Lurking Beneath the Surface

Could Emerging Contaminants Affect Your Next Deal?

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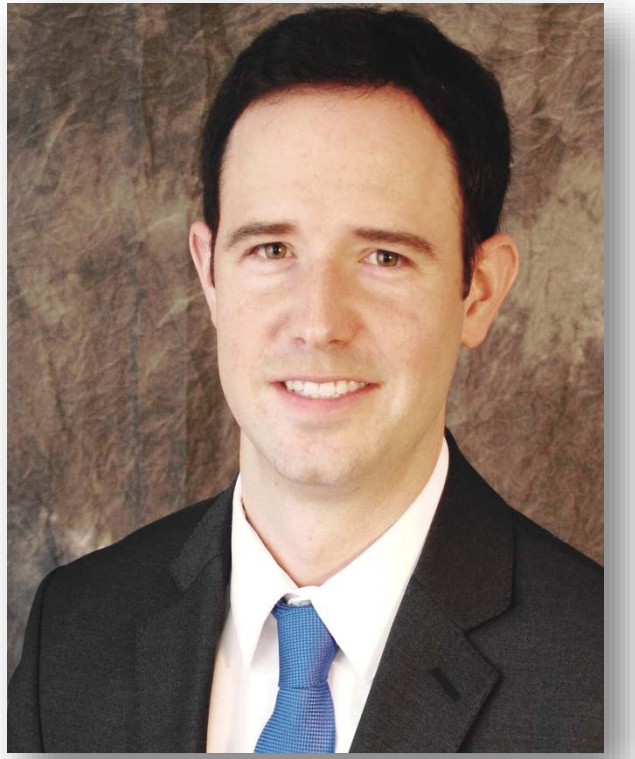
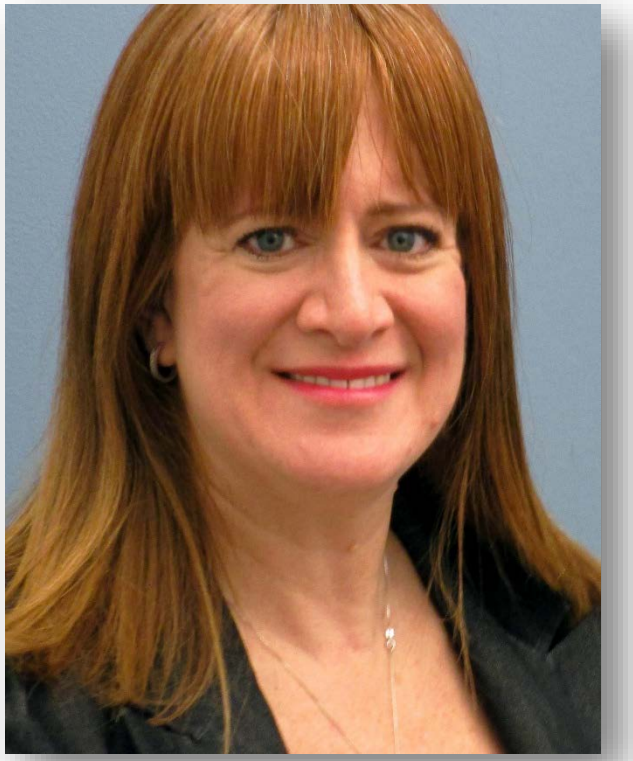
Meet our Panelists



Kevin McCartney, P.G.

Mr. Kevin McCartney is a Principal with BBJ Group. He manages the Real Estate and Transaction Services Group and works closely with our Site Investigation and Remediation Group. He also helps clients navigate the complicated world of emerging contaminants and the regulatory flux around investigations and cleanup processes.



Leslie Nicholas

Ms. Leslie Nicholas is a Senior Consultant with BBJ Group. She helps clients understand the impact of changing regulations on their business and investments. She provides our clients with sustainable strategies that minimize potential risk from future statutory and policy changes.

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Introduction

- New technology is enabling scientists to identify environmental contaminants that could not be detected before
- These contaminants are pervasive in our environment given their broad domestic, commercial and industrial use, some since the 1950s
- The regulatory climate around these contaminants is in flux – making it difficult to predict how the identification of these materials could affect land-owners

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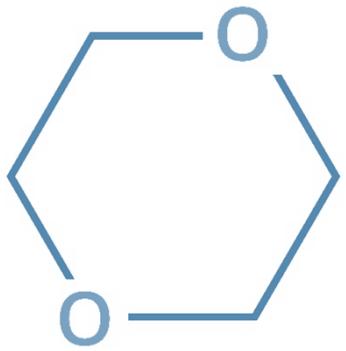
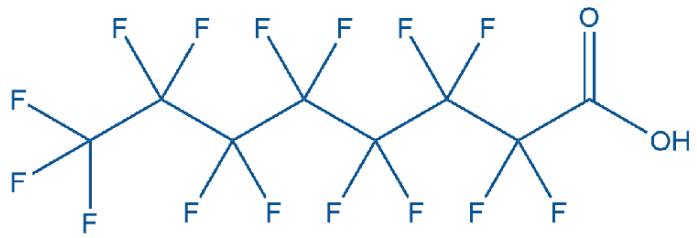
What are emerging contaminants?

- Contaminants of Emerging Concern (CECs) are chemicals that:
  - Were previously unknown as contaminants and are thus not well regulated
  - Have unique physical properties that affect detection and cleanup options
  - Are still being studied for their relative toxicities
- Knowing **where they come from** and **how they might affect the environment** can provide a path forward for individual transactions

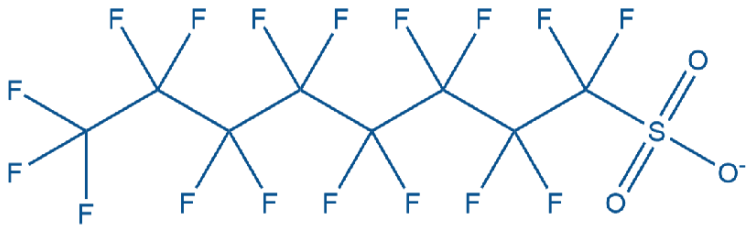
Commonly Recognized CECs



1,4-Dioxane



Perfluorooctanoic acid (PFOA)



Perfluorooctane sulfonate (PFOS)

Two Specific
Per-and Poly-**F**luoro**a**lkyl **S**ubstances
(PFAS)

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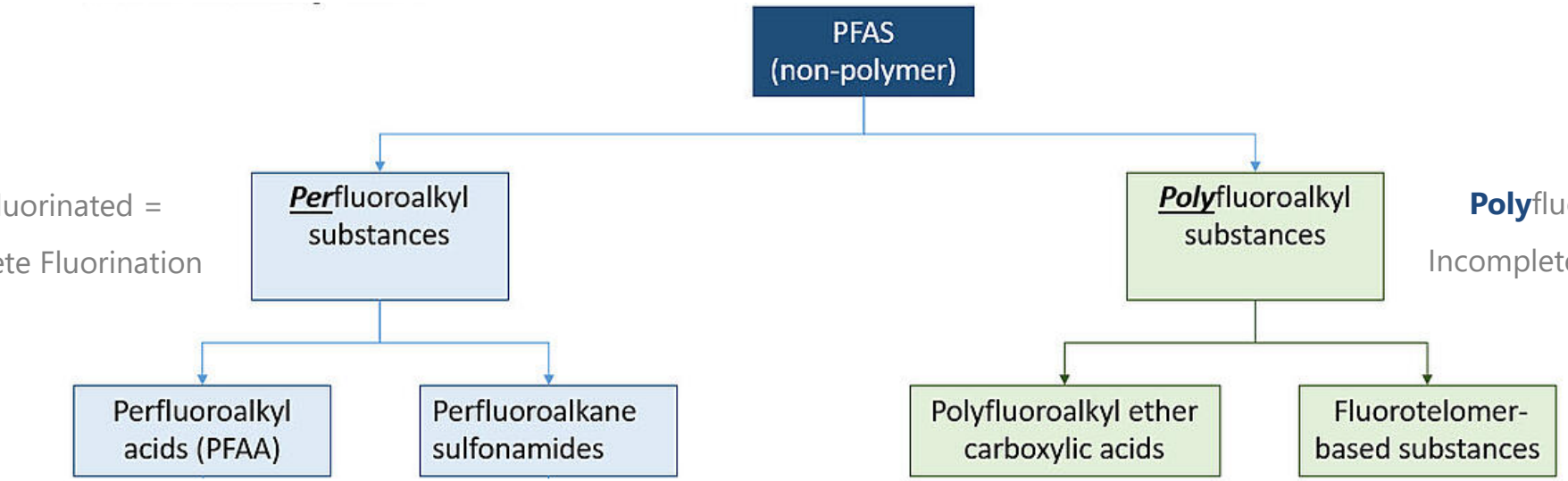
A bit more on **PFAS**

Per-and **P**oly-**F**luoro**a**lkyl **S**ubstances

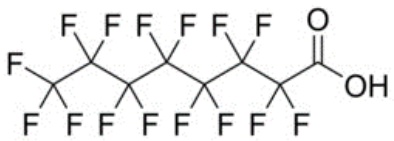


Perfluorinated =

Complete Fluorination

Polyfluorinated =

Incomplete Fluorination



PFOA
(Perfluorooctanoic Acid)

PFOS
(Perfluorooctane sulfonic Acid)

GenX
Fluorinated chemicals
to replace PFOA

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It's Difficult **Finding the Truth** amidst Misinformation

- Emerging contaminants are popular in multiple media outlets but are poorly understood by those in the media
- Making finding **reliable information** difficult

The News&Observer

Duke to study PFAS contamination in Pittsboro. How to protect your home drinking water

New York Bans Products With 1,4-Dioxane

Michigan has more PFAS sites than other states. There's a reason.

Posted Aug 25, 9:00 AM

Town awarded $3 million to remove 1,4 dioxane from water

NEWS > ENVIRONMENT

Colorado ramps up response to toxic "forever chemicals" after discovery of hot spots across metro Denver

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Multiple Definitions of Contaminants of Emerging Concern

- Universe of CECs is **constantly evolving**
- Regulators around the world are trying to define Priority CECs
  - USEPA lists 13 CECs on its website – yet drinking water studies include multiple additional CECs
  - European Union (EU) Watch List identifies 17 CECs

USEPA must choose which contaminants to study

- 1996 Amendments to Safe Drinking Water Act (SDWA) created mechanisms for USEPA to study **Contaminants of Emerging Concern (CECs)**
  - Contaminant Candidate List (CCL)
  - Unregulated Contaminant Monitoring Rule (UCMR)
  - Regulatory Determinations
- Focus on chemicals without health-based standards under SDWA but that **are suspected of being in drinking water supplies**

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Traditional Remediation techniques are not effective and can be costly

- 1,4-Dioxane and most PFAS are **highly soluble and mobile** in groundwater
- 1,4-Dioxane is not effectively treated with granular activated carbon (GAC) and air stripping
- Many PFAS in-situ remedies have not yet been proven to be effective or cost-effective

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Problematic Sites during diligence

- Many products contain PFAS to provide resistance to water, stains, heat, oil, grease, and other chemicals; reduce wear and surface tension; and render very good heat transfer properties
- 1,4-Dioxane was used to stabilize solvents and is used as a purifying agent in pharmaceutical manufacturing

Aerospace

Apparel

Construction

Chemicals and Pharma

Electronics

Oil & Gas

Energy

Healthcare

Fire Fighting (AFFF)

Semiconductors

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Testing Pitfalls if investigating

- Detection limits in parts per **trillion**
- 1,4-Dioxane may not be on your standard parameter list and modifications may be necessary to achieve lower detection limits
- PFAS has slightly different sampling strategies with specific sampling protocols to negate outside interference

USEPA has developed an **Action Plan** to address PFAS Challenges

- USEPA published a PFAS Action Plan in February 2019
- Outlines four priority actions, three of which are for PFOA and PFOS
- Short- and long-term goals focused around expanding knowledge, developing guidance, established standards, and improving communication

Key EPA Actions Addressing PFAS-Related Challenges

- Expand toxicity information for PFAS
- Develop new tools to characterize PFAS in the environment
- Evaluate cleanup approaches
- Develop guidance to facilitate cleanup of contaminated groundwater
- Use enforcement tools to address PFAS exposure in the environment and assist states in enforcement activities
- Use legal tools such as those in TSCA to prevent future PFAS contamination
- Address PFAS in drinking water using regulatory and other tools
- Develop new tools and materials to communicate about PFAS

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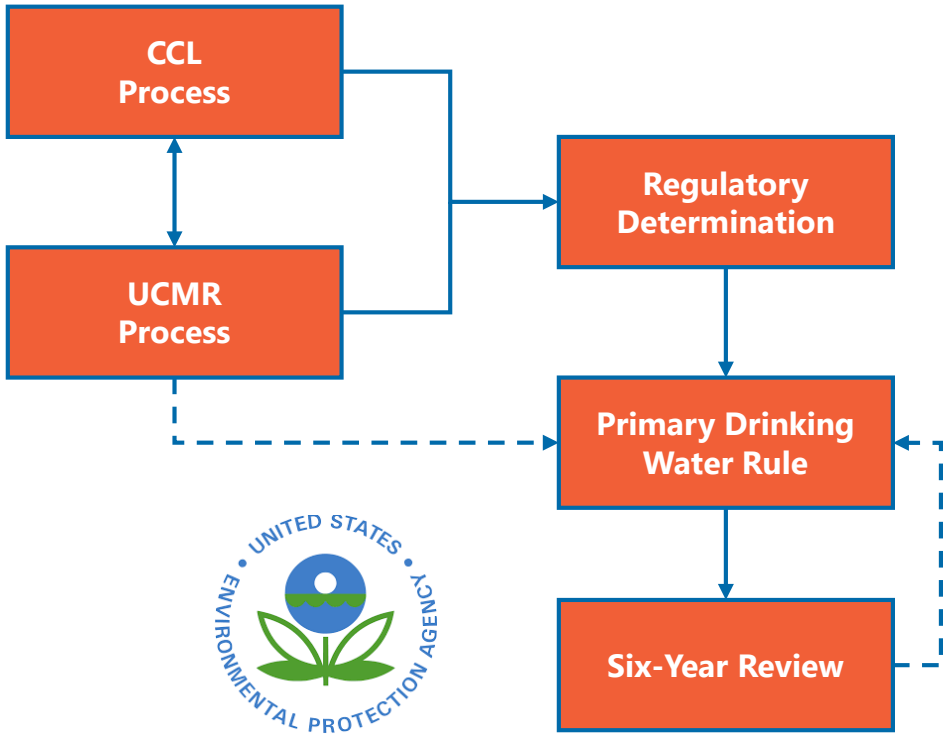
However, the regulatory process is methodical – and slow

- The regulatory process for identifying, studying, and issuing standards for new contaminants is multiple stages, most of which involve public comment periods
- Public awareness puts pressure on state and local regulators to speeds up the process



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State responses to lack of federal regulatory standards

- New York proposed to ban 1,4-dioxane
- Eight states have standards or guidelines around 1,4-dioxane
- 21 states are proposing or have established standards for individual PFAS

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Case Studies for PFAS

- Discovery of former plating operations at a Connecticut facility; PFAS not appropriately considered in seller's diligence.
- In Michigan, PFOS and PFOA were tested for and demonstrated to be below Michigan EGLE standards, documented in Baseline Environmental Assessment (BEA)

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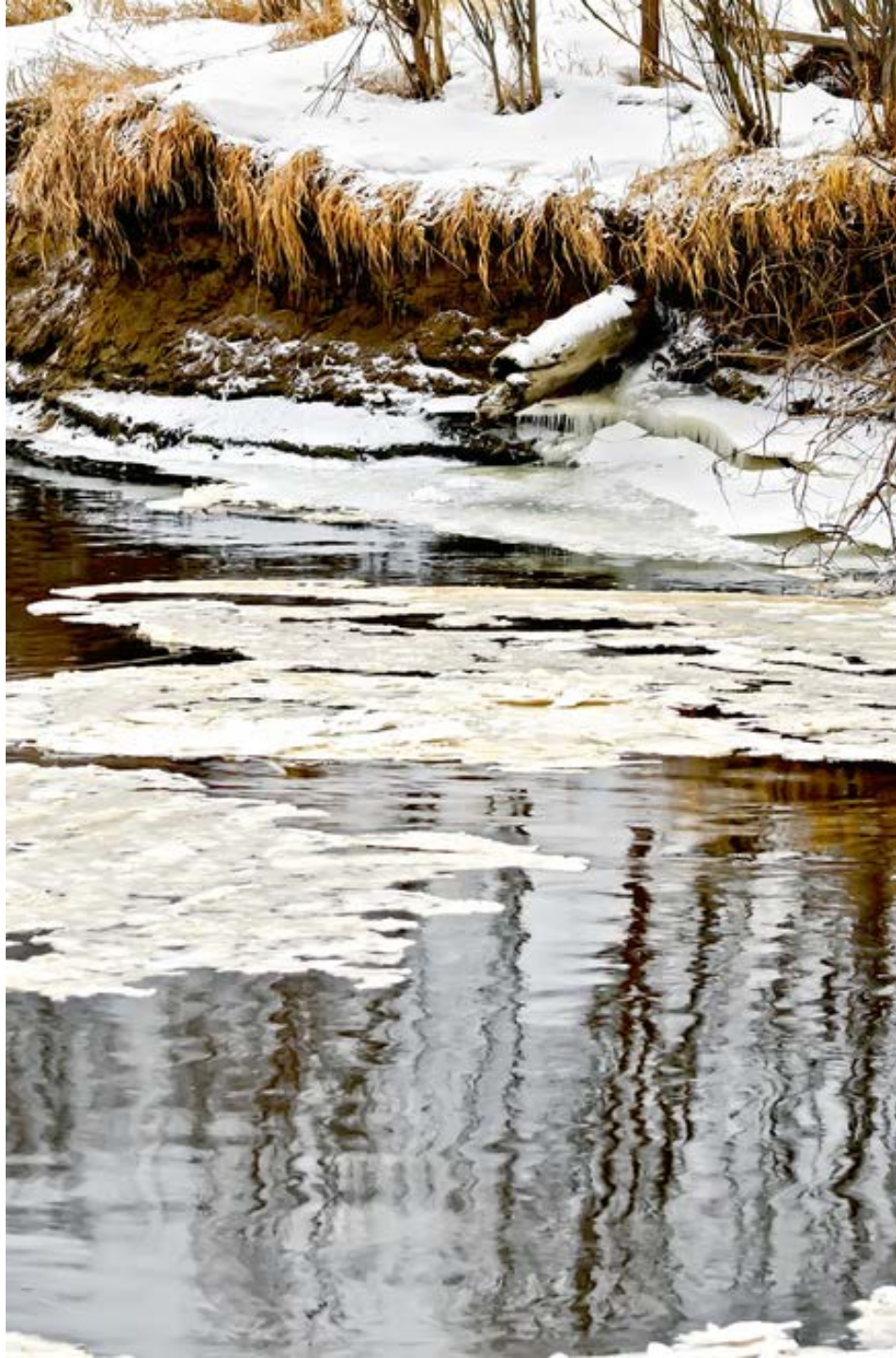
Case Studies for 1,4-Dioxane

- Purchaser sought remediation cost estimates for RCRA Corrective Action site in the Southeast US undergoing chlorinated VOC remediation for three decades. 1,4-Dioxane never evaluated.
- 1,4-Dioxane found at RWQCB site facility in California contaminated with 1,1,1-TCA. Prior in-situ remediation to address the contaminants was ineffective.



Key Takeaways

- CECs are suspected to have adverse health effects and scientific studies are expanding the universe of CECs.
- Federal regulatory standards are slow in coming, with state to state and country to country requirements that can have very low standards or guidance levels.
- CECs have unique properties that make investigation and cleanup more challenging and expensive.
- Understanding historical uses can identify what contaminants may be present.

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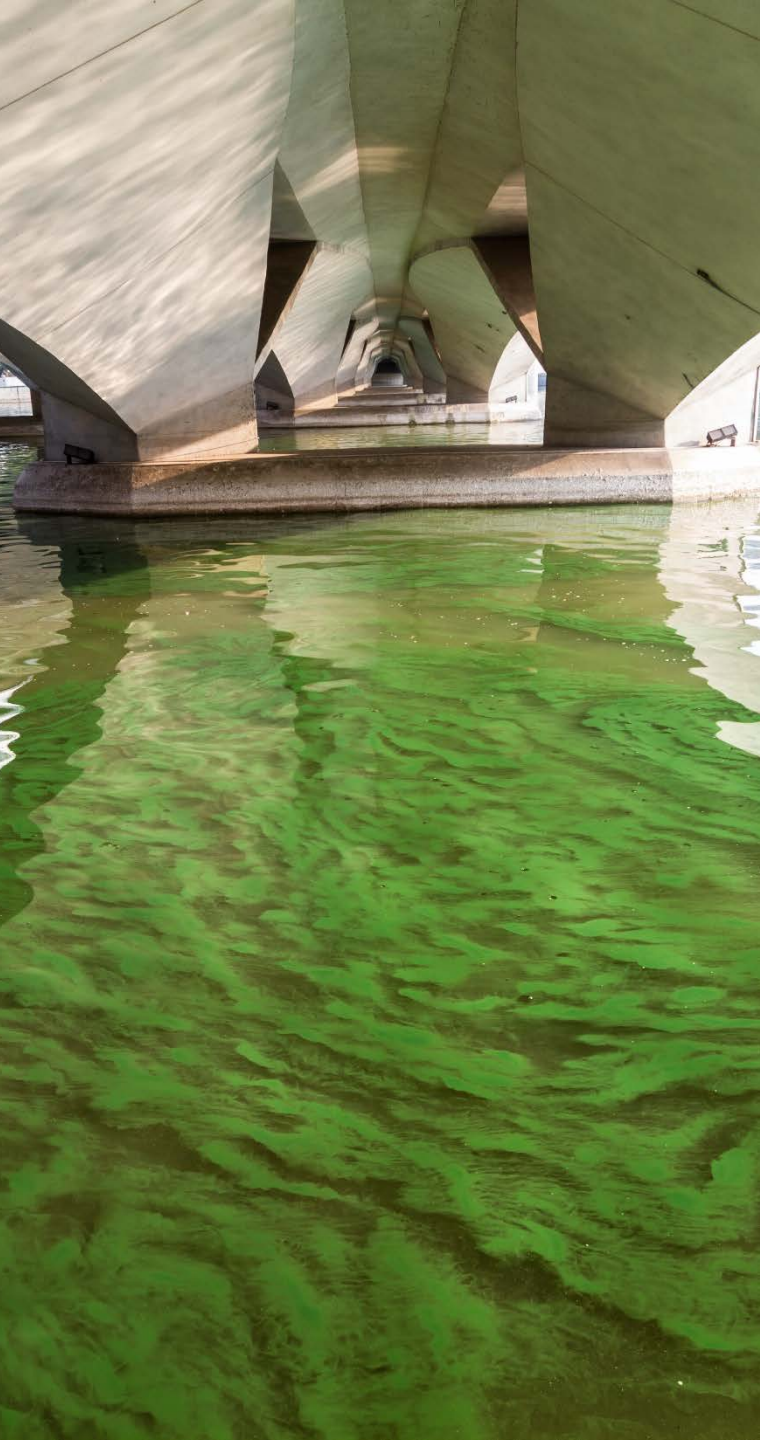

Questions?

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Get in Touch

WEB:
www.bbjgroup.com

PHONE:
800 875 1756

EMAIL:
info@bbjgroup.com

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