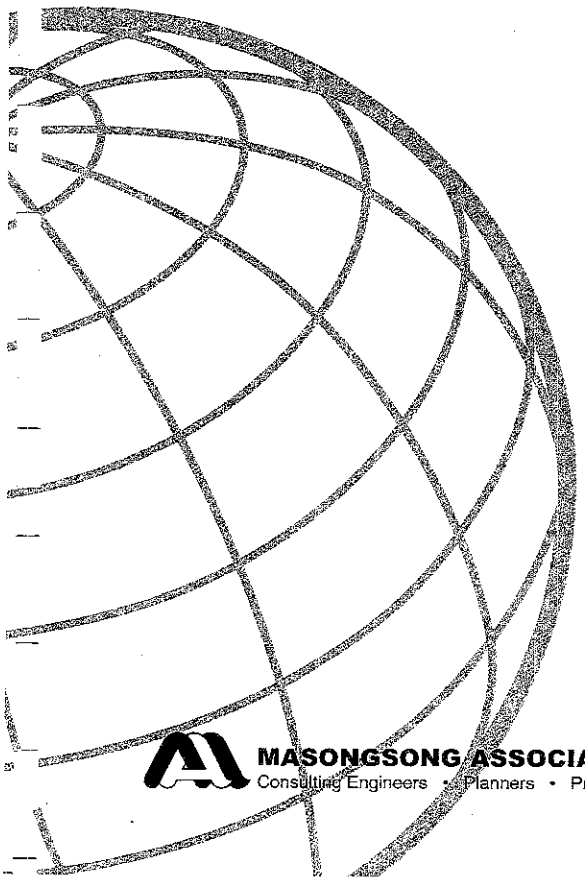
Proposed Mixed-Density Condominium Residential Development
Millford Development Limited • Town of Newmarket

Functional Servicing and Stormwater Management Report

March 2011



MASONGSONG ASSOCIATES ENGINEERING LIMITED
Consulting Engineers • Planners • Project Managers

MAEL Project 99-598

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

PROPOSED MIXED DENSITY CONDOMINIUM RESIDENTIAL DEVELOPMENT

IN THE

TOWN OF NEWMARKET

For

Millford Development Limited

March 2011

Prepared By:

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MAEL Project: 99-598

1.0 INTRODUCTION

Masongsong Associates Engineering Limited has been retained by Millford Development Limited, to prepare this Functional Servicing and Stormwater Management report for a proposed mixed density condominium residential development.

This report will outline the criteria and standards that have been implemented in the design of the site, and will demonstrate how the site fits within the framework of existing receiving systems located along Eagle Street. This report will also describe the stormwater management controls proposed within the subject site in order to meet the established outflow targets outlined in current Town of Newmarket Design Standards and Criteria.

1.1 Planning and Land Use Context

The subject site comprises of two development blocks and a stormwater detention pond area. The total development area of parcels A and B is approximately 2.0 ha (4.87ac), and the pond block area is approximately 0.21ha (0.52ac).

The subject site fronts onto Eagle Street, east of Yonge Street, between Dixon Blvd and Donlin Ave. It is bounded to the north by Western Creek which is tributary to the East Holland River in the Town of Newmarket; to the west by existing commercial/industrial sites and to the east by residential developments. Figure 1 in Appendix A illustrates the location of the subject site. A draft plan of subdivision is also included in Appendix A as Drawing SP1 (dated May 2010).

The subject site is currently vacant and it is proposed to be developed as two separate condominium entities as follows:

High Rise Condominium (Parcel A)

The high-rise condominium will comprise one 12-storey high-rise tower, massed in the northern portion of Parcel A. The condominium tower occupies a site area of approximately 0.78 ha, and will support 154 residential units with below-grade parking. Primary vehicular entry is proposed from a 7.5 m wide private laneway located at the west limit of the site off Eagle Street and east of Dixon Boulevard.

Townhouse Condominium (Parcel B)

A separate condominium entity will be created for Parcel B, which comprises 38 townhouse units situated on a site area of approximately 1.0 ha. A proposed private road, 8.50m wide, will provide vehicular access to this condominium, located approximately 190m to the east of Dixon Boulevard off Eagle Street

2.0 EXISTING CONDITIONS

2.1 Topography

The existing topographic survey indicates that the lands generally slope from the southwest to the northeast, with a 10.5m grade differential, ranging from a height of 267.0m on the table land, to a low of 256.5m at the base of the valley feature. The peak elevation is located on the southwest corner near Eagle Street, while the low elevations are on the opposite corner at the top of bank as established by Lake Simcoe Regional Conservation Authority (LSRCA) on April 2009.

A topographic and legal survey plan prepared by Young and Young Surveying Inc. are included in Appendix A as Drawings TP1 and TP2.

The northerly portion of the site is bounded by Western Creek which is a tributary of the East Holland River. The tributary runs in a north-easterly direction and traverses the north side of the subject lands. As mentioned in the *Tree Inventory Report* (C.V. Bentley, 2007), remnants of planted areas of trees and shrubs suggest that the property was previously a residence or farm. Open areas, indicating old fields or other disturbed areas, are being colonized naturally by invasive or early successional species. There are no natural areas of native forest observed in the proposed area of development.

A 6m wide buffer zone was established by LSRCA on April 16, 2009. The subject development will be located outside of the buffer zone, and is proposed to maintain undisturbed any existing vegetation growing on and below the top of bank.

The *Tree Inventory Report* is included in Appendix C for reference.

2.2 Existing Sewer Systems

Through a review of Town archives and drawings of the surrounding road network, it is known that a 250 mm diameter sanitary sewer, a 300 mm diameter storm sewer and 300 mm diameter watermain are available along Eagle Street.

Research of the Town archives was unable to locate design sheets or other hydraulic calculations for the existing Eagle Street sewer systems. However it is confirmed that a 250mm diameter sanitary sewer and a 300mm diameter storm sewer are draining easterly to service the surrounding area based on a plan a profile drawing of Eagle Street and a sketch (Operation Storm Network 2009) provided by the Town of Newmarket. The plan and profiles and sketch are enclosed on Appendix C of this report.

In order to determine the residual capacity of the existing storm sewer system on Eagle Street, a drainage plan and a design sheet was prepared by this office. An overall runoff coefficient of 0.45 was assumed for the existing residential development draining to this system; as the actual storm sewer slopes are not shown on the drawings provided by the Town, it was assumed that the existing pipe slope is similar to the sanitary sewer slope.

Both, the storm drainage plan (Figure 2) and the storm design sheet (Table B1) are enclosed on Appendix B.

2.3 Water Supply and Distribution

The surrounding development provides for a strong and well-looped water distribution network, with a connection to the boundary main on Yonge Street. An existing 300 mm diameter municipal main running along Eagle Street is available to service the subject site.

It is recommended that on-site hydrant flow- and pressure-tests be carried out prior to detailed design to ascertain the available operating range of the existing municipal water system.

3.0 SERVICING FEASIBILITY

3.1 Site Grading

The existing grading pattern indicates that the subject site drains naturally in a north easterly direction towards Western Creek. It is proposed to maintain the existing drainage pattern on the subject site.

More specifically, on the high rise condominium local low points will be created to redirect the minor runoff to on-site storage facilities and the major overland flow will overtop these facilities to continue overland through the internal roads to ultimately discharge into the Western Creek.

Likewise, the lots in the Townhouse Condominium area will be designed with front drainage grades to ensure that the majority of the overland flow will be intercepted by the proposed private road and conveyed safely overland to the lowest area located at the north east corner where it is proposed to construct a stormwater management facility. In the event that front drainage grades are not feasible on some of the lots, a rear cut-off swale will be provided to direct the drainage towards the stormwater detention facility.

Refer to preliminary grading plan, Figure GRA1 enclosed on Appendix A.

3.2 Water Distribution

The high-rise condominium area will be served by a 200mm diameter fire-service water line and a 100 mm diameter domestic service. The fire-service water line will be teed off the existing 300mm watermain on Eagle Street, and a 100mm diameter domestic service will be branched off the fire line at the street line to service the new development. It is anticipated that the proposed configuration will be sufficient to service the high-rise condominium however, confirmation from a qualified mechanical engineer would be necessary at the detail design stage.

The townhouse condominium area is proposed to be serviced by a 200mm diameter watermain that will be extended along Street A, and be looped back out to Eagle Street. Domestic service to the townhouse units will be via service connection laterals much like standard municipal water connections. Fire protection will be provided with on-street hydrants, also in accordance with typical municipal criteria.

Preliminary watermain sizing was simulated using EPANet V2. The modelling is based on an assumption of minimally available average-day pressures at Eagle Street (50 psi, 400 kPa). Prior to detailed design, a pressure and flow test of the existing systems will be required to confirm internal watermain sizing.

A preliminary servicing feasibility plan is attached as Drawing WM1 on Appendix A. Output from EPA Watermain modelling is included on Appendix B

3.3 Sanitary Sewerage

The subject lands currently contribute flows primarily to the Eagle Street sewer system. The proposed high rise buildings and townhouse units will be developed as two separate condominium entities; therefore, separate service connections will be required for each corporation as per the Ontario Building Code.

Under current sewage generation criteria, and reflecting the proposed development comprising townhouses and apartment units, the sanitary drainage from the proposed development would yield:

High Rise Condominium

$Q_{design} = Q_{population} + Q_{infiltration}$
= 154 units x 1.95 ppu x 360L/Cap/day x1day/24h x 3600h/s x(4.0 Pk Factor)
+ 0.73ha x 0.3L/s/ha
= 5.0L/s + 0.32L/s
= 5.32 L/s

Townhouse Condominium

$Q_{design} = Q_{population} + Q_{infiltration}$
= 38 units x 2.88 ppu x 360L/Cap/day x1day/24h x 3600h/s s x(4.0 Pk Factor)
+ 1.0ha x 0.3L/s/ha
= 1.8L/s + 0.20L/s
= 2.0L/s

Based on the sanitary flow calculations, it is proposed to service the high rise condominium by providing a 200mm diameter connection to the Eagle Street sewer. Likewise a 200mm diameter pipe will service the townhouse condominium.

A schematic sanitary sewer plan illustrated as Drawing SAN1 is enclosed in Appendix A.

3.4 Storm Drainage Criteria and Parameters

3.4.1 Minor Storm Sewer Design and Layout

Minor storm sewers within the subject lands will be designed to accommodate the 5-year design storm flow generated from the residential/road areas as per the current storm drainage design criteria of the Town of Newmarket.

Two stormwater management alternatives have been proposed as follows:

Alternative 1

The existing drainage pattern for the subject sites will be maintained, and two separate minor storm sewer systems will be provided, as shown on Drawing STM1 is enclosed in Appendix A.

Two separate storm sewers for the high-rise condominium and townhouse site will convey stormwater flow to proposed SWM Pond A, and ultimately discharge into Western Creek. In this alternative, all stormwater flows from both development parcels will be conveyed into SWM Pond A and controlled to allowable rates before discharging into Western Creek.

As demonstrated in section 3.5 below the proposed SWM Pond A will have enough capacity to provide quantity and quality controls in accordance with Town of Newmarket criteria.

Alternative 2

Under this alternative storm flow generated from each condominium entity will be managed separately, as follows:

The storm drainage system for the townhouse condominium will be designed to control the storm runoff to predevelopment levels prior to discharging into the existing creek using an end of pipe treatment (SWM Pond). Minor flows will be collected by catchbasins connected to the storm sewer which discharges into the SWM Pond.

The high rise condominium drainage system will be designed to include onsite control structures. The proposed stormwater management scheme for the high rise condominium would include the following site-specific components:

• The northerly landscape area adjacent to the high rise building (0.11 ha.) will drain uncontrolled towards Western Creek as pre-development conditions.

• Flows coming from the rooftop of the proposed 12 storey building and the parking area (0.67ha) will be collected through a super-catchbasin located on the South East corner of the building and controlled to pre-development levels prior to discharging them into Western Creek.

• The allowable 5-year release rate for the high rise condominium area is:

$I_{5\text{-year-pre}}$ $= 930/ (Tc+4)^{0.798}$ (based on Tc = 10min)
$= 113.21$ mm/hr

$Q_{5y\text{-allowable}}$ = (0.67 ha x 0.25 runoff) x 113.21mm/hr /360;
$= 0.053\ m^3/s$
= 53 L/s

The proposed post-development discharge for this area is determined by initially

calculating the composite runoff coefficient as follows:

Table 3.1 *Composite Runoff Coefficient*

AREA TYPE	AREA m^2	RUNOFF COEFF."R"	AREA X R
Landscaped	164	0.25	41
Paved	296	0.90	266
Roofing	210	0.90	189
Total	670		

Σ A X R = 496
AVERAGE R = 0.74

The uncontrolled post-development 5-year generated by this area is:

$I_{5\text{-year}}$ = 930/ (Tc+4)$^{0.798,}$ (based on Tc = 10min)
= 113.21 mm/hr

$Q_{5y\text{-Post}}$ = (0.67 ha x 0.74 runoff) x 113.21mm/hr /360;
= 0.0156 m^3/s
= 156 L/s

In order to control the 5-year discharge down to the allowable release rate, on-site attenuation is required.

The storage required for the High-Rise and the parking is **153 m^3**, as calculated using the Modified Rational Method (refer to Appendix B Table B2). A storage volume of **56 m^3** will be provided on the rooftop and the balance, **100 m^3** will be accommodated with a combination of a super-pipe and an underground tank. Refer to Table B2 in Appendix B.

While these calculations demonstrate feasibility of on-site controls, **Alternative 1** is preferred over Alternative 2 due to the following reasons:

- The stormwater management facility block with an area of 0.21 ha, which has already been identified on the site plan (SP1), is large enough to accommodate a SWM Pond that treats and controls the storm runoff from both private sites.
- An efficient and more natural quality control component will be provided for both the high rise and townhouse condominium prior to discharging into the existing creek without the need for hard infrastructure.
- The proposed underground parking on the high rise condominium occupies the majority of the site; therefore onsite control structures are limited.

- Maintenance of a single communal facility is more efficient and cost effective.

- Providing one single outlet to the Creek for servicing the entire area will decrease the impact of infrastructure on Western Creek. The reinforcement of the outlet dispersion will be confined to a single location rather than multiple locations.

Design criteria for the stormwater management pond is discussed in more detail in the following sections.

3.4.2 Major System Flows (100-year Storm)

All storm sewer flows in excess of the 5-year storm is proposed to remain overland, conveyed to Street A and finally into SWM Pond A. Approximately 80% of the subject development will be tributary to the Street A overland flow route. The remaining lands (rear yards, landscape areas) will drain northerly towards Western Creek as pre-development conditions.

3.5 Stormwater Management Criteria and Methodology

Stormwater Best Management Practices (BMPs) are measures to manage the quality and quantity of urban runoff to mitigate drainage impacts. A treatment train approach to BMPs can be divided into three groups as follows:

- **Source** controls such as roof leaders discharging to grass or soakaway pits;
- **Conveyance** controls such as grassed swales or vegetative filter strips; and,
- **End-of-pipe** controls such as communal extended detention ponds.

In reviewing options, each alternative BMP was evaluated on the basis of its capabilities, limitations, physical constraints associated with implementation on the specific site, and its effectiveness in achieving the stormwater management objectives. BMPs should ideally accomplish the following goals:

- Emulate as closely as possible the hydrological conditions of the site in its existing condition;
- Reduce nutrient and pollutant loadings in untreated urban runoff;
- Minimize temperature increases in treated runoff;
- Integrate with the planned urban form and municipal service requirements; and,
- Be reasonably cost effective in comparison to other options and have acceptable future maintenance requirements for the local municipality.

The first step in the selection process is to review BMPs on the basis of the following screening factors that focus on:

- Suitability of study area soils and groundwater elevations (where known);
- Existing hydrogeological relationship of site drainage to adjacent tributaries;

- Size of contributing drainage areas;
- Compatibility with urban form;
- Municipal servicing requirements; and,
- Water quality control effectiveness.

It is also important to promote infiltration where soils are suitable to help offset as much as possible the reduction in infiltration due to increased impervious area from the proposed development. Therefore, infiltration practices should be reviewed at the detail design stage to determine viable lot level and conveyance controls such as the following:

- Roof leaders directed to rear yard ponding areas, soakaway pits, cisterns, rain barrels, etc.;
- Infiltration trenches;
- Bioretention swales;
- Vegetated filter strips; and
- Stream and valley corridor buffer strips.

Based on the proposed layout, Bioretention swales and "end-of-pipe" extended detention and erosion control ponds, are feasible and efficient BMP devices.

Bioretention systems are stormwater best management practices (BMPs) that use media filtration to treat stormwater runoff. These systems use vegetation, such shrubs, and grasses, and sand or aggregate media to remove pollutants from stormwater runoff.

A bioretention system is suitable for this site as it provides not only vegetated filtration and nutrient intake, but routing stormwater through vegetation also helps reduce water temperature. Furthermore, the bioretention swale serves a dual-function as they will improve infiltration into the subsurface, enhancing recharge and moisture capture by the vegetation.

The stormwater management facility design criteria follows *the MOE 2003 Stormwater Management Practices and Design Manual (2003* MOE SWMP Manual*)* for controlling urban stormwater quality and quantity from the proposed development. Additional SWM design criteria as recommended by the Town of Newmarket will be integrated into the overall design.

3.5.1 Hydrologic Input

Two alternatives have been considered for sizing the SWM pond. Briefly, Alternative 1 assumes that both Parcels A & B will be serviced by a single Stormwater management facility (SWM Pond A); whereas Alternative 2 assumes that only Parcel B will be serviced by the SWM facility.

The hydrologic input to preliminary design of Ponds A was modelled using Visual

OTTHYMO for both alternatives under pre- and post-development conditions.

The LSRCA recommends using the 24-hour SCS type II distribution for sizing SWM facilities. Preliminary pond design parameters, stage storage curve and output data for post development conditions are included in Appendix D.

The following Tables 1 & 2 provide a summary of the pre-development peak flows and peak discharge flows at post-development conditions for each storm event modeled, for the proposed alternatives. A description of the quality and quantity control structures and geometry are provided in the following sections.

Table 1 *VO2 Results Summary for Pre and Post Conditions- Alternative 1*

Return Period	Peak flow to Western Creek (m^3/s)		
	Pre-development	Post-development Uncontrolled	Post-development Controlled
2-year	0.10	0.267	0.098
5-year	0.13	0.316	0.128
10-year	0.19	0.432	0.181
25-year	0.27	0.518	0.252
50-year	0.31	0.567	0.301
100-year	0.34	0.630	0.329

Table 2 *VO2 Results Summary for Pre and Post Conditions- Alternative 2*

Return Period	Peak flow to Western Creek (m^3/s)		
	Pre-development	Post-development Uncontrolled	Post-development Controlled
2-year	0.06	0.172	0.054
5-year	0.08	0.202	0.077
10-year	0.12	0.280	0.114
25-year	0.16	0.334	0.156
50-year	0.19	0.358	0.182
100-year	0.21	0.398	0.196

3.5.2 Quality Control

Provincial water quality objectives are outlined in the Ministry of Environment Stormwater Management Practices Planning and Design Manual (MOE SWMPP). The subject site drains into Western Creek, which ultimately drains into East Holland River.

The SWM Pond will be designed to meet the MOE *Enhanced* (Level-1) habitat protection as per LSRCA guidelines, requiring a minimum 80% Total Suspended Solids removal.
The water quality storage requirement for the facility was derived from Table 3.2 of the MOE SWMPP Manual. The proposed drainage area yields a required storage volume of **400 m^3** for Alternative 1 and a storage volume of **240 m^3** for Alternative 2; refer to Table B2 and B3 in Appendix B.

The preliminary design of Pond A for the two proposed alternatives meets the permanent storage volume requirements (Supporting calculation are enclosed in Table B5 and B6 in Appendix B). Figures, STM1 & STM 2 present the footprint of the proposed SWM Pond A for both Alternative 1 and Alternative 2.

Sediment Forebay

Sediment forebays are a component of quality control providing settlement of the larger particulates flushed through in storm sewers. The sediment forebays were sized in accordance with Table 5.3 of the MOE SWMPP.

Preliminary forebay sizing calculations are included in Tables B6 and B7 in Appendix B.

Extended Detention Pond

Extended detention in both Alternative 1 and 2 will be provided as *active storage* above the permanent pool of the wet pond.

The following Table 3 summarizes the required extended detention volumes.

Table 3 *Extended Detention Volumes*

Facility	Extended Detention (25mm)	100 Yr Storage	Maximum Storage at 30cm freeboard
Alternative 1	400 m^3	680 m^3	1,180 m^3
Alternative 2	240 m^3	500 m^3	970 m^3

3.5.3 Quantity Control

Rain events from the 2 year up to and including the 100 year storm will be controlled to pre-development levels, as illustrated in Tables 1 and 2 above, using outfall control structures such as orifice plates and weirs.

3.5.4 Outfall Control Structures

The pond outlet structures have been preliminary designed to provide the necessary quality protection, erosion control and quantity control. The required control structure is proposed as follows:

1. The first flush 25mm **quality storm** will be attenuated with a 72-hour drawdown outflow control structure comprising an orifice plate. The drawdown structure will be a reverse-slope outlet pipe, which will draw from the relatively cooler lower stratum of water in the permanent pool.

2. A weir is required to control the **quantity storm** events from the 2-yr return period to the 100-yr return period.

3. The controlled outflows from the SWM Ponds will be collected into a single discharge pipe and outlet to a level-spreader where the flows will be conveyed through a vegetated channel towards the existing creek. The level spreader serves to dissipate outflow energy, and provide a widely dispersed (lower velocity) outflow transition into the existing creek.

Further details for the Quantity and Quality control structures to be provided at the detail design stage. It is anticipated that over time, the level-spreader and downstream areas will have sufficient vegetated cover to both reduce erosion and improve upon the natural filtration qualities already provided by the level-spreader device.

3.5 Planting Strategy

A multi-zoned planting strategy which provides the necessary shading, nutrient uptake and erosion protection is an essential part of water quality improvement. In accordance with the SWMPP manual, a five-zone landscaping and planting plan is appropriate to achieve the Enhanced quality targets:

Lower	Zone 1:	Deep water zone
	Zone 2:	Shallow water zone
Emergent	Zone 3:	Shoreline fringe zone
	Zone 4:	Flood fringe zone
Upper Zone	Zone 5:	Upland Zone

A detailed planting strategy will be prepared by a qualified landscape consultant at the time of detailed pond design.

3.6 Summary of Preliminary SWM Pond Geometry

In order to ensure the basic stormwater management objectives are met, the general requirements for the SWM facilities shall include the following design features:

- A 4.0m wide access route for maintenance and emergency vehicles from a municipal roadway to the detention facilities must be provided, not exceeding 10:1 slope.
- Quality control structures shall incorporate an appropriately designed bottom-draw outlet to reduce thermal impacts to the receiving watercourse.
- Detailed soils work is required at the detailed design stage to determine if impermeable linings are necessary for either pond.
- The permanent pool shall be designed to limit the maximum depth of water to 3.0 m above the lowest point of the SWM facilities with a mean depth of 1.0 m to 2.0 m.
- The maximum fluctuation for the active volume (i.e. extended detention plus erosion control) shall not exceed 1.5 m. An additional 0.25 m freeboard is required above the maximum extended storage level.
- The SWM facilities will generally have slopes of no less than 3:1 side slopes. The detailed implementation plan and design should strive to incorporate varied slopes of between 3:1 and 5:1 to promote a more naturalized appearance.
- There should be a 7:1 slope at the normal water level for a distance of 3.0 m into the pond and 3.0 m up the slope creating a terrace for safety purposes. A maximum 3:1 slope from the bottom of the facility up to the bottom of the safety terrace, and a 4:1 slope above the safety terrace to the top of the pond. The design provided in this report illustrates a consistent side slope of 5:1 which is equivalent to the terraced grading design requirement and will be finalized at the detail design stage.
- The bottom of the forebay shall consist of a lined material as approved by the Town of Newmarket, for clean out purposes.
- Erosion control and energy dissipation solutions shall be provided around the inlets and outlets.
- Where grade permits, a gravity maintenance pipe for draining the main pool and sediment forebay shall be provided.
- An erosion resistant emergency spillway should be provided to ensure that any overtopping flows are safely discharged from the facility. A freeboard of 0.3m should be allowed in the design of the emergency spillway.
- A planting plan, prepared by a qualified landscape architect is required SWM Pond A
- An operations and maintenance plan should be prepared at the time of detailed facility design.

4.0 SEDIMENT AND EROSION CONTROL DURING CONSTRUCTION

An erosion and sediment control strategy should be implemented during construction to mitigate transportation of silt from the site and into the existing sewers and roads.
To prevent construction-generated sediments from entering the storm sewer or leaving the site by overland flow, the following measures should be implemented:

- Temporary sediment control fencing should be erected around the perimeter of the grading activities;
- Temporary sediment fabric and stone filter at the rear yard catch basin inlet grates for sediment control;
- Erosion monitoring and sediment removal should be undertaken after every rainfall.

Refer to preliminary erosion and sediment control plan ES1 enclosed on Appendix A.

5.0 RECOMMENDATION AND CONCLUSIONS

The stormwater runoff from the subject site can be properly managed to ensure protection and preservation of the greenland within the subject property. The proposed stormwater management control measures are summarized as follows:

High-Rise Condominium (Parcel A)

- A 200mm fire-service water line will be teed off the existing 300mm watermain on Eagle Street, and a 100mm diameter domestic service will be branched off the fire line at the street line to service this new development.

- A 200mm sanitary sewer connection running out to the existing 250mm-Eagle Street sewer to service the proposed three high-rise buildings will be provided.

- Two alternatives have been proposed on this report to treat the stormwater flows:

Alternative 1

- Both minor flow and major overland flow will be safely conveyed to an end of pipe treatment facility SWM Pond A.

- Storm runoff will be conveyed through storm pipes running easterly on Proposed Street A.

- Stormwater Management Pond A will provide end-of-pipe quality and quantity control to meet both MOE Enhanced (Level-1) treatment guidelines as well as MTO quantity control modelling criteria. The facilities have been preliminary sized to provide:
  - 25mm quality storm attenuation for 72 hours
  - Sediment forebays within the pond will serve to provide pre-treatment of incoming flows, and reduce long-term sediment loading into existing outfall
  - Post-development peak flows are controlled to pre-development levels by outfall control structures

Alternative 2

- Under this alternative, storm drainage from the site will be split into two systems. The storm flow rate generated by the high-rise condominium area will be controlled to predevelopment levels using on-site control structures and finally discharged into Westen Creek. The remaining portion of the site (townhouse condominium) will be treated with an End of Pipe Facility (SWM Pond A)

- Detailed design of the proposed onsite control structures will be coordinated with the architect, the mechanical and the landscape architect at detailed building design.

It is our preference to implement **Alternative 1** due to the reasons described on section 3.4 of this report.

Townhouse Condominium (Parcel B)

- A 200mm fire-service water line will be teed off the existing 300mm watermain on Eagle Street and look back to the same source. Fire protection to the townhouses buildings will be provided by the proposed fire hydrants located on Street A. A flow/pressure test of existing watermain will be conducted prior to detailed design.

- An internal 200mm sanitary sewer line discharging into the existing 250 mm Eagle Street sewer will be installed to service the proposed Townhouse condominium. Separate sanitary laterals to service each of the townhouse units will discharge into the internal 200mm sanitary sewer line.

- An internal minor storm sewer has been designed to accommodate the 5 year runoff flow from the subject condominium and will discharge into an end-of-pipe facility.

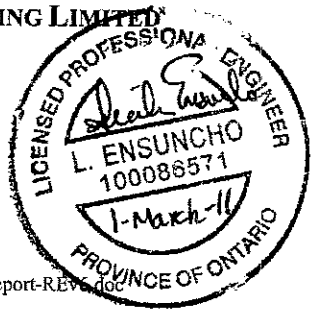
- Major overland flow (greater than 5-year storm) will be safely conveyed to the SWM pond through the proposed Street "A".

- The SWM pond will be designed to provide quantity and quality controls.

Erosion and sediment control measures have been detailed in this report in accordance with TRCA guidelines, and must be implemented throughout the construction program.

This report demonstrates how the site can be serviced without requiring third-party encroachment, or other external servicing corridors.

Respectfully submitted,
MASONGSONG ASSOCIATES ENGINEERING LIMITED



Lucila Ensuncho, M.A.Sc. P.Eng
Project Manager

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Appendix A

Figures & Drawings

No.	DESCRIPTION	BY	DATE
1.	REVISIONS		

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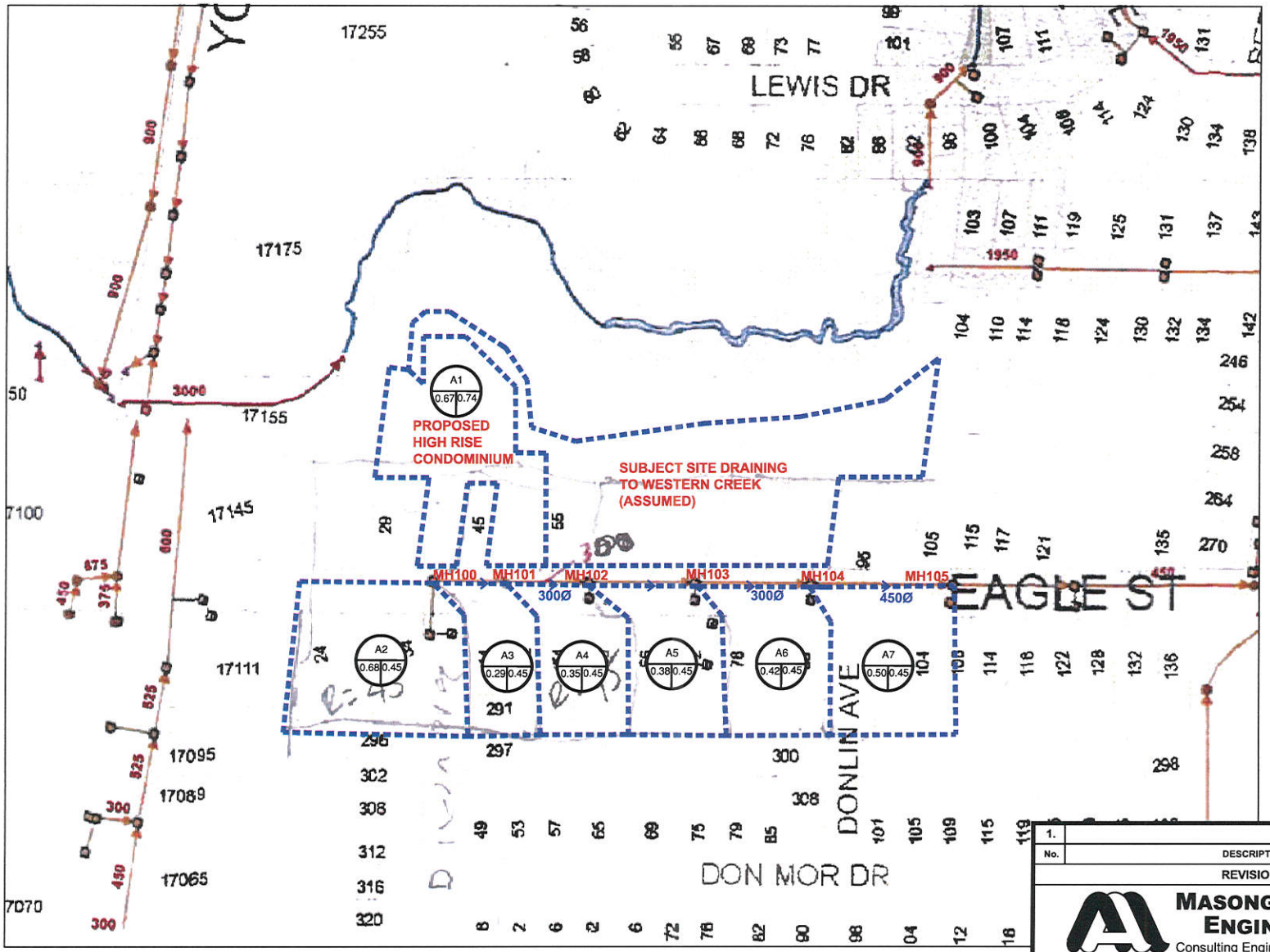
Millford Development, Newmarket - Ont.

LOCATION PLAN

DATE:	SCALE	DESIGN BY:	DRAWN BY:	PROJECT No.	Figure No.
Sep. 2010	N.T.S.		MAEL/CAD	99-598	1



LEGEND

- A4 (0.35 / 0.45) — Sub-Area No. / Run Off Coefficient
- Area (ha)
- DRAINAGE AREA

No.	DESCRIPTION	BY	DATE
1.			

REVISIONS

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Millford Development, Newmarket - Ont.

PRELIMINARY STORM SEWER ASSESSMENT ON EAGLE ST.

DATE:	SCALE	DESIGN BY:	DRAWN BY:	PROJECT No.	Figure No.
Sep. 2010	N.T.S.		MAEL/CAD	99-598	2

KEY PLAN NOT TO SCALE

SURVEY INFORMATION:

SURVEY INFORMATION IS TAKEN FROM A COMPILED PLAN OF SURVEY ENTITLED:
PART OF LOTS 2 AND 3
REGISTERED PLAN 49
TOWN OF NEWMARKET
REGIONAL MUNICIPALITY OF YORK
PREPARED BY:
YOUNG & YOUNG SURVEYING INC., OLS
2 HOLLAND DRIVE, UNIT 5
BOLTON, ON L7E 1E1
DATED: JUNE 2010

PROPERTY AREA:

VALLEY LANDS	28 477 SM (306,526 SF)
BUFFER ZONE	2 114 SM (22,755 SF)
NET DEVELOPMENT AREA	19 742 SM (212,503 SF)
PROPOSED ROAD WIDENING	589 SM (6,340 SF)
TOTAL PROPERTY AREA	50 922 SM (548,124 SF)

PROJECT INFORMATION:

PARCEL A:

PROPOSED UNITS:	154
NET LOT AREA:	8,152.30 SM (87,750 SF; 2.01 AC)
PROPOSED DENSITY:	189 UNITS/HECTARE
GROSS FLOOR AREA GROUND FLOOR:	1,805.34 SM (19,432 SF)
GROSS FLOOR AREA PER LEVEL:	1,362.18 SM (14,662 SF)
PROPOSED FLOORS:	12
TOTAL G.F.A.:	16,789.32 SM (180,719 SF)
PROPOSED FLOOR SPACE INDEX:	2.06

CONDO UNIT TYPE SCHEDULE		# OF UNITS
GROUND FLOOR		0
FLOORS 2–12 (TYP. 14 UNITS/FLOOR)		
8 X 1BR UNITS	69.67–77.11 SM (750–830 SF)	88
6 X 2BR UNITS	92.90–120.77 SM (1,000–1,300 SF)	66
TOTAL NUMBER OF UNITS		154

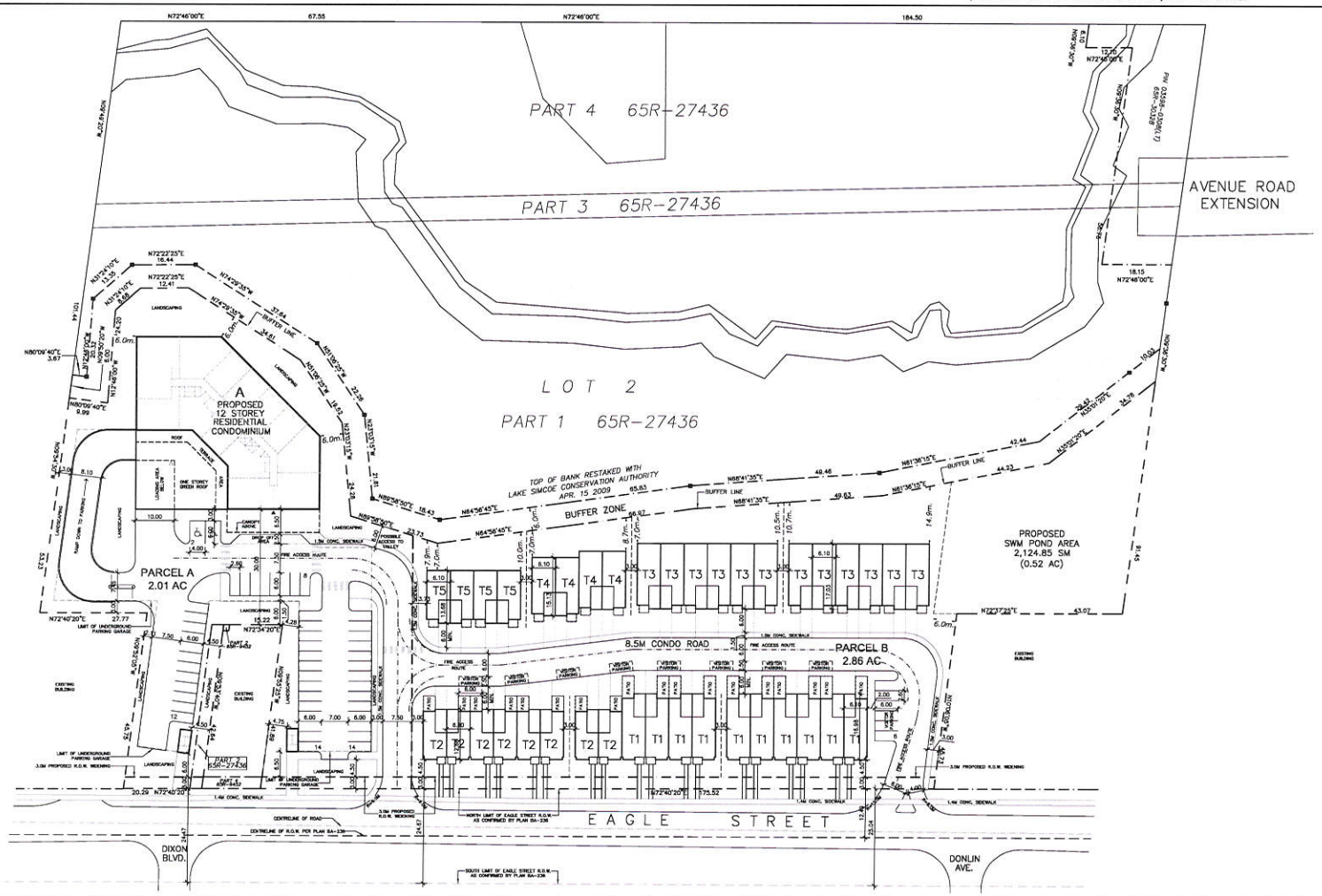
PARKING:
VISITOR PARKING REQUIRED:
0.25 X NUMBER OF UNITS= 39 SPACES
VISITOR PARKING PROVIDED: 39 SPACES
RESIDENT PARKING REQUIRED:
1.5 SPACES/UNIT= 231 SPACES
RESIDENT PARKING PROVIDED: 231 SPACES TOTAL
(2 LEVELS UNDERGROUND GARAGE: 218 SPACES;
ON GRADE: 11 SPACES)

PARCEL B:

PROPOSED TOWNHOUSES:	38
NET LOT AREA:	11,591.28 SM (124,767 SF; 2.86 AC)
PROPOSED DENSITY:	33 UNITS/HECTARE

UNIT TYPE	PROPOSED UNIT SIZE	# OF UNITS
T1	148.65–157.93 SM (1,600–1,700 SF)	10
T2	111.48 SM (1,200 SF)	8
T3	157.93–167.22 SM (1,700–1,800 SF)	12
T4	139.35–148.65 SM (1,500–1,600 SF)	4
T5	120.77–130.06 SM (1,300–1,400 SF)	4
TOTAL NUMBER OF UNITS		38

PARKING:
VISITOR PARKING REQUIRED: 0.25 X NUMBER OF UNITS= 10 SPACES
VISITOR PARKING PROVIDED: 14 SPACES
RESIDENT PARKING REQUIRED: 2 SPACES/UNIT= 76 SPACES
RESIDENT PARKING PROVIDED: 2 SPACES/UNIT= 76 SPACES



PDA architects
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Tel.: (416) 440-0058
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mail@pda-architects.ca
www.pda-architects.ca

NO.	REVISIONS:	ISSUED:
1	REVISED	AUG 12/10

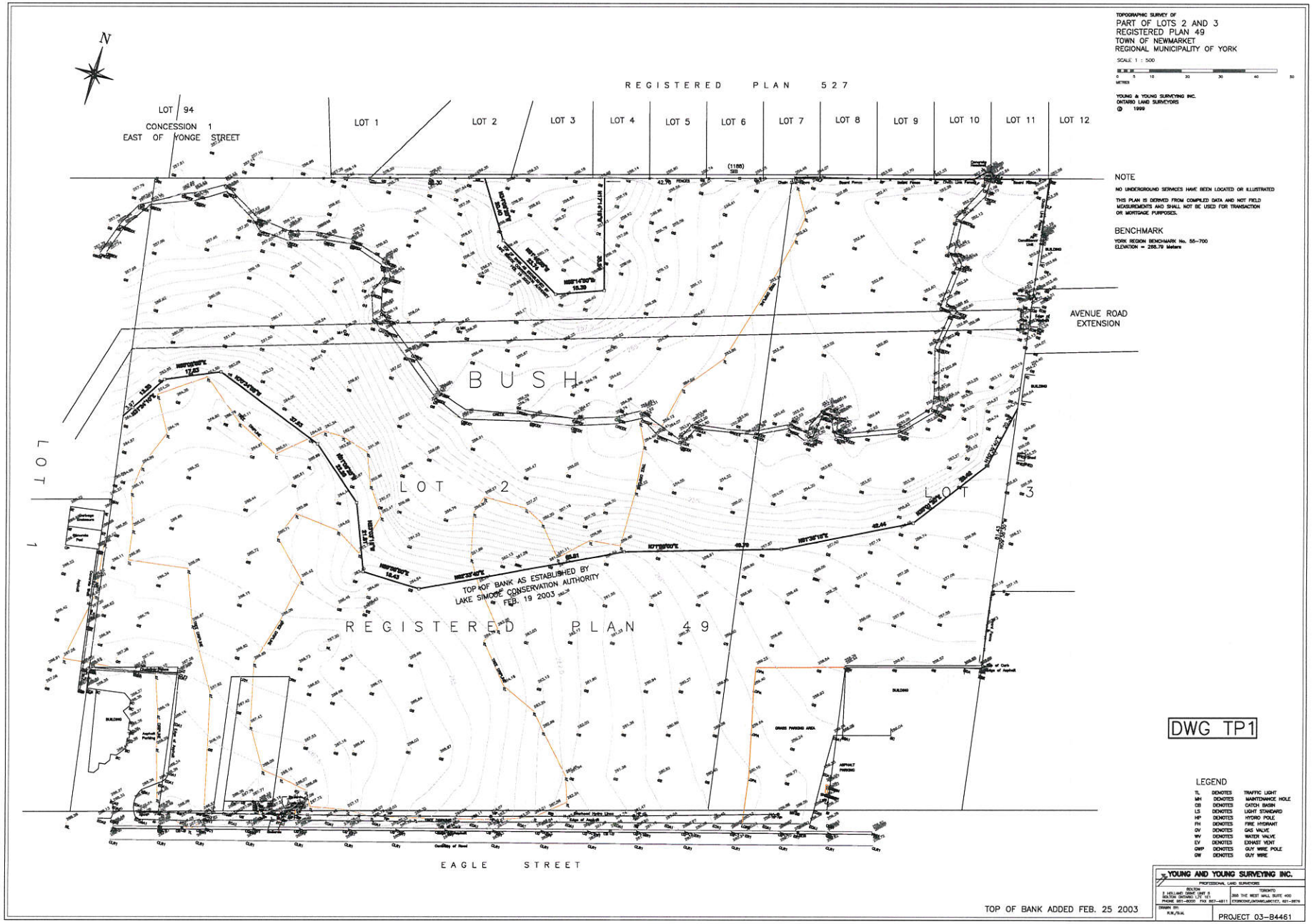
CLIENT:
MILLFORD DEVELOPMENTS

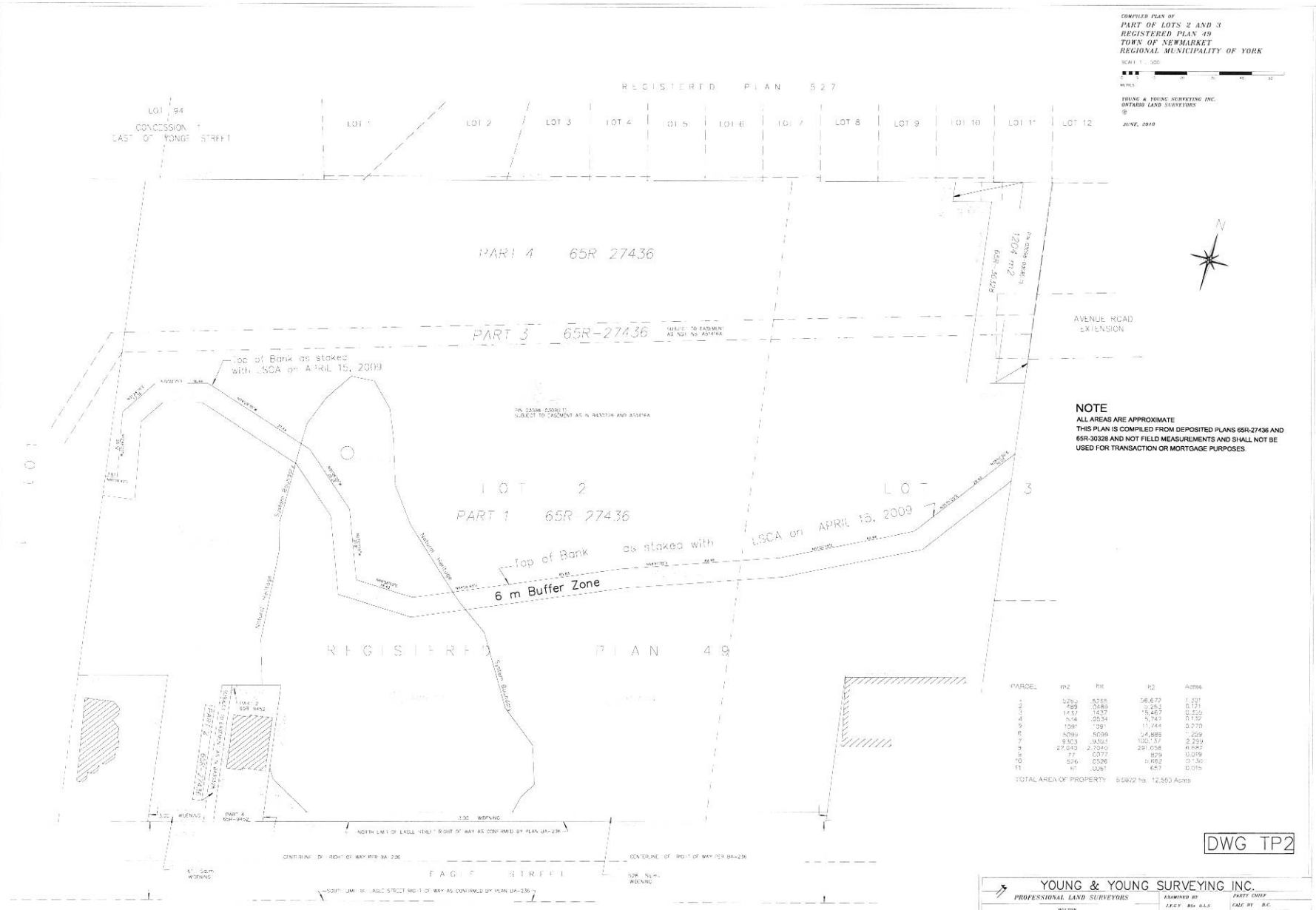
PROJECT:
PROPOSED CONDOMINIUM DEVELOPMENT
NEWMARKET, ON

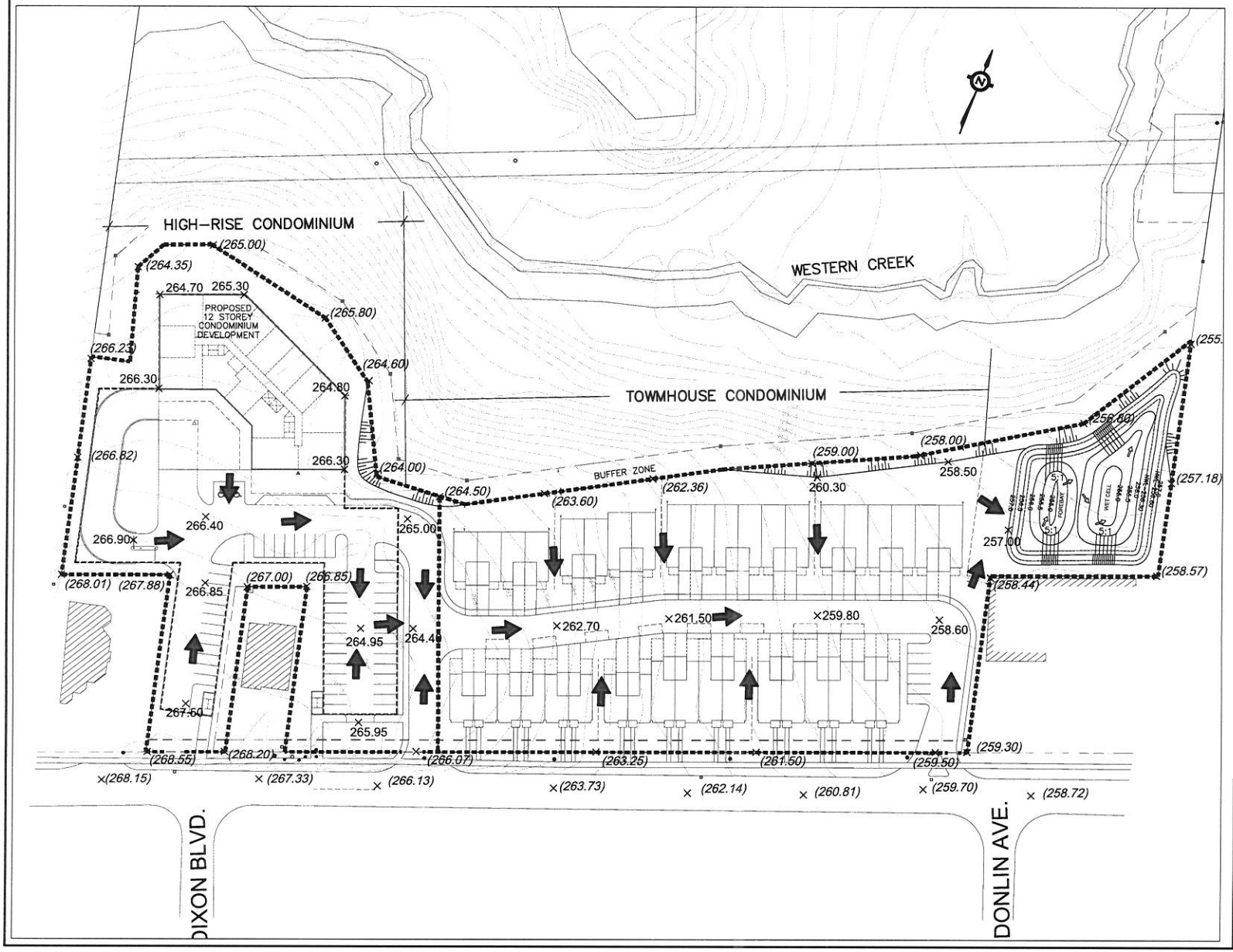
SHEET TITLE:
SITE PLAN

PROJECT NO. 2524	
SCALE: 1:500	DATE: SEE REV.
DRAWN: RS	SHEET NO: SP1
CHECKED: JdeV	
FILE NO. 2524	

M:\2524\2524_DWGS\100804\2524 SP1 100806.dwg Aug 12, 2010–4:49 pm


N
REGISTERED PLAN 527
LOT 94
CONCESSION 1
EAST OF YONGE STREET
LOT 1
LOT 2
LOT 3
LOT 4
LOT 5
LOT 6
LOT 7
LOT 8
LOT 9
LOT 10
LOT 11
LOT 12
AVENUE ROAD EXTENSION
BUSH
LOT 2
LOT 3
LOT 1
REGISTERED PLAN 49
TOP OF BANK AS ESTABLISHED BY LAKE SIMCOE CONSERVATION AUTHORITY FEB. 19 2003
EAGLE STREET
TOPOGRAPHIC SURVEY OF
PART OF LOTS 2 AND 3
REGISTERED PLAN 49
TOWN OF NEWMARKET
REGIONAL MUNICIPALITY OF YORK
SCALE 1 : 500
METRES
YOUNG & YOUNG SURVEYING INC.
ONTARIO LAND SURVEYORS
© 1999
NOTE
NO UNDERGROUND SERVICES HAVE BEEN LOCATED OR ILLUSTRATED
THIS PLAN IS DERIVED FROM COMPILED DATA AND NOT FIELD MEASUREMENTS AND SHALL NOT BE USED FOR TRANSACTION OR MORTGAGE PURPOSES.
BENCHMARK
YORK REGION BENCHMARK No. 55-700
ELEVATION = 288.79 Meters
DWG TP1
LEGEND
TL DENOTES TRAFFIC LIGHT
MH DENOTES MAINTENANCE HOLE
CB DENOTES CATCH BASIN
LS DENOTES LIGHT STANDARD
HP DENOTES HYDRO POLE
FH DENOTES FIRE HYDRANT
GV DENOTES GAS VALVE
WV DENOTES WATER VALVE
EV DENOTES EXHAUST VENT
GWP DENOTES GUY WIRE POLE
GW DENOTES GUY WIRE
TOP OF BANK ADDED FEB. 25 2003
YOUNG AND YOUNG SURVEYING INC.
PROFESSIONAL LAND SURVEYORS
BOLTON
8 HOLLIDAY DRIVE UNIT 15
BOLTON, ONTARIO L7E 2Y7
PHONE 951-4000 FAX 857-4811
TORONTO
366 THE WEST MALL SUITE 400
ETOBICOKE,ONTARIO M9C1C7, 621-3676
DRAWN BY:
R.M./S.M.
PROJECT 03-B4461


COMPILED PLAN OF
PART OF LOTS 2 AND 3
REGISTERED PLAN 49
TOWN OF NEWMARKET
REGIONAL MUNICIPALITY OF YORK
SCALE 1 : 500
METRES
YOUNG & YOUNG SURVEYING INC.
ONTARIO LAND SURVEYORS
©
JUNE, 2010
REGISTERED PLAN 527
LOT 94
CONCESSION 1
EAST OF YONGE STREET
LOT 1
LOT 2
LOT 3
LOT 4
LOT 5
LOT 6
LOT 7
LOT 8
LOT 9
LOT 10
LOT 11*
LOT 12
PART 4 65R 27436
PART 3 65R-27436
SUBJECT TO EASEMENT AS NOT AS ASYAREA
Top of Bank as staked with LSCA on APRIL 15, 2009
PIN 03598-0309(LT)
SUBJECT TO EASEMENT AS IN R433724 AND AS1479A
LOT 2
PART 1 65R-27436
LOT 3
Top of Bank as staked with LSCA on APRIL 15, 2009
6 m Buffer Zone
REGISTERED PLAN 49
AVENUE ROAD EXTENSION
PART 1 65R-9452
PART 4 65R-9452
3.05 WIDENING
NORTH LIMIT OF EAGLE STREET RIGHT OF WAY AS CONFIRMED BY PLAN BA-236
CENTRELINE OF RIGHT OF WAY PER BA 236
CENTRELINE OF RIGHT OF WAY PER BA-236
6.1 SOUTH WIDENING
EAGLE STREET
SOUTH LIMIT OF EAGLE STREET RIGHT OF WAY AS CONFIRMED BY PLAN BA-236
N
NOTE
ALL AREAS ARE APPROXIMATE
THIS PLAN IS COMPILED FROM DEPOSITED PLANS 65R-27436 AND 65R-30328 AND NOT FIELD MEASUREMENTS AND SHALL NOT BE USED FOR TRANSACTION OR MORTGAGE PURPOSES.
PARCEL m2 ha ft2 Acres
1 2252 .2252 24,237 0.557
2 769 .0769 8,278 0.190
3 1417 .1417 15,252 0.350
4 514 .0514 5,533 0.127
5 1091 .1091 11,744 0.270
6 5099 .5099 54,885 1.259
7 9303 .9303 100,137 2.299
8 27,040 2.7040 291,058 6.682
9 77 .0077 829 0.019
10 526 .0526 5,662 0.130
11 61 .0061 657 0.015
TOTAL AREA OF PROPERTY 5.0922 ha. 12.583 Acres
DWG TP2
YOUNG & YOUNG SURVEYING INC.
PROFESSIONAL LAND SURVEYORS
BOLTON
2 HOLLAND DRIVE UNIT 3
BOLTON ONTARIO L7E 1E1
PHONE 905 6000 FAX 857-4811
EXAMINED BY J.K.C.Y. BSc O.L.S.
PARTY CHIEF
CALC BY B.C.
DRAWN BY B.C.
PROJECT 08-B5861
B5861/B5861 2.DWG
JANUARY 21,2011



LEGEND:

- STUDY AREA
- × (175.5) EXISTING ELEVATION
- × 182.55 PROPOSED ELEVATION
- OVERLAND FLOW ROUTE

MASONGSONG ASSOCIATES ENGINEERING LIMITED
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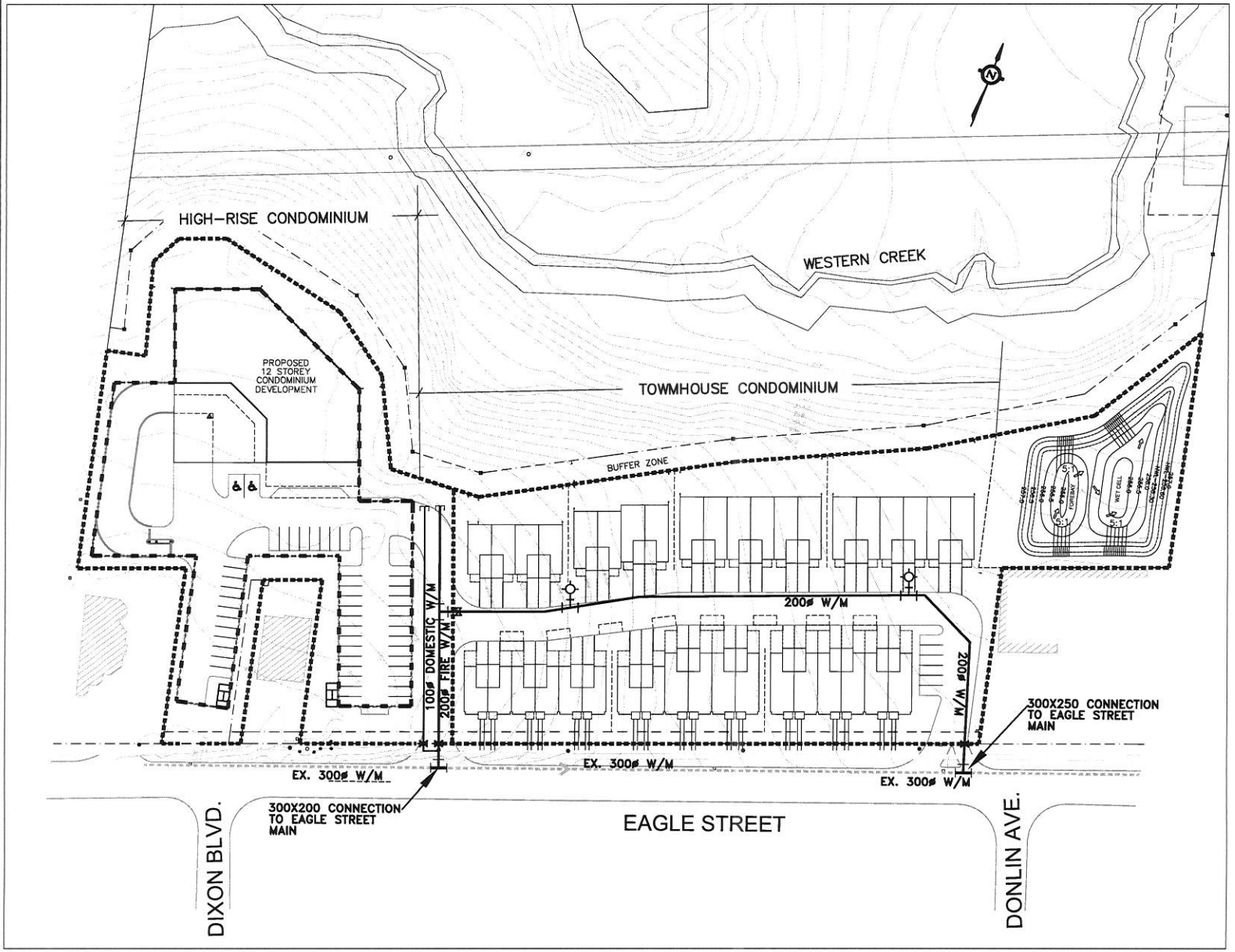
Tel(905) 944-0162 • Fax(905) 944-0165 • E-Mail: maeng@maeng.ca

MILLFORD DEVELOPMENT LIMITED

PRELIMINARY GRADING PLAN

DATE:	SCALE	DESIGN BY:	DRAWN BY:	PROJECT No.	DWG. No.
SEP. 2010	NTS	JJM	MAEL/CAD	99598	GRA1



LEGEND:

- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- STUDY AREA
- UNDERGROUND PARKING
- PROPOSED HYDRANT
- PROPOSED 200Ø VALVE

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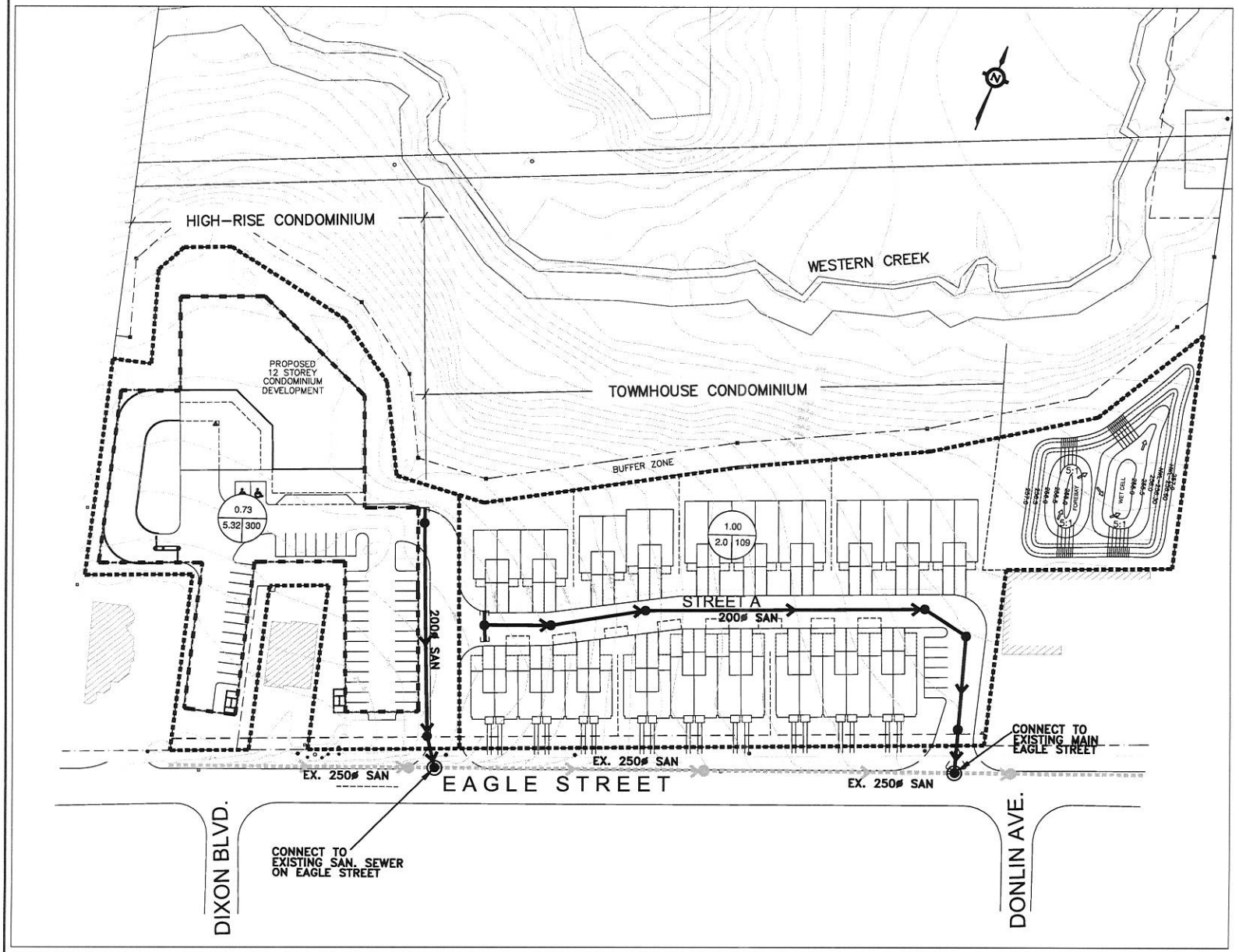
MILLFORD DEVELOPMENT LIMITED

WATERMAIN SCHEMATIC

DATE:	SCALE	DESIGN BY:	DRAWN BY:	PROJECT No.	DWG. No.
SEP. 2010	NTS	JJM	MAEL/CAD	99598	WM1



LEGEND:

- PROPOSED SANITARY LINE
- EXISTING SANITARY LINE
- STUDY AREA
- UNDERGROUND PARKING
- 1.00 / 2.0 | 109 — Area (ha) / Population / Flow (L/s)
- PROPOSED CONNECTION POINT

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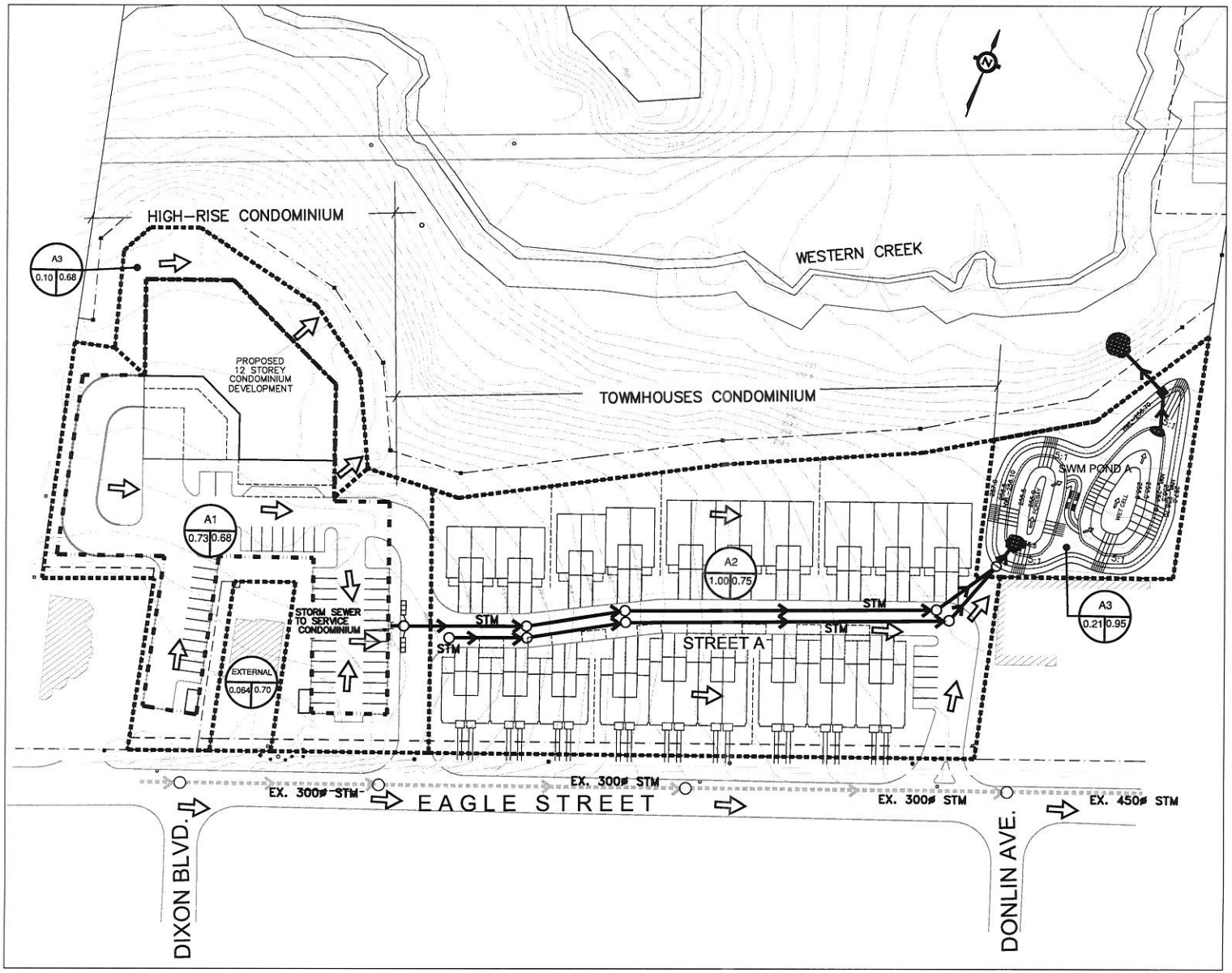
MILLFORD DEVELOPMENT LIMITED

SANITARY DRAiNAGE

DATE:	SCALE	DESIGN BY:	DRAWN BY:	PROJECT No.	DWG. No.
SEP. 2010	NTS	JJM	MAEL/CAD	99598	SAN1



LEGEND:

- A2 / 1.00 / 0.75 — Sub-Area No., Run Off Coefficient, Area (ha)
- PROPOSED STORM LINE
- EXISTING STORM LINE
- OVERLAND FLOW
- DRAINAGE AREA
- UNDERGROUND PARKING
- SUPER CATCHBASIN FOR HIGHRISE CONDOMINIUM OVERLAND FLOW

POND STORAGE VOLUMES

COMP.	ELEV. (m)	REQ. VOL. (m^3)	PROV. VOL. (m^3)
P. POOL	256.10	390	450
EROSION	256.60	400	460
100 YEAR	256.70	680	730
TOTAL	257.00	1,170	1,180

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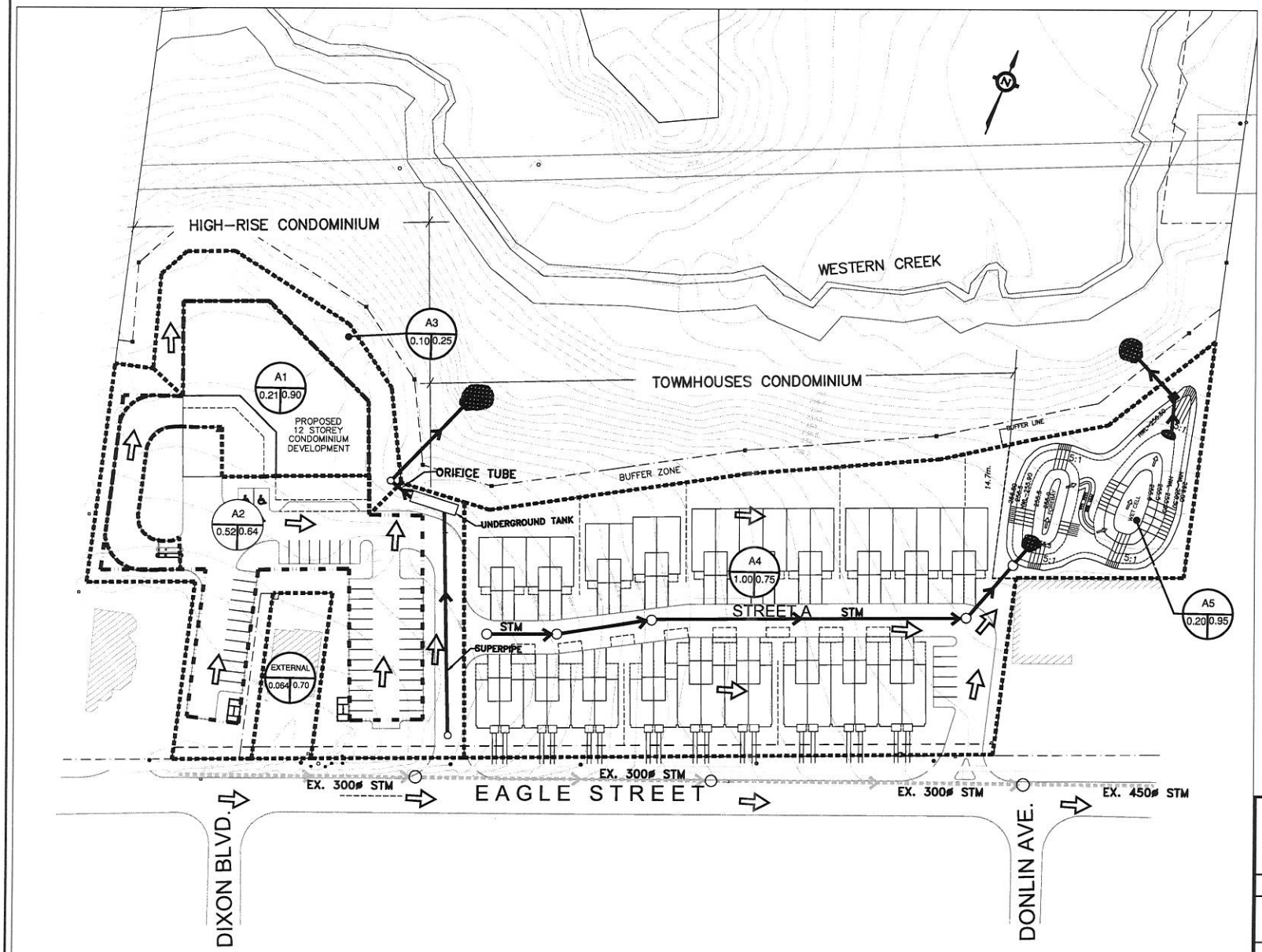
MILLFORD DEVELOPMENT LIMITED

PROPOSED SWM STRATEGY OPTION 1

DATE:	SCALE	DESIGN BY:	DRAWN BY:	PROJECT No.	DWG. No.
SEP. 2010	NTS	JJM	MAEL/CAD	99598	STM1



LEGEND:

- A4 / 1.00 / 0.75 — Sub-Area No. / Run Off Coefficient / Area (ha)
- PROPOSED STORM LINE
- EXISTING STORM LINE
- OVERLAND FLOW
- PERFORATED SUBDRAIN
- DRAINAGE AREA
- SUPER CATCHBASIN FOR HIGHRISE CONDOMINIUM OVERLAND FLOW
- UNDERGROUND PARKING

POND STORAGE VOLUMES

COMP.	ELEV. (m)	REQ. VOL. (m^3)	PROV. VOL. (m^3)
P. POOL	255.90	240	310
EROSION	256.30	240	320
100 YEAR	256.55	500	660
TOTAL	256.80	740	970

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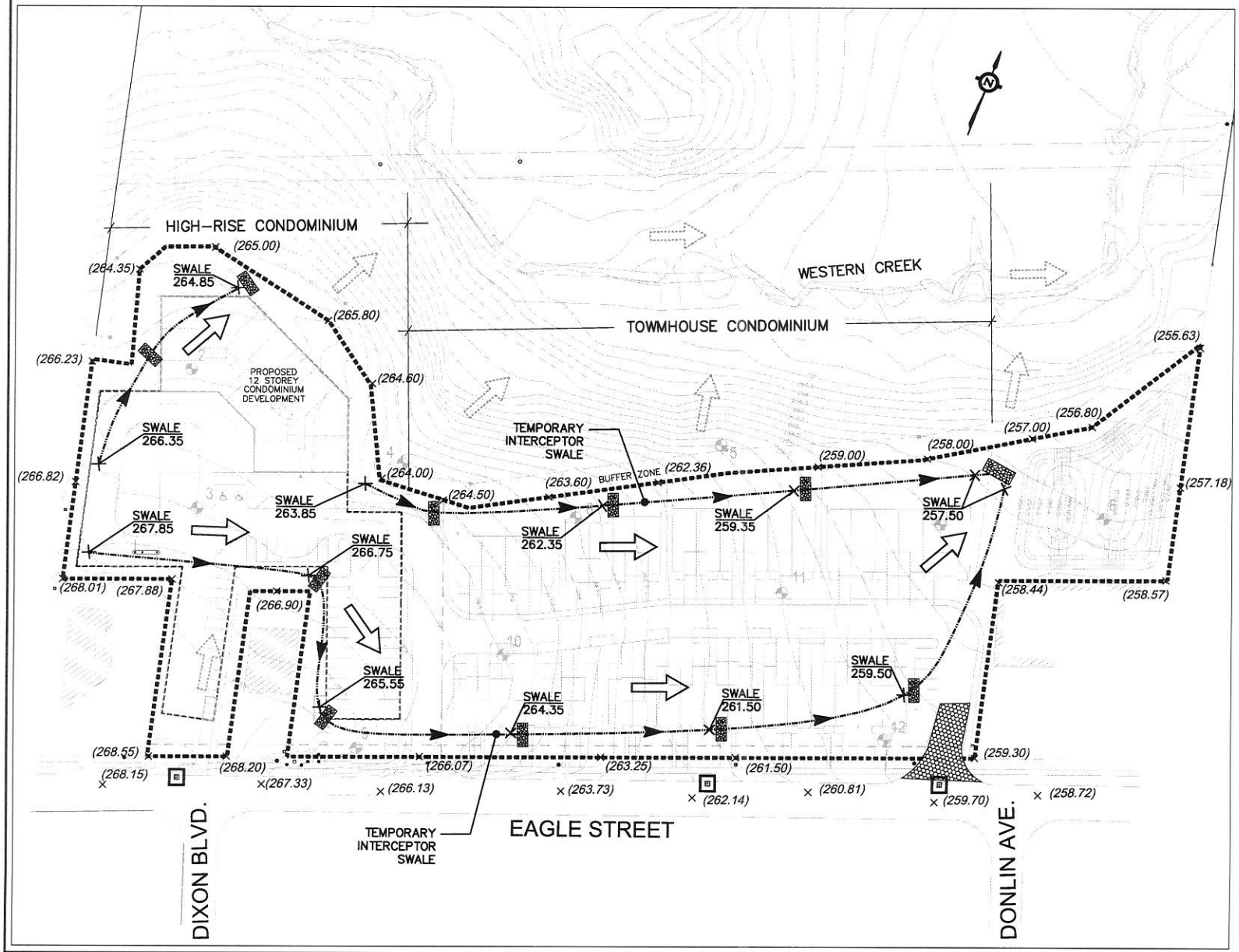
MILLFORD DEVELOPMENT LIMITED

PROPOSED SWM STRATEGY OPTION 2

DATE:	SCALE	DESIGN BY:	DRAWN BY:	PROJECT No.	DWG. No.
SEP. 2010	NTS	JJM	MAEL/CAD	99598	STM2



LEGEND:

- SEDIMENT CONTROL FENCE
- TEMPORARY INTERCEPTOR SWALE DURING CONSTRUCTION
- TEMPORARY GRAVEL ACCESS PAD
- TEMPORARY CATCHBASIN SEDIMENT CONTROL DEVICE
- OVERLAND FLOW ROUTE
- EXISTING OVERLAND FLOW ROUTE
- SWALE 175.62 — SWALE ELEVATION
- ROCK CHECK DAM

MASONGSONG ASSOCIATES ENGINEERING LIMITED
Consulting Engineers • Planners • Project Managers
1151 Denison Street • Unit 15 • Markham, Ontario • L3R 3Y4
Tel(905) 944-0162 • Fax(905) 944-0165 • E-Mail: maeng@maeng.ca

MILLFORD DEVELOPMENT LIMITED

PRELIMINARY SEDIMENT & EROSION CONTROL PLAN

DATE:	SCALE	DESIGN BY:	DRAWN BY:	PROJECT No.	DWG. No.
SEP. 2010	NTS	JJM	MAEL/CAD	99598	ES1

Appendix B

STM and SWM Pond Calculations
EPA Watermain Modeling Output

TABLE B1

TOWN OF NEWMARKET
ENGINEERING DEPARTMENT

Design Return Period = 5Yrs, n=0.013

SHEET NO:	1
JOB NO:	1999-598
DATE:	Jun-10
CONSULTANT	MASONGSONG ASSOCIATES ENGINEERING LTD.
TOWN FILE NO.:	

IDF parameters
A= 2464
B= 16
C= 1

LOCATION			RUNOFF				Rainfall Intensity	Cumm Flow Q_5	STORM SEWER DESIGN INFORMATION			Full Capacity	Full Velocity	Qact/Qcap	Time (Entry 10 min)	
STREET NAME	MANHOLES FROM	MANHOLES TO	A area (ha)	C runoff coeff.	A x C	ACC. A x C	I (mm/hr)	AxCxCrxI (L/s)	size (mm)	slope (%)	length (m)	Q full (l/s)	V full (m/s)	SECT. x100%	Sect. (min)	Accum (min)
HIGH-RISE AREA			0.67	0.74	0.50			53.00								
			0.68	0.45	0.31											
EAGLE STREET	MH100	MH101	0.29	0.45	0.13	0.44	94.77	167.91	300	4.26	86.0	199.57	2.82	0.84	0.51	10.00
EAGLE STREET	MH101	MH102	0.35	0.45	0.16	0.59	92.95	153.37	300	4.26	42.0	199.57	2.82	0.77	0.25	10.51
EAGLE STREET	MH102	MH103	0.38	0.45	0.17	0.77	92.09	195.70	300	4.24	56.0	199.10	2.82	0.98	0.33	10.76
EAGLE STREET	MH103	MH104	0.42	0.45	0.19	0.95	90.97	241.06	300	4.86	58.0	213.16	3.02	1.13	0.32	11.09
EAGLE STREET	MH104	MH105	0.50	0.45	0.23	1.18	89.90	294.43	450	3.30	74.0	517.88	3.26	0.57	0.38	11.41

Table B2

On-Site Storage Calculator

Newmarket 100-Year

Prj. Name: Millford Development
Prj. No.: 99-598
By: JJM
Date: 09-Jun-10

Location: **Eagle Street**

$$i_{100} = \frac{1770}{(T+4)^{0.820}}$$

A =	0.670	ha
Composite C =	0.74	
i-5y (Allowable) =	113.21	mm/hr
$Q_{Allowable}$ =	0.053	m^3/s
Q_{Actual} =	0.053	m^3/s

at R=0.25 Predevelopment

t_c (min)	i_{100} (mm/hr)	Q_{100} (m^3/s)	Q_{stored} (m^3/s)	Peak Volume (m^3)	
1	472.953	0.652	0.599	35.969	
2	407.276	0.562	0.509	61.070	
3	358.916	0.495	0.442	79.602	
4	321.691	0.444	0.391	93.817	
5	292.075	0.403	0.350	105.020	
6	267.900	0.369	0.317	114.024	
7	247.760	0.342	0.289	121.364	
8	230.698	0.318	0.265	127.409	
9	216.043	0.298	0.245	132.422	
10	203.305	0.280	0.228	136.598	
11	192.123	0.265	0.212	140.080	
12	182.220	0.251	0.199	142.983	
13	173.382	0.239	0.186	145.394	
14	165.444	0.228	0.175	147.383	
15	158.269	0.218	0.166	149.006	
16	151.750	0.209	0.157	150.311	
17	145.799	0.201	0.148	151.335	
18	140.342	0.194	0.141	152.110	
19	135.318	0.187	0.134	152.664	
20	130.677	0.180	0.128	153.020	
21	126.375	0.174	0.122	153.197	
22	122.376	0.169	0.116	153.212	*** required on-site storage
23	118.647	0.164	0.111	153.080	
24	115.161	0.159	0.106	152.814	
25	111.894	0.154	0.102	152.425	
26	108.826	0.150	0.097	151.923	
27	105.939	0.146	0.093	151.317	
28	103.217	0.142	0.090	150.615	
29	100.645	0.139	0.086	149.824	
30	98.211	0.135	0.083	148.949	
31	95.904	0.132	0.080	147.997	
32	93.714	0.129	0.077	146.974	
33	91.632	0.126	0.074	145.882	
34	89.650	0.124	0.071	144.728	
35	87.761	0.121	0.068	143.513	

Table B4

POND DESIGN CALCULATIONS
POND A -ALTERNATIVE 1

Project Name: Millford Development
Municipality: Town of Newmarket
Project No.: 98-598
Date: 31-Oct-10

Pond Criteria

Drainage Area:	**2.04 ha.**
External Area:	**0.064 ha.**
Uncontrolled Area:	**0.097 ha.**

Permanent Pool

DA	2.007 ha	
Imp	75%	
Storage Required	193.3 m^3/ha	(see adjacent table)
Total PP Volume	**388 m^3**	

Extended Detention

	19.46 mm (Runoff Volume From VO2)
Total Volume	**391 m^3**

Level 1 Wet Pond (2003 MOE)

Impervious Level (%)	Water Quality Storage Vol m^3/ha	Extended Detention m^3/ha	Permanent Pool m^3/ha
35%	140	40	100
55%	190	40	150
70%	225	40	185
85%	250	40	210
Interpolate a Storage Req'mt			
75%	233.3	40	193.3

Required Volumes

Perm Pool (m^3)	Extended Detention (m^3)	100-Yr Flood Control (m^3)	Total (m^3)
388	391	675	1,063

POND DESIGN CALCULATIONS
POND A -ALTERNATIVE 1

Project Name: Millford Development
Municipality: Town of Newmarket
Project No.: 98-598
Date: 31-Oct-10

Table B4 -Cont'

Pond Design

Pond Volume Provided (Avg Area Method)

** Can Input up to 7 Elev/Area Stations*

	Elevation	Forebay (m^2)	Main Pool (m^2)	Area 3 (m^2)	Area Total (m^2)	ΔH m	H m	Avg Area (m^2)	Volume (m^3) Incr.	Volume (m^3) Cumul.
1	255.00	27	100		127					
2	255.50	125	230		355	0.50	0.50	241	121	121
3	256.00	260	420		680	0.50	1.00	518	259	379
4	256.50	0	1,210		1,210	0.50	1.50	945	473	852
5	257.00	0	1,610		1,610	0.50	2.00	1,410	705	1,557
6										
7										
					Total Height	**2.00**				

Component Interpolation

Component	Elevation m	Component Vol Provided m^3	Component Vol Req'd m^3	Excess or (Shortfall)
Perm Pool (NWL)	256.10	453	388	65
Erosion	256.55	461	391	70
100-Yr	256.75	730	675	55
Total		1,182	1,063	119

Table B5

POND DESIGN CALCULATIONS
POND A - ALTERNATIVE 2

Project Name: Millford Development
Municipality: Town of Newmarket
Project No.: 98-598
Date: 31-Oct-10

Pond Criteria

Drainage Area: **1.2 ha.**

Permanent Pool

DA	1.2 ha	
Imp	78%	
Storage Required	198.3 m^3/ha (see adjacent table)	
	238 m^3	

Extended Detention

	19.81 mm (Runoff Volume From VO2)
Total Volume	**238 m^3**

Level 1 Wet Pond (2003 MOE)

Impervious Level (%)	Water Quality Storage Vol m^3/ha	Extended Detention m^3/ha	Permanent Pool m^3/ha
35%	140	40	100
55%	190	40	150
70%	225	40	185
85%	250	40	210
Interpolate a Storage Req'mt			
78%	238.3	40	198.3

Required Volumes

Perm Pool (m^3)	Extended Detention (m^3)	100-Yr Flood Control (m^3)	Total (m^3)
238	238	500	738

POND DESIGN CALCULATIONS
POND A - ALTERNATIVE 2

Project Name: Millford Development
Municipality: Town of Newmarket
Project No.: 98-598
Date: 31-Oct-10

Table B5 -Cont'

Pond Design

Pond Volume Provided (Avg Area Method)

** Can Input up to 7 Elev/Area Stations*

	Elevation	Forebay (m^2)	Main Pool (m^2)	Area 3 (m^2)	Area Total (m^2)	ΔH m	H m	Avg Area (m^2)	Volume (m^3) Incr.	Volume (m^3) Cumul.
1	255.00	27	100		127					
2	255.50	125	230		355	0.50	0.50	241	121	121
3	256.00	260	430		690	0.50	1.00	523	261	382
4	256.50	0	1,210		1,210	0.50	1.50	950	475	857
5	257.00	0	1,450		1,450	0.50	2.00	1,330	665	1,522
6					0	0.00	0.00	0	0	1,522
7					0	0.00	0.00	0	0	1,522
					Total Height	**2.00**				

Component Interpolation

Component	Elevation m	Component Vol Provided m^3	Component Vol Req'd m^3	Excess or (Shortfall)
Perm Pool (NWL)	255.90	316	238	78
Erosion	256.30	319	238	82
100-Yr	256.60	664	500	164
Total		980	738	242

Table B6

POND DESIGN CALCULATIONS
FOREBAY DESIGN
Alternative 1

Project Name:	Millford Development
Municipality:	Town of Newmarket
Project No.:	98-598
Date:	31-Oct-10

Pond Catchment Area: 2.04 ha

Water Quality Storage Requirements

MOE (1994, Table 4.1)

Level 1	238.3 m^3/ha
% imperviousness	75 %

Settling Calculations

$$Dist = \sqrt{\frac{r \times Q_p}{V_s}}$$

Dist	23	Forebay length	m
r	2.0	Length to width ratio	-
Qp	0.08	Peak flow rate from the pond during design quality storm	m^3/s
Vs	0.0003	settling velocity'	m/s

Dispersion Length

$$Dist = \frac{8Q}{dV_f}$$

Minimum Width 1 m

Dist	5	Dispertion Length	
Q	0.32	Inlet Flow Rate	(5 year Storm)
d	1.1	Depth of the Permanent Pool	
Vf	0.5	Desired Velocity in the Forebay	

(0.50 m/s is the maximum permissible velocity before erosion occurs in a channel (MOE))

Design Quality Storm

MOE Eq 3.7

$$i_{25} = 43C + 5.9$$

A	2.04	Area
C	75	Runoff Coefficient
i	38.15	Intensity
Qp	0.16	Flow Rational Method

Flow Velocity Check

Qd	0.32	Inlet Flow Rate	m^3/s
A	6.11	Crossectional Area	m^2
Vfb	0.05	Flow Velocity	m/s

Forebay Dimensions

5	Average Side Slope	%
25	Top Length	m
15	Bottom Length	m
10	Average Top Width	m
2	Bottom Width	m
1.1	Average Depth of Forbay Pool	m
161	Total Volume of Forbay Pool	m^3

Forebay Cleanout Frequency

Ac	2.04	Contributing Area	(ha)
Ds	0.45	Maximum Sediment Depth	(m)
Vsf	6.39	Maximum Sediment Volume	(m^3)
a	75%	Impervious Level	%
da	3.13	Annual Sediment Loading	(m^3/ha/yr) (Table 5.3 MOE Manual)
Fs	30	Forebay Cleanout Frequency	(years)
	80%	Target Maintenance TSS Removal Efficiency	

Table B7

POND DESIGN CALCULATIONS
FOREBAY DESIGN
Alternative 2

Project Name:	Millford Developments
Municipality:	Town of Newmarket
Project No.:	98-598
Date:	31-Oct-10

Pond Catchment Area: 1.26 ha

Water Quality Storage Requirements

MOE (1994, Table 4.1)

Level 1	238.3	m^3/ha
% imperviousness	78	%

Settling Calculations

$$Dist = \sqrt{\frac{r \times Q_p}{V_s}}$$

Dist	23	Forebay length	m
r	2.0	Length to width ratio	-
Qp	0.08	Peak flow rate from the pond during design quality storm	m^3/s
Vs	0.0003	settling velocity'	m/s

Dispersion Length

$$Dist = \frac{8Q}{dV_f}$$

Minimum Width 0.5 m

Dist	3	Dispertion Length	
Q	0.20	Inlet Flow Rate	(5 year Storm)
d	1.1	Depth of the Permanent Pool	
Vf	0.5	Desired Velocity in the Forebay	

(0.50 m/s is the maximum permissible velocity before erosion occurs in a channel (MOE))

Design Quality Storm

MOE Eq 3.7

$$i_{25} = 43C + 5.9$$

A	1.26	Area	
C	78	Runoff Coefficient	
i	39.44	Intensity	
Qp	0.11	Flow Rational Method	

Flow Velocity Check

Qd	0.20	Inlet Flow Rate	m^3/s
A	6.11	Crossectional Area	m^2
Vfb	0.03	Flow Velocity	m/s

Forebay Dimensions

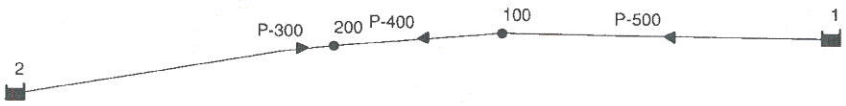
5	Average Side Slope	%
25	Top Length	m
15	Bottom Length	m
10	Average Top Width	m
2	Bottom Width	m
1.1	Average Depth of Forbay Pool	m
161	Total Volume of Forbay Pool	m^3

Forebay Cleanout Frequency

Ac	1.26	Contributing Area	(ha)
Ds	0.45	Maximum Sediment Depth	(m)
Vsf	4.16	Maximum Sediment Volume	(m^3)
a	78%	Impervious Level	%
da	3.3	Annual Sediment Loading	(m^3/ha/yr) (Table 5.3 MOE Manual)
Fs	46	Forebay Cleanout Frequency	(years)
	80%	Target Maintenance TSS Removal Efficiency	

Millford Development

Day



Millford Development

Network Table - Links

Link ID	Length m	Diameter mm	Roughness	Velocity m/s
Pipe P-500	175	200	110	2.06
Pipe P-400	10	200	110	2.10
Pipe P-300	40	200	110	2.20

Table 3.1. Nodal Demand Summary

Millford Development Eagle Street
Town of Newmarket
Fire demand = 10,000L/min for townhouse residential & 15,000L/min for apartments

Node	Elev	No. Of Units	Density Factor	Demand Units	Demand Pop	Demand Flow (300L/capita/day)	Min Hour	Max Day	Max Hour
			1		*2.88/195 ppu*	*L/s*	*0.70*	*2.00*	*3.00*
100		41.00	1	41.00	118.080	0.410	0.287	0.820	1.230
200.00		154.00	1	154.00	300.300	1.043	0.730	2.085	3.128

			Townhouse				HighRise		
Elevation			259.50	m			266.000	m	
Pressure	54.00	psi	38.03	m			38.028	psi	
Total Head			297.53	m			304.028	m	
Fire demand			10,000	L/min	166.667	L/s	15,000	L/min	250.000
Fire demand and max day (L/s)			167.49				252.085		
Pressure	26.20	m	37.88	psi	Max. Day + Fire		>20 psi	OK	
Pressure	36.96	m	53.44	psi	Max. Hour		>50 psi	OK	

Millford Development

Network Table - Nodes

Node ID	Demand LPS	Head m	Pressure m	Quality
Junc 100	0.82	291.85	26.35	0.00
Junc 200	252.08	291.70	26.20	0.00
Resvr 1	-48.18	294.71	0.00	0.00
Resvr 2	-204.73	301.21	0.00	0.00

Millford Development

Network Table - Nodes

Node ID	Demand LPS	Head m	Pressure m	Quality
Junc 100	1.23	302.46	36.96	0.00
Junc 200	3.13	302.76	37.26	0.00
Resvr 1	64.72	297.53	0.00	0.00
Resvr 2	-69.08	304.03	0.00	0.00

Appendix C

Arborist Report

CATHY V. BENTLEY
B.Sc.F., M.Sc.F., R.P.F.,Certified Arborist

Forestry Consultant, Since 1980

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December 7, 2007

Angela Orsi
Millford Development Ltd.
PO Box 215
Newmarket, ON L3Y 4X1

Attn: Angela and Tony Orsi

RE: TREE PLAN - Millford Development Ltd. Property, Eagle St., Newmarket, Ontario

I have followed up on your request to inspect and evaluate the existing trees in order to prepare a Tree Plan, on the above property (Part Lots 2 and 3, Registered Plan 49), on the north side of Eagle Street, in the Town of Newmarket.

I reviewed the site on October 11, 2007 with Peter Allen (Peter E. Allen & Associates Planning Consultants). I inspected the above property on October 25th, 29th and 30th, 2007. The area proposed for residential development (owned by Millford Development Ltd.) is bordered by Eagle St. on the south side, previously developed commercial lands on the west, and previous residential development on the north and east sides. The property boundaries, environmental features of the property and approximate areas of tree locations are indicated on the 'Environmental Features and Tree Locations' page (adapted from Azimuth Environmental Consulting Inc., 2007).

The following are my findings and recommendations, based on data and photos that I collected on site, as well as the information provided by yourself, Peter Allen, and Azimuth Environmental Consulting Inc..

BACKGROUND

Remnants of planted areas of trees and shrubs suggest that the property was a residence or farm previously. Open areas, indicating old fields or other disturbed areas, are being colonized naturally by invasive or early successional species. There were no natural areas of native forest observed in the proposed area of development.

Western Creek, a tributary of the East Holland River, flows through the north part of this property. It is my understanding that the 'Top of Bank' line for the Western Creek corridor (referred to as TOB in this document) was determined and staked by Lake Simcoe Region Conservation Authority (LSRCA), in 2003. In fact, I found that TOB was quite distinctive on site, with relatively flat tableland to the south of TOB. Any vegetation growing on and below TOB will remain undisturbed by the proposed development, as required by Town of Newmarket and agreed to by Millford Development Ltd..

TREE INVENTORY AND STATUS (dbh refers to diameter at breast height, 4.5' above ground)

The following information was collected regarding vegetation growing in the proposed area of development, generally tallied from east to west. Data was recorded for all trees and mature shrubs, located south of the approximate TOB. Any vegetation growing on and below TOB will remain undisturbed by the proposed development.

The data is summarized into 4 sections:
Tree Inventory
Other Vegetation
TOB Area , and
Natural Heritage Area

The locations of the trees included in this inventory, and all other information that was collected, are generally indicated on the attached 'Environmental Features and Tree Locations' (Areas 1-42).

There are no trees in the southeast area of this property (Area 1; Figure 1).

Tree Inventory

A summary of the tree data is provided in the Table below.

Tree	Species	Tree Size	Health Rating, Condition & Notes
1	**NW corner of Green & Ross (Area 2)** **Manitoba Maple** (*Acer negundo*)	25cm dbh; max.	Fair; multi-stem, widespreading crown; 10 of 14 stems living; some deadwood; surrounded by asphalt on E.side, gravel on N.side; Figure 2
2	**SE Corner (Area 4)** **Black Walnut** (*Juglans nigra*)	28cm dbh	Poor; poor structure; dead branch attached; deadwood; 1 main branch removed; Figure 4
3	**Chinese Elm** (*Ulmus chinensis*)	97cm dbh	Poor; over mature; deadwood; E. side dead; loose bark; Figure 4
4	**Manitoba Maple**	15cm dbh	Fair; crowded by Tree #3; healthy crown; Figure 4
5	**Manitoba Maple**	21cm dbh	Fair; forked at base; some deadwood; Figure 4
6-10	**E. of Property (Area 5)** **Manitoba Maple**	>30cm dbh	Fair; overgrown; forked; deadwood in crowns; < 4.5 m from property line; Figures 5-6
11	**Open Field (Area 6)** **Apple/Crabapple** (*Malus sp.*)	25cm dbh	Dying; over mature; ½ removed; wounds; Fig.7
12	**Apple/Crabapple**	17cm dbh; max.	Poor; over mature; multi-stem (7); Figure 7
13	**Mound near TOB (Area 10)** **Manitoba Maple**	-	Dying; Figure 11
14	**Manitoba Maple**	22cm dbh	Fair; low branched; Figure 11
15	**Basswood** (*Tilia americana*)	14,15cm dbh; main stems	Fair; forked at base; Figure 11
16	**Planted Evergreens (Area 12)** **Colorado Blue Spruce** (*Picea pungens*)	40cm dbh	Good; healthy foliage; Figure 13

Tree	Species	Tree Size	Health Rating, Condition & Notes
17	**White Spruce** (*Picea glauca*)	27cm dbh	Dying; sparse foliage; Figure 13
18	**Colorado Blue Spruce**	54cm dbh	Good; healthy foliage; Figure 13
19	**White Spruce**	19cm dbh; main stem	Fair; forked; Figure 13
20	**Natural Heritage (Area 13)** **White Spruce**	22cm dbh	Fair; crown on E. side only; overcrowded; Figure 14
21	**Eastern White Cedar** (*Thuja occidentalis*)	23cm dbh; main stem	Fair; forked; healthy foliage; Figure 14
22	**White Spruce**	29cm dbh	Fair; forked; healthy foliage; Figure 14
23	**Natural Heritage (Area 14)** **Manitoba Maple**	76cm dbh	Dying; new suckers alive; Figures 15,16
24	**Manitoba Maple**	-	Dying; only new suckers alive; Figure 17
25	**Near West TOB (Area 17)** **Chinese Elm**	17cm dbh	Fair; forked; crowded by Manitoba Maples; Fig. 22
26	**Natural Heritage (Area 20)** **Eastern White Cedar**	47cm dbh	Poor; dead top; Figures 25-26
27	**Natural Heritage (Area 21)** **Basswood**	34cm dbh; max.	Fair; multi-stem; over mature; 20 of 24 stems alive; Figure 27
28	**Natural Heritage (Area 22)** **Manitoba Maple**	48cm dbh	Poor; fungi; forked; leaning; some deadwood; Fig.28
29	**Natural Heritage (Area 24)** **Eastern White Cedar**	42cm >bh	Fair; forked @bh; healthy foliage; Figure 30
30	**Natural Heritage (Area 26)** **Black Walnut**	41cm dbh	Fair; forked 4 m up; some deadwood; Figures 33-34
31	**Natural Heritage (Area 27)** **Black Walnut**	36cm>bh; max.	Fair; some deadwood; forked @ 1m ht.; Figure 35
32	**Natural Heritage (Area 28)** **Black Walnut**	62cm dbh	Good; healthy branches & structure; Figure 36
33	**Natural Heritage (Area 29)** **Manitoba Maple**	59cm dbh	Poor; dead main branches; Figure 37
34	**Natural Heritage (Area 31)** **Black Walnut**	38cm dbh	Fair; weak crotch; forked @ 2 m; deadwood; Fig. 39
35	**Natural Heritage (Area 32)** **Black Walnut**	48cm dbh	Fair; weak crotch; forked @ 2m; deadwood; overgrown by vines; upper crown healthy; Figure 39
36	**Natural Heritage (Area 34)** **Eastern White Cedar**	29cm dbh	Good; crowded by #37; Figure 41
37	**Eastern White Cedar**	22cm dbh	Good; crowded by #36; Figure 41
38	**West Side (Area 36)** **Eastern Cottonwood** (*Populus deltoides*)	48cm dbh	Poor; top dead; Figure 44
39	**Eastern Cottonwood**	70cm dbh	Poor; branch ends dead; Figure 44
40	**West Side (Area 38)** **Manitoba Maple**	30cm dbh; max.	Poor; forked @ 1 m; growing into chain link fence; Figure 46 (left front)
41	**Eastern Cottonwood**	39cm dbh	Fair; lower crown dead; Figure 46 (centre)

Tree	Species	Tree Size	Health Rating, Condition & Notes
42	**Eastern Cottonwood**	29cm dbh	Fair; lower crown dead; Figure 46 (right)
	West Side (Area 39)		
43	**Eastern Cottonwood**	44cm dbh	Fair; lower crown dead; Figure 46 (left)
44	**Scots Pine** (*Pinus sylvestris*)	32cm dbh	Fair; forked @ 4 m; healthy foliage; Figure 47
45	**Scots Pine**	34cm dbh	Good; healthy crown; Figure 47
	West Side (TOB,Area 41)		
46	**Scots Pine**	35cm dbh	Good; healthy crown; within 4.5m of P/L; Figure 49

Other Vegetation :

There are shrubs including **Common Lilac** (*Syringa vulgaris*), overgrown and covered by vines, along the south side of the property towards the east end, north of the Green & Ross property (Area 3; Figure 3).

A variety of naturally occurring trees, including **Manitoba Maple** and **Elm**, and shrubs, including **European Buckthorn** (*Rhamnus cathartica*), are growing in Area 8 (Figure 9), located just north of the open field (Area 1), and south of TOB (Area 11, Figure 12). Note that the large trees, Eastern Cottonwood, visible in Figure 12, are below TOB (north of Area 11).

There is a row of evergreens, possibly planted originally near a laneway for an old homestead (Area 12; Figure 13). A dead hardwood tree, overgrown **Eastern White Cedars**, and **Lilac** shrubs are located within this row of planted evergreens.

A cleared area, possibly for a driveway or laneway, is located on the property (Area 19, Figure 24), extending from Eagle St. northwards – towards the west side, between the Orthodontist Office property (west side) and the new home property (east side).

Along the southwest part of the property, east of the Orthodontist Office property, there are hardwood trees left standing, as well as **Trembling Aspen** and **Norway Maple** (*Acer platanoides*) saplings colonizing the open space (Area 35, Figure 42).

North of the Orthodontist Office property, there is a copse of **Scots Pine**, including 19 trees < 30 cm dbh, in Area 37 (Figure 45), and 2 **Manitoba Maples**, < 30 cm dbh, and a **European Buckthorn** shrub (Area 38, Figure 46).

Along the west side of the property, **Lilac** shrubs, **Scots Pine**, and 1 **White Spruce**, < 30 cm dbh, are growing (Areas 39-41, Figures 47-49).

Top of Bank (TOB) Area : East Side of Property

At the east side of the property, the TOB curves northward, following the watercourse (Western Creek). This point is located approximately halfway along the eastern property line (Area 7). The vegetation in this area is located below (north/northwest of) the TOB (Figure 8) and will be undisturbed by the proposed development.

Other vegetation is growing below the TOB and will be undisturbed by the proposed development (Area 9, Figure 10).

Top of Bank (TOB) Area : West Side of Property

Manitoba Maple clumps are growing naturally, near the TOB, towards the west side of the property (Areas 17-18; Figures 21, 23-right).

Scots Pine trees are growing naturally, along the TOB at the west side of the property (Area 42, Figure 50). **Staghorn Sumac** shrubs (*Rhus typhina*) are naturally colonizing the open space east of the Scots Pine (Area 42, Figure 50).

Natural Heritage Area :

Along Eagle Street, the south side of the property, there is overgrown vegetation covering approximately 50 m in length, including **Eastern White Cedar**, **Manitoba Maple**, and **Lilac** shrubs (Areas 15-16; Figures 18-20, 31). **Trembling Aspen** (*Populus tremuloides*) saplings have naturally colonized the available space, in Area 16 (Figure 20).

In the central part of the Natural Heritage Area, there are assorted hardwood trees growing naturally, < 30 cm dbh (Area 23, Figure 29).

Towards the west side of the Natural Heritage Area and east of the existing house property, **Trembling Aspen** saplings have naturally colonized the open space (Area 25; Figure 32). A **Black Walnut** tree (<30 cm dbh), **Eastern White Cedars** (<30 cm dbh), and **Lilac** shrubs are growing towards the west side of this area, near the NE corner of the existing house property (Areas 29-30; Figures 37-38).

In the northwest part of the Natural Heritage Area, there is an over mature, dead **Manitoba Maple**, lying on the ground (Area 33, Figure 40).

DISCUSSION AND RECOMMENDATIONS

I have inspected the property and the following are my recommendations.

Tree Inventory

In total, there are 32 healthy trees (7 in Good and 25 in Fair Condition) that may be affected by the proposed development :

- 9 **Manitoba Maple**, all in Fair Condition, including 5 within 4.5 m of eastern property line
- 2 **Basswood** (Fair)
- 1 **Chinese Elm** (Fair)
- 4 **Black Walnut** (Fair)
- 3 **Eastern Cottonwood** (Fair)
- 3 **White Spruce** (Fair)
- 4 **Eastern White Cedar** (2 Good - < 30 cm dbh, 2 Fair)
- 1 **Scots Pine** (Fair)

- and 5 trees of Significant Size (>30 cm dbh) and in Good Condition :
  - 2 **Colorado Blue Spruce** (Trees #16 – 40 cm dbh; #18 – 54 cm dbh)
  - 1 **Black Walnut** (Tree #32 - 62 cm dbh)
  - 2 **Scots Pine** (Trees #45 - 34 cm dbh; #46 – 35 cm dbh).

The remaining 14 trees that were included in the **Tree Inventory** are in Poor or Dying Condition :

- 1 **Black Walnut**
- 1 **Chinese Elm**
- 2 **Apple**
- 6 **Manitoba Maple**
- 2 **Eastern Cottonwood**
- 1 **White Spruce**
- 1 **Eastern White Cedar**

According to the Town of Newmarket Tree Preservation, Protection, Replacement and Enhancement Policy (10pp.), all trees are to be preserved, protected or replaced if they meet **ALL** of the following criteria (p. 2 of Policy) :

- ✓ Significant (>30 cm dbh)
- ✓ In Good Condition
- ✓ Located within 4.5 m of existing property line
- ✓ Native, non-exotic, AND non-invasive species; or identified on the Town's most current Recommended Plant List.

Only 5 trees listed above, of Significant Size and in Good Condition, meet these criteria. Since development of the property is proposed, I recommend replacing the 5 trees, following the 'Aggregate Inch Replacement' method. The total requirement is 255 cm of diameter (sum of diameters of the 5 trees to be removed = 40+54+62+34+35 cm dbh). The tree replacement will total 255 cm diameter, for example 30 trees of 8 cm dbh + 2 trees of 7.5 cm dbh, or other combinations of caliper to compensate for the total diameter removed. This meets the requirements of the Town of Newmarket, following the Tree Preservation, Protection, Replacement and Enhancement Policy.

In my opinion, Tree #46 (Scots Pine), near TOB in Area 41, will remain undisturbed by the proposed residential development because it will be protected by the buffer extending beyond the TOB line. Therefore, recommendation of this tree for replacement exceeds the requirements of the Town of Newmarket by 35 cm diameter.

Although 5 Manitoba Maples are located within 4.5 m of the eastern property line, these trees are in Fair Condition only.

Other Vegetation :

No trees or shrubs of Significant Size were recorded in this section of my report. This vegetation is colonizing open areas (saplings), naturally occurring, invasive, or overgrown.

Top of Bank (TOB) Area :

Vegetation at the TOB line and below it will be undisturbed by the proposed development. Close to the TOB line, trees and shrubs are naturally colonizing the available space. Even these areas will be undisturbed, once the buffer width beyond the TOB line has been identified.

Prior to construction, I recommend the installation of fencing at the edge of the buffer, to protect the trees and vegetation near the TOB line and on the tablelands, thereby protecting the designated valley corridor.

Natural Heritage Area :

The 17 trees located in this area were included in the **Tree Inventory** section :
1 - Good Condition & Significant Size - Black Walnut, Tree #32; 62 cm dbh

2 - Good Condition & <30 cm dbh – Eastern White Cedar, Trees #36 & 37; 29 & 22 cm dbh

9 - Fair Condition –
- 1 Basswood, Tree #27; 34 cm dbh max
- 4 Black Walnut, Trees #30, 31, 34, 35; 41, 36 (>bh),38, 48 cm dbh
- 2 Eastern White Cedar, Trees # 21, 29; 23, 42 (>bh) cm dbh
- 2 White Spruce, Trees #20, 22; 22, 29 cm dbh

5 - Poor/Dying Condition –
- 4 Manitoba Maple, Trees # 23, 24, 28, 33
- 1 Eastern White Cedar, Tree #26

Although designated Natural Heritage Area, only 1 of the 17 trees tallied is in Good Condition and Significant Size - Tree #32 (Black Walnut). This is insignificant and hardly justifies this designation in the new Official Plan. Furthermore, the remaining vegetation in the Natural Heritage Area is naturally colonizing the open spaces, over mature, or overgrown and unmaintained since the property has been vacant. No natural areas of native forest were observed.

SUMMARY

In conclusion, I recommend the replacement of the 5 trees of Significant Size, following the 'Aggregate Inch Replacement' method. This requirement is 255 cm of diameter of new tree planting, such as 30 trees @ 8 cm dbh and 2 trees @ 7.5 cm dbh, or another combination of sizes to attain the total of 255 cm of diameter. I suggest that the species list for the tree replacements be prepared in coordination with the Site Plan. This will provide the opportunity to enhance the site with suitable species/sizes of trees.

Recommendation of replacement of Tree #46 (Scots Pine), located near TOB, exceeds the Town of Newmarket requirement. I suggest that this indicates your willingness to enhance the site through development.

There are no other trees or vegetation, of Significant Size and in Good Condition, that may be affected by the proposed residential development, as summarized by sections above – Tree Inventory, Other Vegetation, TOB, and Natural Heritage Area.

In the area designated Natural Heritage System, no trees of a natural native forest were observed. Instead, the existing trees are planted and unmaintained, over mature, over grown, or successional species naturally colonizing open spaces (possibly old fields or other disturbed areas). Following the definition of 'woodlot', in the Town of Newmarket Tree Preservation, Protection, Replacement and Enhancement Policy (2006), the existing vegetation in the Natural Heritage Area does not meet the guidelines for this designation. A 'woodlot' is "a dense growth of trees comprising a minimum area of 0.2 hectares (0.5 acres)." (Town of Newmarket, 2006). Only 1 planted tree, Black Walnut – Tree #32, meets the criteria of the Town of Newmarket for replacement, within the Natural Heritage Area. It was included above in the Tree Inventory Table (p.3) and also in the 'Aggregate Inch Replacement' method (p.6, 7).

Please let me know if I can be of further assistance on this project.

Sincerely,

Cathy V. Bentley, B.Sc.F., M.Sc.F., R.P.F.
I.S.A. Certified Arborist #ON-0184

REFERENCES USED

Azimuth Environmental Consulting, Inc. 2007. Environmental Impact Study for the Proposed Residential Development of Part of Lots 2 and 3, Registered Plan 49, Town of Newmarket, Regional Municipality of York. 23 pp. + Figures + Appendices. DRAFT.

Town of Newmarket. 2006. Tree Preservation, Protection, Replacement and Enhancement Policy.

Farrar, J.L. 1995. Trees in Canada. Fitzhenry & Whiteside Limited, Markham, Ontario. 502 pp.

Figure 1. No trees along SE area of property, facing NE (Oct. 25/07)

Figure 2. Tree #1, Manitoba Maple, growing naturally on E. side of property, facing NE (Oct. 25/07)

Figure 3. Overgrown shrubs, along S. edge at E. end of property, facing SE (Oct. 25/07)

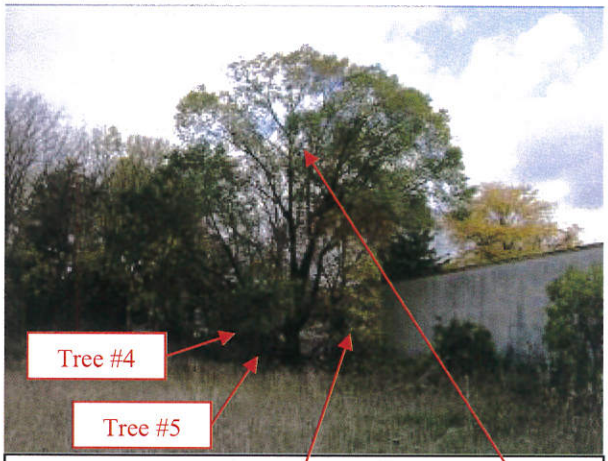

Figure 4. SE corner - Black Walnut (#2), Siberian Elm (#3), Manitoba Maple (#4,5), facing SE (Oct. 25/07)

Figure 5. Manitoba Maples (Trees #6,7), E. of property line, facing E (Oct. 25/07)

Figure 6. Manitoba Maples (Trees #8, 9, 10), E. of property line, facing E (Oct. 25/07)

Figure 25. Eastern White Cedar (#26), growing naturally in Natural Heritage Area, facing SE (Oct.29/07)

Figure 26. Top of dying Eastern White Cedar (Tree #26-centre), facing SE (Oct. 29/07)

Figure 27. Tree #27, Basswood Clump, growing naturally, facing S (Oct. 29/07)

Figure 28. Tree #28, Manitoba Maple, growing naturally, facing S (Oct. 29/07)

Figure 29. Hardwoods, < 30cm dbh, growing naturally (Area 23), facing N (Oct. 29/07)

Figure 30. Tree #29, Eastern White Cedar, growing naturally in Area 24, facing E (Oct. 29/07)

Figure 7. Apple trees #11 & 12 , E. side of property, facing S from TOB (Oct. 25/07)

Figure 8. Vegetation growing naturally below TOB, facing NW (Oct. 25/07)

Figure 9. Young trees growing naturally near TOB, facing W (Oct. 25/07)

Figure 10. Vegetation growing naturally below TOB, facing N (Oct. 25/07)

Figure 11. Manitoba Maples (#13 & 14), & Basswood (#15–right), facing N (Oct. 25/07)

Figure 12. Natural vegetation (foreground) near TOB, facing NW (Oct. 25/07)

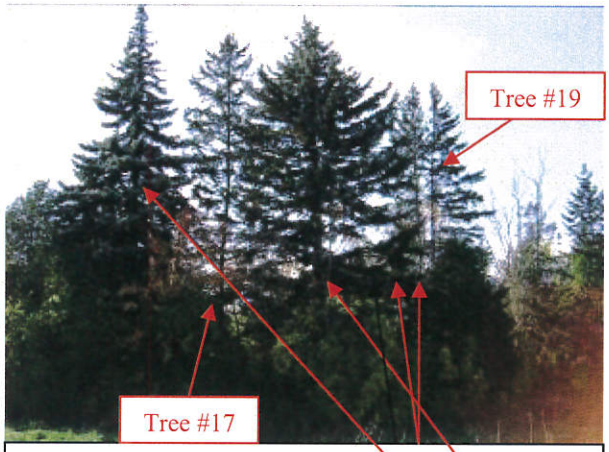

Figure 13. Spruce-Colorado Blue (#16 & 18), White (17-left,19-right), facing W (Oct.25/07)

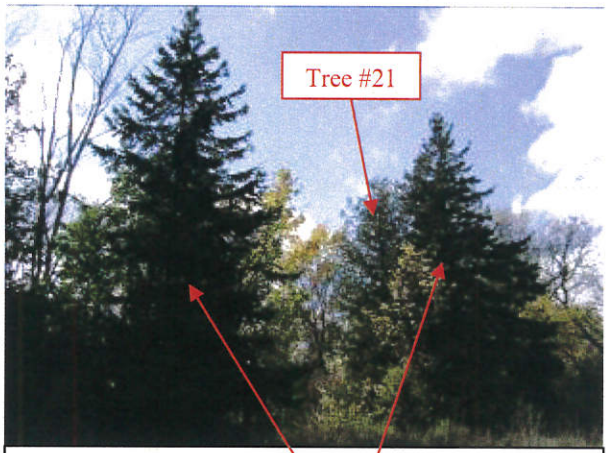

Figure 14. White Spruce (#20 & 22), & White Cedar (#21-right), facing NW (Oct.25/07)

Figure 15. Dying Manitoba Maple (Tree #23), growing naturally, facing W (Oct. 25/07)

Figure 16. Close up of crown of Manitoba Maple (Tree #23), growing naturally, facing N (Oct.25/07)

Figure 17. Tree #24 (centre), dying Manitoba Maple, growing naturally, facing W (Oct. 25/07)

Figure 18. Overgrown Lilacs, Manitoba Maple (centre), White Cedar (right), facing NW (Oct.25/07)

Figure 19. Overgrown vegetation (Lilacs) along Eagle St., on S. side of property, facing NW (Oct. 25/07)

Figure 20. Trembling Aspen saplings & overgrown Cedars-right, facing NW (Oct. 25/07)

Figure 21. Clumps of Manitoba Maple, growing naturally near TOB (Area 17), facing N (Oct. 29/07)

Figure 22. Tree #25, Chinese Elm, growing naturally on E. side, facing NW (Oct. 29/07)

Figure 23. View of natural vegetation near TOB, towards west side of property, facing NW (Oct. 29/07)

Figure 24. Open area (Area 19) & natural vegetation towards west side of property, facing S (Oct. 29/07)

Figure 31. Overgrown Lilac shrubs & Eastern White Cedars, near Eagle St. (Area 15), facing S (Oct.29/07)

Figure 32. Trembling Aspen saplings (Area 25), E. of existing new house property, facing W (Oct. 29/07)

Figure 33. Tree #30, Black Walnut, facing NW (Oct. 29/07)

Figure 34. Crown of Tree #30, Black Walnut, facing NW (Oct. 29/07)

Figure 35. Tree #31, Black Walnut, growing E. of house property, facing W (Oct. 29/07)

Figure 36. Tree #32, healthy Black Walnut, facing NW (Oct. 29/07)

Figure 37. Natural vegetation near W. side of Natural Heritage Area, facing NE (Oct. 29/07)

Figure 38. White Cedars, growing near NE corner of existing house property, facing W (Oct.29/07)

Figure 39. Black Walnuts (#34 & #35), Natural Heritage Area, facing N (Oct. 29/07)

Figure 40. Dead Manitoba Maple (Area 33), laying on ground, facing N (Oct. 29/07)

Figure 41. Eastern White Cedars (#36 & #37), growing on W. side (Area 34), facing W (Oct. 29/07)

Figure 42. SW corner: natural vegetation, facing NW (Oct. 29/07)

Figure 43. Natural vegetation on W. side, facing NW (Oct. 29/07)

Figure 44. Eastern Cottonwood (#38 & #39), on W. side, facing NW (Oct. 29/07)

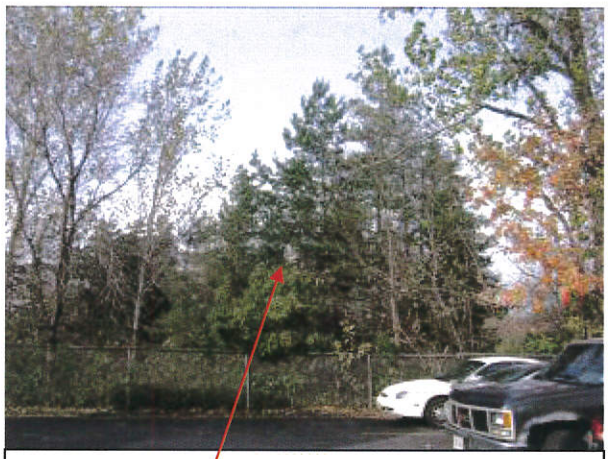

Figure 45. Copse of Scots Pine (Area 37), N. of Orthodontist Office property, facing N (Oct.29/07)

Figure 46. Natural vegetation, including Manitoba Maples & Eastern Cottonwood, facing N (Oct.29/07)

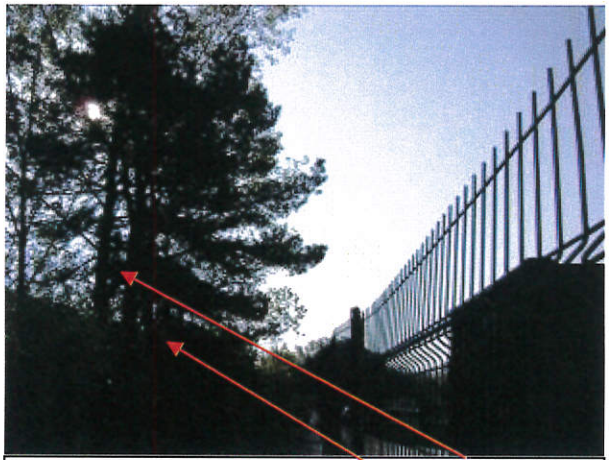

Figure 47. West side: Scots Pine (#44 & #45), growing on W. side, facing S (Oct. 30/07)

Figure 48. Scots Pine, 1 White Spruce & Lilacs, on W. side (Area 40), facing SE (Oct. 30/07)

Figure 49. Copse of Scots Pine & Tree #46, at W end of TOB, growing naturally, facing NW (Oct. 30/07)

Figure 50. Natural Scots Pine (TOB) & Sumac, in Area 42, facing NW (Oct.30/07)

Appendix D

Visual Otthymo Modeling Output

```
       V     V   I    SSSSS  U   U    A    L
       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
       O   O     T      T    H   H   Y Y   MM MM  O   O
       O   O     T      T    HHHHH    Y    M M M  O   O
        OOO      T      T    H   H    Y    M   M   OOO
```


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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 2.3.2\voin.dat
Output filename: H:\PROJECTS\99\598\Design\SWM\VO2\Millford Development\Existing Cond_ALL_V2.out
Summary filename: H:\PROJECTS\99\598\Design\SWM\VO2\Millford Development\Existing Cond_ALL_V2.sum

DATE: 10/31/2010 TIME: 2:55:52 PM

USER:

COMMENTS: _____EXISTING CONDITIONS - ALTERNATIVE 1_____

****
** SIMULATION NUMBER: 1 **
****

READ STORM | Filename: C:\Working Files\POND DESIGN\SCS Storms\25mm4HR.STM
Ptotal= 25.00 mm | Comments: Twenty-Five mm Four Hour Chicago Storm

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	2.07	1.17	5.70	2.17	5.19	3.17	2.80
.33	2.27	1.33	10.78	2.33	4.47	3.33	2.62
.50	2.52	1.50	50.21	2.50	3.95	3.50	2.48
.67	2.88	1.67	13.37	2.67	3.56	3.67	2.35
.83	3.38	1.83	8.29	2.83	3.25	3.83	2.23
1.00	4.18	2.00	6.30	3.00	3.01	4.00	2.14

CALIB
STANDHYD (0004)
ID= 1 DT= 5.0 min | Area (ha)= .06
Total Imp(%)= 70.00 Dir. Conn.(%)= 70.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.04	.02
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	20.70	40.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	2.07	1.083	5.70	2.083	5.19	3.08	2.80
.167	2.07	1.167	5.70	2.167	5.19	3.17	2.80
.250	2.27	1.250	10.78	2.250	4.47	3.25	2.62
.333	2.27	1.333	10.78	2.333	4.47	3.33	2.62
.417	2.52	1.417	50.21	2.417	3.95	3.42	2.48
.500	2.52	1.500	50.21	2.500	3.95	3.50	2.48
.583	2.88	1.583	13.37	2.583	3.56	3.58	2.35
.667	2.88	1.667	13.37	2.667	3.56	3.67	2.35
.750	3.38	1.750	8.29	2.750	3.25	3.75	2.23
.833	3.38	1.833	8.29	2.833	3.25	3.83	2.23
.917	4.17	1.917	6.30	2.917	3.01	3.92	2.14
1.000	4.18	2.000	6.29	3.000	3.01	4.00	2.14

Max.Eff.Inten.(mm/hr)=		50.21	5.24	
over (min)		5.00	25.00	
Storage Coeff. (min)=		1.31 (ii)	24.27 (ii)	
Unit Hyd. Tpeak (min)=		5.00	25.00	
Unit Hyd. peak (cms)=		.33	.05	
				TOTALS
PEAK FLOW	(cms)=	.01	.00	.006 (iii)
TIME TO PEAK	(hrs)=	1.50	1.83	1.50
RUNOFF VOLUME	(mm)=	24.00	5.10	18.18
TOTAL RAINFALL	(mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT	=	.96	.20	.73

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

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

CALIB					
NASHYD (0001)	Area (ha)= .68	Curve Number (CN)= 80.0			
ID= 1 DT=10.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= .20				

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.167	2.07	1.167	5.70	2.167	5.19	3.17	2.80
.333	2.27	1.333	10.78	2.333	4.47	3.33	2.62
.500	2.52	1.500	50.21	2.500	3.95	3.50	2.48
.667	2.88	1.667	13.37	2.667	3.56	3.67	2.35
.833	3.38	1.833	8.29	2.833	3.25	3.83	2.23
1.000	4.18	2.000	6.30	3.000	3.01	4.00	.00

Unit Hyd Qpeak (cms)= .130

PEAK FLOW (cms)= .007 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 4.518
TOTAL RAINFALL (mm)= 24.640
RUNOFF COEFFICIENT = .183

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

CALIB					
NASHYD (0002)	Area (ha)= 1.26	Curve Number (CN)= 80.0			
ID= 1 DT=10.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= .20				

Unit Hyd Qpeak (cms)= .241

PEAK FLOW (cms)= .013 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 4.519
TOTAL RAINFALL (mm)= 24.640
RUNOFF COEFFICIENT = .183

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

ADD HYD (0005)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0004):	.06	.006	1.50	18.18
	+ ID2= 2 (0001):	.68	.007	1.67	4.52
	ID = 3 (0005):	.74	.012	1.50	5.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0003)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0005):	.74	.012	1.50	5.68
	+ ID2= 2 (0002):	1.26	.013	1.67	4.52
	ID = 3 (0003):	2.00	.022	1.50	4.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 2 **
****

READ STORM	Filename: C:\Working Files\POND DESIGN\ SCS Storms\S0022412.stm
Ptotal= 52.12 mm	Comments: TWO YEAR SCS STORM WITH A TWELVE MINUTE

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.20	.51	6.20	1.02	12.20	10.67	18.20	.76
.40	.51	6.40	1.02	12.40	6.60	18.40	.76
.60	.51	6.60	1.02	12.60	4.83	18.60	.76
.80	.51	6.80	1.02	12.80	4.57	18.80	.76
1.00	.51	7.00	1.02	13.00	3.30	19.00	.76
1.20	.51	7.20	1.02	13.20	2.79	19.20	.76
1.40	.51	7.40	1.02	13.40	2.79	19.40	.76
1.60	.51	7.60	1.02	13.60	2.79	19.60	.76
1.80	.51	7.80	1.02	13.80	2.79	19.80	.76
2.00	.51	8.00	1.02	14.00	2.79	20.00	.76
2.20	.51	8.20	1.52	14.20	1.52	20.20	.51
2.40	.51	8.40	1.52	14.40	1.52	20.40	.51
2.60	.51	8.60	1.52	14.60	1.52	20.60	.51
2.80	.51	8.80	1.52	14.80	1.52	20.80	.51
3.00	.51	9.00	1.52	15.00	1.52	21.00	.51
3.20	.51	9.20	1.52	15.20	1.52	21.20	.51
3.40	.51	9.40	1.52	15.40	1.52	21.40	.51
3.60	.51	9.60	1.52	15.60	1.52	21.60	.51

3.80	.51	9.80	1.52	15.80	1.52	21.80	.51
4.00	.51	10.00	1.52	16.00	1.52	22.00	.51
4.20	1.02	10.20	3.05	16.20	1.02	22.20	.51
4.40	1.02	10.40	3.05	16.40	1.02	22.40	.51
4.60	1.02	10.60	3.05	16.60	1.02	22.60	.51
4.80	1.02	10.80	3.05	16.80	1.02	22.80	.51
5.00	1.02	11.00	3.05	17.00	1.02	23.00	.51
5.20	1.02	11.20	4.06	17.20	1.02	23.20	.51
5.40	1.02	11.40	5.84	17.40	1.02	23.40	.51
5.60	1.02	11.60	13.21	17.60	1.02	23.60	.51
5.80	1.02	11.80	28.96	17.80	1.02	23.80	.51
6.00	1.02	12.00	60.45	18.00	1.02	24.00	.51

CALIB
STANDHYD (0004)
ID= 1 DT= 5.0 min

Area (ha)= .06
Total Imp(%)= 70.00 Dir. Conn.(%)= 70.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.04	.02
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	20.70	40.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.51	6.083	1.02	12.083	10.67	18.08	.76
.167	.51	6.167	1.02	12.167	10.67	18.17	.76
.250	.51	6.250	1.02	12.250	8.23	18.25	.76
.333	.51	6.333	1.02	12.333	6.60	18.33	.76
.417	.51	6.417	1.02	12.417	6.25	18.42	.76
.500	.51	6.500	1.02	12.500	4.83	18.50	.76
.583	.51	6.583	1.02	12.583	4.83	18.58	.76
.667	.51	6.667	1.02	12.667	4.62	18.67	.76
.750	.51	6.750	1.02	12.750	4.57	18.75	.76
.833	.51	6.833	1.02	12.833	4.06	18.83	.76
.917	.51	6.917	1.02	12.917	3.30	18.92	.76
1.000	.51	7.000	1.02	13.000	3.30	19.00	.76
1.083	.51	7.083	1.02	13.083	2.79	19.08	.76
1.167	.51	7.167	1.02	13.167	2.79	19.17	.76
1.250	.51	7.250	1.02	13.250	2.79	19.25	.76
1.333	.51	7.333	1.02	13.333	2.79	19.33	.76
1.417	.51	7.417	1.02	13.417	2.79	19.42	.76
1.500	.51	7.500	1.02	13.500	2.79	19.50	.76
1.583	.51	7.583	1.02	13.583	2.79	19.58	.76
1.667	.51	7.667	1.02	13.667	2.79	19.67	.76
1.750	.51	7.750	1.02	13.750	2.79	19.75	.76
1.833	.51	7.833	1.02	13.833	2.79	19.83	.76
1.917	.51	7.917	1.02	13.917	2.79	19.92	.76
2.000	.51	8.000	1.02	14.000	2.79	20.00	.76
2.083	.51	8.083	1.52	14.083	1.52	20.08	.51
2.167	.51	8.167	1.52	14.167	1.52	20.17	.51
2.250	.51	8.250	1.52	14.250	1.52	20.25	.51
2.333	.51	8.333	1.52	14.333	1.52	20.33	.51
2.417	.51	8.417	1.52	14.417	1.52	20.42	.51
2.500	.51	8.500	1.52	14.500	1.52	20.50	.51
2.583	.51	8.583	1.52	14.583	1.52	20.58	.51
2.667	.51	8.667	1.52	14.667	1.52	20.67	.51
2.750	.51	8.750	1.52	14.750	1.52	20.75	.51
2.833	.51	8.833	1.52	14.833	1.52	20.83	.51
2.917	.51	8.917	1.52	14.917	1.52	20.92	.51
3.000	.51	9.000	1.52	15.000	1.52	21.00	.51
3.083	.51	9.083	1.52	15.083	1.52	21.08	.51
3.167	.51	9.167	1.52	15.167	1.52	21.17	.51
3.250	.51	9.250	1.52	15.250	1.52	21.25	.51
3.333	.51	9.333	1.52	15.333	1.52	21.33	.51
3.417	.51	9.417	1.52	15.417	1.52	21.42	.51
3.500	.51	9.500	1.52	15.500	1.52	21.50	.51
3.583	.51	9.583	1.52	15.583	1.52	21.58	.51
3.667	.51	9.667	1.52	15.667	1.52	21.67	.51
3.750	.51	9.750	1.52	15.750	1.52	21.75	.51
3.833	.51	9.833	1.52	15.833	1.52	21.83	.51
3.917	.51	9.917	1.52	15.917	1.52	21.92	.51
4.000	.51	10.000	1.52	16.000	1.52	22.00	.51
4.083	1.02	10.083	3.05	16.083	1.02	22.08	.51
4.167	1.02	10.167	3.05	16.167	1.02	22.17	.51
4.250	1.02	10.250	3.05	16.250	1.02	22.25	.51
4.333	1.02	10.333	3.05	16.333	1.02	22.33	.51
4.417	1.02	10.417	3.05	16.417	1.02	22.42	.51
4.500	1.02	10.500	3.05	16.500	1.02	22.50	.51
4.583	1.02	10.583	3.05	16.583	1.02	22.58	.51
4.667	1.02	10.667	3.05	16.667	1.02	22.67	.51
4.750	1.02	10.750	3.05	16.750	1.02	22.75	.51
4.833	1.02	10.833	3.05	16.833	1.02	22.83	.51
4.917	1.02	10.917	3.05	16.917	1.02	22.92	.51
5.000	1.02	11.000	3.05	17.000	1.02	23.00	.51
5.083	1.02	11.083	4.06	17.083	1.02	23.08	.51
5.167	1.02	11.167	4.06	17.167	1.02	23.17	.51
5.250	1.02	11.250	5.13	17.250	1.02	23.25	.51
5.333	1.02	11.333	5.84	17.333	1.02	23.33	.51
5.417	1.02	11.417	7.31	17.417	1.02	23.42	.51
5.500	1.02	11.500	13.21	17.500	1.02	23.50	.51
5.583	1.02	11.583	13.21	17.583	1.02	23.58	.51
5.667	1.02	11.667	25.80	17.667	1.02	23.67	.51
5.750	1.02	11.750	28.96	17.750	1.02	23.75	.51
5.833	1.02	11.833	41.55	17.833	1.02	23.83	.51
5.917	1.02	11.917	60.45	17.917	1.02	23.92	.51
6.000	1.02	12.000	60.45	18.000	1.02	24.00	.51

Max.Eff.Inten.(mm/hr)=	60.45	22.58		
over (min)	5.00	15.00		
Storage Coeff. (min)=	1.21 (ii)	14.01 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	.33	.08		
			TOTALS	
PEAK FLOW (cms)=	.01	.00	.008 (iii)	
TIME TO PEAK (hrs)=	12.00	12.08	12.00	
RUNOFF VOLUME (mm)=	51.12	18.94	39.64	
TOTAL RAINFALL (mm)=	52.12	52.12	52.12	
RUNOFF COEFFICIENT =	.98	.36	.76	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
NASHYD (0001)
ID= 1 DT=10.0 min

Area (ha)= .68 Curve Number (CN)= 80.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .20

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.167	.51	6.167	1.02	12.167	10.67	18.17	.76
.333	.51	6.333	1.02	12.333	7.42	18.33	.76
.500	.51	6.500	1.02	12.500	5.54	18.50	.76
.667	.51	6.667	1.02	12.667	4.72	18.67	.76
.833	.51	6.833	1.02	12.833	4.32	18.83	.76
1.000	.51	7.000	1.02	13.000	3.30	19.00	.76
1.167	.51	7.167	1.02	13.167	2.79	19.17	.76
1.333	.51	7.333	1.02	13.333	2.79	19.33	.76
1.500	.51	7.500	1.02	13.500	2.79	19.50	.76
1.667	.51	7.667	1.02	13.667	2.79	19.67	.76
1.833	.51	7.833	1.02	13.833	2.79	19.83	.76
2.000	.51	8.000	1.02	14.000	2.79	20.00	.76
2.167	.51	8.167	1.52	14.167	1.52	20.17	.51
2.333	.51	8.333	1.52	14.333	1.52	20.33	.51
2.500	.51	8.500	1.52	14.500	1.52	20.50	.51
2.667	.51	8.667	1.52	14.667	1.52	20.67	.51
2.833	.51	8.833	1.52	14.833	1.52	20.83	.51
3.000	.51	9.000	1.52	15.000	1.52	21.00	.51
3.167	.51	9.167	1.52	15.167	1.52	21.17	.51
3.333	.51	9.333	1.52	15.333	1.52	21.33	.51
3.500	.51	9.500	1.52	15.500	1.52	21.50	.51
3.667	.51	9.667	1.52	15.667	1.52	21.67	.51
3.833	.51	9.833	1.52	15.833	1.52	21.83	.51
4.000	.51	10.000	1.52	16.000	1.52	22.00	.51
4.167	1.02	10.167	3.05	16.167	1.02	22.17	.51
4.333	1.02	10.333	3.05	16.333	1.02	22.33	.51
4.500	1.02	10.500	3.05	16.500	1.02	22.50	.51
4.667	1.02	10.667	3.05	16.667	1.02	22.67	.51
4.833	1.02	10.833	3.05	16.833	1.02	22.83	.51
5.000	1.02	11.000	3.05	17.000	1.02	23.00	.51
5.167	1.02	11.167	4.06	17.167	1.02	23.17	.51
5.333	1.02	11.333	5.49	17.333	1.02	23.33	.51
5.500	1.02	11.500	10.26	17.500	1.02	23.50	.51
5.667	1.02	11.667	19.51	17.667	1.02	23.67	.51
5.833	1.02	11.833	35.26	17.833	1.02	23.83	.51
6.000	1.02	12.000	60.45	18.000	1.02	24.00	.51

Unit Hyd Qpeak (cms)= .130

PEAK FLOW (cms)= .034 (i)
TIME TO PEAK (hrs)= 12.000
RUNOFF VOLUME (mm)= 19.550
TOTAL RAINFALL (mm)= 52.121
RUNOFF COEFFICIENT = .375

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

CALIB
NASHYD (0002)
ID= 1 DT=10.0 min

Area (ha)= 1.26 Curve Number (CN)= 80.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .20

Unit Hyd Qpeak (cms)= .241

PEAK FLOW (cms)= .063 (i)
TIME TO PEAK (hrs)= 12.000
RUNOFF VOLUME (mm)= 19.550
TOTAL RAINFALL (mm)= 52.121
RUNOFF COEFFICIENT = .375

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

ADD HYD (0005)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0004):	.06	.008	12.00	39.64
+ ID2= 2 (0001):	.68	.034	12.00	19.55

ID = 3 (0005):	.74	.042	12.00	21.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0003)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	.74	.042	12.00	21.27
+ ID2= 2 (0002):	1.26	.063	12.00	19.55
ID = 3 (0003):	2.00	.105	12.00	20.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 3 **
****

READ STORM | Ptotal= 62.43 mm

Filename: C:\Working Files\POND DESIGN\SCS Storms\S0052412.stm
Comments: FIVE YR SCS STORM WITH A TWELVE MINUTE

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.20	.76	6.20	1.27	12.20	12.19	18.20	1.27
.40	.76	6.40	1.27	12.40	7.62	18.40	1.27
.60	.76	6.60	1.27	12.60	5.59	18.60	1.27
.80	.76	6.80	1.27	12.80	5.08	18.80	1.27
1.00	.76	7.00	1.27	13.00	3.81	19.00	1.27
1.20	.76	7.20	1.27	13.20	3.05	19.20	1.02
1.40	.76	7.40	1.27	13.40	3.05	19.40	1.02
1.60	.76	7.60	1.27	13.60	3.05	19.60	1.02
1.80	.76	7.80	1.27	13.80	3.05	19.80	1.02
2.00	.76	8.00	1.27	14.00	3.05	20.00	1.02
2.20	.76	8.20	1.78	14.20	1.78	20.20	1.02
2.40	.76	8.40	1.78	14.40	1.78	20.40	1.02
2.60	.76	8.60	1.78	14.60	1.78	20.60	1.02
2.80	.76	8.80	1.78	14.80	1.78	20.80	1.02
3.00	.76	9.00	1.78	15.00	1.78	21.00	1.02
3.20	.76	9.20	1.78	15.20	1.78	21.20	.76
3.40	.76	9.40	1.78	15.40	1.78	21.40	.76
3.60	.76	9.60	1.78	15.60	1.78	21.60	.76
3.80	.76	9.80	1.78	15.80	1.78	21.80	.76
4.00	.76	10.00	1.78	16.00	1.78	22.00	.76
4.20	1.27	10.20	3.30	16.20	1.27	22.20	.76
4.40	1.27	10.40	3.30	16.40	1.27	22.40	.76
4.60	1.27	10.60	3.30	16.60	1.27	22.60	.76
4.80	1.27	10.80	3.30	16.80	1.27	22.80	.76
5.00	1.27	11.00	3.30	17.00	1.27	23.00	.76
5.20	1.27	11.20	4.57	17.20	1.27	23.20	.76
5.40	1.27	11.40	6.60	17.40	1.27	23.40	.76
5.60	1.27	11.60	15.24	17.60	1.27	23.60	.76
5.80	1.27	11.80	33.27	17.80	1.27	23.80	.76
6.00	1.27	12.00	69.60	18.00	1.27	24.00	.76

CALIB STANDHYD (0004) ID= 1 DT= 5.0 min | Area (ha)= .06 | Total Imp(%)= 70.00 | Dir. Conn.(%)= 70.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.04	.02
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	20.70	40.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.76	6.083	1.27	12.083	12.20	18.08	1.27
.167	.76	6.167	1.27	12.167	12.19	18.17	1.27
.250	.76	6.250	1.27	12.250	9.45	18.25	1.27
.333	.76	6.333	1.27	12.333	7.62	18.33	1.27
.417	.76	6.417	1.27	12.417	7.21	18.42	1.27
.500	.76	6.500	1.27	12.500	5.59	18.50	1.27
.583	.76	6.583	1.27	12.583	5.59	18.58	1.27
.667	.76	6.667	1.27	12.667	5.18	18.67	1.27
.750	.76	6.750	1.27	12.750	5.08	18.75	1.27
.833	.76	6.833	1.27	12.833	4.57	18.83	1.27
.917	.76	6.917	1.27	12.917	3.81	18.92	1.27
1.000	.76	7.000	1.27	13.000	3.81	19.00	1.27
1.083	.76	7.083	1.27	13.083	3.05	19.08	1.02
1.167	.76	7.167	1.27	13.167	3.05	19.17	1.02
1.250	.76	7.250	1.27	13.250	3.05	19.25	1.02
1.333	.76	7.333	1.27	13.333	3.05	19.33	1.02
1.417	.76	7.417	1.27	13.417	3.05	19.42	1.02
1.500	.76	7.500	1.27	13.500	3.05	19.50	1.02
1.583	.76	7.583	1.27	13.583	3.05	19.58	1.02
1.667	.76	7.667	1.27	13.667	3.05	19.67	1.02
1.750	.76	7.750	1.27	13.750	3.05	19.75	1.02
1.833	.76	7.833	1.27	13.833	3.05	19.83	1.02
1.917	.76	7.917	1.27	13.917	3.05	19.92	1.02
2.000	.76	8.000	1.27	14.000	3.05	20.00	1.02
2.083	.76	8.083	1.78	14.083	1.78	20.08	1.02

2.167	.76	8.167	1.78	14.167	1.78	20.17	1.02
2.250	.76	8.250	1.78	14.250	1.78	20.25	1.02
2.333	.76	8.333	1.78	14.333	1.78	20.33	1.02
2.417	.76	8.417	1.78	14.417	1.78	20.42	1.02
2.500	.76	8.500	1.78	14.500	1.78	20.50	1.02
2.583	.76	8.583	1.78	14.583	1.78	20.58	1.02
2.667	.76	8.667	1.78	14.667	1.78	20.67	1.02
2.750	.76	8.750	1.78	14.750	1.78	20.75	1.02
2.833	.76	8.833	1.78	14.833	1.78	20.83	1.02
2.917	.76	8.917	1.78	14.917	1.78	20.92	1.02
3.000	.76	9.000	1.78	15.000	1.78	21.00	1.02
3.083	.76	9.083	1.78	15.083	1.78	21.08	.76
3.167	.76	9.167	1.78	15.167	1.78	21.17	.76
3.250	.76	9.250	1.78	15.250	1.78	21.25	.76
3.333	.76	9.333	1.78	15.333	1.78	21.33	.76
3.417	.76	9.417	1.78	15.417	1.78	21.42	.76
3.500	.76	9.500	1.78	15.500	1.78	21.50	.76
3.583	.76	9.583	1.78	15.583	1.78	21.58	.76
3.667	.76	9.667	1.78	15.667	1.78	21.67	.76
3.750	.76	9.750	1.78	15.750	1.78	21.75	.76
3.833	.76	9.833	1.78	15.833	1.78	21.83	.76
3.917	.76	9.917	1.78	15.917	1.78	21.92	.76
4.000	.76	10.000	1.78	16.000	1.78	22.00	.76
4.083	1.27	10.083	3.30	16.083	1.27	22.08	.76
4.167	1.27	10.167	3.30	16.167	1.27	22.17	.76
4.250	1.27	10.250	3.30	16.250	1.27	22.25	.76
4.333	1.27	10.333	3.30	16.333	1.27	22.33	.76
4.417	1.27	10.417	3.30	16.417	1.27	22.42	.76
4.500	1.27	10.500	3.30	16.500	1.27	22.50	.76
4.583	1.27	10.583	3.30	16.583	1.27	22.58	.76
4.667	1.27	10.667	3.30	16.667	1.27	22.67	.76
4.750	1.27	10.750	3.30	16.750	1.27	22.75	.76
4.833	1.27	10.833	3.30	16.833	1.27	22.83	.76
4.917	1.27	10.917	3.30	16.917	1.27	22.92	.76
5.000	1.27	11.000	3.30	17.000	1.27	23.00	.76
5.083	1.27	11.083	4.57	17.083	1.27	23.08	.76
5.167	1.27	11.167	4.57	17.167	1.27	23.17	.76
5.250	1.27	11.250	5.79	17.250	1.27	23.25	.76
5.333	1.27	11.333	6.60	17.333	1.27	23.33	.76
5.417	1.27	11.417	8.33	17.417	1.27	23.42	.76
5.500	1.27	11.500	15.24	17.500	1.27	23.50	.76
5.583	1.27	11.583	15.24	17.583	1.27	23.58	.76
5.667	1.27	11.667	29.67	17.667	1.27	23.67	.76
5.750	1.27	11.750	33.27	17.750	1.27	23.75	.76
5.833	1.27	11.833	47.80	17.833	1.27	23.83	.76
5.917	1.27	11.917	69.60	17.917	1.27	23.92	.76
6.000	1.27	12.000	69.60	18.000	1.27	24.00	.76

Max.Eff.Inten.(mm/hr)=	69.60	29.10		
over (min)	5.00	15.00		
Storage Coeff. (min)=	1.15 (ii)	12.71 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	.34	.08		
			TOTALS	
PEAK FLOW (cms)=	.01	.00	.010 (iii)	
TIME TO PEAK (hrs)=	12.00	12.08	12.00	
RUNOFF VOLUME (mm)=	61.43	25.50	50.61	
TOTAL RAINFALL (mm)=	62.43	62.43	62.43	
RUNOFF COEFFICIENT =	.98	.41	.81	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB NASHYD (0001) ID= 1 DT=10.0 min	Area (ha)= .68 Ia (mm)= 5.00 U.H. Tp(hrs)= .20	Curve Number (CN)= 80.0 # of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.167	.76	6.167	1.27	12.167	12.19	18.17	1.27
.333	.76	6.333	1.27	12.333	8.53	18.33	1.27
.500	.76	6.500	1.27	12.500	6.40	18.50	1.27
.667	.76	6.667	1.27	12.667	5.38	18.67	1.27
.833	.76	6.833	1.27	12.833	4.83	18.83	1.27
1.000	.76	7.000	1.27	13.000	3.81	19.00	1.27
1.167	.76	7.167	1.27	13.167	3.05	19.17	1.02
1.333	.76	7.333	1.27	13.333	3.05	19.33	1.02
1.500	.76	7.500	1.27	13.500	3.05	19.50	1.02
1.667	.76	7.667	1.27	13.667	3.05	19.67	1.02
1.833	.76	7.833	1.27	13.833	3.05	19.83	1.02
2.000	.76	8.000	1.27	14.000	3.05	20.00	1.02
2.167	.76	8.167	1.78	14.167	1.78	20.17	1.02
2.333	.76	8.333	1.78	14.333	1.78	20.33	1.02
2.500	.76	8.500	1.78	14.500	1.78	20.50	1.02
2.667	.76	8.667	1.78	14.667	1.78	20.67	1.02
2.833	.76	8.833	1.78	14.833	1.78	20.83	1.02
3.000	.76	9.000	1.78	15.000	1.78	21.00	1.02
3.167	.76	9.167	1.78	15.167	1.78	21.17	.76
3.333	.76	9.333	1.78	15.333	1.78	21.33	.76
3.500	.76	9.500	1.78	15.500	1.78	21.50	.76
3.667	.76	9.667	1.78	15.667	1.78	21.67	.76
3.833	.76	9.833	1.78	15.833	1.78	21.83	.76
4.000	.76	10.000	1.78	16.000	1.78	22.00	.76
4.167	1.27	10.167	3.30	16.167	1.27	22.17	.76

4.333	1.27	10.333	3.30	16.333	1.27	22.33	.76
4.500	1.27	10.500	3.30	16.500	1.27	22.50	.76
4.667	1.27	10.667	3.30	16.667	1.27	22.67	.76
4.833	1.27	10.833	3.30	16.833	1.27	22.83	.76
5.000	1.27	11.000	3.30	17.000	1.27	23.00	.76
5.167	1.27	11.167	4.57	17.167	1.27	23.17	.76
5.333	1.27	11.333	6.20	17.333	1.27	23.33	.76
5.500	1.27	11.500	11.79	17.500	1.27	23.50	.76
5.667	1.27	11.667	22.45	17.667	1.27	23.67	.76
5.833	1.27	11.833	40.54	17.833	1.27	23.83	.76
6.000	1.27	12.000	69.59	18.000	1.27	24.00	.76

Unit Hyd Qpeak (cms)= .130

PEAK FLOW (cms)= .044 (i)
TIME TO PEAK (hrs)= 12.000
RUNOFF VOLUME (mm)= 26.567
TOTAL RAINFALL (mm)= 62.433
RUNOFF COEFFICIENT = .426

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

CALIB			
NASHYD (0002)	Area (ha)=	1.26	Curve Number (CN)= 80.0
ID= 1 DT=10.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	.20	

Unit Hyd Qpeak (cms)= .241

PEAK FLOW (cms)= .082 (i)
TIME TO PEAK (hrs)= 12.000
RUNOFF VOLUME (mm)= 26.567
TOTAL RAINFALL (mm)= 62.433
RUNOFF COEFFICIENT = .426

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

ADD HYD (0005)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0004):	.06	.010	12.00	50.61
+ ID2= 2 (0001):	.68	.044	12.00	26.57
ID = 3 (0005):	.74	.054	12.00	28.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0003)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	.74	.054	12.00	28.63
+ ID2= 2 (0002):	1.26	.082	12.00	26.57
ID = 3 (0003):	2.00	.136	12.00	27.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 4 **
****

READ STORM | Ptotal= 82.45 mm |

Filename: C:\Working Files\POND DESIGN\SCS Storms\S0102412.stm
Comments: TEN YR SCS STORM 24HR TWELVE MIN TIME ST

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.20	.76	6.20	1.78	12.20	92.20	18.20	1.78
.40	.76	6.40	1.78	12.40	16.00	18.40	1.78
.60	.76	6.60	1.78	12.60	10.16	18.60	1.78
.80	.76	6.80	1.78	12.80	7.37	18.80	1.78
1.00	.76	7.00	1.78	13.00	6.86	19.00	1.78
1.20	.76	7.20	1.78	13.20	4.83	19.20	1.78
1.40	.76	7.40	1.78	13.40	4.06	19.40	1.27
1.60	.76	7.60	1.78	13.60	4.06	19.60	1.27
1.80	.76	7.80	1.78	13.80	4.06	19.80	1.27
2.00	.76	8.00	1.78	14.00	4.06	20.00	1.27
2.20	.76	8.20	1.78	14.20	4.06	20.20	1.27
2.40	.76	8.40	2.54	14.40	2.54	20.40	1.27
2.60	.76	8.60	2.54	14.60	2.54	20.60	1.27
2.80	.76	8.80	2.54	14.80	2.54	20.80	1.27
3.00	.76	9.00	2.54	15.00	2.54	21.00	1.27
3.20	.76	9.20	2.54	15.20	2.54	21.20	1.27
3.40	.76	9.40	2.54	15.40	2.54	21.40	.76
3.60	.76	9.60	2.54	15.60	2.54	21.60	.76
3.80	.76	9.80	2.54	15.80	2.54	21.80	.76
4.00	.76	10.00	2.54	16.00	2.54	22.00	.76
4.20	.76	10.20	2.54	16.20	2.54	22.20	.76
4.40	1.78	10.40	4.57	16.40	1.78	22.40	.76
4.60	1.78	10.60	4.57	16.60	1.78	22.60	.76
4.80	1.78	10.80	4.57	16.80	1.78	22.80	.76
5.00	1.78	11.00	4.57	17.00	1.78	23.00	.76
5.20	1.78	11.20	4.57	17.20	1.78	23.20	.76
5.40	1.78	11.40	6.10	17.40	1.78	23.40	.76
5.60	1.78	11.60	8.89	17.60	1.78	23.60	.76

5.80	1.78	11.80	20.07	17.80	1.78	23.80	.76
6.00	1.78	12.00	44.20	18.00	1.78	24.00	.76

CALIB				
STANDHYD (0004)	Area (ha)=	.06		
ID= 1 DT= 5.0 min	Total Imp(%)=	70.00	Dir. Conn.(%)=	70.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.04	.02
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	20.70	40.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.76	6.083	1.78	12.083	92.19	18.08	1.78
.167	.76	6.167	1.78	12.167	92.20	18.17	1.78
.250	.76	6.250	1.78	12.250	46.49	18.25	1.78
.333	.76	6.333	1.78	12.333	16.00	18.33	1.78
.417	.76	6.417	1.78	12.417	14.83	18.42	1.78
.500	.76	6.500	1.78	12.500	10.16	18.50	1.78
.583	.76	6.583	1.78	12.583	10.16	18.58	1.78
.667	.76	6.667	1.78	12.667	7.93	18.67	1.78
.750	.76	6.750	1.78	12.750	7.37	18.75	1.78
.833	.76	6.833	1.78	12.833	7.17	18.83	1.78
.917	.76	6.917	1.78	12.917	6.86	18.92	1.78
1.000	.76	7.000	1.78	13.000	6.86	19.00	1.78
1.083	.76	7.083	1.78	13.083	4.83	19.08	1.78
1.167	.76	7.167	1.78	13.167	4.83	19.17	1.78
1.250	.76	7.250	1.78	13.250	4.37	19.25	1.47
1.333	.76	7.333	1.78	13.333	4.06	19.33	1.27
1.417	.76	7.417	1.78	13.417	4.06	19.42	1.27
1.500	.76	7.500	1.78	13.500	4.06	19.50	1.27
1.583	.76	7.583	1.78	13.583	4.06	19.58	1.27
1.667	.76	7.667	1.78	13.667	4.06	19.67	1.27
1.750	.76	7.750	1.78	13.750	4.06	19.75	1.27
1.833	.76	7.833	1.78	13.833	4.06	19.83	1.27
1.917	.76	7.917	1.78	13.917	4.06	19.92	1.27
2.000	.76	8.000	1.78	14.000	4.06	20.00	1.27
2.083	.76	8.083	1.78	14.083	4.06	20.08	1.27
2.167	.76	8.167	1.78	14.167	4.06	20.17	1.27
2.250	.76	8.250	2.24	14.250	3.15	20.25	1.27
2.333	.76	8.333	2.54	14.333	2.54	20.33	1.27
2.417	.76	8.417	2.54	14.417	2.54	20.42	1.27
2.500	.76	8.500	2.54	14.500	2.54	20.50	1.27
2.583	.76	8.583	2.54	14.583	2.54	20.58	1.27
2.667	.76	8.667	2.54	14.667	2.54	20.67	1.27
2.750	.76	8.750	2.54	14.750	2.54	20.75	1.27
2.833	.76	8.833	2.54	14.833	2.54	20.83	1.27
2.917	.76	8.917	2.54	14.917	2.54	20.92	1.27
3.000	.76	9.000	2.54	15.000	2.54	21.00	1.27
3.083	.76	9.083	2.54	15.083	2.54	21.08	1.27
3.167	.76	9.167	2.54	15.167	2.54	21.17	1.27
3.250	.76	9.250	2.54	15.250	2.54	21.25	.96
3.333	.76	9.333	2.54	15.333	2.54	21.33	.76
3.417	.76	9.417	2.54	15.417	2.54	21.42	.76
3.500	.76	9.500	2.54	15.500	2.54	21.50	.76
3.583	.76	9.583	2.54	15.583	2.54	21.58	.76
3.667	.76	9.667	2.54	15.667	2.54	21.67	.76
3.750	.76	9.750	2.54	15.750	2.54	21.75	.76
3.833	.76	9.833	2.54	15.833	2.54	21.83	.76
3.917	.76	9.917	2.54	15.917	2.54	21.92	.76
4.000	.76	10.000	2.54	16.000	2.54	22.00	.76
4.083	.76	10.083	2.54	16.083	2.54	22.08	.76
4.167	.76	10.167	2.54	16.167	2.54	22.17	.76
4.250	1.37	10.250	3.76	16.250	2.08	22.25	.76
4.333	1.78	10.333	4.57	16.333	1.78	22.33	.76
4.417	1.78	10.417	4.57	16.417	1.78	22.42	.76
4.500	1.78	10.500	4.57	16.500	1.78	22.50	.76
4.583	1.78	10.583	4.57	16.583	1.78	22.58	.76
4.667	1.78	10.667	4.57	16.667	1.78	22.67	.76
4.750	1.78	10.750	4.57	16.750	1.78	22.75	.76
4.833	1.78	10.833	4.57	16.833	1.78	22.83	.76
4.917	1.78	10.917	4.57	16.917	1.78	22.92	.76
5.000	1.78	11.000	4.57	17.000	1.78	23.00	.76
5.083	1.78	11.083	4.57	17.083	1.78	23.08	.76
5.167	1.78	11.167	4.57	17.167	1.78	23.17	.76
5.250	1.78	11.250	5.49	17.250	1.78	23.25	.76
5.333	1.78	11.333	6.10	17.333	1.78	23.33	.76
5.417	1.78	11.417	6.66	17.417	1.78	23.42	.76
5.500	1.78	11.500	8.89	17.500	1.78	23.50	.76
5.583	1.78	11.583	8.89	17.583	1.78	23.58	.76
5.667	1.78	11.667	17.83	17.667	1.78	23.67	.76
5.750	1.78	11.750	20.07	17.750	1.78	23.75	.76
5.833	1.78	11.833	29.72	17.833	1.78	23.83	.76
5.917	1.78	11.917	44.20	17.917	1.78	23.92	.76
6.000	1.78	12.000	44.20	18.000	1.78	24.00	.76

Max.Eff.Inten.(mm/hr)=		92.20	50.85	
over (min)		5.00	15.00	
Storage Coeff. (min)=		1.03 (ii)	10.28 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		.34	.09	
				TOTALS
PEAK FLOW	(cms)=	.01	.00	.013 (iii)
TIME TO PEAK	(hrs)=	12.17	12.33	12.17
RUNOFF VOLUME	(mm)=	81.45	39.56	68.84
TOTAL RAINFALL	(mm)=	82.45	82.45	82.45

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     RUNOFF COEFFICIENT    =         .99          .48          .83

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  75.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| NASHYD    (0001) |   Area     (ha)=    .68   Curve Number    (CN)= 80.0
|ID= 1 DT=10.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .20

        NOTE:  RAINFALL WAS TRANSFORMED TO  10.0 MIN. TIME STEP.

                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN  |  TIME    RAIN  |  TIME    RAIN  |  TIME    RAIN
                 hrs   mm/hr  |   hrs   mm/hr  |   hrs   mm/hr  |   hrs   mm/hr
                .167     .76  | 6.167    1.78  |12.167   92.20  | 18.17    1.78
                .333     .76  | 6.333    1.78  |12.333   31.24  | 18.33    1.78
                .500     .76  | 6.500    1.78  |12.500   12.50  | 18.50    1.78
                .667     .76  | 6.667    1.78  |12.667    9.04  | 18.67    1.78
                .833     .76  | 6.833    1.78  |12.833    7.27  | 18.83    1.78
               1.000     .76  | 7.000    1.78  |13.000    6.86  | 19.00    1.78
               1.167     .76  | 7.167    1.78  |13.167    4.83  | 19.17    1.78
               1.333     .76  | 7.333    1.78  |13.333    4.21  | 19.33    1.37
               1.500     .76  | 7.500    1.78  |13.500    4.06  | 19.50    1.27
               1.667     .76  | 7.667    1.78  |13.667    4.06  | 19.67    1.27
               1.833     .76  | 7.833    1.78  |13.833    4.06  | 19.83    1.27
               2.000     .76  | 8.000    1.78  |14.000    4.06  | 20.00    1.27
               2.167     .76  | 8.167    1.78  |14.167    4.06  | 20.17    1.27
               2.333     .76  | 8.333    2.39  |14.333    2.84  | 20.33    1.27
               2.500     .76  | 8.500    2.54  |14.500    2.54  | 20.50    1.27
               2.667     .76  | 8.667    2.54  |14.667    2.54  | 20.67    1.27
               2.833     .76  | 8.833    2.54  |14.833    2.54  | 20.83    1.27
               3.000     .76  | 9.000    2.54  |15.000    2.54  | 21.00    1.27
               3.167     .76  | 9.167    2.54  |15.167    2.54  | 21.17    1.27
               3.333     .76  | 9.333    2.54  |15.333    2.54  | 21.33     .86
               3.500     .76  | 9.500    2.54  |15.500    2.54  | 21.50     .76
               3.667     .76  | 9.667    2.54  |15.667    2.54  | 21.67     .76
               3.833     .76  | 9.833    2.54  |15.833    2.54  | 21.83     .76
               4.000     .76  |10.000    2.54  |16.000    2.54  | 22.00     .76
               4.167     .76  |10.167    2.54  |16.167    2.54  | 22.17     .76
               4.333    1.58  |10.333    4.16  |16.333    1.93  | 22.33     .76
               4.500    1.78  |10.500    4.57  |16.500    1.78  | 22.50     .76
               4.667    1.78  |10.667    4.57  |16.667    1.78  | 22.67     .76
               4.833    1.78  |10.833    4.57  |16.833    1.78  | 22.83     .76
               5.000    1.78  |11.000    4.57  |17.000    1.78  | 23.00     .76
               5.167    1.78  |11.167    4.57  |17.167    1.78  | 23.17     .76
               5.333    1.78  |11.333    5.79  |17.333    1.78  | 23.33     .76
               5.500    1.78  |11.500    7.77  |17.500    1.78  | 23.50     .76
               5.667    1.78  |11.667   13.36  |17.667    1.78  | 23.67     .76
               5.833    1.78  |11.833   24.90  |17.833    1.78  | 23.83     .76
               6.000    1.78  |12.000   44.20  |18.000    1.78  | 24.00     .76

     Unit Hyd Qpeak  (cms)=    .130

     PEAK FLOW       (cms)=    .064 (i)
     TIME TO PEAK    (hrs)=  12.167
     RUNOFF VOLUME    (mm)=  41.448
     TOTAL RAINFALL   (mm)=  82.446
     RUNOFF COEFFICIENT   =    .503

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0002) |   Area     (ha)=   1.26   Curve Number    (CN)= 80.0
|ID= 1 DT=10.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .20

     Unit Hyd Qpeak  (cms)=    .241

     PEAK FLOW       (cms)=    .118 (i)
     TIME TO PEAK    (hrs)=  12.167
     RUNOFF VOLUME    (mm)=  41.449
     TOTAL RAINFALL   (mm)=  82.446
     RUNOFF COEFFICIENT   =    .503

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

--------------------------------------------------------------------------------
--------------------
| ADD HYD   (0005) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (0004):        .06     .013    12.17    68.84
      + ID2= 2 (0001):        .68     .064    12.17    41.45
        ================================================
        ID = 3 (0005):        .74     .077    12.17    43.80

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0003) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
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ID1= 1 (0005):	.74	.077	12.17	43.80
+ ID2= 2 (0002):	1.26	.118	12.17	41.45
ID = 3 (0003):	2.00	.195	12.17	42.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 5 **
****

READ STORM | Ptotal= 95.96 mm

Filename: C:\Working Files\POND DESIGN\SCS Storms\S0252412.stm
Comments: TWENTYFIVE YR SCS STORM WITH A TWELVE MI

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.20	1.02	6.20	2.03	12.20	18.80	18.20	2.03
.40	1.02	6.40	2.03	12.40	11.68	18.40	2.03
.60	1.02	6.60	2.03	12.60	8.38	18.60	2.03
.80	1.02	6.80	2.03	12.80	8.13	18.80	2.03
1.00	1.02	7.00	2.03	13.00	5.59	19.00	2.03
1.20	1.02	7.20	2.03	13.20	4.83	19.20	1.52
1.40	1.02	7.40	2.03	13.40	4.83	19.40	1.52
1.60	1.02	7.60	2.03	13.60	4.83	19.60	1.52
1.80	1.02	7.80	2.03	13.80	4.83	19.80	1.52
2.00	1.02	8.00	2.03	14.00	4.83	20.00	1.52
2.20	1.02	8.20	2.79	14.20	2.79	20.20	1.52
2.40	1.02	8.40	2.79	14.40	2.79	20.40	1.52
2.60	1.02	8.60	2.79	14.60	2.79	20.60	1.52
2.80	1.02	8.80	2.79	14.80	2.79	20.80	1.52
3.00	1.02	9.00	2.79	15.00	2.79	21.00	1.52
3.20	1.02	9.20	2.79	15.20	2.79	21.20	1.02
3.40	1.02	9.40	2.79	15.40	2.79	21.40	1.02
3.60	1.02	9.60	2.79	15.60	2.79	21.60	1.02
3.80	1.02	9.80	2.79	15.80	2.79	21.80	1.02
4.00	1.02	10.00	2.79	16.00	2.79	22.00	1.02
4.20	2.03	10.20	5.08	16.20	2.03	22.20	1.02
4.40	2.03	10.40	5.08	16.40	2.03	22.40	1.02
4.60	2.03	10.60	5.08	16.60	2.03	22.60	1.02
4.80	2.03	10.80	5.08	16.80	2.03	22.80	1.02
5.00	2.03	11.00	5.08	17.00	2.03	23.00	1.02
5.20	2.03	11.20	7.11	17.20	2.03	23.20	1.02
5.40	2.03	11.40	10.41	17.40	2.03	23.40	1.02
5.60	2.03	11.60	23.37	17.60	2.03	23.60	1.02
5.80	2.03	11.80	51.56	17.80	2.03	23.80	1.02
6.00	2.03	12.00	107.44	18.00	2.03	24.00	1.02

CALIB
STANDHYD (0004)
ID= 1 DT= 5.0 min

Area (ha)= .06
Total Imp(%)= 70.00 Dir. Conn.(%)= 70.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.04	.02
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	20.70	40.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	1.02	6.083	2.03	12.083	18.81	18.08	2.03
.167	1.02	6.167	2.03	12.167	18.80	18.17	2.03
.250	1.02	6.250	2.03	12.250	14.53	18.25	2.03
.333	1.02	6.333	2.03	12.333	11.68	18.33	2.03
.417	1.02	6.417	2.03	12.417	11.02	18.42	2.03
.500	1.02	6.500	2.03	12.500	8.38	18.50	2.03
.583	1.02	6.583	2.03	12.583	8.38	18.58	2.03
.667	1.02	6.667	2.03	12.667	8.18	18.67	2.03
.750	1.02	6.750	2.03	12.750	8.13	18.75	2.03
.833	1.02	6.833	2.03	12.833	7.11	18.83	2.03
.917	1.02	6.917	2.03	12.917	5.59	18.92	2.03
1.000	1.02	7.000	2.03	13.000	5.59	19.00	2.03
1.083	1.02	7.083	2.03	13.083	4.83	19.08	1.52
1.167	1.02	7.167	2.03	13.167	4.83	19.17	1.52
1.250	1.02	7.250	2.03	13.250	4.83	19.25	1.52
1.333	1.02	7.333	2.03	13.333	4.83	19.33	1.52
1.417	1.02	7.417	2.03	13.417	4.83	19.42	1.52
1.500	1.02	7.500	2.03	13.500	4.83	19.50	1.52
1.583	1.02	7.583	2.03	13.583	4.83	19.58	1.52
1.667	1.02	7.667	2.03	13.667	4.83	19.67	1.52
1.750	1.02	7.750	2.03	13.750	4.83	19.75	1.52
1.833	1.02	7.833	2.03	13.833	4.83	19.83	1.52
1.917	1.02	7.917	2.03	13.917	4.83	19.92	1.52
2.000	1.02	8.000	2.03	14.000	4.83	20.00	1.52
2.083	1.02	8.083	2.79	14.083	2.79	20.08	1.52
2.167	1.02	8.167	2.79	14.167	2.79	20.17	1.52
2.250	1.02	8.250	2.79	14.250	2.79	20.25	1.52
2.333	1.02	8.333	2.79	14.333	2.79	20.33	1.52
2.417	1.02	8.417	2.79	14.417	2.79	20.42	1.52
2.500	1.02	8.500	2.79	14.500	2.79	20.50	1.52
2.583	1.02	8.583	2.79	14.583	2.79	20.58	1.52
2.667	1.02	8.667	2.79	14.667	2.79	20.67	1.52
2.750	1.02	8.750	2.79	14.750	2.79	20.75	1.52
2.833	1.02	8.833	2.79	14.833	2.79	20.83	1.52
2.917	1.02	8.917	2.79	14.917	2.79	20.92	1.52

3.000	1.02	9.000	2.79	15.000	2.79	21.00	1.52
3.083	1.02	9.083	2.79	15.083	2.79	21.08	1.02
3.167	1.02	9.167	2.79	15.167	2.79	21.17	1.02
3.250	1.02	9.250	2.79	15.250	2.79	21.25	1.02
3.333	1.02	9.333	2.79	15.333	2.79	21.33	1.02
3.417	1.02	9.417	2.79	15.417	2.79	21.42	1.02
3.500	1.02	9.500	2.79	15.500	2.79	21.50	1.02
3.583	1.02	9.583	2.79	15.583	2.79	21.58	1.02
3.667	1.02	9.667	2.79	15.667	2.79	21.67	1.02
3.750	1.02	9.750	2.79	15.750	2.79	21.75	1.02
3.833	1.02	9.833	2.79	15.833	2.79	21.83	1.02
3.917	1.02	9.917	2.79	15.917	2.79	21.92	1.02
4.000	1.02	10.000	2.79	16.000	2.79	22.00	1.02
4.083	2.03	10.083	5.08	16.083	2.03	22.08	1.02
4.167	2.03	10.167	5.08	16.167	2.03	22.17	1.02
4.250	2.03	10.250	5.08	16.250	2.03	22.25	1.02
4.333	2.03	10.333	5.08	16.333	2.03	22.33	1.02
4.417	2.03	10.417	5.08	16.417	2.03	22.42	1.02
4.500	2.03	10.500	5.08	16.500	2.03	22.50	1.02
4.583	2.03	10.583	5.08	16.583	2.03	22.58	1.02
4.667	2.03	10.667	5.08	16.667	2.03	22.67	1.02
4.750	2.03	10.750	5.08	16.750	2.03	22.75	1.02
4.833	2.03	10.833	5.08	16.833	2.03	22.83	1.02
4.917	2.03	10.917	5.08	16.917	2.03	22.92	1.02
5.000	2.03	11.000	5.08	17.000	2.03	23.00	1.02
5.083	2.03	11.083	7.11	17.083	2.03	23.08	1.02
5.167	2.03	11.167	7.11	17.167	2.03	23.17	1.02
5.250	2.03	11.250	9.09	17.250	2.03	23.25	1.02
5.333	2.03	11.333	10.41	17.333	2.03	23.33	1.02
5.417	2.03	11.417	13.00	17.417	2.03	23.42	1.02
5.500	2.03	11.500	23.37	17.500	2.03	23.50	1.02
5.583	2.03	11.583	23.37	17.583	2.03	23.58	1.02
5.667	2.03	11.667	45.92	17.667	2.03	23.67	1.02
5.750	2.03	11.750	51.56	17.750	2.03	23.75	1.02
5.833	2.03	11.833	73.91	17.833	2.03	23.83	1.02
5.917	2.03	11.917	107.44	17.917	2.03	23.92	1.02
6.000	2.03	12.000	107.44	18.000	2.03	24.00	1.02

Max.Eff.Inten.(mm/hr)=	107.44	66.26		
over (min)	5.00	10.00		
Storage Coeff. (min)=	.96 (ii)	5.85 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	.34	.15		
			TOTALS	
PEAK FLOW (cms)=	.01	.00	.016 (iii)	
TIME TO PEAK (hrs)=	12.00	12.00	12.00	
RUNOFF VOLUME (mm)=	94.96	49.81	81.39	
TOTAL RAINFALL (mm)=	95.96	95.96	95.96	
RUNOFF COEFFICIENT =	.99	.52	.85	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB NASHYD (0001) ID= 1 DT=10.0 min	Area (ha)= .68 Ia (mm)= 5.00 U.H. Tp(hrs)= .20	Curve Number (CN)= 80.0 # of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.167	1.02	6.167	2.03	12.167	18.80	18.17	2.03
.333	1.02	6.333	2.03	12.333	13.11	18.33	2.03
.500	1.02	6.500	2.03	12.500	9.70	18.50	2.03
.667	1.02	6.667	2.03	12.667	8.28	18.67	2.03
.833	1.02	6.833	2.03	12.833	7.62	18.83	2.03
1.000	1.02	7.000	2.03	13.000	5.59	19.00	2.03
1.167	1.02	7.167	2.03	13.167	4.83	19.17	1.52
1.333	1.02	7.333	2.03	13.333	4.83	19.33	1.52
1.500	1.02	7.500	2.03	13.500	4.83	19.50	1.52
1.667	1.02	7.667	2.03	13.667	4.83	19.67	1.52
1.833	1.02	7.833	2.03	13.833	4.83	19.83	1.52
2.000	1.02	8.000	2.03	14.000	4.83	20.00	1.52
2.167	1.02	8.167	2.79	14.167	2.79	20.17	1.52
2.333	1.02	8.333	2.79	14.333	2.79	20.33	1.52
2.500	1.02	8.500	2.79	14.500	2.79	20.50	1.52
2.667	1.02	8.667	2.79	14.667	2.79	20.67	1.52
2.833	1.02	8.833	2.79	14.833	2.79	20.83	1.52
3.000	1.02	9.000	2.79	15.000	2.79	21.00	1.52
3.167	1.02	9.167	2.79	15.167	2.79	21.17	1.02
3.333	1.02	9.333	2.79	15.333	2.79	21.33	1.02
3.500	1.02	9.500	2.79	15.500	2.79	21.50	1.02
3.667	1.02	9.667	2.79	15.667	2.79	21.67	1.02
3.833	1.02	9.833	2.79	15.833	2.79	21.83	1.02
4.000	1.02	10.000	2.79	16.000	2.79	22.00	1.02
4.167	2.03	10.167	5.08	16.167	2.03	22.17	1.02
4.333	2.03	10.333	5.08	16.333	2.03	22.33	1.02
4.500	2.03	10.500	5.08	16.500	2.03	22.50	1.02
4.667	2.03	10.667	5.08	16.667	2.03	22.67	1.02
4.833	2.03	10.833	5.08	16.833	2.03	22.83	1.02
5.000	2.03	11.000	5.08	17.000	2.03	23.00	1.02
5.167	2.03	11.167	7.11	17.167	2.03	23.17	1.02
5.333	2.03	11.333	9.75	17.333	2.03	23.33	1.02
5.500	2.03	11.500	18.19	17.500	2.03	23.50	1.02
5.667	2.03	11.667	34.65	17.667	2.03	23.67	1.02
5.833	2.03	11.833	62.74	17.833	2.03	23.83	1.02

6.000	2.03	12.000	107.44	18.000	2.03	24.00	1.02

Unit Hyd Qpeak (cms)= .130

PEAK FLOW (cms)= .088 (i)
TIME TO PEAK (hrs)= 12.000
RUNOFF VOLUME (mm)= 52.174
TOTAL RAINFALL (mm)= 95.961
RUNOFF COEFFICIENT = .544

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

CALIB
NASHYD (0002)
ID= 1 DT=10.0 min

Area (ha)= 1.26 Curve Number (CN)= 80.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .20

Unit Hyd Qpeak (cms)= .241

PEAK FLOW (cms)= .164 (i)
TIME TO PEAK (hrs)= 12.000
RUNOFF VOLUME (mm)= 52.174
TOTAL RAINFALL (mm)= 95.961
RUNOFF COEFFICIENT = .544

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

ADD HYD (0005)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0004):	.06	.016	12.00	81.39
+ ID2= 2 (0001):	.68	.088	12.00	52.17
ID = 3 (0005):	.74	.105	12.00	54.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0003)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	.74	.105	12.00	54.68
+ ID2= 2 (0002):	1.26	.164	12.00	52.17
ID = 3 (0003):	2.00	.269	12.00	53.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 6 **
****

READ STORM
Ptotal=108.06 mm

Filename: C:\Working Files\POND DESIGN\SCS Storms\S0502412.stm
Comments: FIFTY YR SCS STORM 12 MIN TIME STEP 24 H

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.20	1.10	6.20	2.20	12.20	22.04	18.20	2.20
.40	1.10	6.40	2.20	12.40	13.78	18.40	2.20
.60	1.10	6.60	2.20	12.60	9.92	18.60	2.20
.80	1.10	6.80	2.20	12.80	9.37	18.80	2.20
1.00	1.10	7.00	2.20	13.00	6.61	19.00	2.20
1.20	1.10	7.20	2.20	13.20	5.51	19.20	1.65
1.40	1.10	7.40	2.20	13.40	5.51	19.40	1.65
1.60	1.10	7.60	2.20	13.60	5.51	19.60	1.65
1.80	1.10	7.80	2.20	13.80	5.51	19.80	1.65
2.00	1.10	8.00	2.20	14.00	5.51	20.00	1.65
2.20	1.10	8.20	3.31	14.20	3.31	20.20	1.65
2.40	1.10	8.40	3.31	14.40	3.31	20.40	1.65
2.60	1.10	8.60	3.31	14.60	3.31	20.60	1.65
2.80	1.10	8.80	3.31	14.80	3.31	20.80	1.65
3.00	1.10	9.00	3.31	15.00	3.31	21.00	1.65
3.20	1.10	9.20	3.31	15.20	3.31	21.20	1.10
3.40	1.10	9.40	3.31	15.40	3.31	21.40	1.10
3.60	1.10	9.60	3.31	15.60	3.31	21.60	1.10
3.80	1.10	9.80	3.31	15.80	3.31	21.80	1.10
4.00	1.10	10.00	3.31	16.00	3.31	22.00	1.10
4.20	2.20	10.20	6.05	16.20	2.20	22.20	1.10
4.40	2.20	10.40	6.05	16.40	2.20	22.40	1.10
4.60	2.20	10.60	6.05	16.60	2.20	22.60	1.10
4.80	2.20	10.80	6.05	16.80	2.20	22.80	1.10
5.00	2.20	11.00	6.05	17.00	2.20	23.00	1.10
5.20	2.20	11.20	8.26	17.20	2.20	23.20	1.10
5.40	2.20	11.40	12.12	17.40	2.20	23.40	1.10
5.60	2.20	11.60	27.55	17.60	2.20	23.60	1.10
5.80	2.20	11.80	60.61	17.80	2.20	23.80	1.10
6.00	2.20	12.00	114.06	18.00	2.20	24.00	1.10

CALIB
STANDHYD (0004)
ID= 1 DT= 5.0 min

Area (ha)= .06
Total Imp(%)= 70.00 Dir. Conn.(%)= 70.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.04	.02
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	20.70	40.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	1.10	6.083	2.20	12.083	22.05	18.08	2.20
.167	1.10	6.167	2.20	12.167	22.04	18.17	2.20
.250	1.10	6.250	2.20	12.250	17.09	18.25	2.20
.333	1.10	6.333	2.20	12.333	13.78	18.33	2.20
.417	1.10	6.417	2.20	12.417	13.01	18.42	2.20
.500	1.10	6.500	2.20	12.500	9.92	18.50	2.20
.583	1.10	6.583	2.20	12.583	9.92	18.58	2.20
.667	1.10	6.667	2.20	12.667	9.48	18.67	2.20
.750	1.10	6.750	2.20	12.750	9.37	18.75	2.20
.833	1.10	6.833	2.20	12.833	8.27	18.83	2.20
.917	1.10	6.917	2.20	12.917	6.61	18.92	2.20
1.000	1.10	7.000	2.20	13.000	6.61	19.00	2.20
1.083	1.10	7.083	2.20	13.083	5.51	19.08	1.65
1.167	1.10	7.167	2.20	13.167	5.51	19.17	1.65
1.250	1.10	7.250	2.20	13.250	5.51	19.25	1.65
1.333	1.10	7.333	2.20	13.333	5.51	19.33	1.65
1.417	1.10	7.417	2.20	13.417	5.51	19.42	1.65
1.500	1.10	7.500	2.20	13.500	5.51	19.50	1.65
1.583	1.10	7.583	2.20	13.583	5.51	19.58	1.65
1.667	1.10	7.667	2.20	13.667	5.51	19.67	1.65
1.750	1.10	7.750	2.20	13.750	5.51	19.75	1.65
1.833	1.10	7.833	2.20	13.833	5.51	19.83	1.65
1.917	1.10	7.917	2.20	13.917	5.51	19.92	1.65
2.000	1.10	8.000	2.20	14.000	5.51	20.00	1.65
2.083	1.10	8.083	3.31	14.083	3.31	20.08	1.65
2.167	1.10	8.167	3.31	14.167	3.31	20.17	1.65
2.250	1.10	8.250	3.31	14.250	3.31	20.25	1.65
2.333	1.10	8.333	3.31	14.333	3.31	20.33	1.65
2.417	1.10	8.417	3.31	14.417	3.31	20.42	1.65
2.500	1.10	8.500	3.31	14.500	3.31	20.50	1.65
2.583	1.10	8.583	3.31	14.583	3.31	20.58	1.65
2.667	1.10	8.667	3.31	14.667	3.31	20.67	1.65
2.750	1.10	8.750	3.31	14.750	3.31	20.75	1.65
2.833	1.10	8.833	3.31	14.833	3.31	20.83	1.65
2.917	1.10	8.917	3.31	14.917	3.31	20.92	1.65
3.000	1.10	9.000	3.31	15.000	3.31	21.00	1.65
3.083	1.10	9.083	3.31	15.083	3.31	21.08	1.10
3.167	1.10	9.167	3.31	15.167	3.31	21.17	1.10
3.250	1.10	9.250	3.31	15.250	3.31	21.25	1.10
3.333	1.10	9.333	3.31	15.333	3.31	21.33	1.10
3.417	1.10	9.417	3.31	15.417	3.31	21.42	1.10
3.500	1.10	9.500	3.31	15.500	3.31	21.50	1.10
3.583	1.10	9.583	3.31	15.583	3.31	21.58	1.10
3.667	1.10	9.667	3.31	15.667	3.31	21.67	1.10
3.750	1.10	9.750	3.31	15.750	3.31	21.75	1.10
3.833	1.10	9.833	3.31	15.833	3.31	21.83	1.10
3.917	1.10	9.917	3.31	15.917	3.31	21.92	1.10
4.000	1.10	10.000	3.31	16.000	3.31	22.00	1.10
4.083	2.20	10.083	6.05	16.083	2.20	22.08	1.10
4.167	2.20	10.167	6.05	16.167	2.20	22.17	1.10
4.250	2.20	10.250	6.05	16.250	2.20	22.25	1.10
4.333	2.20	10.333	6.05	16.333	2.20	22.33	1.10
4.417	2.20	10.417	6.05	16.417	2.20	22.42	1.10
4.500	2.20	10.500	6.05	16.500	2.20	22.50	1.10
4.583	2.20	10.583	6.05	16.583	2.20	22.58	1.10
4.667	2.20	10.667	6.05	16.667	2.20	22.67	1.10
4.750	2.20	10.750	6.05	16.750	2.20	22.75	1.10
4.833	2.20	10.833	6.05	16.833	2.20	22.83	1.10
4.917	2.20	10.917	6.05	16.917	2.20	22.92	1.10
5.000	2.20	11.000	6.05	17.000	2.20	23.00	1.10
5.083	2.20	11.083	8.26	17.083	2.20	23.08	1.10
5.167	2.20	11.167	8.26	17.167	2.20	23.17	1.10
5.250	2.20	11.250	10.58	17.250	2.20	23.25	1.10
5.333	2.20	11.333	12.12	17.333	2.20	23.33	1.10
5.417	2.20	11.417	15.20	17.417	2.20	23.42	1.10
5.500	2.20	11.500	27.55	17.500	2.20	23.50	1.10
5.583	2.20	11.583	27.55	17.583	2.20	23.58	1.10
5.667	2.20	11.667	53.99	17.667	2.20	23.67	1.10
5.750	2.20	11.750	60.61	17.750	2.20	23.75	1.10
5.833	2.20	11.833	81.98	17.833	2.20	23.83	1.10
5.917	2.20	11.917	114.06	17.917	2.20	23.92	1.10
6.000	2.20	12.000	114.06	18.000	2.20	24.00	1.10

Max.Eff.Inten.(mm/hr)=		114.06	74.48	
over (min)		5.00	10.00	
Storage Coeff. (min)=		.94 (ii)	5.71 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		.34	.15	
				TOTALS
PEAK FLOW	(cms)=	.01	.00	.018 (iii)
TIME TO PEAK	(hrs)=	12.00	12.00	12.00
RUNOFF VOLUME	(mm)=	107.06	59.38	92.73
TOTAL RAINFALL	(mm)=	108.06	108.06	108.06
RUNOFF COEFFICIENT	=	.99	.55	.86

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB                |
| NASHYD     (0001)    |   Area     (ha)=     .68   Curve Number    (CN)= 80.0
|ID= 1 DT=10.0 min     |   Ia       (mm)=    5.00   # of Linear Res.(N)= 3.00
                       |   U.H. Tp(hrs)=     .20
```

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.167	1.10	6.167	2.20	12.167	22.04	18.17	2.20
.333	1.10	6.333	2.20	12.333	15.43	18.33	2.20
.500	1.10	6.500	2.20	12.500	11.46	18.50	2.20
.667	1.10	6.667	2.20	12.667	9.70	18.67	2.20
.833	1.10	6.833	2.20	12.833	8.82	18.83	2.20
1.000	1.10	7.000	2.20	13.000	6.61	19.00	2.20
1.167	1.10	7.167	2.20	13.167	5.51	19.17	1.65
1.333	1.10	7.333	2.20	13.333	5.51	19.33	1.65
1.500	1.10	7.500	2.20	13.500	5.51	19.50	1.65
1.667	1.10	7.667	2.20	13.667	5.51	19.67	1.65
1.833	1.10	7.833	2.20	13.833	5.51	19.83	1.65
2.000	1.10	8.000	2.20	14.000	5.51	20.00	1.65
2.167	1.10	8.167	3.31	14.167	3.31	20.17	1.65
2.333	1.10	8.333	3.31	14.333	3.31	20.33	1.65
2.500	1.10	8.500	3.31	14.500	3.31	20.50	1.65
2.667	1.10	8.667	3.31	14.667	3.31	20.67	1.65
2.833	1.10	8.833	3.31	14.833	3.31	20.83	1.65
3.000	1.10	9.000	3.31	15.000	3.31	21.00	1.65
3.167	1.10	9.167	3.31	15.167	3.31	21.17	1.10
3.333	1.10	9.333	3.31	15.333	3.31	21.33	1.10
3.500	1.10	9.500	3.31	15.500	3.31	21.50	1.10
3.667	1.10	9.667	3.31	15.667	3.31	21.67	1.10
3.833	1.10	9.833	3.31	15.833	3.31	21.83	1.10
4.000	1.10	10.000	3.31	16.000	3.31	22.00	1.10
4.167	2.20	10.167	6.05	16.167	2.20	22.17	1.10
4.333	2.20	10.333	6.05	16.333	2.20	22.33	1.10
4.500	2.20	10.500	6.05	16.500	2.20	22.50	1.10
4.667	2.20	10.667	6.05	16.667	2.20	22.67	1.10
4.833	2.20	10.833	6.05	16.833	2.20	22.83	1.10
5.000	2.20	11.000	6.05	17.000	2.20	23.00	1.10
5.167	2.20	11.167	8.26	17.167	2.20	23.17	1.10
5.333	2.20	11.333	11.35	17.333	2.20	23.33	1.10
5.500	2.20	11.500	21.38	17.500	2.20	23.50	1.10
5.667	2.20	11.667	40.77	17.667	2.20	23.67	1.10
5.833	2.20	11.833	71.30	17.833	2.20	23.83	1.10
6.000	2.20	12.000	114.06	18.000	2.20	24.00	1.10

```
Unit Hyd Qpeak  (cms)=     .130

PEAK FLOW       (cms)=     .102 (i)
TIME TO PEAK    (hrs)=  12.000
RUNOFF VOLUME    (mm)=  62.114
TOTAL RAINFALL   (mm)= 108.064
RUNOFF COEFFICIENT   =     .575

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

```
| CALIB                |
| NASHYD     (0002)    |   Area     (ha)=    1.26   Curve Number    (CN)= 80.0
|ID= 1 DT=10.0 min     |   Ia       (mm)=    5.00   # of Linear Res.(N)= 3.00
                       |   U.H. Tp(hrs)=     .20

Unit Hyd Qpeak  (cms)=     .241

PEAK FLOW       (cms)=     .189 (i)
TIME TO PEAK    (hrs)=  12.000
RUNOFF VOLUME    (mm)=  62.115
TOTAL RAINFALL   (mm)= 108.064
RUNOFF COEFFICIENT   =     .575

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

```
| ADD HYD    (0005)    |
|   1 +  2 =  3        |
                         AREA     QPEAK     TPEAK      R.V.
                         (ha)     (cms)     (hrs)      (mm)
       ID1= 1 (0004):     .06      .018     12.00     92.73
     + ID2= 2 (0001):     .68      .102     12.00     62.11
       ==========================================================
       ID = 3 (0005):     .74      .120     12.00     64.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
| ADD HYD    (0003)    |
|   1 +  2 =  3        |
                         AREA     QPEAK     TPEAK      R.V.
                         (ha)     (cms)     (hrs)      (mm)
       ID1= 1 (0005):     .74      .120     12.00     64.74
     + ID2= 2 (0002):    1.26      .189     12.00     62.12
       ==========================================================
       ID = 3 (0003):    2.00      .309     12.00     63.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
 ****************************
 ** SIMULATION NUMBER:   7 **
```

READ STORM	Filename: C:\Working Files\POND DESIGN\SCS Storms\S1002412.stm
Ptotal=112.42 mm	Comments: SCS TYPE II TWENTY FOUR HOUR, HUNDRED YE

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.20	1.27	6.20	2.29	12.20	21.84	18.20	2.29
.40	1.27	6.40	2.29	12.40	13.72	18.40	2.29
.60	1.27	6.60	2.29	12.60	9.91	18.60	2.29
.80	1.27	6.80	2.29	12.80	9.40	18.80	2.29
1.00	1.27	7.00	2.29	13.00	6.60	19.00	2.29
1.20	1.27	7.20	2.29	13.20	5.59	19.20	1.78
1.40	1.27	7.40	2.29	13.40	5.59	19.40	1.78
1.60	1.27	7.60	2.29	13.60	5.59	19.60	1.78
1.80	1.27	7.80	2.29	13.80	5.59	19.80	1.78
2.00	1.27	8.00	2.29	14.00	5.59	20.00	1.78
2.20	1.27	8.20	3.30	14.20	3.30	20.20	1.78
2.40	1.27	8.40	3.30	14.40	3.30	20.40	1.78
2.60	1.27	8.60	3.30	14.60	3.30	20.60	1.78
2.80	1.27	8.80	3.30	14.80	3.30	20.80	1.78
3.00	1.27	9.00	3.30	15.00	3.30	21.00	1.78
3.20	1.27	9.20	3.30	15.20	3.30	21.20	1.27
3.40	1.27	9.40	3.30	15.40	3.30	21.40	1.27
3.60	1.27	9.60	3.30	15.60	3.30	21.60	1.27
3.80	1.27	9.80	3.30	15.80	3.30	21.80	1.27
4.00	1.27	10.00	3.30	16.00	3.30	22.00	1.27
4.20	2.29	10.20	6.10	16.20	2.29	22.20	1.27
4.40	2.29	10.40	6.10	16.40	2.29	22.40	1.27
4.60	2.29	10.60	6.10	16.60	2.29	22.60	1.27
4.80	2.29	10.80	6.10	16.80	2.29	22.80	1.27
5.00	2.29	11.00	6.10	17.00	2.29	23.00	1.27
5.20	2.29	11.20	8.13	17.20	2.29	23.20	1.27
5.40	2.29	11.40	11.94	17.40	2.29	23.40	1.27
5.60	2.29	11.60	27.43	17.60	2.29	23.60	1.27
5.80	2.29	11.80	59.94	17.80	2.29	23.80	1.27
6.00	2.29	12.00	126.49	18.00	2.29	24.00	1.27

CALIB STANDHYD (0004) ID= 1 DT= 5.0 min	Area (ha)= .06 Total Imp(%)= 70.00 Dir. Conn.(%)= 70.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.04	.02
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	20.70	40.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	1.27	6.083	2.29	12.083	21.86	18.08	2.29
.167	1.27	6.167	2.29	12.167	21.84	18.17	2.29
.250	1.27	6.250	2.29	12.250	16.97	18.25	2.29
.333	1.27	6.333	2.29	12.333	13.72	18.33	2.29
.417	1.27	6.417	2.29	12.417	12.95	18.42	2.29
.500	1.27	6.500	2.29	12.500	9.91	18.50	2.29
.583	1.27	6.583	2.29	12.583	9.91	18.58	2.29
.667	1.27	6.667	2.29	12.667	9.50	18.67	2.29
.750	1.27	6.750	2.29	12.750	9.40	18.75	2.29
.833	1.27	6.833	2.29	12.833	8.28	18.83	2.29
.917	1.27	6.917	2.29	12.917	6.60	18.92	2.29
1.000	1.27	7.000	2.29	13.000	6.60	19.00	2.29
1.083	1.27	7.083	2.29	13.083	5.59	19.08	1.78
1.167	1.27	7.167	2.29	13.167	5.59	19.17	1.78
1.250	1.27	7.250	2.29	13.250	5.59	19.25	1.78
1.333	1.27	7.333	2.29	13.333	5.59	19.33	1.78
1.417	1.27	7.417	2.29	13.417	5.59	19.42	1.78
1.500	1.27	7.500	2.29	13.500	5.59	19.50	1.78
1.583	1.27	7.583	2.29	13.583	5.59	19.58	1.78
1.667	1.27	7.667	2.29	13.667	5.59	19.67	1.78
1.750	1.27	7.750	2.29	13.750	5.59	19.75	1.78
1.833	1.27	7.833	2.29	13.833	5.59	19.83	1.78
1.917	1.27	7.917	2.29	13.917	5.59	19.92	1.78
2.000	1.27	8.000	2.29	14.000	5.59	20.00	1.78
2.083	1.27	8.083	3.30	14.083	3.30	20.08	1.78
2.167	1.27	8.167	3.30	14.167	3.30	20.17	1.78
2.250	1.27	8.250	3.30	14.250	3.30	20.25	1.78
2.333	1.27	8.333	3.30	14.333	3.30	20.33	1.78
2.417	1.27	8.417	3.30	14.417	3.30	20.42	1.78
2.500	1.27	8.500	3.30	14.500	3.30	20.50	1.78
2.583	1.27	8.583	3.30	14.583	3.30	20.58	1.78
2.667	1.27	8.667	3.30	14.667	3.30	20.67	1.78
2.750	1.27	8.750	3.30	14.750	3.30	20.75	1.78
2.833	1.27	8.833	3.30	14.833	3.30	20.83	1.78
2.917	1.27	8.917	3.30	14.917	3.30	20.92	1.78
3.000	1.27	9.000	3.30	15.000	3.30	21.00	1.78
3.083	1.27	9.083	3.30	15.083	3.30	21.08	1.27
3.167	1.27	9.167	3.30	15.167	3.30	21.17	1.27
3.250	1.27	9.250	3.30	15.250	3.30	21.25	1.27
3.333	1.27	9.333	3.30	15.333	3.30	21.33	1.27
3.417	1.27	9.417	3.30	15.417	3.30	21.42	1.27
3.500	1.27	9.500	3.30	15.500	3.30	21.50	1.27
3.583	1.27	9.583	3.30	15.583	3.30	21.58	1.27
3.667	1.27	9.667	3.30	15.667	3.30	21.67	1.27
3.750	1.27	9.750	3.30	15.750	3.30	21.75	1.27

3.833	1.27	9.833	3.30	15.833	3.30	21.83	1.27
3.917	1.27	9.917	3.30	15.917	3.30	21.92	1.27
4.000	1.27	10.000	3.30	16.000	3.30	22.00	1.27
4.083	2.29	10.083	6.10	16.083	2.29	22.08	1.27
4.167	2.29	10.167	6.10	16.167	2.29	22.17	1.27
4.250	2.29	10.250	6.10	16.250	2.29	22.25	1.27
4.333	2.29	10.333	6.10	16.333	2.29	22.33	1.27
4.417	2.29	10.417	6.10	16.417	2.29	22.42	1.27
4.500	2.29	10.500	6.10	16.500	2.29	22.50	1.27
4.583	2.29	10.583	6.10	16.583	2.29	22.58	1.27
4.667	2.29	10.667	6.10	16.667	2.29	22.67	1.27
4.750	2.29	10.750	6.10	16.750	2.29	22.75	1.27
4.833	2.29	10.833	6.10	16.833	2.29	22.83	1.27
4.917	2.29	10.917	6.10	16.917	2.29	22.92	1.27
5.000	2.29	11.000	6.10	17.000	2.29	23.00	1.27
5.083	2.29	11.083	8.13	17.083	2.29	23.08	1.27
5.167	2.29	11.167	8.13	17.167	2.29	23.17	1.27
5.250	2.29	11.250	10.41	17.250	2.29	23.25	1.27
5.333	2.29	11.333	11.94	17.333	2.29	23.33	1.27
5.417	2.29	11.417	15.04	17.417	2.29	23.42	1.27
5.500	2.29	11.500	27.43	17.500	2.29	23.50	1.27
5.583	2.29	11.583	27.43	17.583	2.29	23.58	1.27
5.667	2.29	11.667	53.44	17.667	2.29	23.67	1.27
5.750	2.29	11.750	59.94	17.750	2.29	23.75	1.27
5.833	2.29	11.833	86.56	17.833	2.29	23.83	1.27
5.917	2.29	11.917	126.49	17.917	2.29	23.92	1.27
6.000	2.29	12.000	126.49	18.000	2.29	24.00	1.27

				TOTALS
Max.Eff.Inten.(mm/hr)=	126.49	83.93		
over (min)	5.00	10.00		
Storage Coeff. (min)=	.90 (ii)	5.48 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	.34	.16		
PEAK FLOW (cms)=	.02	.00	.019 (iii)	
TIME TO PEAK (hrs)=	12.00	12.00	12.00	
RUNOFF VOLUME (mm)=	111.42	62.90	96.83	
TOTAL RAINFALL (mm)=	112.42	112.42	112.42	
RUNOFF COEFFICIENT =	.99	.56	.86	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0001)	Area (ha)=	.68	Curve Number (CN)=	80.0
ID= 1 DT=10.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	.20		

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.167	1.27	6.167	2.29	12.167	21.84	18.17	2.29
.333	1.27	6.333	2.29	12.333	15.34	18.33	2.29
.500	1.27	6.500	2.29	12.500	11.43	18.50	2.29
.667	1.27	6.667	2.29	12.667	9.70	18.67	2.29
.833	1.27	6.833	2.29	12.833	8.84	18.83	2.29
1.000	1.27	7.000	2.29	13.000	6.60	19.00	2.29
1.167	1.27	7.167	2.29	13.167	5.59	19.17	1.78
1.333	1.27	7.333	2.29	13.333	5.59	19.33	1.78
1.500	1.27	7.500	2.29	13.500	5.59	19.50	1.78
1.667	1.27	7.667	2.29	13.667	5.59	19.67	1.78
1.833	1.27	7.833	2.29	13.833	5.59	19.83	1.78
2.000	1.27	8.000	2.29	14.000	5.59	20.00	1.78
2.167	1.27	8.167	3.30	14.167	3.30	20.17	1.78
2.333	1.27	8.333	3.30	14.333	3.30	20.33	1.78
2.500	1.27	8.500	3.30	14.500	3.30	20.50	1.78
2.667	1.27	8.667	3.30	14.667	3.30	20.67	1.78
2.833	1.27	8.833	3.30	14.833	3.30	20.83	1.78
3.000	1.27	9.000	3.30	15.000	3.30	21.00	1.78
3.167	1.27	9.167	3.30	15.167	3.30	21.17	1.27
3.333	1.27	9.333	3.30	15.333	3.30	21.33	1.27
3.500	1.27	9.500	3.30	15.500	3.30	21.50	1.27
3.667	1.27	9.667	3.30	15.667	3.30	21.67	1.27
3.833	1.27	9.833	3.30	15.833	3.30	21.83	1.27
4.000	1.27	10.000	3.30	16.000	3.30	22.00	1.27
4.167	2.29	10.167	6.10	16.167	2.29	22.17	1.27
4.333	2.29	10.333	6.10	16.333	2.29	22.33	1.27
4.500	2.29	10.500	6.10	16.500	2.29	22.50	1.27
4.667	2.29	10.667	6.10	16.667	2.29	22.67	1.27
4.833	2.29	10.833	6.10	16.833	2.29	22.83	1.27
5.000	2.29	11.000	6.10	17.000	2.29	23.00	1.27
5.167	2.29	11.167	8.13	17.167	2.29	23.17	1.27
5.333	2.29	11.333	11.18	17.333	2.29	23.33	1.27
5.500	2.29	11.500	21.23	17.500	2.29	23.50	1.27
5.667	2.29	11.667	40.44	17.667	2.29	23.67	1.27
5.833	2.29	11.833	73.25	17.833	2.29	23.83	1.27
6.000	2.29	12.000	126.49	18.000	2.29	24.00	1.27

Unit Hyd Qpeak (cms)= .130

PEAK FLOW (cms)= .112 (i)
TIME TO PEAK (hrs)= 12.000
RUNOFF VOLUME (mm)= 65.757
TOTAL RAINFALL (mm)= 112.420
RUNOFF COEFFICIENT = .585

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

CALIB			
NASHYD (0002)	Area (ha)= 1.26	Curve Number (CN)= 80.0	
ID= 1 DT=10.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= .20		

Unit Hyd Qpeak (cms)= .241

PEAK FLOW (cms)= .207 (i)
TIME TO PEAK (hrs)= 12.000
RUNOFF VOLUME (mm)= 65.757
TOTAL RAINFALL (mm)= 112.420
RUNOFF COEFFICIENT = .585

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

ADD HYD (0005)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0004):	.06	.019	12.00	96.83
+ ID2= 2 (0001):	.68	.112	12.00	65.76
ID = 3 (0005):	.74	.131	12.00	68.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0003)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	.74	.131	12.00	68.42
+ ID2= 2 (0002):	1.26	.207	12.00	65.76
ID = 3 (0003):	2.00	.339	12.00	66.75

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

```
 V    V   I    SSSSS  U   U    A    L
 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
 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
```


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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 2.3.2\voin.dat
Output filename: H:\PROJECTS\99\598\Design\SWM\V02\Millford Development\Proposed Cond_ALL_V2.out
Summary filename: H:\PROJECTS\99\598\Design\SWM\V02\Millford Development\Proposed Cond_ALL_V2.sum

DATE: 10/31/2010 TIME: 3:01:37 PM

USER:

COMMENTS: _____PROPOSED CONDITIONS - ALTERNATIVE 1_____

****
** SIMULATION NUMBER: 1 **
****

READ STORM | Ptotal= 25.00 mm

Filename: C:\Working Files\POND DESIGN\SCS Storms\25mm4HR.STM
Comments: Twenty-Five mm Four Hour Chicago Storm

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	2.07	1.17	5.70	2.17	5.19	3.17	2.80
.33	2.27	1.33	10.78	2.33	4.47	3.33	2.62
.50	2.52	1.50	50.21	2.50	3.95	3.50	2.48
.67	2.88	1.67	13.37	2.67	3.56	3.67	2.35
.83	3.38	1.83	8.29	2.83	3.25	3.83	2.23
1.00	4.18	2.00	6.30	3.00	3.01	4.00	2.14

```
| CALIB                |
| STANDHYD  (0001)     |   Area    (ha)=    .68
|ID= 1 DT= 5.0 min     |   Total Imp(%)=  68.00   Dir. Conn.(%)=  68.00
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.46	.22
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	67.30	40.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	2.07	1.083	5.70	2.083	5.19	3.08	2.80
.167	2.07	1.167	5.70	2.167	5.19	3.17	2.80
.250	2.27	1.250	10.78	2.250	4.47	3.25	2.62
.333	2.27	1.333	10.78	2.333	4.47	3.33	2.62
.417	2.52	1.417	50.21	2.417	3.95	3.42	2.48
.500	2.52	1.500	50.21	2.500	3.95	3.50	2.48
.583	2.88	1.583	13.37	2.583	3.56	3.58	2.35
.667	2.88	1.667	13.37	2.667	3.56	3.67	2.35
.750	3.38	1.750	8.29	2.750	3.25	3.75	2.23
.833	3.38	1.833	8.29	2.833	3.25	3.83	2.23
.917	4.17	1.917	6.30	2.917	3.01	3.92	2.14
1.000	4.18	2.000	6.29	3.000	3.01	4.00	2.14

Max.Eff.Inten.(mm/hr)=		50.21	5.24	
over (min)		5.00	30.00	
Storage Coeff. (min)=		2.65 (ii)	25.61 (ii)	
Unit Hyd. Tpeak (min)=		5.00	30.00	
Unit Hyd. peak (cms)=		.29	.04	
				TOTALS
PEAK FLOW	(cms)=	.06	.00	.064 (iii)
TIME TO PEAK	(hrs)=	1.50	1.92	1.50
RUNOFF VOLUME	(mm)=	24.00	5.10	17.93
TOTAL RAINFALL	(mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT	=	.96	.20	.72

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| CALIB                |
| STANDHYD  (0007)     |   Area    (ha)=    .06
|ID= 1 DT= 5.0 min     |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.04	.02
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	20.70	40.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=		50.21	5.24	
over (min)		5.00	25.00	
Storage Coeff. (min)=		1.31 (ii)	24.27 (ii)	
Unit Hyd. Tpeak (min)=		5.00	25.00	
Unit Hyd. peak (cms)=		.33	.05	
				TOTALS
PEAK FLOW	(cms)=	.01	.00	.006 (iii)
TIME TO PEAK	(hrs)=	1.50	1.83	1.50
RUNOFF VOLUME	(mm)=	24.00	5.10	18.18
TOTAL RAINFALL	(mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT	=	.96	.20	.73

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| ADD HYD   (0008)     |
|   1 +  2 =  3        |
```

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):		.68	.064	1.50	17.93
+ ID2= 2 (0007):		.06	.006	1.50	18.18
ID = 3 (0008):		.74	.070	1.50	17.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************


|    READ STORM     |    Filename: C:\Working Files\POND DESIGN\
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SCS Storms\S0022412.stm

Ptotal= 52.12 mm | Comments: TWO YEAR SCS STORM WITH A TWELVE MINUTE

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.20	.51	6.20	1.02	12.20	10.67	18.20	.76
.40	.51	6.40	1.02	12.40	6.60	18.40	.76
.60	.51	6.60	1.02	12.60	4.83	18.60	.76
.80	.51	6.80	1.02	12.80	4.57	18.80	.76
1.00	.51	7.00	1.02	13.00	3.30	19.00	.76
1.20	.51	7.20	1.02	13.20	2.79	19.20	.76
1.40	.51	7.40	1.02	13.40	2.79	19.40	.76
1.60	.51	7.60	1.02	13.60	2.79	19.60	.76
1.80	.51	7.80	1.02	13.80	2.79	19.80	.76
2.00	.51	8.00	1.02	14.00	2.79	20.00	.76
2.20	.51	8.20	1.52	14.20	1.52	20.20	.51
2.40	.51	8.40	1.52	14.40	1.52	20.40	.51
2.60	.51	8.60	1.52	14.60	1.52	20.60	.51
2.80	.51	8.80	1.52	14.80	1.52	20.80	.51
3.00	.51	9.00	1.52	15.00	1.52	21.00	.51
3.20	.51	9.20	1.52	15.20	1.52	21.20	.51
3.40	.51	9.40	1.52	15.40	1.52	21.40	.51
3.60	.51	9.60	1.52	15.60	1.52	21.60	.51
3.80	.51	9.80	1.52	15.80	1.52	21.80	.51
4.00	.51	10.00	1.52	16.00	1.52	22.00	.51
4.20	1.02	10.20	3.05	16.20	1.02	22.20	.51
4.40	1.02	10.40	3.05	16.40	1.02	22.40	.51
4.60	1.02	10.60	3.05	16.60	1.02	22.60	.51
4.80	1.02	10.80	3.05	16.80	1.02	22.80	.51
5.00	1.02	11.00	3.05	17.00	1.02	23.00	.51
5.20	1.02	11.20	4.06	17.20	1.02	23.20	.51
5.40	1.02	11.40	5.84	17.40	1.02	23.40	.51
5.60	1.02	11.60	13.21	17.60	1.02	23.60	.51
5.80	1.02	11.80	28.96	17.80	1.02	23.80	.51
6.00	1.02	12.00	60.45	18.00	1.02	24.00	.51

CALIB
STANDHYD (0001)
ID= 1 DT= 5.0 min

Area (ha)= .68
Total Imp(%)= 68.00 Dir. Conn.(%)= 68.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.46	.22
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	67.30	40.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.51	6.083	1.02	12.083	10.67	18.08	.76
.167	.51	6.167	1.02	12.167	10.67	18.17	.76
.250	.51	6.250	1.02	12.250	8.23	18.25	.76
.333	.51	6.333	1.02	12.333	6.60	18.33	.76
.417	.51	6.417	1.02	12.417	6.25	18.42	.76
.500	.51	6.500	1.02	12.500	4.83	18.50	.76
.583	.51	6.583	1.02	12.583	4.83	18.58	.76
.667	.51	6.667	1.02	12.667	4.62	18.67	.76
.750	.51	6.750	1.02	12.750	4.57	18.75	.76
.833	.51	6.833	1.02	12.833	4.06	18.83	.76
.917	.51	6.917	1.02	12.917	3.30	18.92	.76
1.000	.51	7.000	1.02	13.000	3.30	19.00	.76
1.083	.51	7.083	1.02	13.083	2.79	19.08	.76
1.167	.51	7.167	1.02	13.167	2.79	19.17	.76
1.250	.51	7.250	1.02	13.250	2.79	19.25	.76
1.333	.51	7.333	1.02	13.333	2.79	19.33	.76
1.417	.51	7.417	1.02	13.417	2.79	19.42	.76
1.500	.51	7.500	1.02	13.500	2.79	19.50	.76
1.583	.51	7.583	1.02	13.583	2.79	19.58	.76
1.667	.51	7.667	1.02	13.667	2.79	19.67	.76
1.750	.51	7.750	1.02	13.750	2.79	19.75	.76
1.833	.51	7.833	1.02	13.833	2.79	19.83	.76
1.917	.51	7.917	1.02	13.917	2.79	19.92	.76
2.000	.51	8.000	1.02	14.000	2.79	20.00	.76
2.083	.51	8.083	1.52	14.083	1.52	20.08	.51
2.167	.51	8.167	1.52	14.167	1.52	20.17	.51
2.250	.51	8.250	1.52	14.250	1.52	20.25	.51
2.333	.51	8.333	1.52	14.333	1.52	20.33	.51
2.417	.51	8.417	1.52	14.417	1.52	20.42	.51
2.500	.51	8.500	1.52	14.500	1.52	20.50	.51
2.583	.51	8.583	1.52	14.583	1.52	20.58	.51
2.667	.51	8.667	1.52	14.667	1.52	20.67	.51
2.750	.51	8.750	1.52	14.750	1.52	20.75	.51
2.833	.51	8.833	1.52	14.833	1.52	20.83	.51
2.917	.51	8.917	1.52	14.917	1.52	20.92	.51
3.000	.51	9.000	1.52	15.000	1.52	21.00	.51
3.083	.51	9.083	1.52	15.083	1.52	21.08	.51
3.167	.51	9.167	1.52	15.167	1.52	21.17	.51
3.250	.51	9.250	1.52	15.250	1.52	21.25	.51
3.333	.51	9.333	1.52	15.333	1.52	21.33	.51
3.417	.51	9.417	1.52	15.417	1.52	21.42	.51
3.500	.51	9.500	1.52	15.500	1.52	21.50	.51
3.583	.51	9.583	1.52	15.583	1.52	21.58	.51
3.667	.51	9.667	1.52	15.667	1.52	21.67	.51
3.750	.51	9.750	1.52	15.750	1.52	21.75	.51
3.833	.51	9.833	1.52	15.833	1.52	21.83	.51
3.917	.51	9.917	1.52	15.917	1.52	21.92	.51
4.000	.51	10.000	1.52	16.000	1.52	22.00	.51
4.083	1.02	10.083	3.05	16.083	1.02	22.08	.51
4.167	1.02	10.167	3.05	16.167	1.02	22.17	.51

4.250	1.02	10.250	3.05	16.250	1.02	22.25	.51
4.333	1.02	10.333	3.05	16.333	1.02	22.33	.51
4.417	1.02	10.417	3.05	16.417	1.02	22.42	.51
4.500	1.02	10.500	3.05	16.500	1.02	22.50	.51
4.583	1.02	10.583	3.05	16.583	1.02	22.58	.51
4.667	1.02	10.667	3.05	16.667	1.02	22.67	.51
4.750	1.02	10.750	3.05	16.750	1.02	22.75	.51
4.833	1.02	10.833	3.05	16.833	1.02	22.83	.51
4.917	1.02	10.917	3.05	16.917	1.02	22.92	.51
5.000	1.02	11.000	3.05	17.000	1.02	23.00	.51
5.083	1.02	11.083	4.06	17.083	1.02	23.08	.51
5.167	1.02	11.167	4.06	17.167	1.02	23.17	.51
5.250	1.02	11.250	5.13	17.250	1.02	23.25	.51
5.333	1.02	11.333	5.84	17.333	1.02	23.33	.51
5.417	1.02	11.417	7.31	17.417	1.02	23.42	.51
5.500	1.02	11.500	13.21	17.500	1.02	23.50	.51
5.583	1.02	11.583	13.21	17.583	1.02	23.58	.51
5.667	1.02	11.667	25.80	17.667	1.02	23.67	.51
5.750	1.02	11.750	28.96	17.750	1.02	23.75	.51
5.833	1.02	11.833	41.55	17.833	1.02	23.83	.51
5.917	1.02	11.917	60.45	17.917	1.02	23.92	.51
6.000	1.02	12.000	60.45	18.000	1.02	24.00	.51

Max.Eff.Inten.(mm/hr)=	60.45	22.58	
over (min)	5.00	20.00	
Storage Coeff. (min)=	2.46 (ii)	15.26 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	.30	.07	
			TOTALS
PEAK FLOW (cms)=	.08	.01	.083 (iii)
TIME TO PEAK (hrs)=	12.00	12.17	12.00
RUNOFF VOLUME (mm)=	51.12	18.94	40.81
TOTAL RAINFALL (mm)=	52.12	52.12	52.12
RUNOFF COEFFICIENT =	.98	.36	.78

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0007)
ID= 1 DT= 5.0 min

Area (ha)= .06
Total Imp(%)= 70.00 Dir. Conn.(%)= 70.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.04	.02
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	20.70	40.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=	60.45	22.58	
over (min)	5.00	15.00	
Storage Coeff. (min)=	1.21 (ii)	14.01 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	.33	.08	
			TOTALS
PEAK FLOW (cms)=	.01	.00	.008 (iii)
TIME TO PEAK (hrs)=	12.00	12.08	12.00
RUNOFF VOLUME (mm)=	51.12	18.94	39.64
TOTAL RAINFALL (mm)=	52.12	52.12	52.12
RUNOFF COEFFICIENT =	.98	.36	.76

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0008)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	.68	.083	12.00	40.81
+ ID2= 2 (0007):	.06	.008	12.00	39.64
ID = 3 (0008):	.74	.091	12.00	40.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 3 **
****

READ STORM
Ptotal= 62.43 mm

Filename: C:\Working Files\POND DESIGN\
SCS Storms\S0052412.stm
Comments: FIVE YR SCS STORM WITH A TWELVE MINUTE

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.20	.76	6.20	1.27	12.20	12.19	18.20	1.27
.40	.76	6.40	1.27	12.40	7.62	18.40	1.27
.60	.76	6.60	1.27	12.60	5.59	18.60	1.27
.80	.76	6.80	1.27	12.80	5.08	18.80	1.27

1.00	.76	7.00	1.27	13.00	3.81	19.00	1.27
1.20	.76	7.20	1.27	13.20	3.05	19.20	1.02
1.40	.76	7.40	1.27	13.40	3.05	19.40	1.02
1.60	.76	7.60	1.27	13.60	3.05	19.60	1.02
1.80	.76	7.80	1.27	13.80	3.05	19.80	1.02
2.00	.76	8.00	1.27	14.00	3.05	20.00	1.02
2.20	.76	8.20	1.78	14.20	1.78	20.20	1.02
2.40	.76	8.40	1.78	14.40	1.78	20.40	1.02
2.60	.76	8.60	1.78	14.60	1.78	20.60	1.02
2.80	.76	8.80	1.78	14.80	1.78	20.80	1.02
3.00	.76	9.00	1.78	15.00	1.78	21.00	1.02
3.20	.76	9.20	1.78	15.20	1.78	21.20	.76
3.40	.76	9.40	1.78	15.40	1.78	21.40	.76
3.60	.76	9.60	1.78	15.60	1.78	21.60	.76
3.80	.76	9.80	1.78	15.80	1.78	21.80	.76
4.00	.76	10.00	1.78	16.00	1.78	22.00	.76
4.20	1.27	10.20	3.30	16.20	1.27	22.20	.76
4.40	1.27	10.40	3.30	16.40	1.27	22.40	.76
4.60	1.27	10.60	3.30	16.60	1.27	22.60	.76
4.80	1.27	10.80	3.30	16.80	1.27	22.80	.76
5.00	1.27	11.00	3.30	17.00	1.27	23.00	.76
5.20	1.27	11.20	4.57	17.20	1.27	23.20	.76
5.40	1.27	11.40	6.60	17.40	1.27	23.40	.76
5.60	1.27	11.60	15.24	17.60	1.27	23.60	.76
5.80	1.27	11.80	33.27	17.80	1.27	23.80	.76
6.00	1.27	12.00	69.60	18.00	1.27	24.00	.76

CALIB
STANDHYD (0001)
ID= 1 DT= 5.0 min

Area (ha)= .68
Total Imp(%)= 68.00 Dir. Conn.(%)= 68.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.46	.22
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	67.30	40.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.76	6.083	1.27	12.083	12.20	18.08	1.27
.167	.76	6.167	1.27	12.167	12.19	18.17	1.27
.250	.76	6.250	1.27	12.250	9.45	18.25	1.27
.333	.76	6.333	1.27	12.333	7.62	18.33	1.27
.417	.76	6.417	1.27	12.417	7.21	18.42	1.27
.500	.76	6.500	1.27	12.500	5.59	18.50	1.27
.583	.76	6.583	1.27	12.583	5.59	18.58	1.27
.667	.76	6.667	1.27	12.667	5.18	18.67	1.27
.750	.76	6.750	1.27	12.750	5.08	18.75	1.27
.833	.76	6.833	1.27	12.833	4.57	18.83	1.27
.917	.76	6.917	1.27	12.917	3.81	18.92	1.27
1.000	.76	7.000	1.27	13.000	3.81	19.00	1.27
1.083	.76	7.083	1.27	13.083	3.05	19.08	1.02
1.167	.76	7.167	1.27	13.167	3.05	19.17	1.02
1.250	.76	7.250	1.27	13.250	3.05	19.25	1.02
1.333	.76	7.333	1.27	13.333	3.05	19.33	1.02
1.417	.76	7.417	1.27	13.417	3.05	19.42	1.02
1.500	.76	7.500	1.27	13.500	3.05	19.50	1.02
1.583	.76	7.583	1.27	13.583	3.05	19.58	1.02
1.667	.76	7.667	1.27	13.667	3.05	19.67	1.02
1.750	.76	7.750	1.27	13.750	3.05	19.75	1.02
1.833	.76	7.833	1.27	13.833	3.05	19.83	1.02
1.917	.76	7.917	1.27	13.917	3.05	19.92	1.02
2.000	.76	8.000	1.27	14.000	3.05	20.00	1.02
2.083	.76	8.083	1.78	14.083	1.78	20.08	1.02
2.167	.76	8.167	1.78	14.167	1.78	20.17	1.02
2.250	.76	8.250	1.78	14.250	1.78	20.25	1.02
2.333	.76	8.333	1.78	14.333	1.78	20.33	1.02
2.417	.76	8.417	1.78	14.417	1.78	20.42	1.02
2.500	.76	8.500	1.78	14.500	1.78	20.50	1.02
2.583	.76	8.583	1.78	14.583	1.78	20.58	1.02
2.667	.76	8.667	1.78	14.667	1.78	20.67	1.02
2.750	.76	8.750	1.78	14.750	1.78	20.75	1.02
2.833	.76	8.833	1.78	14.833	1.78	20.83	1.02
2.917	.76	8.917	1.78	14.917	1.78	20.92	1.02
3.000	.76	9.000	1.78	15.000	1.78	21.00	1.02
3.083	.76	9.083	1.78	15.083	1.78	21.08	.76
3.167	.76	9.167	1.78	15.167	1.78	21.17	.76
3.250	.76	9.250	1.78	15.250	1.78	21.25	.76
3.333	.76	9.333	1.78	15.333	1.78	21.33	.76
3.417	.76	9.417	1.78	15.417	1.78	21.42	.76
3.500	.76	9.500	1.78	15.500	1.78	21.50	.76
3.583	.76	9.583	1.78	15.583	1.78	21.58	.76
3.667	.76	9.667	1.78	15.667	1.78	21.67	.76
3.750	.76	9.750	1.78	15.750	1.78	21.75	.76
3.833	.76	9.833	1.78	15.833	1.78	21.83	.76
3.917	.76	9.917	1.78	15.917	1.78	21.92	.76
4.000	.76	10.000	1.78	16.000	1.78	22.00	.76
4.083	1.27	10.083	3.30	16.083	1.27	22.08	.76
4.167	1.27	10.167	3.30	16.167	1.27	22.17	.76
4.250	1.27	10.250	3.30	16.250	1.27	22.25	.76
4.333	1.27	10.333	3.30	16.333	1.27	22.33	.76
4.417	1.27	10.417	3.30	16.417	1.27	22.42	.76
4.500	1.27	10.500	3.30	16.500	1.27	22.50	.76
4.583	1.27	10.583	3.30	16.583	1.27	22.58	.76
4.667	1.27	10.667	3.30	16.667	1.27	22.67	.76
4.750	1.27	10.750	3.30	16.750	1.27	22.75	.76
4.833	1.27	10.833	3.30	16.833	1.27	22.83	.76
4.917	1.27	10.917	3.30	16.917	1.27	22.92	.76

5.000	1.27	11.000	3.30	17.000	1.27	23.00	.76
5.083	1.27	11.083	4.57	17.083	1.27	23.08	.76
5.167	1.27	11.167	4.57	17.167	1.27	23.17	.76
5.250	1.27	11.250	5.79	17.250	1.27	23.25	.76
5.333	1.27	11.333	6.60	17.333	1.27	23.33	.76
5.417	1.27	11.417	8.33	17.417	1.27	23.42	.76
5.500	1.27	11.500	15.24	17.500	1.27	23.50	.76
5.583	1.27	11.583	15.24	17.583	1.27	23.58	.76
5.667	1.27	11.667	29.67	17.667	1.27	23.67	.76
5.750	1.27	11.750	33.27	17.750	1.27	23.75	.76
5.833	1.27	11.833	47.80	17.833	1.27	23.83	.76
5.917	1.27	11.917	69.60	17.917	1.27	23.92	.76
6.000	1.27	12.000	69.60	18.000	1.27	24.00	.76

Max.Eff.Inten.(mm/hr)=	69.60	29.10		
over (min)	5.00	15.00		
Storage Coeff. (min)=	2.33 (ii)	13.89 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	.30	.08		
			TOTALS	
PEAK FLOW (cms)=	.09	.01	.099 (iii)	
TIME TO PEAK (hrs)=	12.00	12.08	12.00	
RUNOFF VOLUME (mm)=	61.43	25.50	49.92	
TOTAL RAINFALL (mm)=	62.43	62.43	62.43	
RUNOFF COEFFICIENT =	.98	.41	.80	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0007)
ID= 1 DT= 5.0 min

Area (ha)= .06
Total Imp(%)= 70.00 Dir. Conn.(%)= 70.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.04	.02
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	20.70	40.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=	69.60	29.10		
over (min)	5.00	15.00		
Storage Coeff. (min)=	1.15 (ii)	12.71 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	.34	.08		
			TOTALS	
PEAK FLOW (cms)=	.01	.00	.010 (iii)	
TIME TO PEAK (hrs)=	12.00	12.08	12.00	
RUNOFF VOLUME (mm)=	61.43	25.50	50.61	
TOTAL RAINFALL (mm)=	62.43	62.43	62.43	
RUNOFF COEFFICIENT =	.98	.41	.81	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0008)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	.68	.099	12.00	49.92
+ ID2= 2 (0007):	.06	.010	12.00	50.61
ID = 3 (0008):	.74	.108	12.00	49.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 4 **
****

READ STORM
Ptotal= 82.45 mm

Filename: C:\Working Files\POND DESIGN\
SCS Storms\S0102412.stm
Comments: TEN YR SCS STORM 24HR TWELVE MIN TIME ST

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.20	.76	6.20	1.78	12.20	92.20	18.20	1.78
.40	.76	6.40	1.78	12.40	16.00	18.40	1.78
.60	.76	6.60	1.78	12.60	10.16	18.60	1.78
.80	.76	6.80	1.78	12.80	7.37	18.80	1.78
1.00	.76	7.00	1.78	13.00	6.86	19.00	1.78
1.20	.76	7.20	1.78	13.20	4.83	19.20	1.78
1.40	.76	7.40	1.78	13.40	4.06	19.40	1.27
1.60	.76	7.60	1.78	13.60	4.06	19.60	1.27
1.80	.76	7.80	1.78	13.80	4.06	19.80	1.27
2.00	.76	8.00	1.78	14.00	4.06	20.00	1.27
2.20	.76	8.20	1.78	14.20	4.06	20.20	1.27
2.40	.76	8.40	2.54	14.40	2.54	20.40	1.27
2.60	.76	8.60	2.54	14.60	2.54	20.60	1.27

2.80	.76	8.80	2.54	14.80	2.54	20.80	1.27
3.00	.76	9.00	2.54	15.00	2.54	21.00	1.27
3.20	.76	9.20	2.54	15.20	2.54	21.20	1.27
3.40	.76	9.40	2.54	15.40	2.54	21.40	.76
3.60	.76	9.60	2.54	15.60	2.54	21.60	.76
3.80	.76	9.80	2.54	15.80	2.54	21.80	.76
4.00	.76	10.00	2.54	16.00	2.54	22.00	.76
4.20	.76	10.20	2.54	16.20	2.54	22.20	.76
4.40	1.78	10.40	4.57	16.40	1.78	22.40	.76
4.60	1.78	10.60	4.57	16.60	1.78	22.60	.76
4.80	1.78	10.80	4.57	16.80	1.78	22.80	.76
5.00	1.78	11.00	4.57	17.00	1.78	23.00	.76
5.20	1.78	11.20	4.57	17.20	1.78	23.20	.76
5.40	1.78	11.40	6.10	17.40	1.78	23.40	.76
5.60	1.78	11.60	8.89	17.60	1.78	23.60	.76
5.80	1.78	11.80	20.07	17.80	1.78	23.80	.76
6.00	1.78	12.00	44.20	18.00	1.78	24.00	.76

CALIB
STANDHYD (0001)
ID= 1 DT= 5.0 min

Area (ha)= .68
Total Imp(%)= 68.00 Dir. Conn.(%)= 68.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.46	.22
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	67.30	40.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.76	6.083	1.78	12.083	92.19	18.08	1.78
.167	.76	6.167	1.78	12.167	92.20	18.17	1.78
.250	.76	6.250	1.78	12.250	46.49	18.25	1.78
.333	.76	6.333	1.78	12.333	16.00	18.33	1.78
.417	.76	6.417	1.78	12.417	14.83	18.42	1.78
.500	.76	6.500	1.78	12.500	10.16	18.50	1.78
.583	.76	6.583	1.78	12.583	10.16	18.58	1.78
.667	.76	6.667	1.78	12.667	7.93	18.67	1.78
.750	.76	6.750	1.78	12.750	7.37	18.75	1.78
.833	.76	6.833	1.78	12.833	7.17	18.83	1.78
.917	.76	6.917	1.78	12.917	6.86	18.92	1.78
1.000	.76	7.000	1.78	13.000	6.86	19.00	1.78
1.083	.76	7.083	1.78	13.083	4.83	19.08	1.78
1.167	.76	7.167	1.78	13.167	4.83	19.17	1.78
1.250	.76	7.250	1.78	13.250	4.37	19.25	1.47
1.333	.76	7.333	1.78	13.333	4.06	19.33	1.27
1.417	.76	7.417	1.78	13.417	4.06	19.42	1.27
1.500	.76	7.500	1.78	13.500	4.06	19.50	1.27
1.583	.76	7.583	1.78	13.583	4.06	19.58	1.27
1.667	.76	7.667	1.78	13.667	4.06	19.67	1.27
1.750	.76	7.750	1.78	13.750	4.06	19.75	1.27
1.833	.76	7.833	1.78	13.833	4.06	19.83	1.27
1.917	.76	7.917	1.78	13.917	4.06	19.92	1.27
2.000	.76	8.000	1.78	14.000	4.06	20.00	1.27
2.083	.76	8.083	1.78	14.083	4.06	20.08	1.27
2.167	.76	8.167	1.78	14.167	4.06	20.17	1.27
2.250	.76	8.250	2.24	14.250	3.15	20.25	1.27
2.333	.76	8.333	2.54	14.333	2.54	20.33	1.27
2.417	.76	8.417	2.54	14.417	2.54	20.42	1.27
2.500	.76	8.500	2.54	14.500	2.54	20.50	1.27
2.583	.76	8.583	2.54	14.583	2.54	20.58	1.27
2.667	.76	8.667	2.54	14.667	2.54	20.67	1.27
2.750	.76	8.750	2.54	14.750	2.54	20.75	1.27
2.833	.76	8.833	2.54	14.833	2.54	20.83	1.27
2.917	.76	8.917	2.54	14.917	2.54	20.92	1.27
3.000	.76	9.000	2.54	15.000	2.54	21.00	1.27
3.083	.76	9.083	2.54	15.083	2.54	21.08	1.27
3.167	.76	9.167	2.54	15.167	2.54	21.17	1.27
3.250	.76	9.250	2.54	15.250	2.54	21.25	.96
3.333	.76	9.333	2.54	15.333	2.54	21.33	.76
3.417	.76	9.417	2.54	15.417	2.54	21.42	.76
3.500	.76	9.500	2.54	15.500	2.54	21.50	.76
3.583	.76	9.583	2.54	15.583	2.54	21.58	.76
3.667	.76	9.667	2.54	15.667	2.54	21.67	.76
3.750	.76	9.750	2.54	15.750	2.54	21.75	.76
3.833	.76	9.833	2.54	15.833	2.54	21.83	.76
3.917	.76	9.917	2.54	15.917	2.54	21.92	.76
4.000	.76	10.000	2.54	16.000	2.54	22.00	.76
4.083	.76	10.083	2.54	16.083	2.54	22.08	.76
4.167	.76	10.167	2.54	16.167	2.54	22.17	.76
4.250	1.37	10.250	3.76	16.250	2.08	22.25	.76
4.333	1.78	10.333	4.57	16.333	1.78	22.33	.76
4.417	1.78	10.417	4.57	16.417	1.78	22.42	.76
4.500	1.78	10.500	4.57	16.500	1.78	22.50	.76
4.583	1.78	10.583	4.57	16.583	1.78	22.58	.76
4.667	1.78	10.667	4.57	16.667	1.78	22.67	.76
4.750	1.78	10.750	4.57	16.750	1.78	22.75	.76
4.833	1.78	10.833	4.57	16.833	1.78	22.83	.76
4.917	1.78	10.917	4.57	16.917	1.78	22.92	.76
5.000	1.78	11.000	4.57	17.000	1.78	23.00	.76
5.083	1.78	11.083	4.57	17.083	1.78	23.08	.76
5.167	1.78	11.167	4.57	17.167	1.78	23.17	.76
5.250	1.78	11.250	5.49	17.250	1.78	23.25	.76
5.333	1.78	11.333	6.10	17.333	1.78	23.33	.76
5.417	1.78	11.417	6.66	17.417	1.78	23.42	.76
5.500	1.78	11.500	8.89	17.500	1.78	23.50	.76
5.583	1.78	11.583	8.89	17.583	1.78	23.58	.76
5.667	1.78	11.667	17.83	17.667	1.78	23.67	.76

5.750	1.78	11.750	20.07	17.750	1.78	23.75	.76
5.833	1.78	11.833	29.72	17.833	1.78	23.83	.76
5.917	1.78	11.917	44.20	17.917	1.78	23.92	.76
6.000	1.78	12.000	44.20	18.000	1.78	24.00	.76

Max.Eff.Inten.(mm/hr)=	92.20	50.85		
over (min)	5.00	15.00		
Storage Coeff. (min)=	2.08 (ii)	11.33 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	.31	.09		
			TOTALS	
PEAK FLOW (cms)=	.12	.02	.133 (iii)	
TIME TO PEAK (hrs)=	12.17	12.33	12.17	
RUNOFF VOLUME (mm)=	81.45	39.56	68.04	
TOTAL RAINFALL (mm)=	82.45	82.45	82.45	
RUNOFF COEFFICIENT =	.99	.48	.83	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0007)
ID= 1 DT= 5.0 min

Area (ha)= .06
Total Imp(%)= 70.00 Dir. Conn.(%)= 70.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.04	.02	
Dep. Storage	(mm)=	1.00	1.50	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	20.70	40.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		92.20	50.85	
over (min)		5.00	15.00	
Storage Coeff. (min)=		1.03 (ii)	10.28 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		.34	.09	
			TOTALS	
PEAK FLOW (cms)=		.01	.00	.013 (iii)
TIME TO PEAK (hrs)=		12.17	12.33	12.17
RUNOFF VOLUME (mm)=		81.45	39.56	68.84
TOTAL RAINFALL (mm)=		82.45	82.45	82.45
RUNOFF COEFFICIENT =		.99	.48	.83

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0008)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	.68	.133	12.17	68.04
+ ID2= 2 (0007):	.06	.013	12.17	68.84
ID = 3 (0008):	.74	.145	12.17	68.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 5 **
****

READ STORM
Ptotal= 95.96 mm

Filename: C:\Working Files\POND DESIGN\
SCS Storms\S0252412.stm
Comments: TWENTYFIVE YR SCS STORM WITH A TWELVE MI

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.20	1.02	6.20	2.03	12.20	18.80	18.20	2.03
.40	1.02	6.40	2.03	12.40	11.68	18.40	2.03
.60	1.02	6.60	2.03	12.60	8.38	18.60	2.03
.80	1.02	6.80	2.03	12.80	8.13	18.80	2.03
1.00	1.02	7.00	2.03	13.00	5.59	19.00	2.03
1.20	1.02	7.20	2.03	13.20	4.83	19.20	1.52
1.40	1.02	7.40	2.03	13.40	4.83	19.40	1.52
1.60	1.02	7.60	2.03	13.60	4.83	19.60	1.52
1.80	1.02	7.80	2.03	13.80	4.83	19.80	1.52
2.00	1.02	8.00	2.03	14.00	4.83	20.00	1.52
2.20	1.02	8.20	2.79	14.20	2.79	20.20	1.52
2.40	1.02	8.40	2.79	14.40	2.79	20.40	1.52
2.60	1.02	8.60	2.79	14.60	2.79	20.60	1.52
2.80	1.02	8.80	2.79	14.80	2.79	20.80	1.52
3.00	1.02	9.00	2.79	15.00	2.79	21.00	1.52
3.20	1.02	9.20	2.79	15.20	2.79	21.20	1.02
3.40	1.02	9.40	2.79	15.40	2.79	21.40	1.02
3.60	1.02	9.60	2.79	15.60	2.79	21.60	1.02
3.80	1.02	9.80	2.79	15.80	2.79	21.80	1.02
4.00	1.02	10.00	2.79	16.00	2.79	22.00	1.02
4.20	2.03	10.20	5.08	16.20	2.03	22.20	1.02
4.40	2.03	10.40	5.08	16.40	2.03	22.40	1.02

4.60	2.03	10.60	5.08	16.60	2.03	22.60	1.02
4.80	2.03	10.80	5.08	16.80	2.03	22.80	1.02
5.00	2.03	11.00	5.08	17.00	2.03	23.00	1.02
5.20	2.03	11.20	7.11	17.20	2.03	23.20	1.02
5.40	2.03	11.40	10.41	17.40	2.03	23.40	1.02
5.60	2.03	11.60	23.37	17.60	2.03	23.60	1.02
5.80	2.03	11.80	51.56	17.80	2.03	23.80	1.02
6.00	2.03	12.00	107.44	18.00	2.03	24.00	1.02

CALIB
STANDHYD (0001)
ID= 1 DT= 5.0 min

Area (ha)= .68
Total Imp(%)= 68.00 Dir. Conn.(%)= 68.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.46	.22
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	67.30	40.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	1.02	6.083	2.03	12.083	18.81	18.08	2.03
.167	1.02	6.167	2.03	12.167	18.80	18.17	2.03
.250	1.02	6.250	2.03	12.250	14.53	18.25	2.03
.333	1.02	6.333	2.03	12.333	11.68	18.33	2.03
.417	1.02	6.417	2.03	12.417	11.02	18.42	2.03
.500	1.02	6.500	2.03	12.500	8.38	18.50	2.03
.583	1.02	6.583	2.03	12.583	8.38	18.58	2.03
.667	1.02	6.667	2.03	12.667	8.18	18.67	2.03
.750	1.02	6.750	2.03	12.750	8.13	18.75	2.03
.833	1.02	6.833	2.03	12.833	7.11	18.83	2.03
.917	1.02	6.917	2.03	12.917	5.59	18.92	2.03
1.000	1.02	7.000	2.03	13.000	5.59	19.00	2.03
1.083	1.02	7.083	2.03	13.083	4.83	19.08	1.52
1.167	1.02	7.167	2.03	13.167	4.83	19.17	1.52
1.250	1.02	7.250	2.03	13.250	4.83	19.25	1.52
1.333	1.02	7.333	2.03	13.333	4.83	19.33	1.52
1.417	1.02	7.417	2.03	13.417	4.83	19.42	1.52
1.500	1.02	7.500	2.03	13.500	4.83	19.50	1.52
1.583	1.02	7.583	2.03	13.583	4.83	19.58	1.52
1.667	1.02	7.667	2.03	13.667	4.83	19.67	1.52
1.750	1.02	7.750	2.03	13.750	4.83	19.75	1.52
1.833	1.02	7.833	2.03	13.833	4.83	19.83	1.52
1.917	1.02	7.917	2.03	13.917	4.83	19.92	1.52
2.000	1.02	8.000	2.03	14.000	4.83	20.00	1.52
2.083	1.02	8.083	2.79	14.083	2.79	20.08	1.52
2.167	1.02	8.167	2.79	14.167	2.79	20.17	1.52
2.250	1.02	8.250	2.79	14.250	2.79	20.25	1.52
2.333	1.02	8.333	2.79	14.333	2.79	20.33	1.52
2.417	1.02	8.417	2.79	14.417	2.79	20.42	1.52
2.500	1.02	8.500	2.79	14.500	2.79	20.50	1.52
2.583	1.02	8.583	2.79	14.583	2.79	20.58	1.52
2.667	1.02	8.667	2.79	14.667	2.79	20.67	1.52
2.750	1.02	8.750	2.79	14.750	2.79	20.75	1.52
2.833	1.02	8.833	2.79	14.833	2.79	20.83	1.52
2.917	1.02	8.917	2.79	14.917	2.79	20.92	1.52
3.000	1.02	9.000	2.79	15.000	2.79	21.00	1.52
3.083	1.02	9.083	2.79	15.083	2.79	21.08	1.02
3.167	1.02	9.167	2.79	15.167	2.79	21.17	1.02
3.250	1.02	9.250	2.79	15.250	2.79	21.25	1.02
3.333	1.02	9.333	2.79	15.333	2.79	21.33	1.02
3.417	1.02	9.417	2.79	15.417	2.79	21.42	1.02
3.500	1.02	9.500	2.79	15.500	2.79	21.50	1.02
3.583	1.02	9.583	2.79	15.583	2.79	21.58	1.02
3.667	1.02	9.667	2.79	15.667	2.79	21.67	1.02
3.750	1.02	9.750	2.79	15.750	2.79	21.75	1.02
3.833	1.02	9.833	2.79	15.833	2.79	21.83	1.02
3.917	1.02	9.917	2.79	15.917	2.79	21.92	1.02
4.000	1.02	10.000	2.79	16.000	2.79	22.00	1.02
4.083	2.03	10.083	5.08	16.083	2.03	22.08	1.02
4.167	2.03	10.167	5.08	16.167	2.03	22.17	1.02
4.250	2.03	10.250	5.08	16.250	2.03	22.25	1.02
4.333	2.03	10.333	5.08	16.333	2.03	22.33	1.02
4.417	2.03	10.417	5.08	16.417	2.03	22.42	1.02
4.500	2.03	10.500	5.08	16.500	2.03	22.50	1.02
4.583	2.03	10.583	5.08	16.583	2.03	22.58	1.02
4.667	2.03	10.667	5.08	16.667	2.03	22.67	1.02
4.750	2.03	10.750	5.08	16.750	2.03	22.75	1.02
4.833	2.03	10.833	5.08	16.833	2.03	22.83	1.02
4.917	2.03	10.917	5.08	16.917	2.03	22.92	1.02
5.000	2.03	11.000	5.08	17.000	2.03	23.00	1.02
5.083	2.03	11.083	7.11	17.083	2.03	23.08	1.02
5.167	2.03	11.167	7.11	17.167	2.03	23.17	1.02
5.250	2.03	11.250	9.09	17.250	2.03	23.25	1.02
5.333	2.03	11.333	10.41	17.333	2.03	23.33	1.02
5.417	2.03	11.417	13.00	17.417	2.03	23.42	1.02
5.500	2.03	11.500	23.37	17.500	2.03	23.50	1.02
5.583	2.03	11.583	23.37	17.583	2.03	23.58	1.02
5.667	2.03	11.667	45.92	17.667	2.03	23.67	1.02
5.750	2.03	11.750	51.56	17.750	2.03	23.75	1.02
5.833	2.03	11.833	73.91	17.833	2.03	23.83	1.02
5.917	2.03	11.917	107.44	17.917	2.03	23.92	1.02
6.000	2.03	12.000	107.44	18.000	2.03	24.00	1.02

Max.Eff.Inten.(mm/hr)=	107.44		66.26
over (min)	5.00		15.00
Storage Coeff. (min)=	1.96	(ii)	10.28 (ii)
Unit Hyd. Tpeak (min)=	5.00		15.00

Unit Hyd. peak (cms)=	.31	.09		
			TOTALS	
PEAK FLOW (cms)=	.14	.03	.160 (iii)	
TIME TO PEAK (hrs)=	12.00	12.08	12.00	
RUNOFF VOLUME (mm)=	94.96	49.81	80.50	
TOTAL RAINFALL (mm)=	95.96	95.96	95.96	
RUNOFF COEFFICIENT =	.99	.52	.84	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0007)
ID= 1 DT= 5.0 min

Area (ha)= .06
Total Imp(%)= 70.00 Dir. Conn.(%)= 70.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=		.04	.02	
Dep. Storage (mm)=		1.00	1.50	
Average Slope (%)=		1.00	2.00	
Length (m)=		20.70	40.00	
Mannings n =		.013	.250	
Max.Eff.Inten.(mm/hr)=		107.44	66.26	
over (min)		5.00	10.00	
Storage Coeff. (min)=		.96 (ii)	5.85 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		.34	.15	
			TOTALS	
PEAK FLOW (cms)=		.01	.00	.016 (iii)
TIME TO PEAK (hrs)=		12.00	12.00	12.00
RUNOFF VOLUME (mm)=		94.96	49.81	81.39
TOTAL RAINFALL (mm)=		95.96	95.96	95.96
RUNOFF COEFFICIENT =		.99	.52	.85

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0008)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	.68	.160	12.00	80.50
+ ID2= 2 (0007):	.06	.016	12.00	81.39
ID = 3 (0008):	.74	.177	12.00	80.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 6 **
****

READ STORM
Ptotal=108.06 mm

Filename: C:\Working Files\POND DESIGN\SCS Storms\S0502412.stm
Comments: FIFTY YR SCS STORM 12 MIN TIME STEP 24 H

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.20	1.10	6.20	2.20	12.20	22.04	18.20	2.20
.40	1.10	6.40	2.20	12.40	13.78	18.40	2.20
.60	1.10	6.60	2.20	12.60	9.92	18.60	2.20
.80	1.10	6.80	2.20	12.80	9.37	18.80	2.20
1.00	1.10	7.00	2.20	13.00	6.61	19.00	2.20
1.20	1.10	7.20	2.20	13.20	5.51	19.20	1.65
1.40	1.10	7.40	2.20	13.40	5.51	19.40	1.65
1.60	1.10	7.60	2.20	13.60	5.51	19.60	1.65
1.80	1.10	7.80	2.20	13.80	5.51	19.80	1.65
2.00	1.10	8.00	2.20	14.00	5.51	20.00	1.65
2.20	1.10	8.20	3.31	14.20	3.31	20.20	1.65
2.40	1.10	8.40	3.31	14.40	3.31	20.40	1.65
2.60	1.10	8.60	3.31	14.60	3.31	20.60	1.65
2.80	1.10	8.80	3.31	14.80	3.31	20.80	1.65
3.00	1.10	9.00	3.31	15.00	3.31	21.00	1.65
3.20	1.10	9.20	3.31	15.20	3.31	21.20	1.10
3.40	1.10	9.40	3.31	15.40	3.31	21.40	1.10
3.60	1.10	9.60	3.31	15.60	3.31	21.60	1.10
3.80	1.10	9.80	3.31	15.80	3.31	21.80	1.10
4.00	1.10	10.00	3.31	16.00	3.31	22.00	1.10
4.20	2.20	10.20	6.05	16.20	2.20	22.20	1.10
4.40	2.20	10.40	6.05	16.40	2.20	22.40	1.10
4.60	2.20	10.60	6.05	16.60	2.20	22.60	1.10
4.80	2.20	10.80	6.05	16.80	2.20	22.80	1.10
5.00	2.20	11.00	6.05	17.00	2.20	23.00	1.10
5.20	2.20	11.20	8.26	17.20	2.20	23.20	1.10
5.40	2.20	11.40	12.12	17.40	2.20	23.40	1.10
5.60	2.20	11.60	27.55	17.60	2.20	23.60	1.10
5.80	2.20	11.80	60.61	17.80	2.20	23.80	1.10
6.00	2.20	12.00	114.06	18.00	2.20	24.00	1.10

CALIB					
STANDHYD (0001)	Area (ha)= .68				
ID= 1 DT= 5.0 min	Total Imp(%)= 68.00		Dir. Conn.(%)= 68.00		

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.46	.22
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	67.30	40.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	1.10	6.083	2.20	12.083	22.05	18.08	2.20
.167	1.10	6.167	2.20	12.167	22.04	18.17	2.20
.250	1.10	6.250	2.20	12.250	17.09	18.25	2.20
.333	1.10	6.333	2.20	12.333	13.78	18.33	2.20
.417	1.10	6.417	2.20	12.417	13.01	18.42	2.20
.500	1.10	6.500	2.20	12.500	9.92	18.50	2.20
.583	1.10	6.583	2.20	12.583	9.92	18.58	2.20
.667	1.10	6.667	2.20	12.667	9.48	18.67	2.20
.750	1.10	6.750	2.20	12.750	9.37	18.75	2.20
.833	1.10	6.833	2.20	12.833	8.27	18.83	2.20
.917	1.10	6.917	2.20	12.917	6.61	18.92	2.20
1.000	1.10	7.000	2.20	13.000	6.61	19.00	2.20
1.083	1.10	7.083	2.20	13.083	5.51	19.08	1.65
1.167	1.10	7.167	2.20	13.167	5.51	19.17	1.65
1.250	1.10	7.250	2.20	13.250	5.51	19.25	1.65
1.333	1.10	7.333	2.20	13.333	5.51	19.33	1.65
1.417	1.10	7.417	2.20	13.417	5.51	19.42	1.65
1.500	1.10	7.500	2.20	13.500	5.51	19.50	1.65
1.583	1.10	7.583	2.20	13.583	5.51	19.58	1.65
1.667	1.10	7.667	2.20	13.667	5.51	19.67	1.65
1.750	1.10	7.750	2.20	13.750	5.51	19.75	1.65
1.833	1.10	7.833	2.20	13.833	5.51	19.83	1.65
1.917	1.10	7.917	2.20	13.917	5.51	19.92	1.65
2.000	1.10	8.000	2.20	14.000	5.51	20.00	1.65
2.083	1.10	8.083	3.31	14.083	3.31	20.08	1.65
2.167	1.10	8.167	3.31	14.167	3.31	20.17	1.65
2.250	1.10	8.250	3.31	14.250	3.31	20.25	1.65
2.333	1.10	8.333	3.31	14.333	3.31	20.33	1.65
2.417	1.10	8.417	3.31	14.417	3.31	20.42	1.65
2.500	1.10	8.500	3.31	14.500	3.31	20.50	1.65
2.583	1.10	8.583	3.31	14.583	3.31	20.58	1.65
2.667	1.10	8.667	3.31	14.667	3.31	20.67	1.65
2.750	1.10	8.750	3.31	14.750	3.31	20.75	1.65
2.833	1.10	8.833	3.31	14.833	3.31	20.83	1.65
2.917	1.10	8.917	3.31	14.917	3.31	20.92	1.65
3.000	1.10	9.000	3.31	15.000	3.31	21.00	1.65
3.083	1.10	9.083	3.31	15.083	3.31	21.08	1.10
3.167	1.10	9.167	3.31	15.167	3.31	21.17	1.10
3.250	1.10	9.250	3.31	15.250	3.31	21.25	1.10
3.333	1.10	9.333	3.31	15.333	3.31	21.33	1.10
3.417	1.10	9.417	3.31	15.417	3.31	21.42	1.10
3.500	1.10	9.500	3.31	15.500	3.31	21.50	1.10
3.583	1.10	9.583	3.31	15.583	3.31	21.58	1.10
3.667	1.10	9.667	3.31	15.667	3.31	21.67	1.10
3.750	1.10	9.750	3.31	15.750	3.31	21.75	1.10
3.833	1.10	9.833	3.31	15.833	3.31	21.83	1.10
3.917	1.10	9.917	3.31	15.917	3.31	21.92	1.10
4.000	1.10	10.000	3.31	16.000	3.31	22.00	1.10
4.083	2.20	10.083	6.05	16.083	2.20	22.08	1.10
4.167	2.20	10.167	6.05	16.167	2.20	22.17	1.10
4.250	2.20	10.250	6.05	16.250	2.20	22.25	1.10
4.333	2.20	10.333	6.05	16.333	2.20	22.33	1.10
4.417	2.20	10.417	6.05	16.417	2.20	22.42	1.10
4.500	2.20	10.500	6.05	16.500	2.20	22.50	1.10
4.583	2.20	10.583	6.05	16.583	2.20	22.58	1.10
4.667	2.20	10.667	6.05	16.667	2.20	22.67	1.10
4.750	2.20	10.750	6.05	16.750	2.20	22.75	1.10
4.833	2.20	10.833	6.05	16.833	2.20	22.83	1.10
4.917	2.20	10.917	6.05	16.917	2.20	22.92	1.10
5.000	2.20	11.000	6.05	17.000	2.20	23.00	1.10
5.083	2.20	11.083	8.26	17.083	2.20	23.08	1.10
5.167	2.20	11.167	8.26	17.167	2.20	23.17	1.10
5.250	2.20	11.250	10.58	17.250	2.20	23.25	1.10
5.333	2.20	11.333	12.12	17.333	2.20	23.33	1.10
5.417	2.20	11.417	15.20	17.417	2.20	23.42	1.10
5.500	2.20	11.500	27.55	17.500	2.20	23.50	1.10
5.583	2.20	11.583	27.55	17.583	2.20	23.58	1.10
5.667	2.20	11.667	53.99	17.667	2.20	23.67	1.10
5.750	2.20	11.750	60.61	17.750	2.20	23.75	1.10
5.833	2.20	11.833	81.98	17.833	2.20	23.83	1.10
5.917	2.20	11.917	114.06	17.917	2.20	23.92	1.10
6.000	2.20	12.000	114.06	18.000	2.20	24.00	1.10

Max.Eff.Inten.(mm/hr)=		114.06	74.48	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.91 (ii)	6.86 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		.31	.14	
				TOTALS
PEAK FLOW	(cms)=	.15	.04	.182 (iii)
TIME TO PEAK	(hrs)=	12.00	12.00	12.00
RUNOFF VOLUME	(mm)=	107.06	59.38	91.80
TOTAL RAINFALL	(mm)=	108.06	108.06	108.06
RUNOFF COEFFICIENT	=	.99	.55	.85

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

```
      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  75.0     Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| STANDHYD  (0007) |   Area    (ha)=    .06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
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                          IMPERVIOUS     PERVIOUS (i)
    Surface Area     (ha)=       .04          .02
    Dep. Storage     (mm)=      1.00         1.50
    Average Slope     (%)=      1.00         2.00
    Length            (m)=     20.70        40.00
    Mannings n            =      .013         .250

    Max.Eff.Inten.(mm/hr)=    114.06        74.48
              over (min)         5.00        10.00
    Storage Coeff.  (min)=       .94 (ii)     5.71 (ii)
    Unit Hyd. Tpeak (min)=      5.00        10.00
    Unit Hyd. peak  (cms)=       .34          .15
                                                      *TOTALS*
    PEAK FLOW        (cms)=      .01          .00          .018 (iii)
    TIME TO PEAK     (hrs)=    12.00        12.00        12.00
    RUNOFF VOLUME     (mm)=   107.06        59.38        92.73
    TOTAL RAINFALL    (mm)=   108.06       108.06       108.06
    RUNOFF COEFFICIENT    =      .99          .55          .86

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  75.0     Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD   (0008) |
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
        ID1= 1 (0001):        .68      .182     12.00     91.80
      + ID2= 2 (0007):        .06      .018     12.00     92.73
        ==========================================================
        ID = 3 (0008):        .74      .200     12.00     91.88

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:   7 **
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|    READ STORM    |    Filename: C:\Working Files\POND DESIGN\
|                  |              SCS Storms\S1002412.stm
| Ptotal=112.42 mm |    Comments: SCS TYPE II TWENTY FOUR HOUR, HUNDRED YE
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.20	1.27	6.20	2.29	12.20	21.84	18.20	2.29
.40	1.27	6.40	2.29	12.40	13.72	18.40	2.29
.60	1.27	6.60	2.29	12.60	9.91	18.60	2.29
.80	1.27	6.80	2.29	12.80	9.40	18.80	2.29
1.00	1.27	7.00	2.29	13.00	6.60	19.00	2.29
1.20	1.27	7.20	2.29	13.20	5.59	19.20	1.78
1.40	1.27	7.40	2.29	13.40	5.59	19.40	1.78
1.60	1.27	7.60	2.29	13.60	5.59	19.60	1.78
1.80	1.27	7.80	2.29	13.80	5.59	19.80	1.78
2.00	1.27	8.00	2.29	14.00	5.59	20.00	1.78
2.20	1.27	8.20	3.30	14.20	3.30	20.20	1.78
2.40	1.27	8.40	3.30	14.40	3.30	20.40	1.78
2.60	1.27	8.60	3.30	14.60	3.30	20.60	1.78
2.80	1.27	8.80	3.30	14.80	3.30	20.80	1.78
3.00	1.27	9.00	3.30	15.00	3.30	21.00	1.78
3.20	1.27	9.20	3.30	15.20	3.30	21.20	1.27
3.40	1.27	9.40	3.30	15.40	3.30	21.40	1.27
3.60	1.27	9.60	3.30	15.60	3.30	21.60	1.27
3.80	1.27	9.80	3.30	15.80	3.30	21.80	1.27
4.00	1.27	10.00	3.30	16.00	3.30	22.00	1.27
4.20	2.29	10.20	6.10	16.20	2.29	22.20	1.27
4.40	2.29	10.40	6.10	16.40	2.29	22.40	1.27
4.60	2.29	10.60	6.10	16.60	2.29	22.60	1.27
4.80	2.29	10.80	6.10	16.80	2.29	22.80	1.27
5.00	2.29	11.00	6.10	17.00	2.29	23.00	1.27
5.20	2.29	11.20	8.13	17.20	2.29	23.20	1.27
5.40	2.29	11.40	11.94	17.40	2.29	23.40	1.27
5.60	2.29	11.60	27.43	17.60	2.29	23.60	1.27
5.80	2.29	11.80	59.94	17.80	2.29	23.80	1.27
6.00	2.29	12.00	126.49	18.00	2.29	24.00	1.27

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| CALIB            |
| STANDHYD  (0001) |   Area    (ha)=    .68
|ID= 1 DT= 5.0 min |   Total Imp(%)=  68.00   Dir. Conn.(%)=  68.00
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                          IMPERVIOUS     PERVIOUS (i)
    Surface Area     (ha)=       .46          .22
```

Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	67.30	40.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	1.27	6.083	2.29	12.083	21.86	18.08	2.29
.167	1.27	6.167	2.29	12.167	21.84	18.17	2.29
.250	1.27	6.250	2.29	12.250	16.97	18.25	2.29
.333	1.27	6.333	2.29	12.333	13.72	18.33	2.29
.417	1.27	6.417	2.29	12.417	12.95	18.42	2.29
.500	1.27	6.500	2.29	12.500	9.91	18.50	2.29
.583	1.27	6.583	2.29	12.583	9.91	18.58	2.29
.667	1.27	6.667	2.29	12.667	9.50	18.67	2.29
.750	1.27	6.750	2.29	12.750	9.40	18.75	2.29
.833	1.27	6.833	2.29	12.833	8.28	18.83	2.29
.917	1.27	6.917	2.29	12.917	6.60	18.92	2.29
1.000	1.27	7.000	2.29	13.000	6.60	19.00	2.29
1.083	1.27	7.083	2.29	13.083	5.59	19.08	1.78
1.167	1.27	7.167	2.29	13.167	5.59	19.17	1.78
1.250	1.27	7.250	2.29	13.250	5.59	19.25	1.78
1.333	1.27	7.333	2.29	13.333	5.59	19.33	1.78
1.417	1.27	7.417	2.29	13.417	5.59	19.42	1.78
1.500	1.27	7.500	2.29	13.500	5.59	19.50	1.78
1.583	1.27	7.583	2.29	13.583	5.59	19.58	1.78
1.667	1.27	7.667	2.29	13.667	5.59	19.67	1.78
1.750	1.27	7.750	2.29	13.750	5.59	19.75	1.78
1.833	1.27	7.833	2.29	13.833	5.59	19.83	1.78
1.917	1.27	7.917	2.29	13.917	5.59	19.92	1.78
2.000	1.27	8.000	2.29	14.000	5.59	20.00	1.78
2.083	1.27	8.083	3.30	14.083	3.30	20.08	1.78
2.167	1.27	8.167	3.30	14.167	3.30	20.17	1.78
2.250	1.27	8.250	3.30	14.250	3.30	20.25	1.78
2.333	1.27	8.333	3.30	14.333	3.30	20.33	1.78
2.417	1.27	8.417	3.30	14.417	3.30	20.42	1.78
2.500	1.27	8.500	3.30	14.500	3.30	20.50	1.78
2.583	1.27	8.583	3.30	14.583	3.30	20.58	1.78
2.667	1.27	8.667	3.30	14.667	3.30	20.67	1.78
2.750	1.27	8.750	3.30	14.750	3.30	20.75	1.78
2.833	1.27	8.833	3.30	14.833	3.30	20.83	1.78
2.917	1.27	8.917	3.30	14.917	3.30	20.92	1.78
3.000	1.27	9.000	3.30	15.000	3.30	21.00	1.78
3.083	1.27	9.083	3.30	15.083	3.30	21.08	1.27
3.167	1.27	9.167	3.30	15.167	3.30	21.17	1.27
3.250	1.27	9.250	3.30	15.250	3.30	21.25	1.27
3.333	1.27	9.333	3.30	15.333	3.30	21.33	1.27
3.417	1.27	9.417	3.30	15.417	3.30	21.42	1.27
3.500	1.27	9.500	3.30	15.500	3.30	21.50	1.27
3.583	1.27	9.583	3.30	15.583	3.30	21.58	1.27
3.667	1.27	9.667	3.30	15.667	3.30	21.67	1.27
3.750	1.27	9.750	3.30	15.750	3.30	21.75	1.27
3.833	1.27	9.833	3.30	15.833	3.30	21.83	1.27
3.917	1.27	9.917	3.30	15.917	3.30	21.92	1.27
4.000	1.27	10.000	3.30	16.000	3.30	22.00	1.27
4.083	2.29	10.083	6.10	16.083	2.29	22.08	1.27
4.167	2.29	10.167	6.10	16.167	2.29	22.17	1.27
4.250	2.29	10.250	6.10	16.250	2.29	22.25	1.27
4.333	2.29	10.333	6.10	16.333	2.29	22.33	1.27
4.417	2.29	10.417	6.10	16.417	2.29	22.42	1.27
4.500	2.29	10.500	6.10	16.500	2.29	22.50	1.27
4.583	2.29	10.583	6.10	16.583	2.29	22.58	1.27
4.667	2.29	10.667	6.10	16.667	2.29	22.67	1.27
4.750	2.29	10.750	6.10	16.750	2.29	22.75	1.27
4.833	2.29	10.833	6.10	16.833	2.29	22.83	1.27
4.917	2.29	10.917	6.10	16.917	2.29	22.92	1.27
5.000	2.29	11.000	6.10	17.000	2.29	23.00	1.27
5.083	2.29	11.083	8.13	17.083	2.29	23.08	1.27
5.167	2.29	11.167	8.13	17.167	2.29	23.17	1.27
5.250	2.29	11.250	10.41	17.250	2.29	23.25	1.27
5.333	2.29	11.333	11.94	17.333	2.29	23.33	1.27
5.417	2.29	11.417	15.04	17.417	2.29	23.42	1.27
5.500	2.29	11.500	27.43	17.500	2.29	23.50	1.27
5.583	2.29	11.583	27.43	17.583	2.29	23.58	1.27
5.667	2.29	11.667	53.44	17.667	2.29	23.67	1.27
5.750	2.29	11.750	59.94	17.750	2.29	23.75	1.27
5.833	2.29	11.833	86.56	17.833	2.29	23.83	1.27
5.917	2.29	11.917	126.49	17.917	2.29	23.92	1.27
6.000	2.29	12.000	126.49	18.000	2.29	24.00	1.27

Max.Eff.Inten.(mm/hr)=		126.49	83.93	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.83 (ii)	6.59 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		.32	.14	
				TOTALS
PEAK FLOW	(cms)=	.16	.04	.203 (iii)
TIME TO PEAK	(hrs)=	12.00	12.00	12.00
RUNOFF VOLUME	(mm)=	111.42	62.90	95.89
TOTAL RAINFALL	(mm)=	112.42	112.42	112.42
RUNOFF COEFFICIENT	=	.99	.56	.85

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 75.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB                |
| STANDHYD  (0007)     |   Area    (ha)=    .06
|ID= 1 DT= 5.0 min     |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
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                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .04           .02
     Dep. Storage     (mm)=       1.00          1.50
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      20.70         40.00
     Mannings n           =       .013          .250

     Max.Eff.Inten.(mm/hr)=     126.49         83.93
               over (min)          5.00         10.00
     Storage Coeff.  (min)=        .90 (ii)     5.48 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=        .34           .16
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .02           .00          .019 (iii)
     TIME TO PEAK    (hrs)=      12.00         12.00        12.00
     RUNOFF VOLUME    (mm)=     111.42         62.90        96.83
     TOTAL RAINFALL   (mm)=     112.42        112.42       112.42
     RUNOFF COEFFICIENT   =        .99           .56          .86

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  75.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| ADD HYD   (0008) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
         ID1= 1 (0001):        .68     .203    12.00     95.89
       + ID2= 2 (0007):        .06     .019    12.00     96.83
         ==========================================================
         ID = 3 (0008):        .74     .222    12.00     95.97

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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 FINISH
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