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SPA1: 21 May 2021
SPA2: 15 September 2021
Revised: 20 January 2023
Revised: 16 November 2023
Revised: 25 January 2024

SBM-21-0716

Middlesex County
399 Ridout Street North
London, Ontario N6A 2P1

Attn: Ms. Marion Cabral, BURPL
Planner

Re: Site Servicing Design Brief for Draft Plan Application for Brock Development Group
Proposed 19 Residential Lot Development, Medway Road, Ballymote, Ontario

1. INTRODUCTION

This Site Servicing Memorandum (Memo) has been prepared by Strik, Baldinelli, Moniz Ltd (SBM) to address the comments from the Middlesex County, received via email, dated April 26, 2023, as well as subsequent communications and conversations with Brock Development for the proposed development of 19 residential lots at Highbury Avenue North and Medway Road, Ballymote, Ontario.

The site is bordered by general agricultural zones to its east and south, Hamlet Residential First Density zones across the Highbury Avenue North Right-of-Way (ROW) to the west and the Medway Road ROW to the north. This Memo is to determine the adequacy of the existing municipal services in support of Zoning By-law Amendment (ZBA) applications for the proposed lot severance.

2. SANITARY SERVICING CONSIDERATIONS

As per the Ballymote Waterworks Highbury Avenue as-constructed drawings provided by the Municipality, Project No. 92037 sheets 1, 2, 6, and 7, all dated April 15, 1994, provided in Appendix A, the proposed development is not tributary to a sanitary sewer. There are no existing sanitary sewers on Highbury Avenue North ROW or Medway Road ROW and therefore, on-site septic systems are proposed.

The dimensions of the on-site septic system and contingency area are obtained from the Soil Report for Wastewater Servicing by BOS Engineering & Environmental Services Inc., dated June 2, 2021 and updated October 22, 2022, provided in Appendix B. The system is schematically shown on Engineering Plans, sheets 2A and 2B provided separately.

To address the sanitary servicing comment regarding Lot 17, septic system and contingency area for Lot 17 is obtained from the Site, General Grading & Servicing Plan by BOS Engineering & Environmental Services Inc., project number 21019-01, sheet S-1, dated September 9, 2021, received September 10, 2021.

3. STORMWATER MANAGEMENT

Pre-development conditions were obtained from the Topographical Plan of Survey by Callon Dietz Incorporated, File No. 20-23779 A, dated February 17, 2021, provided in Appendix C. Grade elevations around the proposed lots are to match existing grades and all lots are graded to generally match the existing drainage patterns. Please see the existing and proposed overflow routes (OFR) shown on Engineering Plans, sheets 2A and 2B provided separately for reference.

As per the Ballymote East Drain Plan & Profile prepared by A. M. Spriet & Associates Ltd. Consulting Engineers, dated October 16, 1971, provided in Appendix C, the site drains to the Ballymote East Drain 1971. Therefore, a soak-away pit is proposed on each property to provide storm water management (SWM) storage and to infiltrate water to help the site achieve a water balance. It is noted that each infiltration trench will be connected to a trench drain near the property line which will collect flows from the driveway and will also act as an overflow point when inflows exceed the capacity of the soak-away pit.

In addition to the overflow point located at the trench drain, an overflow pipe is to also be provided from the roof leader that discharges to a splash pad. A removable filter is incorporated into the roof leader below the overflow pipe. Please refer to Figure 4.3: Roof Leader Discharge to Soak-away Pit in Section 4.5.6 of the Ministry of Environment, Conservation and Parks (MECP) Stormwater Management Planning and Design Manual for details of this system. The overflows from both locations are directed to the municipal drain flowing along the Medway Road ROW and to the Ballymote East Drain generally matching existing drainage patterns.

As per comment 2 regarding infiltration galleries (soak-away pit) received from Middlesex County dated September 23, 2022, the hydraulic conductivity of soil per the Infiltration Assessment prepared by Englobe, dated November 16, 2022, provided in Appendix C, was initially used and incorporated safety factors as identified in Appendix C - Tables C1 and C2 of Credit Valley Conservation Authority's Low Impact Development Stormwater Management Planning and Design Guide. Per subsequent comments from the Municipality requesting in-situ testing to determine the infiltration rates, LDS Consultants were retained and prepared a Soil Infiltration Testing Report dated August 23, 2023 which can be found in Appendix C. The Soil Infiltration Testing report shows the measured infiltration rates at three test pit locations corresponding to the three clusters of proposed lots along Medway Road and Highbury Ave. LDS also provided the infiltration rates (using a 2.5 factor of safety per the TRCA/CVC Low Impact Development Stormwater Management Planning and Design Guide) for the noted three test pit locations. The factored infiltration rates for the three test pit locations range between 1.9mm/hr to 2.1 mm/hr. The LDS report notes that each test hole was advanced to a depth of approximately 1.2m below existing grade and the observed soils were comprised of 300mm of topsoil underlain by silt which extended to termination depth. The silt was described as brown with trace gravel and trace to some clay, and in a moist and compact state.

As per section 4.5.6 of the MECP Stormwater Management Planning and Design Manual, a minimum infiltration rate of 15 mm/hr is required. As neither the in-situ or factored infiltration rates provided by LDS meet this minimum requirement, SBM does not recommend using soak-away pits as an effective method for stormwater management. Therefore, as the expected infiltration rates are low and as discussed above, SBM has provided multiple overflow outlets from the soak-away pit.

For visual clarity, on Engineering Plans, sheets 2A and 2B provided separately, one catchment area marker per lot is shown which represents the total area and runoff coefficient (C-value) of the lot. The calculation and design of the soak-away pit for the lots are completed using only the controlled area (i.e.. the area's tributary to the soak-away pit) as the uncontrolled areas are made up of landscaped area and generally match the pre-development conditions. The resulting assumption is that the peak flow rates from the post-developed uncontrolled areas within each lot would match the peak flow rates from the same associated areas under the pre-development conditions. Calculations of controlled areas for each lot are included in the SWM calculations, provided in Appendix C.

The time of concentration used in the pre-development and post-development SWM calculations is derived from Figure 4.3 Average Runoff Coefficient to Time of Concentration provided within the Middlesex Center Infrastructure designs standards. It is noted that a design porosity (commonly referred to as void ratio) of 0.35 was used for the purposes of the soak-away pit design.

The runoff from each lot's roof and driveway is controlled and directed to each lot's soak-away pit with some lots containing minor landscaped areas which are also tributary to the trench drain and soak-away pit. The remainder of the site area is uncontrolled landscaped area and is graded to generally match pre-development conditions. Therefore, the development will not negatively impact the adjacent farmland. Please refer to the SWM calculations provided in Appendix C which demonstrates how the post-development flows will be controlled to meet pre-development levels, and Engineering Drawings sheets 2A and 2B, which show the lot grading and catchment areas.

For each lot, the pre-development area equivalent to the sum of all controlled areas in the post-development areas are used to compare the runoff and calculate the required storage during 5-year and 100-year storm events. As per the comment received from the Municipality of Middlesex Centre, sizing is completed based on only the contact area at the bottom of the soak-away pit. Please refer to the SWM calculations provided in Appendix C for details. Please also see the below pre to post SWM Summary tables which are also included in the SWM calculations provided in Appendix C. It is noted that each soak-away pit is sized with approximately 16m^3 of storage which is intended to satisfy the constraints of providing adequate storage to store flows to meet the allowable post-development outflow rate, and to provide enough bottom face surface area to allow for a drawdown time of less than 48 hours per the MECP Stormwater Management Planning and Design Manual recommendations. It is noted that a draw down time of 24 hours or less cannot be achieved given the limited infiltration rate of the soils and the space constraints of placing a soak-away pit on each lot while managing required setbacks from property line, building envelope, and other utilities including the water service and septic system.

Lots 1 to 5 SWM Summary

RETURN PERIOD OF STORM	PRE-DEVELOPMENT PEAK FLOW (L/s)	POST-DEVELOPMENT		PRE - POST PEAK OUTFLOW TO DOWNSTREAM (L/s)	POST DEVELOPMENT PEAK FLOW TO PRE-DEVELOPMENT PEAK FLOW IN PERCENTILE
		EXFILTRATION RATE (L/s)	PEAK OVERFLOW TO MUNICIPAL DRAIN (L/s)		
5-YEAR	1.92	0.10	0.24	1.68	13%
100-YEAR	3.35	0.10	3.36	-0.01	100%

Lots 6-15 SWM Summary

RETURN PERIOD OF STORM	PRE-DEVELOPMENT PEAK FLOW (L/s)	POST-DEVELOPMENT		PRE - POST PEAK OUTFLOW TO DOWNSTREAM (L/s)	POST DEVELOPMENT PEAK FLOW TO PRE-DEVELOPMENT PEAK FLOW IN PERCENTILE
		EXFILTRATION RATE (L/s)	PEAK OVERFLOW TO MUNICIPAL DRAIN (L/s)		
5-YEAR	1.98	0.09	0.27	1.71	14%
100-YEAR	3.46	0.09	3.47	-0.02	100%

Lot 16 SWM Summary

RETURN PERIOD OF STORM	PRE-DEVELOPMENT PEAK FLOW (L/s)	POST-DEVELOPMENT		PRE - POST PEAK OUTFLOW TO DOWNSTREAM (L/s)	POST DEVELOPMENT PEAK FLOW TO PRE-DEVELOPMENT PEAK FLOW IN PERCENTILE
		EXFILTRATION RATE (L/s)	PEAK OVERFLOW TO MUNICIPAL DRAIN (L/s)		
5-YEAR	1.91	0.10	0.24	1.67	12%
100-YEAR	3.34	0.10	3.32	0.02	99%

Lot 17 SWM Summary

RETURN PERIOD OF STORM	PRE-DEVELOPMENT PEAK FLOW (L/s)	POST-DEVELOPMENT		PRE - POST PEAK OUTFLOW TO DOWNSTREAM (L/s)	POST DEVELOPMENT PEAK FLOW TO PRE-DEVELOPMENT PEAK FLOW IN PERCENTILE
		EXFILTRATION RATE (L/s)	PEAK OVERFLOW TO MUNICIPAL DRAIN (L/s)		
5-YEAR	1.87	0.10	0.23	1.64	12%
100-YEAR	3.27	0.10	3.26	0.01	100%

Lot 19 SWM Summary

RETURN PERIOD OF STORM	PRE-DEVELOPMENT PEAK FLOW (L/s)	POST-DEVELOPMENT		PRE - POST PEAK OUTFLOW TO DOWNSTREAM (L/s)	POST DEVELOPMENT PEAK FLOW TO PRE-DEVELOPMENT PEAK FLOW IN PERCENTILE
		EXFILTRATION RATE (L/s)	PEAK OVERFLOW TO MUNICIPAL DRAIN (L/s)		
5-YEAR	1.91	0.10	0.24	1.67	13%
100-YEAR	3.35	0.10	3.34	0.00	100%

As noted in the above tables, each lot's soak-away pit has been designed to provide enough storage to restrict peak outflows to the Municipal drain and meet peak pre-development flows. As shown in the SWM Calculations provided in Appendix C, each soak-away pit has also been designed to ensure each soak-away pits drawdown time is 48 hours or less. Referring to the Water Balance Calculations provided separately, under post-development conditions, via the use of infiltration trenches and increased depth of topsoil (30cm) within the proposed residential lots, the water balance shows a decrease in overall runoff and evapotranspiration, and an increase in overall infiltration when compared to the pre-development conditions.

The maintenance of the soak-away pit on each property will be the responsibility of each homeowner. A Homeowner Information Package has been developed to explain the importance of the feature and outline the maintenance responsibilities. The package is attached in Appendix E for reference.

It is further noted that the as the existing ditch within the Medway Road and Highbury Ave. right of ways will be affected by the proposed driveway accesses for each lot, driveway culverts are proposed for the affected lots

and are designed to match the existing flow capacity of the ditch and the slopes of the existing ditches are to remain.

4. WATER SERVICING CONSIDERATIONS

4.1 General Consideration

Water service connections are to be sized as per Section 5.9.1 of the Middlesex Centre Infrastructure Design Standards (MCIDS). Water services shall be a minimum of 25 mm (1") internal diameter, equipped with approved corporation stop with tapping sleeves and saddles, and curb stop with a curb box, and shall be installed as per Figure 5.10 Standard Installation of <50mm Water Service Connection and Layout Detail. The corporation stop with tapping sleeve and saddle shall be installed at the watermain, and a curb stop shall be installed 0.3 m from, and on the street side of, the property line as per Figure 5.11. It is noted that the existing well servicing Lot 18 is to be decommissioned, and new water service connection be provided as per the above.

Based on the above criteria, a 25 mm (1") PEX water service connection with tracer wire full length is proposed, connecting to municipal water main with approved service saddles and main stops as per Figure 5.10. As per Table A-7.6.3.1 of the Ontario Building Code 2012 (OBC), 60 m length of this water service connection can serve 57 fixture units, which is a conservative threshold for a single-family residential building. For reference, according to Table 7.4.9.3 of OBC, a single-family dwelling with 3-bathroom groups, a clothes washer, a dishwasher, a floor drain, a laundry tray, and a sink will have 25.5 fixture units.

To address water service comments from the Municipality of Middlesex Centre, where the significant percentage increase to the population of Ballymote is being proposed, five (5) hydrant test results were received from the Municipality and reviewed. As per the test results dated 16-Jun-22, it appears that there is enough capacity in the system to release at least 762 USGPM and up to 976 USGPM (during 20 psi) for the hydrant located on 21604 Highbury Ave. N. The difference is approximately 214 USGPM. The 18 lots are equivalent to population of 54 as calculated per section 5.3 of Municipality of Middlesex Centre – Infrastructure Design Standards. Per the same section, using 350 L/day/cap average day demand and maximum hour and maximum day peaking factors obtained from Table 3-3 of MECP Design Guidelines for Drinking-Water Systems, maximum hourly demand of 50 USGPM is calculated. Since what is required for maximum hourly demand (50 USGPM) is less than the available capacity (214 USPGM) in accordance with the hydrant tests received, we can confirm that there is sufficient pressure in the system to provide water service for the proposed development. Please refer to Domestic Water Demand and Velocity Calculation and Fire Flow Test received from Middlesex Centre attached in Appendix D.

4.2 Fire-fighting Consideration

As per Section 5.8.1 of the MCIDS, the location of hydrants is subject to the requirements and approval of the Municipal Fire Department in accordance with the Ontario Building Code. As a general guide, hydrants must be located not more than 170 m apart along the length of the watermain and should be located at intersections where possible.

There is an existing Municipal fire hydrant across the Medway Road available for Lots 1, 2, 3, 4, and 5. There is also an existing Municipal fire hydrant at southeast side of Medway Road and Highbury Avenue North intersection and at the front of Lot 15. Because the distance between the hydrants appears greater than 170 m on Highbury Avenue North, two new fire hydrants are proposed in front of Lot 9 and Lot 19. The fire hydrants are to be installed as per the MCID Figure 5.8 - Hydrant and Valve Installation. Please refer to Engineering Plans,

sheets 2A and 2B provided separately, for exact location of the proposed fire hydrants and Engineering Plan, sheet 3 provided separately, for the installation detail.

5. LIMITATIONS

This memorandum was prepared by SBM Ltd. for the Municipality of Middlesex Centre and Brock Development Group. Use of this memorandum by any third party, or any reliance upon its findings, is solely the responsibility of that party. SBM Ltd. accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions undertaken as a result of this memorandum. Third party use of this memorandum, without the express written consent of the Consultant, denies any claims, whether in contract, tort, and/or any other cause of action in law, against the Consultant.

All findings and conclusions presented in this memorandum are based on site conditions as they appeared during the period of the investigation. This memorandum is not intended to be exhaustive in scope, or to imply a risk-free facility. It should be recognized that the passage of time may alter the designs, opinions, conclusions, and/or recommendations provided herein.

The design was limited to the documents referenced herein and on the SBM drawings provided separately. SBM Ltd. accepts no responsibility for the accuracy of the information provided by others. All designs, opinions, conclusions, and/or recommendations presented in this memorandum are based on the information available at the time of the review. This document is deemed to be the intellectual property of SBM Ltd. in accordance with Canadian copyright law.

6. CLOSURE

We trust this memorandum meets your satisfaction and current needs. Should you have any questions or require additional information, please do not hesitate to contact the undersigned.

Respectfully submitted,

Strik, Baldinelli, Moniz Ltd.

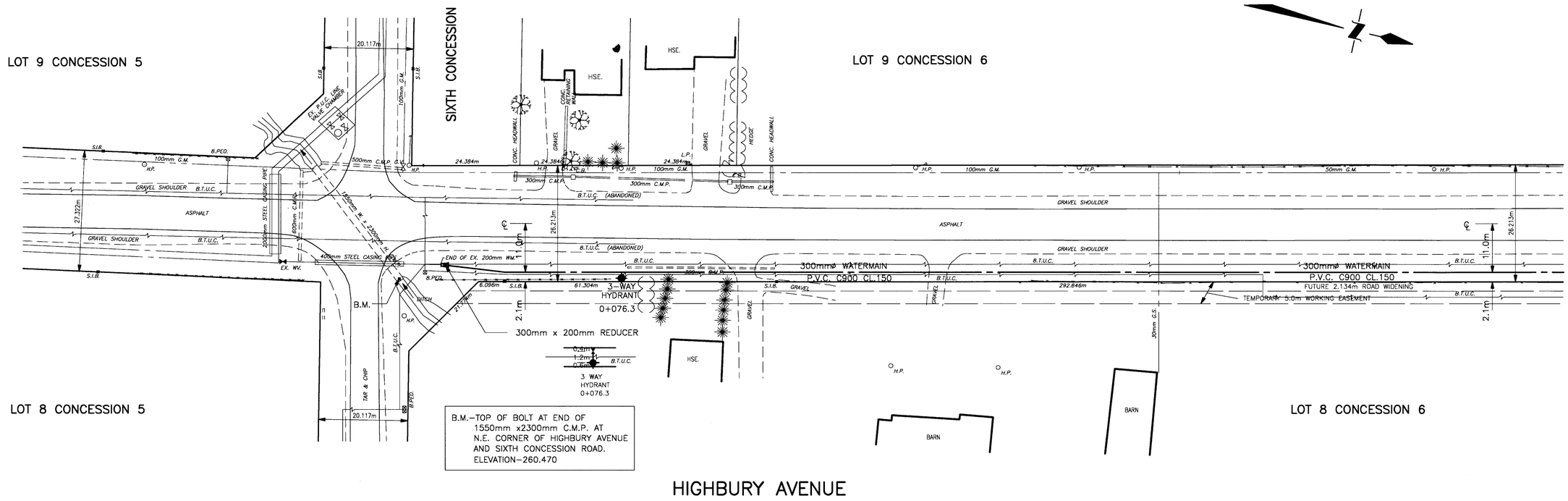
Planning • Civil • Structural • Mechanical • Electrical

Kevin Moniz, P.Eng
Principal

Kurtis Caron, EIT
Civil Engineering Trainee III

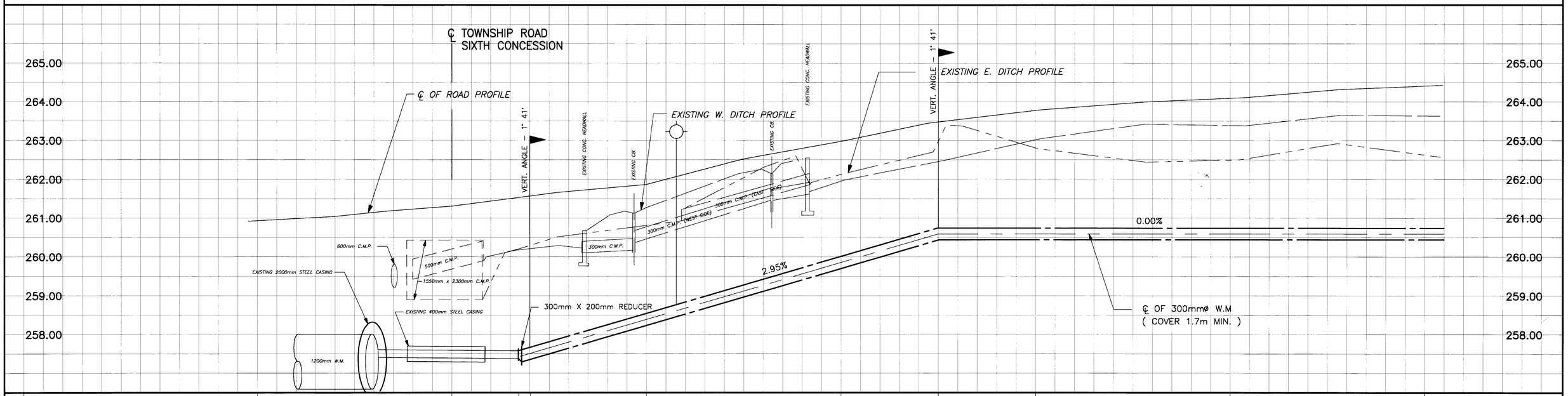
APPENDIX A

As-Constructed drawing from the Municipality, Project No. 92037 sheets 1, dated April 15, 1994
As-Constructed drawing from the Municipality, Project No. 92037 sheets 2, dated April 15, 1994
As-Constructed drawing from the Municipality, Project No. 92037 sheets 6, dated April 15, 1994
As-Constructed drawing from the Municipality, Project No. 92037 sheets 7, dated April 15, 1994



B.M.–TOP OF BOLT AT END OF 1550mm x2300mm C.M.P. AT N.E. CORNER OF HIGHBURY AVENUE AND SIXTH CONCESSION ROAD. ELEVATION–260.470

HIGHBURY AVENUE



STATION	-0+050	0+000	0+017	0+020	0+050	0+100	0+125	0+150	0+200	0+250
℄ ELEV. OF PROP. W.M.			257.50	257.50	258.40	259.85	260.60	260.60	260.60	260.60
EX.GRD. ELEV. @ ℄ W.M.										

AS CONSTRUCTED NOTES	COMPLETION
P.V.C. C900 CL.150 W.M.	NOV.30,1993
25mmø P.E. W.S.	NOV.30,1993

DESIGN: A.L.G.
DRAWN: J.D.A.
CHECKED: A.L.G.
APPROVED: D.J.Y.
DATE: MARCH 1993

No.	REVISIONS	DATE	BY
1.	CITY OF LONDON REVISIONS "AS MARKED"	APR.21,1993	G.J.C.
2.	"AS CONSTRUCTED" DRAWINGS	APR.15,1994	G.J.C.

CONSULTANT
SPRIET ASSOCIATES
LONDON LIMITED
CONSULTING ENGINEERS
722 YORK STREET --LONDON (519) 672-4100--N5W 2S8

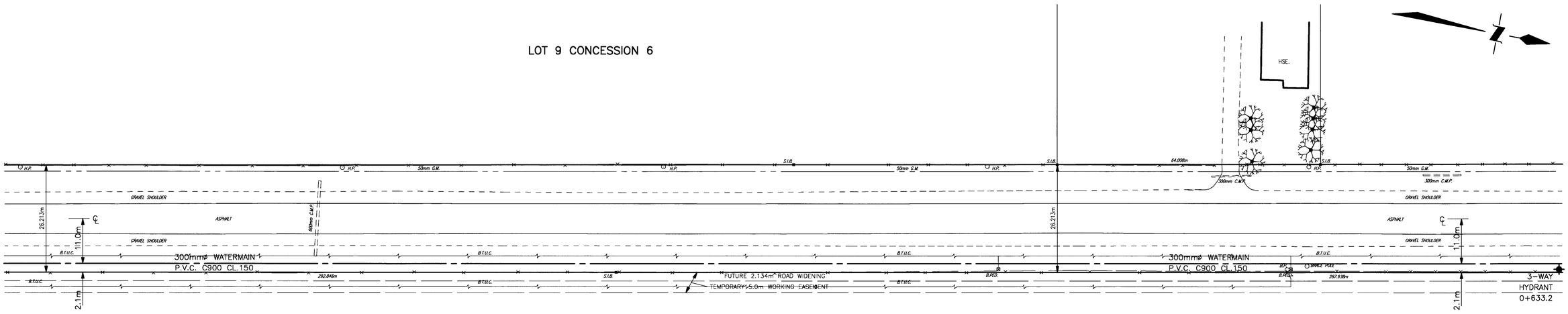
ENGR'S STAMP

CLIENT
TOWNSHIP OF LONDON

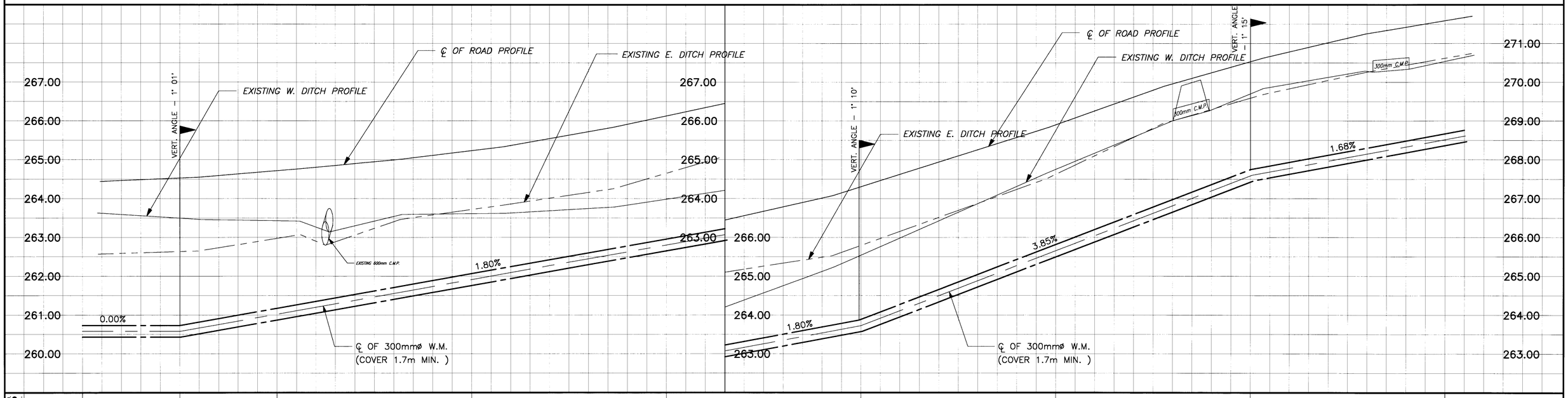
SCALE
5.0 m 0 10.0m
HOR. SCALE
0.5 m 0 1.0 m
VERT. SCALE

TITLE
BALLYMOTE WATERWORKS
HIGHBURY AVENUE
STA. 0+000 TO STA. 0+250

Project No. 92037
Sheet No. 1 of 9
Plan File No.



HIGHBURY AVENUE



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EXIST. ELEV. ℄ W.M.									

AS CONSTRUCTED NOTES	COMPLETION
P.V.C. C900 CL.150 W.M.	NOV.30,1993
25mmø P.E. W.S.	NOV.30,1993

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SPRIET ASSOCIATES
LONDON LIMITED
CONSULTING ENGINEERS
722 YORK STREET --LONDON (519) 672-4100--N5W 2S8

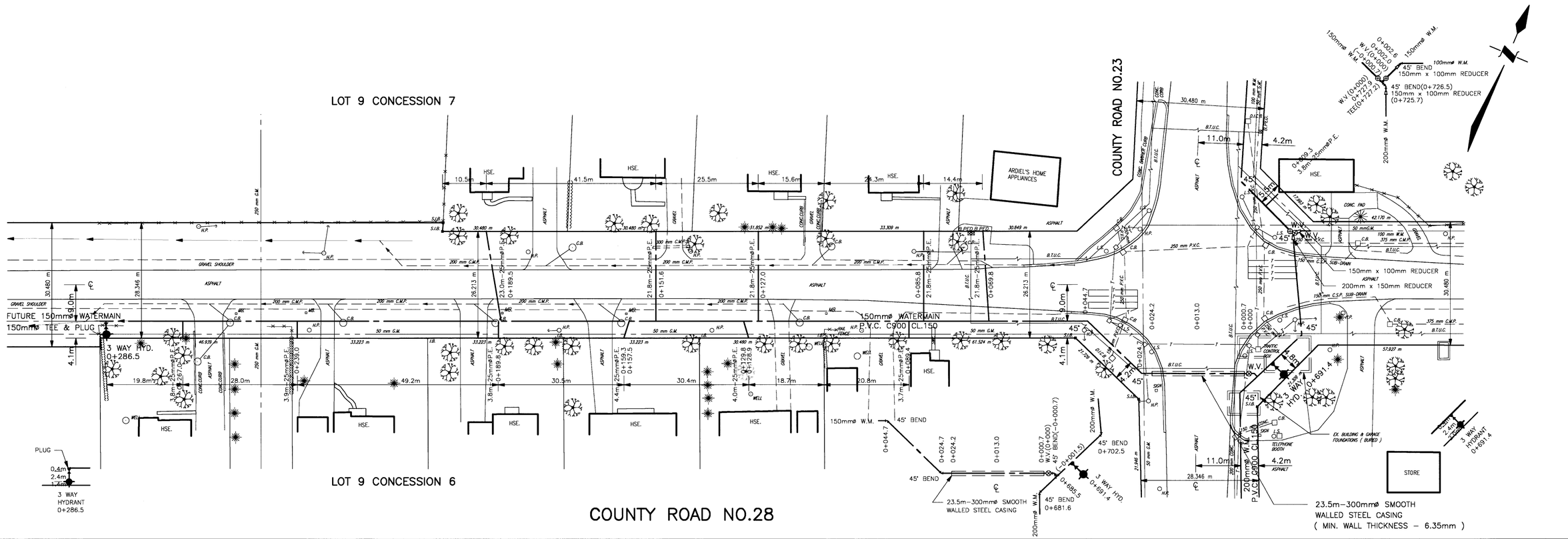
ENGR'S STAMP

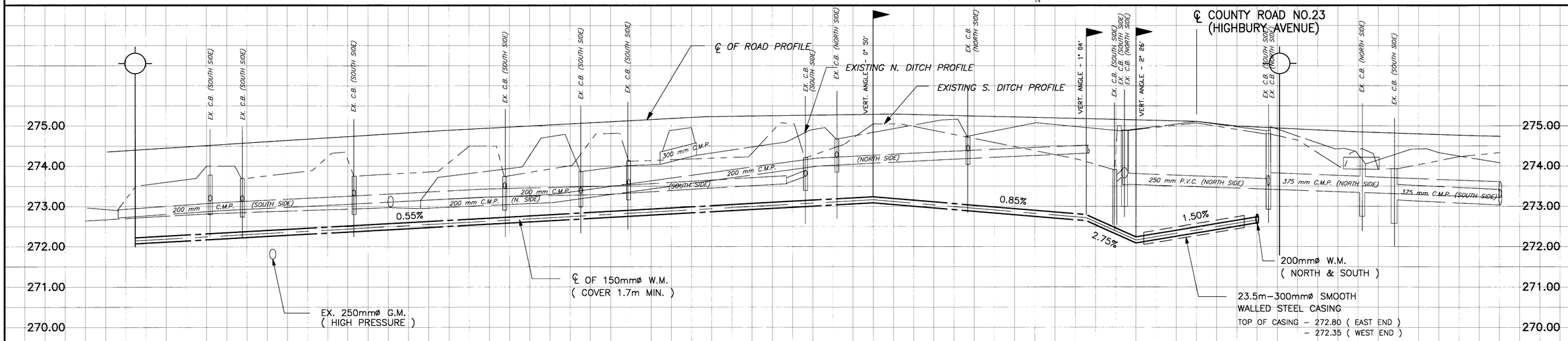
CLIENT
TOWNSHIP OF LONDON

SCALE
5.0 m 0 10.0m
0.5 m 0 1.0 m

TITLE
BALLYMOTE WATERWORKS
HIGHBURY AVENUE
STA. 0+250 TO STA. 0+600

Project No. 92037
Sheet No. 2 of 9
Plan File No.





EX.ORD ELEV. ℄ W.M.																	
℄ ELEV. OF PROP. W.M.	272.15	272.20	272.37	272.50	272.75	273.05	273.15	272.90	272.70	272.15	272.60						
STATION	0+263	0+250	0+228.5	0+200	0+150	0+100	0+080	0+050	0+027.5	0+015	0+000	0+015	0+050				

AS CONSTRUCTED NOTES	COMPLETION
P.V.C. C900 CL.150 W.M.	NOV.30,1993
25mmø P.E. W.S.	NOV.30,1993

DESIGN: A.L.G.
DRAWN: J.A.
CHECKED: A.L.G.
APPROVED: A.L.G.
DATE: 1992

No.	REVISIONS	DATE	BY
1.	"AS CONSTRUCTED" DRAWINGS	APR.15,1994	G.J.C.

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LONDON LIMITED
CONSULTING ENGINEERS
722 YORK STREET – LONDON (519) 672–4100 – N5W 2S8

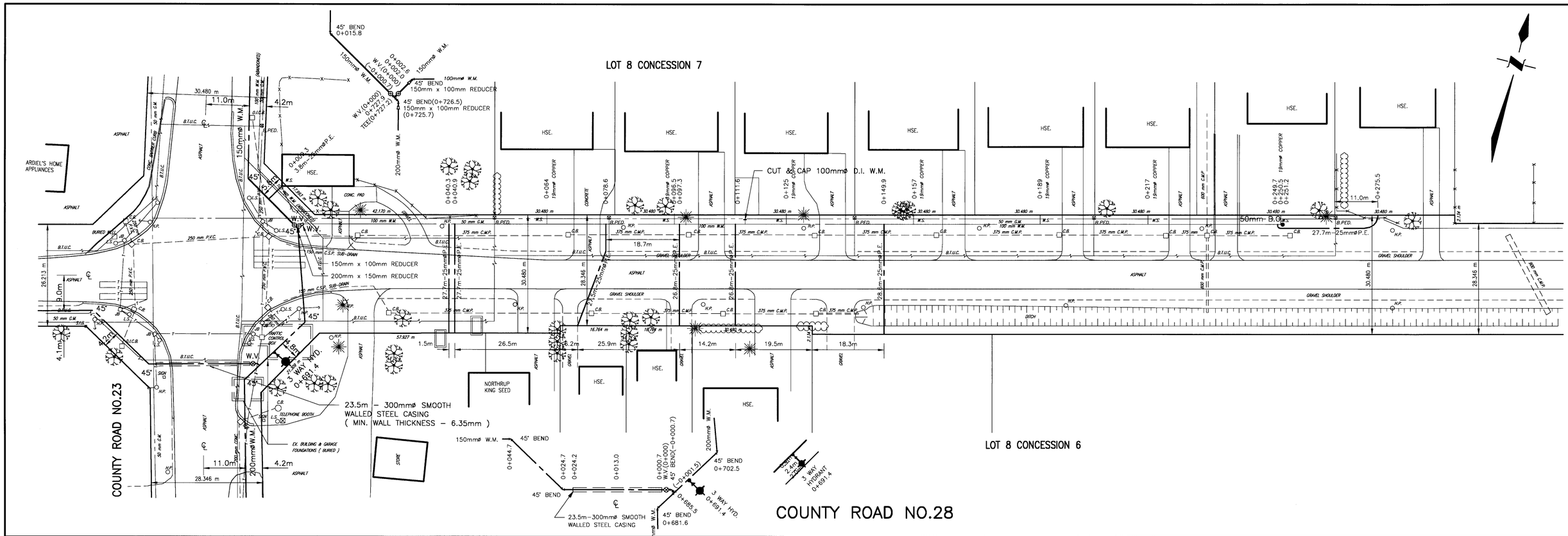
ENGR'S STAMP

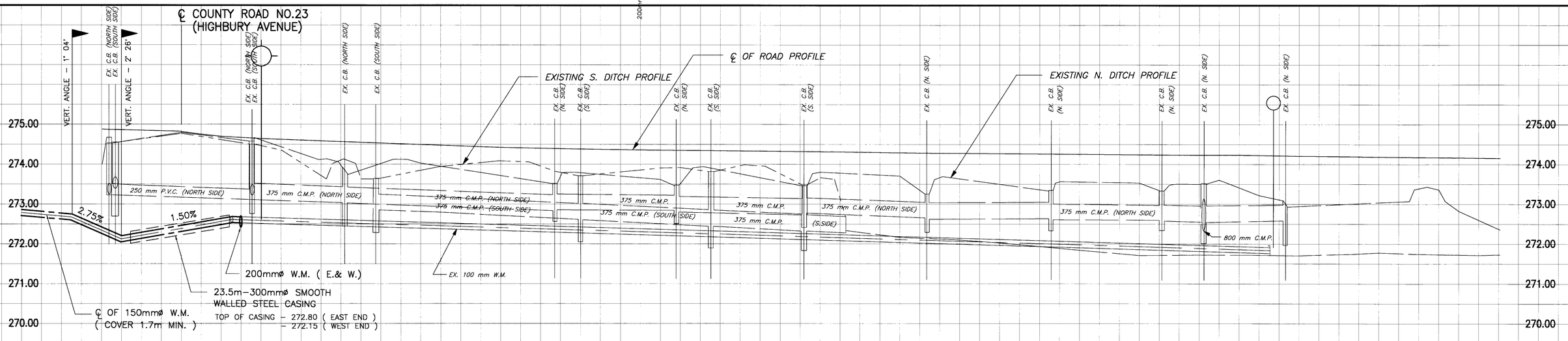
CLIENT
TOWNSHIP OF LONDON

SCALE
5.0 m 0 10.0m
0.5 m 0 1.0 m

TITLE
BALLYMOTE WATERWORKS
COUNTY ROAD NO.28
STA. 0+000 TO STA. 0+275

Project No. 92037
Sheet No. 6 of 9
Plan File No.





STATION	0+027.5	0+015	0+000	0+015	0+050	0+100	0+150	0+200	0+250	0+300
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ELEV. ● W.M.										

AS CONSTRUCTED NOTES	COMPLETION
P.V.C. C900 CL.150 W.M.	NOV.30,1993
25mmø P.E. W.S.	NOV.30,1993

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CONSULTING ENGINEERS
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ENGR'S STAMP

CLIENT
TOWNSHIP OF LONDON

SCALE
5.0 m 0 10.0m (Horizontal)
0.5 m 0 1.0 m (Vertical)

TITLE
BALLYMOTE WATERWORKS
COUNTY ROAD NO.28
STA. 0+000 TO STA. 0+325

Project No. 92037
Sheet No. 7 of 9
Plan File No.

APPENDIX B

Soil Report for Wastewater Servicing by BOS Engineering & Environmental Services Inc., dated June 2, 2021, and updates dated October 22, 2022
Site, General Grading & Servicing Plan by BOS Engineering & Environmental Services Inc., project number 21019-01, sheet S-1, dated September 9, 2021

SOIL TESTING FOR WASTEWATER SERVICING

Proposed Lot Divisions

Concession 6 N Part Lot 8

(Geographic Township of London)

Municipality of Middlesex Centre
County of Middlesex

Prepared for:

Ballymote Developments
356 Oxford St E
London ON
N6A 1V7
519-281-6769, 519-697-0511
michelle@brockdg.com, shawn@brockdg.com

By:

BOS Engineering & Environmental Services Inc.
46 Donnybrook Rd. London Ontario, N5X 3C8
TEL: (519) 850-9987
EMAIL : a.bos@sympatico.ca

January 4, 2021
REV: Updated lot sizing: April 17, 2021
REV: Increased Lot Depth June 2, 2021

Table of Contents

1. INTRODUCTION

This report presents the results of a soils and sewage system assessment carried out at Municipal Address: 21488 Highbury Ave in the Municipality of Middlesex Centre, County of Middlesex. The property is described as Concession 6 N Part Lot 8 (Geographic Township of London) and is located in Ballymote. The 35 ha (86.4 ac) parcel is currently vacant. Frontage of all lots are to be onto Medway Road and Highbury Avenue North with 5 lots along Medway Road and 14 lots along Highbury Avenue. Proposed lot depths will be approximately 87m and most narrow lot will be 23.2 m wide. Appendix A contains a map of the site location.

The lots are currently located on farm land. There are not any defined drainage patterns or roadside ditches along Highbury Avenue. A large road side ditch is present along Medway Rd.

The lots are currently proposed to be serviced with onsite wastewater treatment systems and municipal water.

2. EXISTING SURFICIAL SOILS

Soil testing was conducted on November 26, 2020. A map of the site and test pit locations is presented in Appendix A together with soil test pits logs at nine (9) locations across the site.

The test pits were formed to depths of 1.4 to 1.5m. In all cases the underlying soils were comprised of clay to silty clay TILL with estimated soil percolation time in excess of 50 min/cm. Topsoil was generally 25 to 30 cm thick. At five (5) of the test pits there was a thin layer (22 to 46cm thick) of sand to sandy silt at varying shallow depths. Some of these layers (at TP 1 & TP 2) appeared to be pockets since they were water-bearing. The sandy layers were sampled and tested. Grain size analyses and classifications are presented in Appendix B. Assessment of the predominantly heavy soils was made in the field. Approximate soil test locations and test pit logs are presented in Appendix A.

Due to the variable depths and inconsistency of the sandy layers, a percolation time (T) of greater than 50 min/cm is recommended at this site for septic system design.

3. PROPOSED WASTEWATER TREATMENT SYSTEMS

In order to size the proposed wastewater treatment systems, it is necessary to make assumptions regarding the house characteristics. In this case, a daily load of 3000 L/day was assumed in line with actual homes at a similar recent development in Bryanston. This assumed loading can include a 4-bedroom home with 300m2 of living area and up to 40 fixture units as outlined in Appendix E.

Based on the surficial soil as documented in section 2, conventional raised beds were sized requiring a minimum sand footprint of 750 m^2 or 23m wide x 33m deep. Therefore, a conventional raised bed would consume the entire rear yards of the lots. In Middlesex Centre, during lot creation, it is also required to designate an area for a second "contingency bed" for reconstruction in the event of bed failure. The proposed lot sizes are too small to allow this.

Therefore, enhanced pre-treatment (to CAN/BNQ 3680-600 standard) is required, allowing smaller "Type A" beds (approximately 20.5m x 20.4m) as indicated on the sketch in Appendix E. The contingency bed is indicated as a shallow trench system which is allowed by the Ontario Building Code but not recommended at this site.

Since wells are no longer required at this site in lieu of municipal water supplies, the only setback requirement from the water supply line is 2.4m from distribution pipes and tanks. This may require jogging of service lines or location of shut-off valves (curb stops) near the side lot lines. The raised area location and direction of the proposed sand mantle drainage is dependent on both the existing topography and the proposed grading of the lots. There was not a final grading plan available at the time of reporting.

4. SEWAGE IMPACT ASSESSMENT

MOE Procedure D5-4 outlines a multi-step process to gauge the effects of the combined effluent discharges from all of the individual sewage systems in a development based on nitrogen as an indicator of groundwater impact potential.

4.1 Minimum Lot Size

Generally, if the average lot size is smaller than 1.0 ha in size with no lot being smaller than 0.8 ha, then a hydrogeological assessment is not required provided

that the area is not hydrogeologically sensitive. This exemption does not apply to the subject lots as they are to be 0.18 ha in size.

4.2 System Isolation Considerations & Well Records

Where smaller lots than 1.0 ha are proposed, it is necessary to consider the status of isolation of the sewage effluent from the existing or potential supply aquifer. Although the lots will not be serviced with private wells there may be existing residences that do draw groundwater. Hence water well records for the area were reviewed to verify isolation and/or determine potential impacts of the sewage effluent on area wells.

There were 18 valid well records within approximately 500m of the proposed development site, three (3) of which were professionally closed and sealed. Well locations and logs are presented in Appendices C and D, respectively. Following is a summary of the well logs:

Well #	Year Formed	Casing dia(cm)	Water Depth (m)	Pump Rate (lpm)	Soil Profile (m)	Status
4102089	1964	91	7.9	227	**0 – 2.4 Sandy Clay** 2.4 – 7.9 Hard Blue Clay	On highbury adjacent to proposed lots
4102091	1957	15	25.6	1365	0 – 1.3 Topsoil/Fill 1.3 – 2.4 Sand & Clay 2.4 – 22.6 Blue Clay 22.6 – 25.0 Hard Pan 25 .0 - 26.2 Sand & Gravel	
4102092	1962	91	3.1	22.8	0 – 0.30 Topsoil **0.3 – 1.5 Sand** 1.5 – 3.05 Blue Clay	185m west of highbury on medway
4102096	1967	91	3.7	13.7	**0 – 2.4 Sand** 2.4 – 3.7 Hard Blue Clay	110m west of highbury on medway
4102166	1959	12	42.4	26.5	0 – 3.1 Topsoil & Sandy Clay 3.1 – 9.1 Hard Pan 9.1 – 13.7 Sand 13.7 – 22.9 Clayey Sand & Sandy Hard Pan 22.9 – 27.4 Clay 27.4 – 30.2 Sand 30.2 – 42.4 Hard Pan & Clay 42.4 – 42.7 Sand/Gravel	
4105504	1971	91	5.5	9.1	0 – 1.5 Br. Clay 1.5 – 5.5 Blue Clay **5.5 – 5.8 Gravel** 5.8 – 8.5 Blue Clay Till	at monitoring wells on petrocan property
4106814	1974	12	18.3	45.5	0 – 4.6 Br. Clay 4.6 – 13.7 Blue Clay 13.7 – 20.4 Gravel	

4107096	1974	12	29.6	9.1	0 – 5.5 Br. Sand 5..5 – 29.6 Blue Clay Till 29.6 – 30.2 Gr. Sand 30.2 – 31.7 Blue Clay	
4107563	1976 1994 Closed	15	63.3	n/a	0 – 2.7 Sand 2.7 – 47.5 Gr. Clay 47.5 – 81.4 Blue Clay 22.6 – 81.4.0 Hard Pan	Closed Sealed (sulphur)
4107571	1976	15	10.1	27.3	0 – 3.1 Red Clay 3.1 – 9.1 Layered Clay & Gravel 9.1 – 10.1 Porous Gravel	
4108667	1978	12	9.4	36.4	0 – 9.4 Br. Clay 9.4 – 9.4 Sand & Clay 9.4 – 11.3 Br. Sand	
4110852	1987	12	23.8	46	0 – 1.5 Br. Clay 1.5 – 23.5 layered Sand & Clay 23.5 – 23.8 Gr. Gravel	
4111987	1989	15	30.2	27.3	0 – 2.7 Br. Sand 2.7 – 16.2 Gr. Clay 16.2 – 24.4 Clay -layered sand & silt 24.4 – 30.2 Gr. Clay 30.2 – 31.7 Gr. Sand 31.7 – 32.9 Gr.Clay	
4112242	1990	12	21.3	54.6	0 – 0.91 Br. Clay 0.91 – 18.3 Gr. Clay 18.3 – 21.3 Bl. Sand	
4112352	1991	15	14.9	45.5	0 – 3.7 Br. Sand & Clay 3.7 – 14.6 Gr. Clay & Sand 14.6 – 14.9 Gr. Sand	
4114496	2000		14.9		unknown	Closed Sealed
7045068	2007	2	4.6	n/a	0 – 0.9 Br. Sand Till 0.9 – 4.6 Gr. Clay & Sand 14.6 – 14.9 Gr. Clay till	Monitoring Well (5 wells)
7304894	2017	107	3.1		unknown	Closed Sealed

The soil profiles on the well logs are generally consistent with the shallow test pit data. Most non-closed deep wells are to an aquifer ranging from 9.4m to 30.2m in depth. There appears to be a clay overburden with some sand or silt lenses over the deeper aquifer with considerable unlayered clay to prevent migration of wastewater effluent. With the confined aquifer, wastewater effluent is expected to migrate to surface drainage swales and ditches where denitrification will occur.

There are four (4) shallow wells in proximity of the site, namely wells 4102092, 4102096, 4102089, and 4105504. The first two wells are approximately 185 m and 110m respectively west of Highbury Avenue and hence are unlikely to be affected by the development. However, well 4105504 on the Gas station property southeast of the intersection of Highbury and Medway Roads is shallow

and adjacent the development. The status of this well should be examined since there is an existing deeper drilled well on the same property. Well 4102089 is also shallow and immediately adjacent the south end of the proposed development and its status should therefore also be examined. Both of these shallow wells should be decommissioned and replaced, if not done already.

One deep well to the bedrock aquifer was decommissioned due to sulphur content.

Current pump rates for existing deeper wells range from 9 to 46 Litres/minute.

It is conceivable that some of these documented wells are or will be decommissioned in lieu of a new municipal water supply.

5. SUMMARY & RECOMMENDATIONS

To facilitate this development, it is recommended that:

1. Two shallow wells (Well 4105504 and Well 4102089) adjacent the development should be decommissioned (if not done already) and serviced with a replacement water supply, if necessary.

2. Water supply for all of the new lots will be municipal water pipeline. The preferred location of the curb stops is near the side lot lines to avoid interference with minimum setbacks from the contingency septic beds located in the front yards.

3. The proposed development can accommodate peak sewage design loads up to 3000 L/day on each lot as outlined in Appendix E for the lots on both Highbury Avenue and those on Medway Road.

4. Enhanced treatment of sewage (to CAN/BNQ 3680-600 standard) is required to facilitate use of smaller “Type A” distribution beds to fit the proposed lot sizes. These pre-treatment units will also reduce risks of shallow aquifer contamination. The primary “Type A” beds will be located at the rear of all properties, with orientation dependent on existing topography and proposed final grading.

5. The Ontario Building Code does apply to the sewage system construction. The proposed sewage systems will be required to meet all regulations and required setbacks from wells, structures and lot lines outlined in Part 8 of the Ontario Building Code and CAN/BNQ 3680-600 standard.

6. Building permits will require lot grading plans and specific septic system designs for the individual lot developments.

BOS Engineering & Environmental Services Inc.

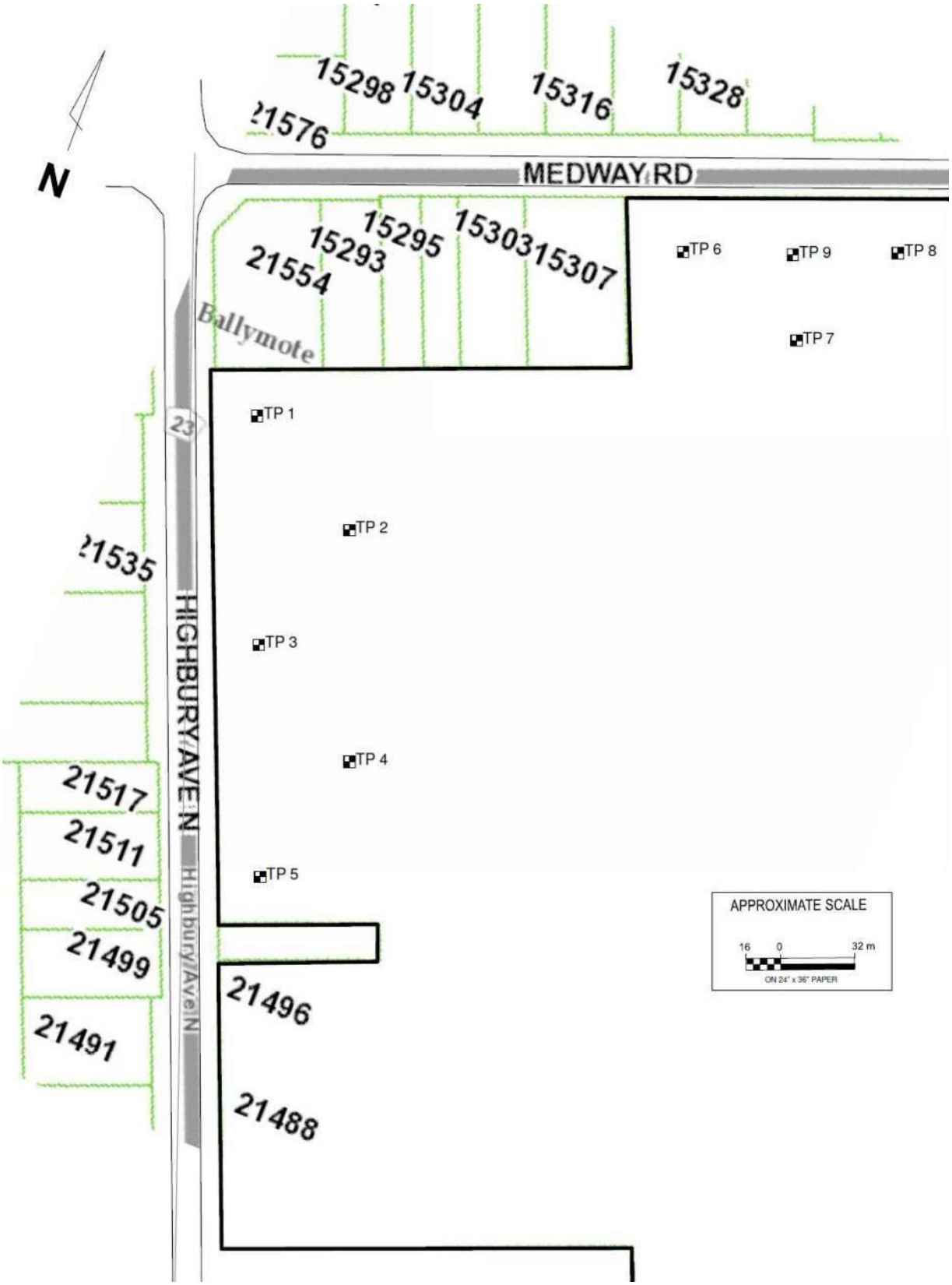
Art W. Bos, P.Eng.

Encl

- Appendix “A” – Map: Soil Test Locations & Logs
- Appendix “B” – Soil Grain Size Analysis of Selected Samples
- Appendix “C” – Map: Existing Water Well Records
- Appendix “D” – Individual Well Records (Provincial Database)
- Appendix “E” – Wastewater Treatment System Assumptions & Sizing

Appendix A

Map: Soil Test Locations & Logs


N
15298
15304
15316
15328
21576
MEDWAY RD
15295
15303
15307
15293
21554
Ballymote
TP 6
TP 9
TP 8
TP 7
TP 1
TP 2
TP 3
TP 4
TP 5
21535
HIGHBURY AVE N
Highbury Ave N
21517
21511
21505
21499
21491
21496
21488
APPROXIMATE SCALE
16 0 32 m
ON 24" x 36" PAPER

SITE SOIL INFORMATION

(BOS ENGINEERING – Nov 26, 2020)

TEST	DEPTH (cm)	SOIL TYPE
TP 1	0 - 30	TOPSOIL
	30 - 76	Hard Silty CLAY
	76 - 114	Sand (Tested: T = 8 min/cm)
	114 - 152	Gr. CLAY (T > 50 min/cm)
		Seepage @ 114 cm
TP 2	0 - 30	TOPSOIL
	30 - 76	Mottled Sandy SILT (Tested: T = 40 min/cm)
	76 - 152	Clay TILL (T >50 min/cm)
		Seepage @ 76cm
TP 3	0 - 30	TOPSOIL
	30 - 81	Mottled Silty CLAY (sand pockets)
	81 - 137	CLAY TILL (T >50 min/cm)
		No Seepage
TP 4	0 - 27	TOPSOIL
	27 - 69	Mottled Silty CLAY
	69 - 132	Gravelly CLAY TILL (cobbles) (T >50 min/cm)
		No Seepage
TP 5	0 - 30	TOPSOIL
	30 - 56	Mottled Silty CLAY
	56 - 127	Stoney Clay TILL (T >50 min/cm)
		(100mm TILE @ 81 cm)
		No Seepage
TP 6	0 - 30	TOPSOIL
	30 - 41	Silty CLAY
	41 - 81	Sand (Tested: T = 10 min/cm)
	81 - 107	Gr. SAND
	107 - 140	Clay TILL (T >50 min/cm)
		Seepage @ 81 cm
TP 7	0 - 30	TOPSOIL
	30 - 46	Gr. CLAY
	46 - 122	Gr. Mottled Silty CLAY (T >50 min/cm)
		No Seepage
TP 8	0 - 25	TOPSOIL
	25 - 48	Gr. CLAY
	48 - 76	SAND
	76 - 127	CLAY TILL (T >50 min/cm)
		No Seepage
TP 9	0 - 25	TOPSOIL
	25 - 69	Gr. Mottled CLAY
	69 - 91	Gravelly SAND (T = 10 min/cm)
	91 - 132	CLAY TILL (T >50 min/cm)
		No Seepage

Appendix B

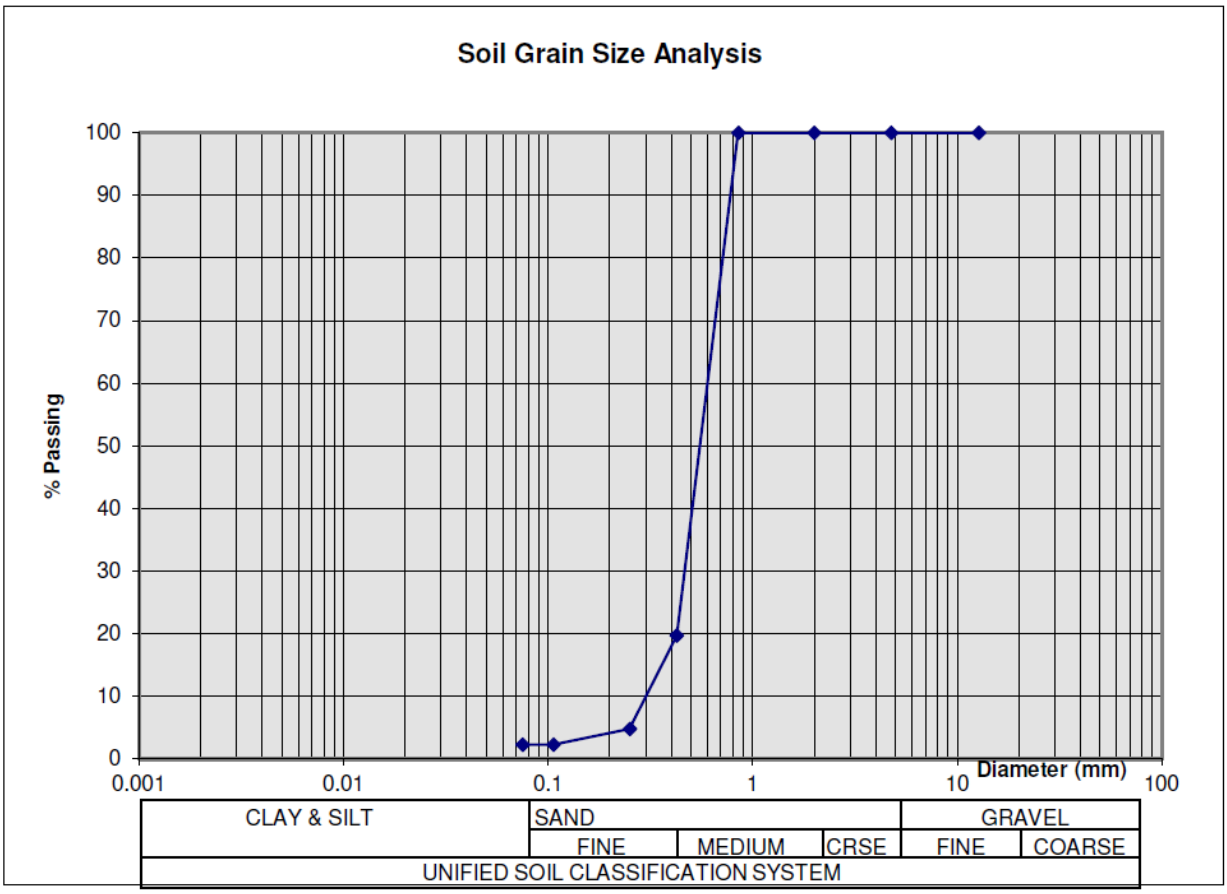
Soil Grain Size Analysis of Selected Samples

BOS Engineering Environmental Services

Project :	Ballymote Lots	***Client :***	Brock Development
Test Pit :	TP1	***RE:***	Waste Treatment System
Depth :	76 to 114 cm	***Proj. No .***	2011-22
Dry Mass:	117.0 g	***Date:***	Nov 27 20

CHART DATA

Sieve No.	Mass	Cum. Mass	Diam. (d)	% Passing
		0	12.7	100
4	0.0	0	4.75	100
10	0.0	0	2	100
20	0.0	0	0.85	100
40	94.0	94	0.425	20
60	17.4	111.4	0.25	5
140	2.9	114.3	0.106	2
200	0.0	114.3	0.075	2



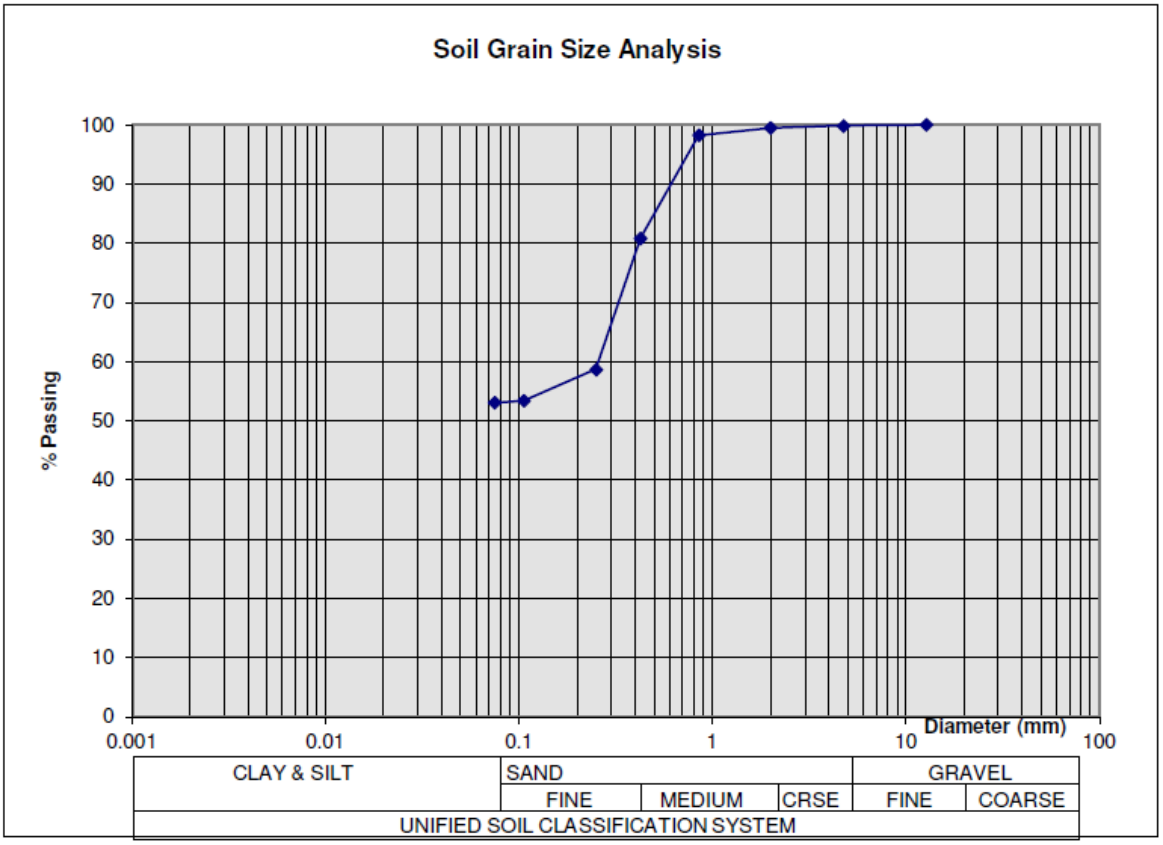
Unified System Classification:
SP Poorly Graded SAND (2% Finer than No. 200 sieve)
Est. Percolation Time: T = 8 min/cm

BOS Engineering Environmental Services

Project :	Ballymote Lots	*Client :*	Brock Development
Test Pit :	TP2	*RE:*	Waste Treatment System
Depth :	30 to 81 cm	*Proj. No.*	2011-22
Dry Mass:	124.9 g	*Date:*	Nov 27 20

CHART DATA

Sieve No.	Mass	Cum. Mass	Diam. (d)	% Passing
		0	12.7	100
4	0.2	0.2	4.75	100
10	0.4	0.6	2	100
20	1.6	2.2	0.85	98
40	21.7	23.9	0.425	81
60	27.7	51.6	0.25	59
140	6.6	58.2	0.106	53
200	0.4	58.6	0.075	53



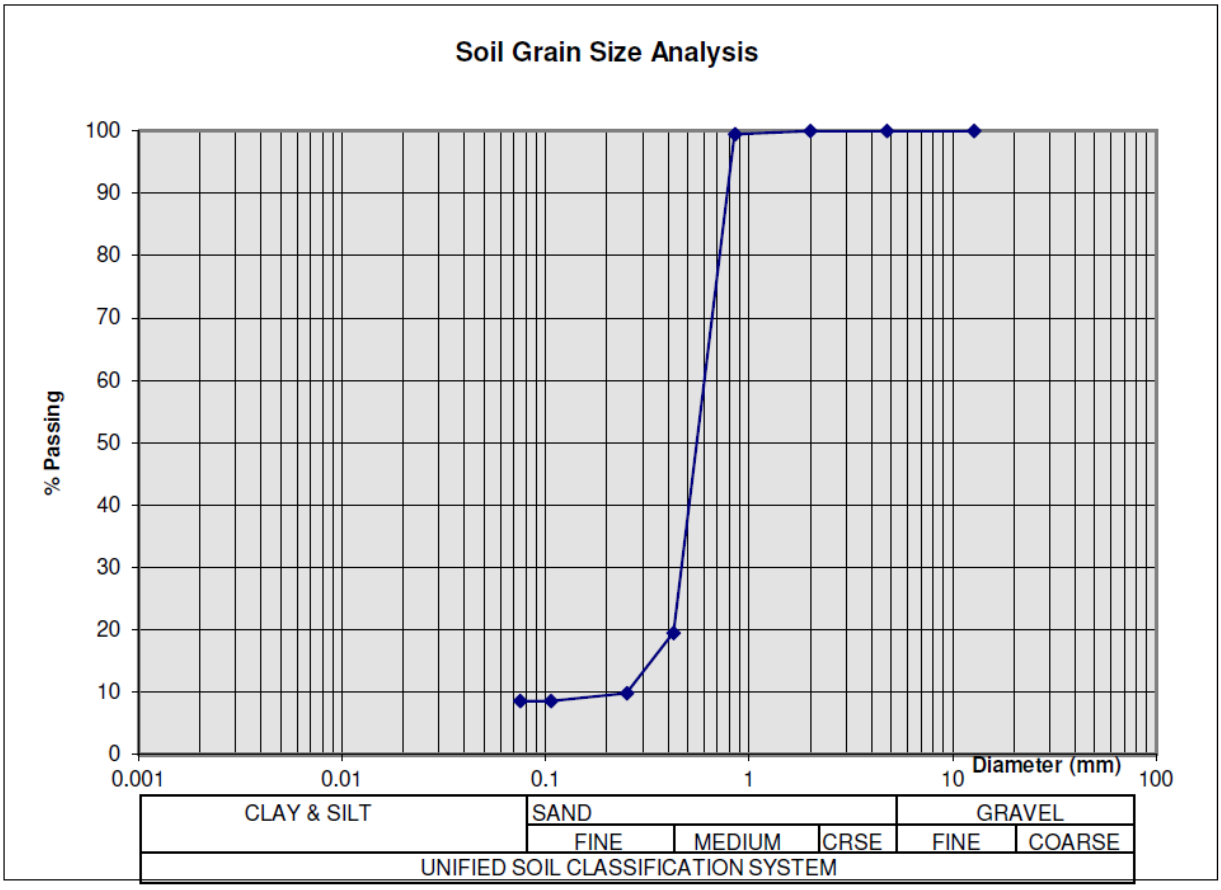
Unified System Classification:
Sandy SILT (53% Finer than No. 200 sieve)
Est. Percolation Time: T = 40 min/cm

BOS Engineering Environmental Services

Project :	Ballymote Lots	***Client :***	Brock Development
Test Pit :	TP6	***RE:***	Waste Treatment System
Depth :	41 to 81 cm	***Proj. No .***	2011-22
Dry Mass:	134.2 g	***Date:***	Nov 27 20

CHART DATA

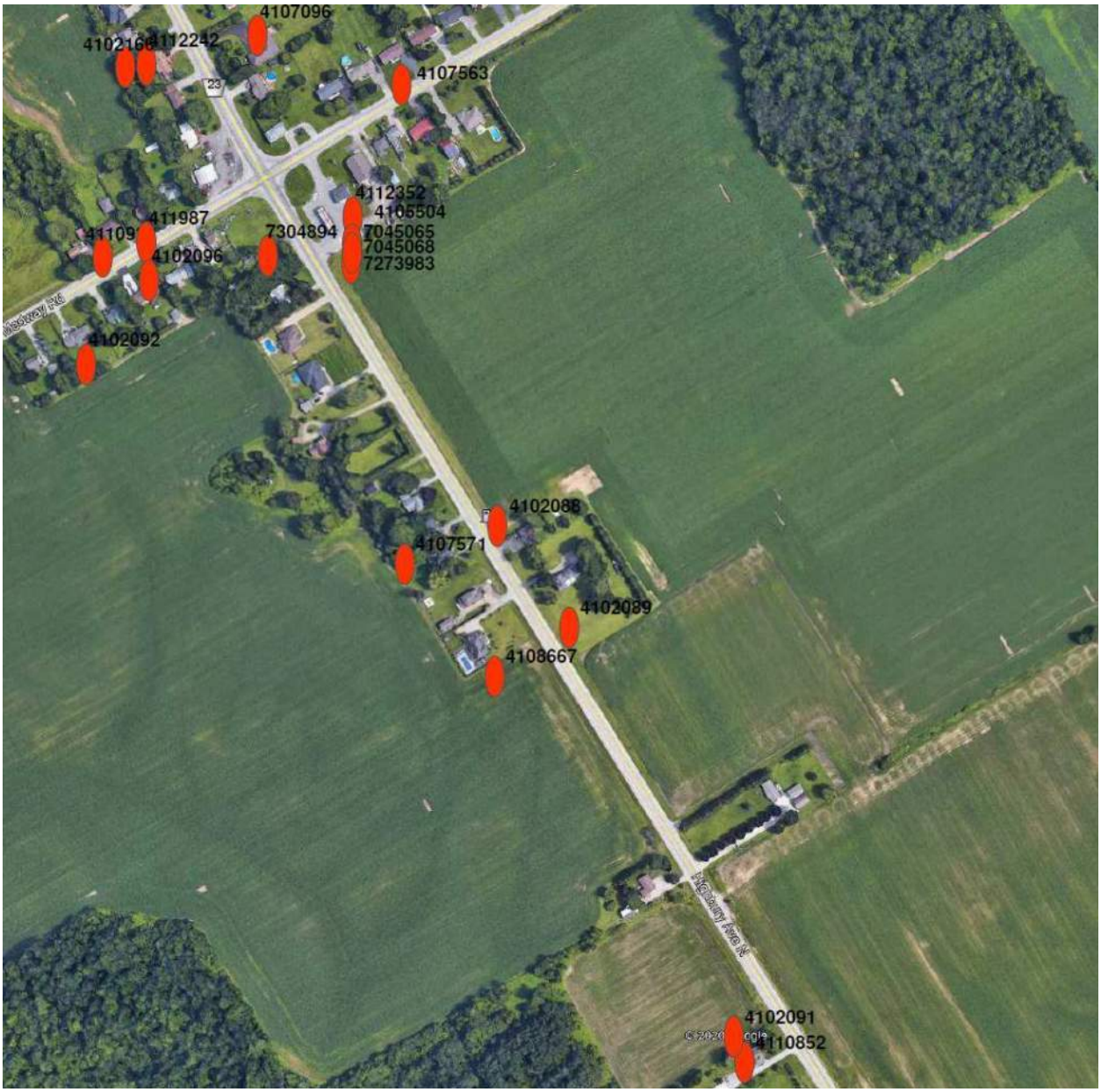
Sieve No.	Mass	Cum. Mass	Diam. (d)	% Passing
		0	12.7	100
4	0.0	0	4.75	100
10	0.0	0	2	100
20	0.7	0.7	0.85	99
40	107.3	108	0.425	20
60	13.0	121	0.25	10
140	1.7	122.7	0.106	9
200	0.0	122.7	0.075	9



Unified System Classification:
SM Sand Trace Silt (9% Finer than No. 200 sieve)
Est. Percolation Time: T = 10 min/cm

Appendix C

Map: Existing Water Well Records


4107096
4102168
4112242
4107563
4112352
4105504
411987
411097
7304894
7045065
7045068
4102096
7273983
4102092
4102088
4107571
4102089
4108667
4102091
4110852

Appendix D

Individual Well Records

UTM 17 Z 480700 E
5 R 4767600 N
Elev. 14 R 6900

The Ontario Water Resources Commission Act

WATER WELL RECORD

JUN 9 1964
41 No. 2089

Basin 2 MIDDLESEX
County or District
Township, Village, ~~Town or City~~ LONDON
Lot 8
Date completed 11 (day) May (month) 1964 (year)
[redacted] ess. RR#1 Arva

Casing and Screen Record

Inside diameter of casing 6 to 18 ft 36 in
Total length of casing
Type of screen 18 to 26 ft 27 in
Length of screen
Depth to top of screen
Diameter of finished hole

Pumping Test

Static level 16
Test-pumping rate 50 G.P.M.
Pumping level 24
Duration of test pumping 1 hr
Water clear or cloudy at end of test clear
Recommended pumping rate 5 G.P.M.
with pump setting of 24 feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Water Record: Depth(s) at which water(s) found	Water Record: Kind of water (fresh, salty, sulphur)
sandy clay	0	8'	26 ft	fresh
hard blue clay	8	26		

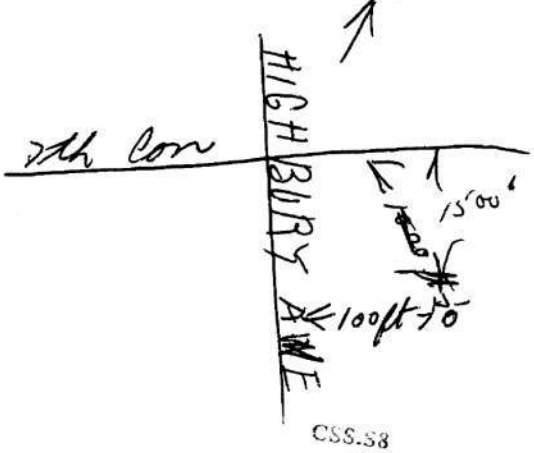
For what purpose(s) is the water to be used? house
Is well on upland, in valley, or on hillside? upland
Drilling or Boring Firm Roy Hudson
Address Arva
Licence Number 52
Name of Driller or Borer same
Address
Date May 11 1964
Roy Hudson
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M-60-4138

OWRC COPY

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



UTM 17 z 480770 E
9 R 4767260 N
Elev. 9 R 0890
Basin 23 2

RECEIVED
JAN 30 1957
GEOLOGICAL BRANCH
DEPARTMENT OF MINES

ONTARIO

The Water-well Drillers Act, 1954 41 № 2091

Department of Mines

Water-Well Record

County or Territorial District Middlesex Township, Village, Town or City London

[redacted] n Village, Town or City)

Address R.R.1 Arva

(day) (month) (year)

Pipe and Casing Record		Pumping Test	
Casing diameter(s)	6¼"	Static level	1½ ft
Length(s)	84 ft	Pumping rate	300 G.P.H.
Type of screen		Pumping level	7½ ft
Length of screen		Duration of test	8 hrs

Well Log / **Water Record**

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
fill	0	1			
top soil	1	3			
clay	3	6			
fine sand & clay	6	8			
blue clay & boulders	8	74			
hardpan	74	82			
sand & gravel	82	86	82	84½	fresh

For what purpose(s) is the water to be used? House

Is water clear or cloudy? Clear

Is well on upland, in valley, or on hillside? upland

Drilling firm W. B. Dale

Address Arva

Name of Driller

Address

Licence Number 476

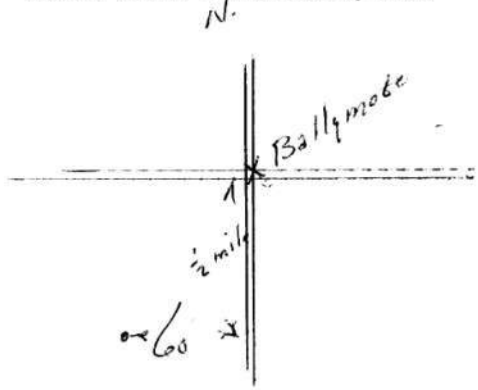
I certify that the foregoing statements of fact are true.

Date........ Wm Dale

Signature of Licensee

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



UTM 17 Z 480320 E

5 R 4767900 N

Elev. 4 R 0895

Basin 23 21

The Ontario Water Resources Commission Act

WATER WELL RECORD

GROUND WATER B...

41 No 2092

County or District MIDDLESEX Township, Village, Town or City LONDON TWP

Con. 6 Lot 9 Date completed April 28 1962 (day month year)

Owner [redacted] (print in block letters) Address RR #1 Arva Ont

Casing and Screen Record		Pumping Test	
Inside diameter of casing	36 in	Static level	4 ft
Total length of casing	10 ft	Test-pumping rate	2 G.P.M.
Type of screen		Pumping level	8 ft
Length of screen		Duration of test pumping	1 hr
Depth to top of screen		Water clear or cloudy at end of test	Clear
Diameter of finished hole	36	Recommended pumping rate	5 G.P.M.
		with pump setting of	8 feet below ground surface

Well Log: Overburden and Bedrock Record	From ft.	To ft.	Water Record: Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
Top soil	0	1	4	fresh
Sand	1	5		
Blue clay rocks	5	10		

For what purpose(s) is the water to be used? House

Is well on upland, in valley, or on hillside? hillside

Drilling or Boring Firm Roy Hudson

Address Arva Ont

Licence Number 8

Name of Driller or Borer Roy Hudson

Address Arva Ont

Date April 28

Roy Hudson

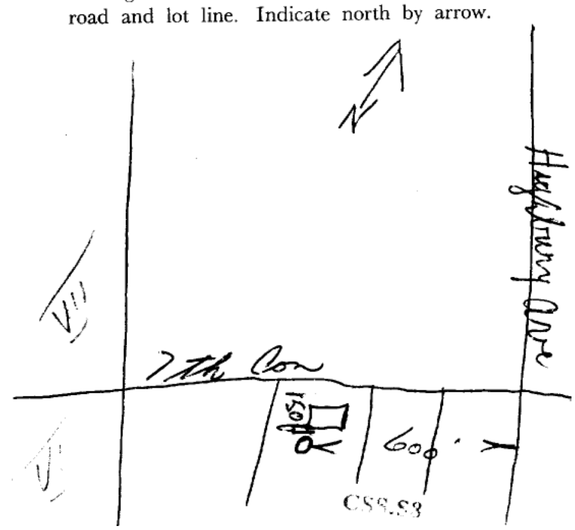
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M Sets 60-5930

OWRC COPY

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



UTM 17 480380 E
15 4767960 N
Elev. 4 0895

The Ontario Water Resources Commission Act

WATER WELL RECORD

41 No. 2096

Basin 230 MIDDLESEX Township, Village, Town or City LONDON

County or District

Con. 6 Lot 9 Date completed 8 (day) May (month) 1967 (year)

Owner [redacted] Address RR#1 Arva

Casing and Screen Record

Inside diameter of casing 36 in

Total length of casing 12 ft

Type of screen

Length of screen

Depth to top of screen

Diameter of finished hole 36 in

Pumping Test

Static level 4 ft

Test-pumping rate 3 G.P.M.

Pumping level 12 ft

Duration of test pumping 1 hr

Water clear or cloudy at end of test clear

Recommended pumping rate 3 G.P.M.

with pump setting of feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Water Record: Depth(s) at which water(s) found	Water Record: Kind of water (fresh, salty, sulphur)
Sandy clay	0	8	4 ft	fresh
hard blue clay	8	12 ft		

For what purpose(s) is the water to be used? D

Is well on upland, in valley, or on hillside? hillside

Drilling or Boring Firm Roy Hudson

Address Arva Ont

Licence Number 107

Name of Driller or Borer Roy Hudson

Address

Date May 8 1967

Roy Hudson
(Signature of Licensed Drilling or Boring Contractor)

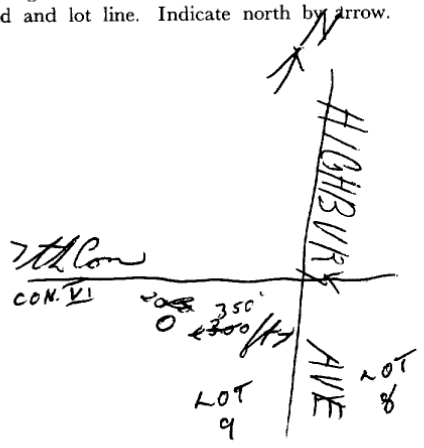
Form 7 15M-60-4138

OWRC COPY

40

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



UTM 17 Z 480400 E
5 R 4768140 N
Elev. 4 R 0895
Basin 2 [illegible]

41 Nº 2166

The Ontario Water Resources Commission Act, 1957

WATER WELL RECORD

County or District MIDDLESEX Township, Village, Town or City LONDON TWP.

[redacted]

Date completed 5 (day) NOV. (month) 1959 (year)

Address 318 BOLER RD. BYRON ONT.

Casing and Screen Record		Pumping Test	
Inside diameter of casing	5" in	Static level	10 ft
Total length of casing	139 ft.	Test-pumping rate	350 per hr G.P.M.
Type of screen		Pumping level	20 ft
Length of screen		Duration of test pumping	4 hrs
Depth to top of screen		Water clear or cloudy at end of test	clear
Diameter of finished hole	5 1/2	Recommended pumping rate	[illegible] G.P.M.
		with pumping level of	350

Well Log / **Water Record**

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	No. of feet water rises	Kind of water (fresh, salty, sulphur)
top soil	0	1			
sandy clay	1	10			
hard pan	10	20			
Hard pan & stones	20	30			
sand	30	45			
clay sand	45	65			
sandy hard pan	65	75			
clay	75	90			
sand	90	99			
hard pan	99	128			
clay	128	139			
sand gravel with water	139	140	139	129	fresh
MAY 12/60 - [illegible]		[illegible]		[illegible] since [illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		

For what purpose(s) is the water to be used? house

Is well on upland, in valley, or on hillside? upland

Drilling Firm Harold Siegrist

Address R.R. 5

London

Licence Number 367

Name of Driller Harold Siegrist

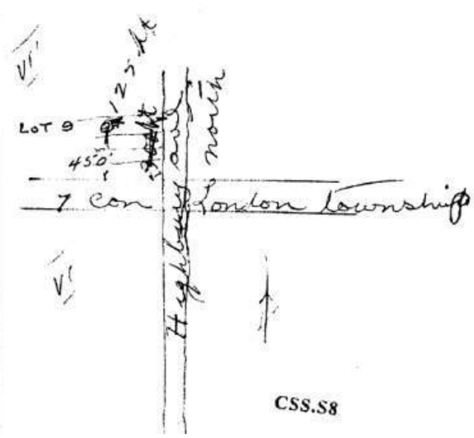
Address R.R. 5 London

Date Nov 5 /59

H. J. Siegrist
(Signature of Licensed Drilling Contractor)

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



CSS.S8

Form 5
15M-56-4149

The Ontario Water Resources Commission Act

40 P/38

WATER WELL RECORD

Water management in Ontario 1. PRINT ONLY IN SPACES PROVIDED 2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 4105504 | MUNICIP. 41008 | CON. CON | 06

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
MIDDLESEX	LONDON	6	008

[redacted] RR#1 ARVA — DATE COMPLETED DAY 27 MO 07 YR 71

NORTHING 767958 | RC. 4 | ELEVATION 0898 | RC. 4 | BASIN CODE 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	TO
BROWN	CLAY		PACKED	0	5
BLUE	CLAY		PACKED	5	18
	GRAVEL		LOOSE	18	19
BLUE	CLAY	BOULDERS	PACKED	19	28

31 | 0005605 | 0018305 | 0019 11 | 0028305 13

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0018	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	TO
	1 ☐ STEEL 2 ☐ GALVANIZED			0028
36	3 ☒ CONCRETE 4 ☐ OPEN HOLE	3	0	28
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN: SIZE(S) OF OPENING (SLOT NO.) | DIAMETER INCHES | LENGTH FEET | MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT – FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER | PUMPING RATE 8 GPM | DURATION OF PUMPING 15 HOURS MINS.

STATIC LEVEL 018 FEET | WATER LEVEL END OF PUMPING 028 FEET | WATER LEVELS DURING 1 ☐ PUMPING 2 ☒ RECOVERY: 15 MINUTES | 30 MINUTES | 45 MINUTES | 60 MINUTES

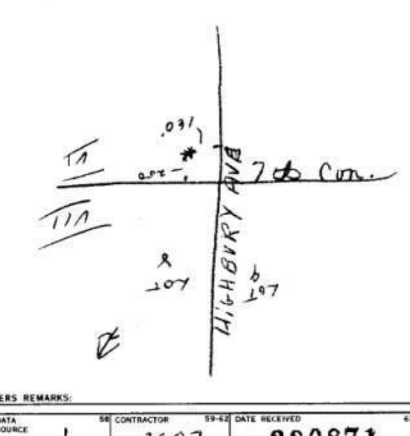
IF FLOWING, GIVE RATE GPM | PUMP INTAKE SET AT 27 FEET | WATER AT END OF TEST 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE ☒ SHALLOW ☐ DEEP | RECOMMENDED PUMP SETTING 027 FEET | RECOMMENDED PUMPING RATE 0002 GPM.

GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



FINAL STATUS OF WELL: 1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 01: 1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING: 1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☒ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

DRILLERS REMARKS:

CONTRACTOR — NAME OF WELL CONTRACTOR: ROY HUDSON | LICENCE NUMBER 2607

ADDRESS: RR#1 ARVA

NAME OF DRILLER OR BORER: C. HAYDEN | LICENCE NUMBER 2552

SIGNATURE OF CONTRACTOR: Hudson per EAAA | SUBMISSION DATE DAY 2 MO AUG YR 71

OFFICE USE ONLY — DATA SOURCE 1 | CONTRACTOR 2607 | DATE RECEIVED 230871 | DATE OF INSPECTION 19, 6, 72 | INSPECTOR | REMARKS | P | WI

COPY

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

40 P/3B

Ontario

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11 | 4106814 | MUNICIP. 41008 | CON. CON | 06

COUNTY OR DISTRICT: [redacted]
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: London
CON., BLOCK, TRACT, SURVEY, ETC.: con. VI
LOT: 008

DATE COMPLETED: DAY 10 MO 07 YR 74

Ballymote

[redacted] 4767451 4 902 4 23 MAY 05, 1976

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
brown	clay			0	15
blue	clay	stones		15	45
	gravel			45	67

OWRC V.7

OWRC P.8

31 | 0015605 | 0045306512 | 0067 11
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0060	☑ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
0063	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
05 5/8	☑ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE	.188	0	0063
05	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☑ OPEN HOLE		63	0064
	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE			

SCREEN: SIZE(S) OF OPENING (SLOT NO.) | DIAMETER INCHES | LENGTH FEET | MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM | TO | MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 Pump | PUMPING RATE: 0010 GPM | DURATION OF PUMPING: 01 HOURS 30 MINS

☑ PUMPING ☐ RECOVERY

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
006 FEET	015 FEET	015 FEET	015 FEET	015 FEET	015 FEET

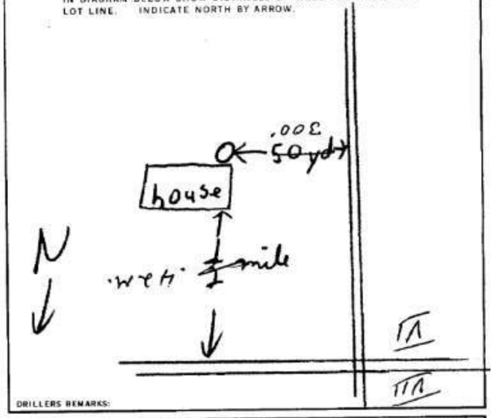
IF FLOWING GIVE RATE: GPM | PUMP INTAKE SET AT: 15 FEET | WATER AT END OF TEST: ☑ CLEAR ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☑ SHALLOW ☐ DEEP | RECOMMENDED PUMP SETTING: 015 FEET | RECOMMENDED PUMPING RATE: 0010 GPM

001.1 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 8067

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



FINAL STATUS OF WELL: 1 — ☑ WATER SUPPLY ☐ OBSERVATION WELL ☐ TEST HOLE ☐ RECHARGE WELL ☐ ABANDONED, INSUFFICIENT SUPPLY ☐ ABANDONED, POOR QUALITY ☐ UNFINISHED

WATER USE: 01 — ☑ DOMESTIC ☐ STOCK ☐ IRRIGATION ☐ INDUSTRIAL ☐ OTHER ☐ COMMERCIAL ☐ MUNICIPAL ☐ PUBLIC SUPPLY ☐ COOLING OR AIR CONDITIONING ☐ NOT USED

METHOD OF DRILLING: 2 — ☐ CABLE TOOL ☑ ROTARY (CONVENTIONAL) ☐ ROTARY (REVERSE) ☐ ROTARY (AIR) ☐ AIR PERCUSSION ☐ BORING ☐ DIAMOND ☐ JETTING ☐ DRIVING

DRILLERS REMARKS:

CONTRACTOR

NAME OF WELL CONTRACTOR: McLeod Well Drilling | LICENCE NUMBER: 3563
ADDRESS: 249 King Street E. Ingersoll
NAME OF DRILLER OR BORER: Ralph | LICENCE NUMBER: 3563
SIGNATURE OF CONTRACTOR: Mc Leod | SUBMISSION DATE: DAY ___ MO. ___ YR. ___

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 3563 | DATE RECEIVED: 180774
DATE OF INSPECTION: 13, 6, 75 | INSPECTOR
REMARKS: N.V.

P 7
WI 7

CSS.S8

FORM 7 07-091

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MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

Ontario

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11 | 4107096 | MUNICIP. 41008 | CON. CON. | 07

COUNTY OR DISTRICT: [redacted]

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: LONDON

CON., BLOCK, TRACT, SURVEY, ETC.: 7 | LOT: 008

[redacted] 1 ARVA. ONT.

DATE COMPLETED: DAY 25 MO 11 YR 74

4768149 4 895 4 23 MAY 05, 1976

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
				0	2
BLACK	LOAM			2	18
BROWN	SAND			18	97
BLUE	CLAY	GRAVEL & STONE		97	99
GREY	SAND	SILT		99	104
BLUE	CLAY	STONES.			

OWRC V.7

OWRC P.8

31 | 0002 802 | 0018 628 | 0097 3051112 | 0099 22 806 | 0104 30512

32 | (51 4¼ Baker Screen) | 75

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0010	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
0097	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
05	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.244	0	0097
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.): 008 | DIAMETER: 05.000 INCHES | LENGTH: 07

MATERIAL AND TYPE: S.S. | DEPTH TO TOP OF SCREEN: 0097 FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER | PUMPING RATE: 0002 GPM | DURATION OF PUMPING: 04 HOURS 30 MINS

STATIC LEVEL: 013 FEET | WATER LEVEL END OF PUMPING: 104 FEET

WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY

15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
104 FEET	104 FEET	104 FEET	104 FEET

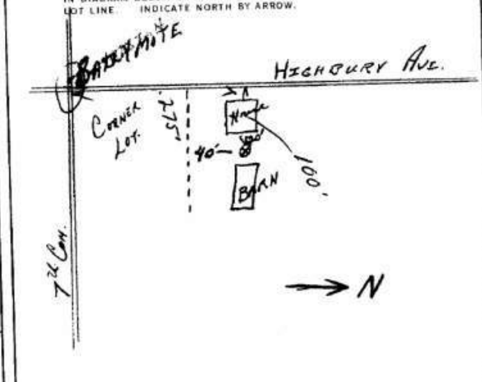
IF FLOWING, GIVE RATE: GPM | PUMP INTAKE SET AT: 104 FEET | WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING: 103 FEET | RECOMMENDED PUMPING RATE: 0002 GPM

000.0 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 8068

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



FINAL STATUS OF WELL: 1 — 1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE: 01 — 1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING: 1 — 1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

DRILLERS REMARKS:

CONTRACTOR

NAME OF WELL CONTRACTOR: WAYNE STONER | LICENCE NUMBER: 4809

ADDRESS: RR # 3 DENFIELD, ONT.

NAME OF DRILLER OR BORER: [signature] | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: Wayne Stoner | SUBMISSION DATE: DAY 25 MO. 11 YR 74

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 4809 | DATE RECEIVED: 240175

DATE OF INSPECTION: 13.6.75 | INSPECTOR: 7

REMARKS:

P 7

WI

CSS.S8

FORM 7 07-09

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Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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11 4107563 MUNICIP 41008 CON. CON. 107

COUNTY OR DISTRICT: Middlesex | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: London | CON. BLOCK, TRACT, SURVEY, ETC.: 7 | LOT: 8

[redacted] R.R. #1, Arva, Ontario

DATE COMPLETED: DAY 27 MO 06 YR 94

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
		ABANDONED			
		Well # 41-7563			

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
10-15	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS
15-18	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS
20-23	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS
25-26	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS
30-33	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
10-13	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	12		13-16
17-18	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	19		20-23
24-25	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	26		27-30

SCREEN

SIZE(S) OF OPENING (SLOT NO.) 31-33	DIAMETER 34-38 INCHES	LENGTH 39-42 FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN 43-46 FEET	50

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD, PACKER, ETC.)
10-13 267	14-17 170	gravel / leadplug 170
18-21 170	22-25 7	Bentonite grout
26-29 7	30-33 0	concrete mix (dry)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☐ BAILER | PUMPING RATE: 34-36 GPM | DURATION OF PUMPING: 15-16 HOURS 17-18 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY
19-21 FEET	22-24 FEET	15 MINUTES 25-28 FEET; 30 MINUTES 29-31 FEET; 45 MINUTES 32-34 FEET; 60 MINUTES 35-37 FEET

IF FLOWING GIVE RATE 38-41 GPM | PUMP INTAKE SET AT FEET | WATER AT END OF TEST 42: 1 ☐ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☐ DEEP | RECOMMENDED PUMP SETTING 43-45 FEET | RECOMMENDED PUMPING RATE 46-49 GPM

50-53

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.

DRILLERS REMARKS: 132221

FINAL STATUS OF WELL 54: 1 ☐ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☒ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED; ☐ DEWATERING

WATER USE 55-56: 1 ☐ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF CONSTRUCTION 57: 1 ☒ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING; ☐ DIGGING; ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: Stainton's Ltd. | WELL CONTRACTOR'S LICENCE NUMBER: 4876

ADDRESS: R.R. #1, Arva, Ontario

NAME OF WELL TECHNICIAN: Wayne Stoner | WELL TECHNICIAN'S LICENCE NUMBER: T-0153

SIGNATURE OF TECHNICIAN/CONTRACTOR: K. M. Stainton | SUBMISSION DATE: DAY 30 MO 06 YR 94

MINISTRY OF THE ENVIRONMENT COPY

OFFICE USE ONLY

DATA SOURCE 58 | CONTRACTOR 59-62: 4876 | DATE RECEIVED 63-66: AUG 23 1994

DATE OF INSPECTION | INSPECTOR

REMARKS: ORIGINAL WATER WELL RECORD (4107563) ATTACHED. AUG. 23/94. AS.

CSS.58

FORM NO. 0506 (11/86) FORM 9

Ontario

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

40P/3B

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(11) 4107563 41008 CON 07

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
MIDDLESEX	LONDON	7	008

[redacted] RR. 1 ARVA ONT. DATE COMPLETED DAY 26 MO 03 YR 76

68100 4 ELEVATION 0896 4 BASIN CODE 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
	topsoil			0	1
brown	sand		fine	1	8
black	sand		meduim	8	9
grey	cl_y	sand and stones		9	156
black	limestone			156	164
brown	limestone			164	209
grey	limestone			209	267

(31) 0001 02 0008608 0009809 0156205281 2 0164815 0209615
(32) 0267215

(41) WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0208	☒ SULPHUR
0265	☒ SULPHUR

(51) CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
07	☒ STEEL	.240	0	0157
06 ¼	☒ OPEN HOLE		157	0267

SCREEN: SIZE(S) OF OPENING (SLOT NO.); DIAMETER INCHES; LENGTH FEET; MATERIAL AND TYPE; DEPTH TO TOP OF SCREEN FEET

(61) PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM / TO; MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

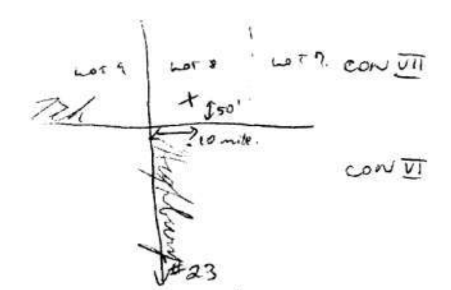
(71) PUMPING TEST

PUMPING TEST METHOD: 2 ☒ BAILER
PUMPING RATE: 0005 GPM
DURATION OF PUMPING: 02 HOURS 00 MINS
STATIC LEVEL: 092 FEET
WATER LEVEL END OF PUMPING: 170 FEET
WATER LEVELS DURING: ☒ PUMPING — 30 MINUTES: 170 FEET
WATER AT END OF TEST: ☒ CLEAR
RECOMMENDED PUMP TYPE: ☒ DEEP
RECOMMENDED PUMP SETTING: 200 FEET
RECOMMENDED PUMPING RATE: 0005 GPM
GPM./FT. SPECIFIC CAPACITY

FINAL STATUS OF WELL: 1 — ☒ WATER SUPPLY
WATER USE: 1, 7 — ☒ DOMESTIC, ☒ PUBLIC SUPPLY
METHOD OF DRILLING: 2 — ☒ ROTARY (CONVENTIONAL)

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: INTO LONDON.

CONTRACTOR	
NAME OF WELL CONTRACTOR	Mervin Jones — LICENCE NUMBER 3009
ADDRESS	R. R. #3, Thorndale, Ontario.
NAME OF DRILLER OR BORER	Murray Jones — LICENCE NUMBER 3034
SIGNATURE OF CONTRACTOR	Mervin Jones — SUBMISSION DATE DAY 30 MO 3 YR 76

OFFICE USE ONLY: DATA SOURCE 1; CONTRACTOR 3009; DATE RECEIVED 050576; DATE OF INSPECTION 24/11/77; INSPECTOR; REMARKS: WH. WELL BEHIND PUMP HOUSE

CSS.S8

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

40P/3B

Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 4107571 | MUNICIP 41008 | CON | 06

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Middlesex	London	6	009

[redacted] RR#1 Arva

DATE COMPLETED: DAY 21 MO 01 YR 76

767680 | 4 | ELEVATION 9902 | 4 | BASIN CODE 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Red	Clay		Dense	0	10
Grey	Gravel	Clay	Layered	10	30
Grey	Gravel		Porous	30	33

OWRC

31 | 0010705566 | 0030211 0574 | 0033211 BD

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0033	1 ☑ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 5/8 07	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.231	0	33 0033
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN: SIZE(S) OF OPENING (SLOT NO.) | DIAMETER INCHES | LENGTH FEET | MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☑ PUMP 2 ☐ BAILER | PUMPING RATE 0006 GPM | DURATION OF PUMPING 48 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
011 FEET	011 FEET	011 FEET	011 FEET	011 FEET	011 FEET

WATER LEVELS DURING: 1 ☑ PUMPING 2 ☐ RECOVERY

IF FLOWING GIVE RATE: GPM | PUMP INTAKE SET AT 25 FEET | WATER AT END OF TEST: 1 ☑ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP | RECOMMENDED PUMP SETTING 025 FEET | RECOMMENDED PUMPING RATE 0006 GPM

GPM./FT. SPECIFIC CAPACITY

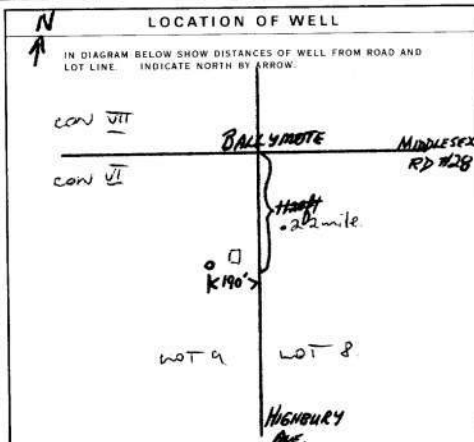
FINAL STATUS OF WELL 1: 1 ☑ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 01: 1 ☑ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING 1: 1 ☑ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

CONTRACTOR

NAME OF WELL CONTRACTOR: John Wilson & Son Well Drilling | LICENCE NUMBER 5466

ADDRESS: RR#1 Springfield, Ont. N0L 2J0

NAME OF DRILLER OR BORER: Joe Humphrey | LICENCE NUMBER —

SIGNATURE OF CONTRACTOR: [signature] | SUBMISSION DATE DAY 24 MO. 3 YR 76

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 5466 | DATE RECEIVED 100576 2

DATE OF INSPECTION 24/11/77 | INSPECTOR

REMARKS: NH — PITLESS ADAPTER - 12" ABOVE GROUND

CSS.S8

P/MR

W/MR

FORM 7 07-091

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Ministry of the Environment

Ontario

The Ontario Water Resources Act

WATER WELL RECORD

40P/3b

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

4108667

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Middlesex	London	Con 6	009

[redacted] R.1 Arva

DATE COMPLETED: DAY 02 MO 10 YR 78

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
			Top soil	0	1
Brown	clay	soft stone		1	10
Brown	clay	large stone		10	31
Brown	sand		coarse from 34-37	31	37

31 0001 02 001 0605 12 003 1605 13 0037 2810

32

51 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
003 27-32	1 ☒ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

52 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
05	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.244	0	34 0034
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT)	DIAMETER	LENGTH
016	05000 INCHES	03 FEET

MATERIAL AND TYPE: Stainless steel

DEPTH TO TOP OF SCREEN: 0034 FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	0008 GPM	06 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
014 FEET	016 FEET	016 FEET	016 FEET	016 FEET	016 FEET

IF FLOWING, GIVE RATE: GPM

PUMP INTAKE SET AT: 36 FEET

WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

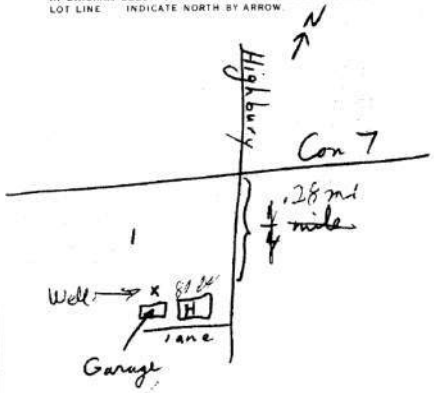
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

RECOMMENDED PUMP SETTING: 036 FEET

RECOMMENDED PUMPING RATE: 0008 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL 1

1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE 01

1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; ☐ OTHER; 9 ☐ NOT USED

METHOD OF DRILLING 1

1 ☒ CABLE TOOL; 2 ☐ BOREHOLE (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Leroy Parsons — LICENCE NUMBER: 4204

ADDRESS: R.R. 2 Ilderton

NAME OF DRILLER OR BORER: same — LICENCE NUMBER: 4204

SIGNATURE OF CONTRACTOR: Leroy Parsons — SUBMISSION DATE: DAY 2 MO 10 YR 78

OFFICE USE ONLY

DATA SOURCE: 1 — CONTRACTOR: 4204 — DATE RECEIVED: 18 12 78

DATE OF INSPECTION: 10, 9, 79 — INSPECTOR: 7

REMARKS: P RM

CSS.SB WI RM

FORM NO. 0506-4-77

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Ontario

(18)

The Ontario Water Resources Act

40P/38

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 4110852 41008 CON 06

COUNTY OR DISTRICT: [redacted]
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: LONDON
CON, BLOCK, TRACT, SURVEY, ETC.: CON 7 VI
LOT: 9
DATE COMPLETED: DAY 24 MO 6 YR 87
ADDRESS OF WELL: R. #1 Arva, Ontario N0M 1C0
767220 0880

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Black	Topsoil			0	1
Brown	Clay	Sand		1	5
Grey	Clay	Sand and Gravel	Layered	5	77
Grey	Gravel		Fine	77	78

31 32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
78	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
5	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	188	0	78
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.) | DIAMETER INCHES | LENGTH FEET
MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

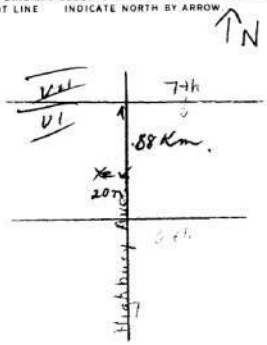
PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER
PUMPING RATE: 10 GPM
DURATION OF PUMPING: 1 HOURS 0 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
24 FEET	36 FEET		36 FEET	36 FEET	36 FEET	36 FEET

IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: 60 FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 45 FEET
RECOMMENDED PUMPING RATE: 10 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: 14401

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED 9 ☐ DEWATERING

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL 2 ☒ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: Mervin Jones
WELL CONTRACTOR'S LICENCE NUMBER: 3009
ADDRESS: R. R. #3 Thorndale, Ontario N0M 2P0
NAME OF WELL TECHNICIAN: Murray S. Jones
WELL TECHNICIAN'S LICENCE NUMBER: T-0068
SIGNATURE OF TECHNICIAN/CONTRACTOR: Mervin Jones
SUBMISSION DATE: DAY 25 MO 6 YR 87

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED: JUL 15 1987
DATE OF INSPECTION: 8 2, 88 | INSPECTOR
REMARKS: PIT LESS
CSS.88

FORM NO. 0506 (11/86) FORM 9

MINISTRY OF THE ENVIRONMENT COPY

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 4111987 — MUNICIP 41008 — CON CON. 106

COUNTY OR DISTRICT: MIDDLESEX
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: LONDON
CON: 6
LOT: 9
ADDRESS OF WELL LOCATION: [redacted] RR#1 ARVA. ONT.
DATE COMPLETED: DAY 20 MO 4 YR 89

21 — ZONE 17 — EASTING 480376 — NORTHING 4767989 — BC — ELEVATION 901 — BC — BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	SAND	CLAY		0	9
GREY	CLAY	STONES		9	55
GREY	CLAY	SILT, SAND, STONES		55	80
GREY	CLAY	STONES		80	99
GREY	SAND	SILT		99	104
GREY	CLAY	STONES		104	108

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
99	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	+2	99
5¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	97	99
			104	108
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE-SLOT OF OPENING (SLOT NO.): 12 — DIAMETER: 5 10 INCHES — LENGTH: 5 FEET
MATERIAL AND TYPE: S.S. — DEPTH TO TOP OF SCREEN: 99 FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

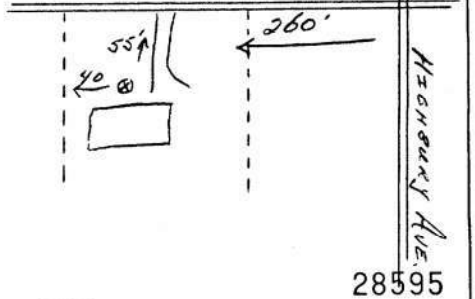
PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER
PUMPING RATE: 6 GPM — DURATION OF PUMPING: 9 HOURS — MINS
WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
12 FEET	106 FEET	81 FEET	98 FEET	102 FEET	103 FEET

IF FLOWING GIVE RATE: GPM
PUMP INTAKE SET AT: 106 FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 106 FEET
RECOMMENDED PUMPING RATE: 6 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED 9 ☐ DEWATERING

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: STONER WELL DRILLING LTD.
WELL CONTRACTOR'S LICENCE NUMBER: 4871
ADDRESS: RR#3 DENFIELD.
NAME OF WELL TECHNICIAN: W STONER
WELL TECHNICIAN'S LICENCE NUMBER: 70193
SIGNATURE OF TECHNICIAN/CONTRACTOR: W. Stoner
SUBMISSION DATE: DAY 20 MO 4 YR 89

OFFICE USE ONLY

DATA SOURCE: 4871 — DATE RECEIVED: FEB 23 1990
DATE OF INSPECTION: — INSPECTOR:
REMARKS:

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FORM NO. 0506 (11/86) FORM 9

Ministry of the Environment
Ontario

(6)

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 4112352 — MUNICIP 41008 — CON. CON 06

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON	BLOCK, TRACT, SURVEY, ETC	LOT
MIDDLESEX	LONDON	6		8

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
B.W.H. HOLDINGS INC.	R. R. #1 Arva, Ontario NOM - 1C0	DAY 03 MO 04 YR 91

21 — ZONE 17 — EASTING 480565 — NORTHING 4768000 — NC — ELEVATION 900 — NC — BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH FEET FROM	DEPTH FEET TO
Black	Topsoil			0	1
Brown	Sand	Clay		1	12
Grey	Clay	Sand		12	48
Grey	Sand		Coarse	48	49

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
49	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH FEET FROM	DEPTH FEET TO
6	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	188	0	49
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE — DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER — PUMPING RATE: 10 GPM — DURATION OF PUMPING: 48 HOURS

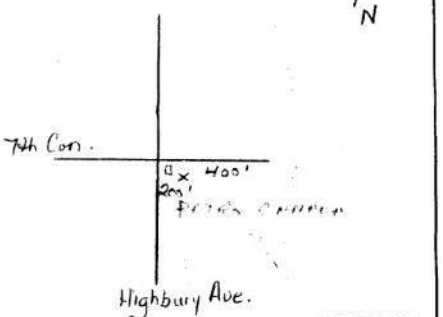
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
7 FEET	21 FEET		21 FEET	21 FEET	21 FEET	21 FEET

IF FLOWING GIVE RATE: GPM — PUMP INTAKE SET AT: 33 FEET — WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP — RECOMMENDED PUMP SETTING: 35 FEET — RECOMMENDED PUMPING RATE: 10 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



67992

DRILLERS REMARKS

FINAL STATUS OF WELL	1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED 8 ☐ DEWATERING
WATER USE	1 ☐ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL 5 ☒ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED ☐ OTHER
METHOD OF CONSTRUCTION	1 ☐ CABLE TOOL 2 ☒ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: MERVIN JONES DRILLING LTD. — WELL CONTRACTOR'S LICENCE NUMBER: 3009

ADDRESS: R. R. #3 Thorndale, Ontario NOM 2P0

NAME OF WELL TECHNICIAN: MURRAY S. JONES — WELL TECHNICIAN'S LICENCE NUMBER: T-0068

SIGNATURE OF TECHNICIAN/CONTRACTOR: Mervin Jones — SUBMISSION DATE: DAY 04 MO 04 YR 91

OFFICE USE ONLY

DATA SOURCE — CONTRACTOR: 3009 — DATE RECEIVED: MAY 02 1991

DATE OF INSPECTION — INSPECTOR

REMARKS: CSS.S8

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86)

Ontario Ministry of the Environment

The Ontario Water Resources Act

WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 **4114496** Municipality 41008 Con CON 06

County or District	Township/Borough/City/Town/Village	Con	block	tract	survey, etc.	Lot
Middlesex	London	6				8

Owner's surname	First Name	Address	Date completed (day month year)
BWH Holdings Inc.		2404 Highbury Ave. R.R.# 1 Arva	20 06 00

21 Zone | Easting | Northing | RC | Elevation | RC | Basin Code

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
	PREVIOUSLY DRILLED			0	49

31

32

41 WATER RECORD

Water found at - feet	Kind of water
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

Sizes of opening (Slot No.)	Diameter inches	Length feet

Material and type | Depth at top of screen feet

61 PLUGGING & SEALING RECORD

☐ Annular space ☐ Abandonment

Depth set - feet From	Depth set - feet To	Material and type (Cement grout, bentonite, etc.)
0	47	Bentonite
47	49	Pea Gravel

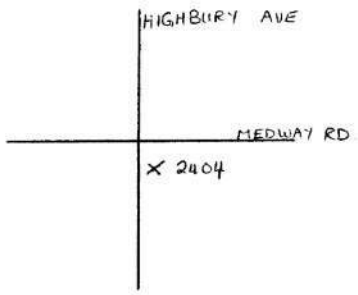
71 PUMPING TEST

Pumping test method 1 ☐ Pump 2 ☐ Bailer | Pumping rate GPM | Duration of pumping Hours Mins

Static level feet	Water level end of pumping feet	Water levels during 1 ☐ Pumping 2 ☐ Recovery			
		15 minutes feet	30 minutes feet	45 minutes feet	60 minutes feet
If flowing give rate GPM		Pump intake set at feet		Water at end of test ☐ Clear ☐ Cloudy	
Recommended pump type ☐ Shallow ☐ Deep		Recommended pump setting feet		Recommended pump rate GPM	

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



217711

FINAL STATUS OF WELL 54

1 ☐ Water supply 2 ☐ Observation well 3 ☐ Test hole 4 ☐ Recharge well 5 ☐ Abandoned, insufficient supply 6 ☐ Abandoned, poor quality 7 ☒ Abandoned (Other) 8 ☐ Dewatering 9 ☐ Unfinished 10 ☐ Replacement well

WATER USE 55-56

1 ☐ Domestic 2 ☐ Stock 3 ☐ Irrigation 4 ☐ Industrial 5 ☐ Commercial 6 ☐ Municipal 7 ☐ Public supply 8 ☐ Cooling & air conditioning 9 ☐ Not use 10 ☐ Other

METHOD OF CONSTRUCTION 57

1 ☐ Cable tool 2 ☐ Rotary (conventional) 3 ☐ Rotary (reverse) 4 ☐ Rotary (air) 5 ☐ Air percussion 6 ☐ Boring 7 ☐ Diamond 8 ☐ Jetting 9 ☐ Driving 10 ☐ Digging 11 ☐ Other

Name of Well Contractor	Well Contractor's Licence No.
Mervin Jones Drilling Ltd.,	3009

Address: 22264 Fairview Rd, Thorndale, Ontario N0M 2P0

Name of Well Technician	Well Technician's Licence No.
Murray S. Jones	T0068

Signature of Technician/Contractor: Murray S Jones | Submission date: 20 06 09

MINISTRY USE ONLY

Data source 58 | Contractor 3009 59-62 | Date received JUL 13 2000 63-68 69

Date of inspection | Inspector

Remarks: CSS.ES0

0506 (11/98) Front Form 9

2 - MINISTRY OF THE ENVIRONMENT COPY

Ontario Ministry of the Environment

Well Tag Number (Place sticker and print number below): A 044681

Well Record

Regulation 903 Ontario Water Resources Act

page 1 of 1

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

[redacted]

Address of Well Location (County/District/Municipality): [illegible]

Township | Lot | Concession

RR#/Street Number/Name: 21559 Highbury Rd. N

City/Town/Village: Ballymote

Site/Compartment/Block/Tract etc.

GPS Reading: NAD 83 | Zone 17 | Easting 480663 | Northing 4768177

Unit Make/Model: Garmin Etrex

Mode of Operation: ☐ Undifferentiated ☐ Differentiated, specify ☒ Averaged

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To
GREY	CLAY			3'	15'
brown	SAND	rocks	Sandy hill	0'	3'
	"cluster of 5 wells"				

Hole Diameter

Depth From	Depth To	Diameter Centimetres
0'	4"	

Water Record

Water found at Metres / Kind of Water

☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:

☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:

☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:

After test of well yield, water was ☐ Clear and sediment free ☐ Other, specify

Chlorinated ☐ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To
	Casing			
2'	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized		0	3'
	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized			
	Screen			
Outside diam	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
2'			3'	15'
	No Casing or Screen			
	☐ Open hole			

Test of Well Yield

Pumping test method	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres)	Static Level			
Pumping rate - (litres/min)	1		1	
Duration of pumping ____hrs +____ min	2		2	
Final water level end of pumping ____metres	3		3	
Recommended pump type: ☐ Shallow ☐ Deep	4		4	
Recommended pump depth. ____metres	5		5	
Recommended pump rate. (litres/min)	10		10	
	15		15	
If flowing give rate - (litres/min)	20		20	
	25		25	
If pumping discontinued, give reason.	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record ☑ Annular space ☐ Abandonment

Depth set at - Metres From	Depth set at - Metres To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	3'	Bentonite CHIPS	3'
3'	15'	Silica SAND	15'

Method of Construction

☐ Cable Tool ☐ Rotary (air) ☐ Diamond ☐ Digging
☑ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use

☐ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☑ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☐ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☑ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: LONDON SOIL TEST LTD | Well Contractor's Licence No.: 7190

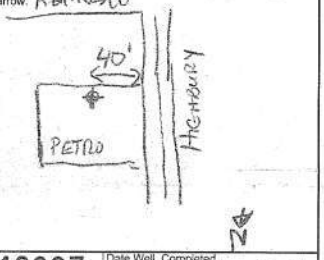
Business Address (street name, number, city etc.): R.R.6 DUNDALK ON N0C 1B0

Name of Well Technician (last name, first name): McRAE DON | Well Technician's Licence No.: 13070

Signature of Technician/Contractor | Date Submitted: 2007 05 24

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Audit No. Z 49987 | Date Well Completed: 2007 05 17

Was the well owner's information package delivered? ☑ Yes ☐ No | Date Delivered: 2007 06 11

Ministry Use Only

Data Source | Contractor: 7190

Date Received: JUN 14 2007 | Date of Inspection

Remarks | Well Record Number

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☑ Well Owner's Copy ☐ *Cette formule est disponible en français*

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)*

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

[redacted]

Address of Well Location (Street Number/Name): 21559 Highbury Ave. N.
Township: Middlesex Centre
Lot: 9
Concession: 6
County/District/Municipality: Middlesex
City/Town/Village: Arva
Province: Ontario
Postal Code: N0M1C0
UTM Coordinates: NAD 83 Zone 17 Easting 480503 Northing 4768176
Municipal Plan and Sublot Number:
Other:

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	NO Previous Report Found.				
	42" Dug Well				
			top soil	0	1
			Chips and Dust	1	7
			Hole Plug	7	8.5
			Washed Peastone	8.5	10

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To

Status of Well

☐ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☑ Other, specify: Decomp

Water Details

Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☑ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor: Stainton's Ltd
Well Contractor's Licence No.: 4876
Business Address (Street Number/Name): 21937 Highbury Ave N
Municipality: Arva
Province: ON
Postal Code: N0M1C0
Business E-mail Address: Staintons@xplornet.com
Bus. Telephone No. (inc. area code): 5196593359
Name of Well Technician (Last Name, First Name): Stainton, Brent F.
Well Technician's Licence No.: 11485
Signature of Technician and/or Contractor: Brent F Stainton
Date Submitted: 2017/05/17

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered

Date Work Completed: 2017/05/17

Ministry Use Only

Audit No.: Z242464

Received: FEB 02 2018

506E (2014/11)

Ministry's Copy

Appendix E

Wastewater Treatment System Assumptions & Sizing

TYPICAL WASTEWATER TREATMENT SYSTEM ASSUMPTIONS AND SIZING FOR MOST NARROW PROPOSED LOT

MIDDLESEX CENTRE REQUIRES SUFFICIENT SPACE FOR A CONTINGENCY BED DURING LOT CREATION.
HENCE, TERTIARY PRETREATMENT SYSTEMS ARE REQUIRED FOR PROPOSED LOT SIZES.
ALTHOUGH PERMITTED BY THE ONTARIO BUILDING CODE, SHALLOW TRENCH SYSTEMS ARE NOT RECOMMENDED AT THIS SITE.

ASSUMED HOUSE CHARACTERISTICS

FIXTURE UNITS - SUMMARY

ITEM	No.	LOAD	TOTAL
1.FULL BATHROOM	4	6	24
INDIVIDUAL ITEMS :			
2. ANY TYPE OF BATH	2	1.5	3.0
3. FLUSH TANK TOILETS	1	4	4
4a.SHOWER(1 HEAD)	0	1.5	0
4b.SHOWER(3 HEAD)	0	4.5	0
5.FLOOR DRAIN	1	2 - 4	3
6.LAVATORY (DOMESTIC)	1	1.5	1.5
7.BIDET	0	1	0
8. KITCHEN SINK	1	1.5	1.5
9. DISHWASHER (to sink trap)	1	0	0
10. LAUNDRY TUB	1	1.5	1.5
11. CLOTHES WASHER	1	1.5	1.5
12. DRINKING FOUNTAIN	0	0.5	0
13. GARBAGE GRINDER	0	3	0
TOTAL UNITS			**40.0**
NO. OF BEDROOMS:		4	
TOTAL LIVING AREA:		300 m²	

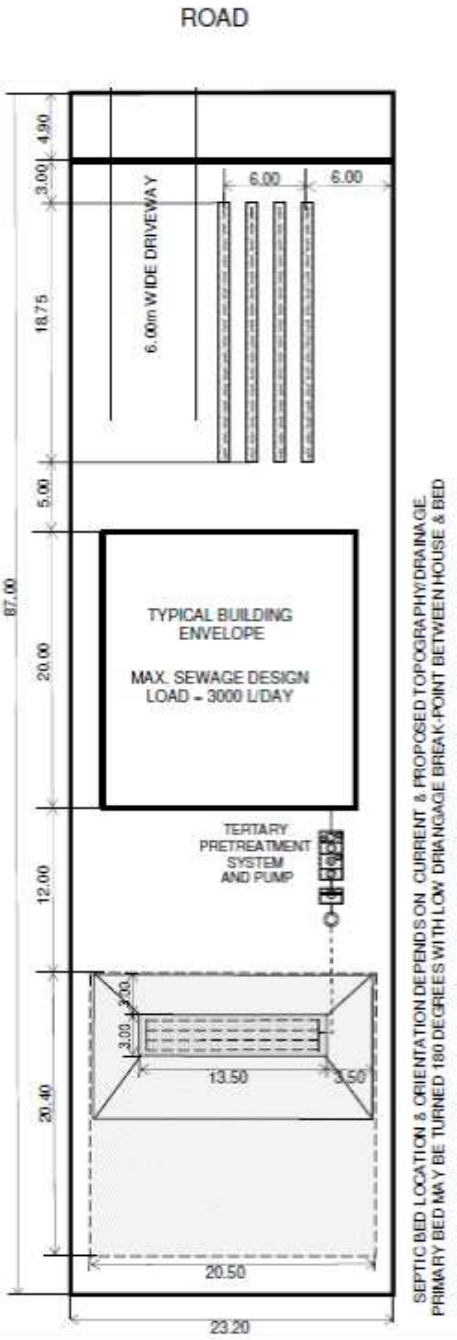
WASTE SYSTEM - DESIGN CAPACITY

BASE LOAD (4 BEDROOM):	2000
1. F. U. OPTION (40 - 20) X 50 :	1000
2. L. A. OPTION (300- 200)/10 X 100:	1000
ADD HIGHER OF ITEM 1 OR 2	
DESIGN LOAD	**= 3000 L/DAY**

CAN/BNQ 3680-600 TYPE "A" BED SEPTIC SYSTEM DESIGN CALCULATIONS AND DIMENSIONS

1. DESIGN LOAD = 3000 L/DAY (SEE "DESIGN CAPACITY")
2. TERTIARY PRETREATMENT UNIT REQUIRED.
3. MIN. STONE BED AREA = 3000 / 75 = 40.0 m²
   SPECIFIED: 13.50 X 3.00 = 40.5 m²
4. DISTRIBUTION PIPE: 4 RUNS EACH 12.3 m LONG @ 67cm ON CENTRES; ALL PIPES 60 cm FROM EDGES OF STONE.
5. MIN. TOTAL SAND CONTACT AREA = QT/400 =375 m²
   TOTAL SPECIFIED AREA INCL MANTLE = 28.90 X 13.50 = 390m²
6. IMPORTED SAND : T = 6 to 8 min/cm

SHALLOW BURIED TRENCH SYSTEM
(FOR CONTINGENCY ONLY – not to be installed)
L = 3000/40 = 75m
USE 4 RUNS OF 18.75m @ 2.0m ON CENTRES



TYPICAL WASTEWATER TREATMENT SYSTEM ASSUMPTIONS AND SIZING FOR MOST NARROW PROPOSED LOT

MIDDLESEX CENTRE REQUIRES SUFFICIENT SPACE FOR A CONTINGENCY BED DURING LOT CREATION.
HENCE. PRIMARY BED IS A CONVENTIONAL RASIED FILTER BED WHILE CONTINGENCY SHALLOW TRENCH SYSTEM IWILL REQUIRE A TERTIARY PRETREATMENT SYSTEM.
ALTHOUGH PERMITTED BY THE ONTARIO BUILDING CODE, SHALLOW TRENCH SYSTEMS ARE NOT RECOMMENDED AT THIS SITE.

ASSUMED HOUSE CHARACTERISTICS

FIXTURE UNITS - SUMMARY

ITEM	No.	LOAD	TOTAL
1.FULL BATHROOM	2	6	12
INDIVIDUAL ITEMS :			
2. ANY TYPE OF BATH	0	1.5	0
3. FLUSH TANK TOILETS	1	4	4
4a.SHOWER(1 HEAD)	0	1.5	0
4b.SHOWER(3 HEAD)	0	4.5	0
5.FLOOR DRAIN	1	2 - 4	3
6.LAVATORY (DOMESTIC)	1	1.5	1.5
7.BIDET	0	1	0
8. KITCHEN SINK	1	1.5	1.5
9. DISHWASHER (to sink trap)	1	0	0
10. LAUNDRY TUB	1	1.5	1.5
11. CLOTHES WASHER	1	1.5	1.5
12. DRINKING FOUNTAIN	0	0.5	0
13. GARBAGE GRINDER	0	3	0
TOTAL UNITS			**25.0**

NO. OF BEDROOMS: 4
TOTAL LIVING AREA: 220 m^2

WASTE SYSTEM - DESIGN CAPACITY

BASE LOAD (4 BEDROOM):	2000
1. F. U. OPTION (25 - 20) X 50 :	250
2. L. A. OPTION (220- 200)/10 X 100:	200
ADD HIGHER OF ITEM 1 OR 2	
DESIGN LOAD	**= 2250 L/DAY**

RAISED FILTER BED SEPTIC SYSTEM DESIGN CALCULATIONS AND DIMENSIONS:

1. DESIGN LOAD = 2250 L/DAY (SEE "DESIGN CAPACITY")

2. MIN. FILTER CONTACT AREA: 2250 X 8/850 = 21.2m^2
   AND 2250/10 min/cm = 225 m^2.

3. MIN. FILTER SURFACE AREA: 2250/75L/m^2/DAY = 30.0m^2

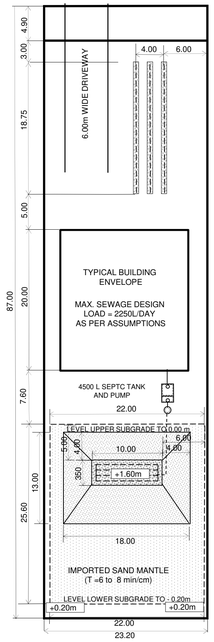
4. THEREFORE USE 1 FILTER BED :10.00 m X 3.50m = 35.00m^2
   with filter media contact area = 18.00 x 13.00= 234 m^2.

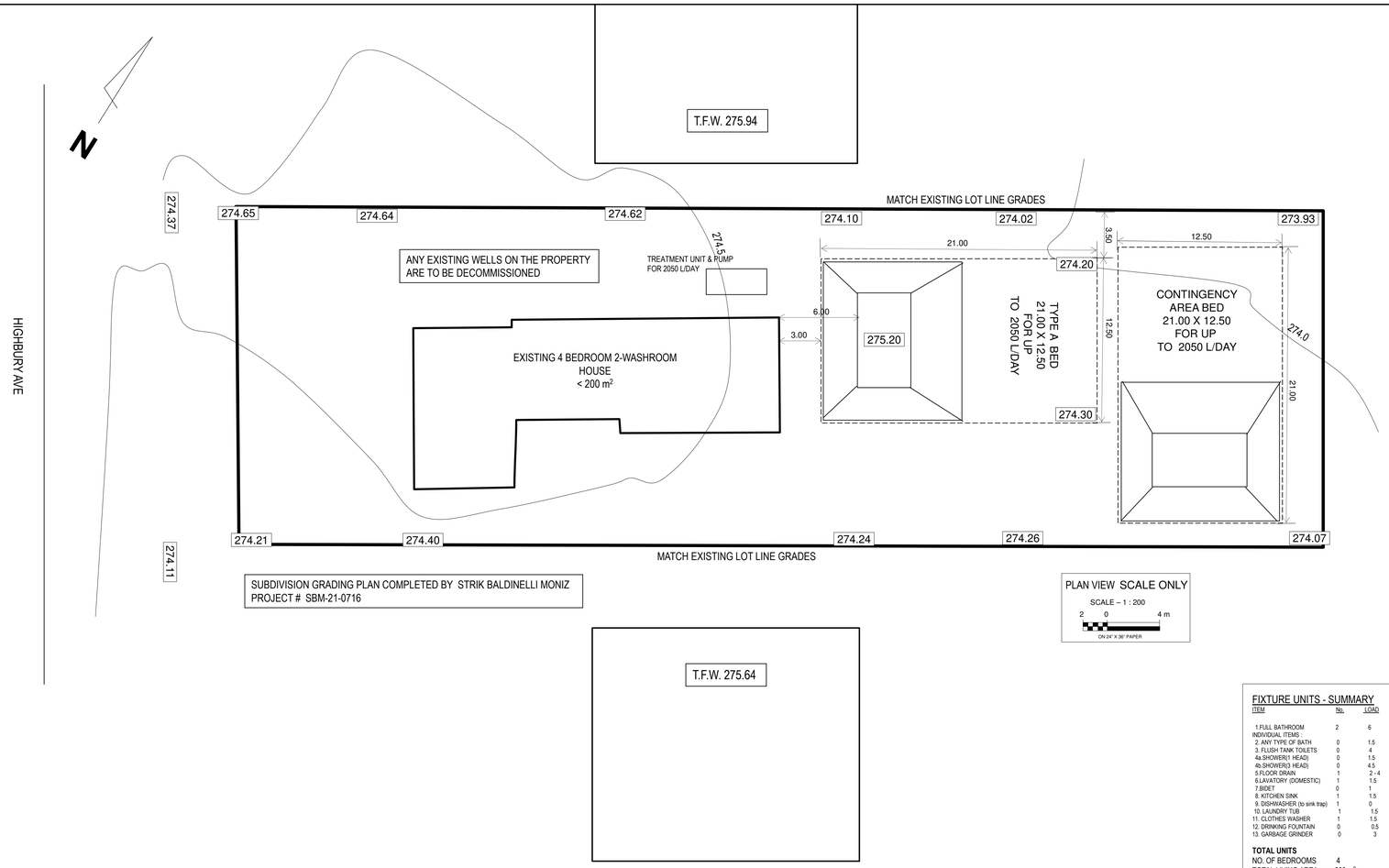
5. MIN. RAISED BED CONTACT AREA = Q(L/d) /4 (L/ m^2/d) = 563m^2
   (for T > 50 min/cm) (Imported base sand: T = 8 min/cm)
   (See profile for Filter Media Specification)
   SPECIFIED: 25.6 x 22.0 = 563 m^2

6. DISTRIBUTION PIPE : 4 RUNS X 9.00 m. LONG
   @ 83cm. SPACING, (KEEPING ALL PIPES 50 cm FROM EDGES OF FILTER).

7. MIN. TANK SIZE = 3900 L . THERFORE USE STANDARD
   4500 L CONCRETE TANK c/w POLYLOK PL-122
   EFFLUENT FILTER OR EQUIV.

SHALLOW BURIED TRENCH SYSTEM
(FOR CONTINGENCY ONLY WITH TERTIARY PRETREATMENT – NOT TO BE INSTALLED)
L = 2250/40 = 56.23m
USE 3 RUNS OF 18.75m @ 2.0m ON CENTRES





SUBDIVISION GRADING PLAN COMPLETED BY STRIK BALDINELLI MONIZ
PROJECT # SBM-21-0716

PLAN VIEW SCALE ONLY
SCALE – 1 : 200
2 0 4 m
ON 24" X 36" PAPER

LOCATION: LOT 18 (21488 Highbury Ave N) BALLYMOTE

LEGEND

- 100.00 = EXISTING ELEVATION (m.)
- 100.00 = PROPOSED ELEVATION (m)
- = PROPERTY BOUNDARY
- = CLOSED DRAIN
- = ROAD CENTRELINE
- = PROPOSED SEPTIC SYSTEM SAND BASE
- = CORRUGATED STEEL PIPE
- F.H. = FIRE HYDRANT
- = WATER VALVE/STOP
- = WATER MAIN OR SERVICE
- = DRAINAGE DIRECTION OR SWALE
- TP 1 = TEST PIT LOCATION
- = EXISTING CONTOUR (1.0m INTERVAL)
- HP5 = UTILITY POLE
- = FENCE
- = SWALE

FIXTURE UNITS - SUMMARY

ITEM	No.	LOAD	TOTAL
1.FULL BATHROOM	2	6	12
INDIVIDUAL ITEMS :			
2. ANY TYPE OF BATH	0	1.5	0
3. FLUSH TANK TOILETS	0	4	0
4a.SHOWER(1 HEAD)	0	1.5	0
4b.SHOWER(3 HEAD)	0	4.5	0
5.FLOOR DRAIN	1	2 -4	3
6.LAVATORY (DOMESTIC)	1	1.5	1.5
7.BIDET	0	1	0
8. KITCHEN SINK	1	1.5	1.5
9. DISHWASHER (to sink trap)	1	0	0
10. LAUNDRY TUB	1	1.5	1.5
11. CLOTHES WASHER	1	1.5	1.5
12. DRINKING FOUNTAIN	0	0.5	0
13. GARBAGE GRINDER	0	3	0
TOTAL UNITS			**21.0**

NO. OF BEDROOMS 4
TOTAL LIVING AREA: = <200 m²

WASTE SYSTEM - DESIGN CAPACITY

MAX. BASE LOAD (4 BEDROOM):	*2000*
Add Highest of 1, 2 or 3 below:	
1. ADDITIONAL BEDROOMS :	*0*
2. F. U. OPTION (21 - 20) X 50 :	*50*
3a. L. A. OPTION (200-200)/10 X 100:	*0*
3b. L.A. ADDED (200 - 400)/10 X 75:	*0*
3c. L.A. ADDED (200 - 600)/10 X 50:	*0*
TOTAL(ITEM 3):	*0*
DESIGN LOAD	***= 2050 L/DAY***

ON-SITE WASTE TREATMENT SIZING

- BUILDING FOOTPRINT AS SHOWN = < 200 m²
- SEWAGE DESIGN LOAD = 2050 L/DAY (BASED ON 4 BEDROOMS & 2 BATH < 200 m² LIVING AREA)
- ASSUMED SOIL TYPE IS CLAY (T > 50 min/cm)
- FOOTPRINT FOR UNIT AREA LOAD OF 8 L/ m² USING SECONDARY TREATMENT = 2050/8L/m² = 257 m²
- 21.00 X 12.50 (262.5 m²) AREA BED DESIGN IS THEREFORE ADEQUATE BASED ON WORST CASE CONDITIONS.
- SPECIFIC WASTE TREATMENT SYSTEM DESIGN & BUILDING PERMIT APPROVAL IS REQUIRED FOR EACH LOT THROUGH THE BUILDING PERMIT PROCESS OF THE OBC.

MINIMUM WASTE SYSTEM SETBACKS (m.)

DISTRIBUTION SYSTEM

CASED WELL OR WATERCOURSE	16
UNCASED WELL	31
STRUCTURES	6
PROPERTY LINE	4

SEPTIC TANKS/TREATMENT UNITS

BUILDING	1.5
PROPERTY LINE	3
CASED/UNCASED WELL	15

AS CONSTRUCTED NOTES	AS CONSTRUCTED SERVICES	COMPLETION		No.	REVISIONS	DATE	BY
				0	PRELIMINARY FOR REVIEW	9-Sep-21	JRB

BOS Engineering & Environmental Services Inc.
46 Donnybrook Rd. London Ontario N5X 3C8 Phone : 519 850-9987 Fax : (519) 663-8057

ENGINEER'S STAMP

CORPORATION OF THE
TOWNSHIP OF MIDDLESEX CENTRE
COUNTY OF MIDDLESEX
ONTARIO, CANADA

SCALE – 1 : 400
4 0 8
ON 600 X 900 PAPER

CLIENT: BROCK DEVELOPMENTS C/O MICHELLE DOORNBOSCH
Tel: (519) 281-6769

SITE, GENERAL GRADING & SERVICING PLAN
LOT 18 (21488 HIGHBURY AVE N) BALLYMOTE, ON

PROJECT No. 2109-01
SHEET No. S -1
PLAN FILE No.

APPENDIX C

Topographical Plan of Survey by Callon Dietz Incorporated, File No. 20-23779 A, dated February 17, 2021
Ballymote East Drain Plan & Profile prepared by A. M. Spriet & Associates Ltd. Consulting Engineers, dated October 16, 1971
Infiltration Assessment prepared by Englobe, dated November 16, 2022
Geotechnical Consultation – Soil Infiltration Testing by LDS Consultants dated August 23, 2023
SWM Calculations

TOPOGRAPHICAL PLAN OF SURVEY
OF PART OF
NORTH HALF LOT 8, CONCESSION 6
(GEOGRAPHIC TOWNSHIP OF LONDON)
IN THE
MUNICIPALITY OF MIDDLESEX CENTRE
COUNTY OF MIDDLESEX
SCALE 1:1000 (Metric)

15 7.5 0 15 30 45 60 75

(SCALE IN METRES)

TERRY P. DIETZ
ONTARIO LAND SURVEYOR

ASSOCIATION OF ONTARIO
LAND SURVEYORS
PLAN SUBMISSION FORM

2154784

THIS PLAN IS NOT VALID
UNLESS IT IS AN EMBOSSED
ORIGINAL COPY
ISSUED BY THE SURVEYOR
In accordance with
Regulation 1026, Section 29 (3)

LEGEND

☐	DENOTES SURVEY MONUMENT SET
■	DENOTES SURVEY MONUMENT FOUND
SIB	DENOTES STANDARD IRON BAR
SSIB	DENOTES SHORT STANDARD IRON BAR
IB	DENOTES IRON BAR
OU	DENOTES ORIGIN UNKNOWN
WIT	DENOTES WITNESS
AGM	DENOTES ARCHIBALD, GRAY & McKAY, O.L.S.'s
HOR	DENOTES HOLSTEAD & REDMOND, O.L.S.'s
FKS	DENOTES FARNCOMB, KIRKPATRICK, & STIRLING, O.L.S.'s
1238	DENOTES MURRAY FRASER LIMITED
OH	DENOTES ONTARIO HYDRO
SCP	DENOTES SPECIFIED CONTROL POINT
P.I.N.	DENOTES PROPERTY IDENTIFIER NUMBER
M	DENOTES MEASURED
S	DENOTES SET
D1	DENOTES INST. 354908 (P.I.N. 08146–0163(LT))
D2	DENOTES INST. 464855 (P.I.N. 08146–0030(LT))
D3	DENOTES INST. 525818 (P.I.N. 08146–0029(LT))
D4	DENOTES INST. 574148 (P.I.N. 08146–0028(LT))
D5	DENOTES INST. 598709 (P.I.N. 08146–0032(LT))
D6	DENOTES INST. 708709 (P.I.N. 08146–0031(LT))
P1	DENOTES PLAN OF SURVEY ATTACHED EXPROPRIATION BY COUNTY OF MIDDLESEX BY–LAW 2624, INST. 96740 MISC.
P2	DENOTES PLAN OF SURVEY ATTACHED EXPROPRIATED BY COUNTY OF MIDDLESEX BY–LAW 2741, INST. 126660 MISC.
P3	DENOTES PLAN 33R–8185
P4	DENOTES PLAN 33R–10443
P5	DENOTES PLAN 33R–12027
P6	DENOTES PLAN 33R–18711
P7	DENOTES AGM PLAN OF SURVEY DATED AUGUST 8, 2008.
AW	DENOTES AERIAL WIRES
BPED	DENOTES BELL PEDESTAL
TVPED	DENOTES CABLE PEDESTAL
DICB	DENOTES DITCH INLET CATCH BASIN
FH	DENOTES FIRE HYDRANT
GP	DENOTES GUARD POST
HP	DENOTES HYDRO POLE
M.B.	DENOTES MAIL BOX
SL	DENOTES STREET LIGHT
○	DENOTES DECIDUOUS TREE
⍭	DENOTES MISCELLANEOUS TRAFFIC SIGN
→	DENOTES POLE ANCHOR

CATCH BASIN / MANHOLE / DITCH INLET SCHEDULE

POINT NO.	LID ELEV.	INVERT ELEV.	SIZE(mm)	TYPE	DIRECTION	FEATURE
10414	273.46					MIDDLE OF GRATE
	273.63					TOP OF GRATE
	273.27					BOTTOM OF GRATE
20105	273.77					CB
		272.58	600	CONCRETE	NORTH	PIPE
		272.56	800	CONCRETE	SOUTH	PIPE
20144	273.63					CB
		272.81	400	CSP	EAST	PIPE
		272.95	400	CSP	WEST	PIPE
20278	273.87					MIDDLE OF GRATE
	273.96					TOP OF GRATE
	273.79					BOTTOM OF GRATE
		273.18	400	PVC	NORTH	PIPE
		273.09	400	CSP	SOUTH	PIPE

CULVERT SCHEDULE

POINT NO.	TOP ELEV.	INVERT ELEV.	SIZE(mm)	TYPE	DIRECTION	FEATURE
10405	273.39	272.94	450	PLASTIC	WEST	CULVERT
20303	273.72	273.32	400	CSP	NORTH	CULVERT
20309	273.81	273.41	400	CPP	SOUTH	CULVERT
20340	273.84	273.44	400	CPP	NORTH	CULVERT
30069	274.16	273.71	450	CSP	NORTH	CULVERT
30071	274.31	273.86	450	CSP	SOUTH	CULVERT
30147	274.57	274.27	300	CSP	NORTH	CULVERT
30150	274.58	274.28	300	CSP	SOUTH	CULVERT
30178	274.46	274.16	300	CSP	NORTH	CULVERT
30205	274.43	274.13	300	CSP	SOUTH	CULVERT
30274	274.41	274.11	300	CSP	NORTH	CULVERT
30296	274.29	273.99	300	CSP	SOUTH	CULVERT
30317	274.41	274.01	400	CPP	NORTH	CULVERT
30343	274.38	273.98	400	CPP	SOUTH	CULVERT
30411	274.25	273.85	400	CPP	NORTH	CULVERT
30412	274.29	273.89	400	CPP	SOUTH	CULVERT
30448	274.08	273.63	450	CSP	NORTH	CULVERT
30483	274.13	273.68	450	CSP	SOUTH	CULVERT

BENCHMARK

VERTICAL CONTROL: CITY OF LONDON MONUMENT BM02–50
TYPE: BOLT
LOCATION: BRICK PRIVACY WALL ON THE SOUTHWEST CORNER OF SUNNINGDALE ROAD EAST AND SOUTH WENIGE DRIVE. BOLT SET IN THE NORTH FACE OF THE WALL, 0.21m BELOW BRICK AND 0.71m WEST OF THE 45 DEGREE ANGLE OF THE WALL.
GEODETIC ELEVATION: 259.153m

VERTICAL CONTROL: CITY OF LONDON MONUMENT BM02–43
TYPE: BOLT
LOCATION: CONCRETE BOX CULVERT CROSSING SUNNINGDALE ROAD EAST, 320m WEST OF THE CENTRELINE OF HIGHBURY AVENUE NORTH. BOLT SET IN THE EAST FACE ON THE NORTH SIDE OF SUNNINGDALE ROAD EAST, 0.12m SOUTH OF THE NORTHEAST CORNER AND 0.12m DOWN FROM THE TOP.
GEODETIC ELEVATION: 260.902m

NOTES

ALL BURIED SERVICES (WITH THE EXCEPTION OF SEWER INVERTS) WERE DERIVED FROM FIELD LOCATES. THE EXISTENCE OR PRECISE LOCATION WAS NOT DETERMINED BY THIS SURVEY ALL SERVICES SHOULD BE VERIFIED BY FIELD LOCATES PRIOR TO CONSTRUCTION.

SPOT ELEVATIONS ARE FROZEN ON LAYER: "SPOT_ELEVATIONS"

TIES TO BUILDINGS ARE AT RIGHT ANGLES TO THE BOUNDARY LINES, UNLESS OTHERWISE INDICATED.

INTEGRATION DATA

BEARINGS ARE MTM GRID DERIVED FROM SPECIFIED CONTROL POINTS SCP 01019881057 AND SCP 02819942004, MTM ZONE 11, NAD83:CSRS:CBNv6–2010.0

FOR BEARING COMPARISONS, A ROTATION OF 0°48'10" COUNTER–CLOCKWISE, WAS APPLIED TO THE BEARINGS FROM P1, P2, P3, P4 & P5.

FOR BEARING COMPARISONS, A ROTATION OF 1°01'35" COUNTER–CLOCKWISE, WAS APPLIED TO THE BEARINGS FROM P6.

ALL DIMENSIONS SHOWN ARE MEASURED, UNLESS OTHERWISE NOTED.

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999993.

SPECIFIED CONTROL POINTS (SCP's): MTM ZONE 11, NAD83:CSRS:CBNv6–2010.0 COORDINATES TO URBAN ACCURACY PER SEC. 14 (2) OF O.REG. 216/10		
POINT ID	NORTHING	EASTING
SCP 01019881057	4769753.206	407746.815
SCP 02819942004	4769802.013	409659.782
PLAN COORDINATES, MTM ZONE 11, NAD83:CSRS:CBNv6–2010.0		
1	4769849.314	407929.612
2	4770641.072	408045.266
COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE–ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN		

METRIC

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

(1) THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
(2) THE SURVEY WAS COMPLETED ON THE 12th OF FEBRUARY, 2021.

DATE

TERRY P. DIETZ
ONTARIO LAND SURVEYOR

C:_CDvault\DWG\2020s\2020\20–23779\23779 A\Topo (E–1306).dwg February 17, 2021

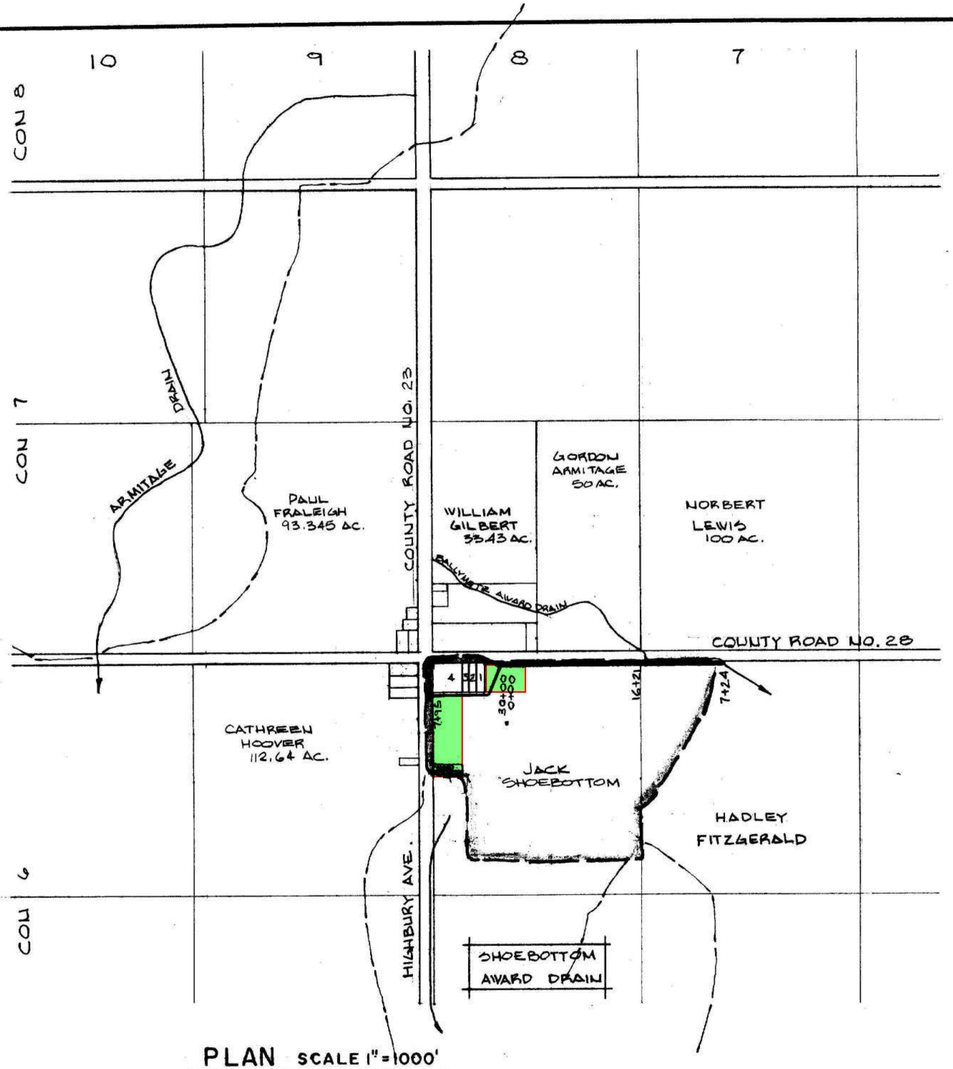
Callon Dietz INCORPORATED
ONTARIO LAND SURVEYORS
CARLETON PLACE LONDON NORTH BAY
info@callondietz.com callondietz.com

ISO 9001 REGISTERED

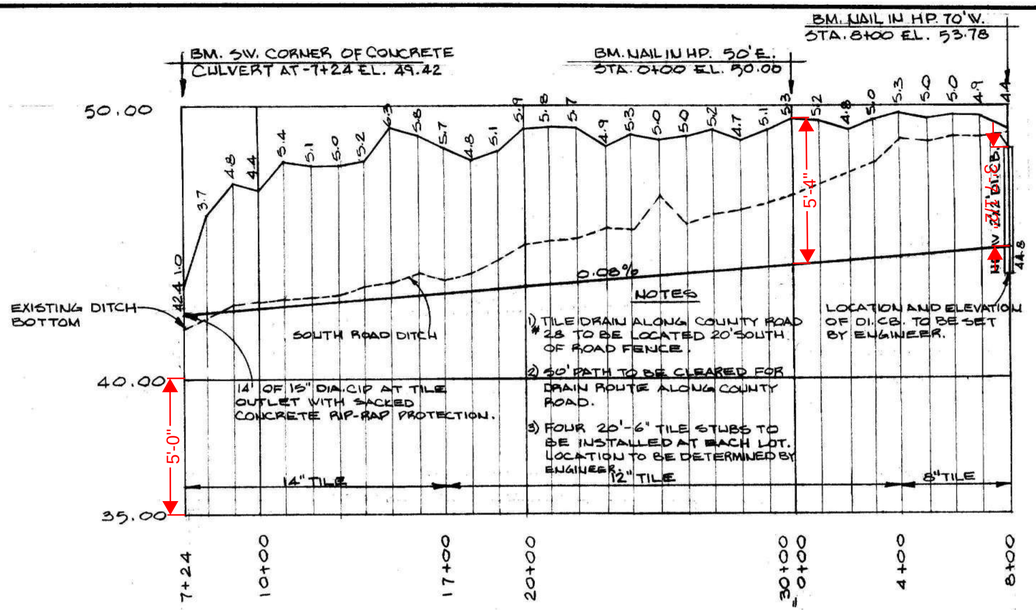
SURVEY BY: LM/PK	DRAWN BY: BO	FILE No: 20–23779 A	PLAN No: E–1306

LEGEND

1. GORDON IRWIN
2. MAY GLEED
3. HARRY BORTHWICK
4. CHRIS SMALL
5. TELLIS VAN DOP



PLAN SCALE 1"=1000'



MAIN DRAIN PROFILE

SCALE HOR. 1"=400'
VERT. 1"=4'-0"

REGISTERED PROFESSIONAL ENGINEER
K. A. SMART
PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER
CIVIL
A. J. DEVOS
PROVINCE OF ONTARIO

BALLYMOTE EAST DRAIN

TOWNSHIP OF LONDON

SCALE: AS SHOWN	APPROVED BY: FB.D-16	JOB NO. 71026	DRAWN BY S J P
DATE: OCT. 16, 1971.			REVISED

PLAN & PROFILE

A. M. SPRIET & ASSOCIATES LTD.
CONSULTING ENGINEERS

DRAWING NUMBER 1

November 16, 2022

Brock Developments Group
1070 Riverside Drive
London, ON N6H 0L4

Subject: **Infiltration Assessment**
21488 Highbury Avenue, Middlesex Centre, Ontario

Englobe Corp. is pleased to submit this letter which provides the results of a review of particle size distribution analyses provided by the client for samples taken from the above noted site. It is understood that the samples were collected from the above-referenced property; to assist with the design of septic tile beds.

The results of the particle size distribution analyses of the main soil unit consisting of silty clay indicate hydraulic conductivities of less than 1 x 10^{-6} cm/sec, corresponding to a factored infiltration rate of less than 5 mm/hr.

The estimated infiltration rate is based on recommendations found in "Low Impact Development Stormwater Management Planning and Design Guide, Appendix C" published by the Toronto and Region Conservation Authority (TRCA) and the Credit Valley Conservation Authority (CVC), and the approximate relationship between hydraulic conductivity and infiltration rate.

Additional in-situ infiltration testing is not recommended as it is Englobe's opinion that minimal additional information will be collected beyond the current level with such tests due to the very low hydraulic conductivity of the silty clay subsoil.

We trust that this letter is suitable for your present requirements. If you have any questions, please do not hesitate to contact our office.
Yours very truly,

Englobe Corp.

Robert Helwig, P.Geo. QP
Senior Geoscientist

Brock Development Group
1070 Riverside Drive
London ON, N6H 0L4

GE-01024
August 23, 2023

Attn: Michelle Doornbosch - michelle@brockdg.com

Re: Geotechnical Consultation – Soil Infiltration Testing
33418 Highbury Avenue, Ballymote

LDS Consultants Inc. (LDS) has been retained to provide geotechnical services for the proposed development located at 33418 Highhbury Avenue North, in Ballymote. The proposed development plan includes the construction of 19 residential dwellings situated along the East side of Hihgbury Avenue North and the South side of Medway Road. It is understood that as part of the stormwater management strategy roof leader discharge is to be directed toward soakaway pits constructed on each of the proposed lots. To support this approach the municipality has requested in-situ infiltration testing at the site.

Physiographic mapping for Southwestern Ontario (Chapman, L.J. and Putnam, D.F. 2007. Physiography of the Southwester Portion of Southern Ontario; Ontario Geological Survey, Miscellaneous Release - Data 228), identifies that the site is located within the Physiographic Region known as the Stratford Till Plain, with soils expected to be predominantly comprised of silty clay with some surficial silt and sand deposits.

On August 10, 2023, LDS visited the site for the purpose of reviewing the site conditions and to advance three test pits to conduct in-situ infiltration testing. The location of the test holes are shown on the appended site plan. Each test hole was advanced to a depth of approximately 1.2 m below existing grade, by an local excavation contractor provided by the client. The soils observed in the test holes were comprised of surficial topsoil (approximately 300 mm in thickness), underlain by silt which extended to termination depth. The silt was described as brown, with trace gravel and trace to some clay, in a moist and compact state.

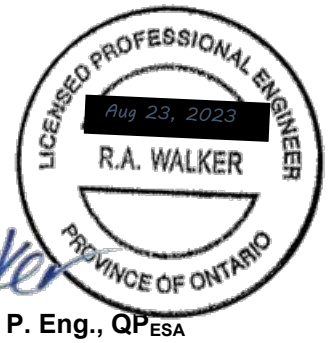
At termination depth within each test pit, LDS conducted an in-situ infiltration test, the results are summarized below:

Location	Measured Infiltration Rate mm/hr	Factored Infiltration Rate mm/hr
Test Pit 1 Silt, trace to some clay 1.2 m depth	4.7 mm/hr	1.9 mm/hr
Test Pit 2 Silt, trace to some clay 1.2 m depth	5.2 mm/hr	2.1 mm/hr
Test Pit 3 Silt, trace to some clay 1.2 m depth	4.5 mm/hr	1.8 mm/hr

The above factored infiltration rates were calculated using correlation from TRCA/CVC Low Impact Development Stormwater Management Planning and Design Guide protocol which references Ontario Ministry of Municipal Affairs and Housing (OMMAH). 1997. Supplementary Guidelines to the Ontario Building Code 1997. SG-6 Percolation Time and Soil Descriptions. Toronto, Ontario. A Factor of Safety of 2.5 has been applied in determining the factored infiltration rate.

We trust this satisfies your present requirements.

LDS CONSULTANTS INC.



Nick M. Houlton, EIT.
Geotechnical Services
Office: 226-289-2952
Cell: 519-636-7519
nick.houlton@LDSconsultants.ca

Rebecca A. Walker, P. Eng., QP$_{ESA}$
Principal, Geotechnical Services
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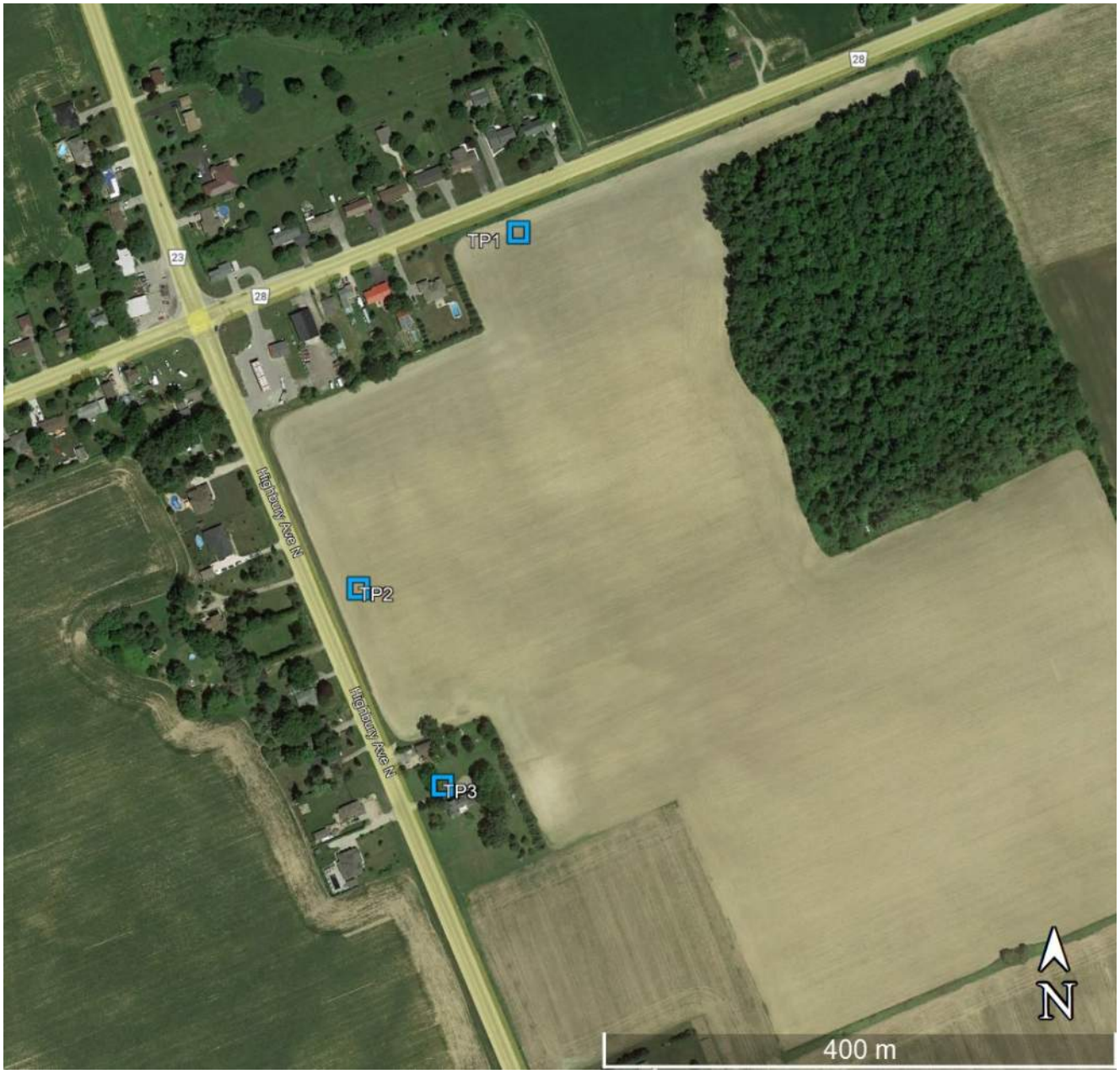
rebecca.walker@LDSconsultants.ca



SOURCE: Google Earth Aerial Imagery, Imagery Date, 07/02/2018

PROJECT NAME	PROJECT LOCATION	SCALE	PROJECT NO.
Geotechnical Site Review	33418 Highbury Avenue North	As Shown	GE-01024
LDS	FIGURE NAME Test Hole Location Plan	DATE August 2023	DRAWING NO. 1

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PLANNING • CIVIL • STRUCTURAL • MECHANICAL • ELECTRICAL

LONDON LOCATION
1599 Adelaide St. N., Units 301 & 203
London, ON N5X 4E8
P: 519-471-6667

KITCHENER LOCATION
1415 Huron Rd., Unit 225
Kitchener, ON N2R 0L3
P: 519-725-8093

www.sbmltd.ca

sbm@sbmltd.ca

SWM Calculations

DATE: January 25, 2024
JOB NO.: SBM-21-0716

Client: Brock Development Group
Project: Proposed Residential Development
Location: Medway Road, Ballymote, Ontario

Post-Development Catchment Area Calculations

LOT 1, 2, 3, 4 - A201, A202, A203, A204

TOTAL LOT AREA

	Area (m^2)	C-Value	AC
Total Site Area:	1902.77		
Building:	350.00	0.9	315
Concrete/Asphalt:	163.25	0.9	146.925
Landscape:	1389.52	0.2	277.904
Total Area:	1902.77		739.829
Runoff Coefficient C =	0.39		

UNCONTROLLED AREA

	Area (m^2)	C-Value	AC
Total Site Area:	1389.52		
Building:	0.00	0.9	0
Concrete/Asphalt:	0.00	0.9	0
Landscape:	1389.52	0.2	277.904
Total Area:	1389.52		277.904
Runoff Coefficient C =	0.20		

CONTROLLED AREA

	Area (m^2)	C-Value	AC
Total Site Area:	513.25		
Building:	350.00	0.9	315
Concrete/Asphalt:	163.25	0.9	146.925
Landscape:	0.00	0.2	0
Total Area:	513.25		461.925
Runoff Coefficient C =	0.90		

LOT 5 - A205

TOTAL LOT AREA

	Area (m^2)	C-Value	AC
Total Site Area:	1839.60		
Building:	350.00	0.9	315
Concrete/Asphalt:	163.25	0.9	146.925
Landscape:	1326.35	0.2	265.27
Total Area:	1839.60		727.195
Runoff Coefficient C =	0.40		

UNCONTROLLED AREA

	Area (m^2)	C-Value	AC
Total Site Area:	1326.35		
Building:	0.00	0.9	0
Concrete/Asphalt:	0.00	0.9	0
Landscape:	1326.35	0.2	265.27
Total Area:	1326.35		265.27
Runoff Coefficient C =	0.20		

CONTROLLED AREA

	Area (m^2)	C-Value	AC
Total Site Area:	513.25		
Building:	350.00	0.9	315
Concrete/Asphalt:	163.25	0.9	146.925
Landscape:	0.00	0.2	0
Total Area:	513.25		461.925
Runoff Coefficient C =	0.90		

LOT 17 - A217

TOTAL LOT AREA

	Area (m^2)	C-Value	AC
Total Site Area:	1960.75		
Building:	350.00	0.9	315
Concrete/Asphalt:	150.92	0.9	135.828
Landscape:	1459.83	0.2	291.966
Total Area:	1960.75		742.794
Runoff Coefficient C =	0.38		

UNCONTROLLED AREA

	Area (m^2)	C-Value	AC
Total Site Area:	1459.83		
Building:	0.00	0.9	0
Concrete/Asphalt:	0.00	0.9	0
Landscape:	1459.83	0.2	291.966
Total Area:	1459.83		291.966
Runoff Coefficient C =	0.20		

CONTROLLED AREA

	Area (m^2)	C-Value	AC
Total Site Area:	500.92		
Building:	350.00	0.9	315
Concrete/Asphalt:	150.92	0.9	135.828
Landscape:	0.00	0.2	0
Total Area:	500.92		450.828
Runoff Coefficient C =	0.90		

LOT 19 - A218

TOTAL LOT AREA

	Area (m^2)	C-Value	AC
Total Site Area:	2075.00		
Building:	350.00	0.9	315
Concrete/Asphalt:	162.08	0.9	145.872
Landscape:	1562.92	0.2	312.584
Total Area:	2075.00		773.456
Runoff Coefficient C =	0.37		

UNCONTROLLED AREA

	Area (m^2)	C-Value	AC
Total Site Area:	1562.92		
Building:	0.00	0.9	0
Concrete/Asphalt:	0.00	0.9	0
Landscape:	1562.92	0.2	312.584
Total Area:	1562.92		312.584
Runoff Coefficient C =	0.20		

CONTROLLED AREA

	Area (m^2)	C-Value	AC
Total Site Area:	512.08		
Building:	350.00	0.9	315
Concrete/Asphalt:	162.08	0.9	145.872
Landscape:	0.00	0.2	0
Total Area:	512.08		460.872
Runoff Coefficient C =	0.90		

LOT 6 - A206

TOTAL LOT AREA

	Area (m^2)	C-Value	AC
Total Site Area:	2059.28		
Building:	350.00	0.9	315
Concrete/Asphalt:	152.52	0.9	137.268
Landscape:	1556.76	0.2	311.352
Total Area:	2059.28		763.62
Runoff Coefficient C =	0.37		

UNCONTROLLED AREA

	Area (m^2)	C-Value	AC
Total Site Area:	1529.89		
Building:	0.00	0.9	0
Concrete/Asphalt:	0.00	0.9	0
Landscape:	1529.89	0.2	305.978
Total Area:	1529.89		305.978
Runoff Coefficient C =	0.20		

CONTROLLED AREA

	Area (m^2)	C-Value	AC
Total Site Area:	529.39		
Building:	350.00	0.9	315
Concrete/Asphalt:	152.52	0.9	137.268
Landscape:	26.87	0.2	5.374
Total Area:	529.39		457.642
Runoff Coefficient C =	0.86		

LOT 7, 8, 9, 10, 11, 12, 13, 14, 15 - A207, A208, A209, A210, A211, A212, A213, A214, A215

TOTAL LOT AREA

	Area (m^2)	C-Value	AC
Total Site Area:	2099.61		
Building:	350.00	0.9	315
Concrete/Asphalt:	152.52	0.9	137.268
Landscape:	1597.09	0.2	319.418
Total Area:	2099.61		771.686
Runoff Coefficient C =	0.37		

UNCONTROLLED AREA

	Area (m^2)	C-Value	AC
Total Site Area:	1570.22		
Building:	0.00	0.9	0
Concrete/Asphalt:	0.00	0.9	0
Landscape:	1570.22	0.2	314.044
Total Area:	1570.22		314.044
Runoff Coefficient C =	0.20		

CONTROLLED AREA

	Area (m^2)	C-Value	AC
Total Site Area:	529.39		
Building:	350.00	0.9	315
Concrete/Asphalt:	152.52	0.9	137.268
Landscape:	26.87	0.2	5.374
Total Area:	529.39		457.642
Runoff Coefficient C =	0.86		

LOT 16 - A216

TOTAL LOT AREA

	Area (m^2)	C-Value	AC
Total Site Area:	2214.71		
Building:	350.00	0.9	315
Concrete/Asphalt:	161.54	0.9	145.386
Landscape:	1703.17	0.2	340.634
Total Area:	2214.71		801.02
Runoff Coefficient C =	0.36		

UNCONTROLLED AREA

	Area (m^2)	C-Value	AC
Total Site Area:	1703.17		
Building:	0.00	0.9	0
Concrete/Asphalt:	0.00	0.9	0
Landscape:	1703.17	0.2	340.634
Total Area:	1703.17		340.634
Runoff Coefficient C =	0.20		

CONTROLLED AREA

	Area (m^2)	C-Value	AC
Total Site Area:	511.54		
Building:	350.00	0.9	315
Concrete/Asphalt:	161.54	0.9	145.386
Landscape:	0.00	0.2	0
Total Area:	511.54		460.386
Runoff Coefficient C =	0.90		

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LONDON LOCATION
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London, ON N5X 4E8
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KITCHENER LOCATION
1415 Huron Rd., Unit 225
Kitchener, ON N2R 0L3
P: 519-725-8093

www.sbmltd.ca

sbm@sbmltd.ca

SWM Calculations

DATE: January 25, 2024
JOB N0.: SBM-21-0716

Client: Brock Development Group
Project: Proposed Residential Development
Location: Medway Road, Ballymote, Ontario

CITY OF LONDON-3 CHICAGO RAINFALL DISTRIBUTION PARAMETERS*

Return Period (years)	A,B,C Parameters A	B	C
25mm	538.850	6.331	0.809
2	1290.000	8.500	0.860
5	1183.740	7.641	0.838
10	1574.382	9.025	0.860
25	2019.372	9.824	0.875
50	2270.665	9.984	0.876
100	2619.363	10.500	0.884
250	3048.220	10.030	0.888

Intensity i=A/(t+B)^C (mm/hr)
Section 6.2 of Municipality of Middlesex Centre IDS, City of London a,b, & c design parameters are used.

Runoff Coefficients (C-Value) from Section 4.8.3 of Municipality of Middlesex Centre Infrastructure Design Standards (IDS)

A201, A202, A203, A204, A205 - LOTS 1, 2, 3, 4, 5

PRE-DEVELOPMENT CONDITIONS

	Area (m^2)	C-Value	AC
Total Site Area:	513.25		
Building:	0.00	0.9	0
Concrete/Asphalt:	0.00	0.9	0
Landscape:	513.25	0.2	102.65
Total Area:	513.25		102.65
Runoff Coefficient C =	0.20		

5-Year Pre-Development Flows

C-value =	0.20	
**Time of concentration t_c =	23	min
Intensity, i (@ t_c) =	67.26	mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A =	1.92	l/s

100-Year Pre-Development Flows

C-value =	0.20	
**Time of concentration t_c =	23	min
Intensity, i (@ t_c) =	117.50	mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A =	3.35	l/s

POST-DEVELOPMENT CONTROLLED AREAS (A201 - A205)

	Area (m^2)	C-Value	AC
Total Site Area:	513.25		
Building:	350.00	0.9	315
Concrete/Asphalt:	163.25	0.9	146.925
Landscape:	0.00	0.2	0
Total Area:	513.25		461.925
Runoff Coefficient C =	0.90		

5-Year Post-Development Flows

C-value =	0.90	
**Time of concentration t_c =	10.3	min
Intensity, i (@ t_c) =	105.33	mm/hr
Post-Development Flow, Q_c = 2.78*C*i*A =	13.53	l/s

100-Year Post-Development Flows

C-value =	0.90	
**Time of concentration t_c =	10.3	min
Intensity, i (@ t_c) =	179.07	mm/hr
Post-Development Flow, Q_c = 2.78*C*i*A =	23.00	l/s

**Time of concentration from Section 4.8.2 - Municipality of Middlesex Centre - Infrastructure Design Standards

SOAK-AWAY PIT DETAILS

Stone Depth	0.260	m
Stone Width=	9.200	m
Stone Length=	20.000	m
19mm Clear Stone Void Ratio=	0.35	
Infiltration Rate=	5.28E-07	m/s
Storage (Total)=	16.744	m^3
Contact Area to Soil (Bottom Area Only)=	184.00	m^2

Infiltration Rate

Factored Infiltration rate	1.9	mm/hr*
	5.28E-07	m/s

*LDS Soil Infiltration Testing, GE-01024, August 23, 2023

INFILTRATION RATE CALCULATIONS

A=	184.000	m^2 Contact Area to Soil
I=	5.28E-07	m/s
A*I	**9.71E-05**	m^3/s

5 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Soakway Pit Surface Overflow Q_o (l/s)	Soak-away Pit Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
10.3	105.33	13.53	8.36	0.00	0.06	0.06	8.30
15	86.67	11.13	10.02	0.00	0.09	0.09	9.93
30	56.60	7.27	13.08	0.00	0.17	0.17	12.91
60	34.64	4.45	16.01	0.00	0.35	0.35	15.66
120	20.34	2.61	18.81	0.19	0.70	2.07	16.74
180	14.73	1.89	20.43	0.24	1.05	3.69	16.74
						Max. Storage Volume (m^3) =	16.74

100 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Soakway Pit Surface Overflow Q_o (l/s)	Soak-away Pit Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
10.3	179.07	23.00	14.21	0.00	0.06	0.06	14.15
15	149.56	19.21	17.29	0.50	0.09	0.54	16.74
30	99.36	12.76	22.97	3.36	0.17	6.22	16.74
60	60.87	7.82	28.14	3.07	0.35	11.40	16.74
120	35.32	4.54	32.65	2.11	0.70	15.91	16.74
180	25.28	3.25	35.06	1.60	1.05	18.32	16.74
						Max. Storage Volume (m^3) =	16.74

Total Storage Available within infiltration trench (m^3) = **16.74**
Required 5 Year Storage (m^3) = **16.74**
Required 100 Year Storage (m^3) = **16.74**

Drawdown time for soak-away pit
5 year storm events 47.89 hrs
100 year storm events 47.89 hrs

RETURN PERIOD OF STORM	PRE-DEVELOPMENT PEAK FLOW (L/s)	POST-DEVELOPMENT EXFILTRATION RATE (L/s)	POST-DEVELOPMENT PEAK OVERFLOW TO MUNICIPAL DRAIN (L/s)	PRE - POST PEAK OUTFLOW TO DOWNSTREAM (L/s)	POST DEVELOPMENT PEAK FLOW TO PRE DEVELOPMENT PEAK FLOW IN PERCENTILE
5-YEAR	**1.92**	0.10	**0.24**	**1.68**	**13%**
100-YEAR	**3.35**	0.10	**3.36**	**-0.01**	**100%**

Therefore, post-development peak flow during 2-year event is approximately 13% of pre-development peak flow during 2-year event, and post-development peak flow during 100-year storm event is approxmiately 100% of pre-development peak flow during 100-year event.

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SWM Calculations

DATE: January 25, 2024
JOB N0.: SBM-21-0716

Client: Brock Development Group
Project: Proposed Residential Development
Location: Medway Road, Ballymote, Ontario

CITY OF LONDON-3 CHICAGO RAINFALL DISTRIBUTION PARAMETERES*

Return Period (years)	A,B,C Parameters A	B	C
25mm	538.850	6.331	0.809
2	1290.000	8.500	0.860
5	1183.740	7.641	0.838
10	1574.382	9.025	0.860
25	2019.372	9.824	0.875
50	2270.665	9.984	0.876
100	2619.363	10.500	0.884
250	3048.220	10.030	0.888

Intensity i=A/(t+B)^C (mm/hr)
Section 6.2 of Municipality of Middlesex Centre IDS, City of London a,b, & c design parameters are used.

Runoff Coefficients (C-Value) from Section 4.8.3 of Municipality of Middlesex Centre Infrastructure Design Standards (IDS)

A206-A215 - LOTS 6-15

PRE-DEVELOPMENT CONDITIONS (A101)

	Area (m^2)	C-Value	AC
Total Site Area:	529.39		
Building:	0.00	0.9	0
Concrete/Asphalt:	0.00	0.9	0
Landscape:	529.39	0.2	105.878
Total Area:	529.39		105.878
Runoff Coefficient C =	0.20		

5-Year Pre-Development Flows

C-value =	0.20	
**Time of concentration t_c =	23	min
Intensity, i (@ t_c) =	67.26	mm/hr
Pre-Development Flow, Q_t = 2.78*C*i*A =	1.98	l/s

100-Year Pre-Development Flows

C-value =	0.20	
**Time of concentration t_c =	23	min
Intensity, i (@ t_c) =	117.50	mm/hr
Pre-Development Flow, Q_t = 2.78*C*i*A =	3.46	l/s

POST-DEVELOPMENT CONTROLLED AREAS (A206 - A215)

	Area (m^2)	C-Value	AC
Total Site Area:	529.39		
Building:	350.00	0.9	315
Concrete/Asphalt:	152.52	0.9	137.268
Landscape:	26.87	0.2	5.374
Total Area:	529.39		457.642
Runoff Coefficient C =	0.86		

5-Year Post-Development Flows

C-value =	0.86	
**Time of concentration t_c =	10.75	min
Intensity, i (@ t_c) =	103.16	mm/hr
Post-Development Flow, Q_c = 2.78*C*i*A =	13.12	l/s

100-Year Post-Development Flows

C-value =	0.86	
**Time of concentration t_c =	10.75	min
Intensity, i (@ t_c) =	175.72	mm/hr
Post-Development Flow, Q_c = 2.78*C*i*A =	22.36	l/s

**Time of concentration from Section 4.8.2 - Municipality of Middlesex Centre - Infrastructure Design Standards

SOAK-AWAY PIT DETAILS

Stone Depth	0.288	m
Stone Width=	8.100	m
Stone Length=	20.000	m
19mm Clear Stone Void Ratio=	0.35	
Infiltration Rate=	5.83E-07	m/s
Storage (Total)=	16.3296	m^3
Contact Area to Soil (Bottom Area Only)=	162.00	m^2

Infiltration Rate

Factored Infiltration rate	2.1	mm/hr*
	5.83E-07	m/s

*LDS Soil Infiltration Testing, GE-01024, August 23, 2023

INFILTRATION RATE CALCULATIONS

A=	162.000	m^2 Contact Area to Soil
I=	5.83E-07	m/s
A*I	**9.45E-05**	m^3/s

5 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Soakway Pit Surface Overflow Q_o (l/s)	Soak-away Pit Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
10.75	103.16	13.12	8.47	0.00	0.06	0.06	8.40
15	86.67	11.03	9.92	0.00	0.09	0.09	9.84
30	56.60	7.20	12.96	0.00	0.17	0.17	12.79
60	34.64	4.41	15.86	0.00	0.34	0.34	15.52
120	20.34	2.59	18.64	0.23	0.68	2.31	16.33
180	14.73	1.87	20.24	0.27	1.02	3.91	16.33
						Max. Storage Volume (m^3) =	16.33

100 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Soakway Pit Surface Overflow Q_o (l/s)	Soak-away Pit Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
10.75	175.72	22.36	14.42	0.00	0.06	0.06	14.36
15	149.56	19.03	17.12	0.79	0.09	0.80	16.33
30	99.36	12.64	22.75	3.47	0.17	6.42	16.33
60	60.87	7.74	27.88	3.11	0.34	11.55	16.33
120	35.32	4.49	32.35	2.13	0.68	16.02	16.33
180	25.28	3.22	34.73	1.61	1.02	18.41	16.33
						Max. Storage Volume (m^3) =	16.33

Total Storage Available within infiltration trench (m^3) = **16.33**
Required 5 Year Storage (m^3) = **16.33**
Required 100 Year Storage (m^3) = **16.33**

Drawdown time for soak-away pit
5 year storm events 48.00 hrs
100 year storm events 48.00 hrs

RETURN PERIOD OF STORM	PRE-DEVELOPMENT PEAK FLOW (L/s)	POST-DEVELOPMENT EXFILTRATION RATE (L/s)	POST-DEVELOPMENT PEAK OVERFLOW TO MUNICIPAL DRAIN (L/s)	PRE - POST PEAK OUTFLOW TO DOWNSTREAM (L/s)	POST DEVELOPMENT PEAK FLOW TO PRE DEVELOPMENT PEAK FLOW IN PERCENTILE
5-YEAR	**1.98**	0.09	**0.27**	**1.71**	**14%**
100-YEAR	**3.46**	0.09	**3.47**	**-0.02**	**100%**

Therefore, post-development peak flow during 2-year event is approximately 14% of pre-development peak flow during 2-year event, and post-development peak flow during 100-year storm event is approxmiately 100% of pre-development peak flow during 100-year event.

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SWM Calculations

DATE: January 25, 2024
JOB N0.: SBM-21-0716

Client: Brock Development Group
Project: Proposed Residential Development
Location: Medway Road, Ballymote, Ontario

CITY OF LONDON-3 CHICAGO RAINFALL DISTRIBUTION PARAMETERS*

Return Period (years)	A,B,C Parameters A	B	C
25mm	538.850	6.331	0.809
2	1290.000	8.500	0.860
5	1183.740	7.641	0.838
10	1574.382	9.025	0.860
25	2019.372	9.824	0.875
50	2270.665	9.984	0.876
100	2619.363	10.500	0.884
250	3048.220	10.030	0.888

Intensity i=A/(t+B)^C (mm/hr)
Section 6.2 of Municipality of Middlesex Centre IDS, City of London a,b, & c design parameters are used.

Runoff Coefficients (C-Value) from Section 4.8.3 of Municipality of Middlesex Centre Infrastructure Design Standards (IDS)

A216 - LOTS 16

PRE-DEVELOPMENT CONDITIONS (A101)

	Area (m^2)	C-Value	AC
Total Site Area:	511.54		
Building:	0.00	0.9	0
Concrete/Asphalt:	0.00	0.9	0
Landscape:	511.54	0.2	102.308
Total Area:	511.54		102.308
Runoff Coefficient C =	0.20		

POST-DEVELOPMENT CONTROLLED AREAS (A206 - A215)

	Area (m^2)	C-Value	AC
Total Site Area:	511.54		
Building:	350.00	0.9	315
Concrete/Asphalt:	161.54	0.9	145.386
Landscape:	0.00	0.2	0
Total Area:	511.54		460.386
Runoff Coefficient C =	0.90		

5-Year Pre-Development Flows

C-value = 0.20
**Time of concentration t_c = 23 min
Intensity, i (@ t_c) = 67.26 mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A = 1.91 l/s

5-Year Post-Development Flows

C-value = 0.90
**Time of concentration t_c = 10.3 min
Intensity, i (@ t_c) = 105.33 mm/hr
Post-Development Flow, Q_r = 2.78*C*i*A = 13.48 l/s

100-Year Pre-Development Flows

C-value = 0.20
**Time of concentration t_c = 23 min
Intensity, i (@ t_c) = 117.50 mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A = 3.34 l/s

100-Year Post-Development Flows

C-value = 0.90
**Time of concentration t_c = 10.3 min
Intensity, i (@ t_c) = 179.07 mm/hr
Post-Development Flow, Q_r = 2.78*C*i*A = 22.92 l/s

**Time of concentration from Section 4.8.2 - Municipality of Middlesex Centre - Infrastructure Design Standards

SOAK-AWAY PIT DETAILS

Stone Depth 0.288 m
Stone Width= 8.300 m
Stone Length= 20.000 m
19mm Clear Stone Void Ratio= 0.35
Infiltration Rate= 5.83E-07 m/s
Storage (Total)= 16.7328 m^3
Contact Area to Soil (Bottom Area Only)= 166.00 m^2

Infiltration Rate

Factored Infiltration rate 2.1 mm/hr*
5.83E-07 m/s

*LDS Soil Infiltration Testing, GE-01024, August 23, 2023

INFILTRATION RATE CALCULATIONS

A= 166.000 m^2 Contact Area to Soil
I= 5.83E-07 m/s
A*I **9.68E-05** m^3/s

5 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Soakway Pit Surface Overflow Q_o (l/s)	Soak-away Pit Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
10.3	105.33	13.48	8.33	0.00	0.06	0.06	8.27
15	86.67	11.09	9.98	0.00	0.09	0.09	9.90
30	56.60	7.24	13.04	0.00	0.17	0.17	12.87
60	34.64	4.43	15.96	0.00	0.35	0.35	15.61
120	20.34	2.60	18.75	0.18	0.70	2.01	16.73
180	14.73	1.89	20.36	0.24	1.05	3.63	16.73
						Max. Storage Volume (m^3) =	16.73

100 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Soakway Pit Surface Overflow Q_o (l/s)	Soak-away Pit Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
10.3	179.07	22.92	14.16	0.00	0.06	0.06	14.10
15	149.56	19.14	17.23	0.45	0.09	0.49	16.73
30	99.36	12.72	22.89	3.32	0.17	6.16	16.73
60	60.87	7.79	28.05	3.05	0.35	11.31	16.73
120	35.32	4.52	32.55	2.10	0.70	15.81	16.73
180	25.28	3.24	34.94	1.59	1.05	18.21	16.73
						Max. Storage Volume (m^3) =	16.73

Total Storage Available within infiltration trench (m^3) = 16.73
Required 5 Year Storage (m^3) = 16.73
Required 100 Year Storage (m^3) = 16.73

Drawdown time for soak-away pit
5 year storm events 48.00 hrs
100 year storm events 48.00 hrs

RETURN PERIOD OF STORM	PRE-DEVELOPMENT PEAK FLOW (L/s)	POST-DEVELOPMENT EXFILTRATION RATE (L/s)	POST-DEVELOPMENT PEAK OVERFLOW TO MUNICIPAL DRAIN (L/s)	PRE - POST PEAK OUTFLOW TO DOWNSTREAM (L/s)	POST DEVELOPMENT PEAK FLOW TO PRE DEVELOPMENT PEAK FLOW IN PERCENTILE
5-YEAR	**1.91**	0.10	**0.24**	**1.67**	**12%**
100-YEAR	**3.34**	0.10	**3.32**	**0.02**	**99%**

Therefore, post-development peak flow during 2-year event is approximately 12% of pre-development peak flow during 2-year event, and post-development peak flow during 100-year storm event is approxmiately 99% of pre-development peak flow during 100-year event.

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SWM Calculations

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Client: Brock Development Group
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CITY OF LONDON-3 CHICAGO RAINFALL DISTRIBUTION PARAMETERS*

Return Period (years)	A,B,C Parameters A	B	C
25mm	538.850	6.331	0.809
2	1290.000	8.500	0.860
5	1183.740	7.641	0.838
10	1574.382	9.025	0.860
25	2019.372	9.824	0.875
50	2270.665	9.984	0.876
100	2619.363	10.500	0.884
250	3048.220	10.030	0.888

Intensity i=A/(t+B)^C (mm/hr)
Section 6.2 of Municipality of Middlesex Centre IDS, City of London a,b, & c design parameters are used.

Runoff Coefficients (C-Value) from Section 4.8.3 of Municipality of Middlesex Centre Infrastructure Design Standards (IDS)

A217 - LOT 17

PRE-DEVELOPMENT CONDITIONS

	Area (m^2)	C-Value	AC
Total Site Area:	500.92		
Building:	0.00	0.9	0
Concrete/Asphalt:	0.00	0.9	0
Landscape:	500.92	0.2	100.184
Total Area:	500.92		100.184
Runoff Coefficient C =	0.20		

POST-DEVELOPMENT CONTROLLED AREAS (A216)

	Area (m^2)	C-Value	AC
Total Site Area:	500.92		
Building:	350.00	0.9	315
Concrete/Asphalt:	150.92	0.9	135.828
Landscape:	0.00	0.2	0
Total Area:	500.92		450.828
Runoff Coefficient C =	0.90		

5-Year Pre-Development Flows

C-value =	0.20	
**Time of concentration t_c =	23	min
Intensity, i (@ t_c) =	67.26	mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A =	1.87	l/s

5-Year Post-Development Flows

C-value =	0.90	
**Time of concentration t_c =	10.3	min
Intensity, i (@ t_c) =	105.33	mm/hr
Post-Development Flow, Q_r = 2.78*C*i*A =	13.20	l/s

100-Year Pre-Development Flows

C-value =	0.20	
**Time of concentration t_c =	23	min
Intensity, i (@ t_c) =	117.50	mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A =	3.27	l/s

100-Year Post-Development Flows

C-value =	0.90	
**Time of concentration t_c =	10.3	min
Intensity, i (@ t_c) =	179.07	mm/hr
Post-Development Flow, Q_r = 2.78*C*i*A =	22.44	l/s

**Time of concentration from Section 4.8.2 - Municipality of Middlesex Centre - Infrastructure Design Standards

SOAK-AWAY PIT DETAILS

Stone Depth	0.245	m
Stone Width=	9.550	m
Stone Length=	20.000	m
19mm Clear Stone Void Ratio=	0.35	
Infiltration Rate=	5.00E-07	m/s
Storage (Total)=	16.37825	m^3
Contact Area to Soil (Bottom Area Only)=	191.00	m^2

Infiltration Rate

Factored Infiltration rate	1.8	mm/hr*
	5.00E-07	m/s

*LDS Soil Infiltration Testing, GE-01024, August 23, 2023

INFILTRATION RATE CALCULATIONS

A=	191.000	m^2 Contact Area to Soil
I=	5.00E-07	m/s
A*I	**9.55E-05**	m^3/s

5 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Soakway Pit Surface Overflow Q_o (l/s)	Soak-away Pit Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
10.3	105.33	13.20	8.16	0.00	0.06	0.06	8.10
15	86.67	10.86	9.78	0.00	0.09	0.09	9.69
30	56.60	7.09	12.77	0.00	0.17	0.17	12.60
60	34.64	4.34	15.63	0.00	0.34	0.34	15.28
120	20.34	2.55	18.36	0.18	0.69	1.98	16.38
180	14.73	1.85	19.94	0.23	1.03	3.56	16.38
						Max. Storage Volume (m^3) =	16.38

100 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Soakway Pit Surface Overflow Q_o (l/s)	Soak-away Pit Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
10.3	179.07	22.44	13.87	0.00	0.06	0.06	13.81
15	149.56	18.74	16.87	0.45	0.09	0.49	16.38
30	99.36	12.45	22.41	3.26	0.17	6.04	16.38
60	60.87	7.63	27.46	2.98	0.34	11.09	16.38
120	35.32	4.43	31.87	2.06	0.69	15.49	16.38
180	25.28	3.17	34.22	1.56	1.03	17.84	16.38
						Max. Storage Volume (m^3) =	16.38

Total Storage Available within infiltration trench (m^3) = **16.38**
Required 5 Year Storage (m^3) = **16.38**
Required 100 Year Storage (m^3) = **16.38**

Drawdown time for soak-away pit
5 year storm events 47.64 hrs
100 year storm events 47.64 hrs

RETURN PERIOD OF STORM	PRE-DEVELOPMENT PEAK FLOW (L/s)	POST-DEVELOPMENT EXFILTRATION RATE (L/s)	POST-DEVELOPMENT PEAK OVERFLOW TO MUNICIPAL DRAIN (L/s)	PRE - POST PEAK OUTFLOW TO DOWNSTREAM (L/s)	POST DEVELOPMENT PEAK FLOW TO PRE DEVELOPMENT PEAK FLOW IN PERCENTILE
5-YEAR	**1.87**	0.10	**0.23**	**1.64**	**12%**
100-YEAR	**3.27**	0.10	**3.26**	**0.01**	**100%**

Therefore, post-development peak flow during 2-year event is approximately 12% of pre-development peak flow during 2-year event, and post-development peak flow during 100-year storm event is approxmiately 100% of pre-development peak flow during 100-year event.

STRIK BALDINELLI MONIZ
PLANNING · CIVIL · STRUCTURAL · MECHANICAL · ELECTRICAL

LONDON LOCATION
1599 Adelaide St. N., Units 301 & 203
London, ON N5X 4E8
P: 519-471-6667

KITCHENER LOCATION
1415 Huron Rd., Unit 225
Kitchener, ON N2R 0L3
P: 519-725-8093

www.sbmltd.ca

sbm@sbmltd.ca

SWM Calculations

DATE: January 25, 2024
JOB N0.: SBM-21-0716

Client: Brock Development Group
Project: Proposed Residential Development
Location: Medway Road, Ballymote, Ontario

CITY OF LONDON-3 CHICAGO RAINFALL DISTRIBUTION PARAMETERES*

Return Period (years)	A,B,C Parameters A	B	C
25mm	538.850	6.331	0.809
2	1290.000	8.500	0.860
5	1183.740	7.641	0.838
10	1574.382	9.025	0.860
25	2019.372	9.824	0.875
50	2270.665	9.984	0.876
100	2619.363	10.500	0.884
250	3048.220	10.030	0.888

Intensity i=A/(t+B)^C (mm/hr)
Section 6.2 of Municipality of Middlesex Centre IDS, City of London a,b, & c design parameters are used.

Runoff Coefficients (C-Value) from Section 4.8.3 of Municipality of Middlesex Centre Infrastructure Design Standards (IDS)

A218 - LOT 19

PRE-DEVELOPMENT CONDITIONS

	Area (m^2)	C-Value	AC
Total Site Area:	512.08		
Building:	0.00	0.9	0
Concrete/Asphalt:	0.00	0.9	0
Landscape:	512.08	0.2	102.416
Total Area:	512.08		102.416
Runoff Coefficient C =	0.20		

POST-DEVELOPMENT CONTROLLED AREAS (A217 - A218)

	Area (m^2)	C-Value	AC
Total Site Area:	512.08		
Building:	350.00	0.9	315
Concrete/Asphalt:	162.08	0.9	145.872
Landscape:	0.00	0.2	0
Total Area:	512.08		460.872
Runoff Coefficient C =	0.90		

5-Year Pre-Development Flows

C-value =	0.20	
**Time of concentration t_c =	23	min
Intensity, i (@ t_c) =	67.26	mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A =	1.91	l/s

5-Year Post-Development Flows

C-value =	0.90	
**Time of concentration t_c =	10.3	min
Intensity, i (@ t_c) =	105.33	mm/hr
Post-Development Flow, Q_r = 2.78*C*i*A =	13.49	l/s

100-Year Pre-Development Flows

C-value =	0.20	
**Time of concentration t_c =	23	min
Intensity, i (@ t_c) =	117.50	mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A =	3.35	l/s

100-Year Post-Development Flows

C-value =	0.90	
**Time of concentration t_c =	10.3	min
Intensity, i (@ t_c) =	179.07	mm/hr
Post-Development Flow, Q_r = 2.78*C*i*A =	22.94	l/s

**Time of concentration from Section 4.8.2 - Municipality of Middlesex Centre - Infrastructure Design Standards

SOAK-AWAY PIT DETAILS

Stone Depth	0.245	m
Stone Width=	9.750	m
Stone Length=	20.000	m
19mm Clear Stone Void Ratio=	0.35	
Infiltration Rate=	5.00E-07	m/s
Storage (Total)=	16.72125	m^3
Contact Area to Soil (Bottom Area Only)=	195.00	m^2

Infiltration Rate

Factored Infiltration rate	1.8	mm/hr*
	5.00E-07	m/s

*LDS Soil Infiltration Testing, GE-01024, August 23, 2023

INFILTRATION RATE CALCULATIONS

A=	195.000	m^2 Contact Area to Soil
I=	5.00E-07	m/s
A*I	**9.75E-05**	m^3/s

5 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Soakway Pit Surface Overflow Q_o (l/s)	Soak-away Pit Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
10.3	105.33	13.49	8.34	0.00	0.06	0.06	8.28
15	86.67	11.10	9.99	0.00	0.09	0.09	9.91
30	56.60	7.25	13.05	0.00	0.18	0.18	12.88
60	34.64	4.44	15.98	0.00	0.35	0.35	15.62
120	20.34	2.61	18.77	0.19	0.70	2.05	16.72
180	14.73	1.89	20.38	0.24	1.05	3.66	16.72
						Max. Storage Volume (m^3) =	16.72

100 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Soakway Pit Surface Overflow Q_o (l/s)	Soak-away Pit Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
10.3	179.07	22.94	14.18	0.00	0.06	0.06	14.12
15	149.56	19.16	17.25	0.49	0.09	0.52	16.72
30	99.36	12.73	22.91	3.34	0.18	6.19	16.72
60	60.87	7.80	28.08	3.06	0.35	11.35	16.72
120	35.32	4.53	32.58	2.11	0.70	15.86	16.72
180	25.28	3.24	34.98	1.59	1.05	18.26	16.72
						Max. Storage Volume (m^3) =	16.72

Total Storage Available within infiltration trench (m^3) = **16.72**
Required 5 Year Storage (m^3) = **16.72**
Required 100 Year Storage (m^3) = **16.72**

Drawdown time for soak-away pit
5 year storm events 47.64 hrs
100 year storm events 47.64 hrs

RETURN PERIOD OF STORM	PRE-DEVELOPMENT PEAK FLOW (L/s)	POST-DEVELOPMENT EXFILTRATION RATE (L/s)	POST-DEVELOPMENT PEAK OVERFLOW TO MUNICIPAL DRAIN (L/s)	PRE - POST PEAK OUTFLOW TO DOWNSTREAM (L/s)	POST DEVELOPMENT PEAK FLOW TO PRE DEVELOPMENT PEAK FLOW IN PERCENTILE
5-YEAR	**1.91**	0.10	**0.24**	**1.67**	**13%**
100-YEAR	**3.35**	0.10	**3.34**	**0.00**	**100%**

Therefore, post-development peak flow during 2-year event is approximately 13% of pre-development peak flow during 2-year event, and post-development peak flow during 100-year storm event is approxmiately 100% of pre-development peak flow during 100-year event.

APPENDIX D

Domestic Water Demand and Velocity Calculation
Fire Flow Test received from Middlesex Centre

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Kitchener, ON N2R 0L3
P: 519-725-8093

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sbm@sbmltd.ca

DOMESTIC WATER DEMAND AND VELOCITY CALCULATION

DATE:	January 20, 2023
JOB No.:	SBM-21-0716
Client:	**Brock Development Group**
Project:	**Proposed Residential Development**
Location:	**Medway Road, Ballymote, Ontario**

DEMAND CALCULATION

*Avg. Day Demand =	350	L/day/cap
Avg. Day Demand =	0.004050926	L/s/cap
**Max. Day Peaking Factor =	9.5	
**Max. Hour Peaking Factor =	14.3	
*Low Density Residential =	3.0	p/unit

	Units/Area (ha)	Population	Avg. Day (L/s)	Max. Hour (L/s)	Max. Day (L/s)
Low Density Residential	18	54	0.22	3.13	2.08
Total			**0.22**	**3.13**	**2.08**
USGPM:			3	50	33

*Refer to Section 5.3 of Municipality of Middlesex Centre - Infrastructure Design Standards
**Refer to MECP "The Design Guidelines for Drinking-Water Systems" (2008)

VELOCITY CALCULATION

Diameter (mm)	Demand (L/s)	Velocity (m/s)
100	3.13	0.398
300	3.13	0.044

Maximum allowable velocity of 1.5 m/s under maximum hour domestic flow conditions as per Section 5.3.7 of Municipality of Middlesex Centre - Infrastructure Design Standards.

FLOWMETRIX
TECHNICAL SERVICES INC.

TOTAL NUMBER OF TESTS	5	# OF TESTS COMPLETED	5	PROJECT % COMPLETION	100.0%

Middlesex Centre - Ballymote

Total Vol. (m3) 19

Start Date 16-Jun-22

End Date 16-Jun-22

2022 Fire Flow Testing Program

TEST INFORMATION					RESIDUAL HYDRANT INFORMATION						FLOW HYDRANT(S) INFORMATION				TOTAL	TOTAL
Date	Time	Civic Address	Make	Model	Test Hydrant #	Static Pressure (PSI)	Residual Pressure (PSI)	% Drop (PSI)	Flow @ 20 PSI	COLOUR	Hydrant #	# of Ports Flowed	Pitot Pressure (PSI)	Discharge Flow (USGPM)	Tests Duration (Min)	Total Vol (Gal)
16-Jun-22	8:30	15330 Medway Rd	AVK	2700	Ba-03	49.3	31.3	36.5	992	ORANGE	Ba-02	1	25.5	762	1.17	890
16-Jun-22	8:30	21604 Highbury Ave N	Canada Valve	Century	Ba-04	47.7	30.2	36.8	976	ORANGE	Ba-02	1	25.5	762	1.17	890
16-Jun-22	8:55	21496 Highbury Ave N	Canada Valve	Century	Ba-05	47.8	37.2	22.2	1330	GREEN	Ba-02	1	27.4	790	1.42	1119
16-Jun-22	8:55	15233 Medway Rd	Canada Valve	Century	Ba-01	50.0	34.4	31.2	1125	GREEN	Ba-02	1	27.4	790	1.42	1119
16-Jun-22	9:20	21554 Highbury Ave N	Canada Valve	Century	Ba-02	47.7	34.1	28.4	1185	GREEN	Ba-05	1	28.5	805	1.25	1006

Comments: 1 LPD was used during these tests

APPENDIX E

Homeowner Information Package

Stormwater Infiltration Trench

Homeowners' Information Package

All drainage from your lot makes its way to the Thames River through groundwater, a system of front yard storm water infiltration soakaway pits, front, side and rear yard swales and ditches, and nearby open watercourses. Your lot has been Engineered to retain natural drainage characteristics as much as possible. Some of the measures on your lot are:

- Storm water infiltration soakaway pit across the front of the lot to temporarily store your rainwater runoff from larger and more intense storms, infiltrate that runoff into the ground, provide some pre-treatment/filtering, and erosion and sediment control for improved storm water quality.
- Front, side and rear yard storm water swales to temporarily store your lot runoff from larger and more intense storms, infiltrate that runoff into the ground, provide some pre-treatment/polishing, and erosion and sediment control for improved storm water quality.
- In addition, measures such as temporary silt fencing, are to be undertaken during construction to reduce erosion, sedimentation, and water quality impacts on the receiving system.

These measures assist in reducing the detrimental impact that the development may otherwise have on storm water quality and quantity of the receiving system.

What can you do to help?

The provision of the above noted measures alone does not solve the problem forever. The measures noted above must be maintained and the residents of each lot must practice preventative measures. The following is a non-inclusive list of homeowner obligations to keep the storm water infiltration trenches functioning properly:

1. Retain the grades on the property in compliance with the approved lot grading plan issued at the time of your home construction;
2. Prevent the storage of items or construction of shed in the front and rear yard in the area of the storm water infiltration soakaway pit and swales;
3. When building decks and patios, consider wooden decking as opposed to a harder and impermeable surfaces to minimize the amount of paved surfaces;
4. Prevent oil and fluid spills or leaks from motor vehicles;
5. Avoid pesticide use, particularly before major storm events and/or consider using organic alternatives to pesticides and fertilizers. This will help with water quality issues;
6. During winter maintenance consider sand and salt alternatives to reduce the amount of salt and sand from entering the side yard swales and roadside ditch to the front;
7. Prevent the entry of debris or pollutants of any kind from entering the infiltration soakaway pit;
8. Remove sediment and debris from the front, side and rear yard swales;
9. Remember that your front yard storm water infiltration soakaway pit and front, side and rear yard swales are designed to temporarily retain and pond runoff water during and after rainfall events.

Use of the above practices and being aware of the purpose of these systems will help keep and improve water quality in the Thames River.

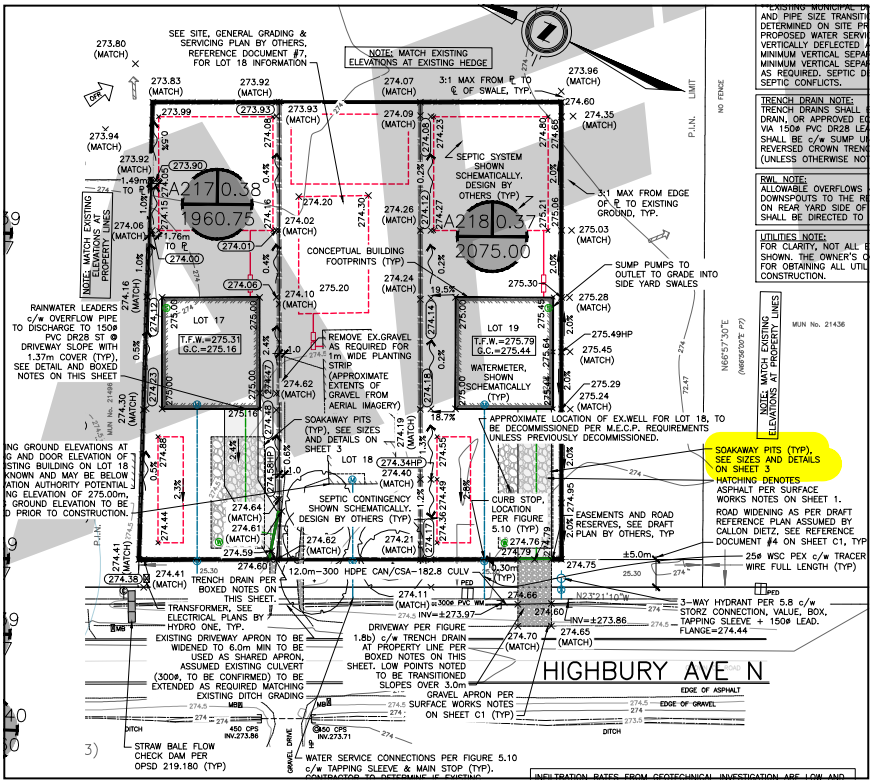
Telephone Numbers:

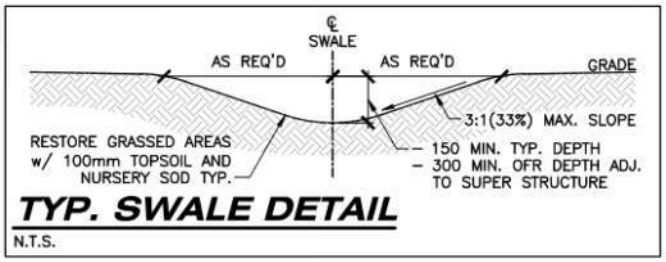
Middlesex Centre
519-666-0190

Upper Thames River Conservation Authority
519-451-2800

Stormwater Infiltration Trench

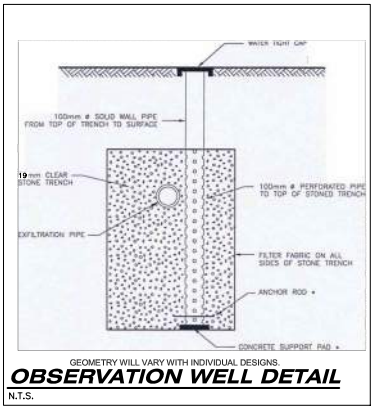
Plan, Sections, and Details





TYP. SWALE DETAIL

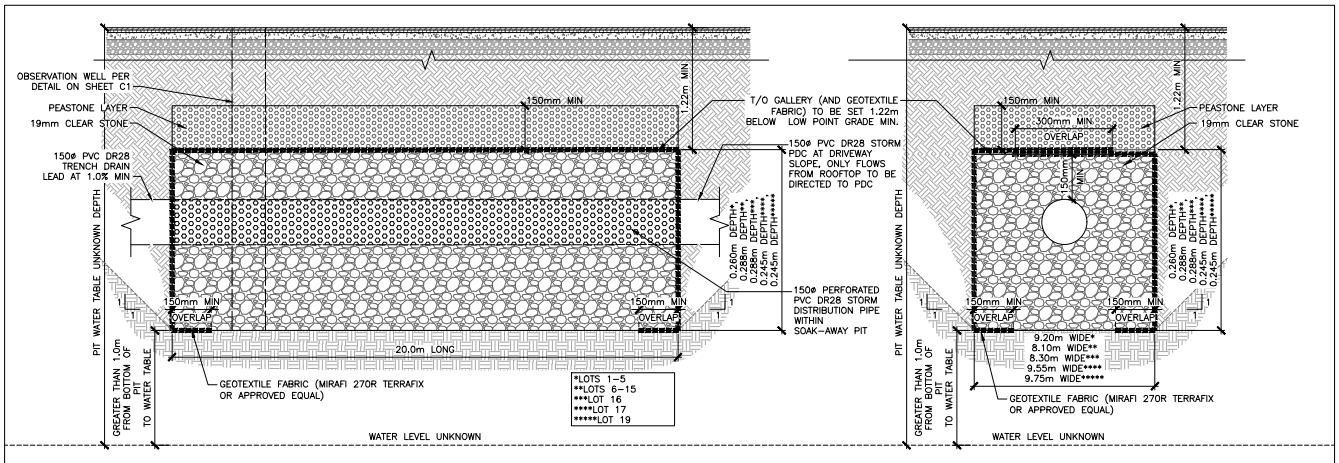
N.T.S.



GEOMETRY WILL VARY WITH INDIVIDUAL DESIGNS.

OBSERVATION WELL DETAIL

N.T.S.

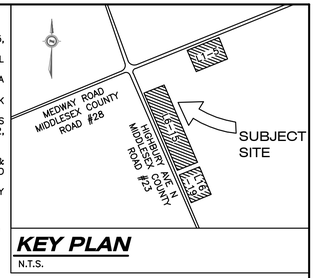


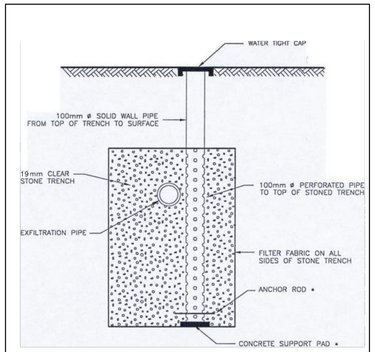
SOAKAWAY PIT DETAIL

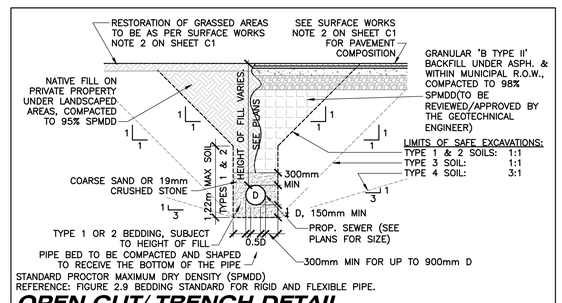
N.T.S.

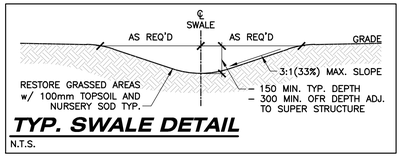
THE ELEVATION OF THE GROUNDWATER TABLE IS UNKNOWN CONTRACTOR/GEOTECHNICAL ENGINEER TO CONFIRM GROUND WATER ELEVATION PRIOR TO CONSTRUCTION

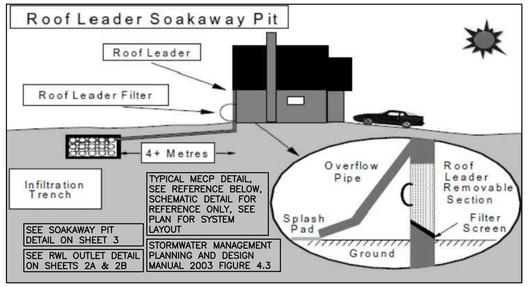
NOTES:
1. REFER TO SHEET 2A & 2B FOR STORM SEWER LOCATION
2. REFER TO SHEET 2A & 2B FOR EXTENT OF SOAKAWAY PITS

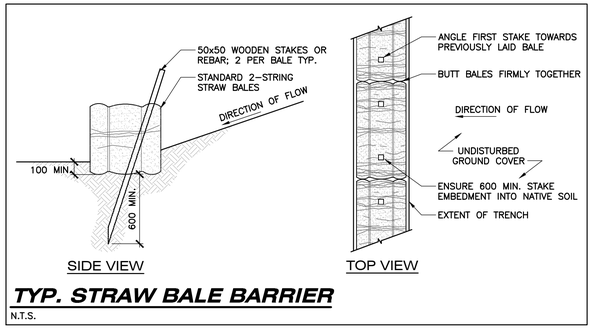












GENERAL NOTES:

1. THE OWNER'S PROFESSIONAL ENGINEER IS REQUIRED TO FIELD REVIEW THE INSTALLATION OF SERVICES INCLUDED IN THIS PROJECT IN ACCORDANCE WITH THE GENERAL REVIEW COMMITMENT CERTIFICATION PROCESS. THE OWNER'S CONTRACTOR IS TO PROVIDE AT LEAST 48 HOURS NOTICE PRIOR TO COMMENCING CONSTRUCTION OF THE SITE SERVICES.
2. THE OWNER/OWNER'S CONTRACTOR SHALL HAVE ITS PROFESSIONAL ENGINEER PROVIDE FULL-TIME ONSITE REVIEW DURING CONSTRUCTION ON AN EXISTING MUNICIPAL STREET OR EASEMENT AND PROVIDE A CERTIFICATE OF COMPLETION OF WORKS UPON COMPLETION OF ALL WORKS TO BE CONSTRUCTED.
3. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE MINIMUM STANDARDS AND SPECIFICATIONS OF THE CURRENT ONTARIO BUILDING CODE (OBC) AND ANY APPLICABLE STATUTES, REGULATIONS, CODES AND BY-LAWS.
4. STRIK, BALDINELLI, MONIZ LTD. (SBM) IS NOT RESPONSIBLE FOR THE INFORMATION (EXISTING TOPOGRAPHY, BENCHMARKS, PROPERTY BOUNDARY, ETC.) PROVIDED BY OTHERS.

CONSTRUCTION NOTES:

1. REFER TO THE DRAFT PLAN/LOT GRADING PLANS FOR LAYOUT DIMENSIONING.
2. THE OWNER'S CONTRACTOR IS TO CONTACT THE CONSULTING ENGINEER (SBM) FOR FINAL ONSITE REVIEW. THE CONTRACTOR IS TO PROVIDE AT LEAST 48 HOURS NOTICE PRIOR TO REQUIRED ONSITE REVIEW.
3. THE OWNER'S CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES UNDER THE OCCUPATIONAL HEALTH AND SAFETY ACT AS REQUIRED BY THE MINISTRY OF LABOUR TO EXECUTE THE WORK.
4. THE OWNER'S CONTRACTOR IS TO REVIEW AND CONFIRM ALL EXISTING CONDITION INFORMATION & INFORM SBM OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. SBM IN NO WAY ACCEPTS RESPONSIBILITY FOR ANY INACCURACIES FOUND ON THIS PLAN RELATIVE TO EXISTING CONDITIONS FOR THE SITE.
5. PRIOR TO COMMENCING ANY CONSTRUCTION, ALL SEWER OUTLET INFORMATION, BENCHMARKS, ELEVATIONS, DIMENSIONS, GRADES, ETC. MUST BE CHECKED BY THE CONTRACTOR AND VERIFIED AND ANY DISCREPANCIES REPORTED TO THE ENGINEERS.
6. PRIOR TO COMMENCING ANY WORK ON THE INSTALLATION OF SERVICES & GRADING, AN APPROVED SET OF PLANS AND SPECIFICATIONS MUST BE AVAILABLE ON THE JOB AND SHALL REMAIN THERE WHILE WORK IS BEING DONE.
7. STRIP FULL DEPTH OF TOPSOIL IN AREAS TO BE DISTURBED AND STOCK PILE FOR RE-USE IN GRASSED/LANDSCAPED AREAS.
8. OWNER'S CONTRACTOR IS RESPONSIBLE FOR ALL AS-BUILT INVERTS AND GRADES, RECORD ANY DEVIATION OF PIPE OR STRUCTURE LOCATION INVOLVED WITH THIS PROJECT AND OWNER'S CONTRACTOR TO PROVIDE A COPY OF THE AS-BUILT DRAWING SHOWING ALL CHANGES CLEARLY MARKED IN RED.
9. THE OWNER'S CONTRACTOR SHALL CONSTRUCT TEMPORARY MEASURES TO CONTROL SILT ENTERING THE STORM DRAINAGE SYSTEM TO THE SPECIFICATIONS OUTLINED IN THE GUIDELINES ON EROSION AND SEDIMENT CONTROL FOR URBAN CONSTRUCTION SITES PREPARED BY THE MINISTRY OF NATURAL RESOURCES. THESE MEASURES ARE TO BE INSTALLED PRIOR TO COMMENCING ANY CONSTRUCTION FOR THIS PROJECT AND ARE TO REMAIN IN PLACE UNTIL CONSTRUCTION HAS BEEN COMPLETED TO BASE ASPHALT AND SOD OR THE SATISFACTION OF THE MUNICIPAL ENGINEER.
10. THE CONTRACTOR SHALL INFORM VOYAGO & COUNTY OF MIDDLESEX AT LEAST ONE WEEK PRIOR TO COMMENCING CONSTRUCTION ON ANY STREET THAT IS AN INTER-COMMUNITY TRANSIT SERVICE BUS ROUTE THAT WILL BE AFFECTED BY CONSTRUCTION.
11. THE CONTRACTOR IS RESPONSIBLE FOR:
    - 11.1. CONNECTING ANY EXISTING SEWER OR DRAIN ENCOUNTERED DURING CONSTRUCTION TO A NEW SEWER OF SIMILAR TYPE, SIZE AND MATERIAL OR INTO ANOTHER EXISTING SEWER OF THE SAME TYPE AND TO REPORT ON AS-BUILT DRAWINGS.
    - 11.2. ENSURING THAT THERE IS NO INTERRUPTION OF ANY SURFACE OR SUBSURFACE DRAINAGE FLOW THAT WOULD ADVERSELY AFFECT NEIGHBOURING PROPERTIES.
12. NO FOUNDATION DRAIN CONNECTIONS WILL BE PERMITTED INTO THE SANITARY SEWERS AND NO DIRECT GRAVITY CONNECTIONS FROM THE FOUNDATION DRAINS WILL BE PERMITTED TO THE STORM SYSTEM UNLESS THE STORM SYSTEM HAS THE CAPACITY TO PROVIDE FOR SUCH CONNECTIONS TO THE SATISFACTION OF THE MUNICIPAL ENGINEER.
13. WORK ON OR ADJACENT TO THE MUNICIPAL/COUNTY RIGHT OF WAY (R.O.W.) SHALL BE COMPLETED IN ACCORDANCE WITH THE ONTARIO TRAFFIC MANUAL BOOK 7 CURRENT EDITION AND THE ONTARIO TRAFFIC MANUAL BOOK 18 CURRENT EDITION.

SURFACE WORKS NOTES:

1. ALL WORK IN THE MUNICIPAL/COUNTY ROAD ALLOWANCE SHALL MEET THE MINIMUM STANDARDS AND SPECIFICATIONS OF THE MUNICIPALITY OF MIDDLESEX CENTRE ENVIRONMENTAL AND ENGINEERING SERVICES DEPARTMENT. THE MUNICIPALITY OF MIDDLESEX CENTRE INFRASTRUCTURE DESIGN STANDARDS ARE TO BE APPLIED TO WORKS WITHIN THE MUNICIPAL/COUNTY ROAD ALLOWANCE UNLESS OTHERWISE APPROVED BY THE MUNICIPAL ENGINEER. THE CONTRACTOR IS REQUIRED TO OBTAIN & PAY FOR PERMIT TO WORK IN MUNICIPAL/COUNTY R.O.W.
2. ALL SURFACES WHICH ARE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO A CONDITION AT LEAST AS GOOD AS ORIGINAL, OR AS PER BELOW (WHICHEVER IS GREATER) OR IF WITHIN THE MUNICIPAL/COUNTY RIGHT OF WAY TO THE SATISFACTION OF THE MUNICIPAL ENGINEER, ALL AT NO COST TO THE MUNICIPALITY.
    - 2.1. GRASSED AREAS TO BE RESTORED w/ 300mm (100mm OFF-SITE) TOPSOIL + SOD FOR WATER BALANCE REQUIREMENTS.
    - 2.2. ANY ASPHALT AREA DISTURBED DURING CONSTRUCTION SHALL BE RESTORED AS FOLLOWS:
        - 2.2.1. PROOF ROLL SUBGRADE (TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER) PRIOR TO PLACEMENT OF GRANULARS (98% STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMDD) MIN.).
        - 2.2.2. MILL ADJACENT ASPHALT TO BE TIED INTO 50mm DEEP x 500mm WIDE PRIOR TO RESTORATION SEE DETAIL ON SHEET C1.
        - 2.2.3. MIN. RECOMMENDED PAVEMENT STRUCTURE (TO BE REVIEWED & APPROVED BY THE GEOTECHNICAL ENGINEER)
            - 40mm HL3 SURFACE ASPHALT COMPACTED TO 97% MARSHALL MIX DESIGN BULK DENSITY (TACK COAT REQUIRED PER OPSS.PROV 308 IF INSTALLED MORE THAN 2 WEEKS AFTER BINDER ASPHALT)
            - 50mm HL8 BINDER ASPHALT COMPACTED TO 97% MARSHALL MIX DESIGN BULK DENSITY
                - ASPHALT TO BE SUPPLIED AND PLACED IN ACCORDANCE WITH OPSS 310 & 1150
            - 150mm OF GRANULAR 'A' COMPACTED TO 100% SPMDD
            - 300mm OF GRANULAR 'B' COMPACTED TO 100% SPMDD
        - 2.2.4. MIN. RECOMMENDED GRAVEL APRON STRUCTURE (TO BE REVIEWED & APPROVED BY THE GEOTECHNICAL ENGINEER)
            - 240mm OF GRANULAR 'A' COMPACTED TO 100% SPMDD
            - 300mm OF GRANULAR 'B' COMPACTED TO 100% SPMDD
    - 2.3. RESTORE ALL PAVEMENT MARKINGS TO MATCH EXISTING PRE-CONSTRUCTION CONDITIONS AND MARKINGS SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 710 'CONSTRUCTION SPECIFICATION FOR PAVEMENT MARKING'.
    - 2.4. ALL EXTERIOR HORIZONTAL CONCRETE SHALL BE MIN 100mm THICK, 32 MPa AT 28 DAYS c/w 5-8% AIR ENTRAINMENT, SLUMP OF 80mm (±20mm) OR 30mm (±10mm) WHEN USING A FORMING MACHINE AND TEMPERATURE BETWEEN 10-28°C. ON MIN 100mm THICK GRANULAR 'A' COMPACTED TO 100% SPMDD.
3. ALL AREAS OUTSIDE THE CONSTRUCTION LIMITS SHALL NOT BE DISTURBED. ANY DAMAGED TO THOSE AREAS ARE TO BE REPAIRED AT THE CONTRACTORS EXPENSE.

SERVICING NOTES:

1. ALL STORM SEWER INSTALLATION SHALL BE IN ACCORDANCE WITH THE CURRENT MUNICIPALITY OF MIDDLESEX CENTRE'S STANDARDS AND SPECIFICATIONS, THE CURRENT EDITION OF THE ONTARIO BUILDING CODE
2. ALL SITE SERVICES SHALL BE INSTALLED TO 1.0m OUTSIDE FOUNDATION WALL.
3. ALL ORGANIC, UNSTABLE OR UNSUITABLE MATERIALS BENEATH THE ROAD ALLOWANCE, SERVICES, UTILITIES, OR FOUNDATIONS MUST BE REMOVED AND THESE AREAS BACKFILLED WITH AN APPROVED FILL MATERIAL, ALL TO THE SATISFACTION OF A GEOTECHNICAL ENGINEER AND SHOULD BE PLACED IN LIFTS NOT EXCEEDING 300mm (LOOSE) THAT ARE COMPACTED TO 95% SPMDD (100% FOR PAVED SURFACES). THE FILL MATERIAL SHOULD COMPRISE OF CLEAN, COMPACTIBLE FILL WITHIN 3% OF THE OPTIMUM MOISTURE CONTENT.
4. REMOVE ALL TRENCH WATER WHEN PIPE LAYING IS IN PROGRESS. ALL REQUIREMENTS FOR DEWATERING PERMITS (INCLUDING THE MINISTRY OF ENVIRONMENT, CONSERVATION AND PARKS (M.E.C.P.)'S PERMIT TO TAKE WATER, IF REQUIRED) SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
5. CONNECTIONS FROM FOUNDATIONS, WEEPING TILE, SUMP PUMP, AND ROOF DRAINS ARE NOT PERMITTED TO ENTER THE SANITARY SEWER SYSTEM AND SHALL BE IN ACCORDANCE WITH THE MUNICIPALITY OF MIDDLESEX CENTRE'S BY-LAW'S.
6. ALL PROPOSED STORM SEWER PIPE SHALL BE: PVC SMOOTH WALL (CSA B182.2) (100ø TO 600ø) OR RIBBED (CSA B182.4) (200ø TO 600ø) OR HDPE (CSA B182.6, 320 kPA ON-SITE PER OBC AND CSA B182.8 IN R.O.W.) (200ø TO 600ø) OR NON-REINFORCED CONCRETE (CAN/CSA 257.1) (100ø TO 600ø) OR REINFORCED CONCRETE (CAN/CSA 257.2). PVC PIPE SHALL BE LAID WITH TYPE I BEDDING UNDER 4.5m OF COVER AND TYPE II BEDDING OVER 4.5m OF COVER. CONCRETE PIPE SHALL BE LAID WITH CLASS B (B1 OR B2) BEDDING. ALL SEWER BACKFILL MUST BE COMPACTED TO 95% STANDARD MAXIMUM DRY DENSITY (MINIMUM) (100% FOR PAVED AREAS). REFER TO THE MUNICIPALITY OF MIDDLESEX CENTRE'S FIGURE 2.9.
7. THE MINIMUM DEPTH OF A STORM SEWER SHALL BE 1.22m FROM THE FINISHED GROUND ELEVATION TO THE CROWN OF THE PIPE AS PER OPSD 3090.101 'FOUNDATION, FROST PROTECTION DEPTHS FOR SOUTHERN ONTARIO' OR GEOTECHNICAL REPORT. WHERE MINIMUM DEPTHS CANNOT BE ACHIEVED AND THEREFORE FROST PROTECTION IS WARRANTED, INSULATION IS REQUIRED AS PER THE MUNICIPALITY OF MIDDLESEX CENTRE'S FIGURE 5.2 'INSULATION STANDARD FOR SHALLOW MAINS AND OFFSETS'.
8. ALL STORM AND SANITARY SEWERS/SERVICES AND CATCHBASIN LEADS SHALL HAVE APPROVED RUBBER GASKET JOINTS + BE INSTALLED USING A LASER LEVEL.
9. WATER SERVICE SHALL BE PASSED UNDER FOOTINGS WITH 0.60m MIN SEPARATION.
10. WHERE ANY WATER SERVICE CONNECTION IS REQUIRED TO BE MADE FOLLOWING THE CONSTRUCTION OF CURB, GUTTER, CONCRETE SIDEWALKS, AND/OR WEARING SURFACE COAT OF ASPHALT ON ANY STREET IN A NEW SUBDIVISION, SUCH WATER SERVICE CONNECTION SHALL NOT BE MADE USING 'OPEN CUT' METHODS BUT SHALL BE MADE USING TRENCHLESS TECHNOLOGIES AND IN SUCH A MANNER AS TO ELIMINATE THE POSSIBILITY OF SETTLEMENT OF SUCH CURB, GUTTER, CONCRETE SIDEWALKS AND/OR WEARING SURFACE COAT OF ASPHALT; IT BEING UNDERSTOOD THAT THIS POLICY SHALL APPLY, EXCEPT WHERE IN THE OPINION OF THE MUNICIPAL/COUNTY ENGINEER, GROUND CONDITIONS ARE SUCH THAT THE USE OF DRILLING OR BORING METHODS BECOME UNREASONABLE OR UNECONOMICAL.
11. ALL WATERMAIN MATERIAL AND CONSTRUCTION SHALL CONFORM TO THE CURRENT MUNICIPALITY OF MIDDLESEX CENTRE'S STANDARDS AND SPECIFICATIONS.
12. ALL FIRE HYDRANTS SHALL BE 3-WAY HYDRANTS c/w STORZ CONNECTION OPENING COUNTER-CLOCKWISE AS PER THE MUNICIPALITY OF MIDDLESEX CENTRE'S STANDARDS AND SPECIFICATIONS.
13. ALL WATERMAIN VALVES SHALL BE GATE VALVES MANUFACTURED TO AWWA C500 AND EPOXY COATED TO AWWA C550 AND ARE TO OPEN COUNTER-CLOCKWISE.
14. INSTALLATION, HYDROSTATIC TESTING, SWABBING, FLUSHING AND DISINFECTION SHALL BE DONE IN ACCORDANCE WITH THE MUNICIPALITY OF MIDDLESEX CENTRE'S STANDARDS AND SPECIFICATIONS.
15. SEPARATION BETWEEN BURIED WSC & PDC AS OUTLINED IN THE CURRENT EDITION OF THE M.E.C.P. "DESIGN GUIDELINES FOR DRINKING-WATER SYSTEMS" SECTION F-6-1 "PROCEDURES TO GOVERN SEPARATION OF SEWERS AND WATERMAINS" AND INSULATE WATER SERVICE AS PER CLAUSE 7.3.5.4. 'PROTECTION FROM FROST' OF THE CURRENT EDITION OF THE ONTARIO BUILDING CODE, WHERE REQUIRED. ALL SUBSTITUTIONS MUST BE APPROVED BY THE MUNICIPALITY ENGINEER.
16. WATER SERVICE TO BE PEX AND ALL WATER PIPE TO HAVE 12AWG TRACER WIRE INSTALLED ON ALL PVC WATERMAINS, VALVES, AND FIRE HYDRANTS. APPROVED TRACER WIRE FOR OPEN CUT INSTALLATION: "COPPERHEAD 1230-HS". WATERMAIN TO BE INSTALLED 2.1m BELOW ROAD GRADE OR 1.1m BELOW THE BOTTOM OF DITCH, WHICHEVER IS GREATER AND SHALL NOT BE LESS THAN 1.5m COVER COVER. PEX WATER SERVICE REQUIRES BRASS FITTINGS. PROVIDE PIPE RESTRAINTS AS REQUIRED BY THE PIPE MANUFACTURER.
17. WATERMAINS/SERVICES SHALL CROSS ABOVE SEWERS WITH SUFFICIENT VERTICAL SEPARATION TO ALLOW FOR PROPER BEDDING AND STRUCTURAL SUPPORT OF THE WATERMAIN/SERVICE AND SEWER MAINS AS OUTLINED IN THE CURRENT EDITION OF THE M.E.C.P. "DESIGN GUIDELINES FOR DRINKING-WATER SYSTEMS" SECTION F-6-1 "PROCEDURES TO GOVERN SEPARATION OF SEWERS AND WATERMAINS" AND INSULATE WATER SERVICE AS PER CLAUSE 7.3.5.4. 'PROTECTION FROM FROST' OF THE CURRENT EDITION OF THE ONTARIO BUILDING CODE, WHERE REQUIRED.
18. ALL SUBSTITUTIONS MUST BE APPROVED BY THE MUNICIPAL/COUNTY ENGINEER.
19. THE ELEVATION OF THE GROUND WATER TABLE IS UNKNOWN. CONTRACTOR TO ADVISE SBM IF GROUNDWATER IS ENCOUNTERED DURING EXCAVATION OPERATIONS; FURTHER REVIEW/INVESTIGATION BY A GEOTECHNICAL ENGINEER MAY BE REQUIRED. IF GROUNDWATER IS ENCOUNTERED DURING EXCAVATION OPERATIONS, CIVIL STRUCTURES ARE TO BE DESIGNED FOR HYDROSTATIC PRESSURE AND UPLIFT/BUOYANCY FORCES. PROVIDE SHOP DRAWINGS SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO FOR REVIEW

SEDIMENT & EROSION CONTROL MEASURES:

1. PROTECT ALL EXPOSED SURFACES AND CONTROL ALL RUNOFF DURING CONSTRUCTION.
2. SEDIMENT AND EROSION CONTROL MEASURES TO BE REMOVED AT COMPLETION OF PROJECT (FOLLOWING COMPLETION OF BASE ASPHALT AND SOD).
3. MAINTAIN EROSION CONTROL MEASURES DURING CONSTRUCTION.
4. ALL COLLECTED SEDIMENT TO BE DISPOSED OF AT AN APPROVED LOCATION.
5. MINIMIZE AREA DISTURBED DURING CONSTRUCTION.
6. ALL DEWATERING TO BE DISPOSED OF IN AN APPROVED SEDIMENTATION BASIN.
7. PROTECT ALL CATCH BASINS, MAINTENANCE HOLES AND PIPE ENDS FROM SEDIMENT INTRUSION WITH GEOTEXTILE FABRIC (TERRAFIX 270 R), SILT SACKS, OR APPROVED EQUAL.
8. KEEP ALL SUMPS CLEAN DURING CONSTRUCTION.
9. PREVENT WIND-BLOWN DUST.
10. STRAW BALES TO BE USED IN LOCALIZED AREAS AS DIRECTED BY THE ENGINEER DURING CONSTRUCTION FOR WORKS WHICH ARE IN OR ADJACENT TO FLOOD LINES, FILL LINES AND HAZARDOUS SLOPES.
11. STRAW BALES TO BE TERMINATED BY ROUNDING BALES TO CONTAIN AND FILTER RUNOFF.
12. OBTAIN APPROVAL FROM THE UPPER THAMES RIVER CONSERVATION AUTHORITY (UTRCA) PRIOR TO CONSTRUCTION FOR WORKS WHICH ARE IN, OR ADJACENT TO FLOOD LINES, FILL LINES AND HAZARDOUS SLOPES.
13. ALL SILT FENCING AND DETAILS ARE AT THE MINIMUM TO BE CONSTRUCTED IN ACCORDANCE WITH THE MINISTRY OF NATURAL RESOURCES GUIDELINES ON EROSION AND SEDIMENT CONTROL FOR URBAN CONSTRUCTION SITES.
14. ALL OF THE ABOVE NOTES AND ANY SEDIMENT & EROSION CONTROL MEASURES ARE AT THE MINIMUM TO BE IN ACCORDANCE WITH THE MINISTRY OF NATURAL RESOURCES GUIDELINES ON EROSION AND SEDIMENT CONTROL FOR URBAN CONSTRUCTION SITES.
15. SEDIMENT AND EROSION CONTROL MEASURES ARE TO BE INSPECTED WEEKLY OR FOLLOWING SIGNIFICANT RAINFALL EVENTS.
16. ON-SITE SEDIMENT AND EROSION CONTROL MEASURES ARE TO BE REVIEWED AND MODIFIED TO MEET THE CHANGING SITE.
17. SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REPAIRED WITHOUT DELAY BY THE OWNERS CONTRACTOR AS INSTRUCTED BY THE CONTRACT ADMINISTRATOR/ENGINEER AT NO EXPENSE TO THE OWNER.

UTILITIES NOTES:

1. ALL WORK FOR COORDINATION, DESIGN, AND CONSTRUCTION OF UTILITIES IS BY OTHERS. SBM DESIGN AND DRAWINGS ARE FOR MUNICIPAL SERVICING ONLY. ANY UTILITY INFORMATION SHOWN IS FOR REFERENCE/COORDINATION PURPOSES ONLY AND MAY NOT BE ACCURATE.
2. THE UTILITIES PROVIDERS MUST BE INFORMED AT LEAST TWO WEEKS PRIOR TO CONSTRUCTION ON ANY EXISTING MUNICIPALITY/COUNTY ROAD ALLOWANCE. ALL EXISTING UNDERGROUND SERVICE OR UTILITIES WITHIN THE LIMITS OF THE CONSTRUCTION SITE SHALL BE LOCATED AND MARKED. ANY UTILITIES, DAMAGED OR DISTURBED DURING CONSTRUCTION, SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE GOVERNING BODY AT THE CONTRACTOR'S EXPENSE.
3. ALL EXISTING UNDERGROUND UTILITY (TELEPHONE, HYDRO, GAS, CABLE, SEWER, WATERMAINS, ETC.) THAT WILL BE CROSSED UNDER DURING THE INSTALLATION OF SERVICES FOR THIS DEVELOPMENT SHALL BE SUPPORTED, AS MAY BE REQUIRED BY THE OWNERS OF THE UTILITY BEING CROSSED UNDER.
4. OWNER'S CONTRACTOR TO LOCATE/FIELD VERIFY LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
5. OWNER'S CONTRACTOR TO COORDINATE WITH UTILITIES PROVIDER FOR BRACING, DECOMMISSIONING AND/OR RELOCATION OF EXISTING GAS, HYDRO, TELEPHONE, CABLE, ETC. SERVICES, IF REQUIRED.

LEGEND:

×271.00	EXISTING SPOT ELEVATION
×<u>271.00</u>	EXISTING SPOT ELEVATION (TO REMAIN)
×271.00	PROPOSED SPOT ELEVATION
×(271.00)	PROPOSED SWALE ELEVATION
□	EXISTING CATCH BASIN
🟩	PROPOSED CATCH BASIN
◑	EXISTING CLEANOUT
◑	PROPOSED CLEANOUT
Ⓦ	PROPOSED OBSERVATION WELL
▣	PROPOSED CATCH BASIN MAINTENANCE HOLE
○	EXISTING MAINTENANCE HOLE
○	PROPOSED MAINTENANCE HOLE
───	PROPOSED TRENCH DRAIN
2.0% ⇝	PROPOSED SWALE
← 2.0%	PROPOSED SLOPE
←	PROPOSED DRAINAGE DIRECTION
⇦	EXISTING OVERLAND FLOW ROUTE
⇦ OFR	PROPOSED OVERLAND FLOW ROUTE
FR-2	PROPOSED SIGN, TYPE OF SIGN
20.0m-300ø ST @ 1.0%	EXISTING STORM SEWER
20.0m-300ø ST @ 1.0%	PROPOSED STORM SEWER
20.0m-150ø SA @ 1.0%	EXISTING SANITARY SEWER
20.0m-150ø SA @ 1.0%	PROPOSED SANITARY SEWER
150 PVC WSC	EXISTING WATERMAIN
150 PVC WSC	PROPOSED WATERMAIN
⌖	EXISTING FIRE HYDRANT
⌖	PROPOSED FIRE HYDRANT
⊗	EXISTING WATER VALVE
⊗	PROPOSED WATER VALVE
Ⓜ	EXISTING WATER METER
Ⓜ	PROPOSED WATER METER
©	PROPOSED CURB STOP
Ⓢ	PROPOSED SUMP PUMP (SEE ARCHITECTURAL DRAWINGS)
®	PROPOSED RAMP
TC	TOP OF CURB
BC	BOTTOM OF CURB

TW	GROUND ELEVATION AT TOP OF RETAINING WALL
BW	GROUND ELEVATION AT BOTTOM OF RETAINING WALL
HP	HIGH POINT
TL	TOP OF LID
▲	BUILDING ENTRANCE
△	OVERHEAD DOOR
▭	PROPOSED LIGHT-DUTY ASPHALT
▬	PROPOSED HEAVY-DUTY ASPHALT
▭	PROPOSED CONCRETE
▬	PROPOSED RETAINING WALL (DESIGNED BY OTHERS)
▨	MILL/PAVE LAP JOINT AS PER DETAIL ON THIS PAGE
▬ ▪ ▬	LIMITS OF DRAINAGE AREA
●	PROPOSED SILT SACK
▭▭▭	PROPOSED STRAW BALE BARRIER
▨	EXISTING BUILDING
▨	PROPOSED BUILDING
─▫─▫─	PROPOSED SILT FENCE
━▪━▪━	PROPOSED TREE PRESERVATION FENCE
───	LIMITS OF SUBJECT PROPERTY
✱	DECIDUOUS/CONIFEROUS TREE
✕	DECIDUOUS/CONIFEROUS TREE TO BE REMOVED

LIST OF STANDARD DETAILS:

ONTARIO PROVINCIAL STANDARDS:

OPSD 219.110	LIGHT-DUTY SILT FENCE BARRIER
OPSD 219.180	STRAW BALE FLOW CHECK DAM

MUNICIPALITY OF MIDDLESEX CENTRE FIGURES:

1.8b	STANDARD FOR SINGLE AND DOUBLE DRIVEWAY ENTRANCE (RURAL)
1.26a	STEPPED MILLED JOINT PAVEMENT DETAIL
2.9	BEDDING STANDARD FOR RIGID AND FLEXIBLE PIPE
5.1	STANDARD SERVICING LOCATIONS FOR SINGLE FAMILY AND SEMI-DETACHED LOTS
5.2	INSULATION STANDARD FOR SHALLOW MAINS AND OFFSETS
5.4	STANDARD 50mm BLOW OFF INSTALLATION
5.8	HYDRANT AND VALVE INSTALLATION
5.10	STANDARD INSTALLATION OF <50mm WATER SERVICE; CONNECTION AND LAYOUT DETAIL
5.12	CATHODIC PROTECTION ASSEMBLIES FOR 20mm TO 50mm WATER SERVICES

TYP. SWALE DETAIL

N.T.S.

REFERENCE DOCUMENTS:

1. SERVICING MEMORANDUM PREPARED BY SBM, PROJECT No: SBM-21-0716, DATED JANUARY 25, 2023.
2. INFORMATION OBTAINED FROM AS-CONSTRUCTED DRAWINGS BY SPRIET ASSOCIATES LTD, DATED APRIL 15, 1994.
3. TOPOGRAPHIC INFORMATION OBTAINED FROM PLANS BY CALLON DIETZ INC. FILE No. 20-23779 A PLOT STAMP DATED SEPTEMBER 7, 2022.
4. LEGAL INFORMATION OBTAINED FROM AUTOCAD COORDINATION FILE 'DRAFT PLAN' PROVIDED BY BROCK DEVELOPMENT GROUP INC. REVISIONS 2 DATED AUGUST 1, 2022.
5. INFORMATION OBTAINED FROM SOIL TESTING FOR WASTEWATER SERVICING REPORT BY BOS ENGINEERING & ENVIRONMENTAL SERVICES INC. REVISED JUNE 2, 2021 AND UPDATED OCTOBER 22, 2022.
6. INFORMATION OBTAINED FROM ELECTRICAL DRAWINGS BY HYDRO ONE DATED APRIL 27, 2021.
7. INFORMATION OBTAINED FROM SITE, GENERAL GRADING & SERVICING PLAN BY BOS ENGINEERING & ENVIRONMENTAL SERVICES INC. PROJECT No. 2109-01 DATED SEPTEMBER 9, 2021 AND UPDATED OCTOBER 22, 2022.
8. INFORMATION OBTAINED FROM GEOTECHNICAL CONSULTATION – SOIL INFILTRATION TESTING REPORT BY LDS CONSULTANTS DATED AUGUST 23, 2023.

KEY PLAN

N.T.S.

LEGAL INFORMATION

PART OF
NORTH HALF OF LOT 8
CONCESSION 6
IN THE
(GEOGRAPHIC TOWNSHIP OF LONDON)
MUNICIPALITY OF MIDDLESEX CENTRE
COUNTY OF MIDDLESEX

SITE BENCHMARK:

MONUMENT TYPE: BOLT (BM02-50)

LOCATION: BRICK PRIVACY WALL ON THE SOUTHWEST CORNER OF SUNNINGDALE ROAD EAST AND SOUTH WENIGE DRIVE. BOLT SET IN THE NORTH FACE OF THE WALL, 0.21m BELOW THE BRICK AND 0.71m WEST OF THE 45 DEGREE ANGLE OF THE WALL.

GEODETIC ELEVATION: 259.153 (CGVD28, 1978)

MONUMENT TYPE: BOLT (BM02-43)

LOCATION: CONCRETE BOX CULVERT CROSSING SUNNINGDALE ROAD EAST, 320m WEST OF THE CENTRELINE OF HIGHBURY AVENUE NORTH. BOLT SET IN THE EAST FACE ON THE NORTH SIDE OF SUNNINGDALE ROAD EAST, 0.12m SOUTH OF THE NORTHEAST CORNER AND 0.12m DOWN FROM THE TOP.

GEODETIC ELEVATION: 260.902 (CGVD28, 1978)

(CONTRACTOR TO CONFIRM BENCHMARK ELEVATIONS)

GEOMETRY WILL VARY WITH INDIVIDUAL DESIGNS.

OBSERVATION WELL DETAIL

N.T.S.

STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMDD)
REFERENCE: FIGURE 2.9 BEDDING STANDARD FOR RIGID AND FLEXIBLE PIPE.

OPEN CUT/ TRENCH DETAIL

N.T.S.

LIST OF ITEMS REQUIRING ENGINEER'S REVIEW
NOTE: CONTRACTOR TO PROVIDE MIN. 48 HOURS NOTICE PRIOR TO REQUESTED FIELD REVIEW TIME.
EROSION AND SEDIMENT CONTROL MEASURES, UPON COMPLETION
SERVICING IN MUNICIPAL RIGHT-OF-WAY (R.O.W.), EXISTING AND FUTURE, DURING CONSTRUCTION
SOAK-AWAY PIT EXCAVATION PRIOR TO BACKFILL
GRADING – ROAD SUBGRADE, PRIOR TO GRANULARS
GRADING – GRANULAR 'B', PRIOR TO GRANULAR 'A'
GRADING – GRANULAR 'A', PRIOR TO BASE ASPHALT
GRADING – BASE ASPHALT, PRIOR TO TOP COAT ASPHALT
GRADING – TOP COAT ASPHALT
GRADING – BOULEVARDS (ROUGH GRADING)
WATERMAIN COMMISSIONING, DURING PROCEDURE

LIST OF SUBMITTALS
NOTE: CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR REVIEW PRIOR TO ORDERING MATERIALS.
SHOP DRAWINGS – RETAINING WALL
PRODUCT SPECIFICATIONS – SEWER AND WATERMAIN, INCLUDING APPURTENANCES
ASPHALT JOB MIX FORMULA(E)
CONCRETE (CURB AND SIDEWALK) MIX DESIGN(S)
GRANULAR 'A' AND 'B' SIEVE ANALYSIS'
EXCESS FILL – DUMP SITE INFORMATION AND PERMISSION LETTER
MATERIAL TESTING REPORT – ENGINEERED FILL SOURCE LETTER (RE CONTAMINANTS, ETC.)
MATERIAL TESTING REPORT – ENGINEERED FILL COMPACTION
MATERIAL TESTING REPORT – ENGINEERED FILL PLAN
MATERIAL TESTING REPORT – SUBGRADE COMPACTION/PREPARATION
19mm CLEAR STONE POROSITY MATERIAL TEST
MATERIAL TESTING REPORT – GRANULAR COMPACTION
MATERIAL TESTING REPORT – CONCRETE CYLINDERS
MATERIAL TESTING REPORT – ASPHALT COMPACTION
MATERIAL TESTING REPORT – ASPHALT SAMPLES
AS-BUILT SURVEY FOR EARTHWORKS QUANTITIES
WATERMAIN TESTING RESULTS

TYPICAL MECP DETAIL, SEE REFERENCE BELOW, SCHEMATIC DETAIL FOR REFERENCE ONLY, SEE PLAN FOR SYSTEM LAYOUT

SEE SOAKAWAY PIT DETAIL ON SHEET 3

SEE RWL OUTLET DETAIL ON SHEETS 2A & 2B

STORMWATER MANAGEMENT PLANNING AND DESIGN MANUAL 2003 FIGURE 4.3

TYP. STRAW BALE BARRIER

N.T.S.

LIST OF DRAWINGS

1	NOTES, LEGEND, AND DETAILS
2A	DEVELOPMENT ENGINEERING PLAN – LOTS 1-5 & 17-19
2B	DEVELOPMENT ENGINEERING PLAN – LOTS 6-16
3	STANDARD DETAIL

AS CONSTRUCTED SERVICES	COMPLETION		No.	REVISIONS	D/M/Y	BY
		DESIGN JSF/JEL	4	ISSUED FOR APPROVAL	15/09/21	JSF
		DRAWN JSF	5	REVISED TO UTRCA/HYDRO ONE COORDINATION	16/02/22	JSF
		CHECKED LS	6	REVISED TO SEPTIC DESIGNER COORDINATION	07/03/22	JSF
		APPROVED NGu	7	CATCHMENT AREAS ADDED	22/06/22	JSF
		DATE 09/03/2021	8	REVISED TO MUNICIPALITY COMMENTS	05/10/22	JSF
			9	REVISED TO MUNICIPALITY COMMENTS	20/01/23	JSF
		CAD 21-0716	10	REVISED TO MUNICIPALITY COMMENTS	21/04/23	JSF
			11	REVISED TO MUNICIPALITY COMMENTS	15/11/23	JSF
			12	REVISED TO CLIENT COMMENTS/DRAFT PLAN REVISIONS	31/01/24	JSF

CONSULTANT

STRIK BALDINELLI MONIZ
sbm
PLANNING • CIVIL • STRUCTURAL • MECHANICAL • ELECTRICAL
1599 Adelaide St. N, Unit 301, London, Ontario, N5X 4E8
Tel: (519) 471-6667 Fax: (519) 471-0034
Email: sbm@sbmltd.ca

ENGINEER'S STAMP
K.A. MONIZ
100124664
Jan 31, 2024

C.TECH'S STAMP

CLIENT
BROCK DEVELOPMENT GROUP
1584 ROUTLEDGE PARK
LONDON, ONTARIO
N6H 5L6
P: 519.281.6769
E: INFO@BROCKDG.COM

SCALE
N/A

TITLE
NOTES, LEGEND, AND DETAILS
BALLYMOTE SUBDIVISION
21488 HIGHBURY AVE N
BALLYMOTE, ON

PROJECT No.
SBM-21-0716

SHEET No.
1

PLAN FILE No.
–

S:\2021 Jobs\SBM-21-0716 Brock Dev.Group Medway Road, Ballymote\03 Dwgs\03 Civil\03 Production Drawings\SBM-21-0716 Brock Dev.Group Medway Road, Ballymote - NotesDetailsPro.dwg

GRADING CERTIFICATE:

I HEREBY CERTIFY THAT THE PROPOSED GRADING AND APPURTENANT DRAINAGE WORKS COMPLY WITH SOUND ENGINEERING DESIGN AND THAT THE PROPOSED GRADING IS COMPATIBLE WITH EXISTING DRAINAGE PATTERNS ON AND ACROSS THESE LANDS AND THE ADJOINING LANDS OR APPLICABLE MUNICIPAL BY-LAWS.

GRADING NOTES:

1. EXISTING GRADES AND DRAINAGE OF ABUTTING LANDS IS NOT TO BE DISTURBED.
2. LOCALIZED SURFACE DRAINAGE FROM ABUTTING PROPERTIES TO BE DEVELOPED IN THE FUTURE MAY BE DISCHARGED ONTO THE PROPOSED LOTS IN THIS SUBDIVISION.
3. BASEMENT OPENINGS TO BE MINIMUM 300mm ABOVE THE CENTRELINE OF ROAD UNLESS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORK AND ENGINEERING.
4. GROUND ELEVATIONS AT BUILDINGS ABUTTING OVERLAND FLOW ROUTES ARE TO BE 300mm ABOVE OVERLAND FLOW ROUTE ELEVATIONS.
5. GROUND ELEVATIONS AT BUILDING OPENING ABUTTING OVERLAND FLOW ROUTES ARE TO TO BE 450mm ABOVE OVERLAND FLOW ROUTE ELEVATIONS.
6. SUMP PUMP DISCHARGE MUST BE DIRECTED AWAY FROM DRIVEWAYS AND SIDEWALKS AND MUST NOT EXTEND BEYOND PROPERTY LIMITS. NO SANITARY SEWER CONNECTIONS PERMITTED.
7. A MINIMUM OF 150mm (6") FROM THE TOP OF FOUNDATION TO THE FINISHED GRADE OUTSIDE THE BUILDING MUST BE PROVIDED, TYPICAL.
8. RETAINING WALLS, 1000mm OR GREATER, & GUARD RAILS ON TOP (IF REQUIRED) ARE TO BE DESIGNED BY AND CONSTRUCTED TO THE SPECIFICATIONS OF A REGISTERED PROFESSIONAL ENGINEER IN ACCORDANCE WITH THE ONTARIO BUILDING CODE.
9. THE MIN. TOP OF FOUNDATION ELEVATION, UNDERSIDE OF FOOTING ELEVATION, BASEMENT WINDOW SILL ELEVATION, ETC. ARE TO BE CONFIRMED BY THE CONTRACTOR IN CONSULTATION WITH THE BUILDING DESIGNER, BASED ON THE FINISHED FLOOR ELEVATION PROVIDED. CONTACT STRIK, BALDINELLI, MONIZ LTD. (SBM) FOR CLARIFICATION, IF REQUIRED.

THE OWNER'S CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL MEASURES IN COMPLIANCE WITH THE ONTARIO TRAFFIC MANUAL BOOK 7 FOR ALL WORKS WITHIN THE MUNICIPALITY RIGHT-OF-WAY. THE OWNER'S OWNER'S CONTRACTOR SHALL SUBMIT TRAFFIC CONTROL PLANS TO THE MUNICIPALITY/ENGINEER FOR REVIEW PRIOR TO PROCEEDING WITH CONSTRUCTION.

CULVERT NOTE:
CULVERTS TO BE PLACED MATCHING EXISTING DITCH GRATE

INSULATION NOTE:
INSULATE SEWERS AS PER THE A-7.3.5.4.(1) FROM THE CURRENT ONTARIO BUILDING CODE COMPENDIUM WHERE 1.22m COVER CANNOT BE PROVIDED.

UNLESS OTHERWISE NOTED ON THE PLANS, GEOTEXTILE SHALL BE NON-WOVEN TO MEET CLASS 2-OPSS 1860.07.02 (I.E. TERRAFIX 270R, OR APPROVED EQUAL) WITH 300mm MIN. OVERLAPS.

ALL WATERMAIN CONSTRUCTION TO CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS OF THE MUNICIPALITY OF MIDDLESEX CENTRE PUBLIC WORKS & ENGINEERING DEPARTMENT. WHERE WATERMAIN/SERVICE IS LESS THAN 2.1m BELOW ROAD GRADE OR 1.1m BELOW THE BOTTOM OF DITCH, WHICHEVER IS GREATER AND SHALL NOT BE LESS THAN 1.5m COVER (EVEN TEMPORARY CONDITIONS), THE WATERMAIN/SERVICE SHALL BE ADEQUATELY INSULATED OVER THE AFFECTED LENGTH AS PER THE MUNICIPALITY OF MIDDLESEX CENTRE FIGURE 5.2.

SILT FENCE TO BE CONSTRUCTED ON PROPERTY LINE. LINE WORK IS NOT SHOWN FOR CLARITY.

OWNER'S CONTRACTOR SHALL BE RESPONSIBLE FOR REGULAR MONITORING & CLEANUP OF TRACKED MUD/DEBRIS ON ADJACENT LANDS & PUBLIC ROADS TO THE SATISFACTION OF THE ENGINEER/MUNICIPALITY OF MIDDLESEX CENTRE.

OWNER'S CONTRACTOR SHALL TAKE ALL REASONABLE MEASURES TO AVOID MIXING TOPSOIL WITH SUBSOIL, WHERE REQUIRED FOR REUSE ON-SITE.

TOPSOIL STOCKPILE SIZES/LOCATIONS TO BE DETERMINED IN THE FIELD. SILT FENCE SHALL BE CONSTRUCTED AT TOE OF DOWNGRADE EDGES OF TOPSOIL STOCKPILE

ALL NATIVE FILL PLACED SHALL MEET THE REQUIREMENTS FOR ENGINEERED FILL, COMPACTED TO 100% SPMDD OR AS OUTLINED IN THE GEOTECHNICAL REPORT.

WINDOW WELL NOTE:
ALL WINDOW WELLS SHALL BE PROJECTED UP TO ELEVATION 275.15m OR 150mm ABOVE FINISHED GRADE MIN, WHICHEVER IS GREATER, TO PROTECT AGAINST POTENTIAL FLOODING

FILTER FABRIC AND STRAW BALE BARRIERS SHALL BE INSTALLED AND MAINTAINED IN EXISTING DICB's FOR DURATION OF PROJECT UNTIL SURFACES ARE PAVED AND BOULEVARDS ARE SODDED.

SITE PREPARATION NOTE:
THIS PLAN HAS BEEN PREPARED TO IDENTIFY REMOVALS, EROSION & SEDIMENT CONTROL MEASURES AND TEMPORARY CONSTRUCTION WORKS FOR THE BENEFIT OF THE OWNER'S CONTRACTOR IN ADVANCE OF SERVICING WORKS. IT IS NOT INTENDED TO IDENTIFY PERMANENT GRADING PATTERNS.

DISPOSAL NOTE:
ALL ITEMS NOTED AS "TO BE REMOVED" SHALL BE DISCARDED OFF-SITE AT AN APPROVED FACILITY.

OWNER'S CONTRACTOR TO CLEAR AND GRUB SITE PRIOR TO CONSTRUCTION AND DISPOSE OF ALL DEBRIS AND EXCESS FILL/TOPSOIL OFF-SITE AT AN APPROVED FACILITY.

SUMP PUMP AND DRAIN LOCATIONS ARE SHOWN FOR SCHEMATIC PURPOSES ONLY. REFER TO ARCHITECTS PLANS FOR SUMP PUMP DESIGN.

SERVICE STUBS TO BE CAPPED AT 1.0m O/S FROM BUILDING ENVELOPE FOR CONNECTION ONCE BUILDING SERVICES ARE INSTALLED.

OVERFLOW PIPE FROM THE ROOF LEADER TO SPLASH PAD AS PER DETAIL ON THIS SHEET.

SOAKAWAY PIT DESIGNED IN ACCORDANCE WITH SECTION 4.5.6 OF M.E.C.P. STORMWATER MANAGEMENT PLANNING AND DESIGN MANUAL (SWMP)

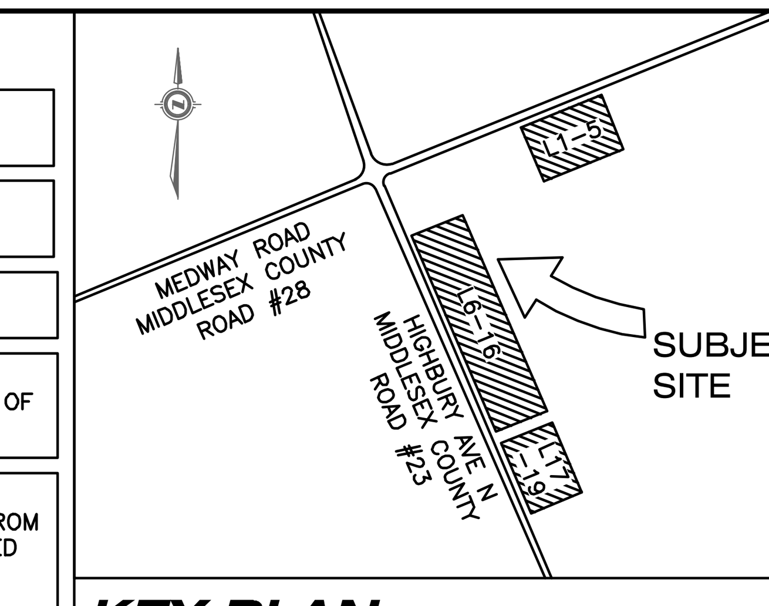
ALL PROP WATER METERS ARE c/w DOUBLE CHECK VALVE ASSEMBLIES (DCVA) FOR PREMISE ISOLATION

SEDIMENT AND EROSION CONTROL MEASURES MAY ONLY BE REMOVED UPON STABILIZATION OF CONTRIBUTING CATCHMENT AREA AND SUBJECT TO APPROVAL OF ENGINEER/MUNICIPALITY OF MIDDLESEX CENTRE.

STORM DRAINAGE NOTE:
STORM DRAINAGE MAY TEMPORARILY NEED TO BE CONTROLLED AND PUMPED FROM STORM SEWER SYSTEM. ANY SUCH TEMPORARY MEASURES SHALL BE CONDUCTED AT NO EXTRA COST TO THE CONTRACT AND BE BASED UPON THE OWNER'S CONTRACTOR'S WATER CONTROL PLANS. WHICH MUST BE APPROVED BY THE CONTRACT ADMINISTRATOR/ENGINEER PRIOR TO CONSTRUCTION.

OWNER'S CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY CONSTRUCTION MEASURES SUCH AS, BUT NOT LIMITED TO, PIPE COVER AT NO ADDITIONAL CHARGE TO THE CONTRACT.

STORM SERVICING NOTE:
NO BUILDING DRAIN (SUMP/WEEPING TILE/RAIN WATER LEADER) CONNECTIONS WILL BE PERMITTED INTO THE SANITARY SEWERS.



KEY PLAN

N.T.S.

LEGAL INFORMATION

PART OF
NORTH HALF OF LOT 8
CONCESSION 6
IN THE
(GEOGRAPHIC TOWNSHIP OF LONDON)
MUNICIPALITY OF MIDDLESEX CENTRE
COUNTY OF MIDDLESEX

SITE BENCHMARK:

MONUMENT TYPE: BOLT (BM02-50)

LOCATION: BRICK PRIVACY WALL ON THE SOUTHWEST CORNER OF SUNNINGDALE ROAD EAST AND SOUTH WENIGE DRIVE. BOLT SET IN THE NORTH FACE OF THE WALL, 0.21m BELOW THE BRICK AND 0.71m WEST OF THE 45 DEGREE ANGLE OF THE WALL.

GEODETIC ELEVATION: 259.153 (CGVD28, 1978)

MONUMENT TYPE: BOLT (BM02-43)

LOCATION: CONCRETE BOX CULVERT CROSSING SUNNINGDALE ROAD EAST, 320m WEST OF THE CENTRELINE OF HIGHBURY AVENUE NORTH. BOLT SET IN THE EAST FACE ON THE NORTH SIDE OF SUNNINGDALE ROAD EAST, 0.12m SOUTH OF THE NORTHEAST CORNER AND 0.12m DOWN FROM THE TOP.

GEODETIC ELEVATION: 260.902 (CGVD28, 1978)

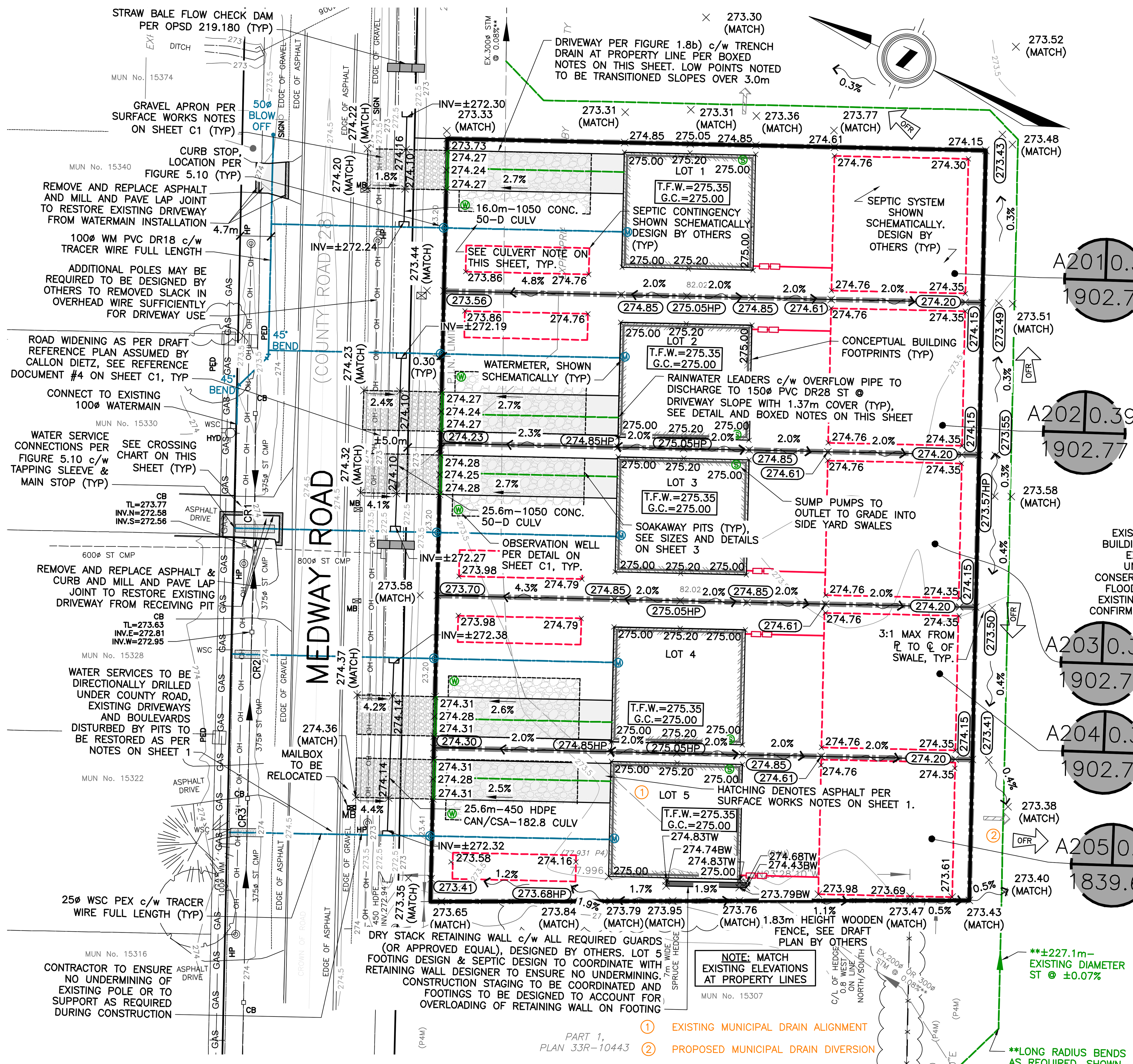
(CONTRACTOR TO CONFIRM BENCHMARK ELEVATIONS)

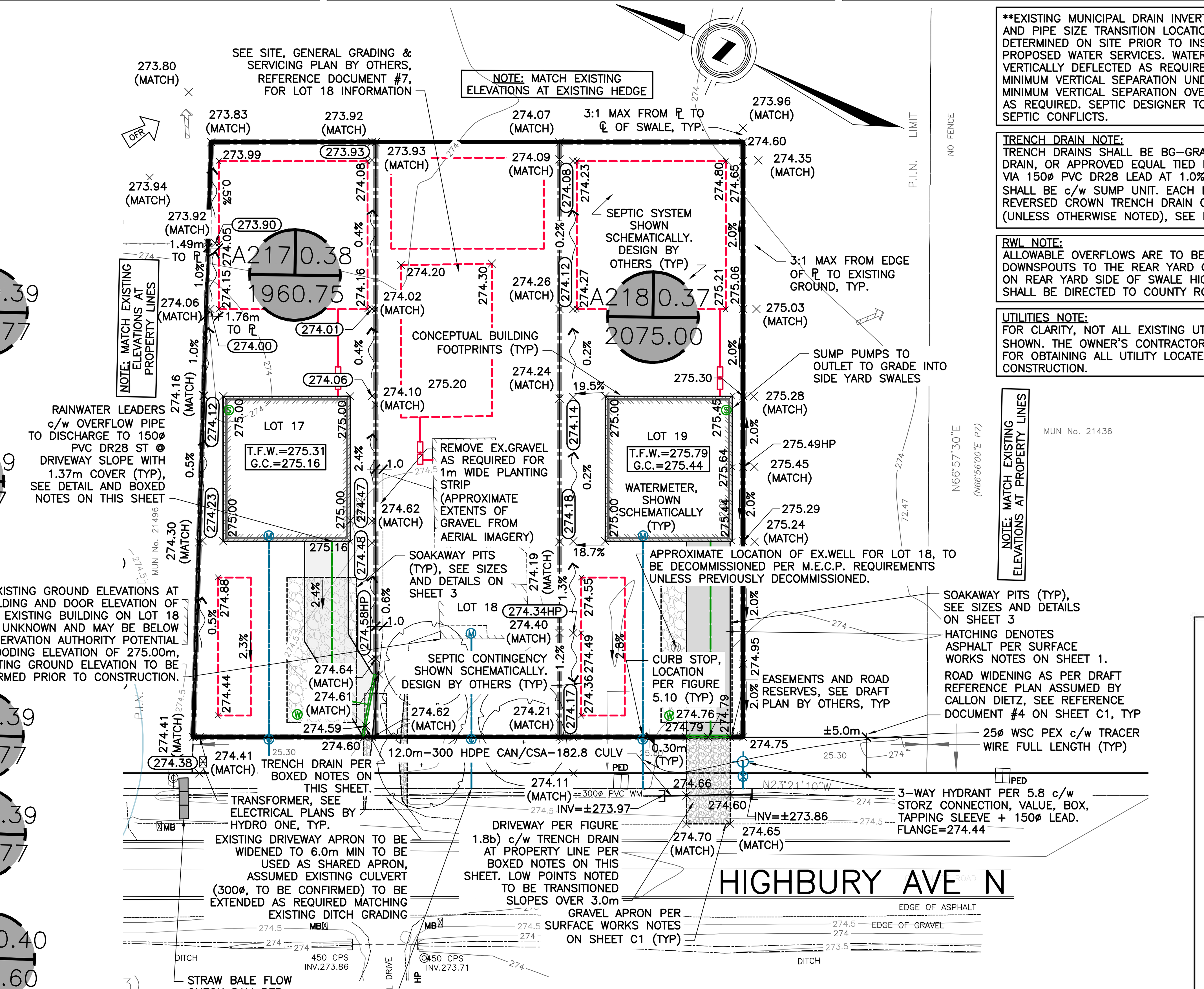
**EXISTING MUNICIPAL DRAIN INVERTS, EXACT LOCATION, AND PIPE SIZE TRANSITION LOCATION UNKNOWN. TO BE DETERMINED ON SITE PRIOR TO INSTALLATION OF PROPOSED WATER SERVICES. WATER SERVICES TO BE VERTICALLY DEFLECTED AS REQUIRED FOR 0.50m MINIMUM VERTICAL SEPARATION UNDER STORM OR 0.23m MINIMUM VERTICAL SEPARATION OVER STORM. INSULATE AS REQUIRED. SEPTIC DESIGNER TO BE CONTACTED FOR SEPTIC CONFLICTS.

TRENCH DRAIN NOTE:
TRENCH DRAINS SHALL BE BG-GRASPOINTNER TRENCH DRAIN, OR APPROVED EQUAL TIED INTO SOAKAWAY PITS VIA 150ø PVC DR28 LEAD AT 1.0% MIN. TRENCH DRAIN SHALL BE c/w SUMP UNIT. EACH LOT SHALL HAVE A REVERSED CROWN TRENCH DRAIN ON PROPERTY LINE (UNLESS OTHERWISE NOTED), SEE DETAILS ON SHEET 3.

RWL NOTE:
ALLOWABLE OVERFLOWS ARE TO BE DIRECTED VIA DOWNSPOUTS TO THE REAR YARD OR SIDE YARD SWALES ON REAR YARD SIDE OF SWALE HIGH POINTS, NO FLOWS SHALL BE DIRECTED TO COUNTY ROADS

UTILITIES NOTE:
FOR CLARITY, NOT ALL EXISTING UTILITIES MAY BE SHOWN. THE OWNER'S CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL UTILITY LOCATES PRIOR TO CONSTRUCTION.





MUNICIPALITY OF MIDDLESEX CENTRE HYDRANT COLOUR CODING		
CLASS	RATED CAPACITY	COLOUR
CLASS AA	1500 usgpm (5680 L/min) OR GREATER	LIGHT BLUE
CLASS A	1000–1499 usgpm (3785–5675 L/min)	GREEN
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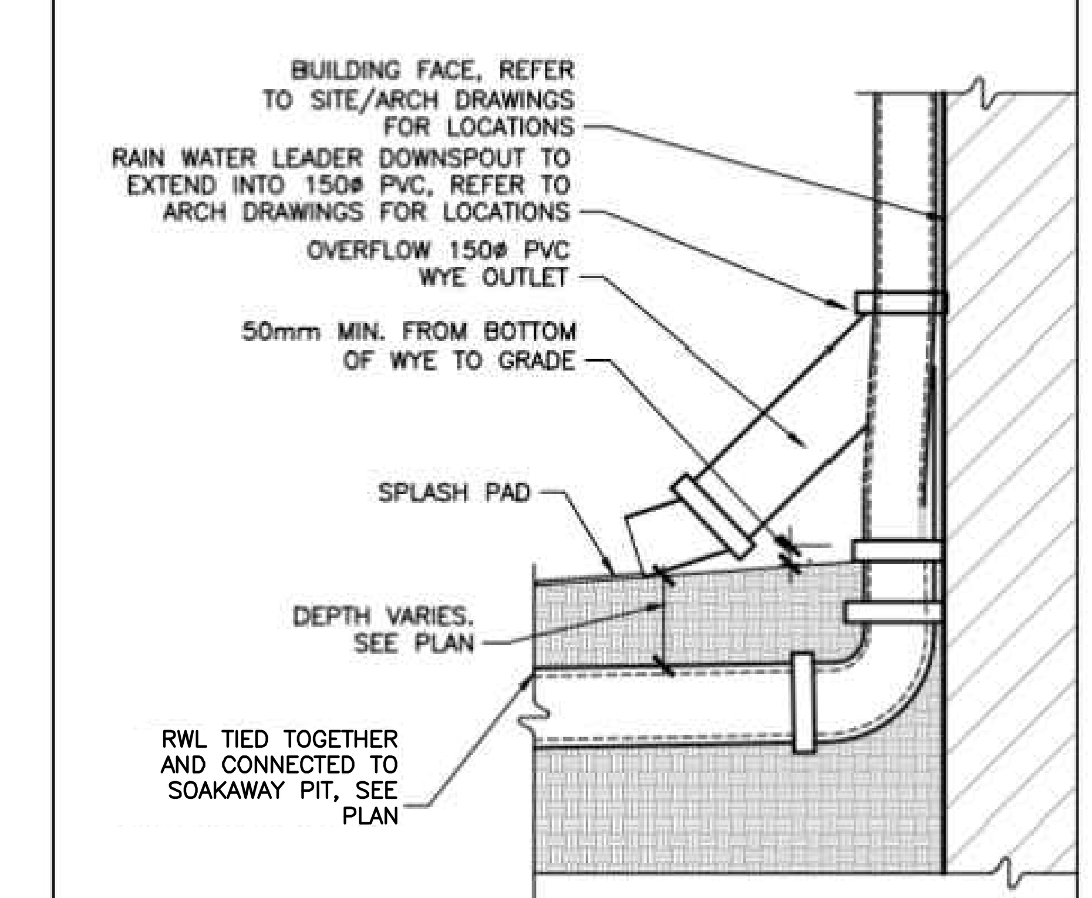
SEE ROOF LEADER SOAKAWAY PIT DETAIL ON SHEET 1



RWL OUTLET DETAIL

N.T.S.

INFILTRATION RATES FROM GEOTECHNICAL INVESTIGATION ARE LOW AND CLAY SOIL ONSITE MAY NOT INFILTRATE. SBM DOES NOT RECOMMEND USING IT. SOAKAWAY PITS FOR EACH PROPERTY HAVE BEEN SIZED WITH INFILTRATION RATE PROVIDED AND THERE MAY BE A REQUIREMENT FOR A DESIGNED OUTLET TO THE DITCH AS A PRECAUTION TO AVOID FLOODING THE BUILDING FOOTPRINT.

ROAD OCCUPANCY PERMIT NOTE:
ROAD OCCUPANCY PERMIT FOR ALL EXTERNAL WORKS IS REQUIRED.

RESTORATION NOTE:
ALL WORK IN THE ROAD ALLOWANCE SHALL MEET THE MINIMUM SPECIFICATIONS OF THE MUNICIPALITY OF MIDDLESEX CENTRE PUBLIC WORKS & ENGINEERING DEPARTMENT.

FOR GRADING ON ADJACENT LANDS, IF REQUIRED, DEVELOPER SHALL OBTAIN WRITTEN APPROVAL FROM ADJACENT LAND OWNER.

BOULEVARD AREAS AND CONCRETE SIDEWALKS DISTURBED DURING INSTALLATION OF SERVICES SHALL BE RESTORED TO MATCH EX. CONDITION OR SURFACE WORKS NOTES ON SHEET 1, WHICHEVER IS GREATER, ALL AT NO COST TO THE MUNICIPALITY.

ALL CLEARANCES TO ELECTRICAL CONDUCTORS AS SET OUT IN THE CURRENT OBC DIV. B-3.1.19.1 'ELECTRICAL CONDUCTOR CLEARANCES TO BUILDINGS' SHALL BE MAINTAINED

WATERMAIN & SEWER CROSSING NOTE:
1. UNDER PRACTICAL CONDITIONS, WATERMAINS SHALL CROSS ABOVE SEWERS WITH SUFFICIENT VERTICAL SEPARATION TO ALLOW FOR PROPER BEDDING AND STRUCTURAL SUPPORT OF THE WATERMAIN AND SEWER. INSULATE AS PER FIGURE 5.2 (WHERE REQUIRED).
2. WHEN IT IS NOT POSSIBLE FOR THE WATERMAIN TO CROSS ABOVE THE SEWER, THE WATERMAIN PASSING UNDER A SEWER SHALL BE PROTECTED BY:
   - 2.1. PROVIDING A VERTICAL SEPARATION OF AT LEAST 0.5 METRES BETWEEN THE INVERT OF THE SEWER AND THE CROWN OF THE WATERMAIN;
   - 2.2. PROVIDING ADEQUATE STRUCTURAL SUPPORT FOR THE SEWERS TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING; AND
   - 2.3. ENSURING THAT THE LENGTH OF WATER PIPE SHALL BE CENTERED AT THE POINT OF CROSSING SO THAT THE JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER.

REFERENCE: JUNE 2012 MINISTRY OF THE ENVIRONMENT'S 'WATERMAIN DESIGN CRITERIA FOR FUTURE ALTERATION AUTHORIZED UNDER A DRINKING WATER WORKS PERMIT'

REFER TO NOTES, LEGEND, AND DETAILS ON SHEET 1 & 3

PIPE CROSSINGS & VERTICAL CLEARANCES

CROSSING No.	SEWER/WATERMAIN ELEVATIONS								VERTICAL CLEARANCES	*VERTICAL OFFSET
CR1	25mm	WM	INV.	273.17	375mm	STM	OBV.	272.94	0.23	YES*
CR2	25mm	WM	INV.	273.22	375mm	STM	OBV.	272.99	0.23	YES*
CR3	25mm	WM	INV.	273.27	375mm	STM	OBV.	273.04	0.23	YES*

*INSULATION REQUIRED PER FIGURE 5.2 ON SHEET 3

OWNER'S CONTRACTOR SHALL SUPPORT ALL EXISTING UTILITIES AS REQUIRED DURING THE INSTALLATION OF SERVICES TO THE SATISFACTION OF THE UTILITY OWNER AT NO EXTRA COST TO THE CONTRACT.

ALL SUMP PIT CONFIGURATIONS SHALL MEET, AT MINIMUM, OBC SECTION 7. ALL PUMPS ARE TO INCLUDE A CHECK VALVE.

BOULEVARD AREAS AND CONCRETE SIDEWALKS DISTURBED DURING INSTALLATION OF SERVICES SHALL BE RESTORED TO MATCH EX. CONDITION OR SURFACE WORKS NOTES ON SHEET 1, WHICHEVER IS GREATER, ALL AT NO COST TO THE MUNICIPALITY.

AS CONSTRUCTED SERVICES	COMPLETION		No.	REVISIONS	D/M/Y	BY
		DESIGN JSF/JEL	4	ISSUED FOR APPROVAL	15/09/21	JSF
		DRAWN JSF	5	REVISED TO UTRCA/HYDRO ONE COORDINATION	16/02/22	JSF
		CHECKED LS	6	REVISED TO SEPTIC DESIGNER COORDINATION	07/03/22	JSF
		APPROVED NGu	7	CATCHMENT AREAS ADDED	22/06/22	JSF
		DATE 25/10/2023	8	REVISED TO MUNICIPALITY COMMENTS	05/10/22	JSF
			9	REVISED TO MUNICIPALITY COMMENTS	20/01/23	JSF
		CAD 21-0716	10	REVISED TO MUNICIPALITY COMMENTS	21/04/23	JSF
			11	REVISED TO MUNICIPALITY COMMENTS	15/11/23	JSF
			12	REVISED TO CLIENT COMMENTS/DRAFT PLAN REVISIONS	31/01/24	JSF

CONSULTANT
STRIK BALDINELLI MONIZ
PLANNING • CIVIL • STRUCTURAL • MECHANICAL • ELECTRICAL
1599 Adelaide St. N, Unit 301, London, Ontario, N5X 4E8
Tel: (519) 471-6667 Fax: (519) 471-0034
Email: sbm@sbmltd.ca

ENGINEER'S STAMP: LICENSED PROFESSIONAL ENGINEER, K.A. MONIZ, 100124664, Jan 31, 2024, PROVINCE OF ONTARIO

C.TECH'S STAMP

CLIENT
BROCK DEVELOPMENT GROUP
1584 ROUTLEDGE PARK
LONDON, ONTARIO
N6H 5L6
P: 519.281.6769
E: INFO@BROCKDG.COM

SCALE
SCALE – 1:500
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TITLE
DEVELOPMENT ENGINEERING PLAN – LOTS 1-5 & 17-19
BALLYMOTE SUBDIVISION
21488 HIGHBURY AVE N
BALLYMOTE, ON

PROJECT No. SBM-21-0716
SHEET No. 2A
PLAN FILE No. –

GRADING CERTIFICATE:

I HEREBY CERTIFY THAT THE PROPOSED GRADING AND APPURTENANT DRAINAGE WORKS COMPLY WITH SOUND ENGINEERING DESIGN AND THAT THE PROPOSED GRADING IS COMPATIBLE WITH EXISTING DRAINAGE PATTERNS ON AND ACROSS THESE LANDS AND THE ADJOINING LANDS OR APPLICABLE MUNICIPAL BY-LAWS.

GRADING NOTES:

1. EXISTING GRADES AND DRAINAGE OF ABUTTING LANDS IS NOT TO BE DISTURBED.
2. LOCALIZED SURFACE DRAINAGE FROM ABUTTING PROPERTIES TO BE DEVELOPED IN THE FUTURE MAY BE DISCHARGED ONTO THE PROPOSED LOTS IN THIS SUBDIVISION.
3. BASEMENT OPENINGS TO BE MINIMUM 300mm ABOVE THE CENTRELINE OF ROAD UNLESS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORK AND ENGINEERING.
4. GROUND ELEVATIONS AT BUILDINGS ABUTTING OVERLAND FLOW ROUTES ARE TO BE 300mm ABOVE OVERLAND FLOW ROUTE ELEVATIONS.
5. GROUND ELEVATIONS AT BUILDING OPENING ABUTTING OVERLAND FLOW ROUTES ARE TO TO BE 450mm ABOVE OVERLAND FLOW ROUTE ELEVATIONS.
6. SUMP PUMP DISCHARGE MUST BE DIRECTED AWAY FROM DRIVEWAYS AND SIDEWALKS AND MUST NOT EXTEND BEYOND PROPERTY LIMITS. NO SANITARY SEWER CONNECTIONS PERMITTED.
7. A MINIMUM OF 150mm (6") FROM THE TOP OF FOUNDATION TO THE FINISHED GRADE OUTSIDE THE BUILDING MUST BE PROVIDED, TYPICAL.
8. RETAINING WALLS, 1000mm OR GREATER, & GUARD RAILS ON TOP (IF REQUIRED) ARE TO BE DESIGNED BY AND CONSTRUCTED TO THE SPECIFICATIONS OF A REGISTERED PROFESSIONAL ENGINEER IN ACCORDANCE WITH THE ONTARIO BUILDING CODE.
9. THE MIN. TOP OF FOUNDATION ELEVATION, UNDERSIDE OF FOOTING ELEVATION, BASEMENT WINDOW SILL ELEVATION, ETC. ARE TO BE CONFIRMED BY THE CONTRACTOR IN CONSULTATION WITH THE BUILDING DESIGNER, BASED ON THE FINISHED FLOOR ELEVATION PROVIDED. CONTACT STRIK, BALDINELLI, MONIZ LTD. (SBM) FOR CLARIFICATION, IF REQUIRED.

UNLESS OTHERWISE NOTED ON THE PLANS, GEOTEXTILE SHALL BE NON-WOVEN TO MEET CLASS 2-OPSS 1860.07.02 (I.E. TERRAFIX 270R, OR APPROVED EQUAL) WITH 300mm MIN. OVERLAPS.

ALL WATERMAIN CONSTRUCTION TO CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS OF THE MUNICIPALITY OF MIDDLESEX CENTRE PUBLIC WORKS & ENGINEERING DEPARTMENT. WHERE WATERMAIN/SERVICE IS LESS THAN 2.1m BELOW ROAD GRADE OR 1.1m BELOW THE BOTTOM OF DITCH, WHICHEVER IS GREATER AND SHALL NOT BE LESS THAN 1.5m COVER (EVEN TEMPORARY CONDITIONS), THE WATERMAIN/SERVICE SHALL BE ADEQUATELY INSULATED OVER THE AFFECTED LENGTH AS PER THE MUNICIPALITY OF MIDDLESEX CENTRE FIGURE 5.2.

SILT FENCE TO BE CONSTRUCTED ON PROPERTY LINE. LINE WORK IS NOT SHOWN FOR CLARITY.

OWNER'S CONTRACTOR SHALL BE RESPONSIBLE FOR REGULAR MONITORING & CLEANUP OF TRACKED MUD/DEBRIS ON ADJACENT LANDS & PUBLIC ROADS TO THE SATISFACTION OF THE ENGINEER/MUNICIPALITY OF MIDDLESEX CENTRE.

OWNER'S CONTRACTOR SHALL TAKE ALL REASONABLE MEASURES TO AVOID MIXING TOPSOIL WITH SUBSOIL, WHERE REQUIRED FOR REUSE ON-SITE.

TOPSOIL STOCKPILE SIZES/LOCATIONS TO BE DETERMINED IN THE FIELD. SILT FENCE SHALL BE CONSTRUCTED AT TOE OF DOWNGRADE EDGES OF TOPSOIL STOCKPILE

ALL NATIVE FILL PLACED SHALL MEET THE REQUIREMENTS FOR ENGINEERED FILL, COMPACTED TO 100% SPMDD OR AS OUTLINED IN THE GEOTECHNICAL REPORT.

INFILTRATION RATES FROM GEOTECHNICAL INVESTIGATION ARE LOW AND CLAY SOIL ONSITE MAY NOT INFILTRATE. SBM DOES NOT RECOMMEND USING IT. SOAKWAY PITS FOR EACH PROPERTY HAVE BEEN SIZED WITH INFILTRATION RATE PROVIDED AND THERE MAY BE A REQUIREMENT FOR A DESIGNED OUTLET TO THE DITCH AS A PRECAUTION TO AVOID FLOODING THE BUILDING FOOTPRINT.

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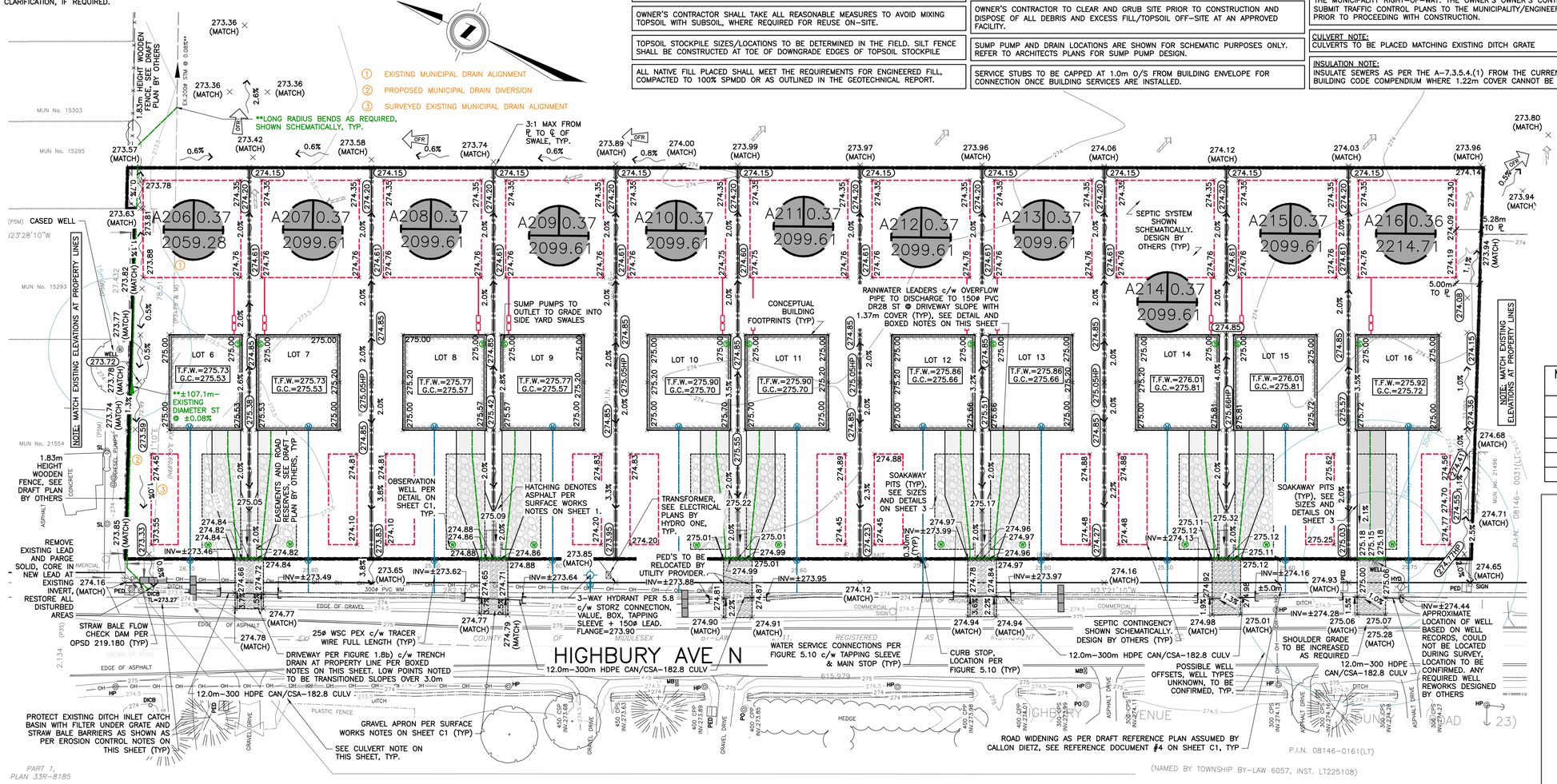
OVERFLOW PIPE FROM THE ROOF LEADER TO SPLASH PAD AS PER DETAIL ON THIS SHEET.

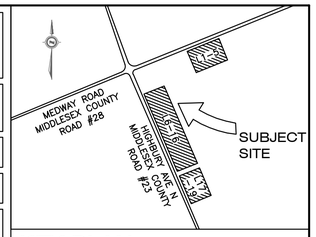
SOAKAWAY PIT DESIGNED IN ACCORDANCE WITH SECTION 4.5.6 OF M.E.C.P. STORMWATER MANAGEMENT PLANNING AND DESIGN MANUAL (SWMP)

THE OWNER'S CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL MEASURES IN COMPLIANCE WITH THE ONTARIO TRAFFIC MANUAL BOOK 7 FOR ALL WORKS WITHIN THE MUNICIPALITY RIGHT-OF-WAY. THE OWNER'S OWNER'S CONTRACTOR SHALL SUBMIT TRAFFIC CONTROL PLANS TO THE MUNICIPALITY/ENGINEER FOR REVIEW PRIOR TO PROCEEDING WITH CONSTRUCTION.

CULVERT NOTE:
CULVERTS TO BE PLACED MATCHING EXISTING DITCH GRATE

INSULATION NOTE:
INSULATE SEWERS AS PER THE A-7.3.5.4.(1) FROM THE CURRENT ONTARIO BUILDING CODE COMPENDIUM WHERE 1.22m COVER CANNOT BE PROVIDED.





KEY PLAN
N.T.S.

LEGAL INFORMATION

PART OF
NORTH HALF OF LOT 8
CONCESSION 6
IN THE
(GEOGRAPHIC TOWNSHIP OF LONDON)
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MONUMENT TYPE: BOLT (BM02-50)

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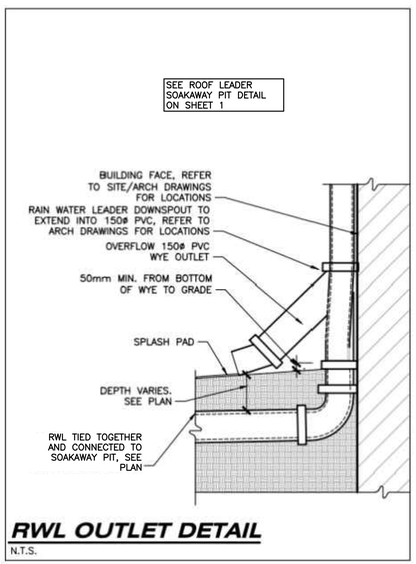

RWL OUTLET DETAIL
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REFER TO NOTES, LEGEND, AND DETAILS ON SHEET 1 & 3

AS CONSTRUCTED SERVICES	COMPLETION

DESIGN	JSF/JEL	
DRAWN	JSF	
CHECKED	LS	
APPROVED	NGu	
DATE	25/10/2023	
CAD	21-0716	

No.	REVISIONS	D/M/Y	BY
4	ISSUED FOR APPROVAL	15/09/21	JSF
5	REVISED TO UTRCA/HYDRO ONE COORDINATION	16/02/22	JSF
6	REVISED TO SEPTIC DESIGNER COORDINATION	07/03/22	JSF
7	CATCHMENT AREAS ADDED	22/06/22	JSF
8	REVISED TO MUNICIPALITY COMMENTS	05/10/22	JSF
9	REVISED TO MUNICIPALITY COMMENTS	20/01/23	JSF
10	REVISED TO MUNICIPALITY COMMENTS	21/04/23	JSF
11	REVISED TO MUNICIPALITY COMMENTS	15/11/23	JSF
12	REVISED TO CLIENT COMMENTS/DRAFT PLAN REVISIONS	31/01/24	JSF

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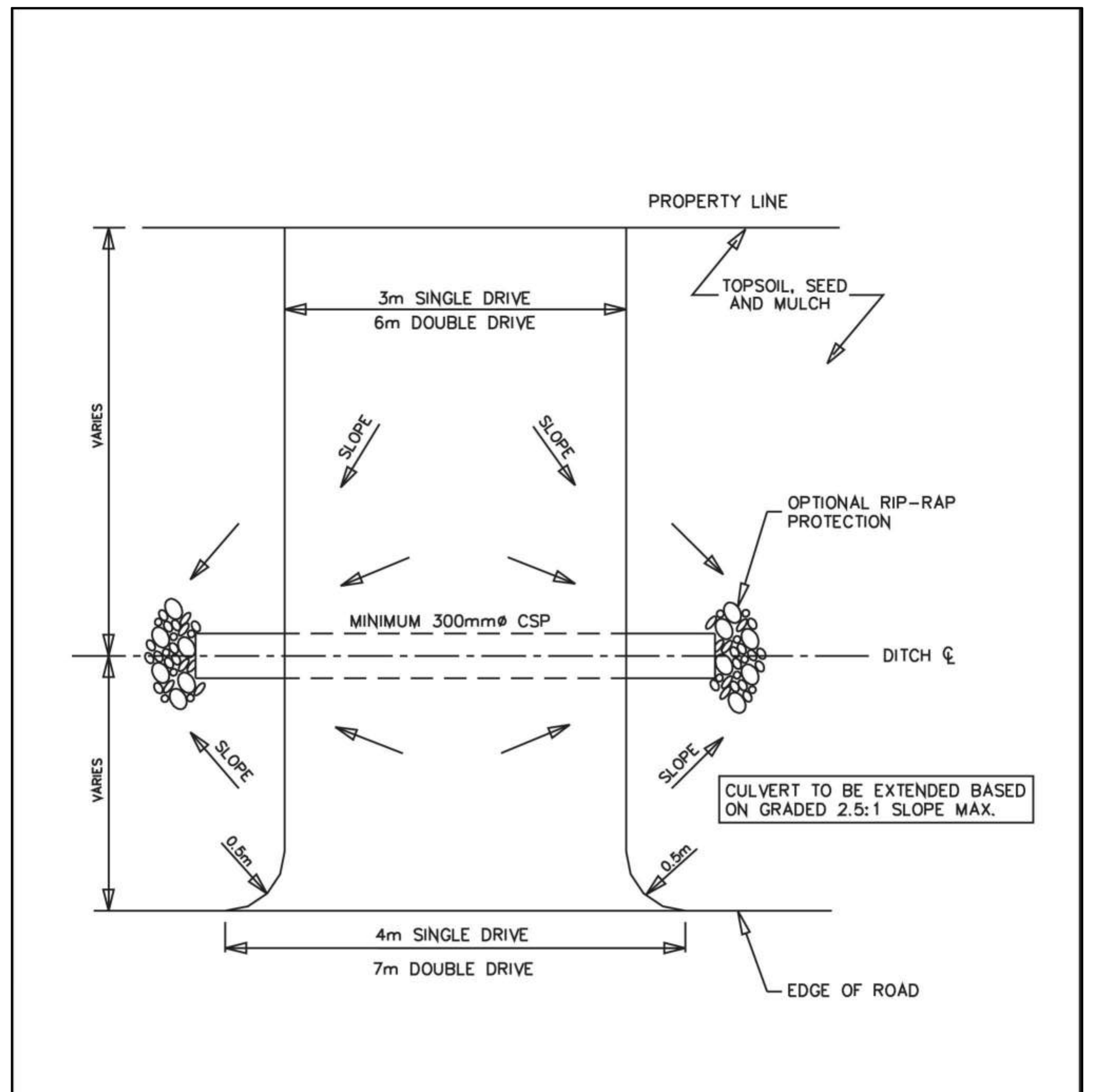
SCALE
SCALE - 1:500
5.0 0 10.0m

TITLE
DEVELOPMENT ENGINEERING PLAN - LOTS 6-16
BALLYMOTE SUBDIVISION
21488 HIGHBURY AVE N
BALLYMOTE, ON

PROJECT No.
SBM-21-0716

SHEET No.
2B

PLAN FILE No.
-

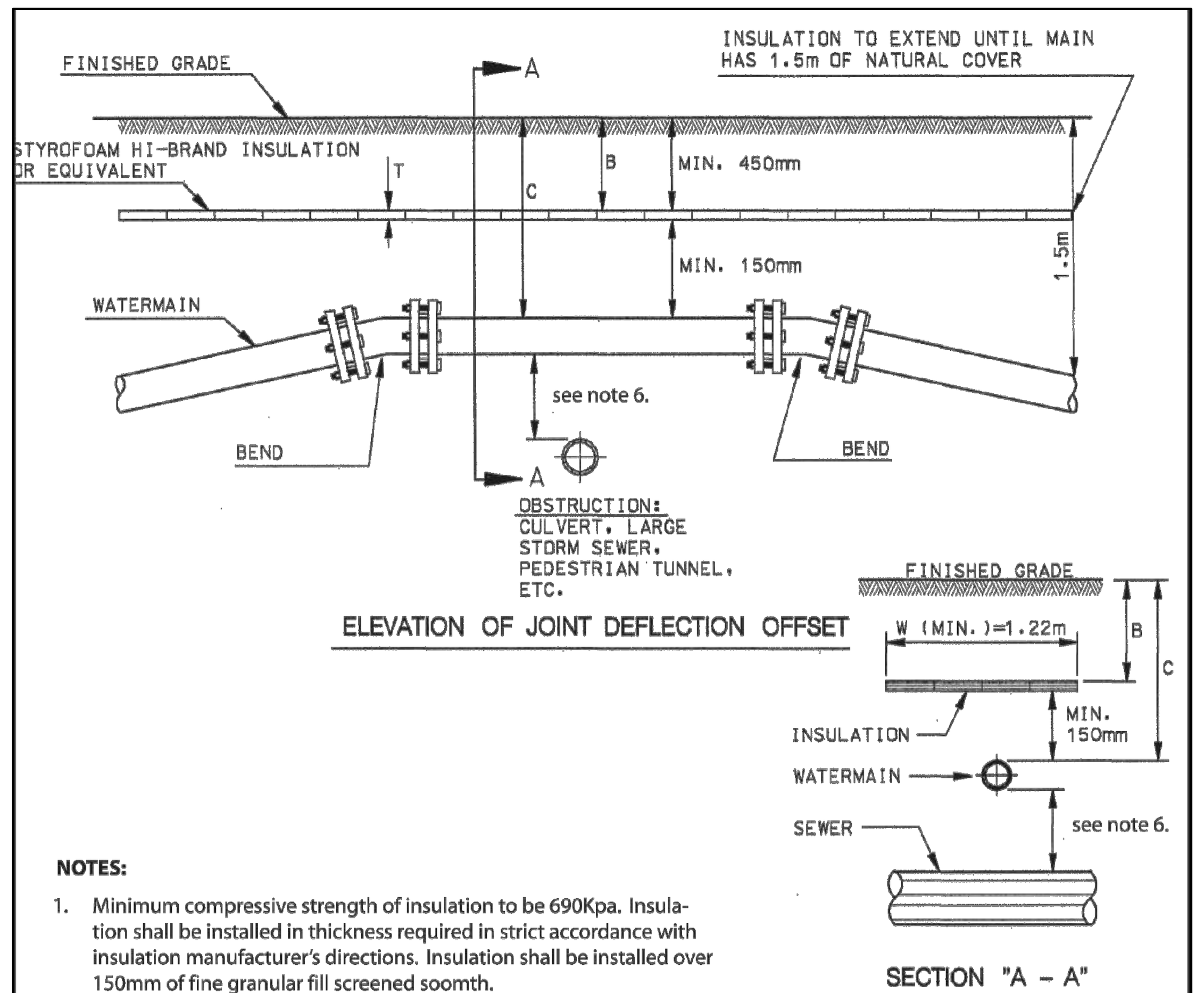


NOTE: CULVERT INVERTS, DITCH INVERTS AND SLOPE GRADES TO BE SHOWN ON APPLICATION DRAWING. ELEVATIONS TO BE RELATIVE TO CENTRELINE OF ROAD DATUM.

middlesex centre — in the centre of it all

STANDARD FOR SINGLE AND DOUBLE DRIVEWAY ENTRANCE (RURAL)

DATE: 2017-04 | FIGURE 1.8b)



NOTES:

1. Minimum compressive strength of insulation to be 690Kpa. Insulation shall be installed in thickness required in strict accordance with insulation manufacturer's directions. Insulation shall be installed over 150mm of fine granular fill screened soomth.
2. Butt insulation tightly together without gaps. Stagger end joints if more than one layer used.
3. To hold in place skewer insulation board to ground with 200mm hardwood skewers. Minimum 6mm dia., and 200mm long. 2 skewers per board.
4. If 2 layers of insulation are used skewer only the top layer through the first layer using a skewer 150mm longer than the combined thickness of the 2 layers of insulation. Insert skewers at approximately 30 degree angle.
5. Place at least 200mm of fine granular fill over insulation before using compaction equipment.
6. Minimum Clearance as per MOECC Procedure F-6-1.

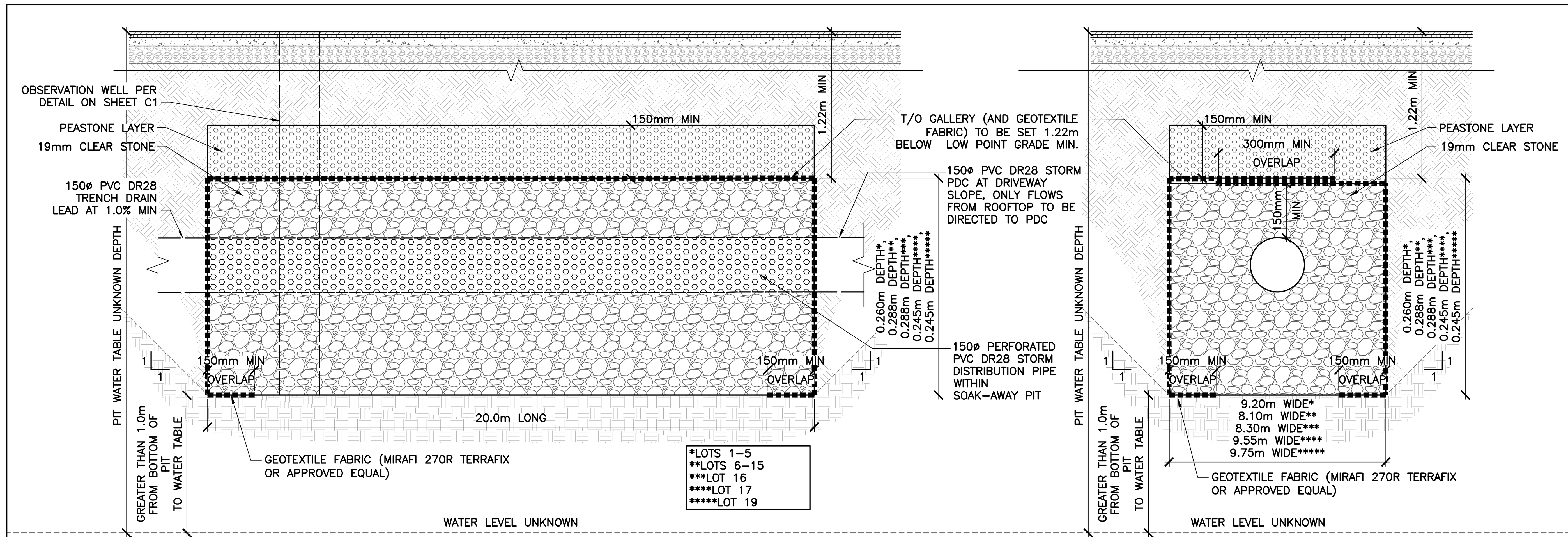
INSULATION THICKNESS		INSULATION WIDTH	
C(m)	T(mm)	B(m)	W(m)
0.60	75	0.45	2.44
0.75	75	0.60	1.83
0.90	50	0.75	1.54
1.09	50	0.90	1.22
1.20	25		
1.35	25		

All dimensions are in millimetres unless shown otherwise.

middlesex centre — in the centre of it all

INSULATION STANDARD FOR SHALLOW MAINS AND OFFSETS

DATE: 2017-04 | FIGURE 5.2

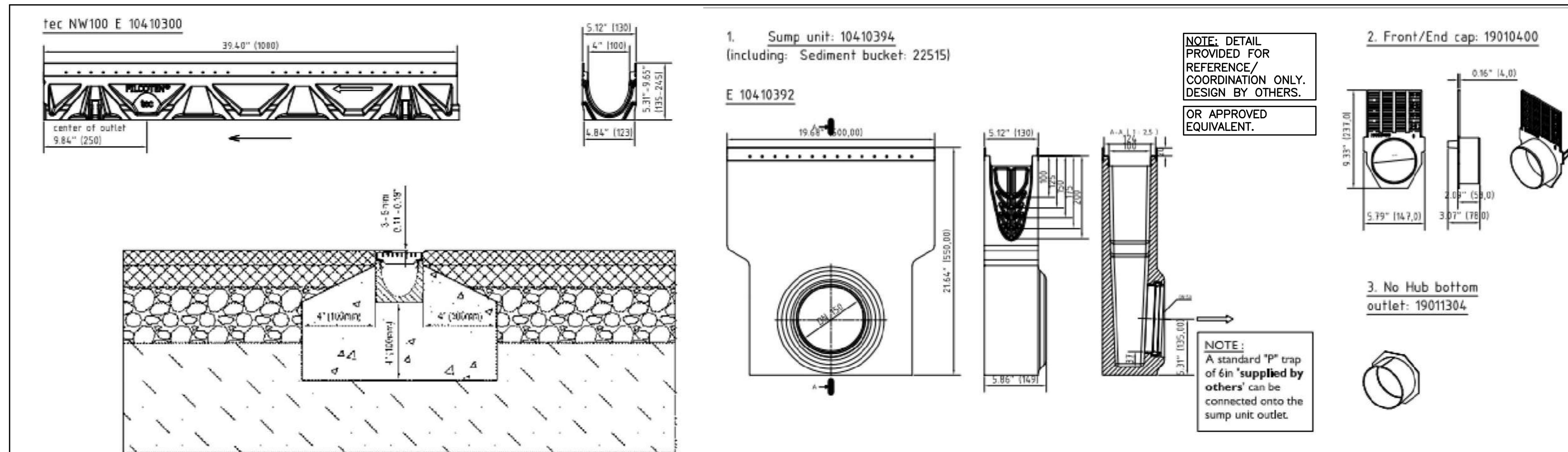


THE ELEVATION OF THE GROUNDWATER TABLE IS UNKNOWN CONTRACTOR/GEOTECHNICAL ENGINEER TO CONFIRM GROUND WATER ELEVATION PRIOR TO CONSTRUCTION

NOTES:
1. REFER TO SHEET 2A & 2B FOR STORM SEWER LOCATION
2. REFER TO SHEET 2A & 2B FOR EXTENT OF SOAKAWAY PITS

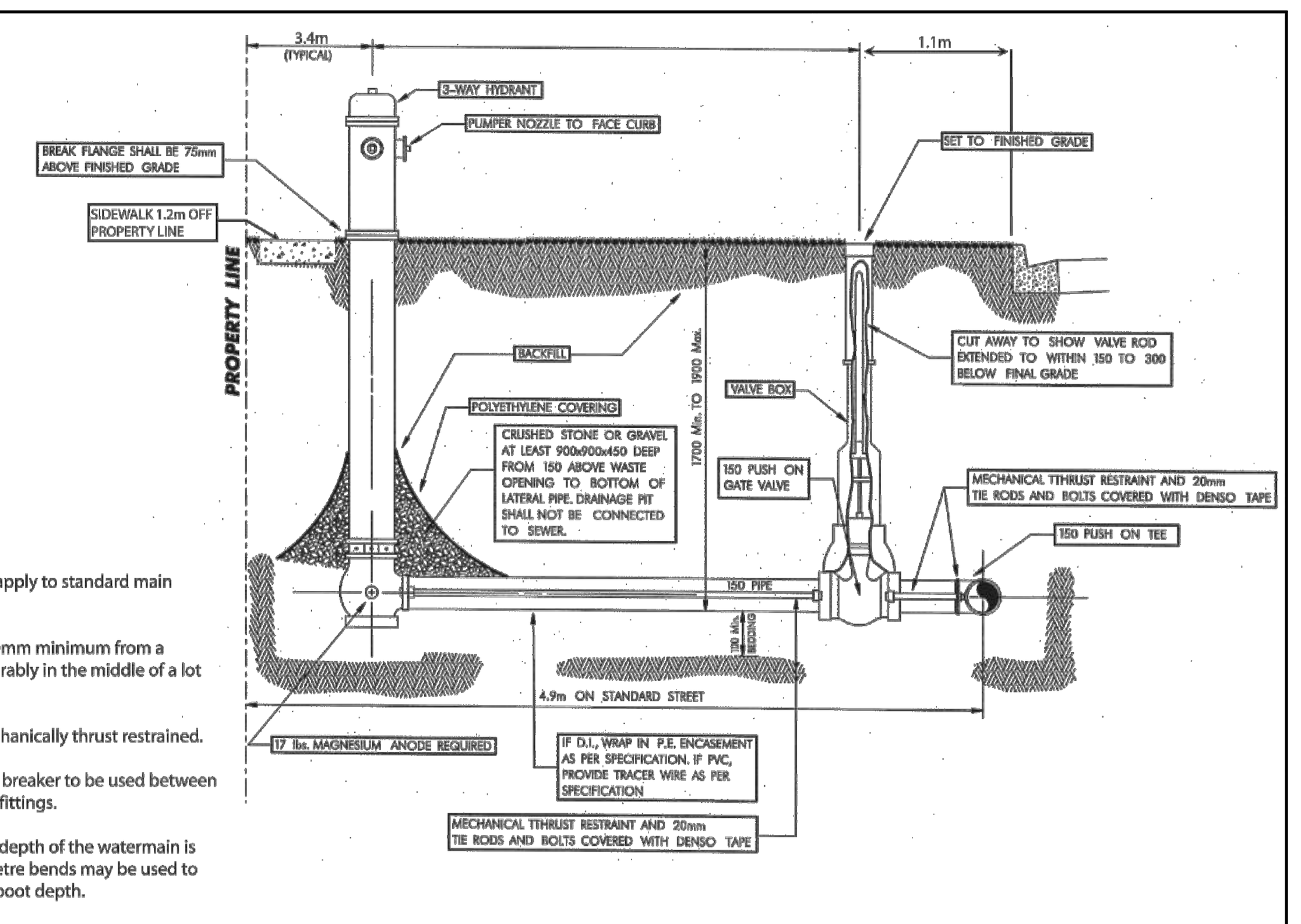
SOAKAWAY PIT DETAIL

N.T.S.



TRENCH DRAIN DETAILS

N.T.S.



NOTES:

1. Dimensions given apply to standard main location.
2. Hydrant to be 1500mm minimum from a driveway and preferably in the middle of a lot frontage.
3. All joints to be mechanically thrust restrained.
4. Polyethylene bond breaker to be used between crushed stone and fittings.
5. In cases where the depth of the watermain is greater than 1.9 metre bends may be used to offset the hydrant boot depth.
6. The use of 300mm, minimum, fire hydrant barrel extension may also be used.

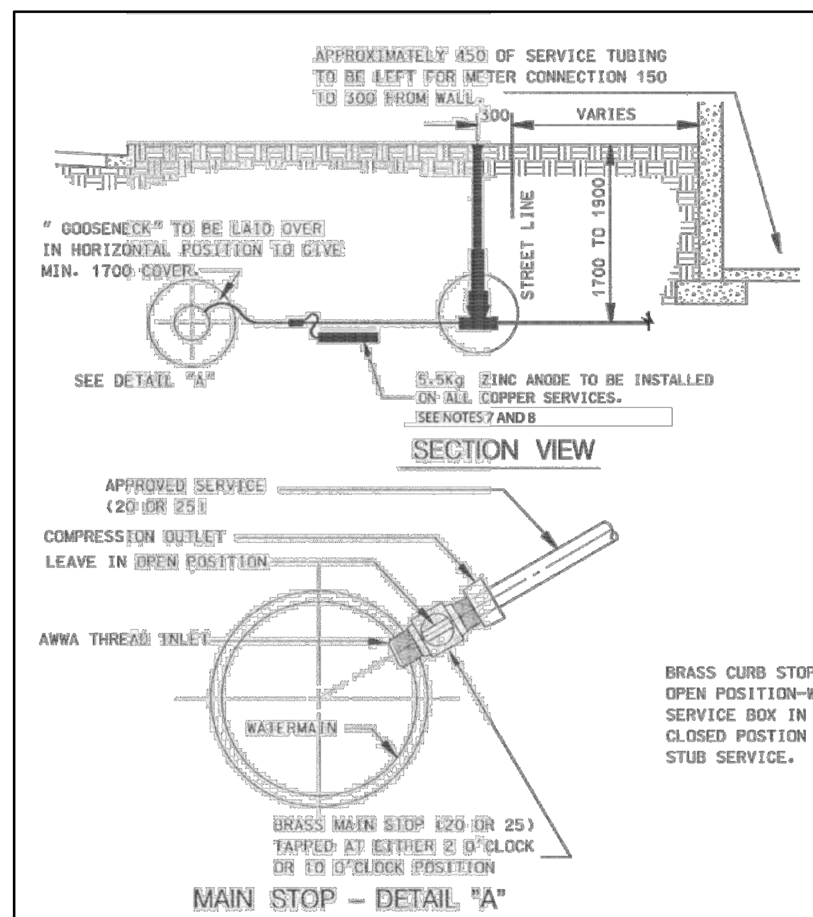
All dimensions are in millimetres unless otherwise shown.

FIGURE 5.8

middlesex centre — in the centre of it all

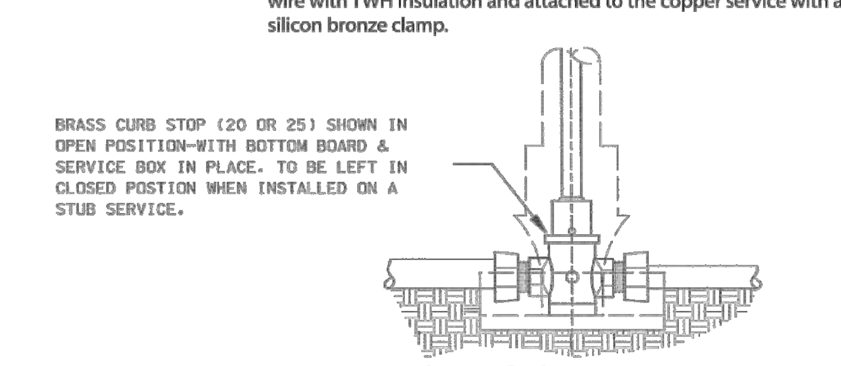
HYDRANT AND VALVE INSTALLATION

DATE: 2017-04 | FIGURE 5.8



NOTES:

1. Main stops shall be spaced on main not closer than 450mm. If main is PVC taps shall not be on a common line parallel to the axis of the pipe and no closer than 450mm from the spigot end of the pipe.
2. Approved service tubing Rehau Municipex . For material on private property refer to Ontario Building Code.
3. Service tubing to be the same material from the main to the water meter.
4. Any joint made in service tubing shall be made with approved couplings.
5. No joints shall be made under pavement.
6. Approved service saddles must be used to tap 25mm main stops into 100mm pipe and all main stops into PVC pipe.
7. 5.5Kg zinc anode must conform to ASTM B418-73 Type II.
8. Anode must be supplied with a 3m AWG 12 gauge solid copper lead wire with TWH insulation and attached to the copper service with a silicon bronze clamp.



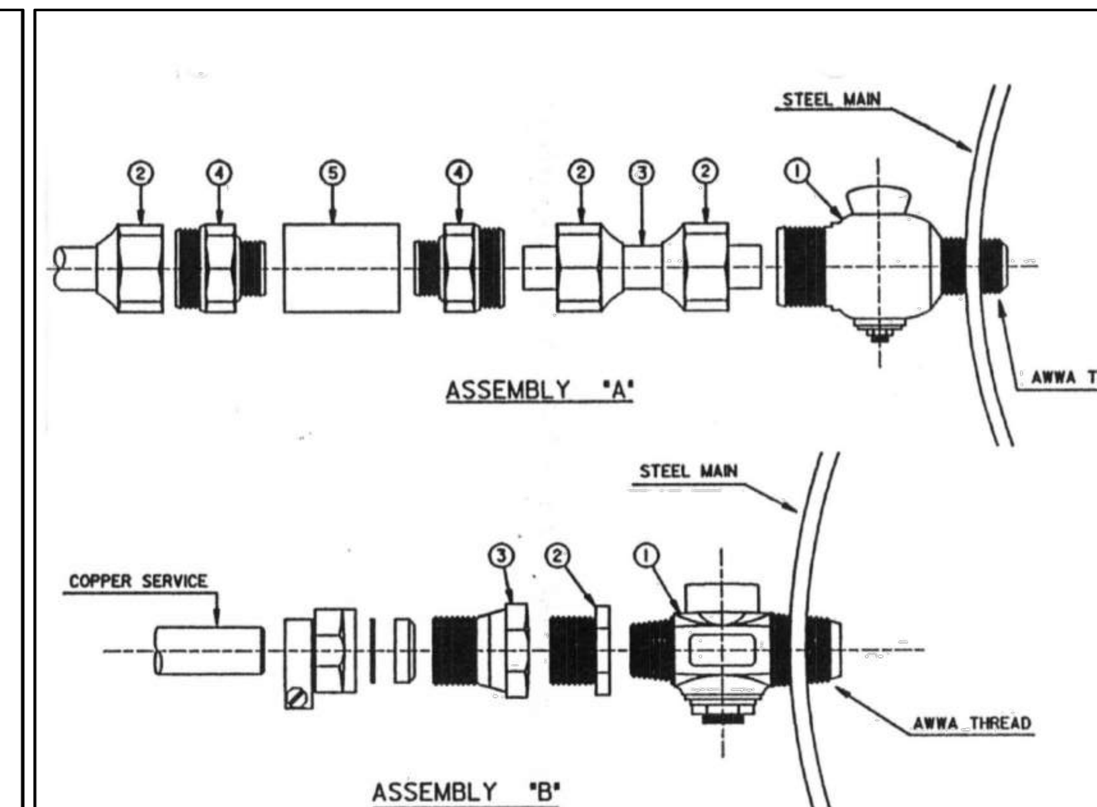
All dimensions are in millimetres unless otherwise shown.

FIGURE 5.10

middlesex centre — in the centre of it all

STANDARD INSTALLATION OF <50 mm WATER SERVICE CONNECTION AND LAYOUT DETAIL

DATE: 2017-04 | FIGURE 5.10



ASSEMBLY 'A'

1. Main stop (left open and burried)
2. Copper coupling nut (part of main stop or coupling)
3. Short piece of copper pipe
4. Copper to iron coupling (Mueller A-314 or equal)
5. Coupling - armour insulated

ASSEMBLY 'B'

1. Ford F400 or FB400 main stop - I.P. thread outlet (left open and barried
2. Nylon dielectric increasing bushing - F.I.P. threat inlet to MIP thread outlet
3. Ford C14 series decreasing coupling - F.I.P. thread inlet to compression outlet

NOTES:

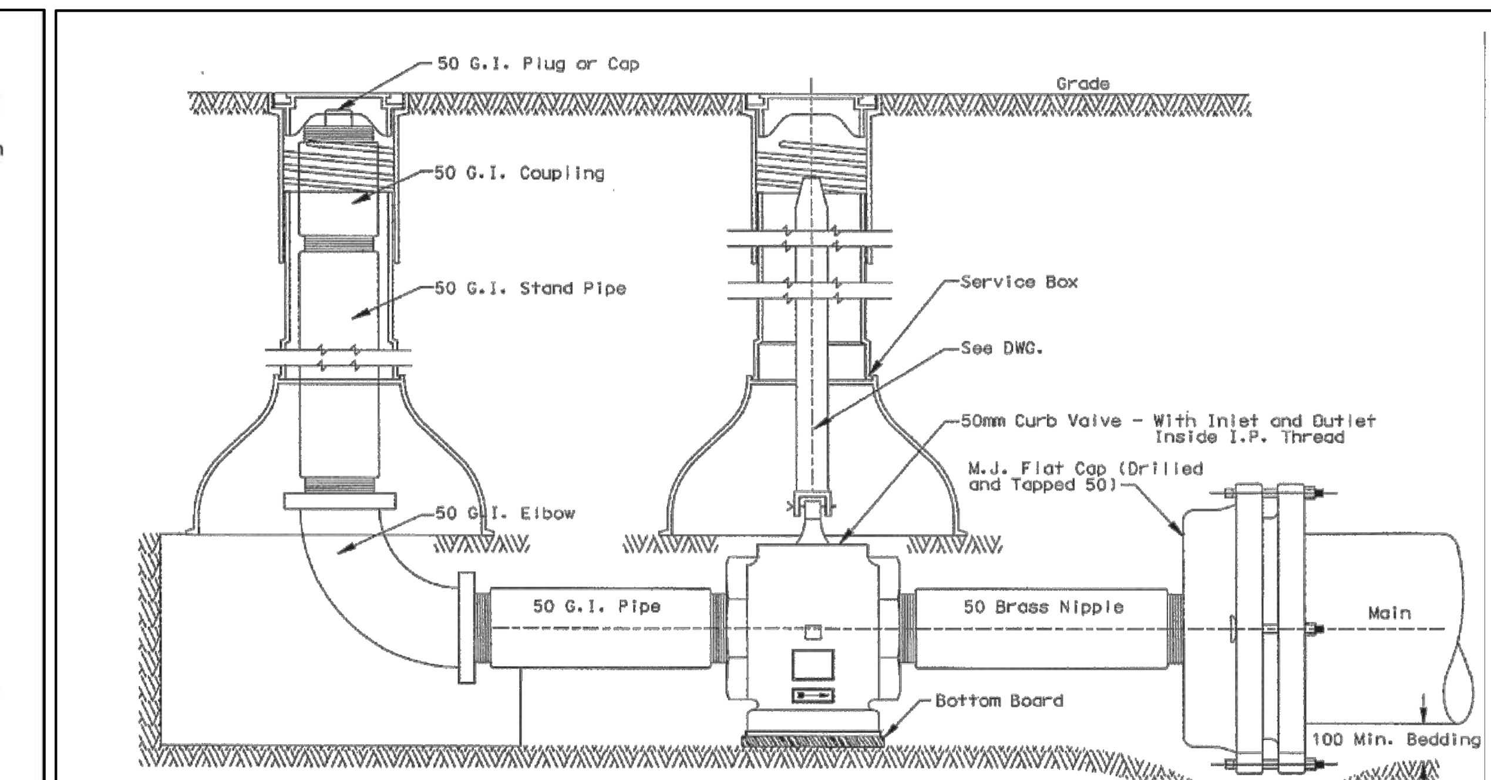
1. Assembly 'A' or Assembly 'B' may be used as an alternative for 20mm and 25mm services, Cambridgt brass series 103 insulated main stop may be used.

FIGURE 5-12

middlesex centre — in the centre of it all

CATHODIC PROTECTION ASSEMBLIES FOR 20 mm TO 50 mm WATER SERVICES

DATE: 2017-04 | FIGURE 5.12



NOTES:

1. All concrete to be minimum 20mpa compressive strength
2. Polyethylene Bond Breaker to be used between concrete and fittings.
3. Mechanical thrust restraint required as per Figure 5.5.

All dimensions are in millimetres unless otherwise shown.

FIGURE 5.4

middlesex centre — in the centre of it all

STANDARD 50mm BLOW OFF INSTALLATION

DATE: 2017-04 | FIGURE 5.4

AS CONSTRUCTED SERVICES	COMPLETION			No.	REVISIONS	D/M/Y	BY
		DESIGN	JSF/JEL	4	ISSUED FOR APPROVAL	15/09/21	JSF
		DRAWN	JSF	5	REVISED TO UTRCA/HYDRO ONE COORDINATION	16/02/22	JSF
		CHECKED	LS	6	REVISED TO SEPTIC DESIGNER COORDINATION	07/03/22	JSF
		APPROVED	NGu	7	CATCHMENT AREAS ADDED	22/06/22	JSF
		DATE	09/03/2021	8	REVISED TO MUNICIPALITY COMMENTS	05/10/22	JSF
				9	REVISED TO MUNICIPALITY COMMENTS	20/01/23	JSF
		CAD	21–0716	10	REVISED TO MUNICIPALITY COMMENTS	21/04/23	JSF
				11	REVISED TO MUNICIPALITY COMMENTS	15/11/23	JSF
				12	REVISED TO CLIENT COMMENTS/DRAFT PLAN REVISIONS	31/01/24	JSF

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ENGINEER'S STAMP: LICENSED PROFESSIONAL ENGINEER — K. A. MONIZ — 100124664 — Jan 31, 2024 — PROVINCE OF ONTARIO

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SCALE: N/A

TITLE: STANDARD DETAILS

BALLYMOTE SUBDIVISION

21488 HIGHBURY AVE N
BALLYMOTE, ON

PROJECT No. SBM–21–0716

SHEET No. 3

PLAN FILE No. –

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