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TECHNICAL MEMORANDUM

DATE :	February 17, 2012
TO :	Peter Joice Project Manager RCMP National Project Management Office
FROM :	M.Ali Ahsan, M.Eng., P.Eng Michael H. MacKay, M.Eng., P.Eng. Principal Engineer and General Manager, GTA
SUBJECT :	Additional Pavement Recommendations for the Proposed RCMP Building, Lot 181 York Road, Niagara-On-The-Lake, Ontario.
O/Ref. :	P-0000031

LVM inc. has completed supplementary pavement recommendations for the proposed permeable paving (pedestrian areas) and the grass paving for emergency fire truck access at the south side of RCMP proposed development on Lot 181, York Road, Niagara-On-The-Lake, Ontario. The purpose of this Technical Memorandum is to provide the recommendations for the design and construction of the proposed special pavement types (grass and permeable paving), including the site preparation, the pavement drainage and the pavement structure (components) based on the anticipated usage.

Paving recommendations are based on the LVM geotechnical investigation report (124-P041600-0100-GE-0001-01, dated September 29, 2011) and pavement report (124-P041600-100-CH-0001-00, dated September 29, 2011), which was submitted to PWGSC in 2011 and should be read in conjunction with this Technical Memorandum. It is our understanding that two types of special pavements are being proposed for this RCMP Building, the first being a grass paving strip which will serve as fire lane and should be capable to accommodating fire trucks during an emergency, and permeable pavement areas for pedestrian traffic and occasional landscaping vehicles. Further the permeable pavement area will be used as a crossing for fire trucks in case of emergency in the area where grass paving strip crosses the permeable pavement structure.

Subsoil Conditions in the Supplementary Pavement Areas

The subgrade soil at the borehole locations (BH No. 2 and BH No. 10) near proposed grass paving (fire lane) and permeable paving areas (pedestrian areas) was observed to consist of stiff to hard silty clay, having Standard Penetration Test "N" values ranging from 9 to 32 blows per 300 mm of penetration. The in-situ moisture content of this material ranged from about 18 (moist) to 24 (very moist) percent.

Groundwater measurements conducted in the open boreholes upon completion of drilling indicated that the groundwater level was below the borehole termination depth in all boreholes.

Pavement Recommendations

Pavement design recommendations were developed by LVM in accordance with OPSS and ASTM Standards. Based on LVM previous experience, Unilock or equivalent concrete pavers are recommended for permeable pavement structure and Grasspave2 (Teraffix Geosynthetic Inc.) or an equivalent product is recommended for the grass paving structure. It is also strongly recommended that these pavement types be properly constructed in conformance with the specific product manufacturer guidelines.

Prior to undertaking any pavement construction work, the pavement drainage and/or sub-drainage should be assessed, noting that provision of proper drainage is fundamental to the performance of the pavement structure to mitigate optional frost-related movements and minimize seasonal loss of subgrade support (subgrade softening in spring).

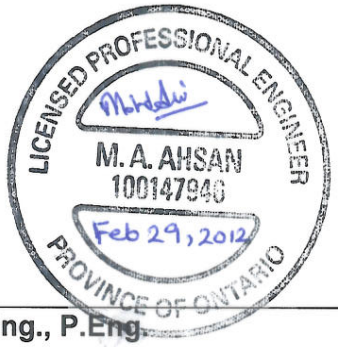
Permeable Paving (Pedestrian Area)

- Sub-excavate to the depth required for pavement installation, minimum 430 mm;
- The exposed subgrade should be carefully proof-rolled and any soft or wet spots properly repaired with approved material;
- Geotextile fabric should be provided between granular base and subgrade layer in accordance with OPSS 1860.
- Install PVC perforated drainage pipe of 100 mm diameter, wrapped in knitted sock geotextile and connect to nearest catch-basin. Seeing that subgrade soil is predominantly silty clay in this area and infiltration rate of this kind of soil is very low, hence it is recommended that the sub-drains be installed extending partially into the subgrade. Installation of sub-drains should be completed in accordance with OPSS 405.
- Construct the pavement base with 300 mm of open graded, crushed, angular granular material meeting ASTM C 33 requirements for No. 57 granular base or 300 mm of Open Graded Drainage Layer - OGDL (aggregate only) in accordance with OPSS 320 gradation requirements. Place in lifts not exceeding 150 mm loose thickness. Compact to 100 percent Standard Proctor Maximum Dry Density (SPMDD).
- Construct the paver bedding layer with 50 mm of crushed, angular, 6 mm nominal chip stone bedding material in accordance with ASTM C 33 requirements for No. 8 chip (or equivalent granular bedding material recommended by the manufacturer).
- Place 80 mm thick permeable paver with installation/construction in accordance with manufacturer's guidelines.

Grass Paving (Emergency Fire Access)

- Sub-excavate to the depth required for Grasspave2 system installation, approximately 300 mm;
- The exposed subgrade should be carefully proof-rolled and any soft or wet spots properly repaired with approved material;
- Geotextile fabric (Terrafix 270R or equivalent) should be provided between the granular base and subgrade layer in accordance with OPSS 1860.
- Construct the pavement base with 200 mm of OPSS 1010 Granular A base. It is recommended that Granular A be produced from pit run sand and gravel material. If crusher run limestone is proposed for use, it will require addition of sharp sand (up to 33% by volume) to ensure long-term porosity. Place in lifts not exceeding 150 mm loose thickness. Compact to 100 percent Standard Proctor Maximum Dry Density (SPMDD); and
- Install the Grasspave2 or equivalent pavement system as per manufacturer's requirements.

We trust that this Technical Memorandum is satisfactory for your purposes. Please do not hesitate to contact us with any questions or if you require more information.



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