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REPORT ON

**GEOTECHNICAL/HYDROGEOLOGICAL
INVESTIGATION
PROPOSED BOSTWICK EAST SUBDIVISION
LONDON, ONTARIO**

Submitted to:

Sifton Properties Limited
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Executive Summary

Golder Associates Ltd. (Golder) was retained by Sifton Properties Limited to carry out a geotechnical and hydrogeological investigation at the site of the proposed Bostwick East Subdivision in London, Ontario.

The proposed Bostwick East development, as currently planned, is comprised of about 117 single family lots, multi-family residential blocks, a stormwater management facility, as well as associated roadways and services. The stormwater management (SWM) pond will be located to the south of the future Bradley Avenue extension and west of Block 127 proposed for future development.

This geotechnical investigation provided the following general information for the proposed development:

- an assessment of the subsurface soil and groundwater conditions at the site;
- a discussion of the overall groundwater regime;
- geotechnical engineering recommendations for site servicing, including excavations and trench backfill;
- a discussion of the dewatering requirements for the proposed works;
- geotechnical engineering recommendations for the proposed SWM pond and pumping station;
- preliminary pavement component designs; and
- discuss any potential difficulties associated with the soil and groundwater conditions.

The field work for this investigation was carried out between October 11 and 14, 2005 during which time seventeen boreholes were drilled with an all-terrain vehicle mounted power auger supplied and operated by a specialist drilling contractor. The soil conditions encountered in the boreholes consisted of the surficial topsoil overlying layers of clayey silt till, silty clay and silt overlying extensive sand deposits.

Based on the water levels in the borehole installations and the measured water levels in the Pincombe Drain, the drain is a point of groundwater discharge. Some regrading of the site by cutting and filling will be required in portions of the site due to the existing ground surface topography. To minimize problems with site development, all fills should be placed as properly constructed engineered fills.

All excavations should be carried out in accordance with the current Occupational Health and Safety Act and Regulations for Construction Projects. Temporary excavation side slopes should not exceed 1 horizontal to 1 vertical and will need to be flatter in some wet areas. To facilitate excavation and installation of the sewers, an effective form of groundwater control such as vacuum well points and/or high volume wells will be required. The contractor's proposed dewatering methodology and monitoring should be reviewed by this office prior to installation.

Most of the excavated materials above the groundwater levels can be used for service trench backfill. Depending on the construction season, some of the wetter materials can probably be reused as backfill if properly handled and stockpiled to promote sufficient drying. Along the alignment of the trunk sanitary sewer, significant settlements of the trench backfill should be anticipated as a consequence of the depth of the sewer.

Areas to be developed for roadways should be stripped of all topsoil and otherwise deleterious materials. The exposed subgrade should be carefully proofrolled and any disturbed materials should then be subexcavated and brought to subgrade level using City of London Select Granular B uniformly compacted to at least 95 per cent of standard Proctor maximum dry density.

Residential dwellings for the proposed development can be founded within the native, undisturbed soils at conventional depths.

The proposed SWM pond side slope inclinations of 5 horizontal to 1 vertical are considered appropriate for the subsurface conditions. Areas of localized instability and erosion in the wet sand and silt in the cut slopes may require blanketing with a non-woven geotextile and 50 millimetre plus clear stone or a proprietary erosion control product to enhance stability.

Based on the information provided, the proposed SWM facility is about 2.3 hectares in area with a bottom of pond elevation of 263.7 metres, a design operating water level at 264.6 metres and a top of berm elevation of 267.0 metres. Based on the results of this investigation, the groundwater level in the area of the pond is at about the design operating level. The pond excavation will generally encounter clayey silt till, silt and sand.

The stability of the existing side slopes for the Pincombe Drain were noted to be stable with an inclination of 2 horizontal to 1 vertical or flatter. The lower portions of the slopes are protected with rip rap and no signs of erosion or gulying were noted during the inspection.

Based on the subsurface conditions, the pumping station excavation will encounter clayey silt till, silty clay, silt and fine sand. The presence of silty clay layers at depth will impact the effectiveness of the dewatering system. The pumping station should be designed for uplift equivalent to a water level at the ground surface.