

Pollutant Removal Testing Services: A Road Map to Cleaner Stormwater



Test Drive Your Treatment Option

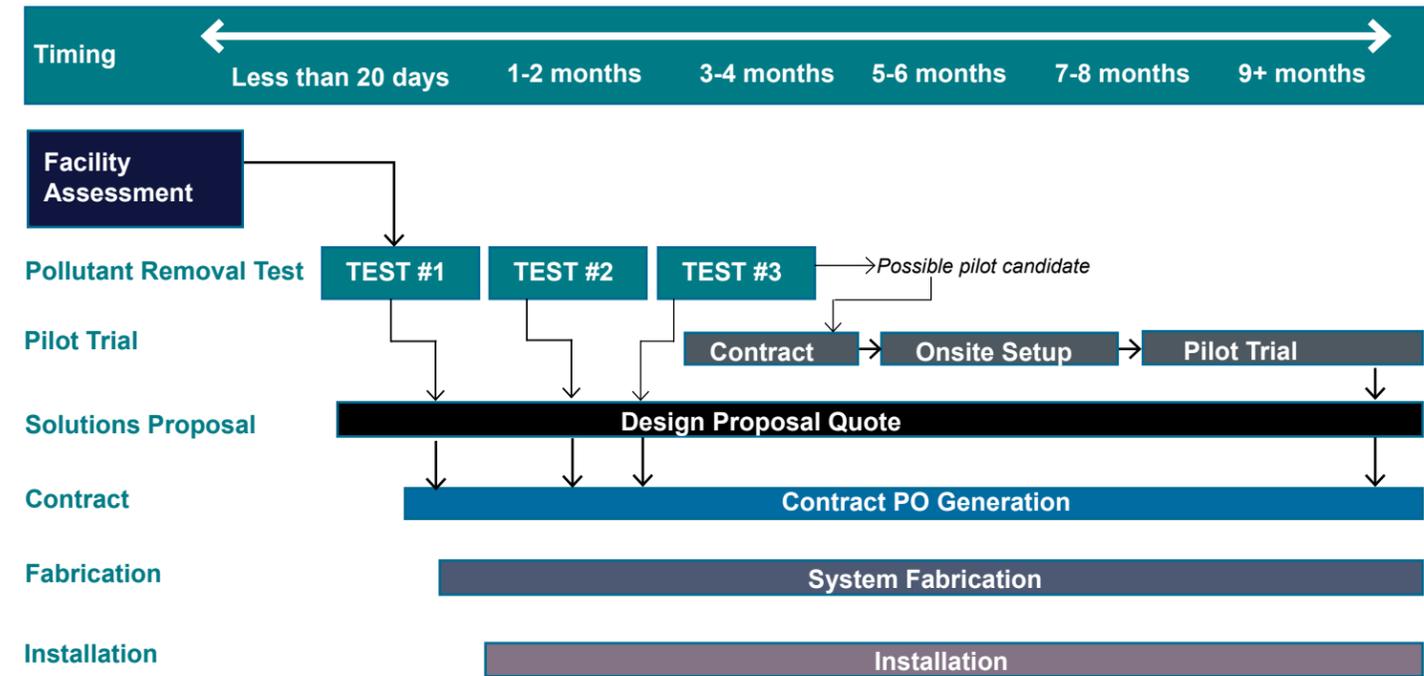
Engineered Solutions for Industrial
Stormwater Treatment

Industrial Stormwater Solutions

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You have an industrial stormwater concentration to meet but you're not certain how to get there. This guide will help you understand the role of pollutant removal testing as a way to evaluate all your treatment options. Use this document as a road-map to help you make informed decisions that are supported by data every step of the way.



Start Here: Facility Assessment

Hydro International will work with you to create a custom treatment plan based on your facility's particular needs. Firstly, we'll evaluate your SWPPP (Stormwater Pollution Prevention Plan) and use the answers to the below questions to make an action plan that aligns with your goals.

1. What pollutants do you need to remove?
2. What are your treatment goals?
3. What is your time-frame for enacting change?



Bench-scale & Solids Analysis Testing

Following a facility assessment, we'll want to make sure that Hydro has a solution that will help you achieve the best outcome. Each industrial facility is unique and so is their stormwater. You already know what pollutants you need to remove but may not know which stormwater treatment system is best suited to do the job.

- **Bench-scale Test:** We'll put a sample of your stormwater through one of our bench-scale treatment systems so you can gauge how effective our solution will be prior to sizing, purchase or installation.
- **Solids Analysis Test:** This assessment will determine the best technology type (separator or filter) and model size for your site based on your treatment goals.

Your Stormwater



Our Product(s)



Free Data Report



Pilot Unit Testing

For industrial facilities with the time and resources to devote to further pollutant removal investigation, leasing a full-scale pilot unit may be a good option.

Pilot units are installed on-site and managed for the duration of the program by the industrial facility.

Good candidates for pilot programs are able to:

- Allow three to nine months¹ to gather sufficient data
- Supply a dedicated staffing resource to collect and mail samples during each rain event
- Cover third party laboratory fees associated with testing

1) Pilot program length is dependent upon pilot unit availability, seasonal rainfall, equipment setup times etc.

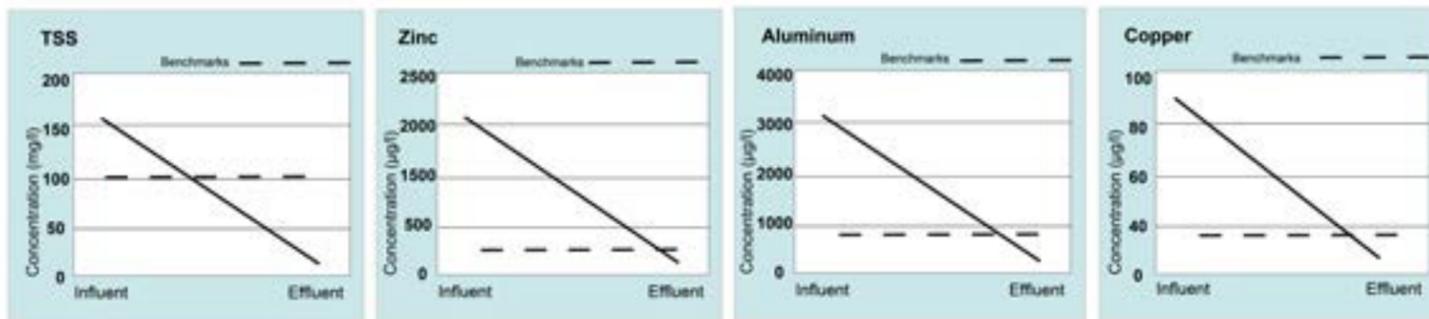


Differences in Pollutant Removal Tests

| Considerations | Bench-scale Test | Solids Analysis Test | On-Site Pilot Test |
|---------------------------------|---|--|--|
| Fee | <ul style="list-style-type: none"> None | <ul style="list-style-type: none"> None | <ul style="list-style-type: none"> Monthly lease |
| Qualification | <ul style="list-style-type: none"> Target Constituents | <ul style="list-style-type: none"> Target Constituents | <ul style="list-style-type: none"> Bench-scale Testing |
| Testing Conducted by: | <ul style="list-style-type: none"> Hydro International | <ul style="list-style-type: none"> Hydro International | <ul style="list-style-type: none"> Industrial facility or consultant |
| Samples Analyzed by: | <ul style="list-style-type: none"> Hydro International: salinity, solids Independent lab: other constituents | <ul style="list-style-type: none"> Hydro International | <ul style="list-style-type: none"> Industrial facility or consultant |
| Sample Analysis Fees: | <ul style="list-style-type: none"> No charge for: solids, dissolved or particulate metals Lab Fee for: other constituents (nitrates, BOD) | <ul style="list-style-type: none"> No charge for: solids, dissolved or particulate metals | <ul style="list-style-type: none"> Independent lab fee schedule |
| Final Report Created by: | <ul style="list-style-type: none"> Hydro International | <ul style="list-style-type: none"> Hydro International | <ul style="list-style-type: none"> Third party or consultant |
| Sampled From: | <ul style="list-style-type: none"> Industrial facility's storm-water runoff | <ul style="list-style-type: none"> Industrial facility's storm-water runoff | <ul style="list-style-type: none"> Industrial facility's storm-water runoff |
| Typical Time-frame: | <ul style="list-style-type: none"> 2 weeks - 1 month | <ul style="list-style-type: none"> 2 weeks - 1 month | <ul style="list-style-type: none"> 3 - 9 months¹ |

Removal Data

The Up-Flo Filter was used to test metals removal for a California-based supplier of materials used in creating commercial and military aerospace and electronics/semiconductors. They needed to lower concentrations of a variety of metals in their runoff and the test results showed up to 88% removal of copper and up to 70% removal of zinc.



Working with Hydro International: Precision and Partnership

Hydro International has 30 years of experience in treating stormwater and more than a decade helping industrial companies clean up their runoff. We know that no two SWPPPs are ever the same so we work hard to understand the specific challenges facing each industrial site.

We recognize the enormous pressure that many industrial companies are facing so we go out of our way to make it easy to work with us. Our knowledge, accessibility and commitment can be counted on throughout the planning, installation and treatment process.



Our World-Class Hydraulics Laboratory

Established in 1996, Hydro International's hydraulics laboratory is one of the largest manufacture-owned testing facilities in the country and has been used for performance verification of stormwater treatment products for the New Jersey Department of Environmental Protection (NJDEP), the Massachusetts Stormwater Technology Evaluation Project, (STEP) the Maine Department of Transportation as well as many industrial facilities operating under a stormwater discharge permit.

Decades of Innovation and Testing



Step 1: Order Your Kit

After you have spoken to a Hydro International Stormwater Specialist to discuss your facility, you'll be ready to order your pollutant removal testing kit. This kit can be used for either bench-scale or solids analysis testing.

Order your FREE kit at hydro-int.com/samplekit
Access the sample checklist at hydro-int.com/testguidelines

Pollutant Removal Testing Kit Includes:

- (1) Copy of Collection Guidelines
- (1) 5-gallon bucket
- (1) Pair non-latex gloves
- (1) FedEx label
- (1) FedEx label holder



Fig. 1

Use your SWPPP (Stormwater Pollution Prevention Plan) to identify all drainage areas on your site.

Ideal sampling locations include:

- Pipes discharging from your site
- Ditches carrying only your facilities runoff
- Manhole access to sewers
- Any area you think you'll need an advanced structural stormwater BMP



Do NOT Collect Samples From...

- Ditches carrying stormwater from other properties upstream
- Partially submerged pipe culvert (results could be tainted by the receiving water body)
- A manhole carrying stormwater from other facilities



Step 3: When to Sample

- Ideally you want to sample during a rain event or within 12 hours of a rain event when rain is still flowing through the drainage system. If you're unable to sample within 12 hours, try to do it as close to 12 hours as possible. **Note: samples taken more than 12 hours post-rain event may skew treatment data.**
- If your facility is in an area where it rains infrequently, pay attention to weather reports so that you can be prepared for the next rain event.



Step 4: Who Should Sample?

The ideal candidate for this position is the environmental consultant for the facility. If the person in that role can't perform the necessary duties for whatever reason, then another reliable staff person (as well as a backup staff person) should be assigned to collect samples during rain events. This person should:

- Be knowledgeable about the location of the designated drainage and sampling areas
- Understand and follow sampling guidelines carefully
- Monitor weather reports to prepare for sample collection
- Be capable of lifting and carrying 40-50lb sampling buckets



Step 5: Properly Collecting a Sample

Hydro International will provide a runoff analysis kit (see Fig.1 on page 6) with all the materials and data collection paperwork needed to conduct a thorough runoff analysis sampling. When sampling, be sure to:

- Wear gloves
- Use the bucket to get direct samples instead of transferring from one container to another
- Keep your hands away from the opening so as not to taint the sample
- Hold the bucket opening upstream of the flow of water
- Do not rinse or overflow the bucket
- Record the following:
 - Where on-site was the sample collected from?
 - Describe how the sample was collected (need examples)

Instructions for shipping the sample to Hydro International's lab facility are included in the kit. Most samples take between 1-2 business days to arrive.

Do NOT...

- Scrape bucket along the ground or add sediment to your sample
- Place your hands inside the bucket
- Sample from a parking lot puddle or standing pool
- Sample from a stormwater pond or catch basin or during dry weather conditions



Make sure bucket is at least 85% full. Most buckets have a fill line.



Step 6: Sample Handling & Shipping

Follow instructions outlined in the Stormwater Collection Guidelines worksheet. **NOTE:** this guide is two pages and includes instructions for both the environmental consultant as well as the designated sample collector from the industrial facility. If you have not been provided those instructions, they can be downloaded at hydro-int.com/testguidelines.com

Samples should be shipped the same day that they are taken. Hydro International personnel will notify you if there are any additional instructions specific to your pollutants of concern (temperature requirements, chain of custodies et cetera).

Hydro International
INDUSTRIAL STORMWATER COLLECTION GUIDELINES

TO BE COMPLETED BY (EC) ENVIRONMENTAL CONSULTANT:

Your Name: _____ Your Title: _____
 Your Company Name: _____
 Your Industrial Client's Name (if different from above): _____
 Facility City, State: _____
 Pollutants to Test: _____
 What are the units for each? _____
 How are the units treated? _____
 How are you treating the water? _____
 Is the site using other stormwater treatment technologies, or just a catchment? _____
 Where will the sampling take place in relation to the existing equipment? _____
 What is the schedule for implementing further stormwater treatment for this catchment area? _____
 (Sediment) (Within the past year) (Within the next 2 years)

The environmental consultant should complete the front page of this form before sending off all materials including the stormwater sampling bucket and return label to the company/person(s) conducting the stormwater sampling. Environmental consultants performing sampling for multiple sites should complete both sides of this form.

If the environmental consultant has any questions, please contact your Hydro International Stormwater Specialist.

Hydro International
INDUSTRIAL STORMWATER COLLECTION GUIDELINES

TO BE COMPLETED BY INDUSTRIAL STORMWATER COLLECTOR (IF DIFFERENT FROM EC):

Your Name: _____ Your Title: _____
 Company Name: _____ Facility Address: _____
 Facility City, State: _____ Date of Sampling: _____
 Was this collected during a rain event? (Y/N) _____
 Where were you located (catchment point)? _____
 Please describe how the samples were collected: _____
 Is there anything else worth noting about the sampling collection? _____

COLLECTION CHECKLIST

- Fill bucket with appropriate amount of water, immediately during a rain event.
- NOTE:** Samples taken prior to rain event may show incorrect results.
- Complete the glove portion of the form, place behind bucket head when returning it to Hydro.
- Place the plastic Floating Device into bucket and place on the outside of the bucket.
- Fill out the Federal Express label to return the bucket analysis sheet.

One more thing to do: place form as well as the FedEx label, plus the stormwater bucket, into the return box and place into the outside of the bucket when ready.

Hydro International 100 Columbia Drive, Portland, OR 97202 • 503.251.4100

Pollutant Removal Testing Kit Includes:

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- (1) 5-gallon bucket
- (1) Pair non-latex gloves
- (1) FedEx label
- (1) FedEx label holder

Overview: Solids Analysis Testing

A high amount of sediment on your site may require use of a separator as either a pretreatment or standalone device. Using a sample of your site's stormwater, we'll use the following methodology to determine which of our sediment separating devices would work best on your site:

- **Particle Size Distribution (PSD)** - Using a sieve, we can screen out solids and evaluate particle size.
- **Specific Gravity** - Measuring specific gravity will tell us the sediment settling rate which will help us recommend a treatment separator best suited for your site.

SOLIDS ANALYSIS SAMPLING COLLECTION:

In order to perform a solids analysis test we'll need a one-liter liquid sample as well as a softball sized sample of sediment taken from a location that is discharging from your site.



INDUSTRIAL STORMWATER SEDIMENT SEPARATORS:

DOWNSTREAM DEFENDER:

High Flows, High-Level Treatment. Impressive floatable capture during even your highest peak flows. Perfect for small to medium sized sites needing to treat larger drainage areas, it can function as either a pretreatment or as a standalone device.

FIRST DEFENSE HIGH CAPACITY:

Works easily with large pipes, multiple inlet pipes, inlet grates and can save 40% more site space due to having the highest certified loading rate in the stormwater industry.



Follow instructions outlined in the Stormwater Collection Guidelines worksheet which can be accessed via hydro-int.com/testguidelines. **NOTE:** this guide is two pages and includes instructions for both the environmental consultant as well as the designated sample collector from the industrial facility.

Samples should be shipped the same day that they are taken. Hydro International personnel will notify you if there are any additional instructions specific to your pollutants of concern (temperature requirements, chain of custody et cetera).

Column Test Unit



Up-Flo® Filter

Column testing mimics the technology used in the full-scale Up-Flo Filter unit.



The scale Up-Flo® Filter test column is made from 2-inch diameter clear PVC, as shown in **Fig. 3**.

- A) Flow enters the column from the bottom where it passes through the same flow distribution media that is used in the full-scale Up-Flo® Filter.
- B) Flow then passes through 8 inches of treatment media before exiting through the overflow.
- C) Pretreatment and post-treatment samples are taken and analyzed for pollutant composition to evaluate the effectiveness of the Up-Flo® Filter.
- D) A pretreatment sample is taken from a well-mixed sample provided from the test site. The post-treatment samples are taken from the overflow after the flow has passed through the Up-Flo® Filter test column. Flow rates are measured by the time-to-fill method at the overflow.

Efficiency

Pretreatment, screening and filtration in one device.



Flexibility

Higher loading rates means a smaller footprint while modular components can adapt to any catchment area.

Longevity

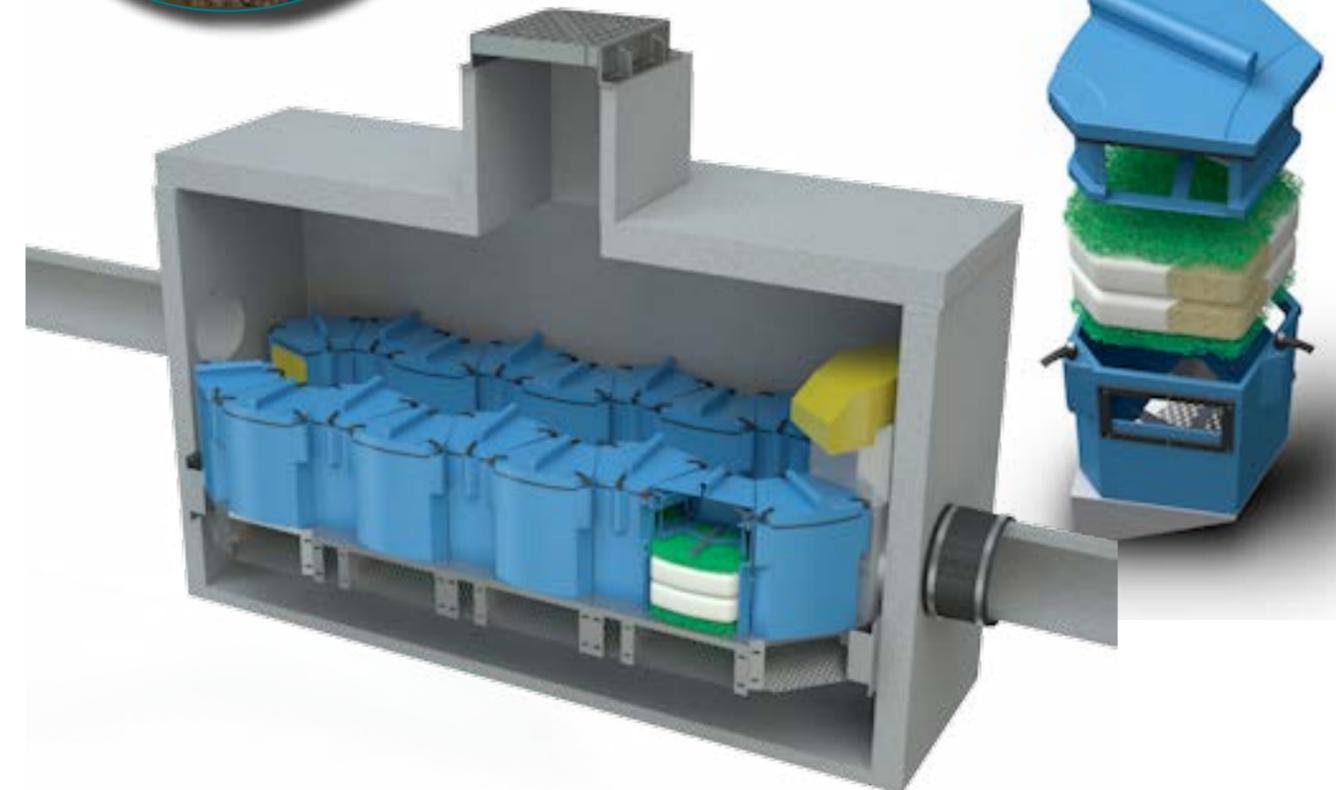
Longer media life means you can go longer between servicings.

Easy Sump Access

Maintenance is simple with easy access to the sump and replaceable media packs. A vactor truck is used to remove sediment and debris from the sump.

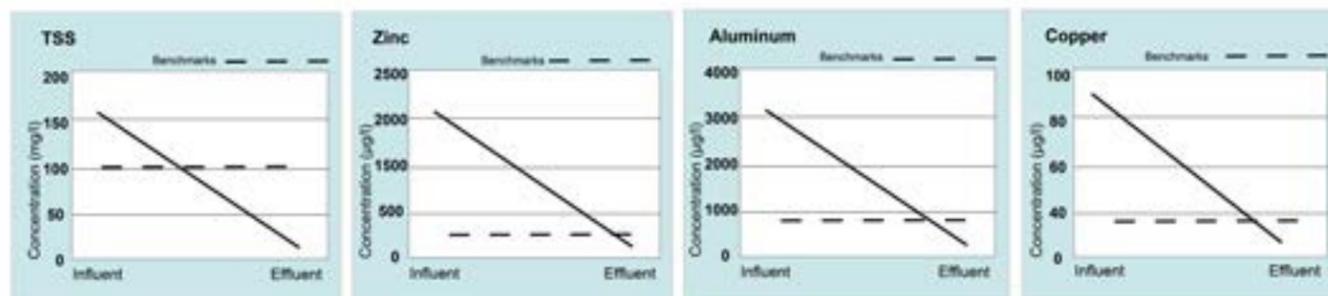
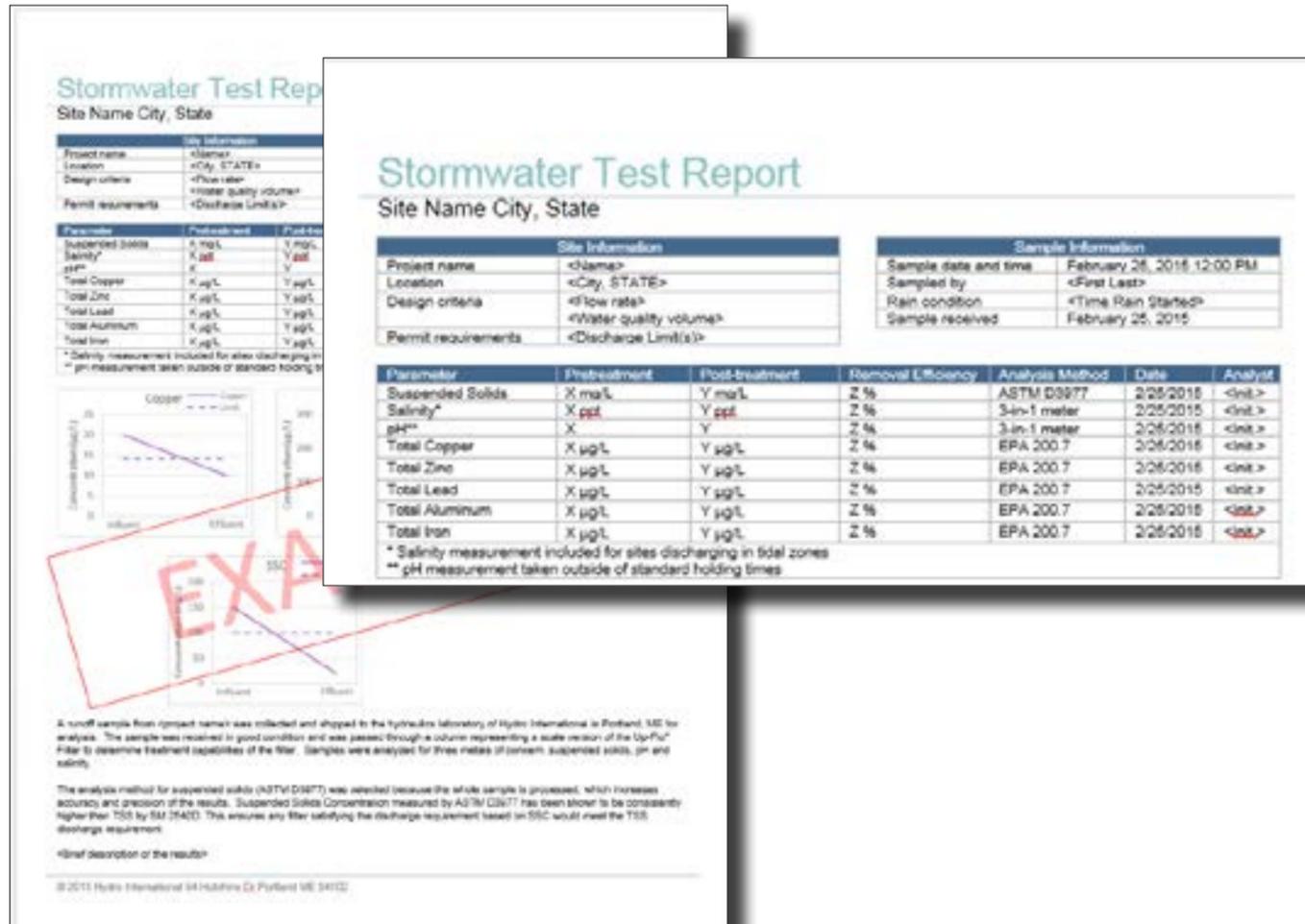
Simple Media Swap

Unlike other filter systems whose media cartridges weigh upwards of 250lbs, our lightweight media bags can be manually replaced without removing or replacing the entire module.



The Up-Flo® Filter was designed with efficiency, longevity and upkeep in mind. The unit is a high performance, low maintenance filter option that offers higher loading rates and longer media life so you'll get quality water for longer periods between servicings.

Column testing data is submitted to certified third party laboratories for an objective analysis. The data for the raw water and the treated water is then delivered back to the industrial facility and/or environmental consultant.



Turnaround times for pollutant removal testing can vary. Results can sometimes be ready in a week or less while other results may need to be repeated because of user error. In order to ensure the fastest timing possible, please be sure to:

- Follow the sampling guidelines very carefully. Delays are most commonly caused by samples that are collected inappropriately.
- Consult with Hydro International about what sampling shipping time-lines are appropriate before mailing.

Turnaround times vary and are minimized by letting us know ahead of time when sampling will be occurring. Typically turnaround times are 6-7 business days from the time the sample is received.



Resources

<https://fortress.wa.gov/ecy/publications/SummaryPages/1503044.html>

Test Drive Your Treatment Option

Visit hydro-int.com/samplekit to request your free pollutant removal testing kit



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