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Major Drainage and Stormwater Management Report

Colonel Talbot Road Development Area

January 2024

SIGN OFF SHEET

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1.0 Introduction

Stantec was retained by W3 Farms and Sifton Properties to prepare this major drainage, flow routing assessment and stormwater management report in support of their proposed subdivisions located on Colonel Talbot Road in the City of London. This report identifies a preliminary drainage strategy for the proposed developments that is consistent with the goals and recommendations of the 2020 Dingman Creek Subwatershed: Stormwater Servicing Strategy, Schedule C Municipal Class Environmental Assessment (Dingman SWM EA), provides guidance for preparation of the corresponding Draft Plans, and provides recommendations for the functional stormwater management (SWM) design.

This report presents a preliminary channel corridor design for the proposed subdivisions and informs the dimensions of that channel. The proposed channel corridor is designed to:

- Safely convey the uncontrolled post-development stormwater from the proposed developments and external tributary area;
- Provide surface water to maintain proposed naturalized features; and
- Act as an amenity within the proposed subdivisions, providing both active and passive recreation opportunities to future residents.

1.1 Background Information

The following background information was reviewed to assist in the preparation of this assessment:

Talbot Village Subdivision Phase 2 Stormwater Management Functional Design Report, prepared by IBI Group, January 2010.

The existing Talbot Village Subdivision is located north of the subject properties. The report provides information regarding the upstream drainage area that contributes runoff to the subject sites.

Silverleaf Subdivision Drainage Servicing Report, prepared by Stantec, December 2016.

The Silverleaf Subdivision is located west of the subject sites. The drainage servicing strategy presented in this report accommodates minor flows from a portion of the proposed Sifton development.

Colonel Talbot Road Subdivision Drainage Servicing Report, prepared by Stantec, December 2016.

Auburn Development's Colonel Talbot Road Subdivision is located south of the subject sites. The drainage servicing strategy presented in this report accommodates stormwater from a portion of the proposed W3 Farms Subdivision.

Dingman Creek Modeling Report, prepared by Aquafor Beech, November 2017.

This report provides a brief summary of the hydrologic modelling completed in support of the ongoing Dingman Creek SWM EA.

Dingman Creek Subwatershed; Stormwater Servicing Study, prepared by Aquafor Beech, September 2020.

This report provides a comprehensive high-level stormwater servicing strategy for the subject tributary among others.

2.0 Pre-Development Conditions

The W3 Farms and Sifton properties are located in the Tributary B drainage area of the Dingman Creek watershed in the southwest portion of the City of London. Most of the runoff from these lands is conveyed to Dingman Creek by Tributary 12.

Tributary 12 carries agricultural runoff to Dingman Creek. Recent aerial photography shows that significant reaches of the tributary upstream of Colonel Talbot Road have been enclosed. The remaining open channel portions have been straightened. Stream flows are ephemeral with no significant baseflow due to the relatively small contributing drainage area.

A pre-development conditions hydrologic analysis was created to establish design target discharges from the proposed W3 Farms and Sifton Developments. A hydrologic model was developed using SWMHYMO to calculate the peak discharges in Dingman Creek Tributary 12. A brief summary of the model inputs, assumptions, and results is presented below.

2.1 Drainage Catchments

The pre-development condition drainage boundaries were delineated based on the available City of London topographic mapping, the drainage delineation previously developed for the neighboring Auburn Developments Colonel Talbot Road Subdivision, and the drainage catchments delineated for the Dingman Creek Stormwater Management Environmental Assessment. The catchments were delineated based on the drainage conditions prior to development of the most recent Phase of the North Talbot Subdivision. The pre-development drainage catchments are shown on Drawing 1 and are described briefly below:

Catchment S101 – Runoff from this agricultural catchment travels southward as shallow surface flow to a CSP culvert at Pack Road. This catchment is currently being developed, and while flows will be redirected to the North Talbot Subdivision ponds, it is represented here in its pre-development condition in order to accurately estimate the target discharges in Dingman Creek Tributary 12.

Catchment S102 – This external drainage area is comprised of actively cropped agricultural lands that contribute runoff to the downstream Sifton property. All runoff travels to the tributary as shallow surface flow.

Catchment S103 – This catchment includes the portion of the Sifton property that contributes runoff to Dingman Creek Tributary 12. This catchment is mostly comprised of actively cropped agricultural land, though there is a small woodland patch located in the southeast corner. All runoff travels to the tributary as shallow surface flow.

Catchment S104 – This catchment is comprised of actively cropped agricultural lands and includes the portion of the W3 Farms property that contributes runoff to Dingman Creek Tributary 12. All runoff travels to the tributary as shallow surface flow.

2.2 Soils

The available Middlesex County soils mapping suggest that the soils within the Dingman Creek Tributary 12 drainage area a generally comprised of Teeswater silt loam, Brant silt loam, and Muriel silt loam. Nearby hydrogeological studies suggest that the area is comprised of silty clay/clayey silts.

2.3 Design Storms

The City of London Design Standards and Requirements Manual (DSRM) outlines the AES parameters for a range of Intensity Duration Frequency (IDF) curves for 3-hour Chicago Design Storms. The size of the drainage catchment and proposed development suggests that this distribution is appropriate for use in this assessment. Consequently, these storm distributions were used in the hydrologic calculations completed for this assessment.

2.4 Hydrologic Parameters

Overland flow lengths were estimated for each catchment based on the 2017 LiDAR Digital Terrain Model. Each overland flow route was measured from the local high point to the Dingman Creek tributary alignment. The 85/10 Method was used to calculate representative slopes and account for the variable catchment topography.

SCS Curve Number values were calculated for the existing and proposed catchments as per the MTO Drainage Manual and USDA TR-55. A summary of the values assigned to each catchment is presented in Appendix A.

2.5 Hydrologic Model Results

The calculated pre-development peak discharges at key locations in the Tributary 12 channel reach are summarized in the following table. These key locations are shown on Drawing 1.

Table 1: Calculated Pre-Development Peak Discharges

Location	Peak Discharge (m^3/s) 2-year	Peak Discharge (m^3/s) 5-year	Peak Discharge (m^3/s) 10-year	Peak Discharge (m^3/s) 25-year	Peak Discharge (m^3/s) 50-year	Peak Discharge (m^3/s) 100-year	Peak Discharge (m^3/s) 250-year
Upstream Sifton Property Limit	1.19	2.13	2.88	3.85	4.60	5.39	6.65
Upstream Sifton North Property Limit	0.39	0.70	0.95	1.27	1.52	1.78	2.19
Upstream Sifton East Property Limit	0.78	1.41	1.90	2.54	3.04	3.56	4.39
Upstream York Property Limit	1.80	3.24	4.38	5.86	7.01	8.21	10.12
Colonel Talbot Road	1.80	3.24	4.38	5.86	7.01	8.21	10.12

3.0 Post-Development Conditions

Map 1 of the London Plan identifies the subject area as “Neighbourhood” place type. Consequently, both the W3 Farms and Sifton properties will be developed as residential subdivisions, and will include single family residential lots, multi-family blocks, park blocks, and SWM blocks. The preliminary stormwater management strategy to control runoff from the future development and supporting hydrologic and hydraulic analyses are described below.

3.1 Stormwater Management Strategy

The Southwest Area Plan Stormwater Management Servicing Report (AECOM, 2010) presents a preliminary SWM strategy for the subject properties that includes two proposed regional SWM facilities (North Lambeth P7 and P8) that provide all necessary stormwater treatment. This concept was intended to accommodate anticipated development phasing, but presents several drawbacks and challenges, including:

- Multiple SWM facilities to operate and maintain;
- Difficulties in developing an efficient strategy to convey the treated flows from P7 to the downstream outlet without interfering with the downstream storm sewers that convey stormwater to P8;
- Difficulties servicing lands in the western portion of the catchment due to relatively low local ground elevations; and
- Conflicts with the Dingman Creek SWM EA preliminary preferred alternative.

The Dingman Creek Subwatershed Stormwater Servicing Strategy (Aquafor Beech, 2020) proposes a “Complete Corridor” for the proposed developments within the Phase 1 study limits that includes both at-source treatment combined with end-of-pipe SWM controls. Consistent with this solution, the preliminary stormwater servicing strategy within the W3 Farms and Sifton developments will include at-source controls to provide water quality treatment, end-of-pipe quantity controls and conveyance provided by a channel corridor.

3.1.1 Proposed Channel Corridor

The proposed channel corridor provides the following opportunities to improve the existing Tributary 12 channel system:

- The undisturbed natural corridor limits are increased from the existing typical widths that range from 0 to 10 m to approximately 30 m;

- Approximately 470 m of tile drain will be removed, resulting in a net increase in aquatic habitat;
- The proposed channel corridor includes a conveyance capacity to accommodate the runoff from the uncontrolled, post-development 250-year storm event as required by the UTRCA; and
- The proposed channel corridor limits are clearly defined to mitigate the possibility of future encroachments.

3.1.2 Quality Control

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

- **Third Pipe System** – Areas of clean runoff such as rear-yards and parkland shall be collected in a separate sewer system, possibly perforated, that would allow runoff not requiring quality treatment to be managed separately from runoff that does require quality treatment. Storm private drain connections (PDC) would also connect to this system. These third pipe systems could outlet to the proposed end-of-pipe facilities or directly to the channel corridor/wetland compensation areas.
- **LID Measures in Boulevards** – The proposed boulevards are graded to provide shallow surface depressions that capture the first flush of runoff and allow it to infiltrate, providing filtration. The proposed depressions are grassed, with shallow slopes to permit mowing. A shallow perforated pipe collects the clean stormwater and conveys it to the local storm sewer. During severe storm events, overflows from the boulevard ponding areas are captured by standard catchbasins located in the roadway. This option would likely prevent planting boulevard street trees were this strategy is implemented, because roots could potentially clog the proposed subdrains. Since both Sifton and W3 Farms are concerned with the reaction of homebuilders and buyers to streetscapes that have a non-standard appearance, this strategy would likely best be implemented in areas with no fronting homes, such as side lots and parks.
- **Storm Sewer Exfiltration System** – Often referred to as the Etobicoke Exfiltration System, a perforated pipe is installed below the proposed local storm sewers and discharges the runoff from small frequent storm events to the granular trench backfill. The stormwater then infiltrates into the surrounding native soils. Pretreatment is provided by catchbasin inserts to improve sediment retention in the catchbasin sumps. These systems are appropriate for locations where the soil permeability is sufficiently high and groundwater elevations are sufficiently low.

Further geotechnical and hydrogeological investigation is necessary to verify that this solution is feasible.

- **Oil/Grit Separators** – Oil/grit separators (OGSs) are provided upstream of each outlet to provide TSS removal. Pretreatment is provided by catchbasin inserts to improve sediment retention in the catchbasin sumps. This option is costly, as at least eight large OGSs will be required to provide the necessary water quality treatment. Furthermore, obtaining an Environmental Compliance Approval for this strategy may prove challenging, as the MECP typically only accepts OGSs as one component of a water quality treatment train. Consequently, OGSs would likely need to be implemented in conjunction with other water quality treatment methods.

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

3.1.3 Quantity Control

Quantity control storage is to be provided within the integrated channel as proposed offline SWM facilities, either wet or dry, to attenuate the post-development peak flows from the proposed W3 Farms and Sifton Subdivisions to the pre-development targets. These facilities would drain directly to the channel corridor at various locations along its length. The volumetric requirements of these facilities are discussed later in this report. Locating and sizing of these facilities would be the next step in the design process.

3.1.4 Culverts

In accordance with City of London design standards for neighborhood streets, the culvert at the single proposed road crossing has been designed to convey the peak calculated discharge from all storm events up to and including the 25-year design event without overtopping. The proposed roadway embankment acts as a weir to control the peak discharges during more severe storm events. The downstream roadway embankment will be adequately armored to mitigate the risk of erosion during design events that result in overtopping. A summary of the anticipated overtopping flows at the proposed road crossing is presented in the following table.

Table 2: Depth of Roadway Overtopping at Proposed Road Crossings

Design Event	Campbell Street Crossing*
Pre-Dev 250-year	0.00 m
UTRCA 50-year	0.03 m
UTRCA 250-year	0.19 m

*Depths taken from HECRAS cross-section 2636.5

The calculation results suggest that the maximum flow depth over the proposed road is less than the maximum allowable City of London standard of 300 mm. Furthermore, the corresponding flow velocities and depths do not present a significant safety hazard during severe storm events.

3.2 Hydrologic Modelling

A post-development conditions hydrologic model was created to assist in the preliminary design of the proposed channel corridor and to evaluate the hydraulic performance.

3.2.1 Catchments

The post-development catchments were delineated based on the available Draft Plan information and the anticipated general site grading. The post-development drainage plan is shown on Drawing 2, and the corresponding catchments are described briefly below:

Catchments 100, 200, 300, 400, 401, 500 and 501– Water quality treatment is provided to the runoff from the proposed Sifton and W3 Farms residential subdivisions by at-source controls. Minor flows are conveyed to the proposed channel corridor by the proposed local storm sewers and third pipe systems. Major flows are conveyed to the proposed SWM facilities as shallow surface flow by the proposed rights-of-way then to the channel corridor.

Catchment 301 – Based on the City of London Official Plan, this external drainage area is anticipated to remain undeveloped. The proposed Sifton subdivision minor and major system provide sufficient capacity to accommodate the peak flows from this catchment and convey them to the proposed channel corridor.

Catchment 302 – At-source SWM controls provide water quality treatment to the runoff from future residential development in this external drainage area. The proposed Sifton subdivision minor and major system provide sufficient capacity to accommodate the peak flows from this catchment and convey them to the proposed channel corridor.

Catchment 402 – In accordance with the drainage servicing strategy previously developed for the Silverleaf Subdivision, minor flows from Phase 1 of the Sifton Subdivision and the neighboring properties on Colonel Talbot Road are conveyed westward to the Silverleaf Subdivision storm sewer. The design peak minor flow rate of 1.2 m^3/s was estimated based on the hydrologic calculations presented in the Silverleaf Subdivision Drainage Servicing Report (Stantec, 2016). Major flows are conveyed southward to the proposed channel corridor.

While this strategy is consistent with previous documentation, we recommend that the minor flows from Catchment S1 be conveyed southward to the proposed channel

corridor. This would eliminate the need for a new storm sewer crossing at Colonel Talbot Road and would provide capacity in the existing North Lambeth Subdivision storm sewer to accommodate proposed development on the west side of Colonel Talbot Road.

Catchment 502 – This catchment consists of a portion of the Phase 1 W3 lands that cannot drain overland to SWMF P9, so major flows from this catchment are being directed to the integrated channel.

Catchments 600, 601 and 602 – These catchments are comprised the integrated channel and retained woodlot. All runoff travels directly to the channel corridor as shallow surface flow.

Catchment EXT1 and EXT2 – All runoff from future development in this external drainage area is treated by upstream SWM controls that provide water quality treatment and attenuate the post-development peak discharges to pre-development magnitudes. The minor and major systems will convey these external flows directly to the proposed channel corridor.

Catchment EXT3 – This catchment consists of properties fronting Colonel Talbot Road that will be contributing to a storm sewer on Colonel Talbot Road that would outlet to the channel corridor. All flows from this area will be controlled on site to come by pipe up to and including the 250-year event.

3.2.2 Hydrologic Parameters

The post-development hydrologic model inputs were developed as follows:

- Percent impervious values were determined assuming a base level imperviousness for single-family residential with additional private controls being assumed to be established on denser blocks;
- Subcatchment flow lengths were measured along the proposed rights-of-way; and
- An average surface slope of 1% was assumed for new development in all post-development catchments.

A summary of the post development hydrologic parameters assigned to each catchment is presented in Appendix A.

3.2.3 Hydrologic Model Results

A comparison of calculated pre-development and the uncontrolled post-development peak discharges at the Colonel Talbot Road culvert is provided in the following table. This table reports model results are compared to the design flows that the UTRCA calculated for the tributary assuming full development and no SWM controls.

Table 3 Calculated Peak Discharges at Colonel Talbot Road

Design Event	3hr Chicago Model Pre-Development Peak Flow (m^3/s)	3hr Chicago Model Controlled Post-Development Peak Flow (m^3/s)	UTRCA HECRAS Uncontrolled Post-Development Peak Flow (m^3/s)
2-year	1.80	1.44	4.9
5-year	3.24	2.46	8.2
10-year	4.38	3.44	11.1
25-year	5.86	4.64	n/a
50-year	7.01	5.55	17.9
100-year	8.21	6.49	21.6
250-year	10.12	7.98	26.0

Model input and output files are available in Appendix A.

3.3 Hydraulic Modelling

A hydraulic surface water model was created to calculate the Tributary 12 post-development condition various water surface elevations within the proposed channel corridor and to verify that the uncontrolled 250-year storm event flows are contained within. The model was created using the US Army Corps of Engineers HEC-RAS program, and the corresponding model development and results are described below.

3.3.1 Model Development

A topographic survey of the Tributary 12 channel and floodplain was completed from the Dingman Creek confluence to Colonel Talbot Road to develop cross sections for the downstream channel reach. Proposed typical sections were used to represent the channel corridor from Colonel Talbot Road to the Natural heritage woodlot on the Sifton Subdivision property. The model cross section locations were selected to provide an accurate hydraulic representation of the channel and floodplain geometry. Cross sections are positioned at all existing and proposed culverts to accurately estimate the corresponding hydraulic losses. The cross-sections themselves have upper limits guaranteed to contain the flows and do not necessarily represent proposed grades as flood elevation was the primary concern of the model.

Manning's equation hydraulic roughness values were assigned to the existing channel reach downstream of Colonel Talbot Road based on the observed site conditions. The cross sections that represent the proposed channel corridor were assigned low flow

channel roughness values of 0.04 and floodplain roughness values of 0.08, which should provide a reasonable representation of the friction losses in the proposed channel reach based on the likely naturalized channel conditions under proposed conditions.

Normal depth was assumed at the downstream boundary of the hydraulic model. Given the relatively steep longitudinal channel and floodplain slopes from the downstream model boundary to Colonel Talbot Road, any error associated with this boundary condition assumption will not affect the calculation results within the proposed channel corridor limits.

Nine flow regime profiles were run as part of this hydraulic model so the water surface elevation in each scenario is known. The 2-year to 250-year predevelopment flows were modelled to show the expected flood levels with appropriate SWM controls in place. The UTRCA's 50 and 250-year flows were evaluated to determine adequate capacity within the channel corridor.

The existing culvert at Colonel Talbot Road is a substantial hydraulic restriction on the channel system and has a considerable backwater effect. Any future improvements to this culvert should be incorporated during future design to mitigate this backwater effect. Current work is being undertaken by the City of London to improve downstream conditions in Tributary 12, including redesigning the culvert under Colonel Talbot Road. While the new culvert dimensions are known, the downstream cross-sections have changed with this design and will also need to be incorporated into the model.

3.3.2 Proposed Conditions Hydraulic Model Results

The proposed channel corridor is shown on Drawings 3 and 4, and the corresponding model output is presented in Appendix B. As shown on Drawings 3 and 4, the 250-year floodplain is contained within the proposed channel corridor limits. Furthermore, approximately 0.3 m of freeboard is provided from the peak 250-year calculated water surface elevation to the top of the proposed channel section.

3.3.3 Channel Width Discussion

The channel width within the integrated channel proposed by this report is 30 m. This channel width is sufficient to accommodate the conveyance requirements of the uncontrolled 250-year storm with a 0.3 m freeboard.

The Fluvial Geomorphology and Meander Belt Assessment, Dingman Creek Tributary B1 (Stantec, Nov 2019), contained in Appendix C, concluded that the meander belt associated with upper portions of this tributary was 19.9 m (reach 1 in the report) and the lower portions of this tributary were 28.0 m (reaches 2, 3 and 4 in the report). The report acknowledged that these meander belt widths assumed the maximum meander

of the watercourse without restraint and that the detailed design of the works will likely include measures that will limit the meander to a lesser width.

3.4 SWM Facility Volumetric Requirements

A SWMHYMO model was developed to determine the volume requirements for SWM facilities to be located along the integrated channel. The model was run for the 3-hour Chicago Storm events to determine target release rates and facility volumes based on a staged control release targeting the 2-year and 100-year storms. The total target release rates were divided between SWMF catchments based on the contributing area as a percentage of the total post-development area.

3.4.1 Proposed Facilities

Seven (7) total facilities are proposed, and their catchment areas are described below.

External Pond – This pond is to service the lands external to the Sifton and York properties upstream of the integrated channel. They consist of drainage areas EXT1 and EXT2. It will likely be further divided to serve the needs of the future developer.

Pond 1 – This pond services drainage area 100 and would best perform as a dry facility given the small catchment area. This facility would be located on Sifton lands.

Pond 2 – This pond services drainage area 200, servicing W3 lands. This facility would best perform as a dry facility. This facility would be located on W3 lands.

Pond 3 – This pond services drainage areas 300, 301 and 302, servicing primarily Sifton and external lands, although likely located in W3. This facility would best perform as a dry facility.

Pond 4 – This pond services drainage areas 400, 401 and 402, servicing both Sifton and W3 lands, although located on W3 lands. This facility would best perform as a dry facility.

Pond 5 – This pond services drainage areas 500, 501 and 502, servicing W3 and external lands, located on W3 lands. This facility would best perform as a dry facility.

External 3 Controls – This facility is to service the lands external to the Sifton and York properties south of the integrated channel. It consists of drainage area EXT3. It will likely be further divided to serve the needs of the future developers. This area will drain by sewer with no overland flow outlet.

3.4.2 Modelling Results

Using the above catchments, the SWMF sizes were conservatively found to be as described in the following table. Model files can be found in Appendix A.

Table 4: SWMF Release Rates and Sizes

	Contributing Area (ha)	2-Year Allowable Release Rate (m^3/s)	100-Year Allowable Release Rate (m^3/s)	Storage Volume with Freeboard (m^3)
External Pond	32.7	0.53	2.42	14400
Pond 1	4.1	0.07	0.30	2400
Pond 2	7.5	0.12	0.56	3600
Pond 3	18.9	0.31	1.40	7000
Pond 4	18.9	0.31	1.40	8400
Pond 5	11.5	0.19	0.85	6000
EXT3	9.2	0.15	-	5000

The release rates shown above are the calculated total allowable release rate for that facility based on meeting existing rate targets. These rates were used in the model's stage-storage curves to then determine a volume to control the 100-year event. These volumes were then expanded on to account for containing the 250-year event and providing 0.3m of freeboard.

3.5 Wetland Compensation Areas

Both the proposed W3 Farms and Sifton subdivisions include wetland compensation areas to replace areas that are to be developed. Though their locations have not yet been finalized, the proposed features will be integrated into the proposed channel corridor to receive sufficient surface runoff to sustain their function.

3.6 Natural heritage Woodlot

The woodlot on the western edge of the Sifton property provides a challenge in conveying the 250-year uncontrolled flow. Further discussion with the City and UTRCA is required to determine the best way forward in incorporating the woodlot and the watercourse it contains into the integrated channel design.

4.0 Fluvial Geomorphological Assessment

A fluvial geomorphological and meander belt assessment was completed for Tributary 12 to:

- Characterize the existing channel;
- Estimate the existing channel meander belt width; and
- Verify that the proposed channel corridor is sufficiently wide to accommodate a stable low flow swale design.

The corresponding assessment is presented in Appendix C and is briefly summarized, as follows:

1. A site visit was completed on November 1, 2019 to review and document the existing channel conditions. The results of the site visit suggest that significant portions of the tributary have been enclosed in drainage tile and the remaining open channel portions have been straightened.
2. Since Tributary 12 has been significantly altered by channel straightening and enclosures, empirical equations were used to estimate the maximum meander belt width. The results of the empirical analysis suggest that the maximum meander belt width of the existing channel is approximately 28 m. Note that this is a theoretical value for an unconfined natural channel allowed to fully mature under the existing flow conditions flow regime. As such, it is simply an indication of the long-term channel migration that could occur in the absence of intervention and land use changes and is not a rigid target that must be adhered to in future design. A stable confined channel with a narrower meander belt width can be designed to convey safely convey the post-development flows.
3. Based on the meander belt assessment results, the proposed channel corridor width of 30 m is sufficient to accommodate a stable low flow swale design. The proposed design will incorporate erosion mitigation measures that will limit lateral movement of the proposed low flow swale.

The channel corridor includes design measures to limit the post-development meander belt width to confine the proposed channel movement and mitigate the possibility of side slope erosion. As seen in the HECRAS cross-sections, the channel corridor cross section incorporates the following design elements to mitigate the risk of channel erosion and to support the natural function of the Tributary 12:

- A low flow swale conveys discharges from small, frequent, flood events; and,

- The proposed low flow bench width has been maximized to accommodate a meandering low flow swale planform.

5.0 Conclusions and Recommendations

A stormwater management strategy was developed to service the proposed W3 Farms and Sifton Subdivisions that is consistent with the preferred alternative identified in the Dingman SWM EA. The proposed SWM strategy meets the stormwater treatment requirements as follows:

- Water quality treatment is provided by at-source SWM controls that will be selected as detailed design proceeds; and
- Peak flow attenuation is provided by offline SWM facilities within the integrated channel corridor. These facilities will be located along the channel corridor both to the north and south.

External flows from future upstream development will be treated by at-source controls to provide water quality treatment and to attenuate the post-development peak discharges to pre-development magnitudes before outletting to the proposed channel corridor.

The results of the preliminary hydrologic and hydraulic analyses completed by Stantec show:

- The proposed 30 m wide channel corridor provides sufficient hydraulic capacity to convey all design events up to and including the uncontrolled 250-year storm; and,
- The proposed channel corridor is sufficiently wide to accommodate a stable low flow swale that will be designed in accordance with natural channel design principles to mitigate the risk of channel and bank erosion.

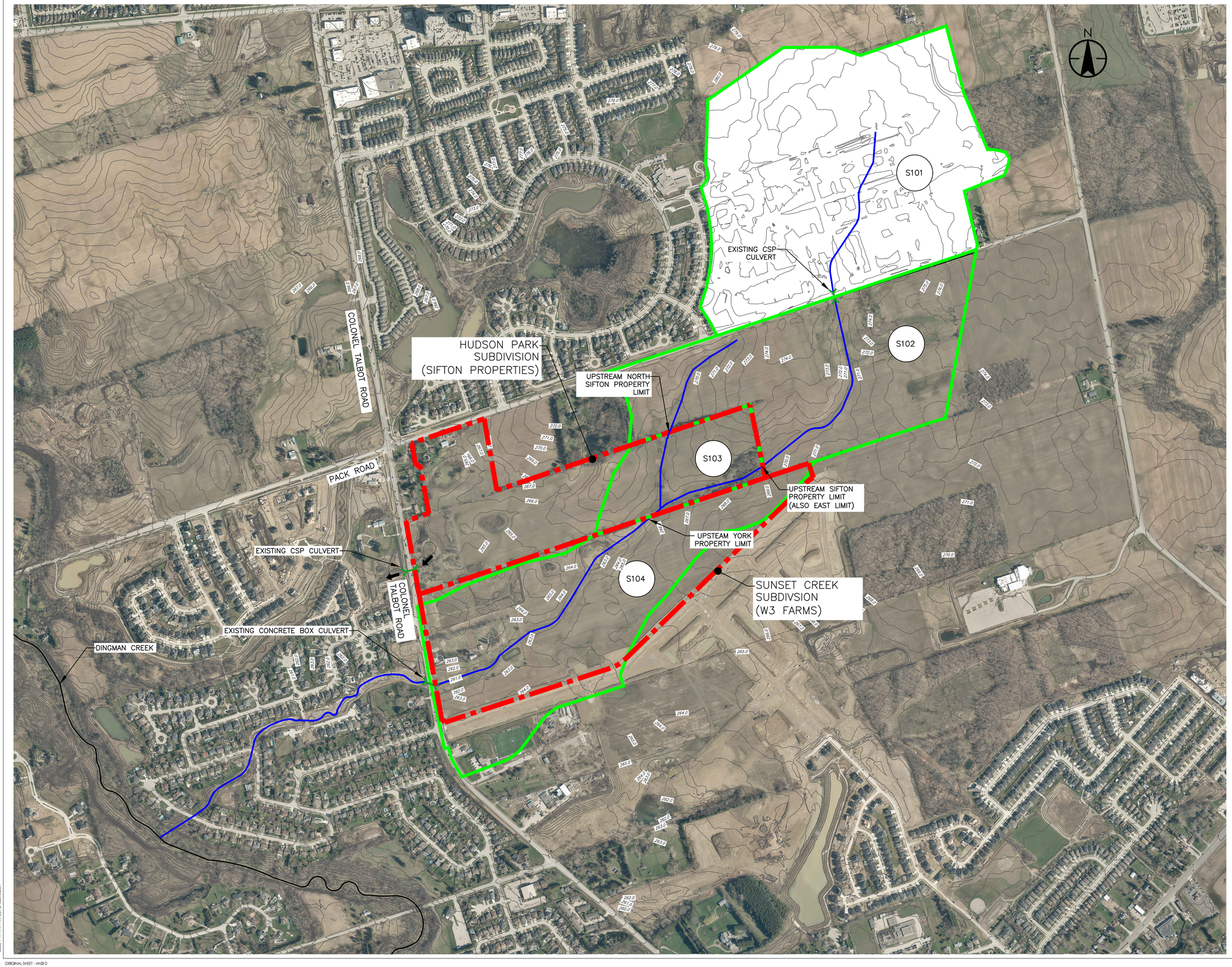
The following recommendations should be incorporated into the channel corridor, SWM facility and subdivision designs:

- Erosion protection must be incorporated into the downstream side of the proposed road crossing embankments to mitigate the risk of failure during overtopping events;
- The proposed wetland compensation areas should be incorporated into the proposed channel corridor to verify that the proposed wetland receives sufficient flow; and
- The minimum property line elevation at all lots abutting the proposed integrated channel should not be less than the Colonel Talbot Road overtopping elevation, which is approximately 263.3 m to mitigate the risk of flooding caused by either a system failure or a flood event that exceeds the channel corridors design capacity.

The next steps for this design process are to complete the design process to bring all of the components of the integrated channel together. This includes sizing and locating the

SWM facilities, designing the channel, locating the trail system and integrating the wetland compensation areas that will be within the integrated channel system.

Drawings



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Liability Note:

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.

Notes

SUBJECT SITE BOUNDARIES

ELEVATION CONTOURS

100 CATCHMENT ID

CATCHMENT BOUNDARY

EXISTING TRIBUTARY B1 CHANNEL ALIGNMENT

File Name: 1614141170_int_channel_pre_dev

Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project

SIFTON PROPERTIES LIMITED/W3 FARMS INC.

COLONEL TALBOT / W3 SUBDIVISION

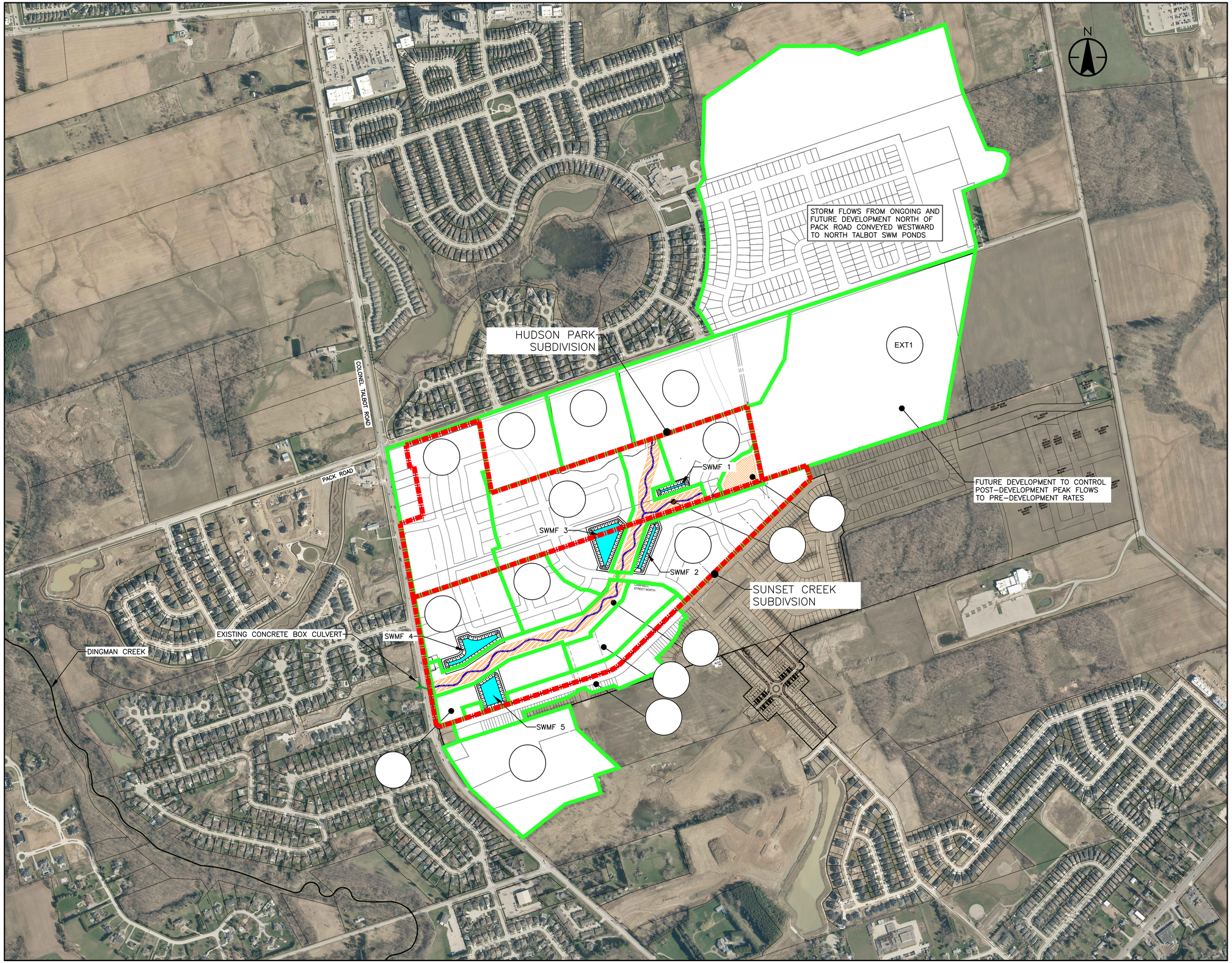
London, ON Canada

Title

PRE-DEVELOPMENT
DRAINAGE AREAS

Project No.	Scale	
161413835	HORZ – 1 : 5000 (50 0 100m)	
Drawing No.	Sheet	Revision
1	1 of 5	0

ORIGINAL SHEET - ANSI D



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Tel. 519-645-2007
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Liability Note:

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Notes

- SUBJECT SITE BOUNDARIES
- 250.0 ELEVATION CONTOURS
- 600 CATCHMENT ID
- CATCHMENT BOUNDARY
- TRIBUTARY B1 CHANNEL ALIGNMENT
- LINEAR CHANNEL
- NATURAL ENVIRONMENT AREA
- MAJOR FLOW DIRECTION

Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD

File Name: 161414170_int_channel_post_dev

Dwn. Chkd. Dsgn. YY.MM.DD

Permit-Seal

Client/Project

SIFTON PROPERTIES LIMITED/W3 FARMS INC.

COLONEL TALBOT / W3 SUBDIVISION

London, ON Canada

Title

POST-DEVELOPMENT DRAINAGE AREAS

Project No. 161413835

Scale HORZ – 1 : 5000 (50 0 100m)

Drawing No. 2

Sheet 2 of 5

Revision 0

ORIGINAL SHEET - ANSI D

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Notes

Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD

File Name: 161414170_int_channel_profile

Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
SIFTON PROPERTIES LIMITED/W3 FARMS INC.

COLONEL TALBOT / W3 SUBDIVISION

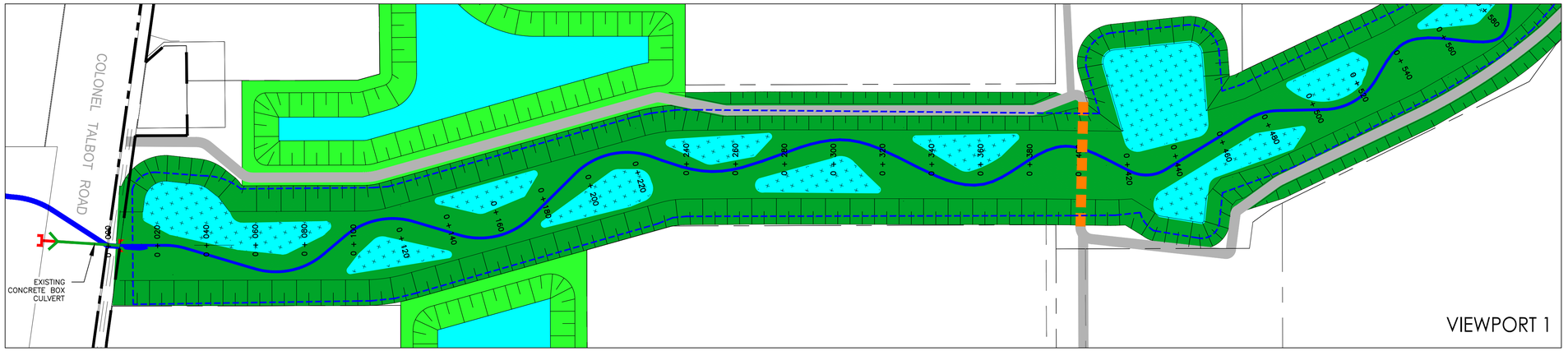
London, ON Canada

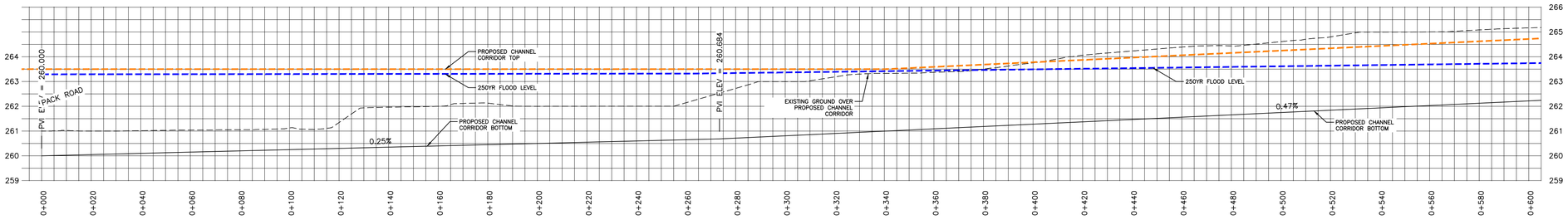
Title
INTERGRATED CHANNEL
SITE PLAN FIGURE

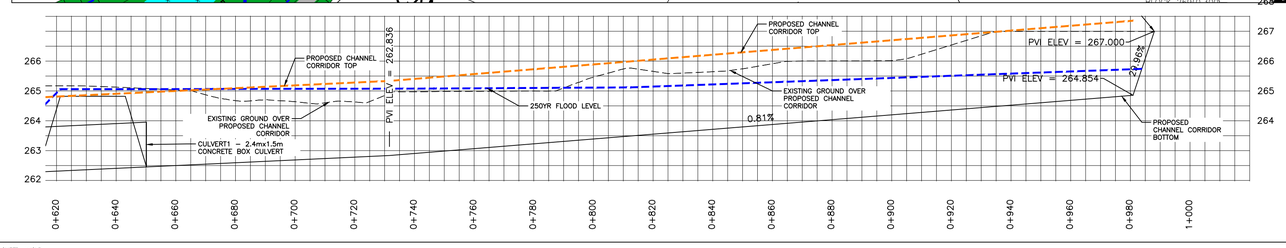
Project No. 161414170
Scale HORZ – 1 : 5000 (50 0 100m)

Drawing No. 3
Sheet 3 of 5
Revision 0

ORIGINAL SHEET - ANSI D







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Notes

CHANNEL CORRIDOR

NATURAL ENVIRONMENT AREA

PROPOSED LOW FLOW SWALE ALIGNMENT

250 YEAR FLOOD ELEVATION

File Name: 161414170_int_channel_profile

Dwn. Chkd. Dsgn. YY.MM.DD

Permit-Seal

Client/Project

SIFTON PROPERTIES LIMITED/W3 FARMS INC.

COLONEL TALBOT / W3 SUBDIVISION

London, ON Canada

Title

INTERGRATED CHANNEL PLAN & PROFILE

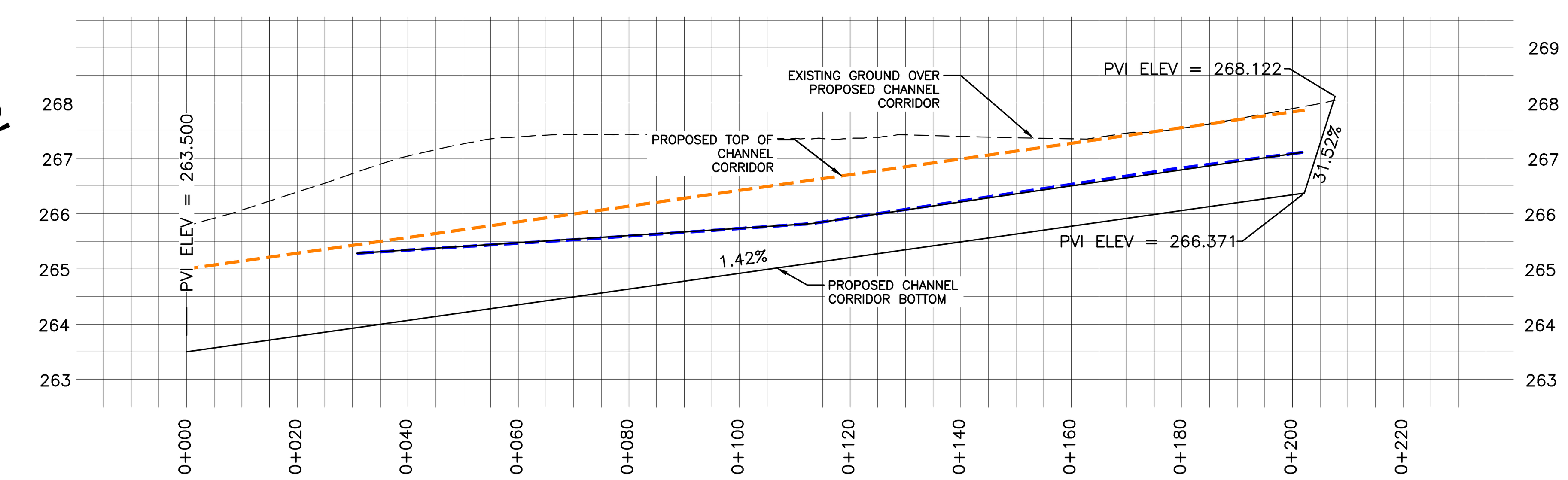
Project No. 161414170

Scale HORZ – 1 :1000 (10 0 20m)

Drawing No. 4

Sheet 4 of 5

Revision 0



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Liability Note:

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Notes

- CHANNEL CORRIDOR
- NATURAL ENVIRONMENT AREA
- PROPOSED LOW FLOW SWALE ALIGNMENT
- 250 YEAR FLOOD ELEVATION

Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD

File Name: 161414170_int_channel_profile

Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project

SIFTON PROPERTIES LIMITED/W3 FARMS INC.

COLONEL TALBOT / W3 SUBDIVISION

London, ON Canada

Title

INTERGRATED CHANNEL PLAN & PROFILE

Project No. 161414170

Scale HORZ – 1 : 1000

Drawing No. 5

Sheet 5 of 5

Revision 0

ORIGINAL SHEET - ANSI D

APPENDIX A:
Hydrologic Analysis Results

161414170 - Sifton/W3 Integrated Channel
SCS Curve Number Determination

Site Soils: Silty Clay

TABLE OF CURVE NUMBERS (CN's)									
Land Use		Hydrologic Soil Type							Manning's
		A	AB	B	BC	C	CD	D	'n'
Meadow		50	54	58	64.5	71	74.5	78	0.40
Woodlot		50	55.3	60.5	67	73.5	76.8	80	0.40
Long Grass		55	60	65	72	79	81.5	84	0.30
Lawns		60	65.5	71	77	83	86	89	0.25
Pasture/Range		58	61.5	65	70.5	76	78.5	81	0.17
Crop		66	70	74	78	82	84	86	0.13
Fallow (Bare)		77	82	86	89	91	93	94	0.05
Wetland		50	50	50	50	50	50	50	0.15

HYDROLOGIC SOIL TYPE (%) - Existing Conditions								
	Hydrologic Soil Type							
Catchment	A	AB	B	BC	C	CD	D	TOTAL
Existing								
S101						100		100
Proposed								
100						100.0		100
301						100.0		100
600						100.0		100

LAND USE (%)									
Catchment	Meadow	Woodlot	Long Grass	Lawns	Pasture Range	Crop	Fallow (Bare)	Wetland	Total
Existing									
S101						100			100
Proposed									
100				100					100
301		100							100
600	75							25	100

CURVE NUMBER (CN) - Existing Conditions									
Catchment	Meadow	Woodlot	Long Grass	Lawns	Pasture Range	Crop	Fallow (Bare)	Wetland	Weighted CN
Existing									
S101	0.0	0.0	0.0	0.0	0.0	84.0	0.0	0.0	84.0
Proposed									
100	0.0	0.0	0.0	86.0	0.0	0.0	0.0	0.0	86.0
301	0.0	76.8	0.0	0.0	0.0	0.0	0.0	0.0	76.0
600	55.9	0.0	0.0	0.0	0.0	0.0	0.0	12.5	68.0

** post development catchments concerned with pervious CN values only
** AMC II assumed
** Hydrological Soil Group taken from MTO Drainage Manual for each soil type

161414170 - Sifton/W3 Integrated Channel
SWMHYMO Parameters

Site Soils: Silty Clay

Area Description	Catchment Number	SWMHYMO Command	Area (ha)	CN	TIMP	XIMP	Slope (%)	Length (m)	Tc (hrs)	Tp (hrs)
	S101	DESIGN NASHYD	49.50	84	NA	NA	0.60	590	1.41	0.84
	S102	DESIGN NASHYD	32.80	84	NA	NA	1.15	485	1.03	0.62
	S103	DESIGN NASHYD	8.90	84	NA	NA	1.83	400	0.80	0.48
	S104	DESIGN NASHYD	33.50	84	NA	NA	0.92	575	1.21	0.72
Total			124.70							

Proposed Conditions

Area Description	Catchment Number	SWMHYMO Command	Area (ha)	CN	TIMP	XIMP	Slope (%)	Length (m)	Tc (hrs)	Tp (hrs)
	100	DESIGN STANDHYD	4.08	86	0.55	0.45	1.00	300		
	200	DESIGN STANDHYD	7.53	86	0.55	0.45	1.00	550		
	300	DESIGN STANDHYD	10.33	86	0.55	0.45	1.00	610		
	301	DESIGN NASHYD	4.37	76	NA	NA	1.10	210	0.69	0.41
	302	DESIGN STANDHYD	4.18	86	0.55	0.45	1.00	210		
	400	DESIGN STANDHYD	5.25	86	0.55	0.45	1.00	250		
	401	DESIGN STANDHYD	3.22	86	0.55	0.45	1.00	250		
	402	DESIGN STANDHYD	10.47	86	0.55	0.45	1.00	350		
	500	DESIGN STANDHYD	3.14	86	0.55	0.45	1.00	250		
	501	DESIGN STANDHYD	2.93	86	0.55	0.45	1.00	250		
	502	DESIGN STANDHYD	5.45	86	0.55	0.45	1.00	600		
	EXT1	DESIGN STANDHYD	23.21	86	0.55	0.45	1.00	750		
	EXT2	DESIGN STANDHYD	9.50	86	0.55	0.45	1.00	400		
	EXT3	DESIGN STANDHYD	9.16	86	0.55	0.45	1.00	400		
	600	DESIGN NASHYD	0.99	68	NA	NA	0.95	140	0.59	0.35
	601	DESIGN NASHYD	3.54	68	NA	NA	0.81	350	0.98	0.59
	602	DESIGN NASHYD	3.61	68	NA	NA	0.40	600	1.62	0.97
Total			110.96							

Notes:

CN calculated for pervious areas only for DESIGN STANDHYD. CN is a weighed average for DESIGN NASHYD

TIMP → *Total percent impervious*

XIMP → *Percent impervious directly connected*

Length → $L = [A*10000/1.5]^{0.5}$

Time of Concentration calculated using the Airport Method → $Tc = [\ 3.26\ (1.1-C)\ L^{0.5}\ ] / S^{0.33}$

Where: *C = Runoff Coefficient = 0.2 for undeveloped areas*
L = Length of Overland Flow (m)
= (Area/1.5)^0.5
S = Slope (%)

Time to Peak → *Tp = 0.6Tc*

Subject: Volumetric Sizing
Project: Colonel Talbot Complete Corridor
Project No.: 161414170
Client: Sifton/York
Date: November 2, 2022

2 Yr Predev Flow 1.803 m^3/s
100 Yr Predev Flow 8.208 m^3/s

	Contributing Areas	Area (ha)	%	2 Yr Release Rate (m^3/s)	100 Yr Release Rate (m^3/s)	Modelled Pond Volume (m^3)	Pond Volume with Freeboard (m^3)
External Pond	EXT1, EXT2	32.71	29.5%	0.53	2.42	12000	14400
Pond 1	100	4.08	3.7%	0.07	0.30	2000	2400
Pond 2	200	7.53	6.8%	0.12	0.56	3000	3600
Pond 3	300, 301, 302	18.88	17.0%	0.31	1.40	5800	6960
Pond 4	400, 401, 402	18.94	17.1%	0.31	1.40	7000	8400
Pond 5	500, 501, 502	11.52	10.4%	0.19	0.85	5000	6000
Channel	600, 601, 602	8.14	7.3%	0.13	0.60		
EXT3	EXT3	9.16	8.3%	0.15	0.68	5000	
Totals		110.96	100.0%	1.80	8.21		41760

```
2     Metric units
*#*************************************************************************
*#  Project Name: [Col Talbot Complete Corridor]    Project Number: [161414170]
*#  Date        : 2022-11-14
*#  Modeller    : [AKK]
*#  Company     : Stantec Consulting Ltd. (London)
*#  License #   :  4730904
*#*************************************************************************
*#*************************************************************************
*
*#  This model represents the hydologic characteristics of the existing and
*#  proposed conditions in the proposed subdivision.
*#  Storm events modeled are:
*#  2YR, 5YR, 10YR, 25YR, 50YR, 100YR and 250YR 3hr Chicago STORMS (London, ONT.
*
*#*************************************************************************
*%-----------------|-------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[2]
                    ["1dn2yr.3hr"]
*%-----------------|-------------------------------------------------------|
READ STORM          STORM_FILENAME=["STORM.001"]
*%-----------------|-------------------------------------------------------|
*#*************************************************************************
*
*#  Existing Conditions to determine target release rates
*
*#*************************************************************************
CALIB NASHYD        ID=[01], NHYD=["S101"], DT=[1]min, AREA=[49.5](ha),
                    DWF=[0](cms),  CN/C=[84], IA=[5](mm),
                    N=[3], TP=[0.84]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr),  END=-1
*%-----------------|-------------------------------------------------------|
CALIB NASHYD        ID=[02], NHYD=["S102"], DT=[1]min, AREA=[32.8](ha),
                    DWF=[0](cms),  CN/C=[84], IA=[5](mm),
                    N=[3], TP=[0.62]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr),  END=-1
*%-----------------|-------------------------------------------------------|
CALIB NASHYD        ID=[03], NHYD=["S103"], DT=[1]min, AREA=[8.9](ha),
                    DWF=[0](cms),  CN/C=[84], IA=[5](mm),
                    N=[3], TP=[0.48]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr),  END=-1
*%-----------------|-------------------------------------------------------|
CALIB NASHYD        ID=[04], NHYD=["S104"], DT=[1]min, AREA=[33.5](ha),
                    DWF=[0](cms),  CN/C=[84], IA=[5](mm),
                    N=[3], TP=[0.72]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr),  END=-1
*%-----------------|-------------------------------------------------------|
ADD HYD             IDsum=[05], NHYD=["Total"], IDs to add=[01+02+03+04]
*%-----------------|-------------------------------------------------------|

*#*************************************************************************
*
*#  External Pond Sizing, CAs EXT1 and EXT2
*
*#*************************************************************************
CALIB STANDHYD      ID=[01], NHYD=["EXT2"], DT=[1](min), AREA=[9.5],
                    XIMP=[0.45], TIMP=[0.55], DWF=[0], LOSS=[2],
                    SCS curve number CN=[86],
                    Pervious   surfaces: IAper=[5], SLPP=[1](%),
                                         LGP=[40], MNP=[0.24], SCP=[0](min),
                    Impervious surfaces: IAimp=[2], SLPI=[1](%),
                                         LGI=[400], MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ] ,  END=-1
*%-----------------|-------------------------------------------------------|
CALIB STANDHYD      ID=[02], NHYD=["EXT1"], DT=[1](min), AREA=[23],
                    XIMP=[0.45], TIMP=[0.55], DWF=[0], LOSS=[2],
                    SCS curve number CN=[86],
                    Pervious   surfaces: IAper=[5], SLPP=[1](%),
                                         LGP=[40], MNP=[0.24], SCP=[0](min),
                    Impervious surfaces: IAimp=[2], SLPI=[1](%),
                                         LGI=[750], MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ] ,  END=-1
*%-----------------|-------------------------------------------------------|
ADD HYD             IDsum=[03], NHYD=["ExPondIn"], IDs to add=[01+02]
*%-----------------|-------------------------------------------------------|
ROUTE RESERVOIR     IDout=[10],   NHYD=["ExPond"],  IDin=[03],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                    -
                                [   0.0 ,  0.0 ]
                                [   0.53,  0.45 ]
                                [   2.42,  1.2 ]
                                [   -1  ,  -1  ]  (max twenty pts)
                          IDovf=["oops"], NHYDovf=[01]
*%-----------------|-------------------------------------------------------|

*#*************************************************************************
*
*#  Pond 1 Sizing, CAs 100
*
*#*************************************************************************
CALIB STANDHYD      ID=[01], NHYD=["100"], DT=[1](min), AREA=[4.08],
                    XIMP=[0.45], TIMP=[0.55], DWF=[0], LOSS=[2],
                    SCS curve number CN=[86],
                    Pervious   surfaces: IAper=[5], SLPP=[1](%),
                                         LGP=[40], MNP=[0.24], SCP=[0](min),
                    Impervious surfaces: IAimp=[2], SLPI=[1](%),
                                         LGI=[300], MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ] ,  END=-1
*%-----------------|-------------------------------------------------------|
ROUTE RESERVOIR     IDout=[09],   NHYD=["Pond1"],  IDin=[01],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                    -
                                [   0.0 ,  0.0 ]
                                [   0.07,  0.07 ]
                                [   0.30,  0.2 ]
                                [   -1  ,  -1  ]  (max twenty pts)
                          IDovf=["oops"], NHYDovf=[01]
*%-----------------|-------------------------------------------------------|

*#*************************************************************************
*
*#  Pond 2 Sizing, CAs 200
*
*#*************************************************************************
CALIB STANDHYD      ID=[01], NHYD=["200"], DT=[1](min), AREA=[7.53],
                    XIMP=[0.45], TIMP=[0.55], DWF=[0], LOSS=[2],
                    SCS curve number CN=[86],
                    Pervious   surfaces: IAper=[5], SLPP=[1](%),
                                         LGP=[40], MNP=[0.24], SCP=[0](min),
                    Impervious surfaces: IAimp=[2], SLPI=[1](%),
                                         LGI=[550], MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ] ,  END=-1
*%-----------------|-------------------------------------------------------|
ROUTE RESERVOIR     IDout=[08],   NHYD=["Pond2"],  IDin=[01],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                    -
                                [   0.0 ,  0.0 ]
                                [   0.12,  0.15 ]
                                [   0.56,  0.30 ]
                                [   -1  ,  -1  ]  (max twenty pts)
                          IDovf=["oops"], NHYDovf=[01]
*%-----------------|-------------------------------------------------------|
*#*************************************************************************
*
*# Pond 3 Sizing, CAs 300, 301 and 302
*
*#*************************************************************************
CALIB STANDHYD      ID=[01], NHYD=["300"], DT=[1](min), AREA=[10.33],
                    XIMP=[0.45], TIMP=[0.55], DWF=[0], LOSS=[2],
                    SCS curve number CN=[86],
                    Pervious   surfaces: IAper=[5], SLPP=[1](%),
                                         LGP=[40], MNP=[0.24], SCP=[0](min),
                    Impervious surfaces: IAimp=[2], SLPI=[1](%),
                                         LGI=[610], MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ] ,  END=-1
*%-----------------|-------------------------------------------------------|
CALIB STANDHYD      ID=[02], NHYD=["302"], DT=[1](min), AREA=[4.18],
                    XIMP=[0.45], TIMP=[0.55], DWF=[0], LOSS=[2],
                    SCS curve number CN=[86],
                    Pervious   surfaces: IAper=[5], SLPP=[1](%),
                                         LGP=[40], MNP=[0.24], SCP=[0](min),
                    Impervious surfaces: IAimp=[2], SLPI=[1](%),
                                         LGI=[210], MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ] ,  END=-1
*%-----------------|-------------------------------------------------------|
CALIB NASHYD        ID=[03], NHYD=["301"], DT=[1]min, AREA=[4.37](ha),
                    DWF=[0](cms),  CN/C=[76], IA=[5](mm),
                    N=[3], TP=[0.41]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr),  END=-1
*%-----------------|-------------------------------------------------------|
ADD HYD             IDsum=[04], NHYD=["Pond3In"], IDs to add=[01+02+03]
*%-----------------|-------------------------------------------------------|
ROUTE RESERVOIR     IDout=[07],   NHYD=["Pond3"],  IDin=[04],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                    -
                                [   0.0 ,  0.0 ]
                                [   0.31,  0.25 ]
                                [   1.40,  0.58 ]
                                [   -1  ,  -1  ]  (max twenty pts)
                          IDovf=["oops"], NHYDovf=[01]
*%-----------------|-------------------------------------------------------|

*#*************************************************************************
*
*# Pond 4 Sizing, CAs 400, 401 and 402
*
*#*************************************************************************
CALIB STANDHYD      ID=[01], NHYD=["402"], DT=[1](min), AREA=[10.47],
                    XIMP=[0.45], TIMP=[0.55], DWF=[0], LOSS=[2],
                    SCS curve number CN=[86],
                    Pervious   surfaces: IAper=[5], SLPP=[1](%),
                                         LGP=[40], MNP=[0.24], SCP=[0](min),
                    Impervious surfaces: IAimp=[2], SLPI=[1](%),
                                         LGI=[350], MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ] ,  END=-1
*%-----------------|-------------------------------------------------------|
CALIB STANDHYD      ID=[02], NHYD=["401"], DT=[1](min), AREA=[3.22],
                    XIMP=[0.45], TIMP=[0.55], DWF=[0], LOSS=[2],
                    SCS curve number CN=[86],
                    Pervious   surfaces: IAper=[5], SLPP=[1](%),
                                         LGP=[40], MNP=[0.24], SCP=[0](min),
                    Impervious surfaces: IAimp=[2], SLPI=[1](%),
                                         LGI=[250], MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ] ,  END=-1
*%-----------------|-------------------------------------------------------|
CALIB STANDHYD      ID=[03], NHYD=["400"], DT=[1](min), AREA=[5.25],
                    XIMP=[0.45], TIMP=[0.55], DWF=[0], LOSS=[2],
                    SCS curve number CN=[86],
                    Pervious   surfaces: IAper=[5], SLPP=[1](%),
                                         LGP=[40], MNP=[0.24], SCP=[0](min),
                    Impervious surfaces: IAimp=[2], SLPI=[1](%),
                                         LGI=[250], MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ] ,  END=-1
*%-----------------|-------------------------------------------------------|
ADD HYD             IDsum=[04], NHYD=["Pond4In"], IDs to add=[01+02+03]
*%-----------------|-------------------------------------------------------|
ROUTE RESERVOIR     IDout=[06],   NHYD=["Pond4"],  IDin=[04],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                    -
                                [   0.0 ,  0.0 ]
                                [   0.31,  0.3 ]
                                [   1.40,  0.7 ]
                                [   -1  ,  -1  ]  (max twenty pts)
                          IDovf=["oops"], NHYDovf=[01]
*%-----------------|-------------------------------------------------------|

*#*************************************************************************
*
*# Pond 5 Sizing, CAs 500, 501 and 502
*
*#*************************************************************************
CALIB STANDHYD      ID=[01], NHYD=["501"], DT=[1](min), AREA=[2.93],
                    XIMP=[0.45], TIMP=[0.55], DWF=[0], LOSS=[2],
                    SCS curve number CN=[86],
                    Pervious   surfaces: IAper=[5], SLPP=[1](%),
                                         LGP=[40], MNP=[0.24], SCP=[0](min),
                    Impervious surfaces: IAimp=[2], SLPI=[1](%),
                                         LGI=[250], MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ] ,  END=-1
*%-----------------|-------------------------------------------------------|
CALIB STANDHYD      ID=[02], NHYD=["500"], DT=[1](min), AREA=[3.14],
                    XIMP=[0.45], TIMP=[0.55], DWF=[0], LOSS=[2],
                    SCS curve number CN=[86],
                    Pervious   surfaces: IAper=[5], SLPP=[1](%),
                                         LGP=[40], MNP=[0.24], SCP=[0](min),
                    Impervious surfaces: IAimp=[2], SLPI=[1](%),
                                         LGI=[250], MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ] ,  END=-1
*%-----------------|-------------------------------------------------------|
CALIB STANDHYD      ID=[03], NHYD=["502"], DT=[1](min), AREA=[5.45],
                    XIMP=[0.45], TIMP=[0.55], DWF=[0], LOSS=[2],
                    SCS curve number CN=[86],
                    Pervious   surfaces: IAper=[5], SLPP=[1](%),
                                         LGP=[40], MNP=[0.24], SCP=[0](min),
                    Impervious surfaces: IAimp=[2], SLPI=[1](%),
                                         LGI=[600], MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ] ,  END=-1
*%-----------------|-------------------------------------------------------|
ADD HYD             IDsum=[04], NHYD=["Pond5In"], IDs to add=[01+02+03]
```

```
00255> *%-----------------|-------------------------------------------------------------|
00256> ROUTE RESERVOIR     IDout=[05],   NHYD=["Pond5"],  IDin=[04],
00257>                     RDT=[1](min),
00258>                           TABLE of ( OUTFLOW-STORAGE ) values
00259>                                     -
00260>                                 [   0.0 ,  0.0 ]
00261>                                 [   0.19,  0.23 ]
00262>                                 [   0.85,  0.50 ]
00263>                                 [   -1  ,  -1   ]  (max twenty pts)
00264>                           IDovf=["oops"], NHYDovf=[01]
00265> *%-----------------|-------------------------------------------------------------|
00266> *#*****************************************************************************
00267> *#
00268> *# EXT3 Sizing, CAs EXT3
00269> *#
00270> *#*****************************************************************************
00271> CALIB STANDHYD      ID=[01], NHYD=["EXT3"], DT=[1](min), AREA=[9.16],
00272>                     XIMP=[0.45], TIMP=[0.55], DWF=[0], LOSS=[2],
00273>                     SCS curve number CN=[86],
00274>                     Pervious   surfaces: IAper=[5], SLPP=[1](%),
00275>                                          LGP=[40], MNP=[0.24], SCP=[0](min),
00276>                     Impervious surfaces: IAimp=[2], SLPI=[1](%),
00277>                                          LGI=[400], MNI=[0.013], SCI=[0](min),
00278>                     RAINFALL=[ ,  ,  ,  , ] ,  END=-1
00279> *%-----------------|-------------------------------------------------------------|
00280> COMPUTE DUALHYD     IDin=[01], CINLET=[0.15](cms), NINLET=[1],
00281>                     MAJID=[02], MajNHYD=["noFlow"],
00282>                     MINID=[03], MinNHYD=["MinorEXT3"],
00283>                     TMJSTO=[5000](cu-m)
00284> *%-----------------|-------------------------------------------------------------|
00285> *#*****************************************************************************
00286> *#
00287> *# Flow Totals and Channel Runoff
00288> *#
00289> *#*****************************************************************************
00290> ADD HYD             IDsum=[01], NHYD=["Control"], IDs to add=[02+03+05+06+07+08+
00291> *%-----------------|-------------------------------------------------------------|
00292> CALIB NASHYD        ID=[02], NHYD=["600"], DT=[1]min, AREA=[0.99](ha),
00293>                     DWF=[0](cms),  CN/C=[68], IA=[5](mm),
00294>                     N=[3], TP=[0.35]hrs,
00295>                     RAINFALL=[ ,  ,  ,  , ](mm/hr),  END=-1
00296> *%-----------------|-------------------------------------------------------------|
00297> CALIB NASHYD        ID=[03], NHYD=["601"], DT=[1]min, AREA=[3.54](ha),
00298>                     DWF=[0](cms),  CN/C=[68], IA=[5](mm),
00299>                     N=[3], TP=[0.59]hrs,
00300>                     RAINFALL=[ ,  ,  ,  , ](mm/hr),  END=-1
00301> *%-----------------|-------------------------------------------------------------|
00302> CALIB NASHYD        ID=[04], NHYD=["602"], DT=[1]min, AREA=[3.61](ha),
00303>                     DWF=[0](cms),  CN/C=[68], IA=[5](mm),
00304>                     N=[3], TP=[0.97]hrs,
00305>                     RAINFALL=[ ,  ,  ,  , ](mm/hr),  END=-1
00306> *%-----------------|-------------------------------------------------------------|
00307> ADD HYD             IDsum=[05], NHYD=["PostTot"], IDs to add=[01+02+03+04]
00308> *%-----------------|-------------------------------------------------------------|
00309> START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[5]
00310>                     ["1dn5YR.3hr"]
00311> *%-----------------|-------------------------------------------------------------|
00312> START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[10]
00313>                     ["1dn10YR.3hr"]
00314> *%-----------------|-------------------------------------------------------------|
00315> START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[25]
00316>                     ["1dn25YR.3hr"]
00317> *%-----------------|-------------------------------------------------------------|
00318> START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[50]
00319>                     ["1dn50YR.3hr"]
00320> *%-----------------|-------------------------------------------------------------|
00321> START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[100]
00322>                     ["1dn100YR.3hr"]
00323> *%-----------------|-------------------------------------------------------------|
00324> START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[250]
00325>                     ["1dn250YR.3hr"]
00326> *%-----------------|-------------------------------------------------------------|
00327>
00328> FINISH
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    SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
    S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
    SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
        S  W W W  M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
    SSSSS   W W   M   M  H   H    Y    M   M   OOO            9      9   =========
                                                           9   9  9   9   # 4730904
          StormWater Management HYdrologic Model           999    999    =========

 ********************************************************************************
 ***************************** SWMHYMO Ver/4.05  ********************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********     based on the principles of HYMO and its successors      *********
 *********                 OTTHYMO-83 and OTTHYMO-89.                  *********
 ********************************************************************************
 ********* Distributed by:  J.F. Sabourin and Associates Inc.           *********
 *********                  Ottawa,  Ontario: (613) 836-3884           *********
 *********                  Gatineau, Quebec: (819) 243-6858           *********
 *********                  E-Mail: swmhymo@jfsa.com                   *********
 ********************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: Stantec Consulting Ltd. (Kitchener)          +++++++++
 +++++++++                Kitchener            SERIAL#:4730904        +++++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ********************************************************************************
 *********          ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *********
 *********          Maximum value for ID numbers  :    10             *********
 *********          Max. number of rainfall points: 105408            *********
 *********          Max. number of flow points    : 105408            *********
 ********************************************************************************


 *********************   D E T A I L E D   O U T P U T   **********************
 ********************************************************************************
 *         DATE: 2022-11-14     TIME: 16:30:48     RUN COUNTER: 000087          *
 ********************************************************************************
 * Input   filename: C:\MODELL~1\14170\SWMHYMO\swmf_vol.dat                      *
 * Output  filename: C:\MODELL~1\14170\SWMHYMO\swmf_vol.out                      *
 * Summary filename: C:\MODELL~1\14170\SWMHYMO\swmf_vol.sum                      *
 * User comments:                                                               *
 * 1:_____________________________________________________________________________*
 * 2:_____________________________________________________________________________*
 * 3:_____________________________________________________________________________*
 ********************************************************************************

 -------------------------------------------------------------------------------
 001:0001-----------------------------------------------------------------------
 *#*****************************************************************************
 *#  Project Name: [Col Talbot Complete Corridor]    Project Number: [161414170]
 *#  Date        : 2022-11-14
 *#  Modeller    : [AKK]
 *#  Company     : Stantec Consulting Ltd. (London)
 *#  License #   :  4730904
 *#*****************************************************************************
 *#*****************************************************************************
 *#
 *#  This model represents the hydologic characteristics of the existing and
 *#  proposed conditions in the proposed subdivision.
 *#  Storm events modeled are:
 *#  2YR, 5YR, 10YR, 25YR, 50YR, 100YR and 250YR 3hr Chicago STORMS (London, ONT.
 *#
 *#*****************************************************************************
  ** END OF RUN :   1

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


 --------------------
 | START            |  Project  dir.: C:\MODELL~1\14170\SWMHYMO\
 --------------------  Rainfall dir.: C:\MODELL~1\14170\SWMHYMO\
     TZERO =   .00 hrs on        0
     METOUT=   2 (output = METRIC)
     NRUN  = 002
     NSTORM=   1
            #  1=ldn2yr.3hr
 -------------------------------------------------------------------------------
 002:0002-----------------------------------------------------------------------
 *#*****************************************************************************
 *#  Project Name: [Col Talbot Complete Corridor]    Project Number: [161414170]
 *#  Date        : 2022-11-14
 *#  Modeller    : [AKK]
 *#  Company     : Stantec Consulting Ltd. (London)
 *#  License #   :  4730904
 *#*****************************************************************************
 *#*****************************************************************************
 *#
 *#  This model represents the hydologic characteristics of the existing and
 *#  proposed conditions in the proposed subdivision.
 *#  Storm events modeled are:
 *#  2YR, 5YR, 10YR, 25YR, 50YR, 100YR and 250YR 3hr Chicago STORMS (London, ONT.
 *#
 *#*****************************************************************************
 -------------------------------------------------------------------------------
 002:0002-----------------------------------------------------------------------
 ---------------------
 | READ STORM       |    Filename: 2-yr, 3hr Chicago Storm from 2021 London
 | Ptotal=  32.83 mm|    Comments: 2-yr, 3hr Chicago Storm from 2021 London
 ---------------------
              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
              hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               .08   2.574 |    .83  14.974 |   1.58   7.501 |   2.33   3.414
               .17   2.812 |    .92  35.641 |   1.67   6.585 |   2.42   3.229
               .25   3.105 |   1.00 108.068 |   1.75   5.876 |   2.50   3.064
               .33   3.472 |   1.08  46.277 |   1.83   5.310 |   2.58   2.917
               .42   3.949 |   1.17  25.470 |   1.92   4.849 |   2.67   2.784
               .50   4.594 |   1.25  17.290 |   2.00   4.465 |   2.75   2.663
               .58   5.517 |   1.33  13.030 |   2.08   4.141 |   2.83   2.554
               .67   6.947 |   1.42  10.448 |   2.17   3.864 |   2.92   2.454
               .75   9.460 |   1.50   8.726 |   2.25   3.624 |   3.00   2.362

 -------------------------------------------------------------------------------
 002:0003-----------------------------------------------------------------------
 *#*****************************************************************************
 *#
 *#  Existing Conditions to determine target release rates
 *#
 *#*****************************************************************************
 ---------------------
 | CALIB NASHYD       |   Area     (ha)=   49.50   Curve Number   (CN)=84.00
 | 01:S101   DT= 1.00 |   Ia       (mm)=    5.000   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .840

     Unit Hyd Qpeak  (cms)=    2.251

     PEAK FLOW       (cms)=     .654 (i)
     TIME TO PEAK    (hrs)=    2.167
     RUNOFF VOLUME    (mm)=   10.165
     TOTAL RAINFALL   (mm)=   32.834
     RUNOFF COEFFICIENT   =     .310

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

 -------------------------------------------------------------------------------
 002:0004-----------------------------------------------------------------------
 ---------------------
 | CALIB NASHYD       |   Area     (ha)=   32.80   Curve Number   (CN)=84.00
 | 02:S102   DT= 1.00 |   Ia       (mm)=    5.000   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .620

     Unit Hyd Qpeak  (cms)=    2.021

     PEAK FLOW       (cms)=     .534 (i)
     TIME TO PEAK    (hrs)=    1.867
     RUNOFF VOLUME    (mm)=   10.165
     TOTAL RAINFALL   (mm)=   32.834
     RUNOFF COEFFICIENT   =     .310

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

 -------------------------------------------------------------------------------
 002:0005-----------------------------------------------------------------------
 ---------------------
 | CALIB NASHYD       |   Area     (ha)=    8.90   Curve Number   (CN)=84.00
 | 03:S103   DT= 1.00 |   Ia       (mm)=    5.000   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .480

     Unit Hyd Qpeak  (cms)=     .708

     PEAK FLOW       (cms)=     .172 (i)
     TIME TO PEAK    (hrs)=    1.667
     RUNOFF VOLUME    (mm)=   10.165
     TOTAL RAINFALL   (mm)=   32.834
     RUNOFF COEFFICIENT   =     .310

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

 -------------------------------------------------------------------------------
 002:0006-----------------------------------------------------------------------
 ---------------------
 | CALIB NASHYD       |   Area     (ha)=   33.50   Curve Number   (CN)=84.00
 | 04:S104   DT= 1.00 |   Ia       (mm)=    5.000   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .720

     Unit Hyd Qpeak  (cms)=    1.777

     PEAK FLOW       (cms)=     .492 (i)
     TIME TO PEAK    (hrs)=    2.000
     RUNOFF VOLUME    (mm)=   10.165
     TOTAL RAINFALL   (mm)=   32.834
     RUNOFF COEFFICIENT   =     .310

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

 -------------------------------------------------------------------------------
 002:0007-----------------------------------------------------------------------
 ---------------------
 | ADD HYD (Total     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
 ------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:S101          49.50     .654    2.17  10.17    .000
                      +ID2 02:S102          32.80     .534    1.87  10.17    .000
                      +ID3 03:S103           8.90     .172    1.67  10.17    .000
                      +ID4 04:S104          33.50     .492    2.00  10.17    .000
                       ==========================================================
                       SUM 05:Total        124.70    1.803    1.97  10.17    .000

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 -------------------------------------------------------------------------------
 002:0008-----------------------------------------------------------------------
 *#*****************************************************************************
 *#
 *#  External Pond Sizing, CAs EXT1 and EXT2
 *#
 *#*****************************************************************************
 ---------------------
 | CALIB STANDHYD     |   Area     (ha)=    9.50
 | 01:EXT2   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
 ---------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.22         4.27
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     400.00        40.00
     Mannings n            =       .013         .240

     Max.eff.Inten.(mm/hr)=      97.77        25.35
                  over (min)        6.00        21.00
     Storage Coeff.  (min)=       5.92 (ii)   20.60 (ii)
     Unit Hyd. Tpeak (min)=       6.00        21.00
     Unit Hyd. peak  (cms)=        .19          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .79          .17          .825 (iii)
     TIME TO PEAK    (hrs)=       1.07         1.40         1.067
     RUNOFF VOLUME    (mm)=      30.83        13.20        21.137
     TOTAL RAINFALL   (mm)=      32.83        32.83        32.834
     RUNOFF COEFFICIENT   =        .94          .40          .644

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

 -------------------------------------------------------------------------------
 002:0009-----------------------------------------------------------------------
 ---------------------
 | CALIB STANDHYD     |   Area     (ha)=   23.00
 | 02:EXT1   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
 ---------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.65        10.35
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     750.00        40.00
     Mannings n            =       .013         .240

     Max.eff.Inten.(mm/hr)=      80.61        22.86
                  over (min)        9.00        25.00
```

```
      Storage Coeff.  (min)=       9.33 (ii)   24.63 (ii)
      Unit Hyd. Tpeak (min)=       9.00        25.00
      Unit Hyd. peak  (cms)=        .12          .05
                                                          *TOTALS*
      PEAK FLOW       (cms)=       1.53          .37         1.634 (iii)
      TIME TO PEAK    (hrs)=       1.12         1.47         1.133
      RUNOFF VOLUME    (mm)=      30.83        13.20        21.137
      TOTAL RAINFALL   (mm)=      32.83        32.83        32.834
      RUNOFF COEFFICIENT   =        .94          .40          .644

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  86.0    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.

---------- 002:0010----------
 | ADD HYD (ExPondIn  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
 ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXT2          9.50     .825    1.07  21.14    .000
                      +ID2 02:EXT1         23.00    1.634    1.13  21.14    .000
                       ========================================================
                       SUM 03:ExPondIn      32.50    2.387    1.12  21.14    .000

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---------- 002:0011----------
 | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
 |  IN>03:(ExPond)   |
 | OUT<10:(ExPond)   |    =========  OUTLFOW STORAGE TABLE  =========
 ----------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)     (ha.m.)
                            .000  .0000E+00   |    2.420  .1200E+01
                            .530  .4500E+00   |     .000  .0000E+00

      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
      ----------------------      (ha)     (cms)     (hrs)       (mm)
      INFLOW >03: (ExPond)       32.50     2.387     1.117     21.137
      OUTFLOW<10: (ExPond)       32.50      .475     2.133     21.137

                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   19.886
                     TIME SHIFT OF PEAK FLOW         (min)=    61.00
                     MAXIMUM  STORAGE   USED       (ha.m.)=.4030E+00

---------- 002:0012----------
*#*************************************************************************
*#
*#  Pond 1 Sizing, CAs 100
*#
*#*************************************************************************
----------
 | CALIB STANDHYD     |   Area    (ha)=    4.08
 | 01:100    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------
                              IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=       2.24         1.84
      Dep. Storage     (mm)=       2.00         5.00
      Average Slope     (%)=       1.00         1.00
      Length            (m)=     300.00        40.00
      Mannings n           =       .013         .240

      Max.eff.Inten.(mm/hr)=     108.07        26.83
                over (min)          5.00        19.00
      Storage Coeff.  (min)=       4.79 (ii)   19.14 (ii)
      Unit Hyd. Tpeak (min)=       5.00        19.00
      Unit Hyd. peak  (cms)=        .23          .06
                                                          *TOTALS*
      PEAK FLOW       (cms)=        .37          .08          .386 (iii)
      TIME TO PEAK    (hrs)=       1.05         1.37         1.050
      RUNOFF VOLUME    (mm)=      30.83        13.20        21.137
      TOTAL RAINFALL   (mm)=      32.83        32.83        32.834
      RUNOFF COEFFICIENT   =        .94          .40          .644

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  86.0    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.

---------- 002:0013----------
 | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
 |  IN>01:(100   )   |
 | OUT<09:(Pond1 )   |    =========  OUTLFOW STORAGE TABLE  =========
 ----------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)     (ha.m.)
                            .000  .0000E+00   |     .300  .2000E+00
                            .070  .7000E-01   |     .000  .0000E+00

      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
      ----------------------      (ha)     (cms)     (hrs)       (mm)
      INFLOW >01: (100   )       4.08      .386     1.050     21.137
      OUTFLOW<09: (Pond1 )       4.08      .054     2.117     21.137

                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   13.934
                     TIME SHIFT OF PEAK FLOW         (min)=    64.00
                     MAXIMUM  STORAGE   USED       (ha.m.)=.5382E-01

---------- 002:0014----------
*#*************************************************************************
*#
*#  Pond 2 Sizing, CAs 200
*#
*#*************************************************************************
----------
 | CALIB STANDHYD     |   Area    (ha)=    7.53
 | 01:200    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------
                              IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=       4.14         3.39
      Dep. Storage     (mm)=       2.00         5.00
      Average Slope     (%)=       1.00         1.00
      Length            (m)=     550.00        40.00
      Mannings n           =       .013         .240

      Max.eff.Inten.(mm/hr)=      90.41        24.64
                over (min)          7.00        22.00
      Storage Coeff.  (min)=       7.40 (ii)   22.25 (ii)
      Unit Hyd. Tpeak (min)=       7.00        22.00
      Unit Hyd. peak  (cms)=        .16          .05
                                                          *TOTALS*
      PEAK FLOW       (cms)=        .56          .13          .597 (iii)
      TIME TO PEAK    (hrs)=       1.08         1.42         1.083
      RUNOFF VOLUME    (mm)=      30.83        13.20        21.137
      TOTAL RAINFALL   (mm)=      32.83        32.83        32.834
      RUNOFF COEFFICIENT   =        .94          .40          .644

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  86.0    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.

---------- 002:0015----------
---------- 002:0016----------
*#*************************************************************************
*#
*# Pond 3 Sizing, CAs 300, 301 and 302
*#
*#*************************************************************************
----------
 | CALIB STANDHYD     |   Area    (ha)=   10.33
 | 01:300    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------
                              IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=       5.68         4.65
      Dep. Storage     (mm)=       2.00         5.00
      Average Slope     (%)=       1.00         1.00
      Length            (m)=     610.00        40.00
      Mannings n           =       .013         .240

      Max.eff.Inten.(mm/hr)=      84.90        23.99
                over (min)          8.00        23.00
      Storage Coeff.  (min)=       8.07 (ii)   23.08 (ii)
      Unit Hyd. Tpeak (min)=       8.00        23.00
      Unit Hyd. peak  (cms)=        .14          .05
                                                          *TOTALS*
      PEAK FLOW       (cms)=        .74          .17          .786 (iii)
      TIME TO PEAK    (hrs)=       1.10         1.43         1.100
      RUNOFF VOLUME    (mm)=      30.83        13.20        21.137
      TOTAL RAINFALL   (mm)=      32.83        32.83        32.834
      RUNOFF COEFFICIENT   =        .94          .40          .644

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  86.0    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.

---------- 002:0017----------
 | CALIB STANDHYD     |   Area    (ha)=    4.18
 | 02:302    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------
                              IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=       2.30         1.88
      Dep. Storage     (mm)=       2.00         5.00
      Average Slope     (%)=       1.00         1.00
      Length            (m)=     210.00        40.00
      Mannings n           =       .013         .240

      Max.eff.Inten.(mm/hr)=     108.07        27.62
                over (min)          4.00        18.00
      Storage Coeff.  (min)=       3.87 (ii)   18.05 (ii)
      Unit Hyd. Tpeak (min)=       4.00        18.00
      Unit Hyd. peak  (cms)=        .29          .06
                                                          *TOTALS*
      PEAK FLOW       (cms)=        .41          .08          .430 (iii)
      TIME TO PEAK    (hrs)=       1.03         1.35         1.033
      RUNOFF VOLUME    (mm)=      30.83        13.20        21.137
      TOTAL RAINFALL   (mm)=      32.83        32.83        32.834
      RUNOFF COEFFICIENT   =        .94          .40          .644

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  86.0    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.

---------- 002:0018----------
----------
 | CALIB NASHYD       |   Area    (ha)=    4.37   Curve Number    (CN)=76.00
 | 03:301    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
 ----------------------   U.H. Tp(hrs)=    .410

      Unit Hyd Qpeak  (cms)=     .407

      PEAK FLOW       (cms)=     .064 (i)
      TIME TO PEAK    (hrs)=    1.583
      RUNOFF VOLUME    (mm)=    7.171
      TOTAL RAINFALL   (mm)=   32.834
      RUNOFF COEFFICIENT   =     .218

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

---------- 002:0019----------
 | ADD HYD (Pond3In   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
 ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:300          10.33     .786    1.10  21.14    .000
                      +ID2 02:302           4.18     .430    1.03  21.14    .000
                      +ID3 03:301           4.37     .064    1.58   7.17    .000
                       ========================================================
                       SUM 04:Pond3In       18.88    1.141    1.08  17.90    .000
```

```
00509>
00510>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00511>
00512> ------------------------------------------------------------------------------
00513> 002:0020------------------------------------------------------------------------
00514> ---------------------
00515> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00516> |  IN>04:(Pond3I)   |
00517> | OUT<07:(Pond3 )   |    =========  OUTFLOW STORAGE TABLE  =========
00518> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00519>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00520>                             .000  .0000E+00   |   1.400  .5800E+00
00521>                             .310  .2500E+00   |    .000  .0000E+00
00522>
00523>      ROUTING RESULTS            AREA     QPEAK     TPEAK      R.V.
00524>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00525>      INFLOW >04: (Pond3I)      18.88     1.141     1.083     17.904
00526>      OUTFLOW<07: (Pond3 )      18.88      .240     2.150     17.904
00527>
00528>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   21.030
00529>                     TIME SHIFT OF PEAK FLOW          (min)=    64.00
00530>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1935E+00
00531>
00532> ------------------------------------------------------------------------------
00533> 002:0021------------------------------------------------------------------------
00534> *#*************************************************************************
00535> *#
00536> *# Pond 4 Sizing, CAs 400, 401 and 402
00537> *#
00538> *#*************************************************************************
00539> ---------------------
00540> | CALIB STANDHYD    |   Area    (ha)=   10.47
00541> | 01:402    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
00542> ---------------------
00543>                             IMPERVIOUS    PERVIOUS (i)
00544>      Surface Area     (ha)=       5.76         4.71
00545>      Dep. Storage     (mm)=       2.00         5.00
00546>      Average Slope     (%)=       1.00         1.00
00547>      Length            (m)=     350.00        40.00
00548>      Mannings n            =       .013         .240
00549>
00550>      Max.eff.Inten.(mm/hr)=     108.07        26.13
00551>                  over (min)        5.00        20.00
00552>      Storage Coeff.  (min)=       5.25 (ii)   19.76 (ii)
00553>      Unit Hyd. Tpeak (min)=       5.00        20.00
00554>      Unit Hyd. peak  (cms)=        .22          .06
00555>                                                          *TOTALS*
00556>      PEAK FLOW       (cms)=        .92          .19          .958 (iii)
00557>      TIME TO PEAK    (hrs)=       1.05         1.38         1.050
00558>      RUNOFF VOLUME    (mm)=      30.83        13.20        21.137
00559>      TOTAL RAINFALL   (mm)=      32.83        32.83        32.834
00560>      RUNOFF COEFFICIENT   =        .94          .40          .644
00561>
00562>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00563>            CN* =  86.0    Ia = Dep. Storage  (Above)
00564>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00565>            THAN THE STORAGE COEFFICIENT.
00566>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00567>
00568> ------------------------------------------------------------------------------
00569> 002:0022------------------------------------------------------------------------
00570> ---------------------
00571> | CALIB STANDHYD    |   Area    (ha)=    3.22
00572> | 02:401    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
00573> ---------------------
00574>                             IMPERVIOUS    PERVIOUS (i)
00575>      Surface Area     (ha)=       1.77         1.45
00576>      Dep. Storage     (mm)=       2.00         5.00
00577>      Average Slope     (%)=       1.00         1.00
00578>      Length            (m)=     250.00        40.00
00579>      Mannings n            =       .013         .240
00580>
00581>      Max.eff.Inten.(mm/hr)=     108.07        26.83
00582>                  over (min)        4.00        19.00
00583>      Storage Coeff.  (min)=       4.29 (ii)   18.64 (ii)
00584>      Unit Hyd. Tpeak (min)=       4.00        19.00
00585>      Unit Hyd. peak  (cms)=        .27          .06
00586>                                                          *TOTALS*
00587>      PEAK FLOW       (cms)=        .31          .06          .320 (iii)
00588>      TIME TO PEAK    (hrs)=       1.03         1.37         1.033
00589>      RUNOFF VOLUME    (mm)=      30.83        13.20        21.137
00590>      TOTAL RAINFALL   (mm)=      32.83        32.83        32.834
00591>      RUNOFF COEFFICIENT   =        .94          .40          .644
00592>
00593>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00594>            CN* =  86.0    Ia = Dep. Storage  (Above)
00595>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00596>            THAN THE STORAGE COEFFICIENT.
00597>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00598>
00599> ------------------------------------------------------------------------------
00600> 002:0023------------------------------------------------------------------------
00601> ---------------------
00602> | CALIB STANDHYD    |   Area    (ha)=    5.25
00603> | 03:400    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
00604> ---------------------
00605>                             IMPERVIOUS    PERVIOUS (i)
00606>      Surface Area     (ha)=       2.89         2.36
00607>      Dep. Storage     (mm)=       2.00         5.00
00608>      Average Slope     (%)=       1.00         1.00
00609>      Length            (m)=     250.00        40.00
00610>      Mannings n            =       .013         .240
00611>
00612>      Max.eff.Inten.(mm/hr)=     108.07        26.83
00613>                  over (min)        4.00        19.00
00614>      Storage Coeff.  (min)=       4.29 (ii)   18.64 (ii)
00615>      Unit Hyd. Tpeak (min)=       4.00        19.00
00616>      Unit Hyd. peak  (cms)=        .27          .06
00617>                                                          *TOTALS*
00618>      PEAK FLOW       (cms)=        .50          .10          .521 (iii)
00619>      TIME TO PEAK    (hrs)=       1.03         1.37         1.033
00620>      RUNOFF VOLUME    (mm)=      30.83        13.20        21.137
00621>      TOTAL RAINFALL   (mm)=      32.83        32.83        32.834
00622>      RUNOFF COEFFICIENT   =        .94          .40          .644
00623>
00624>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00625>            CN* =  86.0    Ia = Dep. Storage  (Above)
00626>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00627>            THAN THE STORAGE COEFFICIENT.
00628>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00629>
00630> ------------------------------------------------------------------------------
00631> 002:0024------------------------------------------------------------------------
00632> ----------------------
00633> | ADD HYD (Pond4In   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00634> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00635>                       ID1 01:402          10.47     .958    1.05  21.14    .000
00636>                     +ID2 02:401           3.22     .320    1.03  21.14    .000
00637>                     +ID3 03:400           5.25     .521    1.03  21.14    .000
00638>                      ============================================================
00639>                      SUM 04:Pond4In       18.94    1.781    1.05  21.14    .000
00640>
00641>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00642>
00643> ------------------------------------------------------------------------------
00644> 002:0025------------------------------------------------------------------------
00645> ---------------------
00646> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00647> |  IN>04:(Pond4I)   |
00648> | OUT<06:(Pond4 )   |    =========  OUTLFOW STORAGE TABLE  =========
00649> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00650>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00651>                             .000  .0000E+00   |   1.400  .7000E+00
00652>                             .310  .3000E+00   |    .000  .0000E+00
00653>
00654>      ROUTING RESULTS            AREA     QPEAK     TPEAK      R.V.
00655>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00656>      INFLOW >04: (Pond4I)      18.94     1.781     1.050     21.137
00657>      OUTFLOW<06: (Pond4 )      18.94      .255     2.100     21.137
00658>
00659>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   14.343
00660>                     TIME SHIFT OF PEAK FLOW          (min)=    63.00
00661>                     MAXIMUM  STORAGE   USED       (ha.m.)=.2472E+00
00662>
00663> ------------------------------------------------------------------------------
00664> 002:0026------------------------------------------------------------------------
00665> *#*************************************************************************
00666> *#
00667> *# Pond 5 Sizing, CAs 500, 501 and 502
00668> *#
00669> *#*************************************************************************
00670> ---------------------
00671> | CALIB STANDHYD    |   Area    (ha)=    2.93
00672> | 01:501    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
00673> ---------------------
00674>                             IMPERVIOUS    PERVIOUS (i)
00675>      Surface Area     (ha)=       1.61         1.32
00676>      Dep. Storage     (mm)=       2.00         5.00
00677>      Average Slope     (%)=       1.00         1.00
00678>      Length            (m)=     250.00        40.00
00679>      Mannings n            =       .013         .240
00680>
00681>      Max.eff.Inten.(mm/hr)=     108.07        26.83
00682>                  over (min)        4.00        19.00
00683>      Storage Coeff.  (min)=       4.29 (ii)   18.64 (ii)
00684>      Unit Hyd. Tpeak (min)=       4.00        19.00
00685>      Unit Hyd. peak  (cms)=        .27          .06
00686>                                                          *TOTALS*
00687>      PEAK FLOW       (cms)=        .28          .06          .291 (iii)
00688>      TIME TO PEAK    (hrs)=       1.03         1.37         1.033
00689>      RUNOFF VOLUME    (mm)=      30.83        13.20        21.137
00690>      TOTAL RAINFALL   (mm)=      32.83        32.83        32.834
00691>      RUNOFF COEFFICIENT   =        .94          .40          .644
00692>
00693>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00694>            CN* =  86.0    Ia = Dep. Storage  (Above)
00695>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00696>            THAN THE STORAGE COEFFICIENT.
00697>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00698>
00699> ------------------------------------------------------------------------------
00700> 002:0027------------------------------------------------------------------------
00701> ---------------------
00702> | CALIB STANDHYD    |   Area    (ha)=    3.14
00703> | 02:500    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
00704> ---------------------
00705>                             IMPERVIOUS    PERVIOUS (i)
00706>      Surface Area     (ha)=       1.73         1.41
00707>      Dep. Storage     (mm)=       2.00         5.00
00708>      Average Slope     (%)=       1.00         1.00
00709>      Length            (m)=     250.00        40.00
00710>      Mannings n            =       .013         .240
00711>
00712>      Max.eff.Inten.(mm/hr)=     108.07        26.83
00713>                  over (min)        4.00        19.00
00714>      Storage Coeff.  (min)=       4.29 (ii)   18.64 (ii)
00715>      Unit Hyd. Tpeak (min)=       4.00        19.00
00716>      Unit Hyd. peak  (cms)=        .27          .06
00717>                                                          *TOTALS*
00718>      PEAK FLOW       (cms)=        .30          .06          .312 (iii)
00719>      TIME TO PEAK    (hrs)=       1.03         1.37         1.033
00720>      RUNOFF VOLUME    (mm)=      30.83        13.20        21.137
00721>      TOTAL RAINFALL   (mm)=      32.83        32.83        32.834
00722>      RUNOFF COEFFICIENT   =        .94          .40          .644
00723>
00724>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00725>            CN* =  86.0    Ia = Dep. Storage  (Above)
00726>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00727>            THAN THE STORAGE COEFFICIENT.
00728>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00729>
00730> ------------------------------------------------------------------------------
00731> 002:0028------------------------------------------------------------------------
00732> ---------------------
00733> | CALIB STANDHYD    |   Area    (ha)=    5.45
00734> | 03:502    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
00735> ---------------------
00736>                             IMPERVIOUS    PERVIOUS (i)
00737>      Surface Area     (ha)=       3.00         2.45
00738>      Dep. Storage     (mm)=       2.00         5.00
00739>      Average Slope     (%)=       1.00         1.00
00740>      Length            (m)=     600.00        40.00
00741>      Mannings n            =       .013         .240
00742>
00743>      Max.eff.Inten.(mm/hr)=      84.90        23.99
00744>                  over (min)        8.00        23.00
00745>      Storage Coeff.  (min)=       7.99 (ii)   23.00 (ii)
00746>      Unit Hyd. Tpeak (min)=       8.00        23.00
00747>      Unit Hyd. peak  (cms)=        .14          .05
00748>                                                          *TOTALS*
00749>      PEAK FLOW       (cms)=        .39          .09          .416 (iii)
00750>      TIME TO PEAK    (hrs)=       1.10         1.43         1.100
00751>      RUNOFF VOLUME    (mm)=      30.83        13.20        21.137
00752>      TOTAL RAINFALL   (mm)=      32.83        32.83        32.834
00753>      RUNOFF COEFFICIENT   =        .94          .40          .644
00754>
00755>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00756>            CN* =  86.0    Ia = Dep. Storage  (Above)
00757>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00758>            THAN THE STORAGE COEFFICIENT.
00759>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00760>
00761> ------------------------------------------------------------------------------
00762> 002:0029------------------------------------------------------------------------
```

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00763> ----------------------
00764> | ADD HYD (Pond5In   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00765> ----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
00766>                        ID1 01:501          2.93     .291    1.03  21.14    .000
00767>                       +ID2 02:500          3.14     .312    1.03  21.14    .000
00768>                       +ID3 03:502          5.45     .416    1.10  21.14    .000
00769>                        ========================================================
00770>                        SUM 04:Pond5In      11.52     .949    1.05  21.14    .000
00771>
00772>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00773>
00774> ------------------------------------------------------------------------------
00775> 002:0030--------------------------------------------------------------------
00776> ----------------------
00777> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00778> |  IN>04:(Pond5I)   |
00779> | OUT<05:(Pond5 )   |    =========  OUTLFOW STORAGE TABLE  =========
00780> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00781>                             (cms)    (ha.m.)   |    (cms)    (ha.m.)
00782>                              .000  .0000E+00   |     .850  .5000E+00
00783>                              .190  .2300E+00   |     .000  .0000E+00
00784>
00785>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00786>      ----------------------      (ha)     (cms)     (hrs)       (mm)
00787>      INFLOW >04: (Pond5I)      11.52      .949     1.050     21.137
00788>      OUTFLOW<05: (Pond5 )      11.52      .132     2.300     21.137
00789>
00790>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=   13.872
00791>                      TIME SHIFT OF PEAK FLOW          (min)=   75.00
00792>                      MAXIMUM   STORAGE   USED       (ha.m.)=.1593E+00
00793>
00794> ------------------------------------------------------------------------------
00795> 002:0031--------------------------------------------------------------------
00796> *#*****************************************************************************
00797> *#
00798> *# EXT3 Sizing, CAs EXT3
00799> *#
00800> *#*****************************************************************************
00801> ----------------------
00802> | CALIB STANDHYD     |   Area    (ha)=    9.16
00803> | 01:EXT3   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
00804> ----------------------
00805>                             IMPERVIOUS    PERVIOUS (i)
00806>      Surface Area     (ha)=       5.04         4.12
00807>      Dep. Storage     (mm)=       2.00         5.00
00808>      Average Slope     (%)=       1.00         1.00
00809>      Length            (m)=     400.00        40.00
00810>      Mannings n           =       .013         .240
00811>
00812>      Max.eff.Inten.(mm/hr)=     97.77        25.35
00813>                over (min)        6.00        21.00
00814>      Storage Coeff.  (min)=       5.92 (ii)   20.60 (ii)
00815>      Unit Hyd. Tpeak (min)=       6.00        21.00
00816>      Unit Hyd. peak  (cms)=        .19          .05
00817>                                                        *TOTALS*
00818>      PEAK FLOW       (cms)=        .76          .17          .795 (iii)
00819>      TIME TO PEAK    (hrs)=       1.07         1.40         1.067
00820>      RUNOFF VOLUME    (mm)=      30.83        13.20        21.137
00821>      TOTAL RAINFALL   (mm)=      32.83        32.83        32.834
00822>      RUNOFF COEFFICIENT   =        .94          .40          .644
00823>
00824>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00825>            CN* =  86.0    Ia = Dep. Storage  (Above)
00826>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00827>            THAN THE STORAGE COEFFICIENT.
00828>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00829>
00830> ------------------------------------------------------------------------------
00831> 002:0032--------------------------------------------------------------------
00832> ----------------------
00833> | COMPUTE DUALHYD    |   Average inlet capacities   [CINLET] =    .150  (cms)
00834> | TotalHyd 01:EXT3   |   Number of inlets in system [NINLET] =       1
00835> ----------------------   Total minor system capacity         =    .150  (cms)
00836>                          Total major system storage [TMJSTO] =    5000.(cu.m.)
00837>
00838>                    ID: NHYD        AREA     QPEAK     TPEAK     R.V.      DWF
00839>                                    (ha)     (cms)     (hrs)     (mm)    (cms)
00840>      TOTAL HYD.   01:EXT3         9.16      .795     1.067   21.137     .000
00841>      ================================================================
00842>      MAJOR SYST   02:noFlow        .00      .000      .000     .000     .000
00843>      MINOR SYST   03:MinorE       9.16      .150      .883   21.171     .000
00844>
00845>      NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00846>
00847>      Maximum MAJOR SYSTEM storage used =     861.(cu.m.)
00848>
00849> ------------------------------------------------------------------------------
00850> 002:0033--------------------------------------------------------------------
00851> *#*****************************************************************************
00852> *#
00853> *# Flow Totals and Channel Runoff
00854> *#
00855> *#*****************************************************************************
00856> -------------------------
00857> | ADD HYD (Control   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00858> -------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
00859>                         ID1 02:noFlow        .00      .000     .00     .00    .000
00860>                        +ID2 03:MinorEXT3    9.16      .150     .88   21.17    .000
00861>                        +ID3 05:Pond5       11.52      .132    2.30   21.14    .000
00862>                        +ID4 06:Pond4       18.94      .255    2.10   21.14    .000
00863>                        +ID5 07:Pond3       18.88      .240    2.15   17.90    .000
00864>                        +ID6 08:Pond2        7.53      .084    2.37   21.14    .000
00865>                        +ID7 09:Pond1        4.08      .054    2.12   21.14    .000
00866>                        +ID8 10:ExPond      32.50      .475    2.13   21.14    .000
00867>                         ========================================================
00868>                         SUM 01:Control     102.61     1.388    2.15   20.55    .000
00869>
00870>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00871>
00872> ------------------------------------------------------------------------------
00873> 002:0034--------------------------------------------------------------------
00874> ----------------------
00875> | CALIB NASHYD       |   Area    (ha)=     .99   Curve Number   (CN)=68.00
00876> | 02:600    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
00877> ----------------------   U.H. Tp(hrs)=    .350
00878>
00879>      Unit Hyd Qpeak  (cms)=     .108
00880>
00881>      PEAK FLOW       (cms)=     .012 (i)
00882>      TIME TO PEAK    (hrs)=    1.500
00883>      RUNOFF VOLUME    (mm)=    5.257
00884>      TOTAL RAINFALL   (mm)=   32.834
00885>      RUNOFF COEFFICIENT   =     .160
00886>
00887>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00888>
00889> ------------------------------------------------------------------------------
00890> 002:0035--------------------------------------------------------------------
00891> ----------------------
00892> | CALIB NASHYD       |   Area    (ha)=    3.54   Curve Number   (CN)=68.00
00893> | 03:601    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
00894> ----------------------   U.H. Tp(hrs)=    .590
00895>
00896>      Unit Hyd Qpeak  (cms)=     .229
00897>
00898>      PEAK FLOW       (cms)=     .030 (i)
00899>      TIME TO PEAK    (hrs)=    1.850
00900>      RUNOFF VOLUME    (mm)=    5.257
00901>      TOTAL RAINFALL   (mm)=   32.834
00902>      RUNOFF COEFFICIENT   =     .160
00903>
00904>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00905>
00906> ------------------------------------------------------------------------------
00907> 002:0036--------------------------------------------------------------------
00908> ----------------------
00909> | CALIB NASHYD       |   Area    (ha)=    3.61   Curve Number   (CN)=68.00
00910> | 04:602    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
00911> ----------------------   U.H. Tp(hrs)=    .970
00912>
00913>      Unit Hyd Qpeak  (cms)=     .142
00914>
00915>      PEAK FLOW       (cms)=     .022 (i)
00916>      TIME TO PEAK    (hrs)=    2.383
00917>      RUNOFF VOLUME    (mm)=    5.257
00918>      TOTAL RAINFALL   (mm)=   32.834
00919>      RUNOFF COEFFICIENT   =     .160
00920>
00921>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00922>
00923> ------------------------------------------------------------------------------
00924> 002:0037--------------------------------------------------------------------
00925> ----------------------
00926> | ADD HYD (PostTot   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00927> ----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
00928>                         ID1 01:Control     102.61    1.388    2.15  20.55    .000
00929>                        +ID2 02:600           .99     .012    1.50   5.26    .000
00930>                        +ID3 03:601          3.54     .030    1.85   5.26    .000
00931>                        +ID4 04:602          3.61     .022    2.38   5.26    .000
00932>                         ========================================================
00933>                         SUM 05:PostTot     110.75    1.443    2.13  19.42    .000
00934>
00935>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00936>
00937> ------------------------------------------------------------------------------
00938> 002:0038--------------------------------------------------------------------
00939>   ** END OF RUN :   4
00940>
00941> ******************************************************************************
00942>
00943>
00944>
00945>
00946>
00947> ----------------------
00948> | START              |  Project  dir.: C:\MODELL~1\14170\SWMHYMO\
00949> ----------------------  Rainfall dir.: C:\MODELL~1\14170\SWMHYMO\
00950>     TZERO =   .00 hrs on       0
00951>     METOUT=   2 (output = METRIC)
00952>     NRUN  = 005
00953>     NSTORM=   1
00954>               #  1=ldn5YR.3hr
00955> ------------------------------------------------------------------------------
00956> 005:0002--------------------------------------------------------------------
00957> *#*****************************************************************************
00958> *#  Project Name: [Col Talbot Complete Corridor]    Project Number: [161414170]
00959> *#  Date        : 2022-11-14
00960> *#  Modeller    : [AKK]
00961> *#  Company     : Stantec Consulting Ltd. (London)
00962> *#  License #   : 4730904
00963> *#*****************************************************************************
00964> *#*****************************************************************************
00965> *#
00966> *#  This model represents the hydologic characteristics of the existing and
00967> *#  proposed conditions in the proposed subdivision.
00968> *#  Storm events modeled are:
00969> *#  2YR, 5YR, 10YR, 25YR, 50YR, 100YR and 250YR 3hr Chicago STORMS (London, ONT.
00970> *#
00971> *#*****************************************************************************
00972> ------------------------------------------------------------------------------
00973> 005:0002--------------------------------------------------------------------
00974> --------------------
00975> | READ STORM       |    Filename: 5-yr, 3hr Chicago Storm from London IDF
00976> | Ptotal=  44.19 mm|    Comments: 5-yr, 3hr Chicago Storm from London IDF
00977> --------------------
00978>                TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00979>                 hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00980>                 .08   3.164 |    .83  21.025 |   1.58  10.072 |   2.33   4.293
00981>                 .17   3.481 |    .92  50.463 |   1.67   8.751 |   2.42   4.042
00982>                 .25   3.874 |   1.00 141.242 |   1.75   7.736 |   2.50   3.819
00983>                 .33   4.373 |   1.08  65.260 |   1.83   6.932 |   2.58   3.620
00984>                 .42   5.028 |   1.17  36.321 |   1.92   6.282 |   2.67   3.443
00985>                 .50   5.925 |   1.25  24.430 |   2.00   5.745 |   2.75   3.282
00986>                 .58   7.226 |   1.33  18.167 |   2.08   5.294 |   2.83   3.137
00987>                 .67   9.274 |   1.42  14.372 |   2.17   4.910 |   2.92   3.005
00988>                 .75  12.926 |   1.50  11.853 |   2.25   4.580 |   3.00   2.884
00989>
00990> ------------------------------------------------------------------------------
00991> 005:0003--------------------------------------------------------------------
00992> *#*****************************************************************************
00993> *#
00994> *#  Existing Conditions to determine target release rates
00995> *#
00996> *#*****************************************************************************
00997> ----------------------
00998> | CALIB NASHYD       |   Area    (ha)=   49.50   Curve Number   (CN)=84.00
00999> | 01:S101   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
01000> ----------------------   U.H. Tp(hrs)=    .840
01001>
01002>      Unit Hyd Qpeak  (cms)=    2.251
01003>
01004>      PEAK FLOW       (cms)=    1.169 (i)
01005>      TIME TO PEAK    (hrs)=    2.117
01006>      RUNOFF VOLUME    (mm)=   17.536
01007>      TOTAL RAINFALL   (mm)=   44.186
01008>      RUNOFF COEFFICIENT   =     .397
01009>
01010>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01011>
01012> ------------------------------------------------------------------------------
01013> 005:0004--------------------------------------------------------------------
01014> ----------------------
01015> | CALIB NASHYD       |   Area    (ha)=   32.80   Curve Number   (CN)=84.00
01016> | 02:S102   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
```

```
                    U.H. Tp(hrs)=    .620

     Unit Hyd Qpeak  (cms)=    2.021

     PEAK FLOW       (cms)=     .963 (i)
     TIME TO PEAK    (hrs)=    1.833
     RUNOFF VOLUME    (mm)=   17.536
     TOTAL RAINFALL   (mm)=   44.186
     RUNOFF COEFFICIENT   =     .397

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

005:0005-----------------------------------------------------------------------
 ---------------------
| CALIB NASHYD       |   Area    (ha)=   8.90   Curve Number   (CN)=84.00
| 03:S103   DT= 1.00 |   Ia      (mm)=   5.000  # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .480

     Unit Hyd Qpeak  (cms)=     .708

     PEAK FLOW       (cms)=     .312 (i)
     TIME TO PEAK    (hrs)=    1.650
     RUNOFF VOLUME    (mm)=   17.536
     TOTAL RAINFALL   (mm)=   44.186
     RUNOFF COEFFICIENT   =     .397

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

005:0006-----------------------------------------------------------------------
 ---------------------
| CALIB NASHYD       |   Area    (ha)=  33.50   Curve Number   (CN)=84.00
| 04:S104   DT= 1.00 |   Ia      (mm)=   5.000  # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .720

     Unit Hyd Qpeak  (cms)=    1.777

     PEAK FLOW       (cms)=     .884 (i)
     TIME TO PEAK    (hrs)=    1.950
     RUNOFF VOLUME    (mm)=   17.536
     TOTAL RAINFALL   (mm)=   44.186
     RUNOFF COEFFICIENT   =     .397

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

005:0007-----------------------------------------------------------------------
 -------------------------
| ADD HYD (Total     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
 -------------------------                (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:S101        49.50    1.169    2.12  17.54    .000
                      +ID2 02:S102        32.80     .963    1.83  17.54    .000
                      +ID3 03:S103         8.90     .312    1.65  17.54    .000
                      +ID4 04:S104        33.50     .884    1.95  17.54    .000
                       ==========================================================
                       SUM 05:Total       124.70    3.239    1.93  17.54    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0008-----------------------------------------------------------------------
*#*****************************************************************************
*#
*#  External Pond Sizing, CAs EXT1 and EXT2
*#
*#*****************************************************************************
 ----------------------
| CALIB STANDHYD     |   Area    (ha)=   9.50
| 01:EXT2   DT= 1.00 |   Total Imp(%)=  55.00   Dir. Conn.(%)=  45.00
 ----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.22         4.27
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     400.00        40.00
     Mannings n            =       .013         .240

     Max.eff.Inten.(mm/hr)=     141.24        50.53
                  over (min)        5.00        16.00
     Storage Coeff.  (min)=       5.11 (ii)   16.25 (ii)
     Unit Hyd. Tpeak (min)=       5.00        16.00
     Unit Hyd. peak  (cms)=        .22          .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.12          .35          1.226 (iii)
     TIME TO PEAK    (hrs)=       1.05         1.30          1.050
     RUNOFF VOLUME    (mm)=      42.19        21.75         30.944
     TOTAL RAINFALL   (mm)=      44.19        44.19         44.186
     RUNOFF COEFFICIENT   =        .95          .49           .700

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

005:0009-----------------------------------------------------------------------
 ----------------------
| CALIB STANDHYD     |   Area    (ha)=  23.00
| 02:EXT1   DT= 1.00 |   Total Imp(%)=  55.00   Dir. Conn.(%)=  45.00
 ----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.65        10.35
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     750.00        40.00
     Mannings n            =       .013         .240

     Max.eff.Inten.(mm/hr)=     112.75        44.60
                  over (min)        8.00        20.00
     Storage Coeff.  (min)=       8.16 (ii)   19.87 (ii)
     Unit Hyd. Tpeak (min)=       8.00        20.00
     Unit Hyd. peak  (cms)=        .14          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.20          .74          2.488 (iii)
     TIME TO PEAK    (hrs)=       1.10         1.37          1.117
     RUNOFF VOLUME    (mm)=      42.18        21.74         30.944
     TOTAL RAINFALL   (mm)=      44.19        44.19         44.186
     RUNOFF COEFFICIENT   =        .95          .49           .700

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

005:0010-----------------------------------------------------------------------
 ----------------------
| ADD HYD (ExPondIn  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
 ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 01:EXT2        9.50    1.226    1.05  30.94    .000
                       +ID2 02:EXT1       23.00    2.488    1.12  30.94    .000
                        ==========================================================
                        SUM 03:ExPondIn    32.50    3.619    1.10  30.94    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0011-----------------------------------------------------------------------
 ----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>03:(ExPond)    |
| OUT<10:(ExPond)    |    =========  OUTFLOW STORAGE TABLE  =========
 ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                             (cms)    (ha.m.)   |    (cms)    (ha.m.)
                              .000  .0000E+00   |    2.420  .1200E+01
                              .530  .4500E+00   |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------           (ha)     (cms)     (hrs)       (mm)
     INFLOW >03: (ExPond)      32.50    3.619     1.100      30.944
     OUTFLOW<10: (ExPond)      32.50     .869     1.900      30.944

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=   24.003
                  TIME SHIFT OF PEAK FLOW         (min)=   48.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.5844E+00

005:0012-----------------------------------------------------------------------
*#*****************************************************************************
*#
*#  Pond 1 Sizing, CAs 100
*#
*#*****************************************************************************
 ----------------------
| CALIB STANDHYD     |   Area    (ha)=   4.08
| 01:100    DT= 1.00 |   Total Imp(%)=  55.00   Dir. Conn.(%)=  45.00
 ----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.24         1.84
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     300.00        40.00
     Mannings n            =       .013         .240

     Max.eff.Inten.(mm/hr)=     141.24        52.52
                  over (min)        4.00        15.00
     Storage Coeff.  (min)=       4.30 (ii)   15.27 (ii)
     Unit Hyd. Tpeak (min)=       4.00        15.00
     Unit Hyd. peak  (cms)=        .27          .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .52          .15           .561 (iii)
     TIME TO PEAK    (hrs)=       1.03         1.28          1.033
     RUNOFF VOLUME    (mm)=      42.19        21.75         30.944
     TOTAL RAINFALL   (mm)=      44.19        44.19         44.186
     RUNOFF COEFFICIENT   =        .95          .49           .700

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

005:0013-----------------------------------------------------------------------
 ----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(100   )    |
| OUT<09:(Pond1 )    |    =========  OUTFLOW STORAGE TABLE  =========
 ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                             (cms)    (ha.m.)   |    (cms)    (ha.m.)
                              .000  .0000E+00   |     .300  .2000E+00
                              .070  .7000E-01   |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------           (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (100   )       4.08      .561     1.033      30.944
     OUTFLOW<09: (Pond1 )       4.08      .088     1.950      30.944

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=   15.672
                  TIME SHIFT OF PEAK FLOW         (min)=   55.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.8014E-01

005:0014-----------------------------------------------------------------------
*#*****************************************************************************
*#
*#  Pond 2 Sizing, CAs 200
*#
*#*****************************************************************************
 ----------------------
| CALIB STANDHYD     |   Area    (ha)=   7.53
| 01:200    DT= 1.00 |   Total Imp(%)=  55.00   Dir. Conn.(%)=  45.00
 ----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.14         3.39
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     550.00        40.00
     Mannings n            =       .013         .240

     Max.eff.Inten.(mm/hr)=     119.53        47.22
                  over (min)        7.00        18.00
     Storage Coeff.  (min)=       6.62 (ii)   18.06 (ii)
     Unit Hyd. Tpeak (min)=       7.00        18.00
     Unit Hyd. peak  (cms)=        .17          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .79          .26           .887 (iii)
     TIME TO PEAK    (hrs)=       1.08         1.33          1.100
     RUNOFF VOLUME    (mm)=      42.18        21.75         30.944
     TOTAL RAINFALL   (mm)=      44.19        44.19         44.186
     RUNOFF COEFFICIENT   =        .95          .49           .700

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

005:0015-----------------------------------------------------------------------
 ----------------------
```

```
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(200   )   |
| OUT<08:(Pond2 )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                            .000  .0000E+00   |     .560  .3000E+00
                            .120  .1500E+00   |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------      (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (200   )       7.53      .887     1.100     30.944
     OUTFLOW<08: (Pond2 )       7.53      .137     2.150     30.944

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=   15.491
                   TIME SHIFT OF PEAK FLOW         (min)=    63.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.1560E+00

--------------------------------------------------------------------------------
005:0016-----------------------------------------------------------------------
*#*****************************************************************************
*#
*# Pond 3 Sizing, CAs 300, 301 and 302
*#
*#*****************************************************************************
----------------------
| CALIB STANDHYD     |   Area    (ha)=   10.33
| 01:300    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.68         4.65
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     610.00        40.00
     Mannings n           =       .013         .240

     Max.eff.Inten.(mm/hr)=     119.53        45.84
               over (min)          7.00        19.00
     Storage Coeff.  (min)=       7.04 (ii)   18.62 (ii)
     Unit Hyd. Tpeak (min)=       7.00        19.00
     Unit Hyd. peak  (cms)=        .16          .06
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.06          .35         1.183 (iii)
     TIME TO PEAK    (hrs)=       1.08         1.35         1.100
     RUNOFF VOLUME    (mm)=      42.19        21.75        30.944
     TOTAL RAINFALL   (mm)=      44.19        44.19        44.186
     RUNOFF COEFFICIENT   =        .95          .49          .700

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

--------------------------------------------------------------------------------
005:0017-----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    4.18
| 02:302    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.30         1.88
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     210.00        40.00
     Mannings n           =       .013         .240

     Max.eff.Inten.(mm/hr)=     141.24        54.10
               over (min)          3.00        14.00
     Storage Coeff.  (min)=       3.47 (ii)   14.31 (ii)
     Unit Hyd. Tpeak (min)=       3.00        14.00
     Unit Hyd. peak  (cms)=        .34          .08
                                                        *TOTALS*
     PEAK FLOW       (cms)=        .58          .16          .621 (iii)
     TIME TO PEAK    (hrs)=       1.02         1.27         1.017
     RUNOFF VOLUME    (mm)=      42.19        21.75        30.944
     TOTAL RAINFALL   (mm)=      44.19        44.19        44.186
     RUNOFF COEFFICIENT   =        .95          .49          .700

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

--------------------------------------------------------------------------------
005:0018-----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.37   Curve Number   (CN)=76.00
| 03:301    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=     .407

     PEAK FLOW       (cms)=     .122 (i)
     TIME TO PEAK    (hrs)=    1.567
     RUNOFF VOLUME    (mm)=   12.861
     TOTAL RAINFALL   (mm)=   44.186
     RUNOFF COEFFICIENT   =     .291

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

--------------------------------------------------------------------------------
005:0019-----------------------------------------------------------------------
------------------------
| ADD HYD (Pond3In   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:300          10.33    1.183    1.10  30.94    .000
                     +ID2 02:302            4.18     .621    1.02  30.94    .000
                     +ID3 03:301            4.37     .122    1.57  12.86    .000
                      ==========================================================
                      SUM 04:Pond3In       18.88    1.715    1.08  26.76    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0020-----------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>04:(Pond3I)   |
| OUT<07:(Pond3 )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                            .000  .0000E+00   |    1.400  .5800E+00
                            .310  .2500E+00   |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------      (ha)     (cms)     (hrs)       (mm)
     INFLOW >04: (Pond3I)       18.88     1.715     1.083     26.758
     OUTFLOW<07: (Pond3 )       18.88      .434     1.950     26.758

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=   25.322
                   TIME SHIFT OF PEAK FLOW         (min)=    52.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.2876E+00

--------------------------------------------------------------------------------
005:0021-----------------------------------------------------------------------
*#*****************************************************************************
*#
*# Pond 4 Sizing, CAs 400, 401 and 402
*#
*#*****************************************************************************
----------------------
| CALIB STANDHYD     |   Area    (ha)=   10.47
| 01:402    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.76         4.71
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     350.00        40.00
     Mannings n           =       .013         .240

     Max.eff.Inten.(mm/hr)=     141.24        50.53
               over (min)          5.00        16.00
     Storage Coeff.  (min)=       4.72 (ii)   15.86 (ii)
     Unit Hyd. Tpeak (min)=       5.00        16.00
     Unit Hyd. peak  (cms)=        .23          .07
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.27          .39         1.386 (iii)
     TIME TO PEAK    (hrs)=       1.05         1.30         1.050
     RUNOFF VOLUME    (mm)=      42.19        21.75        30.944
     TOTAL RAINFALL   (mm)=      44.19        44.19        44.186
     RUNOFF COEFFICIENT   =        .95          .49          .700

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

--------------------------------------------------------------------------------
005:0022-----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    3.22
| 02:401    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.77         1.45
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     250.00        40.00
     Mannings n           =       .013         .240

     Max.eff.Inten.(mm/hr)=     141.24        52.52
               over (min)          4.00        15.00
     Storage Coeff.  (min)=       3.86 (ii)   14.83 (ii)
     Unit Hyd. Tpeak (min)=       4.00        15.00
     Unit Hyd. peak  (cms)=        .29          .08
                                                        *TOTALS*
     PEAK FLOW       (cms)=        .42          .12          .457 (iii)
     TIME TO PEAK    (hrs)=       1.03         1.28         1.033
     RUNOFF VOLUME    (mm)=      42.19        21.75        30.944
     TOTAL RAINFALL   (mm)=      44.19        44.19        44.186
     RUNOFF COEFFICIENT   =        .95          .49          .700

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

--------------------------------------------------------------------------------
005:0023-----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    5.25
| 03:400    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.89         2.36
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     250.00        40.00
     Mannings n           =       .013         .240

     Max.eff.Inten.(mm/hr)=     141.24        52.52
               over (min)          4.00        15.00
     Storage Coeff.  (min)=       3.86 (ii)   14.83 (ii)
     Unit Hyd. Tpeak (min)=       4.00        15.00
     Unit Hyd. peak  (cms)=        .29          .08
                                                        *TOTALS*
     PEAK FLOW       (cms)=        .69          .20          .745 (iii)
     TIME TO PEAK    (hrs)=       1.03         1.28         1.033
     RUNOFF VOLUME    (mm)=      42.19        21.75        30.944
     TOTAL RAINFALL   (mm)=      44.19        44.19        44.186
     RUNOFF COEFFICIENT   =        .95          .49          .700

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

--------------------------------------------------------------------------------
005:0024-----------------------------------------------------------------------
------------------------
| ADD HYD (Pond4In   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:402          10.47    1.386    1.05  30.94    .000
                     +ID2 02:401            3.22     .457    1.03  30.94    .000
                     +ID3 03:400            5.25     .745    1.03  30.94    .000
                      ==========================================================
                      SUM 04:Pond4In       18.94    2.568    1.05  30.94    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0025-----------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>04:(Pond4I)   |
| OUT<06:(Pond4 )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                            .000  .0000E+00   |    1.400  .7000E+00
```

```
                          .310  .3000E+00   |     .000  .0000E+00

      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
      ---------------------       (ha)     (cms)     (hrs)       (mm)
      INFLOW >04: (Pond4I)      18.94     2.568     1.050     30.944
      OUTFLOW<06: (Pond4 )      18.94      .472     1.867     30.944

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   18.372
                    TIME SHIFT OF PEAK FLOW          (min)=    49.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.3594E+00

--------------------------------------------------------------------------------
005:0026--------------------------------------------------------------------------
*#*****************************************************************************
*#
*# Pond 5 Sizing, CAs 500, 501 and 502
*#
*#*****************************************************************************
----------------------
| CALIB STANDHYD     |   Area    (ha)=    2.93
| 01:501    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                               IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=       1.61         1.32
      Dep. Storage     (mm)=       2.00         5.00
      Average Slope     (%)=       1.00         1.00
      Length            (m)=     250.00        40.00
      Mannings n           =       .013         .240

      Max.eff.Inten.(mm/hr)=     141.24        52.52
                      over (min)      4.00        15.00
      Storage Coeff.  (min)=       3.86 (ii)   14.83 (ii)
      Unit Hyd. Tpeak (min)=       4.00        15.00
      Unit Hyd. peak  (cms)=        .29          .08
                                                          *TOTALS*
      PEAK FLOW       (cms)=        .39          .11          .416 (iii)
      TIME TO PEAK    (hrs)=       1.03         1.28         1.033
      RUNOFF VOLUME    (mm)=      42.19        21.75        30.944
      TOTAL RAINFALL   (mm)=      44.19        44.19        44.186
      RUNOFF COEFFICIENT   =        .95          .49          .700

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  86.0    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.

--------------------------------------------------------------------------------
005:0027--------------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    3.14
| 02:500    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                               IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=       1.73         1.41
      Dep. Storage     (mm)=       2.00         5.00
      Average Slope     (%)=       1.00         1.00
      Length            (m)=     250.00        40.00
      Mannings n           =       .013         .240

      Max.eff.Inten.(mm/hr)=     141.24        52.52
                      over (min)      4.00        15.00
      Storage Coeff.  (min)=       3.86 (ii)   14.83 (ii)
      Unit Hyd. Tpeak (min)=       4.00        15.00
      Unit Hyd. peak  (cms)=        .29          .08
                                                          *TOTALS*
      PEAK FLOW       (cms)=        .41          .12          .446 (iii)
      TIME TO PEAK    (hrs)=       1.03         1.28         1.033
      RUNOFF VOLUME    (mm)=      42.19        21.75        30.944
      TOTAL RAINFALL   (mm)=      44.19        44.19        44.186
      RUNOFF COEFFICIENT   =        .95          .49          .700

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  86.0    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.

--------------------------------------------------------------------------------
005:0028--------------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    5.45
| 03:502    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                               IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=       3.00         2.45
      Dep. Storage     (mm)=       2.00         5.00
      Average Slope     (%)=       1.00         1.00
      Length            (m)=     600.00        40.00
      Mannings n           =       .013         .240

      Max.eff.Inten.(mm/hr)=     119.53        47.22
                      over (min)      7.00        18.00
      Storage Coeff.  (min)=       6.97 (ii)   18.42 (ii)
      Unit Hyd. Tpeak (min)=       7.00        18.00
      Unit Hyd. peak  (cms)=        .16          .06
                                                          *TOTALS*
      PEAK FLOW       (cms)=        .56          .19          .632 (iii)
      TIME TO PEAK    (hrs)=       1.08         1.33         1.100
      RUNOFF VOLUME    (mm)=      42.19        21.75        30.944
      TOTAL RAINFALL   (mm)=      44.19        44.19        44.186
      RUNOFF COEFFICIENT   =        .95          .49          .700

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  86.0    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.

--------------------------------------------------------------------------------
005:0029--------------------------------------------------------------------------
------------------------
| ADD HYD (Pond5In   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 01:501          2.93     .416    1.03  30.94    .000
                      +ID2 02:500           3.14     .446    1.03  30.94    .000
                      +ID3 03:502           5.45     .632    1.10  30.94    .000
                       ============================================================
                       SUM 04:Pond5In      11.52    1.421    1.05  30.94    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0030--------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>04:(Pond5I)    |

| OUT<05:(Pond5 )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |     .850  .5000E+00
                             .190  .2300E+00    |     .000  .0000E+00

      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
      ---------------------       (ha)     (cms)     (hrs)       (mm)
      INFLOW >04: (Pond5I)      11.52     1.421     1.050     30.944
      OUTFLOW<05: (Pond5 )      11.52      .210     2.117     30.944

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   14.770
                    TIME SHIFT OF PEAK FLOW          (min)=    64.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2381E+00

--------------------------------------------------------------------------------
005:0031--------------------------------------------------------------------------
*#*****************************************************************************
*#
*# EXT3 Sizing, CAs EXT3
*#
*#*****************************************************************************
----------------------
| CALIB STANDHYD     |   Area    (ha)=    9.16
| 01:EXT3   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                               IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=       5.04         4.12
      Dep. Storage     (mm)=       2.00         5.00
      Average Slope     (%)=       1.00         1.00
      Length            (m)=     400.00        40.00
      Mannings n           =       .013         .240

      Max.eff.Inten.(mm/hr)=     141.24        50.53
                      over (min)      5.00        16.00
      Storage Coeff.  (min)=       5.11 (ii)   16.25 (ii)
      Unit Hyd. Tpeak (min)=       5.00        16.00
      Unit Hyd. peak  (cms)=        .22          .07
                                                          *TOTALS*
      PEAK FLOW       (cms)=       1.08          .34         1.182 (iii)
      TIME TO PEAK    (hrs)=       1.05         1.30         1.050
      RUNOFF VOLUME    (mm)=      42.19        21.75        30.944
      TOTAL RAINFALL   (mm)=      44.19        44.19        44.186
      RUNOFF COEFFICIENT   =        .95          .49          .700

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  86.0    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.

--------------------------------------------------------------------------------
005:0032--------------------------------------------------------------------------
----------------------
| COMPUTE DUALHYD    |   Average inlet capacities   [CINLET] =    .150  (cms)
| TotalHyd 01:EXT3   |   Number of inlets in system [NINLET] =      1
----------------------   Total minor system capacity          =    .150  (cms)
                         Total major system storage [TMJSTO] =   5000.(cu.m.)

                   ID: NHYD        AREA     QPEAK     TPEAK     R.V.      DWF
                                    (ha)     (cms)     (hrs)     (mm)    (cms)
      TOTAL HYD.   01:EXT3         9.16     1.182     1.050   30.944     .000
      ==========================================================================
      MAJOR SYST   02:noFlow        .00      .000      .000     .000     .000
      MINOR SYST   03:MinorE       9.16      .150      .817   31.036     .000

      NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

      Maximum MAJOR SYSTEM storage used =    1634.(cu.m.)

--------------------------------------------------------------------------------
005:0033--------------------------------------------------------------------------
*#*****************************************************************************
*#
*# Flow Totals and Channel Runoff
*#
*#*****************************************************************************
------------------------
| ADD HYD (Control   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 02:noFlow         .00      .000     .00     .00    .000
                      +ID2 03:MinorEXT3      9.16      .150     .82   31.04    .000
                      +ID3 05:Pond5         11.52      .210    2.12   30.94    .000
                      +ID4 06:Pond4         18.94      .472    1.87   30.94    .000
                      +ID5 07:Pond3         18.88      .434    1.95   26.76    .000
                      +ID6 08:Pond2          7.53      .137    2.15   30.94    .000
                      +ID7 09:Pond1          4.08      .088    1.95   30.94    .000
                      +ID8 10:ExPond        32.50      .869    1.90   30.94    .000
                       ============================================================
                       SUM 01:Control      102.61    2.348    1.95  30.18    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0034--------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=     .99   Curve Number   (CN)=68.00
| 02:600    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .350

      Unit Hyd Qpeak  (cms)=     .108

      PEAK FLOW       (cms)=     .023 (i)
      TIME TO PEAK    (hrs)=    1.483
      RUNOFF VOLUME    (mm)=    9.674
      TOTAL RAINFALL   (mm)=   44.186
      RUNOFF COEFFICIENT   =     .219

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

--------------------------------------------------------------------------------
005:0035--------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    3.54   Curve Number   (CN)=68.00
| 03:601    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .590

      Unit Hyd Qpeak  (cms)=     .229

      PEAK FLOW       (cms)=     .058 (i)
      TIME TO PEAK    (hrs)=    1.817
      RUNOFF VOLUME    (mm)=    9.675
      TOTAL RAINFALL   (mm)=   44.186
      RUNOFF COEFFICIENT   =     .219

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

```
01779> ------------------------------------------------------------------------------
01780> 005:0036------------------------------------------------------------------------
01781> ----------------------
01782> | CALIB NASHYD       |   Area    (ha)=    3.61   Curve Number   (CN)=68.00
01783> | 04:602    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
01784> ----------------------   U.H. Tp(hrs)=    .970
01785>
01786>      Unit Hyd Qpeak  (cms)=     .142
01787>
01788>      PEAK FLOW       (cms)=     .042 (i)
01789>      TIME TO PEAK    (hrs)=    2.317
01790>      RUNOFF VOLUME    (mm)=    9.675
01791>      TOTAL RAINFALL   (mm)=   44.186
01792>      RUNOFF COEFFICIENT   =     .219
01793>
01794>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01795>
01796> ------------------------------------------------------------------------------
01797> 005:0037------------------------------------------------------------------------
01798> ------------------------
01799> | ADD HYD (PostTot   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01800> ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
01801>                       ID1 01:Control      102.61    2.348    1.95  30.18    .000
01802>                      +ID2 02:600            .99     .023    1.48   9.67    .000
01803>                      +ID3 03:601           3.54     .058    1.82   9.67    .000
01804>                      +ID4 04:602           3.61     .042    2.32   9.67    .000
01805>                       ========================================================
01806>                       SUM 05:PostTot      110.75    2.456    1.95  28.67    .000
01807>
01808>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01809>
01810> ------------------------------------------------------------------------------
01811> 005:0038------------------------------------------------------------------------
01812> ------------------------------------------------------------------------------
01813> 005:0002------------------------------------------------------------------------
01814>   ** END OF RUN :   9
01815>
01816> ******************************************************************************
01817>
01818>
01819>
01820>
01821>
01822> --------------------
01823> | START            |  Project  dir.: C:\MODELL~1\14170\SWMHYMO\
01824> --------------------  Rainfall dir.: C:\MODELL~1\14170\SWMHYMO\
01825>     TZERO =   .00 hrs on        0
01826>     METOUT=   2 (output = METRIC)
01827>     NRUN  = 010
01828>     NSTORM=   1
01829>            #  1=ldn10YR.3hr
01830> ------------------------------------------------------------------------------
01831> 010:0002------------------------------------------------------------------------
01832> *#*************************************************************************
01833> *#  Project Name: [Col Talbot Complete Corridor]    Project Number: [161414170]
01834> *#  Date        : 2022-11-14
01835> *#  Modeller    : [AKK]
01836> *#  Company     : Stantec Consulting Ltd. (London)
01837> *#  License #   :  4730904
01838> *#*************************************************************************
01839> *#*************************************************************************
01840> *#
01841> *#  This model represents the hydologic characteristics of the existing and
01842> *#  proposed conditions in the proposed subdivision.
01843> *#  Storm events modeled are:
01844> *#  2YR, 5YR, 10YR, 25YR, 50YR, 100YR and 250YR 3hr Chicago STORMS (London, ONT.
01845> *#
01846> *#*************************************************************************
01847> ------------------------------------------------------------------------------
01848> 010:0002------------------------------------------------------------------------
01849> --------------------
01850> | READ STORM       |    Filename: 10-yr, 3hr Chicago Storm from London IDF
01851> | Ptotal=  52.05 mm|    Comments: 10-yr, 3hr Chicago Storm from London IDF
01852> --------------------
01853>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
01854>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
01855>               .08   3.462 |    .83  25.620 |   1.58  11.888 |   2.33   4.796
01856>               .17   3.833 |    .92  61.474 |   1.67  10.245 |   2.42   4.496
01857>               .25   4.297 |   1.00 162.470 |   1.75   8.987 |   2.50   4.231
01858>               .33   4.891 |   1.08  79.139 |   1.83   7.997 |   2.58   3.997
01859>               .42   5.677 |   1.17  44.600 |   1.92   7.200 |   2.67   3.788
01860>               .50   6.765 |   1.25  29.885 |   2.00   6.545 |   2.75   3.600
01861>               .58   8.360 |   1.33  22.041 |   2.08   5.998 |   2.83   3.430
01862>               .67  10.895 |   1.42  17.275 |   2.17   5.535 |   2.92   3.276
01863>               .75  15.461 |   1.50  14.115 |   2.25   5.139 |   3.00   3.135
01864>
01865> ------------------------------------------------------------------------------
01866> 010:0003------------------------------------------------------------------------
01867> *#*************************************************************************
01868> *#
01869> *#  Existing Conditions to determine target release rates
01870> *#
01871> *#*************************************************************************
01872> ----------------------
01873> | CALIB NASHYD       |   Area    (ha)=   49.50   Curve Number   (CN)=84.00
01874> | 01:S101   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
01875> ----------------------   U.H. Tp(hrs)=    .840
01876>
01877>      Unit Hyd Qpeak  (cms)=    2.251
01878>
01879>      PEAK FLOW       (cms)=    1.577 (i)
01880>      TIME TO PEAK    (hrs)=    2.083
01881>      RUNOFF VOLUME    (mm)=   23.193
01882>      TOTAL RAINFALL   (mm)=   52.045
01883>      RUNOFF COEFFICIENT   =     .446
01884>
01885>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01886>
01887> ------------------------------------------------------------------------------
01888> 010:0004------------------------------------------------------------------------
01889> ----------------------
01890> | CALIB NASHYD       |   Area    (ha)=   32.80   Curve Number   (CN)=84.00
01891> | 02:S102   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
01892> ----------------------   U.H. Tp(hrs)=    .620
01893>
01894>      Unit Hyd Qpeak  (cms)=    2.021
01895>
01896>      PEAK FLOW       (cms)=    1.306 (i)
01897>      TIME TO PEAK    (hrs)=    1.817
01898>      RUNOFF VOLUME    (mm)=   23.193
01899>      TOTAL RAINFALL   (mm)=   52.045
01900>      RUNOFF COEFFICIENT   =     .446
01901>
01902>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01903>
01904> ------------------------------------------------------------------------------
01905> 010:0005------------------------------------------------------------------------
01906> ----------------------
01907> | CALIB NASHYD       |   Area    (ha)=    8.90   Curve Number   (CN)=84.00
01908> | 03:S103   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
01909> ----------------------   U.H. Tp(hrs)=    .480
01910>
01911>      Unit Hyd Qpeak  (cms)=     .708
01912>
01913>      PEAK FLOW       (cms)=     .425 (i)
01914>      TIME TO PEAK    (hrs)=    1.633
01915>      RUNOFF VOLUME    (mm)=   23.193
01916>      TOTAL RAINFALL   (mm)=   52.045
01917>      RUNOFF COEFFICIENT   =     .446
01918>
01919>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01920>
01921> ------------------------------------------------------------------------------
01922> 010:0006------------------------------------------------------------------------
01923> ----------------------
01924> | CALIB NASHYD       |   Area    (ha)=   33.50   Curve Number   (CN)=84.00
01925> | 04:S104   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
01926> ----------------------   U.H. Tp(hrs)=    .720
01927>
01928>      Unit Hyd Qpeak  (cms)=    1.777
01929>
01930>      PEAK FLOW       (cms)=    1.196 (i)
01931>      TIME TO PEAK    (hrs)=    1.933
01932>      RUNOFF VOLUME    (mm)=   23.193
01933>      TOTAL RAINFALL   (mm)=   52.045
01934>      RUNOFF COEFFICIENT   =     .446
01935>
01936>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01937>
01938> ------------------------------------------------------------------------------
01939> 010:0007------------------------------------------------------------------------
01940> ------------------------
01941> | ADD HYD (Total     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01942> ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
01943>                       ID1 01:S101          49.50    1.577    2.08  23.19    .000
01944>                      +ID2 02:S102          32.80    1.306    1.82  23.19    .000
01945>                      +ID3 03:S103           8.90     .425    1.63  23.19    .000
01946>                      +ID4 04:S104          33.50    1.196    1.93  23.19    .000
01947>                       ========================================================
01948>                       SUM 05:Total        124.70    4.383    1.92  23.19    .000
01949>
01950>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01951>
01952> ------------------------------------------------------------------------------
01953> 010:0008------------------------------------------------------------------------
01954> *#*************************************************************************
01955> *#
01956> *#  External Pond Sizing, CAs EXT1 and EXT2
01957> *#
01958> *#*************************************************************************
01959> ----------------------
01960> | CALIB STANDHYD     |   Area    (ha)=    9.50
01961> | 01:EXT2   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
01962> ----------------------
01963>                                IMPERVIOUS    PERVIOUS (i)
01964>      Surface Area     (ha)=       5.22         4.27
01965>      Dep. Storage     (mm)=       2.00         5.00
01966>      Average Slope     (%)=       1.00         1.00
01967>      Length            (m)=     400.00        40.00
01968>      Mannings n            =       .013         .240
01969>
01970>      Max.eff.Inten.(mm/hr)=     162.47        68.91
01971>                  over (min)=       5.00        15.00
01972>      Storage Coeff.  (min)=       4.83 (ii)   14.67 (ii)
01973>      Unit Hyd. Tpeak (min)=       5.00        15.00
01974>      Unit Hyd. peak  (cms)=        .23          .08
01975>                                                          *TOTALS*
01976>      PEAK FLOW       (cms)=       1.33          .49         1.506 (iii)
01977>      TIME TO PEAK    (hrs)=       1.05         1.27          1.067
01978>      RUNOFF VOLUME    (mm)=      50.04        28.12         37.985
01979>      TOTAL RAINFALL   (mm)=      52.05        52.05         52.045
01980>      RUNOFF COEFFICIENT   =        .96          .54           .730
01981>
01982>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
01983>            CN* =  86.0    Ia = Dep. Storage  (Above)
01984>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
01985>            THAN THE STORAGE COEFFICIENT.
01986>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01987>
01988> ------------------------------------------------------------------------------
01989> 010:0009------------------------------------------------------------------------
01990> ----------------------
01991> | CALIB STANDHYD     |   Area    (ha)=   23.00
01992> | 02:EXT1   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
01993> ----------------------
01994>                                IMPERVIOUS    PERVIOUS (i)
01995>      Surface Area     (ha)=      12.65        10.35
01996>      Dep. Storage     (mm)=       2.00         5.00
01997>      Average Slope     (%)=       1.00         1.00
01998>      Length            (m)=     750.00        40.00
01999>      Mannings n            =       .013         .240
02000>
02001>      Max.eff.Inten.(mm/hr)=     131.22        61.96
02002>                  over (min)=       8.00        18.00
02003>      Storage Coeff.  (min)=       7.68 (ii)   17.95 (ii)
02004>      Unit Hyd. Tpeak (min)=       8.00        18.00
02005>      Unit Hyd. peak  (cms)=        .15          .06
02006>                                                          *TOTALS*
02007>      PEAK FLOW       (cms)=       2.65         1.05         3.134 (iii)
02008>      TIME TO PEAK    (hrs)=       1.10         1.33          1.117
02009>      RUNOFF VOLUME    (mm)=      50.04        28.12         37.985
02010>      TOTAL RAINFALL   (mm)=      52.05        52.05         52.045
02011>      RUNOFF COEFFICIENT   =        .96          .54           .730
02012>
02013>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02014>            CN* =  86.0    Ia = Dep. Storage  (Above)
02015>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02016>            THAN THE STORAGE COEFFICIENT.
02017>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02018>
02019> ------------------------------------------------------------------------------
02020> 010:0010------------------------------------------------------------------------
02021> ------------------------
02022> | ADD HYD (ExPondIn  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02023> ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
02024>                       ID1 01:EXT2           9.50    1.506    1.07  37.99    .000
02025>                      +ID2 02:EXT1          23.00    3.134    1.12  37.99    .000
02026>                       ========================================================
02027>                       SUM 03:ExPondIn      32.50    4.537    1.12  37.99    .000
02028>
02029>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02030>
02031> ------------------------------------------------------------------------------
02032> 010:0011------------------------------------------------------------------------
```

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02033> ----------------------
02034> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02035> |  IN>03:(ExPond)   |
02036> | OUT<10:(ExPond)   |    =========  OUTLFOW STORAGE TABLE  =========
02037> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02038>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
02039>                              .000  .0000E+00   |    2.420  .1200E+01
02040>                              .530  .4500E+00   |     .000  .0000E+00
02041>
02042>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02043>      --------------------       (ha)     (cms)     (hrs)       (mm)
02044>      INFLOW >03: (ExPond)      32.50     4.537     1.117     37.985
02045>      OUTFLOW<10: (ExPond)      32.50     1.183     1.817     37.985
02046>
02047>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=   26.086
02048>                      TIME SHIFT OF PEAK FLOW          (min)=    42.00
02049>                      MAXIMUM  STORAGE   USED       (ha.m.)=.7093E+00
02050>
02051> --------------------------------------------------------------------------------
02052> 010:0012----------------------------------------------------------------------
02053> *#*****************************************************************************
02054> *#
02055> *#  Pond 1 Sizing, CAs 100
02056> *#
02057> *#*****************************************************************************
02058> ----------------------
02059> | CALIB STANDHYD     |   Area    (ha)=    4.08
02060> | 01:100    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
02061> ----------------------
02062>                              IMPERVIOUS    PERVIOUS (i)
02063>      Surface Area     (ha)=       2.24         1.84
02064>      Dep. Storage     (mm)=       2.00         5.00
02065>      Average Slope     (%)=       1.00         1.00
02066>      Length            (m)=     300.00        40.00
02067>      Mannings n            =       .013         .240
02068>
02069>      Max.eff.Inten.(mm/hr)=     162.47        70.97
02070>                 over (min)        4.00        14.00
02071>      Storage Coeff.  (min)=       4.07 (ii)   13.79 (ii)
02072>      Unit Hyd. Tpeak (min)=       4.00        14.00
02073>      Unit Hyd. peak  (cms)=        .28          .08
02074>                                                          *TOTALS*
02075>      PEAK FLOW       (cms)=        .61          .22          .683 (iii)
02076>      TIME TO PEAK    (hrs)=       1.03         1.25         1.033
02077>      RUNOFF VOLUME    (mm)=      50.04        28.12        37.985
02078>      TOTAL RAINFALL   (mm)=      52.05        52.05        52.045
02079>      RUNOFF COEFFICIENT   =        .96          .54          .730
02080>
02081>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02082>            CN* =  86.0    Ia = Dep. Storage  (Above)
02083>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02084>            THAN THE STORAGE COEFFICIENT.
02085>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02086>
02087> --------------------------------------------------------------------------------
02088> 010:0013----------------------------------------------------------------------
02089> ----------------------
02090> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02091> |  IN>01:(100   )   |
02092> | OUT<09:(Pond1 )   |    =========  OUTLFOW STORAGE TABLE  =========
02093> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02094>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
02095>                              .000  .0000E+00   |     .300  .2000E+00
02096>                              .070  .7000E-01   |     .000  .0000E+00
02097>
02098>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02099>      --------------------       (ha)     (cms)     (hrs)       (mm)
02100>      INFLOW >01: (100   )       4.08      .683     1.033     37.985
02101>      OUTFLOW<09: (Pond1 )       4.08      .119     1.850     37.985
02102>
02103>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=   17.460
02104>                      TIME SHIFT OF PEAK FLOW          (min)=    49.00
02105>                      MAXIMUM  STORAGE   USED       (ha.m.)=.9784E-01
02106>
02107> --------------------------------------------------------------------------------
02108> 010:0014----------------------------------------------------------------------
02109> *#*****************************************************************************
02110> *#
02111> *#  Pond 2 Sizing, CAs 200
02112> *#
02113> *#*****************************************************************************
02114> ----------------------
02115> | CALIB STANDHYD     |   Area    (ha)=    7.53
02116> | 01:200    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
02117> ----------------------
02118>                              IMPERVIOUS    PERVIOUS (i)
02119>      Surface Area     (ha)=       4.14         3.39
02120>      Dep. Storage     (mm)=       2.00         5.00
02121>      Average Slope     (%)=       1.00         1.00
02122>      Length            (m)=     550.00        40.00
02123>      Mannings n            =       .013         .240
02124>
02125>      Max.eff.Inten.(mm/hr)=     148.58        66.30
02126>                 over (min)        6.00        16.00
02127>      Storage Coeff.  (min)=       6.06 (ii)   16.06 (ii)
02128>      Unit Hyd. Tpeak (min)=       6.00        16.00
02129>      Unit Hyd. peak  (cms)=        .19          .07
02130>                                                          *TOTALS*
02131>      PEAK FLOW       (cms)=        .96          .37         1.117 (iii)
02132>      TIME TO PEAK    (hrs)=       1.07         1.30         1.083
02133>      RUNOFF VOLUME    (mm)=      50.04        28.12        37.985
02134>      TOTAL RAINFALL   (mm)=      52.05        52.05        52.045
02135>      RUNOFF COEFFICIENT   =        .96          .54          .730
02136>
02137>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02138>            CN* =  86.0    Ia = Dep. Storage  (Above)
02139>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02140>            THAN THE STORAGE COEFFICIENT.
02141>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02142>
02143> --------------------------------------------------------------------------------
02144> 010:0015----------------------------------------------------------------------
02145> ----------------------
02146> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02147> |  IN>01:(200   )   |
02148> | OUT<08:(Pond2 )   |    =========  OUTLFOW STORAGE TABLE  =========
02149> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02150>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
02151>                              .000  .0000E+00   |     .560  .3000E+00
02152>                              .120  .1500E+00   |     .000  .0000E+00
02153>
02154>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02155>      --------------------       (ha)     (cms)     (hrs)       (mm)
02156>      INFLOW >01: (200   )       7.53     1.117     1.083     37.985
02157>      OUTFLOW<08: (Pond2 )       7.53      .220     1.917     37.985
02158>
02159>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=   19.718
02160>                      TIME SHIFT OF PEAK FLOW          (min)=    50.00
02161>                      MAXIMUM  STORAGE   USED       (ha.m.)=.1842E+00
02162>
02163> --------------------------------------------------------------------------------
02164> 010:0016----------------------------------------------------------------------
02165> *#*****************************************************************************
02166> *#
02167> *# Pond 3 Sizing, CAs 300, 301 and 302
02168> *#
02169> *#*****************************************************************************
02170> ----------------------
02171> | CALIB STANDHYD     |   Area    (ha)=   10.33
02172> | 01:300    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
02173> ----------------------
02174>                              IMPERVIOUS    PERVIOUS (i)
02175>      Surface Area     (ha)=       5.68         4.65
02176>      Dep. Storage     (mm)=       2.00         5.00
02177>      Average Slope     (%)=       1.00         1.00
02178>      Length            (m)=     610.00        40.00
02179>      Mannings n            =       .013         .240
02180>
02181>      Max.eff.Inten.(mm/hr)=     138.66        63.99
02182>                 over (min)        7.00        17.00
02183>      Storage Coeff.  (min)=       6.63 (ii)   16.77 (ii)
02184>      Unit Hyd. Tpeak (min)=       7.00        17.00
02185>      Unit Hyd. peak  (cms)=        .17          .07
02186>                                                          *TOTALS*
02187>      PEAK FLOW       (cms)=       1.27          .49         1.483 (iii)
02188>      TIME TO PEAK    (hrs)=       1.08         1.32         1.100
02189>      RUNOFF VOLUME    (mm)=      50.04        28.12        37.985
02190>      TOTAL RAINFALL   (mm)=      52.05        52.05        52.045
02191>      RUNOFF COEFFICIENT   =        .96          .54          .730
02192>
02193>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02194>            CN* =  86.0    Ia = Dep. Storage  (Above)
02195>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02196>            THAN THE STORAGE COEFFICIENT.
02197>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02198>
02199> --------------------------------------------------------------------------------
02200> 010:0017----------------------------------------------------------------------
02201> ----------------------
02202> | CALIB STANDHYD     |   Area    (ha)=    4.18
02203> | 02:302    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
02204> ----------------------
02205>                              IMPERVIOUS    PERVIOUS (i)
02206>      Surface Area     (ha)=       2.30         1.88
02207>      Dep. Storage     (mm)=       2.00         5.00
02208>      Average Slope     (%)=       1.00         1.00
02209>      Length            (m)=     210.00        40.00
02210>      Mannings n            =       .013         .240
02211>
02212>      Max.eff.Inten.(mm/hr)=     162.47        73.37
02213>                 over (min)        3.00        13.00
02214>      Storage Coeff.  (min)=       3.28 (ii)   12.88 (ii)
02215>      Unit Hyd. Tpeak (min)=       3.00        13.00
02216>      Unit Hyd. peak  (cms)=        .35          .09
02217>                                                          *TOTALS*
02218>      PEAK FLOW       (cms)=        .68          .23          .750 (iii)
02219>      TIME TO PEAK    (hrs)=       1.02         1.23         1.017
02220>      RUNOFF VOLUME    (mm)=      50.04        28.12        37.985
02221>      TOTAL RAINFALL   (mm)=      52.05        52.05        52.045
02222>      RUNOFF COEFFICIENT   =        .96          .54          .730
02223>
02224>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02225>            CN* =  86.0    Ia = Dep. Storage  (Above)
02226>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02227>            THAN THE STORAGE COEFFICIENT.
02228>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02229>
02230> --------------------------------------------------------------------------------
02231> 010:0018----------------------------------------------------------------------
02232> ----------------------
02233> | CALIB NASHYD       |   Area    (ha)=    4.37   Curve Number   (CN)=76.00
02234> | 03:301    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
02235> ----------------------   U.H. Tp(hrs)=    .410
02236>
02237>      Unit Hyd Qpeak  (cms)=     .407
02238>
02239>      PEAK FLOW       (cms)=     .170 (i)
02240>      TIME TO PEAK    (hrs)=    1.550
02241>      RUNOFF VOLUME    (mm)=   17.392
02242>      TOTAL RAINFALL   (mm)=   52.045
02243>      RUNOFF COEFFICIENT   =     .334
02244>
02245>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02246>
02247> --------------------------------------------------------------------------------
02248> 010:0019----------------------------------------------------------------------
02249> -------------------------
02250> | ADD HYD (Pond3In   ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
02251> -------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
02252>                        ID1 01:300          10.33     1.483   1.10  37.99    .000
02253>                       +ID2 02:302           4.18      .750   1.02  37.99    .000
02254>                       +ID3 03:301           4.37      .170   1.55  17.39    .000
02255>                        ==========================================================
02256>                        SUM 04:Pond3In       18.88    2.148    1.10  33.22    .000
02257>
02258>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02259>
02260> --------------------------------------------------------------------------------
02261> 010:0020----------------------------------------------------------------------
02262> ----------------------
02263> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02264> |  IN>04:(Pond3I)   |
02265> | OUT<07:(Pond3 )   |    =========  OUTLFOW STORAGE TABLE  =========
02266> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02267>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
02268>                              .000  .0000E+00   |    1.400  .5800E+00
02269>                              .310  .2500E+00   |     .000  .0000E+00
02270>
02271>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02272>      --------------------       (ha)     (cms)     (hrs)       (mm)
02273>      INFLOW >04: (Pond3I)      18.88     2.148     1.100     33.219
02274>      OUTFLOW<07: (Pond3 )      18.88      .624     1.833     33.219
02275>
02276>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=   29.054
02277>                      TIME SHIFT OF PEAK FLOW          (min)=    44.00
02278>                      MAXIMUM  STORAGE   USED       (ha.m.)=.3451E+00
02279>
02280> --------------------------------------------------------------------------------
02281> 010:0021----------------------------------------------------------------------
02282> *#*****************************************************************************
02283> *#
02284> *# Pond 4 Sizing, CAs 400, 401 and 402
02285> *#
02286> *#*****************************************************************************
```

```
02287> ----------------------
02288> | CALIB STANDHYD     |   Area    (ha)=   10.47
02289> | 01:402    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
02290> ----------------------
02291>                              IMPERVIOUS    PERVIOUS (i)
02292>      Surface Area     (ha)=       5.76         4.71
02293>      Dep. Storage     (mm)=       2.00         5.00
02294>      Average Slope     (%)=       1.00         1.00
02295>      Length            (m)=     350.00        40.00
02296>      Mannings n            =       .013         .240
02297>
02298>      Max.eff.Inten.(mm/hr)=     162.47        70.97
02299>                 over (min)        4.00        14.00
02300>      Storage Coeff.  (min)=       4.46 (ii)   14.19 (ii)
02301>      Unit Hyd. Tpeak (min)=       4.00        14.00
02302>      Unit Hyd. peak  (cms)=        .26          .08
02303>                                                          *TOTALS*
02304>      PEAK FLOW       (cms)=       1.53          .55          1.708 (iii)
02305>      TIME TO PEAK    (hrs)=       1.03         1.27          1.050
02306>      RUNOFF VOLUME    (mm)=      50.04        28.12         37.985
02307>      TOTAL RAINFALL   (mm)=      52.05        52.05         52.045
02308>      RUNOFF COEFFICIENT   =        .96          .54           .730
02309>
02310>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02311>            CN* =  86.0    Ia = Dep. Storage  (Above)
02312>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02313>            THAN THE STORAGE COEFFICIENT.
02314>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02315>
02316> --------------------------------------------------------------------------------
02317> 010:0022--------------------------------------------------------------------------
02318> ----------------------
02319> | CALIB STANDHYD     |   Area    (ha)=    3.22
02320> | 02:401    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
02321> ----------------------
02322>                              IMPERVIOUS    PERVIOUS (i)
02323>      Surface Area     (ha)=       1.77         1.45
02324>      Dep. Storage     (mm)=       2.00         5.00
02325>      Average Slope     (%)=       1.00         1.00
02326>      Length            (m)=     250.00        40.00
02327>      Mannings n            =       .013         .240
02328>
02329>      Max.eff.Inten.(mm/hr)=     162.47        73.37
02330>                 over (min)        4.00        13.00
02331>      Storage Coeff.  (min)=       3.65 (ii)   13.24 (ii)
02332>      Unit Hyd. Tpeak (min)=       4.00        13.00
02333>      Unit Hyd. peak  (cms)=        .30          .09
02334>                                                          *TOTALS*
02335>      PEAK FLOW       (cms)=        .50          .18           .561 (iii)
02336>      TIME TO PEAK    (hrs)=       1.03         1.23          1.033
02337>      RUNOFF VOLUME    (mm)=      50.04        28.12         37.985
02338>      TOTAL RAINFALL   (mm)=      52.05        52.05         52.045
02339>      RUNOFF COEFFICIENT   =        .96          .54           .730
02340>
02341>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02342>            CN* =  86.0    Ia = Dep. Storage  (Above)
02343>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02344>            THAN THE STORAGE COEFFICIENT.
02345>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02346>
02347> --------------------------------------------------------------------------------
02348> 010:0023--------------------------------------------------------------------------
02349> ----------------------
02350> | CALIB STANDHYD     |   Area    (ha)=    5.25
02351> | 03:400    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
02352> ----------------------
02353>                              IMPERVIOUS    PERVIOUS (i)
02354>      Surface Area     (ha)=       2.89         2.36
02355>      Dep. Storage     (mm)=       2.00         5.00
02356>      Average Slope     (%)=       1.00         1.00
02357>      Length            (m)=     250.00        40.00
02358>      Mannings n            =       .013         .240
02359>
02360>      Max.eff.Inten.(mm/hr)=     162.47        73.37
02361>                 over (min)        4.00        13.00
02362>      Storage Coeff.  (min)=       3.65 (ii)   13.24 (ii)
02363>      Unit Hyd. Tpeak (min)=       4.00        13.00
02364>      Unit Hyd. peak  (cms)=        .30          .09
02365>                                                          *TOTALS*
02366>      PEAK FLOW       (cms)=        .82          .29           .914 (iii)
02367>      TIME TO PEAK    (hrs)=       1.03         1.23          1.033
02368>      RUNOFF VOLUME    (mm)=      50.04        28.12         37.985
02369>      TOTAL RAINFALL   (mm)=      52.05        52.05         52.045
02370>      RUNOFF COEFFICIENT   =        .96          .54           .730
02371>
02372>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02373>            CN* =  86.0    Ia = Dep. Storage  (Above)
02374>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02375>            THAN THE STORAGE COEFFICIENT.
02376>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02377>
02378> --------------------------------------------------------------------------------
02379> 010:0024--------------------------------------------------------------------------
02380> ------------------------
02381> | ADD HYD (Pond4In   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02382> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
02383>                       ID1 01:402          10.47    1.708    1.05  37.99    .000
02384>                      +ID2 02:401           3.22     .561    1.03  37.99    .000
02385>                      +ID3 03:400           5.25     .914    1.03  37.99    .000
02386>                       ========================================================
02387>                       SUM 04:Pond4In      18.94    3.180    1.03  37.99    .000
02388>
02389>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02390>
02391> --------------------------------------------------------------------------------
02392> 010:0025--------------------------------------------------------------------------
02393> ----------------------
02394> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02395> |  IN>04:(Pond4I)    |
02396> | OUT<06:(Pond4 )    |    =========  OUTLFOW STORAGE TABLE  =========
02397> ----------------------    OUTFLOW     STORAGE    |  OUTFLOW     STORAGE
02398>                             (cms)     (ha.m.)    |     (cms)     (ha.m.)
02399>                              .000  .0000E+00     |    1.400  .7000E+00
02400>                              .310  .3000E+00     |     .000  .0000E+00
02401>
02402>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02403>      ---------------------       (ha)     (cms)     (hrs)       (mm)
02404>      INFLOW >04: (Pond4I)      18.94     3.180     1.033     37.985
02405>      OUTFLOW<06: (Pond4 )      18.94      .669     1.750     37.985
02406>
02407>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=   21.045
02408>                      TIME SHIFT OF PEAK FLOW          (min)=    43.00
02409>                      MAXIMUM  STORAGE   USED       (ha.m.)=.4319E+00
02410>
02411> --------------------------------------------------------------------------------
02412> 010:0026--------------------------------------------------------------------------
02413> *#*****************************************************************************
02414> *#
02415> *# Pond 5 Sizing, CAs 500, 501 and 502
02416> *#
02417> *#*****************************************************************************
02418> ----------------------
02419> | CALIB STANDHYD     |   Area    (ha)=    2.93
02420> | 01:501    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
02421> ----------------------
02422>                              IMPERVIOUS    PERVIOUS (i)
02423>      Surface Area     (ha)=       1.61         1.32
02424>      Dep. Storage     (mm)=       2.00         5.00
02425>      Average Slope     (%)=       1.00         1.00
02426>      Length            (m)=     250.00        40.00
02427>      Mannings n            =       .013         .240
02428>
02429>      Max.eff.Inten.(mm/hr)=     162.47        73.37
02430>                 over (min)        4.00        13.00
02431>      Storage Coeff.  (min)=       3.65 (ii)   13.24 (ii)
02432>      Unit Hyd. Tpeak (min)=       4.00        13.00
02433>      Unit Hyd. peak  (cms)=        .30          .09
02434>                                                          *TOTALS*
02435>      PEAK FLOW       (cms)=        .46          .16           .510 (iii)
02436>      TIME TO PEAK    (hrs)=       1.03         1.23          1.033
02437>      RUNOFF VOLUME    (mm)=      50.04        28.12         37.985
02438>      TOTAL RAINFALL   (mm)=      52.05        52.05         52.045
02439>      RUNOFF COEFFICIENT   =        .96          .54           .730
02440>
02441>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02442>            CN* =  86.0    Ia = Dep. Storage  (Above)
02443>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02444>            THAN THE STORAGE COEFFICIENT.
02445>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02446>
02447> --------------------------------------------------------------------------------
02448> 010:0027--------------------------------------------------------------------------
02449> ----------------------
02450> | CALIB STANDHYD     |   Area    (ha)=    3.14
02451> | 02:500    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
02452> ----------------------
02453>                              IMPERVIOUS    PERVIOUS (i)
02454>      Surface Area     (ha)=       1.73         1.41
02455>      Dep. Storage     (mm)=       2.00         5.00
02456>      Average Slope     (%)=       1.00         1.00
02457>      Length            (m)=     250.00        40.00
02458>      Mannings n            =       .013         .240
02459>
02460>      Max.eff.Inten.(mm/hr)=     162.47        73.37
02461>                 over (min)        4.00        13.00
02462>      Storage Coeff.  (min)=       3.65 (ii)   13.24 (ii)
02463>      Unit Hyd. Tpeak (min)=       4.00        13.00
02464>      Unit Hyd. peak  (cms)=        .30          .09
02465>                                                          *TOTALS*
02466>      PEAK FLOW       (cms)=        .49          .17           .547 (iii)
02467>      TIME TO PEAK    (hrs)=       1.03         1.23          1.033
02468>      RUNOFF VOLUME    (mm)=      50.04        28.12         37.985
02469>      TOTAL RAINFALL   (mm)=      52.05        52.05         52.045
02470>      RUNOFF COEFFICIENT   =        .96          .54           .730
02471>
02472>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02473>            CN* =  86.0    Ia = Dep. Storage  (Above)
02474>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02475>            THAN THE STORAGE COEFFICIENT.
02476>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02477>
02478> --------------------------------------------------------------------------------
02479> 010:0028--------------------------------------------------------------------------
02480> ----------------------
02481> | CALIB STANDHYD     |   Area    (ha)=    5.45
02482> | 03:502    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
02483> ----------------------
02484>                              IMPERVIOUS    PERVIOUS (i)
02485>      Surface Area     (ha)=       3.00         2.45
02486>      Dep. Storage     (mm)=       2.00         5.00
02487>      Average Slope     (%)=       1.00         1.00
02488>      Length            (m)=     600.00        40.00
02489>      Mannings n            =       .013         .240
02490>
02491>      Max.eff.Inten.(mm/hr)=     148.58        66.30
02492>                 over (min)        6.00        16.00
02493>      Storage Coeff.  (min)=       6.39 (ii)   16.38 (ii)
02494>      Unit Hyd. Tpeak (min)=       6.00        16.00
02495>      Unit Hyd. peak  (cms)=        .18          .07
02496>                                                          *TOTALS*
02497>      PEAK FLOW       (cms)=        .68          .26           .796 (iii)
02498>      TIME TO PEAK    (hrs)=       1.07         1.30          1.083
02499>      RUNOFF VOLUME    (mm)=      50.04        28.12         37.985
02500>      TOTAL RAINFALL   (mm)=      52.05        52.05         52.045
02501>      RUNOFF COEFFICIENT   =        .96          .54           .730
02502>
02503>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02504>            CN* =  86.0    Ia = Dep. Storage  (Above)
02505>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02506>            THAN THE STORAGE COEFFICIENT.
02507>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02508>
02509> --------------------------------------------------------------------------------
02510> 010:0029--------------------------------------------------------------------------
02511> ------------------------
02512> | ADD HYD (Pond5In   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02513> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
02514>                       ID1 01:501           2.93     .510    1.03  37.99    .000
02515>                      +ID2 02:500           3.14     .547    1.03  37.99    .000
02516>                      +ID3 03:502           5.45     .796    1.08  37.99    .000
02517>                       ========================================================
02518>                       SUM 04:Pond5In      11.52    1.800    1.05  37.99    .000
02519>
02520>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02521>
02522> --------------------------------------------------------------------------------
02523> 010:0030--------------------------------------------------------------------------
02524> ----------------------
02525> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02526> |  IN>04:(Pond5I)    |
02527> | OUT<05:(Pond5 )    |    =========  OUTLFOW STORAGE TABLE  =========
02528> ----------------------    OUTFLOW     STORAGE    |  OUTFLOW     STORAGE
02529>                             (cms)     (ha.m.)    |     (cms)     (ha.m.)
02530>                              .000  .0000E+00     |     .850  .5000E+00
02531>                              .190  .2300E+00     |     .000  .0000E+00
02532>
02533>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02534>      ---------------------       (ha)     (cms)     (hrs)       (mm)
02535>      INFLOW >04: (Pond5I)      11.52     1.800     1.050     37.985
02536>      OUTFLOW<05: (Pond5 )      11.52      .323     1.900     37.985
02537>
02538>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=   17.948
02539>                      TIME SHIFT OF PEAK FLOW          (min)=    51.00
02540>                      MAXIMUM  STORAGE   USED       (ha.m.)=.2845E+00
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02541>
02542> ------------------------------------------------------------------------------
02543> 010:0031----------------------------------------------------------------------
02544> *#******************************************************************************
02545> *#
02546> *# EXT3 Sizing, CAs EXT3
02547> *#
02548> *#******************************************************************************
02549>  ---------------------
02550> | CALIB STANDHYD     |   Area    (ha)=    9.16
02551> | 01:EXT3   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
02552>  ---------------------
02553>                              IMPERVIOUS    PERVIOUS (i)
02554>      Surface Area     (ha)=       5.04         4.12
02555>      Dep. Storage     (mm)=       2.00         5.00
02556>      Average Slope     (%)=       1.00         1.00
02557>      Length            (m)=     400.00        40.00
02558>      Mannings n             =      .013         .240
02559>
02560>      Max.eff.Inten.(mm/hr)=     162.47        68.91
02561>                 over (min)        5.00        15.00
02562>      Storage Coeff.  (min)=       4.83 (ii)   14.67 (ii)
02563>      Unit Hyd. Tpeak (min)=       5.00        15.00
02564>      Unit Hyd. peak  (cms)=        .23          .08
02565>                                                          *TOTALS*
02566>      PEAK FLOW       (cms)=       1.28          .47         1.452 (iii)
02567>      TIME TO PEAK    (hrs)=       1.05         1.27         1.067
02568>      RUNOFF VOLUME    (mm)=      50.04        28.12        37.985
02569>      TOTAL RAINFALL   (mm)=      52.05        52.05        52.045
02570>      RUNOFF COEFFICIENT   =        .96          .54          .730
02571>
02572>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02573>            CN* =  86.0    Ia = Dep. Storage  (Above)
02574>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02575>            THAN THE STORAGE COEFFICIENT.
02576>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02577>
02578> ------------------------------------------------------------------------------
02579> 010:0032----------------------------------------------------------------------
02580>  ---------------------
02581> | COMPUTE DUALHYD    |   Average inlet capacities   [CINLET] =    .150  (cms)
02582> | TotalHyd 01:EXT3   |   Number of inlets in system [NINLET] =      1
02583>  ---------------------   Total minor system capacity        =    .150  (cms)
02584>                          Total major system storage [TMJSTO] =   5000.(cu.m.)
02585>
02586>                  ID: NHYD        AREA     QPEAK     TPEAK     R.V.      DWF
02587>                                   (ha)     (cms)     (hrs)     (mm)    (cms)
02588>      TOTAL HYD.   01:EXT3        9.16     1.452     1.067   37.985     .000
02589>      ==========================================================================
02590>      MAJOR SYST   02:noFlow        .00      .000      .000     .000     .000
02591>      MINOR SYST   03:MinorE       9.16      .150      .783   38.072     .000
02592>
02593>      NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02594>
02595>      Maximum MAJOR SYSTEM storage used =    2220.(cu.m.)
02596>
02597> ------------------------------------------------------------------------------
02598> 010:0033----------------------------------------------------------------------
02599> *#******************************************************************************
02600> *#
02601> *# Flow Totals and Channel Runoff
02602> *#
02603> *#******************************************************************************
02604>  ------------------------
02605> | ADD HYD (Control   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02606>  ------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
02607>                        ID1 02:noFlow         .00      .000     .00     .00    .000
02608>                       +ID2 03:MinorEXT3     9.16      .150     .78   38.07    .000
02609>                       +ID3 05:Pond5        11.52      .323    1.90   37.98    .000
02610>                       +ID4 06:Pond4        18.94      .669    1.75   37.98    .000
02611>                       +ID5 07:Pond3        18.88      .624    1.83   33.22    .000
02612>                       +ID6 08:Pond2         7.53      .220    1.92   37.98    .000
02613>                       +ID7 09:Pond1         4.08      .119    1.85   37.98    .000
02614>                       +ID8 10:ExPond       32.50    1.183    1.82   37.99    .000
02615>                        ==========================================================
02616>                        SUM 01:Control      102.61    3.282    1.83   37.12    .000
02617>
02618>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02619>
02620> ------------------------------------------------------------------------------
02621> 010:0034----------------------------------------------------------------------
02622>  ---------------------
02623> | CALIB NASHYD       |   Area    (ha)=     .99   Curve Number   (CN)=68.00
02624> | 02:600    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
02625>  ---------------------   U.H. Tp(hrs)=    .350
02626>
02627>      Unit Hyd Qpeak  (cms)=     .108
02628>
02629>      PEAK FLOW       (cms)=     .032 (i)
02630>      TIME TO PEAK    (hrs)=    1.483
02631>      RUNOFF VOLUME    (mm)=   13.287
02632>      TOTAL RAINFALL   (mm)=   52.045
02633>      RUNOFF COEFFICIENT   =     .255
02634>
02635>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02636>
02637> ------------------------------------------------------------------------------
02638> 010:0035----------------------------------------------------------------------
02639>  ---------------------
02640> | CALIB NASHYD       |   Area    (ha)=    3.54   Curve Number   (CN)=68.00
02641> | 03:601    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
02642>  ---------------------   U.H. Tp(hrs)=    .590
02643>
02644>      Unit Hyd Qpeak  (cms)=     .229
02645>
02646>      PEAK FLOW       (cms)=     .081 (i)
02647>      TIME TO PEAK    (hrs)=    1.800
02648>      RUNOFF VOLUME    (mm)=   13.287
02649>      TOTAL RAINFALL   (mm)=   52.045
02650>      RUNOFF COEFFICIENT   =     .255
02651>
02652>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02653>
02654> ------------------------------------------------------------------------------
02655> 010:0036----------------------------------------------------------------------
02656>  ---------------------
02657> | CALIB NASHYD       |   Area    (ha)=    3.61   Curve Number   (CN)=68.00
02658> | 04:602    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
02659>  ---------------------   U.H. Tp(hrs)=    .970
02660>
02661>      Unit Hyd Qpeak  (cms)=     .142
02662>
02663>      PEAK FLOW       (cms)=     .058 (i)
02664>      TIME TO PEAK    (hrs)=    2.300
02665>      RUNOFF VOLUME    (mm)=   13.287
02666>      TOTAL RAINFALL   (mm)=   52.045
02667>      RUNOFF COEFFICIENT   =     .255
02668>
02669>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02670>
02671> ------------------------------------------------------------------------------
02672> 010:0037----------------------------------------------------------------------
02673>  ------------------------
02674> | ADD HYD (PostTot   ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
02675>  ------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
02676>                        ID1 01:Control      102.61    3.282    1.83  37.12    .000
02677>                       +ID2 02:600            .99     .032    1.48  13.29    .000
02678>                       +ID3 03:601           3.54     .081    1.80  13.29    .000
02679>                       +ID4 04:602           3.61     .058    2.30  13.29    .000
02680>                        ==========================================================
02681>                        SUM 05:PostTot      110.75    3.436    1.83  35.36    .000
02682>
02683>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02684>
02685> ------------------------------------------------------------------------------
02686> 010:0038----------------------------------------------------------------------
02687> ------------------------------------------------------------------------------
02688> 010:0002----------------------------------------------------------------------
02689> ------------------------------------------------------------------------------
02690> 010:0002----------------------------------------------------------------------
02691>   ** END OF RUN :  24
02692>
02693> ******************************************************************************
02694>
02695>
02696>
02697>
02698>
02699>  --------------------
02700> | START              |  Project  dir.: C:\MODELL~1\14170\SWMHYMO\
02701>  --------------------  Rainfall dir.: C:\MODELL~1\14170\SWMHYMO\
02702>     TZERO =   .00 hrs on        0
02703>     METOUT=   2 (output = METRIC)
02704>     NRUN  = 025
02705>     NSTORM=   1
02706>               #  1=ldn25YR.3hr
02707> ------------------------------------------------------------------------------
02708> 025:0002----------------------------------------------------------------------
02709> *#******************************************************************************
02710> *#  Project Name: [Col Talbot Complete Corridor]    Project Number: [161414170]
02711> *#  Date        : 2022-11-14
02712> *#  Modeller    : [AKK]
02713> *#  Company     : Stantec Consulting Ltd. (London)
02714> *#  License #   :  4730904
02715> *#******************************************************************************
02716> *#******************************************************************************
02717> *#
02718> *#  This model represents the hydologic characteristics of the existing and
02719> *#  proposed conditions in the proposed subdivision.
02720> *#  Storm events modeled are:
02721> *#  2YR, 5YR, 10YR, 25YR, 50YR, 100YR and 250YR 3hr Chicago STORMS (London, ONT.
02722> *#
02723> *#******************************************************************************
02724> ------------------------------------------------------------------------------
02725> 025:0002----------------------------------------------------------------------
02726>  --------------------
02727> | READ STORM       |    Filename: 25-yr, 3hr Chicago Storm from London IDF
02728> | Ptotal=  61.48 mm|    Comments: 25-yr, 3hr Chicago Storm from London IDF
02729>  --------------------
02730>                TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
02731>                 hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
02732>                 .08   3.863 |    .83  30.802 |   1.58  13.993 |   2.33   5.432
02733>                 .17   4.298 |    .92  74.085 |   1.67  11.991 |   2.42   5.077
02734>                 .25   4.843 |   1.00 190.819 |   1.75  10.465 |   2.50   4.766
02735>                 .33   5.545 |   1.08  95.197 |   1.83   9.267 |   2.58   4.490
02736>                 .42   6.481 |   1.17  53.926 |   1.92   8.306 |   2.67   4.244
02737>                 .50   7.783 |   1.25  36.022 |   2.00   7.519 |   2.75   4.024
02738>                 .58   9.705 |   1.33  26.421 |   2.08   6.864 |   2.83   3.826
02739>                 .67  12.783 |   1.42  20.579 |   2.17   6.312 |   2.92   3.646
02740>                 .75  18.359 |   1.50  16.712 |   2.25   5.840 |   3.00   3.483
02741>
02742> ------------------------------------------------------------------------------
02743> 025:0003----------------------------------------------------------------------
02744> *#******************************************************************************
02745> *#
02746> *#  Existing Conditions to determine target release rates
02747> *#
02748> *#******************************************************************************
02749>  ---------------------
02750> | CALIB NASHYD       |   Area    (ha)=   49.50   Curve Number   (CN)=84.00
02751> | 01:S101   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
02752>  ---------------------   U.H. Tp(hrs)=    .840
02753>
02754>      Unit Hyd Qpeak  (cms)=    2.251
02755>
02756>      PEAK FLOW       (cms)=    2.102 (i)
02757>      TIME TO PEAK    (hrs)=    2.067
02758>      RUNOFF VOLUME    (mm)=   30.422
02759>      TOTAL RAINFALL   (mm)=   61.481
02760>      RUNOFF COEFFICIENT   =     .495
02761>
02762>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02763>
02764> ------------------------------------------------------------------------------
02765> 025:0004----------------------------------------------------------------------
02766>  ---------------------
02767> | CALIB NASHYD       |   Area    (ha)=   32.80   Curve Number   (CN)=84.00
02768> | 02:S102   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
02769>  ---------------------   U.H. Tp(hrs)=    .620
02770>
02771>      Unit Hyd Qpeak  (cms)=    2.021
02772>
02773>      PEAK FLOW       (cms)=    1.747 (i)
02774>      TIME TO PEAK    (hrs)=    1.800
02775>      RUNOFF VOLUME    (mm)=   30.422
02776>      TOTAL RAINFALL   (mm)=   61.481
02777>      RUNOFF COEFFICIENT   =     .495
02778>
02779>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02780>
02781> ------------------------------------------------------------------------------
02782> 025:0005----------------------------------------------------------------------
02783>  ---------------------
02784> | CALIB NASHYD       |   Area    (ha)=    8.90   Curve Number   (CN)=84.00
02785> | 03:S103   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
02786>  ---------------------   U.H. Tp(hrs)=    .480
02787>
02788>      Unit Hyd Qpeak  (cms)=     .708
02789>
02790>      PEAK FLOW       (cms)=     .570 (i)
02791>      TIME TO PEAK    (hrs)=    1.617
02792>      RUNOFF VOLUME    (mm)=   30.422
02793>      TOTAL RAINFALL   (mm)=   61.481
02794>      RUNOFF COEFFICIENT   =     .495
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02795>
02796>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02797>
02798> ---------------------------------------------------------------------------
02799> 025:0006----------------------------------------------------------------------
02800> ----------------------
02801> | CALIB NASHYD      |   Area    (ha)=   33.50   Curve Number   (CN)=84.00
02802> | 04:S104   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
02803> ----------------------   U.H. Tp(hrs)=    .720
02804>
02805>      Unit Hyd Qpeak  (cms)=    1.777
02806>
02807>      PEAK FLOW       (cms)=    1.597 (i)
02808>      TIME TO PEAK    (hrs)=    1.917
02809>      RUNOFF VOLUME    (mm)=   30.422
02810>      TOTAL RAINFALL   (mm)=   61.481
02811>      RUNOFF COEFFICIENT   =     .495
02812>
02813>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02814>
02815> ---------------------------------------------------------------------------
02816> 025:0007----------------------------------------------------------------------
02817> ------------------------
02818> | ADD HYD (Total     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02819> ------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
02820>                        ID1 01:S101         49.50    2.102    2.07  30.42    .000
02821>                       +ID2 02:S102         32.80    1.747    1.80  30.42    .000
02822>                       +ID3 03:S103          8.90     .570    1.62  30.42    .000
02823>                       +ID4 04:S104         33.50    1.597    1.92  30.42    .000
02824>                        ============================================================
02825>                        SUM 05:Total        124.70    5.855    1.90  30.42    .000
02826>
02827>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02828>
02829> ---------------------------------------------------------------------------
02830> 025:0008----------------------------------------------------------------------
02831> *#*************************************************************************
02832> *#
02833> *#  External Pond Sizing, CAs EXT1 and EXT2
02834> *#
02835> *#*************************************************************************
02836> ----------------------
02837> | CALIB STANDHYD     |   Area    (ha)=    9.50
02838> | 01:EXT2   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
02839> ----------------------
02840>                                IMPERVIOUS    PERVIOUS (i)
02841>      Surface Area     (ha)=        5.22          4.27
02842>      Dep. Storage     (mm)=        2.00          5.00
02843>      Average Slope     (%)=        1.00          1.00
02844>      Length            (m)=      400.00         40.00
02845>      Mannings n            =        .013          .240
02846>
02847>      Max.eff.Inten.(mm/hr)=      190.82         95.71
02848>                  over (min)        5.00         13.00
02849>      Storage Coeff.  (min)=        4.53 (ii)    13.16 (ii)
02850>      Unit Hyd. Tpeak (min)=        5.00         13.00
02851>      Unit Hyd. peak  (cms)=         .24           .09
02852>                                                          *TOTALS*
02853>      PEAK FLOW       (cms)=        1.61           .69          1.918 (iii)
02854>      TIME TO PEAK    (hrs)=        1.05          1.23          1.067
02855>      RUNOFF VOLUME    (mm)=       59.48         36.10         46.624
02856>      TOTAL RAINFALL   (mm)=       61.48         61.48         61.481
02857>      RUNOFF COEFFICIENT   =         .97           .59           .758
02858>
02859>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02860>            CN* =  86.0    Ia = Dep. Storage  (Above)
02861>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02862>            THAN THE STORAGE COEFFICIENT.
02863>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02864>
02865> ---------------------------------------------------------------------------
02866> 025:0009----------------------------------------------------------------------
02867> ----------------------
02868> | CALIB STANDHYD     |   Area    (ha)=   23.00
02869> | 02:EXT1   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
02870> ----------------------
02871>                                IMPERVIOUS    PERVIOUS (i)
02872>      Surface Area     (ha)=       12.65         10.35
02873>      Dep. Storage     (mm)=        2.00          5.00
02874>      Average Slope     (%)=        1.00          1.00
02875>      Length            (m)=      750.00         40.00
02876>      Mannings n            =        .013          .240
02877>
02878>      Max.eff.Inten.(mm/hr)=      163.50         86.50
02879>                  over (min)        7.00         16.00
02880>      Storage Coeff.  (min)=        7.03 (ii)    16.02 (ii)
02881>      Unit Hyd. Tpeak (min)=        7.00         16.00
02882>      Unit Hyd. peak  (cms)=         .16           .07
02883>                                                          *TOTALS*
02884>      PEAK FLOW       (cms)=        3.27          1.48          4.019 (iii)
02885>      TIME TO PEAK    (hrs)=        1.08          1.28          1.100
02886>      RUNOFF VOLUME    (mm)=       59.48         36.10         46.624
02887>      TOTAL RAINFALL   (mm)=       61.48         61.48         61.481
02888>      RUNOFF COEFFICIENT   =         .97           .59           .758
02889>
02890>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02891>            CN* =  86.0    Ia = Dep. Storage  (Above)
02892>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02893>            THAN THE STORAGE COEFFICIENT.
02894>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02895>
02896> ---------------------------------------------------------------------------
02897> 025:0010----------------------------------------------------------------------
02898> ----------------------
02899> | ADD HYD (ExPondIn  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02900> ------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
02901>                        ID1 01:EXT2          9.50    1.918    1.07  46.62    .000
02902>                       +ID2 02:EXT1         23.00    4.019    1.10  46.62    .000
02903>                        ============================================================
02904>                        SUM 03:ExPondIn      32.50    5.871    1.10  46.62    .000
02905>
02906>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02907>
02908> ---------------------------------------------------------------------------
02909> 025:0011----------------------------------------------------------------------
02910> ----------------------
02911> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02912> |  IN>03:(ExPond)    |
02913> | OUT<10:(ExPond)    |    =========  OUTFLOW STORAGE TABLE  =========
02914> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02915>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
02916>                              .000  .0000E+00    |    2.420  .1200E+01
02917>                              .530  .4500E+00    |     .000  .0000E+00
02918>
02919>      ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
02920>      ----------------------       (ha)     (cms)     (hrs)       (mm)
02921>      INFLOW >03: (ExPond)       32.50     5.871     1.100     46.624
02922>      OUTFLOW<10: (ExPond)       32.50     1.575     1.750     46.624
02923>
02924>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   26.820
02925>                    TIME SHIFT OF PEAK FLOW         (min)=    39.00
02926>                    MAXIMUM  STORAGE   USED       (ha.m.)=.8646E+00
02927>
02928> ---------------------------------------------------------------------------
02929> 025:0012----------------------------------------------------------------------
02930> *#*************************************************************************
02931> *#
02932> *#  Pond 1 Sizing, CAs 100
02933> *#
02934> *#*************************************************************************
02935> ----------------------
02936> | CALIB STANDHYD     |   Area    (ha)=    4.08
02937> | 01:100    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
02938> ----------------------
02939>                                IMPERVIOUS    PERVIOUS (i)
02940>      Surface Area     (ha)=        2.24          1.84
02941>      Dep. Storage     (mm)=        2.00          5.00
02942>      Average Slope     (%)=        1.00          1.00
02943>      Length            (m)=      300.00         40.00
02944>      Mannings n            =        .013          .240
02945>
02946>      Max.eff.Inten.(mm/hr)=      190.82         99.45
02947>                  over (min)        4.00         12.00
02948>      Storage Coeff.  (min)=        3.81 (ii)    12.31 (ii)
02949>      Unit Hyd. Tpeak (min)=        4.00         12.00
02950>      Unit Hyd. peak  (cms)=         .29           .09
02951>                                                          *TOTALS*
02952>      PEAK FLOW       (cms)=         .74           .31           .862 (iii)
02953>      TIME TO PEAK    (hrs)=        1.03          1.22          1.050
02954>      RUNOFF VOLUME    (mm)=       59.48         36.10         46.624
02955>      TOTAL RAINFALL   (mm)=       61.48         61.48         61.481
02956>      RUNOFF COEFFICIENT   =         .97           .59           .758
02957>
02958>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02959>            CN* =  86.0    Ia = Dep. Storage  (Above)
02960>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02961>            THAN THE STORAGE COEFFICIENT.
02962>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02963>
02964> ---------------------------------------------------------------------------
02965> 025:0013----------------------------------------------------------------------
02966> ----------------------
02967> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02968> |  IN>01:(100   )    |
02969> | OUT<09:(Pond1 )    |    =========  OUTLFOW STORAGE TABLE  =========
02970> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02971>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
02972>                              .000  .0000E+00    |     .300  .2000E+00
02973>                              .070  .7000E-01    |     .000  .0000E+00
02974>
02975>      ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
02976>      ----------------------       (ha)     (cms)     (hrs)       (mm)
02977>      INFLOW >01: (100   )       4.08      .862     1.050     46.624
02978>      OUTFLOW<09: (Pond1 )       4.08      .158     1.783     46.624
02979>
02980>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   18.335
02981>                    TIME SHIFT OF PEAK FLOW         (min)=    44.00
02982>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1198E+00
02983>
02984> ---------------------------------------------------------------------------
02985> 025:0014----------------------------------------------------------------------
02986> *#*************************************************************************
02987> *#
02988> *#  Pond 2 Sizing, CAs 200
02989> *#
02990> *#*************************************************************************
02991> ----------------------
02992> | CALIB STANDHYD     |   Area    (ha)=    7.53
02993> | 01:200    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
02994> ----------------------
02995>                                IMPERVIOUS    PERVIOUS (i)
02996>      Surface Area     (ha)=        4.14          3.39
02997>      Dep. Storage     (mm)=        2.00          5.00
02998>      Average Slope     (%)=        1.00          1.00
02999>      Length            (m)=      550.00         40.00
03000>      Mannings n            =        .013          .240
03001>
03002>      Max.eff.Inten.(mm/hr)=      174.88         92.53
03003>                  over (min)        6.00         14.00
03004>      Storage Coeff.  (min)=        5.68 (ii)    14.43 (ii)
03005>      Unit Hyd. Tpeak (min)=        6.00         14.00
03006>      Unit Hyd. peak  (cms)=         .20           .08
03007>                                                          *TOTALS*
03008>      PEAK FLOW       (cms)=        1.17           .52          1.431 (iii)
03009>      TIME TO PEAK    (hrs)=        1.07          1.25          1.083
03010>      RUNOFF VOLUME    (mm)=       59.48         36.10         46.624
03011>      TOTAL RAINFALL   (mm)=       61.48         61.48         61.481
03012>      RUNOFF COEFFICIENT   =         .97           .59           .758
03013>
03014>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
03015>            CN* =  86.0    Ia = Dep. Storage  (Above)
03016>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
03017>            THAN THE STORAGE COEFFICIENT.
03018>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
03019>
03020> ---------------------------------------------------------------------------
03021> 025:0015----------------------------------------------------------------------
03022> ----------------------
03023> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
03024> |  IN>01:(200   )    |
03025> | OUT<08:(Pond2 )    |    =========  OUTLFOW STORAGE TABLE  =========
03026> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
03027>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
03028>                              .000  .0000E+00    |     .560  .3000E+00
03029>                              .120  .1500E+00    |     .000  .0000E+00
03030>
03031>      ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
03032>      ----------------------       (ha)     (cms)     (hrs)       (mm)
03033>      INFLOW >01: (200   )       7.53     1.431     1.083     46.624
03034>      OUTFLOW<08: (Pond2 )       7.53      .321     1.783     46.624
03035>
03036>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   22.414
03037>                    TIME SHIFT OF PEAK FLOW         (min)=    42.00
03038>                    MAXIMUM  STORAGE   USED       (ha.m.)=.2185E+00
03039>
03040> ---------------------------------------------------------------------------
03041> 025:0016----------------------------------------------------------------------
03042> *#*************************************************************************
03043> *#
03044> *# Pond 3 Sizing, CAs 300, 301 and 302
03045> *#
03046> *#*************************************************************************
03047> ----------------------
03048> | CALIB STANDHYD     |   Area    (ha)=   10.33
```

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| 01:300    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.68         4.65
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     610.00        40.00
     Mannings n            =       .013         .240

     Max.eff.Inten.(mm/hr)=     174.88        89.79
                over (min)        6.00        15.00
     Storage Coeff.  (min)=       6.05 (ii)   14.90 (ii)
     Unit Hyd. Tpeak (min)=       6.00        15.00
     Unit Hyd. peak  (cms)=        .19          .08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.57          .69      1.898 (iii)
     TIME TO PEAK    (hrs)=       1.07         1.27      1.083
     RUNOFF VOLUME    (mm)=      59.48        36.10     46.624
     TOTAL RAINFALL   (mm)=      61.48        61.48     61.481
     RUNOFF COEFFICIENT   =        .97          .59       .758

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

--------------------------------------------------------------------------------
025:0017--------------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    4.18
| 02:302    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.30         1.88
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     210.00        40.00
     Mannings n            =       .013         .240

     Max.eff.Inten.(mm/hr)=     190.82        99.45
                over (min)        3.00        12.00
     Storage Coeff.  (min)=       3.08 (ii)   11.58 (ii)
     Unit Hyd. Tpeak (min)=       3.00        12.00
     Unit Hyd. peak  (cms)=        .37          .10
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .82          .32       .928 (iii)
     TIME TO PEAK    (hrs)=       1.02         1.22      1.017
     RUNOFF VOLUME    (mm)=      59.48        36.10     46.624
     TOTAL RAINFALL   (mm)=      61.48        61.48     61.481
     RUNOFF COEFFICIENT   =        .97          .59       .758

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

--------------------------------------------------------------------------------
025:0018--------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.37   Curve Number   (CN)=76.00
| 03:301    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=     .407

     PEAK FLOW       (cms)=     .234 (i)
     TIME TO PEAK    (hrs)=    1.550
     RUNOFF VOLUME    (mm)=   23.338
     TOTAL RAINFALL   (mm)=   61.481
     RUNOFF COEFFICIENT   =     .380

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

--------------------------------------------------------------------------------
025:0019--------------------------
| ADD HYD (Pond3In   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                 (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 01:300          10.33    1.898    1.08  46.62    .000
                     +ID2 02:302           4.18     .928    1.02  46.62    .000
                     +ID3 03:301           4.37     .234    1.55  23.34    .000
                      ============================================================
                      SUM 04:Pond3In       18.88    2.764    1.08  41.23    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
025:0020--------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>04:(Pond3I)    |
| OUT<07:(Pond3 )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |   1.400  .5800E+00
                             .310  .2500E+00    |    .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >04: (Pond3I)      18.88     2.764     1.083     41.234
     OUTFLOW<07: (Pond3 )      18.88      .857     1.750     41.234

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   31.004
                    TIME SHIFT OF PEAK FLOW       (min)=    40.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.4156E+00

--------------------------------------------------------------------------------
025:0021--------------------------------------------------------------------------
*#*************************************************************************
*#
*# Pond 4 Sizing, CAs 400, 401 and 402
*#
*#*************************************************************************
----------------------
| CALIB STANDHYD     |   Area    (ha)=   10.47
| 01:402    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.76         4.71
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     350.00        40.00
     Mannings n            =       .013         .240

     Max.eff.Inten.(mm/hr)=     190.82        95.71
                over (min)        4.00        13.00
     Storage Coeff.  (min)=       4.18 (ii)   12.81 (ii)
     Unit Hyd. Tpeak (min)=       4.00        13.00
     Unit Hyd. peak  (cms)=        .27          .09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.85          .77      2.136 (iii)
     TIME TO PEAK    (hrs)=       1.03         1.23      1.050
     RUNOFF VOLUME    (mm)=      59.48        36.10     46.624
     TOTAL RAINFALL   (mm)=      61.48        61.48     61.481
     RUNOFF COEFFICIENT   =        .97          .59       .758

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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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025:0022--------------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    3.22
| 02:401    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.77         1.45
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     250.00        40.00
     Mannings n            =       .013         .240

     Max.eff.Inten.(mm/hr)=     190.82        99.45
                over (min)        3.00        12.00
     Storage Coeff.  (min)=       3.42 (ii)   11.92 (ii)
     Unit Hyd. Tpeak (min)=       3.00        12.00
     Unit Hyd. peak  (cms)=        .34          .09
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .62          .25       .697 (iii)
     TIME TO PEAK    (hrs)=       1.02         1.22      1.017
     RUNOFF VOLUME    (mm)=      59.48        36.10     46.624
     TOTAL RAINFALL   (mm)=      61.48        61.48     61.481
     RUNOFF COEFFICIENT   =        .97          .59       .758

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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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025:0023--------------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    5.25
| 03:400    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.89         2.36
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     250.00        40.00
     Mannings n            =       .013         .240

     Max.eff.Inten.(mm/hr)=     190.82        99.45
                over (min)        3.00        12.00
     Storage Coeff.  (min)=       3.42 (ii)   11.92 (ii)
     Unit Hyd. Tpeak (min)=       3.00        12.00
     Unit Hyd. peak  (cms)=        .34          .09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.00          .40      1.136 (iii)
     TIME TO PEAK    (hrs)=       1.02         1.22      1.017
     RUNOFF VOLUME    (mm)=      59.48        36.10     46.624
     TOTAL RAINFALL   (mm)=      61.48        61.48     61.481
     RUNOFF COEFFICIENT   =        .97          .59       .758

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

--------------------------------------------------------------------------------
025:0024--------------------------
| ADD HYD (Pond4In   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                 (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 01:402          10.47    2.136    1.05  46.62    .000
                     +ID2 02:401           3.22     .697    1.02  46.62    .000
                     +ID3 03:400           5.25    1.136    1.02  46.62    .000
                      ============================================================
                      SUM 04:Pond4In       18.94    3.954    1.03  46.62    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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025:0025--------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>04:(Pond4I)    |
| OUT<06:(Pond4 )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |   1.400  .7000E+00
                             .310  .3000E+00    |    .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >04: (Pond4I)      18.94     3.954     1.033     46.624
     OUTFLOW<06: (Pond4 )      18.94      .911     1.683     46.624

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   23.050
                    TIME SHIFT OF PEAK FLOW       (min)=    39.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.5208E+00

--------------------------------------------------------------------------------
025:0026--------------------------------------------------------------------------
*#*************************************************************************
*#
*# Pond 5 Sizing, CAs 500, 501 and 502
*#
*#*************************************************************************
----------------------
| CALIB STANDHYD     |   Area    (ha)=    2.93
| 01:501    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.61         1.32
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
```

```
03303>      Length            (m)=     250.00        40.00
03304>      Mannings n          =       .013         .240
03305>
03306>      Max.eff.Inten.(mm/hr)=     190.82        99.45
03307>                over (min)        3.00        12.00
03308>      Storage Coeff.  (min)=       3.42 (ii)   11.92 (ii)
03309>      Unit Hyd. Tpeak (min)=       3.00        12.00
03310>      Unit Hyd. peak  (cms)=        .34          .09
03311>                                                          *TOTALS*
03312>      PEAK FLOW       (cms)=        .56          .22          .634 (iii)
03313>      TIME TO PEAK    (hrs)=       1.02         1.22         1.017
03314>      RUNOFF VOLUME    (mm)=      59.48        36.10        46.624
03315>      TOTAL RAINFALL   (mm)=      61.48        61.48        61.481
03316>      RUNOFF COEFFICIENT   =        .97          .59          .758
03317>
03318>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
03319>            CN* =  86.0    Ia = Dep. Storage  (Above)
03320>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
03321>            THAN THE STORAGE COEFFICIENT.
03322>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
03323>
03324> ------------------------------------------------------------------------------
03325> 025:0027------------------------------------------------------------------------
03326> ----------------------
03327> | CALIB STANDHYD     |   Area    (ha)=    3.14
03328> | 02:500    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
03329> ----------------------
03330>                              IMPERVIOUS    PERVIOUS (i)
03331>      Surface Area      (ha)=       1.73         1.41
03332>      Dep. Storage      (mm)=       2.00         5.00
03333>      Average Slope      (%)=       1.00         1.00
03334>      Length            (m)=     250.00        40.00
03335>      Mannings n          =       .013         .240
03336>
03337>      Max.eff.Inten.(mm/hr)=     190.82        99.45
03338>                over (min)        3.00        12.00
03339>      Storage Coeff.  (min)=       3.42 (ii)   11.92 (ii)
03340>      Unit Hyd. Tpeak (min)=       3.00        12.00
03341>      Unit Hyd. peak  (cms)=        .34          .09
03342>                                                          *TOTALS*
03343>      PEAK FLOW       (cms)=        .60          .24          .679 (iii)
03344>      TIME TO PEAK    (hrs)=       1.02         1.22         1.017
03345>      RUNOFF VOLUME    (mm)=      59.48        36.10        46.624
03346>      TOTAL RAINFALL   (mm)=      61.48        61.48        61.481
03347>      RUNOFF COEFFICIENT   =        .97          .59          .758
03348>
03349>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
03350>            CN* =  86.0    Ia = Dep. Storage  (Above)
03351>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
03352>            THAN THE STORAGE COEFFICIENT.
03353>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
03354>
03355> ------------------------------------------------------------------------------
03356> 025:0028------------------------------------------------------------------------
03357> ----------------------
03358> | CALIB STANDHYD     |   Area    (ha)=    5.45
03359> | 03:502    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
03360> ----------------------
03361>                              IMPERVIOUS    PERVIOUS (i)
03362>      Surface Area      (ha)=       3.00         2.45
03363>      Dep. Storage      (mm)=       2.00         5.00
03364>      Average Slope      (%)=       1.00         1.00
03365>      Length            (m)=     600.00        40.00
03366>      Mannings n          =       .013         .240
03367>
03368>      Max.eff.Inten.(mm/hr)=     174.88        89.79
03369>                over (min)        6.00        15.00
03370>      Storage Coeff.  (min)=       5.99 (ii)   14.84 (ii)
03371>      Unit Hyd. Tpeak (min)=       6.00        15.00
03372>      Unit Hyd. peak  (cms)=        .19          .08
03373>                                                          *TOTALS*
03374>      PEAK FLOW       (cms)=        .83          .37         1.004 (iii)
03375>      TIME TO PEAK    (hrs)=       1.07         1.27         1.083
03376>      RUNOFF VOLUME    (mm)=      59.48        36.10        46.624
03377>      TOTAL RAINFALL   (mm)=      61.48        61.48        61.481
03378>      RUNOFF COEFFICIENT   =        .97          .59          .758
03379>
03380>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
03381>            CN* =  86.0    Ia = Dep. Storage  (Above)
03382>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
03383>            THAN THE STORAGE COEFFICIENT.
03384>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
03385>
03386> ------------------------------------------------------------------------------
03387> 025:0029------------------------------------------------------------------------
03388> ------------------------
03389> | ADD HYD (Pond5In   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
03390> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
03391>                       ID1 01:501           2.93     .634    1.02  46.62    .000
03392>                      +ID2 02:500           3.14     .679    1.02  46.62    .000
03393>                      +ID3 03:502           5.45    1.004    1.08  46.62    .000
03394>                       ========================================================
03395>                       SUM 04:Pond5In       11.52    2.197    1.03  46.62    .000
03396>
03397>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
03398>
03399> ------------------------------------------------------------------------------
03400> 025:0030------------------------------------------------------------------------
03401> ----------------------
03402> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
03403> |  IN>04:(Pond5I)    |
03404> | OUT<05:(Pond5 )    |   =========  OUTLFOW STORAGE TABLE  =========
03405> ----------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
03406>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
03407>                             .000  .0000E+00    |     .850  .5000E+00
03408>                             .190  .2300E+00    |     .000  .0000E+00
03409>
03410>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
03411>      --------------------        (ha)     (cms)     (hrs)       (mm)
03412>      INFLOW >04: (Pond5I)      11.52     2.197     1.033     46.624
03413>      OUTFLOW<05: (Pond5 )      11.52      .459     1.800     46.624
03414>
03415>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   20.882
03416>                     TIME SHIFT OF PEAK FLOW          (min)=    46.00
03417>                     MAXIMUM  STORAGE   USED       (ha.m.)=.3400E+00
03418>
03419> ------------------------------------------------------------------------------
03420> 025:0031------------------------------------------------------------------------
03421> *#*************************************************************************
03422> *#
03423> *# EXT3 Sizing, CAs EXT3
03424> *#
03425> *#*************************************************************************
03426> ----------------------
03427> | CALIB STANDHYD     |   Area    (ha)=    9.16
03428> | 01:EXT3   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
03429> ----------------------
03430>                              IMPERVIOUS    PERVIOUS (i)
03431>      Surface Area      (ha)=       5.04         4.12
03432>      Dep. Storage      (mm)=       2.00         5.00
03433>      Average Slope      (%)=       1.00         1.00
03434>      Length            (m)=     400.00        40.00
03435>      Mannings n          =       .013         .240
03436>
03437>      Max.eff.Inten.(mm/hr)=     190.82        95.71
03438>                over (min)        5.00        13.00
03439>      Storage Coeff.  (min)=       4.53 (ii)   13.16 (ii)
03440>      Unit Hyd. Tpeak (min)=       5.00        13.00
03441>      Unit Hyd. peak  (cms)=        .24          .09
03442>                                                          *TOTALS*
03443>      PEAK FLOW       (cms)=       1.55          .66         1.849 (iii)
03444>      TIME TO PEAK    (hrs)=       1.05         1.23         1.067
03445>      RUNOFF VOLUME    (mm)=      59.48        36.10        46.624
03446>      TOTAL RAINFALL   (mm)=      61.48        61.48        61.481
03447>      RUNOFF COEFFICIENT   =        .97          .59          .758
03448>
03449>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
03450>            CN* =  86.0    Ia = Dep. Storage  (Above)
03451>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
03452>            THAN THE STORAGE COEFFICIENT.
03453>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
03454>
03455> ------------------------------------------------------------------------------
03456> 025:0032------------------------------------------------------------------------
03457> ----------------------
03458> | COMPUTE DUALHYD    |   Average inlet capacities   [CINLET] =    .150  (cms)
03459> | TotalHyd 01:EXT3   |   Number of inlets in system [NINLET] =      1
03460> ----------------------   Total minor system capacity          =    .150  (cms)
03461>                          Total major system storage [TMJSTO] =   5000.(cu.m.)
03462>
03463>                    ID: NHYD        AREA     QPEAK     TPEAK     R.V.      DWF
03464>                                     (ha)     (cms)     (hrs)     (mm)     (cms)
03465>      TOTAL HYD.   01:EXT3          9.16     1.849     1.067   46.624     .000
03466>      ================================================================
03467>      MAJOR SYST   02:noFlow         .00      .000      .000      .000     .000
03468>      MINOR SYST   03:MinorE        9.16      .150      .733   46.692     .000
03469>
03470>      NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
03471>
03472>      Maximum MAJOR SYSTEM storage used =    2956.(cu.m.)
03473>
03474> ------------------------------------------------------------------------------
03475> 025:0033------------------------------------------------------------------------
03476> *#*************************************************************************
03477> *#
03478> *# Flow Totals and Channel Runoff
03479> *#
03480> *#*************************************************************************
03481> ------------------------
03482> | ADD HYD (Control   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
03483> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
03484>                        ID1 02:noFlow        .00      .000     .00     .00    .000
03485>                       +ID2 03:MinorEXT3    9.16      .150     .73   46.69    .000
03486>                       +ID3 05:Pond5       11.52      .459    1.80   46.62    .000
03487>                       +ID4 06:Pond4       18.94      .911    1.68   46.62    .000
03488>                       +ID5 07:Pond3       18.88      .857    1.75   41.23    .000
03489>                       +ID6 08:Pond2        7.53      .321    1.78   46.62    .000
03490>                       +ID7 09:Pond1        4.08      .158    1.78   46.62    .000
03491>                       +ID8 10:ExPond      32.50     1.575    1.75   46.62    .000
03492>                        ========================================================
03493>                        SUM 01:Control     102.61     4.425    1.75   45.64    .000
03494>
03495>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
03496>
03497> ------------------------------------------------------------------------------
03498> 025:0034------------------------------------------------------------------------
03499> ----------------------
03500> | CALIB NASHYD       |   Area    (ha)=     .99   Curve Number   (CN)=68.00
03501> | 02:600    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
03502> ----------------------   U.H. Tp(hrs)=    .350
03503>
03504>      Unit Hyd Qpeak  (cms)=     .108
03505>
03506>      PEAK FLOW       (cms)=     .045 (i)
03507>      TIME TO PEAK    (hrs)=    1.483
03508>      RUNOFF VOLUME    (mm)=   18.124
03509>      TOTAL RAINFALL   (mm)=   61.481
03510>      RUNOFF COEFFICIENT   =     .295
03511>
03512>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
03513>
03514> ------------------------------------------------------------------------------
03515> 025:0035------------------------------------------------------------------------
03516> ----------------------
03517> | CALIB NASHYD       |   Area    (ha)=    3.54   Curve Number   (CN)=68.00
03518> | 03:601    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
03519> ----------------------   U.H. Tp(hrs)=    .590
03520>
03521>      Unit Hyd Qpeak  (cms)=     .229
03522>
03523>      PEAK FLOW       (cms)=     .113 (i)
03524>      TIME TO PEAK    (hrs)=    1.800
03525>      RUNOFF VOLUME    (mm)=   18.124
03526>      TOTAL RAINFALL   (mm)=   61.481
03527>      RUNOFF COEFFICIENT   =     .295
03528>
03529>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
03530>
03531> ------------------------------------------------------------------------------
03532> 025:0036------------------------------------------------------------------------
03533> ----------------------
03534> | CALIB NASHYD       |   Area    (ha)=    3.61   Curve Number   (CN)=68.00
03535> | 04:602    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
03536> ----------------------   U.H. Tp(hrs)=    .970
03537>
03538>      Unit Hyd Qpeak  (cms)=     .142
03539>
03540>      PEAK FLOW       (cms)=     .080 (i)
03541>      TIME TO PEAK    (hrs)=    2.283
03542>      RUNOFF VOLUME    (mm)=   18.124
03543>      TOTAL RAINFALL   (mm)=   61.481
03544>      RUNOFF COEFFICIENT   =     .295
03545>
03546>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
03547>
03548> ------------------------------------------------------------------------------
03549> 025:0037------------------------------------------------------------------------
03550> ------------------------
03551> | ADD HYD (PostTot   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
03552> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
03553>                        ID1 01:Control     102.61     4.425    1.75  45.64    .000
03554>                       +ID2 02:600           .99      .045    1.48  18.12    .000
03555>                       +ID3 03:601          3.54      .113    1.80  18.12    .000
03556>                       +ID4 04:602          3.61      .080    2.28  18.12    .000
```

```
                     ============================================================
                     SUM 05:PostTot      110.75    4.636    1.75  43.62    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
025:0038------------------------------------------------------------------------
------------------------------------------------------------------------------
025:0002------------------------------------------------------------------------
------------------------------------------------------------------------------
025:0002------------------------------------------------------------------------
------------------------------------------------------------------------------
025:0002------------------------------------------------------------------------
  ** END OF RUN :  49

********************************************************************************
```

```
---------------------
| START             |  Project  dir.: C:\MODELL~1\14170\SWMHYMO\
---------------------  Rainfall dir.: C:\MODELL~1\14170\SWMHYMO\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 050
    NSTORM=  1
             #  1=ldn50YR.3hr
------------------------------------------------------------------------------
050:0002------------------------------------------------------------------------
*#**************************************************************************
*#  Project Name: [Col Talbot Complete Corridor]    Project Number: [161414170]
*#  Date        : 2022-11-14
*#  Modeller    : [AKK]
*#  Company     : Stantec Consulting Ltd. (London)
*#  License #   :  4730904
*#**************************************************************************
*#**************************************************************************
*#
*#  This model represents the hydologic characteristics of the existing and
*#  proposed conditions in the proposed subdivision.
*#  Storm events modeled are:
*#  2YR, 5YR, 10YR, 25YR, 50YR, 100YR and 250YR 3hr Chicago STORMS (London, ONT.
*#
*#**************************************************************************
------------------------------------------------------------------------------
050:0002------------------------------------------------------------------------
---------------------
| READ STORM        |    Filename: 50-yr, 3hr Chicago Storm from London IDF
| Ptotal=  68.72 mm|    Comments: 50-yr, 3hr Chicago Storm from London IDF
---------------------
               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
                hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
                .08   4.313 |    .83  34.573 |   1.58  15.695 |   2.33   6.074
                .17   4.801 |    .92  82.919 |   1.67  13.445 |   2.42   5.676
                .25   5.412 |   1.00 211.984 |   1.75  11.729 |   2.50   5.326
                .33   6.201 |   1.08 106.433 |   1.83  10.383 |   2.58   5.017
                .42   7.252 |   1.17  60.466 |   1.92   9.302 |   2.67   4.741
                .50   8.715 |   1.25  40.428 |   2.00   8.418 |   2.75   4.494
                .58  10.876 |   1.33  29.658 |   2.08   7.682 |   2.83   4.272
                .67  14.336 |   1.42  23.098 |   2.17   7.062 |   2.92   4.070
                .75  20.603 |   1.50  18.752 |   2.25   6.532 |   3.00   3.887

------------------------------------------------------------------------------
050:0003------------------------------------------------------------------------
*#**************************************************************************
*#
*#  Existing Conditions to determine target release rates
*#
*#**************************************************************************
----------------------
| CALIB NASHYD       |   Area    (ha)=   49.50   Curve Number   (CN)=84.00
| 01:S101   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .840

     Unit Hyd Qpeak  (cms)=    2.251

     PEAK FLOW       (cms)=    2.513 (i)
     TIME TO PEAK    (hrs)=    2.067
     RUNOFF VOLUME    (mm)=   36.218
     TOTAL RAINFALL   (mm)=   68.719
     RUNOFF COEFFICIENT   =     .527

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

------------------------------------------------------------------------------
050:0004------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=   32.80   Curve Number   (CN)=84.00
| 02:S102   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .620

     Unit Hyd Qpeak  (cms)=    2.021

     PEAK FLOW       (cms)=    2.091 (i)
     TIME TO PEAK    (hrs)=    1.800
     RUNOFF VOLUME    (mm)=   36.218
     TOTAL RAINFALL   (mm)=   68.719
     RUNOFF COEFFICIENT   =     .527

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

------------------------------------------------------------------------------
050:0005------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    8.90   Curve Number   (CN)=84.00
| 03:S103   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .480

     Unit Hyd Qpeak  (cms)=     .708

     PEAK FLOW       (cms)=     .683 (i)
     TIME TO PEAK    (hrs)=    1.617
     RUNOFF VOLUME    (mm)=   36.218
     TOTAL RAINFALL   (mm)=   68.719
     RUNOFF COEFFICIENT   =     .527

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

------------------------------------------------------------------------------
050:0006------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=   33.50   Curve Number   (CN)=84.00
| 04:S104   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .720

     Unit Hyd Qpeak  (cms)=    1.777

     PEAK FLOW       (cms)=    1.911 (i)
     TIME TO PEAK    (hrs)=    1.917
     RUNOFF VOLUME    (mm)=   36.218
     TOTAL RAINFALL   (mm)=   68.719
     RUNOFF COEFFICIENT   =     .527

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

------------------------------------------------------------------------------
050:0007------------------------------------------------------------------------
------------------------
| ADD HYD (Total     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:S101         49.50    2.513    2.07  36.22    .000
                      +ID2 02:S102         32.80    2.091    1.80  36.22    .000
                      +ID3 03:S103          8.90     .683    1.62  36.22    .000
                      +ID4 04:S104         33.50    1.911    1.92  36.22    .000
                       ============================================================
                       SUM 05:Total       124.70    7.005    1.88  36.22    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
050:0008------------------------------------------------------------------------
*#**************************************************************************
*#
*#  External Pond Sizing, CAs EXT1 and EXT2
*#
*#**************************************************************************
----------------------
| CALIB STANDHYD     |   Area    (ha)=    9.50
| 01:EXT2   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.22          4.27
     Dep. Storage     (mm)=       2.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     400.00         40.00
     Mannings n            =       .013          .240

     Max.eff.Inten.(mm/hr)=     211.98        117.07
                   over (min)      4.00         12.00
     Storage Coeff.  (min)=     4.35 (ii)    12.31 (ii)
     Unit Hyd. Tpeak (min)=      4.00         12.00
     Unit Hyd. peak  (cms)=       .27           .09

                                                      *TOTALS*
     PEAK FLOW       (cms)=      1.84           .84      2.219 (iii)
     TIME TO PEAK    (hrs)=      1.03          1.22      1.050
     RUNOFF VOLUME    (mm)=     66.72         42.42     53.355
     TOTAL RAINFALL   (mm)=     68.72         68.72     68.719
     RUNOFF COEFFICIENT   =       .97           .62       .776

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

------------------------------------------------------------------------------
050:0009------------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=   23.00
| 02:EXT1   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.65         10.35
     Dep. Storage     (mm)=       2.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     750.00         40.00
     Mannings n            =       .013          .240

     Max.eff.Inten.(mm/hr)=     181.83        105.54
                   over (min)      7.00         15.00
     Storage Coeff.  (min)=     6.74 (ii)    15.04 (ii)
     Unit Hyd. Tpeak (min)=      7.00         15.00
     Unit Hyd. peak  (cms)=       .17           .08

                                                      *TOTALS*
     PEAK FLOW       (cms)=      3.71          1.82      4.718 (iii)
     TIME TO PEAK    (hrs)=      1.08          1.27      1.100
     RUNOFF VOLUME    (mm)=     66.72         42.42     53.355
     TOTAL RAINFALL   (mm)=     68.72         68.72     68.719
     RUNOFF COEFFICIENT   =       .97           .62       .776

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

------------------------------------------------------------------------------
050:0010------------------------------------------------------------------------
------------------------
| ADD HYD (ExPondIn  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXT2          9.50    2.219    1.05  53.36    .000
                      +ID2 02:EXT1         23.00    4.718    1.10  53.36    .000
                       ============================================================
                       SUM 03:ExPondIn      32.50    6.847    1.10  53.36    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
050:0011------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>03:(ExPond)    |
| OUT<10:(ExPond)    |    =========  OUTFLOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00   |    2.420  .1200E+01
                           .530  .4500E+00   |     .000  .0000E+00

     ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
     ---------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >03: (ExPond)       32.50     6.847     1.100     53.355
     OUTFLOW<10: (ExPond)       32.50     1.871     1.717     53.355

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   27.326
                    TIME SHIFT OF PEAK FLOW          (min)=    37.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.9822E+00

------------------------------------------------------------------------------
050:0012------------------------------------------------------------------------
*#**************************************************************************
*#
```

```
*#  Pond 1 Sizing, CAs 100
*#
*#*************************************************************************
----------------------
| CALIB STANDHYD     |   Area    (ha)=    4.08
| 01:100    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.24         1.84
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     300.00        40.00
     Mannings n          =       .013         .240

     Max.eff.Inten.(mm/hr)=     211.98       117.07
                  over (min)        4.00        12.00
     Storage Coeff.  (min)=       3.66 (ii)   11.62 (ii)
     Unit Hyd. Tpeak (min)=       4.00        12.00
     Unit Hyd. peak  (cms)=        .30          .10
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .83          .37          .988 (iii)
     TIME TO PEAK    (hrs)=       1.03         1.20         1.050
     RUNOFF VOLUME    (mm)=      66.72        42.42        53.355
     TOTAL RAINFALL   (mm)=      68.72        68.72        68.719
     RUNOFF COEFFICIENT   =        .97          .62          .776

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

------------------------------------------------------------------------------
050:0013----------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(100   )    |
| OUT<09:(Pond1 )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)     (ha.m.)
                             .000  .0000E+00    |     .300  .2000E+00
                             .070  .7000E-01    |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------      (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (100   )       4.08      .988     1.050     53.355
     OUTFLOW<09: (Pond1 )       4.08      .187     1.750     53.355

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   18.937
                    TIME SHIFT OF PEAK FLOW          (min)=    42.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1362E+00

------------------------------------------------------------------------------
050:0014----------------------------------------------------------------------
*#*************************************************************************
*#
*#  Pond 2 Sizing, CAs 200
*#
*#*************************************************************************
----------------------
| CALIB STANDHYD     |   Area    (ha)=    7.53
| 01:200    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.14         3.39
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     550.00        40.00
     Mannings n          =       .013         .240

     Max.eff.Inten.(mm/hr)=     211.98       112.60
                  over (min)        5.00        13.00
     Storage Coeff.  (min)=       5.26 (ii)   13.35 (ii)
     Unit Hyd. Tpeak (min)=       5.00        13.00
     Unit Hyd. peak  (cms)=        .22          .09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.35          .64         1.667 (iii)
     TIME TO PEAK    (hrs)=       1.05         1.23         1.067
     RUNOFF VOLUME    (mm)=      66.72        42.42        53.355
     TOTAL RAINFALL   (mm)=      68.72        68.72        68.719
     RUNOFF COEFFICIENT   =        .97          .62          .776

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

------------------------------------------------------------------------------
050:0015----------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(200   )    |
| OUT<08:(Pond2 )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)     (ha.m.)
                             .000  .0000E+00    |     .560  .3000E+00
                             .120  .1500E+00    |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------      (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (200   )       7.53     1.667     1.067     53.355
     OUTFLOW<08: (Pond2 )       7.53      .397     1.733     53.355

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   23.826
                    TIME SHIFT OF PEAK FLOW          (min)=    40.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2445E+00

------------------------------------------------------------------------------
050:0016----------------------------------------------------------------------
*#*************************************************************************
*#
*# Pond 3 Sizing, CAs 300, 301 and 302
*#
*#*************************************************************************
----------------------
| CALIB STANDHYD     |   Area    (ha)=   10.33
| 01:300    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.68         4.65
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     610.00        40.00
     Mannings n          =       .013         .240

     Max.eff.Inten.(mm/hr)=     194.39       108.81
                  over (min)        6.00        14.00
     Storage Coeff.  (min)=       5.80 (ii)   13.99 (ii)
     Unit Hyd. Tpeak (min)=       6.00        14.00
     Unit Hyd. peak  (cms)=        .19          .08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.77          .85         2.223 (iii)
     TIME TO PEAK    (hrs)=       1.07         1.25         1.083
     RUNOFF VOLUME    (mm)=      66.72        42.42        53.355
     TOTAL RAINFALL   (mm)=      68.72        68.72        68.719
     RUNOFF COEFFICIENT   =        .97          .62          .776

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

------------------------------------------------------------------------------
050:0017----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    4.18
| 02:302    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.30         1.88
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     210.00        40.00
     Mannings n          =       .013         .240

     Max.eff.Inten.(mm/hr)=     211.98       122.38
                  over (min)        3.00        11.00
     Storage Coeff.  (min)=       2.95 (ii)   10.77 (ii)
     Unit Hyd. Tpeak (min)=       3.00        11.00
     Unit Hyd. peak  (cms)=        .38          .10
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .92          .40         1.076 (iii)
     TIME TO PEAK    (hrs)=       1.02         1.18         1.017
     RUNOFF VOLUME    (mm)=      66.72        42.42        53.355
     TOTAL RAINFALL   (mm)=      68.72        68.72        68.719
     RUNOFF COEFFICIENT   =        .97          .62          .776

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

------------------------------------------------------------------------------
050:0018----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.37   Curve Number    (CN)=76.00
| 03:301    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=     .407

     PEAK FLOW       (cms)=     .284 (i)
     TIME TO PEAK    (hrs)=    1.550
     RUNOFF VOLUME    (mm)=   28.209
     TOTAL RAINFALL   (mm)=   68.719
     RUNOFF COEFFICIENT   =     .410

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

------------------------------------------------------------------------------
050:0019----------------------------------------------------------------------
| ADD HYD (Pond3In   ) | ID: NHYD          AREA     QPEAK    TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)    (hrs)    (mm)    (cms)
                      ID1 01:300           10.33    2.223    1.08  53.36    .000
                     +ID2 02:302            4.18    1.076    1.02  53.36    .000
                     +ID3 03:301            4.37     .284    1.55  28.21    .000
                      ==========================================================
                      SUM 04:Pond3In       18.88    3.247    1.08  47.53    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
050:0020----------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>04:(Pond3I)    |
| OUT<07:(Pond3 )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)     (ha.m.)
                             .000  .0000E+00    |    1.400  .5800E+00
                             .310  .2500E+00    |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------      (ha)     (cms)     (hrs)       (mm)
     INFLOW >04: (Pond3I)      18.88     3.247     1.083     47.535
     OUTFLOW<07: (Pond3 )      18.88     1.034     1.717     47.535

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   31.848
                    TIME SHIFT OF PEAK FLOW          (min)=    38.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.4693E+00

------------------------------------------------------------------------------
050:0021----------------------------------------------------------------------
*#*************************************************************************
*#
*# Pond 4 Sizing, CAs 400, 401 and 402
*#
*#*************************************************************************
----------------------
| CALIB STANDHYD     |   Area    (ha)=   10.47
| 01:402    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.76         4.71
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     350.00        40.00
     Mannings n          =       .013         .240

     Max.eff.Inten.(mm/hr)=     211.98       117.07
                  over (min)        4.00        12.00
     Storage Coeff.  (min)=       4.01 (ii)   11.97 (ii)
     Unit Hyd. Tpeak (min)=       4.00        12.00
     Unit Hyd. peak  (cms)=        .28          .09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.08          .94         2.490 (iii)
     TIME TO PEAK    (hrs)=       1.03         1.20         1.050
     RUNOFF VOLUME    (mm)=      66.72        42.42        53.355
     TOTAL RAINFALL   (mm)=      68.72        68.72        68.719
     RUNOFF COEFFICIENT   =        .97          .62          .776
```

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04065>
04066>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
04067>            CN* =  86.0    Ia = Dep. Storage  (Above)
04068>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
04069>            THAN THE STORAGE COEFFICIENT.
04070>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
04071>
04072> ---------------------------------------------------------------------------
04073> 050:0022-----------------------------------------------------------------
04074> ----------------------
04075> | CALIB STANDHYD     |   Area    (ha)=    3.22
04076> | 02:401    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
04077> ----------------------
04078>                              IMPERVIOUS    PERVIOUS (i)
04079>      Surface Area     (ha)=       1.77         1.45
04080>      Dep. Storage     (mm)=       2.00         5.00
04081>      Average Slope     (%)=       1.00         1.00
04082>      Length            (m)=     250.00        40.00
04083>      Mannings n            =       .013         .240
04084>
04085>      Max.eff.Inten.(mm/hr)=     211.98       122.38
04086>                    over (min)        3.00        11.00
04087>      Storage Coeff.  (min)=       3.28 (ii)   11.10 (ii)
04088>      Unit Hyd. Tpeak (min)=       3.00        11.00
04089>      Unit Hyd. peak  (cms)=        .35          .10
04090>                                                          *TOTALS*
04091>      PEAK FLOW       (cms)=        .69          .30          .808 (iii)
04092>      TIME TO PEAK    (hrs)=       1.02         1.18         1.017
04093>      RUNOFF VOLUME    (mm)=      66.72        42.42        53.355
04094>      TOTAL RAINFALL   (mm)=      68.72        68.72        68.719
04095>      RUNOFF COEFFICIENT   =        .97          .62          .776
04096>
04097>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
04098>            CN* =  86.0    Ia = Dep. Storage  (Above)
04099>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
04100>            THAN THE STORAGE COEFFICIENT.
04101>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
04102>
04103> ---------------------------------------------------------------------------
04104> 050:0023-----------------------------------------------------------------
04105> ----------------------
04106> | CALIB STANDHYD     |   Area    (ha)=    5.25
04107> | 03:400    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
04108> ----------------------
04109>                              IMPERVIOUS    PERVIOUS (i)
04110>      Surface Area     (ha)=       2.89         2.36
04111>      Dep. Storage     (mm)=       2.00         5.00
04112>      Average Slope     (%)=       1.00         1.00
04113>      Length            (m)=     250.00        40.00
04114>      Mannings n            =       .013         .240
04115>
04116>      Max.eff.Inten.(mm/hr)=     211.98       122.38
04117>                    over (min)        3.00        11.00
04118>      Storage Coeff.  (min)=       3.28 (ii)   11.10 (ii)
04119>      Unit Hyd. Tpeak (min)=       3.00        11.00
04120>      Unit Hyd. peak  (cms)=        .35          .10
04121>                                                          *TOTALS*
04122>      PEAK FLOW       (cms)=       1.13          .49         1.318 (iii)
04123>      TIME TO PEAK    (hrs)=       1.02         1.18         1.017
04124>      RUNOFF VOLUME    (mm)=      66.72        42.42        53.355
04125>      TOTAL RAINFALL   (mm)=      68.72        68.72        68.719
04126>      RUNOFF COEFFICIENT   =        .97          .62          .776
04127>
04128>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
04129>            CN* =  86.0    Ia = Dep. Storage  (Above)
04130>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
04131>            THAN THE STORAGE COEFFICIENT.
04132>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
04133>
04134> ---------------------------------------------------------------------------
04135> 050:0024-----------------------------------------------------------------
04136> ------------------------
04137> | ADD HYD (Pond4In   ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
04138> ------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
04139>                       ID1 01:402           10.47    2.490    1.05  53.36    .000
04140>                      +ID2 02:401            3.22     .808    1.02  53.36    .000
04141>                      +ID3 03:400            5.25    1.318    1.02  53.36    .000
04142>                       ========================================================
04143>                       SUM 04:Pond4In       18.94    4.600    1.03  53.36    .000
04144>
04145>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
04146>
04147> ---------------------------------------------------------------------------
04148> 050:0025-----------------------------------------------------------------
04149> ----------------------
04150> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
04151> |  IN>04:(Pond4I)    |
04152> | OUT<06:(Pond4 )    |    =========  OUTLFOW STORAGE TABLE  =========
04153> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
04154>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
04155>                              .000  .0000E+00    |   1.400  .7000E+00
04156>                              .310  .3000E+00    |    .000  .0000E+00
04157>
04158>      ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
04159>      ----------------------       (ha)     (cms)     (hrs)       (mm)
04160>      INFLOW >04: (Pond4I)      18.94    4.600     1.033     53.355
04161>      OUTFLOW<06: (Pond4 )      18.94    1.097     1.633     53.355
04162>
04163>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   23.858
04164>                     TIME SHIFT OF PEAK FLOW          (min)=   36.00
04165>                     MAXIMUM  STORAGE   USED       (ha.m.)=.5890E+00
04166>
04167> ---------------------------------------------------------------------------
04168> 050:0026-----------------------------------------------------------------
04169> *#************************************************************************
04170> *#
04171> *# Pond 5 Sizing, CAs 500, 501 and 502
04172> *#
04173> *#************************************************************************
04174> ----------------------
04175> | CALIB STANDHYD     |   Area    (ha)=    2.93
04176> | 01:501    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
04177> ----------------------
04178>                              IMPERVIOUS    PERVIOUS (i)
04179>      Surface Area     (ha)=       1.61         1.32
04180>      Dep. Storage     (mm)=       2.00         5.00
04181>      Average Slope     (%)=       1.00         1.00
04182>      Length            (m)=     250.00        40.00
04183>      Mannings n            =       .013         .240
04184>
04185>      Max.eff.Inten.(mm/hr)=     211.98       122.38
04186>                    over (min)        3.00        11.00
04187>      Storage Coeff.  (min)=       3.28 (ii)   11.10 (ii)
04188>      Unit Hyd. Tpeak (min)=       3.00        11.00
04189>      Unit Hyd. peak  (cms)=        .35          .10
04190>                                                          *TOTALS*
04191>      PEAK FLOW       (cms)=        .63          .27          .736 (iii)
04192>      TIME TO PEAK    (hrs)=       1.02         1.18         1.017
04193>      RUNOFF VOLUME    (mm)=      66.72        42.42        53.355
04194>      TOTAL RAINFALL   (mm)=      68.72        68.72        68.719
04195>      RUNOFF COEFFICIENT   =        .97          .62          .776
04196>
04197>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
04198>            CN* =  86.0    Ia = Dep. Storage  (Above)
04199>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
04200>            THAN THE STORAGE COEFFICIENT.
04201>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
04202>
04203> ---------------------------------------------------------------------------
04204> 050:0027-----------------------------------------------------------------
04205> ----------------------
04206> | CALIB STANDHYD     |   Area    (ha)=    3.14
04207> | 02:500    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
04208> ----------------------
04209>                              IMPERVIOUS    PERVIOUS (i)
04210>      Surface Area     (ha)=       1.73         1.41
04211>      Dep. Storage     (mm)=       2.00         5.00
04212>      Average Slope     (%)=       1.00         1.00
04213>      Length            (m)=     250.00        40.00
04214>      Mannings n            =       .013         .240
04215>
04216>      Max.eff.Inten.(mm/hr)=     211.98       122.38
04217>                    over (min)        3.00        11.00
04218>      Storage Coeff.  (min)=       3.28 (ii)   11.10 (ii)
04219>      Unit Hyd. Tpeak (min)=       3.00        11.00
04220>      Unit Hyd. peak  (cms)=        .35          .10
04221>                                                          *TOTALS*
04222>      PEAK FLOW       (cms)=        .67          .29          .788 (iii)
04223>      TIME TO PEAK    (hrs)=       1.02         1.18         1.017
04224>      RUNOFF VOLUME    (mm)=      66.72        42.42        53.355
04225>      TOTAL RAINFALL   (mm)=      68.72        68.72        68.719
04226>      RUNOFF COEFFICIENT   =        .97          .62          .776
04227>
04228>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
04229>            CN* =  86.0    Ia = Dep. Storage  (Above)
04230>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
04231>            THAN THE STORAGE COEFFICIENT.
04232>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
04233>
04234> ---------------------------------------------------------------------------
04235> 050:0028-----------------------------------------------------------------
04236> ----------------------
04237> | CALIB STANDHYD     |   Area    (ha)=    5.45
04238> | 03:502    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
04239> ----------------------
04240>                              IMPERVIOUS    PERVIOUS (i)
04241>      Surface Area     (ha)=       3.00         2.45
04242>      Dep. Storage     (mm)=       2.00         5.00
04243>      Average Slope     (%)=       1.00         1.00
04244>      Length            (m)=     600.00        40.00
04245>      Mannings n            =       .013         .240
04246>
04247>      Max.eff.Inten.(mm/hr)=     194.39       108.81
04248>                    over (min)        6.00        14.00
04249>      Storage Coeff.  (min)=       5.74 (ii)   13.94 (ii)
04250>      Unit Hyd. Tpeak (min)=       6.00        14.00
04251>      Unit Hyd. peak  (cms)=        .19          .08
04252>                                                          *TOTALS*
04253>      PEAK FLOW       (cms)=        .94          .45         1.176 (iii)
04254>      TIME TO PEAK    (hrs)=       1.07         1.25         1.083
04255>      RUNOFF VOLUME    (mm)=      66.72        42.42        53.355
04256>      TOTAL RAINFALL   (mm)=      68.72        68.72        68.719
04257>      RUNOFF COEFFICIENT   =        .97          .62          .776
04258>
04259>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
04260>            CN* =  86.0    Ia = Dep. Storage  (Above)
04261>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
04262>            THAN THE STORAGE COEFFICIENT.
04263>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
04264>
04265> ---------------------------------------------------------------------------
04266> 050:0029-----------------------------------------------------------------
04267> ------------------------
04268> | ADD HYD (Pond5In   ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
04269> ------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
04270>                       ID1 01:501            2.93     .736    1.02  53.36    .000
04271>                      +ID2 02:500            3.14     .788    1.02  53.36    .000
04272>                      +ID3 03:502            5.45    1.176    1.08  53.36    .000
04273>                       ========================================================
04274>                       SUM 04:Pond5In       11.52    2.572    1.08  53.36    .000
04275>
04276>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
04277>
04278> ---------------------------------------------------------------------------
04279> 050:0030-----------------------------------------------------------------
04280> ----------------------
04281> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
04282> |  IN>04:(Pond5I)    |
04283> | OUT<05:(Pond5 )    |    =========  OUTLFOW STORAGE TABLE  =========
04284> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
04285>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
04286>                              .000  .0000E+00    |    .850  .5000E+00
04287>                              .190  .2300E+00    |    .000  .0000E+00
04288>
04289>      ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
04290>      ----------------------       (ha)     (cms)     (hrs)       (mm)
04291>      INFLOW >04: (Pond5I)      11.52    2.572     1.083     53.355
04292>      OUTFLOW<05: (Pond5 )      11.52     .563     1.733     53.355
04293>
04294>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   21.873
04295>                     TIME SHIFT OF PEAK FLOW          (min)=   39.00
04296>                     MAXIMUM  STORAGE   USED       (ha.m.)=.3825E+00
04297>
04298> ---------------------------------------------------------------------------
04299> 050:0031-----------------------------------------------------------------
04300> *#************************************************************************
04301> *#
04302> *# EXT3 Sizing, CAs EXT3
04303> *#
04304> *#************************************************************************
04305> ----------------------
04306> | CALIB STANDHYD     |   Area    (ha)=    9.16
04307> | 01:EXT3   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
04308> ----------------------
04309>                              IMPERVIOUS    PERVIOUS (i)
04310>      Surface Area     (ha)=       5.04         4.12
04311>      Dep. Storage     (mm)=       2.00         5.00
04312>      Average Slope     (%)=       1.00         1.00
04313>      Length            (m)=     400.00        40.00
04314>      Mannings n            =       .013         .240
04315>
04316>      Max.eff.Inten.(mm/hr)=     211.98       117.07
04317>                    over (min)        4.00        12.00
04318>      Storage Coeff.  (min)=       4.35 (ii)   12.31 (ii)
```

```
      Unit Hyd. Tpeak (min)=       4.00        12.00
      Unit Hyd. peak  (cms)=        .27          .09
                                                        *TOTALS*
      PEAK FLOW       (cms)=       1.78          .81         2.139 (iii)
      TIME TO PEAK    (hrs)=       1.03         1.22          1.050
      RUNOFF VOLUME    (mm)=      66.72        42.42         53.355
      TOTAL RAINFALL   (mm)=      68.72        68.72         68.719
      RUNOFF COEFFICIENT   =        .97          .62           .776

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  86.0    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.

------------------------------------------------------------------------------
050:0032------------------------------------------------------------------------
----------------------
| COMPUTE DUALHYD    |   Average inlet capacities   [CINLET] =    .150  (cms)
| TotalHyd 01:EXT3   |   Number of inlets in system [NINLET] =       1
----------------------   Total minor system capacity        =    .150  (cms)
                         Total major system storage [TMJSTO] =    5000.(cu.m.)

                   ID: NHYD        AREA     QPEAK     TPEAK     R.V.      DWF
                                    (ha)     (cms)     (hrs)     (mm)     (cms)
      TOTAL HYD.   01:EXT3         9.16     2.139     1.050   53.355     .000
      ============================================================================
      MAJOR SYST   02:noFlow        .00      .000      .000     .000     .000
      MINOR SYST   03:MinorE       9.16      .150      .700   53.452     .000

      NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

      Maximum MAJOR SYSTEM storage used =    3520.(cu.m.)

------------------------------------------------------------------------------
050:0033------------------------------------------------------------------------
*#*************************************************************************
*#
*# Flow Totals and Channel Runoff
*#
*#*************************************************************************
----------------------
| ADD HYD (Control   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                        ID1 02:noFlow        .00     .000     .00    .00    .000
                      +ID2 03:MinorEXT3     9.16     .150     .70  53.45    .000
                      +ID3 05:Pond5        11.52     .563    1.73  53.35    .000
                      +ID4 06:Pond4        18.94    1.097    1.63  53.35    .000
                      +ID5 07:Pond3        18.88    1.034    1.72  47.53    .000
                      +ID6 08:Pond2         7.53     .397    1.73  53.35    .000
                      +ID7 09:Pond1         4.08     .187    1.75  53.35    .000
                      +ID8 10:ExPond       32.50    1.871    1.72  53.35    .000
                       ============================================================
                       SUM 01:Control     102.61    5.293    1.70  52.29    .000

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
050:0034------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=     .99   Curve Number   (CN)=68.00
| 02:600    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .350

      Unit Hyd Qpeak  (cms)=     .108

      PEAK FLOW       (cms)=     .055 (i)
      TIME TO PEAK    (hrs)=    1.467
      RUNOFF VOLUME    (mm)=   22.156
      TOTAL RAINFALL   (mm)=   68.719
      RUNOFF COEFFICIENT   =     .322

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

------------------------------------------------------------------------------
050:0035------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    3.54   Curve Number   (CN)=68.00
| 03:601    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .590

      Unit Hyd Qpeak  (cms)=     .229

      PEAK FLOW       (cms)=     .139 (i)
      TIME TO PEAK    (hrs)=    1.783
      RUNOFF VOLUME    (mm)=   22.156
      TOTAL RAINFALL   (mm)=   68.719
      RUNOFF COEFFICIENT   =     .322

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

------------------------------------------------------------------------------
050:0036------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    3.61   Curve Number   (CN)=68.00
| 04:602    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .970

      Unit Hyd Qpeak  (cms)=     .142

      PEAK FLOW       (cms)=     .098 (i)
      TIME TO PEAK    (hrs)=    2.267
      RUNOFF VOLUME    (mm)=   22.156
      TOTAL RAINFALL   (mm)=   68.719
      RUNOFF COEFFICIENT   =     .322

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

------------------------------------------------------------------------------
050:0037------------------------------------------------------------------------
----------------------
| ADD HYD (PostTot   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                        ID1 01:Control     102.61    5.293    1.70  52.29    .000
                      +ID2 02:600            .99     .055    1.47  22.16    .000
                      +ID3 03:601           3.54     .139    1.78  22.16    .000
                      +ID4 04:602           3.61     .098    2.27  22.16    .000
                       ============================================================
                       SUM 05:PostTot     110.75    5.550    1.72  50.08    .000

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
050:0038------------------------------------------------------------------------
------------------------------------------------------------------------------
050:0002------------------------------------------------------------------------
------------------------------------------------------------------------------
050:0002------------------------------------------------------------------------
------------------------------------------------------------------------------
050:0002------------------------------------------------------------------------
------------------------------------------------------------------------------
050:0002------------------------------------------------------------------------
  ** END OF RUN :  99

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



--------------------
| START            |  Project  dir.: C:\MODELL~1\14170\SWMHYMO\
--------------------  Rainfall dir.: C:\MODELL~1\14170\SWMHYMO\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 100
    NSTORM=   1
           #  1=ldn100YR.3hr
------------------------------------------------------------------------------
100:0002------------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [Col Talbot Complete Corridor]    Project Number: [161414170]
*#  Date        : 2022-11-14
*#  Modeller    : [AKK]
*#  Company     : Stantec Consulting Ltd. (London)
*#  License #   :  4730904
*#*************************************************************************
*#*************************************************************************
*#
*#  This model represents the hydologic characteristics of the existing and
*#  proposed conditions in the proposed subdivision.
*#  Storm events modeled are:
*#  2YR, 5YR, 10YR, 25YR, 50YR, 100YR and 250YR 3hr Chicago STORMS (London, ONT.
*#
*#*************************************************************************
------------------------------------------------------------------------------
100:0002------------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: 100-yr, 3hr Chicago Storm from London ID
| Ptotal=  75.83 mm|    Comments: 100-yr, 3hr Chicago Storm from London ID
--------------------
              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               .08   4.623 |    .83  38.591 |   1.58  17.341 |   2.33   6.569
               .17   5.160 |    .92  92.413 |   1.67  14.811 |   2.42   6.127
               .25   5.836 |   1.00 232.243 |   1.75  12.884 |   2.50   5.740
               .33   6.709 |   1.08 118.408 |   1.83  11.375 |   2.58   5.398
               .42   7.878 |   1.17  67.596 |   1.92  10.166 |   2.67   5.094
               .50   9.510 |   1.25  45.175 |   2.00   9.178 |   2.75   4.822
               .58  11.928 |   1.33  33.066 |   2.08   8.357 |   2.83   4.577
               .67  15.813 |   1.42  25.678 |   2.17   7.666 |   2.92   4.356
               .75  22.868 |   1.50  20.783 |   2.25   7.077 |   3.00   4.155

------------------------------------------------------------------------------
100:0003------------------------------------------------------------------------
*#*************************************************************************
*#
*#  Existing Conditions to determine target release rates
*#
*#*************************************************************************
----------------------
| CALIB NASHYD       |   Area    (ha)=   49.50   Curve Number   (CN)=84.00
| 01:S101   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .840

      Unit Hyd Qpeak  (cms)=    2.251

      PEAK FLOW       (cms)=    2.942 (i)
      TIME TO PEAK    (hrs)=    2.050
      RUNOFF VOLUME    (mm)=   42.085
      TOTAL RAINFALL   (mm)=   75.831
      RUNOFF COEFFICIENT   =     .555

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

------------------------------------------------------------------------------
100:0004------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=   32.80   Curve Number   (CN)=84.00
| 02:S102   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .620

      Unit Hyd Qpeak  (cms)=    2.021

      PEAK FLOW       (cms)=    2.452 (i)
      TIME TO PEAK    (hrs)=    1.783
      RUNOFF VOLUME    (mm)=   42.085
      TOTAL RAINFALL   (mm)=   75.831
      RUNOFF COEFFICIENT   =     .555

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

------------------------------------------------------------------------------
100:0005------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    8.90   Curve Number   (CN)=84.00
| 03:S103   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .480

      Unit Hyd Qpeak  (cms)=     .708

      PEAK FLOW       (cms)=     .801 (i)
      TIME TO PEAK    (hrs)=    1.617
      RUNOFF VOLUME    (mm)=   42.085
      TOTAL RAINFALL   (mm)=   75.831
      RUNOFF COEFFICIENT   =     .555

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

------------------------------------------------------------------------------
100:0006------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=   33.50   Curve Number   (CN)=84.00
| 04:S104   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .720

      Unit Hyd Qpeak  (cms)=    1.777

      PEAK FLOW       (cms)=    2.239 (i)
      TIME TO PEAK    (hrs)=    1.917
      RUNOFF VOLUME    (mm)=   42.085
      TOTAL RAINFALL   (mm)=   75.831
      RUNOFF COEFFICIENT   =     .555
```

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

---------------------------------------------------------------------------
100:0007----------------------------------------------------------------------
----------------------
| ADD HYD (Total     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:S101         49.50    2.942    2.05  42.08    .000
                     +ID2 02:S102          32.80    2.452    1.78  42.08    .000
                     +ID3 03:S103           8.90     .801    1.62  42.08    .000
                     +ID4 04:S104          33.50    2.239    1.92  42.08    .000
                      ============================================================
                      SUM 05:Total        124.70    8.208    1.88  42.08    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---------------------------------------------------------------------------
100:0008----------------------------------------------------------------------
*#************************************************************************
*#
*#  External Pond Sizing, CAs EXT1 and EXT2
*#
*#************************************************************************
----------------------
| CALIB STANDHYD     |   Area    (ha)=    9.50
| 01:EXT2   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.22         4.27
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     400.00        40.00
     Mannings n             =     .013         .240

     Max.eff.Inten.(mm/hr)=     232.24       134.99
                   over (min)       4.00        12.00
     Storage Coeff.  (min)=       4.19 (ii)   11.71 (ii)
     Unit Hyd. Tpeak (min)=       4.00        12.00
     Unit Hyd. peak  (cms)=        .27          .10
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.05         1.00          2.510 (iii)
     TIME TO PEAK    (hrs)=       1.03         1.20          1.050
     RUNOFF VOLUME    (mm)=      73.83        48.75         60.037
     TOTAL RAINFALL   (mm)=      75.83        75.83         75.831
     RUNOFF COEFFICIENT   =        .97          .64           .792

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

---------------------------------------------------------------------------
100:0009----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=   23.00
| 02:EXT1   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.65        10.35
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     750.00        40.00
     Mannings n             =     .013         .240

     Max.eff.Inten.(mm/hr)=     213.27       125.44
                   over (min)       6.00        14.00
     Storage Coeff.  (min)=       6.32 (ii)   14.07 (ii)
     Unit Hyd. Tpeak (min)=       6.00        14.00
     Unit Hyd. peak  (cms)=        .18          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       4.21         2.19          5.435 (iii)
     TIME TO PEAK    (hrs)=       1.07         1.25          1.117
     RUNOFF VOLUME    (mm)=      73.83        48.75         60.037
     TOTAL RAINFALL   (mm)=      75.83        75.83         75.831
     RUNOFF COEFFICIENT   =        .97          .64           .792

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

---------------------------------------------------------------------------
100:0010----------------------------------------------------------------------
------------------------
| ADD HYD (ExPondIn  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:EXT2          9.50    2.510    1.05  60.04    .000
                     +ID2 02:EXT1          23.00    5.435    1.12  60.04    .000
                      ============================================================
                      SUM 03:ExPondIn      32.50    7.863    1.08  60.04    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---------------------------------------------------------------------------
100:0011----------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>03:(ExPond)    |
| OUT<10:(ExPond)    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW     STORAGE   |  OUTFLOW     STORAGE
                            (cms)     (ha.m.)   |    (cms)     (ha.m.)
                            .000  .0000E+00     |   2.420  .1200E+01
                            .530  .4500E+00     |    .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >03: (ExPond)      32.50     7.863     1.083     60.037
     OUTFLOW<10: (ExPond)      32.50     2.176     1.683     60.036

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   27.676
                    TIME SHIFT OF PEAK FLOW          (min)=    36.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1103E+01

---------------------------------------------------------------------------
100:0012----------------------------------------------------------------------
*#************************************************************************
*#
*#  Pond 1 Sizing, CAs 100
*#
*#************************************************************************
----------------------
| CALIB STANDHYD     |   Area    (ha)=    4.08
| 01:100    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.24         1.84
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     300.00        40.00
     Mannings n             =     .013         .240

     Max.eff.Inten.(mm/hr)=     232.24       141.12
                   over (min)       4.00        11.00
     Storage Coeff.  (min)=       3.53 (ii)   10.91 (ii)
     Unit Hyd. Tpeak (min)=       4.00        11.00
     Unit Hyd. peak  (cms)=        .31          .10
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .92          .45          1.139 (iii)
     TIME TO PEAK    (hrs)=       1.03         1.18          1.050
     RUNOFF VOLUME    (mm)=      73.83        48.75         60.037
     TOTAL RAINFALL   (mm)=      75.83        75.83         75.831
     RUNOFF COEFFICIENT   =        .97          .64           .792

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

---------------------------------------------------------------------------
100:0013----------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(100   )    |
| OUT<09:(Pond1 )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW     STORAGE   |  OUTFLOW     STORAGE
                            (cms)     (ha.m.)   |    (cms)     (ha.m.)
                            .000  .0000E+00     |    .300  .2000E+00
                            .070  .7000E-01     |    .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (100   )       4.08     1.139     1.050     60.037
     OUTFLOW<09: (Pond1 )       4.08      .217     1.717     60.036

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   19.094
                    TIME SHIFT OF PEAK FLOW          (min)=    40.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1533E+00

---------------------------------------------------------------------------
100:0014----------------------------------------------------------------------
*#************************************************************************
*#
*#  Pond 2 Sizing, CAs 200
*#
*#************************************************************************
----------------------
| CALIB STANDHYD     |   Area    (ha)=    7.53
| 01:200    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.14         3.39
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     550.00        40.00
     Mannings n             =     .013         .240

     Max.eff.Inten.(mm/hr)=     232.24       129.83
                   over (min)       5.00        13.00
     Storage Coeff.  (min)=       5.07 (ii)   12.71 (ii)
     Unit Hyd. Tpeak (min)=       5.00        13.00
     Unit Hyd. peak  (cms)=        .22          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.50          .76          1.890 (iii)
     TIME TO PEAK    (hrs)=       1.05         1.22          1.067
     RUNOFF VOLUME    (mm)=      73.83        48.75         60.037
     TOTAL RAINFALL   (mm)=      75.83        75.83         75.831
     RUNOFF COEFFICIENT   =        .97          .64           .792

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

---------------------------------------------------------------------------
100:0015----------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(200   )    |
| OUT<08:(Pond2 )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW     STORAGE   |  OUTFLOW     STORAGE
                            (cms)     (ha.m.)   |    (cms)     (ha.m.)
                            .000  .0000E+00     |    .560  .3000E+00
                            .120  .1500E+00     |    .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (200   )       7.53     1.890     1.067     60.037
     OUTFLOW<08: (Pond2 )       7.53      .475     1.683     60.036

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   25.133
                    TIME SHIFT OF PEAK FLOW          (min)=    37.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2710E+00

---------------------------------------------------------------------------
100:0016----------------------------------------------------------------------
*#************************************************************************
*#
*# Pond 3 Sizing, CAs 300, 301 and 302
*#
*#************************************************************************
----------------------
| CALIB STANDHYD     |   Area    (ha)=   10.33
| 01:300    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.68         4.65
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     610.00        40.00
     Mannings n             =     .013         .240

     Max.eff.Inten.(mm/hr)=     232.24       129.83
                   over (min)       5.00        13.00
     Storage Coeff.  (min)=       5.40 (ii)   13.04 (ii)
     Unit Hyd. Tpeak (min)=       5.00        13.00
     Unit Hyd. peak  (cms)=        .21          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.02         1.03          2.549 (iii)
     TIME TO PEAK    (hrs)=       1.05         1.23          1.067
     RUNOFF VOLUME    (mm)=      73.83        48.75         60.037
```

```
     TOTAL RAINFALL   (mm)=      75.83        75.83        75.831
     RUNOFF COEFFICIENT   =       .97          .64          .792

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

------------------------------------------------------------------------------
100:0017------------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    4.18
| 02:302    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.30         1.88
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     210.00        40.00
     Mannings n            =      .013         .240

     Max.eff.Inten.(mm/hr)=     232.24       148.53
                  over (min)       3.00        10.00
     Storage Coeff.  (min)=       2.85 (ii)   10.08 (ii)
     Unit Hyd. Tpeak (min)=       3.00        10.00
     Unit Hyd. peak  (cms)=        .39          .11
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.02          .48         1.232 (iii)
     TIME TO PEAK    (hrs)=       1.02         1.17         1.017
     RUNOFF VOLUME    (mm)=      73.83        48.75        60.037
     TOTAL RAINFALL   (mm)=      75.83        75.83        75.831
     RUNOFF COEFFICIENT   =       .97          .64          .792

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

------------------------------------------------------------------------------
100:0018------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.37   Curve Number    (CN)=76.00
| 03:301    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=     .407

     PEAK FLOW       (cms)=     .339 (i)
     TIME TO PEAK    (hrs)=    1.533
     RUNOFF VOLUME    (mm)=   33.216
     TOTAL RAINFALL   (mm)=   75.831
     RUNOFF COEFFICIENT   =     .438

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

------------------------------------------------------------------------------
100:0019------------------------------------------------------------------------
------------------------
| ADD HYD (Pond3In   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 01:300          10.33    2.549    1.07  60.04    .000
                     +ID2 02:302           4.18    1.232    1.02  60.04    .000
                     +ID3 03:301           4.37     .339    1.53  33.22    .000
                      ==========================================================
                      SUM 04:Pond3In       18.88    3.749    1.08  53.83    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
100:0020------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>04:(Pond3I)    |
| OUT<07:(Pond3 )    |    =========  OUTFLOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)     (ha.m.)
                             .000  .0000E+00    |    1.400  .5800E+00
                             .310  .2500E+00    |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >04: (Pond3I)      18.88     3.749     1.083     53.829
     OUTFLOW<07: (Pond3 )      18.88     1.216     1.683     53.829

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   32.437
                    TIME SHIFT OF PEAK FLOW          (min)=    36.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.5243E+00

------------------------------------------------------------------------------
100:0021------------------------------------------------------------------------
*#############################################################################
*#
*# Pond 4 Sizing, CAs 400, 401 and 402
*#
*#############################################################################
----------------------
| CALIB STANDHYD     |   Area    (ha)=   10.47
| 01:402    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.76         4.71
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     350.00        40.00
     Mannings n            =      .013         .240

     Max.eff.Inten.(mm/hr)=     232.24       141.12
                  over (min)       4.00        11.00
     Storage Coeff.  (min)=       3.87 (ii)   11.25 (ii)
     Unit Hyd. Tpeak (min)=       4.00        11.00
     Unit Hyd. peak  (cms)=        .29          .10
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.31         1.13         2.872 (iii)
     TIME TO PEAK    (hrs)=       1.03         1.18         1.050
     RUNOFF VOLUME    (mm)=      73.83        48.75        60.037
     TOTAL RAINFALL   (mm)=      75.83        75.83        75.831
     RUNOFF COEFFICIENT   =       .97          .64          .792

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

------------------------------------------------------------------------------
100:0022------------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    3.22
| 02:401    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.77         1.45
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     250.00        40.00
     Mannings n            =      .013         .240

     Max.eff.Inten.(mm/hr)=     232.24       148.53
                  over (min)       3.00        10.00
     Storage Coeff.  (min)=       3.16 (ii)   10.40 (ii)
     Unit Hyd. Tpeak (min)=       3.00        10.00
     Unit Hyd. peak  (cms)=        .36          .11
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .77          .36          .929 (iii)
     TIME TO PEAK    (hrs)=       1.02         1.17         1.033
     RUNOFF VOLUME    (mm)=      73.83        48.75        60.037
     TOTAL RAINFALL   (mm)=      75.83        75.83        75.831
     RUNOFF COEFFICIENT   =       .97          .64          .792

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

------------------------------------------------------------------------------
100:0023------------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    5.25
| 03:400    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.89         2.36
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     250.00        40.00
     Mannings n            =      .013         .240

     Max.eff.Inten.(mm/hr)=     232.24       148.53
                  over (min)       3.00        10.00
     Storage Coeff.  (min)=       3.16 (ii)   10.40 (ii)
     Unit Hyd. Tpeak (min)=       3.00        10.00
     Unit Hyd. peak  (cms)=        .36          .11
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.25          .59         1.515 (iii)
     TIME TO PEAK    (hrs)=       1.02         1.17         1.033
     RUNOFF VOLUME    (mm)=      73.83        48.75        60.037
     TOTAL RAINFALL   (mm)=      75.83        75.83        75.831
     RUNOFF COEFFICIENT   =       .97          .64          .792

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    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.

------------------------------------------------------------------------------
100:0024------------------------------------------------------------------------
------------------------
| ADD HYD (Pond4In   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 01:402          10.47    2.872    1.05  60.04    .000
                     +ID2 02:401           3.22     .929    1.03  60.04    .000
                     +ID3 03:400           5.25    1.515    1.03  60.04    .000
                      ==========================================================
                      SUM 04:Pond4In       18.94    5.291    1.03  60.04    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
100:0025------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>04:(Pond4I)    |
| OUT<06:(Pond4 )    |    =========  OUTFLOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)     (ha.m.)
                             .000  .0000E+00    |    1.400  .7000E+00
                             .310  .3000E+00    |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >04: (Pond4I)      18.94     5.291     1.033     60.037
     OUTFLOW<06: (Pond4 )      18.94     1.290     1.600     60.036

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   24.379
                    TIME SHIFT OF PEAK FLOW          (min)=    34.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.6597E+00

------------------------------------------------------------------------------
100:0026------------------------------------------------------------------------
*#############################################################################
*#
*# Pond 5 Sizing, CAs 500, 501 and 502
*#
*#############################################################################
----------------------
| CALIB STANDHYD     |   Area    (ha)=    2.93
| 01:501    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.61         1.32
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     250.00        40.00
     Mannings n            =      .013         .240

     Max.eff.Inten.(mm/hr)=     232.24       148.53
                  over (min)       3.00        10.00
     Storage Coeff.  (min)=       3.16 (ii)   10.40 (ii)
     Unit Hyd. Tpeak (min)=       3.00        10.00
     Unit Hyd. peak  (cms)=        .36          .11
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .70          .33          .846 (iii)
     TIME TO PEAK    (hrs)=       1.02         1.17         1.033
     RUNOFF VOLUME    (mm)=      73.83        48.75        60.037
     TOTAL RAINFALL   (mm)=      75.83        75.83        75.831
     RUNOFF COEFFICIENT   =       .97          .64          .792

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  86.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
```

```
05081>            THAN THE STORAGE COEFFICIENT.
05082>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05083>
05084> ---------------------------------------------------------------------------
05085> 100:0027-----------------------------------------------------------------
05086> ----------------------
05087> | CALIB STANDHYD     |   Area    (ha)=    3.14
05088> | 02:500    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
05089> ----------------------
05090>                              IMPERVIOUS    PERVIOUS (i)
05091>      Surface Area     (ha)=       1.73         1.41
05092>      Dep. Storage     (mm)=       2.00         5.00
05093>      Average Slope     (%)=       1.00         1.00
05094>      Length            (m)=     250.00        40.00
05095>      Mannings n           =       .013         .240
05096>
05097>      Max.eff.Inten.(mm/hr)=     232.24       148.53
05098>                    over (min)        3.00        10.00
05099>      Storage Coeff.  (min)=       3.16 (ii)   10.40 (ii)
05100>      Unit Hyd. Tpeak (min)=       3.00        10.00
05101>      Unit Hyd. peak  (cms)=        .36          .11
05102>                                                        *TOTALS*
05103>      PEAK FLOW       (cms)=        .75          .35          .906 (iii)
05104>      TIME TO PEAK    (hrs)=       1.02         1.17         1.033
05105>      RUNOFF VOLUME    (mm)=      73.83        48.75        60.037
05106>      TOTAL RAINFALL   (mm)=      75.83        75.83        75.831
05107>      RUNOFF COEFFICIENT   =        .97          .64          .792
05108>
05109>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
05110>            CN* =  86.0    Ia = Dep. Storage  (Above)
05111>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
05112>            THAN THE STORAGE COEFFICIENT.
05113>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05114>
05115> ---------------------------------------------------------------------------
05116> 100:0028-----------------------------------------------------------------
05117> ----------------------
05118> | CALIB STANDHYD     |   Area    (ha)=    5.45
05119> | 03:502    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
05120> ----------------------
05121>                              IMPERVIOUS    PERVIOUS (i)
05122>      Surface Area     (ha)=       3.00         2.45
05123>      Dep. Storage     (mm)=       2.00         5.00
05124>      Average Slope     (%)=       1.00         1.00
05125>      Length            (m)=     600.00        40.00
05126>      Mannings n           =       .013         .240
05127>
05128>      Max.eff.Inten.(mm/hr)=     232.24       129.83
05129>                    over (min)        5.00        13.00
05130>      Storage Coeff.  (min)=       5.34 (ii)   12.98 (ii)
05131>      Unit Hyd. Tpeak (min)=       5.00        13.00
05132>      Unit Hyd. peak  (cms)=        .22          .09
05133>                                                        *TOTALS*
05134>      PEAK FLOW       (cms)=       1.07          .54         1.349 (iii)
05135>      TIME TO PEAK    (hrs)=       1.05         1.23         1.067
05136>      RUNOFF VOLUME    (mm)=      73.83        48.75        60.037
05137>      TOTAL RAINFALL   (mm)=      75.83        75.83        75.831
05138>      RUNOFF COEFFICIENT   =        .97          .64          .792
05139>
05140>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
05141>            CN* =  86.0    Ia = Dep. Storage  (Above)
05142>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
05143>            THAN THE STORAGE COEFFICIENT.
05144>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05145>
05146> ---------------------------------------------------------------------------
05147> 100:0029-----------------------------------------------------------------
05148> -------------------------
05149> | ADD HYD (Pond5In   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
05150> -------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
05151>                       ID1 01:501           2.93      .846    1.03  60.04    .000
05152>                      +ID2 02:500           3.14      .906    1.03  60.04    .000
05153>                      +ID3 03:502           5.45    1.349    1.07  60.04    .000
05154>                       ============================================================
05155>                       SUM 04:Pond5In       11.52    3.013    1.03  60.04    .000
05156>
05157>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
05158>
05159> ---------------------------------------------------------------------------
05160> 100:0030-----------------------------------------------------------------
05161> ---------------------
05162> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
05163> |  IN>04:(Pond5I)   |
05164> | OUT<05:(Pond5 )   |    =========  OUTLFOW STORAGE TABLE  =========
05165> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
05166>                            (cms)     (ha.m.)   |    (cms)     (ha.m.)
05167>                             .000  .0000E+00    |     .850  .5000E+00
05168>                             .190  .2300E+00    |     .000  .0000E+00
05169>
05170>      ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
05171>      --------------------         (ha)     (cms)     (hrs)       (mm)
05172>      INFLOW >04: (Pond5I)       11.52     3.013     1.033     60.037
05173>      OUTFLOW<05: (Pond5 )       11.52      .670     1.700     60.036
05174>
05175>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   22.236
05176>                     TIME SHIFT OF PEAK FLOW          (min)=    40.00
05177>                     MAXIMUM  STORAGE   USED       (ha.m.)=.4263E+00
05178>
05179> ---------------------------------------------------------------------------
05180> 100:0031-----------------------------------------------------------------
05181> *#*************************************************************************
05182> *#
05183> *# EXT3 Sizing, CAs EXT3
05184> *#
05185> *#*************************************************************************
05186> ----------------------
05187> | CALIB STANDHYD     |   Area    (ha)=    9.16
05188> | 01:EXT3   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
05189> ----------------------
05190>                              IMPERVIOUS    PERVIOUS (i)
05191>      Surface Area     (ha)=       5.04         4.12
05192>      Dep. Storage     (mm)=       2.00         5.00
05193>      Average Slope     (%)=       1.00         1.00
05194>      Length            (m)=     400.00        40.00
05195>      Mannings n           =       .013         .240
05196>
05197>      Max.eff.Inten.(mm/hr)=     232.24       134.99
05198>                    over (min)        4.00        12.00
05199>      Storage Coeff.  (min)=       4.19 (ii)   11.71 (ii)
05200>      Unit Hyd. Tpeak (min)=       4.00        12.00
05201>      Unit Hyd. peak  (cms)=        .27          .10
05202>                                                        *TOTALS*
05203>      PEAK FLOW       (cms)=       1.97          .97         2.420 (iii)
05204>      TIME TO PEAK    (hrs)=       1.03         1.20         1.050
05205>      RUNOFF VOLUME    (mm)=      73.83        48.75        60.037
05206>      TOTAL RAINFALL   (mm)=      75.83        75.83        75.831
05207>      RUNOFF COEFFICIENT   =        .97          .64          .792
05208>
05209>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
05210>            CN* =  86.0    Ia = Dep. Storage  (Above)
05211>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
05212>            THAN THE STORAGE COEFFICIENT.
05213>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05214>
05215> ---------------------------------------------------------------------------
05216> 100:0032-----------------------------------------------------------------
05217> ----------------------
05218> | COMPUTE DUALHYD    |   Average inlet capacities   [CINLET] =    .150  (cms)
05219> | TotalHyd 01:EXT3   |   Number of inlets in system [NINLET] =       1
05220> ----------------------   Total minor system capacity          =    .150  (cms)
05221>                          Total major system storage [TMJSTO] =    5000.(cu.m.)
05222>
05223>                  ID: NHYD        AREA     QPEAK     TPEAK     R.V.       DWF
05224>                                   (ha)     (cms)     (hrs)     (mm)     (cms)
05225>      TOTAL HYD.   01:EXT3         9.16     2.420     1.050   60.037     .000
05226>      ==========================================================================
05227>      MAJOR SYST   02:noFlow        .00      .000      .000     .000     .000
05228>      MINOR SYST   03:MinorE       9.16      .150      .667   60.102     .000
05229>
05230>      NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
05231>
05232>      Maximum MAJOR SYSTEM storage used =    4098.(cu.m.)
05233>
05234> ---------------------------------------------------------------------------
05235> 100:0033-----------------------------------------------------------------
05236> *#*************************************************************************
05237> *#
05238> *# Flow Totals and Channel Runoff
05239> *#
05240> *#*************************************************************************
05241> -------------------------
05242> | ADD HYD (Control   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
05243> -------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
05244>                        ID1 02:noFlow          .00      .000     .00     .00    .000
05245>                       +ID2 03:MinorEXT3      9.16      .150     .67   60.10    .000
05246>                       +ID3 05:Pond5         11.52      .670    1.70   60.04    .000
05247>                       +ID4 06:Pond4         18.94     1.290    1.60   60.04    .000
05248>                       +ID5 07:Pond3         18.88     1.216    1.68   53.83    .000
05249>                       +ID6 08:Pond2          7.53      .475    1.68   60.04    .000
05250>                       +ID7 09:Pond1          4.08      .217    1.72   60.04    .000
05251>                       +ID8 10:ExPond        32.50     2.176    1.68   60.04    .000
05252>                        ============================================================
05253>                        SUM 01:Control      102.61     6.187    1.67   58.90    .000
05254>
05255>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
05256>
05257> ---------------------------------------------------------------------------
05258> 100:0034-----------------------------------------------------------------
05259> ----------------------
05260> | CALIB NASHYD       |   Area    (ha)=     .99   Curve Number   (CN)=68.00
05261> | 02:600    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
05262> ----------------------   U.H. Tp(hrs)=    .350
05263>
05264>      Unit Hyd Qpeak  (cms)=     .108
05265>
05266>      PEAK FLOW       (cms)=     .066 (i)
05267>      TIME TO PEAK    (hrs)=    1.467
05268>      RUNOFF VOLUME    (mm)=   26.355
05269>      TOTAL RAINFALL   (mm)=   75.831
05270>      RUNOFF COEFFICIENT   =     .348
05271>
05272>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05273>
05274> ---------------------------------------------------------------------------
05275> 100:0035-----------------------------------------------------------------
05276> ----------------------
05277> | CALIB NASHYD       |   Area    (ha)=    3.54   Curve Number   (CN)=68.00
05278> | 03:601    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
05279> ----------------------   U.H. Tp(hrs)=    .590
05280>
05281>      Unit Hyd Qpeak  (cms)=     .229
05282>
05283>      PEAK FLOW       (cms)=     .166 (i)
05284>      TIME TO PEAK    (hrs)=    1.783
05285>      RUNOFF VOLUME    (mm)=   26.355
05286>      TOTAL RAINFALL   (mm)=   75.831
05287>      RUNOFF COEFFICIENT   =     .348
05288>
05289>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05290>
05291> ---------------------------------------------------------------------------
05292> 100:0036-----------------------------------------------------------------
05293> ----------------------
05294> | CALIB NASHYD       |   Area    (ha)=    3.61   Curve Number   (CN)=68.00
05295> | 04:602    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
05296> ----------------------   U.H. Tp(hrs)=    .970
05297>
05298>      Unit Hyd Qpeak  (cms)=     .142
05299>
05300>      PEAK FLOW       (cms)=     .118 (i)
05301>      TIME TO PEAK    (hrs)=    2.250
05302>      RUNOFF VOLUME    (mm)=   26.355
05303>      TOTAL RAINFALL   (mm)=   75.831
05304>      RUNOFF COEFFICIENT   =     .348
05305>
05306>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05307>
05308> ---------------------------------------------------------------------------
05309> 100:0037-----------------------------------------------------------------
05310> -------------------------
05311> | ADD HYD (PostTot   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
05312> -------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
05313>                        ID1 01:Control      102.61    6.187    1.67  58.90    .000
05314>                       +ID2 02:600            .99     .066    1.47  26.36    .000
05315>                       +ID3 03:601           3.54     .166    1.78  26.36    .000
05316>                       +ID4 04:602           3.61     .118    2.25  26.36    .000
05317>                        ============================================================
05318>                        SUM 05:PostTot      110.75    6.493    1.68  56.51    .000
05319>
05320>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
05321>
05322> ---------------------------------------------------------------------------
05323> 100:0038-----------------------------------------------------------------
05324> ---------------------------------------------------------------------------
05325> 100:0002-----------------------------------------------------------------
05326> ---------------------------------------------------------------------------
05327> 100:0002-----------------------------------------------------------------
05328> ---------------------------------------------------------------------------
05329> 100:0002-----------------------------------------------------------------
05330> ---------------------------------------------------------------------------
05331> 100:0002-----------------------------------------------------------------
05332> ---------------------------------------------------------------------------
05333> 100:0002-----------------------------------------------------------------
05334>   ** END OF RUN : 249
```

```
05335>
05336> ********************************************************************************
05337>
05338>
05339>
05340>
05341>
05342> --------------------
05343> | START            |  Project  dir.: C:\MODELL~1\14170\SWMHYMO\
05344> --------------------  Rainfall dir.: C:\MODELL~1\14170\SWMHYMO\
05345>     TZERO =   .00 hrs on        0
05346>     METOUT=   2 (output = METRIC)
05347>     NRUN  = 250
05348>     NSTORM=   1
05349>               #  1=ldn250YR.3hr
05350> --------------------------------------------------------------------------------
05351> 250:0002----------------------------------------------------------------------
05352> *#*****************************************************************************
05353> *#  Project Name: [Col Talbot Complete Corridor]    Project Number: [161414170]
05354> *#  Date        : 2022-11-14
05355> *#  Modeller    : [AKK]
05356> *#  Company     : Stantec Consulting Ltd. (London)
05357> *#  License #   :  4730904
05358> *#*****************************************************************************
05359> *#*****************************************************************************
05360> *#
05361> *#  This model represents the hydologic characteristics of the existing and
05362> *#  proposed conditions in the proposed subdivision.
05363> *#  Storm events modeled are:
05364> *#  2YR, 5YR, 10YR, 25YR, 50YR, 100YR and 250YR 3hr Chicago STORMS (London, ONT.
05365> *#
05366> *#*****************************************************************************
05367> --------------------------------------------------------------------------------
05368> 250:0002----------------------------------------------------------------------
05369> --------------------
05370> | READ STORM       |    Filename: 250-yr, 3hr Chicago Storm from London ID
05371> | Ptotal=  86.60 mm|    Comments: 250-yr, 3hr Chicago Storm from London ID
05372> --------------------
05373>               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
05374>                hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
05375>                .08   5.095 |    .83  43.425 |   1.58  19.302 |   2.33   7.254
05376>                .17   5.690 |    .92 106.077 |   1.67  16.460 |   2.42   6.764
05377>                .25   6.440 |   1.00 274.730 |   1.75  14.300 |   2.50   6.334
05378>                .33   7.410 |   1.08 136.668 |   1.83  12.612 |   2.58   5.955
05379>                .42   8.710 |   1.17  76.864 |   1.92  11.261 |   2.67   5.617
05380>                .50  10.529 |   1.25  50.954 |   2.00  10.158 |   2.75   5.316
05381>                .58  13.230 |   1.33  37.106 |   2.08   9.244 |   2.83   5.044
05382>                .67  17.585 |   1.42  28.713 |   2.17   8.474 |   2.92   4.799
05383>                .75  25.536 |   1.50  23.179 |   2.25   7.819 |   3.00   4.577
05384>
05385> --------------------------------------------------------------------------------
05386> 250:0003----------------------------------------------------------------------
05387> *#*****************************************************************************
05388> *#
05389> *#  Existing Conditions to determine target release rates
05390> *#
05391> *#*****************************************************************************
05392> ----------------------
05393> | CALIB NASHYD       |   Area    (ha)=   49.50   Curve Number   (CN)=84.00
05394> | 01:S101   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
05395> ----------------------   U.H. Tp(hrs)=    .840
05396>
05397>      Unit Hyd Qpeak  (cms)=    2.251
05398>
05399>      PEAK FLOW       (cms)=    3.621 (i)
05400>      TIME TO PEAK    (hrs)=    2.033
05401>      RUNOFF VOLUME    (mm)=   51.229
05402>      TOTAL RAINFALL   (mm)=   86.603
05403>      RUNOFF COEFFICIENT   =     .592
05404>
05405>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05406>
05407> --------------------------------------------------------------------------------
05408> 250:0004----------------------------------------------------------------------
05409> ----------------------
05410> | CALIB NASHYD       |   Area    (ha)=   32.80   Curve Number   (CN)=84.00
05411> | 02:S102   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
05412> ----------------------   U.H. Tp(hrs)=    .620
05413>
05414>      Unit Hyd Qpeak  (cms)=    2.021
05415>
05416>      PEAK FLOW       (cms)=    3.028 (i)
05417>      TIME TO PEAK    (hrs)=    1.767
05418>      RUNOFF VOLUME    (mm)=   51.229
05419>      TOTAL RAINFALL   (mm)=   86.603
05420>      RUNOFF COEFFICIENT   =     .592
05421>
05422>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05423>
05424> --------------------------------------------------------------------------------
05425> 250:0005----------------------------------------------------------------------
05426> ----------------------
05427> | CALIB NASHYD       |   Area    (ha)=    8.90   Curve Number   (CN)=84.00
05428> | 03:S103   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
05429> ----------------------   U.H. Tp(hrs)=    .480
05430>
05431>      Unit Hyd Qpeak  (cms)=     .708
05432>
05433>      PEAK FLOW       (cms)=     .993 (i)
05434>      TIME TO PEAK    (hrs)=    1.600
05435>      RUNOFF VOLUME    (mm)=   51.229
05436>      TOTAL RAINFALL   (mm)=   86.603
05437>      RUNOFF COEFFICIENT   =     .592
05438>
05439>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05440>
05441> --------------------------------------------------------------------------------
05442> 250:0006----------------------------------------------------------------------
05443> ----------------------
05444> | CALIB NASHYD       |   Area    (ha)=   33.50   Curve Number   (CN)=84.00
05445> | 04:S104   DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
05446> ----------------------   U.H. Tp(hrs)=    .720
05447>
05448>      Unit Hyd Qpeak  (cms)=    1.777
05449>
05450>      PEAK FLOW       (cms)=    2.760 (i)
05451>      TIME TO PEAK    (hrs)=    1.900
05452>      RUNOFF VOLUME    (mm)=   51.229
05453>      TOTAL RAINFALL   (mm)=   86.603
05454>      RUNOFF COEFFICIENT   =     .592
05455>
05456>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05457>
05458> --------------------------------------------------------------------------------
05459> 250:0007----------------------------------------------------------------------
05460> ----------------------
05461> | ADD HYD (Total     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
05462> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
05463>                        ID1 01:S101          49.50    3.621    2.03  51.23    .000
05464>                       +ID2 02:S102          32.80    3.028    1.77  51.23    .000
05465>                       +ID3 03:S103           8.90     .993    1.60  51.23    .000
05466>                       +ID4 04:S104          33.50    2.760    1.90  51.23    .000
05467>                        ========================================================
05468>                        SUM 05:Total        124.70   10.121    1.87  51.23    .000
05469>
05470>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
05471>
05472> --------------------------------------------------------------------------------
05473> 250:0008----------------------------------------------------------------------
05474> *#*****************************************************************************
05475> *#
05476> *#  External Pond Sizing, CAs EXT1 and EXT2
05477> *#
05478> *#*****************************************************************************
05479> ----------------------
05480> | CALIB STANDHYD     |   Area    (ha)=    9.50
05481> | 01:EXT2   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
05482> ----------------------
05483>                                IMPERVIOUS    PERVIOUS (i)
05484>      Surface Area     (ha)=       5.22         4.27
05485>      Dep. Storage     (mm)=       2.00         5.00
05486>      Average Slope     (%)=       1.00         1.00
05487>      Length            (m)=     400.00        40.00
05488>      Mannings n             =       .013         .240
05489>
05490>      Max.eff.Inten.(mm/hr)=     274.73       174.76
05491>                  over (min)        4.00        11.00
05492>      Storage Coeff.  (min)=       3.92 (ii)   10.70 (ii)
05493>      Unit Hyd. Tpeak (min)=       4.00        11.00
05494>      Unit Hyd. peak  (cms)=        .29          .10
05495>                                                          *TOTALS*
05496>      PEAK FLOW       (cms)=       2.46         1.30         3.129 (iii)
05497>      TIME TO PEAK    (hrs)=       1.03         1.17          1.050
05498>      RUNOFF VOLUME    (mm)=      84.60        58.52         70.256
05499>      TOTAL RAINFALL   (mm)=      86.60        86.60         86.603
05500>      RUNOFF COEFFICIENT   =        .98          .68           .811
05501>
05502>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
05503>            CN* =  86.0    Ia = Dep. Storage  (Above)
05504>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
05505>            THAN THE STORAGE COEFFICIENT.
05506>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05507>
05508> --------------------------------------------------------------------------------
05509> 250:0009----------------------------------------------------------------------
05510> ----------------------
05511> | CALIB STANDHYD     |   Area    (ha)=   23.00
05512> | 02:EXT1   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
05513> ----------------------
05514>                                IMPERVIOUS    PERVIOUS (i)
05515>      Surface Area     (ha)=      12.65        10.35
05516>      Dep. Storage     (mm)=       2.00         5.00
05517>      Average Slope     (%)=       1.00         1.00
05518>      Length            (m)=     750.00        40.00
05519>      Mannings n             =       .013         .240
05520>
05521>      Max.eff.Inten.(mm/hr)=     251.72       160.16
05522>                  over (min)        6.00        13.00
05523>      Storage Coeff.  (min)=       5.92 (ii)   12.94 (ii)
05524>      Unit Hyd. Tpeak (min)=       6.00        13.00
05525>      Unit Hyd. peak  (cms)=        .19          .09
05526>                                                          *TOTALS*
05527>      PEAK FLOW       (cms)=       5.06         2.84         6.788 (iii)
05528>      TIME TO PEAK    (hrs)=       1.07         1.22          1.100
05529>      RUNOFF VOLUME    (mm)=      84.60        58.52         70.256
05530>      TOTAL RAINFALL   (mm)=      86.60        86.60         86.603
05531>      RUNOFF COEFFICIENT   =        .98          .68           .811
05532>
05533>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
05534>            CN* =  86.0    Ia = Dep. Storage  (Above)
05535>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
05536>            THAN THE STORAGE COEFFICIENT.
05537>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05538>
05539> --------------------------------------------------------------------------------
05540> 250:0010----------------------------------------------------------------------
05541> ------------------------
05542> | ADD HYD (ExPondIn  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
05543> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
05544>                        ID1 01:EXT2          9.50    3.129    1.05  70.26    .000
05545>                       +ID2 02:EXT1         23.00    6.788    1.10  70.26    .000
05546>                        ========================================================
05547>                        SUM 03:ExPondIn      32.50    9.823    1.08  70.26    .000
05548>
05549>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
05550>
05551> --------------------------------------------------------------------------------
05552> 250:0011----------------------------------------------------------------------
05553> ----------------------
05554> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
05555> |  IN>03:(ExPond)    |
05556> | OUT<10:(ExPond)    |    =========  OUTLFOW STORAGE TABLE  =========
05557> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
05558>                             (cms)    (ha.m.)   |    (cms)    (ha.m.)
05559>                              .000  .0000E+00   |    2.420  .1200E+01
05560>                              .530  .4500E+00   |     .000  .0000E+00
05561>       *** WARNING: STORAGE-Q values were extrapolated.
05562>                    Increase curve or use overflow option.
05563>
05564>      ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
05565>      --------------------         (ha)     (cms)     (hrs)       (mm)
05566>      INFLOW >03: (ExPond)       32.50     9.823     1.083     70.256
05567>      OUTFLOW<10: (ExPond)       32.50     2.661     1.633     70.256
05568>
05569>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   27.084
05570>                    TIME SHIFT OF PEAK FLOW          (min)=    33.00
05571>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1296E+01
05572>
05573> --------------------------------------------------------------------------------
05574> 250:0012----------------------------------------------------------------------
05575> *#*****************************************************************************
05576> *#
05577> *#  Pond 1 Sizing, CAs 100
05578> *#
05579> *#*****************************************************************************
05580> ----------------------
05581> | CALIB STANDHYD     |   Area    (ha)=    4.08
05582> | 01:100    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
05583> ----------------------
05584>                                IMPERVIOUS    PERVIOUS (i)
05585>      Surface Area     (ha)=       2.24         1.84
05586>      Dep. Storage     (mm)=       2.00         5.00
05587>      Average Slope     (%)=       1.00         1.00
05588>      Length            (m)=     300.00        40.00
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05589>      Mannings n           =       .013         .240
05590>
05591>      Max.eff.Inten.(mm/hr)=     274.73       184.31
05592>                over (min)        3.00        10.00
05593>      Storage Coeff.  (min)=       3.30 (ii)    9.94 (ii)
05594>      Unit Hyd. Tpeak (min)=       3.00        10.00
05595>      Unit Hyd. peak  (cms)=        .35          .11
05596>                                                          *TOTALS*
05597>      PEAK FLOW       (cms)=       1.13          .58         1.408 (iii)
05598>      TIME TO PEAK    (hrs)=       1.02         1.15         1.033
05599>      RUNOFF VOLUME    (mm)=      84.60        58.52        70.256
05600>      TOTAL RAINFALL   (mm)=      86.60        86.60        86.603
05601>      RUNOFF COEFFICIENT   =        .98          .68          .811
05602>
05603>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
05604>            CN* =  86.0    Ia = Dep. Storage  (Above)
05605>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
05606>            THAN THE STORAGE COEFFICIENT.
05607>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05608>
05609> ---------------------------------------------------------------------------
05610> 250:0013-----------------------------------------------------------------
05611> ---------------------
05612> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
05613> |  IN>01:(100   )   |
05614> | OUT<09:(Pond1 )   |    =========  OUTLFOW STORAGE TABLE  =========
05615> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
05616>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
05617>                             .000  .0000E+00    |     .300  .2000E+00
05618>                             .070  .7000E-01    |     .000  .0000E+00
05619>
05620>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
05621>      --------------------       (ha)     (cms)     (hrs)       (mm)
05622>      INFLOW >01: (100   )       4.08     1.408     1.033     70.256
05623>      OUTFLOW<09: (Pond1 )       4.08      .265     1.667     70.256
05624>
05625>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   18.783
05626>                    TIME SHIFT OF PEAK FLOW          (min)=    38.00
05627>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1799E+00
05628>
05629> ---------------------------------------------------------------------------
05630> 250:0014-----------------------------------------------------------------
05631> *#*************************************************************************
05632> *#
05633> *#  Pond 2 Sizing, CAs 200
05634> *#
05635> *#*************************************************************************
05636> ---------------------
05637> | CALIB STANDHYD     |   Area    (ha)=    7.53
05638> | 01:200    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
05639> ---------------------
05640>                              IMPERVIOUS    PERVIOUS (i)
05641>      Surface Area     (ha)=       4.14         3.39
05642>      Dep. Storage     (mm)=       2.00         5.00
05643>      Average Slope     (%)=       1.00         1.00
05644>      Length            (m)=     550.00        40.00
05645>      Mannings n           =       .013         .240
05646>
05647>      Max.eff.Inten.(mm/hr)=     274.73       166.83
05648>                over (min)        5.00        12.00
05649>      Storage Coeff.  (min)=       4.74 (ii)   11.65 (ii)
05650>      Unit Hyd. Tpeak (min)=       5.00        12.00
05651>      Unit Hyd. peak  (cms)=        .23          .10
05652>                                                          *TOTALS*
05653>      PEAK FLOW       (cms)=       1.80          .98         2.359 (iii)
05654>      TIME TO PEAK    (hrs)=       1.05         1.20         1.067
05655>      RUNOFF VOLUME    (mm)=      84.60        58.52        70.256
05656>      TOTAL RAINFALL   (mm)=      86.60        86.60        86.603
05657>      RUNOFF COEFFICIENT   =        .98          .68          .811
05658>
05659>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
05660>            CN* =  86.0    Ia = Dep. Storage  (Above)
05661>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
05662>            THAN THE STORAGE COEFFICIENT.
05663>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05664>
05665> ---------------------------------------------------------------------------
05666> 250:0015-----------------------------------------------------------------
05667> ---------------------
05668> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
05669> |  IN>01:(200   )   |
05670> | OUT<08:(Pond2 )   |    =========  OUTLFOW STORAGE TABLE  =========
05671> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
05672>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
05673>                             .000  .0000E+00    |     .560  .3000E+00
05674>                             .120  .1500E+00    |     .000  .0000E+00
05675>       *** WARNING: STORAGE-Q values were extrapolated.
05676>                    Increase curve or use overflow option.
05677>
05678>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
05679>      --------------------       (ha)     (cms)     (hrs)       (mm)
05680>      INFLOW >01: (200   )       7.53     2.359     1.067     70.256
05681>      OUTFLOW<08: (Pond2 )       7.53      .599     1.633     70.256
05682>
05683>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   25.406
05684>                    TIME SHIFT OF PEAK FLOW          (min)=    34.00
05685>                    MAXIMUM  STORAGE   USED       (ha.m.)=.3134E+00
05686>
05687> ---------------------------------------------------------------------------
05688> 250:0016-----------------------------------------------------------------
05689> *#*************************************************************************
05690> *#
05691> *# Pond 3 Sizing, CAs 300, 301 and 302
05692> *#
05693> *#*************************************************************************
05694> ---------------------
05695> | CALIB STANDHYD     |   Area    (ha)=   10.33
05696> | 01:300    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
05697> ---------------------
05698>                              IMPERVIOUS    PERVIOUS (i)
05699>      Surface Area     (ha)=       5.68         4.65
05700>      Dep. Storage     (mm)=       2.00         5.00
05701>      Average Slope     (%)=       1.00         1.00
05702>      Length            (m)=     610.00        40.00
05703>      Mannings n           =       .013         .240
05704>
05705>      Max.eff.Inten.(mm/hr)=     274.73       166.83
05706>                over (min)        5.00        12.00
05707>      Storage Coeff.  (min)=       5.05 (ii)   11.96 (ii)
05708>      Unit Hyd. Tpeak (min)=       5.00        12.00
05709>      Unit Hyd. peak  (cms)=        .22          .09
05710>                                                          *TOTALS*
05711>      PEAK FLOW       (cms)=       2.43         1.33         3.186 (iii)
05712>      TIME TO PEAK    (hrs)=       1.05         1.20         1.067
05713>      RUNOFF VOLUME    (mm)=      84.60        58.52        70.256
05714>      TOTAL RAINFALL   (mm)=      86.60        86.60        86.603
05715>      RUNOFF COEFFICIENT   =        .98          .68          .811
05716>
05717>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
05718>            CN* =  86.0    Ia = Dep. Storage  (Above)
05719>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
05720>            THAN THE STORAGE COEFFICIENT.
05721>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05722>
05723> ---------------------------------------------------------------------------
05724> 250:0017-----------------------------------------------------------------
05725> ---------------------
05726> | CALIB STANDHYD     |   Area    (ha)=    4.18
05727> | 02:302    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
05728> ---------------------
05729>                              IMPERVIOUS    PERVIOUS (i)
05730>      Surface Area     (ha)=       2.30         1.88
05731>      Dep. Storage     (mm)=       2.00         5.00
05732>      Average Slope     (%)=       1.00         1.00
05733>      Length            (m)=     210.00        40.00
05734>      Mannings n           =       .013         .240
05735>
05736>      Max.eff.Inten.(mm/hr)=     274.73       189.26
05737>                over (min)        3.00         9.00
05738>      Storage Coeff.  (min)=       2.66 (ii)    9.23 (ii)
05739>      Unit Hyd. Tpeak (min)=       3.00         9.00
05740>      Unit Hyd. peak  (cms)=        .41          .12
05741>                                                          *TOTALS*
05742>      PEAK FLOW       (cms)=       1.22          .62         1.535 (iii)
05743>      TIME TO PEAK    (hrs)=       1.02         1.13         1.017
05744>      RUNOFF VOLUME    (mm)=      84.60        58.52        70.256
05745>      TOTAL RAINFALL   (mm)=      86.60        86.60        86.603
05746>      RUNOFF COEFFICIENT   =        .98          .68          .811
05747>
05748>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
05749>            CN* =  86.0    Ia = Dep. Storage  (Above)
05750>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
05751>            THAN THE STORAGE COEFFICIENT.
05752>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05753>
05754> ---------------------------------------------------------------------------
05755> 250:0018-----------------------------------------------------------------
05756> ---------------------
05757> | CALIB NASHYD       |   Area    (ha)=    4.37   Curve Number   (CN)=76.00
05758> | 03:301    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
05759> ---------------------  U.H. Tp(hrs)=    .410
05760>
05761>      Unit Hyd Qpeak  (cms)=     .407
05762>
05763>      PEAK FLOW       (cms)=     .428 (i)
05764>      TIME TO PEAK    (hrs)=    1.533
05765>      RUNOFF VOLUME    (mm)=   41.152
05766>      TOTAL RAINFALL   (mm)=   86.603
05767>      RUNOFF COEFFICIENT   =     .475
05768>
05769>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05770>
05771> ---------------------------------------------------------------------------
05772> 250:0019-----------------------------------------------------------------
05773> ---------------------
05774> | ADD HYD (Pond3In   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
05775> ---------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
05776>                       ID1 01:300          10.33    3.186   1.07  70.26    .000
05777>                      +ID2 02:302           4.18    1.535   1.02  70.26    .000
05778>                      +ID3 03:301           4.37     .428   1.53  41.15    .000
05779>                       ==========================================================
05780>                       SUM 04:Pond3In      18.88    4.688   1.07  63.52    .000
05781>
05782>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
05783>
05784> ---------------------------------------------------------------------------
05785> 250:0020-----------------------------------------------------------------
05786> ---------------------
05787> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
05788> |  IN>04:(Pond3I)   |
05789> | OUT<07:(Pond3 )   |    =========  OUTLFOW STORAGE TABLE  =========
05790> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
05791>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
05792>                             .000  .0000E+00    |    1.400  .5800E+00
05793>                             .310  .2500E+00    |     .000  .0000E+00
05794>       *** WARNING: STORAGE-Q values were extrapolated.
05795>                    Increase curve or use overflow option.
05796>
05797>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
05798>      --------------------       (ha)     (cms)     (hrs)       (mm)
05799>      INFLOW >04: (Pond3I)      18.88     4.688     1.067     63.520
05800>      OUTFLOW<07: (Pond3 )      18.88     1.504     1.633     63.520
05801>
05802>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   32.080
05803>                    TIME SHIFT OF PEAK FLOW          (min)=    34.00
05804>                    MAXIMUM  STORAGE   USED       (ha.m.)=.6115E+00
05805>
05806> ---------------------------------------------------------------------------
05807> 250:0021-----------------------------------------------------------------
05808> *#*************************************************************************
05809> *#
05810> *# Pond 4 Sizing, CAs 400, 401 and 402
05811> *#
05812> *#*************************************************************************
05813> ---------------------
05814> | CALIB STANDHYD     |   Area    (ha)=   10.47
05815> | 01:402    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
05816> ---------------------
05817>                              IMPERVIOUS    PERVIOUS (i)
05818>      Surface Area     (ha)=       5.76         4.71
05819>      Dep. Storage     (mm)=       2.00         5.00
05820>      Average Slope     (%)=       1.00         1.00
05821>      Length            (m)=     350.00        40.00
05822>      Mannings n           =       .013         .240
05823>
05824>      Max.eff.Inten.(mm/hr)=     274.73       184.31
05825>                over (min)        4.00        10.00
05826>      Storage Coeff.  (min)=       3.62 (ii)   10.26 (ii)
05827>      Unit Hyd. Tpeak (min)=       4.00        10.00
05828>      Unit Hyd. peak  (cms)=        .30          .11
05829>                                                          *TOTALS*
05830>      PEAK FLOW       (cms)=       2.77         1.47         3.591 (iii)
05831>      TIME TO PEAK    (hrs)=       1.03         1.17         1.050
05832>      RUNOFF VOLUME    (mm)=      84.60        58.52        70.256
05833>      TOTAL RAINFALL   (mm)=      86.60        86.60        86.603
05834>      RUNOFF COEFFICIENT   =        .98          .68          .811
05835>
05836>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
05837>            CN* =  86.0    Ia = Dep. Storage  (Above)
05838>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
05839>            THAN THE STORAGE COEFFICIENT.
05840>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05841>
05842> ---------------------------------------------------------------------------
```

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05843> 250:0022-------------------------------------------------------------------------------
05844> ----------------------
05845> | CALIB STANDHYD     |   Area    (ha)=    3.22
05846> | 02:401    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
05847> ----------------------
05848>                              IMPERVIOUS    PERVIOUS (i)
05849>      Surface Area     (ha)=       1.77         1.45
05850>      Dep. Storage     (mm)=       2.00         5.00
05851>      Average Slope     (%)=       1.00         1.00
05852>      Length            (m)=     250.00        40.00
05853>      Mannings n             =      .013         .240
05854>
05855>      Max.eff.Inten.(mm/hr)=     274.73       184.31
05856>                   over (min)        3.00        10.00
05857>      Storage Coeff.  (min)=       2.95 (ii)    9.59 (ii)
05858>      Unit Hyd. Tpeak (min)=       3.00        10.00
05859>      Unit Hyd. peak  (cms)=        .38          .12
05860>                                                          *TOTALS*
05861>      PEAK FLOW       (cms)=        .92          .47         1.133 (iii)
05862>      TIME TO PEAK    (hrs)=       1.02         1.15         1.017
05863>      RUNOFF VOLUME    (mm)=      84.60        58.52        70.256
05864>      TOTAL RAINFALL   (mm)=      86.60        86.60        86.603
05865>      RUNOFF COEFFICIENT   =        .98          .68          .811
05866>
05867>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
05868>            CN* =  86.0    Ia = Dep. Storage  (Above)
05869>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
05870>            THAN THE STORAGE COEFFICIENT.
05871>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05872>
05873> -------------------------------------------------------------------------------
05874> 250:0023-------------------------------------------------------------------------------
05875> ----------------------
05876> | CALIB STANDHYD     |   Area    (ha)=    5.25
05877> | 03:400    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
05878> ----------------------
05879>                              IMPERVIOUS    PERVIOUS (i)
05880>      Surface Area     (ha)=       2.89         2.36
05881>      Dep. Storage     (mm)=       2.00         5.00
05882>      Average Slope     (%)=       1.00         1.00
05883>      Length            (m)=     250.00        40.00
05884>      Mannings n             =      .013         .240
05885>
05886>      Max.eff.Inten.(mm/hr)=     274.73       184.31
05887>                   over (min)        3.00        10.00
05888>      Storage Coeff.  (min)=       2.95 (ii)    9.59 (ii)
05889>      Unit Hyd. Tpeak (min)=       3.00        10.00
05890>      Unit Hyd. peak  (cms)=        .38          .12
05891>                                                          *TOTALS*
05892>      PEAK FLOW       (cms)=       1.50          .76         1.847 (iii)
05893>      TIME TO PEAK    (hrs)=       1.02         1.15         1.017
05894>      RUNOFF VOLUME    (mm)=      84.60        58.52        70.256
05895>      TOTAL RAINFALL   (mm)=      86.60        86.60        86.603
05896>      RUNOFF COEFFICIENT   =        .98          .68          .811
05897>
05898>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
05899>            CN* =  86.0    Ia = Dep. Storage  (Above)
05900>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
05901>            THAN THE STORAGE COEFFICIENT.
05902>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05903>
05904> -------------------------------------------------------------------------------
05905> 250:0024-------------------------------------------------------------------------------
05906> ------------------------
05907> | ADD HYD (Pond4In   ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
05908> ------------------------                   (ha)     (cms)   (hrs)    (mm)   (cms)
05909>                      ID1 01:402           10.47    3.591    1.05   70.26    .000
05910>                     +ID2 02:401            3.22    1.133    1.02   70.26    .000
05911>                     +ID3 03:400            5.25    1.847    1.02   70.26    .000
05912>                      ==========================================================
05913>                      SUM 04:Pond4In       18.94    6.538    1.03   70.26    .000
05914>
05915>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
05916>
05917> -------------------------------------------------------------------------------
05918> 250:0025-------------------------------------------------------------------------------
05919> ----------------------
05920> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
05921> |  IN>04:(Pond4I)    |
05922> | OUT<06:(Pond4 )    |    =========  OUTFLOW STORAGE TABLE  =========
05923> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
05924>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
05925>                              .000  .0000E+00    |   1.400  .7000E+00
05926>                              .310  .3000E+00    |    .000  .0000E+00
05927>       *** WARNING: STORAGE-Q values were extrapolated.
05928>                    Increase curve or use overflow option.
05929>
05930>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
05931>      ---------------------       (ha)     (cms)     (hrs)       (mm)
05932>      INFLOW >04: (Pond4I)      18.94     6.538     1.033     70.256
05933>      OUTFLOW<06: (Pond4 )      18.94     1.592     1.567     70.256
05934>
05935>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   24.347
05936>                     TIME SHIFT OF PEAK FLOW          (min)=    32.00
05937>                     MAXIMUM  STORAGE   USED       (ha.m.)=.7705E+00
05938>
05939> -------------------------------------------------------------------------------
05940> 250:0026-------------------------------------------------------------------------------
05941> *#*****************************************************************************
05942> *#
05943> *# Pond 5 Sizing, CAs 500, 501 and 502
05944> *#
05945> *#*****************************************************************************
05946> ----------------------
05947> | CALIB STANDHYD     |   Area    (ha)=    2.93
05948> | 01:501    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
05949> ----------------------
05950>                              IMPERVIOUS    PERVIOUS (i)
05951>      Surface Area     (ha)=       1.61         1.32
05952>      Dep. Storage     (mm)=       2.00         5.00
05953>      Average Slope     (%)=       1.00         1.00
05954>      Length            (m)=     250.00        40.00
05955>      Mannings n             =      .013         .240
05956>
05957>      Max.eff.Inten.(mm/hr)=     274.73       184.31
05958>                   over (min)        3.00        10.00
05959>      Storage Coeff.  (min)=       2.95 (ii)    9.59 (ii)
05960>      Unit Hyd. Tpeak (min)=       3.00        10.00
05961>      Unit Hyd. peak  (cms)=        .38          .12
05962>                                                          *TOTALS*
05963>      PEAK FLOW       (cms)=        .84          .43         1.031 (iii)
05964>      TIME TO PEAK    (hrs)=       1.02         1.15         1.017
05965>      RUNOFF VOLUME    (mm)=      84.60        58.52        70.256
05966>      TOTAL RAINFALL   (mm)=      86.60        86.60        86.603
05967>      RUNOFF COEFFICIENT   =        .98          .68          .811
05968>
05969>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
05970>            CN* =  86.0    Ia = Dep. Storage  (Above)
05971>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
05972>            THAN THE STORAGE COEFFICIENT.
05973>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
05974>
05975> -------------------------------------------------------------------------------
05976> 250:0027-------------------------------------------------------------------------------
05977> ----------------------
05978> | CALIB STANDHYD     |   Area    (ha)=    3.14
05979> | 02:500    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
05980> ----------------------
05981>                              IMPERVIOUS    PERVIOUS (i)
05982>      Surface Area     (ha)=       1.73         1.41
05983>      Dep. Storage     (mm)=       2.00         5.00
05984>      Average Slope     (%)=       1.00         1.00
05985>      Length            (m)=     250.00        40.00
05986>      Mannings n             =      .013         .240
05987>
05988>      Max.eff.Inten.(mm/hr)=     274.73       184.31
05989>                   over (min)        3.00        10.00
05990>      Storage Coeff.  (min)=       2.95 (ii)    9.59 (ii)
05991>      Unit Hyd. Tpeak (min)=       3.00        10.00
05992>      Unit Hyd. peak  (cms)=        .38          .12
05993>                                                          *TOTALS*
05994>      PEAK FLOW       (cms)=        .90          .46         1.104 (iii)
05995>      TIME TO PEAK    (hrs)=       1.02         1.15         1.017
05996>      RUNOFF VOLUME    (mm)=      84.60        58.52        70.256
05997>      TOTAL RAINFALL   (mm)=      86.60        86.60        86.603
05998>      RUNOFF COEFFICIENT   =        .98          .68          .811
05999>
06000>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
06001>            CN* =  86.0    Ia = Dep. Storage  (Above)
06002>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
06003>            THAN THE STORAGE COEFFICIENT.
06004>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
06005>
06006> -------------------------------------------------------------------------------
06007> 250:0028-------------------------------------------------------------------------------
06008> ----------------------
06009> | CALIB STANDHYD     |   Area    (ha)=    5.45
06010> | 03:502    DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
06011> ----------------------
06012>                              IMPERVIOUS    PERVIOUS (i)
06013>      Surface Area     (ha)=       3.00         2.45
06014>      Dep. Storage     (mm)=       2.00         5.00
06015>      Average Slope     (%)=       1.00         1.00
06016>      Length            (m)=     600.00        40.00
06017>      Mannings n             =      .013         .240
06018>
06019>      Max.eff.Inten.(mm/hr)=     274.73       166.83
06020>                   over (min)        5.00        12.00
06021>      Storage Coeff.  (min)=       5.00 (ii)   11.91 (ii)
06022>      Unit Hyd. Tpeak (min)=       5.00        12.00
06023>      Unit Hyd. peak  (cms)=        .23          .09
06024>                                                          *TOTALS*
06025>      PEAK FLOW       (cms)=       1.28          .70         1.685 (iii)
06026>      TIME TO PEAK    (hrs)=       1.05         1.20         1.067
06027>      RUNOFF VOLUME    (mm)=      84.60        58.52        70.256
06028>      TOTAL RAINFALL   (mm)=      86.60        86.60        86.603
06029>      RUNOFF COEFFICIENT   =        .98          .68          .811
06030>
06031>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
06032>            CN* =  86.0    Ia = Dep. Storage  (Above)
06033>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
06034>            THAN THE STORAGE COEFFICIENT.
06035>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
06036>
06037> -------------------------------------------------------------------------------
06038> 250:0029-------------------------------------------------------------------------------
06039> ------------------------
06040> | ADD HYD (Pond5In   ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
06041> ------------------------                   (ha)     (cms)   (hrs)    (mm)   (cms)
06042>                      ID1 01:501            2.93    1.031    1.02   70.26    .000
06043>                     +ID2 02:500            3.14    1.104    1.02   70.26    .000
06044>                     +ID3 03:502            5.45    1.685    1.07   70.26    .000
06045>                      ==========================================================
06046>                      SUM 04:Pond5In       11.52    3.710    1.03   70.26    .000
06047>
06048>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
06049>
06050> -------------------------------------------------------------------------------
06051> 250:0030-------------------------------------------------------------------------------
06052> ----------------------
06053> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
06054> |  IN>04:(Pond5I)    |
06055> | OUT<05:(Pond5 )    |    =========  OUTFLOW STORAGE TABLE  =========
06056> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
06057>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
06058>                              .000  .0000E+00    |    .850  .5000E+00
06059>                              .190  .2300E+00    |    .000  .0000E+00
06060>
06061>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
06062>      ---------------------       (ha)     (cms)     (hrs)       (mm)
06063>      INFLOW >04: (Pond5I)      11.52     3.710     1.033     70.256
06064>      OUTFLOW<05: (Pond5 )      11.52      .837     1.633     70.256
06065>
06066>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   22.571
06067>                     TIME SHIFT OF PEAK FLOW          (min)=    36.00
06068>                     MAXIMUM  STORAGE   USED       (ha.m.)=.4949E+00
06069>
06070> -------------------------------------------------------------------------------
06071> 250:0031-------------------------------------------------------------------------------
06072> *#*****************************************************************************
06073> *#
06074> *# EXT3 Sizing, CAs EXT3
06075> *#
06076> *#*****************************************************************************
06077> ----------------------
06078> | CALIB STANDHYD     |   Area    (ha)=    9.16
06079> | 01:EXT3   DT= 1.00 |   Total Imp(%)=   55.00   Dir. Conn.(%)=   45.00
06080> ----------------------
06081>                              IMPERVIOUS    PERVIOUS (i)
06082>      Surface Area     (ha)=       5.04         4.12
06083>      Dep. Storage     (mm)=       2.00         5.00
06084>      Average Slope     (%)=       1.00         1.00
06085>      Length            (m)=     400.00        40.00
06086>      Mannings n             =      .013         .240
06087>
06088>      Max.eff.Inten.(mm/hr)=     274.73       174.76
06089>                   over (min)        4.00        11.00
06090>      Storage Coeff.  (min)=       3.92 (ii)   10.70 (ii)
06091>      Unit Hyd. Tpeak (min)=       4.00        11.00
06092>      Unit Hyd. peak  (cms)=        .29          .10
06093>                                                          *TOTALS*
06094>      PEAK FLOW       (cms)=       2.37         1.25         3.017 (iii)
06095>      TIME TO PEAK    (hrs)=       1.03         1.17         1.050
06096>      RUNOFF VOLUME    (mm)=      84.60        58.52        70.256
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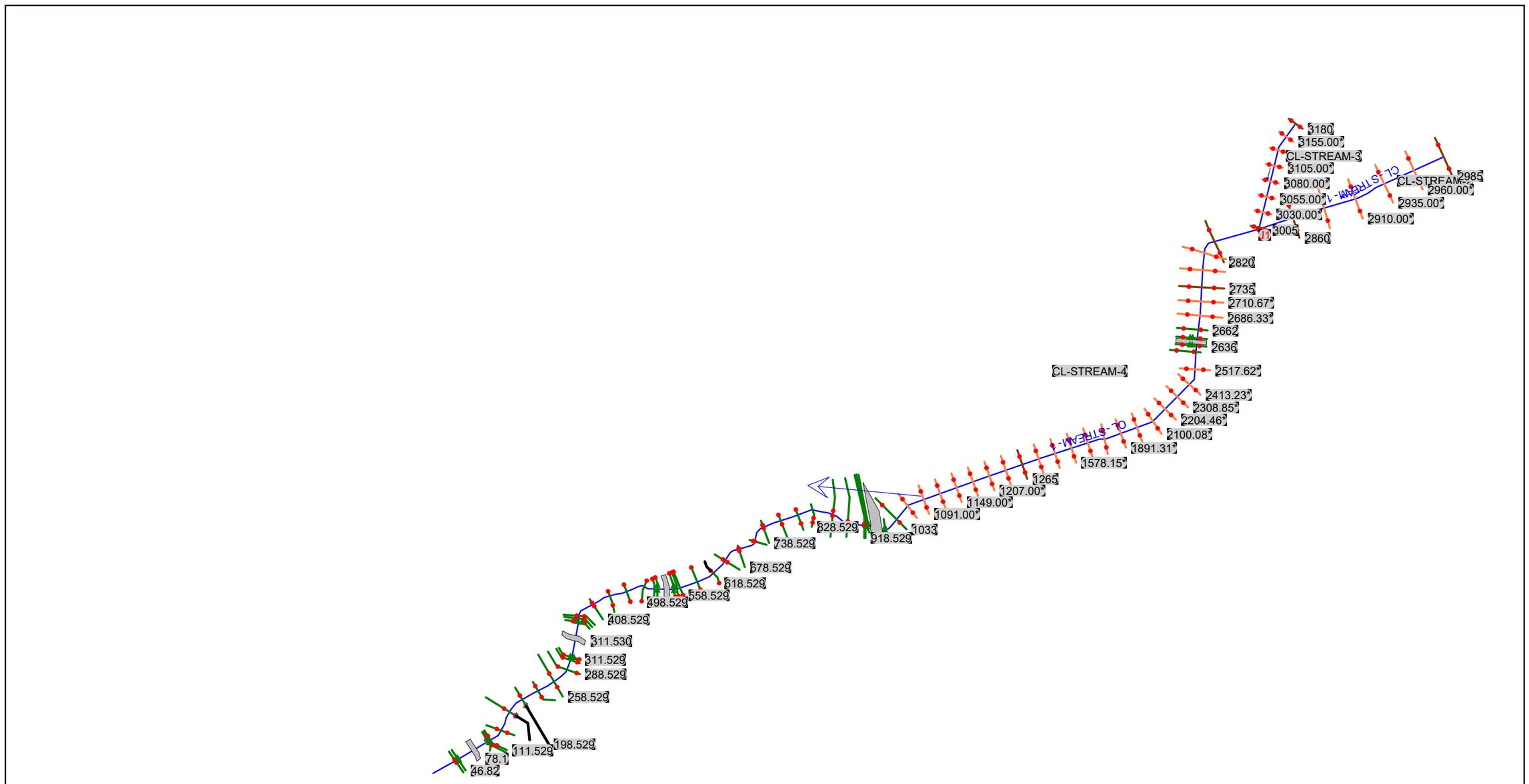
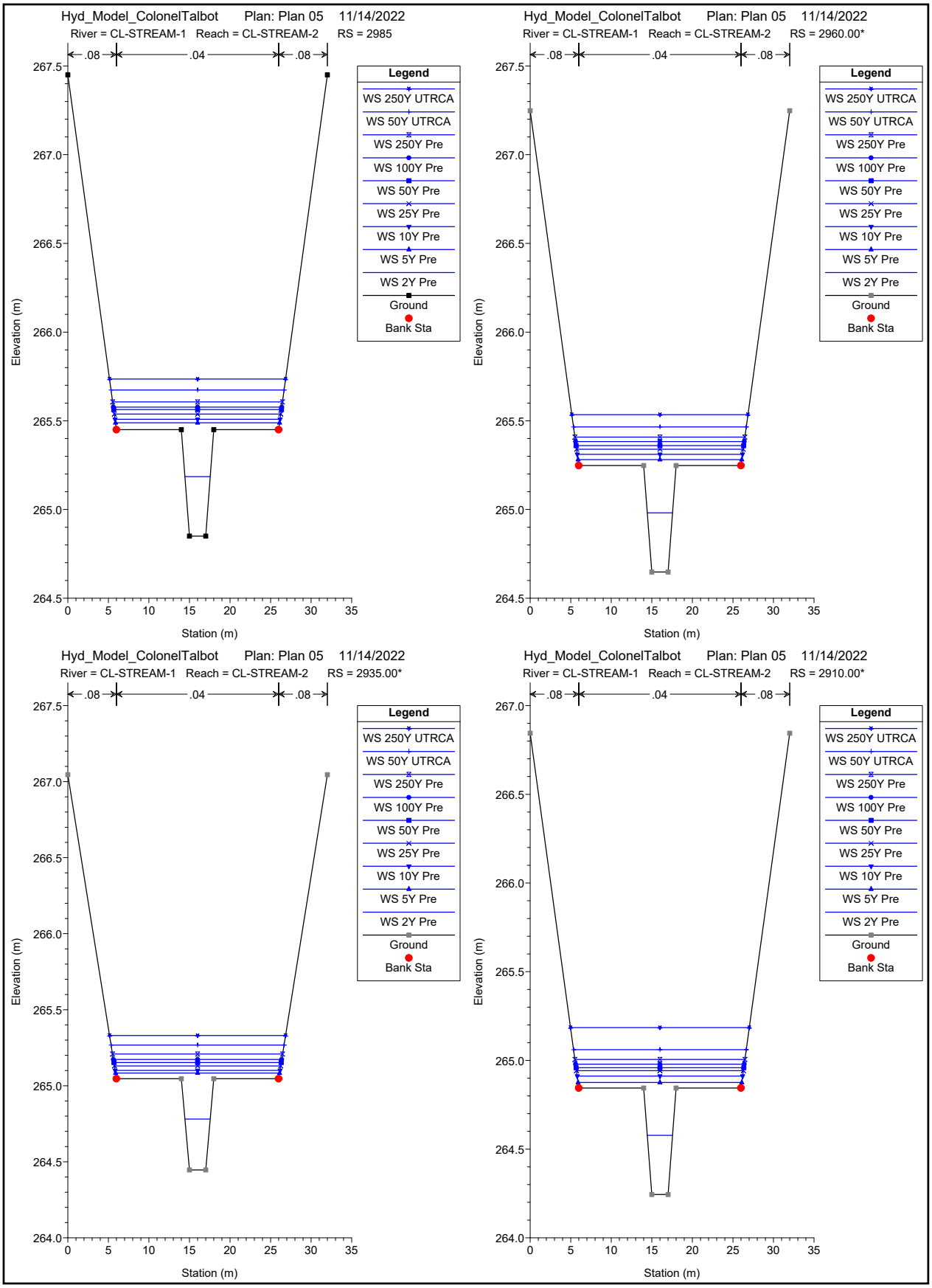
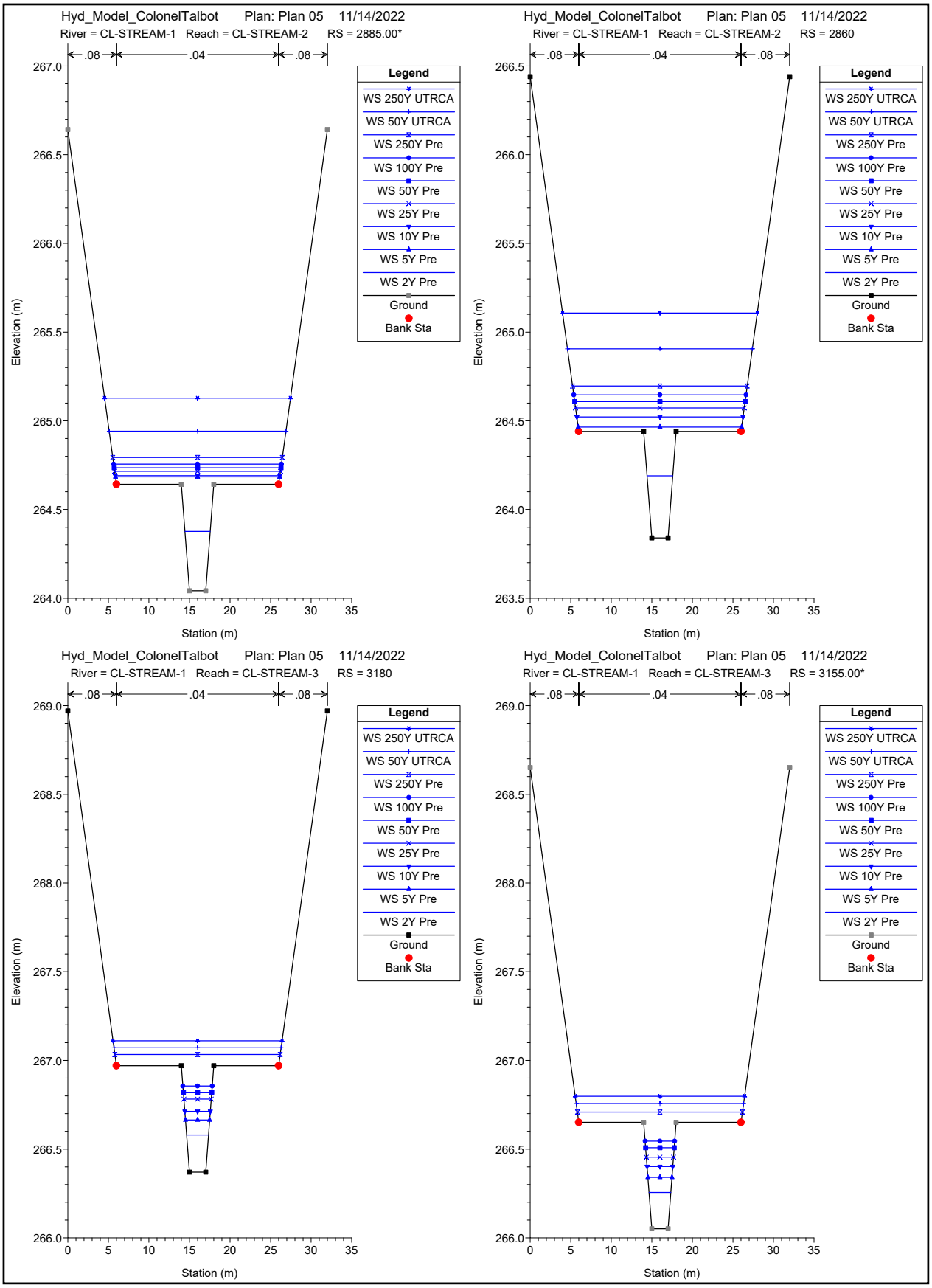
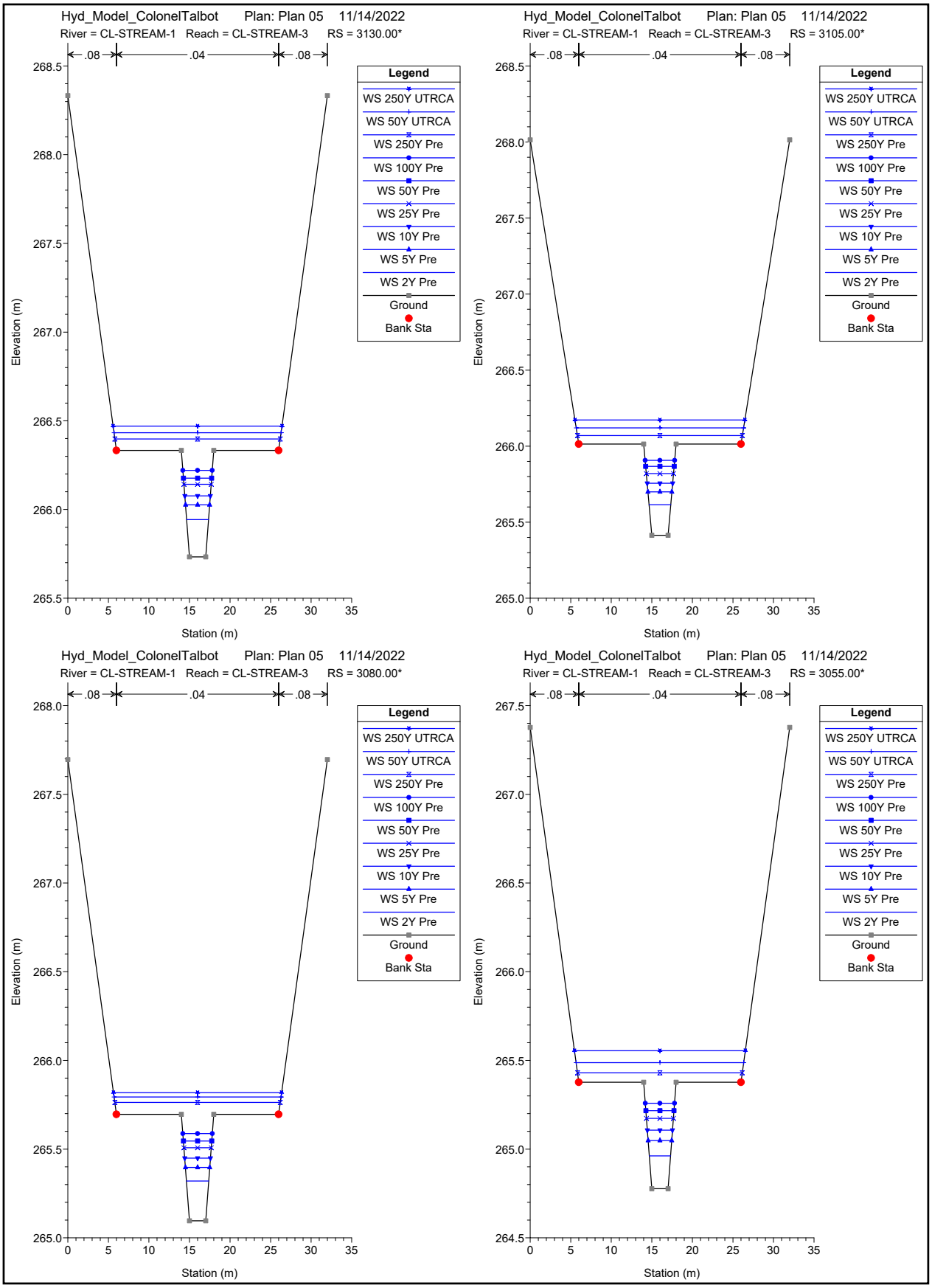
06097>      TOTAL RAINFALL   (mm)=      86.60        86.60         86.603
06098>      RUNOFF COEFFICIENT   =        .98          .68           .811
06099>
06100>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
06101>            CN* =  86.0    Ia = Dep. Storage  (Above)
06102>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
06103>            THAN THE STORAGE COEFFICIENT.
06104>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
06105>
06106> ---------------------------------------------------------------------------
06107> 250:0032---------------------------------------------------------------------
06108> ----------------------
06109> | COMPUTE DUALHYD    |   Average inlet capacities   [CINLET] =    .150  (cms)
06110> | TotalHyd 01:EXT3   |   Number of inlets in system [NINLET] =       1
06111> ----------------------   Total minor system capacity         =    .150  (cms)
06112>                          Total major system storage [TMJSTO] =    5000.(cu.m.)
06113>
06114>                    ID: NHYD        AREA     QPEAK     TPEAK     R.V.      DWF
06115>                                     (ha)     (cms)     (hrs)     (mm)    (cms)
06116>      TOTAL HYD.   01:EXT3         9.16     3.017     1.050   70.256     .000
06117>      ============================================================================
06118>      MAJOR SYST   02:noFlow         .00      .000      .000     .000     .000
06119>      MINOR SYST   03:MinorE        9.16      .150      .633   70.328     .000
06120>
06121>      NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
06122>
06123>      Maximum MAJOR SYSTEM storage used =    4998.(cu.m.)
06124>
06125> ---------------------------------------------------------------------------
06126> 250:0033---------------------------------------------------------------------
06127> *#*************************************************************************
06128> *#
06129> *# Flow Totals and Channel Runoff
06130> *#
06131> *#*************************************************************************
06132> ------------------------
06133> | ADD HYD (Control   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
06134> ------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
06135>                        ID1 02:noFlow          .00     .000     .00    .00    .000
06136>                       +ID2 03:MinorEXT3      9.16     .150     .63  70.33    .000
06137>                       +ID3 05:Pond5         11.52     .837    1.63  70.26    .000
06138>                       +ID4 06:Pond4         18.94    1.592    1.57  70.26    .000
06139>                       +ID5 07:Pond3         18.88    1.504    1.63  63.52    .000
06140>                       +ID6 08:Pond2          7.53     .599    1.63  70.26    .000
06141>                       +ID7 09:Pond1          4.08     .265    1.67  70.26    .000
06142>                       +ID8 10:ExPond        32.50    2.661    1.63  70.26    .000
06143>                        ============================================================
06144>                        SUM 01:Control      102.61    7.599    1.62  69.02    .000
06145>
06146>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
06147>
06148> ---------------------------------------------------------------------------
06149> 250:0034---------------------------------------------------------------------
06150> ----------------------
06151> | CALIB NASHYD       |   Area    (ha)=     .99   Curve Number   (CN)=68.00
06152> | 02:600    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
06153> ----------------------   U.H. Tp(hrs)=    .350
06154>
06155>      Unit Hyd Qpeak  (cms)=     .108
06156>
06157>      PEAK FLOW       (cms)=     .085 (i)
06158>      TIME TO PEAK    (hrs)=    1.467
06159>      RUNOFF VOLUME    (mm)=   33.107
06160>      TOTAL RAINFALL   (mm)=   86.603
06161>      RUNOFF COEFFICIENT   =     .382
06162>
06163>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
06164>
06165> ---------------------------------------------------------------------------
06166> 250:0035---------------------------------------------------------------------
06167> ----------------------
06168> | CALIB NASHYD       |   Area    (ha)=    3.54   Curve Number   (CN)=68.00
06169> | 03:601    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
06170> ----------------------   U.H. Tp(hrs)=    .590
06171>
06172>      Unit Hyd Qpeak  (cms)=     .229
06173>
06174>      PEAK FLOW       (cms)=     .212 (i)
06175>      TIME TO PEAK    (hrs)=    1.767
06176>      RUNOFF VOLUME    (mm)=   33.108
06177>      TOTAL RAINFALL   (mm)=   86.603
06178>      RUNOFF COEFFICIENT   =     .382
06179>
06180>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
06181>
06182> ---------------------------------------------------------------------------
06183> 250:0036---------------------------------------------------------------------
06184> ----------------------
06185> | CALIB NASHYD       |   Area    (ha)=    3.61   Curve Number   (CN)=68.00
06186> | 04:602    DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
06187> ----------------------   U.H. Tp(hrs)=    .970
06188>
06189>      Unit Hyd Qpeak  (cms)=     .142
06190>
06191>      PEAK FLOW       (cms)=     .149 (i)
06192>      TIME TO PEAK    (hrs)=    2.233
06193>      RUNOFF VOLUME    (mm)=   33.108
06194>      TOTAL RAINFALL   (mm)=   86.603
06195>      RUNOFF COEFFICIENT   =     .382
06196>
06197>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
06198>
06199> ---------------------------------------------------------------------------
06200> 250:0037---------------------------------------------------------------------
06201> ------------------------
06202> | ADD HYD (PostTot   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
06203> ------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
06204>                        ID1 01:Control      102.61    7.599    1.62  69.02    .000
06205>                       +ID2 02:600            .99     .085    1.47  33.11    .000
06206>                       +ID3 03:601           3.54     .212    1.77  33.11    .000
06207>                       +ID4 04:602           3.61     .149    2.23  33.11    .000
06208>                        ============================================================
06209>                        SUM 05:PostTot      110.75    7.983    1.63  66.38    .000
06210>
06211>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
06212>
06213> ---------------------------------------------------------------------------
06214> 250:0038---------------------------------------------------------------------
06215> ---------------------------------------------------------------------------
06216> 250:0002---------------------------------------------------------------------
06217> ---------------------------------------------------------------------------
06218> 250:0002---------------------------------------------------------------------
06219> ---------------------------------------------------------------------------
06220> 250:0002---------------------------------------------------------------------
06221> ---------------------------------------------------------------------------
06222> 250:0002---------------------------------------------------------------------
06223> ---------------------------------------------------------------------------
06224> 250:0002---------------------------------------------------------------------
06225> ---------------------------------------------------------------------------
06226> 250:0002---------------------------------------------------------------------
06227>       FINISH
06228> ---------------------------------------------------------------------------
06229> ****************************************************************************
06230>      WARNINGS / ERRORS / NOTES
06231>      -------------------------
06232>  250:0011 ROUTE RESERVOIR
06233>       *** WARNING: STORAGE-Q values were extrapolated.
06234>                    Increase curve or use overflow option.
06235>  250:0015 ROUTE RESERVOIR
06236>       *** WARNING: STORAGE-Q values were extrapolated.
06237>                    Increase curve or use overflow option.
06238>  250:0020 ROUTE RESERVOIR
06239>       *** WARNING: STORAGE-Q values were extrapolated.
06240>                    Increase curve or use overflow option.
06241>  250:0025 ROUTE RESERVOIR
06242>       *** WARNING: STORAGE-Q values were extrapolated.
06243>                    Increase curve or use overflow option.
06244>    Simulation ended on 2022-11-14     at 16:30:53
06245> ============================================================================
06246>
```

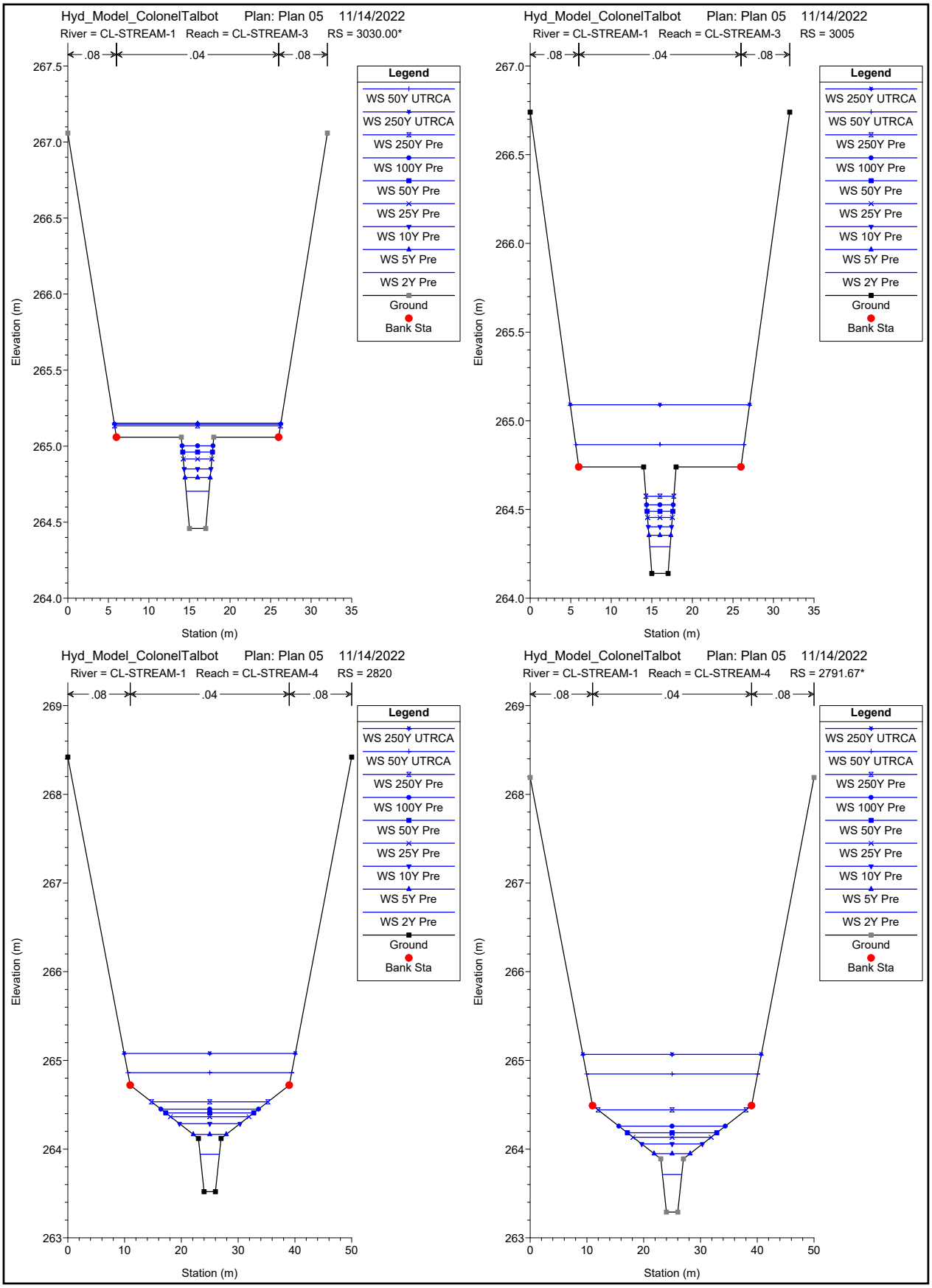
APPENDIX B:
Hydraulic Analysis Results

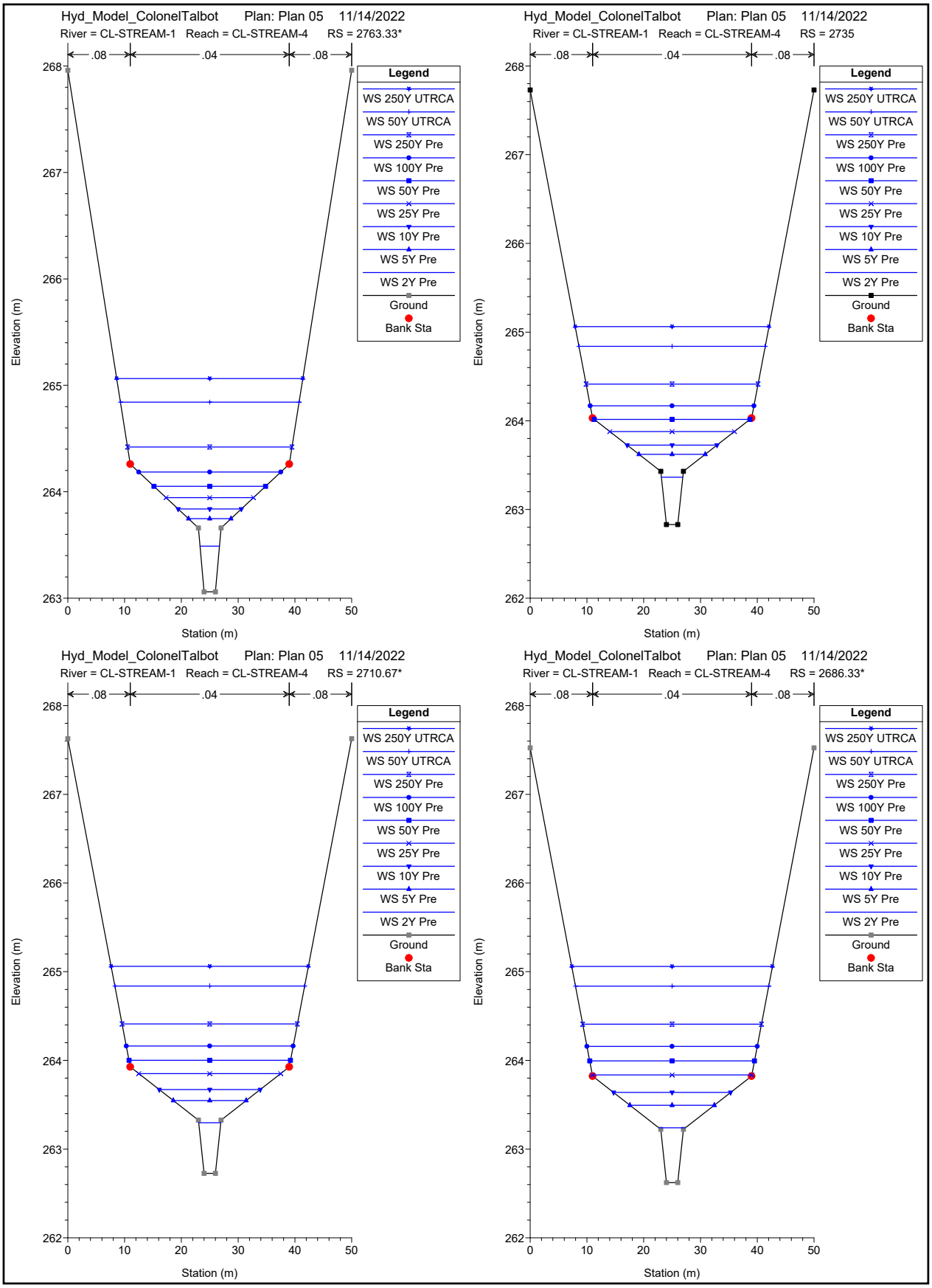

3180
3155.00
CL-STREAM-3
3105.00
3080.00
3055.00
3030.00
3005
2860
J1
CL-STREAM-1
2985
2960.00
2935.00
2910.00
2820
2735
2710.67
2686.33
2662
2636
CL-STREAM-4
2517.62
2413.23
2308.85
2204.46
2100.08
1891.31
1578.15
1265
1207.00
1149.00
1091.00
1033
918.529
828.529
738.529
678.529
618.529
558.529
498.529
408.529
311.530
311.529
288.529
258.529
198.529
111.529
78.1
46.82

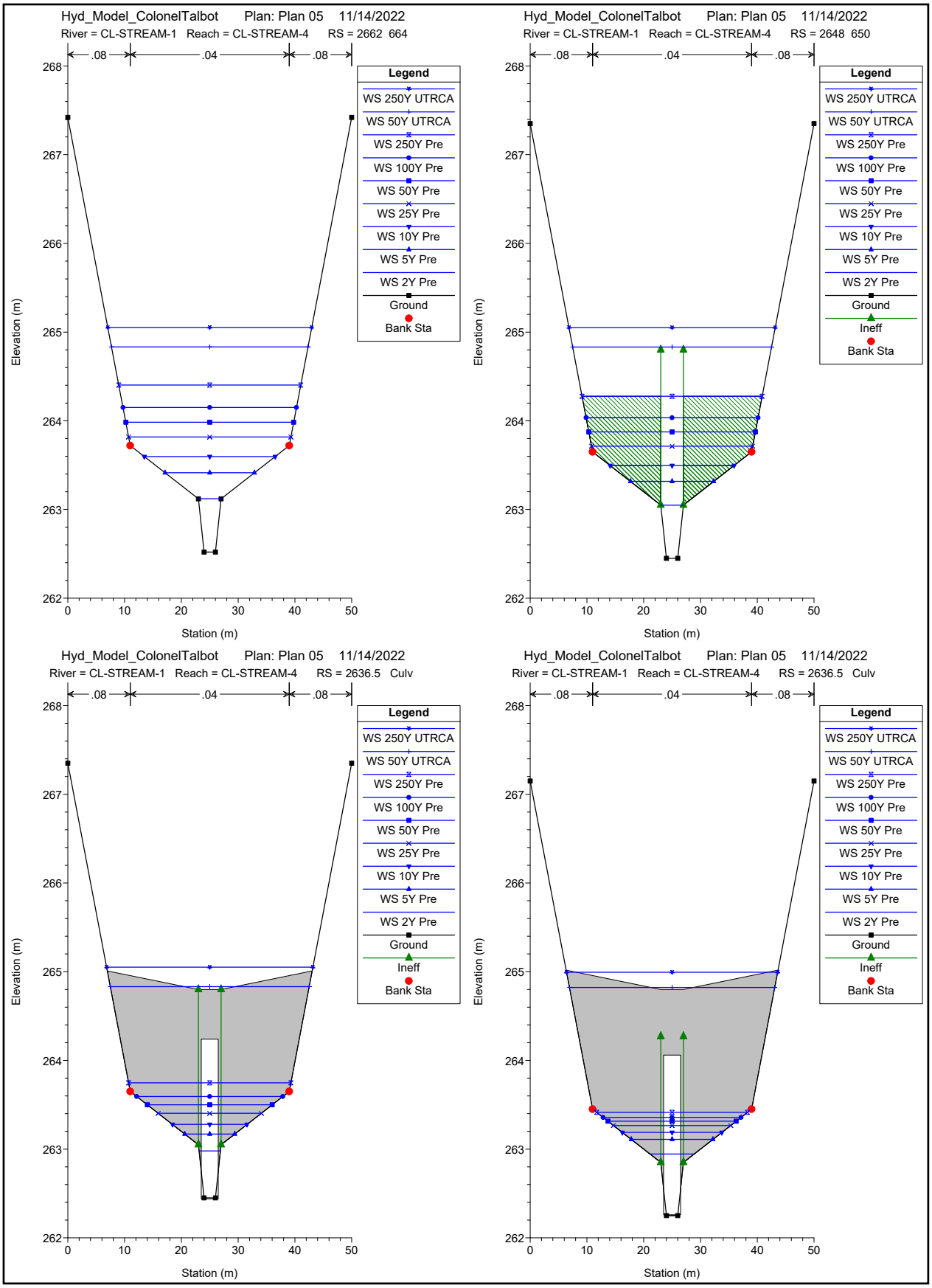

Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-2 RS = 2985
.08
.04
.08
Legend
WS 250Y UTRCA
WS 50Y UTRCA
WS 250Y Pre
WS 100Y Pre
WS 50Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Bank Sta
Elevation (m)
Station (m)
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-2 RS = 2960.00*
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-2 RS = 2935.00*
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-2 RS = 2910.00*

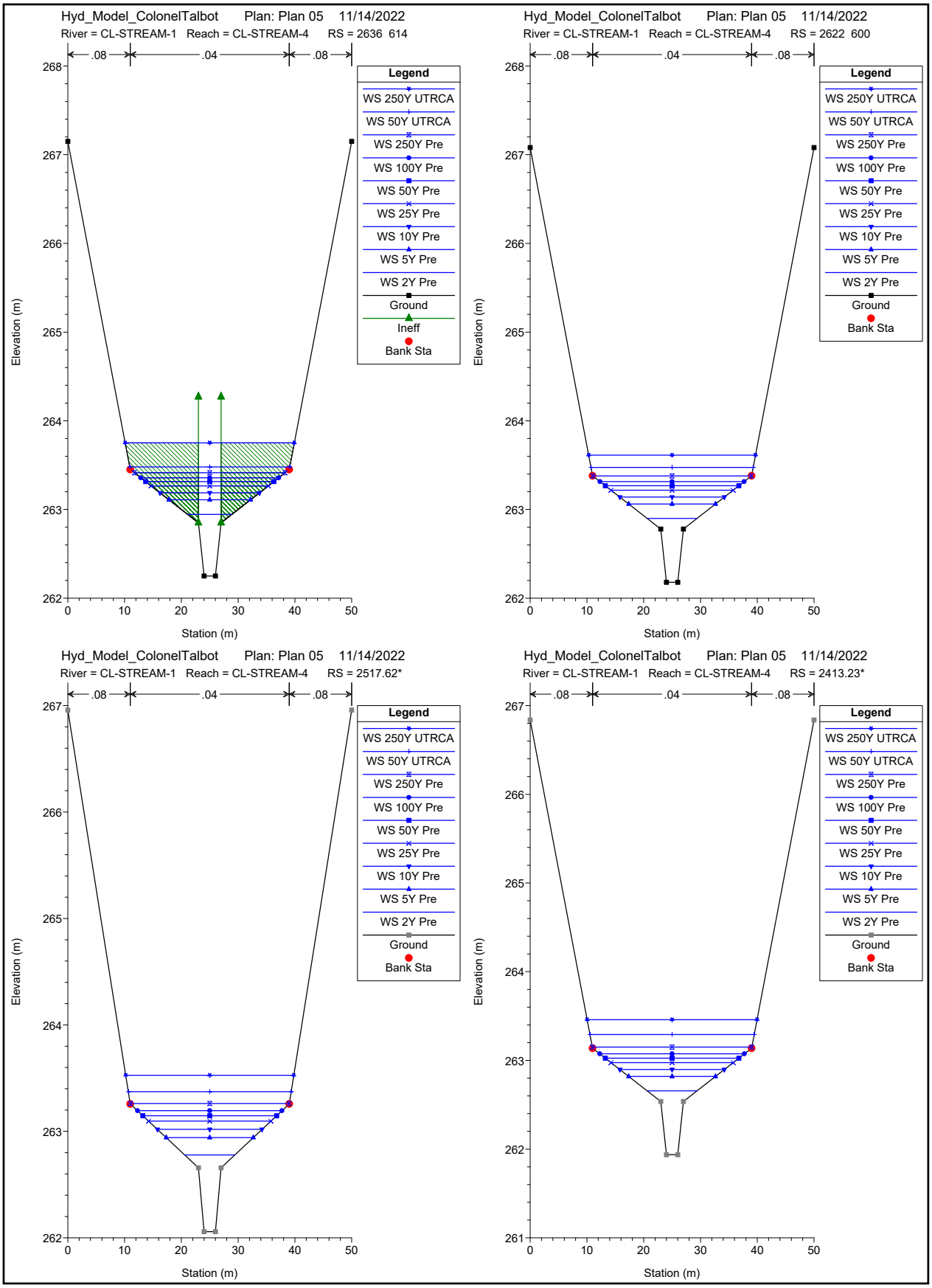

Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-2 RS = 2885.00*
.08
.04
.08
Legend
WS 250Y UTRCA
WS 50Y UTRCA
WS 250Y Pre
WS 100Y Pre
WS 50Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Bank Sta
Elevation (m)
Station (m)
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-2 RS = 2860
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-3 RS = 3180
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-3 RS = 3155.00*

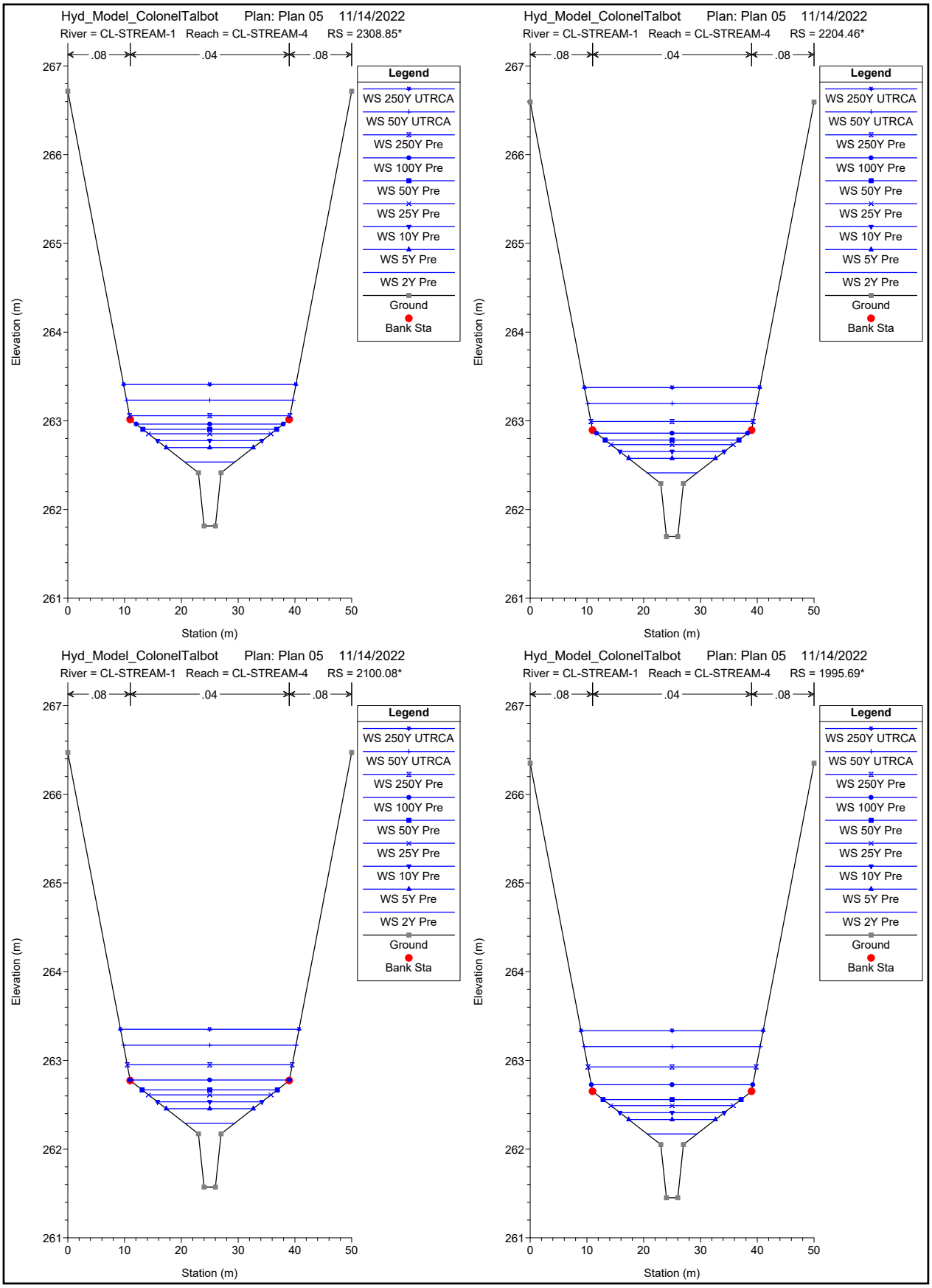

Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-3 RS = 3130.00*
.08
.04
.08
Legend
WS 250Y UTRCA
WS 50Y UTRCA
WS 250Y Pre
WS 100Y Pre
WS 50Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Bank Sta
Elevation (m)
Station (m)
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-3 RS = 3105.00*
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-3 RS = 3080.00*
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-3 RS = 3055.00*

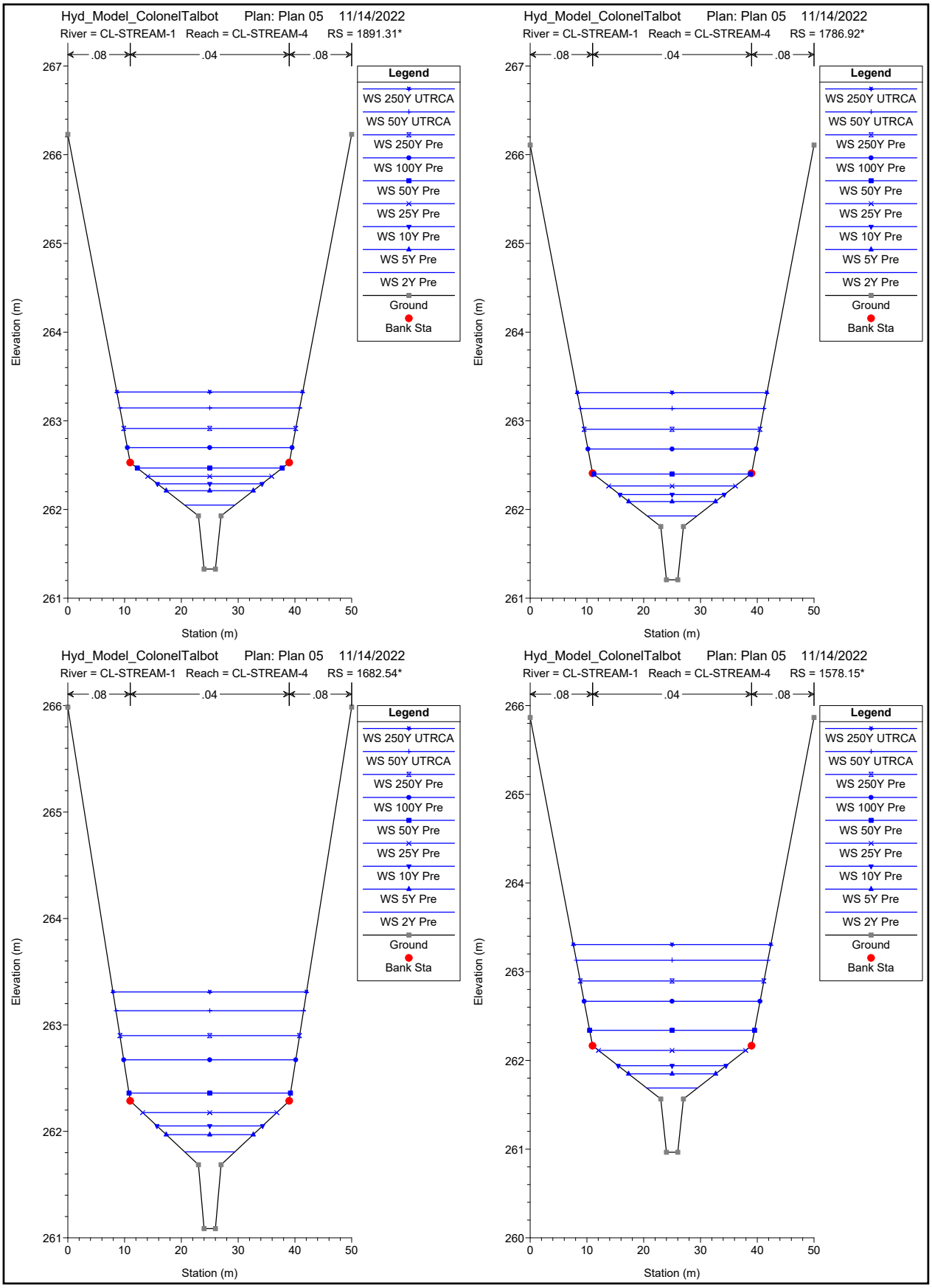

Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-3 RS = 3030.00*
.08
.04
.08
Legend
WS 50Y UTRCA
WS 250Y UTRCA
WS 250Y Pre
WS 100Y Pre
WS 50Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Bank Sta
Elevation (m)
Station (m)
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-3 RS = 3005
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2820
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2791.67*

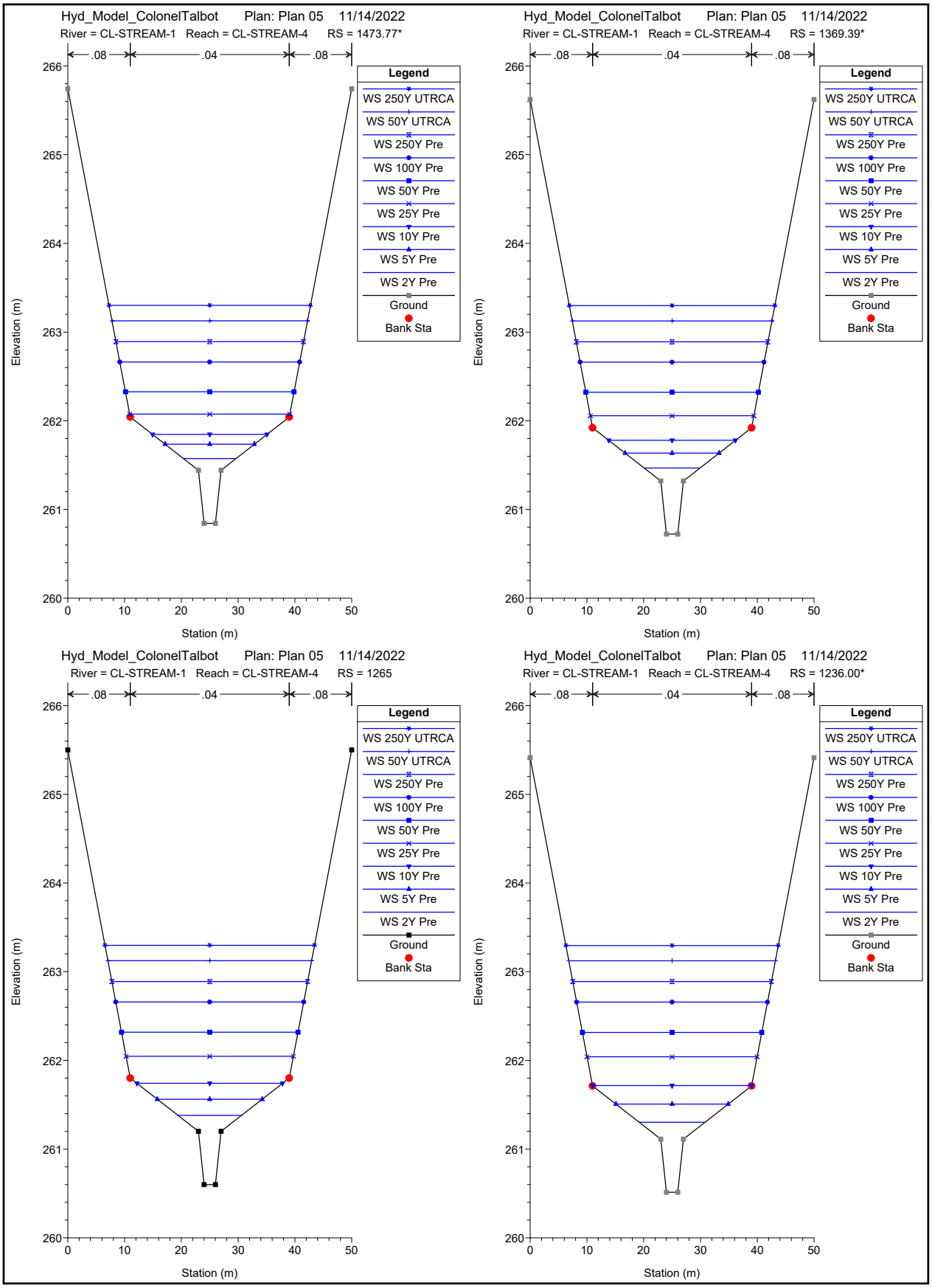

Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2763.33*
.08
.04
.08
Legend
WS 250Y UTRCA
WS 50Y UTRCA
WS 250Y Pre
WS 100Y Pre
WS 50Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Bank Sta
Elevation (m)
Station (m)
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2735
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2710.67*
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2686.33*

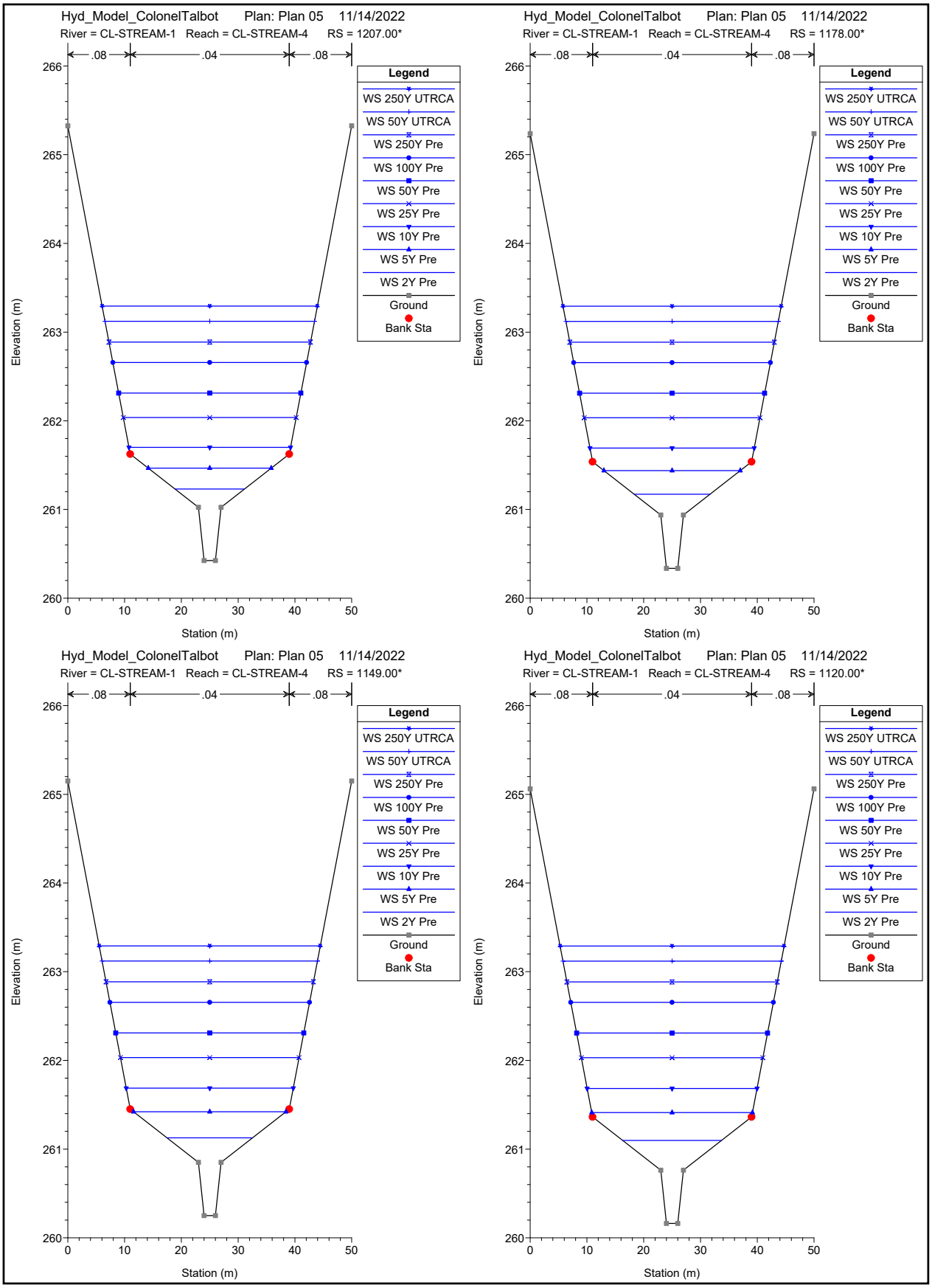

Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2662 664
.08
.04
.08
Legend
WS 250Y UTRCA
WS 50Y UTRCA
WS 250Y Pre
WS 100Y Pre
WS 50Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Bank Sta
Elevation (m)
Station (m)
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2648 650
.08
.04
.08
Legend
WS 250Y UTRCA
WS 50Y UTRCA
WS 250Y Pre
WS 100Y Pre
WS 50Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2636.5 Culv
.08
.04
.08
Legend
WS 250Y UTRCA
WS 50Y UTRCA
WS 250Y Pre
WS 100Y Pre
WS 50Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2636.5 Culv
.08
.04
.08
Legend
WS 250Y UTRCA
WS 50Y UTRCA
WS 250Y Pre
WS 100Y Pre
WS 50Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)


Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2636 614
.08
.04
.08
Legend
WS 250Y UTRCA
WS 50Y UTRCA
WS 250Y Pre
WS 100Y Pre
WS 50Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2622 600
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2517.62*
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2413.23*


Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2308.85*
.08
.04
.08
Legend
WS 250Y UTRCA
WS 50Y UTRCA
WS 250Y Pre
WS 100Y Pre
WS 50Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Bank Sta
Elevation (m)
Station (m)
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2204.46*
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 2100.08*
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1995.69*


Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1891.31*
.08
.04
.08
Legend
WS 250Y UTRCA
WS 50Y UTRCA
WS 250Y Pre
WS 100Y Pre
WS 50Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Bank Sta
Elevation (m)
Station (m)
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1786.92*
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1682.54*
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1578.15*


Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1473.77*
.08
.04
.08
Legend
WS 250Y UTRCA
WS 50Y UTRCA
WS 250Y Pre
WS 100Y Pre
WS 50Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Bank Sta
Elevation (m)
Station (m)
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1369.39*
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1265
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1236.00*


Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1207.00*
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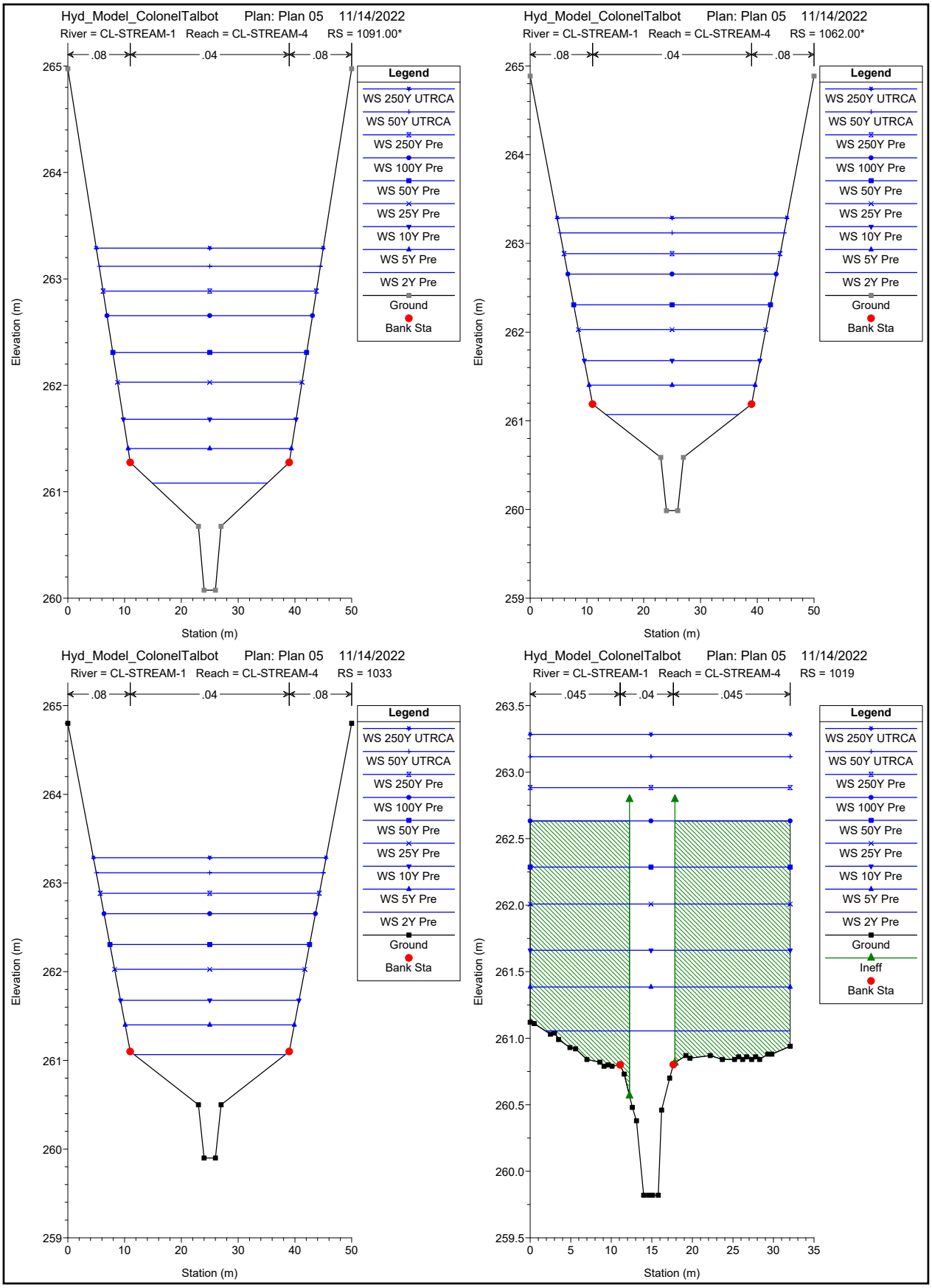
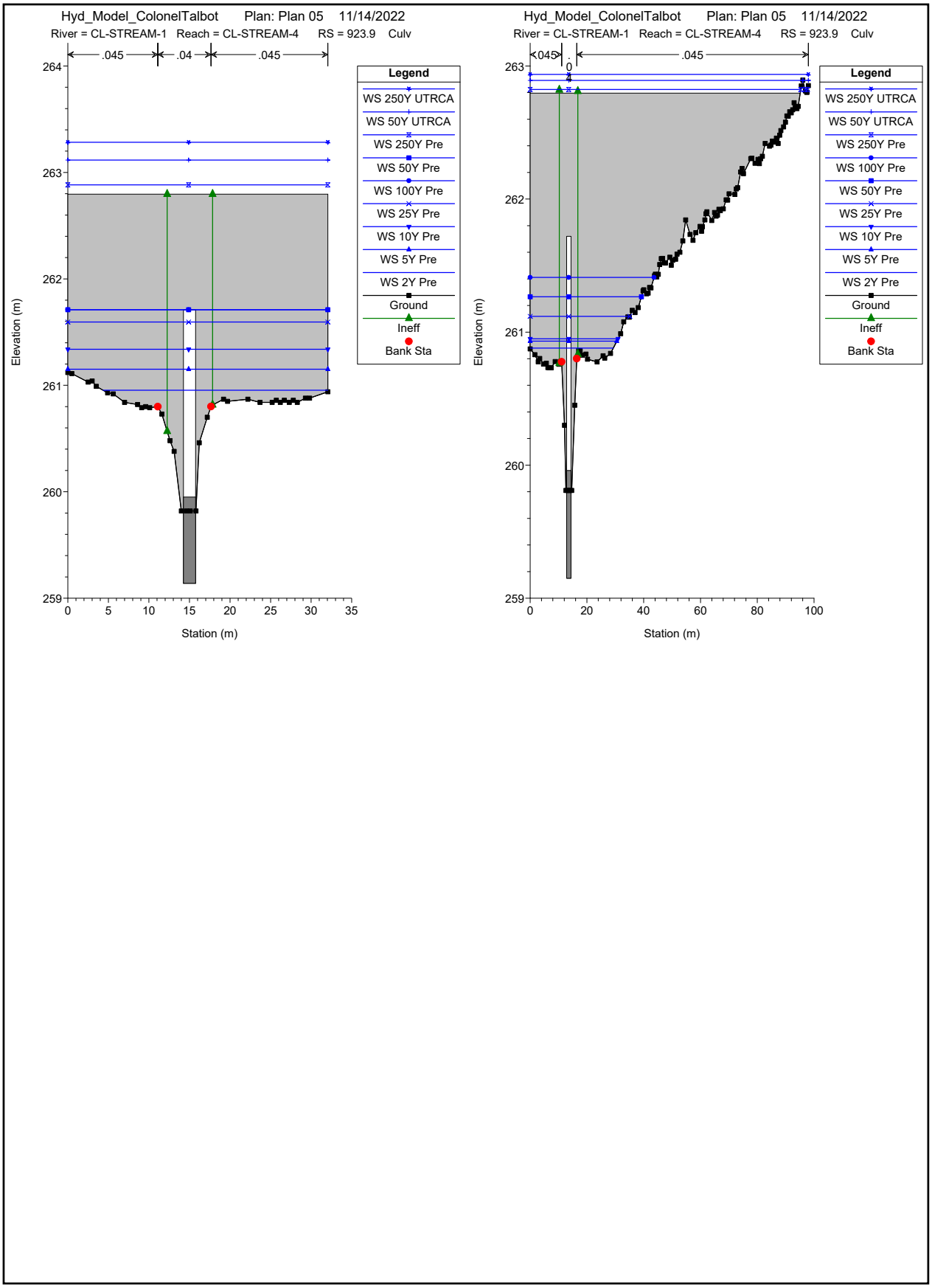
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1178.00*
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1149.00*
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1120.00*
.08
.04
.08
Legend
WS 250Y UTRCA
WS 50Y UTRCA
WS 250Y Pre
WS 100Y Pre
WS 50Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Bank Sta
Elevation (m)
Station (m)
260
261
262
263
264
265
266
0
10
20
30
40
50


Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1091.00*
.08
.04
.08
Legend
WS 250Y UTRCA
WS 50Y UTRCA
WS 250Y Pre
WS 100Y Pre
WS 50Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Bank Sta
Elevation (m)
Station (m)
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1062.00*
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1033
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 1019
.045
.04
.045
Ineff


Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 923.9 Culv
.045
.04
.045
Elevation (m)
Station (m)
Legend
WS 250Y UTRCA
WS 50Y UTRCA
WS 250Y Pre
WS 50Y Pre
WS 100Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Ineff
Bank Sta
Hyd_Model_ColonelTalbot Plan: Plan 05 11/14/2022
River = CL-STREAM-1 Reach = CL-STREAM-4 RS = 923.9 Culv
.045
.045
Elevation (m)
Station (m)
Legend
WS 250Y UTRCA
WS 50Y UTRCA
WS 250Y Pre
WS 100Y Pre
WS 50Y Pre
WS 25Y Pre
WS 10Y Pre
WS 5Y Pre
WS 2Y Pre
Ground
Ineff
Bank Sta

APPENDIX C:
Fluvial Geomorphology and Meander Belt Assessment

Fluvial Geomorphology and Meander Belt Assessment, Dingman Creek Tributary B1, London, Ontario

November 21, 2019

Prepared for:

York Development Group and
Sifton Properties Ltd.

Prepared by:

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Tel.: (519) 579-4410

161413835

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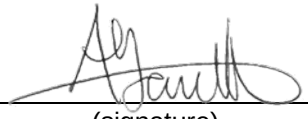
Prepared by 
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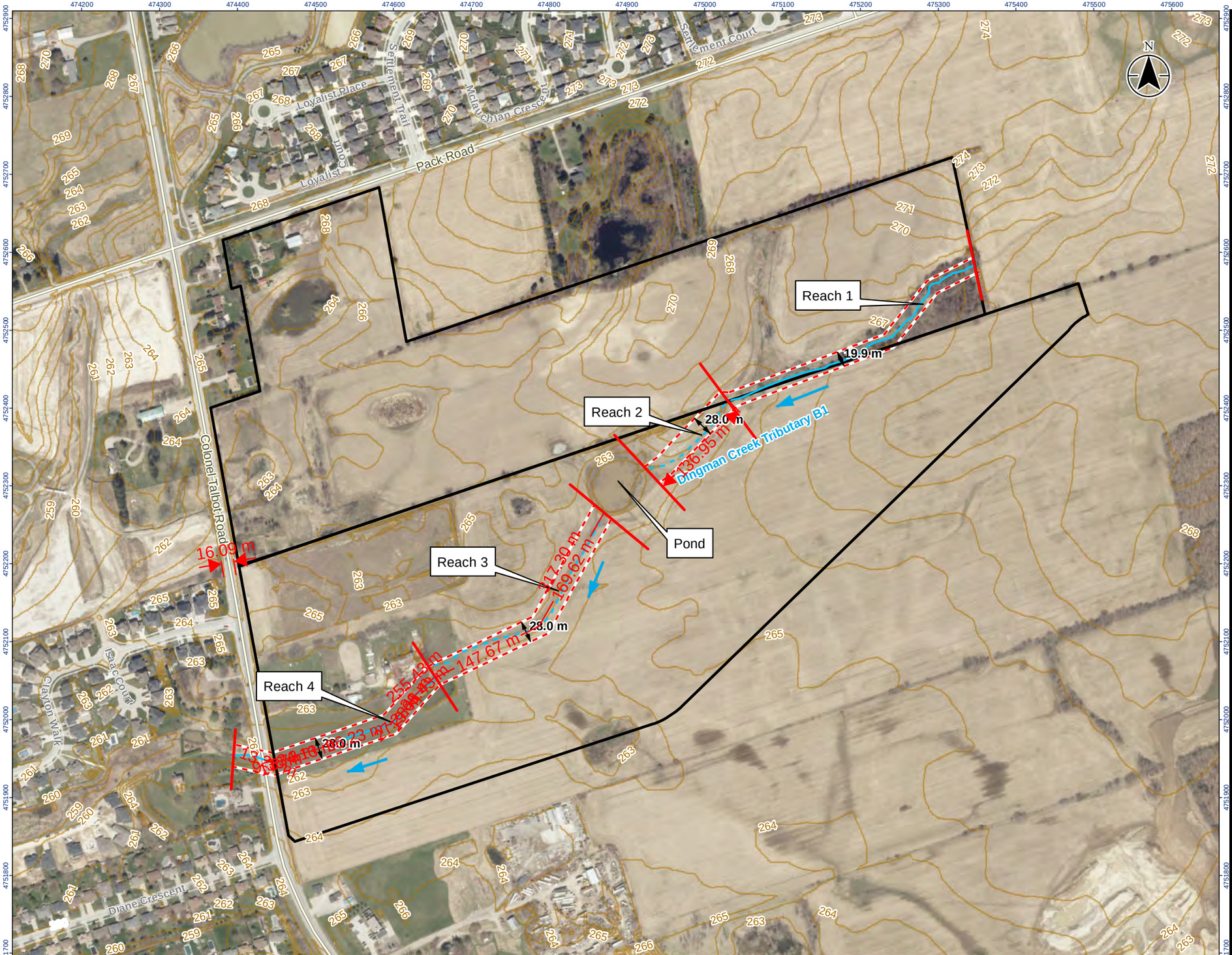
1.0 INTRODUCTION

Stantec Consulting Ltd. was retained by York Developments and Sifton to provide a major drainage and flow routing assessment in support of their proposed subdivisions located on Colonel Talbot Road in the City of London, Ontario. As part of this work plan, a meander belt assessment was recommended for Dingman Creek Tributary B1 (the Tributary). The results of the meander belt assessment support the development by delineating the Tributary's meander belt and confirming the proposed channel corridor. The location of the Study Area and the Tributary are presented in Figure 1.

1.1 SCOPE OF WORK

The scope of this assessment involved various desktop and field components. The goal of these components was to determine a meander belt for the Tributary within the Study Area. The tasks completed for this study included:

1. review background information including topographic mapping, geologic mapping, and aerial photographs;
2. reach delineation and field observations; and
3. meander belt width delineation



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Legend

- Study Area
- Reach Break
- Dingman Creek Tributary (Centerline - 2015)
- Dingman Creek Tributary (Estimated Centerline - 2015)
- Meander Belt
- 1 m Contour
- Expressway / Highway
- Major Road
- Minor Road

0 100 200 metres

1:5,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Orthoimagery © First Base Solutions. Imagery Date, 2019.

Project Location
City of London

161413835 REVA
Prepared by AMW on 2019-11-21
Technical Review by SC on 2019-11-21

Client/Project
731675 ONTARIO LIMITED
COLONEL TALBOT AREA MAJOR DRAINAGE

Figure No.
1

Title
Colonel Talbot Meander Belt

2.0 BACKGROUND REVIEW

2.1 GEOLOGY

Surficial and bedrock geology maps published by the Ontario Geological Service (OGS) indicated the predominant physiographic region within the Study Area is the Mount Elgin Ridges (Chapman and Putnam, 1984). The Mount Elgin Ridges physiographic region contains a series of moraines that are oriented generally parallel to Lake Erie and consist of mainly clay-silt till.

2.2 THE DINGMAN CREEK WATERSHED

The Dingman Creek watershed is located at the southern boundary of the City of London and drains 176 km^2 of the Upper Thames River watershed. Dingman Creek flows east to west from its headwaters in Thames Center to the Thames River just west of London. Within the Study Area, the Tributary, is a constructed drain and is classified as an intermittent system by Land Information Ontario (LIO) mapping (Ministry of Natural Resources and Forestry (MNRF), 2011). This tributary drains an area approximately 2 km^2 from its northern boundary at Southdale Road West to its outlet into Dingman Creek.

2.3 HISTORICAL ANALYSIS

A sequence of historic aerial photographs (1955, 1995, 2007, and 2015) and detailed topographic mapping (1 m contours) were reviewed to gain insight into channel form, surrounding land use/cover, and to identify any changes that have occurred during the period of record. The predominant land use within the watershed is agricultural with a growing proportion of residential in more recent years. Within the area of the proposed development, the Tributary has been straightened within an agricultural field and has remained in that orientation throughout the period of record (since 1955). This type of channel modification is common within the rural areas surrounding the City of London. The riparian corridor consists of short herbaceous vegetation consistent with a pasture. Riparian vegetation within the Study Area has not changed through the period of record.

3.0 REACH DELINEATION AND FIELD OBSERVATIONS

3.1 REACH DELINEATION

Reaches are lengths of channel that have physical constraints (e.g. geology, slope, discharge, vegetation, sediment input) that remain nearly constant along their length and subsequently exhibit similar physical geomorphic characteristics (e.g. channel form, sinuosity, physical dimensions). As a result, the controlling and modifying influences of channel form in a reach are similar (TRCA, 2004). This partitioning of a channel into reaches guides the desktop and field analyses, in that it considers the influence of localized channel patterns and processes. Based on the information available, the Tributary within the Study Area was partitioned into four reaches (Figure 1).

3.2 REACH DESCRIPTION

Existing site conditions were observed during a site visit completed by Stantec on November 1, 2019. Reach 1 exhibited a mostly straightened planform with a low degree of confinement and a narrow, low width/depth ratio channel. Banks appeared almost vertical with some scour but were mostly stable throughout the reach. Vegetation within this reach consisted of herbaceous vegetation on stream banks with shrubs and mature trees in the riparian corridor and floodplain. Reaches 2 and 3 were enclosed in a tile flowing subsurface. Reach 4 consisted of a straight planform within an unconfined valley setting. Channel banks were shallow sloping and vegetated with short grasses typical of a lawn or field. Vegetation in the riparian corridor and floodplain was similar to the channel banks. The physical attributes of the channels within each reach are summarized in Table 1 below. A photographic inventory of Reach 1 and Reach 4 is presented in Appendix A.

Table 1 - Summary of Existing Conditions Along Dingman Creek Tributary B1

Reach	Reach 1	Reach 2	Reach 3	Reach 4
Length (m)	383	142	332	298
Channel Slope (m/m)	0.0088	Not Applicable - Enclosed	Not Applicable - Enclosed	0.0042
Valley Form	Unconfined			Unconfined
Bankfull Width (m)	1.2			3.8
Substrate	Soft clay loam			Soft clay loam
Bank Material	Soft sandy clay loam. Lower banks were bare and undercut, upper banks vegetated with grasses.			Soft sandy clay loam. Banks well vegetated with grasses.
Sinuosity	1.05 (historically straightened)			1.02 (historically straightened)
Riparian Vegetation	Well vegetated with grasses and shrubs. Mature trees outside of bankfull channel			Banks, bed, and riparian corridor, and floodplain exclusively vegetated with short grasses.

4.0 MEANDER BELT WIDTH DETERMINATION

The meander belt is a term used to quantify the lateral extent of a river's occupation of its floodplain (TRCA, 2004). Meander belts are inherently variable and their extent is dependent on a number of controlling factors. These include, among other things, hydrology, stormwater flows, bank erosion rates, channel slope, and the degree of channel confinement by the valley walls.

The Tributary within the Study Area was straightened prior to the available historic air photo record. As a result, channel mapping procedures could not be implemented to delineate the meander belt width. In such situations, a surrogate approach can be used wherein the meander pattern of a similar system is measured and the results are applied to the straightened channel. However, no such suitable surrogate reach could be located as most of the watercourses of this size and slope within this region have also been straightened or altered.

Since there is no available evidence of what this historical meander belt would have been, and with no suitable surrogate reach available, the specific methodology applied to the study area was the Empirical Approach (TRCA Procedure 5). The empirical approach used in this analysis implements a suite of empirical relationships. These models are based on a variety of physical variables and represent a reasonable range of values. As such, calculated averages for each reach are considered appropriate to estimate existing condition meander belt widths. The empirical relations considered suitable for the Study Area include the following:

4.1 TRCA (2004)

The empirical relation developed for this method requires calculating stream power during a 2-year flow event, defined as the product of the specific weight of water, discharge, and channel slope, using the following equation:

$$SP = \gamma Qs, \text{ where}$$

SP = Stream power (watts/m^2)

γ = Specific weight of water (9806 kg/m^2 s^2)

Q = 2-year flow, (m^3/s)

s = Channel slope (m/m)

The empirical relationship used to account for a potential change in hydrology was calculated as follows:

$$W_b = -14.827 + 8.319 \ln (SP * DA) \text{ where}$$

W_b = Meander belt width (m)

DA = Drainage area (km^2)

4.2 WILLIAMS (1986)

This empirical relationship is based on the bankfull width of the channel and calculated as follows:

$$W_b = 4.3w^{1.12} \text{ , where}$$

W_b = Meander belt width (m)

w = Bankfull width, (m)

4.3 ANNABLE (1996)

This empirical relationship was developed based on streams in southern Ontario. The All Types analysis used in this report is calculated as follows:

$$W_b = 35.20Q_{bkf}^{0.53} \text{ , where}$$

W_b = Meander belt width (m)

Q_{bkf} = Bankfull Discharge, (m^3/s)

Results from the empirical analysis are reported in Table 2. Based on a variety of physical variables, these results represent a reasonable range of values. As such, calculated averages for each subject reach are considered appropriate for existing meander belt widths. Given that Reach 2 and 3 were historically tile drained, Reach 4 was used as a surrogate reach in order to recommend a meander belt dimension for these reaches. Meander belt limits are illustrated in Figure 1.

Table 2 - Summary of Existing and Final Meander Belt Widths

Reach	Reach 1	Reach 2	Reach 3	Reach 4
Discharge, Q_2 (m^3/s)	1.1	-	-	2.0
Reach Drainage Area, DA (km^2)	0.82	-	-	1.25
Existing Meander Belt Width – TRCA, 2004 (m)	21.4	-	-	23.7
Existing Meander Belt Width – Williams, 1986 (m)	5.3	-	-	19.2
Existing Meander Belt Width – Annable, 1996 (m)	23.0	-	-	27.2
Existing Meander Belt Width (Average) (m)	16.6	-	-	23.4
Final Meander Belt Width (including factor of safety) (m)	19.9	28.0*	28.0*	28.0

* Reach 4 Meander Belt Width Applied

4.4 FACTOR OF SAFETY

The TRCA (2004) mapping protocol requires that meander belt delineation is augmented by incorporating an additional and appropriate margin of safety to allow for future lateral migration. An evaluation of the historic air photo record indicates that the realigned channel has remained relatively stable over the

period of record. However, because of poor aerial photograph resolution, a quantification of the rate of channel shifting is not possible. As a result, the margin of safety for this study is dependent on a safety factor of 1.2 applied to the existing belt with. This margin of safety is considered conservative, and suitable to account for typical rates of channel adjustment (erosion and migration) and the potential for underprediction within the empirical methods. The final meander belt widths were estimated to be 19.9 m for Reach 1 and 28.0 m for Reaches 2, 3, and 4. Although these belt widths represent the maximum lateral expression of the watercourse within its geomorphically active corridor, it is understood that during detailed design, measures will be implemented that reduce channel erosion within the active corridor.

5.0 SUMMARY

The purpose of this assessment was to delineate a meander belt width for the Tributary within the Study Area. The results of this assessment support the development by estimating a meander belt that provides adequate width to address potential migration associated with the watercourse in its current location. The meander belt widths for the Study Area are 19.9 m for Reach 1 and 28.0 m for Reach 2, 3, and 4. Although these belt widths represent the maximum lateral expression of the watercourse within its geomorphically active corridor, it is understood that during detailed design, measures will be implemented that reduce channel erosion within the active corridor. As a result, the proposed channel corridor of 30.0 m is considered to be conservative and adequate to support the natural function of the Tributary.

6.0 REFERENCES

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APPENDIX A

Photographic Inventory

Photo 1: Looking upstream at Reach 1 from left bank (November 1, 2019).

Photo 2: Looking downstream in Reach 1 (November 1, 2019).

Photo 3: Looking downstream at Reach 4 from Colonel Talbot Road (November 1, 2019).

Photo 4: Looking upstream at Reach 4 from Colonel Talbot Road (November 1, 2019).

Appendix A: Photographic Inventory of Tributary to Dingman Creek B1 Existing Conditions

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York Development Group and Sifton Properties Ltd.

Stantec