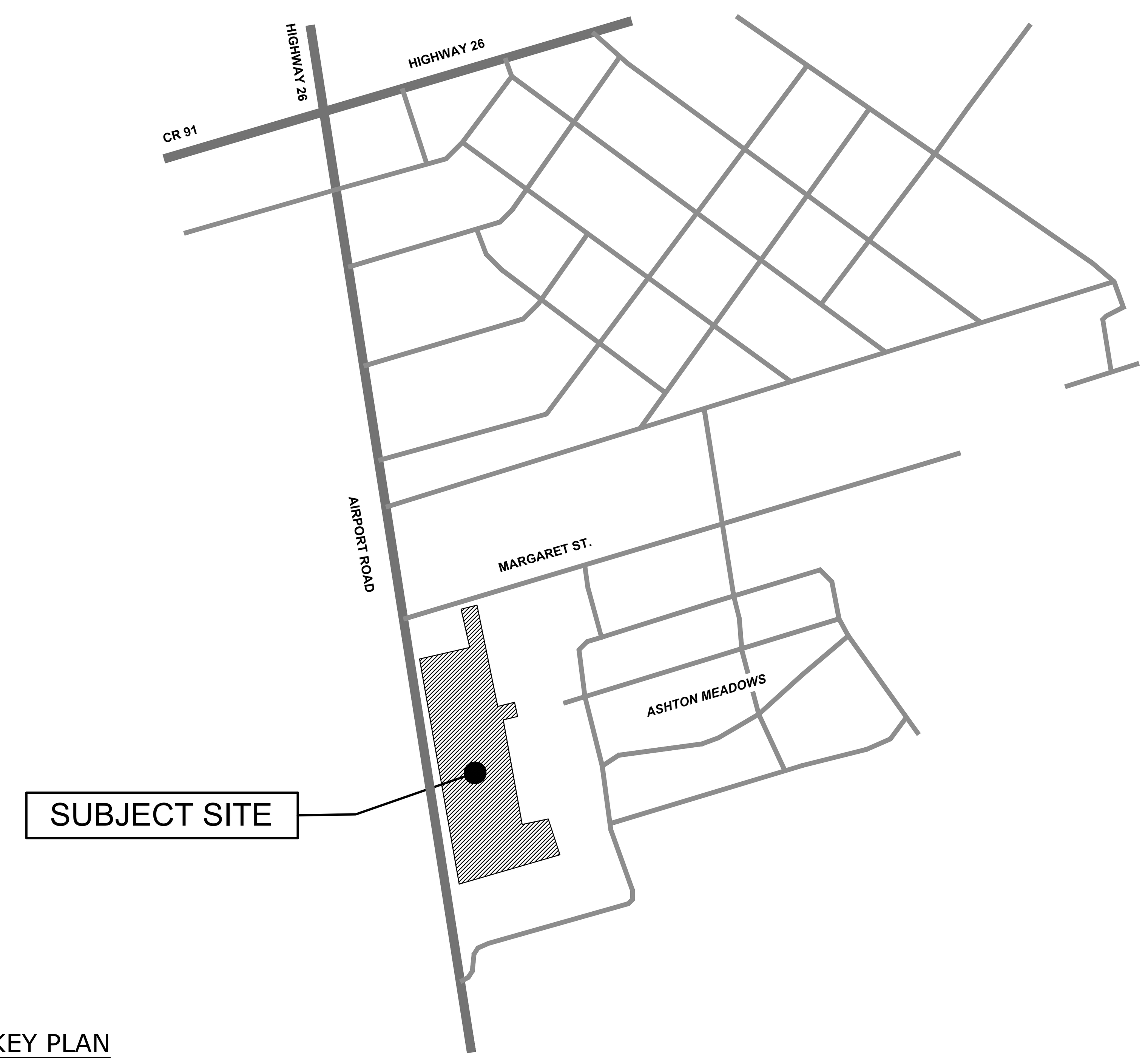
MAMTA HOMES

MAMTA HOMES STAYNER

TOWNSHIP OF CLEARVIEW

DRAWING INDEX

SP1	OVERALL SITE PLAN
C1	SERVICING PLAN (1 OF 2)
C2	SERVICING PLAN (2 OF 2)
C3	GRADING PLAN (1 OF 2)
C4	GRADING PLAN (2 OF 2)
C5	SANITARY DRAINAGE AREA PLAN
C6	STORMWATER MANAGEMENT CATCHMENT AREAS
C7	STANDARD DETAILS
C8	STANDARD DETAILS
C9	GEOTECHNICAL RECOMMENDATIONS
C10	GEOTECHNICAL RECOMMENDATIONS



KEY PLAN
N.T.S.

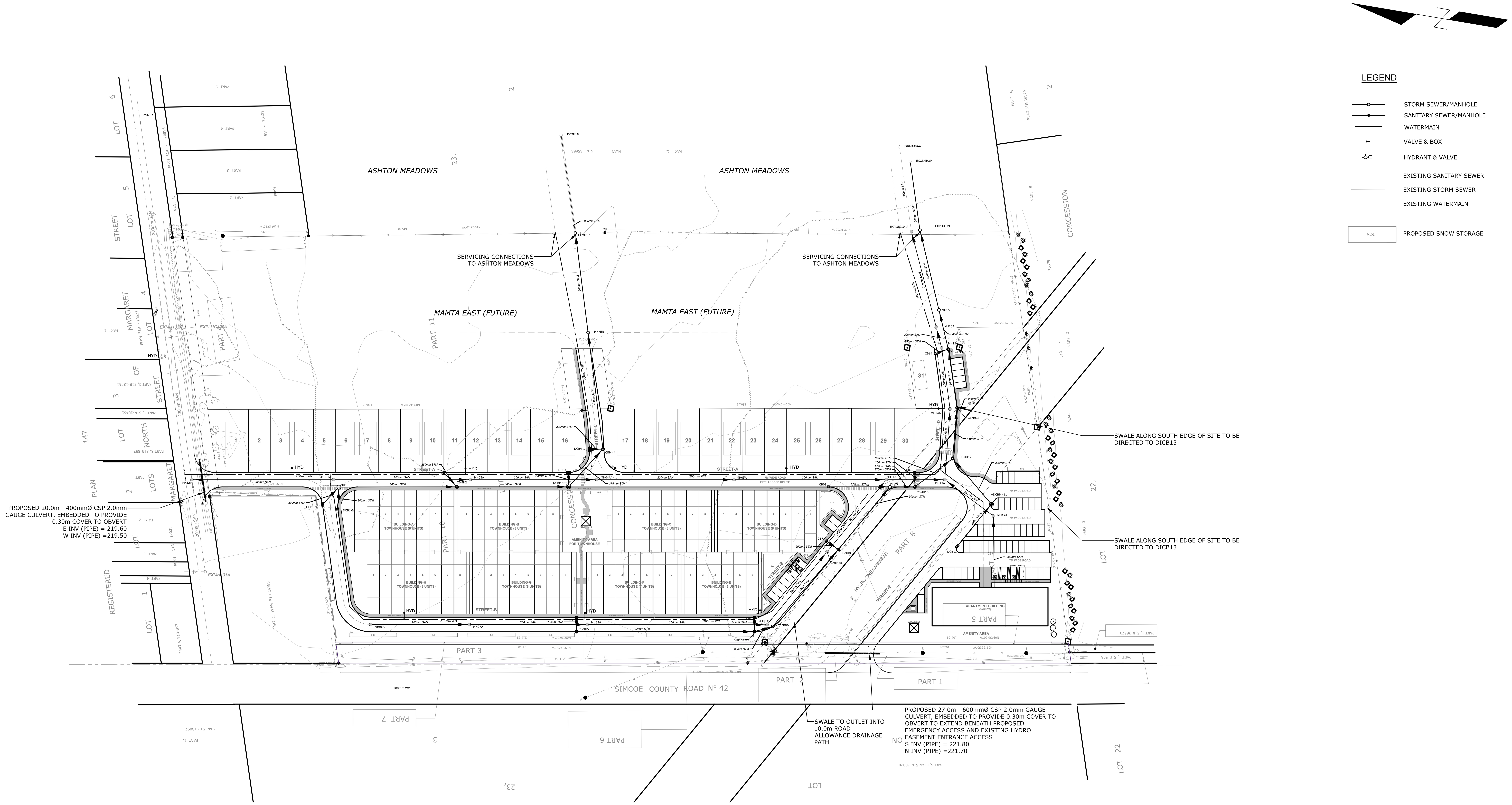
MAMTA HOMES
44 ASTER DRIVE
WASAGA BEACH, ON

Project No. 2018-060

FUNCTIONAL SERVICING REPORT - 25/08/25

CAPES ENGINEERING

MAMTA HOMES - MAMTA HOMES STAYNER - PROJECT No. 2018-060
FUNCTIONAL SERVICING REPORT - 25/08/25



Notes

1. This drawing is the exclusive property of CAPES Engineering Ltd. The reproduction of any part without express written consent of this Corporation is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. CAPES Engineering Ltd. accepts no responsibility for interpretation of third party information, contractor to verify all third party information prior to construction.
5. This is not a plan of survey. Any and all representation of property boundaries are approximate only.

No	Issue / Revision	Date	Auth
1	ISSUED FOR FSR	19/01/14	CC
2	REVISED FUNCTIONAL SERVICING REPORT	25/08/25	CC

NOTE:

TOPOGRAPHIC SURVEY INFORMATION PREPARED BY CC TATHAM AND JOETOPO CAD AND SURVEYING. INFORMATION SHOWN APPORXIMATELY HEREON FOR REFERENCE PURPOSES ONLY.

BOUNDARY SURVEY INFORMATION PREPARED BY MARTIN KNISLEY OLS, AND SHOWN APPROXIMATELY HEREON. THIS IS NOT A PLAN OF SURVEY

BENCHMARK: NAIL IN HYDRO POLE, NORTH SIDE OF MARGARET ST., ELEV - 220.008.

LICENSED PROFESSIONAL ENGINEER
C. CAPES
100056104
AUG. 25, 2025
PROVINCE OF ONTARIO

Client

MAMTA HOMES
44 ASTER DRIVE
WASAGA BEACH, ON

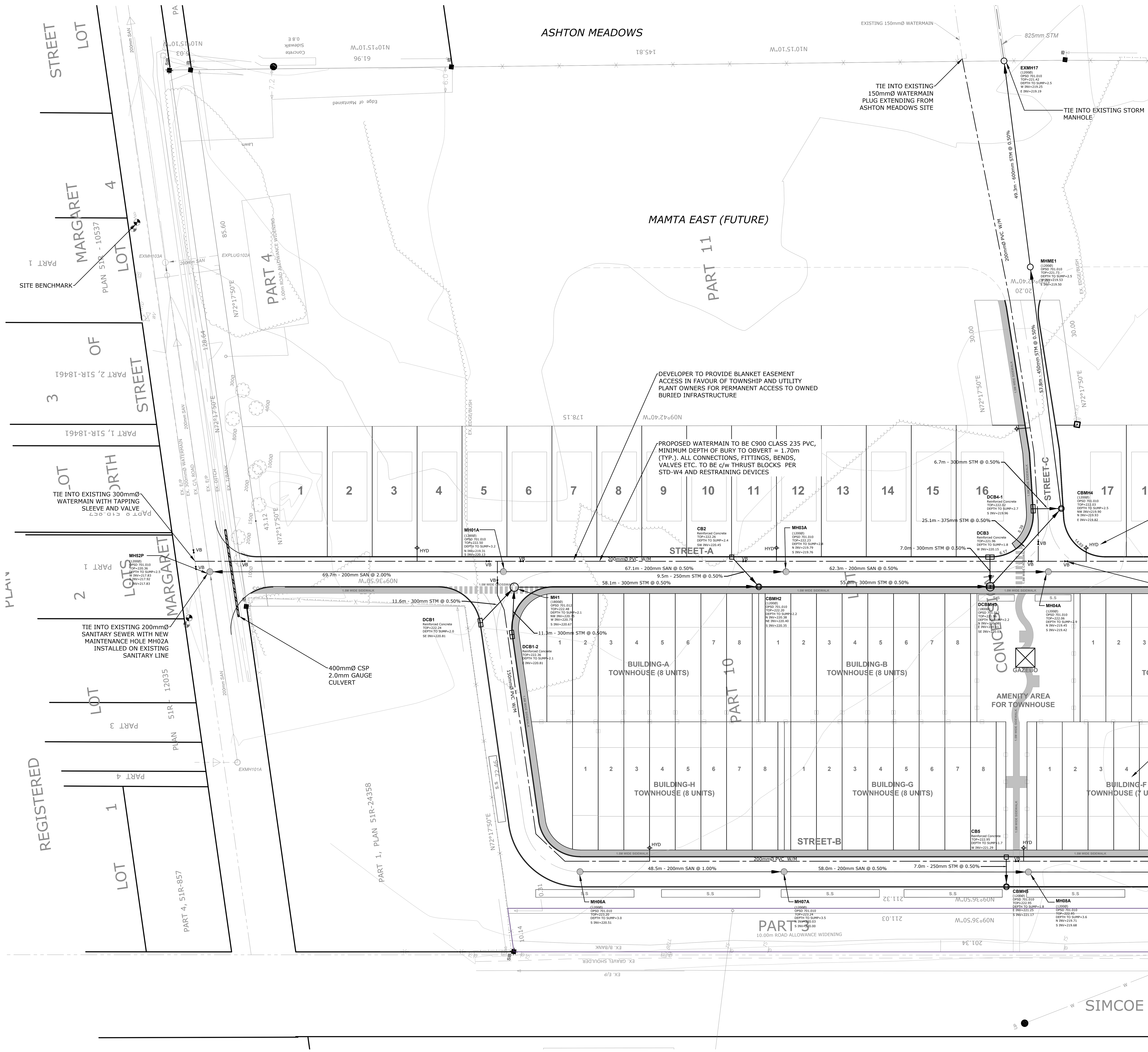
CAPES ENGINEERING

355310 BLUE MOUNTAINS - EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0
TEL: 705-994-4818

MAMTA HOMES STAYNER

OVERALL SITE PLAN

Designed	Checked	Date	Drawing No.
K. GRIFFIN	C. CAPES	25/08/15	SP1
Project No. 2018-060		Rev No. 2	
Scale 1:1,000	0 20 40 60m		



LEGEND

- STORM SEWER/MANHOLE
- SANITARY SEWER/MANHOLE
- WATERMAIN
- VALVE & BOX
- HYDRANT & VALVE
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING WATERMAIN
- PROPOSED SNOW STORAGE

Notes

1. This drawing is the exclusive property of CAPES Engineering Ltd. The reproduction of any part without express written consent of this Corporation is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. CAPES Engineering Ltd. accepts no responsibility for interpretation of third party information, contractor to verify all third party information prior to construction.
5. This is not a plan of survey. Any and all representation of property boundaries are approximate only.

No	Issue / Revision	Date	Auth
1	ISSUED FOR FSR	19/01/14	CC
2	REVISED FUNCTIONAL SERVICING REPORT	25/08/25	CC

NOTE:

TOPOGRAPHIC SURVEY INFORMATION PREPARED BY CC TATHAM AND JOETOPO CAD AND SURVEYING. INFORMATION SHOWN APPORXIMATELY HEREON FOR REFERENCE PURPOSES ONLY.

BOUNDARY SURVEY INFORMATION PREPARED BY MARTIN KNISLEY OLS, AND SHOWN APPROXIMATELY HEREON. THIS IS NOT A PLAN OF SURVEY

BENCHMARK: NAIL IN HYDRO POLE, NORTH SIDE OF MARGARET ST., ELEV - 220.008.

LICENSED PROFESSIONAL ENGINEER C. CAPES 100056104 AUG. 25, 2025 PROVINCE OF ONTARIO

Client
MAMTA HOMES
44 ASTER DRIVE
WASAGA BEACH, ON

CAPES ENGINEERING
355310 BLUE MOUNTAINS - EUPHRASIA TOWNLINE
CLARKSBURG, ON NOH 1J0
TEL: 705-994-4818

MAMTA HOMES STAYNER

SERVICING PLAN (1 OF 2)

Designed	Checked	Date	Drawing No.
K. GRIFFIN	C. CAPES	18/12/07	C1
Project No. 2018-060		Rev No. 2	
Scale 1:500			

Notes

1. This drawing is the exclusive property of CAPES Engineering Ltd. The reproduction of any part without express written consent of this Corporation is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. CAPES Engineering Ltd. accepts no responsibility for interpretation of third party information, contractor to verify all third party information prior to construction.
5. This is not a plan of survey. Any and all representation of property boundaries are approximate only.

No	Issue / Revision	Date	Auth
1	ISSUED FOR FSR	19/01/14	CC
2	REVISED FUNCTIONAL SERVICING REPORT	25/08/25	CC

NOTE:

TOPOGRAPHIC SURVEY INFORMATION PREPARED BY CC TATHAM AND JOETOPO CAD AND SURVEYING. INFORMATION SHOWN APPORXIMATELY HEREON FOR REFERENCE PURPOSES ONLY.

BOUNDARY SURVEY INFORMATION PREPARED BY MARTIN KNISLEY OLS, AND SHOWN APPROXIMATELY HEREON. THIS IS NOT A PLAN OF SURVEY

BENCHMARK: NAIL IN HYDRO POLE, NORTH SIDE OF MARGARET ST., ELEV - 220.008.

LICENSED PROFESSIONAL ENGINEER C. CAPES 100056104 AUG. 25, 2025 PROVINCE OF ONTARIO

Client
MAMTA HOMES
44 ASTER DRIVE
WASAGA BEACH, ON

CAPES ENGINEERING
355310 BLUE MOUNTAINS - EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0
TEL: 705-994-4818

MAMTA HOMES STAYNER

SERVICING PLAN (2 OF 2)

Designed	Checked	Date	Drawing No.
K. GRIFFIN	C. CAPES	18/12/07	C2
Project No. 2018-060		Rev No. 2	
Scale 1:500			

File: C:\CE\Capes Engineering Dropbox\Projects\CAD\2018-060 Mamta Homes\Dr

1. This drawing is the exclusive property of CAPES Engineering Ltd. The reproduction of any part without express written consent of this Corporation is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. CAPES Engineering Ltd. accepts no responsibility for interpretation of third party information, contractor to verify all third party information prior to construction.
5. This is not a plan of survey. Any and all representation of property boundaries are approximate only.

No	Issue / Revision	Date	Auth
1	ISSUED FOR FSR	19/01/14	CC
2	REVISED FUNCTIONAL SERVICING REPORT	25/08/25	CC

NOTE:

TOPOGRAPHIC SURVEY INFORMATION PREPARED BY CC TATHAM AND JOETOPO CAD AND SURVEYING. INFORMATION SHOWN APPORXIMATELY HEREON FOR REFERENCE PURPOSES ONLY.

BOUNDARY SURVEY INFORMATION PREPARED BY MARTIN KNISLEY OLS, AND SHOWN APPROXIMATELY HEREON. THIS IS NOT A PLAN OF SURVEY

BENCHMARK: NAIL IN HYDRO POLE, NORTH SIDE OF MARGARET ST., ELEV - 220.008.

LICENSED PROFESSIONAL ENGINEER
C. CAPES
100056104
AUG. 25, 2025
PROVINCE OF ONTARIO

Client
MAMTA HOMES
44 ASTER DRIVE
WASAGA BEACH, ON

CAPES ENGINEERING
WWW.CAPESENGINEERING.COM

MAMTA HOMES STAYNER

GRADING PLAN (1 OF 2)

Designed	Checked	Date	Drawing No.
K. GRIFFIN	C. CAPES	18/12/07	C3
Project No. 2018-060		Rev No. 2	
Scale 1:500	0 5.0 10.0 20.0 30.0m		

File: C:\CE\Capes Engineering Dropbox\Projects\CAD\2018-060 Mamta Homes\Dr

1. This drawing is the exclusive property of CAPES Engineering Ltd. The reproduction of any part without express written consent of this Corporation is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. CAPES Engineering Ltd. accepts no responsibility for interpretation of third party information, contractor to verify all third party information prior to construction.
5. This is not a plan of survey. Any and all representation of property boundaries are approximate only.

No	Issue / Revision	Date	Auth
1	ISSUED FOR FSR	19/01/14	CC
2	REVISED FUNCTIONAL SERVICING REPORT	25/08/25	CC

NOTE:

TOPOGRAPHIC SURVEY INFORMATION PREPARED BY CC TATHAM AND JOETOPO CAD AND SURVEYING. INFORMATION SHOWN APPORXIMATELY HEREON FOR REFERENCE PURPOSES ONLY.

BOUNDARY SURVEY INFORMATION PREPARED BY MARTIN KNISLEY OLS, AND SHOWN APPROXIMATELY HEREON. THIS IS NOT A PLAN OF SURVEY

BENCHMARK: NAIL IN HYDRO POLE, NORTH SIDE OF MARGARET ST., ELEV - 220.008.

LICENSED PROFESSIONAL ENGINEER
C. CAPES
100056104
AUG. 25, 2025
PROVINCE OF ONTARIO

Client
MAMTA HOMES
44 ASTER DRIVE
WASAGA BEACH, ON

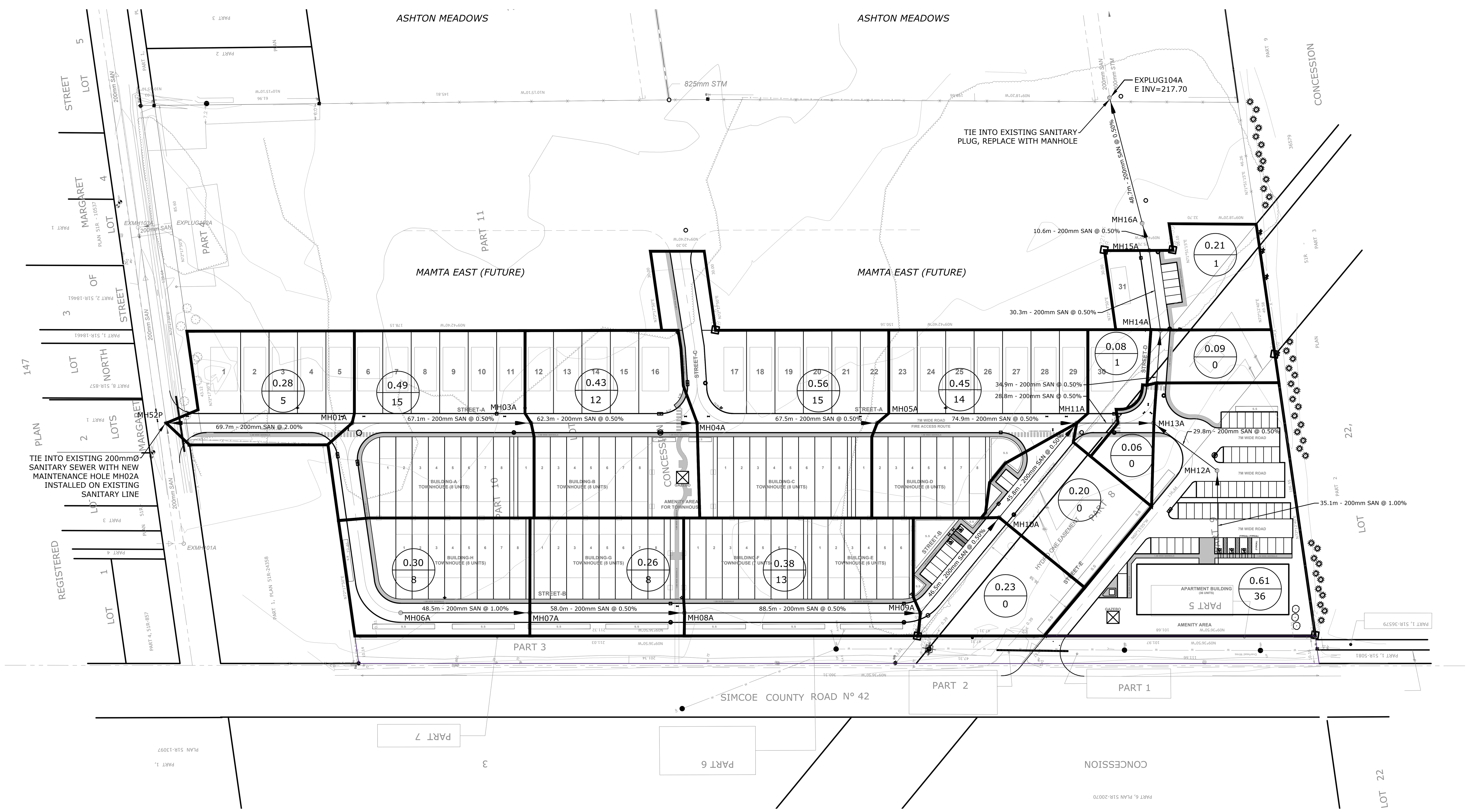
CAPES ENGINEERING
WWW.CAPESENGINEERING.COM

MAMTA HOMES STAYNER

GRADING PLAN (2 OF 2)

Designed	Checked	Date	Drawing No.
K. GRIFFIN	C. CAPES	18/12/07	C4
Project No. 2018-060		Rev No. 2	
Scale 1:500	0 5.0 10.0 20.0 30.0m		

File: C:\CE\Capes Engineering Dropbox\Projects\CAD\2018-060 Mamta Homes\Drawings\3_Production\Dwg\2018-060 Grading Plan.dwg Date Plotted: August 25, 2025 - 11:25 AM



Notes

1. This drawing is the exclusive property of CAPES Engineering Ltd. The reproduction of any part without express written consent of this Corporation is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. CAPES Engineering Ltd. accepts no responsibility for interpretation of third party information, contractor to verify all third party information prior to construction.
5. This is not a plan of survey. Any and all representation of property boundaries are approximate only.

No	Issue / Revision	Date	Auth
1	ISSUED FOR FSR	19/01/14	CC
2	REVISED FUNCTIONAL SERVICING REPORT	25/08/25	CC

NOTE:

TOPOGRAPHIC SURVEY INFORMATION PREPARED BY CC TATHAM AND JOETOPO CAD AND SURVEYING. INFORMATION SHOWN APPORXIMATELY HEREON FOR REFERENCE PURPOSES ONLY.

BOUNDARY SURVEY INFORMATION PREPARED BY MARTIN KNISLEY OLS, AND SHOWN APPROXIMATELY HEREON. THIS IS NOT A PLAN OF SURVEY

BENCHMARK: NAIL IN HYDRO POLE, NORTH SIDE OF MARGARET ST., ELEV - 220.008.

LICENSED PROFESSIONAL ENGINEER C. CAPES 100056104 AUG. 25, 2025 PROVINCE OF ONTARIO

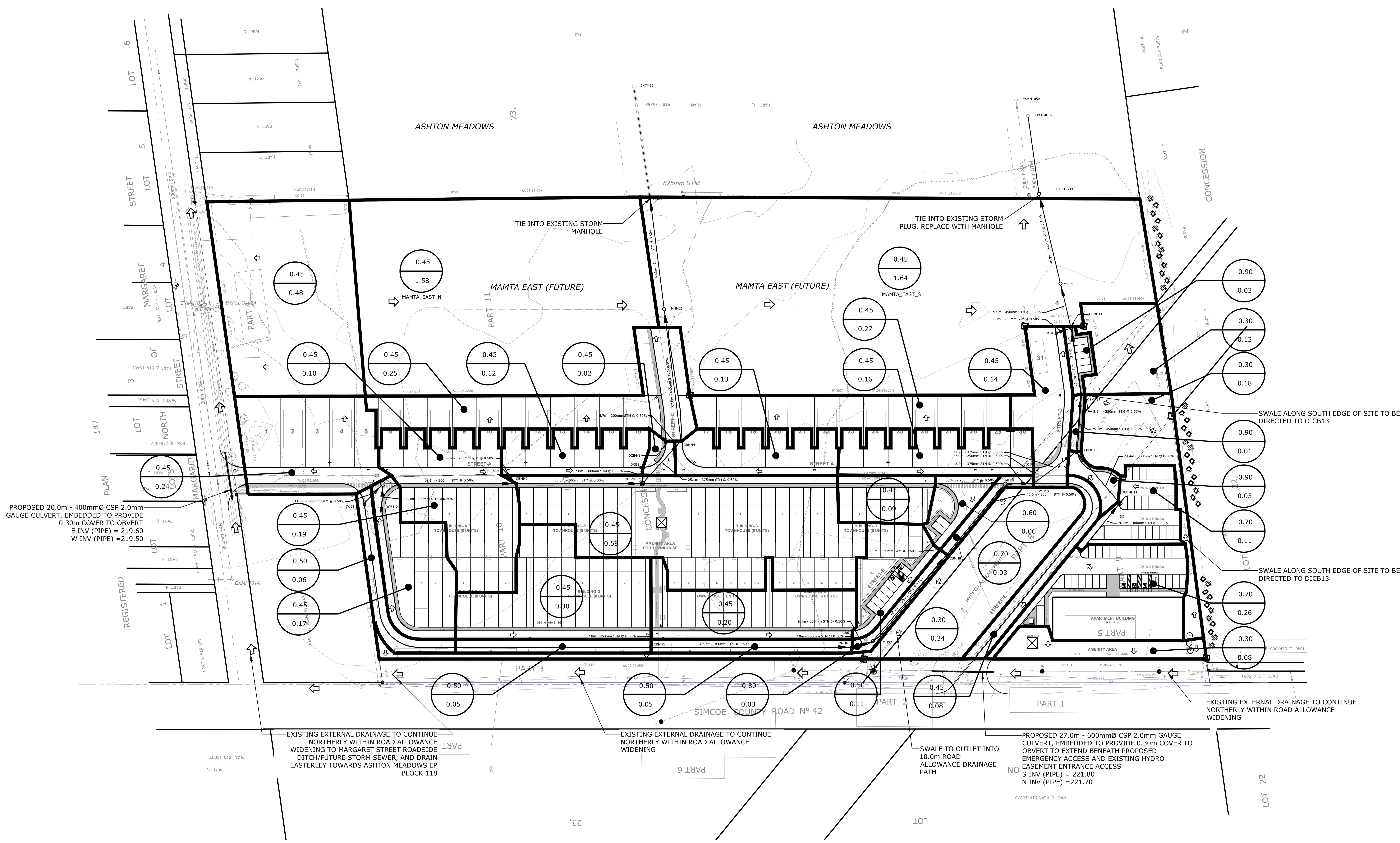
Client
MAMTA HOMES
44 ASTER DRIVE
WASAGA BEACH, ON

CAPES ENGINEERING
355310 BLUE MOUNTAINS - EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0
TEL: 705-994-4818

MAMTA HOMES STAYNER

SANITARY DRAINAGE AREA PLAN

Designed	Checked	Date	Drawing No.
K. GRIFFIN	C. CAPES	18/12/07	C5
Project No. 2018-060		Rev No. 2	
Scale 1:1,000			



LEGEND

- STORM SEWER/MANHOLE
- RUNOFF COEFFICIENT (0.45)
- DRAINAGE AREA (ha) (0.75)
- POST DEVELOPMENT STORM DRAINAGE AREA PLAN
- VALVE & BOX
- HYDRANT & VALVE
- EXISTING STORM SEWER
- OVERLAND FLOW DIRECTION

Notes

1. This drawing is the exclusive property of CAPES Engineering Ltd. The reproduction of any part without express written consent of this Corporation is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. CAPES Engineering Ltd. accepts no responsibility for interpretation of third party information, contractor to verify all third party information prior to construction.
5. This is not a plan of survey. Any and all representation of property boundaries are approximate only.

No	Issue / Revision	Date	Auth
1	ISSUED FOR FSR	19/01/14	CC
2	REVISED FUNCTIONAL SERVICING REPORT	25/08/25	CC

NOTE:

TOPOGRAPHIC SURVEY INFORMATION PREPARED BY CC TATHAM AND JOETOPO CAD AND SURVEYING. INFORMATION SHOWN APPROXIMATELY HEREON FOR REFERENCE PURPOSES ONLY.

BOUNDARY SURVEY INFORMATION PREPARED BY MARTIN KNISLEY OLS, AND SHOWN APPROXIMATELY HEREON. THIS IS NOT A PLAN OF SURVEY

BENCHMARK: NAIL IN HYDRO POLE, NORTH SIDE OF MARGARET ST., ELEV - 220.008.

LICENSED PROFESSIONAL ENGINEER
C. CAPES
100056104
AUG. 25, 2025
PROVINCE OF ONTARIO

Client
MAMTA HOMES
44 ASTER DRIVE
WASAGA BEACH, ON

CAPES ENGINEERING
355310 BLUE MOUNTAINS - EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0
TEL: 705-994-4818

MAMTA HOMES STAYNER

STORMWATER MANAGEMENT CATCHMENT AREAS

Designed	Checked	Date	Drawing No.
K. GRIFFIN	C. CAPES	18/12/07	C6
Project No. 2018-060		Rev No. 2	
Scale 1:1,000	0 20 40 60m		

GENERAL NOTES:

1. ALL MEASUREMENTS ARE IN METRES, PIPE SIZES IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. ALL EXISTING UTILITIES AND SERVICES TO BE LOCATED ON SITE BY THE CONTRACTOR PRIOR TO CONSTRUCTION. LOCATION OF EXISTING SERVICES ARE NOT GUARANTEED. THE CONTRACTOR IS REQUIRED TO NOTIFY THE VARIOUS UTILITY COMPANIES 48 HOURS PRIOR TO THE COMMENCEMENT OF ANY WORK.
3. ALL RELEVANT ONTARIO PROVINCIAL STANDARDS SPECIFICATIONS (OPSS), ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD), AND THE TOWNSHIP OF CLEARVIEW'S STANDARDS SHALL APPLY TO THIS CONTRACT.
4. THE ORDER OF PRECEDENCE OF STANDARD DRAWINGS IS FIRSTLY TOWNSHIP OF CLEARVIEW STANDARD DRAWINGS (STD), AND SECONDLY ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD).
5. MAINTENANCE HOLE SAFETY PLATFORMS SHALL CONFORM TO OPSD 404.020.
6. MAINTENANCE HOLE TOPS (FRAMES) AND CATCHBASIN (FRAMES) ARE TO BE SET TO BASE COURSE ASPHALT GRADE AND THEN ADJUSTED TO FINAL GRADE WHEN THE TOP LIFT OF ASPHALT IS PLACED. (SEE ROAD NOTES 10, 11, 12, 13 & 14)
7. A ROAD OCCUPANCY PERMIT IS REQUIRED FROM THE ENGINEERING DEPARTMENT PRIOR TO THE COMMENCEMENT OF WORK WITHIN ANY TOWNSHIP RIGHT-OF-WAY.
8. NATIVE MATERIAL SUITABLE FOR BACKFILL SHALL BE COMPACTED TO 98% STANDARD PROCTOR MAXIMUM DRY DENSITY, UNLESS OTHERWISE NOTED. ENGINEERING FILL (ON LOTS), SHALL BE COMPACTED TO 100% STANDARD PROCTOR MAXIMUM DRY DENSITY.
9. GRANULAR MATERIAL AND BEDDING MATERIAL SHALL BE PLACED IN LAYERS 150mm IN DEPTH AND COMPACTED TO 100% (ROAD GRAN 'A' & GRAN 'B') OR 100% (PIPE BEDDING AND COVER) STANDARD PROCTOR MAXIMUM DRY DENSITY OR AS DIRECTED BY THE GEOTECHNICAL CONSULTANT.
10. UTILITY CROSSING, WHERE REQUIRED, AND ANY EXISTING STRUCTURES SHALL BE PROPERLY SUPPORTED. ALL UTILITY CROSSINGS TO BE REVIEWED BY THE TOWNSHIP OF CLEARVIEW
11. DRIVEWAY ACCESS TO OCCUPIED RESIDENCES SHALL BE RESTORED AT THE END OF EACH WORKING DAY.
12. CONTRACTOR SHALL COORDINATE HIS WORK SUCH THAT HE DOES NOT INTERFERE WITH WORK BEING UNDERTAKEN BY A UTILITY COMPANY.
13. ALL GRADING MUST CONFORM TO THE TOWNSHIP OF CLEARVIEW LOT GRADING POLICIES CURRENTLY IN EFFECT.

No.	Issue / Revision	Date	Auth.

TOWNSHIP OF CLEARVIEW

Figure Title

STANDARD NOTES - GENERAL

Drawn R.J. BURNSIDE | Approved | DWG. No. ----

Scale | Date 16/12/12

ROADS NOTES:

1. CURB AND GUTTER TO BE BARRIER CURB AS PER OPSD-600.010 (COMMERCIAL, RESIDENTIAL, MULTI-RESIDENTIAL) OR MOUNTABLE AS PER OPSD-600.100 (RESIDENTIAL) IN ALL ROADS. CURBS TO BE SINGLE STAGE ONLY.
2. ROAD WORKS TO CONFORM TO STD-R3 OR STD-R1 FOR 20m R.O.W OR STD-R4 FOR A 26.0M R.O.W.
3. ROADS SHALL BE KEPT CLEAN DURING CONSTRUCTION AT THE CONTRACTOR'S EXPENSE.
4. SIDEWALKS TO COMPLY WITH OPSD 310.010 AND ARE TO BE 1.5 METERS WIDE. MINIMUM THICKNESS AS FOLLOWS:
   -RESIDENTIAL DRIVEWAY 150mm
   -COMMERCIAL/INDUSTRIAL DRIVEWAY 200mm (REINFORCEMENT AS PER OPSS IF REQUIRED)
   -WHEN NO DRIVEWAY IS PRESENT, 125mm.
5. NATIVE SUBGRADE SHALL HAVE A CROSSFALL OF 3% AND THE MATERIAL SHALL BE APPROVED BY A GEOTECHNICAL CONSULTANT WITH THE REVIEW OF A PROOF ROLL WITH A LOADED TANDEM AXLE DUMP TRUCK AND IS SUBJECT TO APPROVAL BY THE TOWNSHIP OF CLEARVIEW.
6. ALL CURB RADII TO BE MINIMUM OF 10.0 METRES AT THE EDGE OF ASPHALT.
7. NATIVE SUBGRADE TO BE COMPACTED TO MINIMUM 98% STANDARD PROCTOR MAXIMUM DRY DENSITY AND SHALL BE TESTED BY THE GEOTECHNICAL CONSULTANT.
8. THE ROAD AND CROSS SECTION SHALL INCORPORATE 150mm DIA. SUBDRAIN WITH FACTORY INSTALLED FILTER FABRIC (OPSD 216.021) AS REQUIRED.
9. GRADE AND CROSS FALL ADJUSTMENT OF MAINTENANCE HOLE AND CATCHBASIN FRAMES SHALL BE MADE USING PRODUCTS SPECIFICALLY MANUFACTURED FOR THAT PURPOSE. CAST IRON ADJUSTMENT UNITS SHALL BE USED FOR ALL MAINTENANCE HOLE AND CATCH BASIN GRATES TO BE SET AT PROPER GRADES FOR SURFACE COURSE ASPHALT ONLY. ALL OTHER ADJUSTMENTS UNITS FOR ALL MAINTENANCE AND CATCHBASIN FRAME AND GRATES SHALL BE CONCRETE (PER OPSD 704.010). ALL MAINTENANCE, CATCH BASINS, ETC SHALL HAVE MINIMUM OF 150mm TO A MAX OF 300MM OF ADJUSTMENT TO ALLOW FOR FUTURE ADJUSTMENT UP OR DOWN.
10. ADJUSTMENT UNITS SHALL BE CERTIFIED TO MEET ALL PERTINENT OPS, CSA, ASTM, AND MTO-DSM LIST, OR OTHER INDUSTRY GUIDELINES FOR MATERIALS, PERFORMANCE AND USE AS APPLICABLE.
11. ADJUSTMENTS UNITS AND JOINTS SHALL BE SEALED AND OR PARGED IN COMPLIANCE WITH MANUFACTURERS SPECIFICATIONS AND GUIDELINES.
12. MORTAR SHALL BE USED FOR LEVELING OF PRECAST UNITS ONLY, THE THICKNESS OF MORTAR SHALL BE 10mm TO FILL ALL VOIDS CREATED BY IRREGULARITIES IN THE PRECAST UNITS TO ENSURE AN EVEN SURFACE ONLY.
13. NON-COMPRESSIBLE BACKFILL SHALL BE USED DURING REBUILDING, ADJUSTING, OR ANY OTHER APPLICABLE CATCHBASIN OR MAINTENANCE HOLES WORKS.
14. DRIVEWAY APRONS TO BE CONSTRUCTED
    i) RESIDENTIAL - MIN. 50mm HL3 ON MIN. 200mm GRAN.'A'
    ii) COMMERCIAL - MIN. 50mm HL3 ON MIN. 250mm GRAN.'A' AND MIN 300 GRANULAR B
15. UNDERGROUND CONDUIT:
    THE CONTRACTOR SHALL SUPPLY AND INSTALL 100mm "HEAVY-WALLED" RIGID PVC CONDUIT, SCEOTRE/CANRON TYPE 2 OR APPROVED EQUIVALENT AS PER CSA STANDARDS C22. NO.212.2 ALL COUPLINGS, ELBOWS, ETC. SHALL BE BONDED WITH ADHESIVES RECOMMENDED BY THE CONDUIT MANUFACTURER IN A MANNER THAT PREVENTS THE ENTRY OF MOISTURE AND BACKFILL MATERIAL, ETC. THE CONDUIT SHALL BE INSTALLED IN LOCATIONS, AS NOTED ON THE CONTRACT DRAWINGS, AT A MINIMUM DEPTH OF 0.6M BELOW FINISHED GRADE. BACKFILL SHALL CONFORM TO THE REQUIREMENTS OF O.P.S.S. FORM 1010, GRANULAR 'A' AND GRANULAR 'B' TYPE 1 AND SHALL BE COMPACTED TO 100% MAXIMUM DRY DENSITY. EARTH BACKFILL SHALL BE COMPACTED TO 98% MAXIMUM DRY DENSITY.
16. A 400N TEST STRENGTH NYLON ROPE "FISH LINE" SHALL BE PLACED WITHIN EACH RUN OF CONDUIT WITH 1.5m OF EXCESS ROPE LEFT COILED WITHIN THE CHAMBERS AT EACH END OF THE CONDUIT.
17. CONCRETE ELECTRICAL HANDHOLES:
    HANDHOLES SHALL INCLUDE CAST IRON COVERS, SONO TUBES AND CONCRETE. THE INSIDE DIAMETER SHALL BE 0.46m. OAKS PRECAST OR APPROVED EQUIVALENT HANDHOLES THAT CONFORM TO OPSD 2112.02 MAY BE USED. CAST IN PLACE HANDHOLES MUST HAVE INSIDE CHAMBER SONO TUBE REMOVED WHEN CONCRETE HAS HARDENED. THE NUMBER AND ORIENTATION OF CHAMBER ENTRY SLEEVES SHALL BE IN ACCORDANCE WITH THE CONTRACT DRAWINGS. THE TOP OF THE JUNCTION BOX SHALL BE SET TO AN ELEVATION THAT CONFORMS TO THE SURROUNDING ELEMENTS (E.G. CURBS, SIDEWALK, ETC.). ALL HANDHOLES SHALL HAVE LIDS FASTENED AND LIFT RINGS REMOVED.
18. EACH CHAMBER SHALL PROVIDE FOUR (4) SPARE AND CAPPED ENTRY SLEEVES SPACED EVENLY AT NINETY DEGREE INTERVALS AROUND THE CIRCUMFERENCE OF THE CHAMBER IN ADDITION TO THE ENTRY POINTS FOR THE ROAD CROSSING CONDUITS.
19. DURING INSTALLATION OF UNDERGROUND CONDUIT AND CONCRETE ELECTRICAL HANDHOLES FOR THE TRAFFIC SIGNALS, A REPRESENTATIVE FROM THE TOWNSHIP OF CLEARVIEW PUBLIC WORKS DEPARTMENT IS TO BE PRESENT.

No.	Issue / Revision	Date	Auth.

TOWNSHIP OF CLEARVIEW

Figure Title

STANDARD NOTES - ROADS

Drawn R.J. BURNSIDE | Approved | DWG. No. ----

Scale | Date 16/12/12

SANITARY NOTES:

1. SANITARY GRAVITY SEWER SHALL BE PVC (CLASS DR35 OR DR28) OR CONCRETE PIPE, WITH RUBBER GASKET JOINTS WHICH CONFORM TO C.S.A. B-182.2,3,4. CONCRETE SANITARY SEWERS SHALL HAVE A MINIMUM STRENGTH OF 65 N/m/mm CONFORMING TO C.S.A. STANDARD A257.2-1982, CLASS 50-D (PREVIOUSLY C.S.A. STANDARD A257.2-1974, CLASS II).
2. SEWERS SHALL BE CONSTRUCTED WITH BEDDING AS PER OPSD-802.010, (GRAN. 'A' OR HIGH-PERFORMANCE EMBEDMENT MATERIAL) FOR FLEXIBLE PIPES AND OPSD-802.030 OR 802.031 CLASS B (GRAN. 'A' OR HIGH-PERFORMANCE BEDDING MATERIAL) FOR RIGID PIPE UNLESS OTHERWISE APPROVED BY THE TOWNSHIP OF CLEARVIEW.
3. PRECAST SANITARY MAINTENANCE HOLES SHALL CONFORM WITH OPSD 701.010 (1200mm) OR 701.011(150mm), WITH FRAME & COVER OPSD 401.010 TYPE 'A' AND SOLID RECTANGULAR RUNGS, OPSD 405.020.
4. SANITARY MAINTENANCE HOLE BENCHING AS PER OPSD 701.021.
5. SANITARY SERVICE CONNECTIONS (SEE TOWNSHIP OF CLEARVIEW STANDARD STD-SAN1)
   A) SANITARY LATERAL CONNECTION TO BE LOCATED 2.5m RIGHT OF ℄ OF LOT
   B) LOCATION OF LATERAL TO BE MARKED AT PROPERTY LINE WITH A 60x100mm WOOD MARKER, PAINTED GREEN, AND EXTENDING FROM THE SERVICE INVERT TO 300mm ABOVE GROUND LEVEL.
   C) PIPE TO BE MINIMUM 125mm PVC DR28, RUBBER GASKET TYPE JOINTS AND SHALL CONFORM TO CSA (B-182.2,3,4)(COLOURED) FOR A RESIDENTIAL HOUSE AND MINIMUM 150mm PVC DR28 FOR INDUSTRIAL, AND COMMERCIAL DEVELOPMENT.
   D) MINIMUM DEPTH OF LATERAL AT PROPERTY LINE SHALL BE 2.7m MEASURED FROM THE SEWER OBVERT TO FINISHED GROUND SURFACE ELEVATION UNLESS OTHERWISE NOTED.
   E) ALL CONNECTIONS TO NEW SANITARY MAINS SHALL BE PRE-MANUFACTURED, FABRICATED TEES, CONNECTIONS TO EXISTING SANITARY SEWER SHALL BE MADE WITH APPROVED FACTORY MADE TEES OR INSERT-A-TEES IN STRICT ACCORDANCE TO MANUFACTURERS GUIDELINES.
   F) MINIMUM PIPE SLOPE TO BE 2.0% MAXIMUM 8.0% AS PER OPSD-1006.020.
6. MAXIMUM DEFLECTION FROM COMBINED LIVE AND DEAD LOADING SHALL NOT EXCEED C.S.A., O.P.S. OR MANUFACTURERS RECOMMENDED SPECIFICATIONS.
7. MAINTENANCE HOLE TOPS (FRAMES) AND CATCH BASIN (FRAMES) ARE TO BE SET TO BASE COURSE ASPHALT GRADE AND THEN ADJUSTED TO FINAL GRADE WHEN THE TOP LIFT OF ASPHALT IS PLACED. A MINIMUM OF 150MM TO A MAXIMUM OF 300MM OF ADJUSTMENT UNITS SHALL BE PROVIDED. ALL ADJUSTMENT SHALL BE IN ACCORDANCE WITH STANDARD DETAIL. REFER TO ROAD NOTES 10, 11, 12,13 AND 14.
8. MINIMUM COVER 2.8m OVER TRUNK AND LOCAL SEWERS.

No.	Issue / Revision	Date	Auth.

TOWNSHIP OF CLEARVIEW

Figure Title

STANDARD NOTES - SANITARY

Drawn R.J. BURNSIDE | Approved | DWG. No. ----

Scale | Date 16/12/12

STORM NOTES:

1. STORM SEWER TO BE PVC (CLASS DR35 OR DR28)PIPE OR REINFORCED CONCRETE PIPE (MIN. CLASS 65-D). PIPE MATERIAL FOR REINFORCED CONCRETE TO HAVE A MINIMUM STRENGTH OF 65 N/m/mm AND BE CERTIFIED TO C.S.A. STANDARD A247.2-1982M CLASS 65-D (PREVIOUSLY C.S.A. STANDARD A257.2-1974, CLASS II). PVC MATERIAL TO BE CERTIFIED TO C.S.A. STANDARDS 182.2 AND 182.4, UNLESS OTHERWISE NOTED.
2. STORM SEWERS SHALL BE CONSTRUCTED WITH BEDDING AS PER OPSD-802.010 (GRAN 'A' OR HIGH-PERFORMANCE EMBEDMENT MATERIAL) FOR FLEXIBLE PIPES AND OPSD-802.030 OR 802.031 CLASS B (GRAN'A' OR HIGH-PERFORMANCE BEDDING MATERIAL) FOR RIGID PIPE UNLESS OTHERWISE APPROVED BY THE TOWNSHIP.
3. PRECAST STORM MAINTENANCE HOLES SHALL CONFORM WITH OPSD 701.010 (1200mm) OR 701.011 (1500mm) WITH FRAME & COVER OPSD 401.010 TYPE 'A' AND SOLID RECTANGULAR RUNGS, OPSD 405.020.
4. CATCHBASIN LEADS TO BE 0.7% MIN. GRADE, 250mm FOR SINGLE CATCHBASIN AND 300mm FOR DOUBLE CATCHBASIN.
5. ALL REAR YARD CATCHBASIN LEADS TO HAVE:
   A) GRANULAR 'A' BEDDING TO OBVERT OF SEWER.
   B) 100mm THICK 10MPa CONCRETE SLAB TO BE PLACED 300mm ABOVE OBVERT OF SEWER AND OVER FULL WIDTH OF SEWER ALONG SIDE LOT LINE.
6. MAINTENANCE HOLE BENCHING SHALL CONFORM WITH OPSD 701.021.
7. CATCH BASIN MAINTENANCE HOLES SHALL HAVE A 300mm SUMP AND NO BENCHING
8. PIPE JOINTS TO CONFORM TO CSA STANDARDS (B-182.2,3,4 AND A257.3).
9. MAINTENANCE HOLE TOPS (FRAMES) AND CATCH BASIN (FRAMES) ARE TO BE SET TO BASE COURSE ASPHALT GRADE AND THEN ADJUSTED TO FINAL GRADE WHEN THE TOP LIFT OF ASPHALT IS PLACED. A MINIMUM OF 150mm TO A MAXIMUM OF 300mm OF ADJUSTMENT UNITS SHALL BE PROVIDED. ALL ADJUSTMENT SHALL BE IN ACCORDANCE WITH STANDARD DETAIL. REFER TO ROAD NOTES 10, 11, 12,13 AND 14.
10. ALL CONNECTIONS TO THE STORM MAIN SHALL BE MADE WITH A STORM MAINTENANCE HOLE OR APPROVED FACTORY TEE CONNECTION AS PER OPSD-708.01 OR 708.03.
11. STORM SEWER TO BE MINIMUM 300mm DIAMETER WITH JOINTS CONFORMING TO C.S.A. STANDARD A257.3.
12. NO FLEXIBLE PIPE SEWERS WILL BE INSTALLED WITH A DEPTH OF COVER GREATER THAN 6 METRES UNLESS SPECIFICALLY APPROVED BY THE TOWNSHIP PUBLIC WORKS DEPARTMENT
13. ALL PIPE HANDLING INSTALLATIONS SHALL BE IN STRICT COMPLIANCE WITH MANUFACTURERS INSTALLATION GUIDES AND THE O.C.P.A. OR UNIBELL GUIDELINES.
14. WHERE FROST SUSCEPTIBLE SOILS ARE ENCOUNTERED AND THE OBVERT OF THE STORM SEWER IS LESS THAN A DEPTH OF 1.5m FROM THE FINISHED ASPHALT SURFACE, THE FOLLOWING MEASURES ARE TO BE APPLIED:
    A) WHERE THE SUBGRADE CONSISTS OF HIGHLY FROST SUSCEPTIBLE SOILS THE SUBGRADE SHALL BE REPLACED WITH NON-FROST SUSCEPTIBLE SOILS TO A DEPTH OF 1.2m OVER THE ENTIRE ROAD PLATFORM.
    B) WHERE THE SUBGRADE CONSISTS OF MODERATELY FROST SUSCEPTIBLE SOILS THE SUBGRADE REPLACEMENT SHALL BE TAPERED AT A SLOPE OF 10 HORIZONTAL: 1 VERTICAL, FROM THE STORM SEWER TRENCH TO THE EDGE OF THE ROAD PLATFORM.

No.	Issue / Revision	Date	Auth.

TOWNSHIP OF CLEARVIEW

Figure Title

STANDARD NOTES - STORM

Drawn R.J. BURNSIDE | Approved | DWG. No. ----

Scale | Date 16/12/12

WATERMAIN NOTES:

1. A) WATERMAIN MATERIAL TO BE PVC (CLASS 235, DR-18) AND, SHALL SATISFY AWWA C900-16 SPECIFICATION. DIAMETER TO BE AS INDICATED ON THE DRAWINGS. ALL FITTINGS TO BE DUCTILE IRON, MECHANICAL JOINT WITH SACRIFICIAL NUTS ON EVERY OTHER BOLT.
   B) MINIMUM RESIDENTIAL SERVICE TO BE 25mm PE IPEX GOLD 901
2. A) WATERMAIN SHALL BE CONSTRUCTED WITH BEDDING AS PER OPSD 802.010 (GRANULAR 'A' OR HIGH PERFORMANCE EMBEDMENT MATERIAL) FOR FLEXIBLE PIPES AS OPSD 802.030 OR 802.031 CLASS 'B' (GRANULAR 'A' OR HIGH PERFORMANCE BEDDING MATERIAL, GRANULAR 'A' OR SELECT NATIVE COVER MATERIAL) FOR RIGID PIPE UNLESS OTHERWISE APPROVED BY THE TOWNSHIP OF CLEARVIEW.

B) SERVICES 25mm TO 50mm IN DIAMETER SHALL BE EMBEDDED IN SAND OR 'A' GRAVEL 100mm ABOVE AND BELOW TO CONFORM TO OPSS 1004.05

3. CONTRACTOR SHALL INFORM THE TOWNSHIP OF CLEARVIEW A MINIMUM OF 48 HOURS IN ADVANCE OF THEIR INTENTIONS TO COMMENCE WORK.
4. CONTRACTOR TO BE RESPONSIBLE FOR INSTALLATION AND MATERIALS TO INSTALL ONE INITIAL TIE-IN REQUIRED TO FACILITATE THE TESTING OF THE NEWLY INSTALLED DISTRIBUTION SYSTEM PRIOR TO CONNECTION TO THE EXISTING SYSTEM. WATERMAIN TO BE PRESSURE TESTED, SWABBED AND CHLORINATED BY THE CONTRACTOR, UPON SUCCESSFUL TEST RESULTS. THE FINAL TIE-IN TO BE COMPLETED BY CONTRACTOR WITH TOWNSHIP OF CLEARVIEW SUPERVISION AND ASSISTANCE WITH OPERATING THE EXISTING WATER SYSTEM FOR A WATER SYSTEM SHUT OFF. RISER PIPES ARE TO BE INSTALLED AS PER STANDARD, AND REMOVED AS DIRECTED. SWABBING / TESTING SCHEDULE TO BE SUPPLIED BY THE CONTRACTOR TO THE TOWNSHIP OF CLEARVIEW TO REVIEW AND APPROVE.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE SWABBING, PRESSURE TESTING, CHLORINATION AND FLUSHING OF THE NEW WATERMAINS. ANY ADDITIONAL SWABBING, PRESSURE TESTING, CHLORINATION AND FLUSHING BEYOND THE INITIAL PROCEDURE WILL BE AT THE CONTRACTORS EXPENSE AND AT THE DISCRETION OF THE TOWNSHIP OF CLEARVIEW. THE CONTRACTOR SHALL MAKE ALL CONNECTIONS TO THE EXISTING WATERMAINS INCLUDING EXCAVATION, BACKFILLING, AND MATERIALS AS REQUIRED, UNDER TOWNSHIP OF CLEARVIEW SUPERVISION. CONTRACTOR TO USE TOWNSHIPS WATERMAIN COMMISSIONING PROCEDURE.
6. ALL NEW SERVICE BOXES TO BE LOCATED ON PROPERTY LINE AND OUT OF THE DRIVEWAYS AND SIDEWALKS.
7. NO WATERMAIN IS TO BE LAID ON FILL UNTIL THE DENSITY REPORT HAS BEEN SUBMITTED TO AND APPROVED BY THE ENGINEER. FILL TO BE PLACED TO 0.6m MINIMUM ABOVE THE TOP OF THE WATERMAIN GRADED AND COMPACTED AS PER OPSS 501. TESTS SHALL BE TAKEN ALONG THE CENTER LINE OF THE WATERMAIN AND 2.5m EITHER SIDE OF THE WATERMAIN AT A MAXIMUM INTERVAL OF 30m FOR EACH 0.6m LIFT. ALL TEES, HORIZONTAL BENDS, AND BRANCH VALVES IN FILL AREAS TO BE TIED WITH TIE RODS IN ADDITION TO CONCRETE BLOCKING ACCORDING TO NOTE 8.
8. A) THRUST BLOCKING: CONCRETE THRUST BLOCKS ARE TO BE INSTALLED AT ALL TEES, BENDS, ENDS OF MAINS AND CONNECTIONS 100mm AND LARGER AS PER OPSD 1103.010 AND 1103.020 AND TOWNSHIP STANDARD DRAWING STD-W4. AT ALL THRUST BLOCK LOCATIONS RESTRAINING DEVICES ARE REQUIRED IN ADDITION TO STANDARD CONCRETE THRUST BLOCKING.
   B) ALL SEGMENTS OF THE FITTING AND THE WATERMAIN AT THE THRUST BLOCK LOCATION SHALL BE RESTRAINED AT LEAST 10M EACH SIDE OF THE THRUST BLOCK WHERE THE DEFLECTION ANGLE AT THE THRUST BLOCK IS MORE THAN 11 $\frac{1}{4}$". TIE RODS AND CLAMPS SHALL BE GIVEN TWO COATS OF BITUMASTIC PAINT.
   C) IMPORTED GRANULAR FILL (OPSD GRANULAR "A" OR EQUIVALENT) IS TO BE USED BEHIND THE THRUST BLOCK AND FOR A MINIMUM DISTANCE OF 2m EACH SIDE OF THE THRUST BLOCK. THIS IMPORTED GRANULAR FILL IS TO BE COMPACTED TO A MINIMUM OF 100% STANDARD PROCTOR MAXIMUM DRY DENSITY. PRIOR TO CONSTRUCTION OF THE THRUST BLOCKS THE CONTRACTOR SHALL OBTAIN THE WRITTEN APPROVAL OF THE BACKFILL FROM A QUALIFIED GEOTECHNICAL ENGINEER.
9. CONTRACTOR TO PERFORM CONSTRUCTION SUCH THAT WATER SERVICE IS MAINTAINED AT ALL TIMES.
10. TRACING WIRE TO BE INSTALLED ON TOTAL LENGTH OF PVC WATERMAIN (#12 TWU STRANDED COPPER FOR OPEN CUT CONSTRUCTION OR #8 TWU FOR DIRECTIONAL BORING INSTALLATION), BROUGHT TO SURFACE AT ALL WATER VALVE BOXES AND COILED UNDER THE VALVE BOX CAPS.
11. WHERE WATER SERVICES CONFLICT WITH OTHER UTILITIES, DEFLECT SERVICE SO AS TO PROVIDE A MIN. 0.5m CLEARANCE. MAINTAIN MIN. DEPTH OF COVER AT ALL TIMES.
12. SERVICE CONNECTIONS SHALL BE PLACED AT A MINIMUM SEPARATION OF 1.0m AND A MINIMUM OF 0.6 FROM JOINTS. (ENDS OF PIPE).
13. A) FIRE HYDRANTS TO BE CANADA VALVE CENTURY PREMIER TYPE WITH STORZ PUMPER TO THE TOWNSHIP OF CLEARVIEW SPECIFICATIONS. ALL PIPE FITTINGS, TEES ETC. TO BE DUCTILE IRON CEMENT LINED MECHANICAL JOINT FITTINGS FOR PVC WATERMAINS 150mm TO 200mm DIAMETER. RESTRAINING AND THRUST BLOCK PROTECTION WILL BE REQUIRED ON ALL MECHANICAL JOINTS . HYDRANTS TO BE RESTRAINED TO MAINLINE TEE.
    B) FIRE HYDRANTS TO BE OFFSET 0.3m FROM ANY PROPERTY LINE, AND 1.5m FROM ANY DRIVEWAY.
14. MINIMUM DEPTH OF COVER OVER WATERMAIN TO BE 1.7 METERS.
15. WHERE 25mm SERVICE CANNOT MAINTAIN 1.7m DUE TO ELEVATIONS OF UTILITIES, THE CONTRACTOR SHALL INSTALL 4.0m OF 100mm PVC SDR28 LINER A MINIMUM OF 0.5m BELOW THE UTILITY.
16. WHERE WATERMAIN CONFLICTS WITH SEWER PIPES, DEFLECT WATERMAIN OVER SEWERS. DO NOT USE BENDS IF POSSIBLE. PROVIDE A MINIMUM OF 0.5 METERS CLEARANCE BETWEEN WATERMAIN AND SEWERS. MAINTAIN MINIMUM DEPTH OF COVER OF 1.7m AT ALL TIMES.
17. MINIMUM HORIZONTAL SEPARATION BETWEEN WATERMAIN AND SEWERS TO BE 2.5 METERS.
18. ALL VALVES TO BE RESILIENT CLOW CANADA F6100 SEAT GATE VALVES.
19. VALVES IN EXCESS OF 1.7m IN DEPTH SHALL REQUIRE A VALVE STEM EXTENSION.
20. RISER PIPES ARE TO BE INSTALLED AS PER STANDARD, AND REMOVED AS DIRECTED.

No.	Issue / Revision	Date	Auth.

TOWNSHIP OF CLEARVIEW

Figure Title

STANDARD NOTES - WATERMAINS

Drawn R.J. BURNSIDE | Approved | DWG. No. ----

Scale | Date 16/12/12

EROSION AND SEDIMENT CONTROL NOTES

1. PRIOR TO CONSTRUCTION ADVISE TOWNSHIP AND CONSERVATION AUTHORITY OF STAFF RESPONSIBLE FOR SITE SEDIMENT CONTROL SUPERVISION, INSPECTION AND MAINTENANCE, INCLUDING AFTER HOUR CONTACTS AND PROVIDE WRITTEN INSPECTION AND MAINTENANCE SCHEDULE OF SEDIMENT CONTROL DEVICES
2. INSTALL ALL SEDIMENT CONTROL DEVICES AS IDENTIFIED ON THE APPROVED EROSION CONTROL PLAN PRIOR TO COMMENCEMENT OF TOPSOIL STRIPPING OR EARTHWORKS OPERATIONS
3. ENSURE TOPSOIL, STRIPPING, GRADING AND UNDERGROUND WORKS CONFORM TO APPROVED GRADING, SERVICING AND EROSION CONTROL PLAN;
4. CONTRACTOR TO CONDUCT REQUIRED WEEKLY INSPECTION, MAINTENANCE AND REPORTING OF SEDIMENT CONTROLS TO THE TOWNSHIP AND CONSERVATION AUTHORITY AND STABILIZE SITE AS REQUIRED THROUGHOUT SITE CONSTRUCTION SCHEDULE
5. CONSTRUCTION AREAS THAT EXCEED 30 DAYS OF INACTIVITY SHALL BE STABILIZED BY SEEDING. THIS IS TO INCLUDE STOCKPILES OF FILL AND TOPSOIL
6. EROSION AND SEDIMENT CONTROLS TO BE DESIGNED IN ACCORDANCE WITH TOWNSHIP AND CONSERVATION AUTHORITY STANDARDS.
7. ALL SEDIMENT CONTROL BASINS SHALL BE IN ACCORDANCE WITH NVCA DRAWING BSD - 23A
8. ALL SEDIMENT CONTROL FENCES SHALL BE IN ACCORDANCE WITH NVCA DRAWING BSD - 23 DRAFT
9. ROCK CHECK DAMS SHALL BE IN ACCORDANCE WITH NVCA DRAWING BSD - 24 DRAFT
10. MUD MATS TO BE USED AT ALL CONSTRUCTION ENTRANCES AND EXIT LOCATIONS AND BE A MINIMUM 20M IN LENGTH AND 5M IN WIDTH. THE PAD SHALL BE A MINIMUM OF 450MM THICK, CONSTRUCTED WITH 50MM DIAMETER CLEAR STONE IN THE FIRST 10M OF THE PAD EXTENDED FROM THE STREET. THE REMAINDER OF THE PAD SHALL BE CONSTRUCTED WITH 150MM DIAMETER STONE
11. CONTRACTOR TO MAINTAIN ALL ROADS AFFECTED BY CONSTRUCTION FREE OF SEDIMENT BY SWEEPING AS NECESSARY OR AS DIRECTED BY THE CONTRACT ADMINISTRATOR OR TOWNSHIP
12. CONTRACTOR TO IMPLEMENT APPROPRIATE DUST CONTROL MEASURES TO PREVENT EXCESSIVE DUST ON SITE OR MIGRATION OF DUST TO ADJACENT PROPERTIES
13. ALL DISTURBED AREAS ARE TO BE REINSTATED TO THEIR ORIGINAL CONDITION OR BETTER AS DETERMINED BY THE TOWNSHIP OF CLEARVIEW.
14. ALL SILT CONTROL AND EROSION PROTECTION DEVICES ARE TO BE IN PLACE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND SHALL REMAIN IN PLACE AND BE MAINTAINED BY THE CONTRACTOR UNTIL CONSTRUCTION IS COMPLETE, AND THE GRASS HAS ESTABLISHED GROWTH; SUBJECT TO APPROVAL BY THE TOWNSHIP OF CLEARVIEW.

No.	Issue / Revision	Date	Auth.

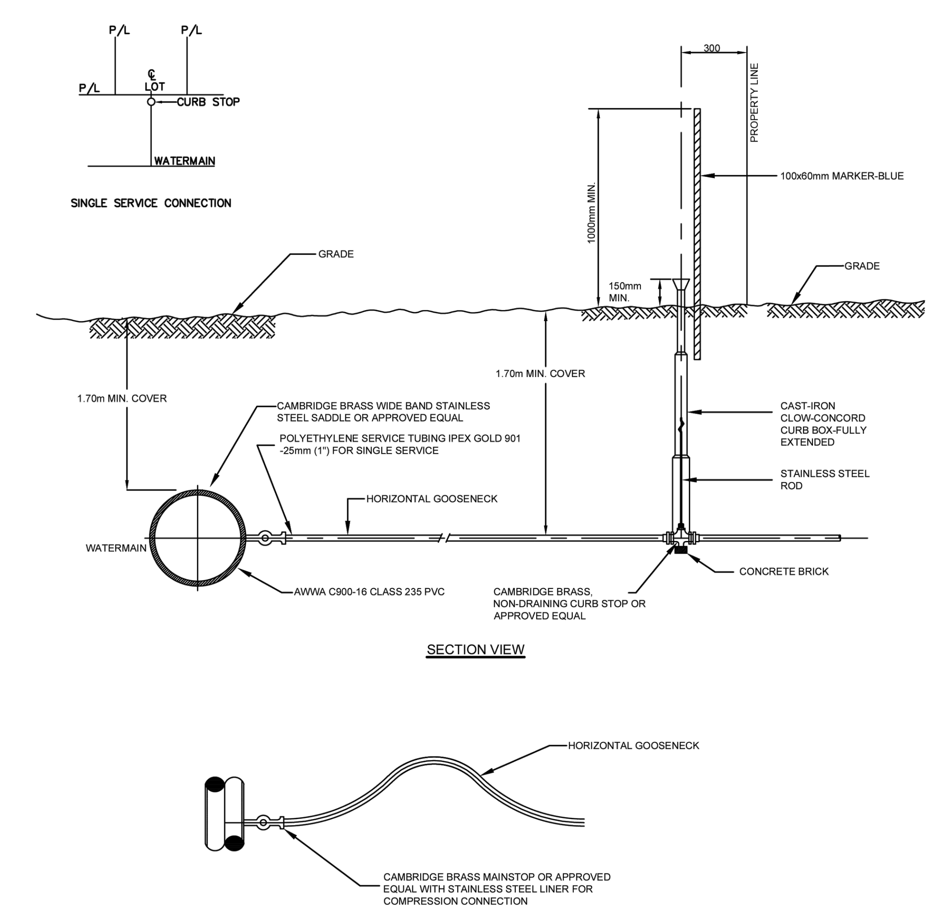
TOWNSHIP OF CLEARVIEW

Figure Title

STANDARD NOTES - EROSION AND SEDIMENT CONTROL

Drawn R.J. BURNSIDE | Approved | DWG. No. ----

Scale N.T.S. | Date 16/12/12



No.	Issue / Revision	Date	Auth.

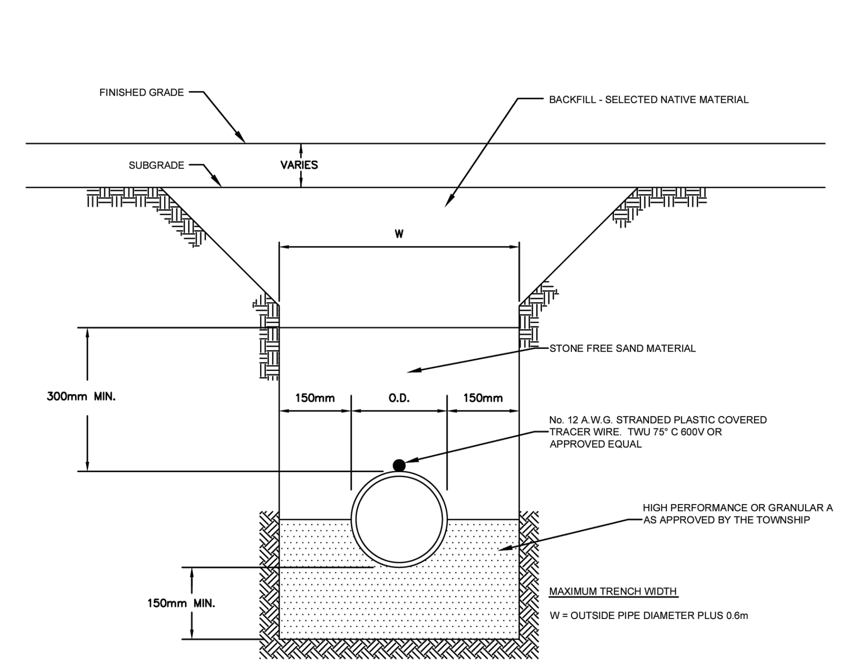
TOWNSHIP OF CLEARVIEW

Figure Title

WATER SERVICE CONNECTION DETAIL

Drawn R.J. BURNSIDE | Approved | DWG. No. STD-W1

Scale N.T.S. | Date 16/12/12



GENERAL NOTES:

1. COMPACTION OF BACKFILL WILL BE REQUIRED IN DRIVEWAYS AND UNDER TRAVELED PORTIONS OF THE ROADWAY
2. BACKFILL FOR ROAD CROSSINGS WILL BE COMPACTED GRANULAR 'B'
3. TRACER WIRE INSTALLATION FOR NON METALLIC WATERMAIN
   -ALL CONNECTIONS MUST BE WATERPROOF.
   -SPLICING OF TRACING WIRE IS NOT ALLOWED UNLESS SPECIFIED OR APPROVED BY THE ENGINEER.
   -TRACER WIRE CONTINUITY OF CURRENT MUST BE TESTED AND VERIFIED BY CLEARVIEW TOWNSHIP BETWEEN CADWELD LOCATIONS.

No.	Issue / Revision	Date	Auth.

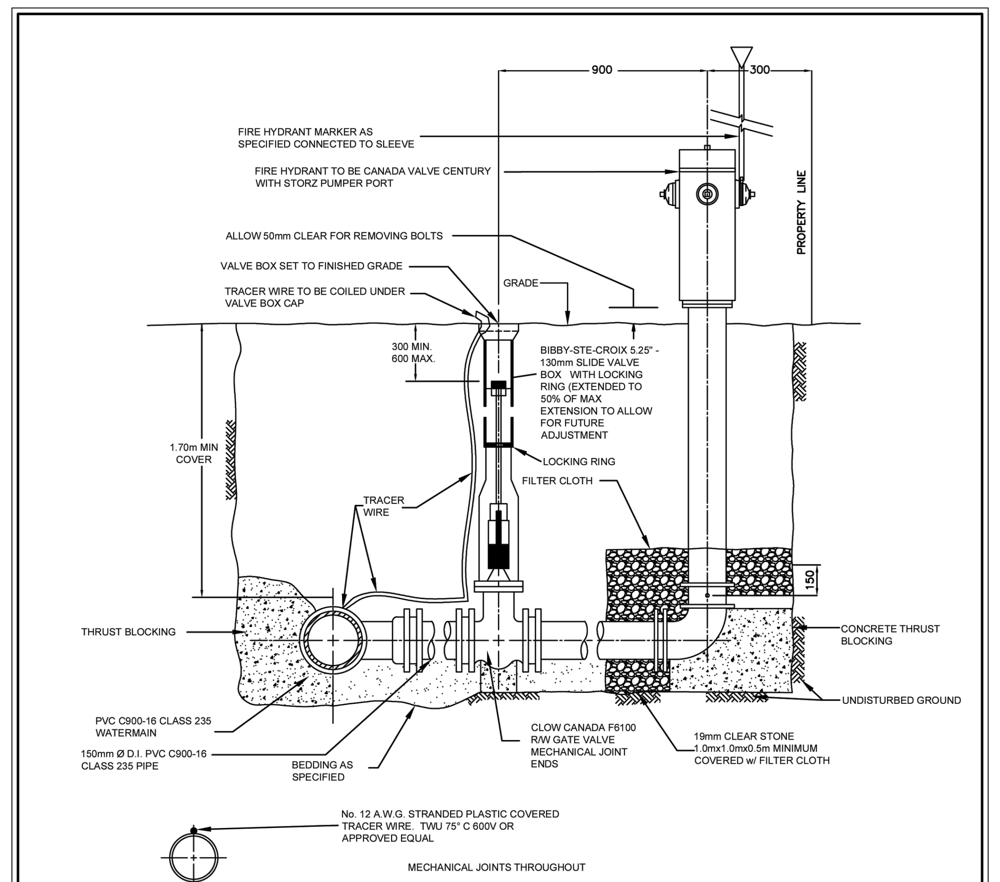
TOWNSHIP OF CLEARVIEW

Figure Title

WATERMAIN BEDDING DETAIL (OPEN CUT)

Drawn R.J. BURNSIDE | Approved | DWG. No. STD-W2

Scale N.T.S. | Date 16/12/12



TRACER WIRE INSTALLATION FOR NON-METALLIC WATER MAIN

1. ALL CONNECTIONS MUST BE WATERPROOFED.
2. SPLICING OF TRACING WIRE IS NOT ALLOWED UNLESS SPECIFIED OR APPROVED BY THE ENGINEER AND SHALL BE IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS
3. TRACER WIRE CONTINUITY OF CURRENT MUST BE TESTED AND VERIFIED BY THE ENGINEER BETWEEN CADWELD LOCATIONS.

NOTE:

1. VALVE EXTENSION REQUIRED WHEN DISTANCE FROM TOP OF VALVE TO FINISHED GRADE IS GREATER THAN 1.70m.
2. THRUST BLOCKS SHALL BE 20 MPa CONCRETE AS PER O.P.S.D. 1103.010. AND O.P.S.D. 1103.020.
3. ALL HYDRANTS ARE SELF-DRAINING UNLESS OTHERWISE SPECIFIED.
4. HYDRANT LATERALS SHALL BE PVC C900-16 CLASS 235.
5. RESTRAINER CLAMPS TO BE PROVIDED ON BOTH SIDES OF ALL MECHANICAL JOINTS.

No.	Issue / Revision	Date	Auth.

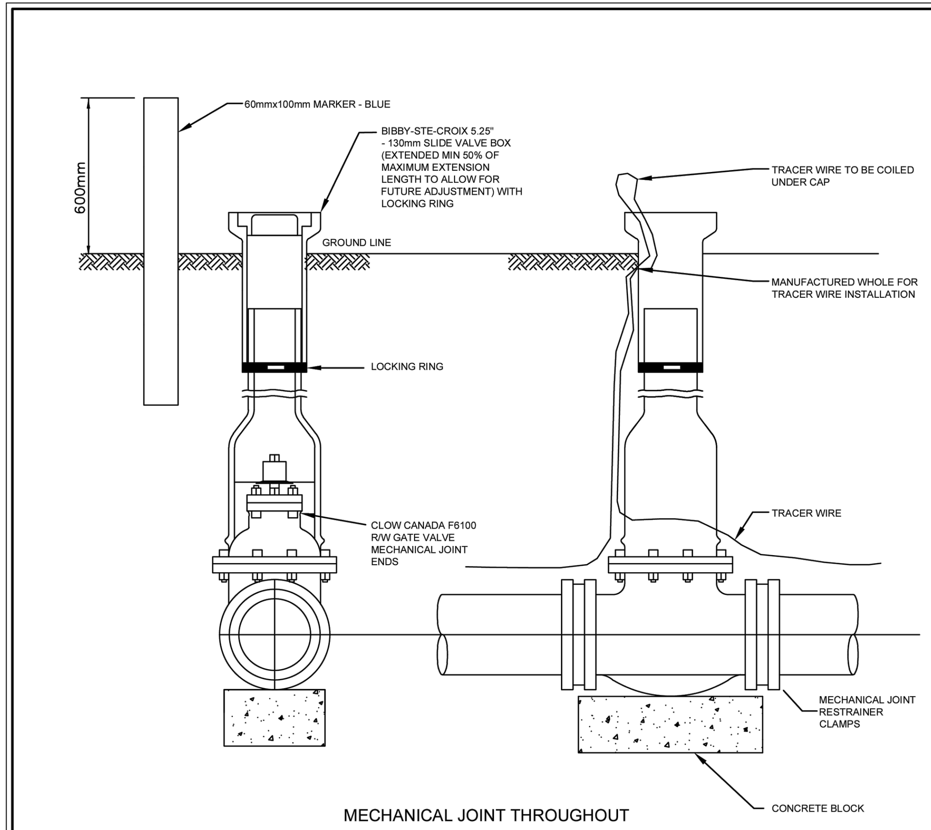
TOWNSHIP OF CLEARVIEW

Figure Title

VALVE AND HYDRANT DETAIL

Drawn R.J. BURNSIDE | Approved | DWG. No. STD-W5

Scale N.T.S. | Date 16/12/12



NOTES:

- CONCRETE BLOCK TO BE MINIMUM SIZE 200mmx200mmx100mm (8"x8"x4")
- VALVE BOX LOCKING RING TO BE USED WHEN VALVE BOX IS INSTALLED IN THE CONCRETE SIDEWALK OR CURB
- CLOW CANADA F6100 R/W GATE VALVE MECHANICAL JOINT ENDS TO BE FUSION EPOXY - NSF 61 AND AWWA C550

No.	Issue / Revision	Date	Auth.

TOWNSHIP OF CLEARVIEW

Figure Title

GATE VALVE AND EXTENDABLE VALVE BOX

Drawn R.J. BURNSIDE | Approved | DWG. No. STD-W3

Scale N.T.S. | Date 16/12/12

Notes

1. This drawing is the exclusive property of CAPES Engineering Ltd. The reproduction of any part without express written consent of this Corporation is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. CAPES Engineering Ltd. accepts no responsibility for interpretation of third party information, contractor to verify all third party information prior to construction.
5. This is not a plan of survey. Any and all representation of property boundaries are approximate only.

No	Issue / Revision	Date	Auth
1	ISSUED FOR FSR	19/01/14	CC
2	REVISED FUNCTIONAL SERVICING REPORT	25/08/25	CC

NOTE:

TOPOGRAPHIC SURVEY INFORMATION PREPARED BY CC TATHAM AND JOETOPO CAD AND SURVEYING. INFORMATION SHOWN APPORXIMATELY HEREON FOR REFERENCE PURPOSES ONLY.

BOUNDARY SURVEY INFORMATION PREPARED BY MARTIN KNISLEY OLS, AND SHOWN APPROXIMATELY HEREON. THIS IS NOT A PLAN OF SURVEY

BENCHMARK: NAIL IN HYDRO POLE, NORTH SIDE OF MARGARET ST., ELEV - 220.008.

LICENSED PROFESSIONAL ENGINEER
C. CAPES
100056104
AUG. 25, 2025
PROVINCE OF ONTARIO

Client

MAMTA HOMES
44 ASTER DRIVE
WASAGA BEACH, ON

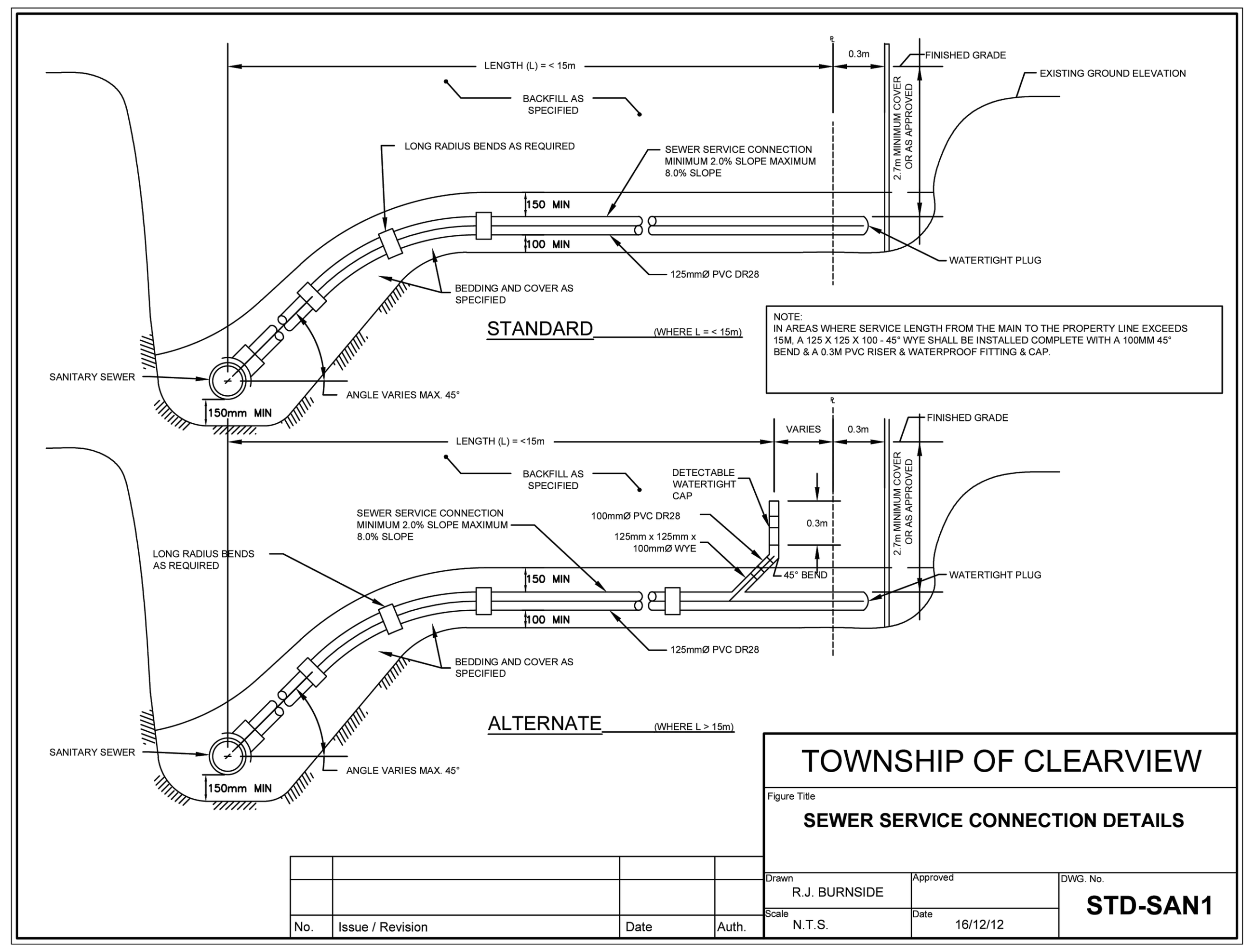
CAPES ENGINEERING

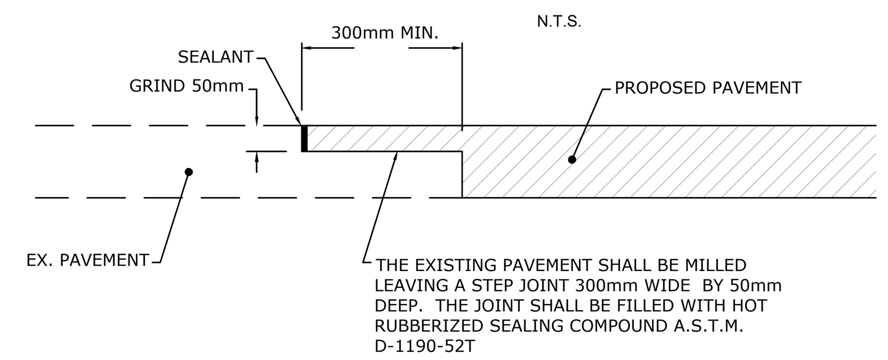
355310 BLUE MOUNTAINS - EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0
TEL: 705-994-4818

MAMTA HOMES STAYNER

STANDARD DETAILS

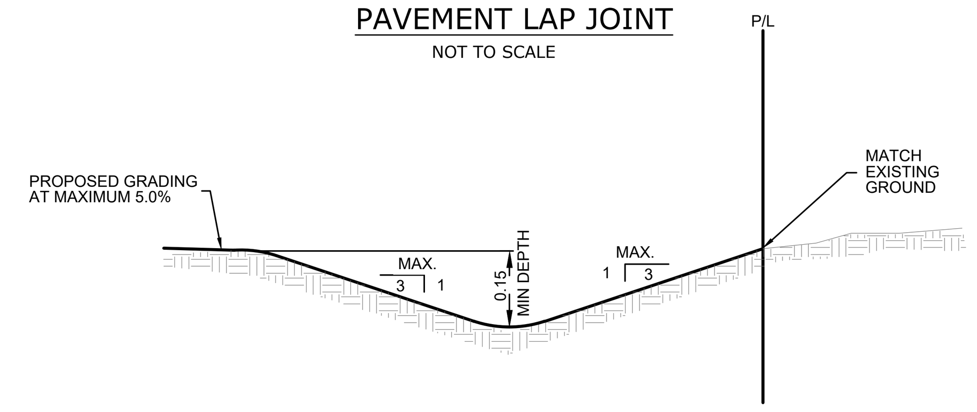
Designed	Checked	Date	Drawing No.
K. GRIFFIN	C. CAPES	19/01/14	C7
Project No. 2018-060		Rev No. 2	
Scale AS NOTED			





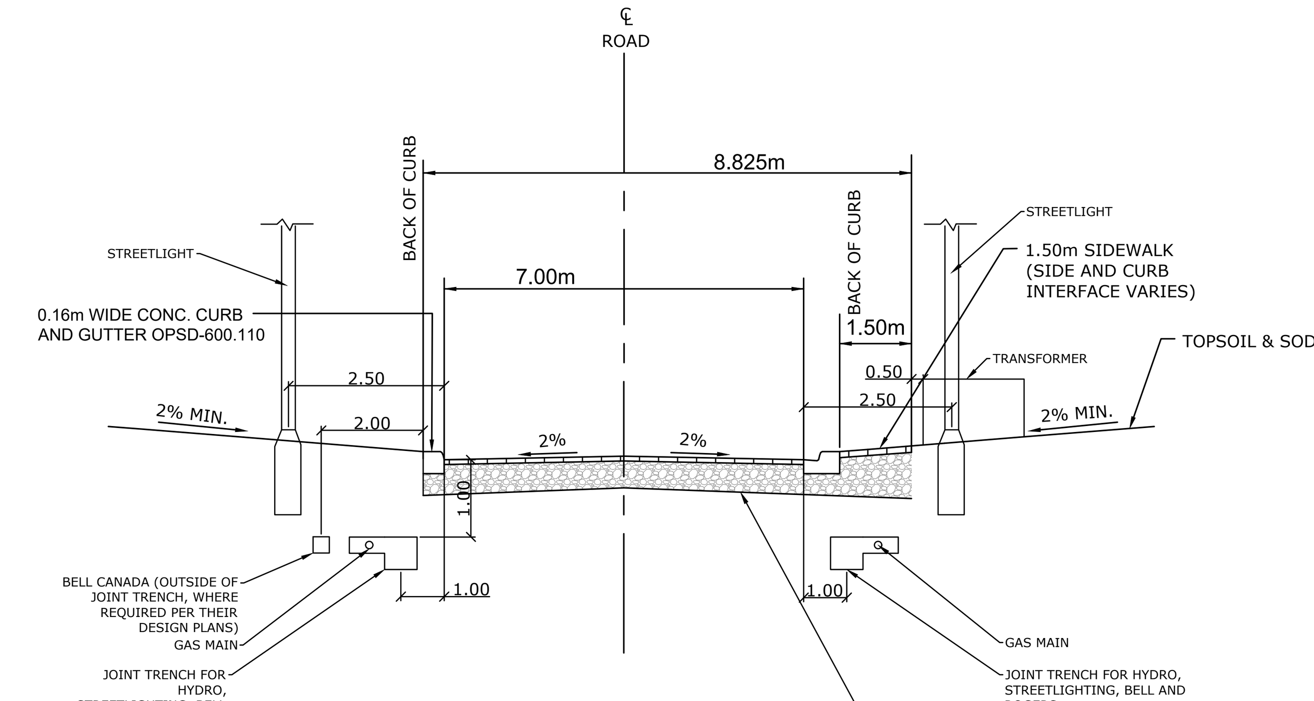
PAVEMENT LAP JOINT

NOT TO SCALE



TYPICAL SIDE YARD SWALE

N.T.S.



TYPICAL ROAD CROSS SECTION

N.T.S.

GENERAL NOTES:

1. PRIVATE INFRASTRUCTURE IS TO BE TESTED TO TOWNSHIP STANDARDS PRIOR TO ACCEPTANCE.
2. SANITARY SEWER FLUSHING, DEFLECTION TESTING, CCTV INSPECTION AND INFILTRATION/EXFILTRATION TESTING TO BE CARRIED OUT IN ACCORDANCE WITH TOWNSHIP STANDARDS AND OPSS 410 & 411
2. STORM SEWER FLUSHING, DEFLECTION TESTING, CCTV INSPECTION AND INFILTRATION/EXFILTRATION TESTING TO BE CARRIED OUT IN ACCORDANCE WITH TOWNSHIP STANDARDS AND OPSS 410 & 411

ROAD SIGNS

1. SHAPE, COLOUR, HEIGHT AND LOCATION OF TRAFFIC SIGNS SHALL BE IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AS PUBLISHED BY THE MINISTRY OF TRANSPORTATION ONTARIO.
2. ALL REGULATORY SIGNS SHALL BE MANUFACTURED USING 'HIGH INTENSITY' SHEETING CONFORMING TO ASTM D4956-90 TYPE III OR TYPE IV MATERIAL.
3. STREET NAME BLADES ARE TO BE MANUFACTURED WITH EXTRUDED ALUMINUM, 16 CENTIMETERS IN WIDTH, WITH WHITE LETTERS ON A GREEN BACKGROUND.
4. SIGN POSTS TO BE 'U-FLANGE' STEEL POSTS MANUFACTURED FROM 80,000 PSI HIGH CARBON STEEL WITH HOT-DIPPED-GALVANIZING AROUND THE PRE-PUNCHED HOLES.
5. POSTS ARE TO BE 3.6m IN TOTAL LENGTH AND ARE TO BE BURIED 1.2m IN GROUND.
6. U-FLANGE SECTION TO BE 32x50mm
7. HARDWARE TO SIGN MOUNTING TO CONFIRM TO THE FOLLOWING SPECIFICS BY CLEMMER INDUSTRIES LIMITED OR APPROVED EQUIVALENT:
   7.1. POST CAP, B-2
   7.2. CROSS MOUNTING BRACKET, D-1
   7.3. U FLANGE POST ADAPTOR, E-2

Notes

1. This drawing is the exclusive property of CAPES Engineering Ltd. The reproduction of any part without express written consent of this Corporation is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. CAPES Engineering Ltd. accepts no responsibility for interpretation of third party information, contractor to verify all third party information prior to construction.
5. This is not a plan of survey. Any and all representation of property boundaries are approximate only.

No	Issue / Revision	Date	Auth
1	ISSUED FOR FSR	19/01/14	CC
2	REVISED FUNCTIONAL SERVICING REPORT	25/08/25	CC

NOTE:

TOPOGRAPHIC SURVEY INFORMATION PREPARED BY CC TATHAM AND JOETOPO CAD AND SURVEYING. INFORMATION SHOWN APPORXIMATELY HEREON FOR REFERENCE PURPOSES ONLY.

BOUNDARY SURVEY INFORMATION PREPARED BY MARTIN KNISLEY OLS, AND SHOWN APPROXIMATELY HEREON. THIS IS NOT A PLAN OF SURVEY

BENCHMARK: NAIL IN HYDRO POLE, NORTH SIDE OF MARGARET ST., ELEV - 220.008.

LICENSED PROFESSIONAL ENGINEER
C. CAPES
100056104
AUG. 25, 2025
PROVINCE OF ONTARIO

Client
MAMTA HOMES
44 ASTER DRIVE
WASAGA BEACH, ON

CAPES ENGINEERING
355310 BLUE MOUNTAINS - EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0
TEL: 705-994-4818

MAMTA HOMES STAYNER

STANDARD DETAILS

Designed	Checked	Date	Drawing No.
K. GRIFFIN	C. CAPES	19/01/14	C8
Project No.		Rev No.	
2018-060		2	
Scale			
AS NOTED			

2 FIELD AND LABORATORY WORKS

Prior to drilling operations, underground utilities were cleared at the borehole locations by representatives of the public utilities company working with personnel from Orbit.

A total of nine (9) boreholes (BH1 to BH9, see **Drawing 1A** for locations) were drilled on March 30-31, 2017 to a maximum depth of 6.7m with solid stem continuous flight augers by a drilling sub-contractor under the direction and supervision of Orbit personnel. Samples were retrieved with a 50mm O.D. split-barrel sampler driven with a hammer weighing 63.5kg and dropping 760mm in accordance with the Standard Penetration Test (SPT) method (ASTM D1586). The samples were logged in the field and returned to the Orbit's laboratory for detailed examination by the project engineer and for index laboratory testing.

As well as visual examination in the laboratory, all the soil samples were tested for moisture content and selected samples for grain size analyses.

Water level observations were made during drilling and in the open boreholes at the completion of the drilling operations. Piezometers (20mm) were installed in four (4) boreholes (BH1, BH3, BH7 and BH9) for an extended period of groundwater level monitoring.

The ground surface elevations at the borehole locations were interpreted from the topographical survey provided by e the owner to Orbit. Note these elevations are approximate only for the purpose of relating borehole soil stratigraphy and should not be used or relied on for other purposes.

3 SITE AND SUBSURFACE CONDITIONS

The project site is at 209 Margaret Street, Stayner, Ontario. The site consists of a rectangle shaped vacant land (approximately 20 acres) located at the south-east corner of County Road 42 and Margaret Street (**Drawing 1**). The majority of the land is covered with vegetation including shrubs, grass and tall trees. A total of nine (9) boreholes (BH1 to BH9) were advanced at this site. The approximate borehole locations are shown on **Drawing 1A**. Notes on sample descriptions are presented on **Drawing 1B**. Detailed subsurface conditions are presented on the Borehole Logs, **Drawings 2 to 10**. The generalized subsurface profile is presented on **Drawing 11**.

The borehole logs indicate the subsurface conditions only at the borehole locations. Note the material boundaries indicated on the borehole logs are approximate and based on visual observations. These boundaries typically represent a transition from one material type to another and should not be regarded as an exact plane of geological change. It should be pointed out that the subsurface conditions will vary across this site. The subsurface soil conditions are summarized as follows.

3.1 Topsoil

The thickness of the topsoil explored in the boreholes generally ranged from 200 to 400mm. The data provided here pertaining to the topsoil thickness is confirmed at the borehole locations only, and may vary between and beyond the boreholes. This information is not considered to be sufficient for estimating topsoil quantities and associated costs.

3.2 Native Soils

The surficial topsoil layer was underlain by the following layers of native soils.

3.2.1 Weathered/Disturbed Sandy silt to Silty sand

The *Upper* native soil zone to depths ranging from 0.8 to 1.2m below the existing grade consisted of weathered/disturbed sandy silt to silty sand with some topsoil inclusions and rootlets, and trace gravel and clay. The weathered/disturbed soil layer was generally in very moist to wet, greyish brown to dark brown or grey color and in very loose to loose state.

3.2.2 Sandy Silt to Silty Sand Till

The *Lower* native soil below the weathered and/or disturbed zone generally consisted of sandy silt to silty sand till with trace to some gravel and clay, extending to maximum explored depth of 6.7m (excluding boreholes BH1 and BH2). The till deposit at the site can contain occasional layers of sandy silt to silty sand as observed at the location of boreholes BH1 and BH2. The deposit was generally very moist to wet, greyish brown to brownish grey or grey in color and in compact to very dense state. The measured moisture contents of these native deposits are shown on the borehole logs, which are generally less than twenty (20) but typically about ten (10) percent by weight.

Typical grain size distribution curves of seven (7) sandy deposit samples from different depths in boreholes BH1 through BH9 are given on **Figure B1** in **Appendix B** and show the following gradation:

Gravel:	0 – 23	Average:	11	%
Sand:	8 – 54	Average:	40	%
Silt:	21 – 86	Average:	43	%
Clay	2 – 13	Average:	6	%

The results indicate that the native deposit at the site can generally be classified as "sandy silt to silty sand with trace some gravel and clay". Based on the Unified Soil Classification, the native deposit is called as "silty sand (SM)".

3.3 Groundwater Conditions

During drilling and at the completion, the short term (not stabilized) groundwater was found in boreholes at shallow depths varying from 0.1 to 0.9m below the existing ground surface. The groundwater levels in piezometer wells installed at the location of boreholes (BH1, BH3, BH7 and BH9) were measured on April 7, 2017 (after about 1 week of installation) and in the year 2025 on April 30, May 28, June 30, July 25 generally varied from 0.06m to 2.1m below the existing grade (corresponding to geodetic elevations of 221.4m and 217.7m respectively). This indicates that the stabilized water level measurements are consistent in general with our observations during the drilling and at the completion. The results are summarized in **Table 3.1** and shown on the borehole logs in **Drawings 2, 4, 8 and 10** in details.

Table 3.1 Groundwater Levels Observed in Boreholes

BH No.	Date of Drilling	Date of Water Measurement	Depth/Elevation of the Tip of Piezometer (m)	Depth/Elevation of Groundwater (m)	Piezometer
BH1	Mar 30, 2017	During drilling	6.7/214.2	0.1*/220.8	Yes
		Apr 7, 2017		0.1*/220.8	
BH2	Mar 30, 2017	During drilling	–	0.3*/221.2	–
BH3	Mar 30, 2017	During drilling	6.3/215.2	0.9*/220.6	Yes
		Apr 7, 2017		0.3*/221.2	
		Apr 30, 2025		0.06*/221.4	
		May 28, 2025		0.3*/221.2	
		June 30,2025		0.5*/221.0	
		July 25, 2025		0.7*/220.8	
BH4	Mar 30, 2017	During drilling	–	0.4*/220.1	–
BH5	Mar 30, 2017	During drilling	–	0.6*/220.2	–
BH6	Mar 30, 2017	During drilling	–	0.6*/219.9	–
BH7	Mar 31, 2017	During drilling	6.3/215.3	0.9*/220.7	Yes
		Apr 7, 2017		1.8*/219.8	
		Apr 30, 2025		0.2*/221.4	
		May 28, 2025		0.5*/221.1	
		June 30, 2025		0.8*/220.8	
		July 25, 2025		1.1*/220.5	
BH8	Mar 31, 2017	During drilling	–	0.3*/219.2	–
BH9	Mar 31, 2017	During drilling	6.7/213.1	0.3*/219.5	Yes
		Apr 7, 2017		2.1*/217.7	
		Apr 30, 2025		0.09*/219.7	
		May 28, 2025		0.3*/219.5	
		June 30, 2025		0.5*/219.3	
		July 25, 2025		0.7*/219.1	

*Groundwater table not stabilized

Perched water may be encountered in excavated areas during wet seasons. A perched water condition can develop within and above fine-grained materials especially during and following periods of sustained precipitation.

Note that the groundwater level can vary and is subject to seasonal fluctuations and in response to major weather events. The depth of groundwater table can also be influenced by the presence of underground features such as utility trenches.

4 DISCUSSION & RECOMMENDATIONS

It is proposed to develop the site as a residential subdivision. The lots therefore will be serviced by a network of roads, storm and sanitary sewers and watermains.

4.1 Frost Susceptibility of Soils

The frost depth penetration in this area is considered to be 1.5m. Based on the grain size analysis and using the Ministry of Transportation (MTO) category for frost susceptibility soils, the on-site native soils can be classified as low to moderate susceptible to frost heaving.

4.2 Roads

The investigation has shown that the predominant subgrade soil, after stripping the topsoil, very loose to loose weathered/disturbed silty and sandy soil and otherwise unsuitable subsoil, will generally consist of

cohesionless soils. The stabilized groundwater table was found at depths varying from 0.06m to 2.1m below the existing grade.

Based on the above and assuming that traffic usage will be residential minor local or local, the following minimum pavement thickness is recommended:

- 40mm HL3 Asphaltic Concrete
- 65mm HL8 Asphaltic Concrete
- 150mm Granular 'A'
- 300mm Granular 'B'

For bus routes and collector roads, the following minimum pavement thickness is recommended:

- 40mm HL3 Asphaltic Concrete
- 80mm HL8 Asphaltic Concrete
- 200mm Granular 'A'
- 250mm Granular 'B'

These values may need to be adjusted according to the Town of Stayner Standards. The site subgrade and weather conditions (i.e. if wet) at the time of construction may necessitate the placement of thicker granular sub-base layer in order to facilitate the construction. Furthermore, heavy construction equipment may have to be kept off the newly constructed roads before the placement of asphalt and/or immediately thereafter, to avoid damaging the weak subgrade by heavy truck traffic.

4.2.1 Stripping, Sub-excavation and Grading

The site should be stripped of all topsoil, weathered/disturbed native and any topsoil or otherwise unsuitable soils to the full depth of the roads, both in cut and fill areas.

Following stripping, the site should be graded to the subgrade level and approved. The subgrade should then be proof-rolled, in the presence of the Geotechnical Engineer, by at least several passes of a heavy compactor having a rated capacity of at least 8 tonnes. Any soft spots thus exposed should be removed and replaced by select fill material, similar to the existing subgrade soil and approved by the Geotechnical Engineer. The subgrade should then be re-compacted from the surface to at least 98% of its Standard Proctor Maximum Dry Density (SPMDD). The final subgrade should be cambered or otherwise shaped properly to facilitate rapid drainage and to prevent the formation of local depressions in which water could accumulate.

In view of the low to medium permeability of the subsoil, proper cambering and allowing the water to escape towards the sides (where it can be removed by means of subdrains) is considered to be beneficial for this

project. Otherwise, any water collected in the granular sub-base materials could be trapped thus causing problems due to softened subgrade, differential frost heave, etc. For the same reason damaging the subgrade during and after placement of the granular materials by heavy construction traffic should be avoided. If the moisture content of the local material cannot be maintained at ±2% of the optimum moisture content, imported granular material may need to be used.

Any fill required for regarding the site or backfill should be select, clean material, free of topsoil, organic or other foreign and unsuitable matter. The fill should be placed in thin layers and compacted to at least 95% of its Standard Proctor Maximum Dry Density (SPMDD). The degree of compaction should be increased to 98% within the top 1.0m of the subgrade, or as per City Standards. The compaction of the new fill should be checked by frequent field density tests.

4.2.2 Construction

Once the subgrade has been inspected and approved, the granular base and sub-base course materials should be placed in layers not exceeding 200mm (uncompacted thickness) and should be compacted to at least 100% of their respective SPMDD. The grading of the material should conform to current OPS (Ontario Provincial Standards) Specifications.

The placing, spreading and rolling of the asphalt should be in accordance with OPS Specifications or, as required by the local authorities.

Frequent field density tests should be carried out on both the asphalt and granular base and sub-base materials to ensure that the required degree of compaction is achieved.

4.2.3 Drainage

All paved surfaces should be sloped to provide satisfactory drainage towards catch basins. Installation of full-length subdrains on all roads is recommended. The subdrains should be properly filtered to prevent the loss of (and clogging by) soil fines.

4.3 Sewers

As a part of the site development, a network of new storm and sanitary sewers is to be constructed.

4.3.1 Trenching

As indicated in the boreholes, the trenches will be generally dug through cohesionless soils (sand and silt or sandy silt to silty sand till) with trace of clayey materials.

The groundwater levels observed in the piezometer wells were at depths ranging from 0.06-2.1m below the existing grade. Where the anticipated trench base is below the groundwater level, positive dewatering such

as well points will be required to lower the water table to at least 1.0m below the excavation base. Otherwise, it will result in an unstable base and flowing sides. Standard borings may not assess dewatering requirements for layered granular soils below the groundwater table. Prior to excavation, we strongly recommend that test pits be carried to further explore the groundwater and seepage conditions and to confirm the need for positive dewatering. A contractor specializing in dewatering should be retained to design the dewatering systems in the area where the excavations extend well into the sandy soils below the groundwater level, such as for the deep service trenches (if required).

All excavations must be carried out in accordance with the most recent Occupational Health and Safety Act (OHSA). In accordance with OHSA, the compact to dense cohesionless deposits above the water table can be classified as Type 3 soil and very loose to loose deposits as type 4. Sandy soils below the water table can also be classified as Type 4.

As a general rule, the excavations in Type 3 soil can be carried out using minimum side slopes of (1 to 1.5)H : 1V. The excavations in Type 4 soils will require at a minimum, flatter side slopes of 3H to 1V. These slopes should be visually monitored for any movement especially if workers are present within the excavation. These temporary slopes should only be utilized for a short duration.

4.3.2 Bedding

The undisturbed compact cohesionless soils (sandy silt to silty sand till) can provide adequate support for the sewer pipes and allow the use of normal Class B type bedding. The recommended minimum thickness of granular bedding below the invert of the pipes is 150mm. The thickness of the bedding may, however, have to be increased depending on the pipe diameter or in accordance with local standards or if wet or weak subgrade conditions are encountered, especially when the soil at the trench base level consists of wet, dilatant silts and sandy silts to clayey silt. The bedding material should consist of well graded granular material such as Granular 'A' or equivalent. After installing the pipe on the bedding, a granular surround of approved bedding material, which extends at least 300mm above the obvert of the pipe, or as set out by the local Authority, should be placed.

To avoid the loss of soil fines from the subgrade, uniformly graded clear stone should not be used below the granular bedding material, unless a suitable approved filter fabric (geotextile) is placed. The geotextile should extend along the sides of the trench and should be wrapped all around the poorly graded bedding material.

4.3.3 Backfilling of Trenches

Based on visual and tactile examination, the on-site excavated sandy deposits without topsoils and rootlets are generally considered to be suitable for re-use as backfill in the service trenches provided their moisture contents at the time of construction are at or near optimum. However, the silts are poorly graded soils and

are very sensitive to their moisture contents. As such, they will be very difficult to handle and to compact, especially when excavated below the water table. Under unfavourable conditions, they may not be suitable for trench backfill.

The backfill should be placed in maximum 200mm thick layers at or near (±2%) their optimum moisture content and each layer should be compacted to at last 95% SPMDD. Unsuitable materials such as organic soils, boulders, cobbles, frozen soils, etc. should not be used for backfilling.

The on-site excavated soils may not be used in confined areas (e.g. around catch basins and laterals under roadways) where heavy compaction equipment cannot be operated. The use of imported granular fill together with an appropriate frost taper would be preferable in confined areas and around structures, such as catch basins.

In light of borehole information, it is recommended that underground services should be kept as high as possible to avoid penetrating the excavation below the wet cohesionless deposits.

4.3.4 Thrust Blocks

Pressurized fluids in buried pipelines generate unbalanced, thrust forces at bends, junctions, valves pump starts or stops, valve closures, air vents and all restrictions to, and changes in direction of flows. Generally, the thrust forces depend on the internal pressure, the cross sectional area of the pipe and the deflection angle. For pipes which are not anchored, the unbalanced thrust forces must be resisted either by thrust blocks and collars or by thrust restraint systems or a combination of both.

Thrust blocks are passive systems which prevent the pipe joint leaking by blocking the pipe movements and the separation of unrestrained joints. Depending on the source of the thrust force, their resistance comes either from the mobilization of soil bearing capacity or dead weight: the bearing type thrust blocks resist thrust forces corresponding to concave vertical and horizontal bends, while the gravity ones secure the convex vertical bends. Because they need to immobilize the pipes, the allowable soil stresses must be considerably smaller than those required to cause ultimate failure of the thrust block itself. The thrust block design is satisfactory if the design force, F_d, is less than the ultimate resistance R_{ult}, reduced by a suitable reduction (safety) factor which will ensure that the displacements will be relatively small.

Values for thrust reduction factors for thrust blocks are given in **Table 4.1** for different soil and rock types. If these lead to unacceptably large thrust blocks, the reduction factor may be re-assessed by determining the actual relationship between thrust reduction factor and displacement under defined load and ground conditions.

Table 4.1 Reduction Factors for Thrust Blocks

Soil or Rock Type	Reduction Factor (T_r)
Dense sandy silt to silty sand deposit	2 to 3
Compact sandy silt to silty sand deposit	3 to 4
Very loose to loose sandy silt to silty sand deposit	4 to 5

Thrust blocks normally consist of a volume of concrete, usually of nominal strength (20-40 MPa), which may be lightly reinforced. The size and shape of the block is decided on the basis of the forces to be restrained, the size and style of the pipe fitting or component, and local ground conditions. The effectiveness of any thrust block is determined by its mass, shape, position relative to the pipeline, the soil reactions on the block, and friction between the pipeline and the surrounding ground.

Thrust blocks for the underground services under pressure may be constructed in native soils in areas where there is no risk of future excavations. The back of the thrust blocks should be vertical and should be cast directly against undisturbed natural soils. The ultimate lateral resistance of thrust blocks can be calculated in accordance with **Drawing 12**.

Thrust restraint systems are alternative to thrust blocks. They are active systems in the sense that they rely on the mobilization of pipe/soil friction and/or passive resistance in the soil for a sufficient length away from the junction. The length of pipeline required to develop the resisting force crucially depends on the type of junction, pipeline material, type and compaction/consistency of the backfill, etc.

4.4 Engineered Fill and Sub-Excavation

The elevation of the existing grade varies across the site. Detailed site grading plans for the proposed development were not available to us at the time of preparation of this report. However based on the existing topography at the site, cut and fill operations are expected to require as part of the proposed development.

In the areas where earth fill is required for site grading purposes, engineered fill can be constructed below house foundations, roads, boulevards, etc. Prior to the placement of the engineered fill, all of the existing topsoil and surficially weathered/disturbed native soils must be removed and the exposed surface proof rolled. Any soft spots revealed during proof rolling must be sub-excavated and re-engineered. The depths of sub-excavation required for the construction of engineered fill at the borehole locations approximately ranged from 0.8m to 1.2m, as listed in **Table 4.2**.

The stabilized groundwater levels observed in boreholes were at depths ranging from 0.1m to 2.1m below the existing ground surface (refer to Table 3.1). Where the excavation base for engineered fill consists of cohesionless soils (sand or sandy silt to silty sand) below the groundwater level, dewatering will be required to lower the water table below the excavation base. It is possible to lower the groundwater table for about 0.6m to 1.0m by pumping from perimeter sumps and trenches.

Where the excavations extend well into the cohesionless soils (sandy silt to silty sand) below the groundwater level, such as for the deep service trenches, a positive dewatering system such as well points will be required to lower the water table below the excavation base.

Table 4.2 Depths of Sub-Excavation for Engineered Fill Construction

Borehole No.	Depth of Sub-Excavation of weathered/disturbed Materials (m)	Depth of Observed Groundwater (m)
BH1/Piezo.	1.2	0.1 (after about 1 week)
BH2	0.8	0.3 (at the completion of BH)
BH3/Piezo.	0.8	0.06 (after 7 years of well installation)
BH4	0.8	0.4 (at the completion of BH)
BH5	0.8	0.6 (at the completion of BH)
BH6	0.7	0.6 (at the completion of BH)
BH7/Piezo.	0.8	0.2 (after 7 years of well installation)
BH8	0.8	0.3 (at the completion of BH)
BH9/Piezo.	0.8	0.09 (after 7 years of well installation)

It is however highly prudent that all footings and underground utilities be placed at elevations as high as possible to avoid penetration into wet native sandy deposit and required dewatering systems.

General guidelines for the placement and preparation of engineered fill are presented on **Appendix C**. A geotechnical reaction 100kPa at the Serviceability Limit States (SLS) and factored geotechnical resistance 150kPa at the Ultimate Limit States (ULS) can be used on engineered fill, provided that all requirements on **Appendix C** are adhered to. To reduce the risk of improperly placed engineered compacted fill, full-time supervision of the contractor is essential. Despite full time supervision, it has been found that contractors frequently bulldoze loose fill into areas and compact only the surface. The inspector, either busy on other portions of the site or absent during "off hours" will be unaware of this condition. For this reason, we cannot guarantee the performance of the engineered fill, and this guarantee must be the responsibility of the contractor. The owner and his representatives must accept the risk involved in the use of engineered fill and

offset this risk with the monetary savings of avoiding deep foundations. This potential problem must be recognized and discussed at a pre-construction meeting. Procedures can then be instigated to reduce the risk of settlement resulting from un-compacted fill.

In the areas where earth fill is required for site grading purposes, an engineered fill may be constructed below house foundations, roads, boulevards, etc.

The following is a recommended procedure for engineered fill:

1. Prior to site work involving engineered fill, a site meeting to discuss all aspects must be convened. The surveyor, contractor, design engineer and geotechnical engineer must attend the meeting. At this meeting, the limits of the engineered fill will be defined. The contractor must make known where all fill material will be obtained and samples must be provided to the geotechnical engineer for review, and approval before filling begins.
2. Detailed drawings indicating the lower boundaries as well as the upper boundaries of the engineered fill must be available at the site meeting and be approved by the geotechnical engineer.
3. The building footprint and base of the pad, including basements, garages, etc. must be defined by offset stakes that remain in place until the footings and service connections are all constructed. Confirmation that the footings are within the pad, service lines are in place, and that the grade conforms to drawings, must be obtained by the owner in writing from the surveyor and Orbit Engineering Limited. Without this confirmation no responsibility for the performance of the structure can be accepted by Orbit Engineering Limited. Survey drawing of the pre and post fill location and elevations will also be required.
4. The area must be stripped of all topsoil and weathered/disturbed materials. Subgrade must be proof rolled. Soft spots must be dug out. The stripped native subgrade must be examined and approved by Orbit Engineering Limited engineer prior to placement of fill.
5. The approved engineered fill must be compacted to 100% Standard SPMDD throughout. Granular Fill preferred. Engineered fill should not be placed (where it will support footings) during the winter months. Engineered fill compacted to 100% SPMDD will settle under its own weight approximately 0.5% of the fill height and the structural engineer must be aware of this settlement. In addition to the settlement of the fill, additional settlement due to consolidation of the underlying soils from the structural and fill loads will occur.
6. Full-time geotechnical inspection by Orbit Engineering Limited during placement of engineered fill is required. Work cannot commence or continue without the presence of the Orbit representative.
7. The fill must be placed such that the specified geometry is achieved. Refer to sketches for minimum requirements. Take careful note that the projection of the compacted pad beyond the footing at footing level is a minimum of 2m (**Appendix C**). The base of the compacted pad extends 2m plus the depth of excavation beyond the edge of the footing.

8. A geotechnical reaction of 100kPa (2000psf) may be used provided that all conditions outlined above are adhered to. A minimum footing width of 500mm (20 inches) is suggested and footings should be provided with nominal steel reinforcement.
9. All excavations must be done in accordance with the Occupational Health and Safety Regulations of Ontario.
10. After completion of the pad, a second contractor may be selected to install footings. All excavations must be backfilled under full time supervision by Orbit to the same degree as the engineered fill pad. Surface water cannot be allowed to pond in excavations or to be trapped in clear stone backfill. Clear stone backfill can only be used with the approval of Orbit.
11. After completion of compaction, the surface of the pad must be protected from disturbance from traffic, rain and frost.
12. If there is a delay in construction, the engineered fill pad must be inspected and accepted by the geotechnical engineer. The location of the structure must be reconfirmed that it remains within the pad.

The native soils are considered suitable for use as engineered fill, provided that they comprise no topsoils and rootlets and their moisture contents at the time of construction are at or near optimum. The silts are poorly graded soils and are very sensitive to their moisture contents. As such, they will be very difficult to handle and to compact, especially at wet conditions. Under unfavourable conditions, they may not be suitable for engineered fill as mentioned in Section 4.3.3.

4.5 House Foundation Conditions

The proposed house foundations can be supported on undisturbed native soils at 0.8m to 1.2m below the existing levels for a geotechnical reaction of 100kPa (2000psf) at the Serviceability Limit States (SLS) and a factored geotechnical resistance of 150kPa at the Ultimate Limit States (ULS). These values would be suitable for the use of normal spread footing foundations to support normal single family dwellings. Footings should be kept as high as possible to avoid penetrating into wet sandy soils.

Alternatively, the proposed structures can be supported by conventional spread and strip footings founded on engineered fill for a geotechnical reaction of 100kPa (2000psf) at the Serviceability Limit States (SLS) and a factored geotechnical resistance of 150kPa ULS. The engineered fill supporting footings should be constructed in accordance with the guidelines presented in **Appendix C**. Other requirements of engineered fill are given in Section 4.4.

Variations in the soil conditions are expected in between the borehole locations, and during construction, the soil bearing pressures should be confirmed by the Geotechnical Engineer.

The base of all footings must be inspected by this office to ensure of their placement on the competent native soil.

Foundations designed to the specified bearing values are expected to settle less than 25mm total and 20mm differential.

All footings exposed to seasonal freezing conditions must have at least 1.5m of soil cover for frost protection.

Where it is necessary to place footings at different levels, the upper footing must be founded below an imaginary 10 horizontal to 7 vertical line drawn up from the base of the lower footing. The lower footing must be installed first to help minimize the risk of undermining the upper footing.

It should be noted that the recommended bearing capacities have been calculated by Orbit Engineering Limited from the borehole information for the design stage only. The investigation and comments are necessarily on-going as new information of the underground conditions becomes available. For example, more specific information is available with respect to conditions between test pits and boreholes when foundation construction is underway. The interpretation between boreholes and the recommendations of this report must therefore be checked through field inspections provided by Orbit Engineering Limited to validate the information for use during the construction stage.

4.6 Floor Slab and Permanent Drainage

The floor slab can be supported by engineered fill, if engineered fill is used to support the foundations.

The weathered/disturbed sand and silt layer present on the site is not suitable for supporting the slab-on-grade. The floor slab can be supported on grade, provided all topsoil, existing weathered/disturbed and surficially softened or loose materials are removed, and the subgrade thoroughly proof rolled. Any loose spots or areas revealed from proof rolling must further be sub-excavated and replaced with imported Granular A and/or Granular B Type 2.

The imported granular material must meet the specifications defined in OPSS-1010-13. The existing weathered/disturbed soil free from topsoil and rootlets may be used to raise the grade, provided it is confirmed by a qualified geotechnical professional from Orbit at the time construction. The fill required to raise the grade must be placed in shallow lifts (each lift not more than 200mm) and compacted to at least 98 percent of Standard Proctor Maximum Dry Density (SPMDD).

A moisture barrier consisting of at least 200mm thick layer of well compacted 19mm clear crushed stone is recommended to place directly under the floor slab. The stone bed would act as a barrier and prevent capillary rise of moisture from the subgrade to the floor slab. This moisture barrier has been proven to be effective for conventional floor surfaces such as carpet, vinyl tile and ceramic tile. However, if special floor

coverings such as sheet P.V.C. with heat sealed seams, as is used in gymnasiums, is considered, either a high efficiency vapour barrier or venting may be required to prevent moisture accumulating between the concrete floor and the P.V.C. flooring.

The estimated modulus of subgrade reaction (k_s) equal to 25 MN/m^3 may be used for the design of slab-on-grade supported on native or structural fill soils, provided that the construction is in accordance with the recommendations provided herein. If structural fill (Granular A or B Type II) having minimum thickness of 300mm, this value can be increased to 30 MN/m^3. The estimated value provided above may need to be adjusted based on the structure size and locations of detail design.

The base floor slabs should not be tied to any load-bearing walls or columns unless they have been designed accordingly. Contraction/expansion joints should be provided for the slabs as required by the structural engineer.

If the base floor slab is more than about 200mm higher than the exterior grade, then perimeter drainage is not considered to be necessary. If the floor is lower, then use of a perimeter drainage system (**Drawing 13**) is recommended.

The perimeter and under floor drainage system shown on **Drawing 14** is recommended for the basement area along the entire perimeter. The first row of the underfloor weeper must be placed close to the perimeter wall. From there-on, the underfloor weepers should be placed in parallel rows not more than 8m centres one way. The placement of perimeter and underfloor drainage systems will be subjected to approval of concerned authorities having jurisdiction over the project site.

Where the exposed subgrade in the basements consists of cohesionless soil below the water table, all openings including the subgrade and permanent drainage systems must be covered or wrapped with filter fabric, typically a Class II non-woven textile with a filtration opening size (F.O.S.) of 0.1mm to 0.3mm. The design of permanent drainage systems should be reviewed by this office prior to the construction.

4.7 Earth Pressures

The lateral earth pressures acting on retaining walls (if any) may be calculated from the following expression:

$$p = K(\gamma h + q)$$

where:

p :	Lateral earth pressure in kPa acting at depth z
K :	Earth pressure coefficient equal to 0.4 for vertical walls and horizontal backfill used for permanent construction. Water pressure must be considered, if continuous wall drains are not used.
γ :	Unit weight of backfill, a value of 20.5 kN/m^3 may be assumed

z :	Depth to point of interest in meters
q :	Equivalent value of surcharge on the ground surface in kPa

The above expression assumes that the perimeter drainage system prevents the buildup of any hydrostatic pressure behind the wall.

4.8 Earthquake Considerations

Based on boreholes information and according to the 2012 Ontario Building Code (OBC 2012), the subject site seismic response for the proposed building structures can be classified as "Class D" (Table 4.1.8.4.A of OBC 2012). Accordingly, the foundation factors F_a can be obtained from Table 4.1.8.4.B and F_v from Table 4.1.8.4.C of the OBC for the design of the buildings.

Consideration can be given to conduct an earthquake site assessment with the use of in-situ testing of the seismic characteristics (i.e. Geophysical testing – Multi-channel Analysis of Surface Waves "MASW"), which can lead to an improved site classification (i.e., from Class D to Class C).

4.9 Corrosivity Evaluation

Three (3) selected samples were submitted for corrosivity analysis to assess the aggressiveness of soil. The test results will be presented in the final report.

4.10 Stormwater Infiltration

Grain size analysis were carried out on selected seven (7) soil samples at specified locations (as explained earlier in section 3.2 and presented in **Appendix B, Figure B1**).

For preliminary estimation purpose, the permeability of the native sandy silt till samples can be estimated using the following expression (Puckett et al, 1985, 1992) which is related to the typical clay size particle content from the results of grain size analyses:

$$k = 4.36 \times 10^{-3} \times e^{(-0.1975 \times \%clay)}$$

where:

k = permeability (cm/s);
% clay = percentage of clay size particles

The results are shown in **Table 4.3**, which show the range of permeability as 3.3E-04 to 2.9E-03 cm/sec.

Table 4.3 Estimated Permeability Coefficient for Native Soil Samples

Sample No.	Soil Type	Depth (m)	Permeability Coefficient, k (cm/sec)
BH1 – SS2	Native Sandy silt to silty sand	0.8 – 1.4	2.0E-03
BH1 – SS4	Native Sandy silt to silty sand	2.3 – 2.9	2.9E-03
BH1 – SS6	Native Sandy silt to silty sand	4.6 – 5.2	1.3E-03
BH3 – SS2	Native Sandy silt to silty sand till	0.8 – 1.4	1.3E-03
BH7 – SS3	Native Sandy silt to silty sand till	1.5 – 2.1	1.1E-03
BH9 – SS2	Native Sandy silt to silty sand till	0.8 – 1.4	3.3E-04
BH9 – SS3	Native Sandy silt to silty sand till	1.5 – 2.1	1.6E-03

The grain size gradations were also compared to published MOEE grain size curves for hydraulic conductivity's (Manual of policy, Procedures and Guidelines for Onsite Sewage Systems). Based on these criteria, the percolation time of the native soil samples may be estimated as 8 to 20 minutes per centimetre for materials with permeability range of 10^{-3} to 10^{-5} cm/sec and may be considered as medium to low permeability. Therefore, the subsurface native soil consisting of sandy silt to silty sand and/or till materials is not considered as free draining soil.

It should be noted that since the groundwater level at this site is near the surface. Therefore it is recommended that if any stormwater infiltration system is implemented, the base of infiltration trench at least 0.6m above the groundwater elevation at the site to provide sufficient water flow gradient.

4.11 Stormwater Management Pond (SWM)

4.11.1 General

If a SWM facility is planned for this site, it may be in cut, with excavated wall slopes of 3 horizontal to 1 vertical or flatter. The borehole log results indicate that beneath the topsoil, weathered/disturbed sand and silt was encountered to depth 1.2m, and sandy silt to silty sand and/ or till deposit to explored depth 6.7m.

The groundwater levels in the piezometers were measured on Apr 7, 2017 (after 1 week of installation) at approximate depth range of 0.1 to 2.1m below the existing grade.

It is recommended that the base of management pond (if applicable) should be at least 0.6m above the stabilized groundwater level at the site.

4.11.2 Construction of SWM Pond

The results of the borehole investigation indicate that the pond base is likely to comprise the native till deposit. Based on the sieve and hydrometer analysis results, the permeability of the native soils is generally estimated to be on the order of 10^{-3} to 10^{-5} cm/sec (Error! Reference source not found.). Therefore, due to the presence of relatively permeable soils which are likely to comprise the pond bottom, a pond liner is recommended to retain a permanent pool level in the pond.

The base of pond and side slopes should be inspected during construction and water seepage conditions (e.g., presence of water bearing and relatively pervious layers / zones) should be assessed by a qualified geotechnical engineer. These areas should be protected by a special filter blanket, such as well graded gravel or sand and gravel layer, or synthetic filter fabric manufactured for this purpose, as directed by the geotechnical engineer during construction.

Based on the discussion in Section 4.4, no major problems with groundwater are anticipated for excavation to approximate depth of 0.5m below the existing ground surface. Seepage from wet sandy and silty layers should be expected but in all likelihood water seepage should be controllable by the use of conventional pumping from collection sumps and ditches for most excavations. Contractors should be prepared to employ more elaborate dewatering procedures if the flow becomes a problem. We recommend that test pit should be dug prior to excavation activity to confirm the groundwater levels.

The final slope surface and all bare or exposed areas (where applicable) should be provided with suitable ground cover or erosion protection. The slope surface should be provided with a thin layer of topsoil (minimum 100mm thick) and should be hydro-seeded with a grass mixture and mulch. If seeded, during the first 2 to 3 years, the surface cover of topsoil and seeding may require periodic maintenance on slopes, due to surface erosion until the vegetation becomes well established.

All excavations must be carried out in accordance with the most recent Occupational Health and Safety Act (OHSA). In accordance with OHSA, the compact to dense cohesionless deposits above the water table can be classified as Type 3 soil and very loos to loose deposits as type 4. Cohesionless soils below the water table can also be classified as Type 4.

As a general rule, the excavations in Type 3 soil can be carried out using minimum side slopes of (1 to 1.5)H : 1V. The excavations in Type 4 soils will require at a minimum, flatter side slopes of 3H to 1V.

4.11.3 Liner Consideration

The liner may consist of a natural soil material (such as clay or clayey silt) or a synthetic membrane liner (such as a High Density Polyethylene, Geo-synthetic Clay Liner, or PVC). A natural soil liner may be preferable based on the following considerations:

- Low permeability clayey silt materials may be available locally for the construction of the liner.
- A clay liner is readily constructed using locally available construction equipment and manpower.
- A synthetic liner requires more elaborate design and construction considerations with respect to fabrication and protection of the completed liner.

However, a synthetic liner would perform satisfactorily and could be considered if a suitable and sufficient clay source were not available.

It is recommended that the minimum liner thickness be 0.5m, and that the liner be inspected on an annual basis, to deal with these considerations.

The liner must be constructed of low permeability materials (clayey silt or silty clay) in order to perform adequately and to provide a liner bulk permeability on the order of 1×10^{-7}cm/s. The liner material should consist of clean mineral soil. The grain size distribution of the liner material must conform to the following:

- No particle greater than 100mm dimension
- Not greater than 15 percent of the material larger than 4.8mm (No. 4 sieve)
- Minimum of 35 percent of the material finer than 0.08mm (i.e., passing No. 200 sieve)
- Minimum 15 percent finer than 0.002mm (clay size)
- Not greater than 5% organic content, with no visible roots or topsoil.

Also for the clay liner material, the plasticity index should not be less than 15, liquid limit should not be less than 30 and not greater than 60, and plastic limit should not be less than 11 and not greater than 30.

A strict control and monitoring of the liner material must be maintained to collect samples to verify its composition based on laboratory test results and to identify any variation in the material. The liner material must be placed at water contents 2 to 4 percent wet of the optimum moisture content. This is required to ensure that the material is compacted to a homogenous mass, and does not remain as distinct "clods" or "clumps". The liner should be constructed in thin lifts (not exceeding 150mm thick) and be heavily compacted to a minimum of 95 percent SPMDD. Liner materials should not contain any frozen soil should the construction proceeds under winter conditions. Also, adequate protection against frost penetration must be provided if required (e.g. straw bales, tarping, heating). The clay liners may be subject to developing desiccation cracks during and after installation if left exposed to dry environment. This can be prevented by placing 0.6m to 0.9m of drainage blanket, protective cover or synthetic cover on top of the liner.

It is recognized that a broad range of soil materials will be suitable for a clay liner (i.e., will meet the specifications noted above). It is recommended that contractors bidding on the project provide the results of testing, to indicate the following:

Notes
1. This drawing is the exclusive property of CAPES Engineering Ltd. The reproduction of any part without express written consent of this Corporation is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. CAPES Engineering Ltd. accepts no responsibility for interpretation of third party information, contractor to verify all third party information prior to construction.
5. This is not a plan of survey. Any and all representation of property boundaries are approximate only.

No	Issue / Revision	Date	Auth
1	ISSUED FOR FSR	19/01/14	CC
2	REVISED FUNCTIONAL SERVICING REPORT	25/08/25	CC

NOTE:
TOPOGRAPHIC SURVEY INFORMATION PREPARED BY CC TATHAM AND JOETOPO CAD AND SURVEYING. INFORMATION SHOWN APPORXIMATELY HEREON FOR REFERENCE PURPOSES ONLY.
BOUNDARY SURVEY INFORMATION PREPARED BY MARTIN KNISLEY OLS, AND SHOWN APPROXIMATELY HEREON. THIS IS NOT A PLAN OF SURVEY
BENCHMARK: NAIL IN HYDRO POLE, NORTH SIDE OF MARGARET ST., ELEV - 220.008.

LICENSED PROFESSIONAL ENGINEER
C. CAPES
100056104
AUG. 25, 2025
PROVINCE OF ONTARIO

Client
MAMTA HOMES
44 ASTER DRIVE
WASAGA BEACH, ON

CAPES ENGINEERING
355310 BLUE MOUNTAINS - EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0
TEL: 705-994-4818

MAMTA HOMES STAYNER

GEOTECHNICAL RECOMMENDATIONS

Designed	Checked	Date	Drawing No.
K. GRIFFIN	C. CAPES	19/01/14	C9
Project No. 2018-060		Rev No. 2	
Scale NOT TO SCALE			

- The location (source) of the clay material
- Verification of the uniformity of the material
- Demonstration that sufficient material is available for the project
- Laboratory testing to demonstrate that the material meets the minimum specifications noted above.

The liner construction must be conducted under the full time supervision of a qualified geotechnical engineer.

Alternatively, as noted before, a synthetic liner (such as HDPE, Geosynthetic Clay Liner or PVC) may be used. Manufacturer's specifications and recommendations must be referred for the design and construction of a synthetic liner.

4.11.4 Slope Protection and Erosion Control

The following slope protection measures should be considered in the design of the stormwater management pond:

- Site development and construction activities should be conducted in a manner which does not result in overloading or surface erosion on the slope. Final site grading and drainage (including surface drainage) should be designed to prevent direct concentrated or channelized runoff from flowing directly over the slopes.
- The slope layout and slope angle should not be altered without prior consultation with Orbit. Any stockpile of materials, construction equipment, temporary and permanent structures should not be placed on the slope or within 5m of the slope crest.
- As a good slope protection practice, the pond slopes should be inspected by a qualified geotechnical engineer each season for including but not limited to the following. Any slope defective area that may affect the slope safety should be repaired immediately by appropriate techniques.
  i. Any slope movement, slope surface erosion or leakage of water-carrying services, and to ensure good slope maintenance conditions.
  ii. Inspection of liner surface for discontinuities or holes as a result of burrowing animals, vandalism, settlement or the like.
  iii. Removal of unwanted vegetation (tree seedlings and the like) from the pond base.

Preliminary Geotechnical Investigation – Proposed Residential Development – 209 Margaret Street, Stayner, Ontario

5 GENERAL COMMENTS

The recommended bearing capacities and the corresponding founding elevations would need to be confirmed by the representative of Orbit during construction. It should be noted that the recommended bearing capacities have been calculated by Orbit from the borehole information for the design stage only. The investigation and comments are necessarily on-going as new information of the underground conditions becomes available. For example, more specific information is available with respect to conditions between boreholes when foundation construction is underway. The interpretation between boreholes and the recommendations of this report must therefore be checked through field inspections provided by Orbit to validate the information for use during the construction.

In this regard, Orbit should be retained for a general review of the final design and specifications to verify that this report has been properly interpreted and implemented. If not accorded the privilege of making this review, Orbit will assume no responsibility for interpretation of the recommendations in the report.

The comments given in this report are intended only for the guidance of design engineers. The number of boreholes required to determine the localized underground conditions between boreholes affecting construction costs, techniques, sequencing, equipment, scheduling, etc., would be much greater than has been carried out for design purposes. Contractors bidding on or undertaking the works should, in this light, decide on their own investigations, as well as their own interpretations of the factual borehole results, so that they may draw their own conclusions as to how the subsurface conditions may affect them.

Preliminary Geotechnical Investigation – Proposed Residential Development – 209 Margaret Street, Stayner, Ontario

6 CLOSURE

We trust that the information contained in this report is satisfactory. Should you have any questions, please do not hesitate to contact this office.

For and on behalf of Orbit,

LICENSED PROFESSIONAL ENGINEER
A. MUNEEB
100553264
Jul 25, 2025
PROVINCE OF ONTARIO

Ahmad Muneeb, M Sc., PMP, P Eng.
Senior Engineer

Reviewed by

LICENSED PROFESSIONAL ENGINEER
A.A.A. Ahmed
100183630
Jul 25, 2025
PROVINCE OF ONTARIO

Aly Ahmed, Ph.D., P.Eng., QPESA
Senior Principal Engineer

Notes
1. This drawing is the exclusive property of CAPES Engineering Ltd. The reproduction of any part without express written consent of this Corporation is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. CAPES Engineering Ltd. accepts no responsibility for interpretation of third party information, contractor to verify all third party information prior to construction.
5. This is not a plan of survey. Any and all representation of property boundaries are approximate only.

No	Issue / Revision	Date	Auth
1	ISSUED FOR FSR	19/01/14	CC
2	REVISED FUNCTIONAL SERVICING REPORT	25/08/25	CC

NOTE:

TOPOGRAPHIC SURVEY INFORMATION PREPARED BY CC TATHAM AND JOETOPO CAD AND SURVEYING. INFORMATION SHOWN APPORXIMATELY HEREON FOR REFERENCE PURPOSES ONLY.

BOUNDARY SURVEY INFORMATION PREPARED BY MARTIN KNISLEY OLS, AND SHOWN APPROXIMATELY HEREON. THIS IS NOT A PLAN OF SURVEY

BENCHMARK: NAIL IN HYDRO POLE, NORTH SIDE OF MARGARET ST., ELEV - 220.008.

LICENSED PROFESSIONAL ENGINEER
C. CAPES
100056104
AUG. 25, 2025
PROVINCE OF ONTARIO

Client
MAMTA HOMES
44 ASTER DRIVE
WASAGA BEACH, ON

CAPES ENGINEERING
355310 BLUE MOUNTAINS - EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0
TEL: 705-994-4818

MAMTA HOMES STAYNER

GEOTECHNICAL RECOMMENDATIONS

Designed	Checked	Date	Drawing No.
K. GRIFFIN	C. CAPES	19/01/14	C10
Project No. 2018-060		Rev No. 2	
Scale NOT TO SCALE			

File: C:\CE\Capes Engineering Dropbox\Projects\CAD\2018-060 Mamta Homes\Drawings\03_ProductionDwg\2018-060 Servicing Plan.dwg Date Plotted: August 25, 2025 - 11:25 AM