

#### NOTES:

- GENERAL:**
  - THE DESIGN, FABRICATION AND INSTALLATION OF PILES SHALL BE GOVERNED BY THE FOLLOWING CODES, STANDARD AND REGULATIONS:
    - CSA G40.21 STRUCTURAL QUALITY STEEL. (A36 STEEL WITH 44KSI MINIMUM YIELD STRENGTH)
    - 2012 ONTARIO BUILDING CODE.
    - CSA W48-18 FILLER METALS AND ALLIED MATERIAL FOR METAL ARC WELDING. (AWS A5.28)
    - CSA W47.1 CERTIFICATION OF COMPANIES FOR FUSION WELDING OF STEEL STRUCTURES. (COMPANY WELDERS CERTIFICATION)
    - ASTM A252 WELDED AND SEAMLESS STEEL PIPE PILES.
    - ASTM A53 WELDED AND SEAMLESS STEEL PIPE.
    - PROVINCIAL HEALTH AND SAFETY REGULATIONS.
  - PILE SHAFT DIAMETER, WALL THICKNESS AND HELIX PLATE THICKNESS SHALL NOT BE LESS THAN MINIMUM SPECIFIED IN PILE SCHEDULE.
- MATERIALS:**
  - STEEL PIPE PILE MATERIALS SHALL CONFORM TO ASTM A500, GRADE C.
  - HELICES SHALL CONFORM TO ASTM 44W.
  - HELICES SHALL BE WELDED TO THE PIPE SECTION USING A CONTINUOUS FILLET WELD ON BOTH SIDES OF THE HELIX-PIPE CONNECTION. HELICES SHALL HAVE MINIMUM THICKNESS AS SPECIFIED.
  - SACRIFICIAL STEEL THICKNESS HAS BEEN PROVIDED TO ACCOUNT FOR CORROSION. AS PER ONTARIO BUILDING CODE SECTION 4.2.3.10.
  - ALL WELDS SHALL BE MIN. 6MM FILLET WELDS, UNLESS NOTED OTHERWISE.
  - WELD TENSILE STRENGTH = 70KSI.
  - WELDING ELECTRODES SHALL CONFORM TO CSA W48-18. ELECTRODE DESIGNATION B-G 49A 3 C1 S6 (AWS AWS 5.18 CLASS ER70S-6 / ASME SFA 5.18 CLASS ER70S-6)
- DESIGN:**
  - PILES CAPACITY GIVEN IN THIS SHEET SHOULD BE USED FOR THE PRELIMINARY GUIDE AND ESTIMATION ONLY.
  - PILE MUST BE INSTALLED BY A PROFESSIONAL CONTRACTOR.
  - PILES MUST HAVE SUFFICIENT EMBEDMENT DEPTH TO RESIST FROST ACTION.
- CONSTRUCTION:**
  - PILES SHALL BE INSTALLED OPEN ENDED; AND ENDS SHALL BE CUT AS 45 DEGREES.
  - PILES SHALL BE INSTALLED CONTINUOUSLY WITHOUT INTERRUPTION TO THE MINIMUM EMBEDMENT DEPTH AND MINIMUM INSTALLATION TORQUE INDICATED ON THE PILE SCHEDULE.
  - PILE INSTALLATION RECORDS SHALL BE DOCUMENTED BY A QUALIFIED PILING INSPECTOR REPRESENTING THE GEOTECHNICAL ENGINEER.
  - FABRICATION SHALL BE CARRIED OUT IN ACCORDANCE WITH STANDARD PRACTICES AND APPLICABLE CODES.
  - PILE EMBEDMENT DEPTHS INDICATED IN THE PILE SCHEDULE ARE HELIX DEPTH FROM THE EXISTING GRADE. STICKUP AND TIP PROJECTION LENGTHS SHALL BE ADDED TO THE PILE LENGTH AS REQUIRED.
  - INSTALL PILES VERTICALLY AND ENSURE THE RATE OF ADVANCEMENT INTO THE SOIL PER REVOLUTION IS EQUAL TO THE HELIX PITCH.
- TOLERANCES:**
  - PILE SHALL BE INSTALLED TO THE FOLLOWING TOLERANCES:
    - TOP OF PILE WITHIN 75MM OUT OF ALIGNMENT.
    - NOT MORE THAN 2% INCLINATION FROM VERTICAL.
  - ANY GAP AROUND INSTALLED PILE MUST BE BACKFILLED WITH CRUSHED STONES OR APPROVED EQUIVALENT.
  - WHERE PILES DEVIATE FROM ABOVE TOLERANCE AND DESIGN REQUIREMENTS, THE CONDITION OF THE FOUNDATION SHALL BE ASSESSED BY THE ENGINEER AND WHERE REQUIRED, CORRECTIONS SHALL BE MADE.
- ACCEPTANCE:**
  - BOTH MINIMUM TOP HELIX EMBEDMENT DEPTH AND MINIMUM INSTALLATION TORQUE MUST BE ACHIEVED FOR PILE ACCEPTANCE.

HELICAL PILE SCHEDULE (FOR PRELIMINARY GUIDE ONLY)1									
PILE TYPE	FACTORED ULTIMATE AXIAL CAPACITY KN (KIP)2		AXIAL STRUCTURAL CAPACITY KN (KIP)4	SHAFT SIZE MM (INCH)	HELIX SIZE MM (INCH)	TOP HELIX MIN. EMBEDMENT	MAX. TORQUE KN-M (FT-LBS)	A	B
	COMPRESSION	TENSION3							
M1	50 (11)	35 (8)	220 (49)	60.3x3.91 (2 3⁄8x3⁄8)	203x9.53 (8x3⁄8)	SEE NOTE 5	5 (3,700)	60.3 (2.375")	12.7 (0.500")
M2	85 (19)	60 (13)	280 (63)	76.2x4.76 (3x1⁄16)	254x9.53 (10x3⁄8)	SEE NOTE 5	8.3 (6,200)	76.2 (3.000")	12.7 (0.500")
M3	130 (29)	90 (20)	430 (97)	88.9x5.51 (3.5x7⁄32)	305x9.53 (12x3⁄8)	SEE NOTE 5	14.8 (10,900)	76.2 (3.500")	19.1 (0.750")

- NOTES:
- THIS SHEET MUST BE USED AS A PRELIMINARY GUIDE ONLY. ENGINEERED SHOP DRAWINGS SHOULD BE PREPARED BY A PROFESSIONAL ENGINEER FOR ANY PROJECT USING THESE MATERIALS.
  - FACTORED ULTIMATE COMPRESSION CAPACITY INCLUDES RESISTANCE FACTOR OF 0.4. ACTUAL PILE CAPACITY MUST BE DETERMINED BY A PROFESSIONAL ENGINEER BASED ON SOIL CONDITIONS, FINAL EMBEDMENT DEPTH AND FINAL INSTALLATION TORQUE.
  - TENSIONAL CAPACITY PROVIDED IN THIS TABLE SHOULD BE USED FOR PRELIMINARY ESTIMATION ONLY. FINAL TENSIONAL CAPACITY OF A PILE DEPENDS ON EMBEDMENT DEPTH AND SOIL CONDITIONS AND MUST BE DETERMINED BY A PROFESSIONAL ENGINEER.
  - AXIAL STRUCTURAL CAPACITY INCLUDES A RESISTANCE FACTOR OF 0.85 AND DOES NOT INCLUDE STRENGTH REDUCTION FACTOR TO ACCOUNT FOR STEEL CORROSION.
  - MINIMUM HELIX EMBEDMENT DEPTH SHOULD BE DETERMINED BASED ON THE FROST DEPTH. IF PILE IS SUBJECTED TO TENSIONAL LOAD, A HIGHER EMBEDMENT DEPTH MIGHT BE REQUIRED.

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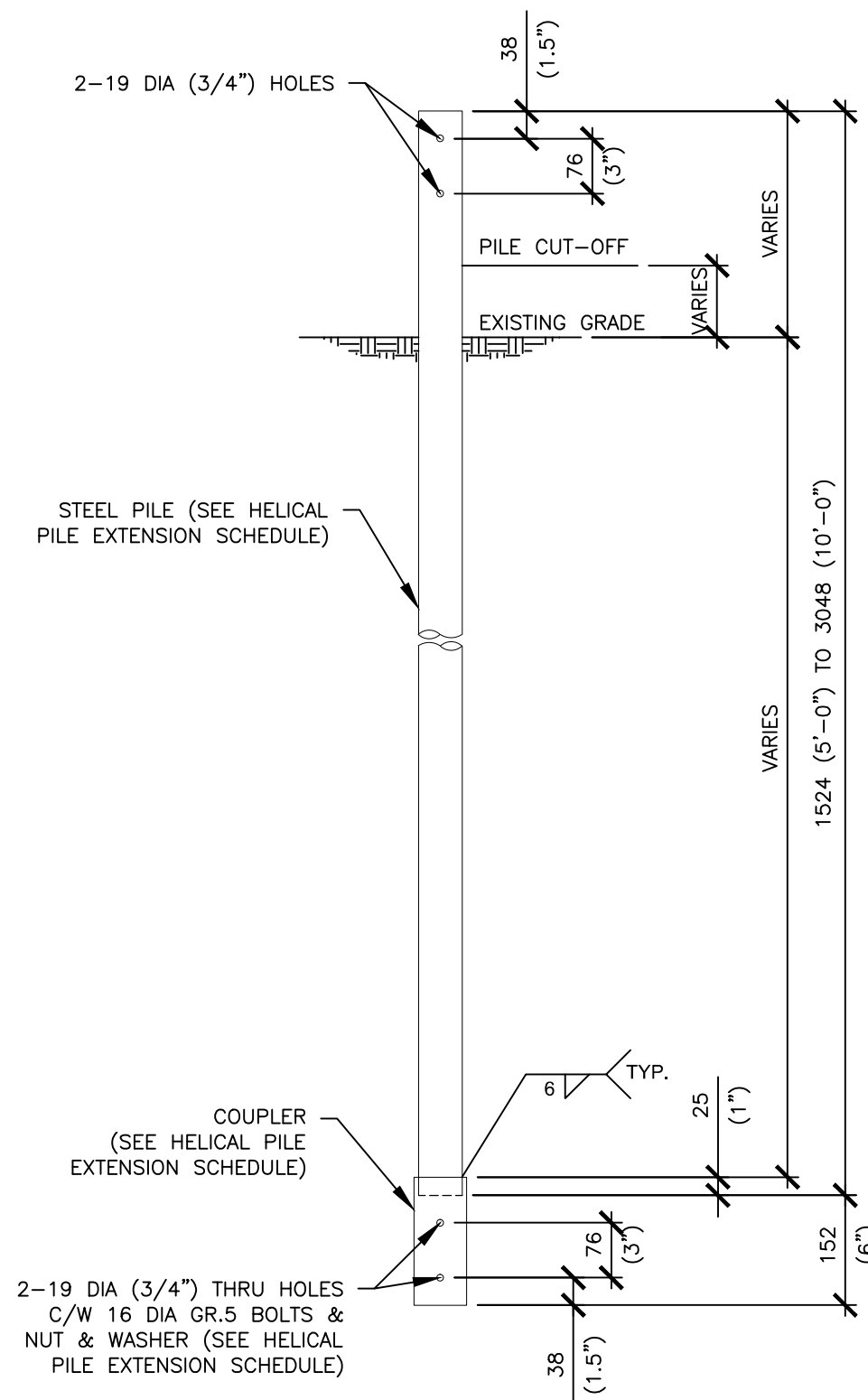


MAScore INC.  
BRANTFORD, ON

DRAWING TITLE

MAScore HELICAL PILE  
SPECIFICATIONS

DATE  
Feb 14th. 2023



NOTES:

1. **GENERAL:**
  - 1.1 THE DESIGN, FABRICATION AND INSTALLATION OF PILES SHALL BE GOVERNED BY THE FOLLOWING CODES, STANDARD AND REGULATIONS:
    - 1.1.1 CSA G40.21 STRUCTURAL QUALITY STEEL. (A36 STEEL WITH 44KSI MINIMUM YIELD STRENGTH)
    - 1.1.2 CSA W48-18 FILLER METALS AND ALLIED MATERIAL FOR METAL ARC WELDING. (AWS A5.28)
    - 1.1.3 CSA W47.1 CERTIFICATION OF COMPANIES FOR FUSION WELDING OF STEEL STRUCTURES. (COMPANY WELDERS CERTIFICATION)
    - 1.1.4 ASTM A252 WELDED AND SEAMLESS STEEL PIPE PILES.
    - 1.1.5 ASTM A53 WELDED AND SEAMLESS STEEL PIPE.
    - 1.1.6 PROVINCIAL HEALTH AND SAFETY REGULATIONS.
  - 1.2 PILE SHAFT DIAMETER, WALL THICKNESS AND HELIX PLATE THICKNESS SHALL NOT BE LESS THAN MINIMUM SPECIFIED IN PILE SCHEDULE.
2. **MATERIALS:**
  - 2.1 STEEL PIPE PILE MATERIALS SHALL CONFORM TO ASTM A500, GRADE B OR ASTM A252 (GRADE 3) MINIMUM.
  - 2.2 HELICES SHALL CONFORM TO CSA-G40.21. GRADE 300W. (A36 STEEL WITH 44KSI MINIMUM YIELD STRENGTH)
  - 2.3 HELICES SHALL BE WELDED TO THE PIPE SECTION USING A CONTINUOUS FILLET WELD ON BOTH SIDES OF THE HELIX-PIPE CONNECTION. HELICES SHALL HAVE MINIMUM THICKNESS AS SPECIFIED.
  - 2.4 SACRIFICIAL STEEL THICKNESS HAS BEEN PROVIDED TO ACCOUNT FOR CORROSION. AS PER ONTARIO BUILDING CODE SECTION 4.2.3.10.
  - 2.5 ALL WELDS SHALL BE MIN. 6MM FILLET WELDS, UNLESS NOTED OTHERWISE.
  - 2.6 WELD TENSILE STRENGTH = 70KSI.
  - 2.7 WELDING ELECTRODES SHALL CONFORM TO CSA W48-18. ELECTRODE DESIGNATION B-G 49A 3 C1 S6 (AWS AWS 5.18 CLASS ER70S-6 / ASME SFA 5.18 CLASS ER70S-6)
3. **DESIGN:**
  - 3.1 PILES CAPACITY GIVEN IN THIS SHEET SHOULD BE USED FOR THE PRELIMINARY GUIDE AND ESTIMATION ONLY.
  - 3.2 PILE MUST BE INSTALLED BY A PROFESSIONAL CONTRACTOR.
  - 3.3 PILES MUST HAVE SUFFICIENT EMBEDMENT DEPTH TO RESIST FROST ACTION.
4. **CONSTRUCTION:**
  - 4.1 PILES SHALL BE INSTALLED OPEN ENDED; AND ENDS SHALL BE CUT AS 45 DEGREES.
  - 4.2 PILES SHALL BE INSTALLED CONTINUOUSLY WITHOUT INTERRUPTION TO THE MINIMUM EMBEDMENT DEPTH AND MINIMUM INSTALLATION TORQUE INDICATED ON THE PILE SCHEDULE.
  - 4.3 PILE INSTALLATION RECORDS SHALL BE DOCUMENTED BY A QUALIFIED PILING INSPECTOR REPRESENTING THE GEOTECHNICAL ENGINEER.
  - 4.4 FABRICATION SHALL BE CARRIED OUT IN ACCORDANCE WITH STANDARD PRACTICES AND APPLICABLE CODES.
  - 4.5 PILE EMBEDMENT DEPTHS INDICATED IN THE PILE SCHEDULE ARE HELIX DEPTH FROM THE EXISTING GRADE. STICKUP AND TIP PROJECTION LENGTHS SHALL BE ADDED TO THE PILE LENGTH AS REQUIRED.
  - 4.6 INSTALL PILES VERTICALLY AND ENSURE THE RATE OF ADVANCEMENT INTO THE SOIL PER REVOLUTION IS EQUAL TOT HE HELIX PITCH.
5. **TOLERANCES:**
  - 5.1 PILE SHALL BE INSTALLED TO THE FOLLOWING TOLERANCES:
    - 5.1.1 TOP OF PILE WITHIN 75MM OUT OF ALIGNMENT.
    - 5.1.2 NOT MORE THAN 2% INCLINATION FROM VERTICAL.
  - 5.2 ANY GAP AROUND INSTALLED PILE MUST BE BACKFILLED WITH CRUSHED STONES OR APPROVED EQUIVALENT.
  - 5.3 WHERE PILES DEVIATE FROM ABOVE TOLERANCE AND DESIGN REQUIREMENTS, THE CONDITION OF THE FOUNDATION SHALL BE ASSESSED BY THE ENGINEER AND WHERE REQUIRED, CORRECTIONS SHALL BE MADE.
6. **ACCEPTANCE:**
  - 6.1 BOTH MINIMUM TOP HELIX EMBEDMENT DEPTH AND MINIMUM INSTALLATION TORQUE MUST BE ACHIEVED FOR PILE ACCEPTANCE.

HELICAL PILE EXTENSION SCHEDULE (FOR PRELIMINARY GUIDE ONLY) <sup>1</sup>						
PILE TYPE	FACTORED ULTIMATE AXIAL CAPACITY KN (KIP) <sup>2</sup>		AXIAL STRUCTURAL CAPACITY KN (KIP) <sup>4</sup>	SHAFT SIZE MM (INCH)	COUPLER SIZE MM (INCH)	MINIMUM BOLTS LENGTH MM (INCH)
	COMPRESSION	TENSION <sup>3</sup>				
M1E	31 (7)	20 (4.5)	220 (49)	60.3 x 3.91 (2 3/8 OD x 3/32)	37 OD x 4.76 WT (2 7/8 OD x 7/16 WT)	101.6 (4)
M2E	67 (15)	56 (12.5)	280 (63)	76.2 x 4.76 (3 x 3/16)	88.9 OD x 4.76 WT (3 1/2 OD x 3/16 WT)	127 (5)
M3E	94 (21)	58 (13)	430 (97)	88.9 x 5.51 (3.5 x 7/32)	101.6 OD x 5.74 WT (4 OD x 7/32 WT)	152.4 (6)

- NOTES:
1. THIS SHEET MUST BE USED AS A PRELIMINARY GUIDE ONLY. ENGINEERED SHOP DRAWING SHOULD BE PREPARED BY A PROFESSIONAL ENGINEER FOR ANY PROJECT USING THESE MATERIALS.
  2. FACTORED ULTIMATE COMPRESSION CAPACITY INCLUDES RESISTANCE FACTOR OF 0.4. ACTUAL PILE CAPACITY MUST BE DETERMINED BY A PROFESSIONAL ENGINEER BASED ON SOIL CONDITIONS. FINAL EMBEDMENT DEPTH AND FINAL INSTALLATION TORQUE.
  3. TENSIONAL CAPACITY PROVIDED IN THIS TABLE SHOULD BE USED FOR PRELIMINARY ESTIMATION ONLY. FINAL TENSION CAPACITY OF A PILE DEPENDS ON EMBEDMENT DEPTH AND SOIL CONDITION AND MUST BE DETERMINED BY A PROFESSIONAL ENGINEER.
  4. AXIAL STRUCTURAL CAPACITY INCLUDES A RESISTANCE FACTOR OF 0.85 AND DOES NOT INCLUDE STRENGTH REDUCTION FACTOR TO ACCOUNT FOR STEEL CORROSION.
  5. MINIMUM HELIX EMBEDMENT DEPTH SHOULD BE DETERMINED BASED ON THE FROST DEPTH. IF PILE IS SUBJECTED TO TENSIONAL LOAD, A HIGHER EMBEDMENT DEPTH MIGHT BE REQUIRED.

FOR INFORMATION ONLY



MASCORE INC.  
BRANTFORD, ON

DRAWING TITLE

MASCORE HELICAL PILE EXTENSION  
SPECIFICATIONS

DATE

NOVEMBER 2019