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Hidden Ridge Subdivision - Phase 2

FUNCTIONAL SERVICING AND PRELIMINARY STORMWATER MANAGEMENT REPORT

EcoVue Consulting Services Inc.

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1 Introduction

Tatham Engineering Limited (Tatham) has been retained by EcoVue Consulting Services Inc. to prepare a Functional Servicing and Preliminary Stormwater Management (SWM) Report in support of a Draft Plan of Subdivision for a sixteen-lot rural residential development located in the Township of Uxbridge. The proposed development represents Phase 2 of the Hidden Ridge Subdivision. A stand-alone Functional Servicing and SWM report was submitted to the Township of Uxbridge, Regional Municipality of Durham and the Lake Simcoe Region Conservation Authority in May 2017, December 2019 and July 2020, in support of a Draft Plan of Subdivision for Phase 1 consisting of seven rural residential lots. The Phase 1 submission is currently under review by the municipality and review agencies.

1.1 SITE DESCRIPTION

The Phase 2 Draft Plan of Subdivision is proposed for land which was previously occupied by the Hidden Ridge Golf Course. The total property is approximately 38.0 ha, however approximately 22.0 ha is located within the Zephyr-Egypt Provincially Significant Wetland Complex (PSW). Development cannot occur within 30m of the PSW. Accordingly, the developable portion of the site, excluding the Phase 1 area is approximately 11.6 ha. This area is herein referred to as the site. The site consists of a mix of lawn and grass/scrub land. Sparse trees and man-made ponds which are remnants of the golf course are scattered throughout the site. The site is legally described as Part of Lots 24 & 25, Concession 3 Township of Uxbridge (Geographic Township of Scott), Regional Municipality of Durham. The site is bounded by the Phase 1 Subdivision land to the north, existing residential dwellings fronting onto Concession Road 3 to the west and forested area and the Zephyr-Egypt PSW to the south and east. The Draft Plan of Subdivision, prepared by EcoVue Consulting Services Inc. dated November 17, 2017 is attached.

A Key Plan illustrating the site location is shown on the Phase 2 Preliminary Grading and Servicing Plan (Drawing GS-1) included at the back of this report.

1.2 OBJECTIVES

The primary objectives of this report are to assess the feasibility of the proposed development with respect to servicing and stormwater management (SWM) and to ensure satisfactory information on these items is presented in support of the proposed Draft Plan of Subdivision. This will involve an evaluation of potable water supply, sanitary sewage treatment and disposal and drainage and SWM. Opportunities and constraints will be evaluated, and a preferred plan recommended.

1.3 GUIDELINES AND BACKGROUND REPORTS

This report was prepared recognizing provincial guidelines on water resources and the environment, and studies including the following publications:

- Township of Uxbridge Design Criteria and Standard Detail Drawings for Subdivision Developments and Site Plans (2016);
- LSRCA Technical Guidelines for Stormwater Management Submissions (LSRCA, September 1, 2016);
- Low Impact Development Stormwater Management Planning and Design Guide (CVC and TRCA, 2010);
- Lake Simcoe Protection Plan (MECP 2009);
- Erosion and Sediment Control Guideline for Urban Construction (GGHACA, 2006);
- The Ministry of Environment Stormwater Management Practices Planning and Design Manual (2003); and
- Ontario Ministry of the Environment Procedure D-5-4, Technical Guideline for Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment.

1.4 PROPOSED DEVELOPMENT SUMMARY

The proposed development consists of sixteen rural residential lots located in the Hamlet of Zephyr, Township of Uxbridge.

Potable water will be drawn from individual wells located on each lot.

Wastewater will be collected and treated via individual septic systems on each lot.

Both wells and septic systems will be developed by individual lot owners and will be approved through the building permit process.

2 Background Information

Information regarding the existing topography, ground cover and drainage patterns was obtained through a review of relevant background studies, detailed topographic survey and base mapping and was confirmed during site visits.

2.1 TOPOGRAPHY AND EXISTING DRAINAGE CONDITIONS

The site is located in the upper headwaters of Zephyr Creek. A detailed topographic survey was completed by A.R (Sandy) Wakeling in August 2016. The survey indicates surface runoff from the majority of the site sheet flows across the site from west to east discharging into the Zephyr-Egypt PSW located along the west bank of the main branch of Zephyr Creek, with grades ranging between 2 and 11%.

Existing drainage patterns are depicted on the appended Existing Condition Drainage Plan (Drawing DP-1).

2.2 HYDROGEOLOGICAL INVESTIGATION

Subsurface soil investigations were completed by Cambium Inc. on August 3, 2017 and documented in their report dated November 16, 2018.

The investigation included a subsurface exploration program by means of excavating 13 test pits across the site to depths ranging from 1.5 to 2.1 metres below ground surface (mBGS). The test pits were systematically logged, and representative soil samples were collected for laboratory analysis.

The hydrogeological assessment also included the installation of three (3) test wells between June 14 and June 20, 2018 to characterize on-site groundwater resources, determine the impact of water withdrawal on surrounding groundwater users and assess the potability of the supply aquifer.

The groundwater level upon installation ranged from 6.3 meters below ground to 2.4 m above ground. Wells which recorded water levels above ground, due to the pressure head in the deep confined aquifer, were equipped with a 0.038m diameter PVC pipe which extended upwards from the steel well casing to allow groundwater pressure to stabilize.

A shallow overburden aquifer exists in the area as confirmed by the water well records for the dug wells located in close proximity to the site. The shallow aquifer is interpreted to be perched on top of the confining layer. It is assumed that in the areas near the PSW, the shallow overburden and the PSW were hydraulically connected.

Well records within 500 m of the property boundary were examined to assess the groundwater level fluctuations in the vicinity of the site. 44 records confirmed the installation of drilled wells and 13 records confirmed the installation of dug wells, 3 records confirmed the installation of monitoring wells and 10 records confirmed either a well abandonment or upgrade.

The drilled wells were installed to an average depth of 26.9 mBGS and groundwater was found at an average depth of 26.1 mBGS. The static water levels of the drilled wells were recorded to be on average 4.7 mBGS. The dug wells were installed to an average depth of 8.1 mBGS and groundwater was found at an average depth of 5.4 mBGS. The static water levels of the dug wells were recorded to be on average 3.2 mBGS.

Soil conditions were found to be generally uniform across the site. The depth of the topsoil ranged from 0 to 0.4 mBGS. Underlying the topsoil is a light brown to brown, sand and silt, some clay, some gravel and trace cobbles. Three (3) test pits reported water entering the excavation and one (1) test pit exhibited saturated cave-in conditions upon completion. The remainder of the test pits were open and dry upon completion.

Cambium Inc. completed a scoped Soil Characterization report to characterize the type of soil in the locations of the proposed road ditches that are expected to exceed 3.5% (Phases 1 and 2) and to assess the potential for erosion. One sample taken in the vicinity of the future east cul-de-sac was reported as having high potential for soil erodibility. A maximum ditch slope of 3.5 % is therefore recommended at this location. All other samples revealed medium soil erodibility and therefore ditch slopes up to 5.0% can be specified.

Additional details are available in the Cambium Inc. reports which are included on the USB at the back of this report.

Additional monitoring of the shallow overburden aquifer is recommended to confirm the proposed road ditches (including any infiltration/filtration practices within the road ditches) and overall site grading will not negatively impact existing well users or the downstream PSW.

3 Grading

Existing drainage patterns will be maintained to the extent possible. A rural road cross section having a maximum slope of 5.0 % is proposed. 0.5m high earth berms within the 0.5 m wide enhanced flat-bottom road ditches are specified on either side of the road wherever the ditch slope is greater than 3.5% to reduce velocities and promote filtering of runoff as part of an overall treatment train approach to SWM. The enhanced road ditches are also proposed to be lined with Nilex SC250 turf reinforcement.

The site will be graded to direct runoff to the road ditches via individual lot grading and side/rear lot swales. The road ditches will direct runoff from the site to a proposed SWM pond which will discharge into the PSW located west of the main branch of Zephyr Creek.

Runoff from a portion of the site will drain to a ditch located within a drainage easement. The drainage easement ditch extends from the road, along the shared property line between lots 15 and 16 and along the back of lots 15 and 12 eventually discharging into the SWM pond. The drainage easement will consist of a 1.2 m wide enhanced flat-bottomed grassed ditch and a 3.0 m wide maintenance access/walking trail.

Preliminary road and ditch elevations are shown on Drawing GS-1 attached at the back of this report.

4 Servicing

Since municipal services are not available to service the site, and because the proposed sixteen lots are of sufficient size, each dwelling will be serviced by an individual private well and septic system. The proposed wells, septic systems and lot grading will be developed by individual lot owners in conjunction with their specific site development and will be approved through the building permit process. The drilled wells and septic systems will be privately owned, operated, and maintained. Individual water treatment systems in compliance with Ontario Regulation 170 are required to treat raw well water. Septic systems are required to be in accordance with Part 8 of the Ontario Building Code.

The report prepared by Cambium provides an account of the observed hydrogeological conditions related to water supply and sewage treatment. Details of the serviceability of the proposed lots, as it relates to potable water supply and sewage treatment based on the above report, are summarized as follows:

- Pumping tests completed at three test wells on the site were shown to provide a peak water supply greater than the calculated daily water withdrawal rate as determined based on the MECP Procedure D-5-5 for sufficient quantity of drinking water for residential use;
- The water quality reported from each pumping well was relatively similar. Each well reported similar exceedances of the ODWQS criteria, most of which were for non-health related parameters. The only ODWQS exceedance of a health-related parameter was for total coliform at well PW3. The presence of total coliform at well PW3 should be confirmed as coliforms are typically not present in deep, confined aquifer systems; as such it is recommended that this well be disinfected and re-sampled;
- The nitrate loading calculations indicate that the maximum number of lots that can be developed within Phase 2 while maintaining the concentration of nitrate at the boundary of the site less than 10mg/L is 23. On this basis, the proposed development of 16 lots is feasible; and
- A water balance was conducted to confirm if the proposed development will influence the PSW, however the proposed condition calculations had to be revised to match the latest Draft Plan of Subdivision.

The conceptual septic system footprints, 600 m^2 (prime and reserve) and well locations are shown on Drawing GS-1 attached at the back of this report.

4.1 ROADWAYS AND TRANSPORTATION

A proposed municipal road having a 23.0 m wide right-of-way (Township Standard Dwg. No. US-201) will provide access throughout the proposed subdivision. It is noted that the ditches on either side of the road have been modified slightly to allow for a 0.5 m bottom width as they are intended to provide not only conveyance of runoff but also water quality treatment. A permanent cul-de-sac (modified Township Standard Dwg. No. US-218) has been specified at the east limit of the site and a temporary cul-de-sac (modified Township Standard Dwg. No. US-220) at the south limit of the site.

The proposed road will consist of a 6.7 m wide asphalt surface over a granular sub-base, constructed in accordance with the Township standards, as shown on Drawing GS-1. The minimum Township standard for depth of asphalt and granulars are summarized in Table 1. These will be confirmed by a geotechnical engineer at the detailed design stage.

Table 1: Proposed Road Construction Details

	DEPTH (mm)	TYPE
Hot Mix Asphalt (Surface Course)	45	HL-3
Hot Mix Asphalt (Base Course)	50	HL-8
Granular Base	150	OPSS Granular 'A'
Granular Sub-Base	350	OPSS Granular 'B'

In the future, the road will be assumed by the Township which will undertake routine maintenance and snow plowing.

4.2 UTILITIES

Zephyr Road is currently serviced with overhead hydro on the north side. Hydro One confirmed that hydro is available on Zephyr Road to service the proposed development.

Enbridge was contacted and confirmed there is no gas on Zephyr Road. However, gas is not an essential service and the lack of service will not jeopardize the proposed development.

Bell was contacted but was not able to confirm, as of the date of this report, what communications plant (telephone, cable TV, coaxial cable etc.) is available to service the future development. However, based on the adjacent residential dwellings it is assumed communications plant exists and will be available to service the proposed development. This will be confirmed during the final design stage.

Correspondence from Hydro One and Enbridge is attached in Appendix A.

5 Proposed Drainage Conditions

5.1 DESIGN CRITERIA

Issues to be addressed and criteria to be met regarding drainage and stormwater management on the site are summarized as follows:

- The site will be developed in accordance with Township, Region, LSRCA and MECP guidelines and criteria;
- Post to pre-development peak flow control for all design storms up to and including the 100-year storm;
- MECP "Enhanced" level water quality control, to ensure the development will have no negative impacts on the downstream receivers;
- No net increases in phosphorus loading from the site;
- Maintain pre-development annual infiltration volume in the post-development condition. As discussed with LSRCA staff during the phase 1 design review, runoff control is not practical at the site due to high groundwater and poor soil conditions: and
- Safe conveyance of storm flows from all storms up to and including the Regional (Timmins) Storm event.

5.2 PROPOSED DEVELOPMENT

The proposed development includes sixteen rural residential lots. A slight increase in impervious cover is expected from the road, driveways and rooftops, compared to existing conditions, and is expected to increase the overall runoff volume generated at the site.

The existing condition drainage areas, patterns and outlets will generally be maintained, with the north west portion of the site draining west (Outlet 1) and the rest of the site draining east towards the main branch of Zephyr Creek (Outlet 2). Minor and major flows from the site will drain to the internal road ditches and/or the ditch in the drainage easement and discharge into a proposed wet SWM pond for water quality and quantity control. Side yard swales will intercept runoff from the lots and direct it to the road ditches or drainage easements. The building rooftops will drain to individual soakaway pits located on each lot to promote at-source infiltration.

5.3 EXISTING CONDITION HYDROLOGIC ANALYSIS

A Visual OTTHYMO hydrologic model has been developed to quantify existing condition peak flows from the site.

The catchment delineations were completed based on detailed topographic survey for the site. Land uses were established based on field reconnaissance and review of online aerial photography. The land uses and soil information were used to establish the curve numbers (CN*) and other catchment parameters used in the hydrologic model. The time to peak values for the catchment areas were calculated using the Bransby Williams and Airport Methods for runoff coefficients "C" greater than and less than 0.4 respectively.

A summary of all catchment parameters established for the existing condition hydrologic model have been included in Appendix B.

Peak flows for storms up to and including the 100-year storm event were calculated for the 4-hour Chicago, 12-hour and 24-hour SCS design storms generated using Township of Uxbridge Intensity-Duration-Frequency (IDF) data (dwg. No. US-600) as well as for the Regional (Timmins) storm. Detailed calculations and Visual Otthymo modeling output are included in Appendix B and the results are summarized below in Table 2. The digital hydrologic model files are included on the USB at the back of this report.

Table 2: Existing Conditions Peak Flow Summary

DESIGN STORM	OUTLET 1 CATCHMENT 101 0.5 ha (m^3/s)			CATCHMENT 102 0.3 ha (m^3/s)			CATCHMENT 103 10.8 ha (m^3/s)			OUTLET 2 CATCHMENT 102 + 103 11.1 ha (m^3/s)		
	4 hr CHI	12 hr SCS	24 hr SCS	4 hr CHI	12 hr SCS	24 hr SCS	4 hr CHI	12 hr SCS	24 hr SCS	4 hr CHI	12 hr SCS	24 hr SCS
25 mm	0.003	-	-	0.002	-	-	0.057	-	-	0.058	-	-
2-Year	0.007	0.012	0.014	0.004	0.006	0.007	0.118	0.190	0.219	0.122	0.196	0.225
5-Year	0.015	0.023	0.026	0.008	0.012	0.014	0.240	0.361	0.406	0.247	0.373	0.419
10-Year	0.020	0.031	0.035	0.011	0.016	0.019	0.334	0.489	0.546	0.345	0.504	0.563
25-Year	0.029	0.042	0.046	0.016	0.022	0.024	0.463	0.655	0.713	0.478	0.677	0.737
100-Year	0.047	0.061	0.065	0.025	0.032	0.034	0.756	0.953	1.016	0.781	0.985	1.05
Regional (Timmins)	0.052			0.031			1.070			1.101		

6 Proposed SWM Plan

The preliminary SWM plan has been developed recognizing the SWM requirements for the site. The internal roadways will be constructed to a rural road cross-section standard with all minor and major system drainage from the roadways and the development areas being captured by the roadside ditches. Roads and overall lot grading will be constructed to follow the existing topography of the land as much as possible to maintain the pre-development drainage patterns, while still directing major flows overland to the SWM pond.

The proposed drainage patterns are shown on Drawing DP-2.

An understanding of specific issues, constraints and opportunities pertaining to the site was gained through an analysis of relevant background information.

Opportunities for maximizing the effective use of the control measures are discussed in this section.

6.1 LOT LEVEL SOURCE CONTROLS

Potential lot level control measures include roof leaders directed to grassed areas or soakaway pits. These measures provide both quality and quantity benefits, including infiltration enhancement and provision of peak flow reductions, as well as partial pollutant removal.

The use of lot level controls is recommended for the site and will be considered at the detailed design stage as deemed appropriate.

6.2 CONVEYANCE CONTROLS

Conveyance controls include low-sloped grass swales and pervious pipe systems. These systems can be very effective for reducing runoff volumes, increasing groundwater recharge and improving water quality.

The use of conveyance controls is recommended for the site and will be considered at the detailed design stage as deemed appropriate.

6.3 END OF PIPE CONTROLS

End of pipe facilities are typically wet ponds, dry ponds, or wetlands that control stormwater runoff from an entire development area. These facilities allow stormwater to be retained and released at a rate equal to that of pre-development and can provide effective quality control of storm events. The major negative attributes are that they require significant land area.

A wet SWM pond is proposed as part of the SWM plan for the site.

The detailed design of the SWM pond to service the site should consider the following:

- Sizing of the stormwater quantity control component of the pond must ensure the post development peak runoff rates from the site are reduced at a minimum at or below existing and must be exclusive of the storage needed for the quality control component based on current MECP design guidelines.
- Sizing of the stormwater quality control component of the pond must achieve "Enhanced" protection and erosion control and thus the pond must have a water quality control volume determined using Table 3.2 of the MECP SWM design guidelines. 24 hour extended detention of the 25 mm storm runoff volume must also be provided for erosion control.
- Any overtopping of the SWM pond during the Regional Storm event must be safely conveyed to the receiving waterbody;
- Optimize nutrient uptake potential and diversity of plantings to enhance local aquatic and wildlife habitats; and
- Consider operation and maintenance requirements and frequency and include as part of the design process.

6.3.1 Water Quantity Control

A hydrologic analysis of the post development condition was completed utilizing the single event Visual OTTHYMO hydrologic model. Peak flow rates for the 2-100-year storm events were calculated for the 4-hour Chicago, 12- hour and 24-hour SCS design storms generated using Township of Uxbridge IDF data as well as for the Regional (Timmins) storm.

A summary of all catchment parameters established for the post development hydrologic model have been included in Appendix B.

Peak runoff rates at each outlet are shown in Tables 3 and 4 and the results of the modeling are attached in Appendix B. The digital hydrologic model files are included on the USB at the back of this report.

Table 3: Proposed Conditions Peak Flow Summary – Outlet 1

DESIGN STORM	OUTLET 1 CATCHMENT 201 0.5 ha UNCONTROLLED (m^3/s)		
	4 hr CHI	12 hr SCS	24 hr SCS
25 mm	0.003 (0.003)	-	-
2-Year	0.007 (0.007)	0.012 (0.012)	0.014 (0.014)
5-Year	0.015 (0.015)	0.023 (0.023)	0.026 (0.026)
10-Year	0.020 (0.020)	0.031 (0.031)	0.035 (0.035)
25-Year	0.029 (0.029)	0.042 (0.042)	0.046 (0.046)
100-Year	0.047 (0.047)	0.061 (0.061)	0.065 (0.065)
Regional (Timmins)	0.052 (0.052)		

Notes: (0.003) refers to existing condition peak flow rate.

As shown in Table 3, the proposed condition uncontrolled peak flows directed to Outlet 1 match the existing condition peak flow rates. On this basis, water quantity controls are not required at Outlet 1. This will be confirmed again at the detailed design stage.

Table 4: Proposed Conditions Peak Flow Summary – Outlet 2

DESIGN STORM	OUTLET 2 (202) 9.6 ha UNCONTROLLED (m^3/s)			OUTLET 2 (202) 9.6 ha CONTROLLED (m^3/s)			OUTLET 2 (202+203+204) 11.1 ha CONTROLLED (m^3/s)		
	4 hr CHI	12 hr SCS	24 hr SCS	4 hr CHI	12 hr SCS	24 hr SCS	4 hr CHI	12 hr SCS	24 hr SCS
25 mm	0.052	-	-	0.050	-	-	0.055 (0.058)	-	-
2-Year	0.107	0.167	0.191	0.102	0.157	0.178	0.112 (0.122)	0.171 (0.196)	0.193 (0.225)
5-Year	0.215	0.314	0.349	0.203	0.292	0.323	0.222 (0.247)	0.316 (0.373)	0.348 (0.419)
10-Year	0.297	0.422	0.465	0.278	0.388	0.423	0.304 (0.345)	0.420 (0.504)	0.455 (0.563)
25-Year	0.403	0.560	0.603	0.377	0.505	0.541	0.412 (0.478)	0.547 (0.677)	0.583 (0.737)
100-Year	0.647	0.804	0.847	0.588	0.784	0.861	0.637 (0.781)	0.854 (0.985)	0.931 (1.050)
Regional (Timmins)	0.944			0.944			1.091 (1.101)		

Notes: (0.122) refers to existing condition peak flow rate.

Preliminary wet SWM pond storage calculations are provided in Appendix B and confirm 1,137 m^3 of quantity storage at an active storage depth of 0.8m whereas 446 m^3 of active storage is required during the 100-year 24 hour SCS design storm.

The minor differences in the uncontrolled post to pre development peak flows are primarily due to the proposed changes in land use and providing longer flow paths in the post development condition. It is noted that the post development modeling also does not include water quality storage provided in the soakaway pits and enhanced road ditches and therefore is conservative. The hydrologic modeling will be confirmed again at the detailed design stage to confirm the ultimate design will not increase peak flows from the site compared to existing.

6.3.2 Water Quality Control

MECP Enhanced Level water quality control for the development will be provided primarily within the proposed SWM pond which will been designed to remove a minimum of 80% TSS prior to discharge into the PSW.

Water quality control plans have been developed for each outlet and are described below. It is noted that the water quality control calculations and storage volume provided within the SWM pond do not consider the additional water quality benefits of any low impact development practices and thus are conservative as it relates to water quality treatment of runoff from the proposed development.

Outlet 1

Catchment 201 (0.5 ha) has an imperviousness of 0%. Therefore, no water quality treatment is required for runoff directed to outlet 1.

Outlet 2

Catchment 202 (9.6 ha) has an estimated imperviousness of 10%. As per MECP guidelines for wet ponds, 88.3 m^3/ha is required for the permanent pool volume and the larger of 40 m^3/ha or the 25 mm runoff volume released over a minimum of 24 hours is required for extended detention. The corresponding permanent pool volume required for water quality control in the wet pond is 463 m^3 whereas 998 m^3 of permanent pool is provided. The extended detention volume for the contributing area makes up a small portion of the overall pond active storage volume.

Sheet flow from Catchments 203 (0.7 ha) and 204 (0.8 ha) are filtered by the vegetated filter buffer prior to discharging into the PSW.

Enhanced Flat-bottom Ditches

Runoff from the road and lot areas will be directed to the road ditches and the drainage easement. Enhancement of the road ditches as flat-bottom swales is proposed to reduce ditch velocities.

Permanent earth berms are proposed in ditch sections where the proposed road grades are 3.5% or greater, for erosion protection. The enhanced ditch and permanent earth berm locations are shown schematically on Drawing GS-1.

Enhanced ditch velocity and storage calculations are included in Appendix B.

Soakaway Pits

Building roof leaders will be connected to underground soakaway pits which are appropriate based on the physical suitability and constraints described in the Low Impact Development SWM Planning and Design Guide (CVC & TRCA, 2010). For example, the site is not located in a wellhead protection area, and the natural topography of land and proposed site grading does not exceed 15%. The above physical suitability and constraints will be reviewed again at the detailed design stage. 50% of the total rooftop area has been assumed to drain to the proposed soakaway pits whereas any building rooftop areas which are unable to drain to the soakaway pits (assumed as 50% of the rooftop area) will drain to pervious front/rear lot areas. The soakaway

pits will be designed in accordance with Section 4.5.6 of the MECP manual and the LID design guide. The soakaway pits will be located a minimum of 4.0 m away from building foundations as shown conceptually on Drawing GS-1. The soakaway pits will be equipped with overflow pipes that discharge to pervious areas. Based on 50% of an average rooftop area of 200m^2, the required soakaway pit storage volume is 2 m^3. A soakaway pit with minimum dimensions of 2.9 m long by 2.9 m wide by 0.6 m deep would therefore be required (assuming a stone void ratio of 0.4). Managing "clean" roof runoff in this manner promotes at-source infiltration and will assist with maintaining the existing water balance for the site. Detailed soakaway pit sizing calculations will be confirmed at the final detailed stage.

In summary, the proposed water quality SWM plan for the site consisting of a combination of a SWM pond, enhanced flat bottom ditches equipped with permanent earth berms as well as individual lot soakaway pits is well suited for the site. Based on the above calculations, the water quality SWM plan for the site will exceed the MECP requirements for enhanced level water quality control.

6.4 STORMWATER CONVEYANCE

Minor and major system drainage will be conveyed in the road ditches and drainage easement ditches to the intended outlets. The enhanced flat bottom ditch capacity calculations in the road section and in the drainage easement channel are included in Appendix B and confirm each have sufficient capacity to safely convey all storms up to and including the Regulatory storm event.

Road cross culverts will be sized to convey the peak runoff rate from storms up to and including the 25-year storm in accordance with Township Design Criteria (2016) for local roads. Driveway culverts will be designed with minimum 5-year storm peak flow capacity and will be minimum 300 mm diameter CSP culverts.

Culvert sizing calculations will be provided at the detailed design stage.

6.5 PHOSPHORUS LOADING

The phosphorus loading assessment is based on phosphorus loading coefficients for different land uses and phosphorus removal rates that are recommended in the MECP's Lake Simcoe Phosphorus Loading Development Tool document (January 2012). The phosphorus loading coefficients are summarized in Table 5.

Table 5: Existing and Proposed Land Uses and Phosphorus Loading Coefficients

SWM LAND USE	MECP PHOSPHORUS TOOL LAND USE	P LOADING COEFFICIENT (kg/ha/yr)
Existing Condition		
Grass/Pasture	Transition	0.08
Proposed Condition		
Impervious	High Intensity – Residential	1.32
Grass	Low Intensity – Residential	0.17

Phosphorus loading coefficients were selected based on the MECP Phosphorus Loading Tool land use which best matched the existing/proposed land use used in the stormwater management calculations. Phosphorus loading removal efficiencies were selected from the Phosphorus Loading Development Tool document to reflect the proposed SWM plan for the site. The proposed SWM plan has been designed to provide MECP enhanced level water quality control including the goal of no net increase in phosphorus loading from the site.

The phosphorus removal efficiencies which are applicable to the proposed SWM plan are summarized in Table 6.

Table 6: Phosphorus Removal Efficiencies

SWM CONTROL	REMOVAL EFFICIENCY (%)
Enhanced Grass Swales (Road Ditches)	34[1]
Soakaway Pits	70
Vegetated Filter Strip	65
SWM Pond	63[2]

Notes:

[1.] Removal efficiency of enhanced grass swales is based on the low end of the range (34%-55%).

[2.] Removal efficiency of the SWM Pond is based on the middle of the range (42%-85%).

In order to assess the impact of the proposed SWM plan on reducing phosphorus loading, a comparison showing phosphorus loading with and without the proposed mitigation measures has been completed and is summarized in Table 7. The desktop phosphorus loading calculations and analysis are attached in Appendix B.

Table 7: Existing and Proposed Condition Phosphorus Loading Summary

MECP PHOSPHORUS TOOL LAND USE	EXISTING CONDITIONS		PROPOSED CONDITIONS		
	Area (ha)	P Loading (kg/yr)	Area (ha)	P Loading without mitigation (kg/yr)	P Loading with mitigation (kg/yr)
Low Intensity Residential (0.17 kg/ha/yr)	-	-	10.56	1.80	0.49
Transition (0.08 kg/ha/yr)	11.60	0.93	-	-	-
High Intensity – Residential (1.32 kg/ha/yr)	-	-	1.04	1.37	0.35
Total	**11.60**	**0.93**	**3.14**	**3.17**	**0.84**

As discussed with LSRCA staff during the Phase 1 preliminary design review, proposed developments are required to reduce post-development phosphorus loading to pre-development conditions as a minimum criterion. Table 7 confirms a post-development phosphorus loading of 0.84 kg/yr as compared to existing condition phosphorus loading of 0.93 kg/yr thus meeting the LSRCA's minimum criteria.

The phosphorus loading assessment will be confirmed again at the detailed design stage.

6.6 RUNOFF VOLUME CONTROL

In accordance with section 2.2.2 of the LSRCA Technical Guidelines for Stormwater Submissions new major developments are to provide volume control if possible. As discussed with LSRCA staff during the phase 1 preliminary design review, runoff volume control is not practical at the site due to high groundwater and poor soil conditions.

7 Siltation and Erosion Plan

Siltation and erosion controls will be implemented for all construction activities, including topsoil stripping, material stockpiling, road construction and grading operations. A detailed erosion and sediment control plan for the site will be prepared with the detailed design and will include the following:

- All erosion control devices will be specified in accordance with Township of Uxbridge standards and the Erosion and Sediment Control Guideline for Urban Construction (Greater Golden Horseshoe Area Conservation Authorities, December 2006) and the Lake Simcoe Region Conservation Authority Technical Guidelines for Stormwater management Submissions;
- Silt control fences will be erected before any grading operations to control sediment movement and sediment control fence will be consistent with the Conservation Authority standard details;
- A construction vehicle entrance will be constructed for the proposed road with a stone mud mat to reduce off-site tracking of material. Construction access mats will be installed at all construction entrances and exits in accordance with the Conservation Authority standard details;
- Regular inspection of control measures will be instituted, and repairs will be made as necessary;
- Temporary swales and check dams will be constructed to control runoff during construction by lowering velocities and promoting settling of particulates; and
- Long term siltation and erosion control will be enhanced with a revegetation strategy for disturbed areas.

8 Summary

The proposed development will consist of sixteen rural residential lots. Existing drainage patterns will be maintained, with stormwater being conveyed via enhanced grassed ditches to a wet SWM pond. A treatment train approach to water quality control is proposed consisting of directing rooftop runoff to individual soakaway pits (50% of rooftop area) and to pervious front and rear lot areas and enhanced flat bottom ditches along the internal roads and in the drainage easement. Permanent 0.5 m high earth berms in the road ditches are specified to further reduce velocities and to mitigate the potential for erosion. Water quantity controls are not required at Outlet 1 since proposed condition peak flows match the existing. Water quantity controls are proposed in the wet SWM pond upstream of Outlet 2 to control post development peak flows to existing condition peak flow rates.

The proposed development will be serviced with private individual septic systems. Water supply will be provided by individual drilled wells. The proposed wells, septic systems and lot grading will be developed by individual lot owners in conjunction with their specific site development and will be approved through the building permit process.

Existing overhead hydro is available on the north side of Zephyr Road and has sufficient capacity to service the proposed subdivision. Natural gas is not available in Zephyr. The availability of communications plant (i.e. telephone, cable TV, coaxial cable etc.) will be confirmed during final design.

Siltation and erosion control will be provided with the proper construction mitigation efforts. Long-term erosion control will be enhanced with an effective revegetation strategy.

Detailed design of these systems will be provided at the final design stage, but the work completed to date confirms that appropriate site servicing and stormwater management can be provided.

DRAFT

Zephyr Road (public travelled)

Foot St

Dafoe Street (public travelled)

Street "A"

Street "B"

Phase 1

Phase 2

23.06
51.14
488.53
27.49
161.35
55.04
42.91
36.90
34.59
32.41
±15.0
±20.0
101.89
61.14
10.60
20.47
24.26
23.0
141.39
21.30
108.30
37.49
19.93
37.39
445.92
115.01
459.13
419.01

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

0 25 50 100 200 metres

LEGEND:

- Wetland
- 30 metre Wetland Setback
- Waterbody/River
- Contour Elevations
- Proposed Lot Fabric
- Proposed Streets
- Adjacent Lots
- Existing Streets

PHASE 2:

17 Lots
6,144m² Avg. Area
48m Avg. Frontage

*All lots meet the minimum requirements for the Hamlet Residential (HR) Zone.

C:\projectstandards\EcoVue Consulting logo RGB.jpg

www.ecovueconsulting.com

PROJECT NO: 17-1672

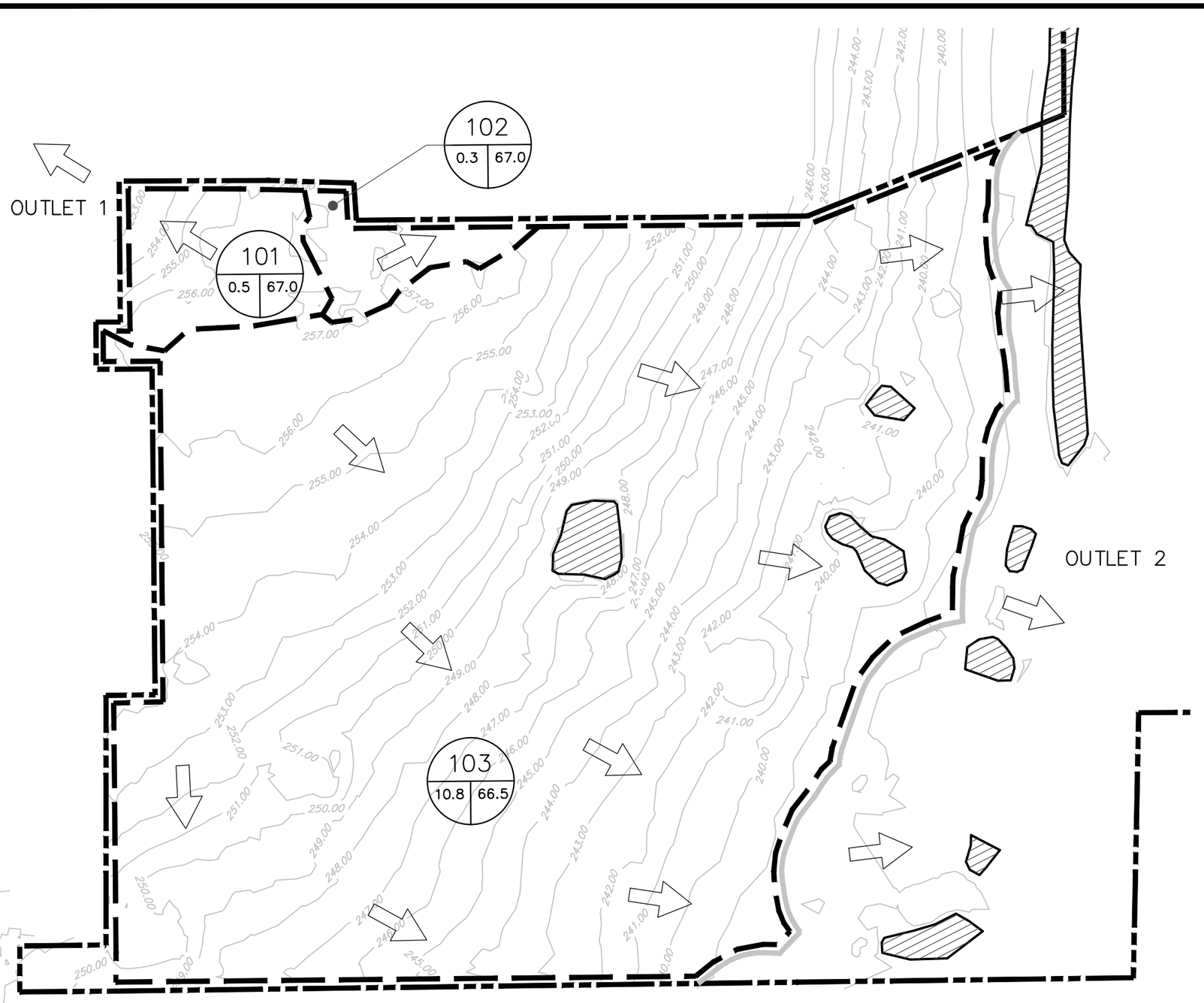
DATE: November 17 2017

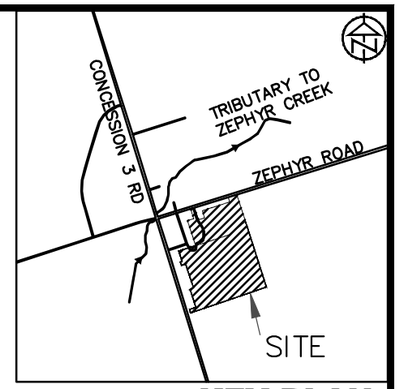
HORIZ. SCALE: 1:2,500

Concept Sketch A

Hidden Ridge Golf Course (Phase 2)

Part of Lots 24 & 25, Concession 3 (Scott)
Township of Uxbridge, Region of Durham

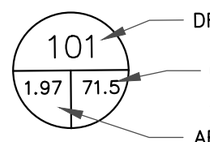




KEY PLAN
N.T.S

LEGEND

- EXISTING OVERLAND FLOW DIRECTION
- PROPERTY BOUNDARY
- EXISTING CONDITION CATCHMENT BOUNDARY
- 30m WETLAND BUFFER
- EXISTING POND



- DRAINAGE AREA ID
- CURVE NUMBER (CN*) / % IMPERVIOUS
- AREA (ha.)

CONTRACT DRAWINGS

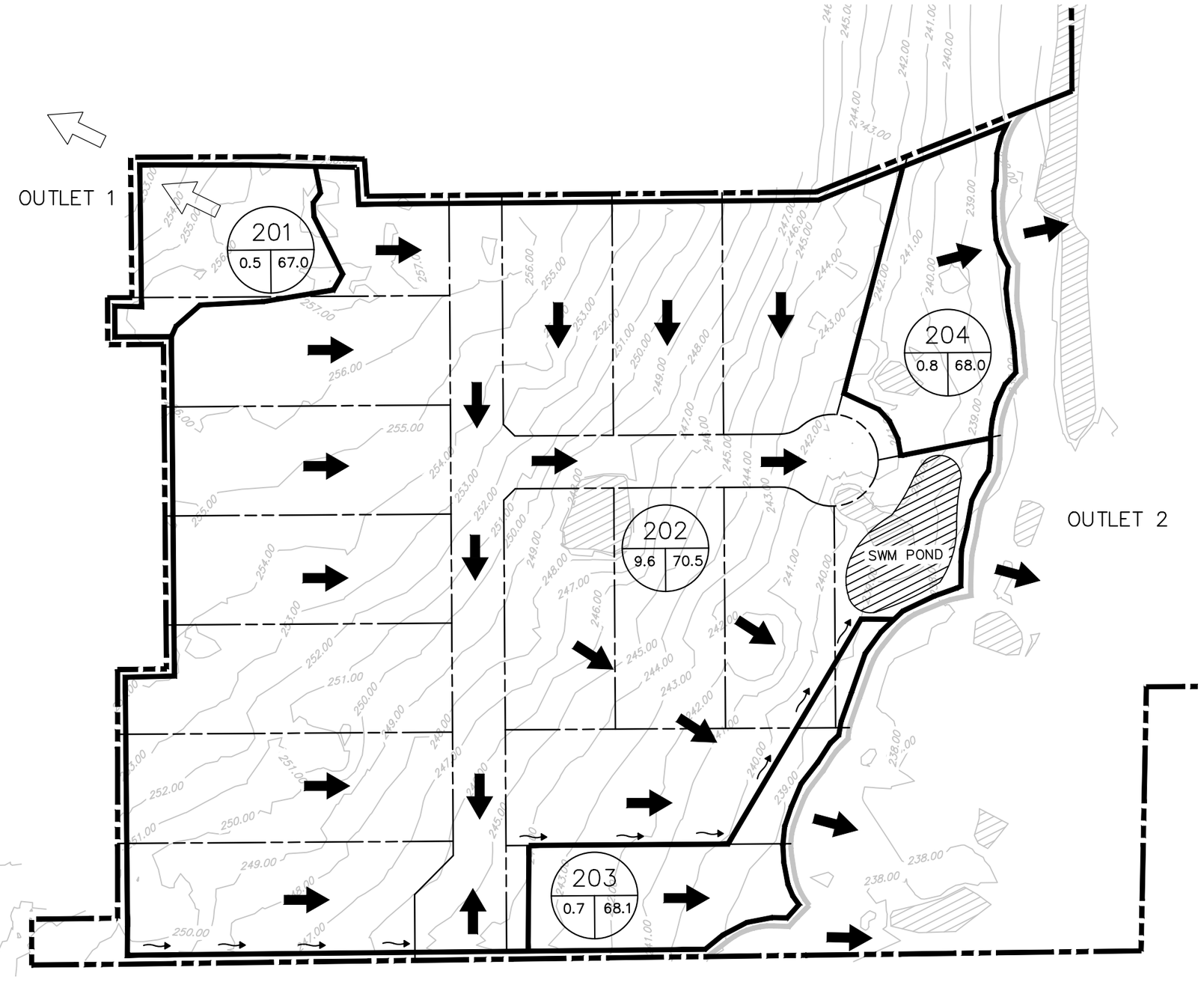
CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

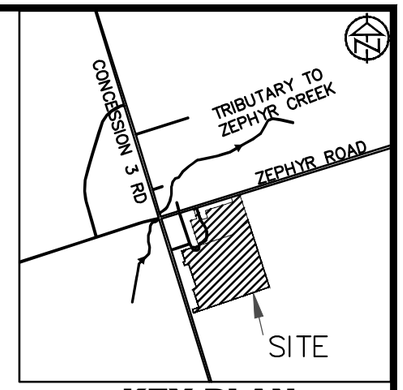
TATHAM ENGINEERING

HIDDEN RIDGE SUBDIVISION PHASE2
TOWNSHIP OF UXBRIDGE
EXISTING CONDITION DRAINAGE PLAN

DWG. No. **DP-1**

SCALE: 1: 2000	DRAWN: HY	DATE: AUG 2020	JOB NO. 516655-02

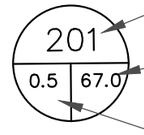




KEY PLAN
N.T.S

LEGEND

- EXISTING OVERLAND FLOW DIRECTION
- PROPOSED OVERLAND FLOW DIRECTION
- PROPERTY BOUNDARY
- PROPOSED CONDITION CATCHMENT BOUNDARY
- 30m WETLAND BUFFER
- PROPOSED REAR YARD SWALE



CONTRACT DRAWINGS

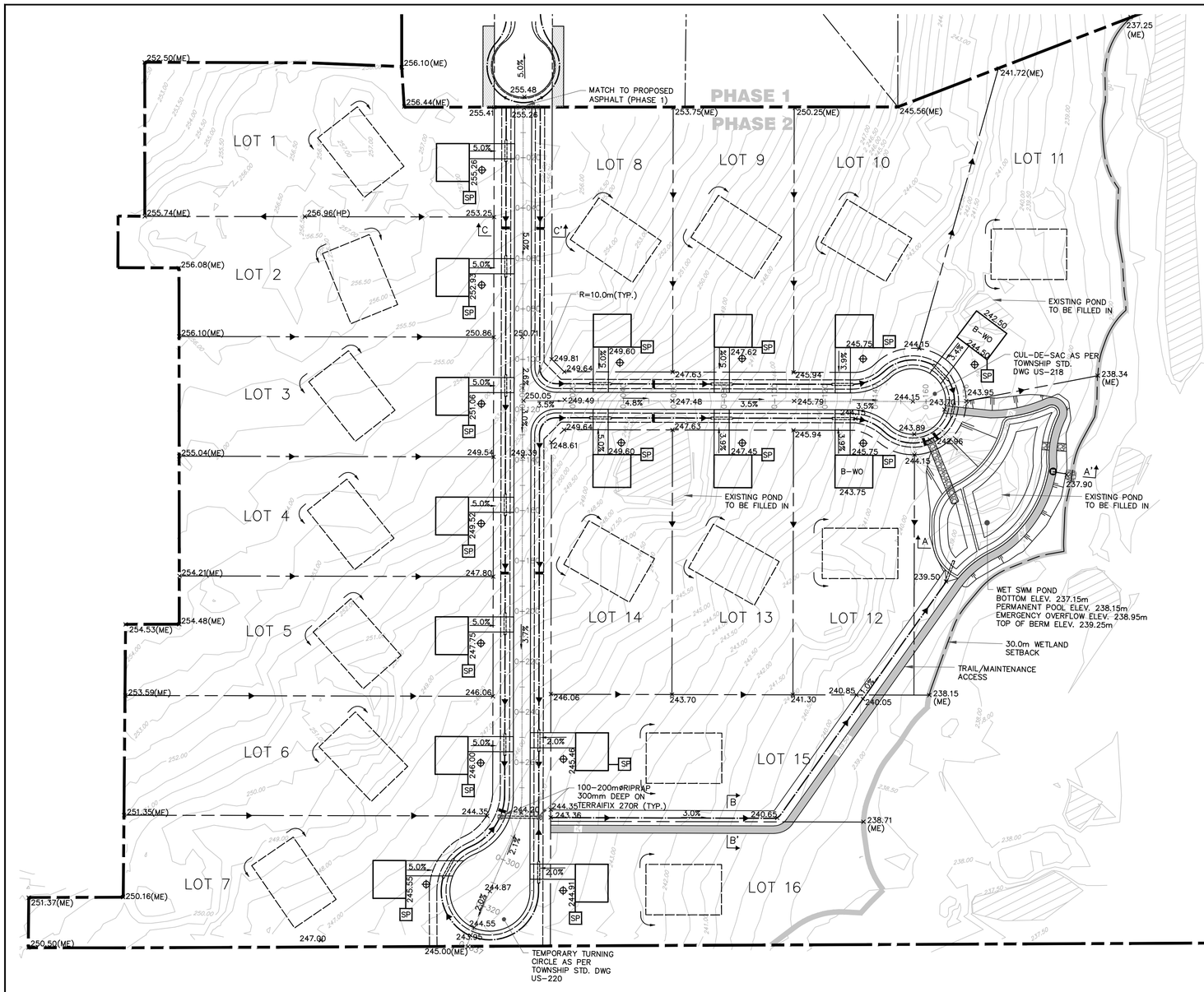
CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

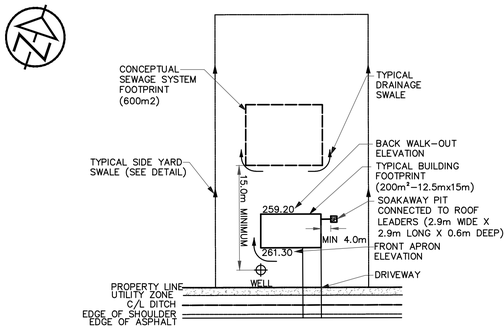
TATHAM ENGINEERING

HIDDEN RIDGE SUBDIVISION PHASE2
TOWNSHIP OF UXBRIDGE
PROPOSED CONDITION DRAINAGE PLAN

DWG. No. **DP-2**

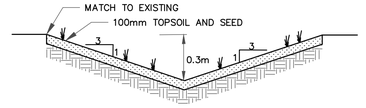
SCALE: 1: 2000	DRAWN: HY	DATE: AUG 2020	JOB NO. 516655–02



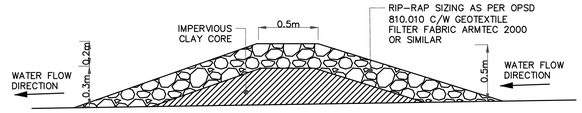


TYPICAL GRADING DETAILS
SCALE: NTS

NOTE: WALK-OUTS REQUIRE 2.1m ELEVATION DIFFERENCE FROM FRONT TO BACK OF HOUSE.

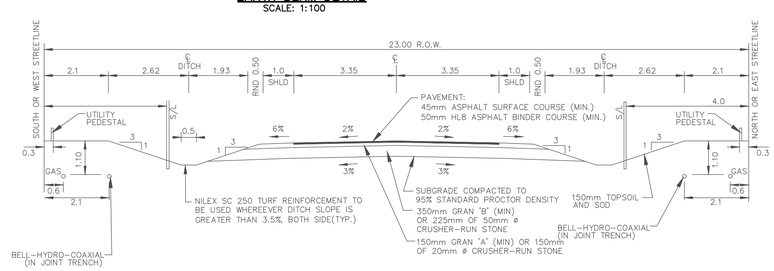


SIDE/REAR YARD SWALE/SECTION C-C' DETAIL (TYP.)
NTS



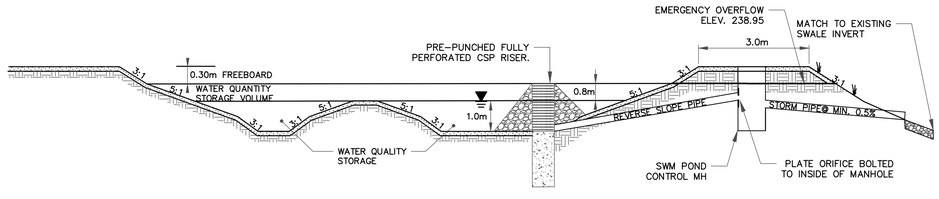
IMPERVIOUS CLAY CORE:
1. MORE THAN 90% OF THE MATERIAL SHOULD BE SMALLER THAN 50% OF MATERIAL SHOLD BE SMALLER THAN 0.002mm.
2. THE PERMEABILITY OF THE CLAY SHOULD BE LESS THAN 1X10^-7cm/sec
3. THE CLAY SHOULD BE COMPACTABLE WITH NATURAL MOISTURE CONTENT, WHICH IS WITHIN 3% OF THE OPTIMUM MOISTURE CONTENT.
4. IT SHOULD BE FREE OF ANY ORGANICS, ETC.

EARTH BERM DETAIL
SCALE: 1:100

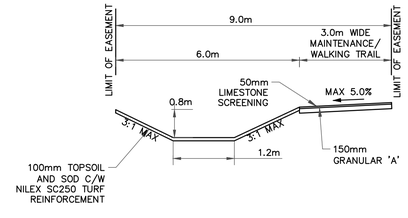


NOTES: ALL DIMENSIONS IN METERS.

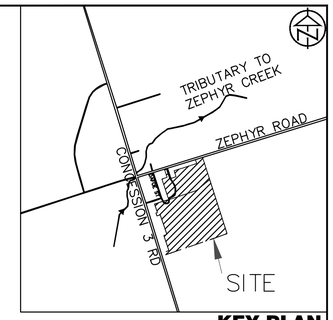
MODIFIED RURAL LOCAL ROAD SECTION WITH OPEN DITCHES CROSS SECTION C-C'
SCALE: 1:100



POND SECTION A-A'
SCALE: NTS



SECTION B-B'-DRAINAGE EASEMENT
SCALE: NTS



KEY PLAN
N.T.S

LEGEND

×221.35	PROPOSED ELEVATION
×221.35(ME)	PROPOSED ELEVATION MATCH TO EXISTING ELEVATION
	PROPERTY BOUNDARY
221.35	EXISTING CONTOUR
	PROPOSED CULVERT
1.0%(SW)	PROPOSED SWALE SLOPE
	SIDE/REAR YARD SWALE
	WELL
SP	SOAKAWAY PIT

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR DRAFT PLAN APPROVAL	AUG 2020

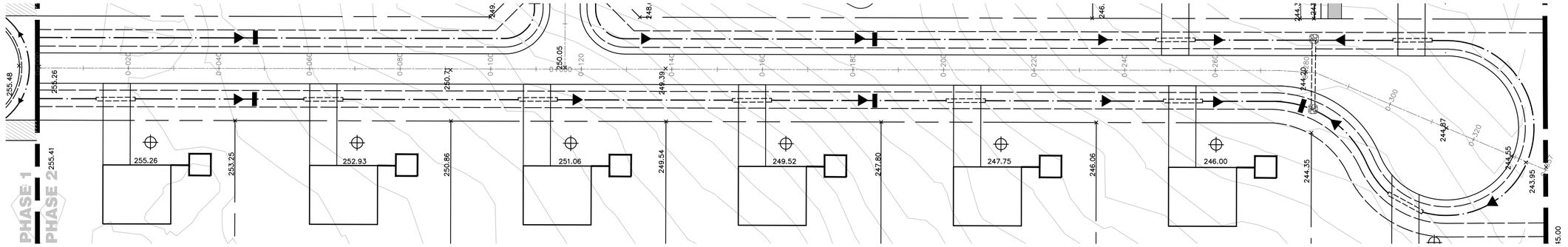
ENGINEER STAMP

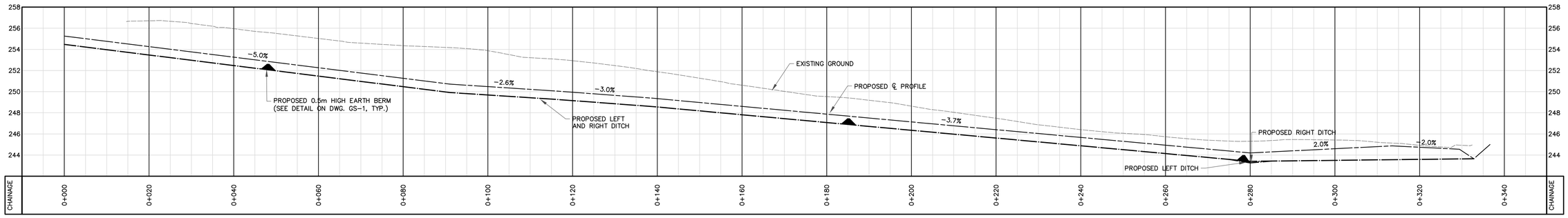
HIDDEN RIDGE SUBDIVISION
TOWNSHIP OF UXBRIDGE

TATHAM ENGINEERING

PHASE 2 PRELIMINARY GRADING AND SERVICING PLAN

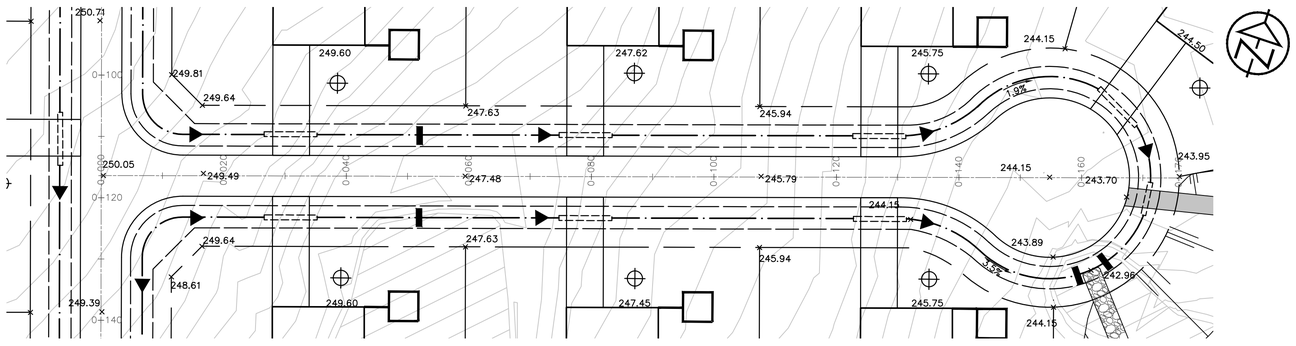
DESIGN: JA/HY	FILE: 516655-02	DWG: GS-1
DRAWN: HY	DATE: AUG 2020	
CHECK: JA	SCALE: 1:1000	

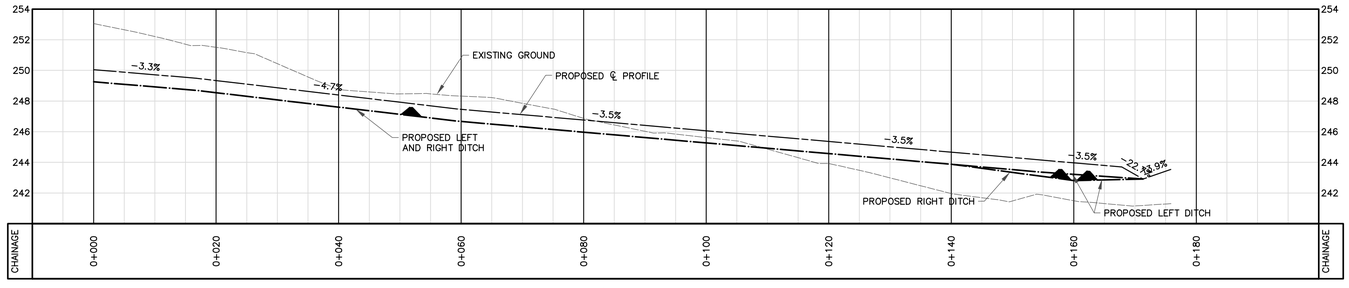




ROAD 'A' PROFILE

H 1:500
V 1:200





ROAD 'B' PROFILE

H 1:500
V 1:200

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR DRAFT PLAN APPROVAL	AUG 2020

ENGINEER STAMP

HIDDEN RIDGE SUBDIVISION
TOWNSHIP OF UXBRIDGE

PHASE 2 PRELIMINARY
PLAN AND PROFILE

TATHAM ENGINEERING

DESIGN: JA/HY	FILE: 516655-02	DWG: PP1
DRAWN: HY	DATE: AUG 2020	
CHECK: JA	SCALE: 1:1000	

Appendix A:
Utility Availability Confirmation

From: Jacob.Potter@HydroOne.com <Jacob.Potter@HydroOne.com>
Sent: February 26, 2020 3:14 PM
To: Oleksandr (Alex) Polyak <opolyak@tathameng.com>
Cc: subdivision@HydroOne.com
Subject: RE: Hidden Ridge Subdivision Phase 2- Zephyr utilities (Zone 3A) (Tatham Proj #516655)

Hi Alex,

Apologies the first response I sent you was for a different email response that I sent earlier today, I think I had to many emails open at the same time.

For this Hidden Ridge Subdivision Phase 1 & 2 we have a 3 phase 4.8/8.32kv line running on Zephyr Rd. I would anticipate there being any issues connecting this additional 16 lots to this as well. Of course once we receive the submission package with all the loading information we will run this by our 'Zone Distribution Planners' for the go ahead but I cannot foresee them asking to upgrade the voltage on the main line or bring in an additional feeder for just 26 residential lots in total.

I hope this helps.

Thank you,

Jacob Potter
Supervising Planning Technician – Subdivision Design
Distribution Design Services
Hydro One Networks Inc.
420 Welham Road, Barrie, ON L4N 8Z2
Tel: (705) 719-5783
Fax: (705) 719-0716
For Family. For Life.
Jacob.Potter@Hydroone.com

Jeremy Ash - FW: Zephyr utilities

From: Elke Grafner <Elke.Grafner@enbridge.com>
To: "HYU@cctatham.com" <HYU@cctatham.com>
Date: 4/28/2017 8:17 AM
Subject: FW: Zephyr utilities
Cc: Vince Manzo <Vince.Manzo@enbridge.com>

Good morning Haoran,

Unfortunately there is no gas main located on Conc3 between Meyers Rd and Zephyr Rd.
The closest community serviced by gas is Mount Albert.

Elke Grafner
Field Representative Customer Connections
—

ENBRIDGE GAS DISTRIBUTION
TEL: 905-927-3290 | FAX: 905-927-3292 |
101 Honda Blvd Markham, Ontario L6C 0M6

enbridgegas.com
Integrity. Safety. Respect

From: Haoran Yu [mailto:HYU@cctatham.com]
Sent: Tuesday, April 11, 2017 3:18 PM
To: Vince Manzo
Cc: Jeremy Ash
Subject: Zephyr utilities

Good Afternoon Vince,

We are completing the preliminary engineering design for a new 7-lot residential subdivision located south of Zephyr Road (Regional Road 13), east of Concession 3, in the Hamlet of Zephyr, Township of Uxbridge. The proposed site entrance will be from Zephyr Road. Can you confirm if

you have plant available to service the proposed development? The site location is shown below.

If you have any question, please call.

Sincerely

Haoran Yu
Engineering Technologist
C.C. Tatham & Associates Ltd.
5335 Canotek Road, Unit 102
Ottawa, Ontario K1J 9L4
Tel: (613) 747-3636
HYU@cctatham.com
www.cctatham.com

Appendix B:
SWM Calculations

Project:	Hidden Ridge Subdivision Phase 2
File No.:	516655-02
Date:	August-2020
Designed By:	HY
Checked By:	JA
Subject:	Hydrologic Parameters

HIDDEN RIDGE SUBDIVISION PHASE 2

EXISITING CONDITION

Catchment 101 **Area** 0.5 ha

Rain Gauge: Township of Uxbridge IDF
100-yr 24hr SCS Rainfall Depth: 119.04 mm

WEIGHTED CN VALUE

Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Cultivated			Impervious			Wetland/Lakes/SWMF			Average CN for Soil Type
				Type	Area	Percent	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	
FL	FARMINGTON	B	Loam or Silt Loam	2	0.5	1		0	60	0.5	1.00	69	0		65	0	0.00	74	0.00	0.00	100	0		50	69.0
	#N/A	#N/A	#N/A	#N/A					#N/A			#N/A	0		#N/A	0		#N/A			#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	**0.5**	**1**	**0**	**0**		**0.5**	**1**		**0**	**0**		**0**	**0**		**0**	**0**		**0**	**0**		**69.0**
																								CN*(AMC II)	**67.0**
																								CN*(AMC III)	**82.4**

Time of Concentration Calculations

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	257.5 m
Minimum Catchment Elevation	252.5 m
Catchment length	130 m
Catchment Slope	4%
Catchment Area	0.5 ha
Time of Concentration (Minutes)	**6.07**
Time of Concentration (Hours)	**0.10**
Time to Peak (2/3 x Time of Concentration)	**0.07**

Time to Peak	**0.22 hrs**

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	257.5 m
Minimum Catchment Elevation	252.5 m
Catchment length	130 m
Catchment Slope	4%
Catchment Area	0.5 ha
Time of Concentration (Minutes)	**19.54**
Time of Concentration (Hours)	**0.33**
Time to Peak (2/3 x Time of Concentration)	**0.22**

Initial Abstraction	**5.0 mm**

Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2

Runoff Coefficient	**0.28**

Landuse Type	Soil Series				
	FL	0	0	0	0
	2	#N/A	#N/A	#N/A	#N/A
Forest/Woodland	0.25	#N/A	#N/A	#N/A	#N/A
Cultivated	0.35	#N/A	#N/A	#N/A	#N/A
Pasture/Lawn	0.28	#N/A	#N/A	#N/A	#N/A
Impervious	0.95	#N/A	#N/A	#N/A	#N/A
Wetland/Lake/SWMF	0.05	#N/A	#N/A	#N/A	#N/A
Meadows	0.27	#N/A	#N/A	#N/A	#N/A
Soil Series Total	0.28	#N/A	#N/A	#N/A	#N/A

TATHAM ENGINEERING		
	Project:	Hidden Ridge Subdivision Phase 2
	File No.:	516655-02
	Date:	August-2020
	Designed By:	HY
	Checked By:	JA
	Subject:	Hydrologic Parameters

HIDDEN RIDGE SUBDIVISION PHASE 2

EXISITING CONDITION

Rain Gauge: Township of Uxbridge IDF

Catchment 102 **Area** 0.3 ha — 100-yr 24hr SCS Rainfall Depth: 119.04 mm

WEIGHTED CN VALUE																									
Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Cultivated			Impervious			Wetland/Lakes/SWMF			Average CN for Soil Type
				Type	Area	Percent	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	
FI	FARMINGTON	B	Loam or Silt Loam	2	0.3	1		0	60	0.3	1.00	69	0		65	0	0.00	74	0	0.00	100	0		50	69.0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	**0.3**	**1**	**0**	**0**		**0.3**	**1**		**0**	**0**		**0**	**0**		**0**	**0**		**0**	**0**		**69.0**
																								CN*(AMC II)	**67.0**
																								CN*(AMC III)	**82.4**

Time of Concentration Calculations

Initial Abstraction	5.0 mm

Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	257.50 m
Minimum Catchment Elevation	255.50 m
Catchment length	111 m
Catchment Slope	2%
Catchment Area	0.3 ha

Time of Concentration (Minutes)	**6.34**
Time of Concentration (Hours)	**0.11**
Time to Peak (2/3 x Time of Concentration)	**0.07**

Time to Peak	0.26 hrs

(use min. 10 minutes)

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	257.50 m
Minimum Catchment Elevation	255.50 m
Catchment length	111 m
Catchment Slope	2%
Catchment Area	0.3 ha

Time of Concentration (Minutes)	**23.19**
Time of Concentration (Hours)	**0.39**
Time to Peak (2/3 x Time of Concentration)	**0.26**

Runoff Coefficient	0.28

Landuse Type	Soil Series				
	FI	0	0	0	0
	2	#N/A	#N/A	#N/A	#N/A
Forest/Woodland	0.25	#N/A	#N/A	#N/A	#N/A
Cultivated	0.35	#N/A	#N/A	#N/A	#N/A
Pasture/Lawn	0.28	#N/A	#N/A	#N/A	#N/A
Impervious	0.95	#N/A	#N/A	#N/A	#N/A
Wetland/Lake/SWMF	0.05	#N/A	#N/A	#N/A	#N/A
Meadows	0.27	#N/A	#N/A	#N/A	#N/A
Soil Series Total	0.28	#N/A	#N/A	#N/A	#N/A

	Project:	Hidden Ridge Subdivision Phase 2
TATHAM ENGINEERING	File No.:	516655-02
	Date:	August-2020
	Designed By:	HY
	Checked By:	JA
	Subject:	Hydrologic Parameters

HIDDEN RIDGE SUBDIVISION PHASE 2

EXISITING CONDITION

Catchment 103 **Area** 10.8 ha

Rain Gauge: Township of Uxbridge IDF
100-yr 24hr SCS Rainfall Depth: 119.04 mm

WEIGHTED CN VALUE																									
Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Cultivated			Impervious			Wetland/Lakes/SWMF			Average CN for Soil Type
				Type	Area	Percent	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	
FI	FARMINGTON	B	Loam or Silt Loam	2	10.8	1	0	0	60	10.6	0.9815	69	0		65	0		74	0		100	0.2	0.0185	50	68.6481
	#N/A	#N/A	#N/A	#N/A	0		0	0.5	#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0	0.5	#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0	0.5	#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0	0.5	#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	**10.8**	**1**	**0**	**0**		**10.6**	**0.981481**		**0**	**0**		**0**	**0**		**0**	**0**		**0.2**	**0.01852**		**68.6**
																								CN*(AMC II)	**66.5**
																								CN*(AMC III)	**82.0**

Initial Abstraction	**4.9 mm**

Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2

Time of Concentration Calculations

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	256.70 m
Minimum Catchment Elevation	239.10 m
Catchment length	366 m
Catchment Slope	5%
Catchment Area	10.8 ha
Time of Concentration (Minutes)	**12.01**
Time of Concentration (Hours)	**0.20**
Time to Peak (2/3 x Time of Concentration)	**0.13**

Time to Peak	**0.34 hrs**

For Runoff Coefficients less than 0.4

Airport Method

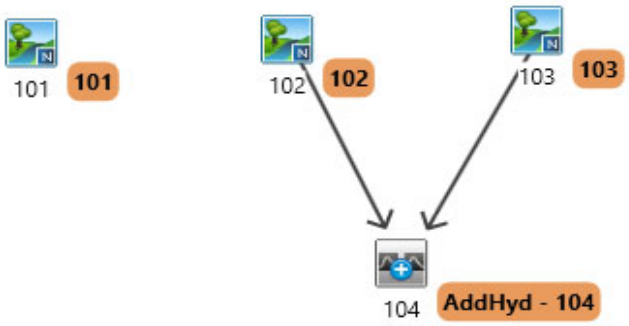
Maximum Catchment Elevation	256.70 m
Minimum Catchment Elevation	239.10 m
Catchment length	366 m
Catchment Slope	5%
Catchment Area	10.8 ha
Time of Concentration (Minutes)	**30.62**
Time of Concentration (Hours)	**0.51**
Time to Peak (2/3 x Time of Concentration)	**0.34**

Runoff Coefficient	**0.28**

Landuse Type	Soil Series				
	FI	0	0	0	0
	2	#N/A	#N/A	#N/A	#N/A
Forest/Woodland	0.25	#N/A	#N/A	#N/A	#N/A
Cultivated	0.35	#N/A	#N/A	#N/A	#N/A
Pasture/Lawn	0.28	#N/A	#N/A	#N/A	#N/A
Impervious	0.95	#N/A	#N/A	#N/A	#N/A
Wetland/Lake/SWMF	0.05	#N/A	#N/A	#N/A	#N/A
Meadows	0.27	#N/A	#N/A	#N/A	#N/A
Soil Series Total	0.276	#N/A	#N/A	#N/A	#N/A

Project:	Hidden Ridge Subdivision Phase 2
File No.:	516655-02
Date:	August-2020
Designed By:	OP
Checked By:	JA
Subject:	Hydrologic Model Schematic

HIDDEN RIDGE SUBDIVISION PHASE 2
HYDROLOGIC MODEL SCHEMATIC: EXISTING CONDITIONS



Nashyd		Route Pipe		Duhyd	
Standhyd		Route Channel		Diverthyd	
Addhyd		Route Reservoir			

```
================================================================================
=========================


       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\a6
dc3e33-d8c0-48bd-834a-cc83d0f2684a\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\a6
dc3e33-d8c0-48bd-834a-cc83d0f2684a\sce


DATE: 01-20-2020                          TIME: 09:08:09

USER:


COMMENTS: _____________________________________________________________


  ***********************************************
  ** SIMULATION : Run 01                       **
  ***********************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                5.0
    [ Ptot= 25.00 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\db5f4eda
-dac5-4479-bde6-c6
    remark: 25mm

*
 ** CALIB NASHYD         0103  1  5.0   10.80    0.06  1.83   2.73 0.11   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.34]
*
 ** CALIB NASHYD         0102  1  5.0    0.30    0.00  1.67   2.75 0.11   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.26]
*
    ADD [  0102+  0103]  0104  3  5.0   11.10    0.06  1.83   2.73  n/a   0.000
*
 ** CALIB NASHYD         0101  1  5.0    0.50    0.00  1.67   2.75 0.11   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
================================================================================
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       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\8e
7257dd-dd4f-48c9-a3ef-16c42f254abb\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\8e
```

7257dd-dd4f-48c9-a3ef-16c42f254abb\sce

DATE: 01-20-2020 TIME: 09:08:09

USER:

COMMENTS: _____

```
  ***********************************************
  ** SIMULATION : Run 02                       **
  ***********************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
    READ STORM                10.0
    [ Ptot= 34.17 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\9c1bb5f6
-66a1-4ac7-a118-06
    remark: 2yr 4hr CHI

*
 ** CALIB NASHYD         0103  1  5.0   10.80    0.12  1.75   5.45 0.16   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.34]
*
 ** CALIB NASHYD         0102  1  5.0    0.30    0.00  1.58   5.51 0.16   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.26]
*
    ADD [  0102+  0103]  0104  3  5.0   11.10    0.12  1.75   5.45  n/a   0.000
*
 ** CALIB NASHYD         0101  1  5.0    0.50    0.01  1.58   5.51 0.16   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\76
28d3b0-0b92-435c-919c-10260c2b0138\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\76
28d3b0-0b92-435c-919c-10260c2b0138\sce
```

DATE: 01-20-2020 TIME: 09:08:09

USER:

COMMENTS: _____

```
  ***********************************************
  ** SIMULATION : Run 03                       **
  ***********************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
    READ STORM                10.0
    [ Ptot= 47.36 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\e4053b51
-dfb0-41ff-9bfe-37
    remark: 5yr 4hr CHI

*
 ** CALIB NASHYD         0103  1  5.0   10.80    0.24  1.75  10.58 0.22   0.000
```

```
    [CN=66.5         ]
    [ N = 3.0:Tp 0.34]
*
 ** CALIB NASHYD         0102  1  5.0    0.30    0.01  1.58  10.71 0.23   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.26]
*
    ADD [  0102+  0103]  0104  3  5.0   11.10    0.25  1.75  10.58  n/a   0.000
*
 ** CALIB NASHYD         0101  1  5.0    0.50    0.01  1.58  10.70 0.23   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\73
36bf96-3e97-47e7-8106-774c7f41209b\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\73
36bf96-3e97-47e7-8106-774c7f41209b\sce


DATE: 01-20-2020                          TIME: 09:08:09

USER:
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COMMENTS: _____________________________________________________________


  ***********************************************
  ** SIMULATION : Run 04                       **
  ***********************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha    '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
    READ STORM                 10.0
    [ Ptot= 55.80 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\6d0b5a5e
-5c8e-4ccb-aa01-28
    remark: 10yr 4hr CHI

*
 ** CALIB NASHYD         0103  1  5.0   10.80    0.33  1.67  14.48 0.26   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.34]
*
 ** CALIB NASHYD         0102  1  5.0    0.30    0.01  1.58  14.66 0.26   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.26]
*
    ADD [  0102+  0103]  0104  3  5.0   11.10    0.35  1.67  14.48  n/a   0.000
*
 ** CALIB NASHYD         0101  1  5.0    0.50    0.02  1.50  14.65 0.26   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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***** S U M M A R Y O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

Output filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\34f0bdac-1a6a-4589-80e2-faca15186c96\sce
Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\34f0bdac-1a6a-4589-80e2-faca15186c96\sce

DATE: 01-20-2020 TIME: 09:08:09

USER:

COMMENTS: _____

****
** SIMULATION : Run 05 **
****

W/E	COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
	START @ 0.00 hrs								
	READ STORM		10.0						
	[Ptot= 65.22 mm]								
	fname : C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\58795a66-57fa-4c18-9d5b-c7								
	remark: 25yr 4hr CHI								
*									
**	CALIB NASHYD	0103	1	5.0	10.80	0.46	1.67	19.32	0.30	0.000
	[CN=66.5]								
	[N = 3.0:Tp 0.34]								
*									
**	CALIB NASHYD	0102	1	5.0	0.30	0.02	1.58	19.55	0.30	0.000
	[CN=67.0]								
	[N = 3.0:Tp 0.26]								
*									
	ADD [0102+ 0103]	0104	3	5.0	11.10	0.48	1.67	19.33	n/a	0.000
*									
**	CALIB NASHYD	0101	1	5.0	0.50	0.03	1.50	19.54	0.30	0.000
	[CN=67.0]								
	[N = 3.0:Tp 0.22]								

*
==
==========

V V I SSSSS U U A L (v 6.0.2000)
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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***** S U M M A R Y O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

Output filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\a81cdcf1-66f6-4b92-bad9-635ba9fd5f78\sce
Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\a81cdcf1-66f6-4b92-bad9-635ba9fd5f78\sce

DATE: 01-20-2020 TIME: 09:08:09

USER:

COMMENTS: _____

****
** SIMULATION : Run 06 **
****

W/E COMMAND HYD ID DT AREA ' Qpeak Tpeak R.V. R.C. Qbase

```
                                 min     ha    '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                10.0
    [ Ptot= 83.51 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\9c520b38
-f138-47d6-a306-44
    remark: 100yr 4hr CHI

*
 ** CALIB NASHYD         0103  1  5.0   10.80    0.76  1.67  29.91 0.36   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.34]
*
 ** CALIB NASHYD         0102  1  5.0    0.30    0.03  1.58  30.25 0.36   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.26]
*
    ADD [  0102+  0103]  0104  3  5.0   11.10    0.78  1.67  29.92  n/a   0.000
*
 ** CALIB NASHYD         0101  1  5.0    0.50    0.05  1.50  30.23 0.36   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat
  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\df
def3c8-bda0-492b-b2d4-70d97680e42e\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\df
def3c8-bda0-492b-b2d4-70d97680e42e\sce


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  ************************************************
  ** SIMULATION : Run 07                         **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha    '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
    READ STORM                  5.0
    [ Ptot= 43.70 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\f154648f
-d6dc-42fd-b206-8a
    remark: 2yr 12hr SCS

*
 ** CALIB NASHYD         0103  1  5.0   10.80    0.19  6.33   9.03 0.21   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.34]
*
 ** CALIB NASHYD         0102  1  5.0    0.30    0.01  6.25   9.14 0.21   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.26]
*
    ADD [  0102+  0103]  0104  3  5.0   11.10    0.20  6.33   9.03  n/a   0.000
*
 ** CALIB NASHYD         0101  1  5.0    0.50    0.01  6.17   9.13 0.21   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
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       V    V   I    SSSSS  U   U    A    L              (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\e2
4708c4-063c-4423-8f17-6f5b1ecb4efe\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\e2
4708c4-063c-4423-8f17-6f5b1ecb4efe\sce


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  ************************************************
  ** SIMULATION : Run 08                        **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
    READ STORM                5.0
    [ Ptot= 60.50 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\af1dd4e8
-0e28-4a0e-81e8-9c
    remark: 5yr 12hr SCS

*
 ** CALIB NASHYD         0103  1  5.0   10.80    0.36  6.33  16.84 0.28   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.34]
*
 ** CALIB NASHYD         0102  1  5.0    0.30    0.01  6.25  17.04 0.28   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.26]
*
    ADD [  0102+  0103]  0104  3  5.0   11.10    0.37  6.33  16.84  n/a   0.000
*
 ** CALIB NASHYD         0101  1  5.0    0.50    0.02  6.17  17.03 0.28   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L              (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\7b
9cce46-0c12-406a-827b-4f5dc1502a7a\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\7b
9cce46-0c12-406a-827b-4f5dc1502a7a\sce
```

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  ***********************************************
  ** SIMULATION : Run 09                       **
  ***********************************************

  W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                 min     ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
    READ STORM                 5.0
    [ Ptot= 71.20 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\3e87cb3c
-c368-4709-82bb-90
    remark: 10yr 12hr SCS

*
 ** CALIB NASHYD         0103  1  5.0   10.80    0.49  6.33  22.62 0.32   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.34]
*
 ** CALIB NASHYD         0102  1  5.0    0.30    0.02  6.25  22.89 0.32   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.26]
*
    ADD [  0102+  0103]  0104  3  5.0   11.10    0.50  6.25  22.63  n/a   0.000
*
 ** CALIB NASHYD         0101  1  5.0    0.50    0.03  6.17  22.88 0.32   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\43
0de815-19a1-4b6f-a48f-97bb05973ec2\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\43
0de815-19a1-4b6f-a48f-97bb05973ec2\sce


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  ***********************************************
  ** SIMULATION : Run 10                       **
  ***********************************************

  W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                 min     ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
    READ STORM                 5.0
    [ Ptot= 83.80 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\6d7aa051
-e460-4620-9151-71
    remark: 25yr 12hr SCS

*
 ** CALIB NASHYD         0103  1  5.0   10.80    0.65  6.33  30.09 0.36   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.34]
*
```

```
 ** CALIB NASHYD         0102  1  5.0    0.30    0.02  6.17  30.43 0.36   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.26]
*
    ADD [  0102+  0103]  0104  3  5.0   11.10    0.68  6.25  30.10  n/a   0.000
*
 ** CALIB NASHYD         0101  1  5.0    0.50    0.04  6.17  30.41 0.36   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\85
6d3646-7817-4057-b05a-75a4138d7708\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\85
6d3646-7817-4057-b05a-75a4138d7708\sce


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```
  ************************************************
  ** SIMULATION : Run 11                        **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
    READ STORM                  5.0
    [ Ptot=104.10 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\7b117713
-0d86-4039-a916-18
    remark: 100yr 12hr SCS

*
 ** CALIB NASHYD         0103  1  5.0   10.80    0.95  6.25  43.31 0.42   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.34]
*
 ** CALIB NASHYD         0102  1  5.0    0.30    0.03  6.17  43.77 0.42   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.26]
*
    ADD [  0102+  0103]  0104  3  5.0   11.10    0.98  6.25  43.32  n/a   0.000
*
 ** CALIB NASHYD         0101  1  5.0    0.50    0.06  6.17  43.74 0.42   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L              (v 6.0.2000)
       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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```

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                ***** S U M M A R Y   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\e1
91203a-d50c-47a5-97df-8f5aeea9a14b\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\e1
91203a-d50c-47a5-97df-8f5aeea9a14b\sce


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  ************************************************
  ** SIMULATION : Run 12                         **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                15.0
    [ Ptot= 50.73 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\f16d20f6
-7be4-410f-bac3-a2
    remark: 2yr 24hr SCS

*
 ** CALIB NASHYD         0103  1  5.0   10.80    0.22 12.25  12.08 0.24   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.34]
*
 ** CALIB NASHYD         0102  1  5.0    0.30    0.01 12.17  12.23 0.24   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.26]
*
    ADD [  0102+  0103]  0104  3  5.0   11.10    0.23 12.25  12.09  n/a   0.000
*
 ** CALIB NASHYD         0101  1  5.0    0.50    0.01 12.08  12.22 0.24   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L              (v 6.0.2000)
       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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                ***** S U M M A R Y   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\82
fa5615-7254-4540-937c-92ad066f556d\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\82
fa5615-7254-4540-937c-92ad066f556d\sce


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  ************************************************
  ** SIMULATION : Run 13                         **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
```

```
     --------------------
    READ STORM                 15.0
    [ Ptot= 70.11 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\62e099ad
-7b0a-44a0-927c-76
    remark: 5yr 24hr SCS

*
 ** CALIB NASHYD         0103  1  5.0   10.80    0.41 12.25  22.01 0.31   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.34]
*
 ** CALIB NASHYD         0102  1  5.0    0.30    0.01 12.17  22.27 0.32   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.26]
*
    ADD [  0102+  0103]  0104  3  5.0   11.10    0.42 12.25  22.02  n/a   0.000
*
 ** CALIB NASHYD         0101  1  5.0    0.50    0.03 12.08  22.26 0.32   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L              (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\d4
253166-7bea-4fc8-8e14-16c8b5b9bad8\sce
```

```
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\d4
253166-7bea-4fc8-8e14-16c8b5b9bad8\sce


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COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 14                        **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
    READ STORM                 15.0
    [ Ptot= 82.55 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\76727b81
-65ef-4036-af3e-cc
    remark: 10yr 24hr SCS

*
 ** CALIB NASHYD         0103  1  5.0   10.80    0.55 12.25  29.32 0.36   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.34]
*
 ** CALIB NASHYD         0102  1  5.0    0.30    0.02 12.17  29.66 0.36   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.26]
*
    ADD [  0102+  0103]  0104  3  5.0   11.10    0.56 12.17  29.33  n/a   0.000
*
 ** CALIB NASHYD         0101  1  5.0    0.50    0.04 12.08  29.64 0.36   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L              (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\83
6c30dc-e51e-4ff3-afc7-5c4a152f1c83\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\83
6c30dc-e51e-4ff3-afc7-5c4a152f1c83\sce


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USER:


COMMENTS: _____________________________________________________


  ************************************************
  ** SIMULATION : Run 15                         **
  ************************************************

  W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                15.0
    [ Ptot= 96.19 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\7fc6ee65
-9b89-4625-8cea-56
    remark: 25yr 24hr SCS
*
 ** CALIB NASHYD         0103  1  5.0   10.80    0.71 12.17  38.00 0.40   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.34]
*
 ** CALIB NASHYD         0102  1  5.0    0.30    0.02 12.08  38.42 0.40   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.26]
*
    ADD [  0102+  0103]  0104  3  5.0   11.10    0.74 12.17  38.01  n/a   0.000
*
 ** CALIB NASHYD         0101  1  5.0    0.50    0.05 12.08  38.39 0.40   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
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       V    V   I    SSSSS  U   U    A    L              (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\89
d823bf-009a-4d67-b12c-385025688bb0\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\89
d823bf-009a-4d67-b12c-385025688bb0\sce


DATE: 01-20-2020                          TIME: 09:08:09

USER:
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```
COMMENTS: ____________________________________________________________


  ***********************************************
  ** SIMULATION : Run 16                       **
  ***********************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                15.0
    [ Ptot=118.68 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\c31e0960
-3f0a-427b-a72f-14
    remark: 100yr 24hr SCS

*
 ** CALIB NASHYD         0103  1  5.0   10.80    1.02 12.17  53.54 0.45   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.34]
*
 ** CALIB NASHYD         0102  1  5.0    0.30    0.03 12.08  54.08 0.46   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.26]
*
    ADD [  0102+  0103]  0104  3  5.0   11.10    1.05 12.17  53.56  n/a   0.000
*
 ** CALIB NASHYD         0101  1  5.0    0.50    0.07 12.08  54.05 0.46   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
================================================================================
=========================


       V    V   I    SSSSS  U   U    A    L              (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\fc
416b02-cb0c-43f6-98d0-f06ff22f5eaf\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\fc
416b02-cb0c-43f6-98d0-f06ff22f5eaf\sce


DATE: 01-20-2020                          TIME: 09:08:09

USER:


COMMENTS: ____________________________________________________________


  ***********************************************
  ** SIMULATION : Run 17                       **
  ***********************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                6.0
    [ Ptot=193.00 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\973b8f8a-5cd7-4f19-8a04-8c7b3c954998\0a563640
-f9ce-42bd-85a5-39
    remark: Timmins

*
 ** CALIB NASHYD         0103  1  5.0   10.80    0.83  7.08 111.92 0.58   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.34]
*
 ** CALIB NASHYD         0102  1  5.0    0.30    0.02  7.00 112.80 0.58   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.26]
```

```
*
    ADD [  0102+  0103]  0104  3  5.0   11.10    0.85  7.08 111.94  n/a   0.000
*
 ** CALIB NASHYD         0101  1  5.0    0.50    0.04  7.00 112.73 0.58   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
 FINISH

================================================================================
========================
```

Project:	Hidden Ridge Subdivision Phase 2
File No.:	516655-02
Date:	August-2020
Designed By:	HY
Checked By:	JA
Subject:	Hydrologic Parameters

HIDDEN RIDGE SUBDIVISION PHASE 2

PROPOSED CONDITION

Rain Gauge: Township of Uxbridge IDF

Catchment 201 **Area** 0.5 ha 100-yr 24hr SCS Rainfall Depth: 119.04 mm

WEIGHTED CN VALUE																									
Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Cultivated			Impervious			Wetland/Lakes/SWMF			Average CN for Soil Type
				Type	Area	Percent	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	
FI	FARMINGTON	B	Loam or Silt Loam	2	0.5	1			60	0.50	1.00	69	0		65	0	0	74	0.00	0.00	100	0		50	69.0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	**0.5**	**1**	**0**	**0**		**0.5**	**1**		**0**	**0**		**0**	**0**		**0**	**0**		**0**	**0**		**69.0**
																								CN*(AMC II)	**67.0**
																								CN*(AMC III)	**82.4**

Time of Concentration Calculations

Initial Abstraction	**5.0 mm**

Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2
Wetland	12

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	257.50 m
Minimum Catchment Elevation	252.50 m
Catchment length	130 m
Catchment Slope	4%
Catchment Area	0.5 ha
Time of Concentration (Minutes)	**6.07**
Time of Concentration (Hours)	**0.10**
Time to Peak (2/3 x Time of Concentration)	**0.07**

Time to Peak	**0.22 hrs**

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	257.5 m
Minimum Catchment Elevation	252.5 m
Catchment length	130 m
Catchment Slope	4%
Catchment Area	0.5 ha
Time of Concentration (Minutes)	**19.54**
Time of Concentration (Hours)	**0.33**
Time to Peak (2/3 x Time of Concentration)	**0.22**

Runoff Coefficient	**0.28**

Landuse Type	Soil Series				
	FI	0	0	0	0
	2	#N/A	#N/A	#N/A	#N/A
Forest/Woodland	0.25	#N/A	#N/A	#N/A	#N/A
Cultivated	0.35	#N/A	#N/A	#N/A	#N/A
Pasture/Lawn	0.28	#N/A	#N/A	#N/A	#N/A
Impervious	0.95	#N/A	#N/A	#N/A	#N/A
Wetland/Lake/SWMF	0.05	#N/A	#N/A	#N/A	#N/A
Meadows	0.27	#N/A	#N/A	#N/A	#N/A
Soil Series Total	0.28	#N/A	#N/A	#N/A	#N/A

Project:	Hidden Ridge Subdivision Phase 2
File No.:	516655-02
Date:	August-2020
Designed By:	HY
Checked By:	JA
Subject:	Hydrologic Parameters

HIDDEN RIDGE SUBDIVISION PHASE 2

PROPOSED CONDITION

Catchment 202 **Area** 9.6 ha

Rain Gauge: Township of Uxbridge IDF
100-yr 24hr SCS Rainfall Depth: 119.04 mm

WEIGHTED CN VALUE

Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Cultivated			Impervious			Wetland/Lakes/SWMF			Average CN for Soil Type
				Type	Area	Percent	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	
FI	FARMINGTON	B	Loam or Silt Loam	2	9.6	1		0	60	8.40	0.87	69	0		65		0	74	1.00	0.10	100	0.2	0.0208	50	71.8
	#N/A	#N/A	#N/A	#N/A		0	0		#N/A			#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	**9.6**	**1**	**0**	**0**		**8.3978**	**0.87477083**		**0**	**0**		**0**	**0**		**1.0022**	**0.1044**		**0.2**	**0.02083**		**71.8**
																								CN*(AMC II)	**70.5**
																								CN*(AMC III)	**84.6**

Time of Concentration Calculations

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	256.500 m
Minimum Catchment Elevation	239 m
Catchment length	542 m
Catchment Slope	3%
Catchment Area	9.6 ha
Time of Concentration (Minutes)	**19.49**
Time of Concentration (Hours)	**0.32**
Time to Peak (2/3 x Time of Concentration)	**0.22**

Time to Peak	**0.43 hrs**

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	256.5 m
Minimum Catchment Elevation	239 m
Catchment length	542 m
Catchment Slope	3%
Catchment Area	9.6 ha
Time of Concentration (Minutes)	**38.91**
Time of Concentration (Hours)	**0.65**
Time to Peak (2/3 x Time of Concentration)	**0.43**

Initial Abstraction	**4.8 mm**

Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2
Wetland	12

Runoff Coefficient	**0.35**

Landuse Type	Soil Series				
	FI	0	0	0	0
	2	#N/A	#N/A	#N/A	#N/A
Forest/Woodland	0.25	#N/A	#N/A	#N/A	#N/A
Cultivated	0.35	#N/A	#N/A	#N/A	#N/A
Pasture/Lawn	0.28	#N/A	#N/A	#N/A	#N/A
Impervious	0.95	#N/A	#N/A	#N/A	#N/A
Wetland/Lake/SWMF	0.05	#N/A	#N/A	#N/A	#N/A
Meadows	0.27	#N/A	#N/A	#N/A	#N/A
Soil Series Total	0.345	#N/A	#N/A	#N/A	#N/A

Project:	Hidden Ridge Subdivision Phase 2
File No.:	516655-02
Date:	August-2020
Designed By:	HY
Checked By:	JA
Subject:	Hydrologic Parameters

HIDDEN RIDGE SUBDIVISION PHASE 2

PROPOSED CONDITION

Catchment 203 **Area** 0.7 ha

Rain Gauge: Township of Uxbridge IDF
100-yr 24hr SCS Rainfall Depth: 119.04 mm

WEIGHTED CN VALUE

Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Cultivated			Impervious			Wetland/Lakes/SWMF			Average CN for Soil Type
				Type	Area	Percent	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	
FI	FARMINGTON	B	Loam or Silt Loam	2	0.7	1		0	60	0.68	0.97	69	0		65		0	74	0.02	0.03	100	0	0	50	69.9
	#N/A	#N/A	#N/A	#N/A		0	0		#N/A			#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	**0.7**	**1**	**0**	**0**		**0.68**	**0.97142857**		**0**	**0**		**0**	**0**		**0.02**	**0.02857**		**0**	**0**		**69.9**
																								CN*(AMC II)	**68.1**
																								CN*(AMC III)	**83.1**

Time of Concentration Calculations

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	244.910	m
Minimum Catchment Elevation	238.5	m
Catchment length	122	m
Catchment Slope	5%	
Catchment Area	0.7	ha
Time of Concentration (Minutes)	**5.17**	
Time of Concentration (Hours)	**0.09**	
Time to Peak (2/3 x Time of Concentration)	**0.06**	

Time to Peak	**0.17 hrs**

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	244.91	m
Minimum Catchment Elevation	238.5	m
Catchment length	122	m
Catchment Slope	5%	
Catchment Area	0.7	ha
Time of Concentration (Minutes)	**15.26**	
Time of Concentration (Hours)	**0.25**	
Time to Peak (2/3 x Time of Concentration)	**0.17**	

Initial Abstraction	**4.9 mm**

Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2
Wetland	12

Runoff Coefficient	**0.37**

Landuse Type	Soil Series				
	FI	0	0	0	0
	2	#N/A	#N/A	#N/A	#N/A
Forest/Woodland	0.3	#N/A	#N/A	#N/A	#N/A
Cultivated	0.45	#N/A	#N/A	#N/A	#N/A
Pasture/Lawn	0.35	#N/A	#N/A	#N/A	#N/A
Impervious	0.95	#N/A	#N/A	#N/A	#N/A
Wetland/Lake/SWMF	0.05	#N/A	#N/A	#N/A	#N/A
Meadows	0.33	#N/A	#N/A	#N/A	#N/A
Soil Series Total	0.367	#N/A	#N/A	#N/A	#N/A

Project:	Hidden Ridge Subdivision Phase 2
File No.:	516655-02
Date:	August-2020
Designed By:	HY
Checked By:	JA
Subject:	Hydrologic Parameters

HIDDEN RIDGE SUBDIVISION PHASE 2

PROPOSED CONDITION

Catchment 204 **Area** 0.8 ha

Rain Gauge: Township of Uxbridge IDF
100-yr 24hr SCS Rainfall Depth: 119.04 mm

WEIGHTED CN VALUE

Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Cultivated			Impervious			Wetland/Lakes/SWMF			Average CN for Soil Type
				Type	Area	Percent	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	
FI	FARMINGTON	B	Loam or Silt Loam	2	0.8	1		0	60	0.78	0.98	69	0		65		0	74	0.02	0.03	100	0	0	50	69.8
	#N/A	#N/A	#N/A	#N/A		0	0		#N/A			#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	**0.8**	**1**	**0**	**0**		**0.78**	**0.975**		**0**	**0**		**0**	**0**		**0.02**	**0.025**		**0**	**0**		**69.8**
																								CN*(AMC II)	**68.0**
																								CN*(AMC III)	**83.0**

Time of Concentration Calculations

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	241.000 m
Minimum Catchment Elevation	238 m
Catchment length	78 m
Catchment Slope	4%
Catchment Area	0.8 ha
Time of Concentration (Minutes)	**3.47**
Time of Concentration (Hours)	**0.06**
Time to Peak (2/3 x Time of Concentration)	**0.04**

Time to Peak	**0.16 hrs**

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	241 m
Minimum Catchment Elevation	238 m
Catchment length	78 m
Catchment Slope	4%
Catchment Area	0.8 ha
Time of Concentration (Minutes)	**14.83**
Time of Concentration (Hours)	**0.25**
Time to Peak (2/3 x Time of Concentration)	**0.16**

Initial Abstraction	**4.9 mm**

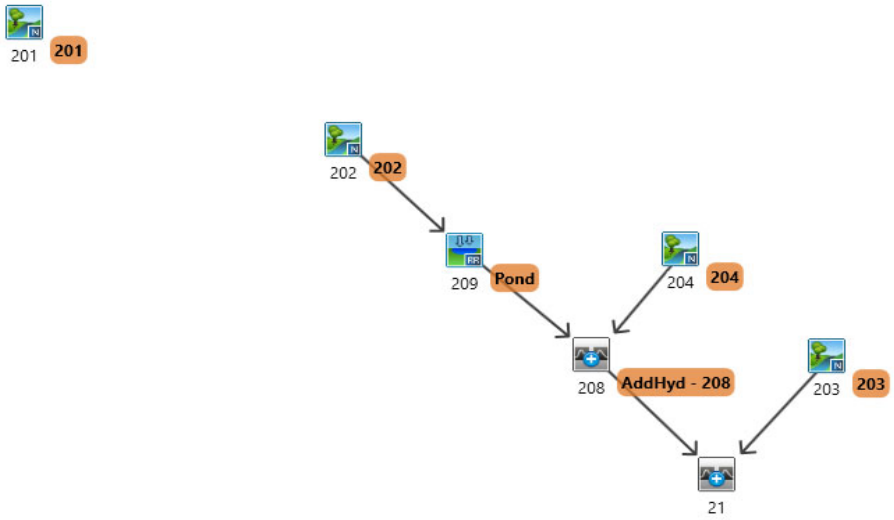
Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2
Wetland	12

Runoff Coefficient	**0.30**

Landuse Type	Soil Series				
	FI	0	0	0	0
	2	#N/A	#N/A	#N/A	#N/A
Forest/Woodland	0.25	#N/A	#N/A	#N/A	#N/A
Cultivated	0.35	#N/A	#N/A	#N/A	#N/A
Pasture/Lawn	0.28	#N/A	#N/A	#N/A	#N/A
Impervious	0.95	#N/A	#N/A	#N/A	#N/A
Wetland/Lake/SWMF	0.05	#N/A	#N/A	#N/A	#N/A
Meadows	0.27	#N/A	#N/A	#N/A	#N/A
Soil Series Total	0.297	#N/A	#N/A	#N/A	#N/A

Project:	Hidden Ridge Subdivision Phase 2
File No.:	516655-02
Date:	August-2020
Designed By:	OP
Checked By:	JA
Subject:	Hydrologic Model Schematic

HIDDEN RIDGE SUBDIVISION PHASE 2
HYDROLOGIC MODEL SCHEMATIC: POST DEVELOPMENT



Nashyd		Route Pipe		Duhyd	
Standhyd		Route Channel		Diverthyd	
Addhyd		Route Reservoir			

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================================================================================
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       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\c0
e84c9e-f40f-4039-b2ed-ac335b49e427\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\c0
e84c9e-f40f-4039-b2ed-ac335b49e427\sce


DATE: 01-20-2020                          TIME: 09:19:38

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 01                         **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                5.0
    [ Ptot= 25.00 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\db5f4eda
-dac5-4479-bde6-c6
    remark: 25mm

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.00  1.67   2.75 0.11   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.01  1.58   2.88 0.12   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.05  1.92   3.23 0.13   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:              0209  1  5.0    9.60    0.05  2.08   3.23  n/a   0.000
*
    ADD [  0204+  0209]   0208  3  5.0   10.40    0.05  2.08   3.20  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.01  1.58   2.89 0.12   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]   0021  3  5.0   11.10    0.06  2.08   3.18  n/a   0.000
*
================================================================================
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       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****
```

```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\ff
c4e61d-56dc-49d1-b518-c777bf53ce50\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\ff
c4e61d-56dc-49d1-b518-c777bf53ce50\sce


DATE: 01-20-2020                          TIME: 09:19:46

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COMMENTS: _____________________________________________________________


  ***********************************************
  ** SIMULATION : Run 02                        **
  ***********************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
    READ STORM                10.0
    [ Ptot= 34.17 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\9c1bb5f6
-66a1-4ac7-a118-06
    remark: 2yr 4hr CHI

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.01  1.58   5.51 0.16   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.01  1.50   5.74 0.17   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.11  1.83   6.36 0.19   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:              0209  1  5.0    9.60    0.10  2.00   6.36  n/a   0.000
*
    ADD [  0204+  0209]   0208  3  5.0   10.40    0.11  2.00   6.31  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.01  1.50   5.76 0.17   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]   0021  3  5.0   11.10    0.11  2.00   6.27  n/a   0.000
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\6d
5cba00-615f-4130-8273-86be1e299f43\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\6d
5cba00-615f-4130-8273-86be1e299f43\sce


DATE: 01-20-2020                          TIME: 09:19:41

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COMMENTS: _____________________________________________________________
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```
  ************************************************
  ** SIMULATION : Run 03                        **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                10.0
    [ Ptot= 47.36 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\e4053b51
-dfb0-41ff-9bfe-37
    remark: 5yr 4hr CHI

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.01  1.58  10.70 0.23   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.03  1.50  11.09 0.23   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.21  1.83  12.17 0.26   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:              0209  1  5.0    9.60    0.20  2.00  12.17  n/a   0.000
*
    ADD [  0204+  0209]  0208  3  5.0   10.40    0.21  2.00  12.09  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.02  1.50  11.13 0.23   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]  0021  3  5.0   11.10    0.22  1.92  12.03  n/a   0.000
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L              (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\c8
375f72-4e89-4010-8417-4ab31e56d60d\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\c8
375f72-4e89-4010-8417-4ab31e56d60d\sce


DATE: 01-20-2020                          TIME: 09:19:43

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COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 04                        **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                10.0
    [ Ptot= 55.80 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\6d0b5a5e
-5c8e-4ccb-aa01-28
    remark: 10yr 4hr CHI

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.02  1.50  14.65 0.26   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
```

```
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.04  1.50  15.14 0.27   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.30  1.83  16.53 0.30   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:              0209  1  5.0    9.60    0.28  2.00  16.53  n/a   0.000
*
    ADD [  0204+  0209]  0208  3  5.0   10.40    0.29  2.00  16.43  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.03  1.50  15.19 0.27   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]  0021  3  5.0   11.10    0.30  1.92  16.35  n/a   0.000
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\e0
6850e4-6d44-46c7-ada4-40aef90efc51\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\e0
6850e4-6d44-46c7-ada4-40aef90efc51\sce
```

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DATE: 01-20-2020                          TIME: 09:19:45

USER:


COMMENTS: _____________________________________________________


  ************************************************
  ** SIMULATION : Run 05                        **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
    READ STORM                10.0
    [ Ptot= 65.22 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\58795a66
-57fa-4c18-9d5b-c7
    remark: 25yr 4hr CHI

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.03  1.50  19.54 0.30   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.05  1.42  20.16 0.31   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.40  1.83  21.89 0.34   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:              0209  1  5.0    9.60    0.38  2.00  21.89  n/a   0.000
*
    ADD [  0204+  0209]  0208  3  5.0   10.40    0.39  1.92  21.76  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.05  1.42  20.22 0.31   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]  0021  3  5.0   11.10    0.41  1.92  21.66  n/a   0.000
*
```

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=========================


       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\5c
ca0253-69e8-4df4-8abe-f9a8502fe96a\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\5c
ca0253-69e8-4df4-8abe-f9a8502fe96a\sce


DATE: 01-20-2020                          TIME: 09:19:40

USER:


COMMENTS: _____________________________________________________________


  ***********************************************
  ** SIMULATION : Run 06                       **
  ***********************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                10.0
    [ Ptot= 83.51 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\9c520b38
-f138-47d6-a306-44
    remark: 100yr 4hr CHI

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.05  1.50  30.23 0.36   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.09  1.42  31.08 0.37   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.65  1.83  33.48 0.40   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:              0209  1  5.0    9.60    0.59  2.00  33.48  n/a   0.000
*
    ADD [  0204+  0209]  0208  3  5.0   10.40    0.61  2.00  33.30  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.08  1.42  31.16 0.37   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]  0021  3  5.0   11.10    0.64  2.00  33.16  n/a   0.000
*
================================================================================
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       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****
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```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\47
d63840-48d8-4092-8479-6e19f6fa687b\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\47
d63840-48d8-4092-8479-6e19f6fa687b\sce


DATE: 01-20-2020                          TIME: 09:20:18

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 07                         **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
    READ STORM                 5.0
    [ Ptot= 43.70 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\f154648f
-d6dc-42fd-b206-8a
    remark: 2yr 12hr SCS

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.01  6.17   9.13 0.21   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.02  6.17   9.47 0.22   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.17  6.42  10.42 0.24   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:             0209  1  5.0    9.60    0.16  6.58  10.42  n/a   0.000
*
    ADD [  0204+  0209]  0208  3  5.0   10.40    0.16  6.58  10.35  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.02  6.17   9.51 0.22   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]  0021  3  5.0   11.10    0.17  6.58  10.30  n/a   0.000
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L              (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\0a
893649-0824-417f-ba41-5cbff3a2f202\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\0a
893649-0824-417f-ba41-5cbff3a2f202\sce


DATE: 01-20-2020                          TIME: 09:19:51

USER:


COMMENTS: _____________________________________________________________
```

```
  ************************************************
  ** SIMULATION : Run 08                        **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                 5.0
    [ Ptot= 60.50 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\af1dd4e8
-0e28-4a0e-81e8-9c
    remark: 5yr 12hr SCS

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.02  6.17  17.03 0.28   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.04  6.17  17.59 0.29   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.31  6.42  19.15 0.32   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:             0209  1  5.0    9.60    0.29  6.58  19.15  n/a   0.000
*
    ADD [  0204+  0209]  0208  3  5.0   10.40    0.30  6.58  19.03  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.04  6.17  17.64 0.29   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]  0021  3  5.0   11.10    0.32  6.58  18.94  n/a   0.000
*
================================================================================
=========================


       V    V   I    SSSSS  U   U    A    L              (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\15
f4a000-fa7e-4a60-937b-a763cc3ee8e7\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\15
f4a000-fa7e-4a60-937b-a763cc3ee8e7\sce


DATE: 01-20-2020                          TIME: 09:19:56

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COMMENTS: ___________________________________________________________


  ************************************************
  ** SIMULATION : Run 09                        **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                 5.0
    [ Ptot= 71.20 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\3e87cb3c
-c368-4709-82bb-90
    remark: 10yr 12hr SCS

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.03  6.17  22.88 0.32   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
```

```
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.06  6.08  23.57 0.33   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.42  6.42  25.53 0.36   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:              0209  1  5.0    9.60    0.39  6.58  25.53  n/a   0.000
*
    ADD [  0204+  0209]  0208  3  5.0   10.40    0.41  6.58  25.38  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.05  6.08  23.64 0.33   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]  0021  3  5.0   11.10    0.42  6.50  25.27  n/a   0.000
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\02
67e1f7-365a-46de-b120-b820e16ad2bc\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\02
67e1f7-365a-46de-b120-b820e16ad2bc\sce

DATE: 01-20-2020                          TIME: 09:19:48

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COMMENTS: _____________________________________________________


  ********************************************
  ** SIMULATION : Run 10                     **
  ********************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha    '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
   READ STORM                  5.0
   [ Ptot= 83.80 mm ]
   fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\6d7aa051
-e460-4620-9151-71
   remark: 25yr 12hr SCS

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.04  6.17  30.41 0.36   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.08  6.08  31.26 0.37   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.56  6.42  33.68 0.40   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:              0209  1  5.0    9.60    0.51  6.58  33.68  n/a   0.000
*
    ADD [  0204+  0209]  0208  3  5.0   10.40    0.53  6.58  33.49  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.07  6.08  31.35 0.37   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]  0021  3  5.0   11.10    0.55  6.58  33.36  n/a   0.000
*
```

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=========================


       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\ca
33b8f7-f136-421d-baf6-826661c2577a\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\ca
33b8f7-f136-421d-baf6-826661c2577a\sce


DATE: 01-20-2020                          TIME: 09:20:36

USER:


COMMENTS: _____________________________________________________________


  ***********************************************
  ** SIMULATION : Run 11                       **
  ***********************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                5.0
    [ Ptot=104.10 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\7b117713
-0d86-4039-a916-18
    remark: 100yr 12hr SCS

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.06  6.17  43.74 0.42   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.11  6.08  44.83 0.43   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.80  6.42  47.96 0.46   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:              0209  1  5.0    9.60    0.78  6.50  47.96  n/a   0.000
*
    ADD [  0204+  0209]   0208  3  5.0   10.40    0.82  6.50  47.72  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.10  6.08  44.94 0.43   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]   0021  3  5.0   11.10    0.85  6.50  47.54  n/a   0.000
*
================================================================================
=========================


       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****
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```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\a1
e2df38-35d5-43f0-b162-6248d4015aae\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\a1
e2df38-35d5-43f0-b162-6248d4015aae\sce


DATE: 01-20-2020                          TIME: 09:20:29

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 12                         **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
    READ STORM                15.0
    [ Ptot= 50.73 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\f16d20f6
-7be4-410f-bac3-a2
    remark: 2yr 24hr SCS

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.01 12.08  12.22 0.24   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.03 12.08  12.65 0.25   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.19 12.33  13.86 0.27   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:              0209  1  5.0    9.60    0.18 12.50  13.86  n/a   0.000
*
    ADD [  0204+  0209]   0208  3  5.0   10.40    0.19 12.50  13.76  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.02 12.08  12.70 0.25   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]   0021  3  5.0   11.10    0.19 12.42  13.70  n/a   0.000
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L              (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\2e
8d4f36-f03a-48c4-aa10-6c1ab5454782\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\2e
8d4f36-f03a-48c4-aa10-6c1ab5454782\sce


DATE: 01-20-2020                          TIME: 09:20:04

USER:


COMMENTS: _____________________________________________________________
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  ************************************************
  ** SIMULATION : Run 13                        **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                15.0
    [ Ptot= 70.11 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\62e099ad
-7b0a-44a0-927c-76
    remark: 5yr 24hr SCS

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.03 12.08  22.26 0.32   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.05 12.08  22.94 0.33   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.35 12.33  24.85 0.35   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:              0209  1  5.0    9.60    0.32 12.50  24.85  n/a   0.000
*
    ADD [  0204+  0209]  0208  3  5.0   10.40    0.34 12.50  24.71  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.04 12.08  23.00 0.33   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]  0021  3  5.0   11.10    0.35 12.42  24.60  n/a   0.000
*
================================================================================
=========================


       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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 M  O   O
         OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\47
50a5f1-2b3e-4bff-af0f-81a214636f9f\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\47
50a5f1-2b3e-4bff-af0f-81a214636f9f\sce


DATE: 01-20-2020                          TIME: 09:20:11

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Run 14                        **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                15.0
    [ Ptot= 82.55 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\76727b81
-65ef-4036-af3e-cc
    remark: 10yr 24hr SCS

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.04 12.08  29.64 0.36   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
```

```
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.07 12.08  30.47 0.37   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.47 12.33  32.85 0.40   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:              0209  1  5.0    9.60    0.42 12.50  32.85  n/a   0.000
*
    ADD [  0204+  0209]  0208  3  5.0   10.40    0.44 12.50  32.66  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.06 12.08  30.56 0.37   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]  0021  3  5.0   11.10    0.46 12.50  32.53  n/a   0.000
*
================================================================================
========================


       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\98
28f700-3538-4e6b-936f-09e1611ec7ac\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\98
28f700-3538-4e6b-936f-09e1611ec7ac\sce
```

```
DATE: 01-20-2020                          TIME: 09:20:21

USER:


COMMENTS: _____________________________________________________


  ********************************************
  ** SIMULATION : Run 15                     **
  ********************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha    '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
    READ STORM                15.0
    [ Ptot= 96.19 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\7fc6ee65
-9b89-4625-8cea-56
    remark: 25yr 24hr SCS

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.05 12.08  38.39 0.40   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.09 12.00  39.39 0.41   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.60 12.33  42.25 0.44   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:              0209  1  5.0    9.60    0.54 12.50  42.25  n/a   0.000
*
    ADD [  0204+  0209]  0208  3  5.0   10.40    0.56 12.50  42.03  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.08 12.00  39.49 0.41   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]  0021  3  5.0   11.10    0.58 12.50  41.87  n/a   0.000
*
```

```
================================================================================
=========================


       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\f7
9f8515-2156-4c6c-8708-9d7fd6aba8f8\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\f7
9f8515-2156-4c6c-8708-9d7fd6aba8f8\sce


DATE: 01-20-2020                          TIME: 09:20:39

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 16                         **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                15.0
    [ Ptot=118.68 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\c31e0960
-3f0a-427b-a72f-14
    remark: 100yr 24hr SCS

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.07 12.08  54.05 0.46   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.12 12.00  55.29 0.47   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.85 12.33  58.90 0.50   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:              0209  1  5.0    9.60    0.86 12.42  58.90  n/a   0.000
*
    ADD [  0204+  0209]  0208  3  5.0   10.40    0.90 12.42  58.62  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.11 12.00  55.42 0.47   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]  0021  3  5.0   11.10    0.93 12.42  58.42  n/a   0.000
*
 FINISH

================================================================================
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================================================================================
=========================


       V    V   I    SSSSS  U   U    A    L             (v 6.0.2000)
       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
Developed and Distributed by Civica Infrastructure
```
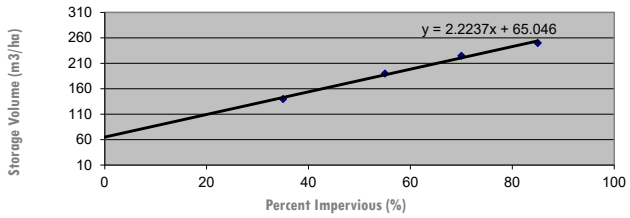

```
                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.0\VO2\voin.dat

  Output  filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\1b
192a00-171d-4b3c-86c8-f1897d1d11fd\sce
  Summary filename:
C:\Users\ABartzou\AppData\Local\Civica\VH5\c5f4e9d2-cf43-4fbd-a5d2-816693ef7366\1b
192a00-171d-4b3c-86c8-f1897d1d11fd\sce


DATE: 01-20-2020                          TIME: 09:20:00

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 17                         **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
    READ STORM                  6.0
    [ Ptot=193.00 mm ]
    fname :
C:\Users\ABartzou\AppData\Local\Temp\ca715e47-a4d1-44c9-8d2d-d6367bdce783\0a563640
-f9ce-42bd-85a5-39
    remark: Timmins

*
 ** CALIB NASHYD         0201  1  5.0    0.50    0.04  7.00 112.73 0.58   0.000
    [CN=67.0         ]
    [ N = 3.0:Tp 0.22]
*
 ** CALIB NASHYD         0204  1  5.0    0.80    0.07  7.00 114.60 0.59   0.000
    [CN=68.0         ]
    [ N = 3.0:Tp 0.17]
*
 ** CALIB NASHYD         0202  1  5.0    9.60    0.75  7.08 120.26 0.62   0.000
    [CN=70.5         ]
    [ N = 3.0:Tp 0.43]
*
 ** Reservoir
    OUTFLOW:             0209  1  5.0    9.60    0.76  7.17 120.26  n/a   0.000
*
    ADD [  0204+  0209]  0208  3  5.0   10.40    0.81  7.17 119.83  n/a   0.000
*
 *  CALIB NASHYD         0203  1  5.0    0.70    0.06  7.00 114.81 0.59   0.000
    [CN=68.1         ]
    [ N = 3.0:Tp 0.17]
*
    ADD [  0203+  0208]  0021  3  5.0   11.10    0.86  7.17 119.51  n/a   0.000
*
```

TATHAM ENGINEERING	Project:	Hidden Ridge Subdivision Phase 2	Date:	August-2020
	File No.:	516655-02	Designed By:	OP
	Subject:	Wet SWM Pond Water Quality Calculations	Checked By:	JA



MECP Water Quality Storage Volumes

Table 3.2 Values

% imp	storage (m^3/ha)
35	140
55	190
70	225
85	250

(Enahnced 80% long-term TSS Removal)

WET SWM POND (Catchment 202)

Contributing area:	9.60 ha
Catchment imperviousness:	10%
MECP Storage Volume Required:	88.3 m^3/ha
Required MECP Water Quality Storage Volume:	463.3 m^3
Extended Detention Storage Volume:	384.0 m^3
25 mm Runoff Volume:	309.7 m^3
Permanent Pool Storage Volume Available:	997.8 m^3

Project:	Hidden Ridge Subdivision Phase 2
File No.:	516655-02
Date:	August-2020
Designed By:	HY
Checked By:	JA
Subject:	Wet SWM Pond Stage-Volume Table

Wet SWM Pond STAGE- VOLUME TABLE

Elevation	Depth	Increasing Area	Accum. Area	Volume	Accum. Dead Volume	Accum. Active Volume	Accum. Total
(m)	(m)	(m^2)	(m^2)	(m^3)	(m^3)	(m^3)	(m^3)
237.15	0.00	0.00	790.80	0.0	0.0	0.00	0.0
237.25	0.10	38.78	829.58	81.0	81.0	0.00	81.0
237.35	0.20	39.70	869.28	84.9	165.9	0.00	165.9
237.45	0.30	40.63	909.91	89.0	254.9	0.00	254.9
237.55	0.40	41.56	951.47	93.1	348.0	0.00	348.0
237.65	0.50	42.49	993.96	97.3	445.2	0.00	445.2
237.75	0.60	43.42	1037.38	101.6	546.8	0.00	546.8
237.85	0.70	44.34	1081.72	105.9	652.7	0.00	652.7
237.95	0.80	45.27	1127.00	110.4	763.2	0.00	763.2
238.05	0.90	46.20	1173.20	115.0	878.2	0.00	878.2
238.15	1.00	47.13	1220.33	119.7	997.8	0.00	997.8
238.25	1.10	48.06	1268.38	124.4	997.8	124.4	1122.3
238.35	1.20	48.99	1317.37	129.3	997.8	253.7	1251.5
238.45	1.30	49.91	1367.28	134.2	997.8	387.9	1385.8
238.55	1.40	50.84	1418.12	139.3	997.8	527.2	1525.0
238.65	1.50	51.77	1469.89	144.4	997.8	671.6	1669.4
238.75	1.60	52.70	1522.59	149.6	997.8	821.2	1819.0
238.85	1.70	53.63	1576.22	154.9	997.8	976.1	1974.0
238.95	1.80	54.55	1630.77	160.3	997.8	1136.5	2134.3
239.05	1.90	55.48	1686.25	165.8	997.8	1302.3	2300.2
239.15	2.00	56.41	1742.66	171.4	997.8	1473.8	2471.6
239.25	2.10	57.34	1800.00	177.1	997.8	1153.3	2648.7

Project :	Hidden Ridge Subdivision Phase 2
File No.:	516655-2
Date:	August-2020
Designed By:	HY
Checked By:	JA
Subject:	Post Dev. Impervious Area Calculations

Impervious Area Calculations

202	**Area (ha)**
row	0.531
Building+driveway	0.471
Total Impervious Area (ha)	**1.002**

203	**Area (ha)**
row	0.000
Building+driveway	0.020
Total Impervious Area (ha)	**0.020**

204	**Area (ha)**
row	0.000
Building+driveway	0.020
Total Impervious Area (ha)	**0.020**

TATHAM ENGINEERING	Project:	Hidden Ridge Subdivision Phase 2	Date:	August-2020
	File No.:	516655-02	Designed By:	HY
	Subject:	Road Ditch Capacity Calcs.	Checked By:	JA

Ditch Description - **Enhanced Road Ditch at Maximum 5.0%**

Ditch Characteristics

Channel Depth	Channel Type	Manning's N	Base Width	Side Slopes	Min. Slope
0.70 m	Grass Ditch	0.035	0.50 m	3H : 1V	5.00%

Storm Conditions		Ditch Flow Conditions					
Return Period	Peak Flow (m^3/s)	Flow Depth	Area (m^2)	WP	R	Q (m^3/s)	V (m/s)
100-year	0.424	0.219	0.25	1.88	0.13	0.424	1.68
25mm	0.026	0.052	0.03	0.83	0.04	0.026	0.76

Comments:

1. 0.052 m^3/s is combined 25 mm storm peak flow from catchment 202. 0.026 m3/s is the approximate peak flow in each ditch.
2. Velocity is > 0.5 m/s therefore permanent 0.5 m high earth berms are proposed to protect the ditches from erosion.
3. 0.847 m^3/s is combined 100-year storm peak flow from catchment 202. 0.424 m3/s is the approximate peak flow in each ditch.
4. Nilex SC 250 Turf reinforcement is proposed to reduce the potential for erosion in the ditches.

Ditch Description - **Enhanced Road Ditch at Minimum 2.0%**

Ditch Characteristics

Channel Depth	Channel Type	Manning's N	Base Width	Side Slopes	Min. Slope
0.70 m	Grass Ditch	0.035	0.50 m	3H : 1V	2.00%

Storm Conditions		Ditch Flow Conditions					
Return Period	Peak Flow (m^3/s)	Flow Depth	Area (m^2)	WP	R	Q (m^3/s)	V (m/s)
100-year	0.424	0.270	0.35	2.21	0.16	0.423	1.19
25mm	0.026	0.068	0.05	0.93	0.05	0.027	0.56

Comments:

1. 0.052 m^3/s is combined 25 mm storm peak flow from catchment 202. 0.026 m3/s is the approximate peak flow in each ditch.
2. Velocity is > 0.5 m/s therefore permanent 0.5 m high earth berms are proposed to protect the ditches from erosion.
3. 0.847 m^3/s is combined 100-year storm peak flow from catchment 202. 0.424 m3/s is the approximate peak flow in each ditch.
4. Nilex SC 250 Turf reinforcement is proposed to reduce the potential for erosion in the ditches.

$Q = (1.00/n)AR^{2/3}S^{1/2}$

Where Q = Peak Flow (m^3)
n = Roughness Coefficient
A = Cross Sectional Area (m^2)
R = Hydraulic Radius
S = Channel Slope (m/m)

TATHAM ENGINEERING	Project:	Hidden Ridge Subdivision Phase 2	Date:	August-2020
	File No.:	516655-02	Designed By:	HY
	Subject:	Road Ditch Capacity Calcs.	Checked By:	JA

Ditch Description - **Enhanced Road Ditch at East Cul-De-Sac - 3.5%**

Ditch Characteristics

Channel Depth	Channel Type	Manning's N	Base Width	Side Slopes	Min. Slope
0.70 m	Grass Ditch	0.035	0.50 m	3H : 1V	3.50%

Storm Conditions		Ditch Flow Conditions					
Return Period	**Peak Flow (m^3/s)**	**Flow Depth**	**Area (m^2)**	**WP**	**R**	**Q (m^3/s)**	**V (m/s)**
100-year	**0.424**	**0.238**	**0.29**	**2.00**	**0.14**	**0.424**	**1.47**
25mm	**0.026**	**0.058**	**0.04**	**0.86**	**0.04**	**0.026**	**0.67**
Comments:							

1. 0.052 m^3/s is combined 25 mm storm peak flow from catchment 202. 0.026 m3/s is the approximate peak flow in each ditch.

2. Velocity is > 0.5 m/s therefore permanent 0.5 m high earth berms are proposed to protect the ditches from erosion.

3. 0.847 m^3/s is combined 100-year storm peak flow from catchment 202. 0.424 m3/s is the approximate peak flow in each ditch.

4. Nilex SC 250 Turf reinforcement is proposed to reduce the potential for erosion in the ditches.

$Q = (1.00/n)AR^{2/3}S^{1/2}$

Where Q = Peak Flow (m^3)

n = Roughness Coefficient

A = Cross Sectional Area (m^2)

R = Hydraulic Radius

S = Channel Slope (m/m)

TATHAM ENGINEERING	**Project:**	Hidden Ridge Subdivision Phase 2	**Date:**	August-2020
	File No.:	516655-02	**Designed By:**	HY
	Subject:	Easement Capacity Calcs.	**Checked By:**	JA

Ditch Description - **Easement at Minimum 1%**

Ditch Characteristics

Channel Depth	Channel Type	Manning's N	Base Width	Side Slopes	Min. Slope
0.80 m	Grass Ditch	0.035	1.20 m	3H : 1V	1.00%

Storm Conditions		Ditch Flow Conditions					
Return Period	**Peak Flow (m^3/s)**	**Flow Depth**	**Area (m^2)**	**WP**	**R**	**Q (m^3/s)**	**V (m/s)**
100-year	**0.847**	**0.351**	**0.79**	**3.42**	**0.23**	**0.851**	**1.08**
25mm	**0.052**	**0.078**	**0.11**	**1.69**	**0.07**	**0.052**	**0.47**
Comments:							
Peak Flow 0.847m^3 /s is from catchment 202 During the 100 year 24 hour SCS storm							

$Q = (1.00/n)AR^{2/3}S^{1/2}$

Where Q = Peak Flow (m^3)

n = Roughness Coefficient

A = Cross Sectional Area (m^2)

R = Hydraulic Radius

S = Channel Slope (m/m)

TATHAM ENGINEERING	**Project:**	Hidden Ridge Subdivision Phase 2	**Date:**	August-2020
	File No.:	516655	**Designed By:**	OP
	Subject:	Phosphorus Calculations	**Checked By:**	JA

Existing Phosphorus Loading Calculations
Catchments 101, 102 and 103

Pervious Area Assumed as **Pasture**	11.60	ha
Pasture Phosphorus loading (kg/ha/yr)	0.08	kg/ha/yr
Pasture Site Ploading	**0.93**	kg/yr
Total Existing Site Unmitigated Loading:	**0.93**	**kg/yr**

Proposed Phosphorus Loading Calculations

Phosphorus Removal Efficiencies

Soakaway Pits:	**70%**
Enhanced Grassed Swales (Ditches):	**34%**
Vegetated Filter Strip:	**65%**
SWM Pond:	**60%**

Notes:

Removal efficiency of enhanced grass swales is based on the low end of the range (34%-55%).
Removal efficiency of soakaway pits are based on end of the range (50%-70%).
As reported in Table 11 of the Hutchinson Environmental Sciences Ltd. Managing New Urban Development in Phosphorus-Sensitive Watersheds report, October 31, 2014.

Catchment 201

Impervious Area Assumed as **High-Intensity** Residential (**1.32 kg/ha/yr**):	**0.00**	ha
Pervious Area Assumed as **Low-Intensity** Residential **(0.17 kg/ha/yr)**:	**0.50**	ha
Total Unmitigated Loading:	**0.09**	**kg/yr**

P Loading Reduction of Pervious Area via **Vegetated Filter Strip**

(assuming 65% P Loading reduction) (0.17 kg/ha/yr) x (0.50 ha) x 65%= **0.06** kg/yr

Catchment 202

Impervious Area Assumed as **High-Intensity** Residential (**1.32 kg/ha/yr**):	**1.00**	ha
Pervious Area Assumed as **Low-Intensity** Residential **(0.17 kg/ha/yr)**:	**8.60**	ha
Total Unmitigated Loading:	**2.78**	**kg/yr**
Impervious Area excluding 50% rooftop area= 0.76 ha - 200 m^2/roof x 50% x 14 roofs:	**0.86**	ha
P Loading Reduction via **Road Ditches** (Excluding 50% rooftop area) (assuming 77% P Loading reduction) (1.32 kg/ha/yr) x (0.65 ha) x 34%=	**0.39**	kg/yr
Impervious Area of 50% rooftop area = 200 m^2/roof x 50% x 14 roofs:	**0.140**	ha
P Loading Reduction of 50% Roof Area via Proposed **Soakaway Pits**: (assuming 70% P Loading reduction) (1.32 kg/ha/yr) x (0.11 ha) x 70%=	**0.13**	kg/yr
P Loading Reduction of 50% Roof Area via **Road Ditches** (assuming 77% P Loading reduction) [(1.32 kg/ha/yr) x (0.11 ha) x (1-0.7)] x 34%=	**0.02**	kg/yr
P Loading Reduction of Pervious Area via **Road Ditches** (assuming 77% P Loading reduction) (0.17 kg/ha/yr) x (6.54 ha) x 34%=	**0.50**	kg/yr
P Loading Reduction of Impervious Area via **SWM Pond** (assuming 60% P Loading reduction)[(1.32 kg/ha/yr) x (0.76 ha)- 0.66 (kg/yr)- 0.10 (kg/yr) - 0.03 (kg/yr)] x 60%=	**0.47**	kg/yr
P Loading Reduction of Pervious Area via **SWM Pond** (assuming 60% P Loading reduction) [(0.17 kg/ha/yr) x (6.54 ha) - 0.86 (kg/yr)] x 60%=	**0.58**	kg/yr

Catchment 203

Impervious Area Assumed as **High-Intensity** Residential (**1.32 kg/ha/yr**):	**0.02**	ha
Pervious Area Assumed as **Low-Intensity** Residential **(0.17 kg/ha/yr)**:	**0.68**	ha
Total Unmitigated Loading:	**0.14**	**kg/yr**

P Loading Reduction of Pervious Area via **Vegetated Filter Strip**
(assuming 65% P Loading reduction) (0.17 kg/ha/yr) x (0.50 ha) x 65%= **0.08** kg/yr

P Loading Reduction of Impervious Area via **Vegetated Filter Strip**
(assuming 65% P Loading reduction) (1.32 kg/ha/yr) x (0.50 ha) x 65%= **0.02** kg/yr

Catchment 204

Impervious Area Assumed as **High-Intensity** Residential (**1.32 kg/ha/yr**):	**0.02**	ha
Pervious Area Assumed as **Low-Intensity** Residential **(0.17 kg/ha/yr)**:	**0.78**	ha
Total Unmitigated Loading:	**0.16**	**kg/yr**

P Loading Reduction of Pervious Area via **Vegetated Filter Strip**
(assuming 65% P Loading reduction) (0.17 kg/ha/yr) x (0.50 ha) x 65%= **0.09** kg/yr

P Loading Reduction of Impervious Area via **Vegetated Filter Strip**
(assuming 65% P Loading reduction) (1.32 kg/ha/yr) x (0.50 ha) x 65%= **0.02** kg/yr

Summary

Total Site P Loading without mitigation	**3.17** kg/yr
Total Site P Loading Reduction	**2.33** kg/yr
	74 %
Total Site P Loading with mitigation	**0.84** kg/yr