standard v2.1
- .3 International Standards Organization
 - .1 ISO 14021 - Environmental Labels and Declarations - Self-Declared Environmental Claims (Type II Environmental Labeling).
 - .2 ISO 14025:2011-10, Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures.
 - .3 ISO 14040:2009-11, Environmental Management - Life Cycle Assessment - Principles and Framework.
 - .4 ISO 14044:2006-10, Environmental Management - Life Cycle Assessment - Requirements and Guidelines.
 - .5 ISO 21930 – Sustainability in Buildings and Civil Engineering Works — Core Rules for Environmental Product Declarations of Construction Products and Services.

1.4 QUALITY ASSURANCE

- .1 Installer Qualifications: An experienced installer who has evidence of training by means of Certificates and evidence of qualification which is endorsed by the partition manufacturer. Certificates and endorsements must be submitted as part of the Shop Drawing submission. The training program attended by the installer must have been associated with partitions of similar size and characteristics when compared with this Project.
- .2 Acoustical Performance:
 - .1 the operable partitions designs must have been tested in an independent acoustical laboratory in accordance with the ASTM E90 test procedure and subsequently classified in accordance with the requirements of ASTM E413.
 - .2 The test results must have attained no less than the STC rating specified herein.
 - .3 This Section shall provide a complete and unedited written test report prepared by the testing laboratory as part of the Shop Drawing submission.

- .3 The preparation of the opening shall conform to the criteria set forth within ASTM E557 Standard Practice for Architectural Application and Installation of Operable Partitions.
- .4 The operable wall must be manufactured by a certified ISO-9001-2015 company or an equivalent quality control system.
- .5 Indoor Air Quality:
 - .1 The operable partition, movable wall manufacturer's non-wood products must meet the SCS Indoor Advantage Gold Certification or equivalent. This approval guarantees conformance to indoor air concentrations meeting Indoor Advantage Gold Indoor Air Quality Certified to SCS-105 v4.2-2023 Conforms to ANSI/BIFMA M7.1 and X7.1 and the CDPH/EHLB Standard Method (CA 01350) v1.2-2017 conducted in an independent third-party air quality testing laboratory.

1.5 WARRANTY

- .1 Manufacturer of operable partition shall provide a warranty which consents to repair or replacement of any components found to have manufacturing defects.
- .2 Warranty period: Ten (10) years.

1.6 ACTION AND INFORMATIONAL SUBMITTALS:

- .1 Make submittals in accordance with Contract Conditions and Section 01 33 00 - Submittal Procedures.
- .2 Prior to fabrication, submit Product Data Sheets which shall display the following as a minimum:
 - .1 The manufacturer's letterhead.
 - .2 Submit product data including manufacturer's literature and Product Data Sheets that indicate compliance with specified requirements and material characteristics. Include as necessary, separate Data Sheets that describe components and accessories.
 - .3 List of materials and components with descriptions or diagrams. Highlight all accessories necessary to install the partition within the space provided and according to the design provided on the Contract Documents.
 - .4 Include product names, types and series numbers.
 - .5 Include contact information for manufacturer and their representative for this Project.
- .3 Prior to Fabrication Submit Shop Drawings:
 - .1 Shop Drawings shall illustrate and describe the location and extent of operable partitions. Include plans, elevations, sections, details, attachments to other construction, and accessories.
 - .2 Indicate dimensions, weights, conditions at openings, and at partition storage areas, and required installation, storage, and operating clearances.
 - .3 Indicate location and installation requirements for hardware and track, including the required floor tolerances for flatness and direction of travel.
 - .4 Indicate blocking, if necessary, which would be provided by Section 06 10 00.
- .4 Setting Drawings:
 - .1 Show imbedded items and cutouts required in other work, including support beam punching template.
- .5 Prior to Fabrication Submit Samples:
 - .1 Submit duplicate Colour Verification Samples demonstrating the full range of finishes available to the Architect. Verification samples must be provided in the same thickness and material indicated for the work.
- .6 Prior to Fabrication Submit Test Reports:
 - .1 Provide a complete and unedited, written, reports that document the results of sound transmission testing for partition test specimens that match the product intended for this Project.
 - .2 .Manufacturer's Instructions:

- .3 Written documentation of installation, storage and other related instructions for optimum installation.
- .7 Prior to Fabrication and together with Shop Drawings, Provide Warranty Documentation:
 - .1 Provide a draft copy of the Warranty with a 10-year period next following Substantial Performance of the Contract.
- .8 Prior to Project Closeout:
 - .1 Provide a final, executed copy of the Warranty with the date of Warranty commencement and the name of the installer disclosed with contact information.

1.7 CLOSEOUT SUBMITTALS

- .1 Maintenance Data: For subsequent periodic maintenance, submit copy of AAMA 609 and 610-02 "Cleaning and Maintenance Guide for Architecturally Finished Aluminum".
- .2 Prior to Project Closeout:
 - .1 Provide a final, executed copy of the Warranty with the date of Warranty commencement and the name of the installer disclosed with contact information.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Store components to permit natural ventilation over finished surfaces.
- .2 Under conditions of high humidity, supply heating or forced air ventilation to prevent accumulation of surface moisture.
- .3 Clearly mark packages and panels with numbering systems used on Shop Drawings. Do not use permanent markings on panels.
- .4 Protect panels during delivery, storage, and handling to comply with manufacturer's direction and as required to prevent damage.

1.9 WASTE MANAGEMENT:

- .1 Separate and recycle waste packaging materials in accordance with Section 01 74 19 - Construction Waste Management and Disposal.
- .2 Remove waste packaging materials from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper and plastic material in appropriate on-site storage containers for recycling in accordance with Waste Management Plan.

Part 2 PRODUCTS

2.1 SYSTEMS:

- .1 Basis of Design:
 - .1 Manufacturers: Subject to compliance with requirements, provide products by the following:
 - .1 Modernfold, Inc. distributed in Ontario by Bravura Interiors Ltd.
 - .2 Products: Subject to compliance with the requirements, provide the following product:
 - .1 OP-01: Acousti-Seal Encore – Paired Panel: Manually operated paired panel operable partition.
 - .2 Substitutions:
 - .1 Not permitted; however, requests for substitutions will be considered providing substitute products and methods of execution are submitted at least 10 days prior to bid closing date.

- .1 To be considered, all such submissions shall have accompanied with them, evidence substantiating similarity in quality and performance, including technical data sheets, testing reports demonstrating thermal and wind-bearing characteristics and a formal 3-Part Specification.

2.2 OPERATION

- .1 OP-01: Acousti-Seal Encore – Paired Panel: Series of paired flat panels hinged together in pairs, manually operated, top supported with operable floor seals and automatic top seals.
- .2 Final Closure:
 - .1 OP-01: Horizontally expanding panel edge with removable crank

2.3 PANEL CONSTRUCTION

- .1 Nominal 4-1/4-inch (108 mm) thick panels in manufacturer's standard 51-inch (1295 mm) widths.
- .2 All panel horizontal and vertical framing members fabricated from minimum 16-gauge, formed steel with overlapped and welded corners for rigidity. Top channel shall be reinforced to support suspension system components.
- .3 The frame shall be designed such that all vertical edges of panels are of formed steel and these edges shall provide concealed protection of the edges of the panel skin.
- .4 Panel skin shall be:
 - .1 OP-01: Roll-formed steel wrapping around panel edge. Panel skins shall be lock-formed and welded directly to the frame for unitized construction.
 - .2 Acoustical ratings of panels with this construction minimum:
 - .1 0.95 NRC (51 STC) – achieved with 16-gauge micro-perforated steel.
- .5 Hinges for Panels, Pass Doors, and Pocket Doors shall be:
 - .1 OP-01: Concealed laminated hinge with antifriction segments mounted between each heat-treated link. Hinge to be attached directly to panel frame. Welded internal hinge bracket shall support the hinge and allow for adjustment of hinge plates. Lifetime Warranty on hinges. Concealed hinges mounted into panel edge or vertical astragal are not acceptable.
- .6 Panel Trim: No vertical or horizontal trim must be required and no trim exposed to view is permitted on edges of panels; the design must establish a minimal groove appearance at panel joints.
- .7 Panel Weights:
 - .1 OP-01: .95 NRC (51 STC) – the weight of the panels shall be no more than 10.3 pounds per square foot of panel face area.
 - .1 To be considered, all such submissions shall have accompanied with them, evidence substantiating similarity in quality and performance, including technical data sheets, testing reports demonstrating thermal and wind-bearing characteristics and a formal 3-Part Specification.

2.4 PANEL FINISH

- .1 Panel finish shall be factory applied, Class "A" rated material. Finish shall be:
- .2 Panel Trim: Exposed panel trim of one consistent color:
 - .1 OP-01, selected from manufacturer's standard range.

2.5 SOUND SEALS

- .1 Vertical Interlocking Sound Seals between panels: Aluminum astragals, with tongue and groove configuration in each panel edge. Rigid plastic astragals are not acceptable.
- .2 Horizontal Top Seals shall be Modernfold SureSet automatic operable top seals, manually operated top seals are not required and they are not permitted.

- .3 Horizontal bottom floor seals shall be Modernfold Sureset bottom seal:
 - .1 OP-01: SM2 - Manually activated seals providing nominal 2-inch (51 mm) operating clearance with an operating range of +1/2-inch (13 mm) to -1-1/2-inch (38 mm). Seal shall be operable from panel edge or face. Extended seal shall exert nominal 120 pounds (54 kg) downward force to the floor throughout operating range.

2.6 SUSPENSION SYSTEM

- .1 OP-01: number 17 Suspension System:
 - .1 Suspension Tracks: Minimum 11-gauge, 0.12-inch (3.04 mm) roll-formed steel track, suitable for either direct mounting to a wood header or supported by adjustable steel hanger brackets, supporting the load-bearing surface of the track, connected to structural support by pairs of 0.38-inch (10 mm) diameter threaded rods. Aluminum track is not acceptable.
 - .1 Exposed track soffit: Steel, integral to track, and pre-painted white to match adjacent ceilings.
 - .2 Carriers: One all-steel trolley equipped with multiple steel tires mounted on wheels which are equipped with ball bearings. Each panel (except hinged panels) shall have such trolleys. Non-steel tires are not acceptable.
 - .3 Warranty period: Ten (10) years.

2.7 POCKET DOORS

- .1 Accessories Required:
 - .1 OP-01: Pocket Doors: Acousti-Seal Pocket Doors by Modernfold, Inc., with same construction, finish, and appearance as the adjacent panels.
 - .1 Product shall be legacy pocket door with tested 50 STC results.

Part 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions:
 - .1 Attend the site prior to installation of ceiling and flooring finishes to verify condition of suspension structure and flatness of the concrete sub-floor.
 - .2 Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for operable partition installation. Conditions on the site shall match the conditions specified by the manufacturer's written instructions.
 - .3 Visually inspect suspension beam and columns, allocated storage space, concrete floor substrate in presence of the Contractor.
 - .4 Inform Contractor and Consultant of unacceptable conditions immediately upon discovery.
 - .5 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from the Consultant.
- .2 Commencement of work implies acceptance of previously completed work executed by others.

3.2 INSTALLATION

- .1 General: Comply with the requirements of ASTM E557, operable partition manufacturer's written installation instructions, Contract Documents and reviewed Shop Drawings.
- .2 Install operable partitions and accessories after other finishing operations, including painting have been completed.
- .3 Match operable partitions by installing panels from marked packages in numbered sequence indicated on Shop Drawings.
- .4 Broken, cracked, chipped, deformed or unmatched panels are not acceptable.

3.3 CLEANING AND PROTECTION

- .1 Clean partition surfaces upon completing installation of operable partitions to remove dust, dirt, adhesives, and other foreign materials according to manufacturer's written instructions.
- .2 Provide final protection and maintain conditions in a manner acceptable to the manufacturer and Installer that ensure operable partitions are without damage or deterioration at time of Substantial Completion.

3.4 ADJUSTING

- .1 Adjust operable partitions to operate smoothly, easily, and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and other moving parts.

3.5 EXAMINATION

- .1 Examine flooring, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable partitions. Proceed with installation only after unsatisfactory conditions have been corrected.

3.6 DEMONSTRATION

- .1 Demonstrate proper operation and maintenance procedures to Owner's Designee.
- .2 Provide Operation and Maintenance Manual to Architect and Owner's Designee.

3.7 CLEANING

- .1 Progress Cleaning: Perform cleanup as work progresses in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave work area clean end of each day.
- .2 Final cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 19 – Waste Management.
- .3 Waste Management:
 - .1 Co-ordinate recycling of waste materials with 01 74 19 - Construction Waste Management and Disposal.
 - .2 Collect recyclable waste and dispose of or recycle field generated construction waste created during construction or final cleaning related to work of this Section.
 - .3 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION