127 CARDEVCO ROAD

City of Ottawa

Site Servicing and Stormwater Management Report

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1.0 INTRODUCTION

The development planned at 127 Cardevco Road is located in a rural industrial subdivision west of the intersection between Cardevco Road and Wescar Lane, in the City of Ottawa, as shown in Figure 1-1. The site area is approximately 2023 square meters and is currently used as a storage yard for equipment and construction materials. The proposed development will consist of a warehouse with associated parking, landscaping, site servicing and lot grading.

This site servicing and stormwater management report outlines how the site will be serviced with the use of a private septic system, a private well and a municipal drainage ditch. A general plan of services, grading and stormwater management of the proposed development has been included in Appendix I.

Figure 1-1 Key Plan of Proposed Site

1.1 Study Objectives

This site servicing and stormwater management report has been provided to support the application for Site Plan Control Approval. The specific elements and potential constraints addressed are as follows:

- Stormwater Management
  Establish stormwater conveyance systems, overland flow routes, outlet controls and stormwater storage features and water quality controls.
- Wastewater Disposal
  Establish the sanitary disposal system while verifying potential conflicts with setbacks from both property lines and existing wells.
- Water Supply
  Establish the location of the private well while considering the proposed and the existing wastewater disposal systems as well as stormwater management features.

2.0 REFERENCES AND SUPPORTING DOCUMENTS

The following supporting documents have been considered in regards to site servicing and stormwater management:

- Ottawa Sewer Design Guidelines (2008)
- Ontario Stormwater Management Manual (2003)
- Ontario Building Code (2012)

3.0 STORMWATER MANAGEMENT DESIGN

To ensure that offsite stormwater management facilities are not overwhelmed in storm events and to conform to the Ottawa Sewer Design Guidelines, the proposed development will include the necessary provisions to limit the runoff to the 1 in 10 year pre-development condition through the use of onsite storage.

3.1 Pre-development Conditions

3.1.1 The Site

The site currently is being used as a storage yard for equipment and construction material.

3.1.2 Existing Drainage

Stormwater currently drains into the municipal drainage ditch on the east of the property on Cardevco Rd. A 500 mm diameter steel culvert exists under the north access way of the property.

3.1.3 Allowable Release Rate

The rational method was used to simulate stormwater runoff. The allowable release rate was calculated for a 10 year storm using a runoff coefficient of 0.40 and a time of concentration of 20 minutes as specified by City of Ottawa Engineer Mr. Kevin Hall. The allowable release rate for the proposed 2023 square meter site was calculated to be 18.9 L/s.

Drainage area	A = 2023 m^2	Q = C i A
Runoff Coefficient	C = 0.40	Q = 0.40 * 0.084 m/h * 2023 m^2
Intensity (10 year)*	i = 84 mm/h	Q = 67.97 m^3/h = 18.9 L/s

*Ottawa Sewer Design Guidelines, Appendix 5-A.1, Ottawa IDF Curves 1967-1997

3.2 Post-development Conditions

3.2.1 Proposed Development

Due to the addition of impermeable surfaces associated with the proposed development, an increase in stormwater runoff will occur. Any runoff in excess of the allowable release rate, up to and including the 1 in 10 year design event, will be stored by surface ponding. Flow in excess of the 1 in 10 year event will be conveyed by lot grading toward the municipal drainage ditch on the east side of the property.

3.2.2 Post-development Flow

The post-development flow consists of controlled flow from the roof, the parking lot and the south and eastern portions of the property (catchment area C1 & C3) as well as uncontrolled flow from the western portion of the property and along the perimeter of the north side of the property (catchment area C2), see Figure 3-1.

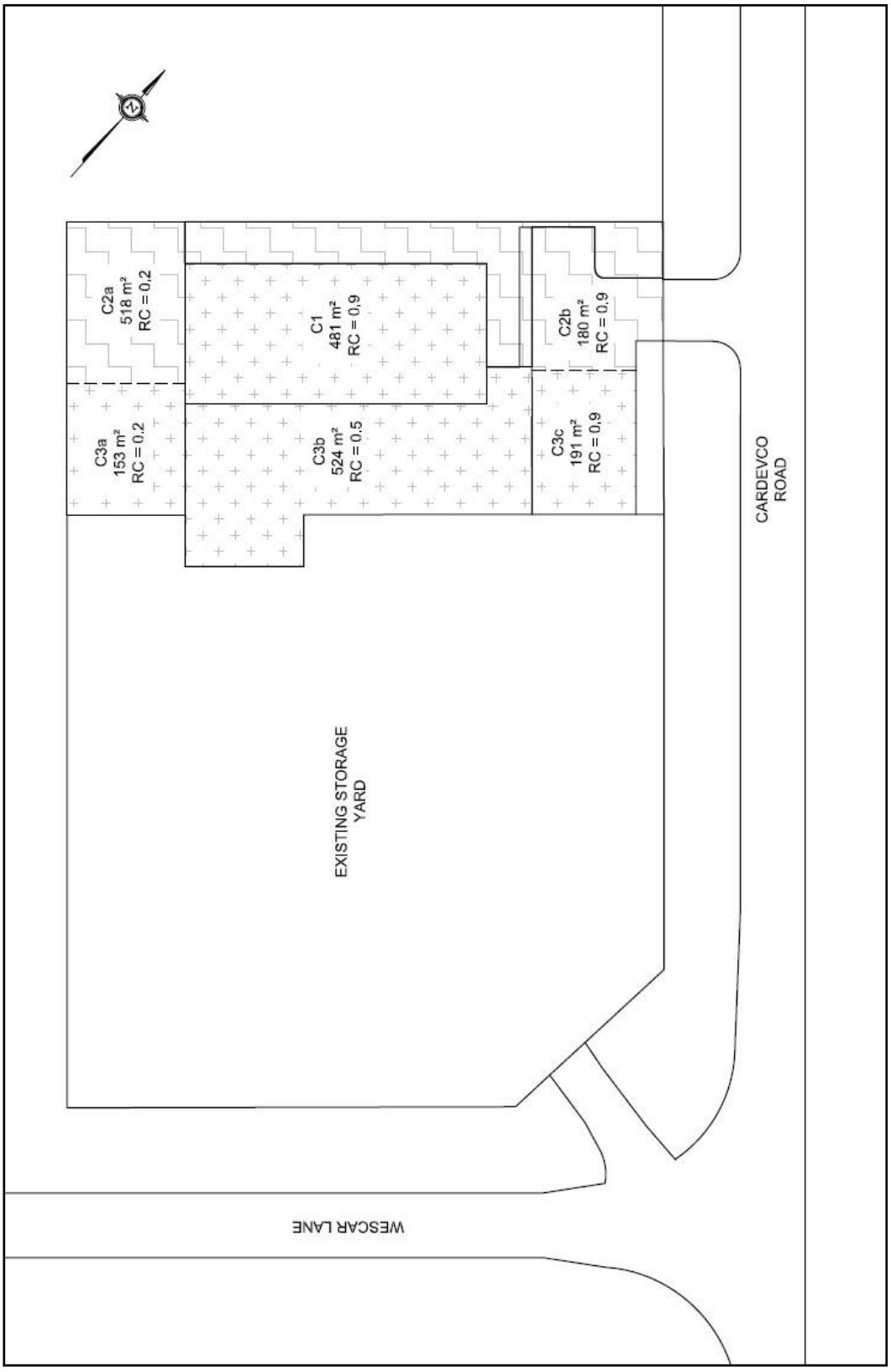

Figure 3-1 Post Development Catchment Areas

3.2.2.1 Uncontrolled Areas (Catchment Area C2)

Catchment area C2 includes flow from a portion of the paved parking lot and landscaped areas. Runoff from these areas will flow off site uncontrolled via a grassed swale toward the municipal drainage ditch. Areas with uncontrolled discharge must be compensated for by areas with controls. Table 3-1 summarizes the parameters used to calculate peak 10 year catchment release rates for the uncontrolled catchment areas.

Catchment Area	Area (m^2)	Description	Runoff Coefficient*
C2a	518	Sod / Grass	0.20
C2b	180	Paved Parking Lot	0.90
Total Area =	698	Equiv. RC =	0.38

Table 3-1: Uncontrolled Catchment Areas

*Ottawa Sewer Design Guidelines, Clause 5.4.5.2.1, Pervious Area Runoff Coefficients

3.2.2.2 Controlled Drainage Areas (Catchment Area C1 & C3)

Catchment areas C1 & C3 consist of four sub-catchment areas, including flow from the roof, rear landscaped area, gravel parking lot and paved parking lot. The runoff from these areas will be captured by lot grading and allowed to pond in the front parking lot, which will then drain into the municipal drainage ditch through an inlet-control device Table 3-2 summarizes the parameters used to calculate peak 10 year catchment release rates for the controlled catchment areas.

Catchment Area	Area (m^2)	Description	Runoff Coefficient*
C1	481	Building Roof	0.90
C3a	153	Sod / Grass	0.20
C3b	524	Gravel Parking Lot	0.50
C3c	191	Paved Parking Lot	0.90
Total Area =	1349	Equiv. RC =	0.67

Table 3-2: Controlled Catchment Areas

*Ottawa Sewer Design Guidelines, Clause 5.4.5.2.1, Pervious Area Runoff Coefficients

The inlet-control device will consist of a 150 mm wide flume in the concrete curb. The size of the flume was chosen to limit flow to the allowable release rates using the Montana Flume Free-Flow Discharge Equation: "$Q = C*(Ha)^n$ ", where C = 0.264, n = 1.58 and Ha = the maximum head level in the retention basin for each storm event.

The storage volume requirements were calculated by applying the 10 year rainfall intensity values at 10 minute intervals. The storage volume required to store the total volume of rainfall for the controlled catchment area from each event was determined. The maximum required storage volume of 15.85 cubic meters chosen is the volume corresponding to time period with the highest total flow from the site that is less than the allowable release rate of 18.9 L/s. A summary of these calculations can be found in Table 3-3. The table shows that events with higher total flow rates require less storage capacity than will be provided.

Time (min)	Intensity (10 yr, mm/h)	Controlled Flow (L/s)	Discharge (L/s)	Net Runoff Stored (L/s)	Storage Required (m^3)
10	125	31.16	6.73	24.43	14.66
20	84	20.94	7.73	13.21	**15.85**
30	65	16.20	7.50	8.70	15.66
40	53	13.21	6.94	6.27	15.04
50	47	11.72	7.05	4.66	13.99
60	38	9.47	5.88	3.59	12.94

Table 3-3 Ponding Storage Volume Calculation

To ensure that storage volume is not exceeded due to the accumulation of snow and ice, the storage volume is increased by 50% to 24 m^3. A ponding area with a maximum ponding depth of 150 mm was sized to approximately 191 m^2, see Appendix I.

Catchment Areas	10-Year Peak Discharge (L/s)
Uncontrolled (C2)	6.2
Controlled (C1 & C3)	9.6
Total Peak Discharge	15.8
Max. Allowable	18.9

Table 3-4 Summary of Total 10 Year Event Release Rates

3.3 Quality Control

Runoff from impervious surfaces will be treated and conveyed via grassed swales to the municipal drainage ditch. This system has been designed to remove at least 70% of suspended particles, which is in conformance to the MOE's "normal protection" level.

3.4 Erosion and Sediment Control Measures

3.4.1 Control Measures during Construction

Erosion and sediment controls must be in place during construction. The following recommendations to the contractor will be included in the contract drawings:

1. Limit the extent of exposed soils at any given time.
2. Re-vegetate exposed areas as soon as possible.
3. Minimize the area to be cleared and grubbed.
4. Protect exposed slopes with plastic or synthetic mulches.
5. Install silt fences to prevent sediment from entering existing ditches.
6. Plan construction at proper time to avoid flooding.

During construction, the contractor shall, at every rainfall event, complete inspections and guarantee proper performance of all erosion control measures.

3.4.2 Permanent Control Measures

The following control measures shall be put in place to manage erosion and sediment transport after construction is complete:

1. All exposed soils shall be covered by landscaping, native forest detritus or gravel to prevent soil erosion.
2. Gravel shall be provided at all locations where roof runoff will fall or at downspouts to prevent soil erosion.

4.0 WASTEWATER DISPOSAL

Wastewater discharged from the proposed warehouse will outlet to a private septic system located at the rear of the property. Proposed grading will maintain positive drainage away from the raised tile bed. The proposed location of the tile bed has been designed to maintain more than the minimum 15 meters separation from existing and proposed water supply wells as well as the minimum 3 meters from all property lines as per clause 8.2.1.6 of the 2012 Ontario Building Code.

5.0 WATER SUPPLY

An on-site private well in the front of the building provides potable water. The well has been constructed with a watertight well casing 6.10 meters below grade and is located to maintain more than 15 meters separation from all existing and proposed septic systems as per Table 8.2.1.6 of the 2012 Ontario Building Code. Supervision, inspection and certification of the well construction were completed by Houle Chevrier Engineering Ltd.

6.0 CONCLUSION

6.1 Stormwater Management Design

Based on the findings of this report, the following recommendations are provided:

- Site runoff is to be directed to the roadside ditch along Cardevco Road.
- A ponding area has been designed to store stormwater on site. The total flow offsite will be limited to the 10 year predevelopment flow 18.9 L/s.
- Overland flow routes are designed to ensure emergency conveyance capacity.
- Appropriate temporary erosion controls will be put in place during construction to prevent sediment transport offsite. Permanent erosion control measure will be put in place after construction is complete.

6.2 Wastewater Disposal

Wastewater discharged from the development is directed to outlet to a private septic system located at the rear of the property. The proposed location satisfies all offset requirements.

6.3 Water Supply

Potable water is available via a private onsite well near the front of the property. The well's location satisfies all offset requirements of the 2012 Ontario Building Code.

ART Engineering Inc. endeavours to ensure the completeness of the information presented in the above report. Should any discrepancies be noted or if any clarification on the information listed be required, please contact:

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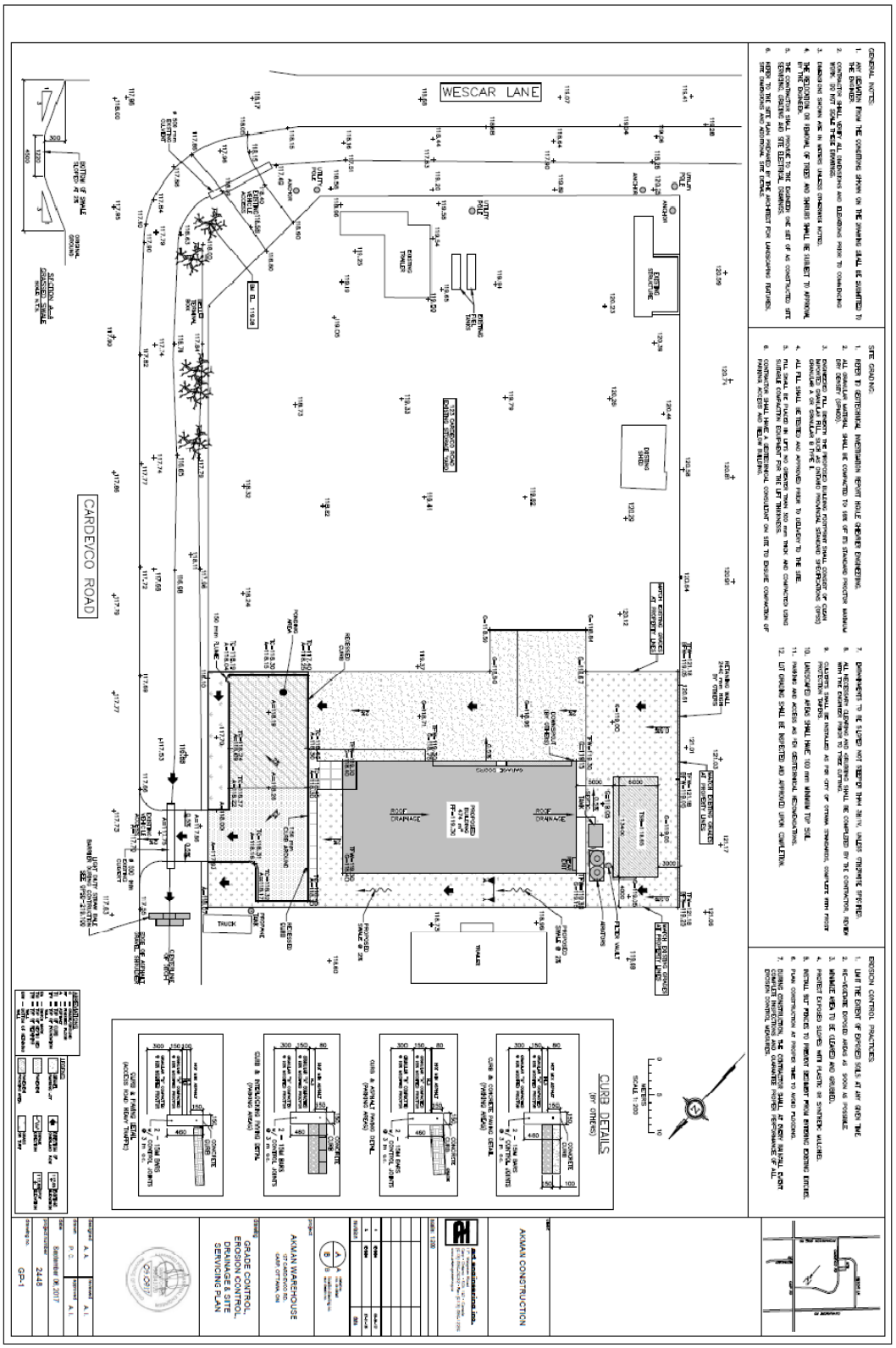
GENERAL NOTES:
SITE GRADING:
EROSION CONTROL PRACTICES
WESCAR LANE
CARDEVCO ROAD
CURB DETAILS
(BY OTHERS)
AKMAN CONSTRUCTION
AKMAN WAREHOUSE
GRADE CONTROL
EROSION CONTROL
DRAINAGE & SITE
SERVICING PLAN
GP-1