Canadian
Environmental Technology Verification (ETV) Program
OGS Performance Testing Protocol for Canada

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GLOBE Performance Solutions
Accelerating Market Adoption of Technology-based Solutions

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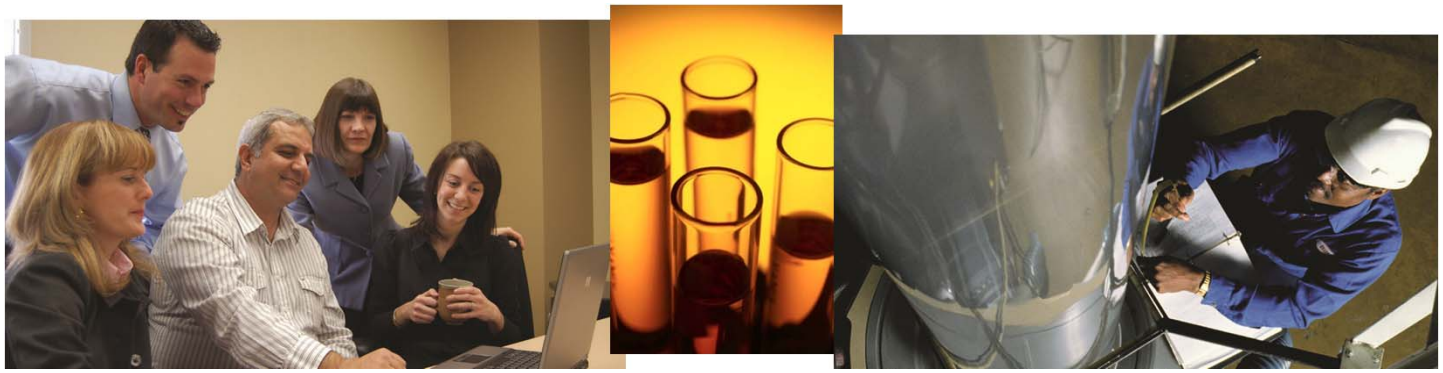
TRIECA 2013 Conference
Toronto and Region Conservation (TRCA) and the Great Lakes Chapter of the International Erosion Control Association
March 26-27, 2013 Markham, ON

Context

- Sustainable development is a priority for government, business, industry, and communities
- Developing and deploying clean technologies can help meet sustainable development objectives
- The ability to verify the environmental performance of technologies helps ensure value-for-money
- Verification facilitates market acceptance and adoption of innovative technologies.

What is ETV?

Confirmation of environmental performance of technologies by qualified third parties based on test data independently generated using pre-determined test procedures



ETV supports advancement of innovative technologies that address environmental priorities.

ETV process targets technologies that affect air, water, waste, and soil across a number of sectors including energy, agriculture, transportation, buildings, etc.

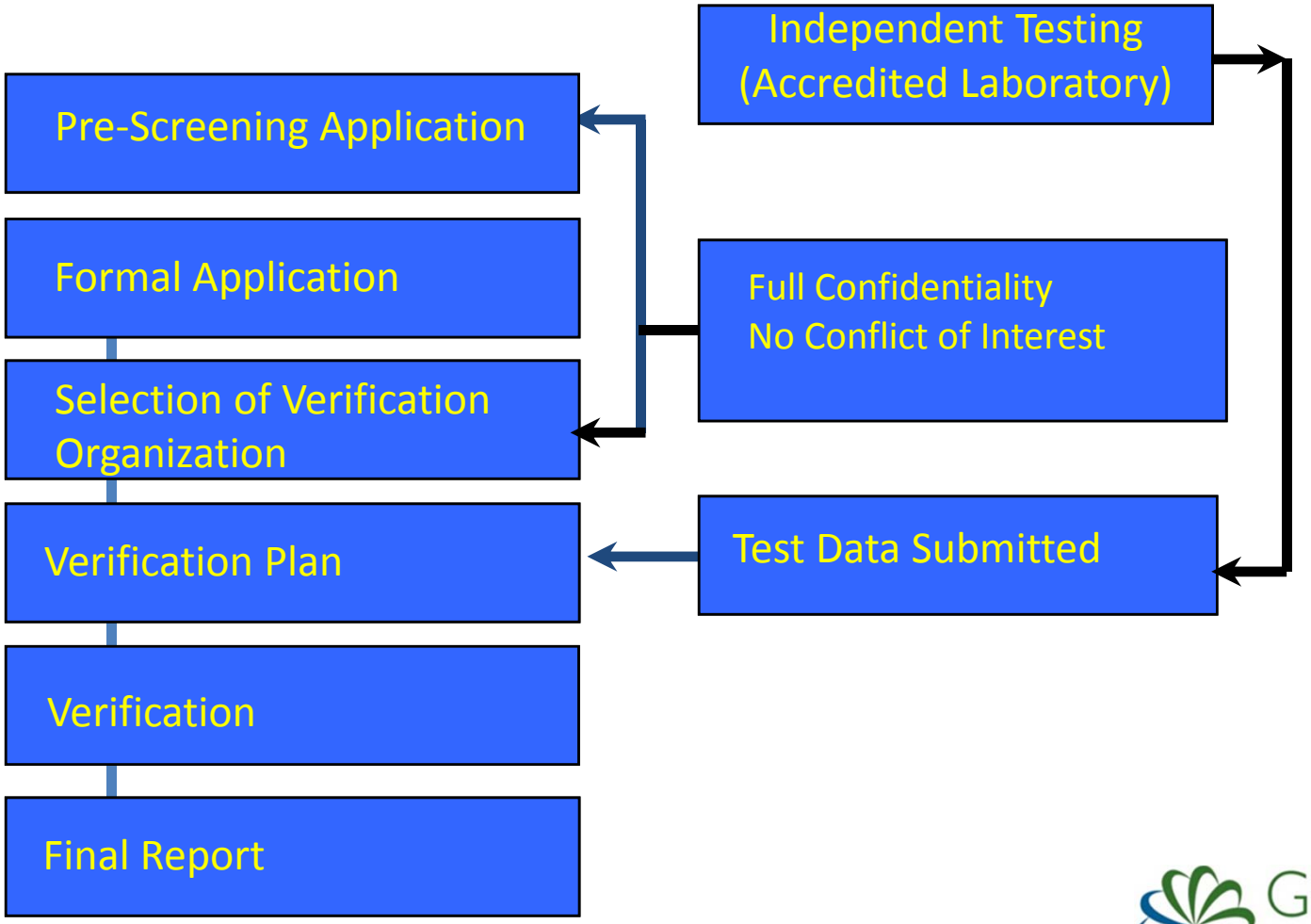
Benefits of Independent Environmental Performance Measurement and Verification

Investment	Procurement	Compliance	Leadership
• Independent information to mitigate market, technical and financial risks • Sustainable technology solutions with greater market acceptance	• Reliable information on technology performance • Greater certainty in buying decisions and improved probability of success	• Evidence based information to support regulatory requirements • Protection and enhancement of ecosystem health	• Information for integrating environmental, social and economic performance • Meeting the needs of changing communities

Canadian ETV Program

- Established in 1997 by Environment Canada
- Environment Canada
  - Responsible for the management of the national program
  - Oversees the delivery agent – GLOBE Performance Solutions
  - Manages Canada's international ETV activities
  - Develops agreements with other jurisdictions (Federal, Provincial and Municipal)
- Technical side of the ETV Program is managed by an independent third party delivery agent (GLOBE Performance Solutions)
  - GLOBE Performance Solutions selected as delivery agent in October 2012 via competitive process
  - GLOBE Performance Solutions uses a distributed network of qualified independent performance testing and verification organizations

Summary of Verification Process



GVP - Independent Testing and Verification

- **General Verification Protocol (GVP)** – Delivery Agent uses the GVP as guidance on the ETV procedure and data requirements. GVP requires that **technology operating conditions** are clearly specified and **performance parameters** are measurable using quality-assured test procedures and analytical methods.

- **Third-Party Testing and Analysis** – Independent, third-party test agents conduct the **testing** and ISO-accredited laboratories conduct the **analysis**.

- **Independent Verification** - An independent verification organization reviews the test results and delivers a **verification report**. The Delivery Agent approves the verification report and issues the verification documents.

GLOBE PERFORMANCE SOLUTIONS

Strengthening the Canadian ETV Program

- Environment Canada, in partnership with GLOBE Performance Solutions, is strengthening the Canadian ETV program by:
  - Engaging governments (federal, provincial, municipal) to increase acceptance of ETV in approvals and permitting processes and reducing duplication of technology testing
  - Establishing a delivery structure that meets local, national and international needs
  - Increasing awareness and understanding of ETV through marketing and stakeholder engagement
  - Improving access to the ETV program in all regions of Canada through a network of established performance testing and verification organizations.

GLOBE Performance Solutions

VISION

A global source for performance-based solutions

GOAL

Supports sustainable economic growth by accelerating market adoption, enhancing benefits and reducing risks of technology-based solutions

Delivery agent for the Canadian ETV Program

GLOBE Performance Solutions - Part of GLOBE Group

Value-added Services

GLOBE PERFORMANCE SOLUTIONS

Online	Verification	Advisors	Access
Global platform to engage stakeholders and build market acceptance	Consortium of performance testing organizations	Performance benchmarking and protocol development	Access to financing and investment
Technology performance information for targeted sectors	Delivery of Canadian ETV Program	Roadmap to navigate standards, protocols and certification requirements	Accelerating market adoption of sustainable solutions

GLOBE Performance Solutions Consortium

- Recognized technology expertise, capabilities and facilities in specific domain areas
- Ability to independently conduct technology performance testing and verification
- Quality management systems in place
- Participation in the development of testing protocols in targeted areas
  - TRCA-LCC and Hydrodynamic Separators - **OGS Performance Testing Protocol for Canada**
  - FPInnovations-PIT and Engine and Vehicle After Market Devices
  - Other
- Participation in marketing and promotion of the Canadian ETV Program

GLOBE PERFORMANCE SOLUTIONS

GLOBE PERFORMANCE SOLUTIONS

FPInnovations

WCWC Walkerton Clean Water Centre
An agency of the Government of Ontario
CWAE Centre de Walkerton pour l'assainissement de l'eau
Un organisme du gouvernement de l'Ontario

PROCESS RESEARCH ORTECH Inc.

pami

The Living City CAMPUS AT KORTRIGHT

Edmonton Waste Management Centre of Excellence

CNETE

c·core Innovative Engineering Solutions

CATT Centre for Advancement of Trenchless Technologies

GLOBE Performance Solutions Consortium
Current Members

CANADA VÉRIFIÉ VERIFIED


Centre de gestion
de l'équipement
roulant
Québec


CFTR


07/21/2008

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Consortium

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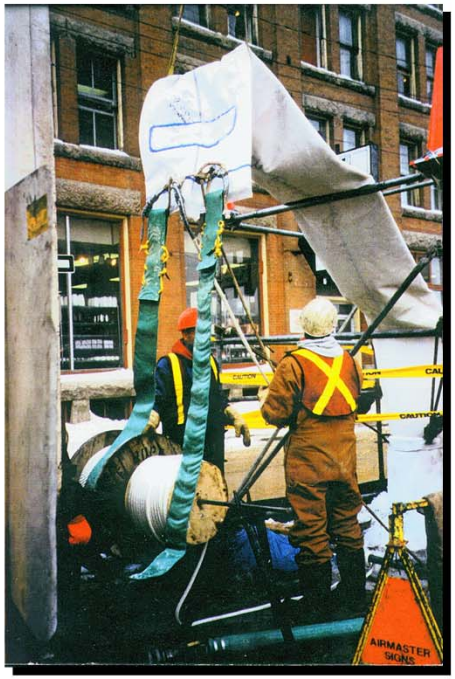

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International Recognition and Cooperation

“Verify once, accept everywhere”

ETV International Working Group (IWG), established in 2008, is working towards international recognition to ensure that a technology verified in one country is accepted as verified in other countries.

Development of ISO- ETV Standard

- One of the ways of achieving mutual recognition of ETV Programs is the development of an ISO-ETV standard
  - Increases stakeholders acceptance and overall credibility of process
  - Reduces trade barriers (nationally and internationally)
- In cooperation with the IWG, Canada is leading the development of a proposal to develop a new ISO-ETV standard with an accreditation framework
  - ISO-ETV Standard will define and describe all phases of the ETV process.
  - Canada is the Convener (Chair) of the ISO-ETV standard development

ISO-ETV Standard - Next Steps

- Canada is currently -
  - Establishing membership for the international working group on the development of the ISO standard.
  - Engaging the Canadian Mirror Committee that reviews and provides comments to the international working group
- May-June 2013 - Start of ISO-ETV standard development process
- 2015 – Anticipated publication of ISO-ETV standard

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Oil Grit Separator Laboratory Testing Protocol

Canadian Environmental Technology Verification Program

Tim Van Seters

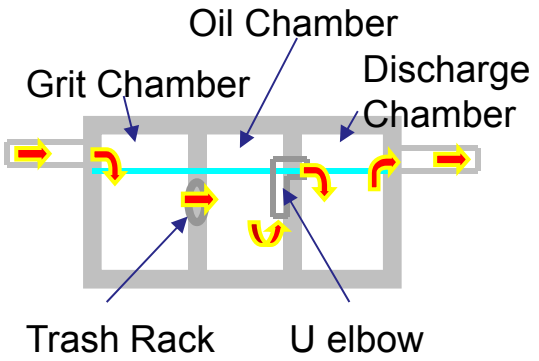
TRIECA Conference
March 26, 2013

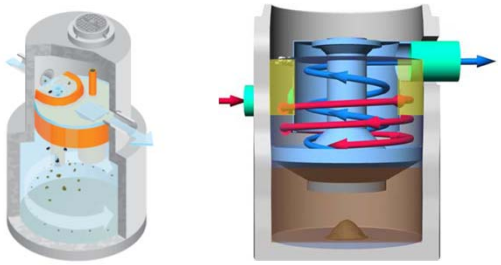
The Living City Foundation

Toronto and Region Conservation for The Living City

Oil Grit Separators

- OGS are designed to capture settleable solids and associated pollutants, trash, floatables, oil and grease in urban runoff.
- Require regular maintenance to function effectively
- Widely used to:
  - improve the quality of runoff from urban developments
  - provide pre-treatment to other downstream stormwater controls
  - Temporary spill containment





Source: Saddoris et al, 2010

The Issue

- Developers/consultants rely on information provided by manufacturers to select appropriate OGS type and model
- Performance claims upon which device selection is based are inconsistent, and often not based on independent testing
- Approval agencies have difficulty assessing whether the device is adequate for a given application
- Competition among manufacturers creates incentives to undersize units and exaggerate performance claims
- Provision in development submissions indicating *'…or approved equivalent'* often results in later substitutions for cheaper units
- Where test data are used to justify model selection, methods used to scale up to larger untested units are not consistent

Purpose and Benefits

- *Develop a national technology verification test protocol for Oil Grit Separators that would guide and support the review and approval of verification performance claims by any manufacturer or vendor in a transparent and credible manner.*

- Sedimentation Manufacturer Treatment Devices (MTDs) only; Filtration MTDs not addressed by protocol

- Key benefits:

  - Create an even playing field among all vendors of OGS devices
  - Establish a scientific and credible basis for assessing the accuracy of performance claims
  - Facilitate the review and approval of OGS devices and help ensure that selected stormwater infrastructure is suitable for the tributary areas being serviced

Process

Assembled technical advisory committee with representation across NA from industry, government, consulting industry and academia

Reviewed and assessed existing protocols to determine applicability for use in Canada

Developed draft protocol for comment by technical advisory committee. Revised based on feedback and developed final draft

Final protocol to be released in April, 2013

Process document will be developed as a future initiative to provide guidance on how the protocol will be applied

Protocols Reviewed

- *The Technology Acceptance Reciprocity partnership (TARP), Protocol for Stormwater BMP Demonstrations*. Originally Endorsed by **California, Massachusetts, Maryland, New Jersey, Pennsylvania, and Virginia**. August 2001 (Updated July 2003).

- **University of Massachusetts**, *Massachusetts Stormwater Technology Evaluation Project (MASTEP).* October 2005.

- **US Environmental Protection Agency (USEPA).** *ETV Verification Protocol: Stormwater Source Area Treatment Technologies.* March 2002.

- **Virginia Department of Conservation and Recreation.** *Guidance for Evaluating Stormwater BMPs – Virginia Technology Assessment Protocol (VTAP).* July 2011

Protocols Reviewed

- **New Jersey Department of Environmental Protection (NJDEP).** *Laboratory Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device (MTD)*. January 25, 2013
- **Wisconsin Department of Commerce and NRC (WIDNR).** *Wisconsin Laboratory Testing Method for Determining and Reporting the Performance of Proprietary SW Sedimentation Devices*, Appendix B. 2008.
- **Washington State Department of Ecology (WADOE).** *Technical Guidance Manual for Evaluating Emerging Stormwater Treatment Technologies Technology Assessment Protocol - Ecology (TAPE)*, October 2002 (revised June 2004, 2008, 2011)

- Only three protocols address lab testing of OGS – NJDEP, WIDNR and TAPE.

Lab and Field Testing

- Field and lab testing are natural companions
- Field testing provides real world data and scenarios in a dynamic setting
- Lab testing provides defensible, repeatable results in a tightly controlled environment
- Only lab testing provides basis for rigorous side by side comparisons

Lab Protocol Comparison

	NJDEP	WA DOE TAPE	WI DNR
Test Facility	Independent 3rd party lab or manufacturer's lab with independent observer		
Test Sediment Part. Size Dist. (PSD)	d_{50} = 75 µm	d_{50} = 15 µm	d_{50} = 8 µm
Test flow rate	25,50,75,100,125% of MTFR*	50, 75, 100, 125% of DHLR*	5, 20, 50,100% of MTFR
Influent TSS concentration	200 mg/L	100 – 200 mg/L for RE ≥ 80%	150 – 250 mg/L
Preload Test Sediment PSD for Scour	d_{50} = 225 µm no particles < 50 µm	Sediment captured during sediment removal tests	d_{50} = 450 µm
Scour Flow Rates	125 % MTFR off-line; 200% MTFR on-line for 30-35 m	At max DHLR*	120% of MTFR for 30 min or 5 volume exchanges

*MTFR: manufacturers Treatment Flow Rate; DHLR: Design Hydraulic Loading Rate

Key Issues with Existing Protocols

- Independence of testing in manufacturer laboratories relies heavily on observer knowledge and experience
- Wide range of test sediment Particle Size Distributions (PSDs) recommended
- Not all lab protocols rely exclusively on mass balance testing
- Coarse test PSD for scour may not adequately reveal differences in the scour potential of different MTDs
- Methods for scaling lab results from tested unit to untested unit are inconsistent

Objectives of the Proposed Testing Protocol

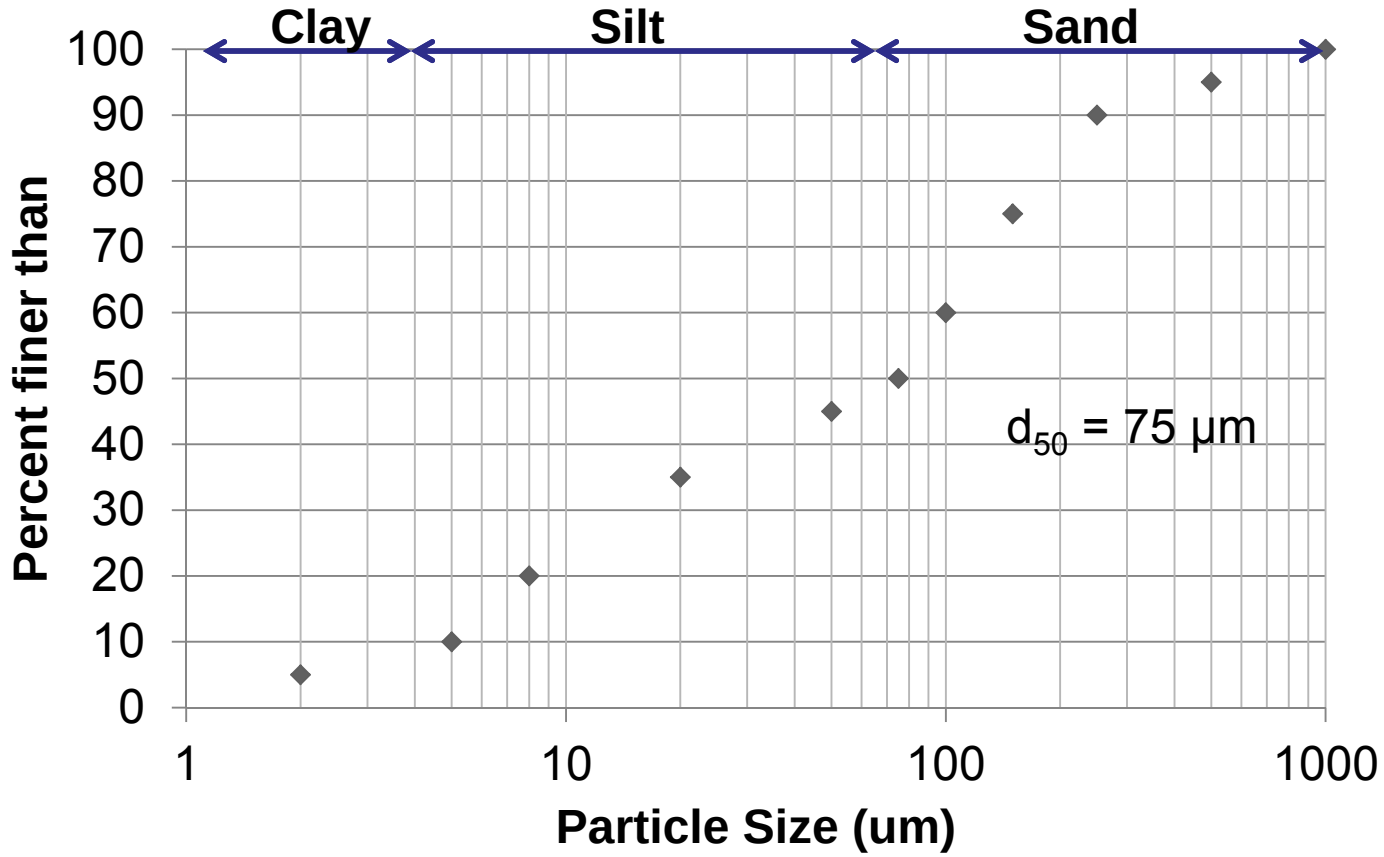
- Quantify the mass, by particle size class, of sediment particles trapped by a device under different surface loading rates;
- Present and analyze data to show device efficiency as a function of particle size and flow rate, and to propose scaling relationships for predicting the efficiency of untested devices in the same device classification;
- Assess the potential for re-suspension of sediment retained by an MTD at medium to high flow rates across a range of particle size fractions.
- Assess the potential for re-entrainment of free oil trapped by an MTD at different flow rates

Proposed Protocol: Testing Facilities

- The testing shall be conducted by an independent, **third party** testing facility
- Sample analysis shall be conducted by an **accredited laboratory**
- **An independent verification organization** reviews the analysis and delivers a verification report

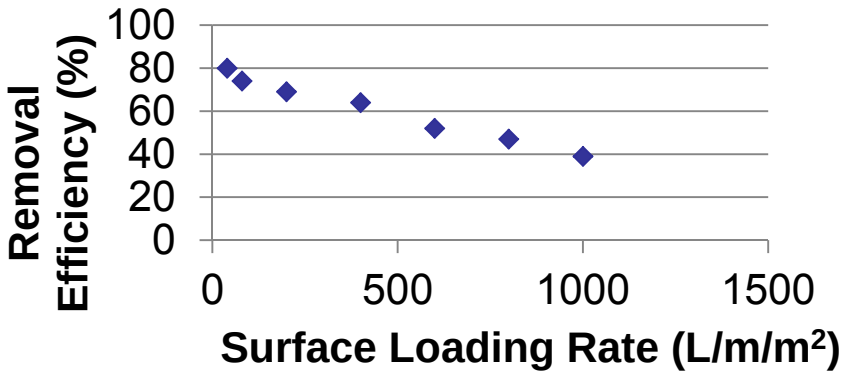
Proposed Protocol: Sediment Removal Performance

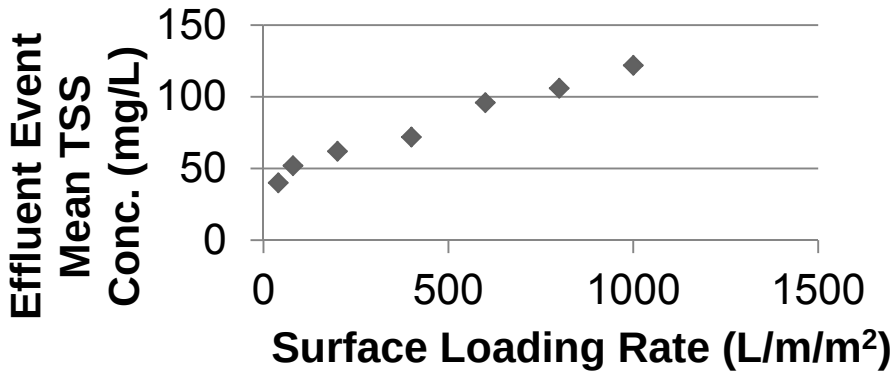
- Test Sediment (NJDEP distribution)



Sediment Removal Performance

- Test Conditions
  - clean system with false floor set to 50% of the MTDs maximum sediment storage depth
  - constant influent concentration of 200 mg/L
  - seven representative surface loading rates with option to include more
  - Mass balance test method for influent and retained mass with sampling of effluent
  - Results reported by particle size fraction





Sediment Re-suspension Testing

- Preload with same test sediment used for sediment removal testing
- False floor with preloaded sediment to equal 50% of max sed. storage depth
- Five surface loading rates three of which would be higher than the peak during the sediment removal test
- Flows increased in five minute intervals
- Effluent samples at minimum one minute intervals to measure sediment concentration and PSD
- Guidance on interpretation of results to be provided

Free Oil Re-entrainment Test

- Oil preloaded in the unit to depth of five cm over an area equivalent to the sedimentation area
- Smaller MTDs would have a lower volume of oil
- MTDs that capture oil over a smaller area would have a greater depth of oil
- Same surface loading rates and procedure as the sediment re-suspension test
- Effluent sampling for oil at the same intervals as for the sediment re-suspension test

Scaling and Laboratory Sample Analysis

- Scaling of results from the tested unit to larger untested unit is to be done the same way as described in the NJDEP protocol
  - Based on similar surface loading rates and geometric proportions
  - Conservative methodology
  - Alternative scaling approach to be supported by testing three different device sizes

- Recognized methods used for analysis of samples in an accredited laboratory

Technical Advisory Committee Members

- Jeffery Guthrie - Environment Canada
- John Neate - Globe Performance Solutions
- Graham Bryant - Hydroworks
- Derek Berg – Contech
- Rob Rainford - Echelon Environment
- Reagan Davidson - Imbrium
- Joel Garbon - Imbrium
- Ted Bowering - City of Toronto
- Steve Hollingworth – The Municipal Infrastructure Group
- Edward Graham - Civica Infrastructure
- John Nemeth – Region of Peel
- Bert Van Duin - City of Calgary
- David Kenth - City of Brampton
- Mike Walters - Lake Simcoe Conservation
- JF Sabourin - JF Sabourin & Associates
- John Priamo - SCS Consulting
- Jiri Marsalek – Environment Canada
- Chris Melanson – City of Ottawa
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- Laurent Jolliet – City of Ottawa
- Darryl Bonhower – City of Moncton
- Bahram Gharabaghi - University of Guelph
- Gilles Rivard – Genivar
- Martin Bouchard Valentine – Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs, Quebec
- Nigel Bosworth- Point Source Processing
- John Antoszek - Ministry of the Environment
- Mark Smith – Canadian Infrastructure Products
- Chris Denich, Aquafor Beech
- John McMahon, City of West Vancouver
- Glenn MacMillan – TRCA
- Tim Van Seters – TRCA
- Patricia Lewis – TRCA

Next Steps

- Final draft to be reviewed by the TAC
- Contact us if you wish to provide written comments
- Release final protocol in April, 2013
- Timing for completion of process document to be determined

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Sustainable Technologies Evaluation Program

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