GENERAL NOTES

1. ANY DEVIATION FROM THE CONDITIONS SHOWN ON THESE DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO COMMENCING WORK. REPORT ANY INCONSISTENCIES BEFORE PROCEEDING WITH THE WORK. ALL DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS NOTED OTHERWISE. DO NOT SCALE THESE DRAWINGS.
3. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH DRAWING NO. C–5 AND C7 TITILED "DETAILS" AND "GRADING PLAN" RESPECTIVELY FOR PROJECT NAME "OFFICE & WAREHOUSE 2167 MCGEE SIDE ROAD, OTTAWA, ONTARIO", DATED AUGUST 10, 2023, PREPARED BY D.B. GRAY ENGINEERING INC.
4. STRUCTURAL DESIGN COMPLETED IN CONFORMANCE WITH THE 2012 ONTARIO BUILDING CODE [2022 AMD.]. THESE DRAWINGS HAVE BEEN COMPLETED WITH RESPECT TO STRUCTURAL REQUIREMENTS ONLY. NON–STRUCTURAL DETAILS ARE SHOWN FOR REFERENCE ONLY AND SHALL BE CONFIRMED BY OTHERS.
5. THESE DRAWINGS SHOW THE COMPLETED STRUCTURE. TEMPORARY BRACING SHALL BE EMPLOYED WHENEVER NECESSARY TO WITHSTAND ALL LOADS TO WHICH THE STRUCTURE MAY BE SUBJECT TO DURING ERECTION AND SUBSEQUENT CONSTRUCTION. TEMPORARY BRACING SHALL REMAIN IN PLACE AS LONG AS REQUIRED FOR THE SAFETY AND INTEGRITY OF THE STRUCTURE. THE CONTRACTOR SHALL HAVE THE SOLE RESPONSIBILITY FOR THE DESIGN, ERECTION, OPERATION, MAINTENANCE, AND REMOVAL OF TEMPORARY SUPPORTS, EXCAVATION SHORING, STRUCTURES, AND FACILITIES, AND THE DESIGN AND EXECUTION OF CONSTRUCTION METHODS REQUIRED IN THEIR USE.
6. ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE ONTARIO HEALTH AND SAFETY ACT (OHSA) AND ITS REGULATIONS.

DESIGN LOADS

1. DESIGN LOADS ARE IN ACCORDANCE WITH PART 4 OF THE 2012 ONTARIO BUILDING CODE [2022 AMD.] AND THE CANADIAN FOUNDATION ENGINEERING MANUAL (CFEM), FOURTH EDITION.
2. DEAD LOAD:
   CONCRETE UNIT WEIGHT = 24 kN/m^3;
   RETAINED SOIL UNIT WEIGHT = 22 kN/m^3;
   WATER UNIT WEIGHT = 9.81 kN/m^3.
3. LATERAL EARTH PRESSURE:
   MAXIMUM ACTIVE EARTH PRESSURE = $(Y_{soil}–Y_{water})*ha*Ka$;
   Φ = 30°;
   $\delta = (2/3)*\Phi$ = 20°;
   ha = VARIES;
   Ka = 0.3;
   MAXIMUM PASSIVE EARTH PRESSURE = $(Y_{soil}–Y_{water})*hp*Kp$;
   Φ = 30°;
   $\delta = (2/3)*\Phi$ = 20°;
   hp = VARIES;
   Kp = 6.1;
4. SEISMIC (MONONOBE–OKABE METHOD) – (kh = PGA = 0.32, kv = 0):
   ACTIVE EARTH PRESSURE (SEISMIC) = $(Y_{soil}–Y_{water})*ha*Kae$;
   Kae = 0.6;
   PASSIVE EARTH PRESSURE (SEISMIC) = $(Y_{soil}–Y_{water})*hp*Kpe$;
   Kpe = 4.0.
5. LATERAL WATER PRESSURE:
   MAXIMUM WATER PRESSURE = $Y_{water} * hw$

CONCRETE

1. GENERAL:
   1.1. CONCRETE DESIGN COMPLETED IN ACCORDANCE WITH CSA A23.3 "DESIGN OF CONCRETE STRUCTURES".
   1.2. CONCRETE MATERIALS AND PLACEMENT PROCEDURES ARE TO BE COMPLETED IN ACCORDANCE WITH CSA A23.1 "CONCRETE MATERIALS AND METHODS OF CONCRETE CONSTRUCTION".
   1.3. CONCRETE TESTING IS TO BE COMPLETED IN ACCORDANCE WITH CSA A23.2 "TEST METHODS AND STANDARD PRACTICES FOR CONCRETE"
   1.4. SUBMIT REINFORCING STEEL SHOP DRAWINGS TO AEI FOR REVIEW AND APPROVAL. SHOP DRAWINGS SHALL BE PREPARED, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO PRIOR TO FABRICATION. SHOP DRAWING REVIEWS WILL BE CONDUCTED FOR GENERAL CONFORMANCE WITH THE CONTRACT DOCUMENTS ONLY.
2. MATERIALS:
   2.1. CONCRETE PROPERTIES:
   2.1.1. IN ACCORDANCE WITH CSA A23.1/A23.2/A23.3.
   2.1.2. MAXIMUM NOMINAL AGGREGATE SIZE SHALL BE 20mm.
   2.1.3. CONCRETE MIX DESIGN SHALL CONFORM THE THE FOLLOWING REQUIREMENTS:

ELEMENT	MINIMUM 28 DAY COMPRESSIVE STRENGTH	EXPOSURE CLASS	NOTES
WALLS & FOOTINGS	35 MPa	C1	

   2.1.4. THE CONTRACTOR AND CONCRETE SUPPLIER SHALL ENSURE THAT THE PLASTIC AND HARDENED MIX PROPERTIES MEET SITE REQUIREMENTS FOR PLACING, FINISHING AND OBTAINING THE SPECIFIED PERFORMANCE LEVELS.
   2.1.5. THE CONCRETE SUPPLIER SHALL BE CERTIFIED BY THE READY MIXED CONCRETE ASSOCIATION OF ONTARIO.
   2.1.6. ALL CONCRETE SHALL BE NORMAL DENSITY (2300 kg/m^3) UNLESS NOTED OTHERWISE.
3. EXECUTION:
   3.1. FORMWORK DESIGN, FABRICATION, ERECTION AND MATERIAL TO CSA S269.1 AND A23.1.
   3.2. CONCRETE SHALL BE MIXED, PLACED, AND CURED IN ACCORDANCE WITH CSA A23.1 AND CSA A23.3. MAINTAIN RECORDS OF POURED CONCRETE ITEMS. RECORD DATE, LOCATION OF POUR, QUANTITY, AIR TEMPERATURE AND TEST SAMPLES TAKEN.
   3.3. WHEN THE AIR TEMPERATURE IS BELOW 10°C, CONCRETE SHALL BE KEPT AT A TEMPERATURE OF NOT LESS THAN 10°C OR MORE THAN 25° C WHILE BEING MIXED OR PLACED, AND MAINTAINED AT A TEMPERATURE OF NOT LESS THAN 10°C FOR 72 HOURS AFTER PLACING.
   3.4. DO NOT POUR CONCRETE OVER A FROZEN SUBGRADE.
   3.5. ALL CONCRETE SHALL BE CONSOLIDATED WITH INTERNAL VIBRATORS AND FINISHED TO THE ARCHITECT'S REQUIREMENTS.
   3.6. DO NOT INCORPORATE CALCIUM CHLORIDE INTO THE CONCRETE MIX.
   3.7. SLAG REPLACEMENT RATIOS UP TO 60% ARE PERMITTED IN THE MIX DESIGN, AND SHALL BE PROPORTIONED BASED ON THE CONCRETE APPLICATION.
   3.8. EDGES OF CONCRETE THAT ARE TO BE PERMANENTLY EXPOSED SHALL INCLUDE A 12 mm CHAMFER.
4. QUALITY CONTROL:
   4.1. THE CONTRACTOR SHALL ENSURE THAT ALL REINFORCING STEEL IS INSPECTED AND APPROVED BY THE ENGINEER UPON COMPLETION AND BEFORE PLACING OF CONCRETE. DO NOT CLOSE FORMS UNTIL REINFORCEMENT HAS BEEN APPROVED BY THE ENGINEER.

EARTHWORK & FOUNDATIONS

1. GENERAL:
   1.1. ALL EXCAVATIONS AND EARTHWORK SHALL BE COMPLETED IN CONFORMANCE WITH THE FOLLOWING:
   1.1.1. ONTARIO OCCUPATIONAL HEALTH AND SAFETY ACT (OHSA) AND ITS REGULATIONS;
   1.2. RETAINING WALL FOOTINGS HAVE BEEN DESIGNED FOR A SOIL BEARING CAPACITY OF 125 kPa (ULS), 75 kPa (SLS).
2. MATERIALS:
   2.1. FOUNDATION WALL BACKFILL MATERIAL TO BE DESIGNED BY A GEOTECHNICAL ENGINEER.
   2.2. RIGID INSULATION:
   2.2.1. FOOTING INSULATION (IF APPLICABLE): OWENS CORNING FOAMULAR 400 XPS RIGID INSULATION, OR EQUIVALENT.
3. EXECUTION:
   3.1. LOCATE ALL PUBLIC AND PRIVATE UTILITIES AND BURIED STRUCTURES PRIOR TO EXCAVATION.
   3.2. SHALLOW TEMPORARY EXCAVATIONS SHALL HAVE THEIR SIDES SLOPED AT 1 HORIZONTAL TO 1 VERTICAL OR FLATTER, AS INDICATED IN THE GEOTECHNICAL REPORT.
   3.3. PROTECT EXPOSED EXCAVATION FROM FREEZING TEMPERATURES USING SUITABLE CONSTRUCTION TECHNIQUES. SUBMIT PROTECTION PLANS TO THE ENGINEER FOR REVIEW AND APPROVAL, AS REQUIRED.
   3.4. ALL FOOTINGS SHALL BEAR ON APPROVED NATIVE SOILS.
   3.5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PLACING BACKFILL WITHOUT ANY DAMAGE TO THE FOUNDATION WALL. BACKFILL ON EACH SIDE OF THE STRUCTURE SHALL BE COMPLETED SIMULTANEOUSLY. DO NOT BACKFILL AROUND STRUCTURE UNTIL CONCRETE HAS REACHED A MINIMUM OF 75% OF ITS DESIGN STRENGTH.
10. QUALITY CONTROL:
   10.1. THE CONTRACTOR IS RESPONSIBLE FOR HAVING ALL FOOTING SURFACES INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER PRIOR TO PLACING CONCRETE.
   10.2. THE CONTRACTOR IS RESPONSIBLE FOR HAVING A GEOTECHNICAL ENGINEER TO CONDUCT/REVIEW SEEPAGE ANALYSIS WHERE REQUIRED.
   10.3. THE CONTRACTOR IS RESPONSIBLE FOR HAVING THE COMPACTION OF GRANULAR FILL TESTED AND APPROVED BY A GEOTECHNICAL ENGINEER.

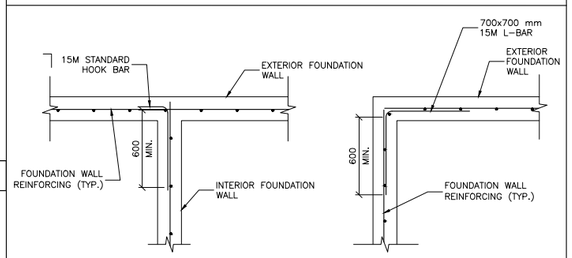
REINFORCING STEEL

1. REINFORCING STEEL SHALL CONFORM TO THE FOLLOWING STANDARDS:
   1.1. DEFORMED BARS – CSA G30.18, GRADE 400W
2. BARS MARKED CONTINUOUS SHALL BE TERMINATED USING STANDARD HOOKS AT THE ENDS AND SPLICED USING CLASS 'B' LAP SPLICES.
3. ALL REBAR HOOKS SHALL BE STANDARD LENGTH 90° OR 180° HOOKS.
4. ALL STIRRUPS SHALL BE CLOSED HOOPS UNLESS NOTED OTHERWISE.
5. WHERE BARS OF DIFFERENT SIZES ARE LAPPED IN TENSION, SPLICE LENGTH MAY BE EQUAL TO THE LARGER OF THE SMALLER BAR'S TENSION LAP SPLICE, OR THE LARGER BAR'S DEVELOPMENT LENGTH.
6. ALL REINFORCING STEEL SHALL BE CLEAN, FREE OF LOOSE SCALE, OIL, DIRT OR ANY OTHER DELETERIOUS MATERIAL.
7. MINIMUM REINFORCING STEEL CLEAR SPACING SHALL BE IN ACCORDANCE WITH CSA A23.3 AND SHALL BE THE LARGER OF 1.4 x (DIAMETER OF BAR OR NOMINAL MAXIMUM AGGREGATE SIZE). THIS ALSO APPLIES TO PARALLEL REINFORCEMENT PLACED IN TWO OR MORE LAYERS.
8. CONCRETE REINFORCING WORK, PLACEMENT, TOLERANCES TO CSA A23.1/A23.3.
9. THE MINIMUM CLEAR COVER TO REINFORCING STEEL SHALL BE AS FOLLOWS:

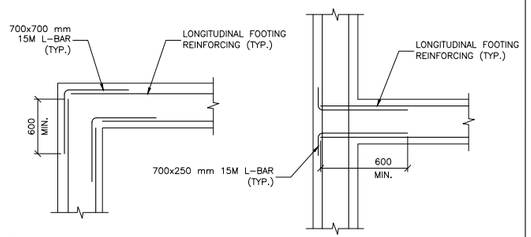
ELEMENT	CLEAR COVER (mm)
WALLS & FOOTINGS	CAST AGAINST EARTH: 75 ± 25 OTHERWISE: 60 ± 20

10. REINFORCING STEEL TENSION TAP SPLICES SHALL HAVE THE MINIMUM LAP LENGTHS AS FOLLOWS:

TENSION LAP SPLICE LENGTHS (mm) [CLASS B]		
BAR SIZE	f'c=35 MPa	
	BOTTOM	TOP
10M	320	420
15M	480	620
20M	640	830
25M	990	1290



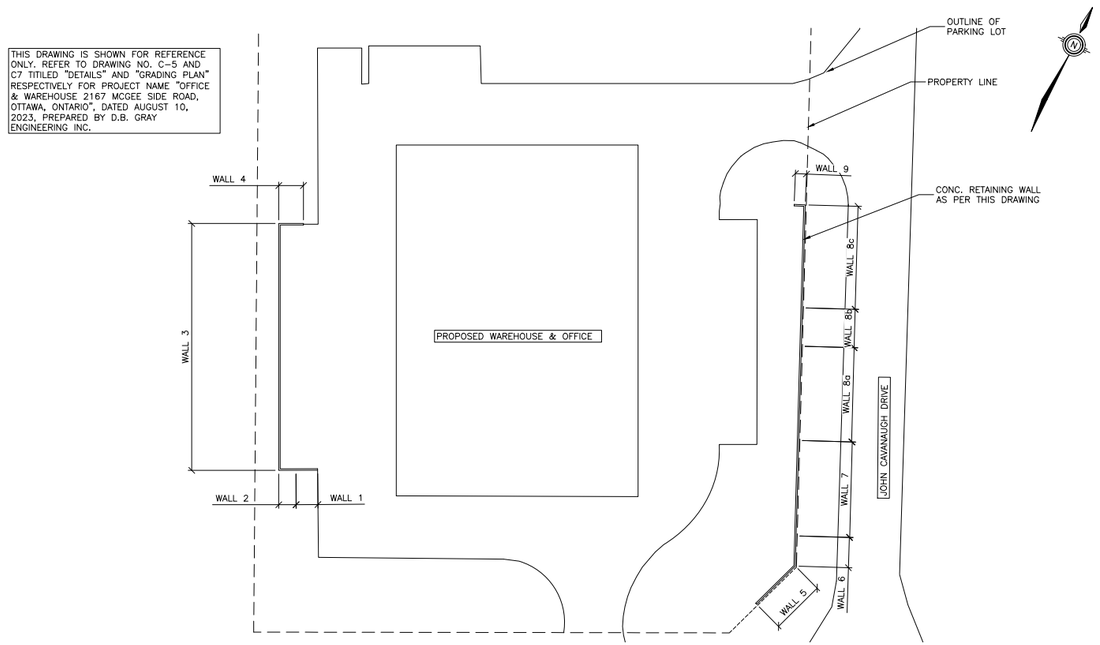
SINGLE LAYER OF REINFORCING



NOTE:

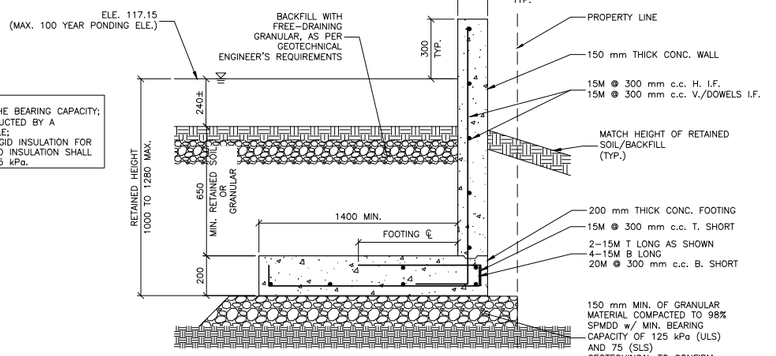
1. VERTICAL DOWELS NOT SHOWN FOR CLARITY. VERTICAL DOWELS SHALL BE AS PER FOOTING SCHEDULE.

TYPICAL FOOTING REINFORCING DETAIL

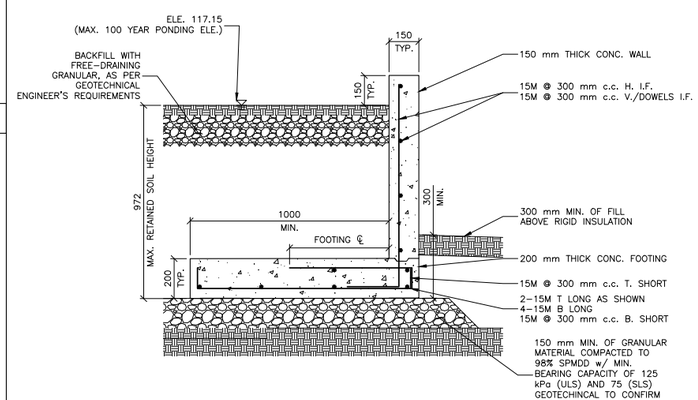


1 / SA–1 CONCRETE RETAINING WALLS – PLAN
NTS

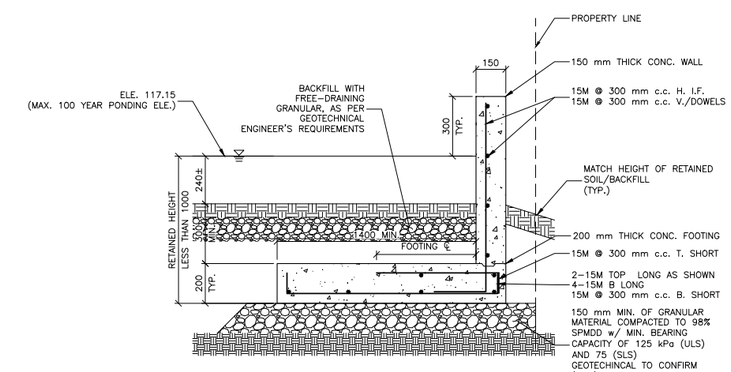
NOTE:
- GEOTECHNICAL TO REVIEW AND CONFIRM THE BEARING CAPACITY;
- SEEPAGE ANALYSIS TO BE REVIEWED/CONDUCTED BY A GEOTECHNICAL ENGINEER WHERE APPLICABLE;
- GEOTECHNICAL TO REVIEW AND PROVIDE RIGID INSULATION FOR FROST PROTECTION WHERE REQUIRED. RIGID INSULATION SHALL HAVE MIN. COMPRESSIVE STRENGTH OF 125 kPa.



3 / SA–1 RETAINING WALL DETAIL AND REINFORCING STEEL – SECTION (2)
1:15
APPLIES TO WALL 5, 6, AND 8b
RETAINED HEIGHT 1000 to 1280 MAX.



2 / SA–1 RETAINING WALL DETAIL AND REINFORCING STEEL – SECTION (1)
1:15
APPLIES TO WALL 1–4



4 / SA–1 RETAINING WALL DETAIL AND REINFORCING STEEL – SECTION (3)
1:15
APPLIES TO WALL 7, 8a, 8c, AND 9
RETAINED HEIGHT OF LESS THAN 1000

client
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project
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A / B — A detail no. no. de détail; B location drawing no. sur dessin no.

scale AS NOTED

revisions		date
1	ISSUED FOR BUILDING PERMIT	12–01–2024
0	ISSUED FOR CLIENT REVIEW	10–01–2024

drawing
GENERAL NOTES & RETAINING WALL PLAN, DETAILS AND REINFORCING STEEL

stamp
LICENSED PROFESSIONAL ENGINEER H. MAKKE 100503353 12.01.2024 PROVINCE OF ONTARIO

designed	drawn	reviewed	approved
Y.M.	Y.M.	T.B.	H.M.

date	project number	drawing number
January 12, 2024	7033	SA–1

ANSI D (22.00" x 34.00")