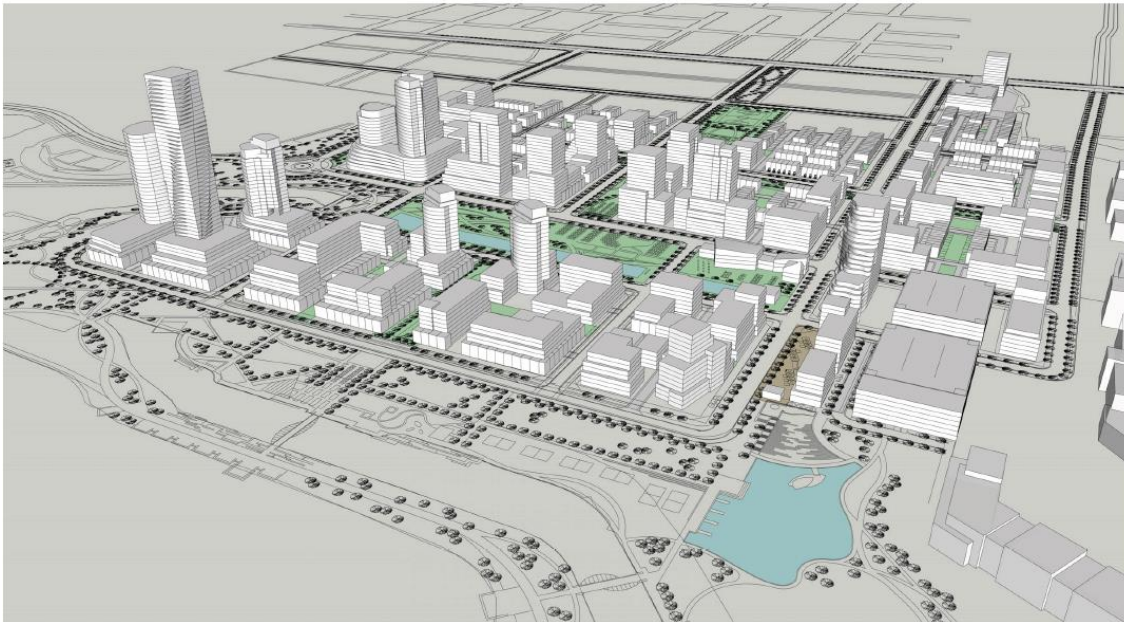


**Preliminary Hydrogeological Investigation
Proposed Residential & Commercial Development-Phase 1
Block-6
800 Hydro Road
Mississauga, Ontario**



**PREPARED FOR:
Lakeview Community Partners Limited**

**Project #: 18-519-103
Date: March 6, 2020**



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18-519-103

March 6, 2020

**Lakeview Community Partners Limited
800 Hydro Road
Mississauga, ON**

RE: Preliminary Hydrogeological Investigation- Block 6 at Proposed Lakeview Village, 800 Hydro Road, Mississauga, ON

DS Consultants Limited (DS) was retained by ARGO Development Corporation on behalf of Lakeview Community Partners Limited to complete a preliminary hydrogeological investigation for the proposed Block 6 within the Phase 1 development at proposed Lakeview Village at 800 Hydro Road, Mississauga, Ontario (Site). The site is located about 3.5 kilometres east of Port Credit, on Mississauga's waterfront. The site was the former OPG Lakeview Coal plant that was decommissioned between 2006 and 2008. The site is currently vacant. The proposed 71.6-hectare Lakeview Village will include 5,000 to 7,000 new homes in a variety of housing options, including townhouses, mid-rise and high-rise buildings. There will be more than 600,000 square feet of employment and institutional use and another 200,000 square feet of cultural space. Lakeview Village will include a Serson Square, a year-round central gathering space with retail offices and homes that can be used as an art and cultural hub.

The Site is divided into several blocks for development purposes and the development will be conducted under different phases. This preliminary hydrogeological investigation report has been prepared for the proposed Block-6 under Phase one (1) development. Base on the conceptual plan, the block will be developed with mid-rise to high rise residential and commercial buildings with up to four levels of underground parking(P4). The average grade and the assumed finished floor elevation (FFL) at the Block-6 is 80.70 and 68.70 meters above sea level (masl), respectively.

The report includes an overview of the existing geological and hydrogeological conditions at the Site and the surrounding area, provides an assessment of the hydrogeological constraints and impacts of the proposed development on the local groundwater. In the absence of actual design, the report includes a preliminary estimation of construction dewatering (short-term dewatering) volumes and groundwater permanent drainage based on specific assumption of below-grade construction and can be used for water taking and discharge permits from the Ministry of the Environment, Conservation and Parks (MECP) and City of Mississauga, if needed.

Based on the results of our investigation, the following summary of conclusions and recommendations are presented:

1. Based on the MECP water wells records search, there are 172 water wells within 500 meters of the Site. One (1) water well is noted as water supply wells (industrial). All other well records are registered as test hole, monitoring well, not in use well, dewatering well or unknown. The study area is fully serviced with municipal water and therefore, no groundwater users are expected in the area.

2. In total, eight (8) boreholes were drilled by DS Consultants Ltd. (DS) within the Block 6 footprint as part of the hydrogeological investigation concurrently with the geotechnical investigation. All boreholes were advanced between December 2019 and February 2020, to depths ranging between 14 to 27 meters below ground surface (mbgs). Six (6) drilled boreholes were converted into monitoring wells and screened in the overburden and shale bedrock at depths ranging from 13.6 to 17 mbgs.
3. The study area (500 m radius) lies within the Iroquois Plain physiographic region of southern Ontario and is characterized by the Bevelled Till Plains physiographic landform. The surficial geology at the study area is dominated by clayey silt till deposits and coarse-textured glaciolacustrine deposits of sand, gravel, silt, and clay. The soils at the Site consist of topsoil/asphalt and heterogeneous fill materials, followed by clayey silt till/ silty clay with interbedded sandy silt/silty sand, sand and gravel and shale bedrock of the Georgian Bay Formation. Bedrock depth varies from about 4 m to 21 meters below the ground surface (EL 76.5) at the Site, which indicates a presence of a buried bedrock valley at the site.
4. On February 3, 2020, Groundwater levels in overburden monitoring wells were found between 78.67 and 75.58 masl and in bedrock wells between 77.12 and 76.25 masl. The groundwater levels at the Site can be subject to seasonal fluctuations. Groundwater flow within overburden is expected towards bedrock valley and within the bedrock is expected towards Lake Ontario. DS recommends implementing a groundwater level monitoring program at the site to observe seasonal fluctuations due to precipitation, the proximity of Lake Ontario and the presence of several buried channels and conduits from the previous land use.
5. Single Well Response Tests (SWRTs) were completed at all monitoring wells at Block 6 by DS on February 3, 2020, to estimate hydraulic conductivity (k) for the representative geological units in which the wells are completed. The reported hydraulic conductivity (k) for overburden is between 5.7×10^{-6} and 2.1×10^{-7} m/s with the geomean value of 6.5×10^{-7} . The hydraulic conductivity for weathered shale/ shale bedrock varies between 2.1×10^{-7} m/s and 3.75×10^{-8} m/s with the geomean value of 1.2×10^{-7} m/s.
6. Considering an unsealed excavation (i.e. soldier pile/lag shoring system or open cut), the **estimated steady-state rates** for an assumed four (4) level of underground parking (P4) **during construction** would be 154,000 L/day including a safety factor of x1.5. However, the design flow rates of **354,000 L/day** should be considered during design and permitting to account for the additional removal of stormwater 201,000 L/day in the open excavation based on a major precipitation event into the open excavation. The estimated design dewatering rate for an unsealed excavation is less than 400,000 L/day, a PTTW application is not required but an EASR application is required to be submitted to the MECP for dewatering prior to construction dewatering.
7. Based on current groundwater conditions and the assumed finished floor elevation (approx. 12 mbgs), the expected permanent drainage volume is 42,000 L/day with a safety factor of x1.5. The drainage control system around and beneath the buildings should be designed with enough capacity

to handle the expected permanent volume. There are several factors that will impact this estimation such as construction sequencing, depth, shoring design, lake level elevation, etc. A PTTW is not required on a permanent basis since the permanent groundwater flow or permanent drainage is not expected more than the water taking limit of 50,000 L/day.

8. The estimation of dewatering flow rates is based on the k-values which were obtained from on-site in-situ permeability tests and represents the permeability value of the immediate area of these monitoring wells. Due to the proximity of Lake Ontario and the presence of the buried bedrock valley at the site in addition to several remnant channels and conduits from previous land use, DS recommends conducting a long term pumping test (24 hrs) to better establish aquifer properties such as transmissivity and storativity and obtain a more accurate dewatering estimate. This test is best done when actual design is available to strategically position the depth and location of the pumping wells for future use during construction.
9. It is important to note that these estimates are based on a high-level concept design without information on construction sequencing within the block, shoring design, dimensions, etc., all of which may significantly change the estimates. As such, it is recommended that these values be revised when design information becomes available.
10. One (1) unfiltered groundwater sample was collected from monitoring well BH/MW 20-32 on February 3, 2020, and submitted to SGS Laboratories, a CALA Certified Lab, Mississauga in Ontario. The groundwater sample was analyzed and compared against the parameters listed on the Region of Peel Wastewater Bylaw (53-2010) and the Provincial Water Quality Objectives (PWQO).
11. Groundwater quality analysis indicates that TSS, various total metals, Biochemical Oxygen Demand (BOD) and total phenolic exceeded the sanitary or storm criteria under the Region of Peel's Wastewater Bylaw (53-2010) or PWQO for surface water discharge. Therefore, groundwater at the Site is not suitable for discharge to the Region's sewer system without treatment. Also, groundwater at the site is not suitable to discharge directly into any surface water bodies. Treatment options include but not limited to the settlement of suspended solids and specialized filtration to remove fines and associated metals. Discharge permits and agreements may be required from the Region of Peel/City of Mississauga to discharge groundwater into the sewer system. Alternatively, water can be discharged onsite depending on construction sequencing, actual volumes, availability of vacant lots and time of year.
12. The area is fully serviced by municipal water supply. It is not expected to have any use of groundwater as a source of drinking water within a radius of 500 meters from the Site or zone of influence (112 m from the centre of excavation) and therefore, there will be no short-term or long-term predicted impacts on private water wells occurring from the proposed dewatering activities.
13. There are no structures and utilities (buildings, houses, sewers) within the predicted zone of influence (ZOI) of about 112 meters from the centre of the excavation when considering an unsealed excavation. Also, the proposed excavation will be ended in low permeable cohesive till and

the underlying bedrock. Therefore, the effects of dewatering during construction are expected to be minimal. No settlement is anticipated due to any dewatering activities.

14. Baseline groundwater quality has been assessed and established prior to construction. However, groundwater quality can change based on several factors (land-use change, spills, natural variations, site remediation activities, etc.) and should be monitored during construction dewatering and after construction to ensure that water quality meets the guideline or regulations associated with any permits from the MECP and City/Region.
15. Once a groundwater dewatering system is set up at the Site, a daily and weekly monitoring should be implemented to assess the groundwater conditions such as water levels, measurement of discharge flow, discharge water quality and any adverse impacts as a result of dewatering include settlement.
16. In conformance with Regulation 903 of the Ontario Water Resources Act, the decommissioning of any dewatering system and monitoring wells should be carried out by a licensed contractor under the supervision of a licensed water well technician.

Should you have any questions regarding these findings, please do not hesitate to contact the undersigned.

DS Consultants Ltd.

Prepared By:

Reviewed By:

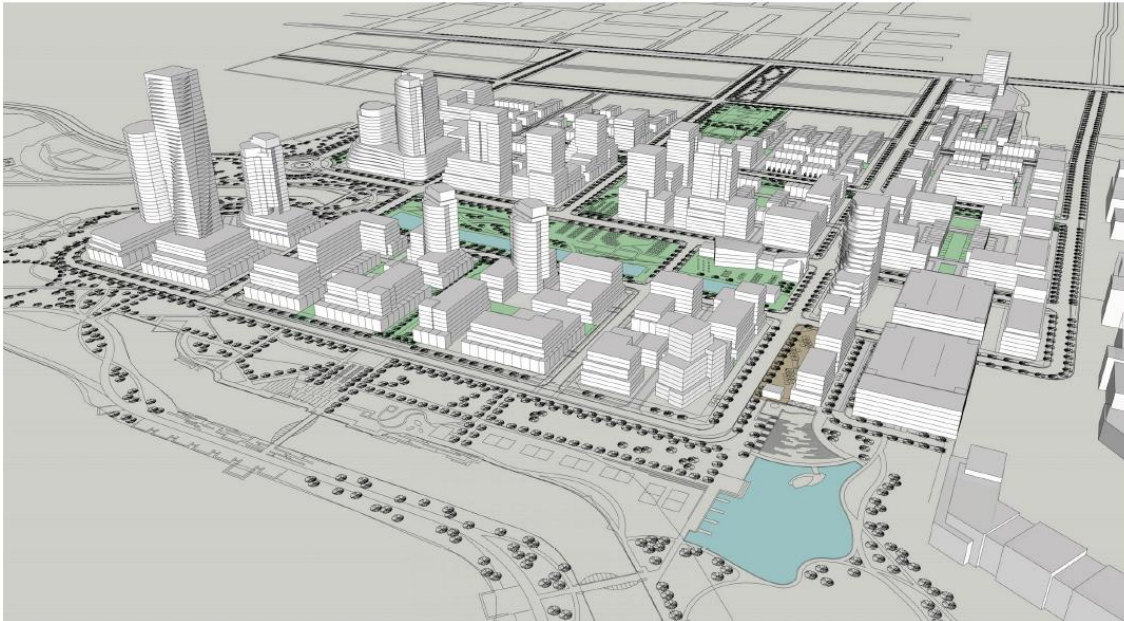


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Preliminary Hydrogeological Investigation
Proposed Residential & Commercial Development-Phase 1
Block- 11
800 Hydro Road
Mississauga, Ontario



PREPARED FOR:
Lakeview Community Partners Limited

Project #: 18-519-103
Date: April 27, 2020



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18-519-103

April 27, 2020

**Lakeview Community Partners Limited
800 Hydro Road
Mississauga, ON**

RE: Preliminary Hydrogeological Investigation- Block 11 at Proposed Lakeview Village, 800 Hydro Road, Mississauga, ON

DS Consultants Limited (DS) was retained by ARGO Development Corporation on behalf of Lakeview Community Partners Limited to complete a preliminary hydrogeological investigation for the proposed Block 11 within the Phase 1 development at proposed Lakeview Village at 800 Hydro Road, Mississauga, Ontario (Site). The site is located about 3.5 kilometres east of Port Credit, on Mississauga's waterfront. The site was the former OPG Lakeview Coal plant that was decommissioned between 2006 and 2008. The site is currently vacant. The proposed 71.6-hectare Lakeview Village will include 5,000 to 7,000 new homes in a variety of housing options, including townhouses, mid-rise and high-rise buildings. There will be more than 600,000 square feet of employment and institutional use and another 200,000 square feet of cultural space. Lakeview Village will include Serson Square, a year-round central gathering space with retail offices and homes that can be used as an art and cultural hub.

The Site is divided into several blocks for development purposes and the development will be conducted under separate phases. This preliminary hydrogeological investigation report has been prepared for the proposed Block 11 under Phase one (1) development. Based on the conceptual plan, the block will be developed with mid-rise to high rise residential and commercial buildings with up to four (4) levels of underground parking (P4). The average grade and the assumed finished floor elevation (FFL) at Block 11 are 76.1 and 64.1 meters above sea level (masl) respectively.

The report includes an overview of the existing geological and hydrogeological conditions at the Site and the surrounding area, provides an assessment of the hydrogeological constraints and impacts of the proposed development on the local groundwater. In the absence of actual design, the report includes a preliminary estimation of construction dewatering (short-term dewatering) volumes and groundwater permanent drainage based on the specific assumption of below-grade construction and can be used for water taking and discharge permits from the Ministry of the Environment, Conservation and Parks (MECP) and the City of Mississauga, if needed.

Based on the results of our investigation, the following summary of conclusions and recommendations are presented:

1. Based on the MECP water wells records search, there are 172 water wells within 500 meters of the Site. One (1) water well is noted as water supply wells (industrial). All other well records are registered as test hole, monitoring well, not in use well, dewatering well or unknown. The study area is fully serviced with municipal water and therefore, no groundwater users are expected in the area.

2. Two (2) boreholes were drilled by DS Consultants Ltd. (DS) within the Block 11 footprint as part of the hydrogeological investigation concurrently with the geotechnical investigation. Both boreholes were advanced in March 2020, to depths ranging between 9.8 to 12.7 meters below ground surface (mbgs) and converted into monitoring wells screened in the shale bedrock at depths 9.8 and 12.7 mbgs. Also, DS used four (4) selected shallow monitoring wells (6.1-3.2 mbgs) installed by EXP within the site as part of the environmental investigation at the site.
3. The study area (500 m radius) lies within the Iroquois Plain physiographic region of southern Ontario and is characterized by the Bevelled Till Plains physiographic landform. The surficial geology at the study area is dominated by clayey silt till deposits and coarse-textured glaciolacustrine deposits of sand, gravel, silt, and clay. The soils at the Site consist of fill, silty clay to clayey silt till and followed by shale bedrock of the Georgian Bay Formation. Bedrock elevation varies between an elevation of 74.1 m to 73.5 masl.
4. Groundwater levels were measured in bedrock wells between 74 and 73 masl on April 3, 2020. Groundwater flows within the bedrock expected to be towards Lake Ontario. Due to the proximity of Lake Ontario, the groundwater levels at the Site can significantly fluctuate in conjunction with Lake Ontario levels. DS recommends implementing a groundwater level monitoring program at the site to observe seasonal fluctuations due to precipitation, the proximity of Lake Ontario and the presence of buried channels and conduits from the previous land use.
5. Single Well Response Tests (SWRTs) were completed at five (5) monitoring wells by DS between April 3 and April 8, 2020, to estimate hydraulic conductivity (k) for the representative geological units in which the wells are completed. The reported hydraulic conductivity (k) for the shale is between 9.7×10^{-6} and 3.7×10^{-7} m/s with the geomean value of 8.2×10^{-7} m/s.
6. Considering an unsealed excavation (i.e. soldier pile/lag shoring system or open cut), the estimated steady-state rates for an assumed four (4) level of underground parking (P4) during construction would be 162,000 L/day including a safety factor of x1.5. However, the design flow rates of 262,000 L/day should be considered during design and permitting to account for the additional removal of stormwater 100,000 L/day in the open excavation based on a major precipitation event into the open excavation. The estimated design dewatering rate for an unsealed excavation is less than 400,000 L/day, a PTTW application is not required but an EASR application is required to be submitted to the MECP for dewatering before construction dewatering.
7. Based on current groundwater conditions and the assumed finished floor elevation (approx. 12 mbgs), the expected permanent drainage volume for the entire block is 60,000 L/day with a safety factor of x1.5. The drainage control system around and beneath the buildings should be designed with enough capacity to handle the expected permanent volume. Several factors will impact this estimation such as construction sequencing, depth, shoring design, lake level elevation, etc. A PTTW may be required on a permanent basis since the permanent groundwater flow or permanent drainage is expected more than the water taking limit of 50,000 L/day.

8. The estimation of dewatering flow rates is based on the k-values which were obtained from on-site in-situ permeability tests and represents the permeability value of the immediate area of these monitoring wells. Due to the proximity of Lake Ontario and the presence of several remnant channels and conduits from previous land use, DS recommends conducting a long term pumping test (24 hrs) to better establish aquifer properties such as transmissivity and storativity and obtain a more accurate dewatering estimate. This pumping test is best done when actual design is available to strategically position the depth and location of the pumping wells for future use during construction.
9. It is important to note that these estimates are based on a high-level concept design without information on construction sequencing within the block, shoring design, dimensions etc., all of which may significantly change the estimates. As such, it is recommended that these values be revised when design information and construction sequencing become available.
10. One (1) unfiltered groundwater sample was collected from monitoring well BH/MW 20-16 on April 3, 2020, and submitted to SGS Laboratories, a CALA Certified Lab, Mississauga in Ontario. The groundwater sample was analyzed and compared against the parameters listed on the Region of Peel Wastewater Bylaw (53-2010), the City of Mississauga sewers Bylaw and the Provincial Water Quality Objectives (PWQO).
11. Groundwater quality analysis indicates that all parameters tested met the Region of Peel's Wastewater Bylaw for sanitary discharge. However, parameters TSS, various total metals, TKN, chlorine and phenolics exceeded the storm criteria for the Region of Peel's Wastewater Bylaw (53-2010) and the City of Mississauga's Sewer Use Bylaw (259-05) or PWQO for surface water discharge. Therefore, groundwater at the Site is suitable for discharge directly into Region's sanitary sewer but not into the Region's /City's sewer system or any surface water bodies without treatment. Treatment options include but not limited to the settlement of suspended solids and specialized filtration to remove fines and associated metals. Discharge permits and agreements may be required from the Region of Peel /City of Mississauga to discharge groundwater into the sewer system. Alternatively, water can be discharged onsite depending on construction sequencing, actual volumes, availability of vacant lots and time of year.
12. The area is fully serviced by municipal water supply. It is not expected to have any use of groundwater as a source of drinking water within a radius of 500 meters from the Site or zone of influence (98 m from the centre of excavation) and therefore, there will be no short-term or long-term predicted impacts on private water wells occurring from the proposed dewatering activities.
13. There are no current structures and utilities (buildings, houses, sewers) within the predicted zone of influence (ZOI) of about 98 meters from the centre of the excavation when considering an unsealed excavation. Also, the proposed excavation will be ended in the bedrock and therefore, the effects of dewatering during construction are expected to be minimal. No settlement is anticipated due to any dewatering activities.
14. Baseline groundwater quality has been assessed and established before construction. However, groundwater quality can change based on several factors (land-use change, spills, natural variations,

site remediation activities, etc.) and should be monitored during construction dewatering and after construction to ensure that water quality meets the guideline or regulations associated with any permits from the MECP and City/Region.

15. Once a groundwater dewatering system is set up at the Site, a daily and weekly monitoring should be implemented to assess the groundwater conditions such as water levels, measurement of discharge flow, discharge water quality and any adverse impacts as a result of dewatering include settlement.
16. In conformance with Regulation 903 of the Ontario Water Resources Act, the decommissioning of any dewatering system and monitoring wells should be carried out by a licensed contractor under the supervision of a licensed water well technician.

Should you have any questions regarding these findings, please do not hesitate to contact the undersigned.

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