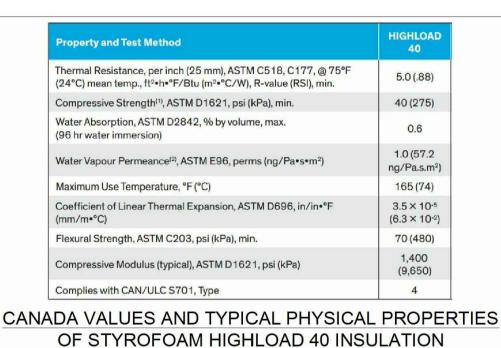
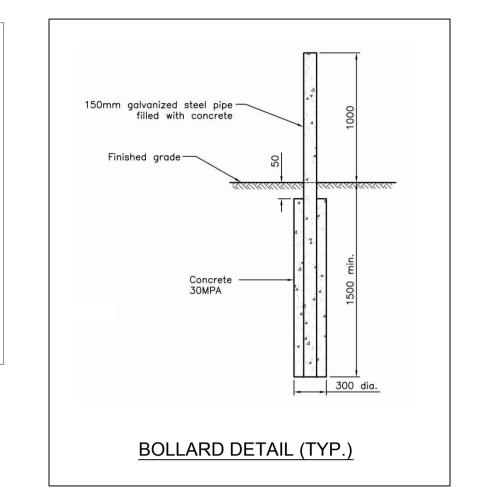
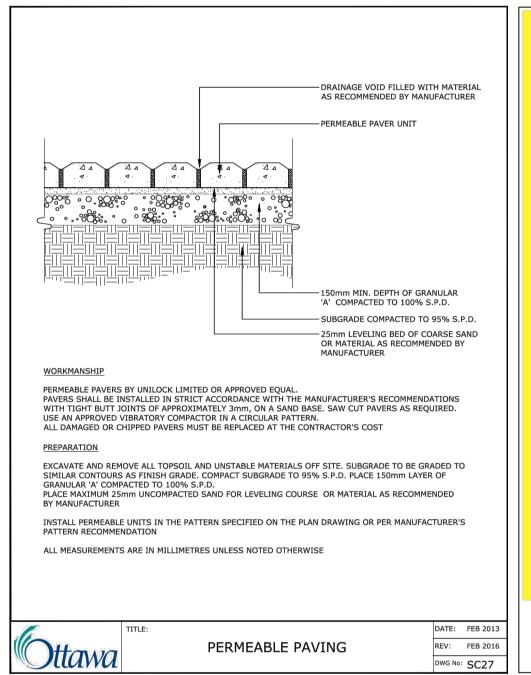


WATERMAIN INSULATION DETAIL

(N.T.S.)









PERMEABLE INTERLOCKING CONCRETE PAVEMENT (PICP)

DESIGN PROFESSIONALS FACT SHEET





creating more green space or building Preserves wooded areas that would otherwise be cleared for stormwater detention or retention ponds

stormwater infiltration and retention

all combined into the same space

 Increases site infiltration that helps maintain pre-development runof volumes, peak flows and time of

 Promotes tree survival and growth Contributes to urban heat island reduction through evaporation and reflective, light

· Highly visible, cost effective exemplary demonstration of cornerstone LID technique for public and private

Design Software Available New software from ICPI for permeable pave incorporates research from a range of university

Contact ICPI for further information.

Permeable Interlocking Concrete Pavement: A Low Impact Development Tool

PICP supports LID Principles . Conserve vital ecological and natural resources:

2. Minimize hydrologic impacts by reducing mperviousness, conserving natural drainage courses educing clearing, grading and pipes 3. Maintain pre-development time of concentration for runoff by routing flows to maintain travel times and

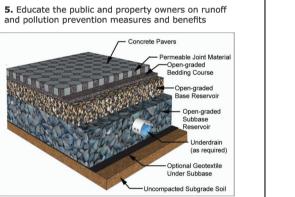
L Provide runoff storage and infiltration uniformly hroughout the landscape with small, on-site ecentralized infiltration, detention and retention practices such as permeable pavement, bioretention rain gardens, open swales and roof gardens

By eliminating detention pond, the subdivision lay

in the cul-de-sac returns rainfall to the water table

out conserves trees while 15,000 sf (1500 m²) PICE

Typical PICP cross section





Install and compact aggregate subbase and

mud on aggregates

machine/day

over non-frozen soil subgrade

Technical Guidelines

CSA A231.2 in Canada

all aggregates

Joint filling stone gradation:

ASTM No. 8, 87, 89 or 9

Construction Guideline

(railroad ballast)

Base gradation: ASTM No. 57

Subbase gradation: ASTM No. 2, 3 or 4

Pavers conform to ASTM C936 in the U.S. or

Open-graded crushed stone recommended for

Optional geotextile: consult manufacturers for

· Structural design: ICPI design chart determine

minimum base thickness to support pedestrian

Soil subgrade: classified per ASTM D2487;

tested for permeability per ASTM D3385

and vehicular traffic (see references)

aggregate into paver joint **Curve Number and Rational Method** NRCS Curve Numbers (CN) and Rational Method runoff coefficients ('C' value) used depend on the soil every case, PICP yields significantly lower CN and C

values than impervious pavement per the table below

Aggregate base and subbase are

spread and compacted; pavers are delivered ready to install. After

placement, joints and/or opening are filled with small aggregate. Then pavers are compacted.

base with standard paving equipment Land Cover | Infilatration | Curve | Runoff Specialty equipment used for screeding bedding layer and for mechanical paver Rates Number Co-in./hr (mm/hr) CN effic efficient Mechanical installation equipment accelerates construction; minimum 5,000 sf (500 m²)/ Up to 50 in./ hr (1270 mm/hr) Pavers, non-frozen bedding material & base/ subbase installable in freezing temperatures 3-4 in./hr (75- Paver joints filled with aggregate and o maintenance No curing time – ready to use upon stallation; modular construction allows for project phasing Specify experienced ICPI contractors with 0 in./hr (0 mm/ | 95 – 98 | 0.90 PICP construction, inspection and detailing

PERFORMANCE **Volume Reduction** Research has demonstrated that PICP can reduce runoff as much as 100% from a 3 Base construction uses locally

a minimum 12 in. (300 mm) thick opengraded aggregate base. Given regional variations in annual rainstorms and PICP base storage capacities PICP can reduce annual runoff between 30% and 80%. Well-maintained PICP can reduce flows by 70% to 90% from intense rain

runoff pollution. Peak Flow Reduction and Delay PICP can reduce peak flow by as much as 89%, producing a hydrograph nearer to

events and up to 100% for many storms

This yields a corresponding reduction in

generally proportional to rainfall intensity. flow runoff from several hours to several

Additional Benefits ADA compliant for slip resistance Concrete pavers available in various shapes and colors from local ICPI members; colored pavers mark lanes and parking spaces

• Simplifies surface and subsurface

weakened pavement cuts

repairs by reinstating the same paving units; no unsightly patches or

Ferguson, B. K. Porous Pavements, Boca Raton, FL:CRC Smith, David R. Permeable Interlocking Concrete Pavements: Selection • Design • Construction • Maintenance, Washington, DC: ICPI 3rd ed., 2006. www.icpi.org.

> For more information pertaining to permeable interlocking concrete payement, please visit the Interlocking Concrete Pavement Institute (icpi.org) or the Low Impact Development Center (lowimpactdevelopment.org). Other Fact Sheets available for Developers.

> > L7R 4K2

Municpal Officials and Schools/Universities

Water Quality Improvement

flush" runoff and reduce pollution.

a periodic inspection.

freezing and thawing cycles.

REFERENCES

FAQs

PICP treats stormwater by slowing runoff velocities to

allow for sedimentation and filtering by aggregates in

soil particles and aggregates and then are digested by

Can PICP be used on clay soils? Yes. Even in clay

soils, PICP reduces runoff and helps to capture "first

Can PICP be used to replace convential stormwate management tools such as detention basins? Yes.

In both colder and warmer climates, PICP has been used

to reduce or eliminate the need for conventional stormwa-

Maintaining PICP difficult? No. PICP can be main-

tained through street sweeping and vacuuming based on

ter pipe infrastructure, detention basins and drop inlets.

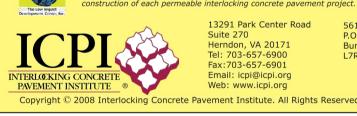
Can PICP be used in cold climates? Yes, PICP has

been very successful in many Canadian and northern

United States applications. It remains stable through

the surface openings and base. Oils adhere to small





CONTRACTOR IS ADVISED TO COLLECT INFORMATION ON SOIL CONDITIONS BEFORE START OF CONSTRUCTION.

USE AND INTERPRETATION OF DRAWINGS GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION ARE PART OF THE CONTRACT DOCUMENTS AND DESCRIBE USE AND INTENT OF THE DRAWING. THE CONTRACT DOCUMENTS INCLUDE NOT ONLY THE DRAWINGS, BUT ALSO THE OWNER-CONTRACTOR REQUIRED BY ALL. WORK NOT COMPLETELY DELINEATED HEREON SHALL BE CONSTRUCTED OF THE SAME MATERIALS AND DETAILED SIMILARLY AS WORK SHOWN MORE COMPLETELY ELSEWHERE IN THE CONTRACT DOCUMENTS.

BY USE OF THE DRAWINGS FOR CONSTRUCTION OF THE PROJECT, THE OWNER CONFIRMS THAT HE HAS REVIEWED AND APPROVED THE DRAWINGS. THE CONTRACTOR CONFIRMS THAT HE HAS VISITED THE SITE, FAMILIARIZED HIMSELF WITH THE LOCAL CONDITIONS, VERIFIED FIELD DIMENSIONS AND CORRELATED HIS OBSERVATIONS WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. AS INSTRUMENTS OF SERVICE, ALL DRAWINGS, SPECIFICATIONS, CADD FILES OR OTHER ELECTRONIC MEDIA AND COPIED THERE OF FURNISHED BY THE ENGINEER ARE HIS PROPERTY. THEY ARE TO BE USED ONLY FOR THIS PROJECT AND ARE NOT TO BE USED ON ANY OTHER PROJECT, INCLUDING REPEATS OF THE PROJECT. CHANGES TO THE DRAWINGS MAY ONLY BE MADE BY THE ENGINEER.

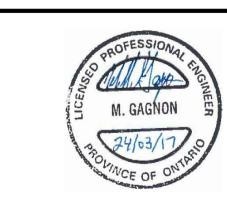
UNLESS THE REVISION TITLE IS "ISSUED FOR CONSTRUCTION", THESE DRAWINGS SHALL BE CONSIDERED PRELIMINARY AND SHALL NOT BE USED AS A CONSTRUCTION DOCUMENT. THESE DRAWINGS ILLUSTRATES THE WORK TO BE DONE. THE ENGINEER IS NOT RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES USED TO DO THE WORK, OR THE SAFETY ASPECTS OF CONSTRUCTION, AND NOTHING ON THESE DRAWINGS EXPRESSED OR IMPLIED CHANGES THIS CONDITION. CONTRACTOR SHALL DETERMINE ALL CONDITIONS AT THE SITE AND SHALL BE RESPONSIBLE FOR KNOWING HOW THEY AFFECT THE WORK. SUBMITTAL OF A BID TO PERFORM THIS WORK IS ACKNOWLEDGEMENT OF THE RESPONSIBILITIES, AND THAT THEY HAVE BEEN FULLY CONSIDERED IN PLANNING OF THE WORK, AND THE BID PRICE. NO CLAIMS FOR EXTRA CHARGES DUE TO THESE CONDITIONS WILL BE FORTHCOMING.

IN THE EVENT THE CLIENT, THE CLIENT, THE CLIENT, SONTRACTORS, OR ANYONE FOR WHOM THE CLIENT IS LEGALLY LIABLE MAKES OR PERMITS TO BE MADE ANY CHANGES TO ANY REPORTS, PLANS, SPECIFICATIONS OR OTHER CONSTRUCTION DOCUMENTS PREPARED BY LRL ASSOCIATES LTD. (LRL) WITHOUT OBTAINING LRL'S PRIOR WRÍTTEN CONSENT, THE CLIENT SHALL ASSUME FULL RESPONSIBILITY FOR THE RESULTS OF SUCH CHANGES. THEREFORE THE CLIENT AGREES TO WAIVE ANY CLAIM AGAINST LRL AND TO RELEASE LRL FROM ANY LIABILITY ARISING DIRECTLY OR INDIRECTLY FROM SUCH UNAUTHORIZED CHANGES.

IN ADDITION, THE CLIENT AGREES, TO THE FULLEST EXTENT PERMITTED BY LAW, TO INDEMNIFY AND HOLD HARMLESS LRL FROM ANY DAMAGES, LIABILITIES OR COST, INCLUDING REASONABLE ATTORNEY'S FEES AND COST OF DEFENSE, ARISING FROM SUCH CHANGES. IN ADDITION, THE CLIENT AGREES TO INCLUDE IN ANY CONTRACTS FOR CONSTRUCTION APPROPRIATE LANGUAGE THAT PROHIBITS THE CONTRACTOR OR ANY SUBCONTRACTORS OF ANY TIER FROM MAKING ANY CHANGES OR MODIFICATIONS TO LRL'S CONSTRUCTION DOCUMENTS WITHOUT THE PRIOR WRITTEN APPROVAL OF LRL AND THAT FURTHER REQUIRES THE CONTRACTOR TO INDEMNIFY BOTH LRL AND THE CLIENT FROM ANY LIABILITY OR COST ARISING FROM SUCH CHANGES MADE WITHOUT SUCH PROPER AUTHORIZATION. GENERAL NOTES:

EXISTING SERVICES AND UTILITIES SHOWN ON THESE DRAWINGS ARE TAKEN FROM THE BEST AVAILABLE RECORDS, BUT MAY NOT BE COMPLETE OR TO DATE. CONTRACTOR SHALL VERIFY IN FIELD FOR LOCATION AND ELEVATION OF PIPES AND CHECK WITH THE UTILITY COMPANIES BEFORE DIGGING OR PERFORMING WORK.

THE ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS. SPECIFICATIONS AND THE DESIGN INTENT THEY CONVEY. OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE ENGINEER'S GUIDANCE WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES AMBIGUITIES OR CONFLICTS WHICH ARE ALLEGED. CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.



NOT AUTHENTIC UNLESS SIGNED AND DATED



ENGINEERING | INGÉNIERIE 5430 Canotek Road | Ottawa, ON, K1J 9G2 www.lrl.ca I (613) 842-3434

BENSON AUTO PARTS MR. GERRY BENSON 700 EDUCATION ROAD, CONRWALL, ONTARIO K6H 6B8, TEL. 613-936-7850 G.C. M.G.

> PROPOSED BENSON AUTO PARTS COMMERCIAL DEVELOPMENT 1871 MERIVALE ROAD, NEPEAN, ON

130828

PROJEC

CONSTRUCTION DETAILS PLAN

01 ISSUED FOR SPA G.C. 24 MAR 2017 24 March 2017 BY DATE REVISIONS