



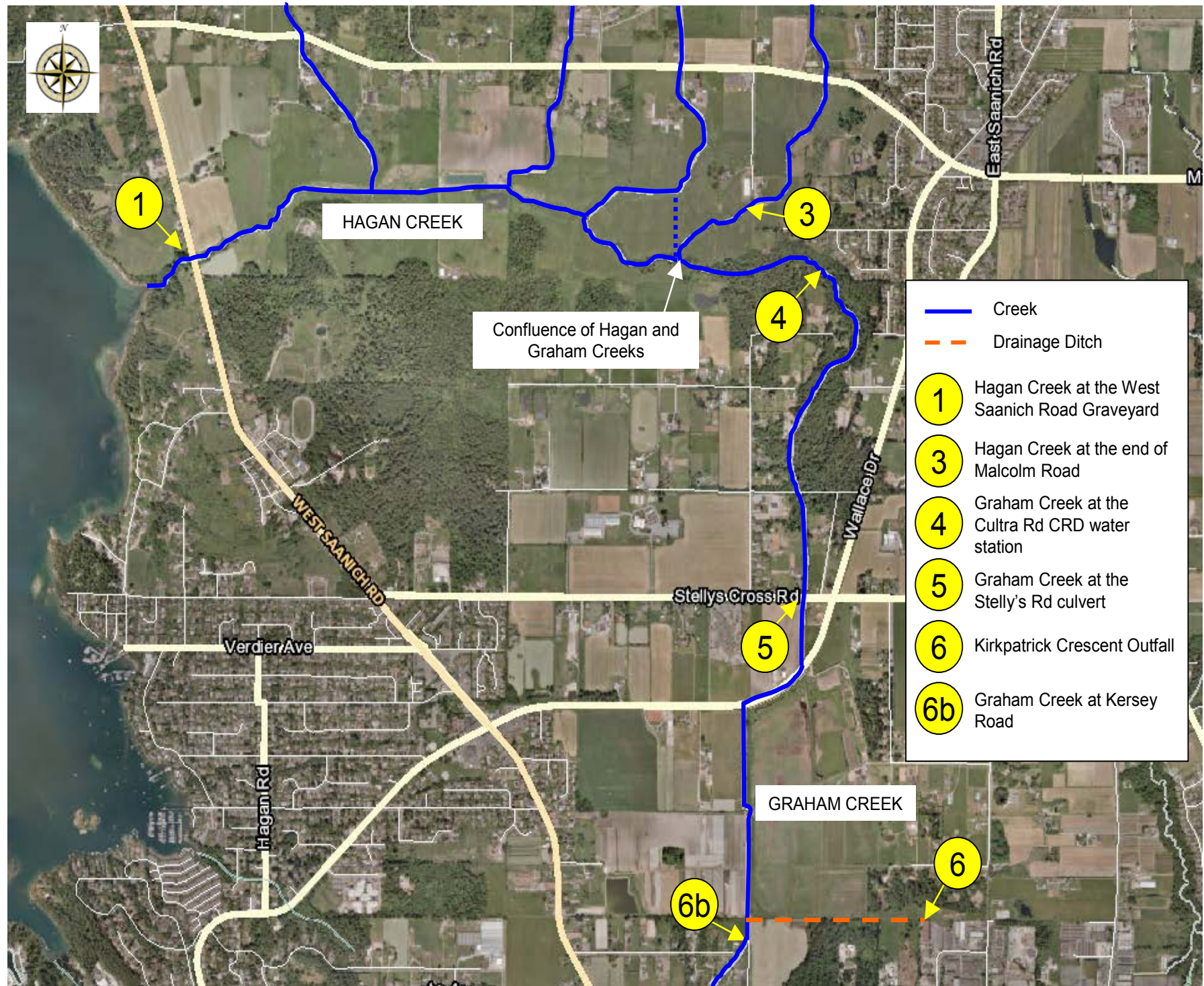
Presentation to the District of Central Saanich – Hagan-Graham and Tetayut Water Quality Monitoring Programs

April 24th, 2017

Hagan-Graham Summary

- 'Modern' WQ program undertaken at 6 sites on Hagan-Graham Creeks: 148 monthly sampling events since June 2005
- Measuring of water temperature, O₂, pH, conductivity, phosphate, nitrite, nitrate, ammonia and turbidity at each site
- Metals, PAH, TEH and fecal coliform measured at Kirkpatrick outfall in water (monthly) and sediments (~quarterly)
- ~2700 hours of volunteer effort in total

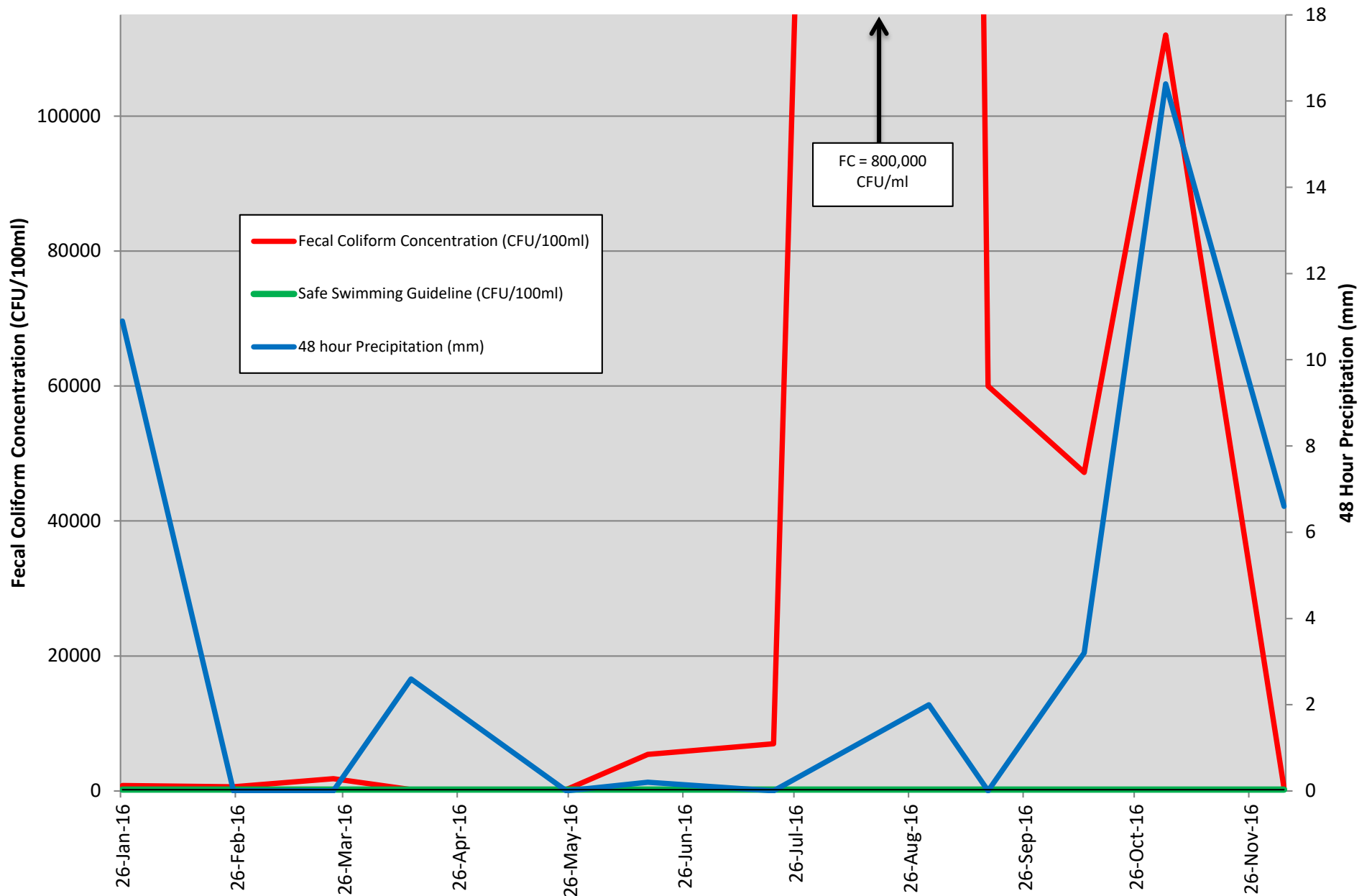
Water Quality Monitoring – Hagan-Graham Site Map



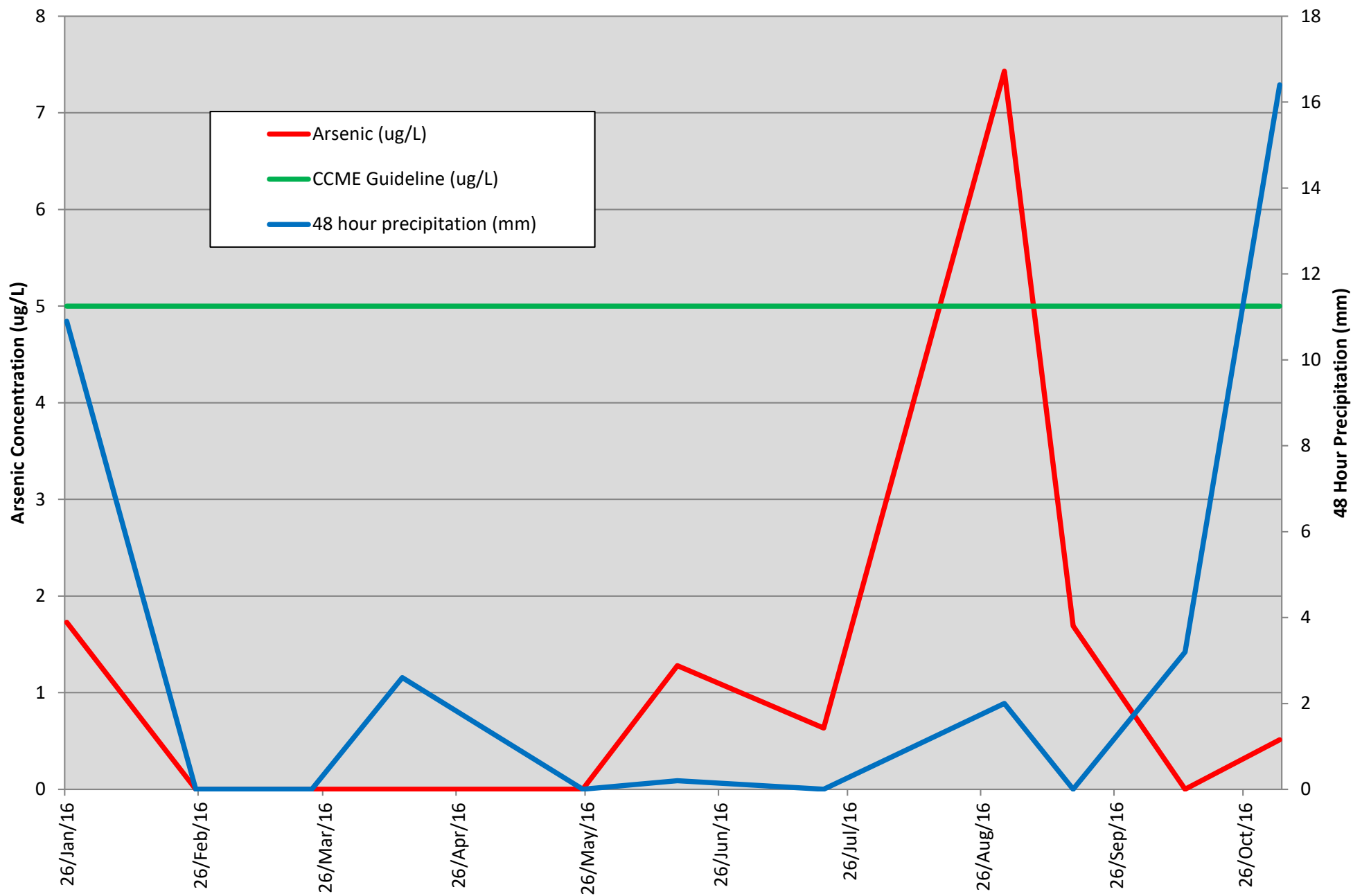
Water Quality Sampling -
Kirkpatrick Crescent outfall -
Fecal Coliforms and Selected
Metals and TEHs

Water Quality Monitoring – Graham Creek - Kirkpatrick Crescent Outfall

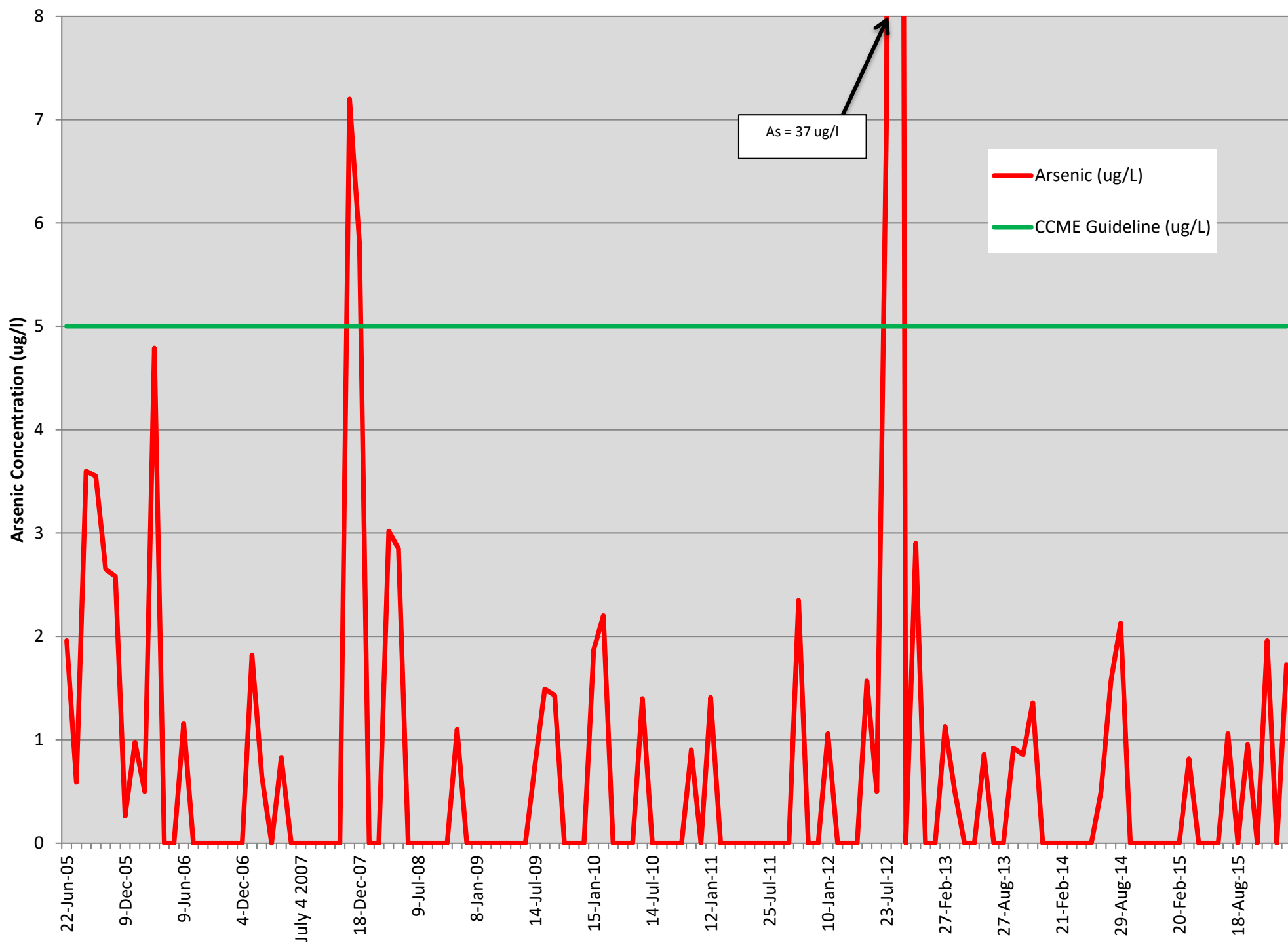
Graph 1 - Concentration of fecal coliforms (CFU/100mL) in water from Kirkpatrick Crescent outfall in 2016.



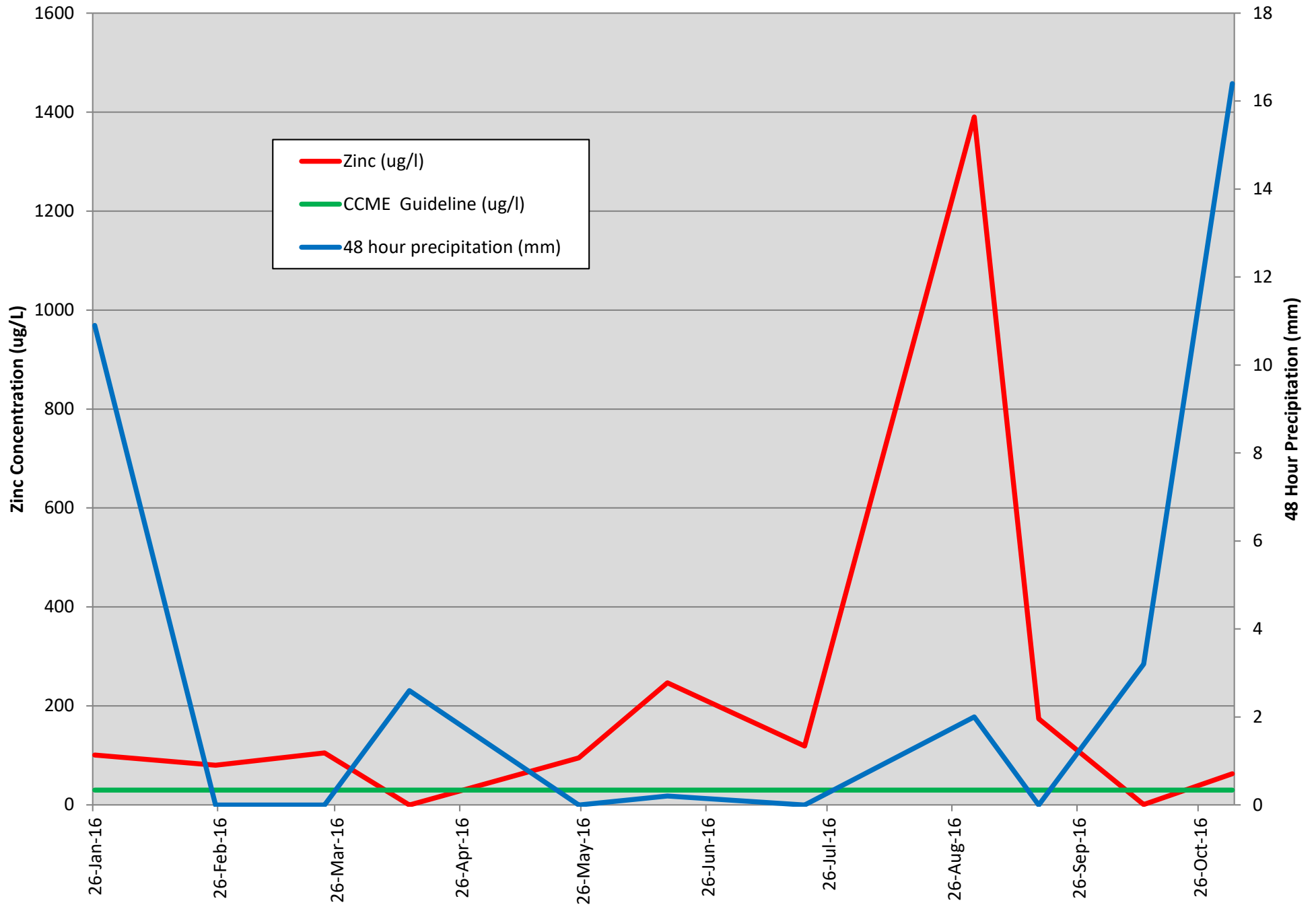
Graph 2 - Concentration of arsenic (ug/L) in water from Kirkpatrick Crescent outfall in 2016.



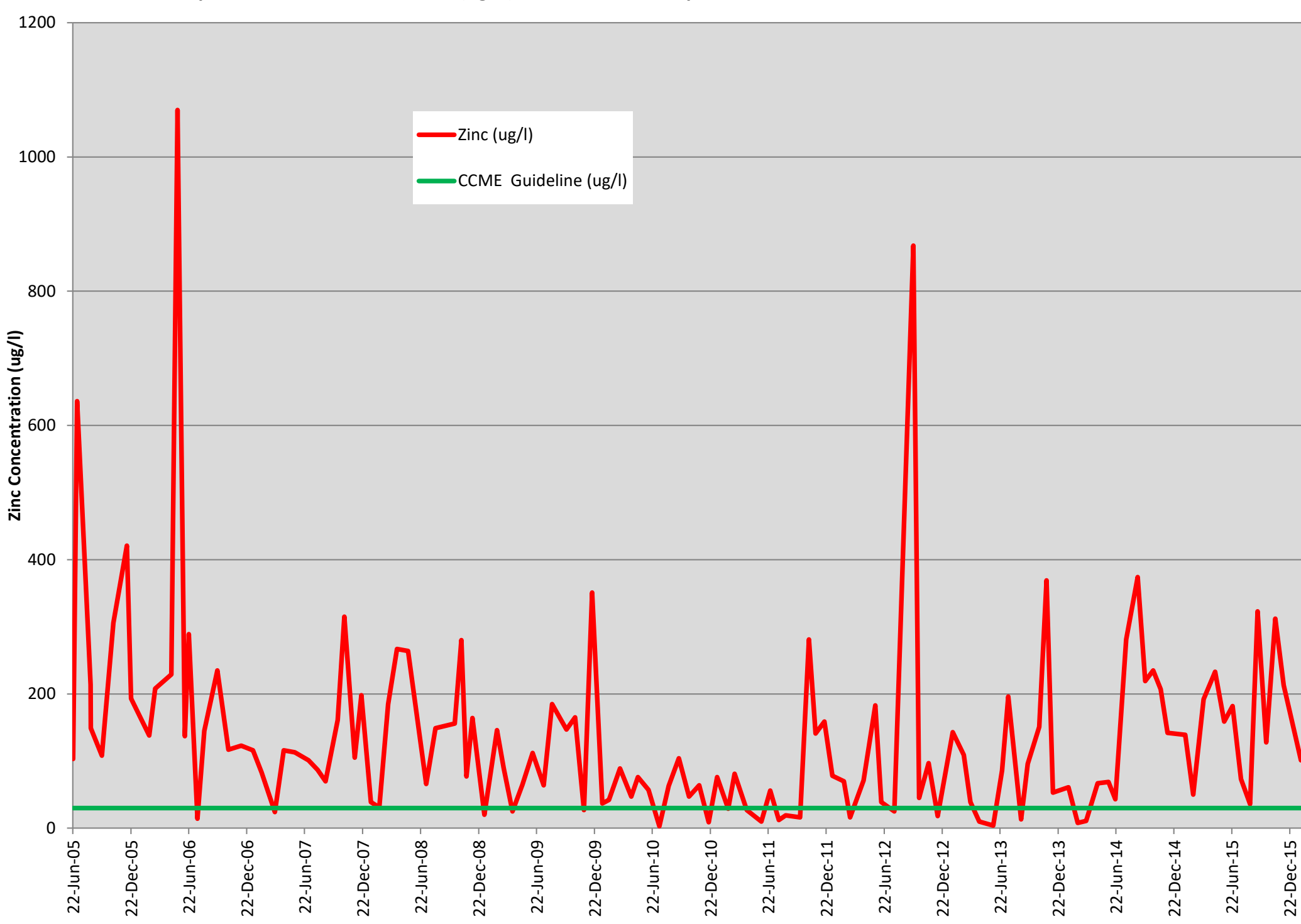
Graph 3 - Concentration of Arsenic (ug/L) in water from Kirkpatrick Crescent Outfall from June 2005 to Dec 2015.



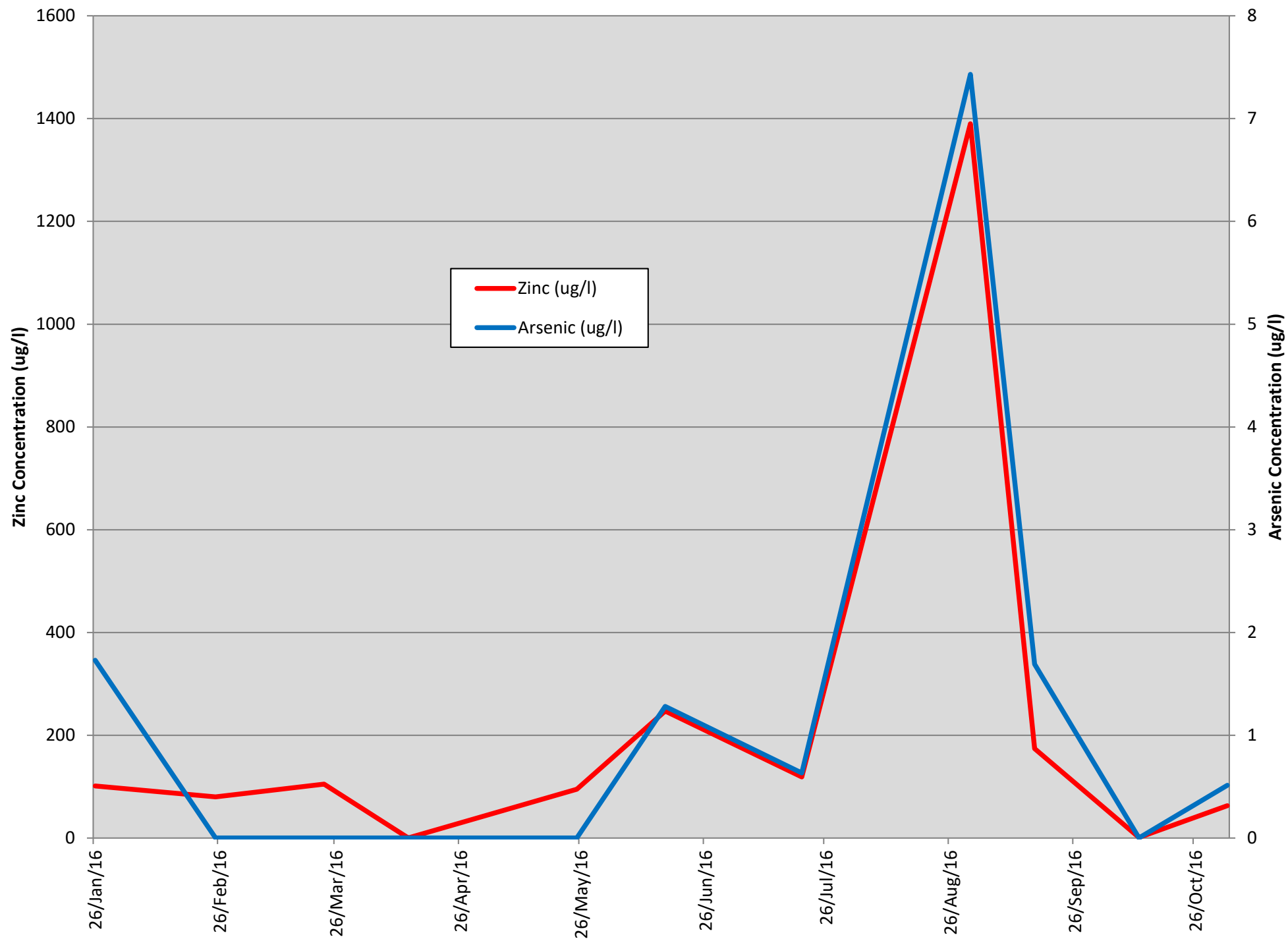
Graph 4 - Concentration of zinc (ug/L) in water at Kirkpatrick Crescent outfall in 2016.



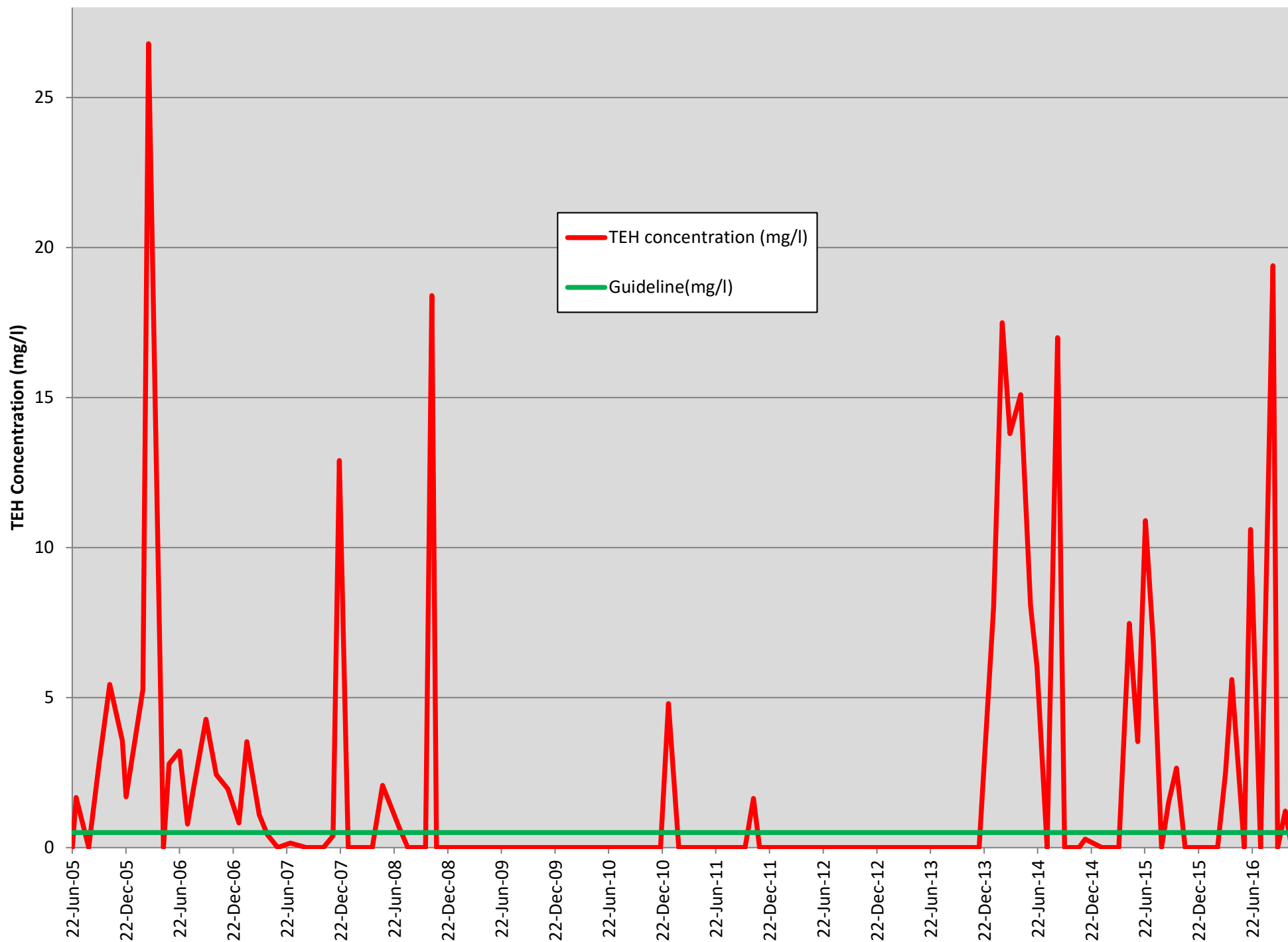
Graph 5 - Concentration of zinc (ug/L) in water from Kirkpatrick Crescent Outfall from June 2005 to Dec 2015



Graph 6 - Concentration of arsenic and zinc (ug/L) in water from Kirkpatrick Crescent outfall in 2016.



Graph 7 - Concentration of TEHs (mg/L) in water from Kirkpatrick Crescent outfall from June 2005-Dec 2016
present.

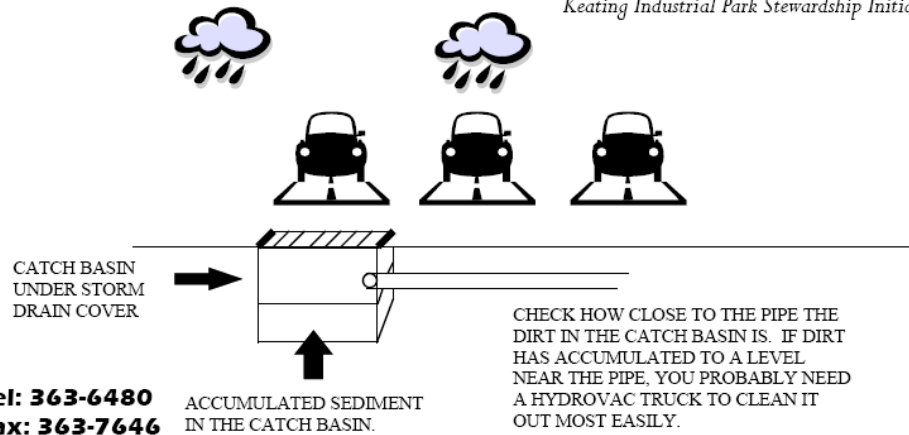




Please reply by November 22!

Storm Drain Catch Basin Cleaning

Keating Industrial Park Stewardship Initiative



Tel: 363-6480

Fax: 363-7646

- Clean storm drain catch basins help trout and salmon in Graham and Sandhill Creeks.
- Check your business parking and loading dock storm drains using the drawing above.
- Save money! Have the work done when your neighbour does; transit costs are reduced.
- Peninsula Streams will forward your contact information to either of two companies with hydrovac trucks in the area (Coast or McRae) to schedule group service.

PENINSULA STREAMS SOCIETY

C/o IOS
9860 West Saanich Rd
Sidney, BC V8L 4B2
V8M 1R3

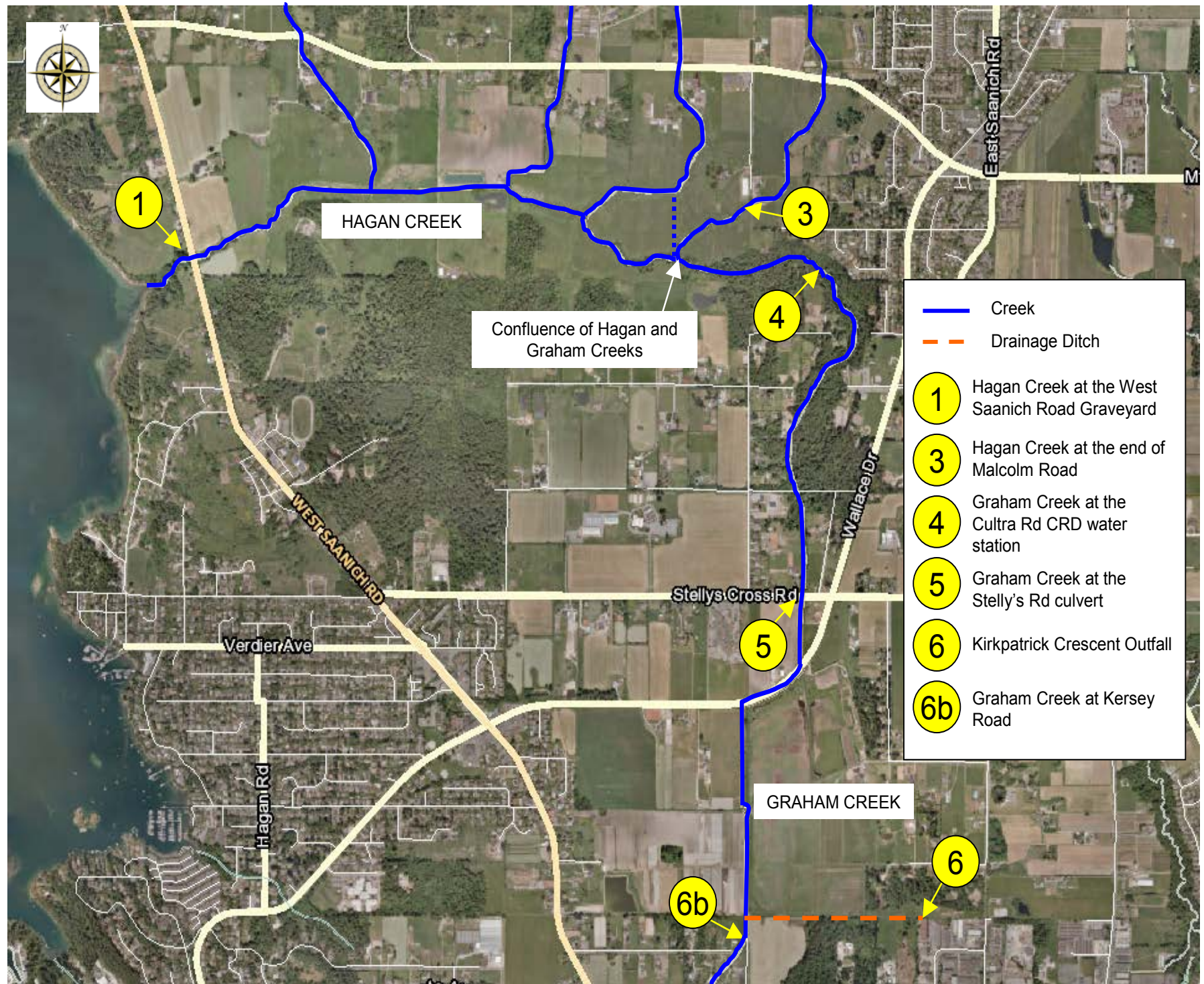
Fax: 363-7646 Tel: 363-6480
Email: verstegens@pac.dfo-mpo.gc.ca

Yes, please include our business on the list for service with fellow Keating businesses!

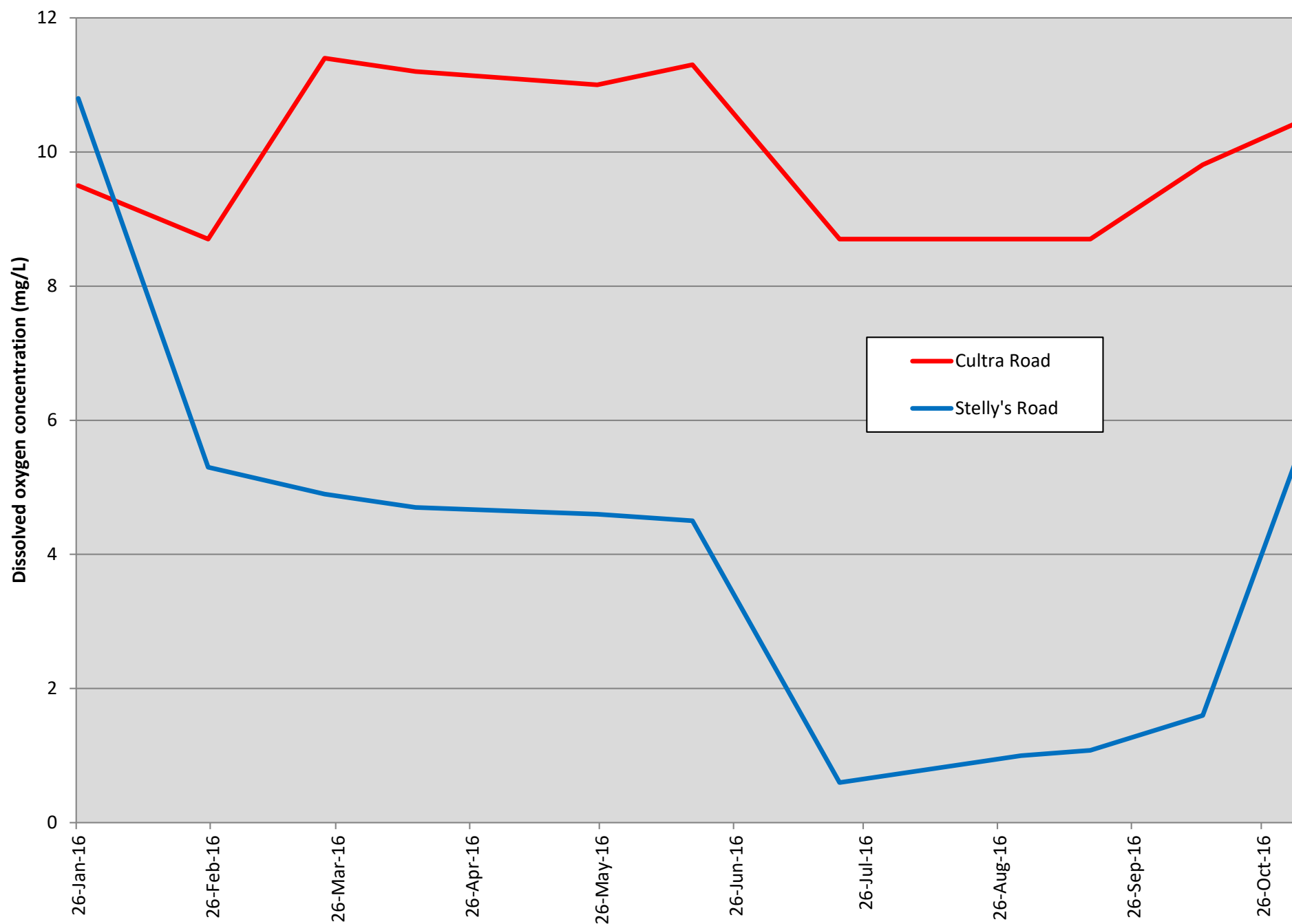
We have ____ catch basins of which ____ is/are packed with dirt to the pipe.

Business name, address, phone and contact person:

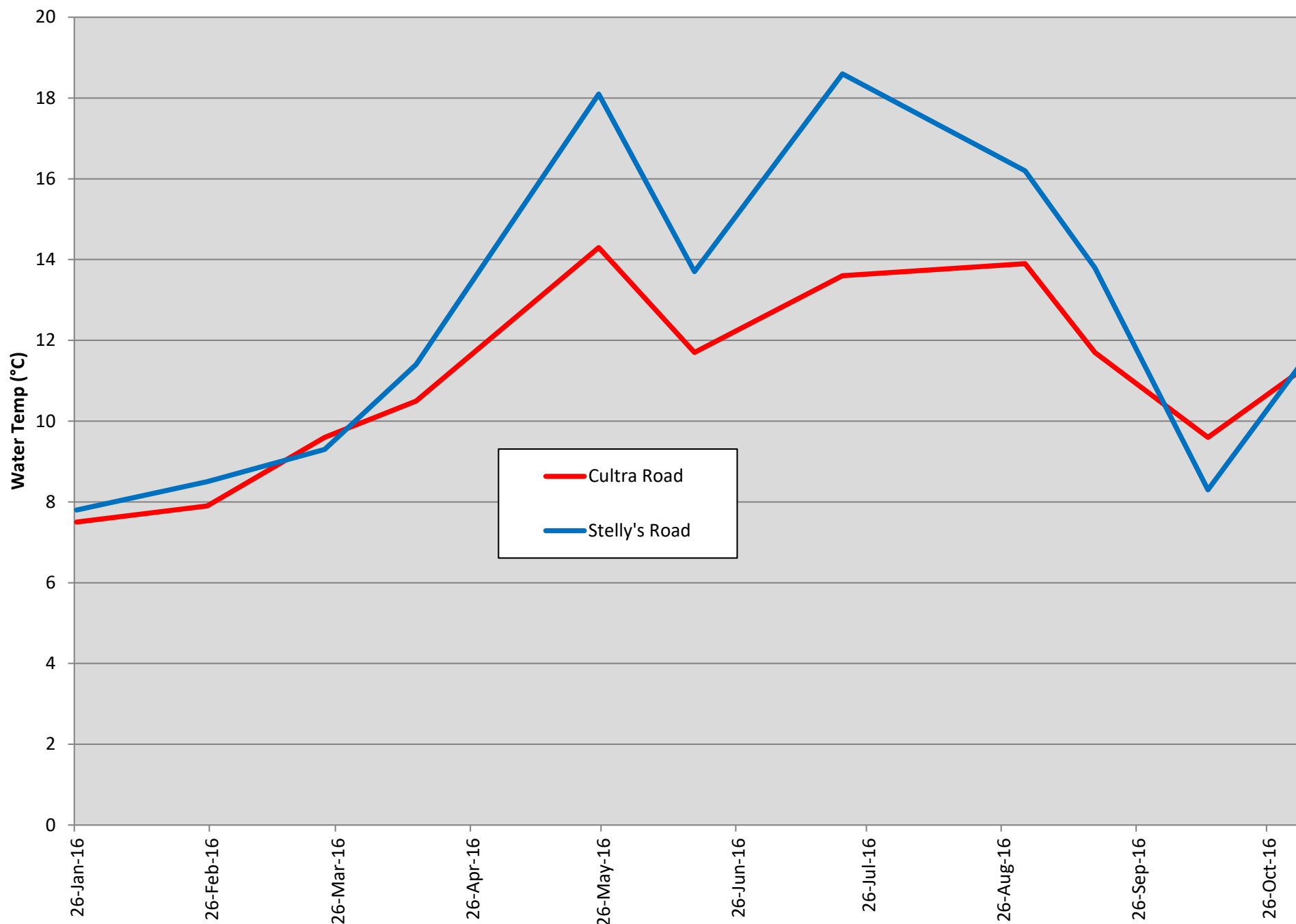
Water Quality Monitoring – Hagan-Graham Site Map



Graph 8 - Concentration of dissolved oxygen (mg/L) of water from Cultra Road and Stelly's Road sites.



Graph 9 - Temperature (°C) of water from Cultra Road and Stelly's Road sites.



Water Quality – Hagan Creek - Comment

- Encourage regular contact with all the businesses in the Keating Industrial area to determine if BMP's are being followed with respect to discharge to storm sewers. Although some improvements are noticeable, there are still some chronic problems: cadmium, copper, chromium, zinc, lead, nickel, TEHs, coliforms, low dissolved oxygen levels and turbidity outside the site-specific guideline.

Water Quality – Hagan Creek - Recommendations

- Continue monitoring contaminants in the water/sediment at the Kirkpatrick outfall. *(underway)*
- Renew public education and awareness projects such as the Keating Industrial Park Water Quality Initiative.
- Install end of pipe filter and/or a constructed wetland to clean contaminated stormwater downstream of the Kirkpatrick outfall and act as a buffer between catastrophic spill events and downstream areas. *(part of ISMP Implementation)*
- Work with landowners to educate them on the problems associated with depositing organic matter in creeks and other fresh water bodies (Agricultural Committee as conduit).
- Investigate the feasibility of restoring Graham Creek upstream of the culvert under Stelly's Road (Site 5), with a view to improving the ecological functioning of this reach. *(part of ISMP Implementation)*
- Work to educate landowners on the importance of riparian vegetation and stream features such as large woody debris and pool-riffle complexes to stream ecosystem health.
- Further implement recommendations of the ISMP process as soon as fiscally possible.
- Re-establish water flow gauging stations established by the ISMP team.
- Install a flow measurement system (passive or active) at the Kirkpatrick Outfall.
- Survey of parking lot catch basin maintenance in DCS.

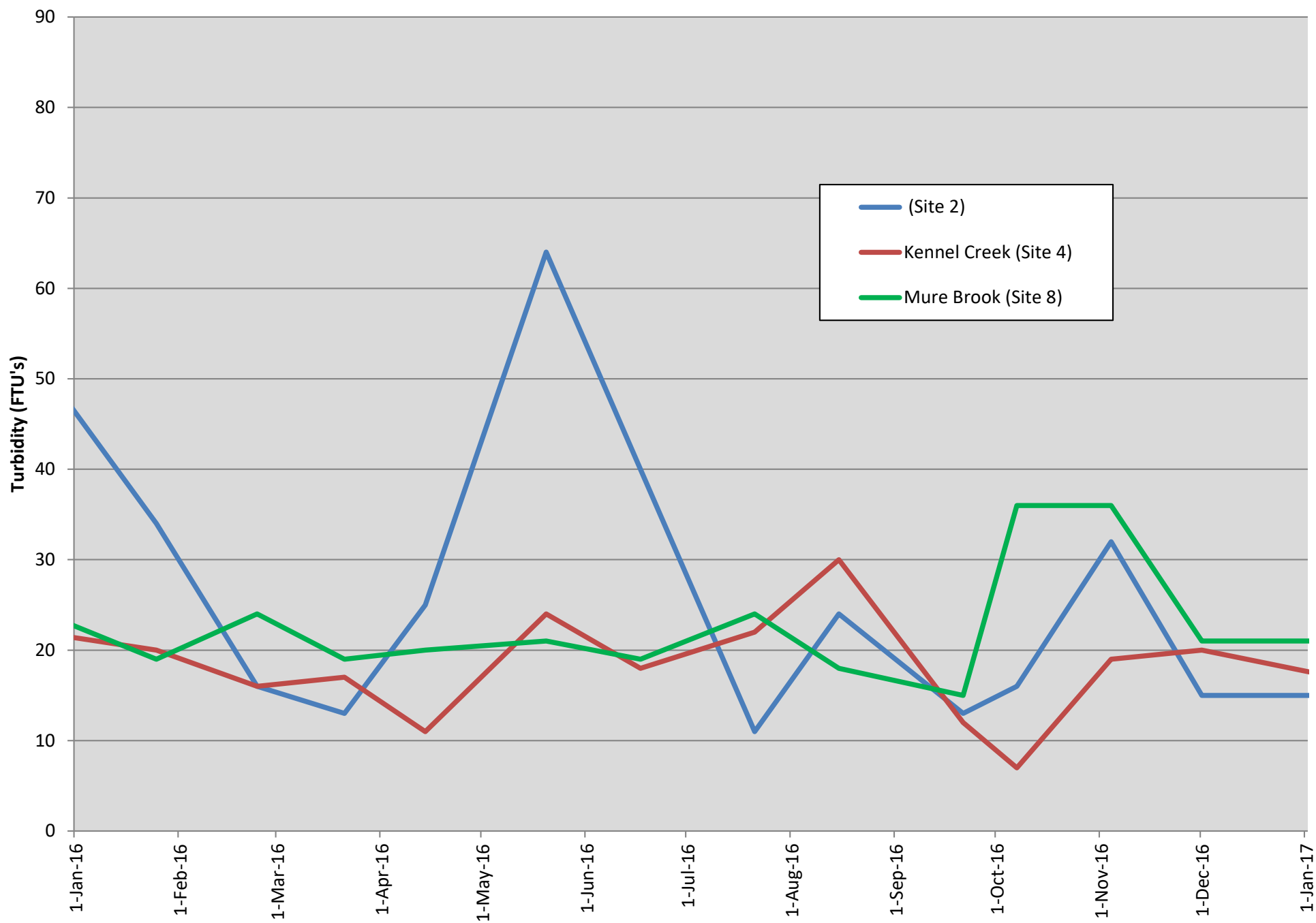
Tetayut Creek Summary

- WQ program undertaken at 9 sites in Tetayut Creek: 74 monthly sampling events since February 2011
- Measuring of water temperature, O₂, pH, conductivity, phosphate, nitrite, nitrate, ammonia and turbidity at each site
- Metals, PAH, TEH and fecal coliform measured at Keating Industrial Park outfall in water (monthly) and sediments (~quarterly)
- ~1300 hours of volunteer effort in total

Water Quality Monitoring – Tetayut Creek



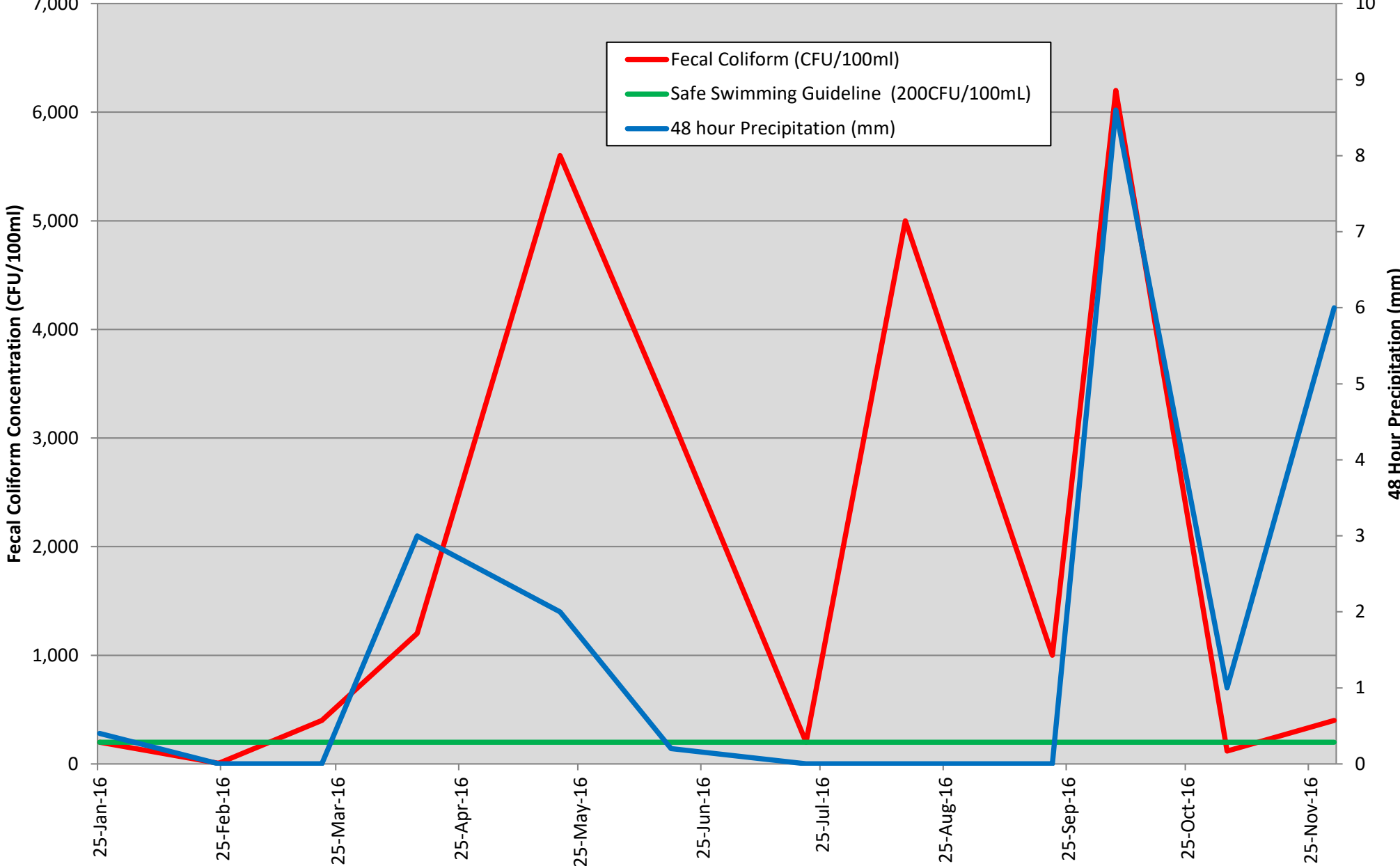
Graph 10 - Turbidity of water from Sites 2, 4 and 8 in the Tetayut Creek Watershed in 2016.



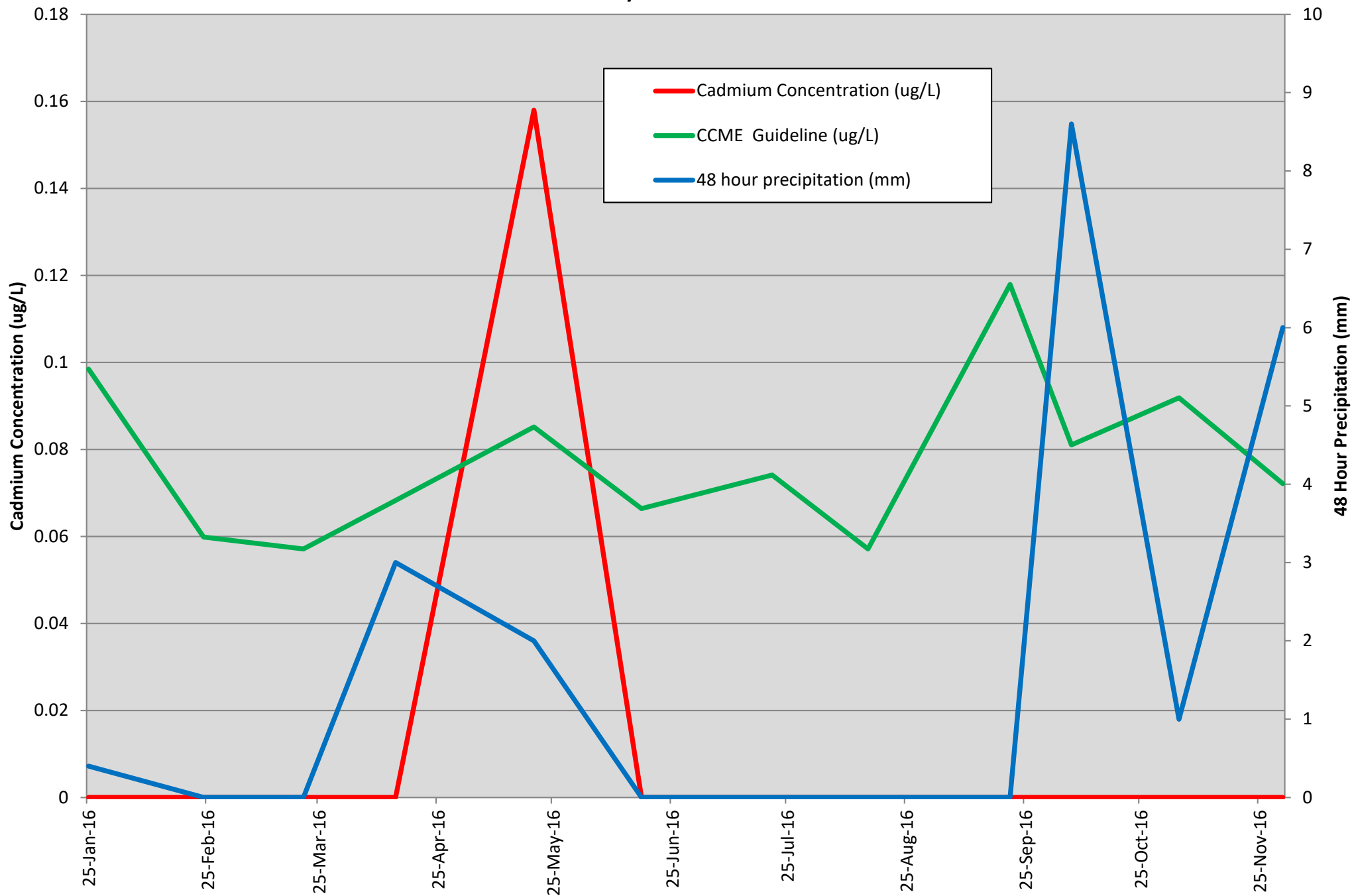
Water Quality Sampling –
Keating Industrial Park Outfall –
Fecal Coliforms and Selected
Metals

Water Quality Monitoring – Tetayut Creek Keating Industrial Park Stormwater Outfall

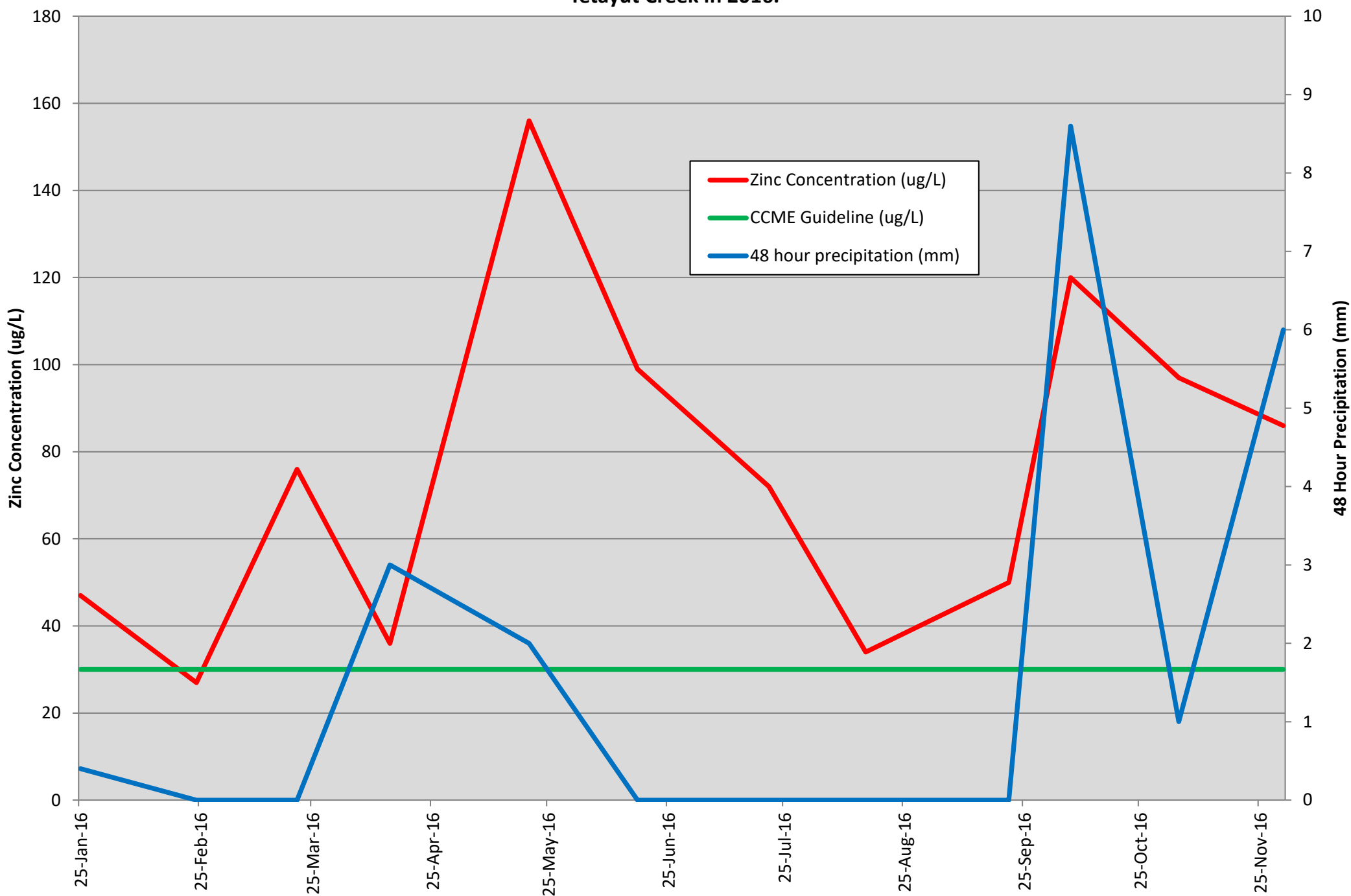
Graph 11 - Concentration of fecal coliforms (CFU/100ml) in water from Keating Industrial Park stormwater outfall (Site 2) in 2016.



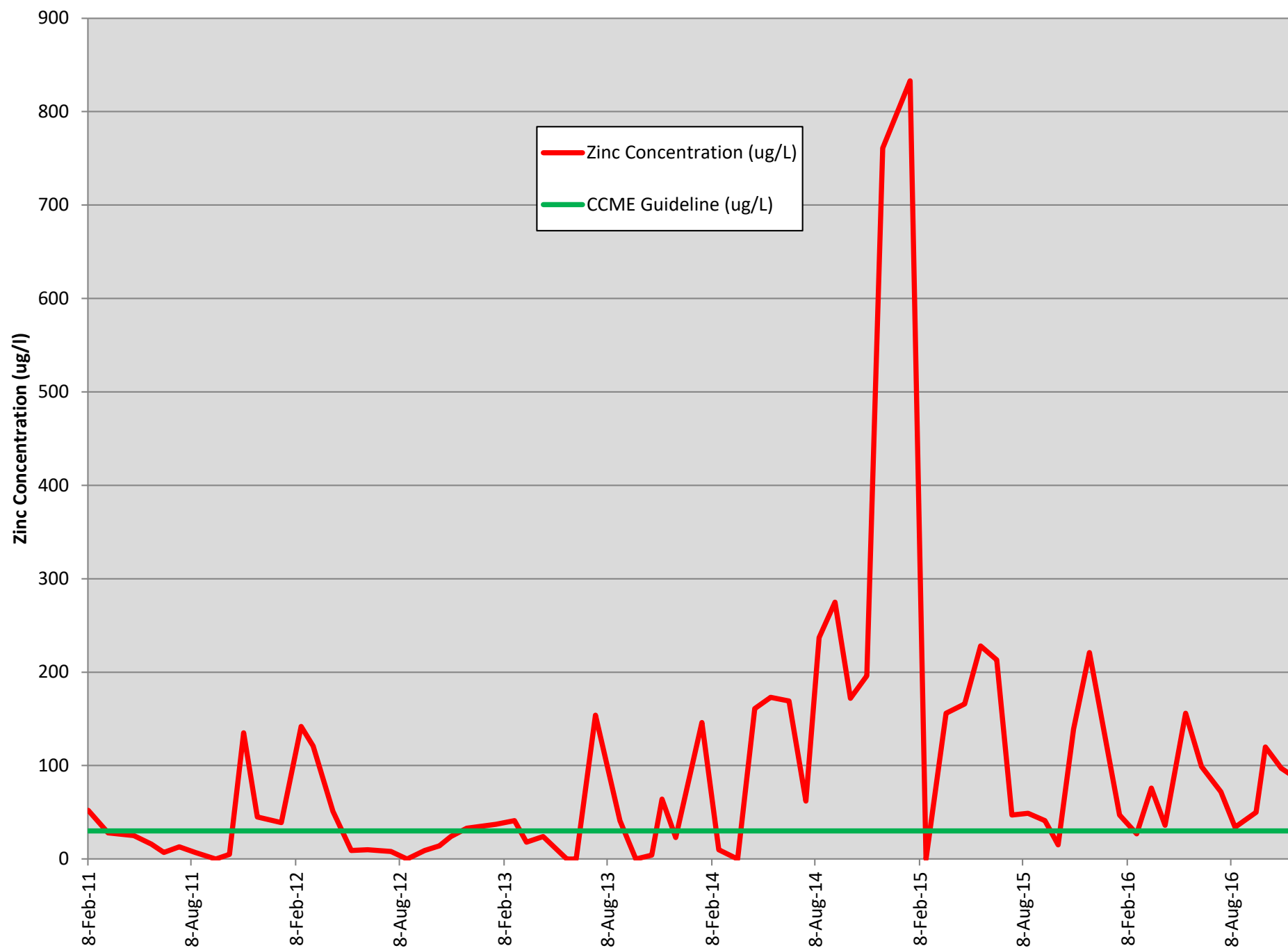
**Graph 12 - Concentration of cadmium (ug/L) in water from Keating Industrial Park Stormwater outfall East (Site 2)
Tetayut Creek in 2016.**



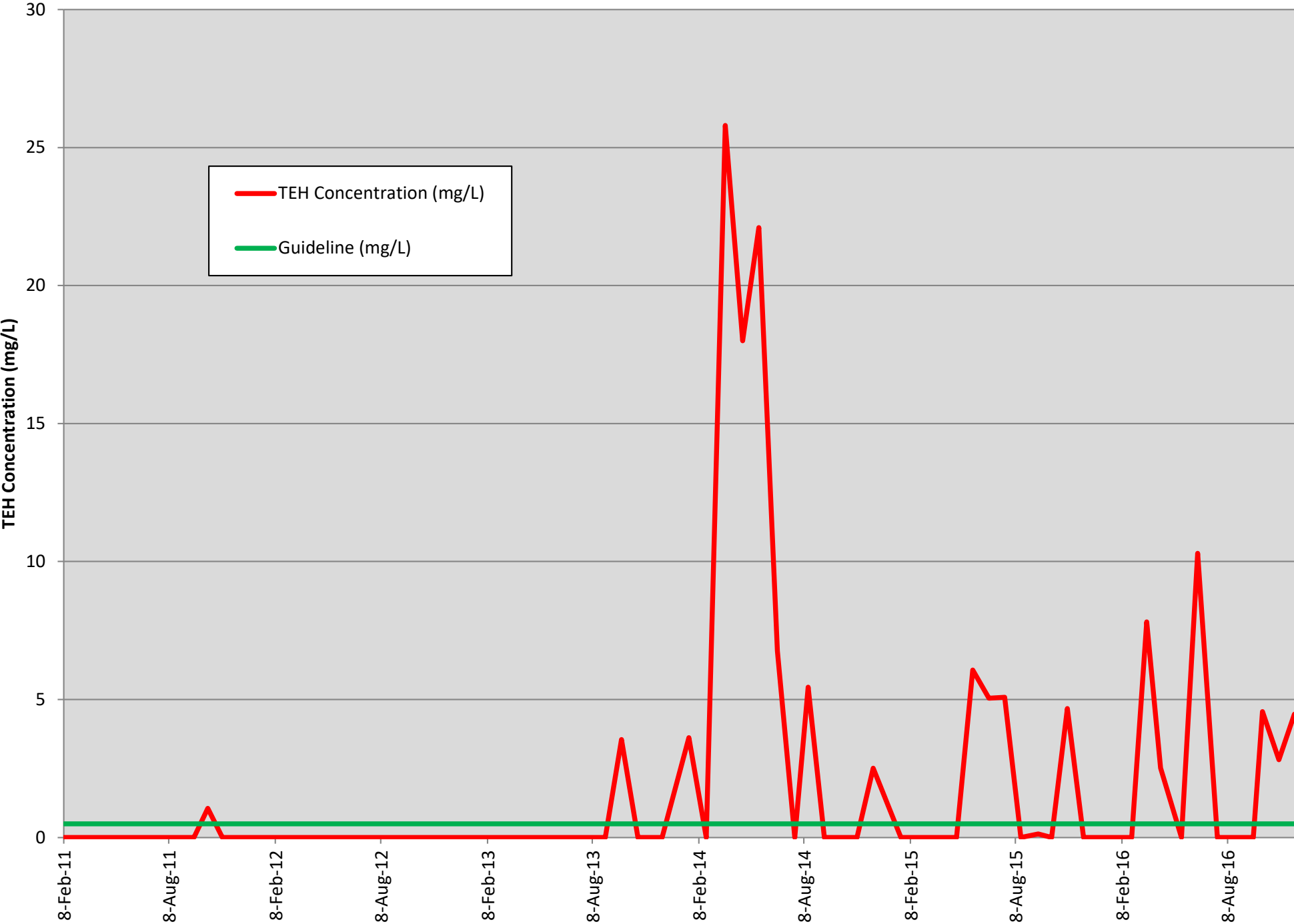
Graph 13 - Concentration of zinc (ug/L) in water from Keating Industrial Park stormwater outfall (Site 2) – Tetayut Creek in 2016.



Graph 14 - Concentration of zinc (ug/L) in water from Keating Industrial Park stormwater outfall East (Site 2) from February 2011 to present.



Graph 15 - Concentration of TEHs (mg/L) in water from Keating Industrial Park stormwater outfall East (Site 2)
from February 2011 to present.



Water Quality – Tetayut Creek- Recommendations

- A continuation of monitoring physical and nutrient parameters in the water and sediment at the Keating Industrial Park Stormwater Outfall and other areas of the industrial park is recommended.
- Investigate the origin of chronic contamination and acute spill events with DCS and CRD.
- Enhance current public education and awareness projects, and the Keating Industrial Park Water Quality Initiative needs to be repeated.
- Continue to work with businesses to improve hazardous material handling and disposal practices.
- Investigate the feasibility of constructing a wetland to clean contaminated stormwater downstream of the East Keating stormwater outfall and act as a buffer between catastrophic spill events and downstream areas. (potential Healthy Watershed Committee initiative)
- Work with landowners to educate them on the problems associated with depositing organic matter in creeks and other fresh water bodies.
- Work to educate landowners on the importance of riparian vegetation and stream features such as large woody debris and pool-riffle complexes to stream ecosystem health.
- Further implement recommendations of the ISMP process as soon as fiscally possible.
- Install water flow gauging stations.
- Install a flow measurement system (passive or active) at the Keating Industrial Park Stormwater East Outfall.
- Survey of parking lot catch basin maintenance in DCS.

LATEST NEWS: Christchurch, New Zealand, marks fifth anniversary of deadly earthquake

Spill in Central Saanich's Graham Creek traced to paving facility

CINDY E. HARNETT / TIMES COLONIST
SEPTEMBER 7, 2013 10:58 PM

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Biologist Ian Bruce examines some of the unknown substance found Friday in Graham Creek, which runs through Centennial Park in Central Saanich. Photograph By ADRIAN LAM, Times Colonist

The province has identified the globs of black stuff gumming up parts of Graham Creek in Central Saanich as an asphalt-

Thank you!

- Questions?