

**INNOVATIVE STORMWATER MANAGEMENT
AT TENNIS CANADA'S REXALL CENTRE
York University, Toronto, Ontario**

by: Mark Hagesteijn, P.Eng.

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Overview

R.V. Anderson Associates Limited (RVA) joined the Rexall Centre design team in 2002, to provide design, assistance with approvals, and construction review of site services, grading and stormwater management. The Rexall Centre is located at York University's Keele Campus in the City of Toronto, and is the site of Canada's annual Tennis Masters Tournament. This 6.4 ha site includes a 12,500-seat open bowl stadium, plus an additional 15 tennis courts.



Background

A site services feasibility study was initially conducted to identify various efficient methods to service the site with respect to potable water, electricity, natural gas, and sanitary sewage. This study was followed by the detailed design stage, where RVA provided services for the design of

watermains, sanitary and storm sewers, electrical duct bank alignments, site grading, and on-site stormwater management.

To avoid relocating the existing sanitary sewers within the site, Courts 3 to 6 were located adjacent to the existing sanitary sewer so that the sewer could be repaired, if required, without damaging the tennis court surfaces.

Reconstruction of Shoreham Drive, to the north of the site, and The Pond Road, to the east of the site, will commence in the near future. To design the grades at the site's property lines and the electrical duct bank to service the site without conflicting with future road conditions, RVA also prepared approximately 1100 m of preliminary road reconstruction designs for Shoreham Drive and The Pond Road.

Stormwater management was a joint effort with SNC Lavalin. RVA prepared the stormwater management design for the on-site drainage and SNC Lavalin prepared the stormwater management design for the external drainage, which affected the eastern part of the site.



Tennis Canada Rexall Centre – Stadium

Innovation in Action

In line with the City of Toronto Wet Weather Flow Master Plan and the “Humber River Watershed Hydrology / Hydraulics and Stormwater Management Study”, the main challenge of the on-site stormwater management was to control the peak flows to the allowable peak flows, and to maintain the pre-development flow routes to minimize the impact on the forested and environmentally sensitive Black Creek and Hoover Creek valleys, located west, south and east of the site.

The middle and north parts of the site could drain by gravity to the proposed conventional stormwater management ponds located along the east and west property lines. However, drainage from the south part of the site could not be controlled using conventional stormwater management facilities because of grading constraints; limited availability of table land for stormwater management facilities; subsoils that are unsuitable for rainwater infiltration; and very low allowable outflows, which needed to drain as sheet flow down five separate gullies of the Black and Hoover Creek valleys.

To address the stormwater management constraints for the south part of the site, RVA designed five in-ground gravel stormwater management facilities. These facilities consist of clear stone wrapped with filtercloth to temporarily store the runoff, and the average 6 metre wide innovative clear stone outlets were designed to drain the storage facilities at the low allowable rates and direct the flow as sheet flows down each of the five gullies of the creeks' valleys to maintain the water balance for the existing vegetation.

To prevent the gravel outlets from plugging, the runoff will be filtered at the inlets via grates, sumps and goss traps. Within the storage basin the water will also be filtered through perforated pipes that can be flushed.

During the filtration process and temporary storage within the stormwater management facilities, the relatively warm surface runoff will also be cooled before it is released. This will improve the water quality before the runoff drains off-site into the environmentally sensitive forested valleys of the Black and Hoover Creeks.

The proposed gravel stormwater management facilities would control the runoff to the allowable peak runoff flows and maintain the water balance so that it will not affect the existing vegetation in the Black and Hoover Creek valleys.

This cost effective solution was carried out to the satisfaction of the approval agencies (Toronto and Region Conservation Authority, the City of Toronto and local community groups), and allowed Tennis Canada to develop the south part of the site without sacrificing developable land for stormwater management facilities.

During construction RVA provided site reviews with respect to site services, site grading and stormwater management.

Conclusion

The Rexall Centre was successfully completed in the summer of 2004 and is serviced by approximately 90 m of gas mains, 840 m of water mains, 960 m of high voltage electrical duct banks, 170 m of sanitary sewers, 1140 m of storm sewers, 2 stormwater management ponds, 5 gravel stormwater management facilities, a 100 stall parking lot with oil/grit separator manhole, and 10,000 m² of walkways.