# 410 Sunset Drive

## Functional Servicing Report

**Project Location:**

410 Sunset Drive
Central Elgin, Ontario

**Prepared for:**

Quincy Developments
1055 Fanshawe Park Road
London, ON N6G 0W7

**Prepared by:**

MTE Consultants
123 St. George Street
London, ON N6A 3A1

**July 11, 2022**

**MTE File No.: 51252-100**

*Engineers, Scientists, Surveyors.*

# Contents



## Appendices

# 1.0 Introduction

## 1.1 Overview

MTE Consultants Inc. (MTE) was retained by Quincy Developments, to prepare a Functional Servicing Report (FSR) in support of Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBA). The 410 Sunset Drive properties are collectively referred to herein as the 'Subject Lands'.

The Subject lands are located in the Municipality of Central Elgin, legally, lot 3, concession 6, geographic Township of Yarmouth. The subject site consists of 1.86ha generally bounded by Sunset Drive to the east, Karen Street to the south, CN Railway to the west, and exiting commercial property to the north.

A Preliminary Design Report for the proposed development has been prepared by EDGE Architects Ltd. (June 30, 2022) and forms the basis for this functional servicing report. The Site Plan includes two residential buildings, a 4-storey building and a 6-storey building with a total of approximately 177 units, landscaped areas, interior and exterior amenity spaces, a total of 215 proposed parking spaces, and an existing municipal sanitary pumping station.

This report recommends a servicing strategy for the proposed Subject Lands and outlines how the site plan can be developed on full municipal services, including sanitary sewers, domestic water distribution, and storm sewers. The City of St. Thomas Design Guidelines Manual (2022) was used for the design criteria.

The Site Plan will be constructed in two phases and this report addresses the full buildout of the development (Phase 2) support of OPA and ZBA.

## 1.2 Background Information

This report should be read in conjunction with the following supporting documents:

- *Sunset Road Rehabilitation, Sheet 23 to 26,* by Spriet Associates, dated October 2007;
- *Norman Subdivision Drains – North, drawings 1 to 6,* by Spriet Associates, dated February 1991;
- *Sunset Drive Wastewater Pumping Station and Forcemain, Sheet R001 and PP004,* by Dillon Consulting, dated December 2009;

# 2.0 Existing Conditions

## 2.1 Pre-Development Conditions

The Subject Lands are ultimately located within the Kettle Creek Watershed. Subject lands are split in two watersheds, the south watershed drains to Norman Subdivision Drain, and the north watershed is collected in the existing 1050mmØ storm sewer conveying flows north to an existing drain.

The subject lands currently consist of landscaped areas, a two-story office building, a right of way, a parking lot and the municipal sanitary pumping station.

# 3.0 Proposed Development

The Site Plan consists of the following:

- Two residential buildings, a 4-storey and a 6-storey building;
- Parking lot with a total of 215 parking spaces;
- Existing municipal sanitary pumping station facilities;
- Landscaped areas, common outdoor amenity space;
- Walkways, emergency access;
- Fire routes;

The existing two-story office building will be demolished in Phase 2 of construction.

The 4-storey building consists of approximately 105 units, and the 6-storey building consists of approximately 72 units, bringing the site total to 177 units. Applying the City's criteria of 3 people/unit, the total estimated population is 531 people.

Please refer to **Appendix A** - **EDGE – Design Report,** dated June 30, 2022.

# 4.0 Municipal Servicing

## 4.1 Sanitary Servicing

Existing sanitary infrastructure consists of the municipal sanitary pumping station in the southeast corner of the site, an abandoned 375mmØ sanitary sewer in the subject lands, and a municipal 300mmØ sanitary sewer along the south border of the site conveying flows west to east to the existing pumping station.

Manhole 'A' has a sanitary stub on the north side which can be used to tie in the sanitary flows from the subject lands. A connection can be made anywhere upstream of the pumping station as the City has indicated that there is capacity in the pumping station to service the development.

Based on the preliminary number of units and the total population estimate, the peak expected sanitary flows from the subject lands are 6.27 l/s. Please refer to **Appendix B** for the detailed sanitary flow calculations.

## 4.2 Water Distribution

Existing water supply infrastructure consists of the municipal 300mmØ watermain on Sunset Drive.

Both residential buildings can be serviced with individual connections to the 300mmØ watermain on Sunset Drive.

Based on the preliminary number of units and the total population estimate, the total site average day demand is 2.77 l/s, total max day demand is 9.68 l/s, and the total peak hour demand is 21.57 l/s. Please refer to **Appendix B** for the detailed water supply demand calculations. Based on the peak hour demand for the preliminary number of units and population, it is proposed to service each building with a 100mm connection.

The building is anticipated to be protected with sprinklers and as a result the fire flow requirements are as follows.

- This development has a light hazard occupancy classification for which the acceptable flow at the base of the riser (including hose stream allowance) is 750 gpm (47.33 L/s) per NFPA 13-Table 11.2.2.1. This flow rate is considered conservative and is intended to be higher than the actual sprinkler design requirements when they become available. This will need to be verified by the development's mechanical engineer once the information is available.

Specifics of the fire protection, final connection sizes, and the available water supply system pressures will be analyzed at the detailed design stage.

## 4.3 Stormwater Management

### 4.3.1 Criteria

The stormwater management design criteria for the subject site, as established by the City are as follows:

- Attenuation of the post-development peak flows for the 5 and 100-year storm events to the pre-development flow rates;
- Implementation of water quality controls.

### 4.3.2 Methodology

In order to successfully complete the stormwater management design for this site, the following specific tasks were undertaken:

- Calculated the allowable runoff rates using Rational Method for the 5-year and 100-year predevelopment conditions;
- Determine the Site's runoff coefficient;
- Calculated post-development runoff using Rational Method;
- Sized orifice to attain the required storage for runoff control;

### 4.3.3 Allowable Pre-Development Flow Rate

The allowable pre-development flow rate was calculated based on the existing conditions, breaking down the area into two watersheds, watershed A1 draining to the existing 1050mmØ storm sewer conveying flows north, and watershed A2 draining south to the Norman Subdivision Drain. MTE completed area take off measurements based on the existing conditions. Surfaces and approximate cumulative areas for Area A1 are summarized as follows:

Impervious Area: 2,659 $m^2$

Pervious Area: 5,393 $m^2$

Total: 8,052 $m^2$

Surfaces and approximate cumulative areas for Area A2 are summarized as follows:

Impervious Area: 891 $m^2$

Pervious Area: 9690 $m^2$

Total: 10521 $m^2$

Applying a runoff coefficient of 0.25 for pervious surfaces and 0.9 for the impervious surfaces, weighted runoff coefficients of 0.46 for Area A1 and 0.26 for Area A2 were calculated.

Based on the pre-development runoff coefficients and using a Time of Concentration (Tc) of 15 minutes per City's criteria, the allowable pre-development 5-year flow rate for Area A1 was calculated to be approximately 85.25 l/s. Using the same area, 'c' value, and Tc, the 100-year design flow rate was calculated to be 141.16 l/s.

Based on the pre-development runoff coefficients and using a Time of Concentration (Tc) of 15 minutes per City's criteria, the allowable pre-development 5-year flow rate for Area A2 was calculated to be approximately 61.20 l/s. Using the same area, 'c' value, and Tc, the 100-year design flow rate was calculated to be 101.34 l/s.

Flows from the post-development Area A3, that generally matches the pre-development Area A1, will be controlled and conveyed to the same 1050mmØ existing storm sewer. MTE completed area take off measurements based on the proposed site plan. Surfaces and cumulative areas for Area A3 are summarized as follows:

Impervious Area: 5,332 $m^2$

Pervious Area: 2,640 $m^2$

Total: 7,972 $m^2$

Flows from the post-development Area A4, that generally matches the pre-development Area A2, will be controlled and conveyed to the same Norman Subdivision Drain south of the site.

MTE completed area take off measurements based on the proposed site plan. Surfaces and cumulative areas for Area A4 are summarized as follows:

Impervious Area: 6,381 $m^2$

Pervious Area: 4,219 $m^2$

Total: 7,972 $m^2$

Applying a runoff coefficient of 0.25 for pervious surfaces and 0.9 for the impervious surfaces, weighted runoff coefficients of 0.68 for Area A3 and 0.64 for Area A4 were calculated.

As the proposed coefficient exceeds the pre-development coefficients, on-site storage will be required to attenuate flows from the 5 to 100-year events to design levels.

### 4.3.4 Quantity Controls

An orifice plate installed over the outlet of each post-development area are proposed to control flows from the site to the allowable 5-year flow rates for both post-development areas.

An extended rational method analysis was completed to determine the storage volume required to attenuate runoff from the 5 and 100-year event to the target release rates for Area A1 and Area A2, respectively. The analysis showed that approximately 90.82 $m^3$ would be required in Area A3, and approximately 143.52 $m^3$ would be required in Area A4. If during detailed design the total areas going to each existing outlet are revised these calculations will need to be updated to reflect any changes to the quantity storage requirements.

### 4.3.5 Quality Controls

Quality control for both post-development areas are proposed to be provided by OGS units sized to provide a minimum of 'Normal' level of quality control (70% TSS removal). Based on the size and coverage of the proposed site, a Stromceptor EFO4 was selected to provide quantity control for Area A3 and a Stormceptor EFO4 was selected to provide quantity control for area A4. Specifications for the proposed units are attached. Any changes to the proposed areas and/or imperviousness will require a re-assessment of the selected OGS unit.

# 5.0 Summary

The main findings of the Functional Servicing Report for the Subject Lands are:

1. Water Supply will be provided by two separate connections to the existing 300mmØ watermain on Sunset Drive.
2. Sanitary flows will be conveyed to the existing 300mmØ sanitary sewer on Karen Street which conveys flows east to the existing municipal sanitary pumping station.
3. The existing site is split into two watersheds in the pre-development condition and the same split will be preserved in post-development. Flows will be controlled with orifice plates. 5-year to 100-year flows will be stored in the parking lot ponding areas. Quality control is proposed to be provided by OGS units, Stormceptor EFO4, for both post-development areas.

We trust this meets your requirements. Should you have any questions or require anything further, please do not hesitate to contact the undersigned.

All of which is respectfully submitted;

**MTE Consultants Inc.**


**Bogdan Pavlovic, MESc., P.Eng.**
Design Engineer
519-204-6510 ext. 2266
bpavlovic@mte85.com

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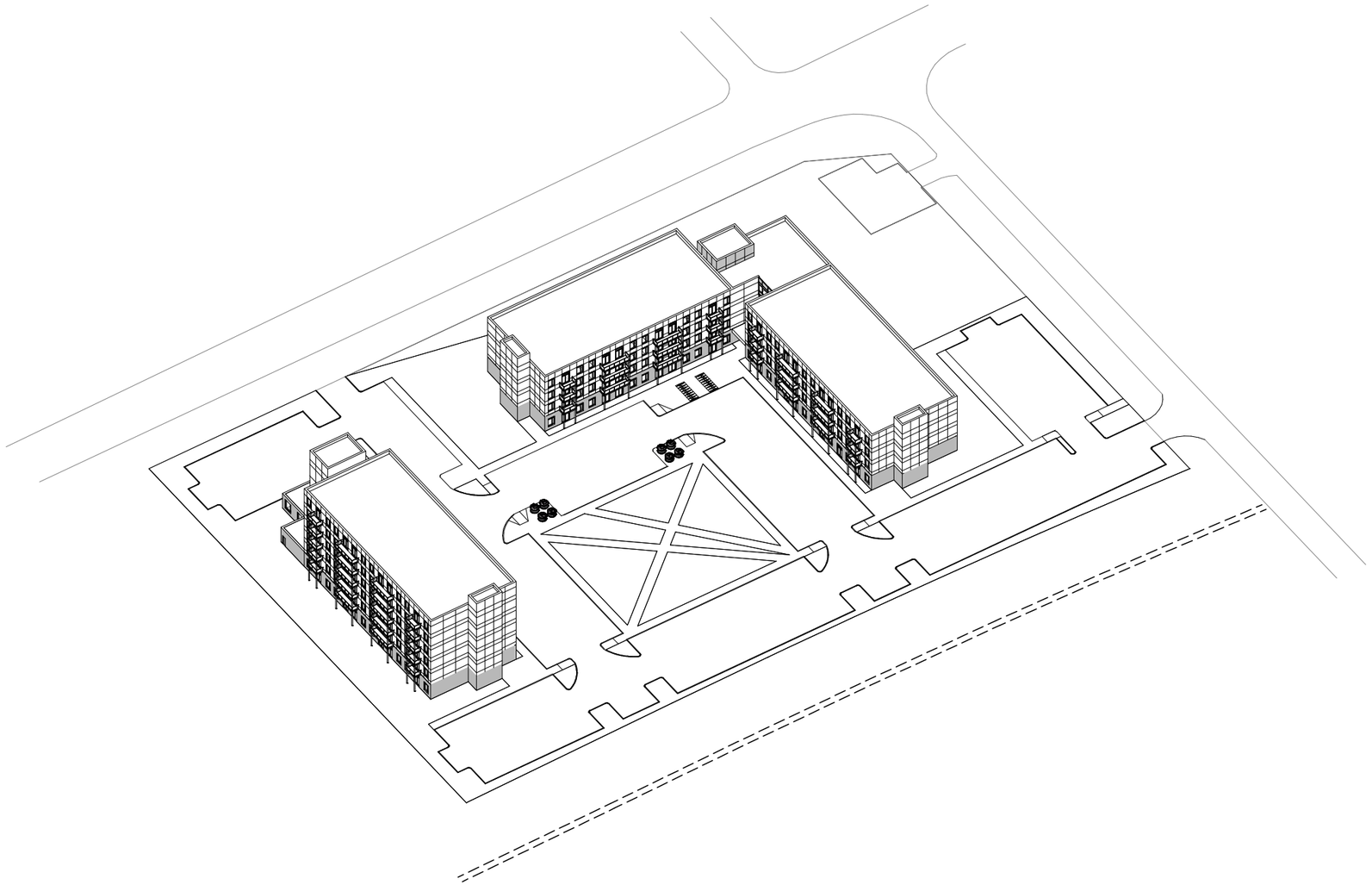
# Appendix A

# EDGE Design Report

EDGE
ARCHITECTS LTD

210-137 GLASGOW STREET
KITCHENER, ON
N2G 4X8

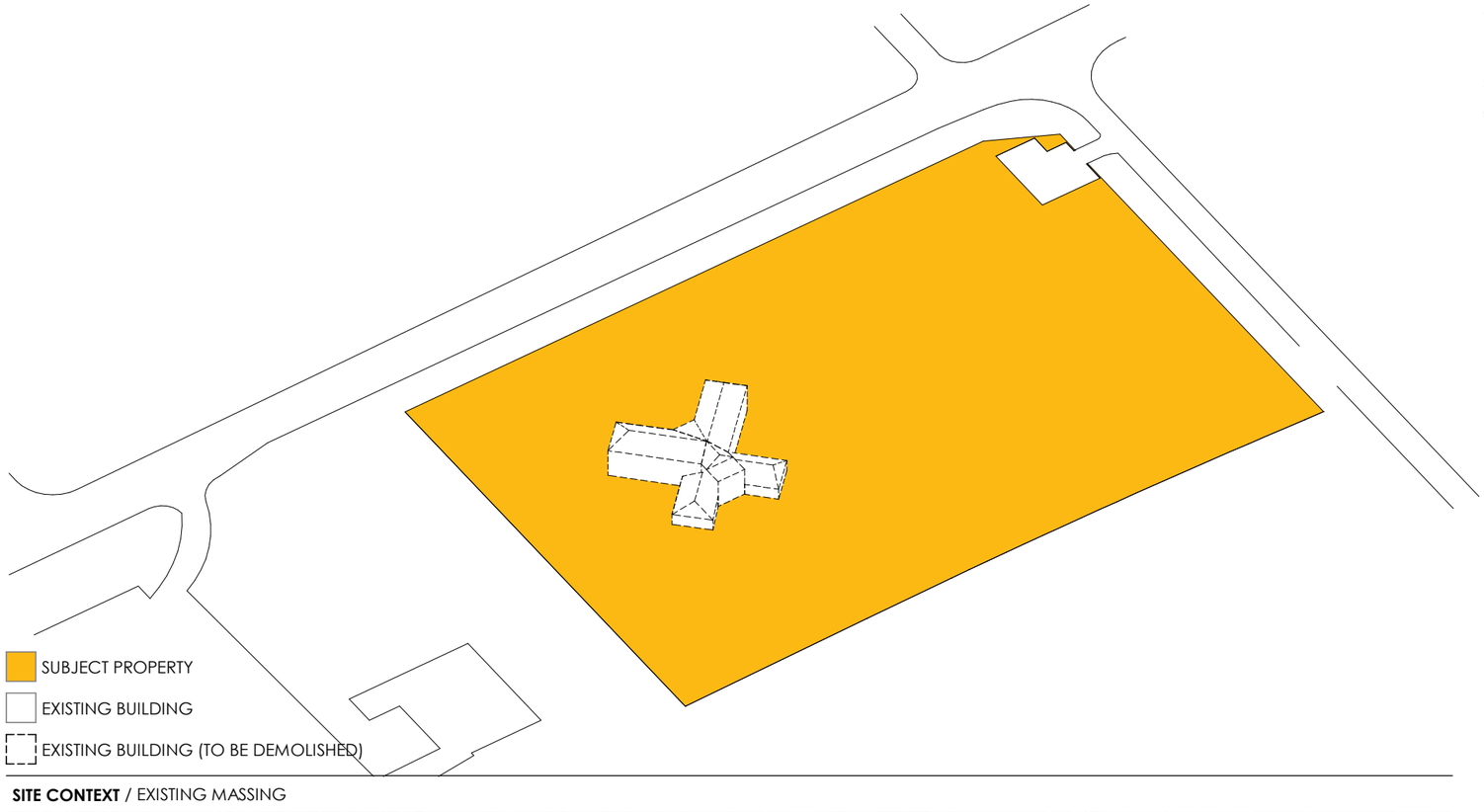
info@edgeltd.ca
www.edgeltd.ca



# DESIGN REPORT

22005 - 410 SUNSET DR MULTI-RES - 2022.06.30

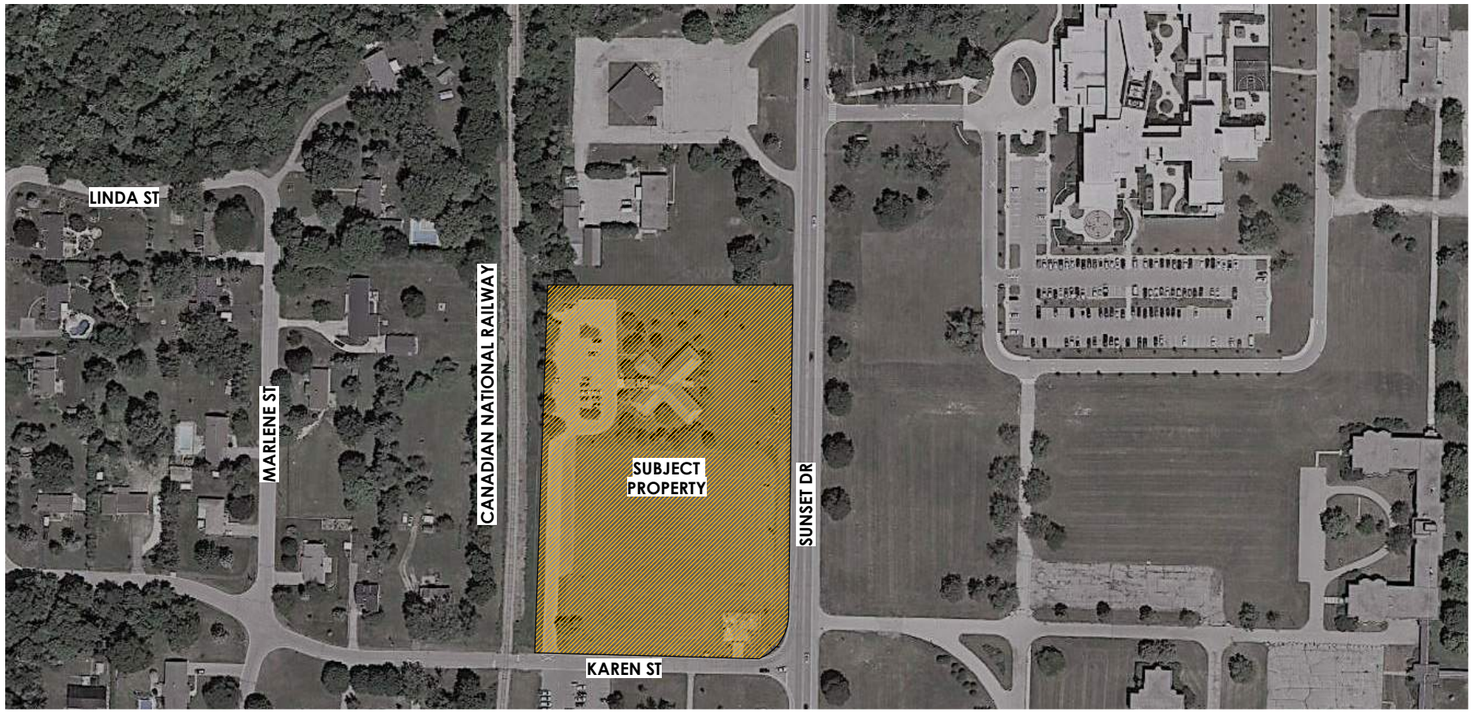
EDGE
ARCHITECTS LTD




**SITE CONTEXT** / EXISTING MASSING

**SITE CONTEXT** / VIEW FROM SUNSET DR & KAREN STREET

**SITE CONTEXT** / VIEW FROM SUNSET DR




**SITE CONTEXT** / AERIAL VIEW

PROJECT NO.
22005

PROJECT NAME
410 SUNSET DR
MULTI-RES

410 SUNSET DR
ST. THOMAS, ON

DRAWING TITLE
SITE CONTEXT

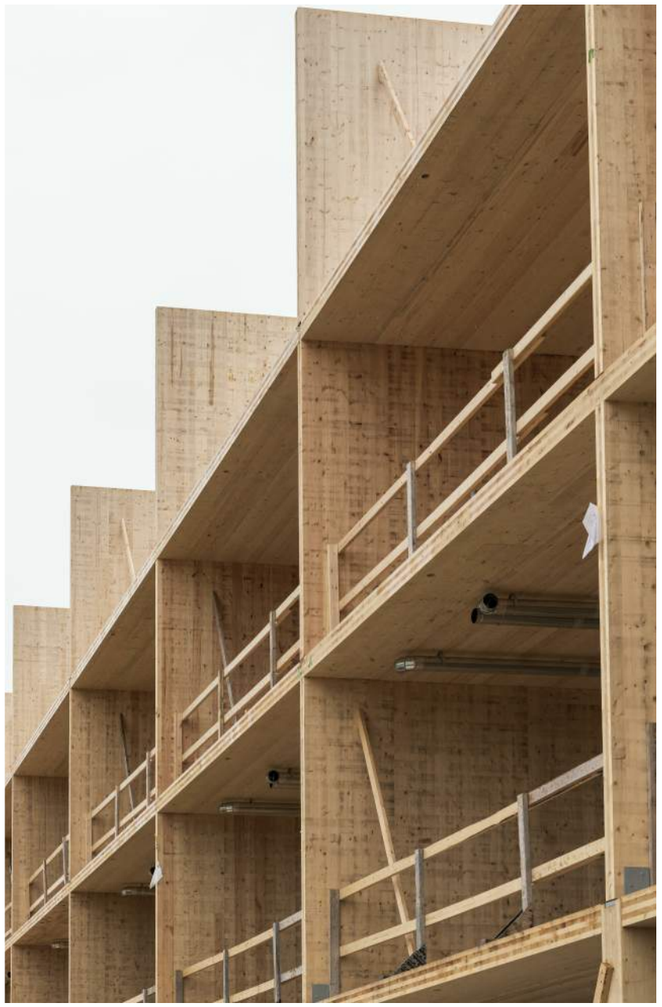
SCALE N.T.S.

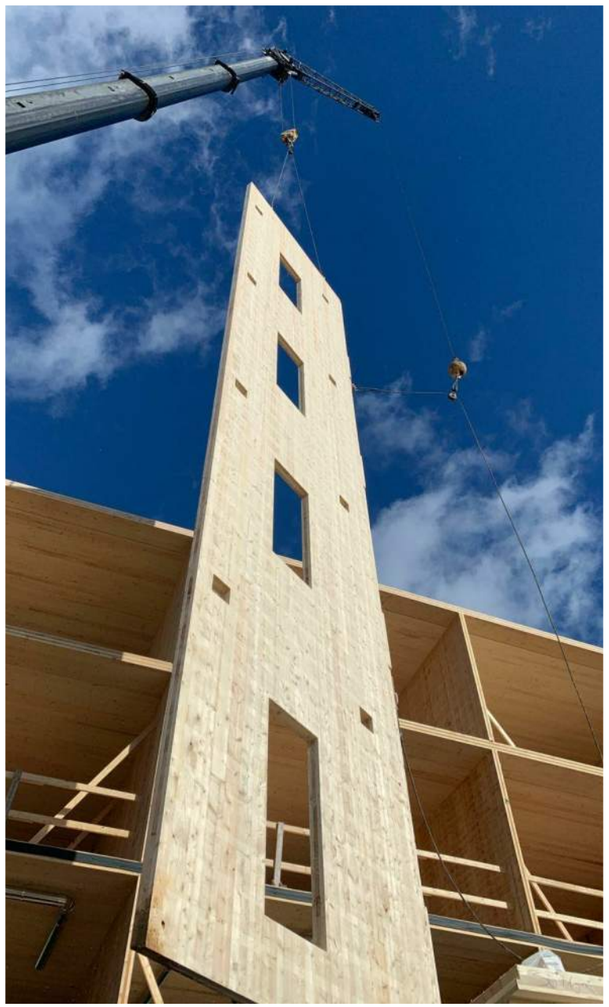
ISSUED FOR
SCHEMATIC DESIGN

DATE 2022.06.30

1.1

EDGE
ARCHITECTS LTD





PROJECT NO.
22005

PROJECT NAME
410 SUNSET DR
MULTI-RES

410 SUNSET DR
ST. THOMAS, ON

DRAWING TITLE
REFERENCE
IMAGES

SCALE N.T.S.

ISSUED FOR
SCHEMATIC
DESIGN

DATE 2022.06.30

1.2

SUNSET DRIVE (#4)

EDGE OF ASPHALT

EDGE OF SHOULDER

EDGE OF ASPHALT

EDGE OF SHOULDER

EXISTING HYDRO POLE (TYP.)

HP

N0°50'30"E 26.97' (8.221)

N0°50'30"E 79.10' (24.110)

N0°50'30"E 46.24' (14.094)

N0°50'30"E 86.62' (26.402)

N89°09'30"W 17.49' (5.331)

N0°50'30"E 251.02' (76.512)

N0°50'30"E 12.29' (3.746)

N27°24'40"E 55.89' (17.035)

N12°15'25"E 88.37' (26.936)

EXISTING UNDERGROUND STM LINE

N12°15'25"E 211.17' (64.365)

EXISTING BUILDING SIGNAGE

LANDSCAPE

N89°09'30"W 90.43' (27.563)

N39°36'30"W 139.39' (42.487)

EXISTING UNDERGROUND STM LINE

N39°36'30"W 200.15' (61.006)

EXISTING SEPTIC BED

EXISTING PUMPING STATION

EXISTING CONCRETE CURB

CB

1-STOREY AMENITY

N89°09'30"W 39.42' (12.015)

CONC. SIDEWALK

BIKE RACKS (18)

114

109

1-STOREY ENTRANCE

POSSIBLE ACCESS FROM PARKING TO ENTRANCE

(PHASE 1) 4 DEEP WELL WASTE RECEPTACALES

89

N89°09'30"W 310.88' (94.757)

EXISTING WELL

EXISTING LANDSCAPING

EXISTING 2-STOREY OFFICE BUILDING

108

102

101

PROPOSED 4-STOREY RESIDENTIAL BLDG. (105 UNITS)

N87°46'35"W 271.79' (82.843)

EXISTING UNDERGROUND STM LINE

EXISTING UNDERGROUND SANITARY LINE

N88°21'10"W 271.76' (82.833)

N89°08'W 247.87' (75.552)

ROUGH-IN FOR FUTURE COVERED CHARGING STATIONS AND SOLAR ARRAYS

ROUGH-IN FOR FUTURE COVERED CHARGING STATIONS AND SOLAR ARRAYS

KAREN STREET

CB

22

1

OUTDOOR AMENITY AREA

EXISTING CONCRETE SIDEWALK

FIRE ROUTE

CONC. SIDEWALK

N89°09'30"W 243.73' (71.547)

CB

90

75

N1°49'40"E 66.00' (20.117)

EXISTING UNDERGROUND SANITARY LINE

12

11

CONC. SIDEWALK

EXISTING UNDERGROUND STM LINE

45+/- PARKING SPACES

74

69

57

43

N89°08'W 62.43' (19.029)

EXISTING WASTE/ RECYCLE BIN LOCATION

EXISTING ASPHALT PARKING

FIRE ROUTE

LANDSCAPE

EXISTING TREES (TYP.)

N1°35'46"E R=6271.17' (1911.476) ARC=200.48' (61.107) CHORD=200.48' (61.107)

N3°01'38"E R=6271.17' (1911.476) ARC=112.80' (34.382) CHORD=112.80' (34.382)

68

61

60

58

42

23

N89°08'W 33.04' (10.071)

N0°03'W 159.50' (48.616)

N0°18'53"E R=6238.17' (1901.417) ARC=79.45' (24.217) CHORD=79.45' (24.217)

N2°07'04"E R=6238.17' (1901.417) ARC=313.26' (95.483) CHORD=313.23' (95.474)

CANADIAN NATIONAL RAILWAY

CANADIAN NATIONAL RAILWAY

EDGE ARCHITECTS LTD

TRUE PROJECT

PROJECT NO.
22005

PROJECT NAME
410 SUNSET DR MULTI-RES

410 SUNSET DR
ST. THOMAS, ON

DRAWING TITLE
SITE PLAN (PHASE 1)

SCALE 1 : 550

ISSUED FOR
SCHEMATIC DESIGN

DATE 2022.06.30

1.3a

SUNSET DRIVE (#4)

EDGE OF ASPHALT

PROPOSED DRIVEWAY

EDGE OF SHOULDER

EXISTING HYDRO POLE (TYP.)

N0°50'30"E 26.97' (8.221)

N0°50'30"E 79.10' (24.110)

N0°50'30"E 46.24' (14.094)

N0°50'30"E 86.62' (26.402)

HP

N89°09'30"W 17.49' (5.331)

N0°50'30"E 251.02' (76.512)

N0°50'30"E 12.29' (3.746)

N27°24'40"E 55.89' (17.035)

N12°15'25"E 88.37' (26.936)

N12°15'25"E 211.17' (64.365)

EXISTING UNDERGROUND STM LINE

EXISTING SEPTIC BED TO BE REMOVED

91300

LANDSCAPE

3322

5170

215

206

195

3193

N89°09'30"W 90.43' (27.563)

3193

N39°36'30"W 139.39' (42.484)

EXISTING UNDERGROUND STM LINE

N39°36'30"W 200.15' (61.004)

205

196

FIRE ROUTE

1-STOREY ENTANCE + AMENITY

N89°09'30"W 39.42' (12.015)

SECURE BIKE STORAGE

186

1-STOREY AMENITY

BIKE RACKS (18)

158

150

(PHASE 2) 4 DEEP WELL WASTE RECEPTACALES

EXISTING BUILDING TO BE DEMOLISHED

N89°09'30"W 310.88' (94.757)

(PHASE 1) 4 DEEP WELL WASTE RECEPTACALES

1-STOREY ENTRANCE

185

128

149

141

170

140

FUTURE 6-STOREY RESIDENTIAL BLDG. (APPROX. 72 UNITS)

PROPOSED 4-STOREY RESIDENTIAL BLDG. (105 UNITS)

LANDSCAPE

CONC. SIDEWALK

FIRE ROUTE

COMMON OUTDOOR AMENITY SPACE

EXISTING PUMPING STATION

EXISTING CONCRETE CURB

POSSIBLE ACCESS FROM PARKING TO ENTRANCE

N87°46'35"W 271.79' (82.843)

N88°21'10"W 271.76' (82.833)

N89°08'W 247.87' (75.552)

EXISTING UNDERGROUND SANITARY LINE

EXISTING UNDERGROUND STM LINE

ROUGH-IN FOR FUTURE COVERED CHARGING STATIONS AND SOLAR ARRAYS

ROUGH-IN FOR FUTURE COVERED CHARGING STATIONS AND SOLAR ARRAYS

CB

22

1

OUTDOOR AMENITY AREA

N1°49'40"E 66.00' (20.117)

171

159

129

114

12

11

CONC. SIDEWALK

CONC. SIDEWALK

113

104

90

76

57

43

EV READY SPACES (10)

N89°08'W 62.43' (19.029)

3193

3193

FIRE ROUTE

N1°35'46"E R=6271.17' (1911.476) ARC=200.48' (61.107) CHORD=200.47' (61.104)

N3°01'38"E R=6271.17' (1911.476) ARC=112.80' (34.382) CHORD=112.80' (34.382)

N89°09'30"W 33.00' (10.059)

103

94

93

91

75

61

60

58

42

EXISTING ASPHALT DRIVEWAY

23

N89°08'W 33.04' (10.071)

N89°09'30"W 243.73' (71.547)

LANDSCAPE

2231

1798

1545

1389

1599

3317

N0°03'W 159.50' (48.616)

N0°18'53"E R=6238.17' (1901.417) ARC=79.45' (24.217) CHORD=79.45' (24.217)

N2°07'04"E R=6238.17' (1901.417) ARC=313.26' (95.483) CHORD=313.23' (95.474)

EXISTING TREES (TYP.)

CANADIAN NATIONAL RAILWAY

CANADIAN NATIONAL RAILWAY

KAREN STREET

FIRE ROUTE

EDGE ARCHITECTS LTD

TRUE PROJECT

PROJECT NO.
22005

PROJECT NAME
410 SUNSET DR MULTI-RES

410 SUNSET DR
ST. THOMAS, ON

DRAWING TITLE
SITE PLAN (PHASE 2)

SCALE 1 : 550

ISSUED FOR
SCHEMATIC DESIGN

DATE 2022.06.30

1.3b

# ZONING DATA CHART

410 SUNSET DR.
ST. THOMAS, ON

## SITE PLAN - PHASE 1 & 2

PREPARED BY EDGE ARCHITECTS LTD.
JUNE 30, 2022

**ZONING COMPLIANCE CHART**
CURRENT ZONING: OFFICE PROFESSIONAL (AS NOTED ON CENTRAL ELGIN OFFICIAL PLAN)

| USE | MULTI-RESIDENTIAL DEVELOPMENT + MIXED-USE | | |
|---|---|---|---|
| | REQUIRED | PHASE 1 | PHASE 2 |
| MINIMUM LOT AREA | --- | GROSS SITE AREA: 18,574.0 m²<br>EASEMENT AREA: 4,594.4 m²<br>**NET SITE AREA: 13,979.6 m²** | GROSS SITE AREA: 18,574.0 m²<br>EASEMENT AREA: 4,594.4 m²<br>**NET SITE AREA: 13,979.6 m²** |
| LOT FRONTAGE | --- | 104.7m (@ KAREN ST) | 104.7m (@ KAREN ST) |
| FRONT YARD SETBACK (S) ** | --- | 15.3m [BUILDING 1] | N/A [BUILDING 2] |
| INT. SIDE YARD SETBACK (W) ** | --- | 27.5m [BUILDING 1] | 24.4m [BUILDING 2] |
| EXT. SIDE YARD SETBACK (E) ** | --- | 14.1m [BUILDING 1] | 23.5m [BUILDING 2] |
| REAR YARD SETBACK (N) ** | --- | 66.8m [BUILDING 1] | 10.1m [BUILDING 2] |
| BUILDING COVERAGE | --- | BUILDING 1: 2,152.2 m²<br>EXISTING BLDG: 642.5 m²<br>TOTAL= 2,794.7 m² | BUILDING 1: 2,152.2 m²<br>BUILDING 2: 1,150.5 m²<br>TOTAL= 3,302.7 m² |
| GROSS FLOOR AREA | --- | BUILDING 1 GFA: 8458.5 m² | BUILDING 1 GFA: 8458.5 m²<br>BUILDING 2 GFA: 5958.6 m² |
| LANDSCAPED | --- | 9,356.73 m²<br>(EXCLUDES PUMPING STATION) | 6,725.01 m²<br>(EXCLUDES PUMPING STATION) |
| PARKING | --- | **EXISTING PARKING:**<br>APPROX. 45 SPACES<br><br>**PROPOSED PARKING:**<br>114 SPACES<br><br>**TOTAL PARKING:**<br>159 SPACES<br><br>**1.09 SPACES/ UNIT**<br>**+ APPROX. 45 FOR OFFICE** | **PROPOSED PARKING:**<br>215 SPACES<br><br>**1.22 SPACES/ UNIT**<br><br>**ASSUMING:**<br>**BUILDING 1: 105 UNITS**<br>**BUILDING 2: 72 UNITS** |
| BARRIER-FREE PARKING | --- | 7 SPACES<br>3 TYPE A; 4 TYPE B | 11 SPACES (PROVIDED)<br>4 TYPE A; 7 TYPE B |

**NOTE:**
**-** PROPERTY BOUNDARY INFORMATION FROM SURVEY PLAN FROM 'DONALD I. HOUGHTON';
DATED: SEPTEMBER 19, 1990.
- EXISTING SITE CONDITION AND SITE CONTEXT FROM TOPOGRAPHICAL BASE PLAN FROM 'STANTEC';
DATED: JUNE 09, 2009.

** SETBACKS SHOWN ONLY FOR THE PROPOSED BUILDINGS

EDGE
ARCHITECTS LTD

PROJECT NO.
22005

PROJECT NAME
410 SUNSET DR
MULTI-RES

410 SUNSET DR
ST. THOMAS, ON

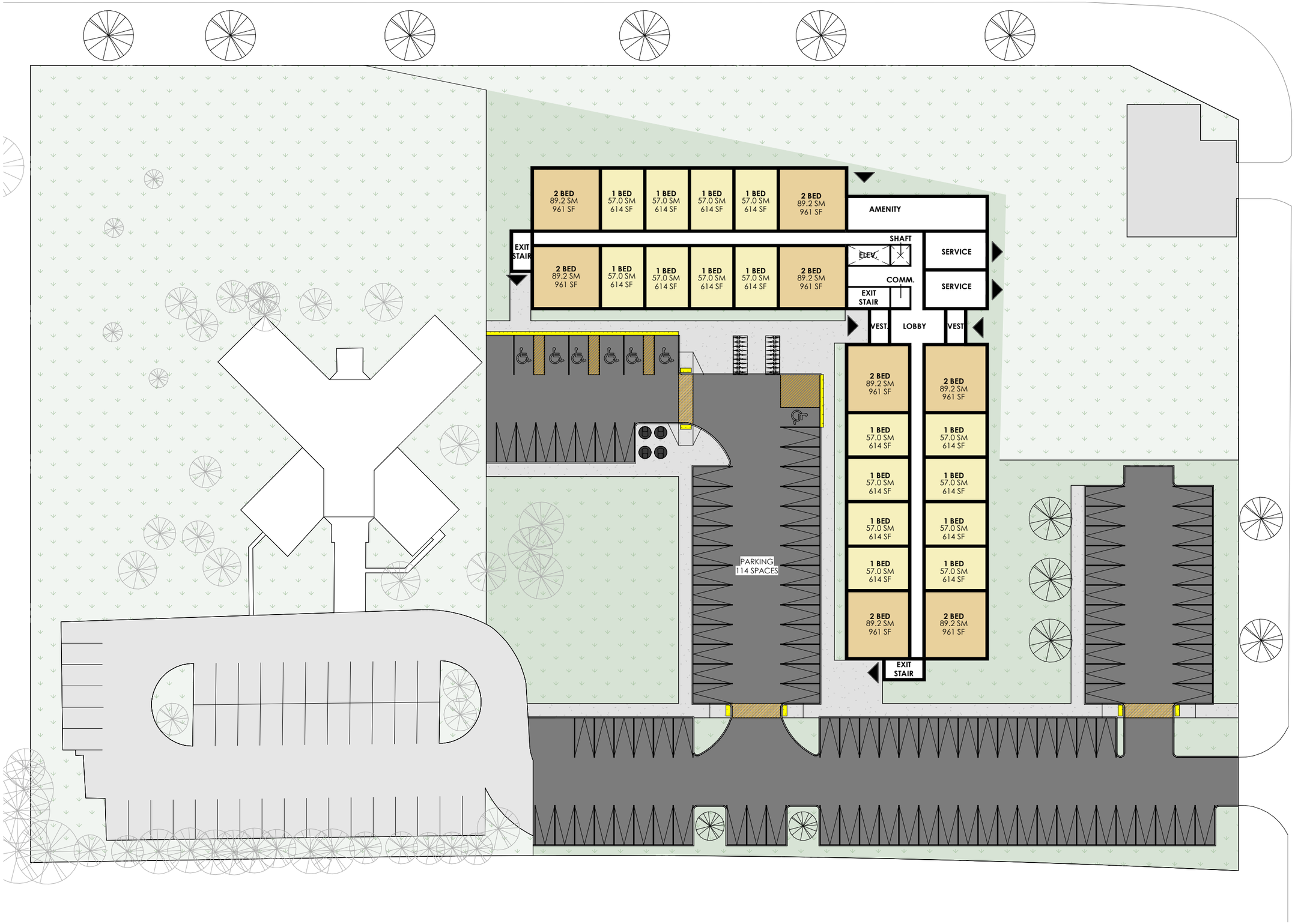
DRAWING TITLE
ZONING CHART
- PHASE 1 & 2

SCALE N.T.S.

ISSUED FOR
SCHEMATIC
DESIGN

DATE 2022.06.30

1.3c




EDGE
ARCHITECTS LTD

TRUE PROJECT

**LEGEND**

- COMMON AREAS
- SERVICE/ PARKING
- STUDIO
- 1 BEDROOM
- 1 BEDROOM + DEN
- 2 BEDROOM
- 2 BEDROOM + DEN
- 3 BEDROOM
- AMENITY
- RETAIL
- OFFICE
- INSTITUTIONAL

PROJECT NO.

22005

PROJECT NAME

410 SUNSET DR
MULTI-RES

410 SUNSET DR
ST. THOMAS, ON

DRAWING TITLE

GROUND FLOOR PLAN DIAGRAM (PHASE 1)

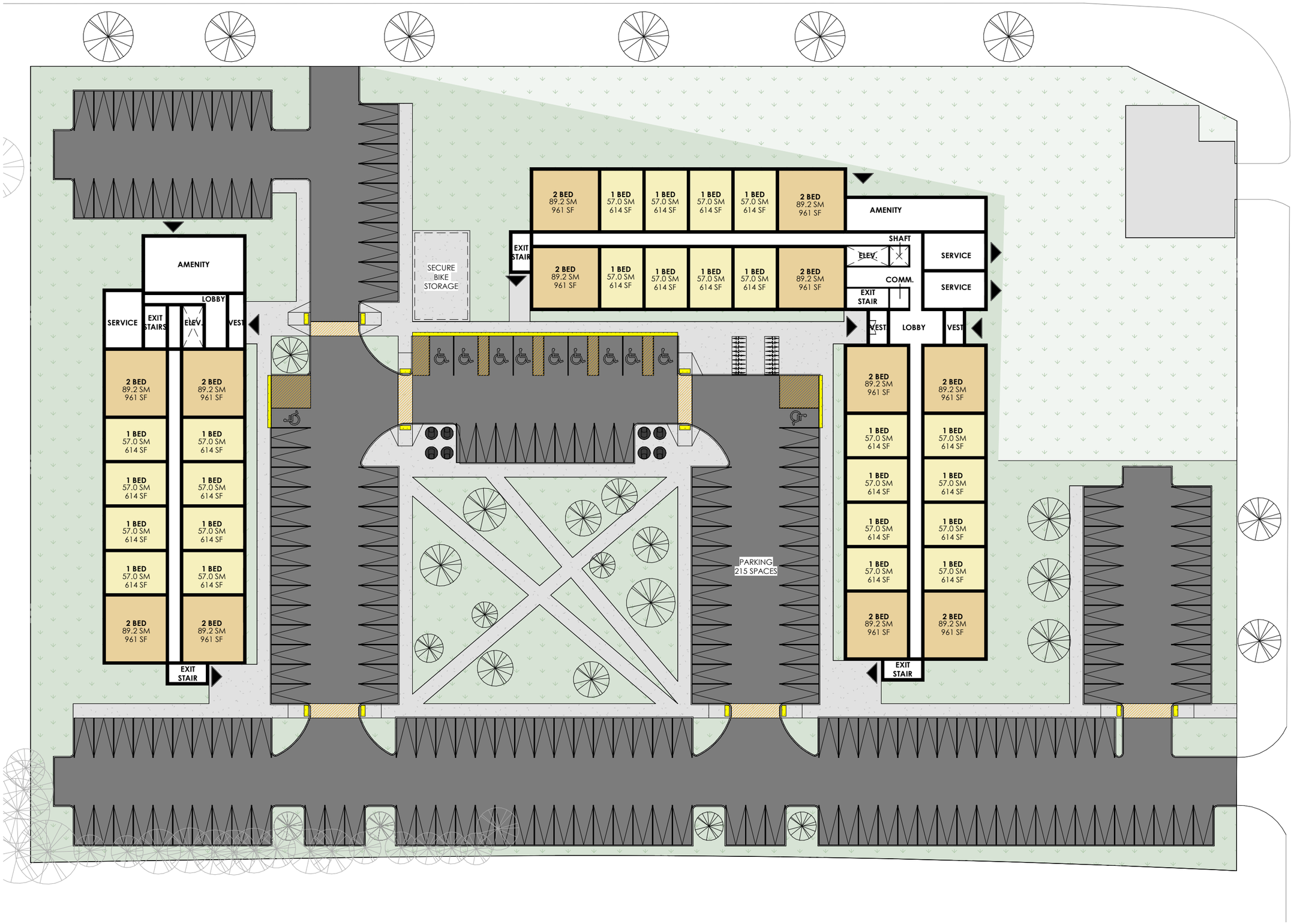
SCALE As indicated

ISSUED FOR

SCHEMATIC DESIGN

DATE 2022.06.30

2.1




EDGE
ARCHITECTS LTD

TRUE PROJECT

**LEGEND**

- COMMON AREAS
- SERVICE/ PARKING
- STUDIO
- 1 BEDROOM
- 1 BEDROOM + DEN
- 2 BEDROOM
- 2 BEDROOM + DEN
- 3 BEDROOM
- AMENITY
- RETAIL
- OFFICE
- INSTITUTIONAL

PROJECT NO.

22005

PROJECT NAME

410 SUNSET DR MULTI-RES

410 SUNSET DR
ST. THOMAS, ON

DRAWING TITLE

GROUND FLOOR PLAN DIAGRAM (PHASE 2)

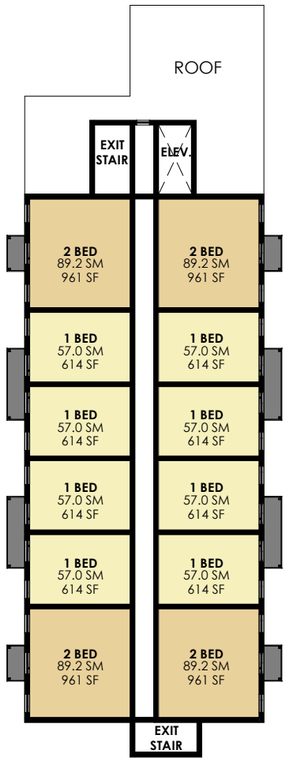
SCALE As indicated

ISSUED FOR

SCHEMATIC DESIGN

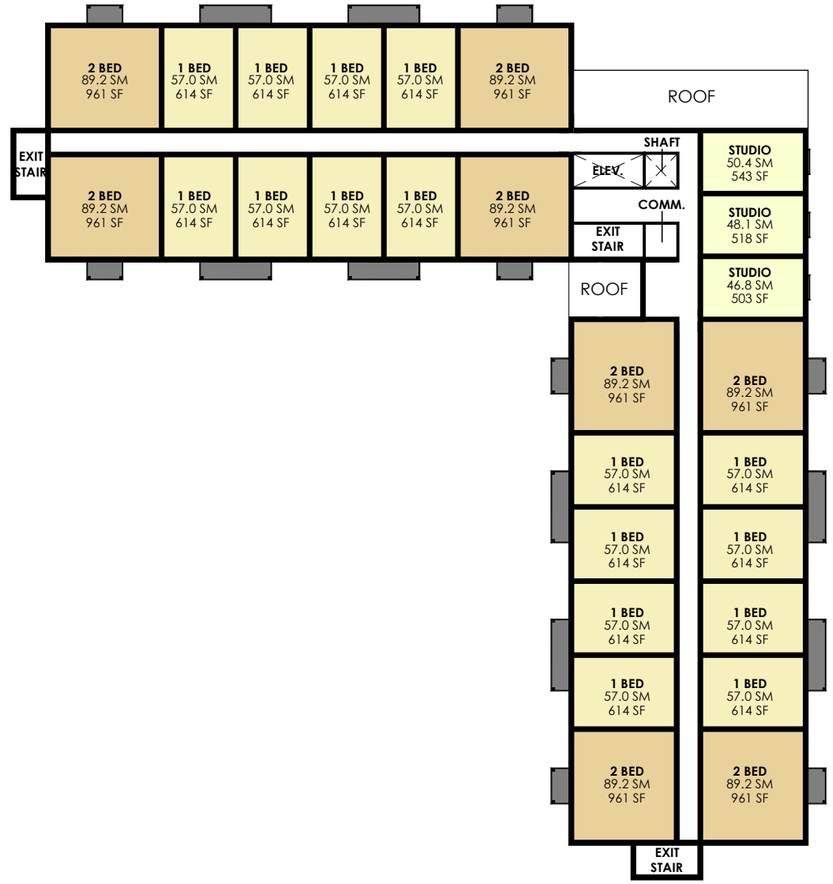
DATE 2022.06.30

2.2




**TYPICAL LEVEL 2-6 FLOOR PLAN (PHASE 2, BLDG 2)**

1 : 500




**TYPICAL LEVEL 2-4 FLOOR PLAN (PHASE 1 BLDG 1)**

1 : 500

EDGE
ARCHITECTS LTD

TRUE PROJECT

**LEGEND**

- COMMON AREAS
- SERVICE/ PARKING
- STUDIO
- 1 BEDROOM
- 1 BEDROOM + DEN
- 2 BEDROOM
- 2 BEDROOM + DEN
- 3 BEDROOM
- AMENITY
- RETAIL
- OFFICE
- INSTITUTIONAL

PROJECT NO.

22005

PROJECT NAME

410 SUNSET DR MULTI-RES

410 SUNSET DR
ST. THOMAS, ON

DRAWING TITLE

TYPICAL FLOOR PLAN DIAGRAM

SCALE As indicated

ISSUED FOR

SCHEMATIC DESIGN

DATE 2022.06.30

2.3


**NORTH ELEVATION - PHASE 1 (D)**

1 : 250


**SOUTH ELEVATION - PHASE 1 (D)**

1 : 250

EDGE
ARCHITECTS LTD

PROJECT NO.
22005

PROJECT NAME
410 SUNSET DR
MULTI-RES

410 SUNSET DR
ST. THOMAS, ON

DRAWING TITLE
ELEVATIONS
(PHASE 1)

SCALE 1 : 250

ISSUED FOR
SCHEMATIC
DESIGN

DATE 2022.06.30

3.1


**EAST ELEVATION - PHASE 1 (D)**

1 : 250


**WEST ELEVATION - PHASE 1 (D)**

1 : 250

EDGE
ARCHITECTS LTD

PROJECT NO.
22005

PROJECT NAME
410 SUNSET DR
MULTI-RES

410 SUNSET DR
ST. THOMAS, ON

DRAWING TITLE
ELEVATIONS
(PHASE 1)

SCALE 1 : 250

ISSUED FOR
SCHEMATIC
DESIGN

DATE 2022.06.30

3.2


**NORTH ELEVATION - PHASE 2 (D)**

1 : 250


**SOUTH ELEVATION - PHASE 2 (D)**

1 : 250

EDGE
ARCHITECTS LTD

PROJECT NO.
22005

PROJECT NAME
410 SUNSET DR
MULTI-RES

410 SUNSET DR
ST. THOMAS, ON

DRAWING TITLE
ELEVATIONS
(PHASE 2)

SCALE 1 : 250

ISSUED FOR
SCHEMATIC
DESIGN

DATE 2022.06.30

3.3

ROOF
20000

SIXTH FLOOR
16800

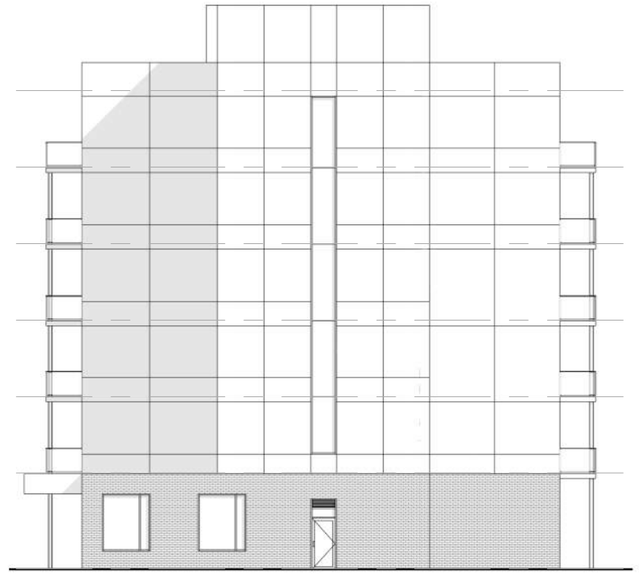
FIFTH FLOOR
13600

FOURTH FLOOR
10400

THIRD FLOOR
7200

SECOND FLOOR
4000

GROUND FLOOR
0



**EAST ELEVATION - PHASE 2 (D)**

1 : 250

ROOF
20000

SIXTH FLOOR
16800

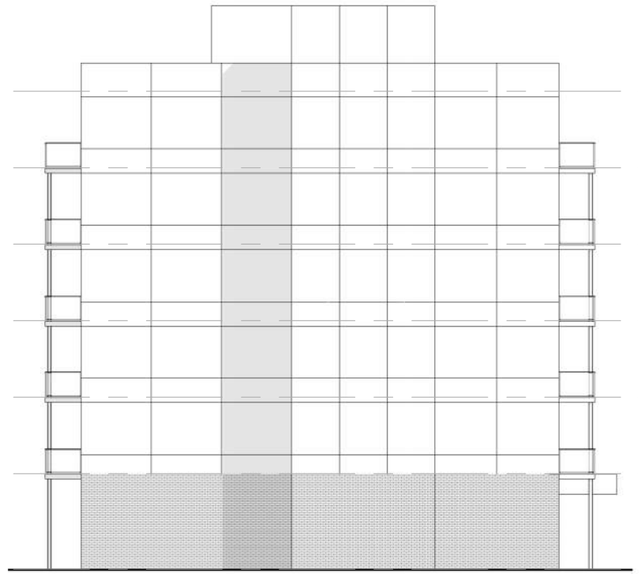
FIFTH FLOOR
13600

FOURTH FLOOR
10400

THIRD FLOOR
7200

SECOND FLOOR
4000

GROUND FLOOR
0



**WEST ELEVATION - PHASE 2 (D)**

1 : 250

EDGE
ARCHITECTS LTD

PROJECT NO.
22005

PROJECT NAME
410 SUNSET DR
MULTI-RES

410 SUNSET DR
ST. THOMAS, ON

DRAWING TITLE
ELEVATIONS
(PHASE 2)

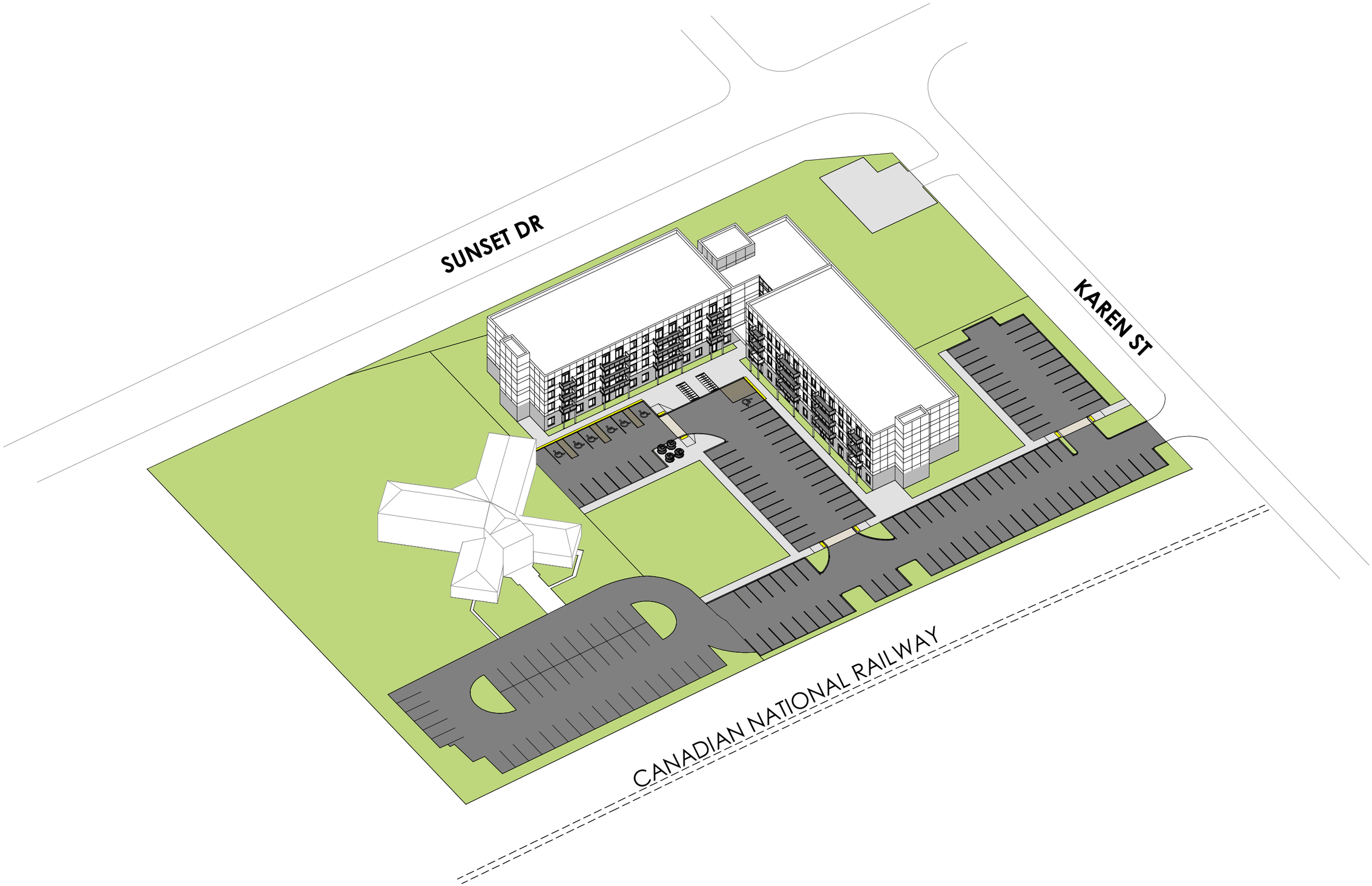
SCALE 1 : 250

ISSUED FOR
SCHEMATIC
DESIGN

DATE 2022.06.30

3.4

EDGE
ARCHITECTS LTD




PROJECT NO.
22005

PROJECT NAME
410 SUNSET DR
MULTI-RES

410 SUNSET DR
ST. THOMAS, ON

DRAWING TITLE
MASSING/
PERSPECTIVE
VIEWS

SCALE N.T.S.

ISSUED FOR
SCHEMATIC
DESIGN

DATE 2022.06.30

5.1

EDGE
ARCHITECTS LTD


PROJECT NO.
22005

PROJECT NAME
410 SUNSET DR
MULTI-RES

410 SUNSET DR
ST. THOMAS, ON

DRAWING TITLE
MASSING/
PERSPECTIVE
VIEWS

SCALE N.T.S.

ISSUED FOR
SCHEMATIC
DESIGN

DATE 2022.06.30

5.2

# Appendix B

# SWM, Sanitary and Water Supply Calculations

# SWM Calculations

| | |
|---|---|
| DATE: | July 11, 2022 |
| JOB N0.: | MTE-51252-100 |
| Client: | Quincy Developments |
| Project: | 410 Sunset Drive SPA |
| Location: | 410 Sunset Drive, Saint Thomas |

## ALLOWABLE FLOWS

EXISTING CATCHMENT A1 TO EXISTING MUNICIPAL 1050mm STM

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 8052.00 | | |
| Building Area: | 642.000 | 0.9 | 577.80 |
| Concrete/Asphalt: | 1922.000 | 0.9 | 1729.80 |
| Gravel: | 95.00 | 0.9 | 85.50 |
| Landscaped/Open: | 5393.00 | 0.25 | 1348.25 |
| Totals: | 8052.00 | | 3741.35 |
| $C_{eq}$ = Sum(A*C)/Sum(A) = | 0.46 | | |

EXISTING CATCHMENT A2 to NORMAN SUBDIVISION DRAINS

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 10521.00 | | |
| Building Area: | 0.000 | 0.9 | 0.00 |
| Concrete/Asphalt: | 831.000 | 0.9 | 747.90 |
| Gravel: | 0.00 | 0.7 | 0.00 |
| Landscaped/Open: | 9690.00 | 0.2 | 1938.00 |
| Totals: | 10521.00 | | 2685.90 |
| $C_{eq}$ = Sum(A*C)/Sum(A) = | 0.26 | | |

SAINT THOMAS RAINFALL DISTRIBUTION PARAMETERS*

| Return Period (years) | A,B,C Parameters A | B |
|---|---|---|
| 2 | 23.600 | -0.699 |
| 5 | 31.100 | -0.699 |
| 10 | 36.000 | -0.699 |
| 25 | 42.300 | -0.699 |
| 50 | 46.900 | -0.699 |
| 100 | 51.500 | -0.699 |

*Intensity $i = at^b$ (mm/hr)

* Refer to the City of St. Thomas Design & Requirments Manual

Existing Catchment (A1) 100-Year Flows

| | | |
|---|---|---|
| C = | 0.46 | |
| Time to concentration $t_c$ = | 15 | min |
| Intensity, i (@ $t_c$) = | 135.72 | mm/hr |
| U1 Post Development Flow, $Q_r = 2.78*C*i*A$ = | 141.16 | l/s |

Existing Catchment (A2) 100-Year Flows

| | | |
|---|---|---|
| C = | 0.26 | |
| Time to concentration $t_c$ = | 15 | min |
| Intensity, i (@ $t_c$) = | 135.72 | mm/hr |
| U3 Post Development Flow, $Q_r = 2.78*C*i*A$ = | 101.34 | l/s |

Existing Catchment (A1) 5-Year Flows

| | | |
|---|---|---|
| C = | 0.46 | |
| Time to concentration $t_c$ = | 15 | min |
| Intensity, i (@ $t_c$) = | 81.96 | mm/hr |
| U2 Post Development Flow, $Q_r = 2.78*C*i*A$ = | 85.25 | l/s |

Existing Catchment (A2) 5-Year Flows

| | | |
|---|---|---|
| C = | 0.26 | |
| Time to concentration $t_c$ = | 15 | min |
| Intensity, i (@ $t_c$) = | 81.96 | mm/hr |
| U4 Post Development Flow, $Q_r = 2.78*C*i*A$ = | 61.20 | l/s |

POST-DEVELOPMENT CONDITIONS

POST-DEVELOPMENT CATCHMENT AREA A3 TO EXISTING 1050mm STM

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 7972.00 | | |
| Building Area: | 1150.000 | 0.9 | 1035.00 |
| Concrete/Asphalt: | 4182.000 | 0.9 | 3763.80 |
| Gravel: | 0.00 | 0.9 | 0.00 |
| Landscaped/Open: | 2640.00 | 0.25 | 660.00 |
| Totals: | 7972.00 | | 5458.80 |
| $C_{eq}$ = Sum(A*C)/Sum(A) = | 0.68 | | |

POST-DEVELOPMENT CATCHMENT AREA A4 TO NORMAN SUBDIVISION DRAINS

| | Area ($m^2$) | C | A*C |
|---|---|---|---|
| Total Area: | 10601.00 | | |
| Building Area: | 2152.200 | 0.9 | 1936.98 |
| Concrete/Asphalt: | 4229.000 | 0.9 | 3806.10 |
| Gravel: | 0.00 | 0.9 | 0.00 |
| Landscaped/Open: | 4219.80 | 0.25 | 1054.95 |
| Totals: | 10601.00 | | 6798.03 |
| $C_{eq}$ = Sum(A*C)/Sum(A) = | 0.64 | | |

| RETURN PERIOD OF STORM | A3 AREA ALLOWABLE POST-DEVELOPMENT FLOWS (L/S) | A4 AREA ALLOWABLE POST DEVELOPMENT FLOWS (L/S) |
|---|---|---|
| 100-YEAR | 141.16 | 101.34 |
| 5-YEAR | 85.25 | 61.20 |

RAINFALL DATA

Rainfall Data - St. Thomas Rainfall Intensity Duration

5 Yr Stm Event

| Duration (min.) | Intensity "i" (mm/hr) |
|---|---|
| 5 | 176.65 |
| 10 | 108.81 |
| 15 | 81.96 |
| 30 | 50.49 |
| 60 | 31.10 |
| 120 | 19.16 |
| 180 | 14.43 |

STORAGE CALCULATIONS

Post development Area A3

| A3 Inflow, $Q_i$ 2.78*C*i*A (l/s) | Volume In $Q_i$*t*60/1000 ($m^3$) | Orifice Outflow, $Q_o$ (l/s) | Surfice Outflow, $Q_o$ (l/s) | Allowable Release $Q_o$ (l/s) | Volume Out $Q_o$*t*60/1000 ($m^3$) | Difference/ Storage ($m^3$) |
|---|---|---|---|---|---|---|
| 268.07 | 80.42 | 85.25 | 0.00 | 85.25 | 25.57 | 54.85 |
| 165.13 | 99.08 | 85.25 | 0.00 | 85.25 | 51.15 | 47.93 |
| 124.38 | 111.94 | 85.25 | 0.00 | 85.25 | 76.72 | 35.22 |
| 76.62 | 137.91 | 85.25 | 0.00 | 85.25 | 153.44 | -15.53 |
| 47.20 | 169.90 | 85.25 | 0.00 | 85.25 | 306.89 | -136.98 |
| 29.07 | 209.32 | 85.25 | 0.00 | 85.25 | 613.77 | -404.45 |
| 21.90 | 236.49 | 85.25 | 0.00 | 85.25 | 920.66 | -684.16 |
| | | | | | Max. Storage Volume ($m^3$) = | 54.85 |

100 Yr Stm Event

| Duration (min.) | Intensity "i" (mm/hr) |
|---|---|
| 5 | 292.52 |
| 10 | 180.19 |
| 15 | 135.72 |
| 30 | 83.60 |
| 60 | 51.50 |
| 120 | 31.72 |
| 180 | 23.89 |

| A3 Inflow, $Q_i$ 2.78*C*i*A (l/s) | Volume In $Q_i$*t*60/1000 ($m^3$) | Orifice Outflow, $Q_o$ (l/s) | Surfice Outflow, $Q_o$ (l/s) | Allowable Release $Q_o$ (l/s) | Volume Out $Q_o$*t*60/1000 ($m^3$) | Difference/ Storage ($m^3$) |
|---|---|---|---|---|---|---|
| 443.91 | 133.17 | 85.25 | 55.92 | 141.16 | 42.35 | 90.82 |
| 273.45 | 164.07 | 85.25 | 55.92 | 141.16 | 84.70 | 79.37 |
| 205.96 | 185.37 | 85.25 | 55.92 | 141.16 | 127.05 | 58.32 |
| 126.87 | 228.37 | 85.25 | 55.92 | 141.16 | 254.09 | -25.72 |
| 78.15 | 281.35 | 85.25 | 55.92 | 141.16 | 508.19 | -226.83 |
| 48.14 | 346.63 | 85.25 | 55.92 | 141.16 | 1016.37 | -669.75 |
| 36.26 | 391.62 | 85.25 | 55.92 | 141.16 | 1524.56 | -1132.94 |
| | | | | | Max. Storage Volume ($m^3$) = | 90.82 |

Available Surface Storage

| Location | | Area ($m^2$) | Depth(m) | Volume ($m^3$) |
|---|---|---|---|---|
| Parking Ponding | | | | |
| | *V=AxD/3* | 3080.00 | 0.29 | 297.73 |
| | | | Total Surface Storage Available ($m^3$) = | 297.73 |

RAINFALL DATA

| Rainfall Data - St. Thomas Rainfall Intensity Duration |
|---|
| 5 Yr Stm Event |

| Duration (min.) | Intensity "i" (mm/hr) |
|---|---|
| 5 | 176.65 |
| 10 | 108.81 |
| 15 | 81.96 |
| 30 | 50.49 |
| 60 | 31.10 |
| 120 | 19.16 |
| 180 | 14.43 |

| 100 Yr Stm Event |
|---|

| Duration (min.) | Intensity "i" (mm/hr) |
|---|---|
| 5 | 292.52 |
| 10 | 180.19 |
| 15 | 135.72 |
| 30 | 83.60 |
| 60 | 51.50 |
| 120 | 31.72 |
| 180 | 23.89 |

STORAGE CALCULATIONS

Post development Area A4

| A3 Inflow, $Q_i$ 2.78*C*i*A (l/s) | Volume In $Q_i$*t*60/1000 ($m^3$) | Orifice Outflow, $Q_o$ (l/s) | Surfice Outflow, $Q_o$ (l/s) | Allowable Release $Q_o$ (l/s) | Volume Out $Q_o$*t*60/1000 ($m^3$) | Difference/ Storage ($m^3$) |
|---|---|---|---|---|---|---|
| 333.84 | 100.15 | 61.20 | 0.00 | 61.20 | 18.36 | 81.79 |
| 205.64 | 123.39 | 61.20 | 0.00 | 61.20 | 36.72 | 86.67 |
| 154.89 | 139.40 | 61.20 | 0.00 | 61.20 | 55.08 | 84.32 |
| 95.41 | 171.74 | 61.20 | 0.00 | 61.20 | 110.16 | 61.59 |
| 58.77 | 211.59 | 61.20 | 0.00 | 61.20 | 220.31 | -8.72 |
| 36.20 | 260.68 | 61.20 | 0.00 | 61.20 | 440.62 | -179.95 |
| 27.27 | 294.51 | 61.20 | 0.00 | 61.20 | 660.93 | -366.42 |
| | | | | | Max. Storage Volume ($m^3$) = | 86.67 |

| A3 Inflow, $Q_i$ 2.78*C*i*A (l/s) | Volume In $Q_i$*t*60/1000 ($m^3$) | Orifice Outflow, $Q_o$ (l/s) | Surfice Outflow, $Q_o$ (l/s) | Allowable Release $Q_o$ (l/s) | Volume Out $Q_o$*t*60/1000 ($m^3$) | Difference/ Storage ($m^3$) |
|---|---|---|---|---|---|---|
| 552.82 | 165.85 | 61.20 | 79.97 | 101.34 | 30.40 | 135.44 |
| 340.54 | 204.32 | 61.20 | 79.97 | 101.34 | 60.80 | 143.52 |
| 256.49 | 230.84 | 61.20 | 79.97 | 101.34 | 91.21 | 139.64 |
| 158.00 | 284.40 | 61.20 | 79.97 | 101.34 | 182.41 | 101.99 |
| 97.33 | 350.38 | 61.20 | 79.97 | 101.34 | 364.82 | -14.45 |
| 59.95 | 431.67 | 61.20 | 79.97 | 101.34 | 729.65 | -297.98 |
| 45.16 | 487.70 | 61.20 | 79.97 | 101.34 | 1094.47 | -606.78 |
| | | | | | Max. Storage Volume ($m^3$) = | 143.52 |

Available Surface Storage

| Location | | Area ($m^2$) | Depth(m) | Volume ($m^3$) |
|---|---|---|---|---|
| Parking Ponding | | | | |
| | *V=AxD/3* | 3048.00 | 0.29 | 294.64 |
| | | | Total Surface Storage Available ($m^3$) = | 294.64 |

# Sanitary Flow Calculations

| | |
|---|---|
| DATE: | July 11, 2022 |
| JOB N0.: | MTE-51252-100 |

| | |
|---|---|
| **Client:** | **Quincy Developments** |
| **Project:** | **410 Sunset Drive** |
| **Location:** | **410 Sunset Drive, Saint Thomas** |

## SANITARY FLOWS

Site Area: 18574 $m^2$

| Building | Units | Population | Harmon Peaking Factor | Infiltration (l/s) | Peak Flow (l/s) |
|---|---|---|---|---|---|
| 4-storey Residential Building | 105 | 315 | 4.07 | 0.19 | 3.89 |
| 6-storey Residential Building | 72 | 216 | 4.14 | 0.19 | 2.77 |
| Total | 177 | 531 | 3.96 | 0.19 | **6.27** |

City of St. Thomas Guidelines:

Population Density: 3 people/unit

Average Flow Rate: 250 l/capita/day 0.002893519 l/cap/s

Infiltration Rate: 0.1 l/ha/s

Peaking factor: Harmon Formula

$$M = 1 + \frac{14}{(4 + P^{\frac{1}{2}})}$$

where P is tributary population in thousands

Peak Domestic Sewage Flows: $Q(d) = PqM + IA$

# Water Supply Demand Calculations

| | |
|---|---|
| DATE: | July 11, 2022 |
| JOB N0.: | MTE-51252-100 |

| | |
|---|---|
| **Client:** | **Quincy Developments** |
| **Project:** | **410 Sunset Drive** |
| **Location:** | **410 Sunset Drive, Saint Thomas** |

## WATER SUPPLY DEMAND

| Building | Units | Population | Average Day Demand (l/s) | Max Day Demand (l/s) | Peak Hour Demand (l/s) |
|---|---|---|---|---|---|
| 4-storey Residential | 105 | 315 | 1.64 | 5.74 | 12.80 |
| 6-storey Residential | 72 | 216 | 1.13 | 3.94 | 8.78 |
| Total | 177 | 531 | **2.77** | **9.68** | **21.57** |

City of St. Thomas Guidelines:

| | | |
|---|---|---|
| Population Density: | 3 | people/unit |
| Average Flow Rate: | 450 | l/capita/day |
| Peaking factors: | 3.5 | Maximum Day Demand |
| | 7.8 | Peak Hour Demand |

# Appendix C

# Stormceptor Sizing Reports

Stormceptor®

FORTERRA

# Stormceptor® EF Sizing Report

## STORMCEPTOR®
## ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

05/20/2022

| | |
|---|---|
| Province: | Ontario |
| City: | St. Thomas |
| Nearest Rainfall Station: | LONDON CS |
| Climate Station Id: | 6144478 |
| Years of Rainfall Data: | 20 |

| | |
|---|---|
| Site Name: | 410 Sunset Dr A3 |
| Drainage Area (ha): | 0.80 |
| % Imperviousness: | 66.88 |

Runoff Coefficient 'c': 0.70

| | |
|---|---|
| Particle Size Distribution: | Fine |
| Target TSS Removal (%): | 70.0 |

| | |
|---|---|
| Required Water Quality Runoff Volume Capture (%): | 90.00 |
| Estimated Water Quality Flow Rate (L/s): | 20.48 |
| Oil / Fuel Spill Risk Site? | Yes |
| Upstream Flow Control? | No |
| Peak Conveyance (maximum) Flow Rate (L/s): | 85.25 |
| Site Sediment Transport Rate (kg/ha/yr): | |

| | |
|---|---|
| Project Name: | 410 Sunset Dr |
| Project Number: | 51252 |
| Designer Name: | Bogdan Pavlovic |
| Designer Company: | MTE Consultants |
| Designer Email: | bpavlovic@mte85.com |
| Designer Phone: | 519-701-2693 |
| EOR Name: | |
| EOR Company: | |
| EOR Email: | |
| EOR Phone: | |

**Net Annual Sediment (TSS) Load Reduction Sizing Summary**

| Stormceptor Model | TSS Removal Provided (%) |
|---|---|
| EFO4 | 80 |
| EFO6 | 90 |
| EFO8 | 94 |
| EFO10 | 97 |
| EFO12 | 98 |

**Recommended Stormceptor EFO Model: EFO4**

**Estimated Net Annual Sediment (TSS) Load Reduction (%): 80**

**Water Quality Runoff Volume Capture (%): > 90**

imbrium

## THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

## PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

## PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

| Particle Size (µm) | Percent Less Than | Particle Size Fraction (µm) | Percent |
|---|---|---|---|
| 1000 | 100 | 500-1000 | 5 |
| 500 | 95 | 250-500 | 5 |
| 250 | 90 | 150-250 | 15 |
| 150 | 75 | 100-150 | 15 |
| 100 | 60 | 75-100 | 10 |
| 75 | 50 | 50-75 | 5 |
| 50 | 45 | 20-50 | 10 |
| 20 | 35 | 8-20 | 15 |
| 8 | 20 | 5-8 | 10 |
| 5 | 10 | 2-5 | 5 |
| 2 | 5 | <2 | 5 |

imbrium

# Stormceptor® EF Sizing Report

| Rainfall Intensity (mm / hr) | Percent Rainfall Volume (%) | Cumulative Rainfall Volume (%) | Flow Rate (L/s) | Flow Rate (L/min) | Surface Loading Rate (L/min/m²) | Removal Efficiency (%) | Incremental Removal (%) | Cumulative Removal (%) |
|---|---|---|---|---|---|---|---|---|
| 0.5 | 9.0 | 9.0 | 0.78 | 47.0 | 39.0 | 100 | 9.0 | 9.0 |
| 1 | 18.9 | 27.8 | 1.56 | 94.0 | 78.0 | 100 | 18.9 | 27.8 |
| 2 | 15.3 | 43.2 | 3.12 | 187.0 | 156.0 | 89 | 13.7 | 41.6 |
| 3 | 10.8 | 53.9 | 4.68 | 281.0 | 234.0 | 82 | 8.8 | 50.4 |
| 4 | 7.8 | 61.7 | 6.24 | 374.0 | 312.0 | 78 | 6.1 | 56.4 |
| 5 | 5.8 | 67.5 | 7.80 | 468.0 | 390.0 | 74 | 4.3 | 60.7 |
| 6 | 4.5 | 72.0 | 9.36 | 561.0 | 468.0 | 71 | 3.2 | 63.9 |
| 7 | 3.6 | 75.6 | 10.92 | 655.0 | 546.0 | 67 | 2.4 | 66.3 |
| 8 | 3.5 | 79.1 | 12.48 | 749.0 | 624.0 | 64 | 2.3 | 68.6 |
| 9 | 3.3 | 82.4 | 14.04 | 842.0 | 702.0 | 64 | 2.1 | 70.7 |
| 10 | 2.6 | 85.0 | 15.60 | 936.0 | 780.0 | 63 | 1.7 | 72.3 |
| 11 | 1.7 | 86.7 | 17.16 | 1029.0 | 858.0 | 63 | 1.1 | 73.4 |
| 12 | 1.7 | 88.4 | 18.72 | 1123.0 | 936.0 | 62 | 1.0 | 74.5 |
| 13 | 1.5 | 89.8 | 20.28 | 1217.0 | 1014.0 | 61 | 0.9 | 75.4 |
| 14 | 1.2 | 91.0 | 21.84 | 1310.0 | 1092.0 | 59 | 0.7 | 76.0 |
| 15 | 1.3 | 92.3 | 23.39 | 1404.0 | 1170.0 | 58 | 0.7 | 76.8 |
| 16 | 0.8 | 93.0 | 24.95 | 1497.0 | 1248.0 | 56 | 0.4 | 77.2 |
| 17 | 0.8 | 93.8 | 26.51 | 1591.0 | 1326.0 | 54 | 0.4 | 77.6 |
| 18 | 1.2 | 95.0 | 28.07 | 1684.0 | 1404.0 | 52 | 0.6 | 78.2 |
| 19 | 0.7 | 95.7 | 29.63 | 1778.0 | 1482.0 | 49 | 0.4 | 78.6 |
| 20 | 0.9 | 96.6 | 31.19 | 1872.0 | 1560.0 | 47 | 0.4 | 79.0 |
| 21 | 0.2 | 96.8 | 32.75 | 1965.0 | 1638.0 | 45 | 0.1 | 79.1 |
| 22 | 0.0 | 96.8 | 34.31 | 2059.0 | 1716.0 | 43 | 0.0 | 79.1 |
| 23 | 0.4 | 97.2 | 35.87 | 2152.0 | 1794.0 | 41 | 0.2 | 79.3 |
| 24 | 0.4 | 97.7 | 37.43 | 2246.0 | 1872.0 | 39 | 0.2 | 79.5 |
| 25 | 0.0 | 97.7 | 38.99 | 2339.0 | 1950.0 | 38 | 0.0 | 79.5 |
| 30 | 1.3 | 99.0 | 46.79 | 2807.0 | 2339.0 | 31 | 0.4 | 79.9 |
| 35 | 0.6 | 99.6 | 54.59 | 3275.0 | 2729.0 | 27 | 0.2 | 80.0 |
| 40 | 0.4 | 100.0 | 62.39 | 3743.0 | 3119.0 | 24 | 0.1 | 80.1 |
| 45 | 0.0 | 100.0 | 70.18 | 4211.0 | 3509.0 | 21 | 0.0 | 80.1 |
| **Estimated Net Annual Sediment (TSS) Load Reduction =** | | | | | | | | **80 %** |

*Climate Station ID*: 6144478 *Years of Rainfall Data*: 20

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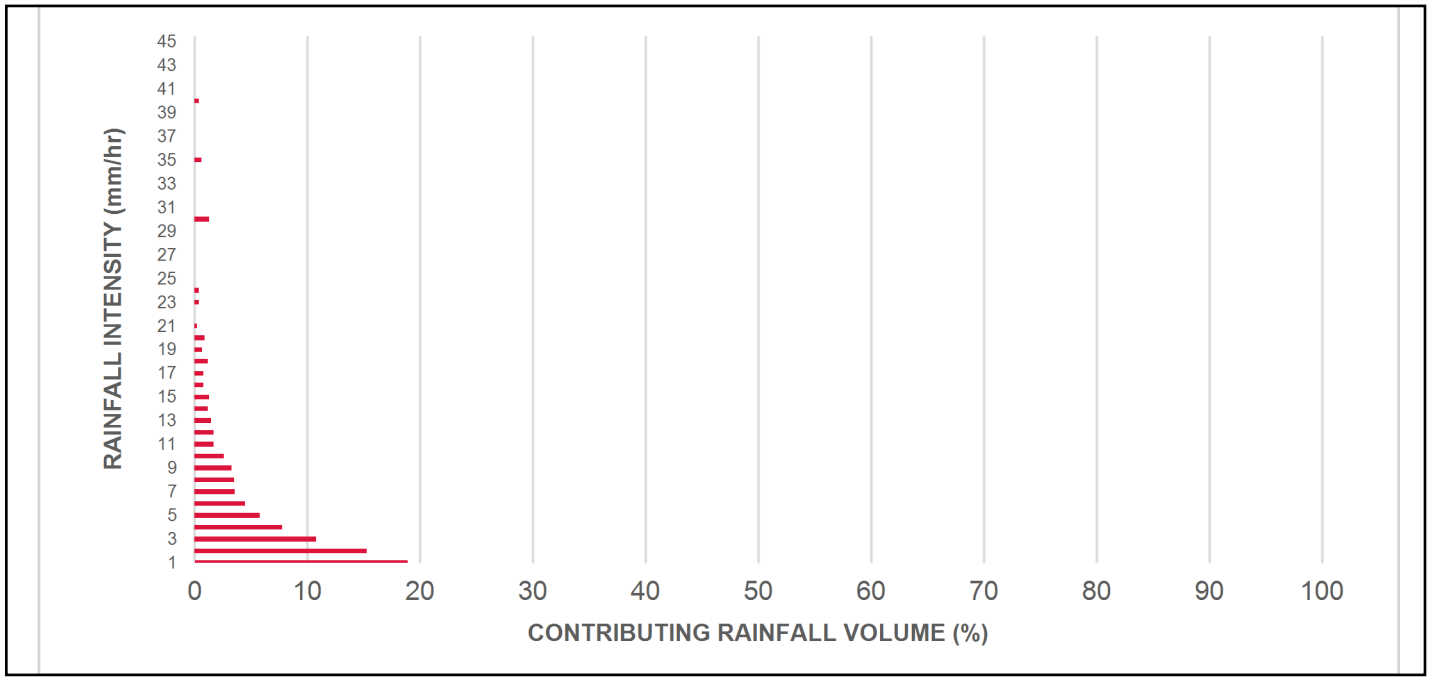
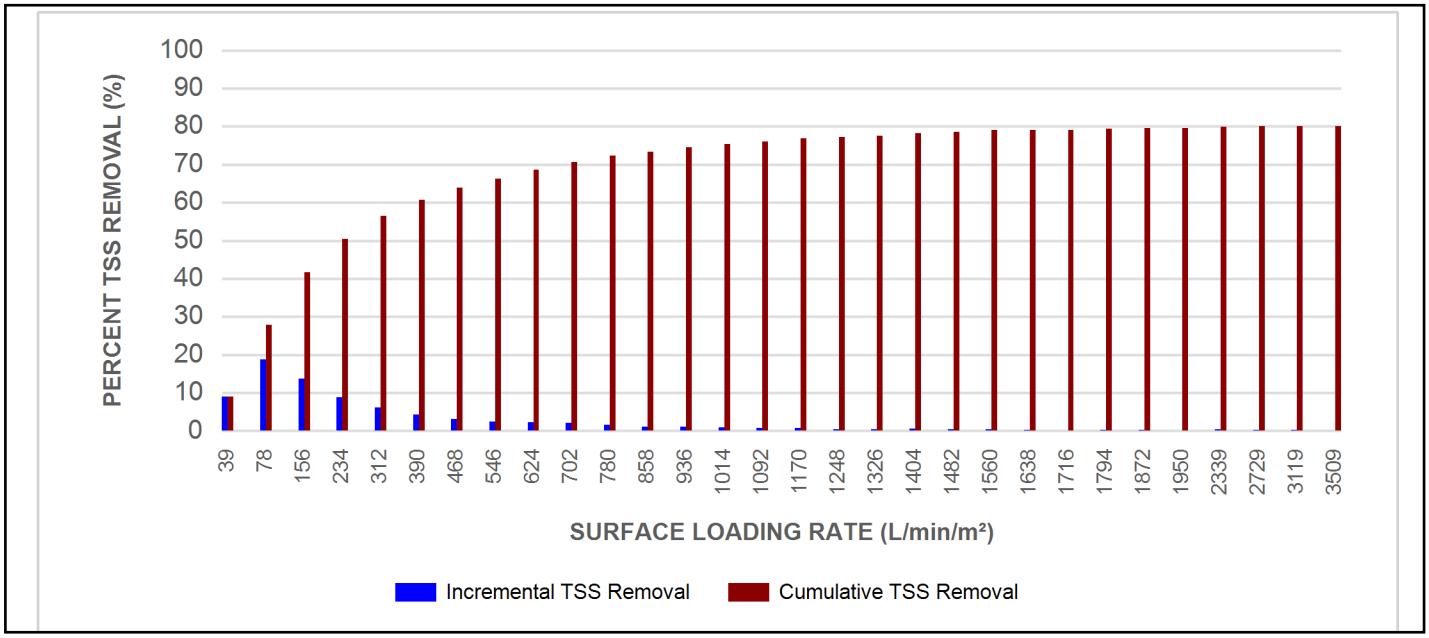
## RAINFALL DATA FROM LONDON CS RAINFALL STATION




## INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL

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**Maximum Pipe Diameter / Peak Conveyance**

| Stormceptor EF / EFO | Model Diameter | | Min Angle Inlet / Outlet Pipes | Max Inlet Pipe Diameter | | Max Outlet Pipe Diameter | | Peak Conveyance Flow Rate | |
|---|---|---|---|---|---|---|---|---|---|
| | (m) | (ft) | | (mm) | (in) | (mm) | (in) | (L/s) | (cfs) |
| EF4 / EFO4 | 1.2 | 4 | 90 | 609 | 24 | 609 | 24 | 425 | 15 |
| EF6 / EFO6 | 1.8 | 6 | 90 | 914 | 36 | 914 | 36 | 990 | 35 |
| EF8 / EFO8 | 2.4 | 8 | 90 | 1219 | 48 | 1219 | 48 | 1700 | 60 |
| EF10 / EFO10 | 3.0 | 10 | 90 | 1828 | 72 | 1828 | 72 | 2830 | 100 |
| EF12 / EFO12 | 3.6 | 12 | 90 | 1828 | 72 | 1828 | 72 | 2830 | 100 |

## SCOUR PREVENTION AND ONLINE CONFIGURATION

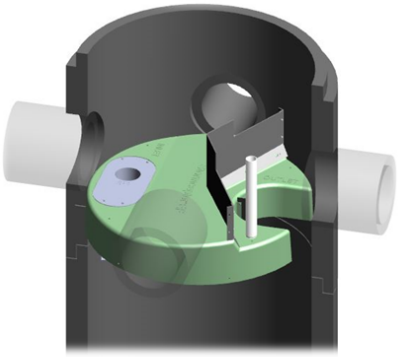
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

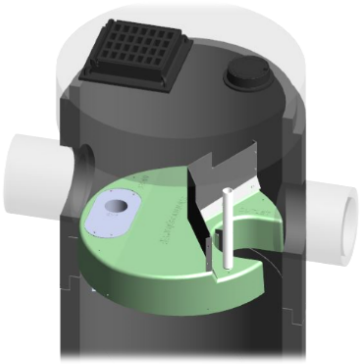
## DESIGN FLEXIBILITY

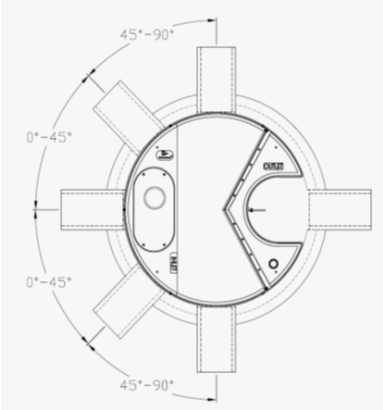
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

## OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.








**INLET-TO-OUTLET DROP**

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

**HEAD LOSS**

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

**Pollutant Capacity**

| Stormceptor EF / EFO | Model Diameter | | Depth (Outlet Pipe Invert to Sump Floor) | | Oil Volume | | Recommended Sediment Maintenance Depth * | | Maximum Sediment Volume * | | Maximum Sediment Mass ** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (m) | (ft) | (m) | (ft) | (L) | (Gal) | (mm) | (in) | (L) | ($ft^3$) | (kg) | (lb) |
| EF4 / EFO4 | 1.2 | 4 | 1.52 | 5.0 | 265 | 70 | 203 | 8 | 1190 | 42 | 1904 | 5250 |
| EF6 / EFO6 | 1.8 | 6 | 1.93 | 6.3 | 610 | 160 | 305 | 12 | 3470 | 123 | 5552 | 15375 |
| EF8 / EFO8 | 2.4 | 8 | 2.59 | 8.5 | 1070 | 280 | 610 | 24 | 8780 | 310 | 14048 | 38750 |
| EF10 / EFO10 | 3.0 | 10 | 3.25 | 10.7 | 1670 | 440 | 610 | 24 | 17790 | 628 | 28464 | 78500 |
| EF12 / EFO12 | 3.6 | 12 | 3.89 | 12.8 | 2475 | 655 | 610 | 24 | 31220 | 1103 | 49952 | 137875 |

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/$ft^3$ )

| Feature | Benefit | Feature Appeals To |
|---|---|---|
| Patent-pending enhanced flow treatment and scour prevention technology | Superior, verified third-party performance | Regulator, Specifying & Design Engineer |
| Third-party verified light liquid capture and retention for EFO version | Proven performance for fuel/oil hotspot locations | Regulator, Specifying & Design Engineer, Site Owner |
| Functions as bend, junction or inlet structure | Design flexibility | Specifying & Design Engineer |
| Minimal drop between inlet and outlet | Site installation ease | Contractor |
| Large diameter outlet riser for inspection and maintenance | Easy maintenance access from grade | Maintenance Contractor & Site Owner |

**STANDARD STORMCEPTOR EF/EFO DRAWINGS**

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

**STANDARD STORMCEPTOR EF/EFO SPECIFICATION**

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

# STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

## PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

## PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

| | | |
|---|---|---|
| 2.1.1 | 4 ft (1219 mm) Diameter OGS Units: | 1.19 $m^3$ sediment / 265 L oil |
| | 6 ft (1829 mm) Diameter OGS Units: | 3.48 $m^3$ sediment / 609 L oil |
| | 8 ft (2438 mm) Diameter OGS Units: | 8.78 $m^3$ sediment / 1,071 L oil |
| | 10 ft (3048 mm) Diameter OGS Units: | 17.78 $m^3$ sediment / 1,673 L oil |
| | 12 ft (3657 mm) Diameter OGS Units: | 31.23 $m^3$ sediment / 2,476 L oil |

## PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall

remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/$m^2$ to 1400 L/min/$m^2$, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/$m^2$ and 1400 L/min/$m^2$ shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/$m^2$ shall be assumed to be identical to the sediment removal efficiency at 40 L/min/$m^2$. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/$m^2$.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/$m^2$ shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/$m^2$, and shall be calculated using a simple proportioning formula, with 1400 L/min/$m^2$ in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/$m^2$.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/$m^2$.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to

assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/$m^2$ to 2600 L/min/$m^2$) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Stormceptor®

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# Stormceptor® EF Sizing Report

## STORMCEPTOR®
## ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

05/20/2022

| | |
|---|---|
| Province: | Ontario |
| City: | St. Thomas |
| Nearest Rainfall Station: | LONDON CS |
| Climate Station Id: | 6144478 |
| Years of Rainfall Data: | 20 |

| | |
|---|---|
| Site Name: | 410 Sunset Dr A4 |

| | |
|---|---|
| Drainage Area (ha): | 1.06 |
| % Imperviousness: | 60.20 |

Runoff Coefficient 'c': 0.66

| | |
|---|---|
| Particle Size Distribution: | Fine |
| Target TSS Removal (%): | 70.0 |

| | |
|---|---|
| Required Water Quality Runoff Volume Capture (%): | 90.00 |
| Estimated Water Quality Flow Rate (L/s): | 25.59 |
| Oil / Fuel Spill Risk Site? | Yes |
| Upstream Flow Control? | No |
| Peak Conveyance (maximum) Flow Rate (L/s): | 61.20 |
| Site Sediment Transport Rate (kg/ha/yr): | |

| | |
|---|---|
| Project Name: | 410 Sunset Dr |
| Project Number: | 51252 |
| Designer Name: | Bogdan Pavlovic |
| Designer Company: | MTE Consultants |
| Designer Email: | bpavlovic@mte85.com |
| Designer Phone: | 519-701-2693 |
| EOR Name: | |
| EOR Company: | |
| EOR Email: | |
| EOR Phone: | |

**Net Annual Sediment (TSS) Load Reduction Sizing Summary**

| Stormceptor Model | TSS Removal Provided (%) |
|---|---|
| EFO4 | 76 |
| EFO6 | 87 |
| EFO8 | 93 |
| EFO10 | 96 |
| EFO12 | 97 |

**Recommended Stormceptor EFO Model: EFO4**

**Estimated Net Annual Sediment (TSS) Load Reduction (%): 76**

**Water Quality Runoff Volume Capture (%): > 90**

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## THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

## PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

## PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

| Particle Size (µm) | Percent Less Than | Particle Size Fraction (µm) | Percent |
|---|---|---|---|
| 1000 | 100 | 500-1000 | 5 |
| 500 | 95 | 250-500 | 5 |
| 250 | 90 | 150-250 | 15 |
| 150 | 75 | 100-150 | 15 |
| 100 | 60 | 75-100 | 10 |
| 75 | 50 | 50-75 | 5 |
| 50 | 45 | 20-50 | 10 |
| 20 | 35 | 8-20 | 15 |
| 8 | 20 | 5-8 | 10 |
| 5 | 10 | 2-5 | 5 |
| 2 | 5 | <2 | 5 |

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# Stormceptor® EF Sizing Report

| Rainfall Intensity (mm / hr) | Percent Rainfall Volume (%) | Cumulative Rainfall Volume (%) | Flow Rate (L/s) | Flow Rate (L/min) | Surface Loading Rate (L/min/m²) | Removal Efficiency (%) | Incremental Removal (%) | Cumulative Removal (%) |
|---|---|---|---|---|---|---|---|---|
| 0.5 | 9.0 | 9.0 | 0.97 | 58.0 | 49.0 | 100 | 9.0 | 9.0 |
| 1 | 18.9 | 27.8 | 1.95 | 117.0 | 97.0 | 97 | 18.3 | 27.3 |
| 2 | 15.3 | 43.2 | 3.90 | 234.0 | 195.0 | 84 | 12.9 | 40.2 |
| 3 | 10.8 | 53.9 | 5.85 | 351.0 | 292.0 | 79 | 8.5 | 48.7 |
| 4 | 7.8 | 61.7 | 7.79 | 468.0 | 390.0 | 74 | 5.8 | 54.5 |
| 5 | 5.8 | 67.5 | 9.74 | 585.0 | 487.0 | 70 | 4.1 | 58.6 |
| 6 | 4.5 | 72.0 | 11.69 | 701.0 | 585.0 | 66 | 2.9 | 61.5 |
| 7 | 3.6 | 75.6 | 13.64 | 818.0 | 682.0 | 64 | 2.3 | 63.8 |
| 8 | 3.5 | 79.1 | 15.59 | 935.0 | 779.0 | 63 | 2.2 | 66.0 |
| 9 | 3.3 | 82.4 | 17.54 | 1052.0 | 877.0 | 63 | 2.0 | 68.1 |
| 10 | 2.6 | 85.0 | 19.48 | 1169.0 | 974.0 | 62 | 1.6 | 69.7 |
| 11 | 1.7 | 86.7 | 21.43 | 1286.0 | 1072.0 | 60 | 1.0 | 70.7 |
| 12 | 1.7 | 88.4 | 23.38 | 1403.0 | 1169.0 | 58 | 1.0 | 71.7 |
| 13 | 1.5 | 89.8 | 25.33 | 1520.0 | 1266.0 | 56 | 0.8 | 72.5 |
| 14 | 1.2 | 91.0 | 27.28 | 1637.0 | 1364.0 | 53 | 0.6 | 73.1 |
| 15 | 1.3 | 92.3 | 29.23 | 1754.0 | 1461.0 | 50 | 0.6 | 73.8 |
| 16 | 0.8 | 93.0 | 31.17 | 1870.0 | 1559.0 | 47 | 0.4 | 74.1 |
| 17 | 0.8 | 93.8 | 33.12 | 1987.0 | 1656.0 | 44 | 0.3 | 74.5 |
| 18 | 1.2 | 95.0 | 35.07 | 2104.0 | 1754.0 | 42 | 0.5 | 75.0 |
| 19 | 0.7 | 95.7 | 37.02 | 2221.0 | 1851.0 | 40 | 0.3 | 75.2 |
| 20 | 0.9 | 96.6 | 38.97 | 2338.0 | 1948.0 | 38 | 0.4 | 75.6 |
| 21 | 0.2 | 96.8 | 40.92 | 2455.0 | 2046.0 | 36 | 0.1 | 75.7 |
| 22 | 0.0 | 96.8 | 42.87 | 2572.0 | 2143.0 | 34 | 0.0 | 75.7 |
| 23 | 0.4 | 97.2 | 44.81 | 2689.0 | 2241.0 | 33 | 0.1 | 75.8 |
| 24 | 0.4 | 97.7 | 46.76 | 2806.0 | 2338.0 | 31 | 0.1 | 75.9 |
| 25 | 0.0 | 97.7 | 48.71 | 2923.0 | 2436.0 | 30 | 0.0 | 75.9 |
| 30 | 1.3 | 99.0 | 58.45 | 3507.0 | 2923.0 | 25 | 0.3 | 76.3 |
| 35 | 0.6 | 99.6 | 68.19 | 4092.0 | 3410.0 | 22 | 0.1 | 76.4 |
| 40 | 0.4 | 100.0 | 77.94 | 4676.0 | 3897.0 | 19 | 0.1 | 76.5 |
| 45 | 0.0 | 100.0 | 87.68 | 5261.0 | 4384.0 | 17 | 0.0 | 76.5 |
| **Estimated Net Annual Sediment (TSS) Load Reduction =** | | | | | | | | **76 %** |

*Climate Station ID*: 6144478 *Years of Rainfall Data*: 20

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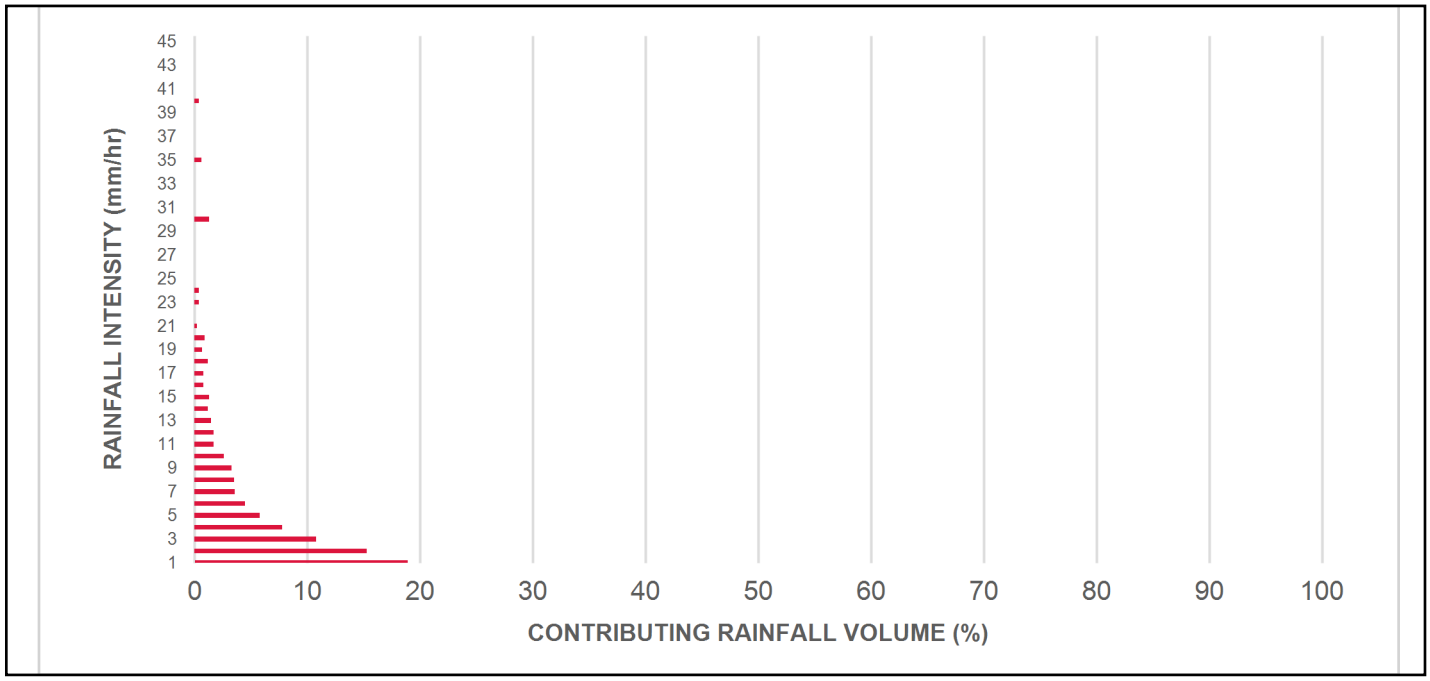


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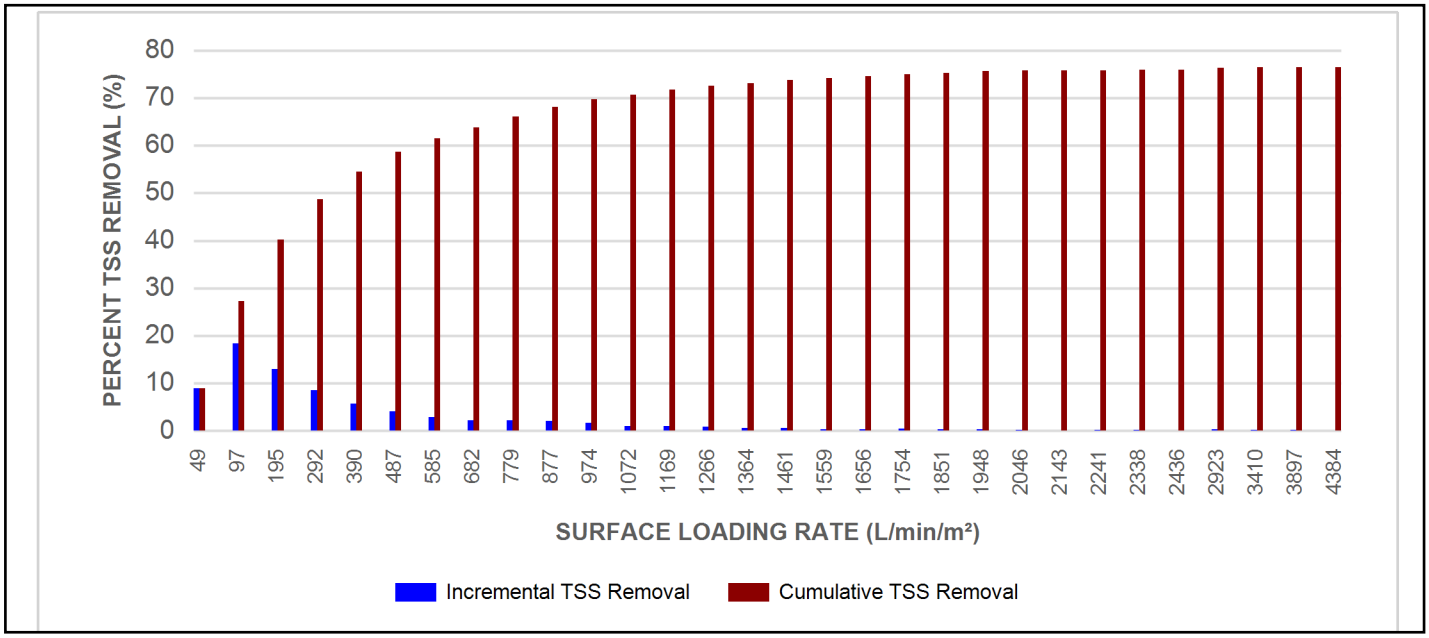

**Maximum Pipe Diameter / Peak Conveyance**

| Stormceptor EF / EFO | Model Diameter | | Min Angle Inlet / Outlet Pipes | Max Inlet Pipe Diameter | | Max Outlet Pipe Diameter | | Peak Conveyance Flow Rate | |
|---|---|---|---|---|---|---|---|---|---|
| | (m) | (ft) | | (mm) | (in) | (mm) | (in) | (L/s) | (cfs) |
| EF4 / EFO4 | 1.2 | 4 | 90 | 609 | 24 | 609 | 24 | 425 | 15 |
| EF6 / EFO6 | 1.8 | 6 | 90 | 914 | 36 | 914 | 36 | 990 | 35 |
| EF8 / EFO8 | 2.4 | 8 | 90 | 1219 | 48 | 1219 | 48 | 1700 | 60 |
| EF10 / EFO10 | 3.0 | 10 | 90 | 1828 | 72 | 1828 | 72 | 2830 | 100 |
| EF12 / EFO12 | 3.6 | 12 | 90 | 1828 | 72 | 1828 | 72 | 2830 | 100 |

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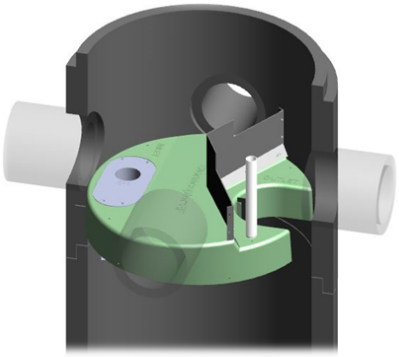
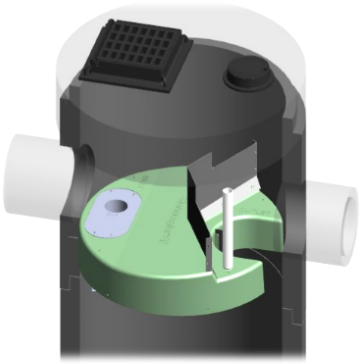
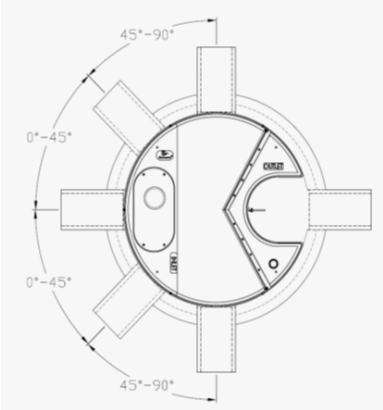
## OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.








**INLET-TO-OUTLET DROP**

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

**HEAD LOSS**

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

**Pollutant Capacity**

| Stormceptor EF / EFO | Model Diameter | | Depth (Outlet Pipe Invert to Sump Floor) | | Oil Volume | | Recommended Sediment Maintenance Depth * | | Maximum Sediment Volume * | | Maximum Sediment Mass ** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (m) | (ft) | (m) | (ft) | (L) | (Gal) | (mm) | (in) | (L) | ($ft^3$) | (kg) | (lb) |
| EF4 / EFO4 | 1.2 | 4 | 1.52 | 5.0 | 265 | 70 | 203 | 8 | 1190 | 42 | 1904 | 5250 |
| EF6 / EFO6 | 1.8 | 6 | 1.93 | 6.3 | 610 | 160 | 305 | 12 | 3470 | 123 | 5552 | 15375 |
| EF8 / EFO8 | 2.4 | 8 | 2.59 | 8.5 | 1070 | 280 | 610 | 24 | 8780 | 310 | 14048 | 38750 |
| EF10 / EFO10 | 3.0 | 10 | 3.25 | 10.7 | 1670 | 440 | 610 | 24 | 17790 | 628 | 28464 | 78500 |
| EF12 / EFO12 | 3.6 | 12 | 3.89 | 12.8 | 2475 | 655 | 610 | 24 | 31220 | 1103 | 49952 | 137875 |

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/$ft^3$ )

| Feature | Benefit | Feature Appeals To |
|---|---|---|
| Patent-pending enhanced flow treatment and scour prevention technology | Superior, verified third-party performance | Regulator, Specifying & Design Engineer |
| Third-party verified light liquid capture and retention for EFO version | Proven performance for fuel/oil hotspot locations | Regulator, Specifying & Design Engineer, Site Owner |
| Functions as bend, junction or inlet structure | Design flexibility | Specifying & Design Engineer |
| Minimal drop between inlet and outlet | Site installation ease | Contractor |
| Large diameter outlet riser for inspection and maintenance | Easy maintenance access from grade | Maintenance Contractor & Site Owner |

**STANDARD STORMCEPTOR EF/EFO DRAWINGS**

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

**STANDARD STORMCEPTOR EF/EFO SPECIFICATION**

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

# STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

## PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

## PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

| | | |
|---|---|---|
| 2.1.1 | 4 ft (1219 mm) Diameter OGS Units: | 1.19 $m^3$ sediment / 265 L oil |
| | 6 ft (1829 mm) Diameter OGS Units: | 3.48 $m^3$ sediment / 609 L oil |
| | 8 ft (2438 mm) Diameter OGS Units: | 8.78 $m^3$ sediment / 1,071 L oil |
| | 10 ft (3048 mm) Diameter OGS Units: | 17.78 $m^3$ sediment / 1,673 L oil |
| | 12 ft (3657 mm) Diameter OGS Units: | 31.23 $m^3$ sediment / 2,476 L oil |

## PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall

remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/$m^2$ to 1400 L/min/$m^2$, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/$m^2$ and 1400 L/min/$m^2$ shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/$m^2$ shall be assumed to be identical to the sediment removal efficiency at 40 L/min/$m^2$. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/$m^2$.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/$m^2$ shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/$m^2$, and shall be calculated using a simple proportioning formula, with 1400 L/min/$m^2$ in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/$m^2$.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/$m^2$.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to

assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/$m^2$ to 2600 L/min/$m^2$) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.