patersongroup **memorandum**

consulting engineers

re: **Geotechnical Review**
Proposed Hotel Building
300 Moodie Drive - Ottawa

to: Colonnade Bridgeport - **Ms. Bonnie Chen** - bchen@colonnadebridgeport.ca
to: Novatech - **Mr. Francois Thauvette** - f.thauvette@novatech-eng.com
to: SiteCast - **Mr. Shawn Hickey** - shickey@sitecast.ca
date: April 16, 2018
file: PG4148-MEMO.01

The present memorandum has been prepared to address geotechnical design questions regarding concrete slab design at the loading docks and rigid insulation recommendations for shallow storm sewers at the aforementioned site.

Reinforced Concrete Access Lane at Loading Docks

The following reinforced concrete structure is recommended for the subject section of the site provided in Table 1 below. It should be noted that the reinforced concrete will be susceptible to the detrimental effects of differential frost heave from varying subgrade materials within 1.8 m of the ground surface if frost protection is not provided. Therefore, some to minor differential frost heave and subsequent cracking may occur.

Table 1 - Rigid Reinforced Concrete Structure

Thickness (mm)	Material Description
150	**Reinforced Concrete -** Minimum 32 MPa - Class C1 Concrete
100	**BASE -** OPSS Granular A Crushed Stone
400	**SUBBASE -** OPSS Granular B Type II
	SUBGRADE - Either approved undisturbed in situ soil, OPSS Granular B Type I or II material placed over in situ soil, or a free draining, non-frost susceptible granular fill such as a well-graded blast rock with maximum particle size of 300 mm in diameter placed over in situ soil.

To minimize the potential differential frost heave, approach transitions should be provided at foundation backfill and trench locations where the backfill within the frost zone (1.8 m below the final grade) is not compatible with soil exposed on the excavation side walls (i.e. do not have similar frost heaving behaviour). It is recommended that the excavation side walls be profiled at a minimum 3H:1V from a depth of 1.8 m to the underside of the pavement granulars when the trench is transverse to the traffic direction and 1.5H:1V when it is longitudinal to the traffic lanes.

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type II material.

The granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 98% of the SPMDD using suitable vibratory equipment.

It is recommended that the concrete access lane be reinforced with 152 mm by 152 mm M W25.8 by M W25.8 gauge welded wire mesh. The reinforcement shall be adequately supported by 50 mm thick masonry blocking and overlapped a minimum of 152 mm.

Full depth isolation joints consisting of approximately 12 mm thick compressible material are recommended adjacent to any existing rigid structure such as curbs, poles, sidewalks and buildings to allow minor movement to occur independently from each other.

Control joints, also known as contraction joints provide a location where drying shrinkage cracks or cracking attributed to frost heave can occur without affecting the appearance of the concrete access lane. The saw cut control joints should be located at a minimum 2.4 m grid with a depth of 50 mm and a maximum width of 5 mm.

Frost Protection for Footings at Loading Dock

The loading dock is typically considered an unheated structure. The following should be provided for adequate frost protection:

- ❑ **Option A - Soil Cover**: Since the loading dock is considered an unheated structure, a soil cover of 2.1 m should be provided to the underside of footing.

- ❑ **Option B - Rigid Insulation**: If a soil cover of 2.1 m is not provided, the footings should be provided with an equivalent combination of soil cover and rigid insulation. A minimum of 600 mm of soil cover should be provided. Additionally, a 100 mm thick layer of HI-40 rigid insulation should be placed below the footings. The layer of rigid insulation should extend horizontally a minimum of 1.2 m beyond the outside face of the footings.

Insulation Detail for Storm Sewer Pipes

Paterson has reviewed the proposed grading and site servicing plans for the aforementioned site. Based on these details, sections of the storm sewer will be provided with approximately 1.5 m of soil cover which is less than 2.1 m. Therefore, insulation of shallow storm sewer pipes should be insulated as per City of Ottawa Standard W22. SM rigid insulation is acceptable for use to insulate the sewer pipes. This standard has been attached to the present memo.

We trust that this information satisfies your immediate requirements.

Best Regards,

Paterson Group Inc.

Colin Belcourt, M.Eng.

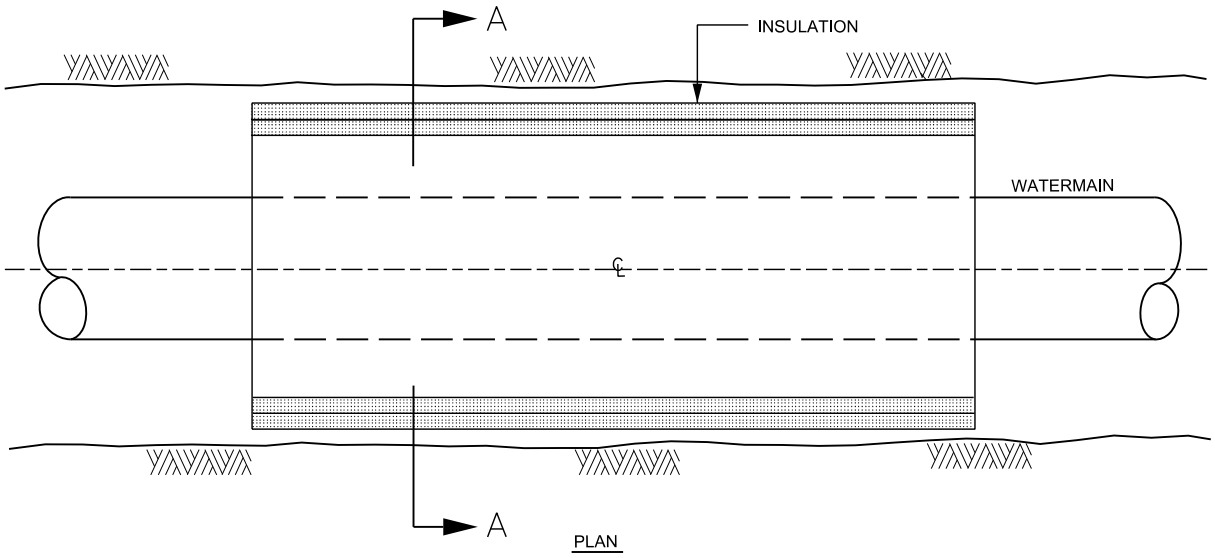
David J. Gilbert, P.Eng.

Paterson Group Inc.

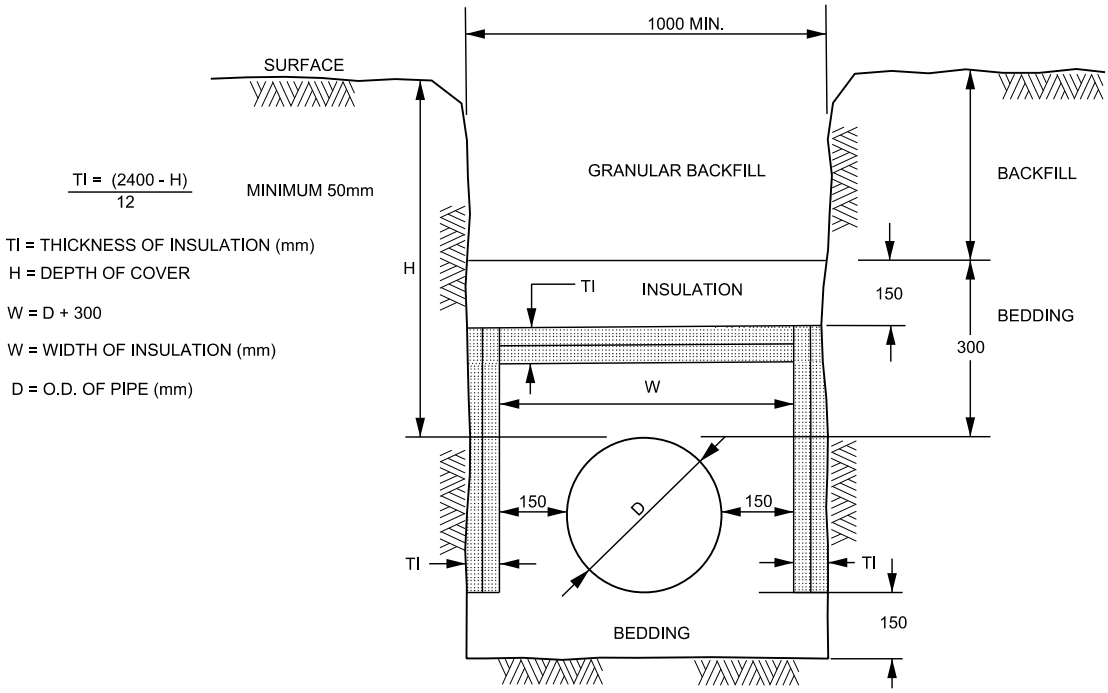
Head Office and Laboratory
154 Colonnade Road South
Ottawa - Ontario - K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

Northern Office and Laboratory
63 Gibson Street
North Bay - Ontario - P1B 8Z4
Tel: (705) 472-5331 Fax: (705) 472-2334

St. Lawrence Office
993 Princess Street
Kingston - Ontario - K7L 1H3
Tel: (613) 542-7381



PLAN



SECTION A - A

NOTES

FOR 150 - 400mm (NOMINAL DIAMETER) WATERMAINS, WHERE THE DEPTH OF COVER IS LESS THAN 2400mm

1. INCREMENTS OF THICKNESS SHALL BE ADJUSTABLE TO 25mm.
2. IN PROXIMITY OF MAINTENANCE HOLES, CULVERTS, CATCHBASINS, ETC., INSULATION SHALL BE PLACED PER DETAIL W23
3. DEPTH OF COVER LESS THAN 1200mm REQUIRES SPECIAL DESIGN
4. STAGGER JOINTS OF MULTIPLE SHEETS.
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.

Ottawa

THERMAL INSULATION FOR WATERMAINS IN SHALLOW TRENCHES

DATE:	MAY 2001
REV. DATE:	MARCH 2013
DWG. No.:	W22