



**KILBOURNE SUBDIVISION FUNCTIONAL
STORMWATER MANAGEMENT REPORT**
3514 Bostwick Road, London Ontario

June 24, 2025

Prepared for:
Kilbourne Developments Inc.

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Project Number:
161413971

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1 Introduction

Stantec has been retained by the Client to provide a functional stormwater management (SWM) strategy for the proposed Kilbourne Subdivision located at 3514 Bostwick Road in London, Ontario. This SWM strategy will outline the functional preliminary design the required SWM facilities to meet the prescribed targets outlined in the governing documentation.

1.1 Site Description

The 85 ha development is bounded by Bostwick Rd to the west, commercial lands and a hydro corridor to the east, Wharncliffe Road to the south and future residential developments to the north. The site is split down the middle by the Thornicroft Drain, which flows from north to south and serves as the primary drainage feature that serves the site. The lands consist of primarily worked agricultural lands with a large, 12 ha woodlot located in the northwest corner. The site is illustrated on the attached draft plan.

1.2 References

The following documents were reviewed and referenced for the production of this report.

- *Kilbourne Subdivision Drainage and Floodlines Future Conditions Report*, Matrix Solutions Inc. (Matrix), September 2022.
- *Westwinds Subdivision Stormwater Management Brief*, AGM Engineering Ltd. (AGM), September 2023.
- *Wonderland Gateway Commercial Lands Stormwater Management Strategy*, Stantec, April 2023.
- *Dingman Creek Subwatershed: Stormwater Servicing Study*, Aquafor Beech Ltd. (Aquafor Beech), September 2020.
- *Design Specifications & Requirements Manual (DSRM)*, City of London, March 2022.
- *Low Impact Development Stormwater Management Planning and Design Guide*, Credit Valley Conservation (CVC) and Toronto and Region Conservation Authority (TRCA), 2010.
- *Stormwater Management Planning and Design Manual*, Ministry of Environment, Conservation and Parks (MECP, formerly known as MOE or MECC), March 2003.



2 Stormwater Management Design Criteria

Based on the above noted information and consultations, the following SWM design criteria has been established for the proposed development:

- Per the Dingman Creek Subwatershed: Stormwater Servicing Study (Aquafor Beech, 2020), the proposed Kilbourne development is to be serviced by three (3) proposed SWM Facilities, North Lambeth P2 North and South and North Lambeth P3.
- Water Quantity Control – provide sufficient on-site peak flow attenuation to control post-development flows to existing levels for storm events, 2- through 100-year:
 - Stormwater management facilities to be sized using the 24-hour Soil Conservation Service (SCS) Type II storm.
 - Safe conveyance of 250-year 3-hour Chicago Storm.
- Water Quality Control:
 - Provide an Enhanced level of water quality control, equivalent to 80% Total Suspended Solids (TSS) removal.
 - Detain runoff generated from a 25 mm event for 24-48 hours.
- Water Balance:
 - Provide infiltration to maintain greater than 80% of the pre-development water balance.



3 Existing Drainage Conditions

The lands proposed for development mainly consist of open space and row-crop agricultural lands. The south end of the property has a golf facility and some commercial areas which are to be redeveloped. The Thornicroft Drain flows from north to south down the middle of the property and receives flows from the east and west, including areas west of Bostwick Road, via sheet flow and drainage draws that are scattered along the property. Minor regrading for volumetric compensation in the fringe flood areas is planned, but the channel will remain largely untouched. The Drain will serve as the primary outlet for stormwater flows from the development.

3.1 Topography

The existing site drains generally towards the Thornicroft Drain at moderate slopes of 2-4% with runoff conveyed as overland flows. Site elevations range from 274 m in the north to 261 m in the south with the Thornicroft Drain serving as the low point throughout the site.

3.2 Soils and Hydrogeology

Based on the information provided by exp by email on November 24, 2023, and presented in Appendix A, site soils consist primarily of clayey silt till over silty sand and sandy silts. Groundwater depths range from 2 to 8 m below ground surface, with the groundwater being shallower closer to the Thornicroft Drain.



4 Stormwater Management Strategy

The development and some external lands are proposed to be serviced by four (4) SWM facilities. This is one (1) more than proposed in the Dingman Creek Subwatershed Study, but it was determined during analysis that the North Lambeth P3 facility needed to be split north and south due to difficulties in getting overland flows to the southern facility from the northern reaches. The ponds are proposed to be located two (2) to either side of the Thornicroft Drain and service the lands predominantly north of them.

Therefore, the four (4) facilities serving the development are:

- Pond 1 – North Lambeth P2 North
- Pond 2 – North Lambeth P3 North
- Pond 3 – North Lambeth P2 South
- Pond 4 – North Lambeth P3 South

These facilities are all proposed to be dry facilities and are preliminarily sized as part of this report to ensure that they will fit in the provided SWM blocks on the draft plan.

4.1 Stormwater Management Design Methodology

4.1.1 HYDROLOGIC MODELING

A hydrologic model was prepared to simulate drainage conditions for the western section of the subject development. Stormwater Management Hydrologic Model (SWMHYMO) was employed to predict flows for existing and proposed development conditions and design SWM systems to ensure the previously mention criteria were achieved.

Various studies provided a range of existing conditions outflows for the site. To address the criteria, existing and post-development conditions were modeled for the following storms derived using City of London IDF parameters from the referenced DSRM, summarized in **Table 1**.

Table 1: Design Storms

Distribution	Return Period	Duration (hrs.)	Depth (mm)
SCS Type II	2-year	24	50.5
SCS Type II	100-year	24	108.5
Chicago	100-year	3	75.8
Chicago	250-year	3	86.6
SCS Type II	250-year	24	119.0



4.1.1.1 Existing Conditions Model

An existing conditions hydrologic model was prepared to simulate runoff from the site using SWMHYMO. SCS curve numbers and catchment parameters were calculated for a generalized catchment based on the site's land use and soil type. All other parameters are from reference material listed in Section 1.2. SCS Calculations, and input/output files are appended for reference.

Delineation of existing drainage catchments is summarized as follows:

- **Catchment EXT-WW** – 13.09 ha of undeveloped land west of Bostwick Road and south of Pack Road to the west of the subject site. This area is conveyed through the subject site to the Thornicroft Drain and comprises the proposed Westwinds Development. This area will be serviced by Pond 2.
- **Catchment EXT-W3** – 14.31 ha of undeveloped land west of Bostwick Road and south of the Westwinds development to the west of the subject site. This area is conveyed through the subject site to the Thornicroft Drain and comprises the proposed Phase 3 of the W3 Development. This area will be serviced by Pond 4.
- **Catchment 100** – 20.00 ha of existing undeveloped land draining west to the Thornicroft Drain that will be partially serviced by Pond 1. Portions external to the proposed draft plan have been included in the design catchment area for Pincombe Drain SWMF #1 and will be tributary to it in the future.
- **Catchment 200** – 8.50 ha of existing undeveloped land draining east to the Thornicroft Drain that will be serviced by Pond 2.
- **Catchment 300** – 30.01 ha of existing mostly undeveloped land draining west to the Thornicroft Drain that will be serviced by Pond 3. This catchment includes the golf facility and commercial lands which have not been factored into the CN calculation to be conservative.
- **Catchment 400** – 13.33 ha of existing undeveloped land draining east to the Thornicroft Drain that will be serviced by Pond 4.

4.1.1.2 Proposed Conditions Model

The SWM strategy accommodates the proposed development and the external lands. The external lands have been accounted for in the model with controls in place on site. For the Westwinds development, this is described in the referenced AGM brief. For the W3 Phase 3, it has been assumed that the site will be controlled to at least existing conditions based on past discussions with the client. No final determination has been made at this time but the preliminary plan has some provision for this scheme. Further, the land use between Bostwick Road and the subject draft land has been included noting most of this parcel is the future remnant section of Bostwick Rd. The Wonderland Commercial lands east of site and north of Kilbourne Road have been included for control in Pond 3.



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4 Stormwater Management Strategy

SCS curve numbers and catchment parameters were calculated for a generalized catchment based on the site's land use and soil type. All other parameters are from reference material listed in Section 1.3. SCS Calculations, impervious calculations, and input/output files are appended for reference.

Delineation of proposed drainage catchments is provided on Figure 1.0, attached, and summarized as follows:

- **Catchment EXT-WW** – 13.09 ha of to be developed land west of Bostwick Road and south of Pack Road to the west of the subject site. The overall impervious level of the catchment is 30%. This area is conveyed through the subject site to the Thornicroft Drain and comprises the proposed Westwinds Development. This area will be serviced by Pond 2.
- **Catchment EXT-W3** – 14.31 ha of to be developed land west of Bostwick Road and south of the Westwinds development to the west of the subject site. The overall impervious level of the catchment is taken as 0% and modelled as existing. This area is conveyed through the subject site to the Thornicroft Drain and comprises the proposed Phase 3 of the W3 Development. The proposed development is currently expected to have onsite controls to limit flows to existing rates or lower. This area will be serviced by Pond 4.
- **Catchment EXT-COMM** – 10.30 ha of developed commercial area to the east of the site draining by way of Kilbourne Road. The overall impervious level of the catchment is taken as 90% and modelled as existing. There are various controls on site providing storage within the block which are broken down in the model as per the commercial lands figure. This area will be serviced by Pond 3. The modelling used is excerpts from the *Wonderland Gateway Commercial Lands Stormwater Management Strategy* SWMHYMO Model.
- **Catchment 100** – 11.80 ha of proposed developed land draining west to the Thornicroft Drain that will be serviced by Pond 1. The overall impervious level of the catchment is 59%.
- **Catchment 200** – 8.50 ha of proposed developed land draining east to the Thornicroft Drain that will be serviced by Pond 2. The overall impervious level of the catchment is 81%.
- **Catchment 300** – 30.01 ha of proposed developed land draining west to the Thornicroft Drain that will be serviced by Pond 3. The overall impervious level of the catchment is 73%.
- **Catchment 400** – 13.33 ha of proposed developed land draining east to the Thornicroft Drain that will be serviced by Pond 4. The overall impervious level of the catchment is 77%.

Determinations of the impervious levels can be found in Appendix B.

4.1.2 EXISTING CONDITIONS TARGETS

Based on the above existing conditions model, expected existing flow rates from the described catchments for each pond are as shown in **Table 2**.



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4 Stormwater Management Strategy

Table 2: Existing Conditions Discharge to Thornicroft Drain

Facility	2-year 24-hour SCS (m³/s)	100-year 24-hour SCS (m³/s)
Pond 1	0.53	1.90
Pond 2	0.57	2.03
Pond 3	0.65	2.34
Pond 4	0.72	2.58

These release rates were then used to size SWM facilities based on the available footprint in the draft plan blocks.

4.2 Quantity Controls

The development is to be controlled as described in the Dingman Creek Subwatershed Study by a series of dry SWM facilities. Utilizing the existing conditions model outputs at targets, stage-storage charts were developed for each pond block and can be found in Appendix B. The key details of the ponds are tabulated below.

Table 3: SWM Facility Attributes

Facility	Depth (m)	Maximum Volume (m³)	Bottom of Pond (m)	Top of Pond (m)	Pond Area (ha)	Draft Plan Block (ha)
Pond 1	1.5	4954	269.0	270.5	0.50	0.71
Pond 2	2.0	10007	268.5	270.5	0.66	0.85
Pond 3	2.3	22399	264.2	266.5	1.31	0.99
Pond 4	2.0	7244	264.0	266.0	0.50	1.19

Table 4: Modelled Release Rates

Facility	2-Year Target Flow (m³/s)	2-Year Proposed Flow (m³/s)	100-Year Target Flow (m³/s)	100-Year Proposed Flow (m³/s)
Pond 1	0.53	0.37	1.90	1.45
Pond 2	0.57	0.38	2.03	1.55
Pond 3	0.65	0.59	2.34	2.12
Pond 4	0.72	0.56	2.58	2.09

It can be determined from these modelled results that the proposed blocks on the draft plan are sufficient in size to fit the necessary SWM facilities with the exception of Pond 3, which requires a larger block.



4.3 Quality Controls

Water quality treatment to remove 80% of total suspended sediment (TSS) is to be provided to the runoff from the proposed development prior to being discharged to the Thornicroft Drain. The following water quality treatment strategies could potentially provide the necessary TSS removal without the need to dedicate additional land for quality treatment in the proposed Draft Plan.

The proposed water quality treatment strategy will be selected and developed as detailed design progresses and may involve a combination of the measures described below, or other potential measures not yet identified.

4.3.1 LID MEASURES IN BOULEVARDS

The proposed boulevards are graded to provide shallow surface depressions that capture the first flush of runoff and allow it to infiltrate, providing filtration. The proposed depressions are grassed, with shallow slopes to permit mowing. A shallow perforated pipe collects the clean stormwater and conveys it to the local storm sewer. During severe storm events, overflows from the boulevard ponding areas are captured by standard catchbasins located in the roadway.

4.3.2 STORM SEWER EXFILTRATION SYSTEM

Often referred to as the Etobicoke Exfiltration System, a perforated pipe is installed below the proposed local storm sewers and discharges the runoff from small frequent storm events to the granular trench backfill. The stormwater then infiltrates into the surrounding native soils. Pretreatment is provided by catchbasin inserts to improve sediment retention in the catchbasin sumps. These systems are appropriate for locations where the soil permeability is sufficiently high and groundwater elevations are sufficiently low. Analysis of the geotechnical and hydrogeological investigations is necessary to verify that this solution is feasible and would be done at detail design.

4.3.3 OIL/GRIT SEPARATORS

Oil/grit separators (OGSs) are provided upstream of each outlet to provide TSS removal. Pretreatment is provided by catchbasin inserts to improve sediment retention in the catchbasin sumps. OGS units would be located upstream of the proposed dry facilities and may need to be configured in off-line setups to minimize scour within the units and prevent resuspension of sediments.

4.4 Infiltration Measures

Opportunities to implement infiltration measures across the site will be examined at detailed design but will include potential quality treatment measures mentioned above along with possibly introducing infiltration in the SWM facilities as well.

Infiltration measures will be sited in correlation with the results of the geotechnical and hydrogeological investigations to inform the designs and give them the best chance to succeed.



5 Conclusions

Based on the strategy put forward in this report, the following conclusions can be drawn:

- SWM quantity controls will be provided to limit proposed flows from site to existing rates.
- The necessary SWM quantity controls can fit in the proposed blocks on the draft plan with the exception of Pond 3 which will require a larger block.
- SWM quality controls will be designed to remove 80% TSS for the entirety of the site.
- Infiltration measures will be explored at the detail design stage.

We trust this satisfies the SWM requirements for draft plan approval of the Kilbourne Subdivision. Should there be any comments, questions or concerns feel free to contact the signatories.



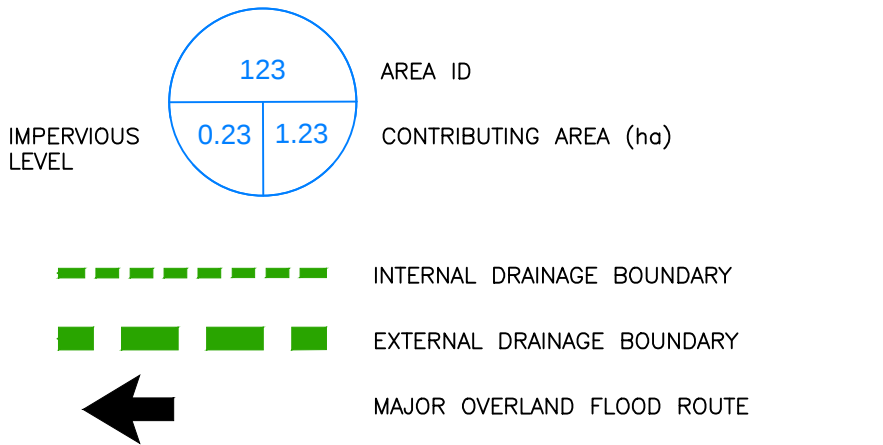
DRAWINGS AND FIGURES



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DO NOT scale the drawing - any errors or omissions shall be
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Notes

Legend



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Client/Project
KILBOURNE DEVELOPMENTS INC.

KILBOURNE SUBDIVISION
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LONDON, ON

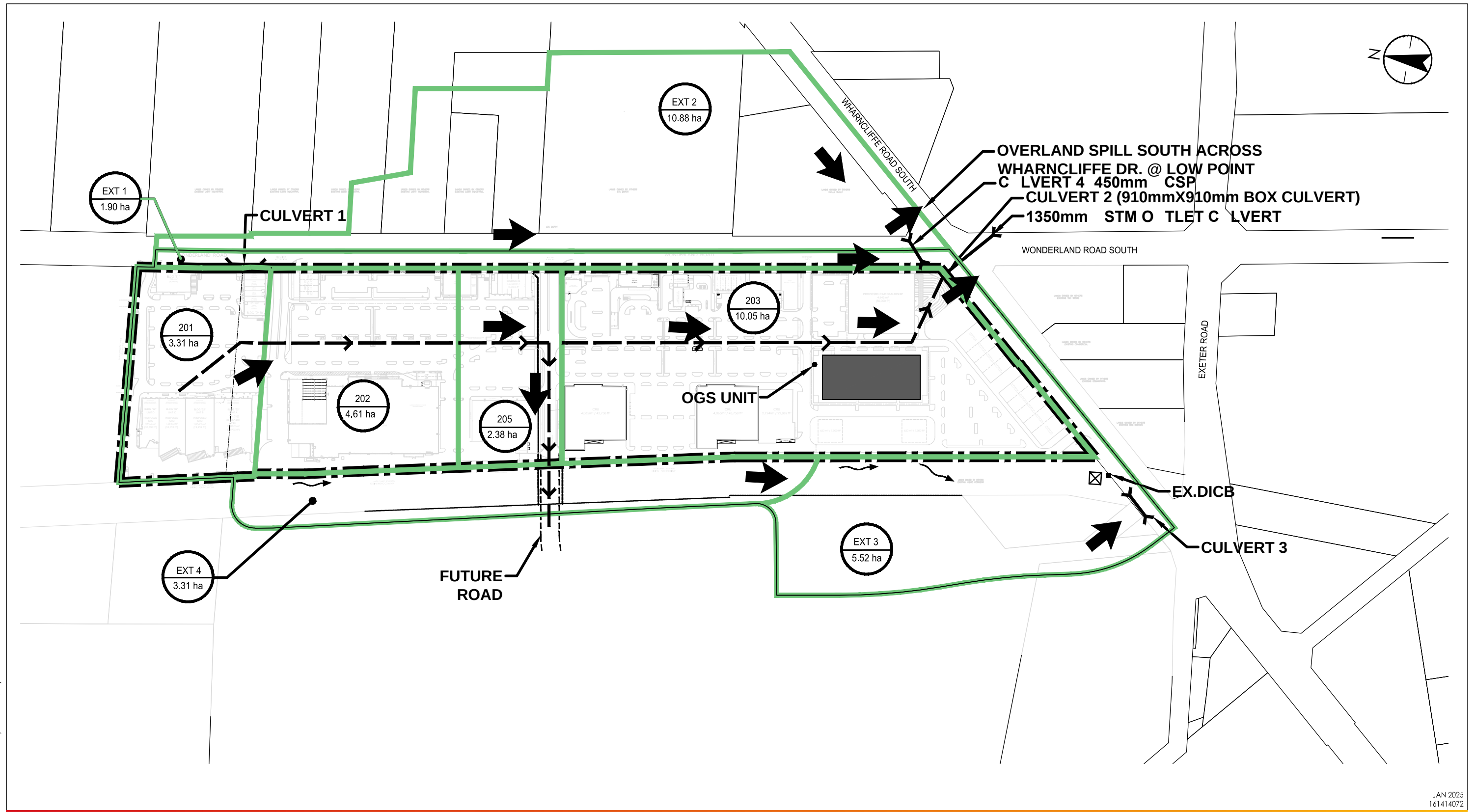
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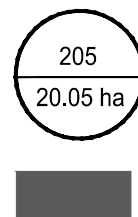
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Legend

- SUBJECT SITE BOUNDARY
- PROPOSED STORM SEWER
- CATCHMENT BOUNDARY
- OVERLAND FLOW DIRECTION



Notes

- CATCHMENT ID
- DRAINAGE AREA
- UNDERGROUND STORAGE



1:4000

Client/Project
YORK DEVELOPMENTS
CONCEPTUAL SWM REPORT
3313 - 3405 WONDERLAND ROAD SOUTH

Figure No.
1

Title
PROPOSED ULTIMATE
SITE DRAINAGE