



C.C. Tatham & Associates Ltd.
Consulting Engineers

**CHARLESTON HOMES
RESIDENTIAL DEVELOPMENT
Town of Collingwood**

Functional Servicing Report

prepared by:

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prepared for

Charleston Homes

December, 2015

CCTA File 114056

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1 Introduction

C.C. Tatham & Associates Ltd. (CCTA) was retained by Charleston Homes to complete a Functional Servicing Report in support of a proposed residential development in the Town of Collingwood (Town).

This servicing report summarizes the engineering servicing review completed to date for the development and provides a guide to establish the servicing requirements associated with it. More specifically the report addresses the requirements for water supply for domestic and fire-fighting purposes, sanitary sewage servicing, stormwater management, transportation and utility distribution (hydro, telephone, cable TV and gas).

While the stormwater management and transportation components are summarized herein, a more detailed assessment is provided under separate cover by CCTA.

2 Proposed Development

2.1 Location and Description

The subject property consists of approximately 31.4 ha of irregular shaped land which contains frontage along Poplar Sideroad and High Street and is generally situated northwest of the roundabout at this intersection. The legal description of the site is more conveniently summarized as Plan 51R-35424, received and deposited on May 30, 2007, geographic Township of Nottawasaga, Town of Collingwood, County of Simcoe. Figure 1 is a Key Plan showing the location of the subject property, herein recognized as the development lands.

The site is bound to the north by a future residential development which currently does not have municipal services. The east boundary of the development lands abuts High Street and to the south by a series of existing residential lots and Poplar Sideroad. The site is bound to the west by the Black Ash Creek watercourse which is surrounded by wooded areas.

2.2 Existing Site Conditions

The majority of the property is being utilized currently for agricultural purposes, whereas the remaining portion encompassing the watercourse corridor for the Black Ash Creek is treed. There are no existing buildings on-site. The property generally conveys runoff as sheet flow in a northerly direction with a majority of the drainage eventually outletting to Black Ash Creek which is the main receiver of runoff flow from these lands.

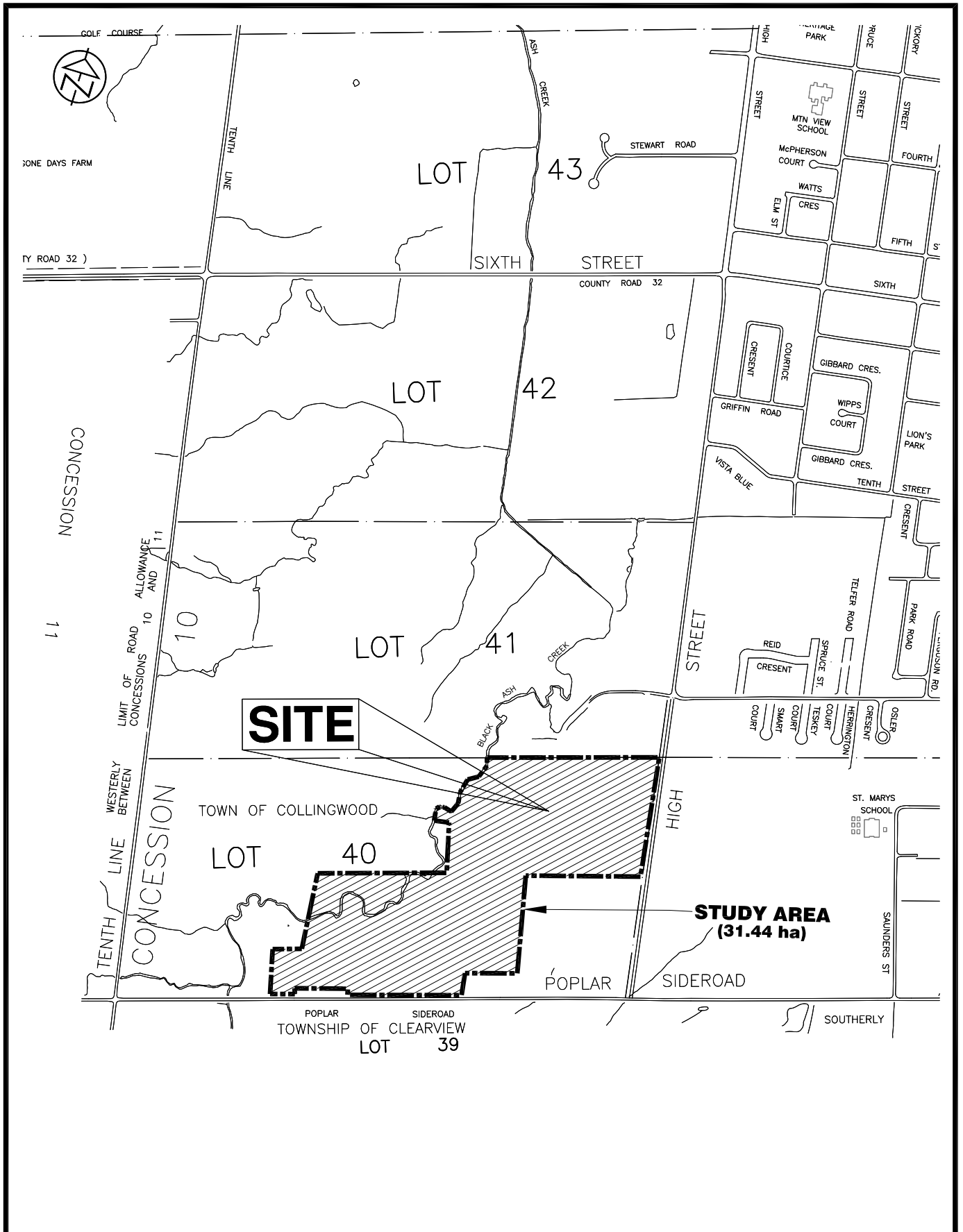
The subject property is presently agricultural land designated and zoned residential (Holding Zone) and deferred development zone. A Zoning By-Law Amendment and Draft Plan of Subdivision are proposed for the property.

A topographic survey of the development lands has been completed along with a geotechnical investigation. The investigation generally describes the upper soils as consisting of 125 mm to 350 mm of topsoil underlain by a native subgrade soil of sandy silt and silty sand.

The geotechnical assessment included the installation of eight groundwater monitoring wells throughout the property. The water levels in each monitoring well are recorded on a monthly basis (12-month program ends in March 2016) and this data will be utilized during the final engineering design stages.

2.3 Charleston Homes Proposal

It is proposed to develop the 31.4 ha property (the developable portion is approximately 25.6 ha) with residential dwellings including 281 single detached lots and 86 freehold townhouse units; for a total of



C.C. Tatham & Associates Ltd.
 Consulting Engineers
 Collingwood Bracebridge Orillia Barrie Ottawa

CHARLESTON HOMES - RESIDENTIAL DEVELOPMENT
TOWN OF COLLINGWOOD
KEY PLAN

SCALE: N.T.S. DATE: NOV/2015 DWG NO. FIGURE 1

JOB NO. 114056

367 residential units. The proposed layout is illustrated on the Draft Plan which is included in Appendix A.

Applying household densities of 2.43 persons per unit (ppu) for single family dwellings and 2.18 ppu for townhouses, would yield populations of 683 and 188 persons respectively for a total population of 871. The density rates are based on the County of Simcoe's Land Budget for the Town of Collingwood.

The residential lots will front a typical 20.0 m wide right-of-way complete with municipal services to Town engineering standards which will connect to the existing right-of-ways for High Street and Poplar Sideroad. The general layout for the development is illustrated in concept form on Dwg. CSP-1 (included in Appendix B) as to how it may be potentially serviced.

The subject property will be serviced with an extension of the watermain and sanitary sewer infrastructure from Findlay Drive / High Street and distributed through a network of internal streets that will be constructed with an urban cross-section. Storm sewers will be installed and will discharge to one of two stormwater management ponds that will be provided on-site adjacent to Black Ash Creek. Two park blocks are proposed along with walkways to maintain pedestrian connectivity throughout the development.

The proposed development will be serviced to municipal standards and all final design details shall adhere to the *Town of Collingwood Development Standards* (July 2007). Details on how the property will be serviced are included in the following sections.

It is expected that the development will be serviced in phases as necessary to meet market demands.

3 Sanitary Sewer Network

3.1 Sewage Demands

Development of the subject lands as proposed provides an estimated total population of 871 persons. Sewage generated for the total development amounts to rates of 4.54 L/s for average flow and 24.03 L/s for peak flow. Additional calculations and details for the proposed development are provided in Appendix C.

3.2 External Sewer

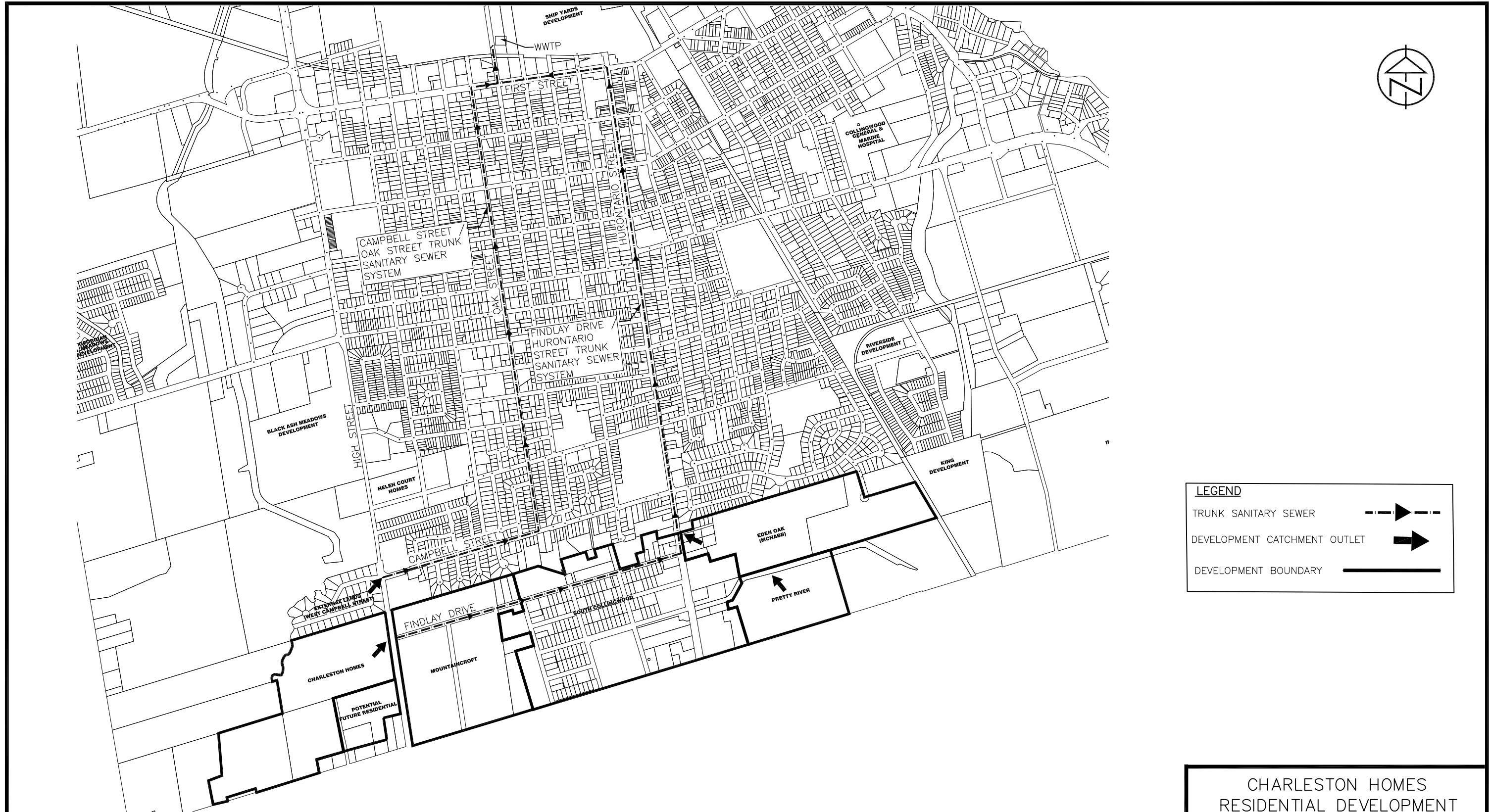
Overall servicing studies prepared for the Town report that the Findlay Drive / Hurontario Street trunk sewer system allows for the incorporation of sanitary sewage generated from the subject lands. This system includes a 300 mm dia. sanitary sewer that runs through the Mountaincroft Subdivision easterly along Findlay Drive, then north along Hurontario Street to First Street, where it is directed to the Town wastewater treatment plant at the north end of Birch Street. Given the planned units and densities it is proposed that sewage will be directed to this trunk sewer system.

The sewage system calculations for the Mountaincroft Subdivision incorporate the sewage flows generated from the subject lands. The sewer design sheet approved for that development identified 26.4 ha of associated land area west of High Street carrying a total of 530 residential units with an equivalent population of 1,537 persons. A 150 metre segment of sanitary sewer is anticipated for completion in 2016 by the developer for the Mountaincroft Subdivision which will extend the sewer network to High Street, ready for connection to this development.

The implementation of the above strategy should also consider the most current and updated development plans for the service area. Figure 2 is provided as an illustration of the pertinent trunk sanitary sewer systems for this service area and also identifies future potential developments which we understand are at various stages of planning.

Depending on the density and timing for other future developments that would share the Hurontario Street trunk sewer system, upgrades for localized sewer segments may be required to correct localized bottlenecks in that system. If constraints in the Hurontario Street system occur, the sewage flows (or part thereof) for the subject development could be directed to the Campbell Street / Oak Street trunk sanitary sewer system (refer to Figure 2). Connection to the Campbell Street sewer from the development lands would require the installation of approximately 250 m of external sewer along High Street.

Regardless of the connection point to existing municipal sewers at Findlay Drive or if necessary Campbell Street, the systems have capacity. All sewage flows eventually discharge to the existing wastewater treatment plant at the north end of Town which has sufficient capacity to accommodate the proposed development.



LEGEND

TRUNK SANITARY SEWER

DEVELOPMENT CATCHMENT OUTLET

DEVELOPMENT BOUNDARY

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

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**CHARLESTON HOMES
RESIDENTIAL DEVELOPMENT
PERTINENT TRUNK SANITARY SEWER SYSTEMS**

C.C. Tatham & Associates Ltd.
Consulting Engineers

Collingwood Bracebridge Orillia Barrie Ottawa

SCALE 1:400	DRAWN BY: GB
DATE: DEC 2015	DWG. FIGURE 2

NO.	REVISIONS	DATE	INITIAL

3.3 Proposed Sewer Network

The proposed internal sewer network will include minimum 200 mm diameter sanitary sewers that convey flows via gravity to the northeast limit of the development at the entrance at High Street to the future 300 mm diameter sanitary sewer on Findlay Drive in the Mountaincroft subdivision. The system will be designed with underground sewers, maintenance holes and services to individual lots and townhouse units, all to Town Development Standards. A preliminary servicing concept is illustrated on Dwg. CSP-1 that demonstrates the feasibility of providing sanitary sewers for the subject development.

4 Water Network

4.1 Water Demands

The proposed water supply demands for the development have been calculated based on MOE guidelines and Town design standards. The proposed water demands and population densities are summarized as follows (additional details are provided in Appendix C):

- Design Population (Residential) 871 people
- Average day demand (ADD) 392 m³/d (4.54 L/s)
- Maximum day demand (MDD) 785 m³/d (9.08 L/s)
- Peak Hour demand (PHD) 20.43 L/s
- Maximum day plus fire flow 66.08 L/s (9.08 L/s + 57.0 L/s) for 2 hours

These figures are included for the Town to incorporate into their water distribution model when necessary to analyze the additional flows generated by the proposed development. A Water Distribution Plan has been previously forwarded to the Manager of Water Services for the Town for review and is included with this report.

4.2 Water Supply

Water supply for the development will be provided from the Town's existing municipal system which will connect at a 450 mm diameter main at the intersection of Findlay Drive and High Street. A 150 metre segment of watermain is anticipated for completion in 2016 by the developer for the Mountaincroft Subdivision which will extend the water network to High Street.

4.3 Water Distribution

The water distribution network for the subdivision includes a watermain which will connect at the intersection of Findlay Drive and High Street and loop into the development lands at two locations along High Street.

This watermain would be at least 150 mm diameter complete with services and fire hydrants as per municipal standard requirements.

A preliminary servicing concept is illustrated on Dwg. CSP-1 to demonstrate the feasibility of providing water service to the development.

5 Stormwater Management

A *Preliminary Stormwater Management Report* that reviews the existing and proposed stormwater conditions for the proposed development has been completed by CCTA under separate cover and should be read in conjunction with this report.

5.1 Stormwater Management System

Key findings/conclusions of the Preliminary Stormwater Management Report as they relate to the proposed stormwater management system are as follows:

- The stormwater management plan developed for the subject lands is in accordance with the criteria set forth by the Town of Collingwood Standards and the Ministry of the Environment Stormwater Management Planning and Design Manual (March 2003).
- The stormwater management plan when implemented will allow the development to proceed without negatively impacting the local drainage systems.
- Water quality to an Enhanced Level with 80% total suspended solids removal will be provided through the use of a treatment train approach including a combination of low impact development and conventional end-of-system facilities. Those facilities will consist of at-source soakaway pits, enhanced grassed swales, and two constructed stormwater management ponds.
- Water quantity controls are not required to Black Ash Creek as the receiver is the channelized reach of the Black Ash Creek that can receive uncontrolled peak flows.
- Siltation and erosion controls will be implemented for all construction activities, including topsoil stripping, material stockpiling, road construction and grading operations. The detailed erosion and sediment control measures proposed to be implemented during and after the construction will be identified during detailed design.

6 Transportation Network

Traffic and Transportation issues related to the development must be addressed to accommodate the development and surrounding land uses. A *Traffic Impact Study* (TIS) has been completed by CCTA under separate cover and should also be read in conjunction with this report.

6.1 Site Access

Access to the development will be provided at one location on High Street and one location on Poplar Sideroad. Sight lines at the proposed access points are acceptable with respect to MTO minimum stopping sight distances. As such, vehicles manoeuvring to/from the site can do so in a safe and efficient manner and no further road improvements are required in this regard.

6.2 Internal Road Network

A 20.0 m urban road cross-section is proposed for the development. The right-of-way would be municipally owned. Daylighting triangles will be incorporated and minimum sightline requirements are satisfied for all entrances and intersections associated with the development. Additional details are illustrated on the Concept Servicing Plan.

6.3 Operational Analysis

The results of the operational analysis indicate that the intersections will provide acceptable overall conditions through 2035 under both future background and future total conditions. Despite the acceptable operations, an eastbound right turn lane at the intersection of Poplar Sideroad with Hurontario Street is recommended in 2035 under background conditions (ie. prior to consideration for the subject development).

The volume of vehicles entering the site at the Poplar Sideroad access does not warrant the provision of exclusive turn lanes.

While the volumes at the High Street access do warrant exclusive turn lanes based on the MTO warrants, such are not considered necessary given the proposed future widening of High Street to a 4-lane profile and the additional capacity that such improvements will provide. However, in the absence of the proposed widening, a 60 metre right turn taper and a northbound exclusive left turn lane with 15 metres of storage are recommended at the High Street access to accommodate the site volumes until such a time that High Street is widened to four lanes.

7 Utility Network

7.1 Existing Utilities

All aboveground existing utility features including hydro poles and pedestals were located during the topographic survey along the perimeter of the subject property.

7.2 Hydro

Collingwood Utilities Services was contacted to determine the availability of hydro services to the development area. It was confirmed that the current system has capacity on a first-come, first-serve basis for this area. Accordingly, provided the timing constraints are met, the existing system has adequate capacity. If the timing constraints are not met and other developments proceed in advance of Charleston Homes, an additional hydro distribution feed would be required prior to development.

7.3 Gas

Enbridge Gas confirmed that there is a natural gas main in the area with sufficient capacity to readily accommodate the development. The servicing requirements will be determined through detailed design.

7.4 Telephone

Bell Canada confirmed their intention to service the site with high speed fibre optic service. The servicing requirements will be determined through detailed design.

7.5 Cable TV

Rogers Cable confirmed that sufficient cable service is available to provide cable TV and internet services for the development. The servicing requirements will be determined through detailed design.

7.6 Connection Strategies

Detailed connection strategies with all utility companies will be formalized at the appropriate time. However, it would appear that there would be no issue in providing all utility servicing to this development.

8 Conclusions

Based on the preceding analysis, the proposed development concept has adequate services available. Specifically, the proposed strategy for servicing includes:

1. An internal sanitary sewer system can be constructed with a primary connection point to the future 300 mm diameter sanitary sewer that is expected for completion in 2016 which will terminate at the intersection of Findlay Drive and High Street in the Mountaincroft Subdivision. As a supplementary solution, a portion of these flows could be diverted to the existing 250 mm diameter sanitary sewer on Campbell Street if necessary in the future.
2. To supply the needs of the development, an internal water distribution system can be constructed and connected to the municipal watermain at the Findlay Drive / High Street intersection adjacent to the Mountaincroft Subdivision which is immediately east of High Street.
3. A storm sewer drainage system to collect surface water runoff from the development can be constructed which will convey flows to two on-site end-of-system stormwater management facilities. Low impact development measures will also be incorporated throughout the site and all measures will ensure flows are discharged at a controlled rate and treated on-site before leaving the property.
4. Access is provided to the development from existing municipal right-of-ways and proposed internal roadways will be designed to urban local-residential Town standards. Sight lines at the proposed access locations meet MTO standards and external road improvements are not necessary as a result of this development, provided that High Street is widened to a 4-lane profile (which is planned for by the Town). Pedestrian connectivity will be provided by a network of sidewalks, trails and walkway corridors.
5. Hydro, telephone, cable TV and natural gas services are available.

Additional details with respect to the various servicing components will be provided at the final design stage. Detailed drawings will be completed for approval by the Town and relevant approval agencies as required to clear the conditions of draft approval and allow registration of the Plan of Subdivision and associated Subdivision Agreement.



Authored by: Jeff Akitt, B.Eng. & Mgmt., P.Eng.
Senior Engineer, Project Manager

Reviewed by: Dan Hurley, B.A.Sc., P.Eng., LEED AP
Vice President, Manager – Water
Resources Engineering

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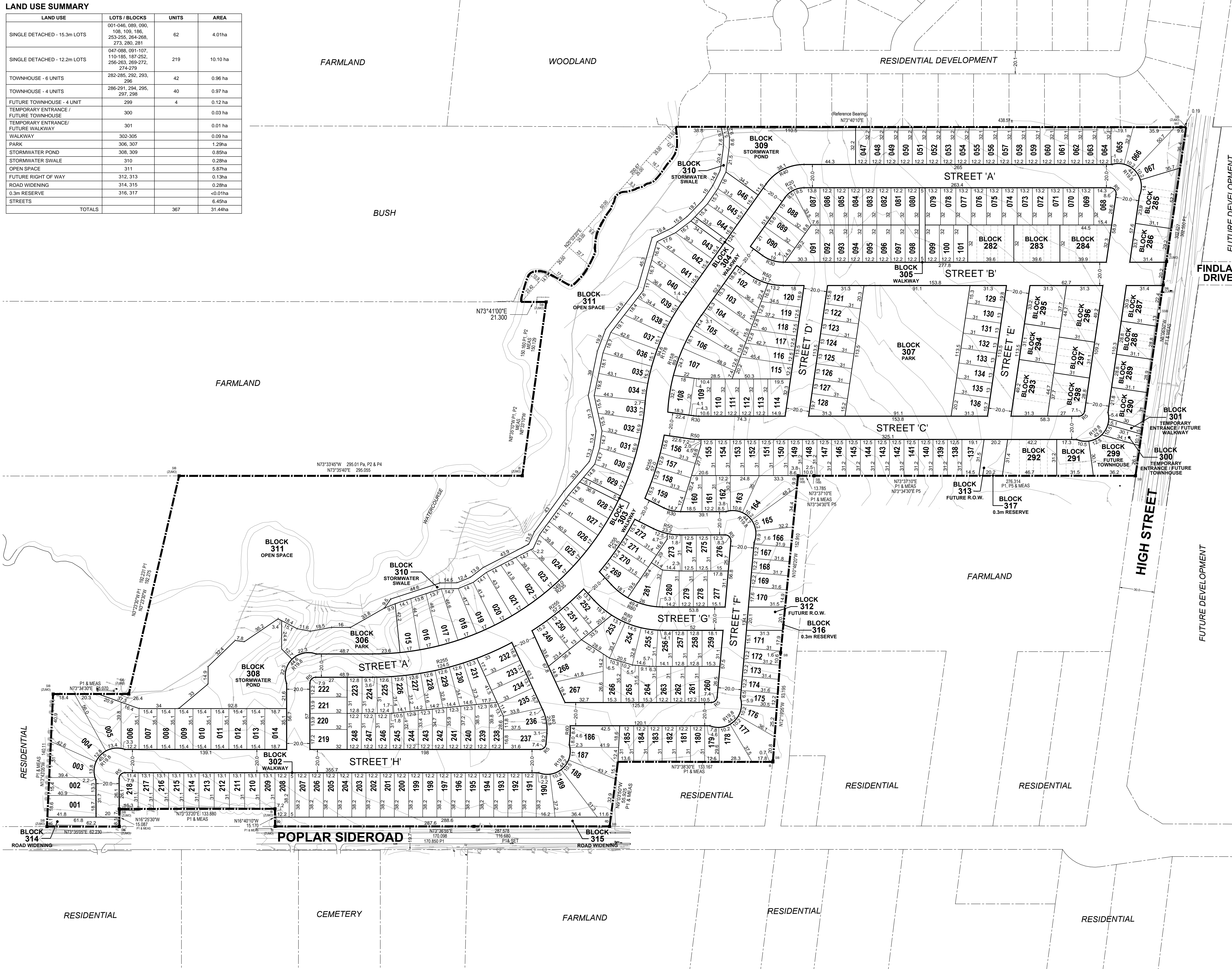
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Appendix A

Draft Plan

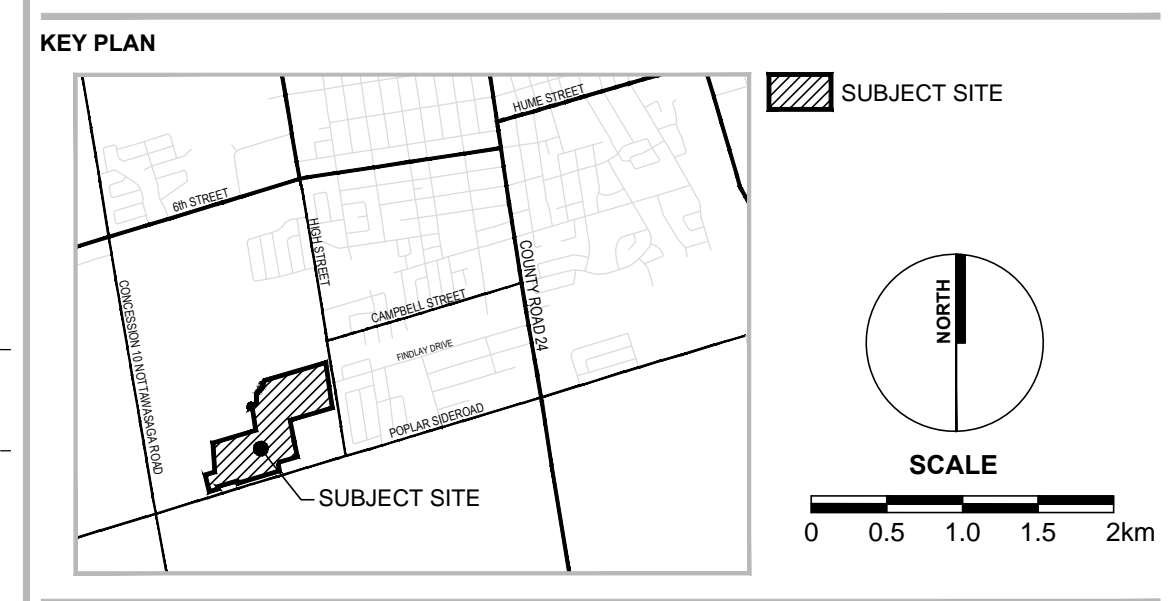
LAND USE	LOTS / BLOCKS	UNITS	AREA
SINGLE DETACHED - 15.3m LOTS	001-046, 089, 090, 108, 109, 186, 253-255, 264-268, 273, 280, 281	62	4.01ha
SINGLE DETACHED - 12.2m LOTS	047-088, 001-107, 110-185, 187-252, 256-263, 269-272, 274-279	219	10.10 ha
TOWNHOUSE - 6 UNITS	282-285, 292, 293, 296	42	0.96 ha
TOWNHOUSE - 4 UNITS	286-291, 294, 295, 297, 298	40	0.97 ha
FUTURE TOWNHOUSE - 4 UNIT	299	4	0.12 ha
TEMPORARY ENTRANCE / FUTURE TOWNHOUSE	300		0.03 ha
TEMPORARY ENTRANCE / FUTURE WALKWAY	301		0.01 ha
WALKWAY	302-305		0.09 ha
PARK	306, 307		1.29ha
STORMWATER POND	308, 309		0.85ha
STORMWATER SWALE	310		0.28ha
OPEN SPACE	311		5.87ha
FUTURE RIGHT OF WAY	312, 313		0.13ha
ROAD WIDENING	314, 315		0.28ha
0.3m RESERVE	316, 317		<0.01ha
STREETS			6.45ha
TOTALS		367	31.44ha



LEGAL DESCRIPTION
 PART OF LOT 40, CONCESSION 10
 GEOGRAPHIC TOWNSHIP OF NOTTAWASAGA
 TOWN OF COLLINGWOOD
 COUNTY OF SIMCOE

OWNER'S CERTIFICATE
 I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED TO SUBMIT THIS PLAN FOR APPROVAL.
 DATE: NOVEMBER 30, 2015
 CHARLIE KUIJEN - PRESIDENT
 CHARLESTON HOMES

SURVEYOR'S CERTIFICATE
 I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.
 DATE: NOVEMBER 30, 2015
 JAMES M. LAWS - O.L.S.
 VAN HARTEN SURVEYING INC.



LEGEND

- BOUNDARY LINE
- RIGHT OF WAY LINE
- BLOCK LINE
- LOT LINE
- UNIT LINE
- PARCEL FABRIC

REVISION No.	DATE	ISSUED / REVISION	BY
ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT R.S.O. 1990 C.P.13 AS AMENDED			
A. AS SHOWN	F. AS SHOWN	K. ALL SERVICES AS REQUIRED	
B. AS SHOWN	G. AS SHOWN	L. NONE	
C. AS SHOWN	H. MUNICIPAL WATER SUPPLY		
D. RESIDENTIAL	I. SANDY SILT		
E. AS SHOWN	J. AS SHOWN		

PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
MHBC PLANNING
 113 COLLIER STREET
 BARRIE, ON, L4M 1H2
 P: 705 728 0045 F: 705 728 2010
 WWW.MHBCPLAN.COM

STAMP	DATE
	NOV. 30, 2015
FILE No.	Y219B
SCALE	1:1,500 (ARCH D)
DRAWN BY	M.M.
CHECKED BY	K.M.
OTHER	

PROJECT
 CHARLESTON SUBDIVISION
 CHARLESTON HOMES
 143 DENNIS STREET
 P.O. BOX 760
 ROCKWOOD, ON N0B 2K0

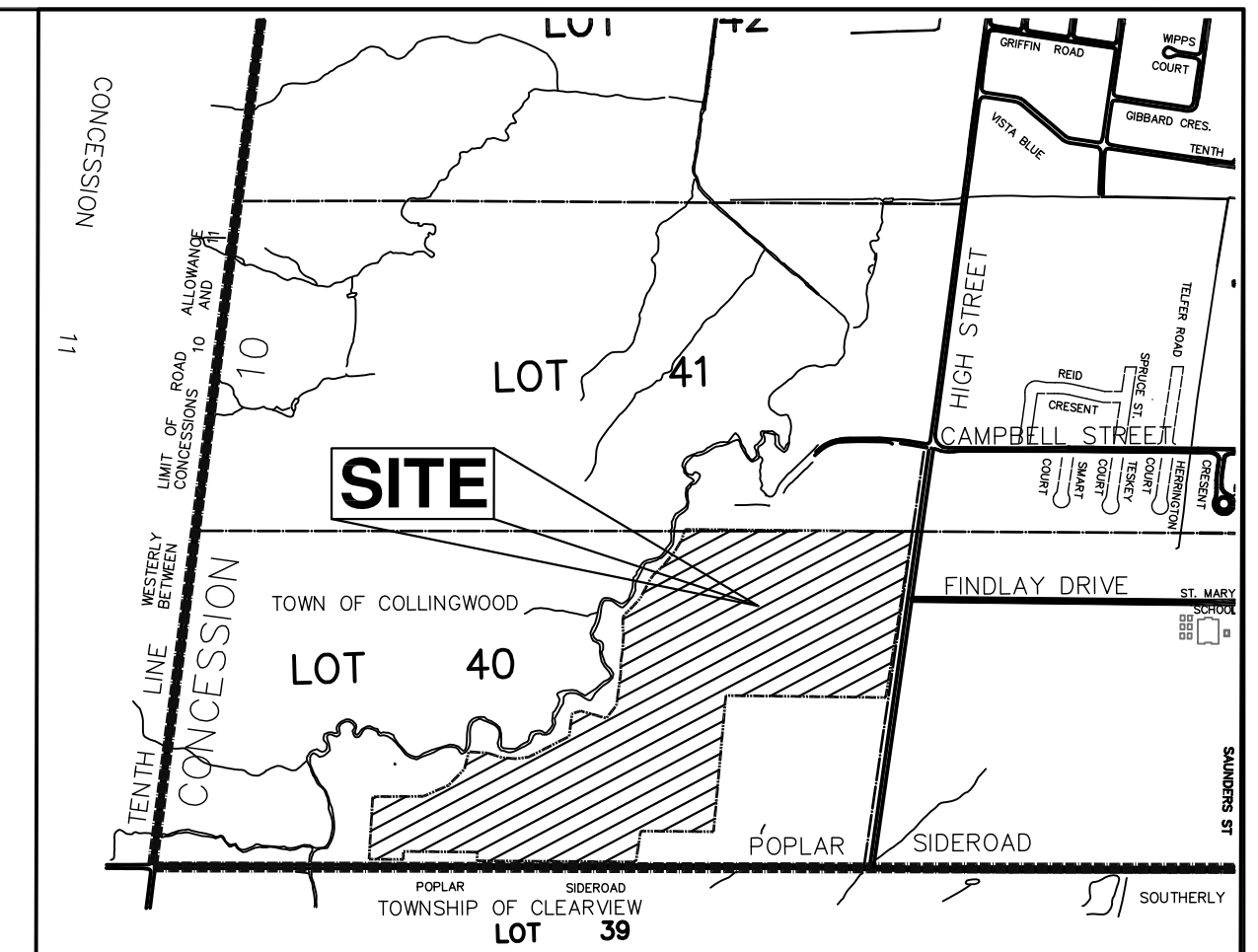
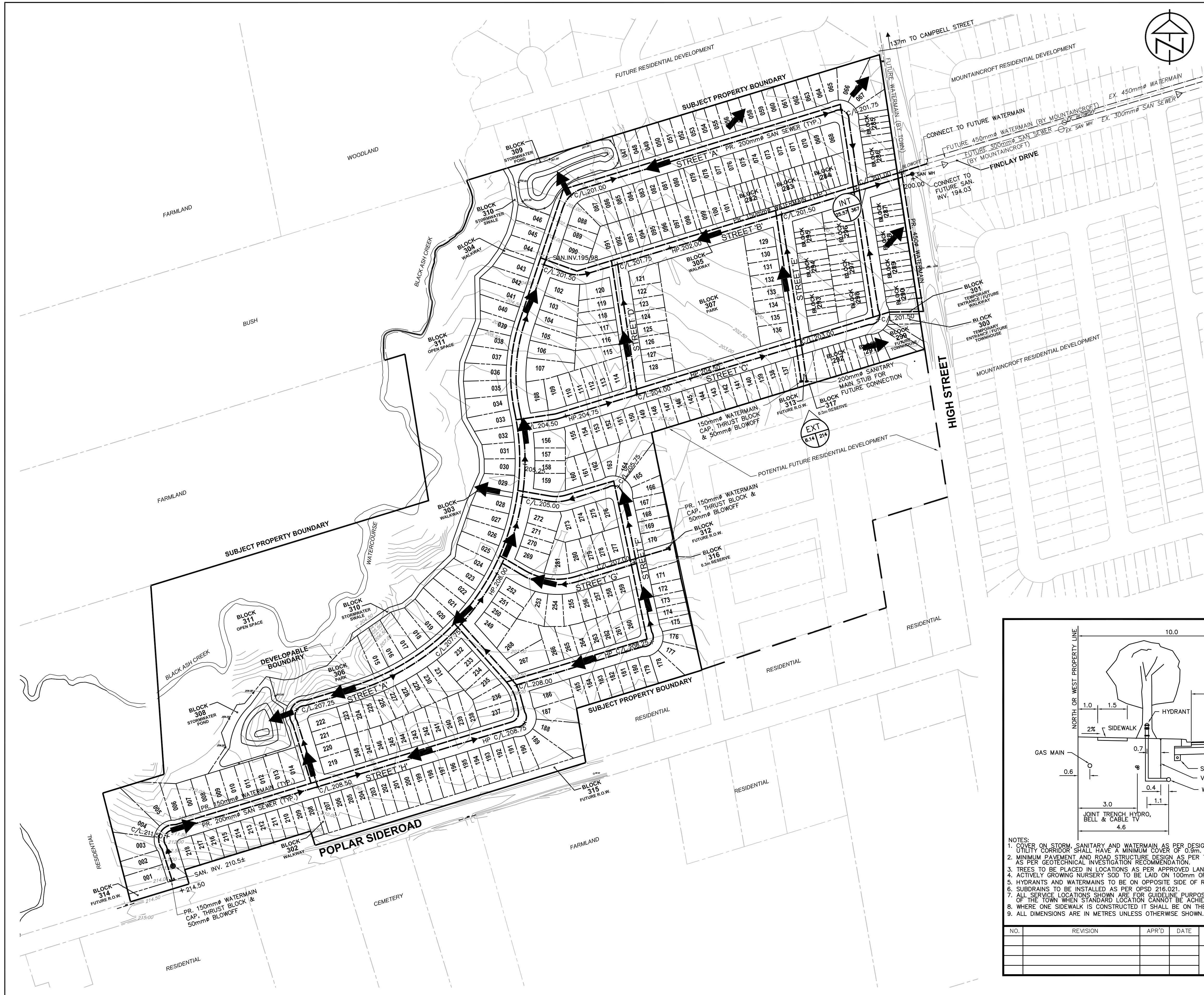
FILE NAME
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DWG No.
 1 of 1

SCALE BAR
 0 20 40 60 80 100m

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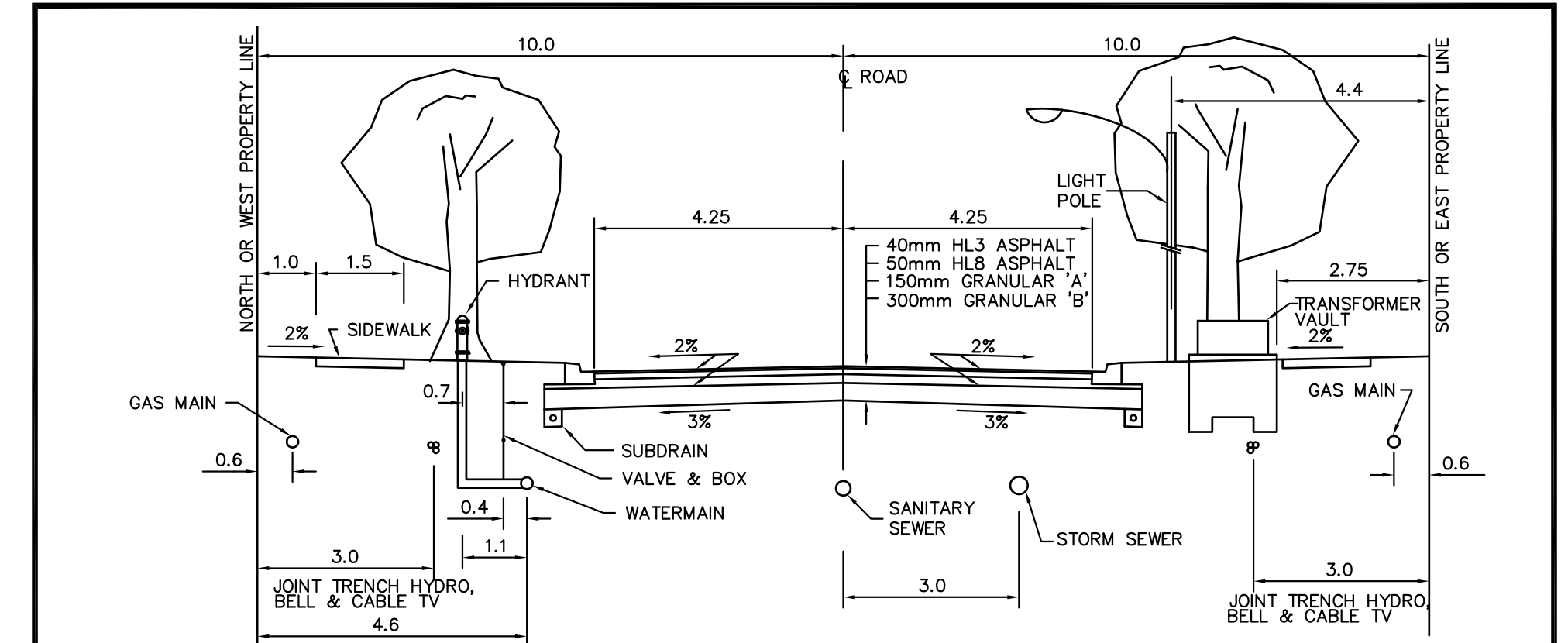
Appendix B
Concept Servicing Plan



KEY PLAN
SCALE: NTS

LEGEND

- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- PROPOSED DRAINAGE SWALE
- SUBJECT PROPERTY BOUNDARY
- PROPOSED OVERLAND FLOW DIRECTION
- PROPOSED ELEVATION AT C/L OF ROAD + C/L.205.65
- SANITARY SEWAGE CATCHMENT ID
- CATCHMENT LABEL
- AREA IN HECTARES
- CATCHMENT LABEL
- NUMBER OF UNITS



- NOTES:
- COVER ON STORM, SANITARY AND WATERMAIN AS PER DESIGN CRITERIA.
 - UTILITY CORRIDOR SHALL HAVE A MINIMUM COVER OF 0.9m.
 - MINIMUM PAVEMENT AND ROAD STRUCTURE DESIGN AS PER TOWN DESIGN CRITERIA OR AS PER GEOTECHNICAL INVESTIGATION RECOMMENDATION.
 - TREES TO BE PLACED IN LOCATIONS AS PER APPROVED LANDSCAPE PLAN.
 - ACTIVELY GROWING NURSERY SOD TO BE LAID ON 100mm OF TOPSOIL PROPERLY GRADED AND ROLLED.
 - HYDRANTS AND WATERMANS TO BE ON OPPOSITE SIDE OF ROAD FROM ELECTRICAL TRANSFORMER.
 - SUBDRAINS TO BE INSTALLED AS PER OPSD 216.021.
 - ALL SERVICE LOCATIONS SHOWN ARE FOR GUIDELINE PURPOSES ONLY AND MAY DEVIATE AS PER THE DIRECTION OF THE TOWN WHEN STANDARD LOCATION CANNOT BE ACHIEVED.
 - WHERE ONE SIDEWALK IS CONSTRUCTED IT SHALL BE ON THE SOUTH AND EAST SIDE OF THE ROAD.
 - ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

NO.	REVISION	APR'D	DATE	TOWN OF COLLINGWOOD	APR'D:	DATE: JAN /03
				URBAN - LOCAL RESIDENTIAL	DRAWN:	SCALE: NTS
				20.0m ROAD ALLOWANCE 8.5m ASPHALT SURFACE	STD. No.	201

CONTRACT DRAWINGS
CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

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NOTES
LEGAL SURVEY BOUNDARY ON THIS PLAN PREPARED BY VAN HARTEN SURVEY INC., PLAN 51R-35424, DATED MAY 30, 2007.

TOPOGRAPHIC SURVEY INFORMATION COMPLETED BY C.C. TATHAM & ASSOCIATES LTD.

DEVELOPABLE BOUNDARY SHOWN BASED ON PLAN PREPARED BY SPL CONSULTANTS LTD., DWG. 17, DATED APRIL 21, 2015.

NO.	REVISIONS	DATE	INITIAL

APPROVED

J.R. Aritt
J. R. ARITT
100103953
DEC. 11/15
PROVINCE OF ONTARIO

**CHARLESTON HOMES
RESIDENTIAL DEVELOPMENT
TOWN OF COLLINGWOOD**

CONCEPT SERVICING PLAN

C.C. Tatham & Associates Ltd.
Consulting Engineers

Collingwood Bracebridge Orillia Barrie Ottawa

SCALE: 1:2000
DESIGN: CFM
DRAWN: GB

CHECKED: JRA
DATE: DEC 2015

JOB NO. 114056
DWG. **CSP-1**

Appendix C

Design Calculations

SANITARY SEWER DESIGN SHEET

Approved:



C.C. Tatham & Associates Ltd.
Consulting Engineers

Collingwood Bracebridge Orillia Barrie Ottawa

FLOW CRITERIA

Residential Flow Rate: L/cap/d

Peak Flow (I/I): L/s/ha (Town Standard)
Population: ppu for Single Family Unit²
 ppu for Townhouse²

Peaking Factor: (Harmon)

Project Name: Charleston Homes - Res. Subdivision
Project Number: 114056
Municipality: Town of Collingwood
Designed By: GB
Date: December 17, 2015
Checked By: JRA
Date: December 18, 2015
Revision Number:

LOCATION OF SECTION	AREA LABEL	UPSTREAM MAINTENANCE HOLE	DOWNSTREAM MAINTENANCE HOLE	NO. OF UNITS	CUMULATED NO. UNITS	POPULATION	ACCUM. POPULATION	PEAKING FACTOR	AREA	CUMULATED AREA	AVERAGE FLOW			PEAK FLOW			PROPOSED SEWER						
											RESIDENTIAL	INFILTRATION	TOTAL	RESIDENTIAL	INFILTRATION	TOTAL	LENGTH OF PIPE	PIPE DIAMETER	GRADE	FULL FLOW CAPACITY	FULL FLOW VELOCITY	PEAK FLOW VELOCITY (ZERO INFILTRATION)	
		ID	ID			cap.	cap.		ha	ha	L/s	L/s	L/s	L/s	L/s	L/s	m	mm	%	L/s	m/s	m/s	
Proposed Development																							
Charleston Homes (CH)	INT	Charleston	Findlay Drive	367	367	871	871	4.00	25.57	25.57	4.54	0.00	4.54	18.15	5.88	24.03	TBD	200	1.50%	40.17	1.28	1.19	
Potential Future Development																							
External Land South of CH	EXT	SFU	Charleston	28	28	68	68	4.00	3.07	3.07	0.35	0.00	0.35	1.42	0.71	2.12	TBD	200	1.00%	32.80	1.04	0.51	
External Land South of CH	EXT	Townhouses	Charleston	186	214	405	474	4.00	3.07	6.14	2.47	0.00	2.47	9.87	1.41	11.28	TBD	200	1.00%	32.80	1.04	0.87	

Notes:
 1. A conservative approach was taken to estimate the population for the external lands south of Charleston Homes. For the purposes of this study, 214 units are considered for the 6.14 hectares of external lands, which equates to a population density of approximately 35 units/hectare.
 2. Population densities are based on County of Simcoe's Land Budget for the Town of Collingwood.



C.C. Tatham & Associates Ltd.
 Consulting Engineers
 Collingwood Bracebridge Orillia Barrie Ottawa

Project:	Charleston Homes - Residential Development	Date:	04-Nov-15
File No.:	114056	Designed:	CFM
Subject:	Water Distribution Calculations	Checked:	JRA

WATER SUPPLY

1.1 Single Family Units

Single Lots (Units) =	281				(Per Draft Plan)
Population per Unit =	2.43				(Per County of Simcoe's Land Budget for Town of Collingwood)
Population =	281	x	2.43	=	683
Average daily per capita flow =	450	L/cap/day			(Per Town of Collingwood Development Standards, July 2007)
Average Daily Flow =	683	x	450	/1000	
	=	307.4	m ³ /day		
	=	3.56	L/s		

1.2 Townhouse Units

Townhouse Lots (Units) =	86				(Per Draft Plan)
Population per Unit =	2.18				(Per County of Simcoe's Land Budget for Town of Collingwood)
Population =	86	x	2.18	=	188
Average daily per capita flow =	450	L/cap/day			
Average Daily Flow =	188	x	450	/1000	
	=	84.6	m ³ /day		
	=	0.98	L/s		

1.3 Total Residential Design Flows

Total Average Daily Flow = Single Family + Townhouse
 = 3.56 + 0.98
 = 4.54 L/s (392.3 m³/day)

Design Factors

Residential Population = 871
 Residential Max. Day Factor = 2.00
 Residential Peak Hour Factor = 4.50 (Per Town of Collingwood Development Standards, July 2007)

Design Flows

Max. Daily Flow = 4.54 x 2.00
 = 9.08 L/s (784.5 m³/day)

Peak Hour Flow = 4.54 x 4.50
 = 20.43 L/s

Fire Flow = 57.00 L/s (Per Town of Collingwood Development Standards, July 2007)

Max. Day plus Fire = 9.08 + 57.0
 = 66.08 L/s (5,709 m³/day)