
Elk Valley Water Quality Plan

Annex C.1

Phase 1 Consultation Discussion Guide and
Feedback Form

Elk Valley Water Quality Plan

Phase 1 Consultation Discussion Guide and Feedback Form
October 28 – November 29, 2013



Teck

Elk Valley Water Quality Plan – Phase 1 Consultation

Teck Wants To Hear From You

Teck is working with communities, First Nations and governments to create an Elk Valley Water Quality Plan that will maintain the health of the watershed and ensure continued, sustainable mining in the Elk Valley.

The process to develop the Elk Valley Water Quality Plan includes several rounds of public consultation with opportunities for feedback. Teck is providing information about various aspects of the development of the Plan and is asking for the public to provide input. The first consultation period, the content of which is contained in this Discussion Guide, is taking place from October 28 – November 29, 2013. The Feedback Form starts on page 11 of this Discussion Guide.

- **Phase 1 – October 28–November 29, 2013** (current phase): This first round of consultation provides information regarding the process to develop the Elk Valley Water Quality Plan and seeks input regarding current and potential water treatment and water quality management approaches as well as Teck's plans for ongoing mitigation strategies and the supporting socio-economic impact analysis.
- **Phase 2 – Anticipated March 2014:** This phase will provide an opportunity for Teck to provide an update on progress made in developing the Plan, technical work underway, and alternatives for water quality and calcite targets.
- **Phase 3 – Anticipated May 2014:** During this phase, Teck will provide a draft of the Elk Valley Water Quality Plan for public comment.

Input received during consultation will be considered, along with technical and socio-economic information, in the development or refinement of the Elk Valley Water Quality Plan, prior to its submission to the B.C. Ministry of Environment for approval.

You can learn more and provide feedback by:

- **Reading this Discussion Guide and completing the Feedback Form** (page 11)
- **Completing an Online Feedback Form** at www.teck.com/ElkValley
- **Attending an Open House** (see schedule on page 2)
- Sending a **written submission**:
 - **Email:** elk.valley@teck.com
 - **Mail:** Teck Elk Valley Water Quality Plan
P.O. Box 1777
Sparwood, BC
V0B 2G0

Public Open House Schedule*

We encourage you to attend any of the Public Open Houses. The first portion of each Open House will be a drop-in format. There will be a presentation and opportunity for questions and answers starting at 7:00 p.m.

Community	Date	Time	Location
Elkford	Tuesday, November 12	4:30–8:30 p.m. Presentation and Q&A at 7:00 p.m.	Elkford Community Conference Centre 750 Fording Drive Elkford, B.C.
Sparwood	Wednesday, November 13	4:30–8:30 p.m. Presentation and Q&A at 7:00 p.m.	Sparwood Senior Citizens' Drop-In Centre 101 4 th Avenue Sparwood, B.C.
Fernie	Thursday, November 14	4:30–8:30 p.m. Presentation and Q&A at 7:00 p.m.	Fernie Seniors Drop-In Centre 562 3 rd Avenue Fernie, B.C.

*Please check www.teck.com/ElkValley for any potential revisions to this schedule.

What We've Heard from Elk Valley Communities

Teck has been providing regional communities with information regarding the Elk Valley Water Quality Plan since the establishment of the process to develop the Plan in April 2013. In June of this year, Teck held open houses in Elkford, Fernie and Sparwood and participated in community events throughout the region to introduce the process, answer questions and gather feedback.

Generally, stakeholders, communities and First Nations have been appreciative of the information regarding the Elk Valley Water Quality Plan, and have expressed a desire to remain updated and engaged as the Plan is developed.

Elk Valley residents are supportive of Teck's efforts to address water quality issues and they are concerned with the protection of aquatic ecosystem health. There is broad recognition of the importance of mining to the local and regional economy. Residents support ensuring that those environmental and socio-economic factors are balanced in the Plan.

Questions and comments have focused on the treatment process and other potential activities that could be used to address water quality. There has also been interest in the possibility of new jobs being created through the construction of water treatment plants and other water quality management activities.

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1. About Teck in the Elk Valley

The Elk Valley is located in the southeast corner of British Columbia, and is home to the Elk and Fording rivers, which flow into Lake Kootenay, a reservoir that crosses the Canada-U.S. border.

The economy of the Elk Valley and surrounding region is heavily dependent on steelmaking coal mining and related activity. Teck plays an important role in supporting the economic and social pillars of communities in the Elk Valley through the operation of its five mines, which directly employ over 4,000 people locally.

Teck is proud of its workers and their commitment to mining excellence and sustainable resource development.

To ensure the continuation of mining and to maintain the existing workforce, Teck is currently planning projects at all five mines to allow production to continue. The Elk Valley Water Quality Plan will guide the future of mining and will help to protect water quality. While other companies have tenure to mine in the Elk Valley, Teck is the only company with active mines in the area.

Employment at Elk Valley Sites

Fording Operations	1,240
Elkview Operations	1,130
Greenhills Operations	645
Line Creek Operations	535
Coal Mountain Operations	340
Sparwood offices	165

Teck's Commitment to Biodiversity

Teck sees mining as an interim land use and works to restore mined areas back to a productive, natural state. Teck has set the goal of having a net-positive impact on biodiversity through reclamation and other initiatives.

One example of this is Teck's recent purchase of 7,150 hectares of private land in the Elk and Upper Flathead valleys. Teck will be working cooperatively to ensure that key wildlife and fish habitat in these areas is protected. In the months ahead, Teck will be having discussions with First Nations, communities and other stakeholders on how these lands should be managed for the future.

2. The Elk Valley Water Quality Plan

In April 2013, the Government of B.C. established a process to create an Elk Valley Water Quality Plan, the goal of which is to stabilize and reverse increasing concentrations of selenium, cadmium, nitrate and sulphate, as well as to address evidence of calcite formation. The Plan will establish short- medium- and long-term targets for improving water quality, as well as targets to manage rates of calcite formation.

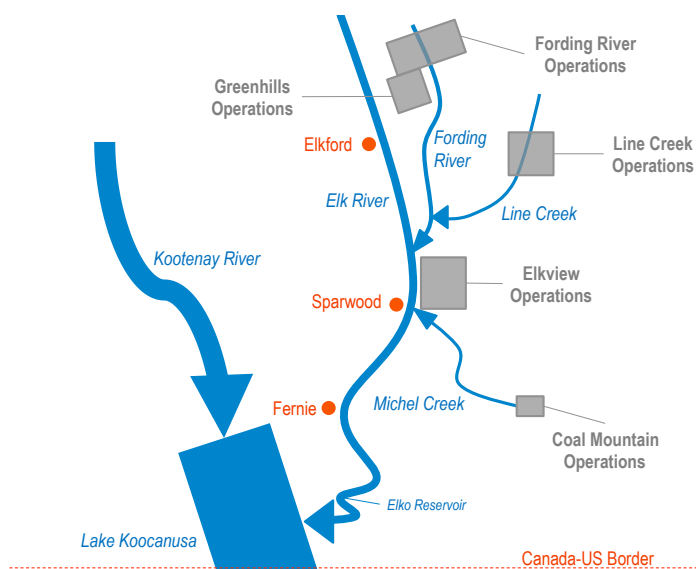
Teck is developing the Elk Valley Water Quality Plan in cooperation with governments in Canada and the U.S., First Nations, and the public. The Plan must be submitted to the B.C. Government in the summer of 2014. Once approved by the provincial government, Teck will implement the Plan.

Ministerial Order M113 and the Approved Terms of Reference can be found at www.teck.com/ElkValley



Timeline for the development of the Elk Valley Water Quality Plan

More information regarding the process for the development of the Elk Valley Water Quality Plan can be found in Section 5.



Teck's coal operations in the Elk Valley

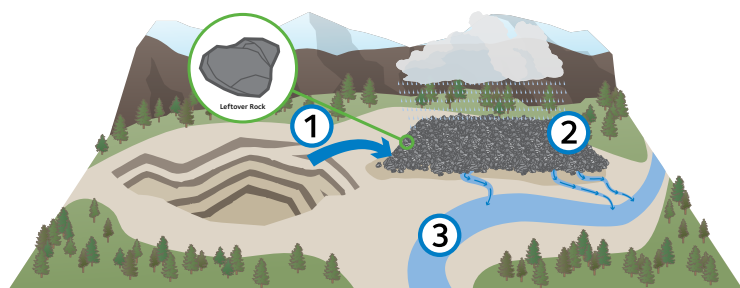
Technical Advisory Committee

Along with input from three public consultation periods, Teck is receiving science-based technical advice from a Technical Advisory Committee (TAC) in developing the Plan. The TAC is chaired by a B.C. Ministry of Environment representative and is composed of representatives from:

- Teck
- Government of British Columbia, including:
 - o Ministry of Environment (Committee Chair)
 - o Ministry of Energy and Mines
 - o Environmental Assessment Office
- Ktunaxa Nation Council
- An independent third-party qualified professional scientist
- Government of Canada represented by Environment Canada
- U.S. Federal Government
- Montana State Government

3. Water Quality in the Elk Valley

The Challenge



1. Steelmaking coal occurs as layers or seams within rock. To access the coal, large quantities of this rock, referred to as waste rock, are mined and placed in piles within and adjacent to the mine pits.
2. Water from both precipitation and runoff flows through these rock piles and carries selenium and other substances, including cadmium, sulphate and nitrate from blasting residue, into the local watershed.
3. If present in high enough concentrations in the watershed, those substances can adversely affect aquatic health.

Effects on Fish Health and Human Health

Aquatic Health

Current monitoring and scientific studies show that selenium is below levels that would affect populations of fish and other sensitive animals and plants in the main stem of the Elk River and the Fording River below Josephine Falls. Monitoring indicates some localized effects on sensitive insect larvae that live on stream bottoms, mainly in the tributaries closest to mining activities, but overall larval insect communities throughout most of the Elk Valley are healthy and diverse.

Fish Consumption

Monitoring indicates that there are elevated levels of selenium in some fish; however, the average selenium level in fish muscle tissue from the Elk River and lower Fording River is currently within B.C. fish consumption screening values, even for frequent fish consumers.

Drinking Water

Selenium levels in municipal drinking water sources in the Elk Valley are within Health Canada and B.C. drinking water guidelines. As part of the development of the Plan, Teck will be conducting testing of well water to better understand groundwater quality.

What is Selenium?

Selenium is a naturally occurring element that is essential and beneficial for all animals, including humans.

Selenium is an essential part of your daily diet. It is found in many common foods such as nuts, cereals, meat, mushrooms, fish, and eggs, and is also sold as a nutritional supplement for people and animals.

When present in the watershed in elevated concentrations, selenium can affect the reproductive processes of aquatic wildlife, which is why Teck is working to stabilize and reverse the selenium trend in the Elk Valley.

4. How Teck Gathers Information about Water Quality and Aquatic Ecosystem Health

Water Quality Initiatives

Teck has been engaging in water and biological monitoring to measure the effects of selenium on the environment and wildlife of the Elk Valley watershed, as well as taking steps to implement solutions. That work has included convening an expert panel on selenium management and construction of water diversions and a first water treatment facility, which is scheduled to begin operations in 2014.

Current Monitoring Initiatives

There are three key ways Teck currently gathers information about water quality.

1. Water Quality Monitoring

Teck has a well-established water quality monitoring program. This program is focused on the collection of water quality and quantity data throughout the Elk River watershed. Concentrations of selenium, cadmium, nitrate and sulphate from mine operations can be found in downstream surface waters and usually come from discharges directly into the surface water or through groundwater. Routine water quality monitoring, at Teck operations and regionally, tracks any changes in water quality that have the potential to affect aquatic life, drinking water or recreational activity.

2. Aquatic Effects Monitoring Program

In collaboration with the B.C. Ministry of Environment and the Ktunaxa First Nation, Teck has developed a comprehensive data collection program that evaluates the effects of mining operations. The program includes monitoring of water quality and the health of fish, insect larvae and other sensitive aquatic organisms, and will provide important information to evaluate the success of water quality management actions.

3. Upper Fording River Westslope Cutthroat Trout Study

In 2012, as part of Teck's monitoring program, a study of the Upper Fording River Westslope Cutthroat Trout population was commissioned. Westslope Cutthroat Trout have been identified as particularly vulnerable to the effects of coal mining and this study is a means of determining that the Westslope Cutthroat Trout population remain healthy, robust and sustainable. The study is guided by a Steering Committee consisting of representatives from the Ktunaxa First Nation, the B.C. Ministry of Forests, Lands, and Natural Resource Operations, Fisheries and Oceans Canada, Dr. Carl Schwarz of Simon Fraser University and Teck. Preliminary study results indicate that, based on physical examinations, the fish appear to be in good condition and robust.

Ecological Effects Analysis

The objective of this analysis will be to define the level of ecosystem protection that would be achieved at various concentrations of selenium, nitrate, sulphate and cadmium in the Elk and Fording rivers. The environmental effects analysis will utilize the available knowledge on effects of selenium, nitrate, sulphate and cadmium on sensitive forms of aquatic life.

Available data will be supplemented with additional studies being undertaken using water from the Fording and Elk rivers. This analysis will provide the information to ensure that ecological considerations relevant to the water quality and biological characteristics in the Elk Valley are included in setting targets for selenium, nitrate, sulphate and cadmium in the Elk Valley Water Quality Plan.

Forms of aquatic life that can be sensitive to changes in water quality include:

- Fish, such as Westslope Cutthroat Trout and Mountain Whitefish
- Benthic invertebrates, which are larval forms of insects and other aquatic animals that live on river bottoms
- Amphibians, which are relatively uncommon in the Elk and Fording rivers, but do occur in wetlands and other slow moving portions of the system
- Waterbirds, such as Sandpipers and Red-Winged Blackbirds, that can be sensitive to selenium

5. Development of the Elk Valley Water Quality Plan – **Consultation Topic**

In April 2013, the Government of B.C. established a process to create an Elk Valley Water Quality Plan, the goal of which is to stabilize and reverse increasing concentrations of selenium, cadmium, nitrate and sulphate, as well as to address calcite formation. The Plan will help to protect water quality while ensuring that mining is sustained in the Elk Valley.

The Plan will establish short, medium and long-term targets for water quality and set out the process for implementation. Between now and summer 2014, Teck will be developing the Elk Valley Water Quality Plan and will include a forward-looking process for adapting the Plan to incorporate new and improved technologies from our Research and Development Program in the future.

Key steps in developing the Plan are:

1. Defining the measures that will be considered in developing the Plan to mitigate (improve) water quality.
2. Investigating different levels of water quality mitigation and management scenarios, utilizing a computerized modelling tool (see Mitigation Modelling Support on page 8) as a planning and assessment tool.
3. Determining environmental, economic and social considerations of different water quality levels in the Elk and Fording rivers.
4. Setting medium- and long-term water quality targets and timelines that achieve a sustainable balance of protecting the health of the aquatic ecosystem while also considering the social and economic costs and benefits.
5. Defining an implementation plan for meeting short- medium- and long-term water quality targets.
6. Develop a strategy for ongoing monitoring to assess the performance of the Plan, with a process for periodic review of the Plan. This review would incorporate results of Teck's Applied Research and Development program, other advances in science and technology, and changes to future Teck mining plans and operations.

In question 1 of the Feedback Form, on page 11, Teck is asking for your feedback regarding the process set out above.

6. Water Treatment and Water Quality Management – **Consultation Topic**

Mitigation Measures

While the Elk Valley Water Quality Plan is in development, Teck has, and will continue to, take action to protect water quality, including the construction of a water treatment plant as well as ongoing aquatic monitoring, and extensive research and development.

Steps Teck has taken include:

- **Water treatment facilities:** Teck's first water treatment facility is currently under construction at our Line Creek Operations and scheduled to begin treating water in spring 2014. Additional facilities are planned for other operations.
- **Water diversions:** Teck has constructed water diversions at several operations and has proposed construction of additional diversions to keep water clean.
- **Management of mine-affected waters** through collection, transport and storage, to reduce effects and allow more effective use of treatment facilities.
- **Covers on waste rock piles** to reduce or prevent contact with water. Teck is exploring the possibility of using complex waste rock covers, made from a synthetic membrane, and covered with soil and vegetation, to prevent water from coming in contact with waste rock and collecting substances such as selenium.
- **Research and Development:** Teck has launched an extensive research and development program to improve water quality management technologies and techniques.

In question 2 of the Feedback Form, starting on page 12, Teck is asking for your feedback on the mitigation measures outlined above.

West Line Creek Facility – Project Update

The West Line Creek Treatment Facility, currently under construction, is the first of Teck's water treatment facilities designed to remove selenium, nitrate and other elements. It is on schedule to begin treating in 2014, with all major treatment equipment on site and 95% of tanks erected. It will use a biological water treatment process that relies on micro-organisms, which converts selenium to its particulate form and then removes it through filtration.

The West Line Creek Facility will treat 7,500 m³ of water every day, enough water to fill three Olympic-sized swimming pools. Planned facility expansions will increase treatment capacity to 15,000 m³ of water per day. The total quantity of selenium removed in the first phase of the facility is anticipated to be 1.8 kilograms per day, increasing to 3.0 kilograms in the second phase.



A photo of the West Line Creek water treatment facility in Fall 2013.

Mitigation Modelling Support

Teck is investigating how mitigation measures can be combined using a computerized modelling tool to predict changes in water quality. This tool will be used to investigate scenarios with different combinations of mitigation measures applied at each of Teck's five mining operations in the Elk Valley. Through this process, Teck will be able to predict the effects of various combinations of mitigation measures on concentrations of selenium, nitrate, sulphate and cadmium at different locations in the Elk and Fording rivers and in Lake Koocanusa.

The computerized model uses a state-of-the art commercial modelling software program and incorporates existing and planned future waste rock placement. The water quality planning model is an important tool that will support the development of an Elk Valley Water Quality Plan that accounts for the effects of historical mine activities and future mining plans at Teck mines in the Elk Valley.

7. Socio-Economic Impact Analysis – **Consultation Topic**

The Elk Valley Water Plan is intended to balance environmental, social and economic considerations. An important part of the development of the Plan is assessing how social and economic factors would be affected by different water treatment approaches. Teck has contracted Ernst & Young, an internationally-recognized professional services firm, to provide the socio-economic impact analysis.

The proposed scope of the analysis was determined by assessing the importance to communities, as understood from ongoing community engagement. The following are the preliminary, important economic and social components that were determined to meet those criteria that will be evaluated in the analysis.

Economic

- Gross domestic product
- Local business opportunities
- Investment
- Jobs
- Tax and resource revenue sharing
- Personal income generation
- Housing prices

Social

- Sustainable community population
- Physical health
- Use of aquatic environment
- Skills training, apprenticeships and education
- Availability and access to community services

The following table lists the social and economic factors and indicates how each will be measured:

Preliminary Economic and Social Components	Preliminary Indicators
Gross domestic product	<ul style="list-style-type: none"> • Changes in gross domestic product
Local business opportunities	<ul style="list-style-type: none"> • Spend on local suppliers by sector • Gross domestic product impacts by industry • Changes in tourism levels
Investment	<ul style="list-style-type: none"> • Capital investment
Jobs	<ul style="list-style-type: none"> • Total jobs • Number of construction/permanent jobs
Tax and resource revenue sharing	<ul style="list-style-type: none"> • Municipal government revenues • Provincial government revenues • Federal government revenues • First Nations revenues (from Provincial Mineral Tax sharing)
Personal income generation	<ul style="list-style-type: none"> • Per capita income levels • Average wage/salary
Housing prices	<ul style="list-style-type: none"> • Property values
Sustainable community population	<ul style="list-style-type: none"> • Increases/decreases in population
Physical health	<ul style="list-style-type: none"> • Selenium level's impact on fish consumption • Selenium levels in drinking water (compared to guidelines)
Use of aquatic environment	<ul style="list-style-type: none"> • Water quality impact on the "swimmability" of the Elk River, Fording River and Lake Koocanusa • Water quality impact on the "fishability" of the Elk River, Fording River and Lake Koocanusa
Skills training, apprenticeships and education	<ul style="list-style-type: none"> • Teck's investments in training and apprenticeships • Distribution of educational attainment across population
Availability and access to community services	<ul style="list-style-type: none"> • Availability of medical services (hospitals/clinics) • Availability of emergency services (police/fire/ambulance) • Availability of pre- and post-secondary education (schools) • Spend on community infrastructure (including donations by Teck)

Teck is interested in whether you feel these are the appropriate social and economic components and indicators to study, and whether there are other aspects that you would like considered in the socio-economic impact analysis.

To provide feedback regarding the scope of the socio-economic analysis, please see question 3 in the feedback form on page 13.

Feedback Form

Please print and fill out the below feedback form or, if you're reading this online, click [here](#) to fill out an online feedback form.

1. Development of the Elk Valley Water Quality Plan (Section 5, page 7)

Key steps in developing an Elk Valley Water Quality Plan are:

1. Defining water quality mitigation measures that will be used to develop the Plan.
2. Investigating different levels of water quality mitigation and management, utilizing an Elk Valley Water Quality Planning Model as an assessment tool.
3. Determining environmental, economic and social considerations of different water quality levels in the Elk and Fording rivers.
4. Setting medium- and long-term water quality targets and timelines that achieve a sustainable balance of protecting the health of the aquatic ecosystem and the social and economic costs and benefits.
5. Defining an implementation plan for meeting short- medium- and long-term water quality targets.
6. Develop a strategy for ongoing monitoring to assess the performance of the Plan, with a process for periodic review of the Plan. This review would incorporate results of Teck's Applied Research and Development program, other advances in science and technology, and changes to future Teck mining plans and operations.

Please indicate your level of agreement with key steps to developing the Elk Valley Water Quality Plan listed below:

Strongly Agree	Somewhat Agree	Neither Agree Nor Disagree	Somewhat Disagree	Strongly Disagree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please indicate your reasons and provide comments for consideration in developing the Elk Valley Water Quality Plan:

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Mitigation measures:

- Please indicate your level of agreement with the water treatment and water quality management measures proposed:**

Please indicate your reasons and provide comments for consideration in developing mitigation measures as part of the Elk Valley Water Quality Plan:

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3. Socio-Economic Impact Analysis (Section 7, pages 9-10)

Preliminary Social and Economic Components	Preliminary Indicators
Gross domestic product	<ul style="list-style-type: none"> Changes in gross domestic product
Local business opportunities	<ul style="list-style-type: none"> Spend on local suppliers by sector Gross domestic product impacts by industry Changes in tourism levels
Investment	<ul style="list-style-type: none"> Capital investment
Jobs	<ul style="list-style-type: none"> Total jobs Number of construction/permanent jobs
Tax and resource revenue sharing	<ul style="list-style-type: none"> Municipal government revenues Provincial government revenues Federal government revenues First Nations revenues (from Provincial Mineral Tax sharing)
Personal income generation	<ul style="list-style-type: none"> Per capita income levels Average wage/salary
Housing prices	<ul style="list-style-type: none"> Property values
Sustainable community population	<ul style="list-style-type: none"> Increases/decreases in population
Physical health	<ul style="list-style-type: none"> Selenium levels' impact on fish consumption Selenium levels in drinking water (compared to guidelines)
Use of aquatic environment	<ul style="list-style-type: none"> Water quality impact on the "swimmability" of the Elk River, Fording River and Lake Koocanusa Water quality impact on the "fishability" of the Elk River, Fording River and Lake Koocanusa
Skills training, apprenticeships and education	<ul style="list-style-type: none"> Teck's investments in training and apprenticeships Distribution of educational attainment across population
Availability and access to community services	<ul style="list-style-type: none"> Availability of medical services (hospitals/clinics) Availability of emergency services (police/fire/ambulance) Availability of pre- and post-secondary education (schools) Spend on community infrastructure (including donations by Teck)

Please indicate your level of agreement with the scope of the socio-economic impact analysis being conducted as part of the development of the Elk Valley Water Quality Plan:

Strongly Agree	Somewhat Agree	Neither Agree Nor Disagree	Somewhat Disagree	Strongly Disagree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please indicate your reasons and provide comments on the socio-economic impact analysis for consideration in developing the Elk Valley Water Quality Plan:

ADDITIONAL COMMENTS

Please identify any additional interests and considerations you may have regarding the Elk Valley Water Quality Plan.

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How Input Will Be Used

Input received during this consultation will be considered, along with technical and socio-economic information, for the Elk Valley Water Quality Plan.

Contact Information

Please provide your contact information (optional):

Name:

Mailing Address:

Organization (if applicable):

Role in Organization (if applicable):

Postal Code:

Phone:

Email:

Personal information collected relates directly to the consultation process for the development of the Elk Valley Water Quality Plan and will not be shared for any other purpose. If you have questions about the consultation process or the information collected, please contact Teck by telephone at 1-855-806-6854 or by email to elk.valley@teck.com.

Please return your feedback form by November 29, 2013.

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Email: elk.valley@teck.com

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