The Meadows Development - Municipal Servicing Brief

Preliminary servicing brief for wastewater sewer, watermain and land drainage for the proposed development of the Meadows

Stantec

Prepared for:
10089844 Manitoba Inc. and 10215032 Manitoba Ltd.

Prepared by:
Stantec Consulting Ltd.

March 18th, 2026

Project/File:
116810640

Stantec Consulting Ltd.

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1 Introduction

This Municipal Servicing Brief has been prepared on behalf of 10089844 Manitoba Inc and 10215032 Manitoba Inc. The brief is intended to support preparation of the Meadows Development by identifying high-level municipal servicing requirements for the study area.

The objective is to establish an overall high-level framework for future water, wastewater, and land drainage infrastructure that supports the ultimate development of the planned area.

The Meadows Development is planned to be a combination of mixed use, commercial, multi-family, single family and a day care centre.

The Meadows Plan Area comprises approximately 74.29 hectares and is shown on Figure 1.0 below. Manitoba Hydro right-of-way traverses the eastern side of the plan area in a generally north-east to south-west direction and a Winnipeg Gas Company buried pipe right-of-way traverses through the western side of the plan area in a generally north-west to south-east direction. The overall area is bounded: on the east by Wenzel Street and McGregor Farm Road; on the south by private properties fronting onto McGregor Farm Road; on the west by McGregor Farm Road (Lagimodiere Blvd); on the north by Manitoba Highways maintenance yard and other private properties.

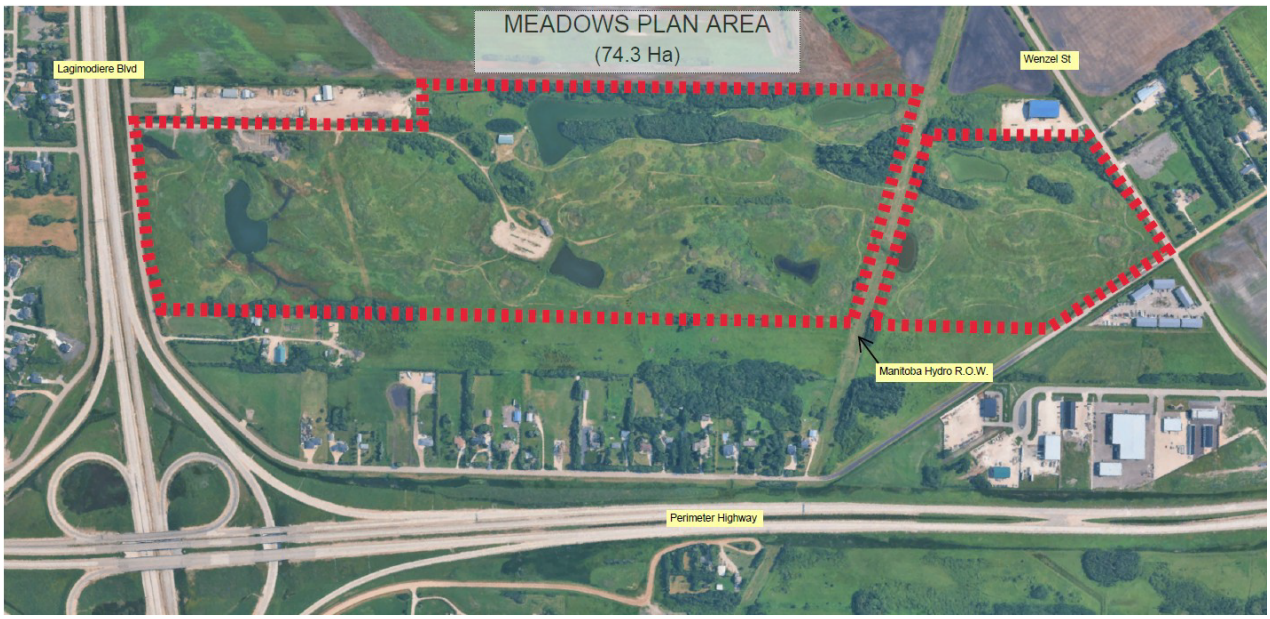


Figure 1.0 – The Meadows Development Plan Area

2 Water

The development water service area including pipe sizing and available fire flows are shown in Figure 2.0.

The system is proposed to have external feedpoints located at;

- At Benham Way & Gateway Road off a 250 mm watermain.
- At 2890 Wenzel Avenue off a 300 mm watermain.

10089844 Manitoba Inc. and 10215032 Manitoba Ltd. will be responsible for installing all internal watermains within their development areas, as well as any external watermains required to provide adequate fire flows within their development area.

The Systems performance was analyzed under various operating conditions using EPA Net 2.0, a computer simulation program produced by the Environmental Protection Agency (EPA).

This assessment is based on East St. Paul master water distribution system model supplied by Stantec's Water Group. The model was used as the starting point of this analysis.

The following design criteria and assumptions were used in the analysis of the watermains:

1. Hazen-Williams coefficient of friction ("C" value) will be assumed to be 120 for watermains with diameters of 200 mm or smaller and 130 for diameters larger than 200 mm.

2. Population will be based on the following;
   - 3.05 persons per single family dwelling unit.
   - 2.30 persons per multi-family dwelling unit

3. The number of dwelling units served by each node will be calculated based on:
   - High-level population density data from the current conceptual land use plan for the area

4. The average daily per capita consumption will be 225 L + 10%.

5. The maximum day demand will be 1.4 x average day rate.

6. The peak hour multiplier will be 2.3.

7. Minimum design fire flows to be provided with maximum day demand on the system to be as shown below, or greater based on FUS method:
   - 100 l/s for single family residential,
   - 175 l/s for multi-family residential,
   - 175 l/s for mixed use, day care and commercial.

8. For analysis purposes, the watermains were assumed to be at a constant elevation considering the subdivision's ground elevations vary slightly.

9. Hydrant losses will be accounted for by calculating available fire flows using 25 psi as opposed to 20 psi.

Based on the above conditions, the proposed watermain system can meet the required operating criteria of:

- A minimum pressure of 207 kPa (30 psi) under maximum hour consumption.
- The minimum fire flow specified above at 140 kPa (20 psi) with maximum day consumption.

The available fire flows at various locations throughout the development are demonstrated in Figure 2.0.

The designers of the private sites will be required to complete a fire underwriters calculation to determine if the fire flow for the proposed site development is sufficient.

Below are the ultimate average water demand calculations for the Meadows area:

Single Family = 692 units x 3.05 ppu x 225 L/c/day + 10% = 522,374 L/day

Multi Family = 1,639 units x 2.3 ppu x 225 L/c/day + 10% = 933,001 L/day

Commercial/Mixed-Use/Day Care = 2.92 ha x 16,800 L/ha/day = 49,056 L/day

Total = 1,504,431 L/day

3 Wastewater

The wastewater sewer system for the Meadows Development is designed to flow through proposed internal wastewater sewers and ultimately discharge into the existing East St. Paul's wastewater sewer system. Further analysis on external WWS requirements will be completed in detail at a later stage.

The contributing wastewater area and proposed pipe sizing are shown on Figure 3.0.

The design criteria and assumptions for the wastewater sewer system are:

1. Peak Design Flow = domestic sewage x peaking factor plus extraneous flow.
   The extraneous flows include groundwater infiltration and manhole cover inflow.

2. Domestic Sewage (Residential)
   Average Flow: 270 L/capita/day
   Peaking Factor: Harman's = 1 + 14/(4+(p/1000)^0.5))
   Population/dwelling = 3.05 persons (single family)
   = 2.30 persons (multi family)
   Dwelling Density = Actual predicted unit counts provided by the developer.

3. Commercial Flow: based on 50 persons per hectare – added to domestic sewage prior to applying peaking factor

4. Peak Industrial Flow (School Site): based on 70 persons per hectare – added to domestic sewage prior to applying peaking factor

5. Extraneous Flow
   a) Groundwater Infiltration: 2200 L/hectare/day
   b) Manhole Infiltration: 12 L/min/MH
   Manhole Spacing: 1.6 Manholes/hectare

6. Pipe selection was based on full flow pipe with Manning's N = 0.013 and minimum velocity of 0.60 m/sec. Adequate pipe cover and slope will be illustrated on the detailed design drawings.

The wastewater sewer system design spreadsheet for this subdivision is presented in Appendix "A". The table shows that pipe sizes presented are sized to handle the predicted flows within this development.

4 Land Drainage

4.1 Background

The total analysis area for the Meadows Development encompasses roughly 76.02 ha, comprising approximately 74.29 ha of developable land and 1.73 ha of Manitoba Hydro transmission right-of-way. The Meadows Development will be split into six (6) catchment areas, and each serviced by its own retention pond. The retention ponds will have a Normal Water Level elevation of 231.50m and will be connected through the proposed interconnecting pipes. The proposed retention pond network will discharge to the west through a 450 mm outlet pipe to the McGregor Farm Road ditch.

4.2 Design Criteria and Detailed Analysis

4.2.1 Retention Lakes

The guidelines used for the Retention Lake are as follows:

- 1.20 m lake rise for a 25 year storm (maximum) for lakes in Residential areas.
- Freeboard elevation will be set 0.60 m above maximum High Water Level (HWL).
- HWL taken to be the maximum calculated water level for the 100 year storm.
- 7:1 side slopes above Normal Water Level (NWL) and 4:1 side slopes below NWL.
- 2.5 m minimum water depth.

The Normal Water Level for these ponds will be set at 231.50m. The maximum high water level (100 yr storm) will be 232.636m.

The detailed analysis and results related to the subdivision drainage are presented in the report named, “Stormwater Management Report for the Meadows Development” attached to this servicing brief in Appendix B.

4.2.2 Land Drainage Sewers

This section details the design criteria, parameters, and assumptions to be used in the design of the land drainage sewers. The piped system will be designed using the Rational Design method and will be based on the following criteria:

- 5 year storm intensity equation I (mm/hr) = $1199/(t+8)^{0.828}$ ---> (MacLaren 1974).
- Pipe friction factor (Manning’s n): 0.013 (Concrete and PVC).
- Minimum full flow velocity: 0.90 m/s.
- Maximum full flow velocity: 3.05 m/s.
- The 1:5 year return frequency will be used for the design of the storm sewer system.

- Tailwater Condition at the Lake = NWL + 0.45 m

Runoff Design Criteria

The rational design method will be used to estimate rainfall runoff to be handled by the piped system:

Q = (1/360) CiA

Where:

Q = runoff (CMS)

C = runoff coefficient

i = rainfall intensity (mm/hr)

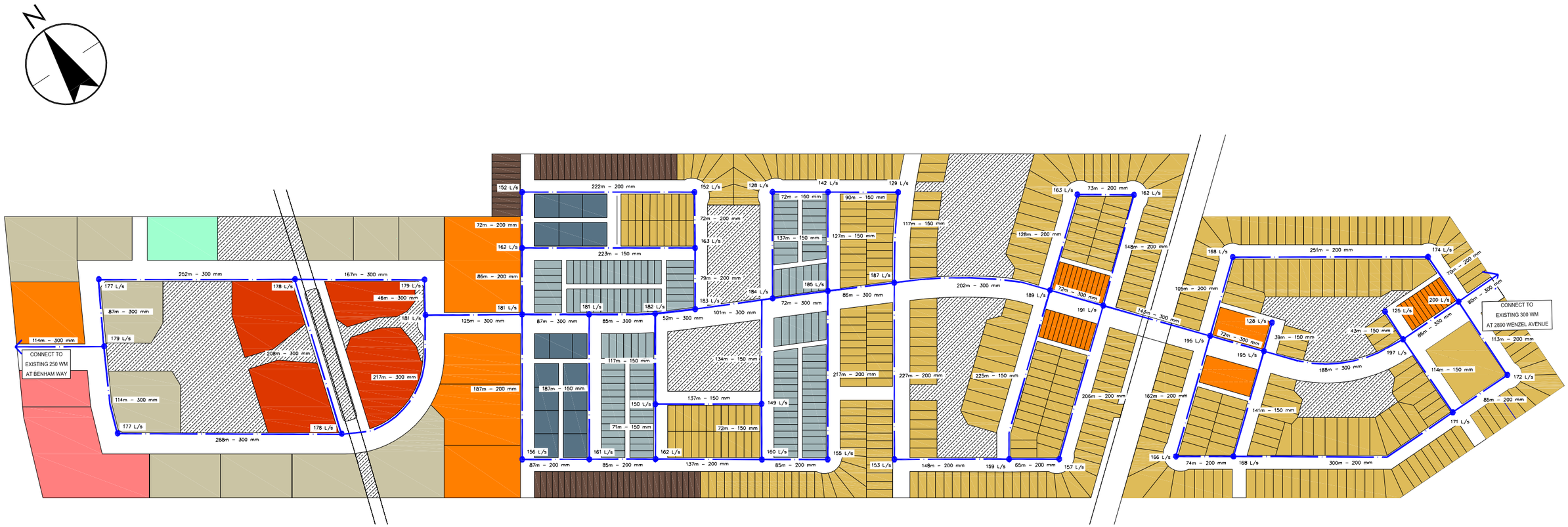
A = area (hectares)

The drainage catchments are expected to include single family residential (C=0.5), duplex/townhomes (C=0.55), multi-family residential (C=0.60), commercial/mixed-use (C=0.60), park (C=0.20) and ex. Grassed area (C=0.15).

System Design Criteria

The land drainage sewers in the precinct will be designed as surcharged pipe systems to accommodate the calculated runoffs. The surcharge level of the system will be designed to be at a minimum of 0.15m below the proposed gutter elevations. The Manning's Equation with an N = 0.013 for concrete or PVC pipe will be used to determine pipe sizes and hydraulic losses within the system. At the outfalls to the lakes, the hydraulic grade line will be assumed to be 0.45 m above the NWL elevation to ensure that the pipes can discharge the peak flows as the lake rises during the storm event.

FIGURES



ORIGINAL SHEET - ISO 11x17 - v14.06

March 2026
116810640

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Legend

PROPOSED WATERMAIN

NODES

100 L/S **AVAILABLE FIREFLOW**

Client/Project
10089844 Manitoba Inc. and 10215032 Manitoba Inc.
The Meadows Development

Figure No.
1.0

Title
Proposed Watermain Sizing and Fire Flows

U:\116810640\0300_drawing\0301_sketches\10640-catchments_2026-03-03.dwg Figure 2.0
2026/03/26 8:32 AM By: K.Kellas, Jordan

ORIGINAL SHEET - ISO 11x17 - v14.06

March 2026
116810640

Legend

WWS CATCHMENTS

PROPOSED WASTEWATER SEWER

POND / PR (6.16 Ha) (EXCLUDED FROM I&I)

Stantec

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Client/Project
10089844 Manitoba Inc. and 10215032 Manitoba Inc.
The Meadows Development

Figure No.
2.0

Title
Wastewater Sewer
Sizing and Catchment Areas

Appendix A Sanitary Sewer Spreadsheet

WASTEWATER SEWER DESIGN SHEET **DESCRIPTION: Peak Sanitary Sewer Flow Calculations**

OWNER
SUBDIV. NAME Meadows (East St. Paul)

Area No.	M.H. From	M.H. To	No. of SF Dwelling Units	No. of MF Dwelling Units	Incremental SF Area (ha)	Incremental MF Area (ha)	Incremental Comm Area (ha)	Incremental LI/School Area (ha)	Cumulative SF Area (ha)	Cumulative MF Area (ha)	Cumulative Comm Area (ha)	Cumulative LI/School Area (ha)	Incremental SF Population (Persons)	Incremental MF Population (Persons)	Incremental Comm Pop. (Persons Equiv.	Incremental LI/School Pop. (Persons Equiv.	Incremental Tot. Population (Persons)	Cumulative Population (Persons)	Peaking Factor M	Cumul. Dry Flow (l/s) (No PF)	Peak Cumul. Dry Flow (l/s)	Incremental ROW Area (Ha)	Cumulative ROW Area (Ha)	Cumulative Total Area (Ha)	Ground Water Infiltration (l/s)	Incremental Manholes (Counted)	Incremental Manholes (Area Based)	Cumulative Manholes	Manhole Inflow (l/s)	Peak Design Flow (l/s)	Proposed and Existing Sewer					
																															Dia. (mm)	Slope %	Crit. Slope %	Des.Slope %	Capacity Q. (l/s)	Velocity (m/s)
PHASE 5 & 6	**5**	**4**	**182**	**33**	**9.1606**	**0.7378**	**0.0000**	**0.0000**	**9.1606**	**0.7378**	**0.0000**	**0.0000**	**555**	**76**	**0**	**0**	**631**	**631**	**3.920**	**1.97**	**7.73**	**4.2528**	**4.2528**	**14.1512**	**0.36**	**0**	**15.8**	**15.8**	**3.17**	**11.26**	**250**	**0.25%**	**1.43%**	**0.25%**	**29.73**	**0.61**
PHASE 3 & 4	**4**	**3**	**149**	**22**	**7.0358**	**0.4900**	**0.0000**	**0.0000**	**16.1964**	**1.2278**	**0.0000**	**0.0000**	**454**	**51**	**0**	**0**	**505**	**1136**	**3.764**	**3.55**	**13.36**	**2.6351**	**6.8879**	**24.3121**	**0.62**	**0**	**12.0**	**27.9**	**5.58**	**19.56**	**250**	**0.25%**	**1.43%**	**0.25%**	**29.73**	**0.61**
PHASE 1 & 2	**3**	**2**	**361**	**341**	**11.1722**	**4.8549**	**0.0000**	**0.0000**	**27.3686**	**6.0827**	**0.0000**	**0.0000**	**1101**	**784**	**0**	**0**	**1885**	**3021**	**3.440**	**9.44**	**32.48**	**8.1788**	**15.0667**	**48.5180**	**1.24**	**0**	**25.6**	**53.5**	**10.70**	**44.42**	**375**	**0.15%**	**1.25%**	**0.15%**	**67.91**	**0.61**
PHASE A & B	**2**	**1**	**0**	**1243**	**0.0000**	**8.7491**	**2.4133**	**0.5084**	**27.3686**	**14.8318**	**2.4133**	**0.5084**	**0**	**2859**	**121**	**36**	**3015**	**6037**	**3.168**	**18.86**	**59.77**	**4.3075**	**19.3742**	**64.4963**	**1.64**	**0**	**16.9**	**70.4**	**14.09**	**75.50**	**450**	**0.12%**	**1.17%**	**0.12%**	**98.76**	**0.62**

Notes:

Single Family
3.05 Persons per Unit (Single Family)
12.29 Dwellings per Hectare (Single Family)
2.3 Persons per Unit (Multi Family)

Proposed Unit Count (Provided by Client - January 2026)
Proposed townhouses treated as multi-family residential for this analysis
Total CMU area of 2.9070 Ha was estimated to have 0.65 Ha of ground floor building footprint used for retail/office use. The rest of the area was dedicated for MF use.
0.6500 + 1.7633 = 2.4133 Ha

Population Equivalent (persons per hectare)	
50	Commercial
70	School and Light Industrial
105	Wet Industrial

Design Flow Factor, F = 0.00313 l/sec/person
60 l. Gal/person/day = 270 l/person/day
Harmon Factor Pf=1+(14/(4+(p)^.5) P = thousands of persons
2<=Pf<=4.5

Infiltration Factor, FI =	2200	l/Ha/day
Manhole Inflow	12	l/MH/min
Manhole Quantity (SF and MF)	1.6	MH/Ha
Manhole Quantity (CMU)	1.0	MH/Ha

Calculated By K.Jeong
Checked By : J. Kellas
Date: 03-Mar-26
File: 116810640

Appendix B Stormwater Management Report

Stormwater Management Report for The Meadows Development

This stormwater management report has been prepared for submission to the RM of East St. Paul, Manitoba Transportation & Infrastructure, and Manitoba Environment & Climate Change

Date:
March 17, 2026

Prepared for:
10089844 Manitoba Inc. and 10215032 Manitoba Ltd.

Prepared by:
Stantec Consulting Ltd.

Project/File:
116810640

Stantec

Revision Record

Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date

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Acronyms / Abbreviations

Acronym / Abbreviation	Full Name
ha	Hectares
Hwy	Highway
Hr	Hour
m	Meters
mm	Millimeters
min	Minutes
m/s	Meters per Second
m^3/s	Cubic Meters per Second
SWM	Stormwater Management
NWL	Normal Water Level
HWL	High Water Level

1 Overview

This brief has been prepared for submission to the RM of East St. Paul, Manitoba Transportation & Infrastructure, and Manitoba Environment & Climate Change as a requirement for the development review and subsequent approval on behalf of the developers 10089844 Manitoba Inc and 10215032 Manitoba Ltd.

The total analysis area for this report is approximately 76.02 ha, comprising approximately 74.29 ha of land owned by 10089844 Manitoba Inc./10215032 Manitoba Ltd. and 1.73 ha of Manitoba Hydro transmission right-of-way traversing through the planned development area.

The development is located in the RM of East St. Paul, bounded by Manitoba Highways maintenance yard and private properties to the north, Lagimodiere Boulevard and McGregor Farm Road to the west, private properties fronting onto McGregor Farm Road to the south and McGregor Farm Road and Wenzel Street to the east.

This report addresses the design and modelling of the proposed subdivision's retention pond drainage system.

2 Predevelopment Flow

The Meadows development area is split into two catchment areas (East and West). The east catchment is approximately 40.26 ha and it currently drains east to an existing ditch located on the west side of Wenzel Street and McGregor Farm Road. The west catchment is approximately 35.76 ha and it currently drains west to an existing ditch located on the east side of McGregor Farm Road. The catchment is shown on Figure 1.

Predevelopment runoff rates were determined by rational method, using Kinematic Wave Equation for sheet flow, and Equation (3-4) for the FHWA HEC 22 Urban Drainage Design Manual for shallow concentrated flow. A runoff coefficient of C=0.22 was used for the landscaped area (former golf course). Rainfall intensity was based on 2011 Environment Canada IDF data for Winnipeg corresponding to an event with 20% probability of exceedance (5 year storm). The results of the pre-development flow calculations are shown in the table below.

Table 1. Pre-development Flow Calculations

Catchment	Area	Total Length	Slope	Sheet Flow			Shallow Concentrated Flow				TOC	Runoff		
	(ha)	(m)	(%)	n	L (m)	Tt (min)	K	L (m)	V (m/s)	Tt (min)	(min)	I (mm/hr)	C	Q (m^3/s)
WEST	35.76	893	0.13	0.15	30	35.22	0.213	863	0.078	184.47	219.7	13.4	0.22	0.293
EAST	40.26	956	0.08	0.15	30	43.29	0.213	926	0.060	256.17	299.47	10.4	0.22	0.257
TOTAL														**0.550**

Based on the table above, the permitted peak flow to the existing McGregor Farm Road ditch is 0.550 m^3/s.

3 Post Development Drainage Plan

The proposed Meadows development will contain six (6) naturalized retention ponds with a combined normal water level area of 3.700 ha, as illustrated in Figure 2.0. These retention ponds will store and attenuate runoff from the proposed Meadows Development and ultimately discharge to the McGregor Farm Road ditch on the west side of development. The total catchment area for the Meadows Development retention pond system is 76.02 ha.

The proposed retention ponds will drain through series of interconnecting pipes to a 450 mm control outlet culvert located approximately 30m east of the existing McGregor Farm Road ditch. The invert of this control outlet culvert will maintain the normal water level elevation of 231.50m and control the discharge from the pond system to the existing ditch west of the Development.

The post development drainage plan is shown Figure 2.0.

3.1 Analysis

Manitoba Environment & Climate Change design criteria require that retention ponds with outlet pipes limit the 25-year post-development peak flow to the 5-year pre-development peak, while also providing storage for the 100-year post-development event. The Province of Manitoba Drainage Policy further requires that outlet pipes that affect drains through provincial trunk highways are to be designed to restrict the 50-year post-development peak flow to the 5-year pre-development peak. These two criteria together form the basis for the stormwater management design for this subdivision.

A Stormwater Management (SWM) model for this subdivision was developed. The controlled discharge system (retention pond, discharge pipes, retention pond inlet pipes, surface storage) was modelled using SWMM 5.1.

The post development catchment boundaries, retention pond inlet pipes, and outlet pipe is shown in Figure 2.0.

3.1.1 Design Criteria and Assumptions

Design rainfall events for retention pond modelling.

- 5 year Storm (MacLaren 1974)
- 25 year Storm (MacLaren 1974)
- 50 year Storm (M.I.T.)
- 100 year Storm (Acres 1978)

Sub catchments were modelled using the following assumption.

- Catchment ‘A’ = 69% Impervious

- Catchment ‘B’, ‘C’, ‘D’, ‘E’ and ‘F’ = 61% Impervious
- Manning’s roughness coefficient for runoff
    - Impervious n=0.015
    - Pervious n=0.25
- Depression Storage
    - Impervious = 3 mm
    - Pervious = 6 mm
- Horton Infiltration Parameters (for pervious surfaces)
    - Fo = 75 mm/hr
    - Fc = 3 mm/hr
    - K = 4.14 hr^{-1}
- Roughness Coefficients
    - LDS Pipes (PVC & Concrete) n = 0.013
    - Culverts (CSP) n = 0.024

3.1.2 Results

3.1.2.1 Retention Pond Responses

The results of the SWM modelling for the retention pond responses to the design storms are presented in Table 2. – 7. below and the detailed plots of the retention pond levels are shown in Figure 3.

Table 2. Retention Pond Responses: Retention Pond #1 (NWL =231.500m)

Storm	High Water Level (m)	Rise Above NWL (m)	Volume Stored (m^3)
5 Year Storm	232.071	0.571	6,630
50 Year Storm	232.365	0.865	10,557
100 Year Storm	232.558	1.058	13,319

Table 3 Retention Pond Responses: Retention Pond #2 (NWL =231.500m)

Storm	High Water Level (m)	Rise Above NWL (m)	Volume Stored (m^3)
5 Year Storm	232.073	0.573	1,611
50 Year Storm	232.413	0.913	2,875
100 Year Storm	232.636	1.136	3,831

Table 4. Retention Pond Responses: Retention Pond #3 (NWL =231.500m)

Storm	High Water Level (m)	Rise Above NWL (m)	Volume Stored (m^3)
5 Year Storm	232.011	0.511	4,968
50 Year Storm	232.266	0.766	7,742
100 Year Storm	232.456	0.956	9,938

Table 5. Retention Pond Responses: Retention Pond #4 (NWL =231.500m)

Storm	High Water Level (m)	Rise Above NWL (m)	Volume Stored (m^3)
5 Year Storm	232.011	0.511	2,905
50 Year Storm	232.266	0.766	4,630
100 Year Storm	232.456	0.956	6,036

Table 6. Retention Pond Responses: Retention Pond #5 (NWL =231.500m)

Storm	High Water Level (m)	Rise Above NWL (m)	Volume Stored (m^3)
5 Year Storm	232.002	0.502	2,307
50 Year Storm	232.246	0.746	3,660
100 Year Storm	232.428	0.928	4,767

Table 7. Retention Pond Responses: Retention Pond #6 (NWL =231.500m)

Storm	High Water Level (m)	Rise Above NWL (m)	Volume Stored (m^3)
5 Year Storm	232.002	0.502	3,615
50 Year Storm	232.246	0.746	5,656
100 Year Storm	232.429	0.929	7,298

As shown in the above tables, the maximum rise for the Meadows Development Ponds is seen in pond #2 during the 100-year storm. The maximum calculated High-Water Level (HWL) is 232.636 m. This represents a rise of 1.136 m above NWL. The flood protection level for this development will be set at 233.236 m, which is 0.60m above the retention pond 100-year HWL.

3.1.2.2 Controlled Runoff

The max discharge for the design storms from the proposed development is summarized in Table 8. below and the detailed plots of the discharge curves are provided in Figure 4.

Table 8. Retention Pond Max Discharge

Storm	Max Discharge (m^3/s)
5 Year Storm	0.242
50 Year Storm	0.355
100 Year Storm	0.411

3.1.2.3 Uncontrolled Runoff

The post-development area contributing to uncontrolled runoff is approximately 1.27 ha. At this stage of the analysis, this portion of the site is assumed to drain directly into the Wenzel Street and McGregor Farm Road ditch. The total uncontrolled surface runoff for post-development conditions under the 50-year storm event is summarized in Table 9.

Table 9. Pre-development Uncontrolled Runoff Calculations

Catchment	Area	Total Length	Slope	Sheet Flow			TOC	Runoff		
	(ha)	(m)	(%)	n	L (m)	Tt (min)	(min)	I (mm/hr)	C	Q (m^3/s)
UNCONTROLLED	1.27	26	2.5	0.24	26	14.19	14.19	131.5	0.15	0.070

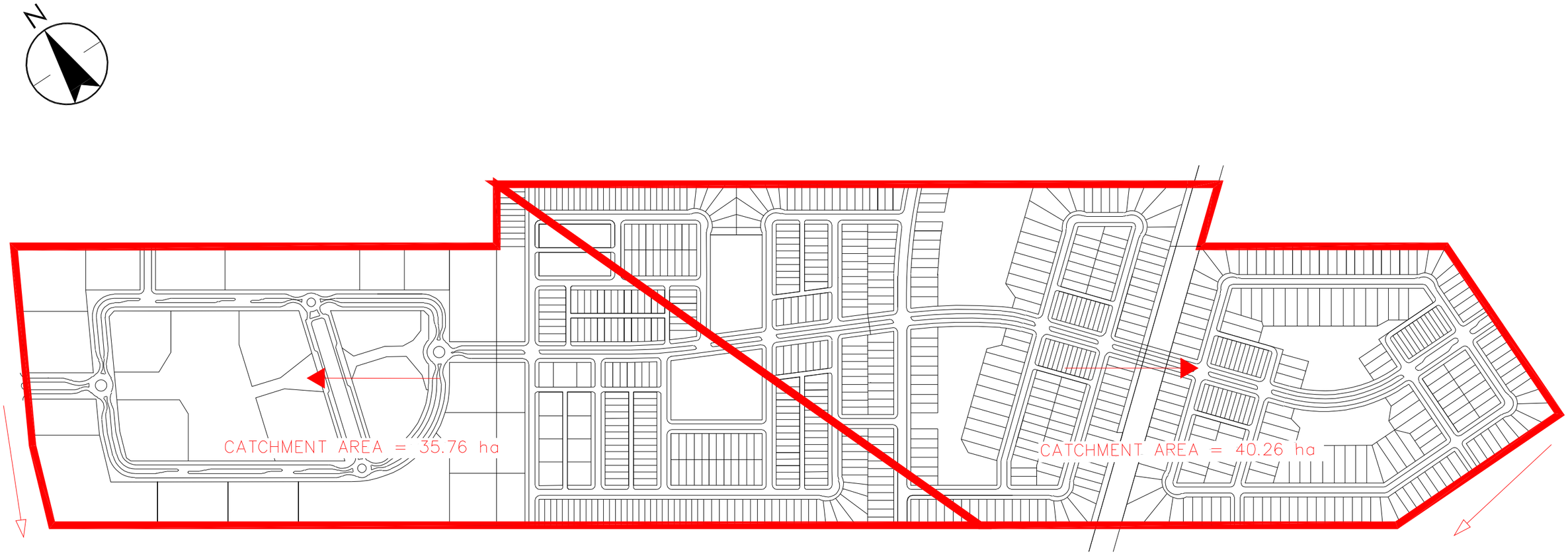
4 Conclusion

The calculated controlled 50 year post development peak flow rate to the existing ditch located directly adjacent to the west end of the site is 0.355 m^3/s and the calculated uncontrolled 50 year post development peak flow rate to the existing ditch is 0.070 m^3/s. The total post development peak flow is 0.425 m^3/s which is 0.125 m^3/s less than the calculated 5 year pre-development peak flow of 0.550 m^3/s.

The retention pond system has capacity to store the runoff generated from the 100 year post development design storm with an expected HWL elevation of 232.636m. The flood protection level for this development will be set at 233.236m (HWL + 0.60m).

Based on our analysis we can conclude that the drainage from this proposed subdivision will not have a negative impact on the rural ditch system, since the post development runoff will be restricted to below the pre-development runoff rate.

FIGURES



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ORIGINAL SHEET - ISO 11x17 - v17.05

2026-03-26
116810640

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PRE-DEVELOPMENT CATCHMENTS

Notes

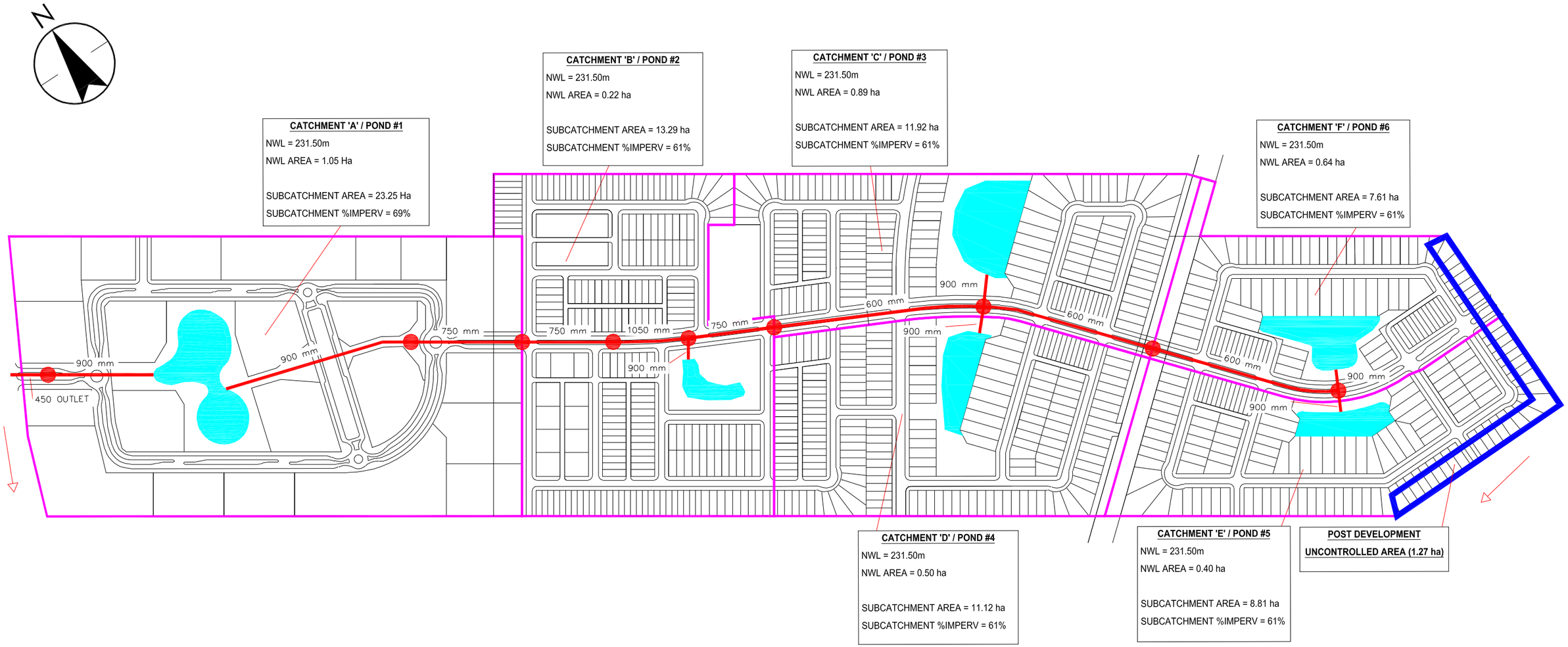
EXISTING DITCH FLOW DIRECTION

CATCHMENT FLOW DIRECTION

Client/Project
10089844 Manitoba Inc. and 10215032 Manitoba Ltd.
The Meadows Development

Figure No.
1.0

Title
Pre-development Flow Patterns



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RETENTION POND CATCHMENTS

UNCONTROLLED AREA

Notes

EXISTING DITCH FLOW DIRECTION

PROPOSED INTERCONNECTING PIPE

Client/Project
10089844 Manitoba Inc. and 10215032 Manitoba Ltd.
The Meadows Development

Figure No.
2.0

Title
Post-development Catchments,
Outlet Pipe and Inteconnecting Pipes

Figure 3.1 - Retention Pond Rises During 5-Year Storm

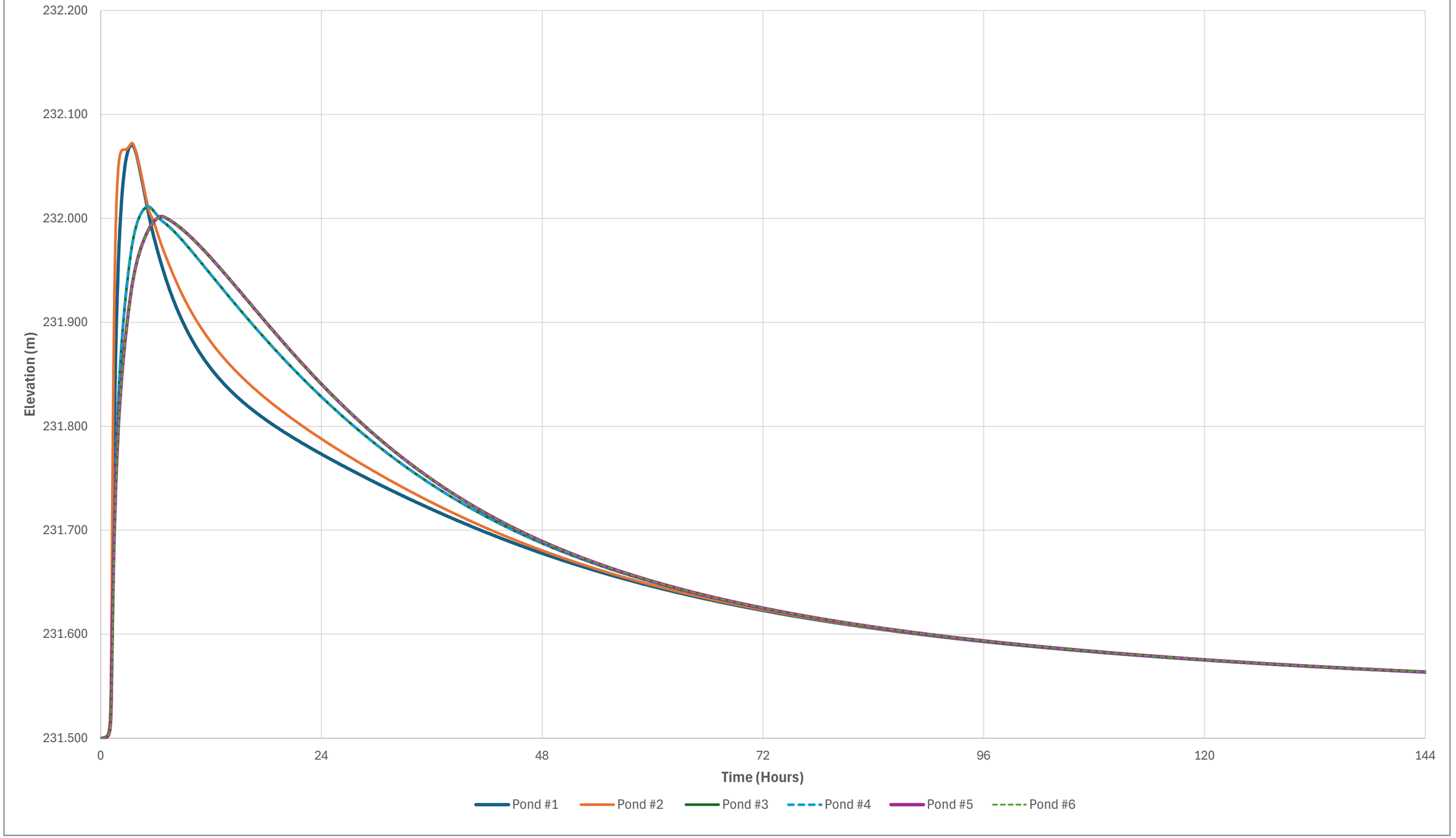


Figure 3.2 - Retention Pond Rises During 50-Year Storm

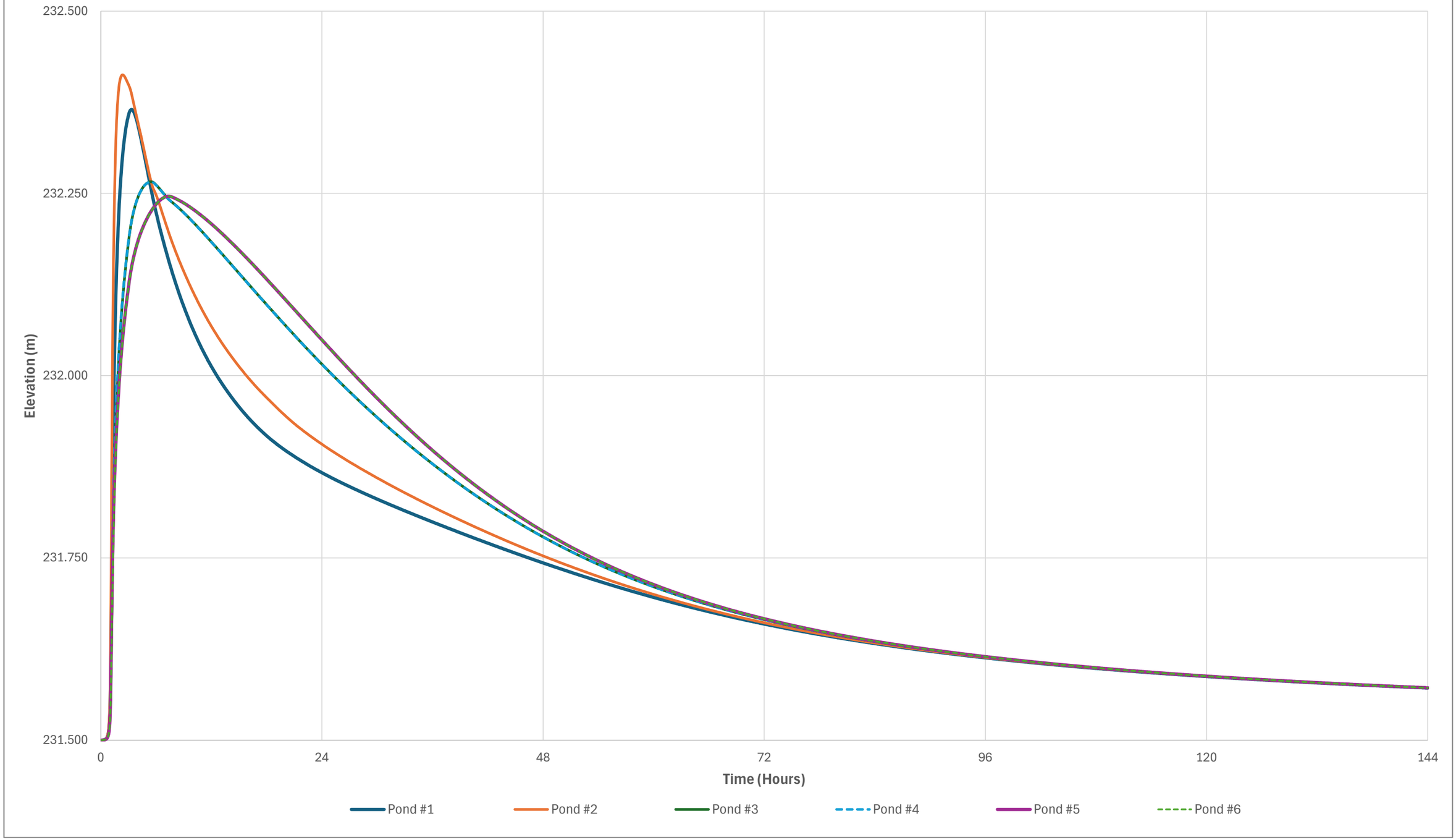


Figure 3.3 - Retention Pond Rises During 100-Year Storm

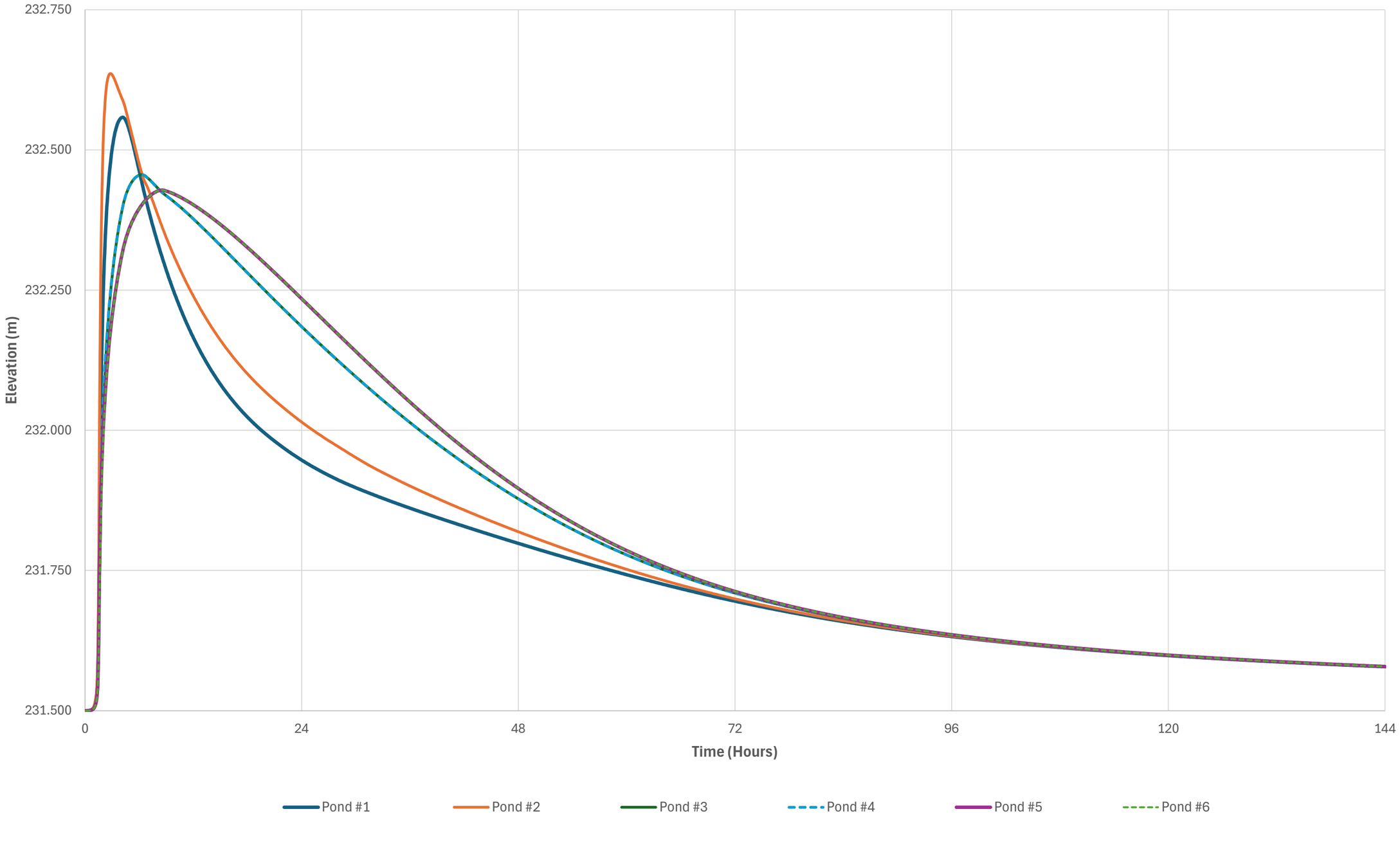
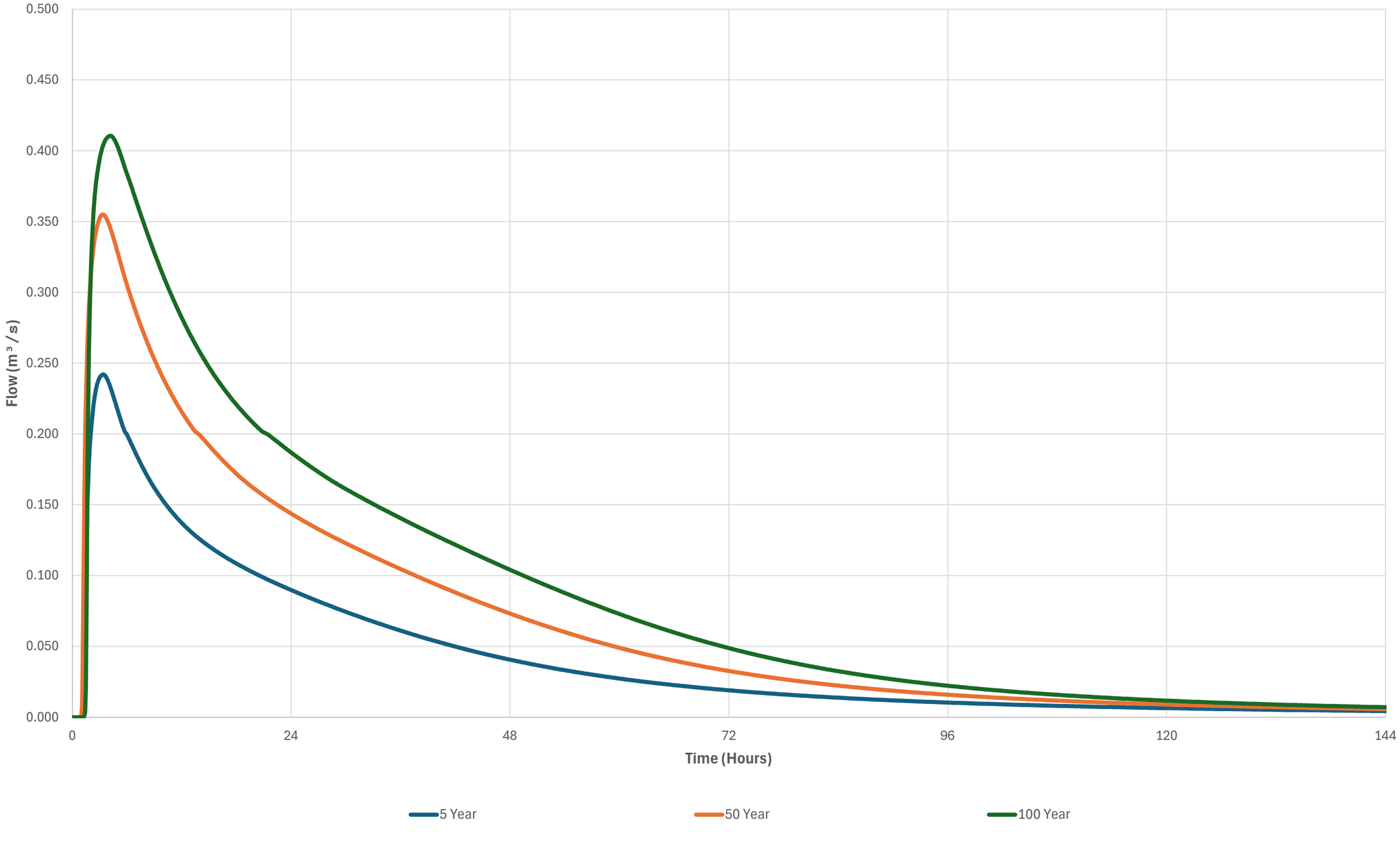


Figure 4 - Discharge Rate at Outlet



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