TATHAM ENGINEERING

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372 Grey Road 21 West

PRELIMINARY STORMWATER MANAGEMENT REPORT

Rhemm Properties Ltd.

File 121088 | July 23, 2025

Document Control

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Date:

July 23, 2025

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Issue	Date	Description
1	August 5, 2022	Draft Plan of Subdivision Application
2	November 6, 2023	Draft Report for Client Review
3	January 22, 2024	Draft Plan of Subdivision Application
4	September 6, 2024	Draft Plan of Subdivision Application
5	July 23, 2025	Draft Plan of Subdivision Application

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1 Introduction

Tatham Engineering has been retained by Rhemm Properties Inc. to prepare a Preliminary Stormwater Management (SWM) Report to support a Draft Plan of Subdivision Application for a residential development located at 372 Grey Road 21, Town of The Blue Mountains. The lands are split into two distinct parcels by the Georgian Trail. The subject site is shown in the attached Figure 1: Location Plan. This report has been prepared to present the recommended preliminary stormwater management plan for the development of the west parcel.

1.1 SITE DESCRIPTION

The site is legally described as Part of Lot 149 Registered Plan 529 in the Town of The Blue Mountains and is bounded by the Georgian Trail to northwest, the future Eden Oaks Residential Development to the west, and undeveloped lands to the south and southwest. The subject property is currently zoned for Development (D) with Hazard adjacent (H-1). In the southeast of the site an existing channel travels along the eastern edge of the site and is regulated by the Grey Sauble Conservation Authority (GSCA).

1.2 OBJECTIVES

The primary objective of this report is to demonstrate that the proposed SWM plan will address any potential adverse impacts which the development will have on the local surface water features. This will be accomplished by evaluating the impact of the development on local drainage conditions and, where necessary, providing solutions to mitigate these impacts.

1.3 GUIDELINES AND BACKGROUND DOCUMENTS

This report was prepared recognizing the pertinent Municipal and Provincial guidelines on water resources and reports specific to development in the surrounding area including the following publications:

- *Stormwater Management Planning and Design Manual.* Ministry of the Environment, Conservation and Parks (2003);
- *Engineering Standards.* Town of The Blue Mountains (May 2023);
- *Eden Oak Servicing & Stormwater Management Implementation Report,* prepared by Crozier Consulting Engineers (September 2020);
- *A Geotechnical Investigation for Proposed Residential Development 372 Grey Road 21 West,* prepared by Soil Engineers Ltd. (September 2022);

- *372 Grey Road 21, Town of The Blue Mountains, Flood Assessment Brief – West Parcel,* prepared by Tatham Engineering. (July 2025).

1.4 PROPOSED DEVELOPMENT

The proposed development includes 47 single family detached homes and six semi-detached homes. 23 of the single detached homes (Lots 53-31) will be constructed so that there is a separate access to the basement and the future owners can choose to rent the basements of the homes as Accessory Dwelling Units (ADUs). Road access to the site will be provided by the future Eden Oaks development to the west of the site. The single detached units and semi-detached units will have a minimum lot frontage of 12 m and 9 m, respectively, as well as varying depths around 30 m. The proposed development is shown on the Development Concept (SP01).

Stormwater control is to be provided by the Regional Stormwater Management Facility (SWMF) located in the proposed Eden Oak Development designed by Crozier Consulting Engineers immediately northwest of the project site. The *Eden Oak Servicing & Stormwater Management Implementation Report,* prepared by Crozier Consulting Engineers (September 2020), details the design of the SWMF and should be reviewed in conjunction with this report.

2 Existing Drainage Conditions

2.1 SURFACE CONDITIONS

A topographic survey of the subject property was completed by Tatham Engineering on January 31, 2022. The high spot (187.56 m) is located in the southwest corner of the site. The subject property generally slopes from the southwest to the northeast at an average gradient of 2.5% draining to an existing watercourse along the Georgian Trail referred to as "Watercourse 6" in the Crozier Report. Watercourse 6 flows northwest, crosses under the Georgian Trail and eventually outlets to Georgian Bay. Refer to the Pre-Development Drainage Plan (DP01) for details on existing drainage areas patterns.

The 7.0 ha site is currently undeveloped, vacant and is primarily covered with trees.

2.2 SUBSURFACE CONDITIONS

A geotechnical investigation (dated September 2022) completed by Soil Engineers Ltd. was submitted under separate cover. Fieldwork was conducted on April 18, 2022 and consisted of seven boreholes. The boreholes were advanced to depths of 0.6 m to 3.4 m below existing ground surface (BGS). In general, subsurface conditions consists of a surficial layer of topsoil, underlain by a sand and gravel deposit, overlying a probable bedrock depth of 0.6 to 3.4 m.

The boreholes were checked for groundwater upon completion of drilling. Groundwater was recorded at depths ranging from 0.4 to 2.4 m.

The soil has been classified as Granby sand loam (Type B), as per the *Soil Survey of Grey County - Report No. 17 of the Ontario Soil Survey*, completed by the Ontario Department of Agriculture. This soil group consists of very deep, poorly drained or very poorly drained sandy soils.

2.3 SITE DRAINAGE CONDITIONS

The existing drainage conditions of the site are characterized as follows:

- The site has an area of 7.0 ha and during storm events runoff flows as sheet flow to Watercourse 6;
- 5.6 ha of the site is proposed for development; and
- The 1.4 ha existing wetland along the northeast extent of the site has been excluded from this analysis.

Crozier prepared a SWMHYMO model for all areas draining to the proposed Regional SWMF. The project site is referred to as catchment 6065 or the "Becker Lands" in the Eden Oaks Servicing

and Stormwater Management Report. Figure 2 at the back of this report shows Crozier's delineation of all subwatersheds draining to the Regional SWMF. The Regional SWMF was designed to receive drainage from Catchments 6062, 6063, 6064 and 6065. A summary of the predevelopment flows from the project site from Crozier's SWMHYMO model is provided in Table 1.

Table 1: Existing Peak Flow Summary for Site

STORM	PEAK FLOW (m^3/s) 6 Hour KEIFER CHU Chicago Storm
25 mm	0.012
1:2-Year	0.037
1:5-Year	0.076
1:10-Year	0.124
1:25-Year	0.168
1:50-Year	0.193
1:100-Year	0.248
Timmins	0.315

3 Stormwater Management Plan

The preliminary stormwater management plan has been developed to address any potential adverse impacts the development will have on the local surface water features. The preliminary stormwater management plan is outlined in the following sections.

3.1 DESIGN CRITERIA

Based on previous reports, the background information collected and our analysis of this information, a clear understanding of the potential impacts was gained. The following design criteria are to be satisfied in the proposed SWM Plan:

- Level 1 "Enhanced" water quality treatment in the form of 80% total suspended solids (TSS) removal for the site effluent is required as the ultimate outlet, Georgian Bay is a cold-water fishery;
- As concluded in the *"Eden Oak Servicing & Stormwater Management Implementation Report"* quantity control is not required as it will result in negative impacts to peak flows downstream of the SWMF facility in Watercourse 6;
- Erosion protection must be provided by controlling the post development 25 mm storm runoff to pre-development levels and by providing a detention time between 24-48 hours to protect the downstream system from erosion;
- The peak flow generated by the Regional (Timmins) Storm must be safely conveyed through the development to the designated outlets to prevent on-site flooding; and
- A siltation and erosion control plan is required to prevent the migration of sediment off-site during construction.

3.2 PROPOSED DRAINAGE CONDITIONS

A Post Development Drainage Plan (DP02) is enclosed which illustrates the proposed drainage conditions of the site and should be referenced when reviewing this section of the report.

3.2.1 Internal Drainage

Under proposed conditions, the residential development will drain internally via a combination of storm sewer and the internal road network to the proposed Regional SWMF within the Eden Oak Development. The Regional SWMF is designed to provide treatment of runoff from a 51.4 ha area including 5.6 ha from this development.

Onsite storm sewers will be sized to convey the minor (1:5-year) design storm peak flows to the end of pipe SWM facility. The road network will be designed to convey the major (1:100-year) design storm peak flows to the proposed SWM blocks overland. The design of the internal roadways will limit surface ponding during major storm events to depths of 0.30 m or less providing safe access/egress throughout the proposed development.

Post development drainage will be divided between a 2.80 ha controlled area (Catchment 201) and a 2.80 ha uncontrolled area (Catchment 202). Catchment 201 will include drainage from the proposed road and right of way, front yards and driveways of all lots, rooftops of all lots excluding lots 31 to 53 and backyards of lots 11-17 and 28-30. Catchment 201 will drain east to a storm water management facility on the Eden Oaks site west of the proposed development. Catchment 202 will consist of drainage from the rooftops and backyards of lots 31 to 53, and the backyards of lots 11-17 and 28-30 and open space land cover and will continue to drain northeast to Watercourse 6 as it did pre-development.

3.2.2 External Drainage

External drainage will be redirected around the site via raised grading and ditching along the south and west border of the site to Watercourse 6. This is consistent with predevelopment conditions. Predevelopment drainage flowed directly to Watercourse 6, therefore the ultimate outlet is consistent. A Flood Assessment Brief (dated July 2025) was prepared by Tatham Engineering and should be reviewed in conjunction with this section of the report.

Site grading will be raised above the existing ground level along the western and southern property lines. Proposed swales will be provided 0.5 m from the western and southern property lines along the bottom of the slope down from the raised grading. The proposed raised grading and swales will direct external surface runoff and spill flow northwards along the western property line back into the main branch of Watercourse 6 and eastwards along the southern property line back into the main branch of Watercourse 6.

An inlet structure consisting of 2 – 600 mm x 1200 mm Ditch Inlets in Type ‘B’ configuration per OPSD 706.031 will capture drainage from the western property line south of the proposed street connecting form the Eden Oaks development and twin 600 mm diameter storm sewers will convey this drainage across the proposed street. A minimum 1.0 m deep ditch through the park block downstream of the twin 600 mm storm sewer outlet will convey this potential spill flow and external overland flow back into Watercourse 6 as occurs under existing conditions.

3.3 WATER QUANTITY CONTROL

Details of the water quantity control and water quality treatment design is described in the following sections.

3.3.1 Catchment 201

The proposed Regional Stormwater Management Facility in the Eden Oaks development will not provide quantity control matching pre-development peak storm flows to post development peak storm flows. Based on hydrologic modelling prepared by Crozier it was determined that providing quantity control would increase peak flow rates downstream in Watercourse 6. The pond will still provide some storage and attenuation, as designed by Crozier, and will only allow for minor increases in peak flows as shown in Table 2.

Table 2: Regional SWMF Outlet Pre and Post Development Peak Flows

STORM	PEAK FLOW (m^3/s)	
	Pre-Development	Post Development
1:2-Year	2.26	2.30
1:5-Year	3.31	3.35
1:10-Year	4.24	4.28
1:25-Year	5.14	5.18
1:50-Year	5.60	5.64
1:100-Year	6.52	6.56
Timmins	13.57	13.97

Data taken from "Eden Oak Servicing & Stormwater Management Implementation Report"

A Visual OTTHYMO (VO) hydrologic model was created to quantify proposed flows to the Regional SWMF from the 372 Grey Road 21 site reflecting the current site plan. For consistency the storm distributions used in the model were the same as those used for the design of the Eden Oaks development, the rainfall intensity-duration-frequency (IDF) parameters were acquired from the MTO's "IDF Curve Lookup". Scenarios for the 25 mm storm, the 1:2-year through 1:100-year return frequency design storms, as well as the Regional (Timmins) Storm were simulated using the 6-hour Chicago storm distributions and are summarized in Table 3. Supporting calculations are provided in Appendix A for reference.

Table 3: Post Development Peak Flows to SWMF Summary

STORM	PEAK FLOW (m^3/s)	
	Catchment 6065 (Crozier Report)	Catchment 201
25 mm	0.077	0.056
1:2-Year	0.150	0.094
1:5-Year	0.247	0.145
1:10-Year	0.349	0.199
1:25-Year	0.448	0.248
1:50-Year	0.497	0.272
1:100-Year	0.601	0.324
Timmins	0.514	0.271

6 hour Kifer Chu Chicago design storm distribution

As shown in Table 3 peak storm flows from site to the Regional SWMF are below the flow rates that the facility was designed for, for all modeled storm events. Therefore, the Regional SWMF has capacity to receive the proposed storm flows from the project site and the function of the pond will not be negatively impacted.

3.3.2 Catchment 202

The size of the area draining northeast to the wetland will be reduced from 5.60 ha under predevelopment conditions to 2.80 ha under post development conditions. The post development peak storm flows from the site to the wetland will not exceed the predevelopment peak storm flows calculated by Crozier as shown in Table 4. As there will be no increase in storm flows pre to post development no quantity control will be required.

Table 4: Uncontrolled Storm Flow Summary for Site

STORM	PEAK FLOW (m^3/s)	
	Predevelopment Catchment 6065 (Crozier Report)	Post-Development Catchment 202
25 mm	0.012	0.010
1:2-Year	0.037	0.031
1:5-Year	0.076	0.061
1:10-Year	0.124	0.097
1:25-Year	0.168	0.129
1:50-Year	0.193	0.147
1:100-Year	0.248	0.186
Timmins	0.315	0.206

3.4 WATER QUALITY TREATMENT

3.4.1 Catchment 201

The Regional SWMF has been sized to provide adequate water quality storage volumes based on the *MOE Stormwater Management Planning and Design Manual* (2003) Table 3.2. The wet pond SWMF has been designed to provide "Enhanced" Level 1 water quality treatment for all contributing catchments.

The Regional SWMF was designed by Crozier based on an average imperviousness of 35% for all catchments contributing to it. The design water quality storage volume used for an imperviousness of 35% was 80 m^3/ha of which 40 m^3/ha is permanent pool and 40 m^3/ha is extended detention storage (MOE, 2003). Based on Crozier's design area for the project site of 5.6 ha, the SWMF design water quality storage volume for the 372 Grey Road site is 448 m^3 of which 224 m^3 is extended detention and 224 m^3 is permanent pool storage.

The 2.80 ha area draining to the SWMF under proposed conditions will have an imperviousness of 58%. A water quality requirement of 107.4 m^3/ha for an imperviousness of 58% was interpolated from the MOE design guidelines, of this storage 40 m^3/ha is to be extended detention storage. The required SWMF water quality storage volume for the proposed site will be 301 m^3 of which 112 m^3 is extended detention and 189 m^3 is permanent pool storage. All required water quality

storage volumes are less than the pond was designed for, therefore adequate water quality storage volume is provided.

The wet pond SWMF provides a drawdown time between 24 and 48 hours during the 4 hour 25 mm CHC storm providing adequate water quality control as calculated by Crozier in the Eden Oak Servicing & Stormwater Management Implementation Report.

3.4.2 Catchment 202

Post development land cover in catchment 202 will include rooftops, lawn and undisturbed brush and trees. Runoff from all of these sources is considered clean and therefore quality treatment will not be required.

3.5 EROSION CONTROL

As previously discussed, the Regional SWMF will have a drawdown time during the 25 mm storm event within the range of 24 to 48 hours. This will ensure nonerosive velocities downstream of the SWMF.

3.6 SITE FLOW CONVEYANCE

An internal storm sewer network will convey runoff from site via approximately 450 m of storm sewer to proposed wet pond SWMF located northwest of the development.

The internal storm sewer will be sized to accommodate the 1:5-year return frequency design storm peak flow, with larger storms being conveyed as overland flow via the roadway. The roadway will safely convey the regional storm event and the 1:100 year storm events with flood depths not exceeding 0.30 m. The Hydraflow Express Extension for Autodesk Civil 3D was used to estimate the depth of storm flow on the road during the 1:100 year storm event. Assuming that the storm sewer is blocked the 1:100 year flow of 0.195 m^3/s can be conveyed on the road with a max design flow depth of 76 mm.

The Storm Sewer Design Sheet and roadway capacity calculations have been attached in Appendix B.

3.7 THERMAL IMPACTS OF THE REGIONAL SWMF

The Regional SWMF is a wetland SWMF designed with a pond bottom elevation of 181.50 m, a permanent pool elevation of 181.80 m and an extended detention elevation of 182.30 m. The Regional SWMF has an extended detention depth of only 0.50 m before discharging through the secondary SWMF control (control structure top grate). Based on the *MOE Stormwater Management Planning and Design Manual* (2003) Table 4.3: Average Temperature Increases by SWMP Type, a wetland type SWM facility has an average temperature increase of 3.4 °C, which

is less than the 5.1 °C average increase for a traditional wet pond type SWMF. The SWMPDM further describes that wet pond and wetland type facilities can compound the temperature increase by detaining water between storms and allowing it to acclimate to air temperatures. In this case, the shallow permanent pool and extended detention depths of the Regional SWMF will help limit this impact as there will be less warm water detained in the SWMF than if it had deeper permanent pool and extended detention depths.

The Regional SWMF design includes a micropool at the outlet to allow a reverse grade bottom draw outlet pipe as recommended in the SWMPDM. The bottom of the micropool is at an elevation of 180.00 m, or 1.8 m below the permanent pool elevation. Per the *Sustainable Technologies Evaluation Program* (STEP), the expected 95th percentile temperature reduction provided by a 2 m deep bottom draw outlet is between 3 and 5 °C. As the micropool is relatively small compared to the overall permanent pool, it would be expected to provide a lesser temperature reduction. The SWMPDM also recommends using riparian plantings to shade the SWMF and reduce the temperature increase between rainfall events. As the Regional SWMF is a wetland type SWMF, it is expected to have a higher amount of vegetative cover throughout the SWMF to help shade the water.

Other possible thermal mitigation practices include cooling trenches and nighttime release outlets. Per STEP guidance, to provide thermal benefits, a cooling trench is recommended to be at least 5% of the volume of runoff discharged from the pond during a 25 mm event. Per the *Eden Oak Servicing & Stormwater Management Implementation Report,* the 25 mm runoff volume is 2,670 m^3, and therefore a cooling trench would require a minimum volume of 134 m^3. Assuming a maximum trench width and depth of 3 m and 0.5 m, respectively, to ensure the trench volume is used effectively, and a stone porosity of 0.40, the required trench length would be 223 m which is not feasible to construct between the Regional SWMF and its outlet to the ditch alongside the Georgian Trail.

Nighttime release outlets involve an automated control that automatically closes the outlet during the day when surface outflow from ponds is warmer, and releases water during the night when outflow temperatures are cooler. Per the STEP guidance, night time release outlets require robust automation technology, electrical supply and back-up power at the outlet to avoid excessive repairs and downtime. We understand the Regional SWMF will be assumed by the Town and do not believe the Town would wish to assume a SWMF with additional operation and maintenance expenses and requirements, and the additional replacement costs that would be associated with an automated outlet.

It is also noted that the total catchment area contributing to Watercourse 6 downstream of the Regional SWMF outlet is approximately 570 ha, and only 2.80 ha of area from the subject site (0.5% of watershed catchment area) will drain to the Regional SWMF and be subjected to thermal

impacts. The moderate warming of 0.5% of the watercourse drainage is expected to have a negligible impact on the temperatures within Watercourse 6. Therefore, based on the constraints and justification described above, we do not recommend implementation of any further thermal mitigation measures for the Regional SWMF as part of this proposed development.

4 Sediment and Erosion Control

Siltation and erosion controls will be implemented for all construction activities, including topsoil stripping, material stockpiling, road construction and grading operations. A detailed Sedimentation and Erosion control Plan will be included with a later submission. Erosion and sediment control measures to be implemented during and after construction are summarized as follows:

- heavy duty silt fence will be erected before the commencement of any grading operations to control sediment movement;
- a construction vehicle entrance will be constructed and maintained consisting of a stone mud mat to reduce off-site tracking of material;
- regular inspection of control measures will be instituted, and repairs will be made as necessary; and
- long term siltation and erosion control will be enhanced with a revegetation strategy for disturbed areas.

5 Summary

This Preliminary SWM Report has been prepared to outline the preliminary stormwater management plan to support the subject development as well as the applicable design criteria and recommended siltation and erosion controls. The SWM Plan ensures the development can be constructed in accordance with all applicable municipal and provincial guidelines while minimizing the impact of the development on the local drainage systems. The development is located outside of the natural hazard limits identified on-site.

Post development storm flows will be safely conveyed through site and discharge to the Eden Oaks Regional Stormwater Management Facility. Peak flows from the 372 Grey Road development will not exceed the flow rates the Regional SWMF was designed for by Crozier. The SWMF provides 80% TSS removal and an acceptable drawdown time for the water quality storage volume. The Regional SWMF was not designed to attenuate post development peak flows below pre-development levels so as not to negatively impact flows through Watercourse 6.

A portion of the site will not drain to the Regional SWMF but will continue to drain northeast to the wetland. This drainage area includes backyards, rooftops and existing, brush/woodland. Runoff from this catchment is considered clean and quality treatment will not be provided. Post development peak storm flows from this catchment will not exceed pre-development peak flows therefore stormwater quantity control will not be provided to this catchment.

External drainage will be redirected around the site via false berms along the south and west border of the site and will be conveyed under the road connecting to the Eden Oaks development at the west border via two 600 mm diameter culverts and through the park block via a swale. External drainage flowing along the south and west borders of the site will ultimately end up in Watercourse 6, the same outlet as in the predevelopment condition.

Implementation of erosion and sediment control best management practices during and after site servicing and building construction will reduce the transportation of sediment from the site, improve the stormwater quality and mitigate any environmental impacts during construction activities.

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372 GREY ROAD 21 - WEST
LOCATION PLAN

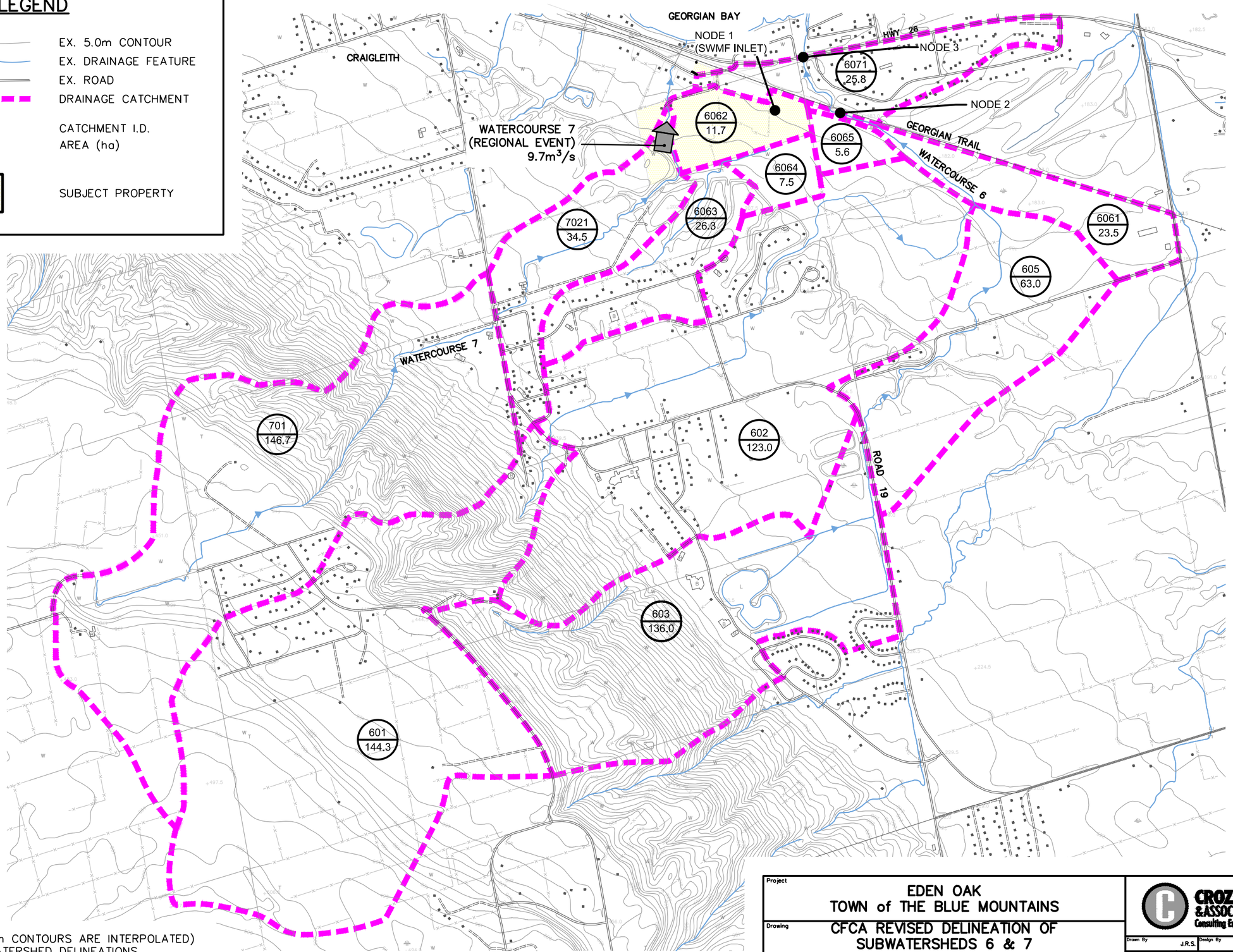
DWG. No.
FIG. 1

SCALE: NTS	DATE: NOV/23	JOB NO. 121088

Drawing Name: 121088-FIG.1.dwg, Plotted: Jan 17, 2024

LEGEND

- EX. 5.0m CONTOUR
- EX. DRAINAGE FEATURE
- EX. ROAD
- DRAINAGE CATCHMENT
- 701 / 146.7 — CATCHMENT I.D. / AREA (ha)
- SUBJECT PROPERTY



NOTES:

1. 5.0m CONTOURS (2.5m CONTOURS ARE INTERPOLATED)
2. CFCA UPDATED SUBWATERSHED DELINEATIONS

Project	EDEN OAK TOWN of THE BLUE MOUNTAINS
Drawing	CFCA REVISED DELINEATION OF SUBWATERSHEDS 6 & 7 POST-DEVELOPMENT – CONTROLLED

CROZIER & ASSOCIATES Consulting Engineers
The HarbourEdge Building,
40 Huron Street, Suite 301,
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705 446-3510 T
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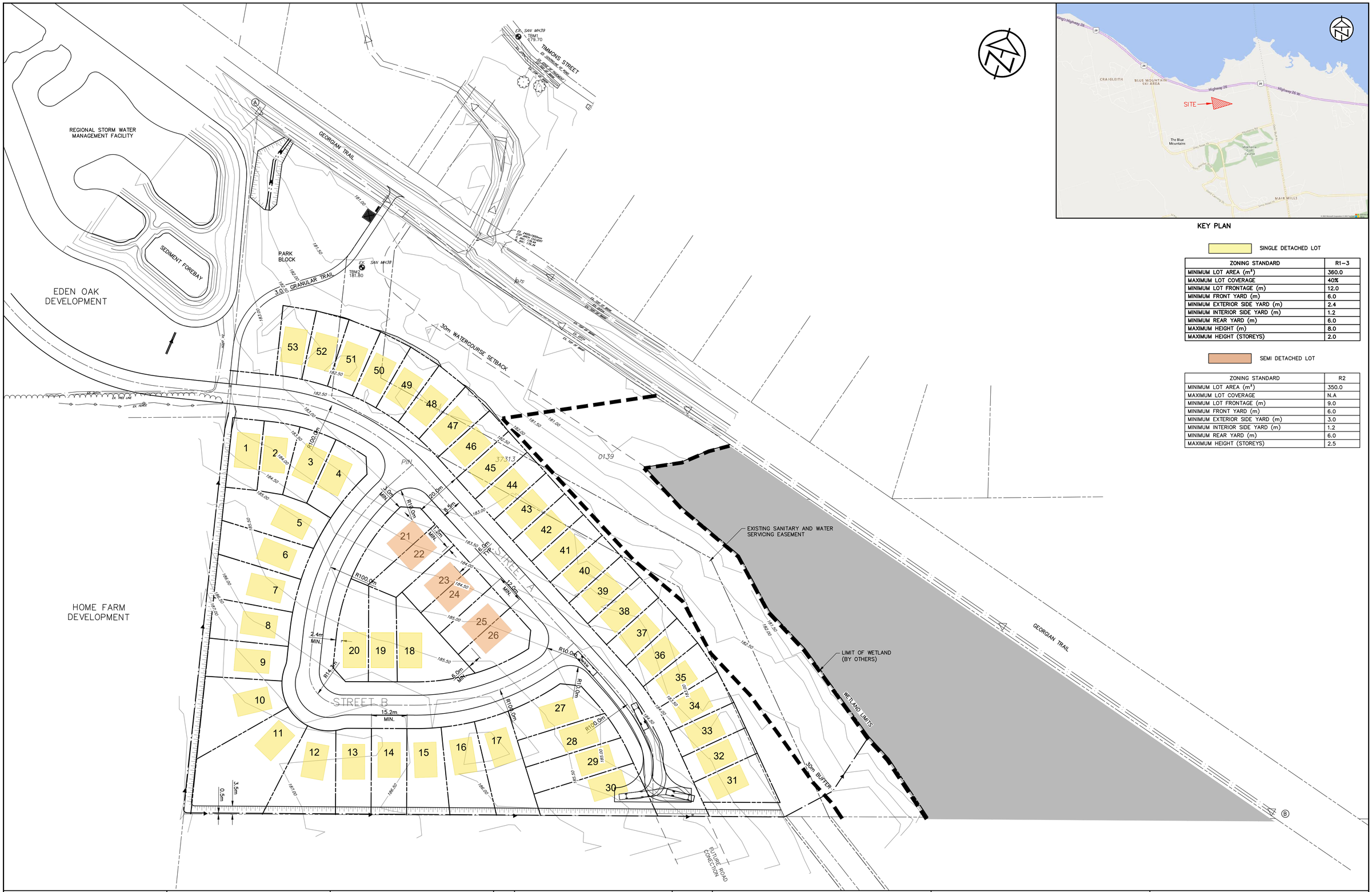
Drawn By	J.R.S.	Design By	K.M.	Project	218-2659
Scale	1: 15 000	Date	07/28/2020	Check By	K.M.
				Drawing	FIG. 5

J:\200\218 - Eden Oak\2659\CAD_Sheets\2659_203, 207.dwg, 207 - FIG. 5, 2020-09-25 8:59:41 AM, jpereira



KEY PLAN

SINGLE DETACHED LOT

ZONING STANDARD	R1-3
MINIMUM LOT AREA (m²)	360.0
MAXIMUM LOT COVERAGE	40%
MINIMUM LOT FRONTAGE (m)	12.0
MINIMUM FRONT YARD (m)	6.0
MINIMUM EXTERIOR SIDE YARD (m)	2.4
MINIMUM INTERIOR SIDE YARD (m)	1.2
MINIMUM REAR YARD (m)	6.0
MAXIMUM HEIGHT (m)	8.0
MAXIMUM HEIGHT (STOREYS)	2.0

SEMI DETACHED LOT

ZONING STANDARD	R2
MINIMUM LOT AREA (m²)	350.0
MAXIMUM LOT COVERAGE	N.A
MINIMUM LOT FRONTAGE (m)	9.0
MINIMUM FRONT YARD (m)	6.0
MINIMUM EXTERIOR SIDE YARD (m)	3.0
MINIMUM INTERIOR SIDE YARD (m)	1.2
MINIMUM REAR YARD (m)	6.0
MAXIMUM HEIGHT (STOREYS)	2.5

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BENCHMARKS

TBM1 – ELEVATION 179.70
TOP OF GRATE OF SAN. MH39 LOCATED ON TIMMONS STREET AND APPROXIMATELY 120m NORTH OF SAN. MH38 .

TBM2 – ELEVATION 181.80
TOP OF GRATE OF SAN. MH38 APPROXIMATELY 79m FROM NORTH EAST CORNER OF PROPERTY LINE.

NOTES

LEGAL SURVEY INFORMATION AND LOT DIMENSIONS SHOWN ON THIS PLAN ARE TAKEN FROM A SURVEY PLAN PREPARED BY J.D.BARNES LIMITED, DATED DEC 2, 2021 WHICH MAY NOT BE FINAL AND ARE NOT GUARANTEED. THE FINAL REGISTERED PLAN OF SUBDIVISION SHALL BE REFERRED TO FOR CONFIRMATION OF THE DATA.

TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN FROM SURVEY PREPARED BY TATHAM ENGINEERING DATED NOV 3, 2021.

No.	REVISION DESCRIPTION	DATE
1.	DRAFT PLAN PRE-CONSULT	JUL 2024
2.	DRAFT PLAN APPROVAL	JUL 2025

ENGINEER STAMP

PRELIMINARY

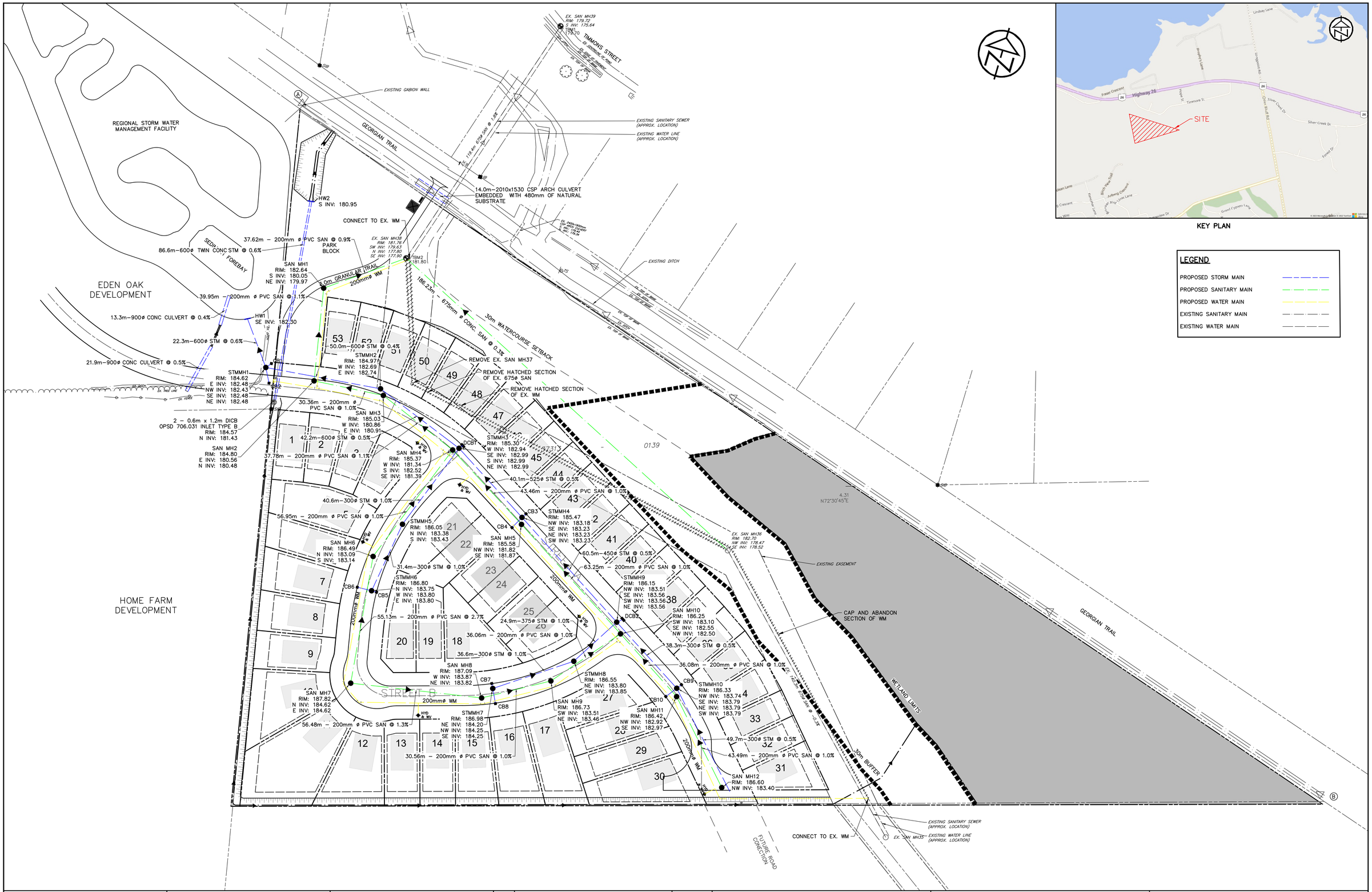
372 GREY ROAD 21 - WEST
TOWN OF THE BLUE MOUNTAINS

TATHAM ENGINEERING

DEVELOPMENT CONCEPT

DESIGN: KH/JB	FILE: 121088	DWG: SP01
DRAWN: KH	DATE: OCT 2022	
CHECK: JPA/RS	SCALE: 1:750	

Drawing Name: 121088-SP01.dwg, Plotted: Jul 17, 2025



KEY PLAN

LEGEND

- PROPOSED STORM MAIN
- PROPOSED SANITARY MAIN
- PROPOSED WATER MAIN
- EXISTING SANITARY MAIN
- EXISTING WATER MAIN

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2.	DRAFT PLAN APPROVAL	JUL 2025

ENGINEER STAMP

PRELIMINARY

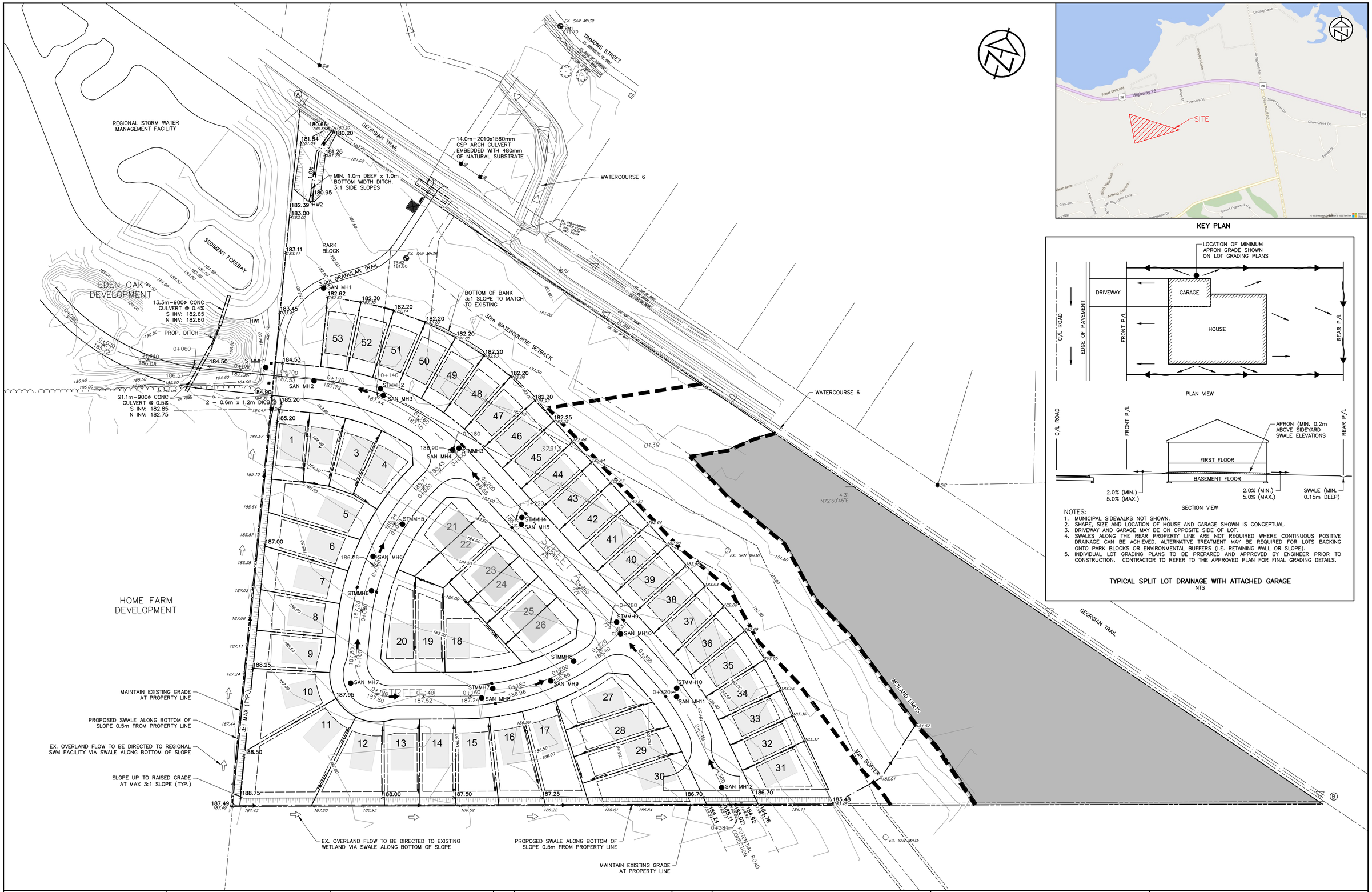
372 GREY ROAD 21 - WEST
TOWN OF THE BLUE MOUNTAINS

TATHAM ENGINEERING

GENERAL SERVICING PLAN

DESIGN: KH/JB	FILE: 121088	DWG: SS01
DRAWN: KH	DATE: JAN 2023	
CHECK: JPA/RS	SCALE: 1:750	

Drawing Name: 121088-SS01.dwg, Plotted: Jul 16, 2025



KEY PLAN

NOTES:
1. MUNICIPAL SIDEWALKS NOT SHOWN.
2. SHAPE, SIZE AND LOCATION OF HOUSE AND GARAGE SHOWN IS CONCEPTUAL.
3. DRIVEWAY AND GARAGE MAY BE ON OPPOSITE SIDE OF LOT.
4. SWALES ALONG THE REAR PROPERTY LINE ARE NOT REQUIRED WHERE CONTINUOUS POSITIVE DRAINAGE CAN BE ACHIEVED. ALTERNATIVE TREATMENT MAY BE REQUIRED FOR LOTS BACKING ONTO PARK BLOCKS OR ENVIRONMENTAL BUFFERS (I.E. RETAINING WALL OR SLOPE).
5. INDIVIDUAL LOT GRADING PLANS TO BE PREPARED AND APPROVED BY ENGINEER PRIOR TO CONSTRUCTION. CONTRACTOR TO REFER TO THE APPROVED PLAN FOR FINAL GRADING DETAILS.

TYPICAL SPLIT LOT DRAINAGE WITH ATTACHED GARAGE
NTS

DISCLAIMER AND COPYRIGHT

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

TATHAM ENGINEERING LIMITED CLAIMS COPYRIGHT TO THIS DRAWING WHICH MAY NOT BE USED FOR ANY PURPOSE OTHER THAN THAT PROVIDED IN THE CONTRACT BETWEEN THE OWNER/CLIENT AND THE ENGINEER WITHOUT THE EXPRESS CONSENT OF TATHAM ENGINEERING LIMITED.

BENCHMARKS

TBM1 – ELEVATION 179.70
TOP OF GRATE OF SAN. MH39 LOCATED ON TIMMONS STREET AND APPROXIMATELY 120m NORTH OF SAN. MH38 .

TBM2 – ELEVATION 181.80
TOP OF GRATE OF SAN. MH38 APPROXIMATELY 79m FROM NORTH EAST CORNER OF PROPERTY LINE.

NOTES

LEGAL SURVEY INFORMATION AND LOT DIMENSIONS SHOWN ON THIS PLAN ARE TAKEN FROM A SURVEY PLAN PREPARED BY J.D.BARNES LIMITED, DATED DEC 2, 2021 WHICH MAY NOT BE FINAL AND ARE NOT GUARANTEED. THE FINAL REGISTERED PLAN OF SUBDIVISION SHALL BE REFERRED TO FOR CONFIRMATION OF THE DATA.

TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN FROM SURVEY PREPARED BY TATHAM ENGINEERING DATED NOV 3, 2021.

No.	REVISION DESCRIPTION	DATE
1.	DRAFT PLAN PRE-CONSULT	JUL 2024
2.	DRAFT PLAN APPROVAL	JUL 2025

ENGINEER STAMP

PRELIMINARY

372 GREY ROAD 21 - WEST
TOWN OF THE BLUE MOUNTAINS

GRADING PLAN

TATHAM ENGINEERING

DESIGN: KH	FILE: 121088	DWG: SG01
DRAWN: KH	DATE: JAN 2023	
CHECK: JPA/RS	SCALE: 1:750	

Drawing Name: 121088-SG01.dwg, Plotted: Jul 16, 2025

KEY PLAN

LEGEND

EX. MAJOR OVERLAND FLOW DIRECTION

EX. DITCH FLOW DIRECTION

DISCLAIMER AND COPYRIGHT

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TOP OF GRATE OF SAN. MH38 APPROXIMATELY 79m FROM NORTH EAST CORNER OF PROPERTY LINE.

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TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN FROM SURVEY PREPARED BY TATHAM ENGINEERING DATED NOV 3, 2021.

No.	REVISION DESCRIPTION	DATE
1.	DRAFT PLAN PRE-CONSULT	JUL 2024
2.	DRAFT PLAN APPROVAL	JUL 2025

ENGINEER STAMP

PRELIMINARY

372 GREY ROAD 21 - WEST
TOWN OF THE BLUE MOUNTAINS

PRE-DEVELOPMENT DRAINAGE PLAN

TATHAM ENGINEERING

DESIGN: JB	FILE: 121088	DWG: DP01
DRAWN: KH	DATE: OCT 2022	
CHECK: JPA/RS	SCALE: 1:750	

Drawing Name: 121088-STM01.dwg, Plotted: Jul 17, 2025

KEY PLAN

LEGEND

- AREA BOUNDARY
- PR. MAJOR OVERLAND FLOW DIRECTION
- EX. MAJOR OVERLAND FLOW DIRECTION
- CATCHMENT ID
- AREA (ha)
- PERCENT IMPERVIOUS (%)

201
3.33 51

DISCLAIMER AND COPYRIGHT

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

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BENCHMARKS

TBM1 – ELEVATION 179.70
TOP OF GRATE OF SAN. MH39 LOCATED ON TIMMONS STREET AND APPROXIMATELY 120m NORTH OF SAN. MH38 .

TBM2 – ELEVATION 181.80
TOP OF GRATE OF SAN. MH38 APPROXIMATELY 79m FROM NORTH EAST CORNER OF PROPERTY LINE.

NOTES

LEGAL SURVEY INFORMATION AND LOT DIMENSIONS SHOWN ON THIS PLAN ARE TAKEN FROM A SURVEY PLAN PREPARED BY J.D.BARNES LIMITED, DATED DEC 2, 2021 WHICH MAY NOT BE FINAL AND ARE NOT GUARANTEED. THE FINAL REGISTERED PLAN OF SUBDIVISION SHALL BE REFERRED TO FOR CONFIRMATION OF THE DATA.

TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN FROM SURVEY PREPARED BY TATHAM ENGINEERING DATED NOV 3, 2021.

No.	REVISION DESCRIPTION	DATE
1.	DRAFT PLAN PRE-CONSULT	JUL 2024
2.	DRAFT PLAN APPROVAL	JUL 2025

ENGINEER STAMP

PRELIMINARY

372 GREY ROAD 21 - WEST
TOWN OF THE BLUE MOUNTAINS

TATHAM ENGINEERING

POST-DEVELOPMENT DRAINAGE PLAN

DESIGN: JB	FILE: 121088	DWG: DP02
DRAWN: KH	DATE: OCT 2022	
CHECK: JPA/RS	SCALE: 1:750	

Drawing Name: 121088-STM01.dwg, Plotted: Jul 17, 2025

Appendix A:
Post Development Hydrology

TATHAM ENGINEERING

Impervious Area & Runoff Coefficient Calculations

Project Details

372 Grey Road 21 West	121088

Prepared By

John Birchard	June 19, 2025

Data Sources	MTO Drainage Management Manual Design Chart 1.07 (1997)

Watershed: GSCA

Impervious Area and Runoff Coefficient (C) for Catchment

Catchment ID				**201**			**202**				
Catchment Area				2.80			2.80				
Land Cover Category	**C**	**TIMP**	**XIMP**	**Area (ha)**	**TIMP (ha)**	**XIMP (ha)**	**Area (ha)**	**TIMP (ha)**	**XIMP (ha)**		
Single Residential	0.54	0.49	0.24	1.52	0.74	0.37	0.59	0.10	0.14		
Semi Residential	0.55	0.50	0.25	0.25	0.12	0.06					
Paved	0.95	1.00	0.95	0.73	0.73	0.69					
Gravel	0.75	0.79	0.39								
Woodland	0.25	0.07	0.04				1.57	0.11	0.06		
Pasture/Lawns	0.28	0.11	0.06	0.30	0.03	0.02	0.64	0.07	0.04		
Waterbody	0.50	0.43	0.50								
Catchment TIMP (%)				58%			10%				
Catchment XIMP (%)				41%			8%				
Catchment Average C				0.62			0.32				

Notes:

TIMP - Total Impervious Area
XIMP - Directly Connected Impervious Area
TIMP = 1.429C - 0.286

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (StandHYD)

Project Details

372 Grey Road 21	121088

Prepared By

John Birchard	Oct 23, 2023

Data Sources

Detailed Soil Survey Reports for Ontario, GSCA Policies for the Administration of the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (2010), MTO Drainage Management Manual (1997)

Post Development Condition

Watershed:	GSCA
Catchment ID:	201
Catchment Area (ha):	2.80
Impervious %:	58%
Pervious Area (ha):	1.18

Average Curve Number (CN) and Initial Abstraction (IA) for Pervious Area

Soil Symbol		**Gsl**							
Soil Series		Granby							
Hydrologic Soils Group		B							
Soil Texture		Sand Loam							
Runoff Coefficient Type		2							
Area (ha)		1.18							
Percentage of Catchment		100%							
Land Cover Category	**IA**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**
Impervious	2		100						
Gravel	3		89						
Woodland	10		60						
Pasture/Lawns	5	1.18	69						
Meadows	8		65						
Cultivated	7		74						
Waterbody	12		50						
Average CN		69.00							
Average IA		5.00							

Notes

CN and IA values have been calculated for the pervious area of the catchment only.

Summary

Catchment CN:	69.0
Catchment IA (mm):	5.00

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

372 Grey Road 21	121088

Prepared By

John Birchard	Oct 23, 2023

Data Sources

Detailed Soil Survey Reports for Ontario, GSCA Policies for the Administration of the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (2010), MTO Drainage Management Manual (1997)

Post Development Condition

Watershed:	GSCA
Catchment ID:	202
Catchment Area (ha):	2.80
Impervious %:	10%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Gsl**											
Soil Series		Granby											
Hydrologic Soils Group		B											
Soil Texture		Sand Loam											
Runoff Coefficient Type		2											
Area (ha)		2.80											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.28	100	0.95									
Gravel	3		89	0.27									
Woodland	10	1.88	60	0.25									
Pasture/Lawns	5	0.64	69	0.28									
Meadows	8		65	0.27									
Cultivated	7		74	0.35									
Waterbody	12		50	0.05									
Average CN		66.06											
Average C		0.33											
Average IA		8.06											

Time to Peak Calculations

Max. Catchment Elev. (m):	187.43
Min. Catchment Elev. (m):	181.21
Catchment Length (m):	300
Catchment Slope (%):	2.07%
Method: Airport Method	
Time of Concentration (mins):	34.32

Summary

Catchment CN:	66.1
Catchment C:	0.33
Catchment IA (mm):	8.06
Time of Concentration (hrs):	0.57
Catchment Time to Peak (hrs):	0.38
Catchment Time Step (mins):	4.58

TATHAM ENGINEERING

PROJECT	372 Grey Road 21	FILE	121088
		DATE	10/22/2023
SUBJECT	Post Development	NAME	John Birchard
	Visual OTTHYMO Schematic	PAGE	1 OF 1

PROPOSED CONDITIONS

201

Post 201
AREA [ha] - 2.800

202

Post 202
AREA [ha] - 2.800

NASHYD

ROUTE PIPE

DUHYD

STANDHYD

ROUTE CHANNEL

DIVERT HYD

ADDHYD

ROUTE RESERVOIR

SHIFTHYD

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================================================================================
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       V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


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DATE: 10/22/2023                          TIME: 06:55:33

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
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  ** SIMULATION : A: 25mm                      **
  ***********************************************


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--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    1.00 |  2.00   16.80 |  4.00    1.30 |
                1.00    2.60 |  3.00    2.40 |  5.00    0.90 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| NASHYD   (  0202)|   Area    (ha)=   2.80   Curve Number   (CN)= 66.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.06   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.38

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    1.00 | 1.583    2.60 | 3.083    2.40 |  4.58    1.30
              0.167    1.00 | 1.667    2.60 | 3.167    2.40 |  4.67    1.30
              0.250    1.00 | 1.750    2.60 | 3.250    2.40 |  4.75    1.30
              0.333    1.00 | 1.833    2.60 | 3.333    2.40 |  4.83    1.30
              0.417    1.00 | 1.917    2.60 | 3.417    2.40 |  4.92    1.30
              0.500    1.00 | 2.000    2.60 | 3.500    2.40 |  5.00    1.30
              0.583    1.00 | 2.083   16.80 | 3.583    2.40 |  5.08    0.90
              0.667    1.00 | 2.167   16.80 | 3.667    2.40 |  5.17    0.90
              0.750    1.00 | 2.250   16.80 | 3.750    2.40 |  5.25    0.90
              0.833    1.00 | 2.333   16.80 | 3.833    2.40 |  5.33    0.90
              0.917    1.00 | 2.417   16.80 | 3.917    2.40 |  5.42    0.90
              1.000    1.00 | 2.500   16.80 | 4.000    2.40 |  5.50    0.90
              1.083    2.60 | 2.583   16.80 | 4.083    1.30 |  5.58    0.90
              1.167    2.60 | 2.667   16.80 | 4.167    1.30 |  5.67    0.90
              1.250    2.60 | 2.750   16.80 | 4.250    1.30 |  5.75    0.90
              1.333    2.60 | 2.833   16.80 | 4.333    1.30 |  5.83    0.90
              1.417    2.60 | 2.917   16.80 | 4.417    1.30 |  5.92    0.90
              1.500    2.60 | 3.000   16.80 | 4.500    1.30 |  6.00    0.90

    Unit Hyd Qpeak  (cms)=   0.281

    PEAK FLOW       (cms)=   0.010 (i)
    TIME TO PEAK    (hrs)=   3.167
    RUNOFF VOLUME    (mm)=   1.949
    TOTAL RAINFALL   (mm)=  25.000
    RUNOFF COEFFICIENT   =   0.078

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

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--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   2.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  41.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.62         1.18
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.50
     Length            (m)=     136.63       200.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    1.00 | 1.583    2.60 | 3.083    2.40 |  4.58    1.30
              0.167    1.00 | 1.667    2.60 | 3.167    2.40 |  4.67    1.30
              0.250    1.00 | 1.750    2.60 | 3.250    2.40 |  4.75    1.30
              0.333    1.00 | 1.833    2.60 | 3.333    2.40 |  4.83    1.30
              0.417    1.00 | 1.917    2.60 | 3.417    2.40 |  4.92    1.30
              0.500    1.00 | 2.000    2.60 | 3.500    2.40 |  5.00    1.30
              0.583    1.00 | 2.083   16.80 | 3.583    2.40 |  5.08    0.90
              0.667    1.00 | 2.167   16.80 | 3.667    2.40 |  5.17    0.90
              0.750    1.00 | 2.250   16.80 | 3.750    2.40 |  5.25    0.90
              0.833    1.00 | 2.333   16.80 | 3.833    2.40 |  5.33    0.90
              0.917    1.00 | 2.417   16.80 | 3.917    2.40 |  5.42    0.90
              1.000    1.00 | 2.500   16.80 | 4.000    2.40 |  5.50    0.90
              1.083    2.60 | 2.583   16.80 | 4.083    1.30 |  5.58    0.90
              1.167    2.60 | 2.667   16.80 | 4.167    1.30 |  5.67    0.90
              1.250    2.60 | 2.750   16.80 | 4.250    1.30 |  5.75    0.90
              1.333    2.60 | 2.833   16.80 | 4.333    1.30 |  5.83    0.90
              1.417    2.60 | 2.917   16.80 | 4.417    1.30 |  5.92    0.90
              1.500    2.60 | 3.000   16.80 | 4.500    1.30 |  6.00    0.90

     Max.Eff.Inten.(mm/hr)=      16.80         4.12
               over (min)        5.00        70.00
     Storage Coeff.  (min)=      6.29 (ii)   68.40 (ii)
     Unit Hyd. Tpeak (min)=      5.00        70.00
     Unit Hyd. peak  (cms)=      0.19         0.02
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.05         0.01         0.056 (iii)
     TIME TO PEAK    (hrs)=      3.00         3.92          3.00
     RUNOFF VOLUME    (mm)=     24.00         4.48         12.47
     TOTAL RAINFALL   (mm)=     25.00        25.00         25.00
     RUNOFF COEFFICIENT   =      0.96         0.18          0.50

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  69.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


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DATE: 10/22/2023                          TIME: 06:55:33

USER:


COMMENTS: _____

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  ***********************************************


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                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    1.50 |  2.00   25.50 |  4.00    1.90 |
                1.00    4.00 |  3.00    3.70 |  5.00    1.30 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| NASHYD   (  0202)|   Area    (ha)=   2.80   Curve Number   (CN)= 66.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.06   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.38

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.50 | 1.583    4.00 | 3.083    3.70 |  4.58    1.90
               0.167    1.50 | 1.667    4.00 | 3.167    3.70 |  4.67    1.90
               0.250    1.50 | 1.750    4.00 | 3.250    3.70 |  4.75    1.90
               0.333    1.50 | 1.833    4.00 | 3.333    3.70 |  4.83    1.90
               0.417    1.50 | 1.917    4.00 | 3.417    3.70 |  4.92    1.90
               0.500    1.50 | 2.000    4.00 | 3.500    3.70 |  5.00    1.90
               0.583    1.50 | 2.083   25.50 | 3.583    3.70 |  5.08    1.30
               0.667    1.50 | 2.167   25.50 | 3.667    3.70 |  5.17    1.30
               0.750    1.50 | 2.250   25.50 | 3.750    3.70 |  5.25    1.30
               0.833    1.50 | 2.333   25.50 | 3.833    3.70 |  5.33    1.30
               0.917    1.50 | 2.417   25.50 | 3.917    3.70 |  5.42    1.30
               1.000    1.50 | 2.500   25.50 | 4.000    3.70 |  5.50    1.30
               1.083    4.00 | 2.583   25.50 | 4.083    1.90 |  5.58    1.30
               1.167    4.00 | 2.667   25.50 | 4.167    1.90 |  5.67    1.30
               1.250    4.00 | 2.750   25.50 | 4.250    1.90 |  5.75    1.30
               1.333    4.00 | 2.833   25.50 | 4.333    1.90 |  5.83    1.30
               1.417    4.00 | 2.917   25.50 | 4.417    1.90 |  5.92    1.30
               1.500    4.00 | 3.000   25.50 | 4.500    1.90 |  6.00    1.30

     Unit Hyd Qpeak  (cms)=   0.281

     PEAK FLOW       (cms)=   0.031 (i)
     TIME TO PEAK    (hrs)=   3.167
     RUNOFF VOLUME    (mm)=   5.560
     TOTAL RAINFALL   (mm)=  37.900
     RUNOFF COEFFICIENT   =   0.147

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   2.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  41.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.62         1.18
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.50
     Length            (m)=     136.63       200.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.50 | 1.583    4.00 | 3.083    3.70 |  4.58    1.90
               0.167    1.50 | 1.667    4.00 | 3.167    3.70 |  4.67    1.90
               0.250    1.50 | 1.750    4.00 | 3.250    3.70 |  4.75    1.90
               0.333    1.50 | 1.833    4.00 | 3.333    3.70 |  4.83    1.90
               0.417    1.50 | 1.917    4.00 | 3.417    3.70 |  4.92    1.90
               0.500    1.50 | 2.000    4.00 | 3.500    3.70 |  5.00    1.90
               0.583    1.50 | 2.083   25.50 | 3.583    3.70 |  5.08    1.30
               0.667    1.50 | 2.167   25.50 | 3.667    3.70 |  5.17    1.30
               0.750    1.50 | 2.250   25.50 | 3.750    3.70 |  5.25    1.30
               0.833    1.50 | 2.333   25.50 | 3.833    3.70 |  5.33    1.30
               0.917    1.50 | 2.417   25.50 | 3.917    3.70 |  5.42    1.30
               1.000    1.50 | 2.500   25.50 | 4.000    3.70 |  5.50    1.30
               1.083    4.00 | 2.583   25.50 | 4.083    1.90 |  5.58    1.30
               1.167    4.00 | 2.667   25.50 | 4.167    1.90 |  5.67    1.30
               1.250    4.00 | 2.750   25.50 | 4.250    1.90 |  5.75    1.30
               1.333    4.00 | 2.833   25.50 | 4.333    1.90 |  5.83    1.30
               1.417    4.00 | 2.917   25.50 | 4.417    1.90 |  5.92    1.30
               1.500    4.00 | 3.000   25.50 | 4.500    1.90 |  6.00    1.30

     Max.Eff.Inten.(mm/hr)=      25.50        11.53
               over (min)        5.00        50.00
```

```
     Storage Coeff.  (min)=       5.32 (ii)   46.46 (ii)
     Unit Hyd. Tpeak (min)=       5.00        50.00
     Unit Hyd. peak  (cms)=       0.21         0.02
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.08         0.02          0.094 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.58           3.00
     RUNOFF VOLUME    (mm)=      36.90        10.20          21.14
     TOTAL RAINFALL   (mm)=      37.90        37.90          37.90
     RUNOFF COEFFICIENT   =       0.97         0.27           0.56


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  69.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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================================================================================
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       V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\JBirchard\AppData\Local\Civica\VH5\61a63be6-f99f-432d-9680-61b7e1a3c1f0\878
df279-3c09-409c-add1-e63aaaf27e10\sc
  Summary filename:
C:\Users\JBirchard\AppData\Local\Civica\VH5\61a63be6-f99f-432d-9680-61b7e1a3c1f0\878
df279-3c09-409c-add1-e63aaaf27e10\sc


DATE: 10/22/2023                          TIME: 06:55:34


USER:


COMMENTS: _____________________________________________________

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  ***********************************************
  ** SIMULATION : C: 5 yr 6 hr chc              **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\JBirchard\AppD
|                  |              ata\Local\Temp\
|                  |              d9ebf607-180b-4fc6-906f-05dd67f7c3ce\4c711abf
| Ptotal= 52.70 mm |    Comments: 5yr
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    2.20 |  2.00   34.60 |  4.00    2.90 |
                1.00    5.70 |  3.00    5.30 |  5.00    2.00 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| NASHYD   (  0202)|   Area    (ha)=   2.80   Curve Number   (CN)= 66.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.06   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.38

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    2.20 | 1.583    5.70 | 3.083    5.30 |  4.58    2.90
             0.167    2.20 | 1.667    5.70 | 3.167    5.30 |  4.67    2.90
             0.250    2.20 | 1.750    5.70 | 3.250    5.30 |  4.75    2.90
             0.333    2.20 | 1.833    5.70 | 3.333    5.30 |  4.83    2.90
             0.417    2.20 | 1.917    5.70 | 3.417    5.30 |  4.92    2.90
             0.500    2.20 | 2.000    5.70 | 3.500    5.30 |  5.00    2.90
             0.583    2.20 | 2.083   34.60 | 3.583    5.30 |  5.08    2.00
             0.667    2.20 | 2.167   34.60 | 3.667    5.30 |  5.17    2.00
             0.750    2.20 | 2.250   34.60 | 3.750    5.30 |  5.25    2.00
             0.833    2.20 | 2.333   34.60 | 3.833    5.30 |  5.33    2.00
```

0.917	2.20	2.417	34.60	3.917	5.30	5.42	2.00
1.000	2.20	2.500	34.60	4.000	5.30	5.50	2.00
1.083	5.70	2.583	34.60	4.083	2.90	5.58	2.00
1.167	5.70	2.667	34.60	4.167	2.90	5.67	2.00
1.250	5.70	2.750	34.60	4.250	2.90	5.75	2.00
1.333	5.70	2.833	34.60	4.333	2.90	5.83	2.00
1.417	5.70	2.917	34.60	4.417	2.90	5.92	2.00
1.500	5.70	3.000	34.60	4.500	2.90	6.00	2.00

Unit Hyd Qpeak (cms)= 0.281

PEAK FLOW (cms)= 0.061 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 11.391
TOTAL RAINFALL (mm)= 52.700
RUNOFF COEFFICIENT = 0.216

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0201)	Area (ha)= 2.80
ID= 1 DT= 5.0 min	Total Imp(%)= 58.00 Dir. Conn.(%)= 41.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.62	1.18
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.50
Length	(m)=	136.63	200.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.20	1.583	5.70	3.083	5.30	4.58	2.90
0.167	2.20	1.667	5.70	3.167	5.30	4.67	2.90
0.250	2.20	1.750	5.70	3.250	5.30	4.75	2.90
0.333	2.20	1.833	5.70	3.333	5.30	4.83	2.90
0.417	2.20	1.917	5.70	3.417	5.30	4.92	2.90
0.500	2.20	2.000	5.70	3.500	5.30	5.00	2.90
0.583	2.20	2.083	34.60	3.583	5.30	5.08	2.00
0.667	2.20	2.167	34.60	3.667	5.30	5.17	2.00
0.750	2.20	2.250	34.60	3.750	5.30	5.25	2.00
0.833	2.20	2.333	34.60	3.833	5.30	5.33	2.00
0.917	2.20	2.417	34.60	3.917	5.30	5.42	2.00
1.000	2.20	2.500	34.60	4.000	5.30	5.50	2.00
1.083	5.70	2.583	34.60	4.083	2.90	5.58	2.00
1.167	5.70	2.667	34.60	4.167	2.90	5.67	2.00
1.250	5.70	2.750	34.60	4.250	2.90	5.75	2.00
1.333	5.70	2.833	34.60	4.333	2.90	5.83	2.00
1.417	5.70	2.917	34.60	4.417	2.90	5.92	2.00
1.500	5.70	3.000	34.60	4.500	2.90	6.00	2.00

				TOTALS
Max.Eff.Inten.(mm/hr)=	34.60	21.91		
over (min)	5.00	40.00		
Storage Coeff. (min)=	4.71 (ii)	36.53 (ii)		
Unit Hyd. Tpeak (min)=	5.00	40.00		
Unit Hyd. peak (cms)=	0.22	0.03		
PEAK FLOW (cms)=	0.11	0.04		0.145 (iii)
TIME TO PEAK (hrs)=	3.00	3.33		3.00
RUNOFF VOLUME (mm)=	51.70	18.52		32.12
TOTAL RAINFALL (mm)=	52.70	52.70		52.70
RUNOFF COEFFICIENT =	0.98	0.35		0.61

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 69.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

```
  Output  filename:
C:\Users\JBirchard\AppData\Local\Civica\VH5\61a63be6-f99f-432d-9680-61b7e1a3c1f0\3f7
e420a-1adf-46d7-b8e1-79b6e5771140\sc
  Summary filename:
C:\Users\JBirchard\AppData\Local\Civica\VH5\61a63be6-f99f-432d-9680-61b7e1a3c1f0\3f7
e420a-1adf-46d7-b8e1-79b6e5771140\sc


DATE: 10/22/2023                          TIME: 06:55:33

USER:



COMMENTS: _____________________________________________________________


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  ***********************************************
  ** SIMULATION : D: 10 yr 6 hr chc             **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\JBirchard\AppD
|                  |              ata\Local\Temp\
|                  |              d9ebf607-180b-4fc6-906f-05dd67f7c3ce\ab86bd38
| Ptotal= 66.00 mm |    Comments: 10yr
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    2.80 |  2.00   43.40 |  4.00    3.50 |
                1.00    7.20 |  3.00    6.60 |  5.00    2.50 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| NASHYD   (  0202)|   Area    (ha)=   2.80   Curve Number   (CN)= 66.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.06   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.38

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                            ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    2.80 | 1.583    7.20 | 3.083    6.60 |  4.58    3.50
                0.167    2.80 | 1.667    7.20 | 3.167    6.60 |  4.67    3.50
                0.250    2.80 | 1.750    7.20 | 3.250    6.60 |  4.75    3.50
                0.333    2.80 | 1.833    7.20 | 3.333    6.60 |  4.83    3.50
                0.417    2.80 | 1.917    7.20 | 3.417    6.60 |  4.92    3.50
                0.500    2.80 | 2.000    7.20 | 3.500    6.60 |  5.00    3.50
                0.583    2.80 | 2.083   43.40 | 3.583    6.60 |  5.08    2.50
                0.667    2.80 | 2.167   43.40 | 3.667    6.60 |  5.17    2.50
                0.750    2.80 | 2.250   43.40 | 3.750    6.60 |  5.25    2.50
                0.833    2.80 | 2.333   43.40 | 3.833    6.60 |  5.33    2.50
                0.917    2.80 | 2.417   43.40 | 3.917    6.60 |  5.42    2.50
                1.000    2.80 | 2.500   43.40 | 4.000    6.60 |  5.50    2.50
                1.083    7.20 | 2.583   43.40 | 4.083    3.50 |  5.58    2.50
                1.167    7.20 | 2.667   43.40 | 4.167    3.50 |  5.67    2.50
                1.250    7.20 | 2.750   43.40 | 4.250    3.50 |  5.75    2.50
                1.333    7.20 | 2.833   43.40 | 4.333    3.50 |  5.83    2.50
                1.417    7.20 | 2.917   43.40 | 4.417    3.50 |  5.92    2.50
                1.500    7.20 | 3.000   43.40 | 4.500    3.50 |  6.00    2.50

     Unit Hyd Qpeak  (cms)=   0.281

     PEAK FLOW       (cms)=   0.097 (i)
     TIME TO PEAK    (hrs)=   3.167
     RUNOFF VOLUME    (mm)=  17.834
     TOTAL RAINFALL   (mm)=  66.000
     RUNOFF COEFFICIENT   =   0.270

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   2.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  41.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.62         1.18
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.50
     Length            (m)=     136.63       200.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                            ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    2.80 | 1.583    7.20 | 3.083    6.60 |  4.58    3.50
                0.167    2.80 | 1.667    7.20 | 3.167    6.60 |  4.67    3.50
```

0.250	2.80	1.750	7.20	3.250	6.60	4.75	3.50
0.333	2.80	1.833	7.20	3.333	6.60	4.83	3.50
0.417	2.80	1.917	7.20	3.417	6.60	4.92	3.50
0.500	2.80	2.000	7.20	3.500	6.60	5.00	3.50
0.583	2.80	2.083	43.40	3.583	6.60	5.08	2.50
0.667	2.80	2.167	43.40	3.667	6.60	5.17	2.50
0.750	2.80	2.250	43.40	3.750	6.60	5.25	2.50
0.833	2.80	2.333	43.40	3.833	6.60	5.33	2.50
0.917	2.80	2.417	43.40	3.917	6.60	5.42	2.50
1.000	2.80	2.500	43.40	4.000	6.60	5.50	2.50
1.083	7.20	2.583	43.40	4.083	3.50	5.58	2.50
1.167	7.20	2.667	43.40	4.167	3.50	5.67	2.50
1.250	7.20	2.750	43.40	4.250	3.50	5.75	2.50
1.333	7.20	2.833	43.40	4.333	3.50	5.83	2.50
1.417	7.20	2.917	43.40	4.417	3.50	5.92	2.50
1.500	7.20	3.000	43.40	4.500	3.50	6.00	2.50

Max.Eff.Inten.(mm/hr)=	43.40	32.90	
over (min)	5.00	35.00	
Storage Coeff. (min)=	4.30 (ii)	31.35 (ii)	
Unit Hyd. Tpeak (min)=	5.00	35.00	
Unit Hyd. peak (cms)=	0.23	0.03	
			TOTALS
PEAK FLOW (cms)=	0.14	0.07	0.199 (iii)
TIME TO PEAK (hrs)=	3.00	3.25	3.00
RUNOFF VOLUME (mm)=	65.00	27.14	42.65
TOTAL RAINFALL (mm)=	66.00	66.00	66.00
RUNOFF COEFFICIENT =	0.98	0.41	0.65

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 69.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

==========
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```
V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
V    V   I    SS     U   U   A A   L
 V  V    I     SS    U   U  AAAAA  L
 V  V    I      SS   U   U  A   A  L
  VV     I    SSSSS  UUUUU  A   A  LLLLL

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O
```

```
       OOO     T      T    H   H    Y    M   M   OOO
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```

***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\JBirchard\AppData\Local\Civica\VH5\61a63be6-f99f-432d-9680-61b7e1a3c1f0\55225e99-4f2d-42ac-8304-9c40b484eb87\sc
Summary filename:
C:\Users\JBirchard\AppData\Local\Civica\VH5\61a63be6-f99f-432d-9680-61b7e1a3c1f0\55225e99-4f2d-42ac-8304-9c40b484eb87\sc

DATE: 10/22/2023 TIME: 06:55:33

USER:

COMMENTS: _____


```
**********************************************
** SIMULATION : E: 25 yr 6 hr chc            **
**********************************************
```

READ STORM	Filename: C:\Users\JBirchard\AppData\Local\Temp\d9ebf607-180b-4fc6-906f-05dd67f7c3ce\0f6d4f27										
Ptotal= 77.90 mm	Comments: 25yr										
	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr			
	0.00	3.50	2.00	50.20	4.00	4.40					
	1.00	8.60	3.00	8.10	5.00	3.10					

CALIB

| NASHYD (0202)| Area (ha)= 2.80 Curve Number (CN)= 66.1
|ID= 1 DT= 5.0 min | Ia (mm)= 8.06 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.38

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.50	1.583	8.60	3.083	8.10	4.58	4.40
0.167	3.50	1.667	8.60	3.167	8.10	4.67	4.40
0.250	3.50	1.750	8.60	3.250	8.10	4.75	4.40
0.333	3.50	1.833	8.60	3.333	8.10	4.83	4.40
0.417	3.50	1.917	8.60	3.417	8.10	4.92	4.40
0.500	3.50	2.000	8.60	3.500	8.10	5.00	4.40
0.583	3.50	2.083	50.20	3.583	8.10	5.08	3.10
0.667	3.50	2.167	50.20	3.667	8.10	5.17	3.10
0.750	3.50	2.250	50.20	3.750	8.10	5.25	3.10
0.833	3.50	2.333	50.20	3.833	8.10	5.33	3.10
0.917	3.50	2.417	50.20	3.917	8.10	5.42	3.10
1.000	3.50	2.500	50.20	4.000	8.10	5.50	3.10
1.083	8.60	2.583	50.20	4.083	4.40	5.58	3.10
1.167	8.60	2.667	50.20	4.167	4.40	5.67	3.10
1.250	8.60	2.750	50.20	4.250	4.40	5.75	3.10
1.333	8.60	2.833	50.20	4.333	4.40	5.83	3.10
1.417	8.60	2.917	50.20	4.417	4.40	5.92	3.10
1.500	8.60	3.000	50.20	4.500	4.40	6.00	3.10

Unit Hyd Qpeak (cms)= 0.281

PEAK FLOW (cms)= 0.129 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 24.371
TOTAL RAINFALL (mm)= 77.900
RUNOFF COEFFICIENT = 0.313

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB | STANDHYD (0201)| Area (ha)= 2.80
|ID= 1 DT= 5.0 min | Total Imp(%)= 58.00 Dir. Conn.(%)= 41.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.62	1.18
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.50
Length (m)=	136.63	200.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.50	1.583	8.60	3.083	8.10	4.58	4.40
0.167	3.50	1.667	8.60	3.167	8.10	4.67	4.40
0.250	3.50	1.750	8.60	3.250	8.10	4.75	4.40
0.333	3.50	1.833	8.60	3.333	8.10	4.83	4.40
0.417	3.50	1.917	8.60	3.417	8.10	4.92	4.40
0.500	3.50	2.000	8.60	3.500	8.10	5.00	4.40
0.583	3.50	2.083	50.20	3.583	8.10	5.08	3.10
0.667	3.50	2.167	50.20	3.667	8.10	5.17	3.10
0.750	3.50	2.250	50.20	3.750	8.10	5.25	3.10
0.833	3.50	2.333	50.20	3.833	8.10	5.33	3.10
0.917	3.50	2.417	50.20	3.917	8.10	5.42	3.10
1.000	3.50	2.500	50.20	4.000	8.10	5.50	3.10
1.083	8.60	2.583	50.20	4.083	4.40	5.58	3.10
1.167	8.60	2.667	50.20	4.167	4.40	5.67	3.10
1.250	8.60	2.750	50.20	4.250	4.40	5.75	3.10
1.333	8.60	2.833	50.20	4.333	4.40	5.83	3.10
1.417	8.60	2.917	50.20	4.417	4.40	5.92	3.10
1.500	8.60	3.000	50.20	4.500	4.40	6.00	3.10

			TOTALS
Max.Eff.Inten.(mm/hr)=	50.20	42.59	
over (min)	5.00	30.00	
Storage Coeff. (min)=	4.06 (ii)	28.45 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.24	0.04	
PEAK FLOW (cms)=	0.16	0.10	0.248 (iii)
TIME TO PEAK (hrs)=	2.92	3.17	3.00
RUNOFF VOLUME (mm)=	76.90	35.52	52.48
TOTAL RAINFALL (mm)=	77.90	77.90	77.90
RUNOFF COEFFICIENT =	0.99	0.46	0.67

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 69.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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       V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\JBirchard\AppData\Local\Civica\VH5\61a63be6-f99f-432d-9680-61b7e1a3c1f0\881d6c60-581e-42dc-b81e-cffe587cae3f\sc
Summary filename:
C:\Users\JBirchard\AppData\Local\Civica\VH5\61a63be6-f99f-432d-9680-61b7e1a3c1f0\881d6c60-581e-42dc-b81e-cffe587cae3f\sc

DATE: 10/22/2023 TIME: 06:55:34

USER:

COMMENTS: _____

** SIMULATION : F: 50 yr 6 hr chc **

READ STORM	Filename: C:\Users\JBirchard\AppData\Local\Temp\d9ebf607-180b-4fc6-906f-05dd67f7c3ce\548a4bf6
Ptotal= 83.90 mm	Comments: 50yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.80	2.00	53.80	4.00	4.80		
1.00	9.30	3.00	8.70	5.00	3.50		

CALIB	
NASHYD (0202)	Area (ha)= 2.80 Curve Number (CN)= 66.1
ID= 1 DT= 5.0 min	Ia (mm)= 8.06 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.38

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.80	1.583	9.30	3.083	8.70	4.58	4.80
0.167	3.80	1.667	9.30	3.167	8.70	4.67	4.80
0.250	3.80	1.750	9.30	3.250	8.70	4.75	4.80
0.333	3.80	1.833	9.30	3.333	8.70	4.83	4.80
0.417	3.80	1.917	9.30	3.417	8.70	4.92	4.80
0.500	3.80	2.000	9.30	3.500	8.70	5.00	4.80
0.583	3.80	2.083	53.80	3.583	8.70	5.08	3.50
0.667	3.80	2.167	53.80	3.667	8.70	5.17	3.50
0.750	3.80	2.250	53.80	3.750	8.70	5.25	3.50
0.833	3.80	2.333	53.80	3.833	8.70	5.33	3.50
0.917	3.80	2.417	53.80	3.917	8.70	5.42	3.50
1.000	3.80	2.500	53.80	4.000	8.70	5.50	3.50
1.083	9.30	2.583	53.80	4.083	4.80	5.58	3.50
1.167	9.30	2.667	53.80	4.167	4.80	5.67	3.50
1.250	9.30	2.750	53.80	4.250	4.80	5.75	3.50
1.333	9.30	2.833	53.80	4.333	4.80	5.83	3.50
1.417	9.30	2.917	53.80	4.417	4.80	5.92	3.50
1.500	9.30	3.000	53.80	4.500	4.80	6.00	3.50

Unit Hyd Qpeak (cms)= 0.281

PEAK FLOW (cms)= 0.147 (i)
TIME TO PEAK (hrs)= 3.083
RUNOFF VOLUME (mm)= 27.902
TOTAL RAINFALL (mm)= 83.900
RUNOFF COEFFICIENT = 0.333

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   2.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  41.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.62         1.18
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.50
     Length            (m)=     136.63       200.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    3.80 | 1.583    9.30 | 3.083    8.70 |  4.58    4.80
              0.167    3.80 | 1.667    9.30 | 3.167    8.70 |  4.67    4.80
              0.250    3.80 | 1.750    9.30 | 3.250    8.70 |  4.75    4.80
              0.333    3.80 | 1.833    9.30 | 3.333    8.70 |  4.83    4.80
              0.417    3.80 | 1.917    9.30 | 3.417    8.70 |  4.92    4.80
              0.500    3.80 | 2.000    9.30 | 3.500    8.70 |  5.00    4.80
              0.583    3.80 | 2.083   53.80 | 3.583    8.70 |  5.08    3.50
              0.667    3.80 | 2.167   53.80 | 3.667    8.70 |  5.17    3.50
              0.750    3.80 | 2.250   53.80 | 3.750    8.70 |  5.25    3.50
              0.833    3.80 | 2.333   53.80 | 3.833    8.70 |  5.33    3.50
              0.917    3.80 | 2.417   53.80 | 3.917    8.70 |  5.42    3.50
              1.000    3.80 | 2.500   53.80 | 4.000    8.70 |  5.50    3.50
              1.083    9.30 | 2.583   53.80 | 4.083    4.80 |  5.58    3.50
              1.167    9.30 | 2.667   53.80 | 4.167    4.80 |  5.67    3.50
              1.250    9.30 | 2.750   53.80 | 4.250    4.80 |  5.75    3.50
              1.333    9.30 | 2.833   53.80 | 4.333    4.80 |  5.83    3.50
              1.417    9.30 | 2.917   53.80 | 4.417    4.80 |  5.92    3.50
              1.500    9.30 | 3.000   53.80 | 4.500    4.80 |  6.00    3.50

     Max.Eff.Inten.(mm/hr)=      53.80        47.34
               over (min)        5.00        30.00
     Storage Coeff.  (min)=       3.95 (ii)   27.33 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=       0.24         0.04
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.17         0.11         0.272 (iii)
     TIME TO PEAK    (hrs)=       2.92         3.17          3.00
     RUNOFF VOLUME    (mm)=      82.90        39.95         57.55
     TOTAL RAINFALL   (mm)=      83.90        83.90         83.90
     RUNOFF COEFFICIENT   =       0.99         0.48          0.69

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  69.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\JBirchard\AppData\Local\Civica\VH5\61a63be6-f99f-432d-9680-61b7e1a3c1f0\429
5c6ce-f6eb-4b78-ac2a-7ad5b37f7ad5\sc
  Summary filename:
C:\Users\JBirchard\AppData\Local\Civica\VH5\61a63be6-f99f-432d-9680-61b7e1a3c1f0\429
5c6ce-f6eb-4b78-ac2a-7ad5b37f7ad5\sc


DATE: 10/22/2023                          TIME: 06:55:33

USER:



COMMENTS: _____________________________________________________________


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  ************************************************
  ** SIMULATION : G: 100 yr 6 hr chc            **
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|    READ STORM    |    Filename: C:\Users\JBirchard\AppD
|                  |              ata\Local\Temp\
|                  |              d9ebf607-180b-4fc6-906f-05dd67f7c3ce\a2326edd
| Ptotal= 96.00 mm |    Comments: 100yr
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    4.40 |  2.00   61.30 |  4.00    5.50 |
                1.00   10.80 |  3.00   10.10 |  5.00    3.90 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| NASHYD   (  0202)|   Area    (ha)=   2.80   Curve Number   (CN)= 66.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.06   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.38

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.40 | 1.583   10.80 | 3.083   10.10 |  4.58    5.50
               0.167    4.40 | 1.667   10.80 | 3.167   10.10 |  4.67    5.50
               0.250    4.40 | 1.750   10.80 | 3.250   10.10 |  4.75    5.50
               0.333    4.40 | 1.833   10.80 | 3.333   10.10 |  4.83    5.50
               0.417    4.40 | 1.917   10.80 | 3.417   10.10 |  4.92    5.50
               0.500    4.40 | 2.000   10.80 | 3.500   10.10 |  5.00    5.50
               0.583    4.40 | 2.083   61.30 | 3.583   10.10 |  5.08    3.90
               0.667    4.40 | 2.167   61.30 | 3.667   10.10 |  5.17    3.90
               0.750    4.40 | 2.250   61.30 | 3.750   10.10 |  5.25    3.90
               0.833    4.40 | 2.333   61.30 | 3.833   10.10 |  5.33    3.90
               0.917    4.40 | 2.417   61.30 | 3.917   10.10 |  5.42    3.90
               1.000    4.40 | 2.500   61.30 | 4.000   10.10 |  5.50    3.90
               1.083   10.80 | 2.583   61.30 | 4.083    5.50 |  5.58    3.90
               1.167   10.80 | 2.667   61.30 | 4.167    5.50 |  5.67    3.90
               1.250   10.80 | 2.750   61.30 | 4.250    5.50 |  5.75    3.90
               1.333   10.80 | 2.833   61.30 | 4.333    5.50 |  5.83    3.90
               1.417   10.80 | 2.917   61.30 | 4.417    5.50 |  5.92    3.90
               1.500   10.80 | 3.000   61.30 | 4.500    5.50 |  6.00    3.90

    Unit Hyd Qpeak  (cms)=   0.281

    PEAK FLOW       (cms)=   0.186 (i)
    TIME TO PEAK    (hrs)=   3.083
    RUNOFF VOLUME    (mm)=  35.435
    TOTAL RAINFALL   (mm)=  96.000
    RUNOFF COEFFICIENT   =   0.369

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   2.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  41.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       1.62         1.18
    Dep. Storage     (mm)=       1.00         5.00
    Average Slope     (%)=       1.00         2.50
    Length            (m)=     136.63       200.00
    Mannings n           =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.40 | 1.583   10.80 | 3.083   10.10 |  4.58    5.50
               0.167    4.40 | 1.667   10.80 | 3.167   10.10 |  4.67    5.50
               0.250    4.40 | 1.750   10.80 | 3.250   10.10 |  4.75    5.50
               0.333    4.40 | 1.833   10.80 | 3.333   10.10 |  4.83    5.50
               0.417    4.40 | 1.917   10.80 | 3.417   10.10 |  4.92    5.50
               0.500    4.40 | 2.000   10.80 | 3.500   10.10 |  5.00    5.50
               0.583    4.40 | 2.083   61.30 | 3.583   10.10 |  5.08    3.90
               0.667    4.40 | 2.167   61.30 | 3.667   10.10 |  5.17    3.90
               0.750    4.40 | 2.250   61.30 | 3.750   10.10 |  5.25    3.90
               0.833    4.40 | 2.333   61.30 | 3.833   10.10 |  5.33    3.90
               0.917    4.40 | 2.417   61.30 | 3.917   10.10 |  5.42    3.90
               1.000    4.40 | 2.500   61.30 | 4.000   10.10 |  5.50    3.90
               1.083   10.80 | 2.583   61.30 | 4.083    5.50 |  5.58    3.90
               1.167   10.80 | 2.667   61.30 | 4.167    5.50 |  5.67    3.90
               1.250   10.80 | 2.750   61.30 | 4.250    5.50 |  5.75    3.90
               1.333   10.80 | 2.833   61.30 | 4.333    5.50 |  5.83    3.90
               1.417   10.80 | 2.917   61.30 | 4.417    5.50 |  5.92    3.90
               1.500   10.80 | 3.000   61.30 | 4.500    5.50 |  6.00    3.90

    Max.Eff.Inten.(mm/hr)=      61.30        57.46
              over (min)        5.00        30.00
    Storage Coeff.  (min)=      3.75 (ii)   25.39 (ii)
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```
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=       0.25         0.04
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.20         0.14          0.324 (iii)
     TIME TO PEAK    (hrs)=       2.92         3.17           3.00
     RUNOFF VOLUME    (mm)=      95.00        49.20          67.97
     TOTAL RAINFALL   (mm)=      96.00        96.00          96.00
     RUNOFF COEFFICIENT   =       0.99         0.51           0.71

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  69.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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       V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\JBirchard\AppData\Local\Civica\VH5\61a63be6-f99f-432d-9680-61b7e1a3c1f0\efc
9426b-2e76-4227-ac3d-0ac935b1eb9d\sc
  Summary filename:
C:\Users\JBirchard\AppData\Local\Civica\VH5\61a63be6-f99f-432d-9680-61b7e1a3c1f0\efc
9426b-2e76-4227-ac3d-0ac935b1eb9d\sc

DATE: 10/22/2023                          TIME: 06:55:34

USER:


COMMENTS: _____________________________________________________

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  ***********************************************
  ** SIMULATION : H: Timmins                   **
  ***********************************************


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|    READ STORM    |    Filename: C:\Users\JBirchard\AppD
|                  |              ata\Local\Temp\
|                  |              d9ebf607-180b-4fc6-906f-05dd67f7c3ce\d265808e
| Ptotal=193.00 mm |    Comments: tim
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00   15.00 |  3.00    3.00 |  6.00   43.00 |  9.00   13.00
                1.00   20.00 |  4.00    5.00 |  7.00   20.00 | 10.00   13.00
                2.00   10.00 |  5.00   20.00 |  8.00   23.00 | 11.00    8.00

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--------------------
| CALIB            |
| NASHYD   (  0202)|   Area    (ha)=   2.80   Curve Number   (CN)= 66.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.06   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.38

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083   15.00 | 3.083    3.00 | 6.083   43.00 |  9.08   13.00
               0.167   15.00 | 3.167    3.00 | 6.167   43.00 |  9.17   13.00
               0.250   15.00 | 3.250    3.00 | 6.250   43.00 |  9.25   13.00
               0.333   15.00 | 3.333    3.00 | 6.333   43.00 |  9.33   13.00
               0.417   15.00 | 3.417    3.00 | 6.417   43.00 |  9.42   13.00
               0.500   15.00 | 3.500    3.00 | 6.500   43.00 |  9.50   13.00
               0.583   15.00 | 3.583    3.00 | 6.583   43.00 |  9.58   13.00
               0.667   15.00 | 3.667    3.00 | 6.667   43.00 |  9.67   13.00
               0.750   15.00 | 3.750    3.00 | 6.750   43.00 |  9.75   13.00
```

0.833	15.00	3.833	3.00	6.833	43.00	9.83	13.00
0.917	15.00	3.917	3.00	6.917	43.00	9.92	13.00
1.000	15.00	4.000	3.00	7.000	43.00	10.00	13.00
1.083	20.00	4.083	5.00	7.083	20.00	10.08	13.00
1.167	20.00	4.167	5.00	7.167	20.00	10.17	13.00
1.250	20.00	4.250	5.00	7.250	20.00	10.25	13.00
1.333	20.00	4.333	5.00	7.333	20.00	10.33	13.00
1.417	20.00	4.417	5.00	7.417	20.00	10.42	13.00
1.500	20.00	4.500	5.00	7.500	20.00	10.50	13.00
1.583	20.00	4.583	5.00	7.583	20.00	10.58	13.00
1.667	20.00	4.667	5.00	7.667	20.00	10.67	13.00
1.750	20.00	4.750	5.00	7.750	20.00	10.75	13.00
1.833	20.00	4.833	5.00	7.833	20.00	10.83	13.00
1.917	20.00	4.917	5.00	7.917	20.00	10.92	13.00
2.000	20.00	5.000	5.00	8.000	20.00	11.00	13.00
2.083	10.00	5.083	20.00	8.083	23.00	11.08	8.00
2.167	10.00	5.167	20.00	8.167	23.00	11.17	8.00
2.250	10.00	5.250	20.00	8.250	23.00	11.25	8.00
2.333	10.00	5.333	20.00	8.333	23.00	11.33	8.00
2.417	10.00	5.417	20.00	8.417	23.00	11.42	8.00
2.500	10.00	5.500	20.00	8.500	23.00	11.50	8.00
2.583	10.00	5.583	20.00	8.583	23.00	11.58	8.00
2.667	10.00	5.667	20.00	8.667	23.00	11.67	8.00
2.750	10.00	5.750	20.00	8.750	23.00	11.75	8.00
2.833	10.00	5.833	20.00	8.833	23.00	11.83	8.00
2.917	10.00	5.917	20.00	8.917	23.00	11.92	8.00
3.000	10.00	6.000	20.00	9.000	23.00	12.00	8.00

Unit Hyd Qpeak (cms)= 0.281

PEAK FLOW (cms)= 0.206 (i)
TIME TO PEAK (hrs)= 7.083
RUNOFF VOLUME (mm)= 108.492
TOTAL RAINFALL (mm)= 193.000
RUNOFF COEFFICIENT = 0.562

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0201)	Area (ha)= 2.80
ID= 1 DT= 5.0 min	Total Imp(%)= 58.00 Dir. Conn.(%)= 41.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.62	1.18
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.50
Length	(m)=	136.63	200.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	15.00	3.083	3.00	6.083	43.00	9.08	13.00
0.167	15.00	3.167	3.00	6.167	43.00	9.17	13.00
0.250	15.00	3.250	3.00	6.250	43.00	9.25	13.00
0.333	15.00	3.333	3.00	6.333	43.00	9.33	13.00
0.417	15.00	3.417	3.00	6.417	43.00	9.42	13.00
0.500	15.00	3.500	3.00	6.500	43.00	9.50	13.00
0.583	15.00	3.583	3.00	6.583	43.00	9.58	13.00
0.667	15.00	3.667	3.00	6.667	43.00	9.67	13.00
0.750	15.00	3.750	3.00	6.750	43.00	9.75	13.00
0.833	15.00	3.833	3.00	6.833	43.00	9.83	13.00
0.917	15.00	3.917	3.00	6.917	43.00	9.92	13.00
1.000	15.00	4.000	3.00	7.000	43.00	10.00	13.00
1.083	20.00	4.083	5.00	7.083	20.00	10.08	13.00
1.167	20.00	4.167	5.00	7.167	20.00	10.17	13.00
1.250	20.00	4.250	5.00	7.250	20.00	10.25	13.00
1.333	20.00	4.333	5.00	7.333	20.00	10.33	13.00
1.417	20.00	4.417	5.00	7.417	20.00	10.42	13.00
1.500	20.00	4.500	5.00	7.500	20.00	10.50	13.00
1.583	20.00	4.583	5.00	7.583	20.00	10.58	13.00
1.667	20.00	4.667	5.00	7.667	20.00	10.67	13.00
1.750	20.00	4.750	5.00	7.750	20.00	10.75	13.00
1.833	20.00	4.833	5.00	7.833	20.00	10.83	13.00
1.917	20.00	4.917	5.00	7.917	20.00	10.92	13.00
2.000	20.00	5.000	5.00	8.000	20.00	11.00	13.00
2.083	10.00	5.083	20.00	8.083	23.00	11.08	8.00
2.167	10.00	5.167	20.00	8.167	23.00	11.17	8.00
2.250	10.00	5.250	20.00	8.250	23.00	11.25	8.00
2.333	10.00	5.333	20.00	8.333	23.00	11.33	8.00
2.417	10.00	5.417	20.00	8.417	23.00	11.42	8.00
2.500	10.00	5.500	20.00	8.500	23.00	11.50	8.00
2.583	10.00	5.583	20.00	8.583	23.00	11.58	8.00
2.667	10.00	5.667	20.00	8.667	23.00	11.67	8.00
2.750	10.00	5.750	20.00	8.750	23.00	11.75	8.00
2.833	10.00	5.833	20.00	8.833	23.00	11.83	8.00
2.917	10.00	5.917	20.00	8.917	23.00	11.92	8.00
3.000	10.00	6.000	20.00	9.000	23.00	12.00	8.00

			TOTALS
Max.Eff.Inten.(mm/hr)=	43.00	48.69	
over (min)	5.00	30.00	
Storage Coeff. (min)=	4.32 (ii)	27.44 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.23	0.04	

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     PEAK FLOW       (cms)=       0.14         0.14          0.271 (iii)
     TIME TO PEAK    (hrs)=       6.92         7.17           7.00
     RUNOFF VOLUME    (mm)=     192.00       132.59         156.94
     TOTAL RAINFALL   (mm)=     193.00       193.00         193.00
     RUNOFF COEFFICIENT   =       0.99         0.69           0.81

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  69.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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Appendix B:
Stormwater Conveyance

TATHAM ENGINEERING

Storm Sewer Design Sheet

Version Number: 1 **Version Date:** October 23, 2023

Project Information

372 Grey Road 21	121088

Drawing Reference

SS01 - Site Servicing Plan	October 23/23

Prepared By

John Birchard	October 23/23

Reviewed By

John Gore	October 23/23

Municipality

Town of The Blue Mountains

Runoff Coefficient Adjustment

Year	A	B
10	0.80	0.20
25	0.70	0.30
50	0.60	0.40
100	0.50	0.50

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.009

Time of Concentration

15 mins

IDF Curve Coefficients

Year	A	B	C
2	807.44	6.75	0.83
5	1135.40	7.50	0.84
10	1387.00	7.97	0.85
25	1676.20	8.30	0.86
50	1973.10	9.00	0.87
100	2193.10	9.04	0.87

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area x Runoff Coefficient	Cumulative Area (ha)	Cumulative Area x Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)	Total Time of Travel (min)
	107	STMMH7	STMMH8	0.33	0.62	5	0.62	0.20	0.33	0.20	15.00	82.79	0.047	0.013	37.0	0.5%	300	0.97	0.068	0.97	0.64	261	68.8%	15.64
	-	STMMH8	STMMH9	0.00	0.62	5	0.62	0.00	0.33	0.21	15.64	80.86	0.046	0.013	24.3	0.5%	300	0.97	0.068	0.97	0.42	259	67.4%	16.06
	106	STMMH6	STMMH5	0.32	0.62	5	0.62	0.20	0.32	0.20	15.00	82.79	0.046	0.013	31.5	1.0%	300	1.37	0.097	1.26	0.42	226	47.2%	15.42
	-	STMMH5	STMMH3	0.00	0.62	5	0.62	0.00	0.32	0.20	15.42	81.52	0.045	0.013	39.6	1.0%	300	1.37	0.097	1.25	0.53	225	46.5%	15.94
	105	STMMH10	STMMH9	0.23	0.62	5	0.62	0.14	0.23	0.14	15.00	82.79	0.033	0.013	38.2	0.5%	300	0.97	0.068	0.89	0.71	228	48.0%	15.71
	104	STMMH9	STMMH4	0.42	0.62	5	0.62	0.26	0.98	0.61	16.06	79.65	0.135	0.013	60.6	0.5%	450	1.27	0.202	1.27	0.80	387	66.8%	16.85
	103	STMMH4	STMMH3	0.29	0.62	5	0.62	0.18	1.27	0.79	16.85	77.46	0.170	0.013	40.2	0.5%	450	1.27	0.202	1.27	0.53	422	84.1%	17.38
	102	STMMH3	STMMH2	0.52	0.62	5	0.62	0.32	2.11	1.31	15.94	79.98	0.291	0.013	41.7	0.5%	525	1.40	0.304	1.40	0.49	516	95.6%	16.44
	-	STMMH2	STMMH1	0.00	0.62	5	0.62	0.00	2.11	1.31	16.44	78.59	0.286	0.013	44.8	0.5%	525	1.40	0.304	1.40	0.53	513	94.0%	16.97
	101	STMMH1	HW1	0.35	0.62	5	0.62	0.22	2.46	1.53	16.97	77.15	0.327	0.013	26.8	0.5%	600	1.54	0.434	1.54	0.29	539	75.3%	17.26

1. Insert Note
2. Insert Note
3. Insert Note
4. Insert Note
5. Insert Note

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Oct 13 2023

ROW (1:100-Year Peak Flow)

User-defined

Invert Elev (m)	= 200.0000
Slope (%)	= 1.0000
N-Value	= 0.016

Calculations

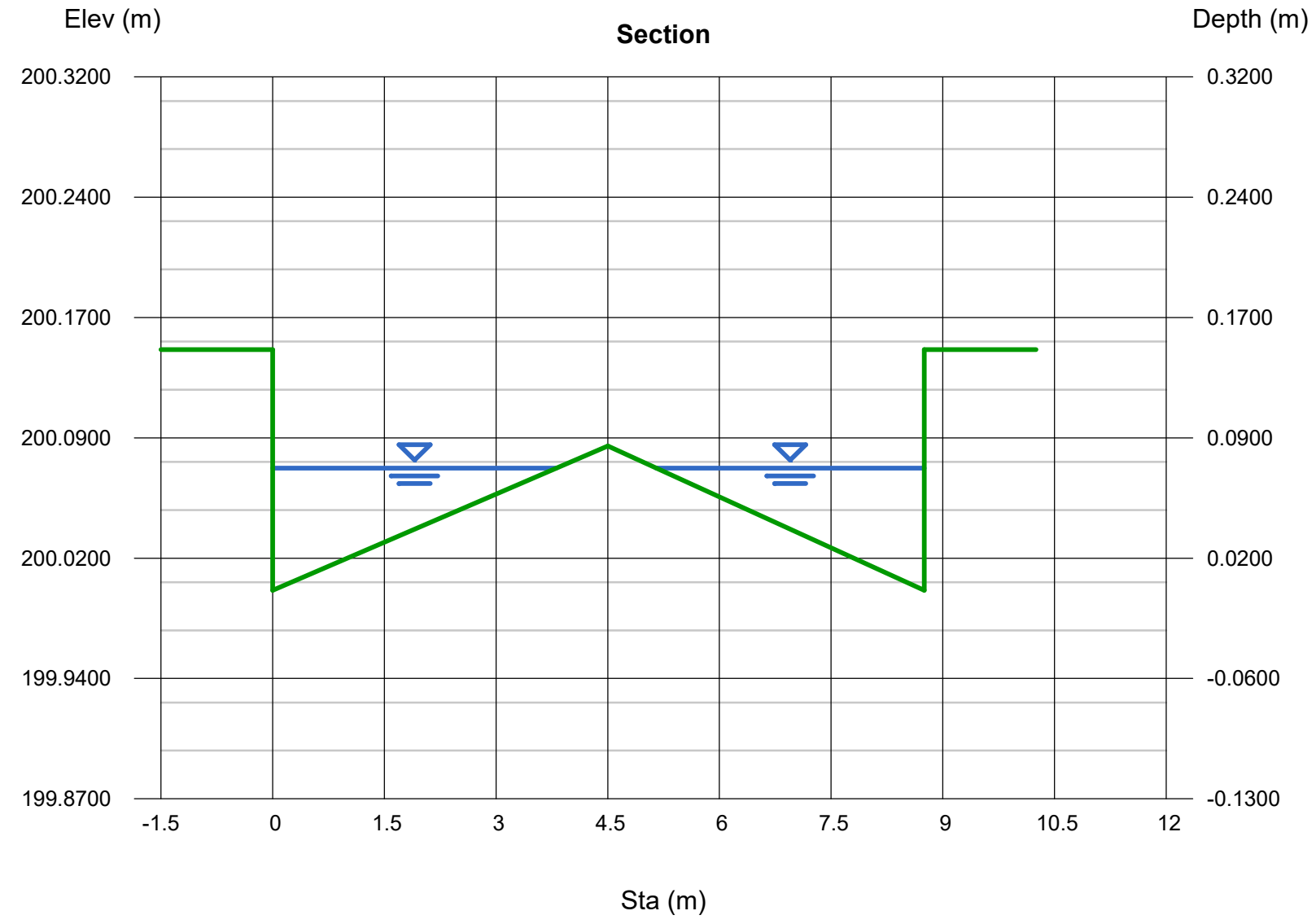
Compute by:	Known Q
Known Q (cms)	= 0.1950

Highlighted

Depth (m)	= 0.0762
Q (cms)	= 0.195
Area (sqm)	= 0.2822
Velocity (m/s)	= 0.6909
Wetted Perim (m)	= 7.5620
Crit Depth, Yc (m)	= 0.0823
Top Width (m)	= 7.4080
EGL (m)	= 0.1005

(Sta, El, n)-(Sta, El, n)...

(0.0000, 200.1500)-(4.5000, 200.0900, 0.016)-(8.7500, 200.0000, 0.016)-(8.7500, 200.1500, 0.016)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Dec 1 2023

Park Block Swale

Trapezoidal

Bottom Width (m)	= 2.0000
Side Slopes (z:1)	= 3.0000, 3.0000
Total Depth (m)	= 1.0000
Invert Elev (m)	= 181.2500
Slope (%)	= 0.2500
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cms)	= 2.2000

Highlighted

Depth (m)	= 0.6736
Q (cms)	= 2.2000
Area (sqm)	= 2.7085
Velocity (m/s)	= 0.8123
Wetted Perim (m)	= 6.2603
Crit Depth, Yc (m)	= 0.4054
Top Width (m)	= 6.0416
EGL (m)	= 0.7073