October 2017

HYDROLOGICAL REVIEW SUMMARY

The form is to be completed by the Professional that prepared the Hydrological Review.
Use of the form by the City of Toronto is not to be construed as verification of engineering/hydrological content.

Refer to the Terms of Reference, Hydrological Review:
http://www1.toronto.ca/static_files/CityPlanning/PDF/geotechnical.pdf

For City Staff Use Only:	
Name of ECS Case Manager (Please print)	
Date Review Summary provided to to TW, EM&P	

IF ANY OF THE REQUIREMENTS LISTED BELOW HAVE NOT BEEN INLCUDED IN THE HYDROLOGICAL REVIEW, THE REVIEW WILL BE CONSIDERED INCOMPLETE.
THE GREY SHADED BOXES WILL REQUIRE A CONSISTANCY CHECK BY THE ECS CASE MANAGER.

Summary of Key Information:

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
Site Address	2993-3011 Sheppard Avenue East, and 1800-1814 Pharmacy Avenue, Toronto, Ontario	Page 1; Section 1.1	
Postal Code	M1T 3J5		
Property Owner (on request for comments memo)	Sheppard Pharmacy GP Inc.	Page 1; Section 1.2	
Proposed description of the project (if applicable) (point towers, number of podiums)	Mixed use building including retail, office and residential units, with a three-level underground parking garage	Page 1; Section 1.2	
Land Use (ex. commercial, residential, mixed, institutional, industrial)	Commercial	Page 1; Section 1.1	
Number of below grade levels for the proposed structure	A maximum of 3 levels below grade for the proposed structure	Page 1; Section 1.2	
HYDROLOGICAL REVIEW INFORMATION			
Date Hydrological Review was prepared:	May 28, 2019	Page i/ii	
Who Performed the Hydrological Review (Consulting Firm)	Lucy Zhang, P.Eng. (Arcadis Canada Inc.) Kim Tan, P.Eng. (Arcadis Canada Inc.)	Page i/ii	

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Name of Author of Hydrological Review	Lucy Zhang, P.Eng. (Arcadis Canada Inc.) Kim Tan, P.Eng. (Arcadis Canada Inc.)	Page i	
Check the directories on the website for Professional Geoscientists and/or Professional Engineers of Ontario been checked to ensure that the Hydrological Report has been prepared by a qualified person who is a licensed Professional Geoscientist as set out in the Professional Geoscientist Act of Ontario or a Professional Engineer? PEO: http://peo.on.ca/index.php?ci_id=1798&la_id=1 APGO: https://www.apgo.net/search/registered-members	Author and reviewer are Professional Engineers	Page i	
Has the Hydrological Review been prepared in accordance with all the following: • Ontario Water Resources Act • Ontario Regulation 387/04 • Toronto Municipal Code Chapter 681- Sewers	Toronto Municipal Code Chapter 681- Sewers	Page 15; Section 4.9	

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		Page # & Section # of every occurrence in the Review	Review Includes this Information City Staff (Check)
Total Volume (L/day) Short Term Discharge of groundwater (construction dewatering) **with safety factor included**	101.3 m^3 What safety factor was used? **50%**	Page 20; Section 5.3 Page 18; Section 5.1	
Total Volume (L/day) Short Term Discharge of groundwater (construction dewatering) **without safety factor included**	95.2 m^3		
Total Volume (L/day) Long Term drainage of groundwater (from foundation drainage, weeping tiles, sub slab drainage) **with safety factor included** If the development is part of a multiple tower complex, include total volume for each separate tower	15.8 m^3 What safety factor was used? **50%**	Page 20; Section 5.3 Page 18; Section 5.1	
List the nearest surface water (river, creek, lake)	Massey Creek, which is located approximately 1 km south of the site	Page 9; Section 3.3	

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Lowest basement elevation	167.55 – 169.45 m amsl	Page 16; Section 5	
Foundation elevation	165.55 – 167.45 m amsl	Page 16; Section 5	
Ground elevation	177.55 – 179.45 m amsl	Page 17; Section 5.1	
STUDY AREA MAP		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**
Study area map(s) have been included in the report.	Figure 1 - 7	Figures	
Study area map(s) been prepared according to the Hydrological Review Terms of Reference.	**Yes**		N/A
The onsite well(s) referenced in the report have been installed at locations that represent the entire proximity of the site (it is required that the well(s) be installed at a minimum of 38mm diameter and 2 meters below the lowest elevation in the proposed building structure(s) if the site is larger than 30m X 30m.	**Yes**	Figures Appendix A	N/A

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WATER LEVEL AND WELLS		Page # & Section # of every occurrence in the Review	Review Includes this Information (City Staff Initial)
The groundwater level has been monitored using all wells located on site (within property boundary).	Yes	Appendix D	
The static water level measurements have been monitored at all monitoring wells for a minimum of 3 months with samples taken every 2 weeks for a minimum of 6 samples. The intent is for the qualified professional to use professional judgement to estimate the seasonally high groundwater level.	Yes	Appendix D	
All water levels in the wells have been measured with respect to masl.	Yes	Appendix D	
A table of geology/soil stratigraphy for the property has been included.	Yes	Page 12; Section 4.3	
GEOLOGY AND PHYSICAL HYDROLOGY		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information (City Staff Initial)**
The review has made reference to the soil materials including thickness, composition and texture, and bedrock environments.	Yes	Page 12; Section 4.3 Appendix A	
Key aquifers and the site's proximity to nearby surface water has been identified.	**Yes** Shallow ground water at the site occurs generally within the silty clay/clayey silt layer, and would be unconfined ground water Massey Creek, which is located approximately 1 km south of the site	Page 12; Section 4.3 Page 9; Section 3.3	N/A

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PUMP TEST/SLUG TEST/DRAWDOWN ANALYSIS		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**
A summary of the pumping test data and analysis is included in the review.	Yes	Page 12, 13; Section 4.4 Appendix C	
The pump test been carried out for at least 24 hours if possible. If not, has a slug test been conducted?	A slug test was conducted, and rising water level in the well was measured at regular time intervals for 24 hours using a level logger	Page 7; Section 2.4	
Have the monitoring well(s) have been monitored using digital devices? If yes how frequently?	A slug test was conducted, and rising water level in the well was measured at regular time intervals for 24 hours using a level logger	Page 7; Section 2.4	
If a slug or pump test has been conducted has the static groundwater level been monitored at all monitoring well(s) multiple times to measure recovery? -prior to the slug or pumping test(s)? -post slug or pumping test(s)?	**Yes** A slug test was conducted, and rising water level in the well was measured at regular time intervals for 24 hours using a level logger	Page 7; Section 2.4	N/A
The above noted slug or pump tests have been included in the report.	**Yes**	Appendix C	
WATER QUALITY		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**
The report includes baseline water quality samples from a laboratory. The water quality must be analyzed for all parameters listed in Tables 1 and 2 of Chapter 681 Sewers of the	A water sample was analysed for all parameters listed in Tables 1 and 2 of Chapter 681 Sewers of the Toronto Municipal Code (found in Appendix A) and the samples must have to be taken unfiltered within 9 months of the date of submission	Page 6; Section 2.3 Page 15; Section 4.9	

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Toronto Municipal Code (found in Appendix A) and the samples must have to be taken unfiltered within 9 months of the date of submission.			
The water quality data templates in Appendix A have been completed for each sample taken for both sanitary/combined and storm sewer limits.	Yes For sanitary discharge- See the sanitary/combined sewer parameter limit template For storm discharge- See the storm sewer parameter limit template	Appendix B	
Qualified professional to list all sample parameters that have violated the Bylaw limits for each sample taken for the sanitary/combined Bylaw limits **If there are any sample parameter Exceedances the groundwater can't be discharged as is.**	Yes	Page 15; Section 4.9 Appendix B	
Qualified professional to list all sample parameters that have violated the Bylaw limits for each sample taken for the storm Bylaw limits. **If there are any sample parameter exceedances the groundwater can't be discharged as is.**	Yes	Page 15; Section 4.9 Appendix B	

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The water quality samples have been analyzed by a Canadian laboratory accredited and licensed by Standards Council of Canada and/or Canadian Association for Laboratory Accreditation. List of Canadian accredited laboratories: https://www.scc.ca/en/search/palcan	**Yes** The water sample was submitted to Maxxam Analytics Inc. (Maxxam) in Mississauga, a member of the Standards Council of Canada for Laboratory Accreditation, for chemical analysis	Page 7; Section 2.3	N/A
A chain of custody record for the samples is included with the report.	Yes	Appendix B	
Has the chain of custody reference any filtered sample? If yes, the report has to be amended and re-submitted to include only non-filtered samples.	The Water sample was not field filtered	Appendix B	
List any of the sample parameters that exceed the Bylaw limits with the reporting detection limit (RDL) included.	Yes	Page 15; Section 4.9 Appendix B	
A true copy of the Certificate of Analysis report, is included with the report.	Yes	Appendix B	
EVALUATION OF IMPACT		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**
Does the report recommend a back-up system or relief safety valve(s)? Does the associated Geotechnical report recommend a back-up system or relief safety valve(s)?	◯ **Yes** ■ **No** ◯ **Yes** ■ **No**		
The taking and discharging of groundwater on site has been analyzed to ensure that no	**Yes**	Page 21-23; Section 6	N/A

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negative impacts will occur to: the City sewage works in terms of quality and quantity (including existing infrastructure), the natural environment, and settlement issues.			
Has it been determined that there will be a negative impact to the natural environment, City sewage works, or surrounding properties has the study identified the following: the extent of the negative impact, the detail of the precondition state of all the infrastructure, City sewage works, and natural environment within the effected zone and the proposed remediation and monitoring plan?	◯ **Yes** **If yes, identify impact:** ■ **No**	Page 21-23; Section 6	N/A

Summary of Additional Information and Key Items (if applicable):

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Appendix A:

SANITARY/COMBINED **Sample Location:** MW16-1

Inorganics		Sample Result	Sample Result with upper RDL included	
Parameter	mg/L			ug/L
BOD	300	<2 mg/L		300,000
Fluoride	10	0.15 mg/L		10,000
TKN	100	0.42 mg/L		100,000
pH	6.0 - 11.5	7.78		6.0 - 11.5
Phenolics 4AAP	1	<0.0010 mg/L		1,000
TSS	350	<10 mg/L		350,000
Total Cyanide	2	<0.0050 mg/L		2,000
Metals				
Chromium Hexavalent	2	0.00051 mg/L		2,000
Mercury	0.01	<0.0001 mg/L		10
Total Aluminum	50	<0.1 mg/L		50,000
Total Antimony	5	<0.02 mg/L		5,000
Total Arsenic	1	<0.01 mg/L		1,000
Total Cadmium	0.7	<0.002 mg/L		700
Total Chromium	4	<0.01 mg/L		4,000
Total Cobalt	5	<0.002 mg/L		5,000
Total Copper	2	<0.01 mg/L		2,000
Total Lead	1	<0.01 mg/L		1,000
Total Manganese	5	0.041 mg/L		5,000
Total Molybdenum	5	<0.005 mg/L		5,000
Total Nickel	2	<0.005 mg/L		2,000
Total Phosphorus	10	<0.05 mg/L		10,000
Total Selenium	1	<0.02 mg/L		1,000
Total Silver	5	<0.01 mg/L		5,000
Total Tin	5	<0.02 mg/L		5,000
Total Titanium	5	<0.005 mg/L		5,000
Total Zinc	2	<0.005 mg/L		2,000
Petroleum Hydrocarbons				
Animal/Vegetable Oil & Grease	150	<0.50 mg/L		150,000
Mineral/Synthetic Oil & Grease	15	<0.50 mg/L		15,000

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Volatile Organics		Sample Result	Sample Result with upper RDL included	
Parameter	mg/L			ug/L
Benzene	0.01	<0.01 mg/L		10
Chloroform	0.04	<0.01 mg/L		40
1,2-Dichlorobenzene	0.05	<0.025 mg/L		50
1,4-Dichlorobenzene	0.08	<0.025 mg/L		80
Cis-1,2-Dichloroethylene	4	0.13 mg/L		4,000
Trans-1,3-Dichloropropylene	0.14	<0.02 mg/L		140
Ethyl Benzene	0.16	<0.01 mg/L		160
Methylene Chloride	2	<0.1 mg/L		2,000
1,1,2,2-Tetrachloroethane	1.4	<0.025 mg/L		1,400
Tetrachloroethylene	1	3 mg/L		1,000
Toluene	0.016	<0.01 mg/L		16
Trichloroethylene	0.4	0.94 mg/L		400
Total Xylenes	1.4	<0.01 mg/L		1,400
Semi-Volatile **Organics**				
Di-n-butyl Phthalate	0.08	<0.002 mg/L		80
Bis (2-ethylhexyl) Phthalate	0.012	<0.002 mg/L		12
3,3'-Dichlorobenzidine	0.002	<0.0008 mg/L		2
Pentachlorophenol	0.005	<0.001 mg/L		5
Total PAHs	0.005	<0.001 mg/L		5
Misc **Parameters**				
Nonylphenols	0.02	<0.001 mg/L		20
Nonylphenol Ethoxylates	0.2	<0.005 mg/L		200

Sample Collected:
April 4, 2019

Temperature:
7.82 ºC

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STORM **Sample Location:**

Inorganics		Sample Result	Sample Result with upper RDL included	
Parameter	mg/L			ug/L
pH	6.0 - 9.5	7.78		
BOD	15	<2 mg/L		15,000
Phenolics 4AAP	0.008	<0.0010 mg/L		8
TSS	15	<10 mg/L		15,000
Total Cyanide	0.02	<0.0050 mg/L		20
Metals				
Total Arsenic	0.02	<0.01 mg/L		20
Total Cadmium	0.008	<0.002 mg/L		8
Total Chromium	0.08	<0.01 mg/L		80
Chromium Hexavalent	0.04	0.00051 mg/L		40
Total Copper	0.04	<0.01 mg/L		40
Total Lead	0.12	<0.01 mg/L		120
Total Manganese	0.05	0.041 mg/L		50
Total Mercury	0.0004	<0.0001 mg/L		0.4
Total Nickel	0.08	<0.005 mg/L		80
Total Phosphorus	0.4	<0.05 mg/L		400
Total Selenium	0.02	<0.02 mg/L		20
Total Silver	0.12	<0.01 mg/L		120
Total Zinc	0.04	<0.005 mg/L		40
Microbiology				
E.coli	200	<10		200,000
Volatile Organics				
Parameter	mg/L			ug/L
Benzene	0.002	<0.01 mg/L		2
Chloroform	0.002	<0.01 mg/L		2
1,2-Dichlorobenzene	0.0056	<0.025 mg/L		6
1,4-Dichlorobenzene	0.0068	<0.025 mg/L		7
Cis-1,2-Dichloroethylene	0.0056	0.13 mg/L		6
Trans-1,3-Dichloropropylene	0.0056	<0.02 mg/L		6
Ethyl Benzene	0.002	<0.01 mg/L		2
Methylene Chloride	0.0052	<0.1 mg/L		5
1,1,2,2-Tetrachloroethane	0.017	<0.025 mg/L		17
Tetrachloroethylene	0.0044	3 mg/L		4
Toluene	0.002	<0.01 mg/L		2
Trichloroethylene	0.0076	0.94 mg/L		8
Total Xylenes	0.0044	<0.01 mg/L		4

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Semi-Volatile Organics		Sample Result	Sample Result with upper RDL included	
Di-n-butyl Phthalate	0.08	<0.002 mg/L		80
Bis (2-ethylhexyl) Phthalate	0.012	<0.002 mg/L		12
3,3'-Dichlorobenzidine	0.002	<0.0008 mg/L		2
Pentachlorophenol	0.005	<0.001 mg/L		5
Total PAHs	0.005	<0.001 mg/L		5
Hexachlorocyclohexane	0.1	NA		100
Misc Parameters				
Nonylphenols	0.001	<0.005 mg/L		1
Nonylphenol Ethoxylates	0.01	<0.00005 mg/L		10

Sample Collected:
April 4, 2019

Temperature:
7.82 ºC

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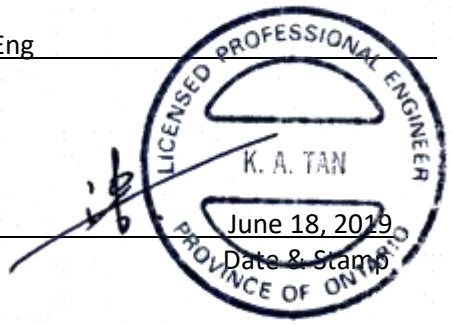
Consulting Firm that prepared Hydrological Report: Arcadis Canada Inc.

Qualified Professional who completed the report summary: Kim A. Tan, P.Eng
Print Name



Qualified Professional who completed the report summary: June 18, 2019
Signature Date & Stamp