

Large Diameter Transmission Watermains – Pipe Materials Study

Public Works and Infrastructure Committee
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Large Diameter Transmission Watermains – Pipe Materials Study



Current City standard

- Since 1950s, large diameter transmission watermains (750mm or larger) constructed of cement mortar lined, continuously welded steel pipe, fully encased in concrete

Issues of concern

- Significant infrastructure investment with bid prices ranging from \$10M to \$20M per kilometre
- Length of time required to construct current City standard watermain

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Recent study

- City engaged Cole Engineering Group Ltd. to review current standard and complete:
 - a literature review across industry publications
 - survey Durham, York and Peel Regions on their use of concrete pressure pipe (all satisfied with pipe performance)
 - conduct a risk assessment workshop of design engineers
- Technical conclusion: while current standard is very durable, no one pipe material is better than another

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Study Recommendations

- Future construction tenders should consider multiple pipe materials promoting competition and potential savings. Pipe materials to include:
 - pre-stressed concrete cylinder pipe (PCCP)
 - steel welded pipe
 - polyvinyl chloride (PVC)
 - high density polyethylene (HDPE)
 - continuously welded steel pipe with mortar lining (current standard)

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Pre-stressed concrete cylinder pipe (PCCP)



Polyvinyl chloride (PVC)

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High density polyethylene (HDPE)



Steel welded pipe (1650 mm used for Neilson Road project)

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Avenue Road watermain replacement -- continuously welded steel pipe with mortar lining (current standard)

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Risk Assessment

- In critical or high risk locations, while alternative pipe materials should be allowed for larger diameter transmission watermains, it is recommended that:
 - pipe meets designed performance standards (i.e. American Water Works Association)
 - high risk locations be identified during the Environmental Assessment phase and/or pre-design phase
 - a standard be developed for locations considered high risk or operationally critical to offer a higher level of protection to ensure safe operation and security of water supply.