stephenson ENGINEERING
A SALAS O'BRIEN COMPANY

Yaniv Geler
President and Founder
1 Rosetta Street Inc. C/O LEV DEVELOPMENTS INC
700 Lawrence Avenue West, Suite 375
West office Tower, Toronto, ON
M6A 3B4

via email: ygeler@levliving.com

May 29, 2023

Re: Project Name: 1 Rosetta Street Condominiums, Georgetown, ON
Project Number: 20180721

Dear Yaniv,

Please find enclosed selected calculations and structural drawings for the proposed new crash wall located at the above-mentioned project. As required, only passenger trains at a max speed of 50mph operate along the line of interest. Refer also to the Appendix A for structural drawing sheets with details of the completed design. *We have updated Structural sketches to address AECOM comments. Please refer to notes on drawings. Background architectural ground floor is also updated.*

Calculations have been performed in accordance with AECOM document titled "Submission Guidelines for crash walls", CW guide Rev2, revised July 29, 2014. Values for passenger train weights, angle of impact, and height of load application were obtained from, "Guidelines for Proximity to Railway Operations", prepared for the Federation of Canadian Municipalities and the railway association of Canada, May 2013.

The AECOM guideline proposes 2 methods for crash wall design, noted as "Method 1" and "Method 2". In order to provide a more economical system our design has been performed in accordance with the energy balance approach "Method 2".

As there is only passenger train traffic on the tracks in question, we consider only load cases 3 and 4 noted in the document as follows:

1. Passenger Train Load Case 3 – Glancing Blow
2. Passenger Train Load Case 4 – Single Car Impact

Derivation of Design loading:

.1 Passenger Train Load Case 3 - Glancing Blow

- 2 cars at 134263 kg/each
  6 cars at 67132 kg/each
  Total = 671318 kg

- Impact angle θ_G, taken as 10°

- Initial speed Vo = 50 mph = 22.35 m/s

  a) Calculate speed of derailed equipment at Impact V_G

$$V_G = \sqrt{V_o^2 + 2a\left(\frac{d_{cl} - 1.625}{\sin\theta_G}\right)} \quad m/s$$

Where d_{cl} is distance from the crash wall to the centerline of tracks in meters.
Vo = Initial speed
θ_G = Impact angle

$$V_G = \sqrt{V_o^2 + 2a\left(\frac{d_{cl}-1.625}{\sin\theta_G}\right)} \quad m/s$$

$$a = -9.8(0.25 + G) = -9.8(0.25 + 0) = -2.45\ m/s$$

$$V_G = \sqrt{22.35^2 + 2(-2.45)\left(\frac{19.33-1.625}{\sin 10}\right)} = 0\ m/s$$

- Based on the given initial velocity of the passenger train (Vo = $50 mph$ = $22.35 m/s$) and its angle of impact (10°), the train will stop moving after derailing at a distance 19.33m from the centerline of tracks. Therefore, this load case will not be considered because d_{cl} is 25.22m which is greater than 19.33m.

.2 Passenger Train Load Case 4 – Single Car Impact

- Single car weighing 67132 kg impacting the wall as it undergoes rotation about its center. The angle of rotation at impact is given by

$$\theta_f = asin\left(\frac{d_{cl}}{13}\right)$$

Where d_{cl} is the distance from the crash wall to the centerline of the track in meters.

- This load case will not be considered because d_{CL} is greater than 13m.

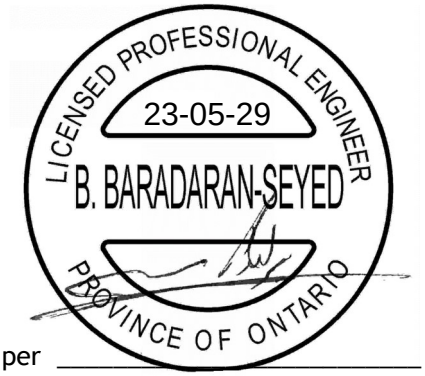
Since none of the two load cases in the design of the crash wall need to be considered, we will use the minimum requirement for the height and thickness of the crash wall as per AECOM guidelines which are 2.135m and 0.45m respectively. Crash wall reinforcement has been determined based on the applied loads as a retaining wall.

Podium levels connected to crash wall, are separated from residential tower by transfer beams and sliding bearings along expansion joint; these areas are allocated for parking spaces. Expansion joints and sliding bearings are introduced to mitigate noise and vibration as well as impact transmission to the residential spaces. See structural plan and section 1 on drawing S6-01.

Exterior face of crash wall shall receive anti-graffiti treatment per Metrolinx requirements.

We assume the above information is adequate for assessing the crash wall requirements for this project, however, should additional information be required please do not hesitate to contact the undersigned.

Yours very truly,
STEPHENSON ENGINEERING LIMITED



per _____

Babak Baradaran-Seyed, M.Sc., P.Eng
Senior Associate
Babak.Baradaran-seyed@salasobrien.com

APPENDIX A
STRUCTURAL DRAWINGS

stephenson ENGINEERING
A SALASO'BRIEN COMPANY
2550 Victoria Park Ave. Suite 602
Toronto ON M2J 5A9
Tel: (416) 635 9970
www.stephenson-eng.com
www.salasobrien.com

1 ROSETTA ST. CONDOMINIUMS

GEORGETOWN, ON

LICENSED PROFESSIONAL ENGINEER
23-05-03
B. BARADARAN-SEYED
PROVINCE OF ONTARIO

READ THIS DRAWING IN CONJUNCTION WITH LATEST STRUCTURAL DRAWINGS. ALL MATERIALS AS LATEST STRUCTURAL DRAWINGS U/N.

Job No.	20180721
Date	22-09-30
Drwn/Chkd By	BB
Sheet No.	S1-01

PROPOSED LOCATION OF EXPANSION/ISOLATION JOINT ON LEVELS UNDERGROUND LV.1 GROUND AND 2ND FLOORS

450 CRASH WALL

200 SOUND BARRIER WALL

PROPERTY OF METROLINX

SETBACK FROM CENTERLINE OF LAYBY RAIL TRACKS 24383

SETBACK FROM CENTERLINE OF CURRENT OUTERMOST RAIL TRACKS (TO BE REMOVED) 30000

SETBACK FROM CENTERLINE OF FUTURE OUTERMOST RAIL TRACKS 30455

SETBACK FROM CENTERLINE OF OUTERMOST ACTIVE RAIL WAY TRACKS 45222

CANADIAN NATIONAL RAILWAYS
CONCRETE PLATFORM
RAIL TRACK
RAIL TRACK

GROUND FLOOR

5/3/2023 10:11:51 AM

stephenson ENGINEERING
A SALAS O'BRIEN COMPANY
2550 Victoria Park Ave. Suite 602
Toronto ON M2J 5A9
Tel: (416) 635 9970
www.stephenson-eng.com
www.salasobrien.com

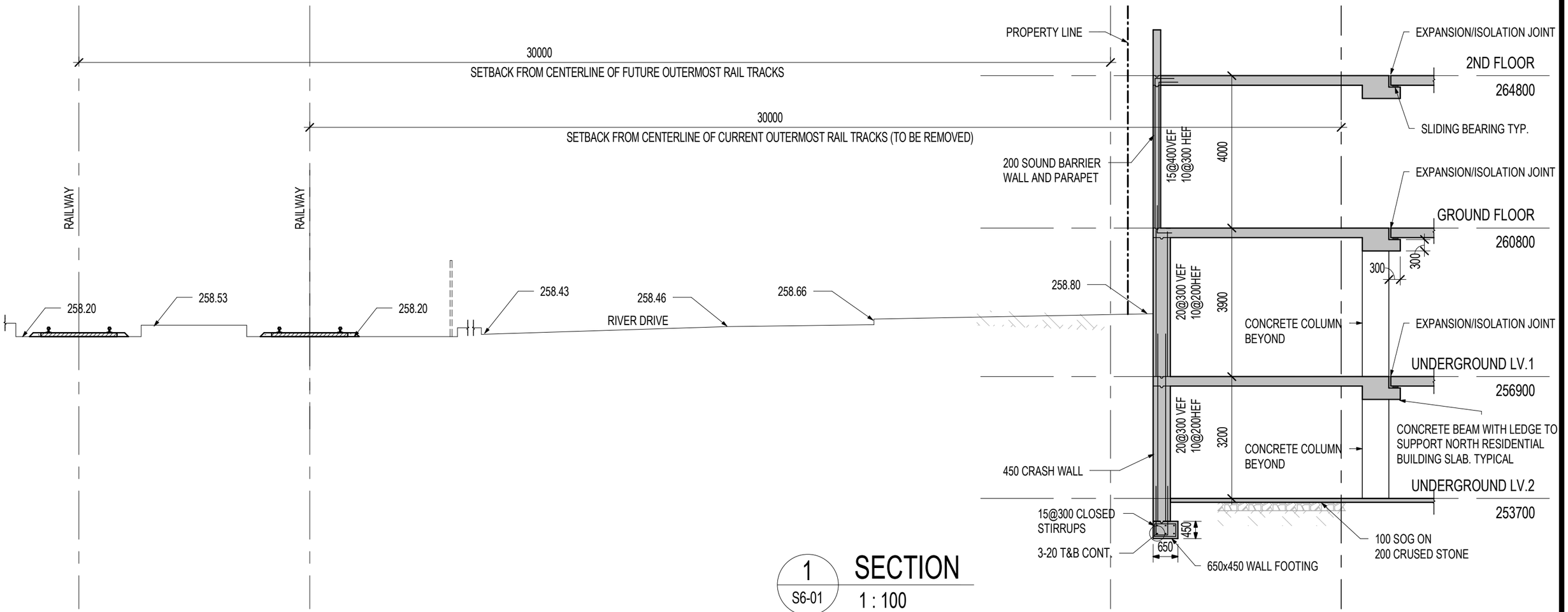
1 ROSETTA ST. CONDOMINIUMS

GEORGETOWN, ON

LICENSED PROFESSIONAL ENGINEER
23-05-03
B. BARADARAN-SEYED
PROVINCE OF ONTARIO

READ THIS DRAWING IN CONJUNCTION WITH LATEST STRUCTURAL DRAWINGS. ALL MATERIALS AS LATEST STRUCTURAL DRAWINGS U/N.

Job No.	20180721
Date	22-09-30
Drwn/Chkd By	BB
Sheet No.	S6-01



1 / S6-01 SECTION
1 : 100

5/3/2023 10:11:51 AM

stephenson ENGINEERING
A SALAS O'BRIEN COMPANY
2550 Victoria Park Ave. Suite 602
Toronto ON M2J 5A9
Tel: (416) 635 9970
www.stephenson-eng.com
www.salasobrien.com

1 ROSETTA ST. CONDOMINIUMS

GEORGETOWN, ON

LICENSED PROFESSIONAL ENGINEER
23-05-03
B. BARADARAN-SEYED
PROVINCE OF ONTARIO

READ THIS DRAWING IN CONJUNCTION WITH LATEST STRUCTURAL DRAWINGS. ALL MATERIALS AS LATEST STRUCTURAL DRAWINGS U/N.

Job No. 20180721
Date 22-09-30
Drwn/Chkd By BB
Sheet No. S8-01

CAST-IN-PLACE CONCRETE NOTES — A03.1

1. GENERAL

1.1. PROVIDE ALL LABOUR, MATERIALS, TOOLS AND EQUIPMENT REQUIRED TO CARRY OUT THE WORK.

1.2. REFER ALSO TO GENERAL NOTES, NOTES UNDER PLANS AND SCHEDULES, TYPICAL DETAILS AND SPECIFICATION.

2. PRODUCTS

2.1. PORTLAND CEMENT, WATER AND AGGREGATES SHALL CONFORM TO CSA STANDARD A23.1.

2.2. PROVIDE AN APPROVED WATER REDUCING ADDITIVE IN ALL CONCRETE. PROVIDE AN APPROVED AIR ENTRAINING ADDITIVE IN ALL CONCRETE WHICH WILL BE EXPOSED TO A FREEZE/THAW CYCLE AND/OR THE ACTION OF DE-ICING SALT. ADMIXTURES SHALL CONFORM TO CSA STANDARD A23.1.

2.3. FORMWORK SHALL CONFORM TO CSA STANDARD A23.1 AND CSA STANDARD S269.1 AND FALSEWORK SHALL CONFORM TO CSA S269.1.

2.4. IF SO INSTRUCTED, THE DESIGNS FOR THE FORMWORK SHALL BE SUBMITTED FOR REVIEW BEFORE CONSTRUCTION. FORMWORK DRAWINGS AND DESIGN SHALL BEAR THE STAMP OF A LICENSED PROFESSIONAL ENGINEER.

2.5. PROVIDE SLAB AND BEAM FORMS WITH AN UPWARD CAMBER AS INDICATED ON PLANS THUS ⊕ mm: WHERE CAMBERS ARE NOT NOTED ON PLANS, CAMBER SLABS AND BEAMS FOR SPAN/500 AT INTERIOR BAYS, AND CANTILEVER LENGTH/250 AT CANTILEVER. CAMBER BOTH THE UNDERSIDE AND TOP OF CONCRETE IN A PARABOLIC PROFILE, WHILE MAINTAINING THE INDICATED STRUCTURAL THICKNESS OF MEMBERS.

2.6. PROVIDE STANDARD ADJUSTABLE MASONRY ANCHOR SLOTS FOR ALL MASONRY FACING OR ABUTTING CONCRETE FACES.

2.7. PROVIDE AND/OR INSTALL STANDARD ADJUSTABLE INSERTS AND ALL OTHER CAST-IN INSERTS AS REQUIRED BY THE ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATION.

2.8. REINFORCING STEEL UNLESS SPECIFICALLY NOTED, SHALL BE DEFORMED BARS CONFORMING TO CAN/CSA -G30.18-M GRADE 400 (58000 PSI).

2.9. WELDED WIRE FABRIC TO BE SUPPLIED IN FLAT SHEETS ONLY, UNLESS APPROVED OTHERWISE.

2.10. REINFORCING SHALL BE DETAILED, BENT, PLACED AND SUPPORTED TO CONFORM TO ACI DETAILING MANUAL AND THE MANUAL OF STANDARD PRACTICE PUBLISHED BY THE REINFORCING STEEL INSTITUTE OF CANADA.

2.11. DRY-PACK GROUT TO BE 1 PART PORTLAND CEMENT TO 1 1/2 PARTS SAND TO 2 PARTS OF 8 mm PEA GRAVEL WITH ONLY SUFFICIENT WATER TO DAMPEN MIXTURE. COMPRESSIVE STRENGTH 50MPa AT 28 DAYS.

2.12. NON-SHRINK GROUT TO BE AN APPROVED PRE-MIXED PROPRIETARY PRODUCT.

2.13. PROVIDE APPROVED EXTRUDED PVC WATERSTOPS OF SIZE AND STYLE INDICATED, WITH PRE-WELDED CORNERS AND INTERSECTIONS. SEE ALSO TYPICAL DETAILS.

2.14. CURING AND SEALING COMPOUNDS WHERE APPROVED FOR USE TO CONFORM TO ASTM STANDARD C309. GENERALLY ALL CONCRETE SURFACES ARE TO BE SEALED UNLESS NOTED OTHERWISE. COMPOUNDS ARE TO BE COMPATIBLE WITH APPLIED FINISHES.

2.15. SHEAR REINFORCEMENT AT SLAB CONNECTION AS SHOWN ON DRAWINGS AND DETAILS, SHALL BE STUDRAILS® AS MANUFACTURED BY DECON®. THE COMPLETE AND FINISHED STUDRAILI® SHALL BE ICC ES EVALUATED AND WELDING SHALL TAKE PLACE IN A ICC ES APPROVED AND AUDITED FACILITY. STUDRAILS® SHALL CONFORM TO THE LATEST UPDATE OF ASTM A1044.

3. EXECUTION

3.1. MINIMUM COMPRESSIVE STRENGTH FOR CONCRETE @ 28 DAYS SHALL BE AS NOTED ON THE DRAWINGS (20MPa MINIMUM).

3.2. SLUMP AT THE POINT OF DISCHARGE SHALL BE CONSISTENT AT 80 mm ±30mm (3" ±1 1/8") UNLESS NOTED OTHERWISE. GREATER SLUMPS ARE NOT ACCEPTABLE.

3.3. CONCRETE MIXING, TRANSPORTATION, HANDLING AND PLACING SHALL CONFORM TO CSA STANDARD A23.1.

3.4. CONSTRUCTION JOINTS FOR WALLS ARE BASED UPON VERTICAL JOINTS AT A MAXIMUM SPACING OF 10000mm (30'-0") .UNLESS CONTROL JOINTS ARE PROVIDED AS PER DETAIL CFW02. TOTAL LENGTH OF POUR TO BE DISCUSSED WITH ENGINEER PRIOR TO PROCEEDING.

3.5. CONSTRUCTION JOINTS FOR WALLS, SLABS, AND BEAMS NOT SHOWN ON THE DRAWINGS SHALL BE APPROVED BY THE STRUCTURAL CONSULTANT BEFORE CONSTRUCTION. GENERALLY JOINTS IN SLABS SHALL BE AT RIGHT ANGLES TO THE SPANS, AT MID-SPAN IF POSSIBLE AND CLEAR OF SUPPORTS AND POINT LOADS.

3.6. INSERTS, FRAME-OUTS, SLEEVES, BRACKETS, CONDUITS AND FASTENING DEVICES, SHALL BE INSTALLED AS REQUIRED BY THE DRAWINGS AND SPECIFICATIONS IN A MANNER THAT SHALL NOT IMPAIR THE STRUCTURAL STRENGTH OF THE SYSTEM, BE SO INSTALLED THAT THEY SHALL NOT REQUIRE THE CUTTING, BENDING, OR DISPLACEMENT OF THE REINFORCING OTHER THAN AS SHOWN ON THE TYPICAL DETAILS.

3.7. ELECTRICAL CONDUIT SHALL NOT PASS THROUGH A COLUMN, SHALL NOT BE LARGER IN OUTSIDE DIAMETER THAN 1/3 SLAB THICKNESS OR WALL OR BEAM IN WHICH IT IS EMBEDDED, SHALL NOT BE SPACED CLOSER THAN 3 DIAMETERS ON CENTRE UNLESS APPROVED AND HAVE A MINIMUM CONCRETE COVER OF 25 mm (1") AND UNLESS SPECIFICALLY PERMITTED OTHERWISE, SHALL NOT RUN HORIZONTALLY IN A CONCRETE WALL.

3.8. OPENINGS AND DRIVEN FASTENERS REQUIRED IN THE CONCRETE AFTER THE CONCRETE IS PLACED SHALL BE APPROVED BY THE STRUCTURAL CONSULTANT BEFORE PROCEEDING.

3.9. FINISHING, REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR REQUIRED FINISH TO EXPOSED CONCRETE. ALL HONEYCOMBING SHALL BE CUT OUT AND FILLED. FLOOR FINISHES SHALL BE AS REQUIRED BY THE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS AND SHALL CONFORM TO CSA STANDARD A23.1.

3.10. TOLERANCES FOR PLACING STRUCTURAL CONCRETE, REINFORCING STEEL, CAST-IN HARDWARE AND FOR FLOOR AND ROOF FINISHES SHALL BE AS SPECIFIED IN CSA STANDARD A23.1.

3.11. MINIMUM REINFORCING FOR ANY CONCRETE WALL TO BE AS SHOWN ON TYPICAL DETAIL FOR CONCRETE WALLS.

3.12. MINIMUM REINFORCING FOR ANY SUSPENDED SLAB SHALL BE TEMPERATURE BARS BOTTOM EACH WAY PLUS 10M @ 400 (16") DOWELS 600x600 (2'-0" x 2'-0") TOP AROUND PERIMETER. REFER TO TYPICAL DETAIL OF ONE WAY SLABS.

3.13. PERFORM SURVEYS OF SLABS AS INDICATED IN SPECIFICATIONS.

stephenson ENGINEERING
A SALAS O'BRIEN COMPANY
2550 Victoria Park Ave. Suite 602
Toronto ON M2J 5A9
Tel: (416) 635 9970
www.stephenson-eng.com
www.salasobrien.com

1 ROSETTA ST. CONDOMINIUMS

GEORGETOWN, ON

LICENSED PROFESSIONAL ENGINEER
23-05-03
B. BARADARAN-SEYED
PROVINCE OF ONTARIO

READ THIS DRAWING IN CONJUNCTION WITH LATEST STRUCTURAL DRAWINGS. ALL MATERIALS AS LATEST STRUCTURAL DRAWINGS U/N.

CAST-IN-PLACE CONCRETE NOTES

A03.2

3.14. GENERAL REQUIREMENTS FOR CUTTING AND DRILLING INTO CONCRETE

(A) DO NOT DRILL INTO, CORE THROUGH, SAW-CUT OR CHIP THE CONCRETE STRUCTURE WITHOUT WRITTEN AUTHORIZATION BY THE STRUCTURAL CONSULTANT.

(B) UNLESS NOTED OTHERWISE, PRIOR TO CUTTING, CORING OR DRILLING INTO THE CONCRETE STRUCTURE, LOCATE EXISTING CONCRETE REINFORCEMENT AND EMBEDDED SERVICES AT THAT LOCATION USING SUITABLE SCANNING DEVICE (I.E. X-RAYS, GROUND PENETRATION RADAR (GPR), LOCAL CHIPPING OF SLAB - ONLY WHERE APPROVED BY THE STRUCTURAL CONSULTANT, ETC), AS AUTHORIZED BY PROPERTY MANAGER IF APPLICABLE

(C) GPR SCANNING MUST BE DONE BY TRAINED TECHNICIANS WITH AT LEAST 5 YEARS OF EXPERIENCE AS SUCH.

(D) GPR SCANNING DEVICES MUST BE CAPABLE OF ACCURATELY LOCATING REBAR IN A CONCRETE SLAB TO A MINIMUM DEPTH OF 300 mm, THIN A HORIZONTAL TOLERANCE OF +- 25 mm AND A VERTICAL (DEPTH) TOLERANCE OF THE LARGER OF +-25 mm OR +- 15% OF THE REBAR DEPTH.

(E) AFTER ALL THE EXISTING REINFORCEMENT AND SERVICES HAVE BEEN LOCATED, NOTIFY THE STRUCTURAL CONSULTANT, WHO WILL REVIEW AND APPROVE THE PROPOSED LOCATION OF OPENINGS, CORES OR DRILLED HOLES. MAKE ANY NECESSARY ADJUSTMENTS TO THE HOLE LOCATIONS AS DIRECTED BY THE STRUCTURAL CONSULTANT.

(F) THE REVIEW BY THE STRUCTURAL CONSULTANT IS LIMITED ONLY TO THE LOCATION OF THE PROPOSED CORES OR DRILLED HOLES THROUGH THE EXISTING STRUCTURE AND IT IS BASED ON THE ASSUMPTION THAT THE X-RAY OR SCAN RESULTS LOCATING SLAB REINFORCEMENT AND EMBEDDED SERVICES ARE COMPLETE AND ACCURATE. STEPHENSON ENGINEERING LTD. TAKES NO RESPONSIBILITY FOR THE ACCURACY OF THE X-RAY OR SCAN RESULTS.

(G) CORE DRILL NEW HOLES FOR PIPES TO A DIAMETER NOT LARGER THAN THE OUTSIDE PIPE DIAMETER PLUS 25MM. DO NOT CUT EXISTING REINFORCEMENT OR SERVICES WITHOUT PRIOR APPROVAL OF THE CONSULTANT.

(H) WHERE RECTANGULAR OPENINGS ARE TO BE CUT, PRE-DRILL THE CORNERS USING A 100 MM DIAMETER CORE DRILL OR DRILL A SERIES OF HOLES TO PREVENT OVER CUTTING OF THE CORNERS.

4. QUALITY CONTROL

4.1 FOR INSPECTION AND TESTING, SEE GENERAL NOTES AND/OR SPECIFICATION.

Job No.
20180721

Date
22-09-30

Drwn/Chkd By
BB

Sheet No.
S8-02

5/3/2023 10:11:52 AM