Eagle Mountain – Woodfibre Gas Pipeline Project

Construction Environmental Management Plan

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Rev. 1

September 2022

FortisBC Energy Inc.

Prepared for:



16705 Fraser Highway
Surrey, BC V4N 0E8
Tel: 250.380.5707

Prepared by



Metrotower II – Suite 2100
4720 Kingsway
Burnaby, BC V5H 4N2
Tel: 604.684.3282

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Project Manager:	Liz Swift
Author:	Various Authors

Jacobs Consultancy Canada Inc.

Metrotower II – Suite 2100
4720 Kingsway
Burnaby, BC V5H 4N2
Canada
T +1.604.684.3282
F +1.604.684.3292
www.jacobs.com

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Document History and Status

Date Issued	Description	Distribution
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2021	100% Draft Review	Squamish Nation (Sḵwx̱wú7mesh Úxwumixw), Tsleil-Waututh Nation, Musqueam Indian Band, Kwikwetlem First Nation, BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLNROD), BC Ministry of Environment and Climate Change Strategy (BC ENV), Environment and Climate Change Canada (ECCC), BC OGC.
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Sḵwx̱wú7mesh Úxwumixw (Squamish Nation) Preamble

The FortisBC Energy Inc. (FortisBC) Eagle Mountain – Woodfibre Gas Pipeline intersects Sḵwx̱wú7mesh-ulh Temíxw (Squamish Territory), including Seĺíl̓wit Stakw̱ (Indian River), Sx̱wéx̱wel tl'a Mámxwem (Mamquam Valley), Skwelwíl̓em (Squamish River Estuary), and the northwest side of Nexwnéwu7ts Átlḵ'a7tsem (Howe Sound).

The eastern portion of the pipeline lies within the shared territory of Sḵwx̱wú7mesh Úxwumixw (Squamish Nation) and Seĺíl̓wit-ulh (Tsleil-Waututh Nation).

The path of the pipeline follows an ancient route used by Sḵwx̱wú7mesh stélmexw (Squamish People) for millennia which connects villages from Indian Arm to Squamish (Sḵwx̱wú7mesh).

The existing pipeline was established in an era where the Sḵwx̱wú7mesh Úxwumixw (Squamish Nation) was not consulted and had no legal recourse. Today we are an independent environmental regulator on the Eagle Mountain – Woodfibre Gas Pipeline Project (the EGP Project) and are involved in key decision-making as per the Sḵwx̱wú7mesh Úxwumixw (Squamish Nation) Environmental Assessment Agreement (Squamish Nation EAA). Through effective co-operation and negotiation Sḵwx̱wú7mesh Úxwumixw (Squamish Nation) ensures our unique environmental stewardship standards and economic benefits are realized.

Sḵwx̱wú7mesh Úxwumixw (Squamish Nation) maintains Aboriginal Rights and Title through the EGP Project area.

This Construction Environmental Management Plan is primarily written in English with important place names, species, phrases and passages provided in the Squamish language and English

Table of Concordance

Table 0-1 describes how this Construction Environmental Management Plan meets the applicable British Columbia Environmental Assessment Certificate (EAC) Conditions.

Table 0-1. Concordance with EAC Conditions 2: Plan Development and 9: Construction Environmental Management Plan

EAC Condition	Section
EAC Condition 2 - Plan Development	
Where a condition of this Environmental Assessment Certificate requires the Holder to develop a plan, program or similar documents, any such document must, at a minimum, include the following information: a) purpose and objectives of the document;	Subsection 2.1
b) roles and responsibilities of the Holder, project personnel and contractors;	Subsection 2.3
c) names and if applicable, professional certifications and professional stamps/seals, for those responsible for the preparation of the document;	Section 13
d) schedule for implementing the document throughout the relevant project phases;	Subsection 2.5
e) the means by which the effectiveness of mitigation measures to be implemented under the applicable document are to be evaluated;	Section 10
f) adaptive management to address effects of the project if those effects: i) are not mitigated to the extent contemplated in the Application; or ii) are not predicted in the Application;	Section 11
g) schedules and methods for the submission of reporting to specific agencies, Aboriginal Groups, and the public and the required form and content of those reports; and	Section 12
h) process and timing for updating and revising the document, including any consultation with agencies and Aboriginal Groups that would occur in connection with such updates and revisions.	Subsection 2.6
EAC Condition 9 - Construction Environmental Management Plan	
The Certificate Holder must retain one or more Qualified Professionals to develop a Construction Environmental Management Plan (CEMP). The CEMP must be developed in consultation with the British Columbia Ministry of Environment (MOE), the British Columbia British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development and Rural Development (MFLNRORD), the British Columbia Oil and Gas Commission, and Aboriginal Groups. The CEMP must include the means by which the following will be addressed:	Section 3
a) human-wildlife conflict;	Subsection 9.9
b) invasive plants management;	Subsection 8.3
c) erosion and sediment control;	Subsection 8.1
d) waste management;	Subsection 8.6
e) leaks or other accidental emissions from machinery or equipment; and	Subsection 9.6
f) acid rock drainage and metal leachate management.	Subsection 8.4

Table 0-1. Concordance with EAC Conditions 2: Plan Development and 9: Construction Environmental Management Plan

EAC Condition	Section
The Holder must provide the construction environmental management plan to EAO, MOE, FLNRO, OGC and Aboriginal[a] groups for review a minimum of 45 days prior to the planned commencement of Construction.	Section 3
The plan and any amendments thereto, must be implemented throughout Construction under the supervision of a Qualified Professional and to the satisfaction of EAO.	Section 13
The Holder must carry out a Post-Construction Monitoring Program in accordance with Section 24 of the Application, to monitor and report on the effectiveness of the mitigation set out in the Construction Environmental Management Plan.	Section 7 and Section 10

Note:

[a] "Aboriginal" was used at the time of the EAC. "Indigenous" is now preferred.

BC EAO = BC Environmental Assessment Office
ECCC = Environment and Climate Change Canada

BC Ministry of Environment (MOE) = British Columbia Ministry of Environment and Climate Change Strategy (BC ENV)

BC MFLNRORD = British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development was divided into BC Ministry of Forests, and the BC Ministry of Land, Water and Resource Stewardship. References within the Plan are made to the current Ministries , where applicable.
BC OGC = BC Oil and Gas Commission

In addition, Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) and FortisBC Energy Inc. entered into the Squamish Nation Environmental Assessment Agreement (EAA) outlining Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) environmental Conditions of approval for the Eagle Mountain – Woodfibre Gas Pipeline Project. Subsection 4.5 of the Squamish Nation EAA identifies regulated and non-regulated management plans. The CEMP is considered a regulated plan and must receive Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) approval.

Definitions of Terms

Terms	Definition
Aquatics Specialist	A Qualified Professional (QP) with professional experience in aquatic ecology or fish (Sts'úkwi7) biology and a B.Sc. or higher degree in an environmental field including but not limited to Biology or Ecology.
avulsion	Abandonment of a stream channel and formation of a new stream channel.
backfill	Filling in the trench after the welded pipe has been lowered in using protective padding and excavated material.
bar ditch ramp	Subsoil, snow, or ice as a ramp out of a pit or channel dug for drainage purposes.
barge landing	Existing barge landings sites.
Best Management Practices (BMPs)	Methods or techniques that have consistently shown results superior to those achieved with other means, and that are used as a benchmark. BMPs are used to maintain quality as an alternative to mandatory legislated standards and can be based on self-assessment or benchmarking. BMPs are a feature of accredited management standards (such as, International Organization for Standardization and Canadian Standards Association, BC OGC Environmental Protection and Management Guideline (BC OGC 2018), Pipeline Associated Watercourse Crossings Fourth Edition and DFO's Measures to Protect Fish and Fish Habitat, Standards and Codes of Practice).
biodegradable	Natural decomposition or break down.
borehole	Vertical or horizontal, narrow shaft bored in the ground.
Blue list	List of ecological communities, native species, and subspecies in British Columbia (BC) that are of Special Concern.
built feature	Includes but is not limited to residences, cabins, campgrounds, businesses, schools, golf courses, community use areas, commercial, or industrial areas.
Certificate of Compliance	May be issued after remediation is completed when a site demonstrates compliance with remediation standards.
Certified Project	The Project components approved by the BC Environmental Assessment Office for construction.
coarse woody debris (CWD) or large woody debris (LWD)	CWD / LWD refers to fallen dead trees and the remains of large branches on the ground in forests and in rivers or wetlands. CWD / LWD can consist of woody materials in various stages of decomposition, including sound and rotting logs, snags, and large branches.
coir	Natural fibre logs or matting made from coconut husks and used in erosion and sediment control methods.

Terms	Definition
Construction	The phase of the Project during which physical alteration of land, vegetation or any other aspect of the natural environment, occurs. For the purposes of Schedule B, Construction: (i) does not include any activities conducted solely for investigative purposes under a valid permit or authorization, and (ii) includes upgrading, repairing, replacing, or removing, any existing work or infrastructure.
Coquitlam Twinning	The 3 km pipeline loop in Coquitlam, BC (also known as "EGP South 610 Line" and "3 km loop" for permitting).
compressor station	A facility located along a natural gas pipeline which compresses the gas to specified pressures, thereby allowing it to continue traveling along the pipeline to the intended recipient(s).
contaminated soil	Soil containing hazardous waste or another prescribed substance in quantities or concentrations exceeding prescribed risk-based or numerical criteria or standards or conditions.
contingency plan	A plan designed for response to an unplanned event or emergency.
criteria air contaminant	A group of pollutants including: Sulphur Oxides; Nitrogen Oxides; Particulate Matter; Volatile Organic Compounds; Carbon Monoxide; and Ammonia.
cross-ditch	A shallow channel or swale across the surface of a road or right-of-way to channel surface water (Stak̲w) off the road or right-of-way and prevent soil erosion.
culvert	A channel or tunnel designed for drainage under a road, railroad, or other infrastructural feature.
debris flow	A water-laden mass of loose mud, soil, rock and other debris traveling downslope under the influence of gravity.
deciduous	Shrubs or trees that shed their leaves or needs seasonally or at a certain stage of development in the life cycle.
drilling mud	A mud or fluid, typically consisting of bentonite and water, used to aid the drilling of horizontal directional drills and boreholes.
East Portal	The east location of the tunnel construction site, at the BC Rail site in Squamish (Sḵwx̱wú7mesh), BC.
EGP North 610 Line	The 39 km pipeline component from Hixon Creek to the East Portal (the start of the tunnel at KP 38.7).
EGP Project Footprint	The land (Temíxw) area directly disturbed by the proposed EGP Project construction and clean-up activities, including associated physical works and activities (such as, permanent right-of-way, temporary infrastructure sites, and temporary workspaces for construction).
emergency	A situation that calls for immediate and targeted action because it has resulted or may result in the following: undue risk to the health and safety of personnel or the public; significant damage to equipment or property; significant damage to public property; damage to the environment; financial or reputational risk to FortisBC Energy Inc. (FortisBC).

Terms	Definition
Environmental Assessment Certificate	A legally binding certificate issued by Ministers to the proponent that sets out the EGP Project details, Conditions, commitments, and may include periodic reporting requirements. An EAC is typically valid for 5 years from the date issued by the Ministers.
Environmental Alignment Sheets	The Environmental Alignment Sheets (EAS) provide information pertaining to the environmental and socio-economic setting below the photomosaic. Potential environmental and socio-economic issues identified during Project planning, and their corresponding mitigation measures, are positioned above their respective location on the photomosaic.
Environmental Site Information Sheet.	The Environmental Site Information Sheet (ESIS) are the same as the EAS in that it provides information pertaining to the environmental and socio-economic setting but for one site only.
excessive flow	Excessive flows are flows that are greater than the seasonally expected normal range based on existing and predicted flow data. Signs that indicate excessive flows include water levels above the ordinary high watermark or topping the banks, highly turbid conditions, and transport of wood debris.
final clean-up	Last phase of construction activity before restoration activities begin. This phase involves recontouring to a stable grade and replacing the topsoil over the area disturbed by pipeline construction.
freeze-up	Formation of ice cover on a water (Staḵw) surface due to seasonal cooling.
geogrid	Synthetic material used to reinforce soils and mitigate the erosion or failure of streambanks.
geotextile	Permeable fabrics used for sediment control measures to separate, filter, reinforce, protect, or drain.
Grade Plan	A plan determining the desired ground surface, contour, and methods of achievement.
grubbing	The removal of stumps or roots.
herbaceous plant	A plant that dies down at the end of its growing season.
High water table	The highest point reached by underground water (Staḵw).
hotline exposure	The exposure of the exiting live pipeline.
hydrostatic testing	The pipeline is pressure tested for integrity using water (Staḵw).
hydrovac	Used to safely excavate in proximity to existing underground utilities.
Indigenous nations	Squamish Nation (Sḵwx̱wú7mesh Úxwumixw), Tsleil-Waututh Nation, Musqueam Indian Band, and Kwikwetlem First Nation

Terms	Definition
invasive plant species	Species that are not native to the province, or are outside of their natural distribution, and can negatively impact British Columbia's environment, people and/or economy (IMISWG 2014). Invasive plant species that are subject to management on the EGP Project are Provincially-regulated species,species of Regional concern (as identified by the Invasive Species Council of Metro Vancouver and the Sea-to-Sky Invasive Species Council) and species identified by local government or organizations affected by the EGP Project.
isolated trenched crossing	Involves the direct excavation of the trench through the banks and bed of a watercourse or water (Stak̲w) body and isolating the instream work area from flowing water (Stak̲w) while maintaining downstream flow through water (Stak̲w) diversion; water diversion methods to isolate the crossings include flume, dam and pump, coffer dam, aqua dam, and diversion channel.
Kilometre Post	Location reference points along pipeline spaced approximately one kilometre apart.
lateral erosion	Widening of a river (Stak̲w) or stream due to the undermining the streambank.
line-of-sight	Unobstructed view to a distant point or feature.
Liquefied Natural Gas	A clear, colourless, non-toxic liquid that forms when natural gas is cooled to -160°C.
Log Ramp	A pattern of logs lain over a low-lying road or swampy area, perpendicular to the direction of travel.
lowering-in	Lowering welded sections of pipe into the trench using specially equipped pipe laying tractors (side-booms) and excavators.
merchantable timber	A tree or stand that has attained sufficient size, quality and (or) volume to make it suitable for harvesting and utilization. According to the cutting permit, this is timber that meets or exceeds the timber merchant ability specification in the Provincial Logging Residue and Waste Measurement Procedures Manual.
microsite	A small part of a larger ecosystem with unique features, conditions, or characteristics.
microtopography	Land (Temíxw) features with slight irregularities causing small variations in elevation.
mineral lick	Natural mineral deposit.
narrow down	Reducing the width of the pipeline right-of-way and temporary construction workspace to avoid sensitive features.
natural feature	Includes but is not limited to parks, trailhead, and community use areas.
non-classified drainage	Any reach (or section of a stream) that does not have a defined bed and banks for a minimum length of 100 m.
non-merchantable timber	Trees and forests that do not hold commercial value.

Terms	Definition
Noxious weed	Noxious weeds are non-native plants, identified under the BC *Weed Control Act,* that have been introduced to BC without the insect predators and plant pathogens that help keep them in check in their native habitats.
ordinary high watermark	The visible high watermark of any lake, stream, or other body of water where the presence and action of the water are so common and usual and so long continued in all ordinary years as to mark upon the soil of the bed of the lake, river stream, or other body of water a character distinct from that of the banks.
ornamental tree	Trees grown for decorative purpose.
outslope	The face of an embankment sloping downward from the highest elevation.
pathogen	Catalyst for disease production.
Proposed Prohibited Noxious weeds	Plants that, while not yet established as pests, may threated BC's environment, economy, or human health.
Qualified Professional	A person who has training, experience and expertise in a discipline relevant to the field of practice set out in the condition, and who is registered with the appropriate professional organization in British Columbia, is acting under that organization's code of ethics and is subject to disciplinary action by that organization.
Red list	List of any species or ecological communities in BC that is at risk of being lost (Extirpated, Endangered, or Threatened).
right-of-way	A cleared area, usually linear and of varying widths used for a specific purpose (such as, electric utilities, oil and gas pipelines, access or transportation). A right-of-way is a legal right to pass along or use this land.
rock armour	Rock or other material used to protect shorelines, streambeds, bridge abutments, pilings, and other shoreline structures.
riparian	The terrestrial zone adjacent to a watercourse where vegetation and microclimate are hydrologically influenced by the presence of perennial or intermittent water from the stream or river (Stak̲w). Riparian ecosystems are maintained by high water tables and periodic flooding. Typically extends from the ordinary high watermark to the toe of the valley wall but may vary depending on the amount of influence from the watercourse.
Riparian Management Areas	An area that consists of a riparian management zone and a riparian reserve zone.
Riparian Management Zones	Component of Riparian Management Area along the stream channel where constraints to harvesting apply. The RMZ begins at the edge (outermost) of the RRZ and extends to a specific width as described in the Environmental Protection Management Guideline. If no RRZ present, the RMZ begins at the edge of the channel bank.
Riparian Reserve Zone	Component of Riparian Management Area along the stream channel beginning at the edge of the channel bank and extending to the beginning of the Riparian Management Zone.

Terms	Definition
Rollback	Non-merchantable timber pulled back over row in clean-up used for access control, contour stabilization or part of the macro-site restoration.
root zone material	Soil or material around a plant that has contact with plant roots.
salvage	Saving topsoil and stockpiling before excavation of overburden begins.
scour	The removal of sediment such as soil, sand, and rock as a result of hydrodynamic force.
seismic	Types, frequency and size of earthquakes or vibrations.
sensitive feature	Include but is not limited to rare plants, rare ecological communities, fish (Sts'úkwi7) and wildlife (Sekw'ekw'inexw) species of concern, archaeological features, site-specific traditional land (Temíxw) and resource use sites, and any other sensitive environmental or cultural features.
shoo-fly	Short, narrow construction phase access connections between an existing access road and the pipeline right-of-way.
sediment fence	A temporary barrier used to intercept sediment-laden runoff.
slash	Branches and other debris left after the trees have been processed.
sloughing	Soil falling or slumping off banks and slopes due to a loss of cohesion.
sorbent boom	An absorbent material that attract and contains hydrocarbon spills.
spoil	Excavated material.
staking	Area or place markers.
Squamish Nation Environmental Assessment Agreement	The formal agreement entered into by Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) and FortisBC which establishes Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) Conditions applicable to FortisBC and describes the process by which the Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) Conditions will be satisfied.
stringing	Pipe is hauled to the right-of-way in segments to be laid out end to end in preparation for bending and welding.
subsoil	The layer of soil below the topsoil, or surface organic material.
sump	A pit or hollow generally for collecting liquids.
support-of-excavation	Mechanical means to support the ground along the perimeter of an area prior to/during excavation.
swamp mats or wooden matting	Portable platform used to support transportation and/or equipment.
temporary infrastructure site	Includes workforce accommodation, offices, and parking for EGP Project personnel and EGP Project material storage sites.
temporary workforce accommodation	Accommodation or housing for EGP Project construction personnel. Could include a temporary workforce accommodation (construction camp as described in the approved Certified Project Description), as well as rental housing or other temporary accommodation options as determined through engagement and as approved, as required, by regulatory agencies.

Terms	Definition
temporary workspace	Short-term working area that will be restored once activities are complete.
tie-in	Where pipeline segments are welded together to complete the entire pipeline.
topsoil	Uppermost layer of soil, containing the highest concentration of organic matter and microorganisms.
total suspended solids	The combined content of inorganic and organic substances contained in a liquid.
trench breaker	Trench breakers, also known as ditch plugs, are barriers that help to slow the runoff rate, thereby helping to prevent erosion. They are most commonly used during open pipeline excavation. Trench breakers help to avoid the pipeline trench from turning into a subsurface drainage path. Trench breakers may be comprised of stacked sandbags, bentonite clay or foam.
trench water management	Process of removing water (Stak̲w).
trenchless crossing	Installing pipeline without excavating an earthen trench by either underground methods such as boring, tunneling or micro-tunneling or aboveground methods such as aerial suspension or truss span bridge structures, attachment to an existing bridge or placement on skids on the ground surface.
trench line	The line of the installation route.
trenching	Creating a ditch or channel for pipeline installation using excavating equipment and blasting in rocky areas.
Tunnel Spoil	Material generated during excavation of the tunnel using a tunnel boring machine (TBM). Tunnel spoils may consist of hard rock or sand/silty sand and gravel.
Van Man 273 Relocation	The relocation of a section of existing FortisBC NPS 10 pipeline to align with the EGP North 610 Line (that is, the proposed Project) in the vicinity of approximately KP 33.8 to 36.5, east of downtown Squamish (Sk̲wx̲wú7mesh).
watercourse	Any reach, flowing on a perennial or intermittent basis that has a defined bed and banks for greater than 100 m.
water treatment plant	A system of specialized and automated tanks and filters to treat construction affected water prior to discharge into the receiving environment.
weeds	Wild growing, unwanted, non-native plants that are either regionally-listed or Provincially-listed as Noxious or Invasive.
Woodfibre Portal	The west location of the tunnel construction site, at Woodfibre LNG Limited.
wetland	A swamp, marsh, bog, fen or other similar area that supports natural vegetation that is distinct from adjacent upland areas or enclosed uplands.
windrow	Material such as topsoil, subsoil, grubbings, or snow stockpiled in a linear row.
wildfire	An unplanned fire - including unauthorized human-caused fires - occurring on forest or range lands, burning forest vegetation, grass (Sáx̲wi), brush, scrub, peat lands, or a prescribed fire set under regulation which spreads beyond the area authorized for burning.

Terms	Definition
Use of 'Practical'	Phrasing including "to the extent practical", "when practical", "where practical", is intended to allow for consideration of on-site conditions, weather conditions, environmental factors, construction factors, and safety when applying appropriate mitigation measures. In such situations, the Environmental Inspector (EI), Contractor Environment Coordinator (CEC), FortisBC, Contractor Project Manager, and other members of the Construction Management Team, in co-operation with appropriate QPs, will determine the proper approach to mitigation for the situation.

Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) Language Terms

English	Squamish Nation Language
General Terms	
Squamish Nation	Sḵwx̱wú7mesh Úxwumixw
Squamish language	Sḵwx̱wú7mesh Snichim
Monitoring	Ínexwantas
Land, Earth, Dirt	Temíxw
Mountain	Smánit
Hunting	Ch'áatl'am
Water, River	Stakw
Cultural Site	Siiyamin ta Skwxwú7mesh
Locations	
Howe Sound	Nexwnéwu7ts Átlḵ'a7tsem
Indian River	Selĺĺwit Stakw
Squamish	Sḵwx̱wú7mesh
Vancouver	K'emk'emeláy
Historic Squamish Nation village located at Woodfibre LNG Limited Site	Swĺyat
Stawamus	St'á7mes
Squamish River Estuary	Skwelwil'em
Wildlife Species	
bald eagle	sp'akw'us
bat	Skáp'kap'tsaylh
bird nest	tsiptspĺ7lhtn
northern goshawk	nsxipim
wildlife	sekw'ekw'inexw
mountain goat	X̱wex̱wsélḵen
great blue heron	Smekw'á7
frog	Wex̱és
snake	Élhkay̓
grizzly bear	Stl'alhálem
fish	Sts'úkwi7
beaver	Sḵeĺáw̓
Marbled murrelet	Piyís
Western screech-owl	Shá7yu
wildlife	Sekw'ekw'inexw

English	Squamish Nation Language
Fish Species	
Herring	Slhawt'
Vegetation	
Grasses/sedges	Sáx̱wi
Willow tree	X̱wáy̓ay

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Acronyms and Abbreviations

AEC	area of environmental concern
AHRP	Archaeology - Heritage Resources Plan
AIA	Archaeological Impact Assessment
AMP	Access Management Plan
ARD	Acid Rock Drainage
ATV	all-terrain vehicle
BC	British Columbia
BC EAO	British Columbia Environmental Assessment Office
BC ENV	British Columbia Ministry of Environment and Climate Change Strategy
BC MFLNRORD	British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development
BC MoTI	British Columbia Ministry of Transportation and Infrastructure
BC OGC	British Columbia Oil and Gas Commission
BC LWRS	British Columbia Ministry of Land, Water and Resource Stewardship
BMP	Best Management Practice
CEC	Contractor Environment Coordinator
CEL	Contractor Environment Lead
CEM	Contractor Environment Manager
CEMP	Construction Environmental Management Plan
cm	centimetre(s)
CN Rail	Canadian National Railway
CofC	Certificate of Compliance
CP	cathodic protection
CSA	Canadian Standards Association
CSIMP	Community Services and Infrastructure Management Plan
CTS	custody transfer station
CWD	coarse woody debris
dS/m	deciSiemen(s) per metre
DFO	Fisheries and Oceans Canada
EA	environmental assessment
EAC	Environmental Assessment Certificate
EAS	Environmental Alignment Sheet(s)

1	ECCC	Environment and Climate Change Canada
2	EGP Project	Eagle Mountain - Woodfibre Gas Pipeline Project
3	EI	Environmental Inspector
4	EIM	Environmental Inspection Manager
5	EMBC	Emergency Management BC
6	EMD	electric motor driven
7	EPP	Environmental Protection Plan
8	EST	Environmental Summary Table
9	ETWS	extra temporary workspace
10	FMMP	Fish Management and Monitoring Plan
11	FortisBC	FortisBC Energy Inc.
12	GBMMP	Grizzly bear Mitigation and Monitoring Plan
13	ha	hectare(s)
14	HADD	harmful alteration, disruption, or destruction
15	HP	horsepower
16	IAPP	Invasive Alien Plant Program
17	ILI	in-line inspection
18	IPSMP	Invasive Plant Species Management Plan
19	IRWMMP	Indian River Watershed Mitigation and Management Plan
20	ISCBC	Invasive Species Council of British Columbia
21	ISCMV	Invasive Species Council of Metro Vancouver
22	kg	kilogram(s)
23	kg/ha	kilogram(s) per hectare
24	km	kilometre(s)
25	KP	Kilometre Post
26	L	litre(s)
27	LWD	large woody debris
28	m	metre(s)
29	m^2	square metre(s)
30	m/s	metre(s) per second
31	m^3/second	cubic metre(s) per second
32	MEND	Mine Environment Neutral Drainage
33	mg/kg	milligram(s) per kilogram
34	mg/L	milligram(s) per litre

1	ml	millilitre(s)
2	ML	metal leaching
3	mm	millimetre(s)
4	NCD	non-classified drainage
5	NPS	nominal pipe size
6	*OGAA*	*Oil and Gas Activities Act*
7	OGMA	Old Growth Management Area
8	PAG	potentially acid-generating
9	PCB	polychlorinated biphenyls
10	PCM	Post-Construction Monitoring
11	PVP	Performance Verification Plan
12	QP	Qualified Professional
13	RCMP	Royal Canadian Mounted Police
14	RFP	Request for Proposal
15	RMA	Riparian Management Area
16	RRZ	Riparian Reserve Zone
17	SDS	Safety Data Sheet
18	Squamish Nation EAA	Squamish Nation Environmental Assessment Agreement
19	SSISC	Sea-to-Sky Invasive Species Council
20	SOE	Support-of-Excavation
21	TAC	Technical Advisory Committee
22	TBM	tunnel boring machine
23	TCMP	Traffic Control Management Plan
24	TDG	Transportation of Dangerous Goods
25	*TDG Act*	*Transportation of Dangerous Goods Act*
26	TEPP	Tunnel Environmental Protection Plan
27	the Application	Environmental Assessment Certificate Application
28	THLB	Timber Harvesting Land Base
29	TLU	Traditional Land Use
30	TSS	Timber Salvage Strategy
31	TSS	total suspended solid
32	TWS	temporary workspace
33	UTM	Universal Transverse Mercator
34	UWR	Ungulate Winter Range

VMMP	Vegetation Red- and Blue-Listed Plants and Ecological Communities Survey Results and Mitigation Plan
WHMIS	Workplace Hazardous Materials Information System
WLNG	Woodfibre LNG Limited
WMA	Wildlife Management Area
WMMP	Wildlife Mitigation and Monitoring Plan
WMP	Wetland Management Plan
Woodfibre Portal	Tunnel portal at the Woodfibre LNG Limited facility
WSA	*Water Sustainability Act*
WTP	water treatment plant

1. Introduction

On August 9, 2016, FortisBC Energy Inc. (FortisBC) received an Environmental Assessment Certificate (EAC) (No. E16-01) from the British Columbia (BC) Environmental Assessment Office (BC EAO) for the Eagle Mountain – Woodfibre Gas Pipeline Project (EGP Project), and later granted a 5-year extension to the EAC on August 5, 2021. In addition to the EAC, Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) conducted an independent environmental assessment (EA), establishing the Squamish Nation EAA between FortisBC and Squamish Nation (Sḵwx̱wú7mesh Úxwumixw). The Squamish Nation EAA provides Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) Conditions applicable to FortisBC and describes the process by which the Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) conditions will be satisfied.

The Construction Environmental Management Plan (CEMP) meets EAC Condition 2 by developing a Plan which meets the requirements imposed in EAC Condition 9. EAC Condition 9 describes the environmental protection measures that must be implemented during the construction of the EGP Project to accomplish two objectives:

1) avoiding, reducing, or mitigating potential adverse environmental, social, economic, heritage, and health effects associated with the construction; and
2) communicating commitments made to applicable regulatory agencies, Indigenous nations, and public stakeholders.

The CEMP should be read in conjunction with the Environmental Alignment Sheets (EAS) and applicable regulatory approvals and permits as well as other EAC Condition management plans linked in subsection 2.2. The CEMP provides environmental mitigation and commitments to be addressed throughout construction. Mitigation measures for specific environmental features are expanded upon in their corresponding Condition management plans, which are referenced throughout the CEMP.

The mitigation contained within the CEMP is consistent with Table 25.3-1 in the Application for the EAC (the Application) and the Addendums, with certain updates made to reflect changes in regulatory requirements, to address changes to EGP Project design, and to address feedback received from Technical Advisory Committee (TAC) members.

Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) and FortisBC entered into the Squamish Nation Environmental Assessment Agreement (Squamish Nation EAA) outlining Squamish Nation's Conditions of approval for the EGP Project. Section 4.5 of the Squamish Nation EAA identifies regulated and non-regulated management plans. The CEMP is considered a regulated plan and must receive Squamish Nation approval. Condition 4.8 (Schedule A) of the Squamish Nation EAA outlines mitigations measures that Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) will be monitoring. The CEMP has been developed to meet Conditions 17 and 20 of the Squamish Nation EAA.

The FortisBC-Squamish Nation Environmental Working Group, which operates under the terms of the Squamish Nation EAA and comprised of Squamish Nation and FortisBC, provided the Squamish Nation language place names and wildlife species names to be included in the Condition management plans. Squamish Nation terms appear where available in parenthesis following the English name throughout the body text of the CEMP.

Key hən̓q̓əmin̓əm̓ (Downriver Halkomelem language) terms exist but have not been provided by Tsleil-Waututh Nation, and therefore are not included in the CEMP.

Project Description

The EGP Project will expand FortisBC's existing pipeline capacity by twinning the line to the proposed Woodfibre LNG Limited (WLNG) facility site (Swíyat) in Squamish, BC (Sḵwx̱wú7mesh). The pipeline will convey natural gas from an area north of the Coquitlam Watershed, in Metro Vancouver, to the WLNG facility site (Swíyat), southwest of Squamish, BC (Sḵwx̱wú7mesh) (Figure 1-1). The pipeline will be approximately 47 kilometres (km) long and 24-inches in diameter (Nominal Pipe Size [NPS] 24). The pipeline traverses the Indian River Watershed.

The tunnel component starts at the southern end of the BC Rail site, within the District of Squamish Industrial Park (East Portal) and will extend for approximately 8.8 km to terminate in a portal at the WLNG facility site (Woodfibre Portal). The eastern portion of the tunnel component runs under the Squamish Estuary Wildlife (sekw'ekw'inexw) Management Area (WMA) for approximately 3.75 km and the western portion is a bedrock tunnel that crosses under mountainous terrain on the west side of Howe Sound (Nexwnéwu7ts Átlḵ'a7tsem) for approximately 5 km.

The Coquitlam Twinning is approximately 3 km of NPS 24 gas pipeline twinning the existing FortisBC NPS 12 gas pipeline from the existing FortisBC Eagle Mountain Compressor Station to a tie-in point located on the existing NPS 12 FortisBC pipeline at the south end of the Coquitlam Watershed.

The EGP Project also includes the installation of electric-drive compression at the existing compressor station located at Eagle Mountain in Coquitlam and a gas turbine-powered compressor station located at Squamish (Sḵwx̱wú7mesh), BC. The EGP Project will require construction logistics, including temporary workspace (TWS), temporary infrastructure sites, and the use of existing barge landing sites to transport people and materials.

Additional detail on the EGP Project components is provided in Table 1-1.

480000 490000 500000 510000

5510000 5500000 5490000 5480000

N

Tantalus Provincial Park
Squamish River
Garibaldi Provincial Park
Garibaldi Provincial Park
Brackendale Eagles Park
District of Squamish (Skwxwu7mesh)
Mamquam River
KP 38.81
KP 40
KP 35
Option 2: Squamish Compressor Station and NPS 10 Reroute & Connector
Option 1: Mount Mulligan Compressor Station
SQUAMISH-LILLOOET REGIONAL DISTRICT
SKWELWIL'EM SQUAMISH ESTUARY WMA
Stawamus Chief Prov. Park
KP 45
KP 30
KP 47.54
Squamish Harbour
Woodfibre Site (Swlyat)
Darrell Bay (Kwtsa7tsutsin)
Shannon Falls Provincial Park
KP 25
Existing 10" Pipeline
Murrin Provincial Park
Brittania Beach (Shishayu7ay)
KP 20
Indian Arm
Pinecone Burke Provincial Park
SUNSHINE COAST REGIONAL DISTRICT
Proposed 24" Pipeline
KP 15
KP 10
BRITANNIA RANGE
Porteau Cove Provincial Park
METRO VANCOUVER REGIONAL DISTRICT
KP 5
KP 0
Coquitlam Conservation Reserve
FANNIN RANGE
Cypress Provincial Park
Indian Arm Provincial Park
Indian Arm Provincial Park
Coquitlam Conservation Reserve
NPS 12
KP 2.9
KP 2
KP 1
NPS 24
KP 0
Eagle Mountain Park
Coquitlam 3 km Pipeline Twinning and Eagle Mountain Compressor Station
1:50,000

FORTIS BC

September 2022

FIGURE 1-1
PROJECT OVERVIEW

EAGLE MOUNTAIN-WOODFIBRE GAS PIPELINE PROJECT

- Compressor Staton
- Kilometre Post (KP)
- Proposed NPS 24 FortisBC Pipeline Route
- Proposed Tunnel Route
- Existing FortisBC Pipeline
- Certified 230 kV Transmission Line
- Meridian Substation
- Certified Electrical Transmission Corridor
- Certified Compressor Station Area
- Watercourse
- Waterbody
- Regional District
- Municipality
- First Nation Reserve
- Park and Protected Area
- Coquitlam Conservation Reserve

SCALE: 1:120,000

0 1 2 3 4 5 km

(All Locations Approximate)

JACOBS

Jacobs Project Number CE833400

UTM Zone 10 North. NAD 1983.
Proposed Pipeline Route, KP: Universal Pegasus International (UPI) 10-20-2021 (Route 1025/4003); Proposed Tunnel Route: UPI 10-24-2019 (SSEID 6002); Existing Pipeline: FortisBC 2012; Proposed Squamish Compressor Station: Solaris 06-18-2020; Mount Mulligan CS: FortisBC 08-04-2015; Certified 230kV Transmission Line: Primary Engineering and Construction 01-07-2020; Certified Compressor Station Area: McElhanney Associates Land Surveying Ltd 10-16-2014; Certified Electrical Transmission Corridor: CNZM 30-07-2014; Conservation Reserve: Metro Vancouver 07-02-2017, Morgan Stewart and Company, 1995 provided by Fortis BC 2019 (modified by Jacobs 05-12-2020), Meridian Substation: DBS Energy Services 03-04-2014; Roads: NRCan 2014; Railways: BCGov 2019; Hydrography: NRCan. 2009, BC MFLNRO 2008; Municipal Boundaries, Regional Districts: BC MFLNRO 2017; Parks, Wildlife Management Areas: BC MFLNRO 2008; First Nation Reserves: Government of Canada 2018; Base Map Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community.

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Table 1-1. Technical Details for Construction of the Project

Details	Description
Total Length	Approximately 47.7 km of NPS 24 main pipeline extending from Hixon Valley to the WLNG facility site, including EGP North 610 Line and the tunnel pipelines. A 3 km, NPS 24 pipeline loop (the Coquitlam Twinning) starting at the Eagle Mountain Compressor Station in Coquitlam. The loop runs parallel to the existing FortisBC NPS 12 pipeline for the entire length. The existing FortisBC NPS 10 pipe will be relocated to align with the EGP North 610 Line from approximately Kilometre Post (KP) 33.8 to 36.5, east of downtown Squamish (Sḵwx̱wú7mesh). This re-alignment is known as the Van Man 273 Relocation. The existing NPS 10 pipeline located in the north portion of the proposed Squamish Compressor Station siting area will be relocated to accommodate the new compressor station site. The length of the NPS 10 pipeline to be relocated is approximately 300 metres (m). A new approximately 450-m-long NPS 10 pipeline lateral will be constructed to connect the rerouted NPS 10 pipeline at the Squamish Compressor Station to the new Custody Transfer Station (CTS). This is known as WLNG Lateral 273.
Length Parallel* to Existing Linear Corridors	Approximately 24 km or 51 percent (includes roads, industrial rights-of-way, electrical transmission rights-of-way, and existing FortisBC pipeline)
Length Parallel* to Existing FortisBC Pipeline	Approximately 16 km (of the approximately 24 km parallel to existing linear corridors described above)
Product	Sweet natural gas
Operating Pressure	14.89 megapascal pressure units (2,160 pounds per square inch gauge)
Nominal Pipeline Capacity	6,711 by E3 cubic metres per day (237 million standard cubic feet per day)
Pipe Coating	Fusion bond epoxy, abrasion resistant overcoat coating at bored road crossings
Permanent Right-of-Way Width	Approximately 18 m
Cathodic Protection (CP System)	A CP system, including anode beds, rectifiers, and power supplies, will be installed for the pipeline, CTS, and compressor stations.
Pipeline Burial Depth	As per Canadian Standards Association (CSA) Z662-19, the minimum depth of cover is 0.9 m. The typical burial depth of the proposed pipeline will vary from 0.9 to 1.2 m depending on site-specific conditions, with deeper depths of burial where warranted.
Hydrostatic Test Medium	Fresh water (Staḵw). The source of water (Staḵw) and testing method will be subject to BC OGC approval.

Table 1-1. Technical Details for Construction of the Project

Details	Description
Compressor Stations	Eagle Mountain Compressor Station expansion involves adding two 26,000 horsepower (HP) electric motor driven (EMD) tandem compressor packages to the existing compressor station. Upgrade includes additional discharge gas cooling, high pressure yard piping, isolation valves, electrical, control and gas systems; construction of an electrical substation and electrical power lines. Squamish Compressor Station design involves the installation of two 6,270 HP gas turbine compressor packages. The site will also be equipped with discharge gas cooling and other auxiliary equipment, including high pressure yard piping, isolation valves, electrical, control and gas systems, storage facilities, and offices.
Tunnel	Construction of approximately 8.7 km tunnel for pipeline installation from the East Portal (BC Rail site) to the Woodfibre Portal (WLNG facility site) underneath the Squamish (Sḵwx̱wú7mesh) River Estuary. The EGP Tunnel is comprised of two segments, that describe the geologic condition of that segment of the tunnel; ▪ The soft ground segment of the tunnel (the Soft Ground Tunnel) starts from the East Portal and Monmouth Ridge. ▪ The Bedrock Tunnel segment (the Bedrock Tunnel) interfaces with the soft ground tunnel at Monmouth Ridge and continues to the Woodfibre Portal.
Tunnel (East Portal)	The East Portal at the BC Rail site is the entrance point for the excavation of the Soft Ground Tunnel segment. A support-of-excavation (SOE) structure will form a perimeter around the East Portal to provide support during excavation. The East Portal will remain open for the duration of construction and backfilled for permanent closure.
Tunnel - Soft Ground Tunnel (Segment)	The Soft Ground Tunnel segment will be excavated using a soft ground TBM from the East Portal, until reaching the interface with the Bedrock Tunnel segment. The Soft Ground Tunnel segment will be excavated underneath the Squamish (Sḵwx̱wú7mesh) River Estuary, avoiding surface impacts to the Estuary and WMA. The Soft Ground Tunnel segment is comprised of river sediments such as sand, silt, and gravel. During excavation, tunnel spoils will be conveyed to the BC Rail site for processing, testing and disposal. The soft ground tunnel boring machine (TBM) will erect a concrete and gasketed segmental liner to support the tunnel excavation and manage water ingress throughout the tunnel's design life. Once the excavation is complete, the soft ground TBM will be removed and the tunnel will be backfilled for operational purposes.
Woodfibre Portal	The Woodfibre Portal at the WLNG facility site will serve as the entrance to the Bedrock Tunnel segment. The portal will be excavated through drill and blast methodology with rock support for stabilization as necessary, to provide access for the hard rock TBM and a means of removing tunnel spoils during excavation.

Table 1-1. Technical Details for Construction of the Project

Details	Description
Tunnel - Bedrock Tunnel (Segment)	The Bedrock Tunnel will be excavated from the Woodfibre Portal, until reaching the interface with the Soft Ground Tunnel segment. It will be excavated through mountainous bedrock, comprised mainly of competent granite using a hard rock TBM. During excavation, tunnel spoils will be conveyed back to the WLNG facility site for segregation, testing, and disposal. Rock support will be installed throughout the tunnel excavation in areas of weaker rock and grout will be used to reasonably reduce water inflows in areas of significant flows. Once excavation is complete, the hard rock TBM will be removed to the WLNG facility site, and the tunnel will be backfilled.
Temporary Facilities	▪ Extra temporary workspace (ETWS) ▪ Temporary workforce accommodation ▪ Staging areas ▪ Stockpile sites ▪ Contractor yards ▪ Laydown areas ▪ Rail sidings ▪ Work areas for trenchless crossing construction ▪ Borrow sites ▪ Use of existing barge landing sites ▪ Temporary access roads ▪ Temporary communication towers ▪ Other ancillary components and activities
Access to Components	Existing access roads will be used for construction, wherever feasible. New temporary access roads may be needed for construction.
Expected Useful Life of Pipeline	50+ years

Note:

* % parallel was estimated based on review of air photos and disturbance was considered parallel if it was generally within 50 m of the proposed route.

2. Environmental Management Plan Overview

The EAC granted for the EGP Project is subject to 30 Conditions. The CEMP has been developed to meet the requirements of the EAC Conditions 2 (plan development) and 9 (construction environmental management). The Squamish Nation EAA between FortisBC and Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) includes eight Conditions for FortisBC.

The scope of the CEMP includes:

- Purpose and objectives, roles and responsibilities, implementation schedule, and future updates (Section 2)
- Consultation and engagement (Section 3)
- Procedure for notifying concerned parties (Section 4)
- A description of the mitigation measures for environmental protection that may be implemented during pre-construction, construction, and post-construction activities (Sections 5, 6, and 7)
- Management plans (Section 8)
- Contingency plans (Section 9)
- Monitoring (Ínexwantas) Program (Section 10)
- Adaptive Management (Section 11)
- A plan for reporting on the implementation of the CEMP including the schedule, content, and recipients of reports (Section 12)
- Professional Authentication of the CEMP (Section 13)
- Details (Section 14)
- References (Section 15)

To specify the applicability of a given mitigation measure to the various components of the EGP Project, check-boxes for each component denote the applicability of the mitigation. FortisBC will follow these specifications to meet the Conditions of the EAC.

Mitigation measures provided in the CEMP are based on:

- input from Squamish Nation (Sḵwx̱wú7mesh Úxwumixw), Tsleil-Waututh Nation, Musqueam Indian Band, and Kwikwetlem First Nation, BC Ministry of Environment and Climate Change Strategy (BC ENV), BC Ministry of Land, Water and Resource Stewardship (BC LWRS), BC OGC, and public stakeholders gathered during the consultation and engagement program;
- the results of environmental and archaeological and Heritage Resources field studies;
- commitments made in the EAC Application;
- commitments made in the Squamish Nation EAA;
- permit Conditions and other approvals;
- commitments made to Squamish Nation (Sḵwx̱wú7mesh Úxwumixw), Tsleil-Waututh Nation, Musqueam Indian Band, and Kwikwetlem First Nation, and stakeholders through consultation and engagement including draft plan reviews, working group meetings, and stakeholder meetings;

- a review of the results of environmental as-built, Post-Construction Monitoring (PCM), and restoration assessment programs for other pipeline projects; and
- regulatory requirements and guidance.

2.1 Purpose and Objectives

In addition to meeting EAC Condition 9, the purpose of the CEMP is to communicate FortisBC's environmental mitigation measures to all personnel engaged during construction of the EGP Project in a clear and concise format. These environmental procedures and mitigation measures will be implemented during construction to mitigate, avoid, or reduce potential adverse environmental effects.

The objectives of the CEMP are to:

- identify mitigation measures to be implemented during construction activities;
- provide instructions for carrying out construction activities in a manner that will avoid, reduce, mitigate, or offset potential adverse environmental and socio-economic effects; and
- serve as reference information for the environmental management program to be implemented during construction.

The Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) mitigation effectiveness monitoring program is relevant to the CEMP as well as the Traffic Control Management Plan (TCMP), Access Management Plan (AMP), and Community Services and Infrastructure Management Plan (CSIMP).

2.2 Linkages to Other Plans

Information on other management plans prepared for the EGP Project have been considered in the CEMP and linked identified in Table 2-1.

Table 2-1. Linkages to Other Plans

Plan	Linkages to the CEMP
Fish Management and Monitoring Plan (FMMP) (EAC Condition 11)	The FMMP provides overall environmental mitigation measures and monitoring (Ínexwantas) and contingency plans for the protection of fish (Sts'úkwi7) and fish (Sts'úkwi7) habitat. The CEMP contains mitigation measures specific to protection of fish and fish habitat during construction.
AMP (EAC Condition 12)	The CEMP contains access control management measures during construction.
Vegetation – Red- and Blue-Listed Plants and Ecological Communities Management Plan (VMMP) (EAC Condition 13)	The CEMP contains construction mitigation measures applicable to Red- and Blue-listed plants and ecological communities.
Old Growth Letter (EAC Condition 14)	The CEMP contains construction mitigation measures applicable to tree clearing, Old Growth Management Areas (OGMAs), and areas of old growth forest.

Table 2-1. Linkages to Other Plans

Plan	Linkages to the CEMP
Timber Salvage Strategy (TSS) (EAC Condition 15)	The CEMP contains general provisions for timber harvest and salvage.
Wildlife Mitigation and Monitoring Plan (WMMP) (EAC Condition 17)	The CEMP contains construction mitigation measures applicable to wildlife (Sekw'ekw'inexw).
Grizzly Bear Mitigation and Monitoring Plan (GBMMP) (EAC Condition 18)	The CEMP contains construction mitigation measures applicable to grizzly bears (Stl'alhálem).
Wetland Management Plan (WMP) (EAC Condition 21)	The CEMP contains construction mitigation measures applicable to wetlands.
CSIMP (EAC Condition 22)	The CEMP contains construction mitigation measures applicable to community services and infrastructure.
TCMP (EAC Condition 23)	The CEMP contains construction mitigation measures applicable to EGP Project-related traffic.
Archaeology - Heritage Resources Plan (AHRP) (EAC Condition 26)	The CEMP contains the Heritage Resource Discovery Contingency Plan and the Traditional Land Use (TLU) Sites Contingency Plan applicable to archaeological and heritage resources.
Indian River Watershed Mitigation and Management Plan (IRWMMP) (EAC Condition 27)	The CEMP contains construction mitigation measures applicable to construction within the Indian River Watershed (KP 0 to KP 24.8).
Restoration Framework	The CEMP contains reference to the Restoration Framework. Mitigation measures described in the Restoration Framework and Restoration are monitored and reported on as part of the PCM Program.
PCM Framework	The effectiveness of mitigation set out in the CEMP, AMP, VMMP, WMMP, WMP, GBMMP, the Restoration Framework and Plan, and will be monitored and reported on during the PCM Program.
EAS	Mitigation measures in the CEMP are specific to the EGP Project and are supported by the EAS to provide site-specific information. There will be many references to the EAS throughout the mitigation, management plans and contingency plans. The CEMP and EAS will be used together when implemented.

2.3 Roles and Responsibilities

This subsection describes FortisBC and Contractor personnel who are responsible for implementing the requirements of the CEMP, associated management plans and the Contractors' EPPs during construction.

Table 2-2 provides information on the roles of key individuals with environmental responsibilities. Position titles may vary or change, but they will align with the role and responsibility described as intended. Specifics of these positions are also provided in the associated management plans. This subsection also describes roles and responsibilities associated with Indigenous nation support and oversight for the EGP Project.

EAC Condition 8 describes the role of an Environmental Monitor. The FortisBC Environmental Inspection Manager (EIM) fulfils this role within the CEMP and as described in EAC Condition 8. FortisBC will develop a Terms of Engagement outlining the stop work process as construction planning advances.

The following tables provide information on the position descriptions for FortisBC, Contractor, and Indigenous nation environmental personnel. Qualifications and training requirements have been identified for each member of the Environment Team.

Table 2-2. Summary of FortisBC Environmental Roles and Responsibilities for the EGP Project

Role	Responsibility
FortisBC	
FortisBC Project Director(s)	▪ Verifies that environmental compliance and requirements are integrated into all construction components of the EGP Project. ▪ Verifies that the requirements of the Squamish Nation EAA Conditions, the EAC and applicable permits required for construction are in place. ▪ Seeks advice from the FortisBC Environment Manager, as needed.
FortisBC Project Manager(s)	▪ Reports to the FortisBC Project Director. ▪ Responsible for overseeing the construction of respective components of the EGP Project. ▪ Authority to verify that the Contractor is completing the work in accordance with the CEMP, associated management plans and the Contractor's EPPs during construction of the EGP Project. ▪ Seeks advice from the FortisBC Environment Manager as needed during construction of the respective EGP Project component.
FortisBC Construction Manager(s)	▪ Reports to the FortisBC Project Manager. ▪ Notifies the FortisBC Project Manager and the FortisBC EIM of the Contractor's changes to the respective EGP Project component work schedule. ▪ Has authority to verify that environmental compliance requirements are incorporated into construction execution planning and daily construction meetings. ▪ Authority to accompany regulatory authority representatives during field visits and inspections. ▪ Authority to seek and receive advice and input from the Environmental Inspection Manager (EIM) and Lead Environmental Inspector (EI) related to the CEMP, associated management plans and the Contractors' EPPs during construction of the EGP Project.

Table 2-2. Summary of FortisBC Environmental Roles and Responsibilities for the EGP Project

Role	Responsibility
FortisBC Environment Manager	▪ Reports to the FortisBC Project Director. ▪ Is a Qualified Professional (QP) as defined in the EAC Schedule B (Table of Conditions) 5 years of experience on major construction projects in BC. ▪ Supports ongoing consultation on environmental management in accordance with the CEMP and associated management plans. ▪ Liaises with regulatory agencies on environmental compliances during construction of the components of the EGP Project. ▪ Reports environmental non-compliances in accordance with the CEMP. ▪ Directs the FortisBC environmental inspection program. ▪ Directs implementation of the internal environmental compliance audit program for construction of the components of the EGP Project. ▪ Responsible for resourcing, qualified and trained personnel to support the environmental oversight for construction of the EGP Project, including retaining QP(s). ▪ Oversees monitoring of environmental incidents and non-compliances in accordance with the CEMP.
FortisBC Environmental Inspection Manager	▪ The FortisBC EIM will fulfill the responsibilities as outlined in Condition 8, Schedule B of the EAC, including stop work authority, and will be supported by a team of EIs and QPs. ▪ Supervises the FortisBC Lead EIs, QPs, and environmental inspection conducted by FortisBC on the Project. ▪ Responsible for scheduling and coordination of the FortisBC EI and QP field programs during construction, including coordination and communication with the FortisBC Construction Manager and Contractor team. ▪ The FortisBC EIM or delegate accompanies regulatory authority representatives during field visits and inspections as required. ▪ Reviews and verifies quality and consistency in environmental inspection, mitigation effectiveness, and reporting required under the CEMP and associated management plans across the EGP Project. Reviews and verifies that the Contractor EPPs are developed in accordance with Section 2.4 of the CEMP. ▪ Receives copies of and reviews environmental reports, environmental incident reports and Contractor Environmental Protection Plans (EPPs) required under the CEMP. ▪ Provides senior environmental technical support to the FortisBC Environment Manager and the FortisBC EI team.

Table 2-2. Summary of FortisBC Environmental Roles and Responsibilities for the EGP Project

Role	Responsibility
FortisBC Lead EI(s)	▪ A Lead EI will be retained for construction of each of the EGP Project components: pipeline, tunnel, and facilities. ▪ Reports to the FortisBC EIM; confirms that appropriate environmental resources (including QPs), are on-site as required. ▪ Supervises FortisBC EIs and QPs within their respective work sites and responsibilities. ▪ Coordinates with the FortisBC Construction Manager(s) to ensure QPs are engaged as required. ▪ Authority to verify compliance with the CEMP, associated management plans and Contractor EPPs during construction of the EGP Project. ▪ Works with the Contractor(s), the FortisBC Construction Manager(s), FortisBC EIM and FortisBC EIs, and the applicable QPs to develop new or alternative mitigation measures in accordance with the CEMP. ▪ Works closely with the Contractors to confirm that the environmental requirements of the CEMP are clearly understood and verify that the Contractor EPPs are implemented. ▪ Documents and reports environmental incidents or non-compliances to the FortisBC EIM. Verifies that the Contractor implements mitigation measures and follows up to verify that necessary corrective actions have been completed and documented, as required, in accordance with Sections 10 and 11 of this CEMP. ▪ Communicates with the Contractor's Environment team to resolve any conflicts that may occur regarding environmental issues. ▪ Has stop work authority for site-specific environmental conditions. Consults with FortisBC's Construction Manager, Project Manager, EIM, and Environment Manager to issue Stop Work Notices, as warranted.
FortisBC EI(s)	▪ Reports to the FortisBC Lead EI and is authorized to inspect, document, and report on Contractor compliance with the CEMP, associated management plans and Contractor EPPs during construction. ▪ Attends Contractor's daily meetings and communicates with the Contractor on work schedules and construction activities. ▪ Submits Daily EI Reports to the FortisBC Lead EI. ▪ Reports any actual or potential environmental non-compliances and events to the FortisBC Lead EI. ▪ Supports environmental issues resolution, field decision-making, and reporting.
FortisBC Archaeology Lead	▪ Reports to the FortisBC Environment Manager. ▪ Provides archaeological and heritage resources support as required during construction. ▪ Communicates archaeological and heritage resources requirements and sensitivities to the FortisBC EIM, Lead EI and Contractors.

Table 2-2. Summary of FortisBC Environmental Roles and Responsibilities for the EGP Project

Role	Responsibility
FortisBC Archaeological Monitor(s)	▪ Reports to the FortisBC Archaeology Lead. ▪ Authority to verify on-site compliance with BC *Heritage Conservation Act* Permits and Indigenous Permits or Notifications. ▪ Provides on-site archaeological monitoring (Ínexwantas) as required in compliance with the AHRP. ▪ Consults with FortisBC Archaeology Lead as needed during review of on-site mitigation measures or potential archaeological issues encountered during construction. ▪ Submits daily reports when in the field and maintains a photographic record of works in archaeologically sensitive areas.
FortisBC Permitting and Compliance Manager	▪ Reports to the FortisBC Project Director. ▪ Accountable for compliance reporting and deliverables to meet EGP Project regulatory requirements. Directs preparation and submission of reports to the applicable regulatory agencies and Indigenous nations within required timelines. ▪ Provides support for timely resolution, documentation, and follow-up of potential non-compliances. ▪ Oversees development and implementation of the Orientation Program. ▪ Authority to accompany environmental regulatory agency representatives during field visits and inspections as required.
Regulatory Compliance Lead	▪ Reports to the FortisBC Permitting and Compliance Manager. ▪ Responsible for recording of compliance to meet the environmental requirement of the EGP Project. ▪ Liaise during field inspections and audits by BC OGC, BC EAO, and Squamish Nation (Sḵwx̱wú7mesh Úxwumixw). ▪ Coordinate delivery of required training to all Project personnel. ▪ Develop and submit compliance reporting in accordance with the environmental requirements of the EGP Project.
QP	▪ A person who has training, experience and expertise in a discipline relevant to the field of practice set out in the condition, and who is registered with the appropriate professional organization in BC, is acting under that organization's code of ethics and is subject to disciplinary action by that organization. Scheduled and coordinated by the FortisBC EIM or Lead EI. ▪ Responsible for providing services related to a specific area of environmental technical expertise, prior to construction, during construction, and during PCM. ▪ Works with the FortisBC Construction Manager(s) and provides support to the FortisBC EIM, and FortisBC EIs to develop new or alternative mitigation measures if warranted. ▪ Provides advice on the implementation of mitigation measures required under this CEMP and the environmental requirements for the EGP Project based on their specific areas of specialized training and experience. ▪ Provides input if an unanticipated discovery of valued resources occurs (such as, a rare plant that was not previously mapped).

Table 2-3. Summary of Contractor Personnel Environmental Roles and Responsibilities for the EGP Project

Role	Responsibility
Contractor Project Manager	▪ Directs and communicates construction activity schedules to the FortisBC Construction Manager and FortisBC EIM. ▪ Provides leadership to create a strong culture of safety and environmental compliance for the EGP Project.
Contractor Construction Superintendent(s)	▪ Reports to the Contractor Project Manager. ▪ Adheres to applicable environmental requirements for the EGP Project that pertain to the Contractor's work scope. ▪ Confirms that Contractor field crews and Subcontractors are aware of and implement all measures required by the EPP applicable to their scope of work. ▪ Responsible for effective communication and understanding of environmental responsibilities and requirements through pre-job and tailgate meetings for activities that could potentially affect sensitive environmental resources, such as construction at fish-bearing watercourse crossings. ▪ Implements the work procedures under the Contractor EPP. ▪ Verifies that sites are restored to a stable condition and that the completed work areas are left in a safe, clean, and environmentally-acceptable condition.
Contractor Environmental Manager (CEM)	▪ Responsible for the development and implementation of the Contractor EPP as described in Section 2.4 of the CEMP. ▪ Supervises the Contractor Environmental Lead and Contractor Environmental Coordinators to monitor construction activities in accordance with the Contractor EPP. ▪ Notifies the FortisBC EIM and Lead EI in advance of construction activities that could potentially affect sensitive environmental resources identified in the CEMP or the Contractor EPP. ▪ Confirms that environmental incidents or non-compliances are investigated and reported to FortisBC in a timely manner. Applies and documents the appropriate corrective and preventative measures. ▪ Responsible for recruiting, planning, and managing the resources of the Contractor to comply the environmental requirements and the Contractor EPP applicable to their respective scope of work.
Contractor Environment Lead (CEL)	▪ Document and monitor incidents, non-compliance, and non-conformances with the CEMP and the Contractor EPP and reporting as required to FortisBC. ▪ Liaise and communicate with the FortisBC EIs on environmental compliance, provide on-site environmental oversight during construction with mitigation measures required by this CEMP and by the EPP. ▪ Provides advice and responds to queries and correspondence on environmental matters. ▪ Verifies that Contractor personnel have been made aware of their environmental obligations and responsibilities. ▪ Participates in audits to evaluate compliance with the environmental requirements of the EGP Project and the Contractor EPP. ▪ Disseminates environmental information and requirements, including changes to legislation, to relevant Contractor personnel and subcontractors ▪ Verifies environmental records are retained and readily available.

Table 2-3. Summary of Contractor Personnel Environmental Roles and Responsibilities for the EGP Project

Role	Responsibility
Contractor Environment Coordinator(s) (CECs)	▪ Reports to the CEL. ▪ Responsible for environmental monitoring (Ínexwantas) of construction in accordance with the environmental requirements of the EGP Project and the Contractor EPPs. ▪ Provides guidance and support to Contractor field personnel on environmental requirements. ▪ Communicates with the FortisBC EI team to identify and resolve potential environmental issues in a proactive and timely manner and track them to completion. ▪ Prepares reports for review by the CEL that summarize daily construction activities, implemented mitigation measures, and actual or potential environmental issues encountered during construction, including corrective actions that were taken. Copies of environmental reports will be shared with FortisBC.

Table 2-4. Summary of Indigenous Nation Personnel Environmental Roles and Responsibilities for the EGP Project

Role	Responsibility
Indigenous Monitor(s)	▪ Provides environmental, cultural, and archaeological monitoring (Ínexwantas) support, focusing on TLU areas along the EGP Project alignment during construction. ▪ Works with the EIs and QPs to provide Traditional Knowledge. ▪ Discusses cultural use with the EIs and QP(s).
Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) Indigenous Monitor	▪ Reviews and approves the EGP Project management plans through the process described in Condition 17, Section 4.5 of the Squamish Nation EAA (2016). ▪ Monitors Monitored Mitigation Measures as identified by Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) through the process described in Condition 20 of the Squamish Nation EAA (2016).
Indian River Indigenous Monitor	▪ Responsibilities are as described in the IRWMMP (in development)

Note: Mitigation that refers to an Indigenous Monitor may be filled by the positions in Table 2-4.

2.4 Contractor Environmental Protection Plans

The applicable Contractor for each EGP Project component must include the identification of applicable environmental permits and authorizations as well as requirements in the Condition management plans and EAC, applicable to the scope of work covered by the EPP. The EPP will also describe how the Contractor will comply with the Conditions of those permits and authorizations as well as a contract. FortisBC Contractor EPPs will include:

- Pipeline EPP
- Tunnel EPP

- Facilities EPP
- Temporary Workforce Lodging EPP

The EPPs will include:

- A description of the construction activities and location to which the EPP applies
- Identification of applicable environmental permits and authorizations
- A description of how the Contractor will comply with the Conditions of those permits and authorizations
- Requirements in the Condition management plans and EAC
- Detailed site or activity-specific mitigation measures and how they will be implemented, including a description of roles and responsibilities
- A description of how environmental monitoring (Ínexwantas) of construction activities applicable to the scope of work covered by the EPP, will be conducted to determine compliance with the EPP and the management plans:
  - The type and frequency of data collection, methodologies, and protocols to be followed during construction
  - The types of locations or activities that require regular inspection during construction

2.5 Implementation Schedule

The CEMP will be submitted to BC EAO at least 45 days before the commencement of construction. Table 2-6 provides a current preliminary schedule for implementation of the CEMP through the EGP Project phases. FortisBC will monitor mitigation effectiveness during the construction period and in the first five growing seasons following completion of restoration (the first growing season) (subsection 10.3.3 for the PCM Program).

Table 2-5. Construction Environmental Management Plan Implementation through the Project Phases

Project Phase	Timeline
Planning	Present to Q4 2023
Pipeline Construction	Q2 2023 to Q1 2026
Permanent Facilities Construction	Q4 2023 to Q1 2026
Temporary Facilities Construction	Q1 2023 to Q3 2026
Access Road Construction	Q1 2023 to Q4 2023
Tunnel Construction	Q1 2023 to Q4 2025
Watercourse Crossing Construction	Q3 2023 to Q4 2025
Restoration	Q1 2026 to Q1 2031
PCM	Q3 2026 to Q3 2031

Note that references for 'pre-construction' may refer to the 'planning' phase or refer to the timeframe of 'prior to construction' or prior to various construction activities in a given area.

2.6 Future Updates to the Construction Environmental Management Plan

Revisions to the CEMP could occur as a result of:

- Changes to EGP Project planning (for example, EGP Project amendments or scheduling);
- New information obtained through consultation and engagement programs; or
- Changes to regulatory permits and authorization conditions that require edits to the CEMP.

FortisBC will consult with BC EAO to establish if required updates to the CEMP are considered material revisions. As determined by BC EAO, FortisBC will notify the BC LWRS, BC ENV, BC OGC, Squamish Nation (Sḵwx̱wú7mesh Úxwumixw), Tsleil-Waututh Nation, Musqueam Indian Band, and Kwikwetlem First Nation, and other TAC members and provide opportunity to review material revisions. The consultation and engagement period will depend on the nature of the revision, and the relative interests of regulatory agencies and of the rights and relative interests of potentially affected Indigenous nations, as determined by BC EAO. Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) will be given the opportunity to review and approve material revisions as per the Squamish Nation EAA.

The Document History table included at the beginning of the CEMP, shall be updated as per any future updates and will list the version, date and distribution.

3. Consultation and Engagement

The CEMP was developed in accordance with consultation and engagement requirements of EAC Condition 9. Consultation was completed with the BC Ministry of Land, Water and Resource Stewardship (BC LWRS; which together with BC MoF were formerly BC MFLNRORD), BC ENV, BC OGC, Squamish Nation (Sḵwx̱wú7mesh Úxwumixw), Tsleil-Waututh Nation, Musqueam Indian Band, and Kwikwetlem First Nation.

Table 3-1 provides information on the CEMP engagement schedule for review of the Detailed Plan Outline, 100% Draft Plan, Rev 0 and Rev 1. FortisBC prepared Comment Tracking Tables that document comments received on the CEMP and the FortisBC responses to each. The final CEMP incorporated the feedback received from reviewers.

Table 3-1. Construction Environmental Management Plan Engagement Schedule

Draft Plan	Reviewer(s)	Date
Detailed Plan Outline	Squamish Nation	April 24, 2020
	Tsleil-Waututh Nation	June 16, 2020
	BC OGC	August 6, 2020
100% Draft Plan	Squamish Nation (Sḵwx̱wú7mesh Úxwumixw), BC MFLNRORD	June 9, 2021
	Tsleil-Waututh Nation, BC ENV	June 11, 2021
	Kwikwetlem First Nation, BC OGC	June 16, 2021
	Musqueam Indian Band	June 18, 2021
	Environment and Climate Change Canada (ECCC)	July 28, 2021
Final (Rev 0)	Squamish Nation (Sḵwx̱wú7mesh Úxwumixw), Tsleil-Waututh Nation, Kwikwetlem First Nation, Musqueam Indian Band	April 1, 2022
	BC EAO, BC MFLNRORD, BC OGC, BC ENV, ECCC	April 1, 2022
Tracked Rev 1	Squamish Nation (Sḵwx̱wú7mesh Úxwumixw)	July 26, 2022

In addition, FortisBC has engaged with various reviewers through working group meetings whereby Condition management plans and mitigation were discussed. To FortisBC's knowledge, there are no outstanding issues for resolution for the CEMP.

Records of consultation and engagement will be maintained and provided to BC EAO, upon request, in accordance with EAC Condition 3. In addition, Indigenous Engagement records will be managed in accordance with EAC Condition 24.

4. Notification of Concerned Parties

Notification of the construction schedule and timing of specific construction activities will facilitate awareness of upcoming activities and allow regulatory agencies, Indigenous nations, and other stakeholders to plan as appropriate for construction activities in their area. The objectives of these measures are to:

- reduce disruptions to other land (Temíxw) use activities during construction;
- communicate EGP Project activities to affected Indigenous nations and stakeholders;
- maintain communication with regulatory agencies throughout construction; and
- meet EAC Conditions and other regulatory requirements for notifications.

Company Measures

Parties that will be contacted by FortisBC during the EGP Project include those listed as follows. Notification process of concerned parties includes:

- Local governments of the anticipated pipeline routing and construction schedules a minimum of one (1) month prior to commencement of construction [R-1144];
- Applicable regulatory agencies (such as, BC ENV, DFO, BC LWRS, BC OGC) as warranted and required during construction [R-1145];
- Regulatory agencies and licensees, if required by the *Water Sustainability Act* (*WSA*), prior to commencement of and prior to withdrawing water for testing or other construction-related uses [R-1155];
- Applicable companies for road, power line and pipeline crossings, if needed, by crossing and Road Use Agreements including, but not limited to, BC Hydro, Canadian National Railway (CN Rail), and BC Ministry of Transportation and Infrastructure (BC MoTI) [R-1147]; and
- Notify a minimum of one (1) month prior to construction, Indigenous nations identified in FortisBC's Indigenous Consultation Plan, trappers, guides and outfitters, landowners and lessees, tenure holders, as well as recreational organizations of commencement of construction of the EGP Project components including the pipeline, tunnel, east shaft, WLNG Portal, facilities and temporary infrastructure sites, and as required by project approvals, or when there is the potential to restrict access, until construction and clean-up of the EGP Project is complete. [R-1151].

Contractor Measures

Parties that will be contacted by the Contractors during the EGP Project include:

- Utility Officer(s) if required by road crossing agreements prior to commencement of:
  - construction [R-1152]
  - Bylaw Officers, if required, prior to conducting any burning [R-1153]
  - BC MoTI if required by highway crossing agreement(s) Conditions [R-1154]
- CN Rail prior to commencement of construction, if required by rail crossing agreement(s) [R-1156]; and the CEC if any activities are observed that may be contributing to, or are resulting in, environmental harm or regulatory non-compliance.

5. Pre-Construction Activities

The following section provides mitigation measures to prepare for construction by conducting a review of the key environmental issues, EAS, permits, approvals, and construction documents, as well as a review of the pipeline routing, contingency plans, locations of TWS, and sensitive features.

To specify the applicability of a given mitigation measure to the various components of the EGP Project, check-boxes for each component denote the applicability of the mitigation. Column 'TIS' refers to the temporary infrastructure sites.

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
CEMP and Supporting Documents	1. Provide the Contractor and EI with the CEMP, EAS, Condition management plans and copies of environmental approvals and permits including the most recent updates and revisions. A complete set of the CEMP, EAS, Condition management plans, and copies of environmental approvals and permits will be kept at FortisBC's construction field office for each spread and component. [R-5]	x	x	x	x	x	x
CEMP and Supporting Documents	2. Communicate the Emergency contact information (Appendix A) so that EGP Project personnel are made aware. [R-6]	x	x	x	x	x	x
Approvals, Licences and Permits	3. Obtain necessary approvals, licenses, and permits, as well as fulfill regulatory requirements for a particular activity or construction site prior to the commencement of the applicable activity or construction at that site (Appendix B). FortisBC, its authorized representatives, Contractor(s), and Subcontractors, will comply with applicable Conditions as presented on permits, approvals, licenses, certificates, and EGP Project-specific management plans. Inconsistencies between conditions of different permits and contracts will be resolved prior to construction. [R-7]	x	x	x	x	x	x
	4. Confirm that approvals, licences, and permits have been obtained in accordance with the Permits, Easements, and Third-Party Agreements specification prepared for the EGP Project. Required regulatory notifications will be submitted according to the applicable regulatory timelines. [R-28]	x	x	x	x	x	x
	5. Flag overhead line crossings and install signage to alert equipment operators of hazards. [NR-351]	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Pre-Job Meeting	6. Hold a pre-job meeting prior to the commencement of construction (along each spread and at each component) with FortisBC and the Contractor. Regulatory agencies and key government representatives will be invited to this meeting (Appendix C). This meeting is designed to make supervisory construction personnel aware of the key environmental issues, general environmental concerns, environmental approvals, permits and requirements, the CEMP, contingency plans, rules, regulations, EGP Project policies, as well as to address any outstanding concerns. [R-12]	x	x	x	x	x	x
Workspace	7. Identify the need for TWS prior to commencement of clearing or other construction. Take ETWS at: ▪ sharp sidebends as well as foreign line, rail, and road crossings to provide sufficient separation between topsoil and spoil piles, sidehills and on rugged terrain to allow sufficient storage space for graded material; ▪ where separation cannot be maintained between topsoil and subsoil piles due to workspace limitations, place a barrier (such as, straw, tarps or other material) approved by the CEC; and ▪ locations where rollback storage or slash berms are necessary. [R-2]	x					
	8. Reduce ground disturbance (that is, grubbing or stripping) associated with TWS within 10 m of an S1 to S4 stream (fish-bearing streams), where feasible. This distance should be increased to the extent practical on a site-specific basis to prevent erosion and sediment entering the watercourse. Refer to the FMMP for additional information on watercourse classification. [R-3]	x					
	9. Limit placement of ETWS (such as, staging areas and spoil storage areas) in Riparian Management Areas (RMAs) to the extent practical and in accordance with Permit Conditions. Clearing of ETWS will not occur within the Riparian Reserve Zone (RRZ) of an S1 to S3 stream or within 10 m of an S4 to S6 stream without approval from the EI and regulatory agencies. These distances should be increased to the extent practical on a site-specific basis to prevent erosion and sediment entering the watercourse. Site-specific watercourse drawings can be found in the FMMP. [R-203]	x	x	x	x	x	x
	10. Locating additional work areas (such as, staging areas, grade and borrow areas for ramping, additional spoil storage areas) within Riparian Management Area is limited by setbacks specified in mitigation measure R-203. Confirm that landowner or Crown land authority approvals are in place for applicable additional temporary workspace prior to use. [R-4]	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Watercourse Crossings	11. Seek to reduce disturbance to watercourse bed and banks to the extent practical and conduct necessary assessments of fish and fish habitat. [R-8]	x					
	12. The pipeline route will traverse watercourses at straight sections and perpendicular to the banks, to the extent practical. Seek to avoid crossings at meander bends and unstable banks to the extent practical. [R-9]	x					
	13. Temporary vehicle crossings will be planned for straight sections of watercourses and where stable banks are located, to the extent practical. [R-10]	x					
Water Source Identification	14. Initiate, with the Contractor, the identification of potential water sources for construction requirements (that is, water for hydrostatic testing, dust control, etc.) as early as practical to avoid delays in receipt of BC *WSA* approval under Section 10. [R-11]	x	x	x	x	x	x
Environmental Inspection	15. The EI's main responsibility, working directly with the FortisBC Construction Manager, is to meet compliance with environmental commitments, and Conditions of authorizations. The EI is responsible for inspecting, verifying, documenting, and reporting on compliance with Project environmental requirements. [R-13]	x	x	x	x	x	x
	16. Prior to the commencement of clearing and grading, the EIM will review the Contractor's clearing plan and preliminary grade plan, if applicable, to verify that adequate measures and protection are in place for site-specific environmental resources (such as, rare plants, archaeological sites). [R-15]	x		x	x		x
Construction Preparation Surveys - general	17. Complete environmental surveys that are required prior to the commencement of overall construction or construction at specific locations and provide the key results of the surveys and any associated mitigation to the EGP Project inspection personnel and the Contractor. Provide the above personnel with updated summary tables and, if warranted, updated EAS. Identify site-specific locations in the field where mitigation is necessary and mark the locations accordingly (Section 5). [R-16]	x	x	x	x	x	x
	18. Complete wildlife surveys to identify habitat features that warrant site-specific mitigation prior to the commencement of construction. Surveys should be conducted along the EGP Project in areas with habitat to support Wildlife features that could be adversely impacted by EGP Project activities. [NR-1]	x		x	x	x	x
	19. The results of the pre-construction survey for wetlands and Red-and Blue-listed plants and ecological communities will be provided to BC EAO, BC LWRS, BC OGC, Kwikwetlem First Nation, Musqueam Indian Band, Squamish Nation, and Tsleil-Waututh Nation for review, a minimum of 30 days prior to planned commencement of construction.	x	x	x	x	x	x
Pre-Construction Surveys Weeds	20. Conduct a pre-construction weed survey of lands within the EGP Project Footprint. [R-17]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Review Mitigation Measures for Sensitive Features	21. Review with the Contractor the mitigation measures to be implemented for rare plants, rare ecological communities, fish and wildlife species of concern, archaeological features, culturally important plant species, site-specific Traditional Land and Resource Use sites and other applicable sensitive environmental or cultural features along or in proximity to the EGP Project Footprint. Conduct this review in advance of construction at locations where any of the above features are known to be present (EAS). [R-18]	x		x	x	x	x
Disturbance of Natural or Built Features with a Human Use	22. Avoid or reduce disturbance of valued natural features with a non-traditional human use (such as, recreational trails, recreational use areas, key use areas within parks and protected areas), to the extent practical. [R-19]	x					
	23. Avoid or reduce disturbance of built features (such as, residences, cabins, campgrounds, businesses, schools, golf courses, community use areas, commercial and industrial areas), to the extent practical. [R-20]	x					
	24. Narrow the EGP Project Footprint at key locations to avoid valued built or natural features (such as, residences, cabins, campgrounds, businesses, schools, golf courses, parks, trailhead, and community use areas), to the extent practical. [R-21]	x					
	25. Reduce the amount of land disturbed by using previously disturbed areas for stockpiles and staging areas. [R-22]	x					
	26. Reduce disturbance to ornamental trees, windbreaks, and shelterbelts on landowner property, to the extent practical. This may involve narrowing the EGP Project Footprint at key locations or boring under shelterbelts. [R-23]	x					
Monitoring	27. At some locations, monitoring will be necessary to assess the effects on specific environmental features (such as, archaeological feature, rare plant, culturally important plant species, nesting bird). Applicable permits or approvals will be in place to allow monitoring to be conducted. [R-24]	x	x	x	x	x	x
Squamish Nation Siiyamin ta Skwxwú7mesh	28. Provide Squamish Nation with EAS or other documents that show the distance of the agreed upon buffer around the Cultural Sites as required by the Squamish Nation EAA at least 90 days prior to commencement of Construction. [2004]	x					
	29. Design laydown areas, shoo-fly, or other temporary roads and ancillary components as far away from the sites as is feasible. [2005]	x				x	x
	30. Plan lay-downs, shoo-fly, temporary workforce accommodations, borrow areas, and other ancillary land uses in a way that reduces the amount of back-and-forth traffic. [2006]	x				x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
TLU Sites Discovery	31. In the event that TLU sites are identified during supplemental studies with Indigenous nations prior to construction for the EGP Project, the sites will be assessed, and appropriate mitigation measures will be determined. The TLU site will be assessed based on the following criteria: ▪ the location of the TLU site with respect to the EGP Project Footprint; ▪ the relative importance of the TLU site to the community; and ▪ the potential for an alteration of construction activities to reduce or avoid sensory disturbance. First consider the types of accepted mitigation listed in the TLU Sites Discovery Contingency Plan (Section 9), which have been successful in mitigating adverse effects on TLU sites. Alternative site-specific mitigation strategies recommended by Indigenous nations will be considered. The mitigation measure(s) implemented in a particular circumstance will be dependent on the type of site identified. [R-25]	x		x	x	x	x
Orientation Program	32. EGP Project personnel will attend the Orientation Program before they can access any development site associated with the EGP Project. Training for those conducting work at the site will include the following, at a minimum: ▪ An overview of the environmental and safety requirements. ▪ The process to follow should an environmental feature (such as, wildlife habitat feature, watercourse or drainage, and so forth) be located or disturbed during construction. ▪ Initial response should a spill of any hazardous substance occur. ▪ The requirement that speed limits and signage, flagging, or fences delineating the environmental features shall always be respected. [NR-510]	x	x	x	x	x	x
	33. Document that site visitors receive appropriate level of environmental and visitor orientation relative to the scope of their visit prior to entry onto the site. [NR-511]	x	x	x	x	x	x
	34. Provide the Project Archaeological Chance Find Procedure to EGP Personnel who will perform ground disturbance. [2011]	x	x	x	x	x	x
Worker Accommodation	35. EGP Project workforce estimates, and construction schedule will inform accommodation requirements. [R-29]	x	x	x	x	x	x
Water Management	36. Identify potential water sources for construction requirements (for example, water for TBM use or hydrostatic testing) as early as practical to avoid delays in receipt of temporary diversion licences during construction. Submit potential water sources to the CEC and the EI will confirm to have regulatory approvals in place prior to the withdrawal of water from any source. [R-30]	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Water Wells	37. Where shallow domestic water wells are located within 100 m of the EGP Project Footprint, they will be sampled and analyzed for water quality and quantity prior to the start of pipeline construction at those locations. [NR-189]	x	x	x	x	x	x
Contingency Plans	38. Review the Emergency Contacts list (Appendix A) and contingency plans (such as, for spills, fire, discovery of rare plants or rare ecological communities, wildlife species of concern or historical, or archaeological features; Section 9) prior to kicking off construction. All key personnel on the EGP Project Footprint (that is, personnel in the roles within Appendix C) must be aware of these plans. Periodically review the Emergency Contacts list (Appendix A) throughout construction and update as required. Prior to construction kick-off, Contractors will verify that spill response equipment and materials are on-site or readily available. [R-32]	x	x	x	x	x	x

6. Project Construction

To specify the applicability of a given mitigation measure to the various components of the EGP Project, check-boxes for each component denote the applicability of the mitigation. Column 'TIS' refers to the temporary infrastructure sites.

6.1 General Environmental Protection Measures

General environmental protection measures to be implemented by FortisBC, the Contractor, or the Subcontractor are provided as follows. These are followed by environmental protection measures for each phase of EGP Project construction.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Discipline	1. Remove those who show careless or wanton neglect of the environment or disregard the CEMP, or any EGP Project policies, from the work. [R-74]	x	x	x	x	x	x
	2. Prohibit EGP Project personnel from hunting or fishing on the EGP Project Footprint or associated facility sites [NR-18]	x	x	x	x	x	x
Existing Hotlines	3. Conduct construction activities in the vicinity of adjacent pipelines in compliance with FortisBC standards and requirements of Canadian Standards Association Z662 19 for work close to an existing hotline [NR-355].	x	x	x	x	x	x
Adaptive Management	4. Any EGP Project personnel who determine that mitigation measures identified in the CEMP are ineffective at avoiding or reducing environmental effects, or who can identify alternative measures to address environmental issues, will notify the CEC and EI. [R-95]	x	x	x	x	x	x
	5. The EI will develop new or alternative mitigation measures if the measures identified in the CEMP are ineffective at avoiding or reducing environmental effects (Section 11). If the EI considers it to be warranted, alternative or new measures will be developed in co-operation with the applicable QP(s). [R-75]	x	x	x	x	x	x
	6. If the planned changes in mitigation meet the environmental objectives (according to judgement of CEC and the EI) and there is no specific regulatory approval(s) required for the change, no discussions with regulatory agencies are necessary. If required, obtain the appropriate approval with applicable regulatory agencies and, prior to implementing the new measure(s). [R-76]	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Adaptive Management (cont'd)	7. Document the change in mitigation and communicate the change to applicable construction personnel. Monitor the effectiveness of the new or alternative mitigation (Section 11). [R-77]	x	x	x	x	x	x
Access Management	8. Use existing access to the extent practical. [R-78]	x	x	x	x	x	x
	9. Near Cultural Sites, use existing forest service roads, where feasible. [2007]	x	x	x	x	x	x
	10. Prohibit EGP personnel from stopping within the Stawamus Cultural Site boundaries, or within the buffer (unless it is to allow vehicle or wildlife passage). Use signage to notify EGP personnel where appropriate. [2008]	x	x	x	x	x	x
	11. Accommodate access and travel to Squamish Nation members to exercise hunting rights or TLU activities, if safe to do so. [2010]	x	x	x	x	x	x
	12. Acquire Road Use Agreements with road permit holders for roads affected by the EGP Project. Discuss EGP Project schedules and potential access restrictions, construction time frames necessary for access, expected traffic volumes, road maintenance, road safety issues and radio frequencies, with the applicable road permit holders. [R-79]	x					x
	13. Notify the public in accordance with FortisBC's Communication Plan at the commencement of construction of the EGP Project components including the pipeline, tunnel, east portal, Woodfibre Portal, facilities and temporary infrastructure sites, and as required by project approvals, or when there is the potential to significantly restrict access, until the EGP Project is complete. [R-162]	x	x	x	x	x	x
	14. Review and adhere to the measures related to pre-construction and construction traffic in the Access Management Plan and Traffic Control Management Plan Contractor personnel are to adhere to applicable traffic, road use and safety requirements [NR-315] .	x	x	x	x	x	x
	15. Follow acceptable heavy truck routes and approved access routes. To the extent practical, seek to schedule heavy construction traffic to periods of less traffic where it would reduce impacts on businesses or residences. Seek to reduce interactions with school buses and students along EGP Project-related traffic routes. [R-147]	x	x	x	x	x	x
	16. Obtain required bridge restriction and oversize load permits. [R-148]	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Access Management (cont'd)	17. Communicate with Royal Canadian Mounted Police (RCMP), police and emergency services personnel to keep these organizations informed of traffic schedules and enlist their services as needed. [R-149]	x	x	x	x	x	x
	18. Prohibit the recreational use of all-terrain vehicles or snowmobiles by construction personnel on the EGP Project Footprint or at associated EGP Project facility sites. [R-150]	x	x	x	x	x	x
	19. Restrict construction traffic to the work side of the EGP Project Footprint, where practical, to reduce the area subjected to potential soil compaction. [R-151]	x	x	x	x	x	x
	20. Establish speed limits on the EGP Project Footprint and access roads. Post signs stating the applicable speed limits for construction traffic. Advise construction personnel to comply with applicable Provincial and EGP Project-related traffic, road use, and safety laws, or requirements. [R-152]	x	x	x	x	x	x
	21. Transport workers to and from the EGP Project by multi-passenger vehicles to the extent practical. Pick-up and drop-off workers at marshalling areas to limit traffic volumes and the potential for vehicle/wildlife interactions. [R-153]	x	x	x	x	x	x
	22. Install appropriate protection to prevent damage at road and rail crossings when moving construction equipment across roads and rail lines. [R-155]	x	x	x	x	x	x
	23. Install temporary erosion and sediment control measures on sloped approaches to roads and rail crossings where the vegetative mat has been disturbed, as required. [R-156]	x	x	x	x	x	x
	24. Install berms, gates or equivalent, at strategic access points to help prevent motorized access to select areas, where determined appropriate by the CEC and in consultation with the landowner and Forest Tenure Holder. [R-80]	x					
	25. Shovel and sweep clean any mud tracked onto paved roads following equipment crossings. [R-157]	x	x	x	x	x	x
	26. Repair any damage to roads, caused by the EGP Project activities, to pre-construction condition. Seek to avoid physical disturbance to roads used for Regional access to parks and protected areas, to the extent practical. [R-158]	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Access Management (cont'd)	27. Locate turnaround points in natural clearings to the extent practical. Obtain approval from the CEC and landowner or land authority if ETWS is needed for turnaround points. [R-159]	x					
	28. Maintain access to established recreation features, through the clearing, construction, and restoration period, to the extent practical. [R-161]	x	x	x	x	x	x
	29. Place signage on access roads in the vicinity of the construction activities notifying road users that construction activities are taking place. [R-163]	x	x	x	x	x	x
	30. Seek to avoid physical disturbance to any roads used for Regional access to parks and protected areas, where and to the extent practical. [R-164]	x	x	x	x	x	x
	31. For construction in urban areas, establish alternate access routes for commercial or residential areas to the extent practical. Install signage to direct traffic flows to alternate access routes. [R-165]	x		x		x	x
Water Wells	32. In the event that construction activities result in a reduction of well water quality and quantity, provide well replacement or the replacement to create equal or better quality and quantity of water. [NR-190]	x	x				

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Watersheds	33. Metro Vancouver guidelines as outlined in *Watershed & Environmental Management Contractor Documents* must be followed for works within the Coquitlam Watershed. [NR-500] These guidelines are related to wildfire prevention (subsection 8.5) wildlife safety (subsection 9.9), spill response (subsection 9.6) and chance find (subsection 9.3). Specific mitigations in these documents include: ▪ In the case of accidents which may result in discharges of petroleum substances or other chemical substances, Greater Vancouver Watershed Management personnel should be contacted immediately. ▪ Fueling of equipment in the watersheds will normally be accomplished by means of a single pick-up mounted fueling tank (e.g. Tidy tank) except under exceptional circumstances as described in regulation 2.4 following. ▪ The use of bulk storage tanks for petroleum products is allowed within the Coquitlam watershed only under circumstances when there is no alternative. In these cases, all approved storage sites must be surrounded by impervious dykes and all hoses must be equipped with automatic shut off valves with locks. In addition to the above, approval must be obtained from a GVWD representative when siting fuel storage tanks. The tanks must be located away from watercourses and drainage feeding the watershed from accidental destruction of the tank and dyke by vehicles, equipment, slides, etc. ▪ Provide proof of equipment cleaning completion (invoice, photos, or certificate) prior to entering the Coquitlam Watershed. ▪ Complete the Watershed Access Permit Request form.	x					
Wetlands	34. Where wetlands will be disturbed by EGP Project activities, obtain an approval under Section 11 of the BC *WSA* from the regulatory agencies, as required. [R-93]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Contaminated Soil	35. Avoid or manage known areas of contaminated soil and groundwater shown on the EAS. Comply with applicable measures provided in the Known or Suspected Contaminated Groundwater and Soil Handling Management Plan, the Waste Management Plan and Spill, Fuel and Hazardous Materials Contingency Plan for handling of contaminated material. [R-83]	x	x	x	x	x	x
	36. Avoid or manage known areas of contaminated soil, and groundwater as directed by the EI. Implement the Spill, Fuel, and Hazardous Materials Contingency Plan (Section 9) if contaminated soil, sediments, and groundwater are discovered during construction. Comply with applicable measures provided in the Waste Management Plan (Section 8) and Spill, Fuel, and Hazardous Materials Contingency Plan for handling of contaminated material. [NR-480]	x	x	x	x	x	x
Compressor Station Emissions	37. To the extent practical, coordinate tie-ins for new facilities during planned outages and already planned blowdowns of existing facilities to reduce venting of natural gas. [NR-220]	x				x	
	38. Install dry gas seals on new compressor stations to reduce methane losses from normal operating procedures. [NR-222]					x	
	39. Seek to reduce "stand-by running" (idling units) or "test running" of compressors during maintenance activities to the extent practical. [R-1258].					x	
	40. Seek to reduce fugitive emissions through regular inspection and maintenance of block valves, valves at in-line inspection (ILI) facilities, and maintenance of connectors, pressure relief devices, and pressure regulators at flow meter stations. [R-1259]	x				x	
Compressor Station Gas Detection	41. Provide perimeter gas detection FortisBC Compressor Station site to alert site personnel to a release of flammable gas from the V2 Compressor Station. [NR-490]					x	
	42. Provide gas detection on the ventilation intakes of FortisBC staffed and occupied buildings if not already installed [NR-489]					x	
	43. Apply emergency response measures such as a system that rapidly alerts operators in the event of a major gas release. [NR-488]					x	

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Wildlife and Vegetation Species of Concern	44. Implement the mitigation measures related to known environmental features as identified on the EAS. [R-175]	x	x	x	x	x	x
	45. Report sightings of species of concern to the CEC. Where warranted, implement applicable contingency measures associated with the discovery of species of concern (Plant Species and Ecological Communities of Concern Discovery Contingency Plan or Wildlife Species of Concern and Habitat Discovery Contingency Plan in Section 9). [R-176]	x	x	x	x	x	x
	46. Do not harass or feed wildlife. Prohibit EGP Project personnel from having pets on the EGP Project Footprint or at associated EGP Project facility sites. [R-177]	x	x	x	x	x	x
	47. Report any incidents with wildlife or collisions with wildlife to CEC, Provincial regulatory agencies and, if appropriate, the local police detachment. [R-178]	x	x	x	x	x	x
	48. Prohibit EGP Project personnel from having firearms on the EGP Project Footprint, at associated facility sites or in EGP Project vehicles. [R-179]	x	x	x	x	x	x
	49. Ecological communities of concern and plant species of concern that are listed by the Species at Risk Act, the Committee on the Status of Endangered Wildlife in Canada or are red (endangered and threatened) and blue (threatened) listed species by the BC Conservation Data Centre should be avoided to the extent practical, by realigning the route, relocating workspace, adjusting the equipment layout or location of the Project Footprint, extending road or watercourse bores or narrowing the Project Footprint or workspace. If avoidance is not practical, then alter construction methods to provide the greatest protection to the community or population. Options for altering construction methods are described in the Plant Species and Ecological Communities of Concern Discovery Contingency Plan (Section 7) [R-168].	x	x	x	x	x	x
	50. For Species at Risk listed under Schedule I of the *Species at Risk Act*, acquire a permit pursuant to Section 73 of *Species at Risk Act* before conducting any activity that could result in harm to a species [NR-169].	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Wildlife and Vegetation Species of Concern (cont'd)	51. If any Federally listed plant species at risk (Schedule 1), their habitat, or Critical Habitat are present, avoidance measures will be utilized, such that direct effects will be avoided [NR-248].	x	x	x	x	x	x
	52. If avoidance of *Species at Risk Act*-listed plant species is not possible (that is, will result in safety concerns), mitigation will be determined in consultation with Environment and Climate Change Canada, where feasible [NR-299].	x	x	x	x	x	x
	53. For *Species at Risk Act*-listed plant species that are adjacent to the Project Footprint, activities will occur such that there is no disturbance to the plants off right-of-way [NR-300].	x	x	x	x	x	x
	54. During construction, use directional or shielding lighting at facilities, where practical, to reduce sensory disturbance to wildlife [NR-603].					x	
Authorization - Raptor Nests	55. Consult with BC LWRS to discuss practical options and mitigation measures in the event an active raptor or heron nest is found. Mitigation will depend on the species and location of the nest and may include on-site monitoring. [NR-61]	x		x	x	x	x
	56. If construction activities require the removal of a raptor/heron nest that is protected year-round under the BC *Wildlife Act* (that is, eagle, peregrine falcon, great blue heron, osprey), obtain authorization under the BC *Wildlife Act*. A BC *Wildlife Act* permit Application is not required for the removal of a raptor nest that is not protected under the BC *Wildlife Act* (such as, red-tailed hawk nests) and these nests can be removed when not active or occupied. [NR-63]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Scheduling – Mountain Goats	57. No blasting within 500 m of Ungulate Winter Range UWR u-2-002 during winter (November 1 to April 30) and kidding or rearing period (May 1 to July 15), where practical. Where not feasible, incorporate the input of a Wildlife QP and apply the following mitigation to reduce sensory disturbance from noise: ▪ Conduct mountain goat monitoring prior to and during blasting to confirm that no mountain goats are present within the vicinity of the blasting area. Establish monitoring locations where goats can be observed from a distance; ▪ Blasting will avoid all areas where individual or groups of goats are observed; ▪ If mountain goat(s) are observed within 500 m of the blasting locations and behaviour indicates animals are distressed or disturbed due to construction activities, blasting will be stopped immediately until the mountain goat(s) are confirmed to have left the area; ▪ utilize warning sirens, blasting mats and blasting controls to reduce potential sensory disturbance to mountain goat; and ▪ If mountain goat(s) are spotted incidentally during construction activities, implement the Wildlife Species of Concern and Habitat Discovery Plan [NR-602]	x					
	58. Where compliance with timing restrictions is not feasible, the Wildlife QP may deem it necessary to implement an adaptive management approach for mountain goat as described in Section 7 of the WMMP in consultation and engagement with FortisBC's Environmental Staff, and if required, regulatory agencies (such as, BC Oil and Gas Commission, Environment and Climate Change Canada) and other stakeholders. [NR-413]	x					
Scheduling - Migratory Birds	59. Seek to schedule clearing, or other activities incurring a higher risk of incidental take, outside the migratory bird nesting period of March 26 to August 9 (ECCC 2018), where practical. [NR-54]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Scheduling - Raptor Nests	60. Eagle, peregrine falcon, great blue heron, and osprey nests are protected year-round by the BC *Wildlife Act* and may not be cleared except with a permit. The Guidelines for Raptor Conservation (BC MOE 2013) provides information on sensitive breeding and nesting time periods and buffers for active nests according to their tolerance to human disturbance. These buffers range from 50 m to 500 m depending on the surrounding land use and species. Develop with Care provides recommended timing periods and buffers for herons. Seek to schedule clearing outside of sensitive time periods for raptors (in areas where they are known to exist) to the extent practical. These include the following (BC MOE 2013): ▪ Bald eagle: January 5 to August 31; ▪ Peregrine Falcon: February 30 to July 20; ▪ Osprey: March 21 to September 14; ▪ Spotted owl: February 18 to July 27; ▪ Western screech owl: February 15 to August 31; ▪ Northern goshawk: February 15 to September 15 ▪ Other raptors/owls: February 1 to August 27; and ▪ Great blue heron: January 15 to September 15. [NR-59]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Scheduling - Raptor Nests (cont'd)	61. In the event vegetation disturbance activities are scheduled within these periods, in areas of suitable habitat, conduct non-intrusive nest searches up to a maximum of 5 days prior to commencement of vegetation disturbance activities to locate active raptor/heron nests. A QP will recommend that the bird nest searches be conducted fewer than 5 days in advance of activity commencement depending on the timing of work within the nesting period, the complexity of habitat being affected, and the overall potential for new nests In the event that a nest search has been completed but activities are delayed more than the number of days recommended by the QP, or a site becomes inactive, an additional search shall be conducted prior to activities commencing. If an active nest is found, the recommended setbacks are listed below and shall be applied at the discretion of a QP. ▪ Bald eagle and osprey: 200 m (undeveloped), 100 m (rural), 1.5 tree lengths (urban); ▪ Great blue herons: 300 m (undeveloped), 200 m (rural), 60 m (urban); (an additional 200 m "no disturbance" buffer is recommended for herons during the nesting season); ▪ Spotted owl, peregrine falcon, northern goshawk, and western screech owl: 500 m buffer (undeveloped), rural and urban area buffers determined as advised by a QP; ▪ Other raptors: ranges from 50 m to 500 m or more (species- and situation-specific). ▪ During the breeding season, an additional 100 m "quiet" buffer is recommended around known nest sites, where high disturbance activities cannot occur, such as clearing or blasting[b,c] [NR-60]	x		x	x	x	x
	62. Avoid disturbance to active raptor nests and maintain buffers by narrowing down the footprint, where practical (Section 14, Detail No. 1) [NR-62]	x		x	x	x	x
Scheduling - Marbled murrelet	63. Within Moderate suitability marbled murrelet Critical Habitat, seek to schedule tree clearing outside the marbled murrelet breeding period of April 1 to September 15 (Burger 2004), . Plant conifer tree seedlings within areas of temporary workspace and portions of the pipeline easement outside of the operational vegetation maintenance area. Mixed-species tree/shrub plantings will be used to establish species diversity; at least one tree species planted must be conifer. [NR-400]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Scheduling - Amphibian Breeding Ponds	64. Where practical, seek to schedule clearing activities outside the breeding, dispersal and seasonal migration periods for amphibians for areas of the EGP Project Footprint where amphibian breeding and migration is anticipated. [NR-68]	x		x	x	x	x
	65. If construction activities are scheduled during the amphibian breeding period, protect, and maintain identified amphibian breeding ponds by implementing, where practical, the recommended buffers (150 m buffer in undeveloped areas; 100 m buffer in rural areas; 30 m buffer in urban areas) or install amphibian exclusion fencing to reduce amphibians entering the construction site. [NR-69]	x		x	x	x	x
	66. If EGP Project activities, including access, occur near an amphibian breeding pond during the dispersal period and dispersing amphibians are observed, implement measures to direct amphibian movement away from the EGP Project Footprint and/or the associated access (such as, install exclusion fencing) or monitor and move amphibians from the worksite to suitable, safe locations. A QP will recommend and oversee the implementation of appropriate measures based on site conditions, EGP Project activities and timing. Amphibian relocations will be completed in accordance with Conditions of applicable permit (that is, *Wildlife Act* General Wildlife Permit). If access roads are located near amphibian breeding ponds or migration routes, potential wildlife conflicts will be communicated to all EGP Project construction and operation personnel through safety briefings, notification signs, posted speed limits, and the use of two-way radios on access roads at all times to facilitate immediate notification of wildlife along the roadway. [NR-410]	x		x	x	x	x
Scheduling - Bear Dens	67. Seek to schedule clearing and grading activities in moderate and high value grizzly bear denning habitat, or within a 250 m buffer, , prior to the onset of denning to discourage bears from denning (from November 1 through April 15) on the EGP Project Footprint. [NR-65]	x					
	68. In the event that construction activity (that is, clearing or grading) is scheduled to coincide with the period when bears are denning (from November 1 through April 15) and in moderate and high value grizzly bear denning habitat, or within a 250 m buffer, a QP will implement bear den searches prior to the commencement of construction. [NR-66]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Scheduling - Bear Dens (cont'd)	69. If an occupied bear den is encountered on the Project Footprint or within 250 m of the Project Footprint, implement the Wildlife Species of Concern and Habitat Discovery Contingency Plans (Section 9 of the CEMP). Construction activity within 250 m of the occupied bear den will be temporarily suspended until a notice to proceed has been given by the EIM [NR-67].	x					
	70. To the extent practical, maintain setback distance from identified bear dens during winter construction, from November 1 through April 15 (100 m for unoccupied den; 250 m for occupied den [BC OGC 2021]) [NR-64].	x					
Survey – Mineral Lick	71. In the event a mineral lick is discovered implement a 100 m setback (BC OGC 2013). In the event that shifting or narrowing the Project Footprint is not practical to maintain the 100 m setback from a mineral lick, submit a deviation request to the appropriate regulatory agency and as part of the application, including rationale and, if appropriate, a mitigation strategy [NR-50]. 72. In the event that a mineral lick is identified, maintain the integrity of trails to and from a mineral lick (provide a gap in strung pipe within the area of the mineral lick to allow Wildlife to access the mineral lick). The locations of the gaps should coincide with gaps in strippings, spoil, snow and rollback windrows to the extent practical. [NR-51]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Survey – Migratory Birds	73. Where vegetation disturbance, or other activities incurring a higher risk of incidental take, are scheduled during the migratory and non-migratory bird nesting period (March 1 to August 31), conduct non-intrusive nest searches up to a maximum of 5 days prior to commencement of vegetation disturbance activities. A QP will recommend that the bird nest searches be conducted fewer than 5 days in advance of activity commencement depending on the timing of work within the nesting period, the complexity of habitat being affected, and the overall potential for new nests. The QP may recommend that searches be conducted as little as 48 hours in advance of EGP project activities, based on timing during nesting period and suitability of habitat being affected. In the event that a nest search has been completed but activities are delayed more than the number of days recommended by the QP, or a site becomes inactive, an additional search shall be conducted prior to vegetation disturbance activities commencing. Surveyors will passively search for active nests without disturbing the nesting birds, by searching for breeding and nesting behaviour (such as, singing males alarm calls, distraction displays, or adults carrying nesting materials or food). Active nests may be subject to site-specific mitigation measures (such as, protective buffer around the nest or unobtrusive monitoring). [NR-56]	x		x	x	x	x
Bat Hibernacula and Maternity Roosts	74. In the event active bat roosts or hibernacula are discovered, implement the Wildlife Species of Concern and Habitat Discovery Contingency Plan (Section 9). Consult with the appropriate regulatory authority where disturbance of a hibernacula or maternity roost is unavoidable. Until the QP determines the roost or hibernacula is vacated, implement these mitigation measures: ▪ avoid high-impact activities (such as, blasting, removal of rock or talus) ▪ avoid using heavy equipment, or construction of new access roads within 100 m of the roost or hibernacula Sensitive timing windows for bat habitat features are: ▪ Maternity roost sites: June 1 to September 1 75. Hibernaculum sites: September 1 to April 30. [NR-82]	x	x				
Snake Hibernacula	76. In the event an active snake hibernaculum is discovered, implement the Wildlife Species of Concern and Habitat Discovery Contingency Plan (Section 9). Mitigation measures may involve setback buffers or snake salvage. The following buffers are recommended for snake hibernacula: 150 m in undeveloped areas, 100 m in rural areas and 30 m in urban areas (BC MOE 2014). [NR-535]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Scheduling – Instream works	77. Schedule instream work during periods of low flow, to the extent practical, to reduce the risk to fish and their habitat or to allow instream work to be isolated (BC MOE 2006). [R-84]	x		x	x	x	x
	78. No instream pipeline crossings will be conducted outside the instream work window found in the watercourse crossing table for any fish-bearing watercourse or wetland unless: ▪ it is dry at the time of construction; ▪ trenchless techniques are employed; or ▪ work outside the instream work window receives approval from the applicable regulatory agencies. [R-85]	x		x	x	x	x
	79. Complete construction activities prior to the expiration of applicable permits and approvals. If a Contractor permit or approval is likely to expire prior to the completion of the applicable construction activities, the contractor is responsible to obtain renewal or extension of the permit or approval. [R-88]	x	x	x	x	x	x
Wetlands	80. Seek to schedule instream trenched pipeline installation at watercourse and wetland crossings to be completed in as the shortest duration practical. [R-90]	x					
Vegetation Communities of Concern	81. Seek to reduce damage to standing trees on the edge of the Project Footprint to limit the potential for infection and spread of forest health pathogens [NR-96].	x					
Timber Harvest Operations, Forest Tenure Holders, and OGMAs	82. Notify forest tenure holders, BC Ministry of Forests (MoF) and other forestry stakeholders of the construction schedule [NR-198].	x					
	83. Notify registered woodlot tenure holders of anticipated construction at least 14 days prior to construction [NR-123].	x					
	84. Communicate the EGP Project construction schedule to non-timber Forest Product harvesters. [NR-205]	x					
	85. Follow appropriate tenure consultation as identified by tenureship agreements [NR-134]	x					
	86. Provide forest tenure holders with information and protocols regarding time frames for approval of pipeline crossings by trucks and heavy equipment, weight restrictions, standard operating procedures and blasting restrictions [NR-199].	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Timber Harvest Operations, Forest Tenure Holders, and OGMAs (cont'd)	87. Seek to avoid crossing Old Growth Management Areas to the extent practical. The QP will work with BC MoF and forest tenure holders in the area to identify appropriate mitigation for altering Old Growth Management Areas and confirm processes and responsibilities for finding replacement areas [NR-197].	x					
	88. Seek to reduce the amount of disturbance to areas of High Non-Timber forest product productivity by using previously disturbed areas for stockpiles and temporary work areas, to the extent practical [NR-207].						
	89. Adhere to applicable Provincial and Regional tree clearing guidelines and regulations [NR-203].	x					
	90. Work with forest tenure holders and BC MoF to determine appropriate recovery, handling, and processing of salvageable wood from the Project Footprint [NR-204].	x					
	91. To the extent practical, seek to limit temporary workspace in OGMAs [NR-117].	x					
	92. A Provincial Old Growth Management Area (OGMA) replacement process has been established to guide the replacement of OGMAs that are affected by resource development activities. If it is necessary to cross OGMAs, participate in the OGMA replacement process when the Project Footprint is finalized, in consultation with BC MoF [NR-118]	x					
	93. Where avoidance of Old Growth Management Areas is not practical, the QP will consult with BC MoF and forest tenure holders in the area to identify suitable replacement areas [NR-119].	x					
	94. In Old Growth Areas (including OGMAs) that cannot practically be avoided, seek to reduce effects on old growth attributes by retaining standing dead trees and large stumps, to the extent practical [NR-100].	x					
	95. In areas of identified old growth and non-timber forest products of concern, where possible, narrow the work area in order to retain patches of natural species including trees (young, mature and old), shrubs, herbs and groundcover species, depending on the type and distribution found in the vegetation community to the extent practical [NR-105].	x					
	96. Retain all leave patches and single leave trees left on the landscape by harvesting companies, to the extent practical. Buffer with additional trees and shrubs to the extent practical [NR-106].	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Weeds	97. Inspect construction equipment prior to its arrival on the EGP Project Footprint to reduce the risk of weed introduction. Any equipment which arrives in a dirty condition (that is, soil or vegetative debris) will not be allowed on the EGP Project Footprint until it has been cleaned at a suitable location. [R-102]	x		x	x	x	x
	98. Follow mitigation regarding invasive plants in the Invasive Plant Species Management Plan (Section 8.3) [NR-307].	x		x	x	x	x
	99. Follow recommendations made in the pre-construction weed survey to limit the risk of transporting weed seeds from weed-infested areas including the use of cleaning stations. [R-103]	x		x	x	x	x
	100. Implement weed management at locations identified within the pre-construction weed survey to a level that is consistent with weed management observed adjacent to the EGP Project Footprint to reduce the potential for weed infestations following construction. [R-104]	x		x	x	x	x
	101. Restrict vehicular traffic to the approved EGP Project Footprint and access roads. [R-105]	x		x	x	x	x
	102. Consider the installation of mats (construction matting or swamp mats) to limit weed migration at select locations. Mats are to be free of soil, vegetation, and debris prior to installation and removing from the site. [R-107]	x		x	x	x	x
	103. Record sites where equipment was specifically cleaned due to concerns associated with weeds and communicate the information to the CEC. [R-988]	x		x	x	x	x
	104. Monitor weed growth on topsoil piles frequently during construction. Implement corrective measures when warranted. [R-108]	x		x	x	x	x
	105. Clean equipment (that is, steam clean or shovel, sweep or use compressed air); see Invasive Plant Species Management Plan (IPSMP [Section 8]) when passing through areas identified as having a weed problem (on the EAS) prior to continuing work on the EGP Project Footprint. Clean equipment involved in topsoil handling at weed-infested sites prior to leaving the location. [R-110]	x		x	x	x	x
	106. Equipment arriving on the site will be inspected by the CEC who will determine whether the equipment is sufficiently free of soil or vegetative debris to be acceptable for use on the EGP Project Footprint. [R-111]	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Use of Herbicides	107. Allow only licensed applicators to apply herbicides. [R-112]	x		x	x	x	x
	108. Seek to reduce the broad application of herbicides within 30 m of known rare plant populations or rare plant communities. Spot spraying, wicking, mowing, or hand-picking are acceptable weed control measures in proximity to rare plants and rare plant communities. [R-113]	x		x	x	x	x
	109. Prohibit the use of herbicides within 30 m of a watercourse or wetland. [R-114]	x		x	x	x	x
Dust Control	110. Use dust control measures during hot and dry weather. Dust control measures may include the application of water or mulch. The use of calcium chloride shall be approved by a QP [R-131].	x	x	x	x	x	x
	111. Do not apply dust control chemicals to roads during windy conditions or within 30 m of a known rare plant location [NR-296].	x	x	x	x	x	x
Spill Prevention	112. An appropriate emergency spill-kit is to be available at all times. [R-115]	x	x	x	x	x	x
	113. Inspect equipment and vehicles regularly and conduct maintenance as necessary so that they are in good working condition and are free of leaks. [R-116]	x	x	x	x	x	x
	114. Avoid releasing fuel, lubricating fluids, hydraulic fluids, methanol, antifreeze, herbicides, biocides, or other chemicals on the ground or into any watercourse, wetland, drainage, non-classified drainage (NCD) or ditch. In the event of a spill, implement the Spill, Fuel and Hazardous Materials Contingency Plan (Section 9). [R-117]	x	x	x	x	x	x
	115. Store hazardous substances and fuels in secondary containment systems appropriate for preventing release to the environment. [R-118]	x	x	x	x	x	x
	116. Avoid refueling and servicing of equipment or vehicles on lands with environmental sensitivities (for example, near rare plant or ecological communities of concern, migratory birds' nest, amphibian breeding sites, or watercourses and other waterbodies) or in locations deemed inappropriate by the CEC, where practical. Refueling on roads or developed areas or for immobile equipment in closer proximity to sensitive areas may be conducted if the appropriate safeguards are in place, as approved by the CEC. [R-119]	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Spill Prevention (cont'd)	117. Transport, handle, use, and dispose of hazardous materials in accordance with Provincial and Federal regulatory requirements, and as identified in the Waste Management Plan (Section 8) and the Spill, Fuel and Hazardous Materials Contingency Plan (Section 9). [R-120]	x	x	x	x	x	x
Equipment Refueling and Servicing	118. Report spills immediately to the CEC who will contact the FortisBC Construction Manager and FortisBC EIM or their delegate. The EIM will notify the appropriate government agencies in accordance with the Spill, Fuel and Hazardous Materials Contingency Plan (Section 9). [R-121]	x	x	x	x	x	x
	119. Place an impervious tarp or a spill tray underneath equipment and vehicles when servicing equipment and vehicles where there is a potential for accidental spills (such as, during oil changes or servicing of hydraulic systems). [R-122]	x	x	x	x	x	x
	120. Bulk fuel trucks, service vehicles and pick-up trucks equipped with box mounted fuel tanks are to carry spill prevention, containment and clean-up materials, that are suitable for the volume of fuels or oils carried. Carry spill contingency material on bulk fuel and service vehicles that is suitable for use on land and water (such as, sorbent pads, sorbent boom, and rope). [R-123]	x	x	x	x	x	x
	121. Confirm that temporary fuel storage tanks have appropriate spill prevention measures in accordance with the Field Guide to Fuel Handling, Transportation and Storage (BC MWLAP 2002). [NR-520] Spill prevention measures include: 230 litre (L) to 454 L to truck box fuel tanks (meet container design specification, maintain in good condition, adequately seal container, secure transportation). Refer to the Waste Management Plan (subsection 8.6) and Spill, Fuel, and Hazardous Materials Contingency Plan (subsection 9.6) for measures that meets these guidelines.	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Equipment Refueling and Servicing (cont'd)	122. Employ the following measures to reduce the risk of fuel spills near water: ▪ conduct refueling at least 30 m from watercourses and other waterbodies to the extent practical; refueling of immobile equipment or on developed landings may be conducted if the appropriate safeguards are in place, as approved by the CEC an appropriate spill-kit is available at the refueling site; ▪ all containers, hoses, and nozzles are free of leaks; ▪ all fuel nozzles are equipped with automatic shut-offs; ▪ operators are stationed at both ends of the hose during fueling unless the ends are visible and readily accessible by one Operator; ▪ prohibit use of distracting devices (such as, cell phones) and devices that generate static electricity during fueling; and ▪ return remaining fuel in the hose to the storage tank. [R-125]	x		x	x	x	x
	123. Operators and on-site construction supervisors will be trained on how to contain spills or leakage from equipment. [R-126]	x	x	x	x	x	x
	124. Do not clean equipment or machinery in, or within 30 m of, watercourses, wetlands, and drainages/NCDs. Control wastewater from construction activities, such as equipment cleaning or concrete mixing, to avoid discharge directly into any drainage feature that may connect to fish habitat, including ditches. [R-127]	x	x	x	x	x	x
	125. Hydraulic, fuel, and lubrication systems of equipment used in watercourse and wetland crossing construction will be in good condition and free of leaks. Equipment to be used instream or adjacent to a watercourse or wetland is to be clean, free of external grease, oil or other fluids, mud, soil, and vegetation, both prior to entering the watercourse or wetland and upon completion of instream activity. Comply with the Spill, Fuel and Hazardous Materials Contingency Plan (Section 9) to reduce the potential for discharge of any materials toxic to fish or other aquatic life into a watercourse or wetland. [R-128]	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Air Pollution and Noise	126. Schedule construction activities between 7:00 AM to 10:00 PM in accordance with the BC OGC's BC Noise Control Best Practices Guideline (BC OGC 2021a). In the District of Squamish, schedule construction activities within 1.5 km of residences, cabins, campgrounds, or parks between 7:00 AM and 10:00 PM and comply with applicable noise bylaws (District of Squamish Bylaw No. 2313) (2014) or approval Conditions. Adhere to conditions in the variance approval to construct 24 hours/day within the Tunnel. [R-94]	x	x	x	x	x	x
	127. Use well-maintained equipment to reduce air pollution and noise. [R-130]	x	x	x	x	x	x
	128. Reduce idling to the extent practical and adhere to applicable local government anti-idling bylaws [R-132]. District of Squamish Bylaw No. 2220, 2012 (subsection 4.6).	x	x	x	x	x	x
	129. Use multi-passenger vehicles for the transport of crews to and from the job sites to the extent practical, to reduce emissions during construction. [R-133]	x	x	x	x	x	x
	130. Seek to schedule heavy vehicle access for materials deliveries in areas close to residences for daytime, non-peak hours to the extent practical to reduce night-time traffic near residences between the hours of 10:00 PM and 7:00 AM. [R-134]	x	x	x	x	x	x
	131. Notify potentially affected residents of any major construction activities that will be conducted at night. [R-135]	x	x	x	x	x	x
	132. Use "drive-through" site access for roads and temporary storage areas, to the extent practical, to reduce the use of vehicle backup alarms. [R-136]	x	x	x	x	x	x
	133. Comply with regulatory agency guidelines related to noise during construction and operation of compressor stations to reduce disturbance related to noise [NR-15].					x	
Lighting	134. Seek to reduce light emissions near residential areas to the extent practical. [R-137]	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Visual Screening	135. Replace ornamental trees and other vegetation disturbed during construction or site-specific maintenance on residential and commercial properties, as applicable. [R-138]	x				x	x
	136. Use seeds that blend vegetation regrowth with adjacent vegetation, whenever practical. In areas that contain Noxious or invasive plant species or on erodible slopes, use a seed mix that contains both native seed and short-lived agronomic (non-native) species. [R-139]	x		x	x	x	x
	137. Building structures and colours at expanded facilities will be consistent with pre-existing structures. [R-140]	x				x	x
Garbage	138. Refer to the Waste Management Plan in Section 8 for mitigation measures pertaining to the handling and disposal of waste. [NR-648]	x	x	x	x	x	x
Erosion and Sediment Control	139. Implement erosion and sediment control measures outlined in the Soil Erosion and Sediment Control Plan (Section 8). [R-167]	x		x	x	x	x
Heritage Resources and TLU Sites	140. Respect that Squamish Nation members frequently exercise unceded rights throughout the EGP Project area, and that use happens intermittently in all seasons. Where a request is made from Squamish Nation for the project to accommodate use for harvesting medicinal and food source plants, trap lines and trails, or to carry out other traditional use activities, FortisBC will consider all reasonable options towards a mutually agreeable solution . [2002]	x	x	x	x	x	x
	141. The FortisBC Archaeology Lead will consider corrective measures where a change in scope, regulatory needs, or stakeholder consultation causes existing mitigation to be insufficient at addressing impacts to known or found TLU sites. [2016]	x	x	x	x	x	x
	142. Include additional measures in the Emergency Preparedness and Response Plan (subsection 8.8) to protect Cultural Sites in the event of a forest fire (such as, setbacks for machinery or activities, and staging of firefighting equipment). [2009]	x	x	x	x	x	x
	143. Where an agreement is made with Squamish Nation, observe no construction windows in certain areas for winter ceremonies at Cultural Sites. [2019]	x	x	x	x	x	x
	144. If TLU sites not previously identified are found on the EGP Project Footprint during construction, follow conditions outlined in the Traditional Land Use Sites Discovery Contingency Plan (Section 9). [R-172]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Archaeological, Palaeontological or Historical Resources	145. Suspend work within the immediate area of archaeological, palaeontological, or historical sites discovered during construction. No work at that location shall continue until permission is granted by the regulatory agency (Appendix C). Follow the contingency measures identified in the Heritage Resource Discovery Contingency Plan (Section 9). [R-173]	x		x	x	x	x
	146. Site-specific mitigations are decided on a case-by-case basis as the result of consultations between FortisBC, BC LWRS Archaeology Branch, and applicable Indigenous nation. The list of potential mitigation options in order of preference include but are not limited to: ▪ avoidance by altering the EGP Project Footprint ▪ avoidance by implementing a flagged 'No Work Zone' buffer with on-site monitoring during construction ▪ the use of trenchless methods where other avoidance techniques are not feasible, or where geotechnical instability is confirmed ▪ mitigation excavation ▪ controlled data recovery in accordance with applicable permit obligations under the *Heritage Conservation Act*. [R-1083]	x		x	x	x	x
	147. Prohibit the collection of historical, archaeological, or palaeontological resources by EGP Project personnel. [R-174]	x	x	x	x	x	x
Stawamus River Siiyamin ta Skwxwú7mesh	148. Follow the approval to widen Mamquam Forest Service Road in order to reduce the buffer from 10 m to 5 m at the interaction with Stawamus River Cultural Site [2023].	x					
	149. Parking within the Stawamus River Cultural Site by EGP Project personnel is prohibited. [2024]	x					
	150. Apply the IPSMP (subsection 8.3) within the Stawamus River Cultural Site. [2025]	x					
	151. Annual invasive plant management reports from the Stawamus River Cultural site will be provided to Squamish Nation during construction and post-construction monitoring. [2026]	x					
Road R11101	152. Record activities and mitigation measures conducted near the creek running adjacent to R11101 near KP 33 and provide to Squamish Nation, if requested. [2031]	x					
	153. Decommission the road upon completion of the EGP Project will require consultation with Road Permit Holder (Alan Woods – Woodlot 028). [2032]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Road R11101 (cont'd)	154. Only the transportation of construction crews and light equipment will occur on the road during daylight hours (or specific times). [2033]	x					
Trappers	155. Prohibit construction personnel from vandalizing or stealing trapper equipment or trapped animals. Report violators to the BC ENV. [R-181]	x				x	
WMA Skwelwil'em Squamish Estuary	156. In the event that access to the Skwelwil'em Squamish Estuary WMA is required during construction (for example, as a result of unforeseen construction challenges), adhere to Squamish Nation EAA Condition 4.1, or seek written approval from Squamish Nation for access outside of the Condition requirements. Comply with mitigation measures prescribed by FortisBC in consultation with the BC LWRS and the District of Squamish, and engagement with Squamish Nation. [NR-412]	x	x				
Fires	157. Implement the Fire Preparedness Plan (Section 8), notify applicable regulatory agencies and cut or plow fire breaks in the event of a wildfire or an accidental fire associated with the EGP Project. [R-182]	x	x	x	x	x	x
	158. All personnel will be made aware of proper disposal methods for welding rods, discarded cigarettes, and other hot or burning material. Comply with Conditions of burn permits. [R183]	x	x	x	x	x	x
	159. Prohibit smoking in EGP Project vehicles or in the open on the EGP Project Footprint when BC MoF determines that the fire hazard is high, except within designated areas. Remove discarded cigarettes for proper disposal. Fire extinguisher and shovel shall be present for each area designated for smoking. [R-184]	x	x	x	x	x	x
	160. Maintain a water truck on the EGP Project Footprint when the fire hazard is high, as determined by BC Wildfire Service. [R-186]	x		x	x	x	x
	161. Place an appropriate non-flammable barrier, where warranted, between vegetation and work area directly affected by welding operations. Non-flammable barriers are not warranted if topsoil has been salvaged from the work area. A water truck will accompany welding and coating operations. [R-187]	x		x	x	x	x
	162. Crews will carry, at a minimum, two shovels, two pulaskis, one fire extinguisher and one two-way radio or cell phone when fire risk is high (Section 8). [R-188]		x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Fire Protection for Siiyamin ta Skwxwú7mesh	163. Maintain a water truck on the EGP Project Footprint when the fire hazard is high, as determined by the BC Wildfire Service. [R-185]. Additional: Locate this water truck in proximity to the cultural sites. [2045]	x					
	164. Provide an on-site storage box in proximity to the cultural site that contains two shovels, two pulaskis, one fire extinguisher. [2046]	x					

6.2 Surveying, Access, and Clearing

This subsection identifies surveying, access and clearing activities or concerns, and the mitigation measures for each activity or concern to be implemented by FortisBC, the Contractor, or the Subcontractor.

The applicable EGP Project components for each mitigation measure are identified. The purpose is to restrict the EGP Project Footprint to the approved workspace and limit the disturbance of vegetation (such as, merchantable timber, native vegetation, harvestable plants used by Indigenous nations), and other localized features (such as, wetlands, watercourses) to the extent practical.

Refer to the AMP for access management considerations specific to new or existing road use, maintaining access for land occupants and Indigenous nations, and to monitor use of EGP Project roads.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Notifications/ Approvals	1. Obtain BC *WSA* approval under Section 10 from the BC OGC for the short-term use of water for construction and adhere to notification requirements and permit conditions. [R-189]	x	x	x	x	x	x
	2. Plan the installation, use and removal of temporary vehicle or equipment watercourse and wetland crossings with input from a QP and in accordance with the applicable BC *WSA* requirements for Changes In and About a Stream as well as in accordance with Federal *Fisheries Act* requirements. Approved crossing methods will be included in the watercourse or wetland crossing tables, construction plans, and EGP Project permits. [R-190]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Notifications/ Approvals (cont'd)	3. Complete the on-site checklist for each watercourse, wetland or NCD crossing prior to, during, and following construction (Appendix E). These checklists should be filled out by the EI. FortisBC should retain these checklists as a permanent record of crossing activities. [R-191]	x					
	4. Present information relating to temporary road closures in plain-language and by accessible means for Squamish Nation members 14 days prior to the closure. Include contact information for addressing questions and an outline of FortisBC personnel who are responsible for developing, implementing, and monitoring closures [2027].	x					
	5. Notify local Road Authority of any planting activity, if required to do so. [R-274]	x		x	x	x	x
	6. Burning should comply with the provincial Open Burning Smoke Control Regulation where the Metro Vancouver does not have jurisdiction. A permit under the Metro Vancouver Air Quality Management Bylaw 1082, 2008 is required. Electoral Area D in the Squamish-Lillooet Regional District, City of Coquitlam, and the District of Squamish do not allow burning. [R-1257]	x		x	x	x	x
	7. Locate and mark existing hotlines and foreign cables using BC One Call services prior to the start of construction to maintain the safety of EGP Project personnel and the public [NR-359].	x		x	x	x	x
Staking	8. Stake and flag boundaries of the EGP Project Footprint, staging and stockpile areas. Do not allow clearing or grading beyond the stakes unless additional workspace rights have been obtained. Flag or stake the boundaries of temporary access roads and shoo-fly. Restake/flag the EGP Project Footprint boundaries, where warranted, following clearing and prior to the commencement of subsequent construction activities. [R-192]	x		x	x	x	x
	9. Identify, flag, stake or fence-off site-specific resource features (such as, invasive plant species infestations, rare plant populations or communities, archaeological sites, ornamental trees, watercourse or wetland RMAs and drainages/NCDs) as indicated on the EAS. (Detail No. 1). [R-193]	x	x	x	x	x	x
	10. Install signage following clearing to alert workers of the presence of sites to be avoided or where special measures are necessary (such as, at watercourse and wetland crossings and RMAs). [R-194]	x	x	x	x	x	x
	11. Identify segments of the EGP Project Footprint or access trails where access is restricted to essential construction personnel or equipment. Use signs and construction access markers to identify these locations. Direct other personnel/equipment around the restricted area via alternate access routes. [R-195]	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Staking (cont'd)	12. Stake drainages where determined by the EI as being necessary to assist in locating topsoil windrow, as well as to avoid flooding or erosion problems. [R-196]	x		x	x	x	x
	13. Delay final staking until prior to the commencement of clearing and construction. [R-199]	x	x	x	x	x	x
Workspace	14. Additional workspace, not shown on permitted construction plans, cannot be used without prior approval and the landowner/regulatory agency. FortisBC will seek this approval as required. [R-200]	x	x	x	x	x	x
Cedar Trees	15. The FortisBC Archaeology Lead will work with Squamish Nation to determine if cedar trees cleared from the EGP Footprint are eligible for donation through the Cultural Cedar Tree Program [2001].	x		x	x	x	x
Watercourse and Wetland RMAs	16. Seek to avoid or reduce the EGP Project Footprint in the RMAs to the extent practical. Techniques that reduce root grubbing and soil disturbance and soil compaction will be used, to the extent practical. [R-1092]	x		x	x	x	x
	17. Flag or fence-off any shrubs or trees to be salvaged and replaced at watercourses and wetlands, including vegetation removed from below the ordinary high watermark of a watercourse. This task will be completed with oversight by the EI or other QP. [R-204]	x		x	x	x	x
Beaver Dams and Lodges	18. Submit notification or application for approval under the Provincial *Wildlife Act* and, if required, the *WSA* for breaching of beaver dams. Follow permit requirements and best practices for working around water. [R-1100]	x		x	x	x	x
	19. Involve a QP to determine if beaver dam breaching activities require review by DFO and monitoring and fish salvage programs. [R-1101]	x		x	x	x	x
	20. Notify the CEC of intended scheduling of beaver dam removals at least 2 months before conducting the work so the necessary permits can be secured, including for potential wildlife and fisheries impacts. Conduct breaching activities in accordance with permit Conditions. A QP may be involved with water quality monitoring or fish salvage during breaching activities. [R-225]	x		x	x	x	x
	21. Remove or breach the dam slowly by physical means or as advised by the applicable regulatory agencies to avoid the rapid release of water, fish entrapment, erosion of the bed and banks of the watercourse, downstream flooding and sedimentation and wash out of downstream beaver dams. The preservation of water quality parameters (such as, turbidity, dissolved oxygen) shall be monitored and maintained at the dam site and downstream from beaver dam breaching locations. Refer to the FMMP for water quality monitoring protocols. [R-227]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Helicopter Supported Project Activities Guidelines	22. Do not circle or approach wildlife [NR-85]	x		x	x	x	x
	23. To the extent practical seek to: ▪ avoid helicopter landing sites that are located in the vicinity of important wildlife habitat or features during sensitive time periods ▪ maintain avoidance distances, reduce the frequency of flights during sensitive periods for wildlife and in proximity to identified wildlife areas such as mountain goat range, wetlands with breeding and staging waterbirds, and wildlife features (such as, active stick nests) ▪ avoid overflights of helicopters and fixed-wing aircraft and maintain a 2,000 m horizontal distance and 400 m vertical distance from mountain goat habitat year-round. If flights within 2,000 m horizontal distance or 400 m vertical distance are necessary within mountain goat habitat, consider the following mitigation strategies to reduce disturbance of goats: – use topographic barriers to separate helicopters from mountain goats; – when mountain goats are observed, restrict helicopter flights to an elevation that is lower than the mountain goats that have been sighted, where practical; – avoid flying directly towards, hovering near or landing near mountain goats; and reduce the number of flights and time spent within disturbance space (BC MOE 2010). [NR-87]	x	x	x	x	x	x
Schedule	24. Seek to avoid grubbing the EGP Project Footprint, in erosion prone areas, until prior to construction if clearing is conducted in advance of construction. [R-206]	x		x	x	x	x
Clearing Limits	25. Confine clearing or mowing and associated activities within the staked or flagged EGP Project Footprint boundaries, with the exception of danger trees. Comply with clearing or mowing restrictions associated with fencing, flagging, staking or signage associated with special environmental features, or RMAs. [R-207]	x		x	x	x	x
	26. Request assistance from the CEC to determine the size of an avoidance buffer surrounding areas where clearing or grubbing is to be avoided. [R-208]	x		x	x	x	x
	27. Seek to avoid clearing timber (other than danger trees), stumps, brush or other vegetation beyond the identified construction Project Footprint boundaries [NR-2].	x		x	x	x	x
	28. Where grading or stripping is not required, cut/mow/walk down shrubs and small diameter deciduous trees to ground level to facilitate rapid regeneration [NR-4].	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Buffers for Siiyamin ta Skwxwú7mesh	29. Leave an additional buffer of vegetation (trim down the workspace) for TLU sites located off the EGP Project Footprint, were feasible. [2000]	x		x	x	x	x
	30. Temporary workforce accommodations will maintain a minimum of approximately 500 m from Cultural Site boundaries. [2020]	x		x	x	x	x
	31. Other EGP Project-related vegetation clearing, equipment storage, and other construction activities require a 10 m buffer with the exception of the NPS 10 relocation on Mamquam Forest Service Road. [2021]	x		x	x	x	x
	32. Seek to reduce the potential for noise disturbances near Cultural Sites. [2022]	x		x	x	x	x
	33. Cultural Sites should be buffered by 10 m, unless otherwise agreed upon between Squamish Nation and FortisBC.	x		x	x	x	x
Fences	34. Install flagging or fencing along segments of the route where a narrower than usual EGP Project Footprint is necessary to avoid or reduce effects on site-specific environmental features (Section 14, Detail No. 1). [R-209]	x		x	x	x	x
	35. Brace existing fences before cutting. Install gates in fences crossed by the EGP Project Footprint. 36. Locate any new gates within the boundaries of EGP Project Footprint, the same height as the adjacent fence and adequately sized to allow passage of construction equipment. [R-210]	x		x	x	x	x
	37. Close gates after each use. The Contractor Project Manager will consider whether it is necessary to assign security personnel to restrict public access. [R-211]	x		x	x	x	x
Survey Slash Lines	38. Fell timber onto the EGP Project Footprint during survey line clearing. No fallen or leaning trees will be permitted to remain in any watercourse, wetland, or drainage/NCD. [R-213]	x		x	x	x	x
Ramp Bar Ditches	39. Construct bar ditch ramps (Section 14, Detail No. 2) with subsoil on applicable land uses unless otherwise approved by regulatory agencies. At locations where disturbance is to be reduced excavate subsoil from the trench line for use as ramping material. [R-215]	x		x	x	x	x
	40. Install culverts in bar ditch ramps (Section 14, Detail No. 2) to maintain drainage. The EGP Project Engineer, or designate, will determine culvert specifications. [R-216]	x		x	x	x	x
Foreign Pipelines	41. Construct ramps on the work side of the EGP Project Footprint over existing foreign pipelines, where practical, in accordance with crossing agreements. [R-217]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Hotline Exposure and Hydrovac	42. Salvage topsoil prior to exposing hotlines. Topsoil salvage is not required prior to exposing hotlines for holes less than 1 m in diameter if soil will be removed using a hydrovac. [R-218]	x		x	x	x	x
	43. Prior to excavation, carefully expose (daylight) known locations of existing hotlines and foreign cables (using methods such as, hydro vac, hand excavation, etc.), and flag aboveground facilities in accordance with prescribed safe methods. [NR-350]	x		x	x	x	x
Hotline Exposure and Hydrovac	44. Empty the hydrovac truck onto subsoil at approved locations (such as, at road crossings where the topsoil has been salvaged). Contain hydrovac material within the designated release area (that is, will not migrate to a watercourse, wetland or drainage/NCD or onto topsoil) (Known or Suspected Contaminated Groundwater and Soil Handling Management Plan [Section 8] and the Spill, Fuel and Hazardous Materials Contingency Plan [Section 9]). [R-220]	x		x	x	x	x
	45. If an impermeable berm or lined sump is warranted to contain the slurry, compose the dike material of subsoil material and prevent any surface water runoff from contacting the slurry. Hydrovac slurry will not be pumped into or allowed to flow or seep into a watercourse, wetland, or drainage/NCD. [R-221]	x		x	x	x	x
	46. Implement the appropriate measures presented in the Waste Management Plan (Section 8) and Contaminated Soils Discovery Contingency Plan (Section 9) if contaminated or potentially contaminated soils are discovered during hydrovac activities. [R-222]	x		x	x	x	x
	47. Assign a tow dozer or tractor to assist the hydrovac through localized wet areas to avoid or reduce rutting. [R-219]	x		x	x	x	x
Shoo-Fly	48. Install shoo-fly at locations approved by the Contractor Project Manager, the CEC, the landowner, and the regulatory agency. [R-223]	x		x	x	x	x
Temporary Vehicle Crossings – Watercourses and NCDs	49. To the extent practical, plan temporary vehicle crossings for straight sections of watercourses and where stable banks are located. [R-230]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Temporary Vehicle Crossings – Watercourses and NCDs (cont'd)	50. Refer to the watercourse crossing table for temporary vehicle crossing methods, as follows: ▪ use clear-span bridge crossing methods on fish-bearing watercourses (Detail 16); ▪ use culvert (Detail 17), clear-span bridge (Detail 16), or other bridge crossing methods approved by the CEC on nonfish-bearing watercourses; ▪ use culvert (Detail 17) or matting crossing methods on NCDs; and ▪ use matting crossing methods on wetlands.	x		x	x	x	x
	51. Alternate crossing methods can be used per regulatory approvals. Consult with the CEC prior to installation of temporary vehicle and equipment crossings on undocumented waterbodies to determine if QP assessment is required. [R-231]	x		x	x	x	x
	52. Equipment used during the installation of vehicle crossings at waterbodies will be clean prior to the start of Project so that equipment does not introduce foreign invasive plants or aquatic pests (such as, Didymo algae [*Didymosphenia geminata*]). Equipment components (such as, the hoe bucket) that are used for instream construction activities in the presence of water will be cleaned or disinfected prior to instream work on a different waterbody that also contains water. Follow mitigation measures in the Invasive Plant Species Management Plan (Section 8.3) to prevent the spread of invasive plants from problem areas. [R-233]	x		x	x	x	x
	53. Locate vehicle crossings at waterbodies within existing rights-of-way to reduce clearing requirements and disturbance of the riparian area, where applicable and allowed by a third-party operating company. [R-234]	x		x	x	x	x
	54. Obtain approval of the CEC, where required, for any fill imported for use in the construction of ramps on the approaches to temporary bridges (Detail No. 16). Install geotextile fabric between the fill material and the surface layer unless otherwise approved by the CEC. [R-235]	x		x	x	x	x
	55. Monitor temporary vehicle crossing structures to confirm they do not disrupt fish passage, interfere with or impede flow or navigation, and that erosion control measures are adequate, and water quality is not adversely affected. [R-238]	x		x	x	x	x
	56. Closed bottom structures (culverts) will be considered for use to provide temporary vehicle access on nonfish-bearing watercourses (and NCDs) only. [R-240]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Temporary Vehicle Crossings – Watercourses and NCDs (cont'd)	57. Install and maintain appropriate erosion and sediment control methods (such as, sediment fence, coir matting, coir logs, geotextile, temporary berms) following installation of the temporary vehicle crossing, if warranted to prevent sediment from disturbed areas from being transported into flowing watercourses. This will, where appropriate, include the management of adjacent slopes. (Section 14, Detail Nos. 4, 19, and 20). [R-241]	x		x	x	x	x
Temporary Vehicle Crossings – Watercourses	58. Seek to reduce, stabilize, and to the extent practical, restore to approximate pre-construction conditions, disturbances on the approach to watercourses. [R-242]	x		x	x	x	x
Temporary Vehicle Crossings - Wetlands	59. Comply with plans or notifications submitted to BC OGC or BC LWRS when installing vehicle crossing structures across wetlands. [R-243] Refer to the WMP for information on wetland crossings, monitoring and adaptive management.	x		x	x	x	x
	60. Install wetland vehicle crossings in accordance with BC *WSA* and BC OGC permit requirements. [R-989]	x		x	x	x	x
	61. Install swamp mats or wooden matting to create a travel or work pad for wetland construction (Section 14, Detail No. 15). If warranted to reduce impacts on wetland soils and vegetation, cover the mats or matting with geotextile and subsoil. Do not allow spoil to enter wetland from the travel or work pad. Note that subsoil and geotextiles and other support material must be removed from the wetland upon completion of construction. [R-244]	x		x	x	x	x
	62. As documented in the Grade Plan, construct a shoo-fly around the wetland, if directed by the CEC. Applicable approvals are to be in place prior to commencing development of the shoo-fly. Align the shoo-fly far enough from the wetland to avoid the RMA of the wetland and inundation of water during any high water periods that could occur when the shoo-fly is in use. Stake or flag the boundaries of the wetland and place signs to direct construction traffic to use the shoo-fly (Section 14 Detail No. 15). [R-245]	x		x	x	x	x
	63. Narrow down the area of disturbance and protect the wetland by marking the boundaries using signage, flagging, or fencing. Limit traffic in the vicinity of the flagged or fenced off area. [R-246]	x		x	x	x	x
Watercourses, Wetlands	64. Retain salvageable timber, where warranted, in the vicinity of watercourses and wetland crossings for use in the construction of the vehicle crossings or restoration works. [R-248]	x		x	x	x	x
	65. Salvage flagged or fenced live shrubs from the banks of watercourses, wetlands and drainages/NCDs if requested by the CEC. Store salvaged shrubs in a manner to maintain viability for replanting within the EGP Project Footprint. [R-251]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Watercourses, Wetlands (cont'd)	66. Seek to reduce clearing and disturbance within the RMA of watercourses and wetlands to the extent practical according to the BC OGC Environmental Protection and Management Guideline (2021). [R-252]	x		x	x	x	x
	67. Maintain low vegetation or vegetated ground mat within the riparian areas (including RMAs where applicable) of watercourses and wetlands to the extent practical by walking down small trees and shrubs. [R-255]	x		x	x	x	x
Drainage	68. Infrastructure installed to control surface and subsurface drainage (such as, trench breakers, subdrains, and diversion berms) will be documented using the Crossing Checklists and shown on the as-built.	x		x	x	x	x
Merchantable or Salvageable Timber	69. Salvage timber in accordance with the EGP Project-specific TSS. [R-256]	x		x	x	x	x
	70. Salvage timber with equipment that is appropriate for the terrain conditions, limits damage to salvaged timber, and harvests timber that meets the receiving mill's requirements. [R-257]	x		x	x	x	x
	71. Salvage and deck timber on privately-owned lands where requested. Consider the timber to be non-salvageable and dispose of it accordingly if the landowner has not requested timber salvage. [R-258]	x		x	x	x	x
	72. Use low-ground-pressure equipment, if directed by the CEC, to transport salvaged logs to deck sites. [R-259]	x		x	x	x	x
Non-Merchantable Timber	73. Use mobile mulching or chipping equipment (for example, brushcutters, brushhogs), when practical, to avoid or reduce terrain disturbance when clearing non-salvageable timber and stumps to assist in maintaining an intact ground surface in areas where grading is not warranted. [R-264]	x		x	x	x	X
	74. If directed by the CEC to facilitate the preservation of topsoil, push slash and non-merchantable timber into piles along areas that were previously cleared (such as, using a brush rake attachment on a dozer or other suitable equipment). Leave a firebreak (8 m minimum) at 60 m (maximum) intervals. [R-265]	x		x	x	x	x
Deck Site Preparation	75. Locate deck sites, to the extent practical, in previously disturbed areas, natural clearings, and other locations where clearing will not be necessary. The CEC will assess the soil characteristics at each deck site and determine if topsoil salvage is needed (Section 14, Detail No. 3). [R-261]	x		x	x	x	x
	76. Locate deck sites further than 30 m from FortisBC's existing 10-inch pipeline right-of-way or utility crossings and in accordance with the EGP Project-specific TSS [R-262].	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Rollback, Wildlife Slash Berms, and Coarse Woody Debris	77. Retain non-salvageable timber, where warranted, for use as wildlife slash berms, coarse woody debris (CWD), or rollback. The amount of timber retained for use as rollback slash berms or CWD will be determined by the CEC in consultation with the Contractor. Mark or identify non-merchantable timber retained for use as rollback or slash berms. Rollback and slash berm windrows will be protected and not disposed of. [R-266]	x		x	x	x	x
	78. Use non-merchantable timber for rollback, CWD, and slash berms that is free of forest pests as determined by a QP. [R-267]	x		x	x	x	x
Leaning and Damaged Trees	79. Fell trees damaged during construction activities as deemed necessary by the CEC. Do not postpone felling of damaged trees until clean-up. A tree that has fractured limbs or bark loss on at least approximately 50 percent of its circumference is damaged. [R-283]	x		x	x	x	x
	80. Danger trees that pose a safety hazard will be felled as identified by a Certified Arborist or a Registered Professional Forester trained in danger tree risk assessment, as per WorkSafeBC. [R-1077]	x		x	x	x	x
Vegetation Clearing	81. Seek to reduce clearing, mowing and grading of native vegetation (areas with >30 percent native species [native versus exotic is per Government of BC 2022]), where disturbance to native vegetation is required. Options could include narrowing down the required workspace, utilizing existing disturbance, retaining vegetative height while mowing, or using alternative mowing equipment such as weed whippers to reduce disturbance. [R-284]	x		x	x	x	x
	82. Invasive plant species listed on Schedule A of the *Weed Control Regulation* will be managed according to the IPSMP (subsection 8.3). [2041]	x		x	x	x	x
	83. Wildlife trees or patches that remain in young forest blocks will be avoided and grubbing techniques that reduce soil disturbance will be used in less productive areas and areas susceptible to erosion, to the extent feasible [NR-280].	x					
Slash Disposal	84. Seek to reduce open burning and smoke emissions (particulate matter) and greenhouse gases by marketing as much cleared timber as practical and utilizing non-merchantable wood for erosion control, access management, or restoration purposes. [R-286]	x		x	x	x	x
	85. Slash burning is not permitted in the District of Squamish. [NR-525]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Slash Disposal (cont'd)	86. Burn, chip, or mulch slash and stumps unless needed for erosion and sediment control, access management or restoration. Consider the volume of chips or mulch that will be produced when determining the appropriate slash disposal method. Note that the depth of chips or mulch spread for reclamation purposes is not to exceed approximately 5 centimetres (cm). [R-287]	x		x	x	x	x
	87. Do not pile or spread chips or mulch, or mechanically cut woody debris in wetlands. [R-288]	x		x	x	x	x
	88. Do not bury slash or stumps. [R-289]	x		x	x	x	x
	89. Do not chip or mulch slash within the RMAs of watercourses and wetlands. [R-290]	x		x	x	x	x
	90. Slash burning crews are to have firefighting equipment on hand that can control any fire that may occur as a result of their activities as regulated by the BC *Open Burning Smoke Control Regulation*. [R-292]	x		x	x	x	x
	91. Burn slash in accordance with permits. If burning is delayed, store slash along the EGP Project Footprint, in natural clearings, at cutline intersections or in approved push-outs. Leave gaps in the slash windrow where directed by the CEC. [R-293]	x		x	x	x	x
	92. Confirm that burn piles are extinguished prior to the completion of final clean-up. Conduct infrared scanning of burn pile locations to locate any hot spots. [R-291]	x		x	x	x	x
	93. Implement the Fire Preparedness Plan (Section 8) and implement additional measures, if required, to address the BC *Wildfire Act* and *Wildfire Regulations*. [R-294]	x		x	x	x	x
	94. Implement techniques to limit smoke production including limiting pile size, reducing fuel moisture content, maintaining loose burning piles free of soil, and using burn sloops or large capacity shredders. [R-295]	x		x	x	x	x
	95. Comply with the measures related to the prevention of wildfires outlined in Section 8. [R-296]	x		x	x	x	x
	96. Do not locate burn piles within a watercourse, wetland or NCD, or on organic soils. [R-297]	x		x	x	x	x
	97. Avoid locating burn piles on peat-rich soils to limit the risk of residual fires after construction. Locate burn piles on exposed mineral soils (that is, where topsoil salvage has been conducted) or on burning sleds or sloops. [R-299]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Grubbing	98. Seek to reduce clearing on steep, erodible slopes. Restrict root grubbing on steep erosion prone slopes to the ditchline and where required for safe equipment travel and constructability, in order to reduce soil disturbance and erosion. [R-275]	x		x	x	x	x
	99. Postpone root grubbing until prior to grading along segments of the route where clearing was conducted and where there is potential for soil erosion to occur. [R-276]	x		x	x	x	x
	100. Consider the use of a stump mulcher rather than grubbing on areas where topsoil salvage and grubbing are not necessary. [R-279]	x		x	x	x	x
	101. Seek to avoid grubbing within 2 m of the edge of the EGP Project Footprint to the extent practical to prevent damaging adjacent trees. [R-280]	x		x	x	x	x
Drainage and Erosion Control – New and Upgraded Roads	102. Provide adequate drainage by maintaining the proper grade and installing culverts to allow for cross drainage. Outslope the crown of the road higher than the shoulders to allow the road surface to drain and dry (Detail No. 17). [R-269]	x		x	x	x	x
	103. Top new access roads with clean gravel, where warranted. Consider using underlay felt liners, geotextile, filter mats, or matting if the soil conditions and drainage on new access roads are poor and there is potential for rutting and erosion. [R-270]	x		x	x	x	x
	104. Install and implement drainage and erosion control measures (for example, check dams, sediment traps, or culverts; Detail No. 17), in accordance with the CEMP, road construction plans, or as otherwise directed by the CEC during the development of new access roads and upgrading of existing roads or trails. [R-271]	x		x	x	x	x
	105. Monitor and repair erosion control measures and implement supplemental erosion control measures, when the risk of erosion and sedimentation of a watercourse, wetland, or drainage/NCD exists. [R-272]	x		x	x	x	x
	106. Seed disturbed side slopes and bar ditches (if present) of new and upgraded roads with an approved grass mix. [R-273]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Forest Pest Management	107. Prior to clearing, assess potentially infected forests along the pipeline route for the presence of forest pests that could be moved or worsened by EGP Project activities. A QP will conduct the assessment. The survey will follow the guidelines set out by the MOF (Aerial Overview Survey Methods. [NR-131]	x		x	x	x	x
	108. Adhere to all applicable provincial and regional guidelines to control the movement of forest pests (FRPA sec 26). Follow all applicable provincial and regional guidelines/restrictions and scheduling requirements related to tree clearing and timing of log removal in order to avoid the potential spread of forest pest parasites (such as, Douglas-fir beetle) [R-229 in TSS].	x		x	x	x	x
	109. Hauling of timber potentially infected by a forest pest will be scheduled prior to April 15th. If Douglas-fir logs need to be left onsite for more than one season, baited beetle traps will need to installed and maintained by a QP. [R-278 in TSS].	x		x	x	x	x
	110. Fallen infested trees will not be stacked near healthy standing or felled trees. All non-merchantable timber infested with forest pests will be disposed of by burning or mulching to eliminate the risk of spread of forest pests. Douglas-fir should be avoided as roll back material or used for restoration.[R-279 in TSS].	x		x	x	x	x
U-2-002 UWR Mountain Goat	111. Deactivate and reclaim all temporary construction access within 1 km of mountain goat Ungulate Winter Range, unless otherwise directed by the relevant regulatory authority. [NR-408]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
New Access	112. FortisBC will deactivate new access trails associated with construction activities by implementing one or more of the following mitigation measures: ▪ Rollback timber and slash across the width of the right-of-way for approximately 100 m on either side of the intersection of existing access (such as, access trails, rights-of-way) to deter travel by both humans and predatory wildlife. ▪ Plant trees or shrubs at locations where new access is created where the pipeline crosses existing rights-of-way or trails that are not crossed using a bore or other measures as agreed upon with the appropriate regulatory agencies. ▪ Plant trees or shrubs and install rollback at locations where new access is created or where temporary access will be constructed to access the EGP Project Footprint from existing access, or other measures as agreed upon with the appropriate regulatory agencies. ▪ Complete final clean-up and restoration, including the implementation of final access control methods along portions of the right-of-way adjacent to environmentally sensitive features such as wetlands. ▪ Remove bar ditch ramps and restore all temporary access trails and shoo-fly to stable conditions. Recontour to pre-construction conditions and seed accordingly. ▪ Regrade right-of-way to pre-construction profile where practical and applicable, to deter vehicle and all-terrain vehicles traffic. ▪ Routine access to the right-of-way will be by way of pre-existing roads and trails wherever practical. Where travel along the right-of-way in the vicinity of sensitive vegetation (such as, ecological communities of concern or species of concern, vegetation that is re-establishing) is required (such as, during restoration monitoring) foot travel will be used whenever practical. All terrain vehicles will be used if necessary. [R-1140]	x		x	x	x	x

6.3 Topsoil and Rock Excavation

This subsection identifies activities or concerns associated with topsoil salvage and grading, and the mitigation measures for each activity or concern to be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Soil Cuts	1. Review with the Contractor site-specific locations to be avoided during topsoil salvage and grading activities. Also review the finalized Grade Plan prepared by the Contractor. [R-301]	x		x	x	x	x
	2. Refer to the Contractor's Grade Plan to identify areas of potential concern where site-specific soil cut slopes are recommended. [R-1178]	x					
	3. Create a stable grading profile through use of appropriate soil cut slope angles. Unless otherwise noted, stable cut angles in granular material are 1.5H:1V. Where seepage is encountered, flatter angles or drainage blankets will be required. In marginally stable areas, it will be appropriate to partially or fully regrade the EGP Project Footprint to match the pre-existing slope profile to maintain upslope stability. [R-1179]	x		x	x	x	x
	4. Maintain existing surface and groundwater drainage patterns, to the extent practical. [R-1180]	x		x	x	x	x
	5. As required by WorkSafeBC regulation, soil cuts should be designed and reviewed in the field by a Geotechnical Engineer when they are below an overall slope that is steeper than 3H:1V or where indications of seepage or pre-existing slope movements are present. [R-1181]	x		x	x	x	x
	6. Soil cuts should be reduced by keeping the grading as narrow as practical. Larger cut slopes will have a higher probability of altering local stability conditions and will expose more area to surface soil erosion. [R-1182]	x		x	x	x	x
	7. WorkSafeBC *Occupational Health and Safety Regulation* must be considered in safety plans for work below cut slopes. The Regulation may require that work around cuts are subject to written instructions by a QP Engineer registered with Association of Professional Engineers and Geoscientists of BC. [R-1183]	x		x	x	x	x
Rock Cuts	8. Cut-and-fill design will depend on site-specific rock slope kinematics. Preliminary design of cut slopes in rock should use a cut angle of 0.25H:1V. Carry out assessments of cut and fill slopes during construction to amend recommendations to suit actual conditions, as required. [R-1184]	x		x	x	x	x
	9. Rock cuts higher than 6 m must be assessed by an on-site QP Geotechnical Engineer. Assessments may prescribe scaling or grading, external support surface and or ground water control, or barriers. [R-1185]	x		x	x	x	x
	10. Where streams discharge over rock slopes, geotechnical engineering assessments are warranted due to increased rockfall and debris flow hazard. [R-1188]	x			x	x	x
	11. Potential for rockfall from cuts must be mitigated by scaling. [R-1186]	x			x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Rock Cuts (cont'd)	12. Soil overburden should be cleared back at least 3 m from the crest of rock slopes. Cuts in soil overburden are subject to the mitigation above. Where this is not practical, additional site-specific soil slope stabilization measures should be designed in consultation with a QP. [R-1187]	x		x	x	x	x
	13. Artificial support such as shotcrete and anchors or drainage may be required in some areas [R-1189]	x		x	x	x	x
Soil and Rock Fills	14. The on-site QP Geotechnical Engineer must field assess any fills higher than 6 m (vertical, toe to create) for the potential for short- and long-term instability affecting workers, the environment and pipeline integrity. [R-1193]	x		x	x	x	x
	15. Permanent and temporary fills on slopes steeper than 3H:1V or in areas identified as having a potential for terrain instability will be designed by a QP Geotechnical Engineer. The designs will include deactivation prescriptions where appropriate. [R-1196]	x		x	x	x	x
	16. Create a stable grading profile through use of appropriate soil and rock fill slope angles. Unless otherwise noted, stable fill angles to consider are 1.5H:1V in granular material, 2H:1V in fine-grained material and 1.25H:1V in competent rockfill. Fill material must be placed at suitable moisture contents to encourage compaction. [R-1192]	x		x	x	x	x
	17. The fill footprint must be stripped of organic soil, woody debris, snow, and ice prior to placing of fill and these materials must not be incorporated into fill slopes. Placing fill over or including these materials in fills will likely result in future instability issues. [R-1194]	x		x	x	x	x
	18. Fills placed over sloping ground should be keyed in at the toe by cutting a horizontal bench along the downslope extent of the fill prism. [R-1195]	x		x	x	x	x
	19. Drainage measures must be implemented where seepage is encountered within fill footprints. Examples would include pre-fabricated geosynthetic drainage products, French drains or free-draining, granular layers protected by non-woven geotextile filter fabric. [R-1197]	x		x	x	x	x
	20. Sliver fills (that is, fills that are uniformly shallow and extend a long way down the slope) should be avoided to the extent practical by shifting the grading in favour of enlarged cut slopes. Where this is not practical, site-specific geotechnical engineering is required. In most circumstances, preference should be given to artificially supported cut slopes over retained fills. [R-1198]	x		x	x	x	x
	21. In marginally stable areas, it will be appropriate to partially or fully regrade the EGP Project Footprint to match the pre-existing slope profile to maintain stability across the grading. [R-1199]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Seepage in Cut Slopes	22. The on-site QP Geotechnical Engineer and the Erosion Control Team will assess groundwater discharge areas affecting the construction footprint. [R-1209]	x		x	x	x	x
Seepage in Pipe Trench and Surface Water Infiltration into Pipe Trench	23. Potential groundwater flow down the backfilled pipe trench should be managed by installation of trench breakers at appropriate intervals. [R-1213]	x					
Topsoil Handling Contingency Measures	24. Implement the Known or Suspected Contaminated Groundwater and Soil Handling Management Plan (Section 8) during topsoil stripping if any of the following are encountered: little or no topsoil; uneven boundary between topsoils and subsoils; poor colour separation between topsoils and subsoils; stony soils; high winds; or requests for alternate topsoil handling methods by a landowner. [R-317]	x		x	x	x	x
	25. Salvage topsoil in areas of equipment and vehicle travel where it is determined by the CEC and EI, that soils may be prone to pulverization, rutting, or erosion. [R-990]	x		x	x	x	x
General Topsoil Salvage	26. Implement topsoil salvage to colour change or a minimum of 15 cm and store in stockpiles or windrows. Keep contaminated topsoil separated. [R-1080]	x					
	27. Salvage topsoil to the extent practical for use in post-construction restoration. [NR-610]	x		x	x	x	x
Landowner Requests	28. Accommodate landowner or regulatory authority topsoil salvage requests, to the extent practical. [R-318]	x		x	x	x	x
Wind Erosion	29. Postpone topsoil salvage activities prior to trenching in areas with limited topsoil depth that are prone to erosion by wind. [R-320]	x		x	x	x	x
Monitoring of Topsoil Windrows	30. Monitor topsoil windrows and piles for erosion and weed growth until the soil windrows are replaced. Initiate erosion control (such as, watering down, tackifier application) or weed control measures (such as, spraying, hand-pulling) as directed by the CEC. [R-302]	x		x	x		x
Windrow Gap Locations	31. Install gaps in pipe, topsoil and spoil to facilitate wildlife movement, which also facilitates construction, such as at slope changes, crossings (that is, watercourse, road) and bends. The locations can be determined in the field by the EI. [R-303]	x					
Topsoil Salvage for Access Roads	32. Salvage topsoil from areas of the access road where construction activities may result in extensive mixing of surface and subsoils or excessive damage to the upper soils, as determined by the CEC. [R-304]	x		x	x	x	x
	33. Salvage topsoil at new temporary access roads. [R-305]	x		x	x	x	x
	34. Salvage topsoil or the upper approximate 15 cm of topsoil, where present, for use during clean-up and closure of new and upgraded access roads as directed by the EI. [R-306]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Topsoil Salvage for Access Roads (cont'd)	35. Store salvaged topsoil from the permanent access road bed area in windrows along one or both edges of the access road in a manner that does not alter natural drainage patterns. [R-307]	x		x	x	x	x
	36. Implement weed control in accordance with the IPSMP and erosion and sediment control measures on topsoil windrows in accordance with the Soil Erosion and Sediment Control Plan (Section 8). [R-308]	x		x	x	x	x
Topsoil Salvage - Full EGP Project Footprint	37. Salvage topsoil from the EGP Project Footprint to prevent mixing and rutting (note that EGP Project Footprint stripping cannot be conducted when soils are excessively wet). [R-324]	x		x	x	x	x
	38. Consider topsoil salvage of the EGP Project Footprint in areas where localized weed infestations are encountered or suspected, if more practical than other weed control methods. [R-323]	x		x	x	x	x
Topsoil Salvage - Blade Width	39. Increase the width of topsoil salvage to two-times the blade width at known locations where the trench may be prone to sloughing or the trench walls may be sloped to prevent topsoil from sloughing into the trench (such as, sandy subsoils, high water [Stak̲w] table). [R-327]	x		x	x	x	x
Increased or Reduced Topsoil Salvage Width	40. Increase the topsoil salvage width at locations where bedrock or boulders may be encountered within trench depth, if necessary, to reduce the risk of topsoil and subsoil mixing. [R-328]	x		x	x	x	x
	41. Salvage strippings from locations where grubbing has been conducted. [R-329]	x		x	x	x	x
	42. Reduce the topsoil salvage width at localized sensitive areas during non-frozen conditions as directed by the CEC. [R-330]	x		x	x	x	x
	43. Salvage topsoil from twice the width of the trench centered over the trench where directed by the CEC. [R-331]	x		x	x	x	x
Sidebends and Crossings	44. Salvage a greater width of topsoil at sharp sidebends and at crossings of watercourses, roads, rail lines, and foreign lines to accommodate a wider and deeper trench, and increased workspace. [R-332]	x					
Topsoil Depth	45. Use equipment with fine depth control to salvage variable depths of topsoil. [R-335]	x		x	x	x	x
	46. Salvage available topsoil to a minimum of 15 cm where soils are not readily distinguishable by colour or as directed by the CEC. [R-336]	x		x	x	x	x
	47. Salvage the upper surface material on applicable trenched crossings to maintain the root stock and seed bank for replacement following wetland crossing construction. Salvage surface material in mineral soils to a maximum depth of approximately 50 cm or to the depth of colour change where there is less than approximately 50 cm of surface material or as directed by the CEC. Salvage the full depth of peat unless directed otherwise by the CEC. [R-802]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Storage of Salvaged Topsoil	48. Windrow salvaged topsoil. Consider the excavation equipment to be used, depth and width of the trench, local topography, presence of nearby existing hotlines, drainage, as well as the susceptibility of the trench walls to sloughing when determining the location of salvaged topsoil material windrows on the EGP Project Footprint. [R-342]	x					
	49. Store topsoil salvaged prior to grading taking into consideration space requirements for grade and trench spoil, existing nearby hotlines, local topography, cross EGP Project Footprint access requirements and drainage. [R-343]	x		x	x	x	x
	50. Place topsoil piles on the high side of grade cuts, to the extent practical, to prevent overlap with the grade spoil piles. [R-344]	x		x	x	x	x
	51. Store grade spoil on the work side along the EGP Project Footprint boundary unless needed for local fill. Take into consideration local topography and drainage when determining spoil storage locations. Maintain at least 1 m separation between grade spoil storage piles and topsoil windrows. Where separation cannot be maintained between topsoil and subsoil piles due to workspace limitations, place a barrier (such as, straw, tarps, or other material) approved by the CEC. [R-345 and R-346]	x		x	x	x	x
	52. Monitor topsoil windrows and piles for erosion and weed growth until the soil windrows are replaced. Initiate erosion control (such as, watering down, tackifier application) or weed control measures (such as, spraying, hand-pulling) as directed by the EI. [R-302]	x		x	x	x	x
Windrow Gaps	53. Leave gaps in topsoil and grade spoil windrows, at obvious drainage courses, access trails and wildlife trails and, where directed by the CEC, to allow wildlife to cross the EGP Project Footprint. Breaks in the topsoil and grade spoil windrows will be coincident with gaps in the slash or rollback windrows and gaps in strung and set-up pipe. [R-347]	x		x	x	x	x
Surface Drainage Patterns	54. Surface drainage patterns should be preserved to the extent practical through use of cross-berms to avoid concentration of surface runoff along the grading. [R-1201]	x		x	x	x	x
	55. The grading should typically be out-sloped by at least 2 percent, except where otherwise directed by the Geotechnical Engineer. [R-1203]	x		x	x	x	x
	56. Use local armouring as applicable to protect the EGP Project Footprint from concentrated surface runoff. [R-1204]	x		x	x	x	x
	57. Revegetate the EGP Project Footprint as soon as practical after construction to mitigate formation of rills where revegetation measures are recommended. [R-1205]	x		x	x	x	x
	58. Mitigate potential erosion around alternate drainage pathways on alluvial fans and other landforms where natural shifts in drainage patterns could occur. [R-1206]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Surface Drainage Patterns (cont'd)	59. Where applicable, trench backfill should be roached to allow for settlement of the backfill and to avoid a trough along the pipeline due to settlement. The roach should be interrupted at areas of cross-berms and surface water flow that is channeled across the grade. [R-1207]	x		x	x	x	x
Seepage in Cut Slopes	60. If active seepage is noted: ▪ Excavation in the affected area should be halted. ▪ Temporary measures to control seepage erosion should be implemented immediately. A typical temporary measure would be to cover the affected area with medium weight, non-woven geotextile and at least 1 m of free-draining granular material. ▪ A Geotechnical Engineer should be notified as soon as practical. Site-specific assessment by a Geotechnical Engineer must be carried out as soon as practical. [R-1210]	x		x	x	x	x
	61. Stockpiles or sources of shot rock or free-draining gravel and medium to heavy-weight geotextile should be available at various locations along the EGP Project Footprint to mitigate encountered areas of seepage erosion in a timely fashion. [R-1211]	x		x	x	x	x
	62. Water discharged from seepage areas should be directed to reduce the potential for surface erosion and entry of sediment into streams and other waterbodies. [R-1212]	x		x	x	x	x
Seepage in Pipe Trench and Surface Water Infiltration into Pipe Trench	63. Where appropriate, the use of clay trench breakers is preferred. Sand bag trench breakers are difficult to place. Foam trench breakers are less desirable since they may crack, particularly if backfill moves or settles, but can be considered where there are access limitations. [R-1214]	x					
	64. Trench drains should be incorporated wherever appreciable seepage into the trench is anticipated upslope of a trench breaker. The drains should be daylighted to surface in appropriate locations and the water discharge should be managed to prevent surface soil erosion and entry of sediment into streams and other waterbodies. [R-1215]	x					
	65. Groundwater infiltration within the EGP Project Footprint should be managed to reduce infiltration in areas upslope of potentially unstable fills or potentially unstable natural slopes below the permanent right-of-way. Measures for managing infiltration include selecting trench backfill materials that match the permeability of the surrounding soil, cross sloping the grading to promote surface runoff and providing periodic subsurface drains to daylight accumulated groundwater in areas of anticipated infiltration or seepage (Detail No 18). [R-1216]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Erosion of Topsoil and Windrow	66. Tackify or apply water or pack the topsoil windrow with approved equipment (such as, bulldozer tracks), if the assessment by the CEC indicates that soils are likely to be prone to erosion by wind. Apply tackifier, approved by the CEC, evenly over the soil windrow as recommended by the supplier. [R-348]	x		x	x	x	x
	67. Obtain appropriate BC *WSA* approvals and landowner consent, where required, to withdraw water for use in watering down soil windrows or for tackifier applications. [R-349]	x		x	x	x	x
	68. Avoid disturbance of soil windrows following application of water or tackifier. [R-350]	x		x	x	x	x
	69. Reapply tackifier, if warranted, at locations where disturbance to the soil windrow has occurred and the potential for erosion by wind persists. [R-351]	x		x	x	x	x
	70. Monitor soil windrows during the growing season for wind and water erosion and inhibit weed growth by spraying or hand-pulling until the soils are replaced. Implement remedial measures to control erosion (that is, water [Staḵw] down the EGP Project Footprint, apply tackifier, and weed growth (that is, spraying, hand-pulling) per the IPSMP (Section 8). [R-367]	x		x	x	x	x
Grading	71. Salvage topsoil from areas to be graded and windrow to the closest edge of the EGP Project Footprint. Seek to avoid overstripping. The area stripped is to correspond to area to be graded. [R-352]	x		x	x	x	x
	72. No grading will be permitted within the limits of known archaeological sites unless otherwise approved by regulatory agencies (such as, BC OGC or BC MOF Archaeological Branch). [R-353]	x		x	x	x	x
	73. Keep graded material on the EGP Project Footprint and out of standing shrubs or trees. [R-354]	x		x	x	x	x
	74. Seek to avoid mixing graded material with topsoil or foreign material such as stumps or slash. [R-355]	x		x	x	x	x
	75. Store graded material in discrete piles or windrows for replacement during backfilling or rough clean-up. [R-356]	x		x	x	x	x
	76. Grade the EGP Project Footprint, to the extent practical, to direct surface water away from the trench line. [R-358]	x		x	x	x	x
	77. Construct cut and fills in accordance with the specifications outlined by the Geotechnical Engineer. [R-359]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Grading Near Watercourses, Wetlands and NCDs	78. Install erosion control measures prior to commencing grading in the vicinity of watercourse, wetland and drainage/NCD crossings. Inspect erosion and control measures regularly and after precipitation or snow melt events. Where repairs are warranted, repair as soon as practical. [R-360]	x		x	x	x	x
	79. Direct grading away from waterbodies to the extent practical, to reduce the risk of sedimentation. Keep waterbody soils separate from upland soils. Do not place fill material in a waterbody during grading. [R-361]	x		x	x	x	x
	80. Delay grading, to the extent practical, on approach slopes to watercourses and wetlands until before commencement of construction of the crossing. [R-362]	x		x	x	x	x
	81. Seek to reduce clearing, grading, and root grubbing to the ditchline and travel lane in riparian areas of watercourses and wetlands where practicable and in agreement with other EGP Project considerations such as safety and constructability. Clearing, grading, and grubbing and grading (Section 5) within the riparian areas will take into account the following considerations: 1) slope gradient required for safe constructability; 2) potential for soil erosion and sedimentation; and 3) applicable permit conditions. 1) slope gradient both before grading and after slope has been graded out; and 2) potential for sedimentation (that is, soil texture of materials to be graded); and 3) permit Conditions. Review the grading plan with the CEC and agree upon the erosion and sediment controls required and any opportunity to reduce clearing, grubbing, and grading. [R-363]	x		x	x	x	x
	82. Maintain vegetation and reduce stumping or ground disturbance within 10 m of the highwater mark and delay grading of bank on S1 to S6 streams until the pipeline or vehicle or equipment crossing is ready to be constructed and the CEC has approved grading plans, unless otherwise approved by the regulatory agency. This distance should be increased to the extent practical on a site-specific basis to prevent erosion and sediment entering the watercourse. [R-364]	x		x	x	x	x
Temporary Berms and Sediment Fences	83. Install and maintain temporary berms on the approach slopes to watercourses and wetlands and erect sediment fence(s) near the base of approach slopes at watercourses and wetlands following grading (Detail No. 4). Alternate sediment and erosion control measures may be used if they can effectively prevent sediment from reaching the waterbody. Install sediment fences as per manufacturer's specifications. Inspect the temporary sediment control structures regularly (including following heavy rain) and maintain and repair if needed, as soon as practical. [R-366]	x		x	x	x	x

6.4 Stringing, Welding, Trenching, and Lowering-In

This subsection identifies activities or concerns associated with stringing, welding, trenching, and lowering-in the pipeline, and the mitigation measures for each activity or concern to be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Notifications	1. Notify public of blasting schedule through local newspapers at least 48 hours prior to blasting and provide updates to the schedule as necessary to reflect changes in overall duration and timing. [R-405]	x	x		x	x	x
	2. Coordinate blasting activities with local authorities and comply with appropriate jurisdictional guidelines, where required. Coordinate blasting activities within proximity to adjacent roads, railway tracks and recreational areas with local authorities and landowners prior to commencement of activities. Place signage along areas where required during blasting activities. [R-402]	x	x		x	x	x
Timing	3. Conduct construction in accordance with the Wet Soil Contingency Plan (Section 9) if wet soil conditions are observed or anticipated. [R-389]	x					
Stringing Traffic	4. Confine stringing truck traffic to the areas where topsoil salvage has been conducted. [R-390]	x					
	5. Confirm that caps on strung pipe remain in place prior to welding to avoid trapping or confining wildlife. [R-391]	x					
Welding	6. Weld pipe prior to trenching at locations with soils prone to sloughing to reduce the time the trench is left open. [R-393]	x					
	7. Do not leave spent welding rods, filings or shavings or cut off pipe rings on the ground or in the trench. Use a tarp or magnets to collect bevel shavings daily to prevent ingestion by wildlife. Provide receptacles for disposal of welding rods and other welding refuse. [R-394]	x					
Coating	8. Place tarps or other impermeable material on the ground to catch drippings/overspray for spray or paint-on coating application at weld joints and areas where repairs to the coating are made. Dispose of spilled coating at an approved location. [R-395]	x					
Bedrock	9. Rip bedrock in trench, if encountered and to the extent practical. Ripping is preferred over blasting, where feasible. [R-396]	x					
	10. Do not deposit bedding material on unstripped topsoil prior to placement in the trench, unless otherwise approved by the CEC. [R-397]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Rock Disposal	11. Dispose of excess rock displaced from the trench or from blasting in rock piles and windrows, or scatter along right-of-way, or through extraneous haul to an approved disposal site. Excess rock shall not be buried on or adjacent to the right-of-way EGP Project Footprint. [R-398]	x					
	12. Do not dispose of rocks in a watercourse, wetland, or drainage/NCD. Placement of rock is permitted in these waterbodies if associated with restoration activities (such as, establishment of bed and banks). [R-400]	x					
Blasting	13. Employ blasting where grading is required on the EGP Project Footprint only where grading cannot be completed with conventional grading techniques and only when it can be completed safely. Use techniques in blasting that reduce effects from the blasting shockwaves such as: ▪ use monitoring equipment to reduce effects of the shockwaves; ▪ determine borehole location and patterns to reduce associated shock waves; and ▪ specify the type and quantity of explosives used. [R-401]	x					
	14. Where blasting is required, storage, handling and operations shall be conducted according to applicable Federal and Provincial laws and regulations governing explosives (*Canadian Explosives Act* [R.S.C., 1985, c. E-17]). [R-403]	x	x		x	x	x
	15. Develop a site-specific blasting procedure for each location before any blasting commences. Identify locations of potentially required erosion control, such as trench plugs that may be required to key in, are identified in the blasting procedure. [R-404]	x	x		x	x	x
	16. Review blasting procedures, safety protocols and applicable erosion control measures with Contractor personnel prior to commencing blasting activities. [R-406]	x	x		x	x	x
	17. Transport explosives in accordance with the *Transportation of Dangerous Goods Act* (*TDG Act*) and other applicable Provincial or Federal regulations. [R-407]	x	x		x	x	x
	18. Blasting will only be conducted by licensed blasters, following blast plans designed by a Qualified Engineer or Technologist, and reviewed by a Qualified Geotechnical Engineer. [R-408]	x	x		x	x	x
	19. Conduct pre-blast surveys for any structure within 150 m of the blast site. [R-409]	x	x		x	x	x
	20. Blasting in environmentally sensitive areas will incorporate appropriate precautions to protect ecological resources. [R-410]	x	x		x	x	x
	21. Use pre-packaged explosives to prevent spillage. [R-411]	x	x		x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Blasting (cont'd)	22. Store explosives in a secured container to prevent accessibility to wildlife and the public. [R-412]	x	x		x	x	x
	23. Control traffic on highways and roads within the fly rock zone and in accordance with requirements of existing regulations. [R-413]	x	x		x	x	x
	24. Use blasting mats, where required, to limit the potential for safety issues as well as disturbance or damage of vegetation, adjacent infrastructure, and land uses. Control traffic where blasting is to be conducted in the vicinity of roads and use warning sirens, blasting controls, and monitoring where warranted to limit risk to the public. [R-414]	x	x		x	x	x
	25. Place double matting on blast sites adjacent to urban areas. [R-415]	x	x		x	x	x
	26. Where blasting has been undertaken or the backfill substrate in a trench has changed drainage conditions from impermeable to permeable, it may be necessary to install impermeable trench blocks to prevent the backfilled pipeline trench from becoming a conduit for redirected drainage. [2034]	x	x		x	x	x
Blasting Near Ungulate Winter Range	27. No blasting within 500 m of Ungulate Winter Range UWR u-2-002 during winter (November 1 to April 30) and kidding or rearing period (May 1 to July 15), where practical. Where not feasible, incorporate the input of a Wildlife QP and apply the following mitigation to reduce sensory disturbance from noise: ▪ conduct monitoring prior to blasting to confirm that no mountain goat are present within the vicinity of the blasting area. If mountain goat are spotted, implement the Wildlife Species of Concern and Habitat Discovery Plan; and, ▪ utilize warning sirens, blasting mats and blasting controls to reduce potential sensory disturbance to mountain goat [NR-602]	x					
	28. Where compliance with timing restrictions is not feasible, the Wildlife QP may deem it necessary to implement an adaptive management approach for mountain goat as described in Section 7 of the WMMP in consultation with FortisBC's Environmental Staff, and if required, regulatory agencies (such as, BC Oil and Gas Commission, Environment and Climate Change Canada) and other stakeholders. [NR-413]	x					
Blasting Near Fish-Bearing Watercourses and Drainages	29. Incorporate the input of a QP into blasting plans for blasting within 150 m of a fish-bearing watercourse. Follow guidelines in Wright and Hopky (1998) and associated permit or approval Conditions. [R-416]	x			x		
	30. Where required under applicable authorizations, schedule the use of explosives in adherence with the instream work window found in the watercourse crossing table or as otherwise approved. [R-417]	x			x		

<table>
<tr><th rowspan="2">Activity/ Concern</th><th rowspan="2">Mitigation Measure</th><th colspan="6">Applicable EGP Project Components</th></tr>
<tr><th>Pipeline</th><th>Tunnel</th><th>East Portal</th><th>Woodfibre Portal</th><th>Facilities</th><th>TIS</th></tr>
<tr><td rowspan="8">Blasting Near Fish–Bearing Watercourses and Drainages (cont'd)</td><td>31. Backfill blast holes (stemmed) with sand or gravel to grade or to streambed/water interface to confine the blast. [R-419]</td><td>x</td><td></td><td></td><td>x</td><td></td><td></td></tr>
<tr><td>32. Place blasting mats over top of holes to reduce scattering of blast debris around the area to reduce potential injury to wildlife and humans.. [R-420]</td><td>x</td><td></td><td></td><td>x</td><td></td><td></td></tr>
<tr><td>33. Remove blasting debris and other associated equipment or products from the blast area. [R-421]</td><td>x</td><td></td><td></td><td>x</td><td></td><td></td></tr>
<tr><td>34. Do not use ammonium-nitrate based explosives in or near natural waterbodies with water present unless regulatory approval has been obtained for its use on a site-specific basis. [R-422]</td><td>x</td><td></td><td></td><td>x</td><td></td><td></td></tr>
<tr><td>35. Use appropriate explosive charges and setback distances from fish habitat to prevent damage to fish and fish habitat, as outlined in Table 2 of Wright and Hopky (1998) or as specified in permit Conditions. QP will observe to confirm if fish mortality occurs and advise on further mitigation if necessary.
<table>
<tr><th></th><th colspan="7">Weight of Explosive Charge (kg)</th></tr>
<tr><th></th><th>0.5</th><th>1</th><th>5</th><th>10</th><th>25</th><th>50</th><th>100</th></tr>
<tr><td>Setback distance (m)</td><td>10.7</td><td>15.1</td><td>33.7</td><td>47.8</td><td>75.5</td><td>106.7</td><td>150.9</td></tr>
</table>
[R-424]
kg = kilogram(s)</td><td>x</td><td></td><td></td><td>x</td><td></td><td></td></tr>
<tr><td>36. Seek to reduce detrimental effects to fish by incorporating one or more of the following measures:
▪ subdivide large charges into smaller detonations;
▪ use lowest weight of explosive charge practical; and
▪ use time delays to reduce the pressures created. [R-426]</td><td>x</td><td></td><td></td><td>x</td><td></td><td></td></tr>
<tr><td>37. Schedule construction activities to allow for fish deterrence activities to be conducted at fish-bearing watercourses prior to blasting, as needed. A QP may need to deter fish from the blasting zone using measures such as:
▪ pre-blast scare tactics;
▪ use of noise generating devices; and
▪ isolation (such as, bubble curtain, cofferdams, or aquadams) or removal of fish from the work area. [R-427]</td><td>x</td><td></td><td></td><td>x</td><td></td><td></td></tr>
</table>

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Blasting Near Domestic Water Wells	38. Assess the grain size of the soil; if it is poorly graded and coarse material, consider the installation of filter fabric at the base of the trench to prevent migration of fine sediment into the aquifer during trenching over highly vulnerable aquifers. [R-1078]	x			x	x	x
	39. Monitor registered or known potable water wells within 200 m of any blasting before construction work starts and after the blasting work is completed. Monitoring will take place before and after construction and will consist of measurement of well yields, static and pumping water levels as well as water sampling in accordance with Canadian Guidelines for Drinking Water Quality (Health Canada 2020) and the *Drinking Water Protection Act* (Government of BC 2001). [R-428]	x			x	x	x
	40. Provide an alternate water supply where well monitoring indicates a reduction in water quality or quantity has occurred due to blasting. [R-429]	x		x	x	x	x
Disposal of Explosives	41. If disposal and destruction-sites for explosive materials are required, then the sites should be located at least 100 m from any watercourse or wetland, unless otherwise approved by the CEC and any regulatory agencies. Disposal sites for explosives will not be located within sensitive wildlife habitat during sensitive time periods to the extent practical and not without the approval of the CEC, Environmental Staff and the regulatory agencies (*Canadian Explosives Act* [R.S.C., 1985, c. E-17]). [R-430]	x		x	x	x	x
Protection of Trees - Outside the EGP Project Footprint	42. Seek to avoid trenching through the drip line of a tree that is to remain standing. [R-1073]	x		x	x	x	x
	43. Seek to avoid changing the ground level around the trunk of a tree that is to remain standing in a manner that may harm the tree. [R-1074]	x		x	x	x	x
	44. Roots broken during construction should be cut cleanly with a saw. [R-1075]	x		x	x	x	x
	45. Limbs broken during construction should be cut cleanly with a saw. [R-1076]	x		x	x	x	x
Wildlife	46. Conduct work expeditiously to maintain a tight construction spread (that is, interval between front-end work activities such as grading and back-end activities such as clean-up) to reduce the duration of the open trench and to reduce potential barriers and hazards to wildlife. [NR-22]	x					
	47. The Contractor will visually monitor the open trench for trapped wildlife. Should any wildlife be identified, the Wildlife Encounter Contingency Plan will be implemented, and the Contractor will contact the CEC immediately. The CEC will contact the Wildlife QP, regulatory agency, or the land agent to consult on appropriate action. [R-433]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Unstable Trench Walls	48. Suspend trenching and salvage a wider area of topsoil if the trench walls slough into the trench and the potential for topsoil or subsoil mixing exists. Back slope the trench walls until stable. [R-434]	x					
High Water Table	49. Delay trenching until prior to lowering-in at locations with a high-water table or where there is a risk of sloughing. [R-435]	x					
	50. Assess the need for well points, prior to commencing trenching, to intercept groundwater in site-specific locations before it enters the trench. [R-436]	x					
Springs	51. Monitor water present in the trench during trenching to determine if groundwater flow is being intercepted. Seek and follow the advice of the QP if the flow of a spring has been disrupted. Measures that may be necessary to restore cross drainage in the trench include the installation of subdrains or trench breakers. (Detail Nos. 5 to 7). [R-437]	x					
Trench Water *Management*	52. Locate grey water discharge sites a minimum of 50 m away from watercourses or other waterbodies to the extent practical. Monitor and control surface runoff to avoid introduction of sediment-laden water into watercourses. [R-439]	x					
	53. Obtain approval from the CEC for the location of water discharge locations. [R-440]	x					
	54. Pumps are to have sufficient capacity and hoses are to be of adequate length to allow trench water to be discharged at the desired location(s). [R-441]	x					
	55. Implement trench water management, if warranted, when laying pipe in areas with high water tables. Place pumps on an impermeable barrier above the ordinary high watermark of the watercourse, wetland or drainage/NCD. In addition, manage trench water if existing or anticipated (based on precipitation forecasts) water levels or flow rates in the trench could overwhelm existing trench water control measures (such as, berms, take-offs) allowing sediment-laden water to affect watercourses, wetlands, and drainages/NCDs. Install soft plugs or maintain hard plugs in the trench, where needed to contain or direct water flow out of the trench as directed by the CEC. [R-442]	x					
	56. Pump water onto stable and well-vegetated areas, using flow dissipaters, geotextile, erosion control mats, tarpaulins or sheeting or into a settling pond at a rate and in a manner that does not cause erosion or any unfiltered or sediment-laden water to enter a watercourse, wetland or drainage/NCD. Discharge trench water through an appropriate sediment filtering medium (such as, geotextile bag), where warranted. Place pumps and generators on suitable secondary containment above the high watermark of the nearest watercourse, wetland, or drainage/NCD. [R-443]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Trench Water *Management (cont'd)*	57. When implementing trench water management, avoid resuspending sediment by using measures such as a floating suction hose or elevated intake. Secure the pump above the bottom of the trench. Suspend pumping if sediments are picked up by the pump as water volume drops. [R-444]	x					
	58. Periodically monitor the water discharge site for erosion, saturation of the discharge site, flooding, or flow off the property. Suspend trench water management and apply erosion control measures, reduce the flow, or move the discharge site if it appears that the above effects could occur. [R-445]	x					
	59. Comply with the recommendations of a QP and the EI at locations where metal leaching (ML) or acid rock drainage (ARD) may be present and trench water management is necessary. Record locations and estimated volumes of trench water discharged in areas where ARD/ML is present. [R-446]	x					
	60. Notify and comply with the advice of the CEC(s) at locations where water potentially contaminated with hydrocarbons or other materials is to be discharged from the trench. Mitigation measures may include the use of tank trucks to haul discharged water to an appropriate disposal facility or site, ensuring the intake is submerged below the surface sheen, lab testing and use of sorbent booms to hold the sheen away from the pump intake. [R-448]	x					
Lowering-In	61. Inspect the open trench for potentially trapped animals at the start of each day before commencing construction activities. Contact the CEC if wildlife are discovered in the trench. [R-449]	x					
	62. Seek to avoid sideboom traffic on the topsoil windrow if located on the work side during lowering-in. [R-450]	x					

6.5 Backfilling

This subsection identifies activities or concerns associated with backfilling, and the mitigation measures to be implemented by FortisBC, the Contractor, or the Subcontractor, for each activity or concern.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Assess Trench Compaction Issues	1. Assess the need for special trench compaction measures or equipment prior to the commencement of backfilling. Factors to be considered by the FortisBC Construction Manager during the assessment include typical trench width, locations with a wider than normal trench (such as, sharp sidebends, bellholes, multiple pipelines, tie-ins), trench depth, soil texture, and soil moisture content. [R-451] (FortisBC 2015 [Section 4])	x					
	2. Special trench compaction measures and equipment to be considered, if determined by the FortisBC Construction Manager to be warranted during the above assessment, include: use of specialized equipment; backfilling and compacting in lifts, and retention of a higher than normal trench crown; and subsequent monitoring and remedial work to correct locations with either an excessive trench crown height or excessive subsidence. Note that topsoil replacement is to be deferred until the trench crown has subsided at locations where a higher than normal trench crown is left. [R-452] (FortisBC 2015 [Section 4])	x					
Install Sack Breakers - Slopes	3. Mark the location of each sack breaker prior to backfilling to facilitate the correct placement of a diversion berm directly downslope of the sack breaker. [R-455]	x					
	4. Install trench breakers, on moderate and steep slopes where directed by the Contractor Project Manager, in consultation with the CEC (Detail No. 5). [R-454]	x					
Install Sack Breakers - Watercourses	5. Install trench breaker(s) adjacent to watercourses where the banks are composed of organic material, or otherwise warranted in order to prevent sloughing of the backfill into the channel (Detail No. 6). [R-456]	x					
Install Sack Breakers - Wetlands	6. Install trench breakers at the edge of wetlands if it is required to prevent the pipe trench from acting as a drain (Detail No. 6). [R-457]	x					
Install Subdrains	7. Install subdrains in association with trench breakers, as directed by the Construction Manager where there is evidence of seepage or a flowing spring once the trench is excavated (Detail No. 7). [R-458]	x					
Install Stub Berms	8. Install diversion berms where directed by the Construction Manager on sloping terrain and high groundwater areas to prevent surface water flow along the trench line and erosion of the trench backfill. [R-459]	x					
Select Backfill	9. Use select backfill (such as, washed gravel) at specific locations to address geotechnical issues (such as, erodible native spoil). Known locations where select backfill is to be used will be identified prior to trenching and additional locations where select backfill is to be used will be determined by the Construction Manager following trenching. [R-460]	x	x				

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Select Backfill (cont'd)	10. Obtain materials from nearby borrow sources, if feasible, where the need for select backfill has been identified on construction drawings or where directed by the Geotechnical Consultant or Construction Manager. Obtain approval for the source of the material from the Provincial regulator (that is, BC OGC), the Construction Manager, EI, and Geotechnical Consultant. [R-461]	x	x				
Backfill Trench	11. Inspect the trench for small animals, refuse, debris, and garbage prior to backfilling. Remove if present. Notify the CEC if wildlife are present in the trench. [R-462]	x					
	12. Backfill the trench as soon as practical, following lowering-in. to reduce hazards to wildlife. [R-463]	x					
	13. Avoid depositing padding material on unstripped topsoil prior to placement in the trench, unless otherwise approved by the CEC. [R-464]	x					
	14. Backfill the trench without mixing spoil with topsoil. Do not walk machinery on the topsoil pile while backfilling spoil. [R-465]	x					
	15. Seek to avoid backfilling bedrock or large rock excavated from the trench into approximately the upper 50 cm of the trench. [R-468]	x					
	16. Dispose of excess rock displaced from the trench or from blasting in discrete piles, windrows or as directed by landowner. Known locations with shallow bedrock are identified on the EAS. [R-469]	x					
	17. Haul excavated trench spoil that is deemed not suitable by the FortisBC Construction Manager, for use as backfill (such as, excess bedrock) and dispose of at locations approved by the FortisBC Construction Manager and landowner or Land Authority. [R-470]	x					
	18. Comply with measures outlined in the EGP Project-specific Acid Rock Drainage and Metal Leachate Management Plan (Section 8) for the disposal of potentially acid-generating rock or metal leaching materials from the trench. [R-471]	x	x				
	19. Backfill clay first, if salvaged separately from organic material in wetlands, so that organic material, where present, remains at the surface. [R-477]	x	x				
	20. Have backfill up tight by the end of the working day, to the extent practical, to reduce hazards to wildlife. [R-478]	x	x				
Crown Trench	21. Crown the trench with remaining spoil to allow for settlement, where appropriate. [R-480]	x					
	22. Leave breaks in the trench crown at obvious drainages and wherever seepage is located to reduce interference with natural drainage. Compact the backfill where breaks have been left. [R-481]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Excess Trench Spoil	23. Feather-out excess spoil over the portion of the EGP Project Footprint where topsoil salvage has been conducted to avoid the creation of a permanent mound. Do not feather-out excess spoil over the salvaged area to an extent that may cause excessive subsidence of the trench. [R-482]	x					
Recontour EGP Project Footprint	24. Where re-establishment of the pre-construction grade is not practical due to risk of slope failure, recontour the grades and drainage channels as directed by the Geotechnical Consultant. [R-483]	x					
	25. To the extent practical, restore applicable wetlands to their pre-construction profile. Recontour the EGP Project Footprint and re-establish the pre-construction grades and drainage channels, to the extent practical. [R-484]	x					
Erosion and Sediment Control	26. Install temporary erosion and sediment control structures (such as, sediment fences, coir logs; Details 4 and 19) following the completion of backfilling adjacent to watercourse crossings, wetlands, and drainages/NCDs where the potential for sedimentation exists. [R-486]	x	x				
	27. Inspect erosion and sediment control measures regularly and after precipitation and snow melt events. Where repairs are warranted, repair as soon as practical. [R-487]	x	x				

6.6 Hydrostatic Pressure Testing

This subsection identifies activities or concerns associated with hydrostatic pressure testing, and the mitigation measures to be implemented by FortisBC, the Contractor, or the Subcontractor, for each activity or concern.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Approvals, Permits, and Licences	1. All required approvals, licences and permits are to be in place prior to commencing applicable hydrostatic testing activities. [R-488]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Water Release	2. Depending upon test section configurations, test water from one test section may be pushed to the next section. In such case water may need to be added or discharged, depending upon volume differences between sections. [R-494]	x					
	3. Test the hydrostatic test water prior to release to confirm it meets requirements in the BC *Oil and Gas Waste Regulation*. [R-495] Section 7(e) parameters includes: **Parameters** / **Values** Chlorides (as Cl) / 500 mg/L Hydrocarbons / no visible sheen Electrical Conductivity / 2 dS/m Chlorides (as Cl) / 500 mg/L dS/m = deciSiemen(s) per metre mg/L = milligram(s) per litre	x					
	4. Do not allow test water withdrawn from one drainage basin (that is, Indian River, Stawamus River, Coquitlam River, and Squamish townsite) (Howe Sound tributaries) to enter natural waters of another drainage basin, or to be discharged upstream of the withdrawal within the same basin. Involve a EI as needed to determine suitable discharge locations. Regulatory approval may be required for cross-basin transfers. [R-496]	x					
Sections 10 and 11 of the BC WSA	5. Comply with application requirements of the BC *WSA*, Sections 10 and 11, and applicable Conditions of the approval. [R-497]	x					
Approvals and Permits	6. Maintain copies of applicable pressure testing approvals or permits and notifications on-site during pressure testing. [R-499]	x					
CEMP	7. All procedures involved in hydrotesting will comply with requirements within the CEMP. [R-500]	x					
Water Source(s)	8. Confirm that approvals and notifications are in place for the intended test water sources and that adequate stream flow or volume is present for the testing program. [R-501]	x					
	9. Identify an alternate test water source if the intended water source will provide inadequate stream flow and volume for testing purposes. Assist FortisBC in obtaining required approvals and permits or the provision of required notification(s). [R-502]	x					
Equipment and Workers	10. Enough workers and equipment are to be available on-site to repair any rupture, leak or erosion problems that arise during hydrostatic testing. [R-503]	x					
Safety	11. Follow safety precautions and regulations required for pressure testing. [R-504]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Water Trucks	12. Water trucks, if used to transport test water to the fill site, are to be clean. [R-505]	x					
Temporary Fill Lines	13. The approval holder can request and receive approval to store water in dugouts or other freshwater storage structures subject to permit conditions. All applicable approvals are to be in place prior to installing a temporary fill line that extends off the EGP Project Footprint. [R-506]	x					
	14. Obtain appropriate approvals and implement the applicable mitigation measures in the CEMP if clearing, topsoil salvage or grading is necessary for the laying of temporary fill line off the EGP Project Footprint. [R-507]	x					
	15. Natural pools in excess of 0.5 m should be selected for the point of diversion and the excavation of sumps should be avoided, where practical. Permission to excavate a sump, if required, will require a *WSA* Section 11 Permit. [2047]	x					
Erosion Control	16. Install erosion control measures appropriate for the approaches to the water withdrawal site. Repair and supplement the erosion control measures. [R-514]	x					
	17. Monitor fill and discharge lines for leaks. Repair or control leaks to prevent erosion. [R-516]	x					
Isolate Pumps	18. Isolate test pumps, generators and fuel storage tanks with an impermeable lined berm, tray or depression to contain any spills of fuels or lubricants. [R-517]	x					
	19. Keep a spill-kit appropriate for aquatic spill response on-site to respond to any spills of fuels or lubricants. [R-543]	x					
Pre-Test Select Watercourse Crossings	20. FortisBC may elect to conduct a hydrostatic test prior to installing welded pipe sections at select watercourse crossings to reduce the length of time spent working instream. [R-518]	x					
Screen Intake	21. Screen pump intakes per DFO's Interim Code of Practice for End-of-Pipe Fish Protection Screens for Small Water Intakes in Freshwater and follow all applicable Provincial and Federal permit Conditions when withdrawing water from fish-bearing or potentially fish-bearing waters. [R-519]	x					
	22. Locate screens in areas and depths of water with low concentrations of fish throughout the year, where practical. Locate screens away from natural or artificial structures that may attract fish that are migrating, spawning, or in rearing habitat. [R-520]	x					
	23. Openings in the guides and seals are to be less than the mesh size opening criteria to prevent fish entrainment. [R-521]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Screen Intake (cont'd)	24. Locate screens above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms associated with the bottom area. [R-522]	x					
	25. Use fish screens at fish-bearing watercourses per Permit conditions and regulatory approvals, including following applicable guides in DFO's interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater. Pump intakes are to be screened with a maximum mesh size of 2.54 millimetres (mm). Screen surface approach velocities are not to exceed 0.035 metres per second (m/s) unless otherwise indicated by a QP or Permit Conditions. Intakes can be placed in a mesh cage (2.54 mm) to reduce the approach velocities and potential entrainment of benthos. Monitor for compliance with withdrawal limits and maintain the screens free of debris. [R-738]	x					
	26. Support screen panels appropriately to prevent sagging and collapse of the screen. [R-523]	x					
	27. Maintain screens during water withdrawal to keep them clear of debris. Shut-down pumps when fish screens are removed for maintenance. [R-526]	x					
Withdrawal Rate	28. Monitor withdrawal rates and volumes and source stream parameters (such as, discharge and depth) in accordance with permit conditions. Maintain accurate records of all water withdrawal activities throughout the term authorized for the short-term use of water and submit records to the BC OGC, as specified in the Permit Conditions [R-527]	x					
Chemical Recovery	29. If chemical additives are used, they will be recovered and returned to the supplier, or the test water will be treated (as described in subsection 8.2) and discharged in accordance with applicable Provincial and Federal requirements. [R-530]	x					
Water Management	30. Collect samples of source water, hydrostatic test water of the receiving environment and analyze to demonstrate regulatory compliance. For this purpose, samples will be collected of hydrostatic test water at the beginning, middle and end of the release for laboratory testing for the EGP Project record. [R-531]	x					
	31. Shunt the test water ahead from test section to test section, to the extent practical, to reduce water hauling, water usage, and the number of water management points. [R-532]	x					
	32. Conduct testing of the test water at the discharge site, when required, and in accordance with applicable Provincial and Federal requirements, and as described in subsection 8.2. [R-534]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Water Management (cont'd)	33. Discharge the water at a location that is approved by the Contractor Project Manager and the CEC. Discharge the water in a manner that does not cause erosion and does not allow unfiltered or silted water to directly re-enter a watercourse, wetland or drainage/NCD. [R-536]	x					
	34. Manage water into a bar ditch, to the extent practical, or onto other well-drained, level, to very gently sloping land. Do not allow managed water to flow onto cultivated lands or directly back into a watercourse, wetland, or drainage/NCD unless otherwise warranted by regulatory requirements. [R-537]	x					
	35. Dissipate water energy and utilize rock armour, sheeting, tarpaulins, plywood, or an equivalent energy diffuser to avoid or reduce erosion when managing water. The rate of discharge will be reduced if these measures are ineffective. [R-538]	x					
	36. Monitor discharge locations for erosion or flooding. If conditions become saturated to the extent that adequate natural filtration is no longer occurring, suspend water management activities and move the discharge to another location approved by the Contractor Project Manager and CEC or construct a holding pond for the water and release the water when natural filtration is again practical. [R-539]	x					
Drying	37. The pipe will be dried in accordance with the drying specification. No chemicals (such as, methanol or glycol) will be used for drying purposes. [R-540]	x					
Pigging Debris	38. Collect pre-test pigging debris and pigging debris and water. Discharge the water at an acceptable location on-site in a manner that does not cause erosion or allow unfiltered or silted water to directly re-enter a watercourse or wetland. Dispose of the remaining material with other construction waste, in accordance with applicable Provincial guidelines. [R-541]	x					
Temporary Overland Piping	39. Remove temporary fill and discharge lines and restore as part of mainline clean-up (Section 8). [R-542]	x					
Daylighting	40. Follow applicable CEMP mitigation and safety measures if exposure of the pipe is required for inspection or repairs. [R-1177]	x					

6.7 Construction of the Portals, Tunnel and Facilities

This subsection identifies activities or concerns associated with the construction of the portals, and tunnel and the mitigation measures to be implemented for each activity or concern. Refer to Section 8 for a detailed outline of the management plans, encompassing applicable components and activities, required for construction of the tunnel.

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Excavation	1. Conduct excavation of the Woodfibre Portal and East Portal sites in accordance with the Excavation, Backfill, and Grading Specification prepared for the EGP Project. [NR-620]		x	x	x		
	2. Refer to the Known or Suspected Contaminated Groundwater and Soil Handling Management Plan provided in Section 8 and the Handling, Testing, and Disposal of Excavated Material specification prepared for the EGP Project for information pertaining to the handling of known contaminated material at the East Portal site. [NR-621]		x	x	x		
	3. Notify and adhere to the advice of the QP where contaminated soil, groundwater, or other materials are found during the excavation. Confirm that contaminated soil and water, if present, are not transported off-site or disposed until analytical results have been received as per Federal and Provincial legislation, as detailed in the Known or Suspected Contaminated Groundwater and Soil Handling Management Plan (Section 8). [NR-622]		x	x	x		
	4. Conduct blasting in accordance with the Tunnel Excavation by Construction Specification prepared for the EGP Project. [NR-623]		x		x		
	5. Conduct excavation in such a manner that prevents sediment-laden runoff from the site of the work from entering natural drainage systems. [2042]		x	x	x		
Blasting	6. Conduct blasting in accordance with the Tunnel Excavation by Drill and Blast Specification prepared for the EGP Project. [NR-623]		x		x		
	7. Coordinate blasting activities with local authorities and comply with appropriate jurisdictional guidelines, where required. Coordinate blasting activities within the reasonable proximity to adjacent roads, railway tracks and recreational areas with local authorities and landowners prior to commencement of activities. Place signage along areas where required during blasting activities. [R-402]		x		x		
	8. Store explosives in a secured and permitted container to prevent accessibility to wildlife and the public. [R-412]		x		x		

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Blasting (cont'd)	9. Develop a site-specific blasting procedure for each location before any blasting commences. Identify locations of potentially required erosion control, such as trench plugs that may be required to key in, are identified in the blasting procedure. [R-404]		X		X		
	10. Review blasting procedures, safety protocols and applicable erosion control measures with Contractor personnel prior to commencing blasting activities. [R-406]		X		x		
	11. Transport explosives in accordance with the *TDG Act* and other applicable Provincial or Federal regulations. [R-407]		X		X		
	12. Blasting will only be conducted by licensed blasters, following blast plans designed by a Qualified Engineer or Technologist, and reviewed by a Qualified Geotechnical Engineer. [R-408]		x		X		
	13. Conduct pre-blast surveys for any structure within 150 m of the blast site. [R-409]		x		x		
	14. Use pre-packaged explosives to prevent spillage. [R-411]		X		x		
	15. Store explosives in a secured container to prevent accessibility to wildlife and the public. [R-412]		X		X		
	16. Control traffic on highways and roads within the fly rock zone and in accordance with requirements of existing regulations. [R-413]		X		X		
	17. Use blasting mats, where required, to limit the potential for safety issues as well as disturbance or damage of vegetation, adjacent infrastructure, and land uses. Control traffic where blasting is to be conducted in the vicinity of roads and use warning sirens, blasting controls, and monitoring where warranted to limit risk to the public. [R-414]		X		X		
	18. Place double matting on blast sites adjacent to urban areas. [R-415]		X		X		
	19. Where blasting has been undertaken or the backfill substrate in a trench has changed drainage conditions from impermeable to permeable, it may be necessary to install impermeable trench blocks to prevent the backfilled pipeline trench from becoming a conduit for redirected drainage.		x		X		
Invasive Species Management	20. Known or discovered invasive plant species on storage piles will be managed according to the IPSMP (Section 8).		x	x	x		
Rock and Muck Disposal	21. Prepare rock and muck disposal plans for review and approval by FortisBC prior to start of construction. [NR-624]		x	x	x		
	22. Comply with measures outlined in the EGP Project-specific Acid Rock Drainage and Metal Leachate Management Plan (Section 8) for the disposal of potentially acid-generating (PAG) rock or ML materials from the tunnel or excavation. [R-479]		x	x	x		

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Groundwater	23. Manage water on BC Rail site to the extent practical to avoid the migration of contaminants in groundwater from the northern portion of the BC Rail site. Sentinel monitoring wells located on the BC Rail site which were installed to establish a baseline will continue to be monitored to determine that there are no changes in the aquifer's hydrogeological characteristics (such as, water levels and gradients) and chemical quality during construction. [NR-462]		x	x			
Contaminated Sites	24. If contamination remains in place (that is, not removed) follow mitigation outline in the Known or Suspected Contaminated Groundwater and Soil Handling Management Plan (subsection 8.2). The risk controls in accordance with the current Certificate of Compliance (CofC) and Performance Verification Plan (PVP) will be maintained and additional mitigation measures for managing contamination will be developed with a QP, if necessary. [NR-432]			x	x		
	25. Changes to land use at the WLNG Site will be communicated to a QP and FortisBC. FortisBC will communicate with the holder of the CofC and BC ENV to determine if an application for an amendment or new CofC may be necessary. The CofC at the WLNG site does not cover the landfill area. If construction is anticipated to affect the landfill footprint, additional measures may be required. [NR-483]				x	x	
	26. The footprint of the Squamish Compressor Station overlaps areas of known contamination; therefore, soil remediation may be required prior to construction. Remedial and development plans will be developed by a QP and submitted to BC ENV, as necessary. [NR-484]					x	
	27. As per the CofC and PVP, should construction occur within areas which have conditions within the Certificate of Compliance, a QP must develop a site-specific health and safety plan. [NR-486]	x	x	x	x	x	
	28. Avoid locating Project components (such as, construction work areas, roads, and so forth) on the historical waste asbestos disposal area. [NR-487]		x		x	x	

6.8 Clean-up

This subsection identifies activities or concerns associated with clean-up activities and the mitigation measures to be implemented by FortisBC, the Contractor, or the Subcontractor, for each activity or concern.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Forest Pests and Pathogens	1. Choose improved tree seedling stock that are pest-resistant. [R-1069]	x		x	x	x	x
	2. Seek to avoid planting susceptible tree species in areas of known pest or pathogen outbreaks. [R-1070]	x		x	x	x	x
Assess Erosion Hazard	3. Assess the erosion hazard prior to the commencement of final clean-up. This assessment, to be conducted by the FortisBC Construction Manager and CEC or applicable QP, will consider topography, degree of disturbance, soil erodibility, access limitations, approved instream work window and likely schedule for final clean-up and seeding. [R-544]	x		x	x	x	x
	4. Direct the Contractor to implement appropriate erosion control measures where warranted. [R-545]	x		x	x	x	x
Seeding (in accordance with the Restoration Framework)	5. Review and retain seed Certificates of Analysis for each seed mix and each lot of seed to be sown. [R-546]	x		x	x	x	x
	6. Review and approve of the Contractor's planned seeding procedures including the seeding equipment to be used along the various segments of the EGP Project Footprint, calibration procedures for drill or broadcast seeders and the seeding schedule. [R-547]	x		x	x	x	x
	7. Avoid planting agronomic species (such as, clover, legumes) that may attract bears to the EGP Project Footprint. [NR-23]	x		x	x	x	x
General Clean-Up Scheduling	8. Proceed expeditiously with final clean-up along the EGP Project Footprint. [R-550]	x		x	x	x	x
	9. Coordinate clean-up activities to reduce the risk of interference with forestry operations as much as practical given the season. [R-551]	x		x	x	x	x
	10. As determined by the CEC, and to the extent practical, postpone clean-up work on wet soils until favourable weather and soil conditions are present. [R-552]	x		x	x	x	x
	11. CEC shall review timing constraints applicable to construction-related activities prior to scheduling clean-up activities (Section 8). [R-553]	x		x	x	x	x
Landowner Requests	12. Review landowner requests as they appear on the landowner line list, or as they arise in the field and adhere with the environmental commitments. Consider any special landowner requests related to clean-up. [R-554]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Vehicle Crossings	13. Remove temporary vehicle crossing structures from waterbodies on the pipeline right-of-way following the season of construction (generally prior to higher precipitation or freeze-up periods) unless continued usage is needed and approved by the applicable regulatory agency. [R-555]	x		x	x	x	x
Water Crossings, Streambanks and Approach Slopes	14. Re-establish the streambanks and approach slopes following construction of watercourse or waterbody crossings as soon as practical. [R-557]	x		x	x	x	x
Swamp Mats, Matting and Geotextiles	15. Remove geotextiles, swamp mats, and matting from locations on the EGP Project Footprint unless otherwise approved by the CEC at locations where access may be necessary during final clean-up. Review the Universal Transverse Mercator (UTM) coordinates for locations where the above materials were installed to confirm that applicable materials are removed. Note that sediment fences are to remain in place, where warranted, to assist with controlling erosion until vegetation is re-established. [R-563]	x		x	x	x	x
Access Control	16. Implement measures to reduce access (human and predator) along the EGP Project Footprint as outlined in the AMP following construction (such as, during final clean-up) where requested and agreed to with landowners and tenure holders. [R-565]	x	x	x	x	x	x
	17. Where rollback for access management, erosion control or log walls for line-of-sight management are required, set aside sufficient woody debris during logging and clearing activities [NR-26]	x		x	x	x	x
Cross-Ditches and Berms	18. Install cross-ditches and berms on steep and moderate slopes on treed and forested lands to prevent runoff along the EGP Project Footprint and subsequent erosion (Detail No. 8). Exact locations of berms will be determined in the field. Tie berms into existing erosion control structures on adjacent right(s)-of-way. Install berms directly downslope of trench breakers installed on slopes (Detail No. 8). [R-566]	x		x	x	x	x
	19. Increase berm height, if necessary, to limit truck access. [R-567]	x		x	x	x	x
	20. Construct berms of subsoil capped with topsoil where grading has been conducted or extensive disturbance to the surface layer has occurred. [R-568]	x		x	x	x	x
	21. Construct berms of timbers, imported logs, coir logs, or sandbags where disturbance of the sod layer is limited. [R-569]	x		x	x	x	x
Sediment Fence	22. Install and maintain temporary erosion control measures (such as, sediment fence [Detail No. 4]), to control sedimentation prior to final clean-up and the establishment of permanent erosion and sediment control measures. [R-570]	x		x	x	x	x
Temporary Fences and Gates	23. Install temporary fences and gates until replaced with permanent structures, where applicable. [R-572]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Bar Ditch Ramps	24. Remove bar ditch ramps to prevent blockage of spring runoff in ditches during surface preparation activities (Detail No. 2). [R-574]	x		x	x	x	x
Temporary Access and Shoo-Fly	25. Conduct final clean-up on new temporary EGP Project access roads and shoo-fly, unless previously deactivated during rough clean-up or otherwise directed by the applicable regulatory agency or landowner. [R-575]	x		x	x	x	x
	26. Where temporary access is needed to facilitate construction, implement measures to deactivate the access road that may include one or more of the following ▪ remove vehicle crossings at watercourses and restore associated disturbances; ▪ remove cross drainage culverts and excavate a shallow ditch; ▪ block off the access with the use of permanent fences with locked gates, boulders, ditches, rollback or other method suitable for the site; ▪ recontour the road and replace salvaged topsoil ; ▪ install permanent erosion control structures such as cross-ditches and berms (Detail No. 8); and ▪ seed disturbed areas with an approved cover crop or grass mix, as directed by the CEC or, ▪ install biodegradable erosion control measures (Detail Nos. 19, 20, and 22). [R-578]	x		x	x	x	x
Temporary Vehicle Crossings	27. Re-install temporary vehicle crossings that were needed to provide access to complete final clean-up. Follow measures provided in Section 6.2 when reinstalling the temporary vehicle crossing. [R-579]	x		x	x	x	x
	28. All notifications and approvals for temporary vehicle crossings are to be valid and current. [R-580]	x		x	x	x	x
Recontouring and Regrading	29. Recontour the EGP Project Footprint to a stable configuration, restore the pre-construction grades to the extent practical, microtopography (including removal of large rocks) and drainage. [R-581]	x		x	x	x	x
	30. Install mounds on contours in riparian areas, to reduce erosion and to enhance woody vegetation establishment. [R-582]	x		x	x	x	x
	31. Regrade areas with vehicle ruts, erosion rills/gullies or where the trench has settled. [R-583]	x		x	x	x	x
	32. Revegetate all areas as soon as practical after construction [R-1220].	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Surface Drainage	33. Re-establish subsoil berms and cap with topsoil material where grading or disturbance to the surface layer has been conducted. Construct berms of timbers, imported logs, or sandbags where disturbance of the surface layer is limited. [R-585]	x		x	x	x	x
Watercourse, Wetland and NCD Crossings	34. Implement final clean-up measures related to watercourse, wetland and drainage/NCD crossings. [R-586]	x		x	x	x	x
	35. Recontour the EGP Project Footprint and stabilize approach slopes at watercourse and other waterbody crossings. Where restoration of the pre-construction grade is not practical or recommended due to risk of failure of fill on slopes or maintenance of an access trail, recontour to grades as directed by the Geotechnical Consultant. [R-587]	x		x	x	x	x
	36. Temporary erosion control measures such as temporary berms, sediment fences, mounds or cross-ditches measures will be maintained on approach slopes following backfilling, and until the following permanent erosion and sediment controls can be completed: 37. Temporary erosion control measures such as temporary berms, sediment fences, mounds or cross-ditches measures will be maintained on approach slopes following backfilling, and until the following permanent erosion and sediment controls can be completed: Seed areas with an approved annual or perennial grass cover crop or native grass mix, as approved by the CEC, as soon as practical after construction as outlined in the Restoration Framework Transplant dormant shrubs or install dormant willow stakes or commercially grown rooted stock plants (plugs), where warranted, during restoration of streambanks where riparian vegetation was present prior to construction (Detail Nos. 12 and 13). [R-589]	x		x	x	x	x
	38. Install additional permanent erosion control measures, as outlined in the Restoration Plan unless directed otherwise by the CEC. [R-590]	x		x	x	x	x
	39. To the extent practical and in consultation with the CEC, coordinate final clean-up of fish-bearing watercourse crossings to coincide with the instream work window found in the watercourse crossing table or as otherwise approved. Note that some riparian planting may occur outside the instream work window (such as, fall dormancy preferred for willow staking). [R-549]	x		x	x	x	x
Wetlands	40. Allow wetlands to recover naturally (that is, do not seed wetland areas) unless directed otherwise by the QP. [R-591]	x		x	x	x	x
	41. Leave a trench crown during clean-up of wetlands to allow for settlement of backfilled material within the trench only where settlement is anticipated. [R-592]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Wetlands (cont'd)	42. Re-establish surface drainage patterns in wetlands to as close to the pre-construction contours as practical during restoration. Leave frequent breaks in the crown trench to reduce the risk of ponding water and to re-establish drainage connectivity across the wetland. [R-593]	x		x	x	x	x
Debris	43. Avoid over-picking of small diameter slash in treed areas with erodible soils. [R-594]	x		x	x	x	x
	44. Remove any remaining construction garbage and debris including flagging, stakes, and lath. [R-595]	x		x	x	x	x
Erosion and Sediment Control	45. Install erosion control matting, coir logs, wattles, or rollback on exposed moderately to highly erodible soils where there is potential for water or wind erosion prior to re-establishment of vegetation (Detail Nos. 19 and 20). [R-597]	x		x	x	x	x
	46. Install rollback, mounds and CWD in riparian areas to reduce the potential for overland flow and sedimentation into watercourses and other waterbodies to provide microsites to enhance woody vegetation establishment as directed by the CEC or EI. [R-598]	x		x	x	x	x
	47. Control wind and water erosion using one or a combination of the options available in the Soil Erosion and Sediment Control Plan (Section 8). The appropriate erosion controls for the site-specific conditions will be selected in consultation with the CEC. [R-599]	x		x	x	x	x
	48. Rollback slash and small diameter, merchantable timber on steep slopes and approach slopes to watercourses and other waterbodies. Do not bury rollback when walking down with bulldozer. Leave gaps in rollback at obvious wildlife trails. [R-600]	x		x	x	x	x
	49. Chips and mulch is not to exceed approximately 5 cm in depth so that soil thermal properties and vegetation re-establishment are not compromised. [R-601]	x		x	x	x	x
	50. Apply hydromulch or hydroseed at a rate recommended by the supplier on steep slopes and where soil wind erosion may be problematic. [R-602]	x		x	x	x	x
	51. Remove unnecessary sediment fence or other temporary measures not required, as specified by the CEC. [R-603]	x		x	x	x	x
Subsoil Compaction	52. Determine the locations where subsoil compaction has occurred by comparing compaction levels on and off the EGP Project Footprint. Sites compared are to be in close proximity and have similar drainage, soil moisture, aspect, and land use. This assessment will be completed by the CEC. [R-604]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Subsoil Compaction (cont'd)	53. Rip compacted subsoils on the EGP Project Footprint and along shoo-fly with a multi-shank ripper or breaking disc to a depth of approximately 30 cm or the depth of compaction, whichever is deeper, where practical. If soils are moist, postpone ripping of subsoils until soil is dry so that the soils fracture when ripped. [R-605]	x		x	x	x	x
Excess Trench Spoil	54. Feather-out excess trench spoil over the portion of the EGP Project Footprint where topsoil salvage has been conducted to avoid the creation of a permanent crown. Do not feather-out excess spoil over the stripped area to an extent that may cause excessive subsidence of the trench. [R-606]	x		x	x	x	x
Excess Rock	55. Dispose of excess rock displaced from excavations or from blasting in discrete piles, windrows or scattered along the EGP Project Footprint, or as directed by the landowner or regulatory agency. [R-608]	x		x	x	x	x
Replace Transition Soils	56. Replace transition soils that were salvaged during the final pass of topsoil salvage activities. Spread transition soils thinly over the area where topsoil salvage has been conducted after the grade has been completely restored and recontoured. [R-609]	x		x	x	x	x
Topsoil Replacement	57. Replace topsoil evenly over applicable portions of the EGP Project Footprint that have been stripped. [R-610]	x		x	x	x	x
	58. Pick-ups and other rubber-tired vehicles (other than ATVs) will not be permitted to drive on replaced topsoil. [R-1081]	x		x	x	x	x
	59. Postpone topsoil replacement during excessively wet or dry conditions or high winds to prevent damage to soil structure or erosion of topsoil. [R-611]	x		x	x	x	x
Surface Preparation - Steep Slopes	60. Confirm, prior to seeding, that cleat marks are present on steep slopes. If warranted, create microsites on steep slopes to retain moisture and enhance seed germination success by aligning the final pass of dozers straight up and down the slope. [R-613]	x		x	x	x	x
Recreation Trails and Use Areas	61. Restore recreation trails and public use areas disturbed by the EGP Project to the extent practical, to their pre-construction condition and according to the Restoration Plan. [R-614]	x		x	x	x	x
Remove Remaining Vehicle Crossings	62. Remove any temporary vehicle crossings that were reinstalled to provide access during final clean-up. Follow measures related to bank restoration. [R-615]	x		x	x	x	x
Vegetation Mat and Sod Conservation	63. Seek to avoid scalping of the vegetation mat or sod layer during topsoil replacement on cleared or ungrubbed riparian vegetation. Use specialized equipment (such as, clean-up bucket) that limits the risk of scalping during the final pass of topsoil material replacement and is approved by the CEC. [R-616]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Restoration Plan	64. A Restoration Plan will be prepared prior to construction to outline site-specific restoration methods, seed mixes, and planting compositions. [R-1094]	x		x	x	x	x
Seeding Plans and Procedures	65. Prepare a seeding plan for approval by the CEC that identifies the seeding equipment to be used along the various segments of the EGP Project Footprint, calibration procedures for the seeding equipment to be used, the seed mix to be used, the application rate, and the seeding schedule. [R-617]	x		x	x	x	x
Seeding	66. Seed disturbed erodible soils on non-cultivated land with a mixture of approved agronomic or native seed and cover crop as indicated in the Restoration Plan. [R-619]	x		x	x	x	x
	67. Seed disturbed lands with land uses that support native and non-native plant communities with native and non-native grass mixtures and rates. [R-620]	x		x	x	x	x
Seed	68. Use only Certified Canada No. 1 agronomic seed from a local source and retain the Certificates of Analysis for future documentation when seeding lands that do not support native vegetation. Present the Certificates of Analysis to the CEC and landowner prior to purchase or upon request. For native seed, obtain the highest seed grade available. Do not accept seed that contains any invasive plant species. [R-621]	x		x	x	x	x
	69. Purchase seed that will be sown within 12 months of the germination testing. [R-622]	x		x	x	x	x
	70. Seed land with native and non-native seed mixes developed for the EGP Project that is based on vegetation field survey data and consultation with the landowner and regulatory agency. [R-625]	x		x	x	x	x
Seeding Schedule	71. Conduct seeding as soon as practical to restore applicable disturbed lands within one growing season following construction. [R-626]	x		x	x	x	x
	72. Confirm timing of seeding of various segments of the EGP Project Footprint with the CEC prior to commencing seeding. Factors that will influence the timing of seeding include: erosion hazard, likely weather conditions during expected time of germination, and access during optimum seeding period. [R-627]	x		x	x	x	x
	73. Conduct seeding as soon as practical following topsoil replacement. [R-628]	x		x	x	x	x
	74. Contact the local land authorities, to determine the appropriate schedule for planting of seedlings. [R-629]	x		x	x	x	x

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<tr><th rowspan="2">Activity/ Concern</th><th rowspan="2">Mitigation Measure</th><th colspan="6">Applicable EGP Project Components</th></tr>
<tr><th>Pipeline</th><th>Tunnel</th><th>East Portal</th><th>Woodfibre Portal</th><th>Facilities</th><th>TIS</th></tr>
<tr><td>Seeding Equipment</td><td>75. Confirm acceptability of equipment to be used to seed the various segments of the EGP Project Footprint with the CEC prior to commencing seeding. Use the seeding equipment identified for each seed mix to be sown. [R-630]</td><td>x</td><td></td><td>x</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td></td><td>76. Calibrate seed drills and broadcast seeders for each seed mix in accordance with the manufacturers recommended procedures unless otherwise approved by the CEC. [R-631]</td><td>x</td><td></td><td>x</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td>Seeding of Treed and Forest Lands</td><td>77. Seed disturbed soil on level and gently sloping native vegetated areas (treed and forest lands) with Seed Mix 1 unless otherwise requested by the landowner or applicable regulatory agency. Wetland areas do not need to be seeded.
SEED MIX 1
(Native Seed Mix) Species Composition
<table><tr><td>Fringed brome</td><td>40%</td></tr><tr><td>Slender wheatgrass</td><td>20%</td></tr><tr><td>Smooth wild rye</td><td>20%</td></tr><tr><td>Tufted hairgrass</td><td>10%</td></tr><tr><td>Fowl bluegrass</td><td>10%</td></tr></table>*Species substitutions and equivalent cultivars may be recommended by the appropriate land manager or a restoration QP
Drill at 10 kilograms per hectare (kg/ha) or broadcast at 18 kg/ha and harrow in. [R-632]</td><td>x</td><td></td><td>x</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td>Seeding Streambanks</td><td>78. Seed banks of watercourses with Seed Mix 2.
SEED MIX 2
Streambank Soils Mix 2 Species Composition
<table><tr><td>Slender wheatgrass</td><td>75%</td></tr><tr><td>Rough hairgrass</td><td>25%</td></tr></table>*Species substitutions and equivalent cultivars may be recommended by the appropriate land manager or a restoration QP.
Broadcast at 5 kg/ha and harrow in. [R-635]</td><td>x</td><td></td><td>x</td><td>x</td><td>x</td><td>x</td></tr>
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<tr><td>Seeding of Steep Slopes and Erodable Soils</td><td>79. Seed steep non-cultivated slopes and disturbed or erodible soils on non-cultivated land with Seed Mix 3.
SEED MIX 3
(Steep Slopes and Erodable Soils Mix) Species Composition
<table><tr><td>Slender wheatgrass</td><td>40%</td></tr><tr><td>Smooth wild rye</td><td>30%</td></tr><tr><td>Rough hairgrass</td><td>20%</td></tr><tr><td>Hairy wild rye</td><td>10%</td></tr></table>*Species substitutions and equivalent cultivars may be recommended by the appropriate land manager or a restoration QP.
Seed Mix 3 @ 35 kg/ha
Cover Crop Fall Rye (var. Local Certified) @ 45 kg/ha
[if Seeding in late summer] or
Cover Crop Annual Oats (var. Local Certified) @ 45 kg/ha
[if seeding in winter, spring or early summer]
Total @ 80 kg/ha
Broadcast at 80 kg/ha and hand rake, where safe to do so. [R-633]</td><td>x</td><td></td><td>x</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td>Seeding of Road Ditches</td><td>80. Seed disturbed road ditches with same mix as the adjacent land, where applicable. Confirm with the Municipality when within urban land.
SEED MIX 4
(Road Ditch Seed Mix) Species Composition
<table><tr><td>Slender wheatgrass</td><td>40%</td></tr><tr><td>Smooth wild rye</td><td>30%</td></tr><tr><td>Rough hairgrass</td><td>20%</td></tr><tr><td>Hairy wild rye</td><td>10%</td></tr></table>Broadcast at 50 kg/ha. [R-634]</td><td>x</td><td></td><td>x</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td>Seed Mix Requirements</td><td>81. Seed disturbed soils at:
▪ level and gently sloping non-cultivated terrain (shrub, treed, and forested land);
▪ steep non-cultivated slopes (including approach slopes of watercourses outside of the riparian area) and erodible soils;
▪ road ditches, riparian areas, and borrow sites. [R-636]</td><td>x</td><td></td><td>x</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td rowspan="2">Seeding and Planting</td><td>82. Seeding or planting and vegetation management will be conducted in areas where a dense shrub cover, or invasive plant species inhibit the establishment of conifers. [R-1093]</td><td>x</td><td></td><td>x</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td>83. Follow the restoration measures outlined in the Restoration Plan to stabilize and vegetate the permanent right-of-way. [R-1096]</td><td>x</td><td></td><td>x</td><td>x</td><td>x</td><td>x</td></tr>
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Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Planting - Marbled murrelet	84. Within Moderate suitability marbled murrelet Critical Habitat, plant conifer tree seedlings within areas of TWS and portions of the pipeline easement outside of the operational vegetation maintenance area. Mixed-species tree or shrub plantings will be used to establish species diversity; at least one tree species planted must be conifer. [NR-400 - partial]	x					
Revegetation (General)	85. Productive areas will be allowed to regenerate naturally; however, seeding or planting will be conducted in areas of lower productivity as directed by the CEC. [R-1090]	x		x	x	x	x
	86. To the extent practical, native groundcover and shrubs will be allowed to regenerate on the Project Footprint following construction [R-210].	x		x	x	x	x
Reforestation and Revegetation of Forested Lands	87. Revegetate or reforest disturbed TWS where construction clearing has been conducted within the Timber Harvesting Land Base (THLB), where described in the Restoration Plan. Revegetation or reforestation will be in accordance with BC MoF requirements and approved Land Use Plans. [R-638]	x		x	x	x	x
	88. Effects on the THLB have been identified for the EGP Project. Where construction clearing has occurred, FortisBC will revegetate or reforest disturbed TWS where construction clearing has been conducted within the THLB, where required in the Restoration Plan. Revegetation or reforestation will be in accordance with BC MoF requirements and approved Land Use Plans. [R-639]	x		x	x	x	x
Fertilization Requirements	89. Fertilize disturbed soils as directed by the Restoration Plan and where woody debris has been added to topsoil during construction to adjust the Carbon:Nitrogen ratio or to encourage vegetation establishment on nutrient deficient soils to be seeded with an agronomic or native grass mix (Restoration Plan) for potential application locations, fertilizer blends, and application rates). [R-640]	x		x	x	x	x
Natural Recovery (No Seeding) Tackifier	90. Allow disturbed areas on the EGP Project Footprint to naturally recover where directed in the Restoration Plan, where requested by the Land Authority, or where directed by the CEC [R-642]	x		x	x	x	x
	91. Use natural recovery unless specified by the Land Manager or the CEC, unless invasive plant species are a concern, or specified by the CEC. [R-1088]	x		x	x	x	x
	92. Seed a cover crop, where directed by the CEC, to provide erosion control until vegetation re-establishes through the natural recovery process. [R-643]	x		x	x	x	x
	93. Apply a tackifier on disturbed soils at a rate recommended by the supplier where wind erosion may be problematic (see EAS). [R-644]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Residual Chips or Mulch Disposal During Restoration	94. If chips or mulch are spread over disturbed portions of the EGP Project Footprint following seeding, do not exceed a depth not to exceed approximately 5 cm in order to avoid a disruption of soil thermal properties or the creation of a physical barrier that could impede seed germination or emergence or re-establishment of plant propagules (such as, root and stem pieces). In areas where excessive chips or mulch are produced, dispose of material at an approved off-site facility. [R-645]	x		x	x	x	x
	95. Apply a hydromulch or hydroseed at a rate recommended by the supplier on steep recontoured slopes or where wind erosion may be problematic. [R-647]	x		x	x	x	x
Fences	96. Repair fences affected by construction and replace temporary gates with permanent fences of equal or better quality, unless otherwise requested by landowner or Crown Land Authority. [R-648]	x		x	x	x	x
Log Ramps	97. Remove any remaining log ramps that were left in place to allow access during final clean-up. [R-649]	x		x	x	x	x
Rollback	98. Use rollback, as needed for erosion control and access management. Locations for access management will be determined in consultation with the landowner and tenure holder. [R-650]	x		x	x	x	x
Coarse Woody Debris	99. Restore habitat connectivity by redistributing CWD (log segments, stumps, root wads) over select locations on the EGP Project Footprint (such as, where high levels of woody debris were located prior to construction), to provide cover and facilitate movement of wildlife. Specific locations are to be determined in the field by the CEC and QP in discussion with the regulatory agencies. [NR-24]	x		x	x	x	x
Line-of-sight	100. Implement measures to reduce long lines of sight along the EGP Project Footprint using a combination of long-term techniques (such as, vegetation screens) and measures that are more effective in the short to medium-term (such as, log walls combined with vegetation plantings). Line-of-sight measures may include: bends in EGP Project Footprint, doglegs at intersections with access roads and/or planting trees or shrubs to create vegetation screens across EGP Project Footprint. The locations of line-of-sight measures will be determined prior to construction and may be modified post-construction when clearing is complete. [R-1084]. Refer to the AMP for proposed line-of-sight mitigation locations.	x		x	x	x	x
Bar Ditch Ramps	101. Remove any remaining bar ditch ramps, then seed and fertilize (Detail No. 2). [R-657]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Traffic and Access Restrictions	102. Seek to limit pipeline construction equipment and vehicle traffic along the EGP Project Footprint along segments where final clean-up and restoration have been completed, to the extent practical. [R-658]	x		x	x	x	x
	103. Consider requests from affected stakeholders to install tree or shrub plantings at potential access points to the EGP Project Footprint to visually screen the EGP Project Footprint. [R-659]	x		x	x	x	x
	104. Implement measures to reduce access along the EGP Project Footprint following construction (such as, during final clean-up). Measures may include using woody debris as rollback, mounding, placing boulders across the right-of-way, installing gates and signs, and planting trees or shrubs at select locations at the edges of the pipeline right-of-way. The locations of site-specific measures will be determined based on site-specific conditions and consultation with the applicable regulatory agencies, landowners, and tenure holders, as directed by the CEC. [R-660]	x		x	x	x	x
	105. Restrict vehicle access over newly seeded areas. [R-661]	x		x	x	x	x
	106. Seek to reduce foot traffic on newly seeded areas until grass establishment has occurred. [R-1095]	x		x	x	x	x
Burn Piles and Infrared Scanning	107. Confirm that burn piles are extinguished prior to the completion of final clean-up. Conduct infrared scanning of burn pile locations to locate any hot spots, where appropriate. [R-662]	x		x	x	x	x

6.9 Watercourse and Non-Classified Drainage Crossings

This subsection identifies activities or concerns associated with watercourse and NCD crossings, and the mitigation measures to be implemented by FortisBC, the Contractor, or the Subcontractor, for each activity or concern.

These mitigation measures are intended to be implemented in accordance with the FMMP. The FMMP also discusses routine environmental and regulatory reporting requirements for watercourse crossings and related activities. Additional site-specific information for watercourse crossings will be included in site-specific crossings plans and the watercourse crossing table that will be completed once designs are sufficiently advanced, prior to commencement of construction.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Notification and Approvals	1. Notify the CEC if any activities are observed that may result in death of fish or harmful alteration, disruption or destruction (HADD) of fish habitat, such as deposit of deleterious material into a watercourse, wetland, or drainage/NCD that have not been previously approved by DFO. [R-1157]	x		x	x	x	x
	2. Confirm with the CEC that applicable regulatory notifications and approvals are on-site prior to installing a temporary vehicle crossing or commencing pipeline construction at each watercourse and fish-bearing drainage crossing. Review crossing notification or approval Conditions. Retain copies of approvals on-site during crossing construction. [R-683]	x		x	x	x	x
	3. Review and comply with the procedures presented in the CEMP, and notifications prepared to satisfy Provincial regulatory requirements (such as, BC *WSA* applications) and DFO review or authorization requirements. [R-684]	x		x	x	x	x
	4. Where navigable waters are located, comply with Conditions of permits and notifications issues under the *Canadian Navigable Waters Act* (Section 4). Maintain lighting (such as, yellow flashing lights, light towers), signage and other warning systems required by the *Canadian Navigable Waters Act,* until navigational hazards are removed. Refer to the watercourse crossing table for sites with potential navigable waters considerations. [R-685]	x		x	x	x	x
	5. Confirm that Provincial and Federal approvals (such as, those under the *WSA, Fisheries Act,* and *Canadian Navigable Waters Act*) are obtained prior to the commencement of construction and instream activities. Confirm the necessary notifications are conducted prior to construction of watercourse and other waterbody crossings. [R-663]	x		x	x	x	x
	6. Confirm activities in or around watercourses and other waterbodies have been assessed and can follow permit and approval Conditions and regulatory guidelines, including the DFO's Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2019), any relevant DFO Code of Practice, and navigable waters guidance from Transport Canada. [R-664]	x		x	x	x	x
	7. Notify downstream water users, where warranted, prior to commencement of instream crossing construction in accordance with measures identified in Section 4. [R-665]	x		x	x	x	x
	8. Notify the CEC and FortisBC EI at least 3 working days ahead of construction activities in and around watercourses that require water quality monitoring to allow time for preparation. Provide 5 working days notice for instream works on fish-bearing or coastal tailed frog watercourses to allow additional time for salvage preparation. Refer to the watercourse crossing table for water quality monitoring and salvage requirements and the EAS for known amphibian breeding sites. [R-736]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Schedule	9. Comply with the instream work windows found in the watercourse crossing table, or as otherwise approved, during temporary vehicle crossing installation and pipeline crossing construction in and around fish habitat unless otherwise approved by the applicable regulatory agencies. [R-667]	x		x	x	x	x
Fish Salvage	10. If an isolated method is employed at fish-bearing watercourses, conduct a fish salvage led by a QP per fish salvage protocols in the FMMP and consideration of site-specific conditions. Abide by permit Conditions to salvage fish from the isolated area prior to and during water management activities. Apply for fish salvage permits from BC LWRS and DFO at least 2 months prior to instream construction activities (Appendix B). [R-670]	x		x	x	x	x
	11. Release captured fish to areas upstream or downstream of the crossing that provide suitable habitat, per permit conditions and discretion of a QP. Use block nets or other exclusion means to prevent fish from accessing the crossing location until the isolation is established, as needed. [R-671]	x		x	x	x	x
	12. Implement the applicable measures from the Unexpected Fish Presence Contingency Plan (Section 9) should fish be discovered during construction. [R-672]	x		x	x	x	x
	13. Clean fish salvage equipment (such as, waders, boots, nets) of mud and dirt, and disinfect with 100 mg/L chlorine bleach or other recommended solutions before using in any watercourse or other waterbody to prevent the spread of pathogens (such as, whirling disease) and invasive species (such as, Didymo algae). Dispose of washed off mud and dirt at a location that will prevent the reintroduction of these untreated materials into a watercourse or other waterbody. [R-673]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Coastal Tailed Frog Streams	60. To the extent practical, implement the following measures at coastal tailed frog streams: ▪ limit extra temporary workspace and reduce the width of clearing and grubbing activities within a 30 m buffer (measured from top of banks and from high-water mark around seeps). ▪ mark or fence off riparian buffers prior to clearing and construction; ▪ within the 30 m buffer, conduct an amphibian salvage prior to clearing or grubbing activities during the active period (approximately March 1 through October 31); ▪ if instream activities are required, prioritize work during the active period (approximately March 1 through October 31) when a salvage can be conducted, and conduct an amphibian salvage prior to instream construction activities; ▪ use existing access to facilitate construction; if no existing access is available, limit instream crossings to one vehicular/equipment crossing to install an appropriate temporary crossing to facilitate construction and remove crossings following construction; ▪ install and maintain appropriate erosion control measures to prevent siltation during and following construction; ▪ maintain stream flows throughout construction and conduct water quality monitoring during instream activities; ▪ document pre-disturbance conditions and presence of cover objects (that is, cobbles and boulders); retain cover objects on site and return to the stream as closely as practical to pre-disturbance conditions; and ▪ following construction, restore disturbed riparian areas using appropriate techniques to encourage rapid regeneration of native riparian vegetation. Monitor and implement restoration measures, if warranted. [NR-80].	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Coastal Tailed Frog Salvage	61. A coastal tailed frog salvage is required prior to commencement of construction activity (including clearing and grubbing) within 30 m or below the high-water mark of coastal tailed frog streams during the active period (approximately March 1 to October 31). In the event a salvage and relocation is required, it will be conducted by qualified personnel under the supervision of a QP in accordance with the conditions of a General Wildlife Permit under the BC *Wildlife Act*: ▪ Coastal tailed frog of all life stages (egg, tadpole, juvenile, adult) captured during terrestrial sweeps or instream salvages will be captured and relocated upstream (at least 50 m, where suitable conditions exist, to reduce potential for relocated individuals moving back to work site) Coastal tailed frogs use the same stream year-round and salvages cannot be conducted during the over-wintering period (approximately November 1 through February 28). Where instream construction is scheduled below the high-water mark within coastal tailed frog streams between November 1 through February 28, consult with B.C. LWRS on site-specific mitigation measures. Options could include, but are not limited to: ▪ Prior to winter, conduct salvage and instream habitat simplification (removal of cover material, rocks and logs, within the work area) to reduce the risk of the presence of coastal tailed frog during over wintering where instream construction activity is to occur. ▪ This measure must only occur within the area required for instream work (that is, not across the entire construction footprint) and only where instream construction will occur between November 1 and February 28. ▪ Habitat simplification should occur as closely as practical to the onset of winter (November 1) to reduce the risk of water flows moving cover objects downstream and onto the Project footprint. [NR-81]	x					
Aquatic and Riparian Plants and Pests	62. Determine the presence of any invasive aquatic or riparian plants and pests prior to the commencement of construction activities within the RMA (see the IPSMP in Section 8). Notify the Contractor of any special measures to be implemented to prevent the transfer of these organisms from one watercourse to another, if they differ from R-756. [R-675]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Aquatic and Riparian Plants and Pests (cont'd)	63. Clean equipment components (such as, the hoe bucket) between instream construction activities at different waterbodies that contain water so that equipment does not introduce foreign invasive plants or aquatic pests (such as, Didymo algae [*Didymosphenia geminate*]). For clarity: in this context "contains water" is inclusive of standing water or seepage water in open cut crossing, whether that seepage is natural low-flow or residual water after majority of flow is bypassed around the crossing site. This requirement does not apply to entirely dry channels. Follow mitigation measures in the Invasive Plant Management Plan to prevent the spread of invasive plant species from problem areas. Follow mitigation measures in the Invasive Plant Management Plan to prevent the spread of invasive plant species from problem areas. [R-756]	x					
Inspection	64. Visually inspect the bed and banks of watercourses prior to and during construction activities to assess the immediate effects of crossing construction and to provide baseline conditions to inform restoration activities. [R-677]	x		x	x	x	x
	65. Conduct water quality monitoring for construction activities in and around watercourses and other waterbodies per specifications in the watercourse crossing table and protocols in the FMMP. The magnitude and scope of water quality monitoring will be site- and activity-specific based on factors such as zone of influence and proximity to fish and amphibian habitat. If monitoring reveals that water quality measurements (such as, for sediment or pH) are approaching threshold values, the water quality monitors will notify the EI and Contractor, who will develop corrective actions. If the corrective actions are not successful, the EI may temporarily suspend crossing construction until an effective solution is developed. [R-678]	x		x	x	x	x
	66. Include in the FMMP water quality monitoring protocols developed by a QP that is familiar with the proposed construction activities and potential risks to fish and fish habitat values in the Project area. The monitoring program will consider EAC Condition 10 requirements and use the current Provincial standards for the appropriate water quality parameters. Modifications to the water quality monitoring program may be made at the time of construction per the discretion of a QP based on site- and activity-specific considerations. [R-679]	x		x	x	x	x
Monitor	67. Monitor construction activities at fish-bearing watercourses, and at nonfish-bearing waterbodies with a zone of influence extending to fish habitat, and take immediate action to remedy or mitigate the potential effects of any activities that could result in death of fish or HADD of fish habitat, including introduction of deleterious materials. [R-681]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Isolated Trenched Crossings	68. Feasibility of isolation is dependent on several variables including: flow rate, channel gradient and geometry; substrate materials; and working room, among others. Typical isolated trenched methods include the following. ▪ Dam and pump – stream flow is dammed upstream and downstream of the crossing and water is pumped through hoses over/around the crossing area. Typically used for stream flows up to about 1 cubic metre per second (m^3/second). Constraints include permeable substrates (seepage or subsurface flow occurring underneath the dam is not captured) and pump capacity (Detail No. 9). ▪ Conventional fluming – stream flow is captured and diverted into pipe(s) using an upstream dam. Downstream dams are also typically used and together the dams help to isolate the area between the inlet and outlet ends of the flume(s). Water is captured and diverted into pipes which convey water through the crossing area. Requires sufficient gradient between capture and discharge points to allow adequate flow. Typically used for flows up to about 3 m^3/second. Constraints include permeable substrates (seepage or subsurface flow occurring underneath the dam is not captured), adequate geometry of approach slopes for excavation and tie-in below flume pipes, and channel gradient (Detail No. 10). ▪ Superfluming – similar to conventional fluming, but uses larger, square-channel flume structures. Methods often require the assistance of dams and pumps to effectively isolate the work area. Typically used for flows up to about 8 m^3/second, although multiple superflumes may be used for higher flows. Constraints include permeable substrates (seepage or subsurface flow occurring underneath the dam is not captured), adequate geometry of approach slopes for excavation and tie-in below flume pipes, and requirement for steep channel gradient. ▪ Diversion – stream flow is diverted into side channels or newly constructed channel around the crossing area. Typically used for flows too high for fluming, but requires substantial effort for preparation, construction, and restoration. Constraints include permeable substrates (seepage or subsurface flow is not captured), adequate workspace or geometry for building diversion channel and specialized design and construction requirements. [R-1246]	x					
Scheduling	69. No instream pipeline crossings will be conducted outside the instream work window found in the watercourse crossing table for any fish-bearing watercourse or wetland unless: ▪ it is dry at the time of construction; ▪ trenchless techniques are employed; or ▪ work outside the instream work window receives approval from the applicable regulatory agencies. [R-85]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Scheduling (cont'd)	70. Seek to schedule crossing construction to complete trenching, lowering-in, and backfill within a short-time period (such as, less than 3 consecutive days), to the extent practical. Larger or more complex crossings are expected to take longer to construct. [R-688]	x		x	x	x	x
Watercourse and NCD Crossing Plans	71. Provide site-specific watercourse crossing plans to the CEC for approval, at least 72 hours prior to the commencement of watercourse crossing construction. The plans will consist of typical drawings or other design specifications detailing information such as equipment to be used, isolation dam materials to be used, pump or generator sizes and quantities, discharge and bypass locations, grey water control/management measures, spoil containment locations and materials, a description of the excavation procedure and the anticipated duration of instream activity. [R-690]	x		x	x	x	x
	72. Install the pipeline at each watercourse crossing using the technique as identified in the watercourse crossing table and EGP Project management plans and permits. Implement the technique in accordance with the reports, notifications, and applications provided to the regulatory agencies. [R-691] Reporting requirements are provided in subsection 6.1 of the FMMP.	x					
	73. All necessary equipment and materials are to be on-site, appropriate for use and ready for installation prior to commencing instream work. Complete applicable instream work as soon as practical to reduce the duration of disturbance. [R-692]	x		x	x	x	x
	74. Locate sources of clean gravel, cobble, and rock armour, if needed, prior to the commencement of temporary vehicle crossing installation or watercourse crossing construction where these materials may be needed. These materials are not to be sourced from within the ordinary high watermark of any watercourse unless approved by the CEC. Have materials on-site and ready for use during watercourse crossing construction, stabilization, and restoration. [R-693]	x		x	x	x	x
Floods	75. Postpone crossings of watercourses or other waterbodies if excessive flows or flood conditions are present or anticipated, and construction activities cannot be modified to address the increased flow. Position all soil piles well above the anticipated flood water level. Resume activities when water levels have subsided or when equipment or techniques suitable for the conditions are deployed. Follow the Flood and Excessive Flow Contingency Plan in Section 9. [R-694]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Equipment Inspection and Servicing	76. Review and comply with the general protection measures related to equipment cleaning, inspection of hydraulic, fuel, and lubrication systems of equipment, equipment servicing and refueling as well as fuel storage in proximity to watercourses and other waterbodies. Operate equipment in a manner that prevents deleterious substances from entering a watercourse, wetland, or other waterbody. [R-695]	x		x	x	x	x
	77. Confirm hydraulic, fuel and lubrication systems of equipment used in watercourse and wetland crossing construction are in good condition and free of leaks. Hydraulic machinery working instream will use non-toxic, readily biodegradable hydraulic fluids where mechanically feasible [R-721].	x		x	x	x	x
Garbage	78. Prohibit depositing construction waste in, or immediately adjacent to, any watercourse, wetland, drainage/NCD, or ditch. [R-142]	x		x	x	x	x
Riparian Areas and RMAs	79. Review and follow protection measures related to the maintenance of vegetative and stumps and rods on both sides of watercourse crossings. [R-698]	x		x	x	x	x
	80. Seek to reduce the EGP Project Footprint within the riparian areas (including RMAs where applicable) of any watercourse, wetland, or drainage/NCD. [R-699]	x		x	x	x	x
Shrub Salvage	81. Salvage live willow and other appropriate shrubs or bushes from the banks of wetlands, watercourses, and drainages, where present and where bank disturbance is anticipated, if requested by the CEC or as indicated in permit Conditions or site-specific crossing plans. Store at the side of the EGP Project Footprint in a manner in which they will not dry out. Other species local to the area may also be used per direction from the CEC or QP. If salvage of willows from the bank is likely to result in limited success, salvage willows from adjacent areas or use container stock from nurseries. Prior to construction, salvage emergent and submergent aquatic plants, if they can be successfully transplanted per discretion of a QP and if is practical to do so. [R-700]	x		x	x	x	x
Erosion and Sediment Control	82. Inspect any temporary erosion control structures installed on approach slopes, on a regular basis throughout crossing construction. If problems are identified with a structure, initiate repairs as soon as practical. [R-702]	x		x	x	x	x
	83. Collect and filter sediment resulting from the washing of gravel and other streambed materials. [R-704]	x		x	x	x	x
	84. Prohibit the operation of construction equipment close to the banks of watercourses where there is a risk of bank sloughing, failure of the vehicle crossing or flooding of the work area, except where the equipment is required for remediation or general construction. [R-971]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Electrical Transmission Line structures	85. To the extent practical, locate electrical transmission line structures at least 30 m from the ordinary high water mark of a watercourse to maintain ground cover and to prevent erosion [NR-246].	x		x	x	x	x
	86. Implement erosion and sediment control measures where appropriate, including at electrical transmission line structure footing sites and temporary workspaces located within 30 m from the ordinary high watermark of watercourses. Measures may include installation and monitoring of silt fencing [NR-247].	x		x	x	x	x
Weld, Coat and Weight	87. Weld, coat, and weight, where warranted, the pipe prior to the commencement of instream construction. Completion of welding, coating, and weighting of the pipe may be deferred, to a limited extent, at large watercourses where a substantial instream trenching period is anticipated. [R-705]	x					
	88. Do not perform concrete coating activities near a watercourse, wetland or drainage/NCD unless suitable isolation from surface drainage and water sources is in place. Obtain approval from the CEC for planned concrete coating locations. [R-706]	x					
	89. Records will be kept of locations where the pipeline has been weighted with continuous concrete coating, pipe saks™, or other weights [2040].	x					
Trenchless Crossings	90. If water quality monitoring is required as specified in the watercourse crossing table, provide 3 working days' notice to the water quality monitoring crew to allow for sufficient time for mobilization to the site and set-up their monitoring equipment before construction commences. If water quality monitoring crews have to work in swift water, provide sufficient time so they can confirm flow conditions are safe and mark safe passage routes. [R-709]	x					
	91. Do not discharge or allow water from water management entry and exit sites with a high sediment load to flow into any watercourse, wetland, or drainage/NCD, unless the water meets Provincial water quality guidelines for turbidity and any other potential contaminant. Remove the sediment load (such as, by filtering, settling or discharging into a vegetated area) before discharge water is allowed to enter any waterbody. Sediment-laden water discharged onto vegetated land should be pumped through a discharge diffuser and monitored so that the state of the vegetated area is not impacted, including by erosion or smothering of vegetation with sediment. Excess sediment deposited in vegetated areas should be removed the extent practical, per discretion of the CEC. [R-713]	x					
	92. Notify the regulatory agencies and have necessary permits in place prior to starting an alternative crossing method in the event that a trenchless crossing fails. [R-715]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Trenchless Crossings (cont'd)	93. To the extent practical and where applicable, consider extending trenchless pipeline crossings at watercourses, roads or utility corridors to leave a vegetated screen to manage access and line-of-sight [NR-28]	x					
Trenched Crossings	94. Comply with the following measures that apply to trenched crossings as well as applicable measures related to the specific crossing method used (such as, isolated crossings). [R-716]	x					
	95. Construct trenched crossings during the instream work windows found in the watercourse crossing table, unless otherwise approved by the applicable regulatory agencies. [R-717]	x					
	96. Conduct isolated trenched crossing instream activities unless approvals are obtained to do otherwise from the regulatory agencies. [R-718]	x					
	97. Only use materials and equipment in a watercourse, wetland, or drainage/NCD that have been handled and treated in a manner to prevent the release or leaching of substances that may be deleterious to fish. [R-720]	x					
	98. Confirm hydraulic, fuel and lubrication systems of equipment used in watercourse and wetland crossing construction are in good condition and free of leaks. Hydraulic machinery working instream will use non-toxic, readily biodegradable hydraulic fluids where mechanically feasible. [R-721]	x					
	99. Retain hard plugs at each bank until just prior to pipe installation. If necessary to control water flow and trench sloughing, install temporary soft plugs and manage water from the trench on to stable vegetated land, not directly to the watercourse or other waterbody (Detail No. 11). [R-722]	x					
	100. Store temporary instream spoil a minimum of 3 m from the bank under dry conditions. Use sediment barriers or cover spoil piles to prevent erosion and runoff during rain events. Store saturated spoil that is prone to runoff a minimum of 10 m from the bank and stabilize this material by constructing a temporary containment area to prevent spoil or sediment-laden water from flowing back into the watercourse. Note that the vegetative buffers are to be maintained (Detail No. 23). [R-724]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Trenched Crossings (cont'd)	101. Pile spoil on the banks to the extent practical. Construct a temporary storage area for spoil above the high watermark and back from the watercourse if spoil is likely to be highly saturated (such as 10 m or as workspace allows). Excavate a pit or construct berms of packed earth or swamp weights, if warranted, to prevent spoil or silty water from flowing back into the watercourse. Containment berms and spoil should be back from the streambank to avoid sloughing into the watercourse (Detail No. 11). Note: established vegetation setbacks are to be maintained and, consequently, spoil may require stockpiling an appropriate distance from the banks as determined by the EI. If spoil cannot be stored on the banks and must be stored below the high-water mark, store in discrete piles in areas of low current velocity to reduce erosion potential. Protect upstream side of piles with large rock or concrete barriers, where warranted [NR-182].	x					
	102. Where present, existing gravel and cobble streambed materials will be utilized for restoration of the streambed. Prior to trenching, the surface streambed materials contained within the anticipated width of disturbance will be salvaged separately from the trench spoil. The native streambed materials will be replaced back on top of the streambed as a cap (0.5 m depth or as specified by the CEC) following backfill of the trench. Where the native streambed materials are not deemed appropriate in quality, clean gravel and cobble will be imported and used as a cap over the disturbed streambed, as specified by the CEC. Substrate gradation should retain surface flows similar to pre-construction conditions. [R-725]	x					
	103. Prior to construction, remove and salvage emergent and submergent aquatic plants, organic materials (for example, LWD) and other habitat features in watercourses, per specifications in the Restoration Plan and site-specific watercourse crossing plans. [R-726]	x					
	104. Crossings should not be re-aligned or straightened or have their hydraulic characteristics changed. If re-alignment of a watercourse or other waterbody cannot be avoided, develop a site-specific plan for re-alignment that is approved by the applicable regulatory agencies and meets the requirements in the CEMP. [R-727]	x					
	105. Follow the measures for bank and riparian protection and restoration outlined in the CEMP. Follow site-specific restoration plans prepared for watercourse crossings. [R-728]	x					
	106. Salvage the upper layer of topsoil (maximum of 0.5 m) over the trench area on watercourse approaches in riparian zones and retain for use in capping the trench following backfilling. Stockpile separately from other materials. [R-729]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Trenched Crossings (cont'd)	107. Resistance to lateral erosion and scour may be maintained by appropriately restoring the natural particle size and bed complexity of the channel base and side slopes. The entry and exit grading approaches should be constructed at stable angles to reduce the potential for instability. [R-1245]	x					
	108. Where developed, follow site-specific crossing plans for riparian plantings and restoration of instream habitat features. Where site-specific crossing plans are not developed, salvage then replace instream habitat features that may be used by fish or other aquatic species (such as, boulders and CWD) per discretion of the EI, placing these features at a similar depth from which they were salvaged. [R-1265]	x					
	109. Arrange to have appropriate water quality sampling equipment on-site so that accurate water quality samples are taken, such as: ▪ turbidity meter; ▪ flow meter; ▪ sampling pole; ▪ chest waders; ▪ nitrile gloves; ▪ inert plastic packing material; ▪ water sample bottles; ▪ field filter kit; ▪ boat; ▪ ice or frozen ice substitute; and ▪ coolers [R-891]						
	110. Approximate locations of water quality monitoring stations and sampling intervals will be established prior to construction; and actual monitoring sites and sampling intervals will be determined in the field by a QP based on a number of variables including discharge rates and accessibility to safe monitoring sites. A control site should be established no closer than approximately 100 m upstream of the crossing. [R-898]						
Dry Isolated Trenched Crossings	111. Non-isolated trenched crossings can only be undertaken on watercourses or NCDs that are dry (Detail No. 11). [R-730]	x					
Isolated Crossings	112. Seek to limit instream construction to the shortest duration practical for fish-bearing watercourses and watercourses and drainages/NCDs that are flowing at the time of construction. [R-732]	x					
	113. Construct isolated crossings in accordance with Provincial and Federal permit and approval Conditions [R-733]	x					
	114. Follow the measures for trenched crossings as well as the measures noted on Detail Nos. 9 and 10 for dam and pump, and flume methods. [R-734]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Isolated Crossings (cont'd)	115. Schedule construction activities to allow for fish salvage to be conducted at fish-bearing watercourses prior to water management activities, providing the CEC with 5 working days' notice to mobilize a fish salvage crew for early fish salvage. [R-735]	x					
	116. Construct the isolation dams of materials that meet the applicable Provincial and DFO requirements and Permit Conditions and are approved by the CEC. [R-737]	x					
	117. Use non-earthen material (e.g., water-filled portable dams, sheet piling, sand bags, concrete blocks) for isolation structures to the extent practical. If earthen material is necessary, develop site-specific plans and drawings for review and approval of regulatory agencies [NR-185].	x					
	118. If earthen material must be used in construction of isolation dams, armour the outside face of the dam with suitable-sized riprap to protect the dam from erosion [NR-186].	x					
	119. Temporary fuel storage tanks and small portable cans (such as, jerry cans) will be set upon impermeable secondary containment having a storage volume equal to 1.5 times the volume of the fuel storage tank, allowing for 0.5 times the volume of the tank as freeboard. To prevent precipitation from accumulating in the secondary containment, the fuel storage tank should be covered. Alternatively, any accumulations of precipitation in the secondary or tertiary containment will need to be pumped out or drained from the secondary or tertiary containment immediately via an oil-water separator. [R-739]	x					
	120. Maintain the quantity and quality of stream flow when constructing an isolated crossing. If a pump-around method is used to maintain downstream flow, backup pumping capacity and hoses must be on-site and ready to take over pumping if operating pumps fail or if the current isolation system is at risk of being overwhelmed by high flows. Pumps are to be continuously monitored to maintain downstream flow until the dam materials are removed and normal flows restored to the channel. [R-740]	x					
	121. Manage the water in the segment of the watercourse or NCD between the dams, to the extent practical. Any sediment-laden water discharged onto vegetated land should be pumped through a discharge diffuser and monitored to help prevent impacts to vegetated areas (per R-713) and re-entry of sediment-laden water to a waterbody does not occur. Salvage any fish from between the dams on fish-bearing streams following the fish salvage protocols outlined in the FMMP. [R-741]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Isolated Crossings (cont'd)	122. Do not cause scour or introduce sediment into the channel from water from flumes, dam, and pumps, diversion, or other methods. If necessary, to accomplish this objective, place rock armour; tarpaulins, plywood sheeting or other materials to control erosion and reduce scour at the outlet of pump hoses and flumes. Supplement the erosion control materials if these measures are insufficient to control any erosion (Section 8). [R-742]	x					
	123. Position pump hose outlets away from unstable or erodible surfaces when discharging bypass flows or other clean sources of water into a watercourse. Protect discharge areas using geotextiles or other materials and use energy dissipators, as needed, to prevent erosion on approaches or to the bed and banks of the channel. Monitor discharge site for signs of erosion and promptly address any issues. [R-1262]	x					
	124. Remove excess accumulations of silt and sediment within instream isolation areas where feasible prior to placement of clean salvaged or imported surface gravel, cobble materials and the release of natural flow. If silt materials are removed, spread at a location above the ordinary high water mark where the materials will not re-enter the watercourse [R-743]	x					
Bank and Riparian Protection and Restoration	125. Stabilize disturbed areas upon completion of construction of the watercourse or NCD crossing until permanent restoration activities can be completed. Temporary measures may include seeding of a cover crop, installation of coir matting, geotextile, sediment fences and temporary berms or other measures requested by the CEC. Restoration of fish-bearing watercourses will proceed as soon as practical in accordance with instream timing windows and any site-specific plans, regulatory approvals and permit Conditions, and CEC direction. [R-746]	x					
	126. Review and implement site-specific restoration plans for any watercourse crossing for which they have been developed. [R-747]	x					
	127. Implement the bank and riparian protection and restoration measures identified in in this section at watercourse crossings that were trenched or where disturbance of the bank or riparian area occurred. [R-748]	x					
	128. Install trench breakers if sloping banks are composed of organic materials as noted in the CEMP or as otherwise noted on Detail Nos. 5 and 6 of Section 14. [R-749]	x					
	129. Recontour the banks of the watercourse as close as practical to their pre-construction profile (slope and height) . Follow methods to stabilize the banks (such as, grass rolls, brush layers, willow plantings and erosion control matting [Detail Nos. 12 and 13]). Refer to any bank restoration recommendations in the watercourse crossing table and seek input, as needed. [R-750]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Bank and Riparian Protection and Restoration (cont'd)	130. A QP will assess site-specific rip-rap requirements. Incorporate vegetation into the rip-rap to the extent practical, such as using planting pockets and willow stakes [NR-175].	x					
	131. Obtain recommendations from FortisBC engineering for additional measures to effectively stabilize banks, if required. Such measures may include the installation of clean and appropriately sized and placed rock armour. For fish-bearing watercourses, avoid installation of rock armour unless specified in site-specific plans and regulatory approvals (including under the Federal *Fisheries Act*) and the CEC has approved its use. [R-751]	x					
	132. Consider use of cribwalls along vertical or overhanging banks to restore fish habitat, as required and with input from a QP on proper placement. [R-752]	x					
	133. Install live willow stakes or plant salvaged willow or shrub plugs in the banks of in the banks of fish-bearing watercourses and RRZs where planting is required per CEC discretion, site-specific crossing plans, or permit conditions (Detail No. 12). If the planting of salvaged shrubs from the bank is likely to result in limited success (such as, from dry weather), salvage shrubs from adjacent areas where approvals are in place or use container stock approved by the CEC from nurseries. [R-753]	x					
	134. Temporary sediment control structures are to be maintained until vegetation is sufficiently established to prevent erosion, after which they are to be removed. [R-754]	x					
Clean-Up	135. Commence clean-up following completion of backfill and erosion control activities. [R-755]	x					

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6.10 Wetland Crossings

This subsection identifies activities required for wetland crossings and the mitigation measures to be implemented by FortisBC, the Contractor, or the Subcontractor, for each activity. Details on specific wetland crossing information will be provided in the WMP.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Notification and Approvals	1. Review the Provincial and Federal notification requirements related to the installation of wetland vehicle and pipeline crossing construction provided in this Section 6 and contact information provided in Appendix C. Confirm that *WSA* Section 11 notifications and DFO Request for Reviews have been submitted, if required, a sufficient amount of time prior to construction. [R-759]	x		x	x	x	x
	2. Complete the on-site checklist (Appendix E) for vehicle and pipeline crossings for each wetland crossing prior to, during and following construction. These checklists should be filled out by the EI and retained as a permanent record of crossing installation. [R-760]	x		x	x	x	x
	3. Notify the CEC and FortisBC Lead EI at least 3 working days prior to the commencement of wetland crossing construction. Provide 5 days' notice to the CEC and FortisBC EI where amphibian salvage may be required to allow additional time for salvage preparation. Refer to the wetland crossing table for salvage requirements and the EAS for known amphibian breeding sites [R-773]	x		x	x	x	x
	4. Confirm with the CEC that notifications/approvals are in place prior to installing a temporary vehicle crossing or commencing pipeline crossing construction at each wetland. Review crossing notification or approval conditions. Retain copies of applicable notifications or approvals on-site during crossing construction. [R-774]	x		x	x	x	x
	5. Review and comply with the procedures presented in the CEMP to satisfy Provincial regulatory requirements (such as, BC *WSA*, BC *Oil and Gas Activities Act* [*OGAA*]) and DFO review or authorization requirements. [R-775]	x		x	x	x	x
Fish Salvage	6. Where fish habitat occurs in wetlands, obtain fish salvage permits from the appropriate regulators and have a QP managed crew salvage fish from the isolated area prior to and during water management activities in accordance with salvage protocols in the FMMP. The QP will use salvage methods appropriate for the site and in consideration of other organisms that may be present (such as, amphibians or rodents that may be harmed by electrofishing or minnow trapping). All captured fish will be released unharmed to areas which provide suitable habitat, upstream or downstream of the crossing per discretion of the QP. Applications for fish salvage permits should be submitted at least 2 months ahead of construction. [R-761]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Amphibian Salvage	7. Implement the Wildlife Encounter Contingency Plan (Section 9), in the event of wildlife incidents or human-wildlife encounters, and the Wildlife Species of Concern and Habitat Discovery Contingency Plan (Section 9), in the event that a wildlife species of concern or a wildlife habitat feature is discovered, to reduce direct wildlife mortalities associated with the construction of the EGP Project. [R-762] 8. In the event amphibian breeding locations cannot be avoided and an amphibian salvage and relocation is required, it will be conducted in accordance with the conditions of a General Wildlife Permit under the BC *Wildlife Act*. Where practical, prioritize wetland and instream work at known pond-dwelling amphibian sites during the active period (that is, approximately March 1 through October 31) when salvage can be conducted, and conduct salvage prior to instream construction activities. In larger wetlands where all eggs, tadpoles, or adults are not moved, isolate the work area (such as, exclusion fencing) to restrict amphibians from adjacent parts of the wetland from moving into the construction site. Maintain silt fencing following construction and remove after amphibians have dispersed from the wetland to avoid potential indirect mortality or health effects. [NR-77]	x		x	x	x	x
Invasive Wetland Plants and Pests	9. Determine the presence of any invasive wetland plants (found on the EAS) prior to the commencement of construction activities within wetlands. The EI should notify the Contractor of any special measures to be implemented to prevent the transfer of these invasive species from one wetland to another wetland. [R-764]	x		x	x	x	x
Wetland RMAs	10. Review measures for establishment of wetland RMAs and installation of signage. [R-767] 11. RMAs are identified on the EAS and WMP Wetland Crossing table.	x		x	x	x	x
	12. Review measures regarding reduced disturbance in clearing and reducing grubbing within the RMA. [R-768] 13. RMAs are identified on the EAS and WMP Wetland Crossing table	x		x	x	x	x
Flag Shrubs and Trees at Wetlands	14. Review flagging measures for shrubs and trees to be salvaged at wetland crossings. [R-769]	x		x	x	x	x
Monitoring	15. Monitor wetlands for hydrological function as defined in the PCM Program (Volume 1, Part E, Section 24 of the Application) and implement remedial measures if there are indications of impeded wetland function. [R-1067]	x		x	x	x	x
	16. Monitor approaches of roads (from other roads and the pipeline construction right-of-way) as outlined in the PCM Program (Section 10) to identify areas where movement of mineral soil or debris might be eroding and depositing within the wetland edges, or at locations where hydraulic effects may occur (such as, pipeline installation that parallels wetland riparian areas). Implement remedial measures (such as, install sediment fence or equivalent structure) should monitoring identify areas where sediment or debris is being deposited along wetland edges. [R-1068]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Construction Technique and Equipment	17. Seek to apply standard wetland construction and restoration mitigation (such as, reduce disturbance, recontouring, restoration, monitoring and remedial measures) to support habitat restoration that would be implemented during the restoration stage of the EGP Project, as required [NR-72].						
	18. Use wide track equipment, equipment with low pressure tires, or conventional equipment operated from swamp mats, rig mats, matting or, if approved, log ramps when working on saturated soils during non-frozen conditions. The feasibility of the use of logs in wetlands will be determined by the EI. [R-772]	x		x	x	x	x
Weld, Coat, and Weight	19. Weld, coat and, if warranted, weight the pipe prior to the commencement of wetland crossing construction. [R-795]	x					
Scheduling	20. Schedule instream trench excavation, pipeline lowering-in and backfill of the wetland crossing to be conducted in the shortest duration practical. [R-778]	x		x	x	x	x
	21. Seek to schedule construction in wetlands to comply with the timing constraints identified in the WMMP (Section 8). [R-91]	x		x	x	x	x
	22. Postpone wetland construction activities if excessive rain or flood conditions exist or are anticipated, and construction methods cannot be modified to cope with the increased water volumes. [R-779]	x		x	x	x	x
Vehicle Crossing Method	23. Comply with measures related to vehicle wetland crossing techniques identified in the Appendix E. Install vehicle crossing, where existing or alternate shoo-fly access is not available, in accordance with the reports provided to the applicable regulatory agencies (such as, notifications, wetland crossing drawings) [Detail No. 15]). [R-780]	x		x	x	x	x
	24. Review and comply with general protection measures in the CEMP related to equipment washing, inspection of hydraulic, fuel and lubrication systems of equipment, equipment servicing and refueling and fuel storage near a wetland. Operate equipment in a manner that prevents deleterious substances from entering a wetland. [R-781]	x		x	x	x	x
Equipment Inspection and Servicing	25. Confirm hydraulic, fuel and lubrication systems of equipment used in watercourse and wetland crossing construction are in good condition and free of leaks. Hydraulic machinery working instream will use non-toxic, readily biodegradable hydraulic fluids where mechanically feasible [R-721].	x		x	x	x	x
Narrow Down	26. Reduce the clearing and mowing area at wetlands, to the extent practical. Rope, fence, or flag off areas to prevent disturbance due to construction traffic or construction activities within the narrowed down area (Detail No. 1). [R-786]	x		x	x	x	x
Wildlife	27. Implement the mitigation measures (Section 9 [such as, timing constraints and contingency plans]) for wildlife encountered in wetlands. [R-788]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Ecological Communities of Concern	28. Implement the mitigation measures related to known vegetation (that is, rare plants or rare ecological communities) species of concern as identified in the vegetation resources-specific mitigation (VMMP) and where shown on the EAS. [R-789]	x		x	x	x	x
	29. If species of concern are identified during construction of the EGP Project, implement the Plant Species and Ecological Communities of Concern Discovery Contingency Plan (Section 9). [R-790]	x		x	x	x	x
Topsoil Handling Contingency Measures	30. Implement the Known or Suspected Soil Handling Management Plan (Section 8) during topsoil stripping in wetlands. [R-1071]	x		x	x	x	x
Delay Topsoil Salvage	31. Delay topsoil salvage on approach slopes and the banks of applicable wetlands until prior to construction. [R-791]	x		x	x	x	x
Grubbing	32. Seek to reduce the width of grubbing through wetlands and low-lying wet areas during construction to facilitate the restoration of shrub communities. [R-792]	x		x	x	x	x
Temporary Berms and Sediment Fences	33. Inspect any temporary erosion and sediment control structures installed on approach slopes to a wetland, regularly throughout crossing construction. Repair the structures, if warranted, before the end of each working day. [R-794]	x		x	x	x	x
Test Holes	34. Excavate test holes on the trench line along wetland areas, where required, to determine mineral soil and organic content and water depth. Use this information to identify water management needs, the potential for trench sloughing, storage locations for salvaged upper surface and trench spoil materials, any materials needed to support trenching equipment and other factors that may affect construction to help with planning an effective wetland crossing. [R-797]	x					
Trenchless Crossing(s)	35. Construct trenchless crossings in accordance with approval requirements under the BC *WSA*. [R-798]	x					
Isolated Crossing(s)	36. Installation of a pipeline in fish-bearing wetlands should be conducted using an isolated crossing method. A salvage of fish should be conducted prior to prior to instream construction within the isolated work area. Refer to wetland crossing Detail No. 15. [R-801] 37. Refer to Section 5 of the FMMP for fish salvage protocols.	x					
Salvage Upper Surface Material	38. Salvage the upper surface material on applicable trenched crossings to maintain the root stock and seed bank for replacement following wetland crossing construction (Detail No. 15). Salvage surface material in mineral soils to a maximum depth of approximately 50 cm or to the depth of colour change where there is less than approximately 50 cm of surface material or as directed by the CEC. Salvage the full depth of peat unless directed otherwise by the CEC. [R-802]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Salvage Width (Mineral Soils)	39. Salvage upper surface material at wetland crossings as directed by the CEC (Detail No. 15). [R-803]	x					
	40. Seek to reduce the salvage width at wetlands that are excessively wet at the time of construction to the width of the trench area (that is, the salvage width is to be narrow enough to reduce the area of disturbance and wide enough to prevent upper surface material/subsoil mixing in the event of trench instability) [R-804]	x					
Trench Plugs	41. Leave temporary hard or soft plugs at the appropriate locations to prevent the flow of water along the trench that could result in dewatering of a wetland community or flood adjacent areas. [R-805]	x					
Maintain Natural Drainage	42. Install temporary culverts, if warranted, to prevent grade or trench spoil or salvaged upper surface material from blocking natural drainage and causing pooling. [R-806]	x					
	43. Store trench spoil in a manner that does not interfere with natural drainage patterns. If necessary, haul trench spoil to a nearby location for storage (such as, wet spoil that does not stack well) [R-808].	x					
Trench Walls	44. Slope the trench walls to limit the potential for sloughing. Store salvaged upper surface materials or peat further from the trench if the potential exists for salvaged surface material or peat to slough or flow into the trench. [R-807]	x					
Spoil Storage	45. Install a temporary sediment barrier (such as, sediment fence [Detail Nos. 4 and 15]) to help prevent the flow of sediment from spoil piles and disturbed areas into nearby wetlands. [R-809]	x	x	x	x		
Trench Water	46. Use salvaged upper surface material and trench spoil at locations where deep water is encountered as a containment berm or barrier. Consider using alternate dam materials such as an Aquadam or cubic meter bag weights where warranted (Detail No. 15). Pump excess water from the isolated area and trench to opposite side of berm or work ramp. [R-810]	x	x	x	x		
	47. Discharge pumped trench water without causing erosion and filter pumped trench water through established vegetation and stable soils. Pumped trench water must be clear of suspended solids before entering wetlands. Do not permit unfiltered trench water to enter any wetland, watercourse or NCD. [R-811]	x	x	x	x		
	48. Dewatering of artificial water features (such as, dugouts) is to be conducted only once applicable approvals are received and are in hand at the time of the activity. [R-812]	x	x	x	x		

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Trench Water (cont'd)	49. Do not dewater any wetlands, other than from within an isolated section. Although temporary water management activities may be necessary during the construction of trenched wetland crossings (Detail No. 15), water is not to be permanently removed from the wetland. Options for trench water management within wetlands should be discussed with the CEC and, when required, the regulatory agency. [R-813]	x	x	x	x		
Trench Breakers	50. Install trench breakers as directed by the Construction Manager to prevent the pipe trench from acting as a drain. Trench breaker requirements are identified on construction drawings (Detail Nos. 5 and 6) by FortisBC. [R-814]	x					
Backfilling	51. Backfill subsoil and mineral soils prior to organic material in wetlands so that organic material, where present, remains at the surface. [R-815]	x					
	52. Remove any excess trench spoil and dispose of at an upland location approved by the CEC and landowner. [R-816]	x	x	x	x		
	53. Replace trench spoil in the same manner as it was excavated, avoiding admixing of soils and uneven contour. [R-817]	x	x	x	x		
Erosion and Sediment Control	54. Check temporary and, if present, permanent erosion control structures to confirm they are in working condition and repair if warranted. Maintain temporary erosion and sediment control measures in place until vegetation is established or erosion and sedimentation risk is determined to be acceptable by the CEC. [R-821]	x					
Replace Salvaged Surface Materials (Mineral Wetlands)	55. Replace salvaged topsoil and upper soil material over the area where salvage was conducted. Restore wetland contours and drainage channels so that a permanent trench crown is not created. Replace salvaged topsoil or upper surface material as evenly as practical over the area where salvage was conducted. [R-822]	x					
Rollback, Slash Berms	56. Spread chips or mulch on peatlands on the EGP Project Footprint to a depth not to exceed approximately 5 cm. [R-1072]	x					
Recontour	57. Recontour the wetland and restore surface hydrology patterns to as close to the pre-construction profile as practical during restoration. [R-823]	x					
Restoration	58. Use natural recovery (that is, do not seed), tree seedling planting and shrub staking or planting on workspace in wetland riparian margins where the QP indicates appropriate (Detail No. 12). [R-1099]	x		x	x	x	x
	59. Use natural recovery in areas of plant species of concern unless invasive plant species are a concern, or unless specified by QP [NR-297].	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Restoration (cont'd)	60. Replant salvaged trees or shrubs along the disturbed riparian margins of wetlands as directed by the CEC. [R-825]	x		x	x	x	x
	61. Install willow staking along the disturbed margins of the wetland to stabilize exposed soils, reduce the potential for sediment introduction and restore habitat function where shrubs were present prior to construction, where directed by the CEC (Detail No. 12). [R-826]	x		x	x	x	x
Access Removal	62. Remove swamp mats, matting, geotextiles, and subsoil ramps, if used to cross wetlands, unless otherwise directed by the CEC where access may be necessary to adjacent lands during final clean-up. Remove vehicle crossings upon the completion of construction. [R-827]	x		x	x	x	x

6.11 Existing Barge Landing Sites and Marine Dock Facilities

This subsection identifies mitigation measures to be implemented by FortisBC, the Contractor, or the Subcontractor, to reduce adverse effects to the shoreline and marine environment associated with the use of existing barge landing sites and marine dock facilities.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Operation of Barges and Other Vessels	1. Barges and other vessels are to use the designated berthing areas and avoid coming to shore in non-designated areas to reduce disturbance to shoreline habitats and vegetation, to the extent feasible. The need for additional shore access locations will be discussed with the FortisBC Construction Manager and EI. [NR-629]	x	x				
	2. Vessels will follow Vancouver Fraser Port Authority, Transport Canada, and Pacific Pilotage Authority requirements. [NR-630]	x	x				
	3. Avoid anchoring barges and other vessels or placing spuds unless approved by the FortisBC Construction Manager and EI. [NR-631]	x	x				
	4. Confirm that vessels used on the EGP Project are free of fuel and oil leaks and in good operating condition. [NR-632]	x	x				

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Operation of Barges and Other Vessels (cont'd)	5. Maintain a marine spill-kit on-site in a quickly accessible location to contain and clean large spills (minimum 500 L) in the marine environment. [NR-633]	x	x				
	6. Do not release bilge water containing oil or fuel residues in the EGP Project Footprint including the marine environment. Empty contaminated bilge water at an appropriate facility (for example, fuel dock or marine mechanic). [NR-634]	x	x				
	7. Use appropriate containers for the storage of fuel or lubricants. Store applicable fuels and lubricants brought onto the vessel in properly labelled containers. [NR-635]	x	x				
	8. Store jerry cans and other single-walled fuel or oil containers in secondary containment (such as, a rubber tub) that can contain the full amount of liquids stored, should rupture occur. Cover secondary containment during rainy weather to prevent the creation of potentially contaminated water. [NR-636]	x	x				
	9. Limit power output of vessels to that necessary for the task at hand. [NR-637]	x	x				
	10. EGP Project vessels will follow established shipping lanes and navigation routes and will maintain a constant course and constant speed, to the extent practical. [NR-638]	x	x				
Operation of Onboard Equipment	11. Inspect equipment (such as, pumps, generators, or hydraulic equipment) used on barges and other vessels daily to verify that equipment is free of fuel and oil leaks and in good operating condition. [NR-639]	x	x				
	12. Confirm that barges or vessels that contain stored fuel, oil, or operating equipment have a spill-kit onboard suited to containing and cleaning onboard spills. [NR-640]	x	x				
	13. Conduct fueling of equipment on barges or other vessels over a catch basin with a spill-kit at hand. [NR-641]	x	x				
	14. Place absorbent pads underneath equipment that requires maintenance. Conduct equipment maintenance to repair any leaks before the start of the next shift. [NR-642]	x	x				
Lighting	15. Implement the following mitigation measures during the herring spawning periods (February 1 to July 1): ▪ Avoid using lights when lighting is not needed. ▪ Focus bright lights on work areas and off of the water, to the extent feasible. [NR-643]	x	x				

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Marine Invasive Species	16. Confirm that hold water (for example, ballast, buckets, and wells) that has originated from other areas is not released at the EGP Project site. [NR-644]	x	x				
	17. Confirm that vessels and equipment are clean and free of marine vegetation and debris prior to their use on the EGP Project. [NR-645]	x	x				
Vegetation	18. Seek to avoid or reduce interaction with marine vegetation, to the extent practical, by siting gangways and ramps above the high watermark. [NR-646]	x	x				
	19. Seek to reduce damage to marine vegetation and upland shoreline vegetation at the edge of the EGP Project Footprint to limit the loss of shoreline biodiversity. [NR-647]	x	x				

6.12 Geotechnical Hazards and Terrain

This subsection identifies activities or concerns associated with potential geotechnical hazards or terrain concerns associated with the EGP Project, and the mitigation measures to be implemented by FortisBC, the Contractor, or the Subcontractor, for each concern.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Mountainous Terrain (that is, *Avalanches, Landslides, etc.)*	1. Active and potentially active areas may be protected by additional depth of cover and use of armoured pipe. The length and depth of the active zone should be determined on a site-specific basis in order to optimize the mitigation. [R-1224]	x					
	2. To the extent practical, reduce disturbance to identified areas of PAG rock and metal leaching through micro-routing. [R-1243]	x					
	3. In addition to mitigating for debris flow through route selection in the planning phase, mitigation during construction may include increasing the depth of cover to reduce impact by debris flows, or protective measures above or around the pipe. [R-1234]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Mountainous Terrain (that is, *Avalanches, Landslides, etc.) (cont'd)*	4. Mitigation of avulsion includes avoidance through route selection, increasing the depth of cover below the depth of anticipated erosion, crossing alluvial fans near their apex where the lateral extent of avulsion is limited and using protective measures above or around the pipe. [R-1235]	x					
	5. Site-specific recommendations will be required to manage snow avalanche potential where necessary. In general, measures to control snow avalanche hazard to the EGP Project include: ▪ locating above ground structures away from areas of snow avalanche hazard; ▪ installation of deflection berms or other protective structures where snow avalanche hazard cannot be avoided; ▪ additional trench depth or soil cover for buried pipe; and ▪ ongoing avalanche monitoring and controls, such as pre-emptive management by blasting. [R-1233]	x					
Shallow to Moderately Deep Slides	6. The primary means of mitigation is avoidance by routing around, bridging over or passing beneath areas of shallow sliding. [R-1228]	x					
	7. Alternative mitigations may include management of surface and groundwater or construction of earthworks or grading to improve stability conditions, or installation of artificial support such as pile walls or anchors. [R-1229]	x					
	8. Where the pipeline is in the potential runout zone for shallow sliding, the potential impact to the pipeline may potentially be mitigated using additional depth of cover or armoured pipe. [R-1230]	x					
Rockfall	9. Site-specific review of rockfall hazards is necessary, particularly for those hazards stemming from boulders in surficial materials. [R-1231]	x	x		x	x	
	10. Site-specific recommendations will be required to manage rockfall potential where necessary. In general, methodology that could be employed include pre-emptive scaling or trim blasting of potential rockfall sources, anchoring of loose materials, retention of debris using rockfall nets or catchment of debris using rockfall ditches. Potential additional measures to control rockfall hazard to the pipe include the following. ▪ Location of the pipeline below the toe of the grading cut slope, as close to the overlying slope as practical to put it in a rockfall shadow area and to reduce the potential for direct impacts. ▪ Additional trench depth or soil cover. ▪ Sloping rock armour or soil cover across the pipeline. ▪ Full or partial regrading of the EGP Project Footprint to match pre-existing slope profiles. ▪ Concrete armoured pipe. [R-1232]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Steep Longitudinal Sections – Grade Exceeds 20 degrees (36 percent)	11. If piping erosion is a concern, use site-specific, select filter-compatible backfill materials. Filter design should be carried out by a Geotechnical Engineer. [R-1255]	x					
	12. Install frequent trench breakers with drains to arrest and mitigate groundwater flow along the trench (Detail No. 5). It is imperative to prevent accumulation of groundwater flow, which could lead to piping erosion. [R-1254]	x					
Areas Subject to Flooding or Lateral Erosion	13. Lateral erosion and scour are typically mitigated through implementation of additional depth of cover over a sufficiently wide area such that the pipeline will not be exposed. [R-1236]	x	x				
	14. Additional measures such as rock armour or channel bottom armour may be considered but should be designed by a QP with consideration of associated alteration of sediment balance in the upstream and downstream reaches, and the potential long-term maintenance implications. [R-1237]	x					
Alluvial Fans	15. Consider installation of cross-berms or rock armouring as appropriate to site-specific conditions to mitigate the potential for avulsion along the grading, particularly on climbing or descending sections. [R-1222]	x					
	16. Manage the potential for seepage along the pipe trench using impermeable trench breakers as appropriate (Detail No. 5). [R-1223]	x					
Mine Subsidence	17. Voids, if found, may be mitigated through avoidance, bridging, stabilization, or filling. [R-1240]	x					
Heritage Resources and TLU Sites	18. Where archaeological sites occur near known areas of instability, avoidance should be the primary strategy, and a terrain stability assessment should be conducted. [2015]	x					

7. Post-construction Activities

This section identifies post-construction activities to monitor the condition of the EGP Project Footprint following restoration to determine soil capability and the success of revegetation and erosion and sediment control efforts. Monitoring (Ínexwantas) will occur in the first five growing seasons following completion of restoration.,

By initiating monitoring (Ínexwantas) in year one, the issues identified, and any additional mitigation implemented within the first year following final clean-up and restoration can be assessed, and any outstanding issues can be managed during the subsequent years. Any outstanding restoration issues remaining after the fifth year will be identified and addressed by FortisBC representatives through ongoing routine monitoring (Ínexwantas) of the permanent right-of-way, which will continue for the life of the proposed EGP Project as part of regular operations and maintenance activities. See subsection 10.3.3 and the PCM Framework for further detail.

To specify the applicability of a given mitigation measure to the various components of the EGP Project, check-boxes for each component denote the applicability of the mitigation. Column 'TIS' refers to the temporary infrastructure sites.

The following table provides information on components and monitoring topics that FortisBC will implement during the post-construction program. .

Activity/ Concern	Mitigation and Monitoring Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
PCM Program - General	1. The PCM Program will include an assessment of disturbed and restored areas within the EGP Project Footprint and consider environmental issues identified by regulatory agencies, Indigenous nations, landowners, land users or other stakeholders. The PCM Program will conduct monitoring for the first five growing seasons following completion of restoration, [R-1141]	x		x	x	x	x
	2. Monitor the effectiveness of restoration and access control efforts during the Post-Construction Monitoring Program. Implement remedial measures if warranted (that is, adaptive management protocol). Seek to schedule remedial work outside of sensitive periods for Wildlife, to the extent practical [NR-91].	x		x	x	x	x
	3. Results of a PCM survey (such as, occurrences of invasive plant species, wetland, watercourse, soil, landscape, and vegetation establishment issues) and any remedial measures conducted will be added to the Environmental Summary Table (EST). [2039]	x		x	x	x	x
	4. The EAS and EA application information provide the baseline data for comparison of post-construction conditions. Soil, watercourse and wetland crossings, and vegetation establishment will be assessed during PCM in addition to the environmental features and monitored mitigation measures identified by the Squamish Nation EAA and EAC, where applicable. [2038]	x		x	x	x	x

Activity/ Concern	Mitigation and Monitoring Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Terrain Monitoring	5. Conduct aerial reconnaissance of the EGP Project Footprint beginning the first year following final clean-up and restoration. Areas where erosion, slope or bank instability, disruption of natural drainage, or excessive trench and grade area subsidence are evident will be noted and addressed appropriately. [R-1158]	x		x	x	x	x
	6. Ground reconnaissance will be completed to inspect locations where potential environmental issues were observed during the aerial reconnaissance. During the ground reconnaissance, the condition of disturbed areas will be assessed. The focus of subsequent monitoring will be on the status of corrective measures applied, as well as unresolved or new issues that were identified during year one of the PCM Program. [R-1159]	x		x	x	x	x
Watercourse and NCD Monitoring	7. Monitor beds, banks, riparian areas, and approach slopes of watercourses and NCDs, for stability, soil erosion, vegetation establishment and presence of invasive plant species beginning the first year following final clean-up and restoration. If warranted, detailed assessments will be completed at sites where restoration issues are identified. [R-1160]	x		x	x	x	x
	8. Monitor watercourses and NCD during the third and fifth years of the PCM Program where unresolved issues were identified during the first and second year of the PCM Program. Routine PCM may occur on any watercourse and NCD crossings where additional corrective action was taken. Areas identified as having moderate to high risk of erosion will be monitored throughout the PCM program. [R-1161]	x		x	x	x	x
Fish and Fish Habitat Monitoring	9. Restored fish habitats will be monitored for success of restoration methods, particularly relating to spawning and rearing habitat values. Habitat restorations and enhancements (such as, CWD installation, riparian plantings, and spawning gravel placement) will be compared against specifications and targets identified at selected sites. Deficiencies will be documented, and corrective actions determined for subsequent implementation. 10. Assessment will be made of instream and riparian habitat restoration measures, as well as erosion and sediment controls. 11. The focus of monitoring during subsequent years will be to address not fully resolved and unresolved issues to determine whether fish habitat restoration meets the targets for the EGP Project.	x		x	x	x	x
Groundwater Monitoring	12. Sample domestic water intakes and wells within 100 m of the EGP Project Footprint prior to construction in order to acquire a baseline for water quality and, in certain locations, groundwater quantity will also be measured. [R-1162]. Table 15.4-2 of ESA Health Section – 1 well within 100 m at KP 36.4 9 (Well ID 74537 – Private landowner).	x		x	x	x	x
	13. Conduct follow-up sampling of domestic water intakes and wells within the 100 m of the EGP Project Footprint 1 year following final clean-up and restoration in order to confirm that construction has not adversely affected groundwater quality or quantity. [R-1163]	x		x	x	x	x

Activity/ Concern	Mitigation and Monitoring Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Groundwater Monitoring	14. Monitor registered or known potable water wells within 200 m of any blasting before construction work starts and after the blasting work is completed. Monitoring will take place before and after construction and will consist of measurement of well yields, static and pumping water levels as well as water sampling in accordance with Canadian Guidelines for Drinking Water Quality (Health Canada 2020) and the Drinking Water Protection Act (Government of BC 2001). [R-428]	x			x	x	x
	15. Where the flow of a spring has been disrupted, mitigation measures implemented to restore cross drainage in the trench (such as, subdrains or trench breakers; Detail Nos. 5 and 6) may require monitoring during the post-construction phase. [2037, adapted from R-437]	x		x	x	x	x
Vegetation Monitoring	16. Conduct vegetation monitoring when vegetation is mature enough for accurate species identification and evaluation during the middle to late timing of the growing season after the first full growing season following construction. Monitor for vegetation issues such as weed infestations and poor vegetation establishment along the EGP Project Footprint. Conduct additional soils monitoring, if warranted, to identify the cause of vegetation issues, if any. Where issues are identified, implement remedial measures as soon as practical. [R-831]	x		x	x	x	x
	17. Conduct aerial reconnaissance beginning the first year following clean-up and restoration to determine the success of restoration and planting efforts. [R-1164]	x		x	x	x	x
	18. Conduct ground reconnaissance to inspect any locations where revegetation issues were observed during aerial reconnaissance. During the ground reconnaissance, the condition of the EGP Project Footprint and access routes will be visually inspected to assess the effectiveness of measures implemented during construction (including clean-up and restoration) for vegetation issues identified prior to construction (that is, weed infestations) and vegetation effects arising from construction activities (such as, soil degradation). If warranted, detailed vegetation assessments will be completed at sites where restoration issues are identified. [R-1165]	x		x	x	x	x
	19. Following ground reconnaissance, the focus of monitoring during subsequent years will be to address unresolved issues to determine whether vegetation on the restored EGP Project Footprint is comparable to pre-construction conditions or conditions adjacent to the EGP Project Footprint. Where the natural regeneration of vegetation along the EGP Project Footprint is the preferred option for revegetation, the establishment of a vegetative cover compatible with the surrounding vegetation and land use will be evaluated. [R-1166]	x		x	x	x	x
	20. Implement the Post-Construction Monitoring Program in order to monitor the rare plant populations of concern following construction [NR-301].	x		x	x	x	x

Activity/ Concern	Mitigation and Monitoring Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Vegetation Monitoring (cont'd)	21. At permanent facilities, monitor for the presence of invasive plant species and take prompt action to control the spread of invasive plants. [NR-308]	x		x	x	x	
Rare Plants Monitoring	22. Depending upon specific biophysical element requirements for the EGP Project, rare plant monitoring may be conducted for specific plant species of conservation concern found on the EGP Project Footprint. The effectiveness of the construction measures (including restoration measures) implemented will be determined through species-specific assessments. [R-1167]	x		x	x	x	x
Invasive Plant Species Monitoring	23. To evaluate the effectiveness of the weed control program, general weed monitoring will be conducted post-construction at various locations within the EGP Project Footprint and along key access routes. Monitoring will include vegetation surveys twice per year for the first five years as determined by a QP, specifically for early detection of invasive species colonization. [R-1137]	x		x	x	x	X
	24. The Contractor will supply weed treatment and monitoring records to FortisBC. [2035]	x		x	x	x	x
Wetlands Monitoring	25. Survey wetlands within the EGP Project Footprint during the first growing season following clean-up and restoration to document the effectiveness of measures implemented during construction (including clean-up and restoration) for wetland issues identified prior to construction (that is, weed infestations) and wetland effects arising from construction activities. Information will be collected on wetland function and compared to data collected during baseline surveys to assess whether restoration measures were effective in restoring the functions of the wetland ecosystem to pre- construction conditions. Should any concerns be identified additional mitigation will be provided, if warranted, to promote the successful return of wetland function in the lifetime of the PCM Program. [R-1168]	x		x	x	x	x
	26. Monitor wetlands on the EGP Project during the first five growing seasons following restoration. If a wetland is determined not to have full functionality during the first year of the PCM Program, FortisBC will continue to monitor those specific wetlands in the third and fifth years until the wetland is fully functional. If the wetland has still not reached full functionality at the end of the PCM Program, FortisBC will consult with regulatory agencies regarding the next appropriate steps. [R-1169]	x		x	x	x	x

Activity/ Concern	Mitigation and Monitoring Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Wildlife Monitoring	27. Wildlife and wildlife habitat monitoring will be conducted beginning the first year following final clean-up and restoration to collect sufficient information to determine the effectiveness of wildlife mitigation, identify the need for adaptive measures, and detect changes in wildlife and wildlife habitat resulting from the EGP Project. The specific locations for PCM will be based in part on consultation with regulatory authorities and Indigenous nations, as well as the results of field work. Likely locations for monitoring include high value wildlife habitats (such as, select wetlands, sensitive areas, and locations where there is high potential for species at risk). An adaptive management component will be included in the wildlife PCM Program, whereby results of the wildlife monitoring will be used to determine the need for further monitoring as well as the need for and nature of remedial measures to address any identified issues. Wildlife and wildlife habitat monitoring results collected during PCM survey will be included in PCM reporting. Further details on the mitigation effectiveness and compliance monitoring plan, as well as adaptive management, are outlined in the WMMP. [R-1170]	x		x	x	x	x
Archaeological Sites Monitoring	28. Monitoring of archaeological sites will consider the individual site integrity, and cumulative effects on the cultural heritage landscape [2017].	x		x	x	x	x
	29. Pre- and post-construction photographs will be used to capture archaeological site integrity for the purposes of PCM [2018].	x		x	x	x	x

8. Management Plans

The following management plans provide mitigation measures to address known environmental concerns in the EGP Project Footprint.

To specify the applicability of a given mitigation measure to the various components of the EGP Project, check-boxes for each component denote the applicability of the mitigation. Column 'TIS' refers to the temporary infrastructure sites.

8.1 Soil Erosion and Sediment Control Plan

Parts of the EGP Project Footprint may be susceptible to soil erosion due to topography, drainage patterns, and soils. The following plan outlines some of the general measures to be implemented to reduce soil erosion risks and, in the case of erosion events, measures to control resulting sediment deposition.

Any water that has mobilized sediment from a construction site must be managed to avoid direct entry into a natural waterbody and exceedance of in the Approved Water Quality Guidelines (BC ENV 2021). The Contractor is expected to manage and monitor construction sites for the risk of sediment migration off-site.

If erosion is evident during the construction phase of the EGP Project, necessary Contractor equipment and personnel will be made available to control the erosion. During the construction phase, the Contractor, in consultation with the CEC and the Contractor Project Manager, will determine appropriate procedures to be implemented to control soil erosion and other soil handling problems encountered [R-852].

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Erosion and Sediment Control	1. Install and maintain erosion and sediment control measures to the satisfaction of the CEC. [R-166]	x		x	x	x	x
	2. Maintain or, when the area is stabilized, remove drainage and erosion control devices and materials, at sites that are no longer in use including, but not limited to: temporary roads, borrow sites, spoil disposal sites, stockpile sites, and work pads. [R-168]	x		x	x	x	x
	3. Take measures to mitigate unintended ponding of water or channelization of surface water flow. [R-169]	x		x	x	x	x
	4. Inspect culvert installations on the EGP Project Footprint, and clear debris as necessary to permit proper functioning of culvert. [R-170]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Wet Soils	5. Postpone aboveground construction activities, suspend equipment travel, or use construction alternatives in the event of wet soils (as defined in the Wet Soils Contingency Plan in Section 9) in order to reduce terrain disturbance, erosion, and soil structure damage. [R-96]	x		x	x	x	x
	6. Initiate contingency measures once one of the following indicators are noticed: rutting; wheel slip; build-up of mud on tires and cleats; formation of puddles; or tracking of mud down the road as vehicles leave the EGP Project Footprint. [R-97]	x		x	x	x	x
	7. Employ contingency measures such as the following, progressively, or individually as warranted, in locations where the indicators noted in point 6 are identified: ▪ Prevent rubber-tired traffic from driving on the EGP Project Footprint. ▪ Install geotextiles, swamp mats, matting, mats, or log ramps constructed from non-merchantable timber. ▪ Restrict construction vehicle traffic to equipment with low-ground-pressure tires or wide pad tracks. ▪ Salvage topsoil from the EGP Project Footprint to prevent mixing and as directed by the CEC. ▪ As a last resort, shut-down construction in that vicinity until conditions improve. [R-98]	x		x	x	x	x
	8. Review and comply with the criteria for the suspension of specific pipeline activities under wet soil conditions outlined in the Wet Soils Contingency Plan (Section 9) once an indicator of wet soils (as defined in the Wet Soils Contingency Plan) is observed. [R-99]	x		x	x	x	x
	9. The wet soil shut-down decision (that is, the final measure in the progressive listing of measures) will be made by the CEC in consultation with the Construction Manager and the Contractor. Factors influencing a decision to postpone start-up or shut-down work include the weather forecast and available construction alternatives. [R-100]	x		x	x	x	x
Water Erosion	10. Shut-down or relocate construction temporarily until the risk of erosion and sediment transport has been addressed or the conditions improve as determined by the CEC. [R-853]	x		x	x	x	x
	11. Construct temporary berms of subsoil, logs, timber, coir logs, or sandbags during construction activities if directed by the CEC. [R-854]	x		x	x	x	x
	12. Construct temporary cross-ditches as directed by the CEC (Detail No. 8). [R-856]	x		x	x	x	x
	13. Install temporary berms of subsoil, coir logs, timbers, sandbags, or bales during construction activities as directed by the CEC (Detail No. 19). [R-857]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Water Erosion (cont'd)	14. Install sediment fences near the base of slopes and adjacent to watercourses, NCDs, and the marine environment to reduce sedimentation if directed by the CEC (Detail No. 4). [R-858]	x		x	x	x	x
	15. Salvage remaining topsoil and store away from area to be regraded as directed by the CEC. [R-859]	x		x	x	x	x
	16. Regrade rills and gullies as directed by the CEC. [R-860]	x		x	x	x	x
	17. Replace salvaged topsoil as directed by the CEC. [R-861]	x		x	x	x	x
	18. Implement one or more of the following techniques to mitigate water erosion, as directed by the CEC: ▪ construct cross-ditches and berms decreasing the spacing on steeper slopes or on more erodible soils (Detail No. 8); ▪ armour the upslope face of berms with geotextile, logs, grass rolls, or wattles (Detail Nos. 20 and 22); ▪ import small diameter slash then roll back and walk down; ▪ apply coir logs, mulch, or tackifier to hold soil (Detail No. 19); ▪ reseed and hand rake an annual cover crop, hydroseed, or apply seed impregnated mats; ▪ transplant native shrubs or trees, plant willow stakes, or use other bioengineering techniques (such as, brush layers, fascines, grass rolls, and wattle fences; Detail Nos. 12, 13, 20, and 22); and ▪ install slope indicators at locations where the risk of slope failure, or creep exists; consult the Geotechnical Consultant. [R-862]	x		x	x	x	x
Wind Erosion	19. When directed by the CEC, shut-down or relocate construction activities until winds decrease and conditions improve. [R-863]	x		x	x	x	x
	20. Consider using one or more of the following techniques if wind erosion of windrowed topsoil is of concern, and as directed by the CEC: ▪ apply water to the windrow; ▪ tackify (at rate recommended by the manufacturer) the windrow; or ▪ pack the windrow with equipment (such as, bulldozer) tracks. [R-864]	x		x	x	x	x
	21. Consider using one or more of the following techniques if wind erosion is of concern after topsoil replacement and as directed by the CEC: ▪ seed with cereal or sterile hybrid cover crop; ▪ employ straw crimping at 2 to 2.5 tonnes per hectare (ha); ▪ apply hydromulch or tackifier; ▪ import small diameter slash for use as rollback; ▪ add locally available manure and cultivate; and ▪ install wind fences. [R-865]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Wind Erosion (cont'd)	22. Tackifier products are to be produced from a source approved by the CEC. All products are to be biodegradable, non-toxic, of organic origin, and pre-approved by the landowner or Land Authority. [R-866]	x		x	x	x	x
Dust Control	23. Use dust control measures during hot and dry weather. Dust control measures may include the application of water or mulch. The use of calcium chloride shall be approved by a QP [R-131].	x	x	x	x	x	x
	24. Do not apply dust control chemicals to roads during windy conditions or within 30 m of a known rare plant location [NR-296].	x	x	x	x	x	x
Erosion or Failure of Streambanks	25. As directed by the CEC, implement the following: ▪ Prohibit the operation of construction equipment close to the banks of watercourses and NCDs where there is a risk of bank sloughing, failure of the vehicle crossing, flooding of the work area or damage to sensitive aquatic species or habitat. ▪ Install additional sediment fencing to prevent sediment-laden water from entering watercourses, NCDs, wetlands, or lakes (Detail No. 4). ▪ Excavate cross-ditches to divert runoff away from watercourses, NCDs, wetlands, and lakes (Detail No. 8). ▪ Construct berms of subsoil, sandbags, rock, timber, or coir logs on approach slopes or banks to divert runoff from the EGP Project Footprint and onto well-vegetated lands or sediment retention ponds (Detail Nos. 19 and 20). ▪ Install erosion control blanket or coir matting on disturbed areas such as the banks and approach slopes to assist in the control of erosion and potential for sedimentation of watercourses, NCDs, wetlands, and lakes. ▪ Import sandbags and place strategically to help stabilize and add height to the banks in order to prevent flooding of nearby areas, especially where vegetation has been removed. ▪ Implement one or a combination of the following mitigation techniques: – plant dormant willow stakes or commercially grown rooted stock plants (plugs). Fall dormancy is preferred for willow staking (Detail No. 12); – transplant willow clumps, install willow wattles, or brush layering (Detail Nos. 13 and 20); – apply erosion control blanket following seeding; install contour wattles for riparian and bank protection (Detail No. 20); – support banks with rock armour or cobble armouring; – install vegetated geogrid; or – support the stream profile with coniferous tree revetment to cover scour holes or eroding banks (Detail No. 14). [R-867]	x		x	x	x	x

8.2 Known or Suspected Contaminated Groundwater and Soil Handling Management Plan

Known or Suspected Contamination

Areas of Environmental Concern (AECs) with CofCs are found at the WLNG facility site and BC Rail site. FortisBC reviewed site assessments that include historical information and site delineation. At these sites, encountering residual contamination is anticipated. The AECs are shown on the Environmental Site Information Sheet. .

Soils encountered at the WLNG facility site and BC Rail site may be a combination of contaminated and non-contaminated material, including concentrations of Na^+ (sodium) and Cl^- (chloride) in the Soft Ground Tunnel spoils. A QP experienced in managing contaminated soil and groundwater will confirm the presence of contaminated surface soils and provide direction on soils management and disposal.

Contaminated groundwater may be encountered in excavation areas at the East Portal site. Removal of contaminated water (Stak̲w) (for example, groundwater or surface runoff) in amounts that require treatment or special water (Stak̲w) management approaches (such as, a tank truck) may be needed. Before discharging potentially contaminated water (Stak̲w), contact the QP.

Contamination Discovery Contingency

Construction activities may involve excavating, handling or hydrovacing contaminated soil other than the existing contamination, as defined in the specifications and subsection 8.2 of the CEMP. This contingency plan describes the procedures to be taken if the presence of contaminated soil is suspected, as well as procedures for notification of the regulatory agencies.

Soil may be suspected of contamination if one of more of the following criteria are encountered:

- Odours (hydrocarbon, sweet smelling, medicinal, solvents)
- Discolouration (black, shades of grey blue and green)
- Sheen in pore spaces or excavated water
- Presence of anthropogenic debris
- Change in soil texture compared to surrounding areas
- Changes in elevation compared to surrounding areas (depression or fracture)

In the event acid-generating rock is encountered, implement the Acid Rock Drainage and Metal Leachate Management Plan (subsection 8.4).

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Notifications	1. After securing the site, the EI or CEC will notify the QP and the FortisBC Construction Manager, without delay, of the discovery. [R940]	x	x	x	x	x	x
	2. FortisBC is responsible for the timely notification of appropriate regulatory agencies and Indigenous nations (Appendix A), if required. A QP will provide guidance during the investigation, personal protective equipment requirements, safe handling and disposal of and disposal of contaminated materials. [R-941]	x	x	x	x	x	x
Discovery	3. Suspect contaminated soils if free product is present, the soil is a notably different colour than the surrounding soil (black, shades of grey, blue and green), hydrocarbon odours are present, or there is sheen on excavation water. Notify the EI or CEC as soon as possible. [R-938]	x	x	x	x	x	x
	4. If unknown contaminants are encountered, the EI will notify the QP and the FortisBC Construction Manager without delay. [R-942]	x	x	x	x	x	x
	5. The EIM will stop work in the immediate area where suspect contamination is identified, during the construction phase of the EGP Project, to allow a QP (that is, a qualified professional experienced in managing contaminated soil and groundwater) to assess the contaminated area, where required. Do not resume excavation within suspect contaminated soil until an assessment result is received from the QP and reviewed by FortisBC. [R-939]	x	x	x	x	x	x
	6. The QP will characterize the extent of the contamination using test pits, or through on-site excavation. Lateral and vertical delineation will be conducted as the first investigation method. [CMP-1044]	x	x	x	x	x	x
Continuance of Work	7. The QP in consultation with the FortisBC, the Contractor and applicable regulatory agencies will determine if and when conditions are suitable to resume work. [R-943]	x	x	x	x	x	x
Poor Colour Separation Between Topsoils and Subsoils	8. Identify subsoil by texture and structure for any site-specific adjustments to depth (minimum stripping depth of 15 cm, where possible). [R-869]	x		x	x	x	x
Stony Subsoils or Topsoils	9. Use conventional equipment (such as, a bulldozer) as far as possible to salvage topsoil. [R-871]	x		x	x	x	x
	10. Employ backhoe, if above measures are ineffective. [R-872]	x		x	x	x	x
Shallow Bedrock	11. Ripping is preferred over blasting where rock trenching is encountered. [R-875]	x			x	x	x
	12. Bedrock is not to be backfilled into the upper approximate 0.5 m of the trench. [R-876]	x			x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Shallow Bedrock (cont'd)	13. Excess bedrock will be disposed of at locations approved by the landowner, FortisBC, CEC, and regulatory agency. [R-877]	x			x	x	x
	14. Import clean additional or replacement backfill if warranted from locations approved by the CEC. Clean backfill will be free of contamination, large rocks and anthropogenic debris [R-878]	x			x	x	x
Unstable Trench Walls	15. Salvage extra width of topsoil if storage of extra spoil is required. [R-879]	x		x	x	x	x
	16. Strip extra width of topsoil if topsoil could slough into the trench (minimum stripping width of two-times blade width). [R-880]	x		x	x	x	x
	17. Back slope the trench until stable (up to approximately a 1:1). [R-881]	x		x	x	x	x
Uneven Boundary Between Topsoil and Subsoil	18. Utilize equipment capable of fine depth adjustments when salvaging topsoil. [R-882]	x		x	x	x	x
	19. Seek to reduce scalping of sod layer. Overstrip if necessary, such that the majority of topsoil is salvaged. [R-883]	x		x	x	x	x
Soil Pulverization	20. Reduce traffic on the EGP Project Footprint if directed by the CEC. [R-884]	x		x	x	x	x
	21. Increase topsoil stripping to EGP Project Footprint if fine textured soils will be subjected to steady traffic and pulverization. [R-885]	x		x	x	x	x
High Winds	22. Suspend topsoil handling during high wind conditions if directed by the CEC. [R-887]	x		x	x	x	x
Contaminated Soils and Groundwater	23. Adhere to the BC *Contaminated Sites Regulation*, including the applicable technical guidance documents and protocol.		x	x	x		
	24. Adhere to Conditions specified in the applicable Municipal permits. A Site Disclosure Statement and Notice of Independent Remediation in accordance with the *Environmental Management Act* and BC *Contaminated Sites Regulation* will be completed the contractor, as required. [NR-582]		x	x	x		
	25. Consult with a QP to determine sampling and soil characterization requirements based on the source and proposed disposal locations, including temporary soil stockpile locations within the EGP Project right-of-way [NR-583]		x	x	x		
	26. The QP will approve a facility capable of accepting the types of contamination found to be in the soil following resting. The contractor will dispose of the contaminated soil off-site at the approved facility. Confirm that contaminated soil and water are not transported off-site or disposed of until analytical results have been received. [NR-584]		x	x	x		

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Contaminated Soils and Groundwater (cont'd)	27. Depending on the level of contamination or the type of contamination present in the soil encountered, the QP, under the guidance of appropriate regulatory conditions, may determine alternative measures such as in situ remediation.						
	28. Contain contaminated spoil generated by tunneling for testing and disposal as directed by the QP. [NR-585]		x	x	x		
Soil Handling and Storage	29. Separate topsoil and subsoil suspected of contamination from non-contaminated topsoil and subsoil, and where applicable, into additional separate topsoil and subsoil piles where an invasive plant species is known or discovered. [R-944]	x		x	x	x	x
	30. Maintain separate storage piles of each soil (that is, storage may require multiple piles: contaminated topsoil; contaminated subsoil; clean topsoil; and clean subsoil, and topsoil and subsoil piles with known or discovered invasive plant species. Weed infestations on storage piles will be managed according to the IPSMP [Section 8]). [R-945]	x		x	x	x	x
	31. Store soils suspected of contamination within a bermed and lined containment cell. All liners must be high density polyethylene sheeting or equivalent. [R-946]	x		x	x	x	x
	32. Locate contaminated soil storage piles at least approximately 100 m from any permanent watercourse, NCD, wetland, environmentally sensitive features and areas, and in an area that does not have an excessive slope. [R-947]	x		x	x	x	x
	33. Label and install signs at the contaminated stockpiles so the contents (subsoil or topsoil) of each pile can be readily identified. [R-948]	x		x	x	x	x
	34. The CEC will be on-site when work is to be conducted in areas where contaminated soil is likely. Be aware that any water in the excavation or trench may be contaminated. [R-949]	x		x	x	x	x
Hydrovac Material	35. If contaminants are suspected, do not remove the hydrovac slurry from the site. Arrangements should be made to temporarily contain the slurry on-site pending analysis and final disposal arrangements. [2043]	x					
Stockpiling Contaminated Soil	36. The QP will determine where to site stockpile areas for contaminated soil storage. The stockpiles will be separated from uncontaminated soil stockpiles, lined and bermed. Prior to transporting soils off-site, a QP will collect soil samples. The suspected impacted stockpiles will be characterized in accordance with BC *Contaminated Sites Regulation* and disposed of or repurposed at the direction of the QP. [NR-587]			x	x		

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Stockpiling Contaminated Soil (cont'd)	37. Cover contaminated soil stockpiles to protect them from rain, wind, or runoff while awaiting soil management (that is, re-use or off-site disposal). Coverings should be weighed down and checked regularly. [NR-588]			x	x		
	38. Known or discovered invasive plant species on storage piles will be managed according to the IPSMP (subsection 8.3). [CMP-1040]			x	x		
	39. Refer to subsection 6.3 for mitigation measures applicable to handling uncontaminated soil [CMP-980].						
Soil Sampling and Analysis	40. The QP will collect (or arrange to have collected) samples and GPS coordinates of each soil sample and stockpile suspected of contamination. [R-955]	x		x	x	x	x
	41. Submit samples of suspected contaminated soils to a laboratory and test for the following parameters as appropriate and as directed by the CEC: benzene, toluene, ethylbenzene, and xylene; light and heavy extractable petroleum hydrocarbon, volatile petroleum hydrocarbon, metals; polycyclic aromatic hydrocarbons; flashpoint; benzene, toluene, ethylbenzene and xylene toxicity characteristic leaching procedure, metals and paint filler toxicity characteristic leaching procedure. [R-956]	x		x	x	x	x
Hot Loading Contaminated Soil	42. Conduct hot loading (that is, the excavation and immediate transport of soils off-site for disposal at an approved facility) only where soils have been previously characterized and transportation of contaminated soil is completed to meet applicable Provincial or Federal regulations. [NR-589]			x	x		
	43. Verify that the CEC is present during hot loading of contaminated soil to document the activities. [NR-590]			x	x		
	44. Refer to Section 5 for the use of dust control measures in hot or dry conditions. [CMP-976]			x	x		
Disposal	45. Characterize and dispose of contaminated soil that does not meet applicable regulatory criteria at a licensed landfill. [NR-591]			x	x		
	46. Dispose of contaminated soil that does not meet applicable regulatory criteria at a licensed landfill. Obtain waste acceptance at the disposal facilities for each location anticipated to contain contaminated soil or groundwater. Determine the need for a waste manifest prior to hauling. Obtain a waste manifest from the waste disposal facility or Transportation of Dangerous Goods (TDG) certified Contractor before hauling. Wherever warranted, have disposal acceptance for wastes anticipated during construction in place prior to initiation of construction. [R-959]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Backfilling/Backfill Selection	47. Identify potential sources for East Portal and Woodfibre Portal backfill prior to construction that do not contain contaminants or weed infestations and obtain prior approval from FortisBC for the use of these materials and sources. [NR-592]		x	x	x		
	48. Backfill the trench with subsoil that meets applicable regulatory criteria. In the event it is necessary to import subsoil, consult with the CEC to determine appropriate procedures. [R-967]	x		x	x	x	x
	49. If topsoil importing is necessary, obtain the topsoil from a certified weed-free provider or conduct laboratory analyses for contaminants and weeds prior to importation in accordance with the direction of the CEC. [R-968]	x		x	x	x	x
Contaminated Groundwater	50. Water management must maintain the stable conditions (that is, the size, shape, and concentrations) of the existing contamination plume on the property adjacent to the leased area, as defined in the CofC for the northern portion of the East Portal site. [NR-593]			x			
	51. Groundwater to be discharged will be sampled and sent to a laboratory for analysis. Upon receipt of the laboratory results, mitigation or disposal options will be determined by FortisBC in consultation with the CEC and QP. [NR-594]			x	x		
	52. Confirm that appropriate discharge permits and approvals are in place, if required, before commencing water management activities. Contact the QP for further information. [NR-595]			x	x		
	53. Completely remove any contaminants of concern on the water prior to water management activities. Methodology to remove the oil, oil sheen or non-aqueous phase liquid, shall be left to the Contractor and approved by FortisBC and the QP. [NR-596]			x	x		
	54. If excavating in contaminated soil, petroleum compounds may be dissolved in trench water (such as, groundwater or surface runoff) in amounts that require treatment or special water management approaches (such as, a tank truck). Before discharging potentially contaminated water, contact the EI or CEC. [R-961]	x					
	55. Suspect contaminated water if free product is present, the soil under the water is a notably different colour than the surrounding soil (black, shades of grey, blue and green), hydrocarbon odours are present or there is sheen on excavation water. Notify the EI or CEC as soon as feasible. [R-962]	x					

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Contaminated Groundwater (cont'd)	56. Collect a sample of the water and send to a laboratory for analysis. Confirm sampling protocols and required laboratory analyses with the EI or CEC and the QP. To the extent practical, leave contaminated water in the trench while waiting for the results of the laboratory analysis. Any potentially contaminated trench water that is removed must be transferred to an on-site tank that has been approved by the EI or CEC. Upon receipt of the laboratory results, mitigation or disposal options will be determined by the QP in consultation with the EI or CEC. Laboratory results and proposed mitigation or disposal options will be provided to the FortisBC QP for review and comment prior to disposal or implementation of mitigation measures. [R-963]	x					
	57. If mitigation of contamination is not feasible, water will be disposed of at an approved facility. Lab results will be communicated to the disposal facility. Determine the need for a waste manifest prior to hauling. If required, the waste manifest should be issued by the EI or CEC before hauling. [R-964]	x					
	58. Before commencing trench water management activities, appropriate discharge permits and approvals are to be in place, if required. Contact the EI or CEC for further information. [R-965]	x					
	59. Before trench water management activities, any oil (free product) on the water must be removed or contained in the excavation. [R-966]	x	x				
Contaminated Soil, Vapour, and Groundwater Reporting	60. Submit analytical data and field notes, including soil management and Confirmation of Remediation, in a field report to FortisBC. Reporting should contain, at a minimum: ▪ A description of the work completed ▪ The standards applied to the work and rationale ▪ Sampling methods and locations ▪ Mitigation employed for handling contaminated soil or groundwater ▪ Laboratory results ▪ Coordinates for the sampling locations. [NR-597]			x	x		
Documentation	61. Reports, forms or notifications required for contaminated soils management will be prepared by a QP for FortisBC for review and submission to the applicable regulators. [R-969]	x		x	x	x	x

8.3 Invasive Plant Species Management Plan

The IPSMP addresses the management of invasive or Noxious plant species for the EGP Project. For the IPSMP, invasive and Noxious plants are referred to as invasive plant species.

This IPSMP includes procedures for the pre-construction and construction phases of the EGP Project. Procedures to be implemented during the post-construction phase will be addressed in the PCM Program.

8.3.1 Purpose and Objectives

The purpose of the IPSMP is to provide guidance that will reduce the EGP Project-related introduction or spread of invasive plant species infestations and is guided by the following objectives:

- coordinate EGP Project-related invasive plant species management activities with the Sea-to-Sky Invasive Species Council (SSISC) Regional Strategy 2015-2020 including:
  - prevent new invasive species from arriving and follow integrated management and early detection and rapid response protocol to prevent their establishment if and when they do arrive;
  - reduce or reverse the spread of existing invasive plant species through coordinated, integrated invasive species management efforts.
- prescribe protection measures for the construction of the EGP Project that will reduce the potential for the introduction of new invasive plant species, reduce the establishment of new invasive plant species occurrences (or prevent the increase of existing density and distribution of existing occurrences), and the movement of existing invasive plant species; and
- monitor the effectiveness of invasive plant species management activities within the EGP Project Footprint as part of the PCM Program and apply appropriate remedial actions, if necessary.

8.3.2 Invasive Plant Species of Concern

The list of potential invasive plant species of concern for the EGP Project includes Provincially-regulated species, as well as invasive plant species of Regional concern identified by the SSISC and Invasive Species Council of Metro Vancouver (ISCMV).

Provincial invasive plant species designations are Proposed Prohibited Noxious and Noxious species. Noxious weeds are non-native species introduced to BC without the insect predators and plant pathogens that help keep them in check in their native habitats. The species have aggressive growth, are highly destructive, competitive, and difficult to control (BC IMISWG 2021a). Proposed Prohibited Noxious are plant species that are not present in BC or are present but extremely limited in extent and pose a significant threat to BC's environment, economy, or human health (BC IMISWG 2014). The Proposed Prohibited Noxious plants are candidates for the BC Early Detection Rapid Response Program and are proposed for addition to the BC Noxious Weed list.

The BC *Weed Control Act* requires all land occupants to control Noxious weed species growing or located on their land (Temíxw) and premises. The *Weed Control Act* is enabling legislation that local governments may choose to adopt through the appointment of a weed inspector. The *Weed Control Regulation* limits the movement of Noxious weeds, contains the Provincial and Regional Noxious weed lists, and provides structure for weed notices and level of control action weed inspectors may require landowners to complete.

The SSISC has four categories of Regional invasive plant species (SSISC 2018) and include:

- **Prevent**: Species that are currently not found in the SSISC region and the goal for these species is early detection and rapid response to any occurrence.
- **Eradicate**: Species that are found in the SSISC region at low frequency and the goal for these species is eradication of existing occurrences and early detection and rapid response to new occurrences.
- **Contain**: Species that are limited in the region and the goal is to prevent the species from spreading to weed-free areas.
- **Strategic Control:** Species that are widespread species for which control measures are only implemented in high priority areas, such as conservation lands

The ISCMV also designates invasive plant species into four categories: Prevent, Eradicate, Contain, and Control and category goals are similar to those of the SSISC (ISCMV 2013).

Squamish-Lillooet Regional District established a service area (through Bylaw No. 1541-2017) to enable Squamish-Lillooet Regional District to fund external organizers to manage invasive plant species in the Region. SSISC serves this purpose in Squamish (Sḵwx̱wú7mesh). Two new bylaws (the Invasive Species Management Bylaw and Pesticide and Herbicide Use Bylaw) were adopted in February 2021 by the District of Squamish (Sḵwx̱wú7mesh). The bylaws seek to prevent the use and spread of invasive species while reducing the use of cosmetic pesticides. The bylaws are aligned with the District's Official Community Plan (District of Squamish 2022).

The overall goal of the City of Coquitlam's Invasive Plant Management Strategy is to prevent, reduce, or mitigate the effects of invasive plant species on conservation, aesthetic, and recreation values of publicly-owned parks and natural areas in the City of Coquitlam (City of Coquitlam 2008).

No Provincial Proposed Prohibited Noxious species were found during weed surveys conducted to date for the certified EGP Project Footprint, however five Noxious species were recorded: annual sow-thistle, Canada thistle, Dalmatian toadflax, Japanese knotweed, and Yellow iris. The locations of weed infestations are recorded on the EAS, and locations of infestations are used to site weed cleaning stations. The locations of weed cleaning stations will vary based on where the Contractor is working and moving equipment. Project personnel will be instructed to use the cleaning stations when passing through these areas.

A few individual annual sow-thistle plants occur midway along the Coquitlam Twinning area. Canada thistle patches occur along the Stawamus (Stá7mes) Corridor Expansion, EGP North 610 Line and East Portal. A known occurrence of Dalmatian toadflax has been recorded at the East Portal (IAPP 2020). Japanese knotweed or Bohemian knotweed infestations occur at the Squamish Compressor Station at the WLNG facility site, and the Invasive Alien Plant Program indicates populations along the Stawamus Corridor Expansion, EGP North 610 Line, and at the East Portal (2020). A known occurrence of yellow iris has been recorded along the EGP North 610 Line near KP 37.4 (IAPP 2020).

Invasive plant species were observed primarily on the existing FortisBC right-of-way adjacent to the EGP Project Footprint, within disturbed or cleared areas and along existing access roads. The overall abundance of invasive plant species in the surveyed portions of the EGP Project Footprint was low (less than or equal to one plant per square metre [m^2]) to moderate (2 to 5 plants/m^2) (BC MOFR 2010). Invasive plant species surveys will be completed on an ongoing basis during construction and locations of high priority invasive plant species (Appendix F) within the EGP Project Footprint will be identified on the

EAS to track the efficacy of the IPSMP through PCM. Invasive plant species locations are identified on the EAS as well as Table 8-1.

Table 8-1. Observed or Known Occurrences of Invasive Plant Species with Provincial or Regional Listings

Common Name	Scientific Name[a]	Provincial Listing	SSISC Category	ISCMV Category	Locations
Canada thistle	*Cirsium arvense*	--	Strategic Control	Control	Noxious
perennial sow-thistle	*Sonchus arvensis*	--	Strategic Control	--	Noxious
Scotch broom	*Cytisus scoparius*	Regional Containment/ Control	Contain	Control	--
common comfrey	*Symphytum officinale*	--	Contain	--	--
Himalayan blackberry	*Rubus armeniacus*	Regional Containment/ Control	Contain	Control	--
wild clematis	*Clematis vitalba*	--	Prevent	--	--
hairy cat's ear	*Hypochaeris radicata*	--	Strategic Control	--	--
yellow archangel	*Lamium galeobdolon*	Regional Containment/ Control	Contain	Control	--
morning glory	*Convolvulus sp.*	--	Strategic Control	--	--
common periwinkle	*Vinca minor*	--	Strategic Control	Control	--
yellow iris	*Iris pseudacorus*	Regional Containment/ Control	Eradicate	Control	Noxious
English holly	*Ilex aquifolium*	--	Contain	Control	--
butterfly bush	*Buddleja davidii*	--	Contain	Control	--
perennial pepperweed	*Lepidium latifolium*	Provincial EDRR	Prevent	--	--
lamb's-quarters	*Chenopodium album*	--	Strategic Control	--	--
cutleaf evergreen blackberry	*Rubus laciniatus*	--	Contain	Control	--
oxeye daisy	*Leucanthemum vulgare*	--	Strategic Control	--	--
St. John's wort	*Hypericum perforatum*	--	Strategic Control	--	--
common tansy	*Tanacetum vulgare*	Regional Containment/ Control	Strategic Control	Control	--
Japanese knotweed	*Fallopia japonica*	Regional Containment/ Control	Contain	Control	Noxious
policeman's helmet	*Impatiens glandulifera*	Regional Containment/ Control	Contain	Control	--
common burdock	*Arctium minus*	--	Strategic Control	--	--

Table 8-1. Observed or Known Occurrences of Invasive Plant Species with Provincial or Regional Listings

Common Name	Scientific Name[a]	Provincial Listing	SSISC Category	ISCMV Category	Locations
foxglove	*Digitalis purpurea*	--	Strategic Control	--	--
yellow hawkweed	*Hieracium sp.*	Management	Strategic Control	--	--
Cypress spurge	*Euphorbia cyparissias*	Management	Eradicate	--	--
yellow loosestrife	*Lysimachia vulgaris*	--	Prevent	--	--
bull thistle	*Cirsium vulgare*	--	Strategic Control	--	--
English ivy	*Hedera helix*	--	Contain	Control	--
orange-red king devil / orange Hawkweed	*Hieracium aurantiacum*	Regional Containment/ Control	Strategic Control	Eradicate	--
smallflower touch-me-not	*Impatiens parviflora*	--	Contain	--	--
bull thistle	*Cirsium vulgare*	--	Strategic Control	--	--
English ivy	*Hedera helix*	--	Contain	Control	--
orange-red king devil / orange Hawkweed	*Hieracium aurantiacum*	Regional Containment/ Control	Strategic Control	Eradicate	--
smallflower touch-me-not	*Impatiens parviflora*	--	Contain	--	--

[a] Scientific names are reflective of the most recent BC terminology and may differ from those listed in the Provincial and Regional Invasive plant species lists.

Sources:

BC Inter-Ministry Invasive Species Working Group (BC IMISWG 2021b). Provincial Priority Invasive Species. Accessed January 2022 https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/publications/provincial_priority_is_list.pdf

Sea to Sky Invasive Species Council (SSISC). 2021. SSISC Invasive Plants List – EXTERNAL VERSION – 2021 05 08. Accessed January 2022 https://ssisc.ca/wp-content/uploads/2021/05/SSISC-Invasive-Plants-List-EXTERNAL-VERSION-2021-05-08.pdf

Invasive Species Council of Metro Vancouver (ISCMV). 2013. Current Priority Invasive Plant Species. Accessed January 2022 https://iscmv.ca/docs/ISCMV_Priority_Plant_Spp_List_2013.pdf

Government of British Columbia (Government of BC). 2011. *Weed Control Act. Weed Control Regulation*. Accessed January 2022 https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/10_66_85

8.3.3 Invasive Plant Species Prevention and Control

FortisBC will work with the SSISC and the ISCMV to manage invasive plant species occurrences according to the recommendations provided by the Invasive Species Council of BC (ISCBC) in Best Practices for Managing Species on Utility Operations (ISCBC 2014) in addition to ISCMV Best Management Practice (BMPs) (ISCMV various). Invasive plant species establishment and spread will be prevented by requiring vehicles and equipment be free of dirt (Temíxw) and plant fragments (such as, seeds, root and stem fragments, and flowers) before entering the EGP Project.

These objectives will seek to avoid new invasive plant species introductions and to reduce the spread of known invasive plant species within the existing FortisBC right-of-way. Additional cleaning will be needed when equipment moves out of a weed-infested zone. Soil movement will also be restricted. Potentially

weed-infested soils will not be moved or stored outside infested areas, to the extent practical (movement of contaminated soil potentially containing weed seeds, roots or rhizome fragments or plant parts may be needed during construction). Weed infestations will be identified on EGP Project EAS and control activities in these areas will be determined prior to soil disturbance.

When invasive plant species or weed management is necessary, an integrated pest management approach will be applied and may include mechanical, cultural, and chemical methods to prevent increased weed density. The integrated management approach will include the most economical means to manage weeds with the least possible hazard to people, property, and the environment. Cultural and mechanical invasive plant species management methods include hand-pulling, cultivation, mowing, mulching, hand digging, smothering and active restoration of suitable plant communities. Chemical treatments include either selective herbicides (that is, those which target specific weed species) or non-selective herbicides (that is, those which target vegetation).

FortisBC will work with District of Squamish (Sḵwx̱wú7mesh), the City of Coquitlam, and seek advice from SSISC and ISCMV if chemical treatments are required. Herbicide applications will be conducted in accordance with applicable Acts, regulations, and statutes that regulate the use and application of herbicides in BC.

Canada thistle spreads rapidly through horizontal roots that can result in infestation patches and out-compete native plants. Canada thistle may produce 1,000 to 1,500 seeds per flowering shoot. It is dispersed primarily by wind; however, seeds can also be dispersed by water (Staḵw), animals, clothing, equipment, and vehicles (ISCMV 2020).

Annual sow-thistle produces thousands of seeds per plant and spreads by seed dispersal through wind or water (Staḵw) (Province of BC 2002).

Prevention is key to managing Canada thistle and annual sow-thistle which includes identifying infestations and monitoring (Ínexwantas) control efforts. Canada thistle and annual sow-thistle plants can be controlled by removing plants, plant parts, and seeds from personal gear, clothing, vehicles, and equipment. Clean vehicles, including tires and undercarriage, and equipment at designated cleaning sites before leaving infested areas. Bag or tarp plants, plant parts, and seeds before transporting to a designated disposal site. Take special care when controlling Canada thistle and annual sow-thistle near streams, or ditch lines, to prevent the movement of plant parts downstream. If plants are cut prior to flowering, the plant material can be left on the site to decompose. If plants are cut post-flowering, plant parts, including flower heads, should be bagged and disposed. Mechanical, chemical, and cultural management methods are also options to prevent and control Canada thistle and annual sow-thistle (Province of BC 2002; ISCBC 2019).

Dalmatian toadflax is a perennial forb that can produce thousands of seeds per year as well as spread by horizontal roots. Hand-pulling toadflax before seed-set each year can be an effective management method for new and small populations, especially if a seed bank has not developed. Chemical and cultural management methods are also options to prevent and control Dalmatian toadflax (Province of BC 2002).

Knotweed infestations occurring within the EGP Project will follow Best Practices for Managing Species on Utility Operations and best practices from the SSISC's partnership with the District of Squamish (Sḵwx̱wú7mesh) on Japanese Knotweed herbicide treatment. Knotweed infestations will be identified on EGP Project EAS and control activities in these areas will be determined prior to soil disturbance. EGP Project personnel (crew supervisors and CEC) will be provided with information and training on knotweed identification, prevention and control. Equipment cleaning stations will be made available at key locations

within the EGP Project Footprint. The Contractor will provide EGP Project personnel with a list that identifies the locations of equipment cleaning sites and immediately record any additional sites where equipment is specifically cleaned due to concerns associated with knotweed species.

Four knotweed species are currently found in BC: Japanese knotweed (*Reynoutria japonica*), Giant knotweed (*Reynoutria sachalinensis*), Bohemian knotweed (*Reynoutria x bohemica*), and Himalayan knotweed (*Polygonum polystachyum*). All four species are similar in appearance, biology, impacts, and methods of control.

Japanese knotweed or Bohemian knotweed infestations occur at the Woodfibre Portal on the WLNG facility site. Site specific mitigation measures related to invasive plant species management, including knotweed species will be followed by FortisBC's Contractor and will be detailed in their EPP. All equipment leaving the WLNG site as part of the EGP Project will be cleaned to prevent the spread of knotweed off that site. FortisBC's Contractor(s) will maintain inspection records of vehicles and equipment coming and going from WLNG.

Chemical control with a systemic herbicide is the recommended treatment strategy for all knotweed species due to their extensive root structure and aggressive growth and reproduction. This treatment method is the easiest, most cost effective, and successful treatment method. Knotweeds typically require treatment with herbicide for 3 to 5 years. Two treatments are recommended in year one and should be followed with at least one treatment in year two with 4 to 6 weeks between treatments. Mechanical and cultural means of control have demonstrated ineffective control. (ISCBC 2017a).

Chemically treated knotweed canes can be left on-site to compost. Manually removed knotweed plants, plant parts and seeds must be bagged or tarped before transporting to a designated disposal site (such as, landfill or transfer station). It is recommended that transfer stations provide disposal bins intended solely for invasive plant species so that the plant matter within the container is transported in a sealed unit and properly disposed of at the landfill. All cut plant parts should undergo deep burial (at least 5-m-deep) at a landfill certified to take Noxious weeds (ISCBC 2017a).

FortisBC may utilize chemical or mechanical treatments, or both for known knotweed populations prior to construction. Knotweed infestation areas will be delineated and temporarily fenced with signage. Soils from the knotweed infestation areas will remain in those delineated areas and not reused elsewhere. If infestation soils are removed from the site, they will be disposed of properly to avoid spreading knotweed plant material or seed. Soil contaminated with knotweed plant material or seed will be handled carefully and either undergo deep burial or disposed of at a suitable disposal site. Disposal sites will be far enough away from water (Stak̲w) and drinking wells to enable herbicide treatment. Disposal sites should be monitored and managed as necessary (ISCBC 2017a).

Yellow iris reproduces quickly through seed dispersal, horizontal root systems, and fragmentation. Seeds and fragmented rhizomes float and can easily move downstream. Mechanical control is possible by hand-pulling, digging, or cutting yellow iris, however the risk of spread by fragmentation can be high. Laying heavy rubber matting as a benthic barrier for 2 to 3 months can smother the plants and exhaust their ability to regrow (ISCBC 2017b).

English holly spreads vegetatively and by seeds, and its successful climate adaptation makes it a high priority for management. Prevention is the best and most economic means to reduce the spread of English holly. Mechanical treatment (such as, pulling and digging) is recommended and should include measures to safely dispose if berries if they are found on the tree. Due to English holly's frequent occurrence within riparian areas, chemical control may not be practical (ISCMV 2021a).

Controlling English ivy will benefit native vegetation, as English ivy is known to smother understory growth as well as trees. Mechanical removal, including cutting and pulling are preferred management strategies over mulch or heat applications, in order to select for the invasive species rather than also eliminating desirable vegetation through control. Chemical control is most effective on young, establishing plants, which have more tender leaves than those of a mature plant, which are waxy and poorly absorb herbicide (ISCMV 2021a).

Dense patches of Himalayan blackberry prevent the establishment of native vegetation, the movement of wildlife and humans, and control is a significant economic burden throughout Metro Vancouver. Mechanical control (such as, hand-pulling, digging or grubbing, cutting or mowing, and tilling) is most effective, but may be used in addition to chemical control (ISCMV 2021b).

Control of Reed canarygrass can be complicated when the species is found among other invasive species in wetlands. Restoration efforts can benefit the control of Reed canarygrass; increasing competition to the species by planting native shrubs and grasses, in addition to mechanical control (such as, digging or covering populations with mulch, where feasible) are the most effective management strategies. Chemical control is not preferred in wetlands and may decrease competition with Reed canarygrass (ISCMV 2021c).

Scotch broom can interfere with native vegetation establishment, especially conifers, during restoration and the species can pose a fire hazard due to its high oil content. Deep roots and long seed viability means that control must account for mechanical removal followed by re-establishment of desirable species. Pulling and cutting, as well as strategic herbicide use may be used, but should include restoration using a native grass seed mix and selection of shrub species by a QP based on the local site moisture (ISCMV 2021d).

8.3.4 General Invasive Plant Species Management Measures

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Pre-Construction Inventory and Treatment	1. Invasive plant species surveys will be completed and locations of high priority invasive plant species (Appendix F) within the EGP Project Footprint will be identified on the EAS. [R-1102]	x		x	x	x	x
	2. Priority invasive plant species that are actively growing on the EGP Project Footprint during the construction window may be controlled prior to ground disturbance. [R-1103]	x		x	x	x	x
	3. To the extent practical, borrow pits that contain weeds that reproduce from plant propagules will not be used until weed species have been controlled. [R-1104]	x		x	x	x	x
Invasive Plant Species Awareness	4. Provide EGP Project workers (crew supervisors and EI) with information on invasive plant species prevention and control. Advise personnel of, and use, the IPSMP. [R-1105]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Invasive Plant Species Infestations	5. Do not park or store vehicles, equipment, materials or machinery on invasive plant species infestations. If an infested area must be used, treat or remove invasive plant species prior to use of the area. [NR-305]	X		x	x	x	x
Invasive Plant Species Prevention	6. Require equipment cleaning stations at key locations within the EGP Project Footprint. Provide the Contractor with a list that identifies the locations of weed cleaning sites. Weed cleaning sites will be located in areas of concerns associated with invasive plant species (Detail No. 21). [R-1106]	x		x	x	x	x
	7. To the extent practical, check that restoration seed mixes and EGP Project materials (gravel, fill, topsoil, mulch, straw, and plant stock) are free of Proposed Prohibited Noxious or Noxious seeds and plant propagules. Restoration seed will not contain seed of any plant classified as Provincially or Regionally Noxious or Proposed Prohibited Noxious. [R-1107]	x		x	x	x	x
	8. Inspect equipment for weeds (that is, any reproductive parts of weeds, including seeds, roots and rhizomes, flowers, and stem fragments) prior to entry onto the right-of-way. Identify equipment found not to contain weeds with a weed-inspected sticker specific to the EGP Project spread. [R-1108]	x		x	x	x	x
Invasive Plant Species Control	9. Monitor topsoil stockpiles during construction and develop corrective measures (such as, brushing, hand cultivation, seeding), if warranted, before weedy species mature and produce seed. [R-1109]	x		x	x	x	x
Invasive Plant Species Prevention	10. Provide EGP Project personnel (crew supervisors and EI) with information on invasive plant species prevention and control. Advise personnel of, and use, the IPSMP. [R-1105]	x		x	x	x	x
	11. Clean equipment at designated cleaning stations when leaving soil containment zones prior to continuing work on the right-of-way, unless full right-of-way stripping has been conducted. Stripping equipment and topsoil or root material handling equipment must be cleaned when leaving a soil containment zone. Shovels and compressed air can be used to clean equipment moving between containment zones. [R-1111]	x		x	x	x	x
	12. Clean the tracks and blades of topsoil handling equipment by hand (track shovel) before removing equipment from the weed-infested site, as directed by the CEC. Weed-infested material will remain in the soil containment zone as close to the weed patch as possible, or at the designated weed cleaning station. Hand cleaning will be conducted routinely before equipment enters adjacent land. [R-1112]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Invasive Plant Species Prevention (cont'd)	13. Topsoil salvage handling equipment shall be clean of soil and plant material before leaving locations with invasive plant species concerns. Locations with invasive plant species concerns will be identified by the CEC and shown on the EAS. [R-1113]	x		x	x	x	x
	14. Fills, gravels, stockpiled soil, and mulch materials will not be stored near high priority invasive plant species sites, as identified by the CEC. [R-1114]	x		x	x	x	x
	15. The CEC will approve weed-free fills, gravel, and mulch materials for use in the EGP Project Footprint based on inspections conducted at the material source. [R-1115]	x		x	x	x	x
	16. EGP Project vehicles and equipment will avoid driving and parking on vegetated areas unless they are designated for EGP Project use by the CEC. [R-1116]	x		x	x	x	x
Invasive Plant Species Cleaning Stations	17. As directed by the CEC, set-up, and use weed cleaning stations with high-pressure water, or compressed air. Track shovels at locations where blade and track cleaning by hand or other weed control measures. [R-1117]	x		x	x	x	x
	18. Construct weed cleaning stations at approved locations by stripping topsoil and constructing containment berms out of subsoil (Detail No. 21). Containment berms will not be required when clean-off is done with compressed air and track shovels. [R-1118]	x		x	x	x	x
	19. Install cleaning pad filter fabric under equipment being cleaned [R-1119]	x		x	x	x	x
	20. Construct cleaning stations large enough to accommodate the maximum size of equipment expected. [R-1121]	x		x	x	x	x
	21. Enter equipment consistently at one end and exit at another (Detail No. 21). [R-1122]	x		x	x	x	x
	22. Conduct cleaning to the satisfaction of the CEC. [R-1123]	x		x	x	x	x
	23. Pump out dirty water into a tank truck, as necessary, and dispose of water at an approved location or facility. [R-1125]	x		x	x	x	x
	24. Remove and dispose of filter fabric to an acceptable landfill when the cleaning station is dismantled. [R-1126]	x		x	x	x	x
	25. Backfill the cleaning station with bermed material. Any soils contaminated by petroleum-based or other undesirable materials from clean-off stations shall be removed in accordance with applicable requirements. [R-1127]	x		x	x	x	x
	26. When construction is complete, return topsoil and reclaim the cleaning station area. [R-1128]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Invasive Plant Species Control	27. Reduce soil disturbance adjacent to wetlands to the extent practical. [R-1129]	x		x	x	x	x
	28. Follow the control prescriptions of the SSISC and ISCMV for species listed in Table 8-1 of the CEMP. [R-1130]	x		x	x	x	x
	29. Invasive plant species listed on Schedule A of the *Weed Control Regulation* will be separated from other vegetation and disposed of appropriately. [CMP-1413]	x		x	x	x	x
	30. Local governments may have additional bylaws or recommendations for invasive plant species control, which will be implemented as part of site-specific invasive plant species management plans. [CMP-992]	x		x	x	x	x
	31. Invasive plant species control techniques conducted by the Contractor will be approved by the CEC. [R-1131]	x		x	x	x	x
	32. If seeding, use only Certified Canada No.1 seed from a local source that is free of Noxious, Proposed Prohibited Noxious, or SSISC-listed species. For native seed, obtain the highest seed grade available. Seed Certificates of Analysis will be obtained. Certificates will be retained for 1 year. Additional details for seeding and seed mixes are found in subsections 6.8 and 8.7. [R-1132]	x		x	x	x	x
	33. Monitor soil stockpiles during construction and control the growth of weeds on soil stockpiles by hand cultivating, brushing, mowing or, if necessary, using selective, non-persistent herbicides. Control will be initiated before weedy species mature and produce seed. [R-1133]	x		x	x	x	x
	34. Use chemical control with a systemic herbicide as a treatment strategy for knotweeds due to their extensive root structure and aggressive growth and reproduction. Treat knotweeds with herbicide for 3 to 5 years. [NR-607] Continue to monitor treatment areas after herbicide treatment has finished as knotweed can remain dormant for several years.	x		x	x	x	x
	35. Chemically treated knotweed canes can be left on-site to compost. Manually removed knotweed plants, plant parts and seeds must be bagged or tarped before transporting to a designated disposal site (such as, landfill or transfer station). It is recommended that transfer stations provide disposal bins intended solely for invasive plant species. This will confirm the plant matter within the container is transported in a sealed unit and properly disposed of at the landfill. All cut plant parts should undergo deep burial (at least 5 m deep) at a landfill. [NR-608]	x		x	x	x	x
	36. The Contractor will supply weed treatment and monitoring records to FortisBC. [PCM Framework]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Monitoring	37. The effectiveness of weed control measures conducted in the EGP Project Footprint, temporary construction facilities, and existing access roads will be assessed using the BC Invasive Alien Plant Program (IAPP) standards. Weed density and distribution within and adjacent to the Project area will be documented; weed control will be considered successful when weed density and distribution in the Project area is less than or equal to density and distribution in the adjacent area. Remedial weed control actions will be conducted if weed control efforts were not successful, or if new populations of Noxious, invasive, or weeds of regional concern establish. [R-1134]	X		x	x	x	x
Adaptive Management	38. Through the PCM program, FortisBC will monitor the effectiveness of weed control measures. Monitoring will occur every year for the first five years. If the mitigation for invasive plants is not effective, FortisBC will modify their approach through engagement with the Contractor and QP to determine different approaches .	X		x	x	x	x

8.3.5 Site-Specific Invasive Plant Species Management Methods

Site-specific invasive plant species management methods will be developed for infestations found in sensitive areas, as needed according to the CEC. Site-specific methods may be required for invasive plant species at known locations of plant species of concern or infestations of priority invasive plant species in aquatic habitats. The need for treatment and type of treatment will be determined in engagement with the Regional invasive plant species committees.

8.3.6 Monitoring

Condition/Concern	Mitigation Options
Year of Construction	1. The effectiveness of weed control measures conducted in the EGP Project Footprint and at the temporary construction facilities and existing access roads will be assessed. Remedial weed control actions will be conducted if weed control efforts were not successful. [R-1134] 2. Periodic monitoring of adherence to cleaning station policies and procedures will be conducted by the CEC. [R-1135]
PCM (First Five Years)	3. All equipment cleaning stations will be assessed in the growing season between March 15 and October 31. Weed species of concern that are identified at the sites will be managed. Manual removal of plants or chemical treatment will occur. If plants are manually removed, they shall be removed from the site and disposed of appropriately at a landfill facility. [R-1136] 4. To evaluate the effectiveness of the weed control program, general weed monitoring will be conducted at various locations within the EGP Project Footprint and along key access routes. [R-1137] 5. The Contractor will supply weed management and monitoring records to the CEC. [R-1138] 6. After the completion of the 5-year PCM Program, invasive plant species management will be released to FortisBC Operations and will follow the FortisBC vegetation management plans. [R-1139]

8.4 Acid Rock Drainage and Metal Leachate Management

8.4.1 Purpose and Objectives

The construction of a pipeline through complex topographic conditions will involve extensive excavation and disturbance of bedrock, including cut-and-fill operations and grading for right-of-way preparation, portal and tunnel construction, pipe trench excavation and backfilling, as well as use of bedrock-derived borrow materials and the disposal of excess bedrock materials associated with specific construction activities.

Where sulphide-bearing mineral assemblages in bedrock can signify PAG rock, leading to ARD/ML conditions being present, these excavation activities may expose fresh rock surfaces to weathering conditions resulting in potential release of ARD/ML impacted runoff to the environment.

This section summarizes measures that will be implemented to identify ARD/ML-susceptible bedrock and to mitigate potential adverse effects on the receiving environment that could result from the disturbance of ARD/ML prone bedrock material encountered during construction of the Project.

This section:

- defines roles and responsibilities for the identification and management of ARD/ML prone materials on the Project;
- describes the mitigation measures for avoiding, excavating, managing and storing ARD/ML prone bedrock during construction of the Project; and
- establishes requirements for reporting and monitoring (Ínexwantas) programs during construction of the EGP Project to assess the performance of material management and storage strategies.

Roles and responsibilities and the applicability of mitigation measures will differ between the pipeline, facilities, and the tunnel components of the Project.

8.4.2 Regulatory Framework

The ARD/ML Management Plan must be consistent with Provincial and Federal guidelines and policies pertaining to ARD/ML characterization and mitigation, which includes:

- Guidelines for Metal Leaching and ARD at Minesites in British Columbia (Price and Errington 1998)
- Guidelines and Recommended Methods for the Prediction of Metal Leaching and ARD at Minesites in British Columbia (Draft) (Price 1997)
- Policy for Metal Leaching and ARD at Minesites in British Columbia (BC Ministry of Energy and Mines and BC Ministry of Environment, Lands and Parks 1998)
- Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. Mine Environment Neutral Drainage (MEND) Report 1.20.1 (Price 2009)
- List of Potential Information Requirements in Metal Leaching/ARD Assessment and Mitigation Work (Price 2005)
- Engineering Manual (BC MFLNRORD 2019)
- British Columbia Ministry of Environment Approved and Working Water Quality Guidelines
- Evaluating the Potential for ARD and Metal Leaching at Quarries, Rock cut sites and from Stockpiled Rock or Talus Material used by the BC MoTI (BC MoTI 2013)

8.4.2.1 Guiding Principles

The Policy for Metal Leaching and ARD at Minesites in British Columbia (BC Ministry of Energy and Mines and BC Ministry of Environment, Lands and Parks 1998) outlines guiding principles for the development of ARD/ML management planning and were considered for the Project, including:

- Ability and Intent – A proponent must demonstrate that they have the necessary understanding, site capacity, technical capability, resources and intent to operate in a manner which protects the environment though mitigation plans.
- Site-specific – The current regulatory philosophy appreciates that the project area has a unique set of geological and environmental conditions and therefore ARD/ML will be evaluated on a site-specific basis.
- ARD/ML Program – Whenever significant bedrock will be excavated or exposed, the proponent is responsible for the development and implementation of an effective ARD/ML program.
- Prediction and Prevention – The primary objective of an ARD/ML program is prevention. This will be achieved through prediction, design and effective implementation of appropriate mitigation strategies by understanding of materials geochemical characterization and implementing appropriate mitigation.
- Contingency – Contingency plans will be required when existing plans create unacceptable risks to the environment as a result of uncertainty in either the prediction or primary mitigation measures.
- Reduce Impacts – Where ARD/ML cannot be prevented, reduce impacts to levels that assure long-term protection of the environment.
- Cautious Approach – Conservative assumptions will be applied where either the ARD/ML assessment or the current level of understanding is deficient.

- Reasonable Assurance – The regulation of ARD/ML will be carried out in a manner which reduces environmental risk and with reasonable assurance that government will not have to pay the costs of mitigation.

8.4.3 Roles and Responsibilities

FortisBC has completed ARD/ML assessments and developed guidance documents for each Project component. The Tunnel Contractor will be responsible for developing a plan to identify, characterize, handle, test, manage, and dispose of PAG and ML-susceptible bedrock encountered during tunnel construction activities. The pipeline and facilities Contractor scope will cover the handling and disposal of PAG bedrock as the procedures that they are required to follow are outlined in the ARD/ML Management Plan in development by FortisBC. Additional details regarding the roles and responsibilities are provided below and subsection 8.9.3.

Tunnel Contractor Roles and Responsibilities

The Tunnel Contractor will engage or appoint a QP who will be responsible for the overall assessment and mitigation of ARD/ML prone bedrock during tunnel construction. The QP must be registered as a professional geoscientist or engineer with Engineers and Geoscientists of BC, have experience with ARD/ML evaluation, and have geological field mapping experience.

The QP, or someone working under the supervision of the QP, will complete ARD/ML assessment during excavation of the Bedrock Tunnel. The QP shall be responsible for:

- developing the Tunnel Contractor's ARD/ML Management Plan;
- developing a procedure for identification of ARD/ML prone bedrock;
- directing segregation of excavated bedrock at surface with the Contractor, based on findings of ARD/ML assessment during construction;
- reviewing findings of bedrock assessment (inspection and on-site testing) to verify compliance; and
- reporting detailed findings of rock assessment and ARD/ML confirmation (visual, on-site, and off-site testing results) and if needed, quantities of bedrock segregated in monthly monitoring (Ínexwantas) reports for filing and circulation. Summary findings shall be conveyed to the designated FortisBC representative on a regular basis, as determined between the Tunnel Contractor and FortisBC.

The QP will make decisions regarding ARD/ML mitigation in collaboration with FortisBC.

The Tunnel Contractor shall also be responsible for:

- providing training to applicable Project personnel involved in the determination of ARD/ML prone bedrock by the appointed QP;
- monitoring (Ínexwantas) the tunnel excavation for indicators of ARD/ML prone bedrock in coordination with the Contractor Construction Management Team;
- collecting rock samples to send for testing to determine ARD/ML potential;
- designing and implementing a method to segregate ARD/ML prone bedrock until test results are available;
- handling, temporary storage, and disposal of ARD/ML prone rock during construction;
- segregating and temporary stockpiling of confirmed ARD/ML prone bedrock material at site;

- identifying adaptive management for variations in expected conditions; and
- preparing and logging monthly reports of findings, handling, storage, and disposal of ARD/ML prone bedrock and confirmed ARD/ML assessment results for circulation to the Construction Management Team representative, EI, or designated FortisBC representative.

Tunnel Contractor ARD/ML Management Plan

The Tunnel Contractor must submit an ARD/ML Management Plan to FortisBC for review and approval. The ARD/ML Management Plan will include:

- details on the approach to excavation, storage and monitoring (Ínexwantas) of ARD/ML prone bedrock during tunnel construction;
- details on sampling, identification, segregation and disposal of ARD/ML prone bedrock generated during tunnel construction activities;
- details on environmental protection;
- a Care of Water (Staq̲w) Plan that describes the measures the Contractor will implement during construction regarding how ARD/ML prone bedrock contact water (Staq̲w) will be managed, including water treatment as needed, to verify that the water (Staq̲w) meets the applicable discharge criteria prior to entering the receiving environment; and
- a description of the water (Staq̲w) quality monitoring (Ínexwantas) that will be conducted, including sampling locations, frequency, analytical approach and test result thresholds which may require that the water (Staq̲w) be stored or treated prior to being discharged.

The ARD/ML Management Plan is to be developed by a QP, as described above, in accordance with applicable regulatory requirements and this section. The FortisBC Environment Inspection Team and Construction Management Team will review the ARD/ML Management Plan and monitor its implementation during tunnel construction activities.

The Tunnel Contractor will receive approval from FortisBC for management and mitigation of ARD/ML prior to any disturbance, exposure, or disposal of bedrock from tunnel construction activities.

FortisBC Roles and Responsibilities: Pipeline and Facilities

FortisBC will engage or appoint a QP who will be responsible for the overall assessment and prescription of mitigation of ARD/ML prone bedrock during construction of the pipeline and facilities component of the Project. The QP must be registered as a professional geoscientist or engineer with Engineers and Geoscientists of BC, have experience with ARD/ML evaluation, and have geological field mapping experience.

The QP, or someone working under the supervision of the QP, will coordinate ARD/ML assessment both prior to and during pipeline and facilities construction. The QP shall be responsible for:

- developing the ARD/ML Management Plan for the pipeline and facilities components of the Project;
- developing a procedure for identification of ARD/ML prone bedrock for the Construction Management team, the Contractor and the EI;
- directing segregation of excavated rock with the Contractor, based on findings of the assessment.

- providing training to applicable Project personnel involved in the assessment of ARD/ML prone bedrock by the appointed QP;
- monitoring (Ínexwantas) construction activities for indicators of ARD/ML prone rock in coordination with the Construction Management Team and the Contractor;
- collecting bedrock samples for testing to determine ARD/ML potential;
- identifying adaptive management for variations in expected conditions; and
- preparing and logging monthly reports of findings, handling, storage, and disposal of ARD/ML prone rock and confirmed ARD/ML assessment results for circulation to the Construction Management Team representative and/or designated representative. The QP will make high level decisions regarding ARD/ML mitigation in collaboration with FortisBC and the Contractor.

Pipeline and Facilities Contractor Roles and Responsibilities

FortisBC is responsible for developing an ARD/ML Management Plan for the pipeline and facilities components of the Project. The pipeline and facilities Contractors are responsible for:

- following the guidance and mitigation measures prescribed in the ARD/ML Management Plan provided by FortisBC;
- designing and implementing a method to segregate ARD/ML prone bedrock identified by the QP until assessment results are available;
- handling, temporarily storing, transporting and disposing of ARD/ML prone bedrock during construction;
- segregating and temporary stock piling of confirmed ARD/ML prone bedrock material at site;
- providing the Construction Management team and the EI with volumes of ARD/ML prone bedrock temporarily stockpiled and disposed of.

8.4.4 Completed ARD/ML Assessment During Pre-Construction

A preliminary ARD/ML study was completed for the EGP Project in 2014 (AMEC 2014). Since that time, desktop, field sampling, and laboratory testing has been completed at various locations to determine the risk of ARD/ML at and along the Project components, including:

- a field program that visually assessed bedrock outcrops along the alignment and collected rock samples for ARD/ML static analysis (Thurber 2020, 2021);
- a laboratory testing program on select bedrock samples for acid base accounting, total metals determination, and shake flask extraction and leachate analysis. A selection of samples was also submitted for analyses by x-ray diffraction using Rietveld refinement to assist with mineral identification (Thurber 2020, 2021); and
- ARD/ML characterization focused specifically on the area of the Bedrock Tunnel excavation. Results indicated that bedrock within the central area of the Bedrock Tunnel are classified as PAG or have uncertain acid-generating potential. Analysis including static testing and humidity cell testing (Tetra Tech 2019).

8.4.5 Mitigation for Discovery of Potential Acid-Generating Rock

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
ARD/ML	1. Implement the guiding principles outlined in Draft Guidelines and Recommended Methods for the Prediction of Metal Leaching and ARD at Minesites in British Columbia (Price 1998). [R-1241]	x	x		x	x	x
	2. Develop an EGP Project-specific identification, prediction, management, and mitigation protocol, consisting of advance sampling and testing of outcrops, stockpiling of suspect materials pending test results, and stockpiled resources for the mitigation of PAG materials as they are encountered. [R-1242]	x	x		x	x	x
	3. To the extent practical, reduce disturbance to identified areas of PAG rock through micro-routing. [R-1243]	x					
	4. In the event that suspected ARD/ML prone bedrock is discovered during construction, the material will be temporarily stockpiled at the construction site while the required follow-up assessments are completed. [NR-626]	x	x		x	x	x
	5. In the event that follow-up analysis confirms that excavated bedrock materials have the potential to cause ARD/ML, the material will be managed in accordance with the ARD/ML Management Plan and applicable regulatory requirements. [NR-627]	x	x		x	x	x
	6. Where ARD/ML prone bedrock is suspected within the tunnel, it will be inspected by a QP after it has been excavated during the tunnel boring process. Samples of rock will be taken and tested following acid-based accounting methods as per the Mine Environment Neutral Drainage Guidelines (MEND 2009). Bedrock that is confirmed to have ARD/ML potential, will be segregated, managed, or disposed of in a controlled manner as determined by the QP. During construction, water (Stak̲w) will be treated and processed prior to disposal, adhering to applicable permit conditions. Water samples will be collected and analyzed routinely during construction. [NR-460]		x				
	7. Install measures that will seal groundwater and reduce potential ARD/ML conditions along the tunnel alignment, where practical to limit water flows and oxygen access to PAG rock. [NR-625]		x				
	8. Manage the water at the excavation sites and the tunnel, as warranted. Place pumps above ground on a tray or within an excavated sump lined with polyethylene sheeting. Pump water into appropriate water conveyance and storage features (such as, settling ponds) for containment and treatment prior to discharge. Monitor precipitation forecasts and proactively manage water for surface excavations to avoid the collection/infiltration of volumes that may overwhelm existing water control measures. [NR-461]		x	x	x		

8.4.6 Monitoring

FortisBC's Construction Management and Environmental Inspection Team will monitor construction activities to determine whether regulatory requirements are being met and the component specific ARD/ML Management Plans are being successfully implemented. The Design Build Tunnel Contractor will also have a full-time team of dedicated staff to control, manage, and inspect the works continually.

For the tunnel component, monitoring (Ínexwantas) will be conducted so that the tunnel spoil is constantly monitored for signs or traces of sulphide mineralization and staining and will conduct ARD/ML assessment by consistent rock monitoring and testing.

At locations where ARD/ML prone bedrock is suspected, samples will be taken as required and sent for testing to an approved laboratory to accurately determine ARD/ML classification.

8.4.7 Reporting

The results of monitoring (Ínexwantas) and laboratory testing will be documented as described in the component specific ARD/ML Management Plans. The QP will use monitoring (Ínexwantas) results to determine if additional measures or corrective actions are warranted, through engagement with regulatory agencies, as required. The result of monitoring (Ínexwantas) will be communicated to the regulatory agencies and Indigenous nations depending on the location and type of storage.

8.4.8 Adaptive Management

Contingency measures will be prepared and implemented to respond to potential issues resulting from deficiencies in the design, construction or operation of mitigation, or the release or leak of potentially contaminated water (Stak̲w) from ponds, ditches, or channels. Contingency measures will be described in the component specific ARD/ML Management Plans and will include an adaptive management response framework, including specific mitigation developed as contingency.

8.5 Fire Preparedness Plan

8.5.1 Purpose and Objectives

In addition to General Measures found in Section 6 for mitigating fire risk, the Fire Preparedness Plan will be designed to reduce the potential risks of fire during construction and to respond effectively and efficiently if a wildfire occurs. All aboveground construction activities must comply with the BC *Wildfire Act* and BC *Wildfire Regulation*. Prior to clearing and logging, the Contractor will prepare, and will submit to FortisBC for review, a Fire Preparedness Plan that complies with all aspects of the BC *Wildfire Act* and BC *Wildfire Regulation*.

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Fire Suppression Measures	1. The following standard measures will be adhered to during construction of the EGP Project. ▪ Prior to commencement of construction, the Contractor will designate a Fire Boss. The Fire Boss will be familiar with firefighting techniques and equipment and will have some degree of fireline certification (such as S-100 Basic Fire Suppression and Safety) and fire experience, or knowledge of fire weather and fire behaviour. ▪ The Fire Boss will work with emergency response crews and Local authorities to inspect and provide advice for safe work around the pipeline. ▪ All activity inspectors and Contractors' vehicles (except equipment used underground) will carry firefighting equipment in accordance with the BC *Wildfire Regulation* including the following firefighting equipment: pulaskis; shovels; and fire extinguishers. In addition, motorized equipment must carry a fully charged fire extinguisher. The Fire Boss will confirm that fire extinguishers are present and fully charged. ▪ The Fire Boss will make sure that the belly pans of crawler tractors and spark arrestors on engines and exhausts are periodically removed, cleaned, and inspected. Any spark arrestors that are worn or in disrepair will be replaced. [R-849]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
In the Event of a Wildfire	2. The following mitigation measures will be implemented in the event of a wildfire. ▪ Commence fire suppression measures immediately upon detection of fire provided that fire conditions allow personnel to safely proceed. ▪ As soon as practicable, report location of fire, as well as size of fire and wind direction, to BC Wildfire Service and then to the Fire Boss. ▪ Fire Boss will report wildfires and relevant information to the FortisBC Construction Manager, Contractor Project Manager, BC MoF Wildfire Management Branch and local fire department (if in a municipality). ▪ Fire Boss will deploy firefighting equipment and crew to plow or clear fire breaks or extinguish the fire directly to the extent practical. All equipment and personnel shall be made available to control the fire. Effort of fire control will be subject to safety considerations including fire conditions, fitness of personnel and equipment availability. ▪ Fire Boss will inspect the fire site as soon as practical and take charge of directing suppression measures. ▪ In coordination with BC Wildfire Service, the Fire Boss will deploy additional crew and machinery as needed and will request assistance of BC MoF Wildfire Management Branch, local fire department, and applicable Municipal District, if Contractor resources are inadequate (Appendix A). Fire suppression measures shall continue until the fire is extinguished or until otherwise notified by the applicable regulatory agency. ▪ To the extent practical, promptly move explosive or flammable materials to a safe location whenever there is a risk of combustion. ▪ In coordination with BC Wildfire Service, the Fire Boss will be responsible for checking for unextinguished burning embers and will monitor the burn area for smouldering material. Employ infrared scanning equipment to detect any hot spots, if required. [R-850]	x		x	x	x	x
Fire Protection for Siiyamin ta Skwxwú7mesh	3. The Fire Boss will be familiar with location of the cultural sites (as shown on the EAS) and the importance of reducing the impacts of wildfire on those sites [CMP-1011, 2045].	x		x	x	x	x
	4. Maintain a water truck on the EGP Project Footprint when the fire hazard is high, as determined by the BC Wildfire Service. [R-185]. Additional: Locate this water truck in proximity to the cultural sites. [CMP-1011].	x		x	x	x	x
	5. Provide an on-site storage box in proximity to the cultural site that contains two shovels, two pulaskis, one fire extinguisher or wildland fire backpack pump. The Fire Boss or Contractor will have discretion to add more firefighting equipment [CMP-1011, 2046].	x		x	x	x	x

8.6 Waste Management Plan

8.6.1 Purpose and Objectives

The Waste Management Plan outlines specific environmentally-responsible measures for handling, storage, and disposal of EGP Project-related waste also in accordance with applicable legislation. The plan will reduce the likelihood of an accidental release of potentially hazardous products into the environment during construction.

The plan applies to all FortisBC personnel, Contractors, and Consultants who conduct work on the EGP Project. All personnel, Contractors, and Consultants will abide by Federal, Provincial, and local requirements for the storage, handling, transport, and disposal of waste as well as spill reporting requirements of products and waste materials that are potentially hazardous to the environment.

The EI and CEC are responsible for ensuring compliance with applicable codes, regulations, and industry standards for waste management. Where a discrepancy occurs, the most stringent requirements apply. If a spill of waste material occurs, the Spill, Fuel and Hazardous Materials Contingency Plan (subsection 9.6) will be implemented. The Spill, Fuel and Hazardous Materials Contingency Plan sets forth the lines of communication and procedures to follow in order to facilitate containment and clean-up if a spill occurs.

8.6.2 Applicable Waste Management Regulations and Guidelines

Table 8-2 provides information on the provincial and federal waste management regulations related to the plan.

Table 8-2. Federal, Provincial, and Municipal Waste Management Regulations

Jurisdiction	Regulations and Guidelines
Federal	▪ Canada Labour Code, *Oil and Gas Occupational Safety and Health Regulations*, Part XI Hazardous Substances ▪ *Hazardous Products Act*, *Controlled Products Regulations*, and *Ingredients Disclosure List Regulation* ▪ *TDG Act* ▪ *Canada Shipping Act*
Provincial	▪ *Environmental Management Act* – *Contaminated Sites Regulation* – *Hazardous Waste Regulation* – *Oil and Gas Waste Regulation* – *Recycling Regulation* – *Spill Contingency Planning Regulation* – *Spill Preparedness, Response and Recovery Regulation* – *Spill Reporting Regulation* – *Waste Discharge Regulation* ▪ *Fire Services Act* – BC Fire Code ▪ *Health Act* ▪ *OGAA* – *Environmental Management and Protection Regulation* ▪ *Pipeline Act, Pipeline Regulation* ▪ *Workers Compensation Act* – *Occupational Health and Safety Regulation*, Part 5 Chemical Agents and Biological Agents ▪ *WAS* – *Groundwater Protection Regulation*
Municipal	▪ City of Coquitlam Bylaw No. 4679, 2016 ▪ District of Squamish Bylaw No. 2547, 2017

8.6.3 Guiding Principles

The following general guiding principles have been incorporated into the plan:

- Reasonable preventative measures will be taken to avoid the release of hazardous and non-hazardous materials into the environment.
- All hazardous material spills will be reported to the EI or CEC and to the regulatory agencies, if warranted.
- All hazardous and non-hazardous material spills will be cleaned up.
- Hazardous and non-hazardous materials will, to the extent practical, be recycled, disposed of, or moved to an approved area as needed.

8.6.4 Application

This Waste Management Plan applies to the EGP Project Footprint. An overview of plan will form part of the Orientation Program for the construction management teams, EI and CEC, and Contractor inspection and supervisory personnel, as well as environmental awareness for EGP Project personnel and visitors.

8.6.5 Description of Wastes

Potential EGP Project-related wastes have been divided into solid and liquid waste. Both categories may contain hazardous and non-hazardous wastes.

Hazardous waste includes any product, substance, or mixture thereof that is declared to be harmful, hazardous, toxic, controlled, restricted, or prohibited under any Federal or Provincial environmental law, such as the *Hazardous Waste Regulation* and *TDG Regulations*. The use, storage, manufacture, transportation, handling, or release of hazardous materials into the environment are prohibited, controlled, and regulated under Federal and Provincial environmental laws.

8.6.6 Solid Waste

Solid non-hazardous waste includes garbage and debris generated through activities during construction and restoration. These wastes are non-hazardous in nature and may include, but are not limited to:

- human wastes (such as, food wastes and sewage);
- pipe tape and coating;
- spent welding rods;
- grinder pads;
- styrofoam and plastics;
- wood;
- wire;
- survey stakes and flagging tape;
- used geotextile; and
- metal strapping.

Solid, non-hazardous waste generated during construction is similar to waste generated by households, agricultural activities, and small businesses.

8.6.7 Liquid Waste

Liquid wastes, if not properly contained, may impact the environment if allowed to seep into porous ground material. Some hazardous wastes such as lubricating oil, methanol and antifreeze contain components that are toxic to plants and animals. In addition, many of these materials are readily flammable or explosive. Antifreeze (that is, ethylene glycol) has a sweet smell and may attract wildlife (Sekw'ekw'inexw). Should these products enter the environment, localized contamination would require either removal of contaminated soil and vegetation, or in situ remediation.

Hazardous liquid waste may include, but is not limited to:

- cleaning products;
- fuels;
- lubricants (such as, engine oil, transmission or drive train oil, hydraulic oil, gear oil, and lubricating grease);
- coolants (such as, ethylene glycol, and propylene glycol);
- paints and solvents; and
- glues (including epoxy and urethane coating products) and cements.

8.6.8 Industrial Waste

Industrial waste includes products generated during construction that are not necessarily hazardous in and of themselves but may contain quantities of potentially toxic substances in the form of residual substances (such as, used lube oil, antifreeze), which if released into the environment, may cause localized contamination of soil, surface water (Stak̲w) or groundwater, and must therefore be managed carefully. Industrial waste may include, but is not limited to:

- used lube filters;
- spent grease cartridges;
- containers and cans (such as, oil and antifreeze);
- contaminated soil, vegetation, or absorbents, which may contain hydraulic fluid, gasoline, diesel, or lube oil; and
- contaminated hydrovac slurry.

Industrial waste containing potentially hazardous substances that is not accepted at local recycling facilities will be managed and disposed of according to applicable Federal, Provincial, or Municipal environmental law and will follow the mitigation measures outlined in subsection 8.6.9.

Industrial waste generated during construction that is recyclable will follow the mitigation measures outlined for recyclable materials in subsection 8.6.9.

8.6.9 Waste Management Mitigation Measures

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
General	1. To the extent practical, construction yards and staging areas will be selected and designed to: ▪ avoid wetlands, watercourses, sensitive vegetation, highly permeable soils, steep slopes, and water supply wells; ▪ prevent vehicle incidents by providing unobstructed access for delivery vehicles and emergency vehicles; ▪ provide unobstructed access and egress to and from emergency response materials and equipment; and ▪ provide safe storage areas, including secondary containment, for liquid hazardous wastes. [R-1030]	x	x	x	x	x	x
	2. EGP Project personnel with waste management responsibilities will be educated in accordance with regulatory requirements. Personnel shall be made aware of their responsibilities for proper handling, identification, disposal, documentation, and storage of wastes. [R-1031]	x	x	x	x	x	x
	3. Prohibit depositing construction waste in watercourses, wetlands, or NCD. [R-1142]	x	x	x	x	x	x
	4. Store garbage with potential to be a wildlife-attractant in wildlife-proof containers. [R-145]	x	x	x	x	x	x
	5. An appropriate number of portable toilets shall be made available so that each crew has access to washroom facilities. The facilities will be serviced, cleaned regularly and adequately secured. Site personnel will use portable toilets as provided. [R-1033]	x	x	x	x	x	x
Hazardous Waste Storage	6. If hazardous wastes are generated, the Contractor will register as the generator of the hazardous wastes [NR-580]	x	x	x	x	x	x
	7. Hazardous waste will be stored according to its Safety Data Sheet (SDS), and may include secondary containment, covering, and secured storage containers, where appropriate. Hazardous waste will be stored a minimum of 30 m outside of the RMAs of watercourses and wetlands and 30 m back from NCDs. [R-1045]	x	x	x	x	x	x
	8. Hazardous waste storage areas will be clearly identified and secured. Waste stored in any containers must be clearly labelled to comply with Workplace Hazardous Materials Information System (WHMIS) Regulations. Documentation will be maintained on waste being stored at EGP Project facilities. [R-1049]	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Hazardous Waste Storage (cont'd)	9. Hazardous waste storage areas shall be inspected on a routine basis in accordance with applicable regulations. Identified problems or deficiencies shall be corrected. [R-1050]	x	x	x	x	x	x
	10. Hazardous wastes will be separated by type (such as, waste oil). [R-1051]	x	x	x	x	x	x
	11. Contractors will remove secondary containment structures at the end of construction and where applicable, return the impoundment area to its original contours and appearance, including establishing appropriate drainage patterns and vegetation cover. [R-1052]	x	x	x	x	x	x
	12. Bulk tanks containing hazardous waste will be contained in a bermed area lined with an impervious polyethylene liner. The containment berm will be impermeable and large enough to contain 110 percent of the largest tank plus 10 percent of the aggregate tank volume within the containment area or as otherwise specified by regulatory requirements. Secondary containment for hydrocarbons will be designed and sized in accordance with applicable Provincial and Federal requirements. Any rainwater that accumulates within the containment structure may be removed if authorized by the EI. If there is visible hydrocarbon sheen, the water in the containment structure will be collected for proper storage and disposal. [R-1047]	x	x	x	x	x	x
	13. Contractors will visually inspect aboveground fuel tanks on a regular basis as well as when the tank is refilled. Inspection records will be maintained for each tank. Should a leak be detected, remedial action will be taken as soon as practical. Provide records to the EI and CEC. [R-1048]	x	x	x	x	x	x
	14. Bulk hazardous waste will be appropriately labelled in accordance with the *TDG Regulation* and WHMIS Regulations for worker protection during handling and incident response. Products will be labelled appropriately, and material SDS will be available for each product stored at a construction yard or staging area. [R-1054]	x	x	x	x	x	x
Use of Waste Products	15. Containers and tanks will be closed when not in use. Drain valves will be locked to prevent accidental or unauthorized releases. [R-1055]	x	x	x	x	x	x
	16. Procedures for safe loading and unloading of bulk products will be followed including: ▪ service vehicles will be equipped with automatic shut-off valves; ▪ brakes will be set; ▪ wheels will be chocked, where required; ▪ the vehicle will be grounded if the product is flammable; ▪ the operator will observe loading and unloading operations; and ▪ when complete, the operator will examine outlets for leakage and take corrective action, if warranted. [R-1056]	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Waste Disposal	17. Collect construction garbage, food, industrial waste, and debris on a frequent basis, and dispose of waste at an appropriate facility to avoid the attraction of wildlife and to reduce odours. Each construction site will be equipped with adequate garbage receptacles (that is, at least one per crew or work area) for solid non-hazardous waste and debris. [R-141] Refer to the District of Squamish waste diversion program and the 'What Goes Where' guide.	x	x	x	x	x	x
	18. Prohibit the installation of waste collection receptacles or portable toilets within 50 m of environmentally sensitive features, where practical (such as, near rare plants or ecological communities of concern, sensitive wildlife habitat, or immediately adjacent to watercourses and wetlands etc.) [R-143]	x	x	x	x	x	x
	19. Receptacles for recycling various products (such as, paper, cardboard, glass, tin) will be available at the Contractor's yard if practical and will be hauled to appropriate recycling depots. [R-1060] Refer to the District of Squamish waste diversion program and the 'What Goes Where' guide.	x	x	x	x	x	x
	20. Receptacles for industrial wastes generated during construction will be provided and labelled to keep them segregated from non-hazardous waste. [R-1061]	x	x	x	x	x	x
	21. Used oil and oil filters will be placed in a sealed container and delivered for disposal by a qualified service Contractor. [R-1062]	x	x	x	x	x	x
Hydrovac Slurry	22. Implement the appropriate measures presented in the Contaminated Soils Discovery Contingency Plan (Section 9) if contaminated or potentially contaminated soils are discovered during hydrovac activities. [R-222]	x		x	x	x	x
Record Keeping and Documentation for Hazardous Wastes	23. Provincial manifest records must be signed by an authorized Contractor representative with current TDG certification when waste is transferred from a temporary storage facility for transport to a final disposal location. [R-1063]	x	x	x	x	x	x
	24. Provincial manifest records must be reconciled in accordance with regulatory requirements. Until notification that the waste has been received at its final disposal location, the waste is the responsibility of the Contractor. [R-1064]	x	x	x	x	x	x
	25. Copies of the manifest records must be kept in a central location by FortisBC according to regulations. [R-1065]	x	x	x	x	x	x

8.7 Restoration Framework

This section provides a summary of the Restoration Framework. The Restoration Framework provides information for the final Restoration Plan to be completed prior to the restoration phase and will address restoration measures for EGP Project activities that disturb Crown land, Traditional Territory, and privately-owned land.

8.7.1 Purpose and Objectives

Restoration measures may be applicable to areas affected by activities within the EGP Project Footprint prior to construction, during construction and post-construction. The Restoration Framework provides information on general restoration measures as well as special area restoration

The objectives of the Restoration Program outlined in the Restoration Framework include:

- Adhering to all applicable legislation and EGP Project permits
- Reducing impacts to the natural environment and where possible, promote species diversity and habitat structure in sensitive areas disturbed by the EGP Project

8.7.2 Restoration Measures

In general, measures implemented prior to construction address the protection of sensitive features, invasive plant species management, development of temporary access roads, and clearing and grading of the right-of-way, TWS, and ETWS. Restoration measures during construction target soil and rock handling and water (Stak̲w) and erosion control activities and post-construction measures focus on restoring the natural topography, revegetating disturbed soils, and removing temporary access and disposal of surplus disturbed materials.

Final clean-up and restoration activities will be conducted as soon as practical following construction. The Framework provides information on the restoration measures during the pre-construction phase, construction phase and post-construction; these measures are provided throughout Section 5, 6, and 7. Construction and restoration activities may occur in parallel at multiple locations along the EGP Project Footprint. Final clean-up and restoration activities typically are 3 to 5 months in duration; however, timing of activities and overall duration will be dependent upon the construction schedule.

The Restoration Framework provides information on general restoration measures for temporary and permanent access, clearing, topsoil salvage, grading and replacement. Restoration measures also seeding and biostabilization as well as areas for include natural regeneration. Special area restoration measures include contaminated sites, forest land (old forests, OGMAs, and reforestation), municipal lands and privately-owned lands. The Restoration Framework provides measures for culturally important vegetation, provincially Red- and Blue-listed plants and ecological communities as well as watercourse crossings, wetlands and wildlife habitat.

PCM will measure the effectiveness of the restoration measures during the first five growing seasons following completion of final clean-up. Subsection 10.3 provides information on the PCM framework.

8.8 Emergency Preparedness and Response Plan Requirements

8.8.1 Purpose and Objectives

The purpose of the Emergency Preparedness and Response Plan is to facilitate the management of incidents and emergencies effectively during construction of the EGP Project. This section on Emergency Preparedness and Response Plan Requirements has been prepared to provide the framework for the development of Contractor Emergency Preparedness and Response Plan(s) for the management of incidents and emergencies during construction of the EGP Project. Contractor Emergency Preparedness and Response Plan is expected to consider and interface with the FortisBC Project Emergency Management Requirements for Contractors, and to meet the following objectives:

- prevent injury responders and public;
- prevent injury to the public;
- reduce damage to public and private property;
- reduce damage to the environment; and
- restore or continue operations in a safe manner.

The Contractor's Emergency Preparedness and Response Plan must delegate specific responsibilities to members of their workforce and provide necessary training to allow workers to meet their responsibilities during an emergency, including having key personnel trained and familiar with the terms of communications protocols and organizational structures. A summary of topics to be included in the Contractor Emergency Preparedness and Response Plan and a preliminary framework for emergency response is provided as follows.

8.8.2 Topics to be Included

The potential emergencies that are relevant to the construction of the EGP Project should be addressed by the Contractor Emergency Preparedness and Response Plan. For each type of emergency, the Contractor should identify:

- Immediate actions upon discovering an emergency and which additional appropriate actions will be taken while emergency conditions exist.
- Responsible personnel for each action.
- Required corrective and preventative action items after the completion of an after-action report.

8.8.3 Components

Contractor Emergency Preparedness and Response Plan may include the following components as outlined in the FortisBC Projects Emergency Management Requirements for Contractors (FortisBC 2021) :

- Distribution lists;
- Emergency contacts cists;
- Plan activation protocols;
- Responder checklists;
- Public protection measures;
- Emergency response protocols and equipment for specific incidents; and
- Plan administration and forms.

8.8.4 Protester Management

The Protect Scenarios for Workers (FortisBC 2019) outline the procedures for supervisors and workers if they encounter anti-project persons or groups that approach them of the EGP Project area during active construction. The procedures should provide information on various scenarios including, for example:

- Protestors show up or verbal abuse from a distance is occurring (no physical threat)
- Risk to your personal safety (the protesters are actively trying to obstruct you from working)
- Pushed, spit on, horn blown in ear, throwing rocks, wood, or other debris at you (these actions are assault)

Protestor management procedures will include information on notifications and required documentation.

8.8.5 Mitigation Measures for Emergency Preparedness and Response

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Pre-Planning and Emergency Prevention	1. Require key Contractor personnel to attend the pre-job meeting with FortisBC. Confirm roles and responsibilities for emergency response at the pre-job meeting. [R-27]	x	x	x	x	x	x
	2. Implement the FortisBC Fit for Duty Policy, to restrict workers from distributing, possessing, consuming or using alcohol, cannabis or illegal drugs on the EGP Project, or in any vehicle, or any other piece of equipment used for the EGP Project. [NR-276]	x	x	x	x	x	x
	3. Employ the required number of trained and qualified persons to provide sufficient medical coverage based on the work being performed at each of the respective sites in accordance with WorkSafeBC Regulations. These numbers will be determined based on the WorkSafeBC first aid assessment procedures. [NR-223]	x	x	x	x	x	x
	4. Conduct notifications with the District of Squamish community representatives, Squamish Nation, and regulatory agencies in accordance with the FortisBC Projects Emergency Management Requirements for Contractors (FortisBC 2021) and the CSIMP. [NR-420]	x	x	x	x	x	x
	5. Monitor local and disaster notification services (for example, Emergency Info BC) to receive any advanced warning of extreme weather events or natural disasters. [NR-570]	x	x	x	x	x	x
	6. Conduct regular emergency exercises and drills at a frequency and scope to be agreed upon by FortisBC and the Contractor. [NR-421]	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Environmental Emergency Response	7. When notified of an environmental emergency or environmental incident, the CEC or the first person on the scene will: ▪ Act to control danger to human life including the appointment of a Supervisor in accordance with WorkSafeBC requirements. ▪ Assume the commander role until another qualified person assumes the role. ▪ Suspend work in the vicinity of the environmental emergency or evacuate the site, if warranted. ▪ Conduct notifications in accordance with regulatory requirements and FortisBC's Corporate Emergency Response Plan. EGP Project-specific notification requirements must be included as part of the Contractor Emergency Preparedness and Response Plans and must include the reporting and notification requirements for regulatory agencies, such as the RCMP, Emergency Management BC (EMBC), BC MoF and BC LWRS. In the event that these agencies are notified, Squamish Nation and FortisBC's Emergency Management Team must also be notified. [NR-422]	x	x	x	x	x	x
	8. The commander will work with the Contractor Project Manager, FortisBC, RCMP, or regulatory agency while responding to the emergency. The Incident Commander will mobilize any additional resources required to prevent injury, damage to property or harm to the environment, in accordance with the final Emergency Preparedness and Response Plan. [NR-571]	x	x	x	x	x	x
	9. The commander will refer to the applicable management plans and contingency plans (such as, Fire Response Plan [Section 8]; Waste Management Plan [Section 8]; Contaminated Soils Discovery Contingency Plan [Section 9]; Spill, Fuel and Hazardous Materials Contingency Plan [Section 9]), depending on the type of emergency situation encountered. [NR-572]	x	x	x	x	x	x
	10. The commander will communicate developments of response and clean-up activities to the Contractor Project Manager, FortisBC, and any other regulatory agencies noted above through regular briefings and updates, as applicable. [NR-573]	x	x	x	x	x	x
Resume Activities	11. The Contractor Project Manager, in consultation with FortisBC, CEC, and regulatory agency (where applicable) will assess the situation following initial emergency response and either allow construction to be resumed or, in the event that ongoing issues are present, recommend further corrective actions. [NR-574]	x	x	x	x	x	x
	12. Complete and submit follow-up reporting as required by the regulatory agencies (for example, BC OGC, RCMP, and EMBC). [NR-575]	x	x	x	x	x	x

8.9 Tunnel Environmental Protection Plan Framework

8.9.1 Purpose and Objectives

The purpose of the Tunnel Environmental Protection Plan (TEPP) Framework is to provide an outline of the information for the TEPP that will be developed by the Tunnel Contractor prior to construction. The TEPP Framework provides a summary of mitigation measures related to tunnel construction that will avoid or reduce adverse environmental effects.

Tunneling under the Skwelwil'em Squamish Estuary and WMA is the avoidance strategy chosen to reduce potential adverse impacts to the area, and the tunnel construction activities meet the requirements of Squamish Nation EAA Condition 13 and 14. The Conditions require that:

a) Section 4.1 No Pipeline Construction Impacts within WMA – Squamish Condition 13

- FortisBC will construct the Project's pipeline without industrial impacts within the WMA and will locate the entry and exit points of the pipeline's installation path outside the WMA boundaries as covered in the scope of Addendum 2, […a map of which is included as Schedule "G" of the Squamish Nation EAA];
- Exception to section 4.1(a) will be:
  - Vegetation clearing by hand;
  - Exploratory geotechnical studies to plan Project construction;
  - The use of small watercrafts;
  - Emergency access; and
  - Helicopter use.

b) Section 4.2 No Barges in WMA – Squamish Condition 14

- FortisBC will not use barges to conduct work in the WMA and will prohibit any contractor retained by FortisBC for the Project from installing barge landings or other related physical works in the WMA during any phase of the EGP Project.

Compliance with the Squamish Nation EAA Conditions 13 and 14 are required for the Project.

The TEPP Framework:

- defines roles and responsibilities during construction of the tunnel;
- describes the mitigation measures or industry standards typically involved in tunnel construction during all phases of the activity, including:
  - site establishment
  - drilling and blasting
  - excavation of the portals
  - limiting disturbance to vegetation
  - tunnel excavation
  - contaminated material and tunnel muck handling and disposal
  - groundwater, surface water, and construction water management
- identifies reporting and monitoring requirements during construction and post-construction.

Roles and responsibilities and the applicability of mitigation measures will differ between the pipeline, facilities, and the tunnel components.

8.9.2 Regulatory Framework

Information on the legislation and regulatory documents that are applicable to the TEPP is provided in the following subsections.

8.9.2.1 Federal Legislation

- *Canadian Navigable Waters Act*
- *Fisheries Act*

8.9.2.2 Provincial Legislation

- BC *Environmental Assessment Act*
- BC *OGAA* and *Regulations*
- BC *Land Act*
- BC *Forest Act*
- BC *WSA* and *Regulations*
- BC *Environmental Management Act*
- BC *Dike Maintenance Act*
- BC *Heritage Conservation Act*

8.9.3 Roles and Responsibilities

The Tunnel Contractor is responsible for developing the TEPP in compliance with the CEMP, EAC Condition management plans, and TEPP Framework. Information on the roles and responsibilities of the Tunnel Contractor for ARD/ML prone bedrock during tunnel construction, is provided in subsection 8.4.3. In developing the TEPP, the Tunnel Contractor will engage and appoint a QP who will be responsible for the overall planning, implementation, monitoring, and reporting of individual activities. The QP must be registered as a professional geoscientist or engineer with Engineers and Geoscientists of BC and have extensive experience in the field of their respective activity.

The QP must provide:

- A description of the construction activities and locations to which the TEPP applies.
- Detailed site or activity-specific mitigation measures and how they will be implemented, including a description of roles and responsibilities.
- Identification of applicable environmental permits and authorizations and a description of how the Contractor will comply with the Conditions of those permits and authorizations.
- A description of how environmental monitoring (Ínexwantas) of construction activities will be conducted to reliably determine whether the construction activities are being undertaken in compliance with the TEPP and the management plans.
- The environmental monitoring (Ínexwantas) scope, level of effort, and reporting requirements will be established through collaboration between the FortisBC and Contractor environment teams (and their environmental personnel) based on QP recommendations and Indigenous nation feedback prior to construction. The following details must be provided in the TEPP:
  - The type and frequency of observations and data collection, methodologies, and protocols to be followed during construction.
  - The types of locations or activities that require regular inspection during construction.

- For water (Stak̲w) quality monitoring (Ínexwantas), a description of the parameters to be monitored upstream and downstream of construction areas in the vicinity of watercourses and groundwater interaction.

8.9.4 Tunnel Component Activities

8.9.4.1 East Portal

The East Portal will consist of an open excavation constructed with SOE at the BC Rail site for the assembly and launch of the soft ground TBM and installation of the pipeline through pipe-stringing methodology. Contractor design considerations for the SOE include:

- Clearing and grading of the site;
- A long, narrow and shallow decline for ease of TBM launch and welded pipe segments, while reducing groundwater inflows;
- Ground improvement and installation of support to enclose and secure the perimeter of the SOE prior to excavation;
- Installation of a concrete base slab post-excavation to mitigate basal heave and water ingress;
- Installation and operation of a water collection and pumping system to manage groundwater, surface water runoff and precipitation ingress; and
- Permanent backfill after pipeline installation completion.

8.9.4.2 Soft Ground Tunnel

Accessed through the East Portal, the Soft Ground Tunnel will be constructed with a slurry (bentonite and water compound) TBM until encountering the transition between the Soft Ground Tunnel and the Bedrock Tunnel. During excavation, the slurry will support the cutting face and convey excavated material to the slurry separation plant at surface for processing.

Contractor design considerations for the Soft Ground Tunnel include:

- no surface disturbance to vegetation;
- scour elevation in the Squamish River and depth to tunnel from surface;
- pressurized slurry excavation to reduce water inflow, over excavation and settlement;
- advanced slurry separation to remove excavated soil from the slurry and re-introduce the slurry to the TBM on a closed circuit;
- centrifugal process to separate bentonite from water for treatment and discharge, as required;
- structural precast concrete segmental lining for tunnel support and limiting water ingress;
- concrete bulkheads for tunnel component isolation; and
- flooding for permanent closure.

8.9.4.3 Woodfibre Portal

The Woodfibre Portal will be an open rock cut, with a flat base and near vertical walls, at the northwest edge of the WLNG facility site, constructed for the assembly and launch of the hard rock TBM.

Contractor design considerations for the Portal include:

- removal of trees and soil overburden from hillside;
- drilling and blasting of bedrock for flat-bottomed and near vertical-walled open rock cut;
- slope stabilization above open rock cut; and
- design, construction and operation of a water collection and pumping system or trenched diversion of surface runoff and precipitation around open rock cut.

8.9.4.4 Bedrock Tunnel

Accessed through the Woodfibre Portal, the Bedrock Tunnel will be constructed with a hard rock TBM until encountering the transition into the Soft Ground Tunnel. During operation, excavated rock will continuously be conveyed to the surface for disposal. The initial section of the Bedrock Tunnel will be excavated over a short length by drill and blast methods, adjacent to the Woodfibre Portal to facility TBM launch.

Contractor design considerations for the Bedrock Tunnel include:

- no surface disturbance to vegetation;
- baselining of rock and water qualities prior to excavation;
- segregation and testing of excavated rock at surface;
- grouting to reduce water inflows;
- concrete bulkheads for tunnel component isolation; and
- partial backfill and flooding for permanent closure.

8.9.4.5 Excavated Material and Water Treatment

For all excavated material from the tunnel, the Contractor (with guidance from the QP) will segregate based on visual inspection or if excavated from a known area of contamination. Site or laboratory testing will then be conducted by the Contractor to confirm contamination, as required, prior to disposal.

Contaminated material will be disposed of at a certified facility, while all other material will be stockpiled on-site for reuse for various construction purposes or permanent disposal.

Modular water treatment plants (WTPs) will be designed, constructed and operated by the Contractor at the East Portal and Woodfibre Portal to treat all construction affected water. The WTPs are designed to treat water to BC Approved Water Quality Guidelines prior to discharge. Standard treatment includes the removal of sediment and pH balance through a series of settlement tanks, sand filtration units and chemical injection. In addition, advanced treatment will be established to remove organics and heavy metals through activated carbon media. The activated carbon media with captured residuals will be disposed of at a certified facility when it has reached saturation and is replaced. The following sources of water for treatment are anticipated:

- SOE water inflows;
- tunnel water inflows;
- surface runoff and precipitation in contact with SOE;
- TBM process water;
- pipeline hydrostatic testing;
- acid rock drainage and metal leachate rock stockpile runoff; and
- general construction activities.

8.9.5 Tunnel Mitigation Measures

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure
Approvals, Licences, and Permits	1. Obtain necessary approvals, licenses, and permits, as well as fulfill regulatory requirements for a particular activity or construction site prior to the commencement of the applicable activity or construction at that site (Appendix B). FortisBC, its authorized representatives, Contractor(s), and Subcontractors, will comply with applicable Conditions as presented on permits, approvals, licences, certificates, and EGP Project-specific management plans. Inconsistencies between conditions of different permits and contracts will be resolved prior to construction. [R-7]
	2. Confirm that approvals, licenses, and permits have been obtained in accordance with the Permits, Easements, and Third-Party Agreements specification prepared for the EGP Project. Required regulatory notifications will be submitted according to the applicable regulatory timelines. [R-28]
Worker Accommodation	3. EGP Project workforce estimates, and construction schedule will inform accommodation requirements. [R-29]
Pre-Job Meeting	4. Require key Contractor personnel to attend the pre-job meeting with FortisBC. Confirm roles and responsibilities for emergency response at the pre-job meeting. [R-27]
Discipline	5. Remove those who show careless or wanton neglect of the environment or disregard the CEMP, or any EGP Project policies, from the work. [R-74]
Review Mitigation Measures for Sensitive Features	6. Review with the Contractor the mitigation measures to be implemented for rare plants, rare ecological communities, fish and wildlife species of concern, archaeological features, site-specific Traditional Land and Resource Use sites, and other applicable sensitive environmental or cultural features along or in proximity to the EGP Project Footprint. Conduct this review in advance of construction at locations where any of the above features are known to be present (refer to the EAS). [R-18]
Construction Documents and Documentation	7. Provide the Contractor and EI with the CEMP and copies of environmental approvals and permits including the most recent updates and revisions. A complete set of the CEMP and copies of environmental approvals and permits will be kept at FortisBC's construction field office for the tunnel component. [R-5] Measure edited for this section.
Workspace	8. Identify the need for TWS prior to clearing and construction [R-2] Measure edited this section.
Clearing	9. Stake and flag boundaries of the portal sites. Do not allow activities beyond the boundaries. Re-instate site boundaries following site preparation activities, where warranted, prior to subsequent construction activities. [R-192] Measure edited for this section.
Traffic Management	10. Use existing access to the extent practical. [R-78]
	11. Acquire Road Use Agreements with road permit holders for roads affected by the EGP Project. Discuss EGP Project schedules, construction time frames necessary for access, expected traffic volumes, road maintenance, road safety issues and radio frequencies, with the applicable road permit holders. [R-79]
	12. Notify the public in accordance with FortisBC's Communication Plan at the commencement of construction of the tunnel, and as required by project approvals, or when there is the potential to significantly restrict access, until the EGP Project is complete. [R-162]
	13. Review and comply with the measures related to pre-construction and construction traffic in the TCMP. Contractor personnel will comply with applicable traffic, road use, and safety requirements. [R-146]

Activity/ Concern	Mitigation Measure
Traffic Management (cont'd)	14. Follow acceptable heavy truck routes and approved access routes. To the extent practical, seek to schedule heavy construction traffic to periods of less traffic where it would reduce impacts on businesses or residences. Seek to reduce interactions with school buses and students along EGP Project-related traffic routes. [R-147]
	15. Communicate with RCMP, police and emergency services personnel to keep these organizations informed of traffic schedules and enlist their services as needed. [R-149]
	16. Establish speed limits on the EGP Project Footprint and access roads. Post signs stating the applicable speed limits for construction traffic. Advise construction personnel to comply with applicable Provincial and EGP Project-related traffic, road use, and safety laws, or requirements. [R-152]
	17. Transport workers to and from the EGP Project by multi-passenger vehicles to the extent practical. Pick-up and drop-off workers at marshalling areas to limit traffic volumes and the potential for vehicle/wildlife interactions. [R-153]
Topsoil Handling	18. Implement topsoil salvage to colour change or a minimum of 15 cm and store in stockpiles or windrows. Keep contaminated topsoil separated. [R-1080]
	19. Keep on-site grade or excavation spoil piles separate from topsoil piles, and clearly mark the piles to avoid confusion. Maintain separation between the piles. Storage locations and methods of managing erosion risk will be approved by the EI. [NR-611]
	20. Separate topsoil and subsoil suspected of contamination from non-contaminated topsoil and subsoil, and where applicable, into additional separate topsoil and subsoil piles where an invasive plant species is known or discovered. [R-944]
	21. Maintain separate storage piles of each soil (that is, storage may require multiple piles: contaminated topsoil; contaminated subsoil; clean topsoil; and clean subsoil, and topsoil and subsoil piles with known or discovered invasive plant species. Weed infestations on storage piles will be managed according to the IPSMP [Section 8]). [R-945]
Soil Cuts	22. Refer to the Known or Suspected Contaminated Groundwater and Soil Handling Management Plan provided in Section 8 and the Handling, Testing, and Disposal of Excavated Material specification prepared for the EGP Project for information pertaining to the handling of known contaminated material at the East Portal site. [NR-621]
	23. Identify potential sources for East Portal and Woodfibre Portal backfill prior to construction that do not contain contaminants or weed infestations and obtain prior approval from FortisBC for the use of these materials and sources. [NR-592]
Weeds	24. Inspect construction equipment prior to its arrival on the EGP Project Footprint to reduce the risk of weed introduction. Any equipment which arrives in a dirty condition (that is, soil or vegetative debris) will not be allowed on the EGP Project Footprint until it has been cleaned at a suitable location. [R-102]
	25. Follow recommendations made in the pre-construction weed survey to limit the risk of transporting weed seeds from weed-infested areas. [R-103]
	26. Implement weed management at locations identified within the pre-construction weed survey to a level that is consistent with weed management observed adjacent to the EGP Project Footprint to reduce the potential for weed infestations following construction. [R-104]
	27. Record sites where equipment was specifically cleaned due to concerns associated with weeds and communicate the information to the CEC. [R-988]

Activity/ Concern	Mitigation Measure
Equipment Refueling and Servicing	28. Report spills immediately to the CEC who will contact the FortisBC Construction Manager and FortisBC EIM or their delegate. The EIM will notify the appropriate government agencies in accordance with the Spill, Fuel and Hazardous Materials Contingency Plan (Section 9). [R-121]
	29. Place an impervious tarp or a spill tray underneath equipment and vehicles when servicing equipment and vehicles where there is a potential for accidental spills (such as, during oil changes or servicing of hydraulic systems). [R-122]
	30. Bulk fuel trucks, service vehicles and pick-up trucks equipped with box mounted fuel tanks are to carry spill prevention, containment and clean-up materials, including a that are suitable for the volume of fuels or oils carried. Carry spill contingency material on bulk fuel and service vehicles that is suitable for use on land and water (such as, sorbent pads, sorbent boom, and rope). [R-123]
	31. Confirm that temporary fuel storage tanks have appropriate spill prevention measures in accordance with the Field Guide to Fuel Handling, Transportation and Storage (BC MWLAP 2002). [NR-520]
	32. Spill prevention measures include: 230 L to 454 L to truck box fuel tanks (meet container design specification, maintain in good condition, adequately seal container, secure transportation). Refer to the Waste Management Plan (subsection 8.6) and Spill, Fuel, and Hazardous Materials Contingency Plan (subsection 9.6) for measures that meets these guidelines.
	33. Employ the following measures to reduce the risk of fuel spills near water: ▪ conduct refueling at least 30 m from watercourses and other waterbodies to the extent practical; refueling of immobile equipment or on developed landings may be conducted if the appropriate safeguards are in place, as approved by the CEC an appropriate spill-kit is available at the refueling site; ▪ all containers, hoses, and nozzles are free of leaks; ▪ all fuel nozzles are equipped with automatic shut-offs; ▪ operators are stationed at both ends of the hose during fueling unless the ends are visible and readily accessible by one Operator; ▪ prohibit use of distracting devices (such as, cell phones) and devices that generate static electricity during fueling; and ▪ return remaining fuel in the hose to the storage tank. [R-125]
	34. Operators and on-site construction supervisors will be trained on how to contain spills or leakage from equipment. [R-126]
	35. Hydraulic, fuel, and lubrication systems of equipment used in watercourse and wetland crossing construction will be in good condition and free of leaks. Equipment to be used instream or adjacent to a watercourse or wetland is to be clean, free of external grease, oil or other fluids, mud, soil, and vegetation, both prior to entering the watercourse or wetland and upon completion of instream activity. Comply with the Spill, Fuel and Hazardous Materials Contingency Plan (Section 9) to reduce the potential for discharge of any materials toxic to fish or other aquatic life into a watercourse or wetland. [R-128]
Air Pollution and Noise	36. Schedule construction activities between 7:00 AM to 10:00 PM in accordance with the BC OGC's Noise Control Best Practices Guideline (BC OGC 2021a). In the District of Squamish schedule construction activities within 1.5 km of residences, cabins, campgrounds, or parks between 7:00 AM to 10:00 PM and comply with applicable noise bylaws (District of Squamish Bylaw No. 2313) (2014) or approval Conditions. [R-94]
	37. Use well-maintained equipment to reduce air pollution and noise. [R-130]

Activity/ Concern	Mitigation Measure
Air Pollution and Noise (cont'd)	38. Use dust control measures during hot and dry weather. Dust control measures may include the application of water, calcium chloride (as approved by a QP), or mulch. [R-131]
Lighting	39. Seek to reduce light emissions near residential areas to the extent practical. [R-137]
Garbage	40. Refer to the Waste Management Plan in Section 8 for mitigation measures pertaining to the handling and disposal of waste. [NR-648]
Water Collection	41. Manage water in disturbed areas by using ditches and berms to redirect surface runoff into storage ponds. 42. Groundwater infiltration into the East Portal access will be collected and pumped to on-site treatment. 43. Place pumps onto impermeable barriers (that is, secondary containment). 44. Grey water will be stored and treated prior to discharge. 45. Trench Water Management should occur prior to high precipitation events that could compromise secondary containment. 46. The CEC will use a floating suction hose and elevated intake, or other measures to prevent entraining sediment from the bottom. 47. Maintain erosion and sediment controls at the point of discharge.
Source Water Quality	48. Identify potential water sources for construction requirements (for example, water for TBM use or hydrostatic testing) as early as practical to avoid delays in receipt of temporary diversion licenses during construction. Submit potential water sources to the CEC and have regulatory approvals in place prior to the withdrawal of water from any source. [R-30] 49. Intake screen designs will comply with the DFO Interim Code of Practice: End-of-Pipe fish protection screens for small water intakes in freshwater (DFO 2020a) and the End-of-Pipe Screen Size Tool (DFO 2020b) to prevent fish loss due to impingement or entrainment. 50. Position intake screens over the riverbed to avoid fine suspended sediments and use an oversized screen for easier cleaning. Inspection and conduct maintenance of the intake system periodically over the withdrawal period. 51. Monitor salinity levels at the intake head and store an adequate volume of water to allow for durations where pumping may be limited due to an exceedance of salinity levels (as determined by the CEC). 52. Selectively clear vegetation to the extent needed to lay pipe and place restraints. 53. Mark in-water structures with navigation buoys as required under the *Navigable Waters Act* 54. Record water withdrawal activities, including the volumes of water for each point of diversion monthly. Records are submitted to BC OGC quarterly. 55. Comply with short-term water use suspensions, as directed by BC OGC. 56. WTPs will be comprised of multiple automated modular or interchangeable units and will provide the following at a minimum: sedimentation or storage ponds, sand filtration, pH balance, flocculant addition, oil-water separation, hydrocarbon, or heavy metal removal. 57. Water treatment, sampling, analysis, and reporting will follow BC Approved Water Quality Guidelines prior to discharge. If the guidelines are not met, the water will be continuously treated until met.
Erosion and Sediment Control	58. Prepare a site-specific plan for erosion and sediment control in addition to the measures described in subsection 8.1. 59. Grade the Footprint to allow drainage to collect in storage ponds in preparation of treatment.

Activity/ Concern	Mitigation Measure
Ground and Groundwater Control During Drilling	60. Monitor groundwater for contamination potential. 61. Implement mitigation found in subsection 8.2 where groundwater contamination is known or suspected. 62. Implement mitigation for the migration of contaminated groundwater during construction. 63. Avoid the release of deleterious substances into groundwater by cleaning, refueling, and servicing equipment away from where spills or wash water could drain into groundwater sources.
Drilling Mud and Slurry	64. Review source water quality and identify any additives used during the testing process. Keep SDS sheets. 65. Spent fluids or filter cake are to be disposed of at a certified facility
Spoil Storage, Transport and Disposal	66. Test rock spoil for ARD/ML and soil spoil for Na+ and Cl- and ground conditioners prior to site removal in order to determine disposal method and certified receiving facility. 67. ARD/ML and all soil spoils to be stockpiled within lined containment prior to disposal. All runoff to be treated by the site water treatment plant. Comply with applicable road use agreements or bans during transportation. 68. Use salvaged upper surface material and trench spoil at locations where deep water is encountered as a containment berm/barrier. Consider using alternate dam materials such as an Aquadam or cubic meter bag weights where warranted (Detail No. 15). Pump excess water from the isolated area and trench to opposite side of berm or work ramp. [R-810]
Excavation	69. During excavation activities, the EI (with QP oversight) will monitor for potential groundwater or soil contamination and guide segregation. [2048]
	70. Refer to the Known or Suspected Contaminated Soil and Groundwater Management Plan (subsection 8.2) for handling, storage, and disposal of contaminated materials.
	71. Conduct excavation of the Woodfibre Portal and East Portal sites in accordance with the Excavation, Backfill, and Grading specification prepared for the EGP Project. [NR-620]
Blasting	72. Conduct blasting in accordance with Provincial regulations and the Tunnel Excavation by Drill and Blast Specification prepared for the EGP Project. [NR-623]
	73. Coordinate blasting activities with local authorities and comply with appropriate jurisdictional guidelines, where required. Coordinate blasting activities within the reasonable proximity to adjacent roads, railway tracks and recreational areas with local authorities and landowners prior to commencement of activities. Place signage along areas where required during blasting activities. [R-402]
	74. Store explosives in a secured and permitted container to prevent accessibility to wildlife and the public. [R-412]
	75. Where blasting is required, storage, handling and operations shall be conducted according to applicable Federal and Provincial laws and regulations governing explosives (*Canadian Explosives Act* [R.S.C., 1985, c. E-17]). [R-403]
	76. Develop a site-specific blasting procedure for each location before any blasting commences. Identify locations of potentially required erosion control, such as trench plugs that may be required to key in, are identified in the blasting procedure. [R-404]
	77. Notify public of blasting schedule through local newspapers at least 48 hours prior to blasting and provide updates to the schedule as necessary to reflect changes in overall duration and timing. [R-405]
	78. Review blasting procedures, safety protocols and applicable erosion control measures with Contractor personnel prior to commencing blasting activities. [R-406]

Activity/ Concern	Mitigation Measure
Blasting (cont'd)	79. Transport explosives in accordance with the *TDG Act* and other applicable Provincial or Federal regulations. [R-407]
	80. Blasting will only be conducted by licensed blasters, following blast plans designed by a Qualified Engineer or Technologist, and reviewed by a Qualified Geotechnical Engineer. [R-408]
	81. Conduct pre-blast surveys for any structure within 150 m of the blast site. [R-409]
	82. Use pre-packaged explosives to prevent spillage. [R-411]
	83. Store explosives in a secured container to prevent accessibility to wildlife and the public. [R-412]
	84. Control traffic on highways and roads within the fly rock zone and in accordance with requirements of existing regulations. [R-413]
	85. Use blasting mats, where required, to limit the potential for safety issues as well as disturbance or damage of vegetation, adjacent infrastructure, and land uses. Control traffic where blasting is to be conducted in the vicinity of roads and use warning sirens, blasting controls, and monitoring where warranted to limit risk to the public. [R-414]
	86. Place double matting on blast sites adjacent to urban areas. [R-415]
	87. Where blasting has been conducted or the backfill substrate in a trench has changed drainage conditions from impermeable to permeable, it may be necessary to install impermeable trench blocks to prevent the backfilled pipeline trench from becoming a conduit for redirected drainage.
Hydrostatic Testing	88. Hydrostatic testing will be completed in accordance with subsection 6.6.
	89. Review source water quality used for hydrostatic testing, and any chemical additives used in the process. Keep SDS sheets.
	90. Keep records of hydrostatic testing procedures, including water withdrawal rates, volumes, chemical analysis and discharge locations.
	91. Place pumps and generators on suitable secondary containment above the high watermark of the nearest watercourse, wetland, or drainage/NCD.
	92. Identify an alternate test water source if the intended water source will provide inadequate stream flow and volume for testing purposes. Assist FortisBC in obtaining required approvals and permits or the provision of required notifications. [R-502]
	93. Conduct hydrostatic tests at 1.4 times operating pressure to identify leaks.
Backfilling (Bedrock and Soft Ground Tunnels)	94. Refer to subsection 6.5 for general mitigation related to backfilling and those measures checked for the tunnel component .
	95. Backfill the portal excavation in layers, compacting each layer following installation.
	96. Commence clean-up activities as soon as practical.
Rock and Muck Disposal	97. Comply with measures outlined in the EGP Project-specific Acid Rock Drainage and Metal Leachate Management Plan (Section 8) for the disposal of PAG rock or ML materials from the tunnel/excavation. [R-479]
	98. Prepare rock and muck disposal plans for review and approval by FortisBC prior to start of construction.
Deep-Seated Slides	99. Typically, the primary mitigation method is avoidance by routing around, bridging over or tunneling or drilling under the slide area. [R-1226]

Activity/ Concern	Mitigation Measure
ARD/ML	100. Contain contaminated spoil generated by tunneling for testing and disposal as directed by the QP. [NR-585]
	101. Where areas of potential acid-generating rock are anticipated during construction, develop an Acid Rock Drainage and Metal Leachate Management Plan in accordance with the outline provided in subsection 8.4
	102. Where ARD/ML is suspected within the tunnel, it will be inspected by a QP after it has been excavated during the tunnel boring process. Samples of rock will be taken and tested following acid-based accounting methods as per the MEND Guidelines. Rock that is confirmed to have ARD/ML potential, will be segregated and disposed of in a controlled manner. During construction, water will be treated and processed prior to disposal, adhering to applicable permitting restrictions. Water samples will be collected and analyzed routinely during construction to determine the concentration of metals. However, at the present time metal leaching is not anticipated to affect water quality. [NR-460]
	103. Install measures that will seal groundwater and reduce potential ARD/ML conditions along the tunnel alignment to limit water flows and oxygen access to PAG rock. [NR-625]
	104. The QP will determine where to site stockpile areas for contaminated soil storage. The stockpiles will be separated from uncontaminated soil stockpiles, lined and bermed. Prior to transporting soils off-site or reusing soils in the excavation, a QP will collect soil samples. The suspected impacted stockpiles will be characterized in accordance with Provincial requirements and disposed of or repurposed at the direction of the QP. [NR-587]
	105. Cover contaminated soil stockpiles to protect them from rain, wind, or runoff while awaiting soil management (that is, re-use or off-site disposal). Coverings should be weighed down and checked regularly. [NR-588]
Water Management and Treatment	106. Before commencing trench water management activities, appropriate discharge permits and approvals are to be in place, if required. Contact the EI or CEC for further information. [R-965]
	107. Implement construction processes during tunneling to reduce groundwater inflow and to reduce the volume of water requiring management and treatment.
	108. Implement construction methodologies to separate tunnel spoil from slurry (bentonite and water) so that slurry can be reused in the TBM to reduce water usage.
	109. Design, construct and operate WTPs at the East Portal and Woodfibre Portal to treat all construction affected water. Design WTPs to treat water to the regulatory guidelines outlined in the applicable permits or authorizations prior to discharge. The WTP will be designed by a QP. Water sampling will be completed to verify that water quality meets regulatory guidelines outlined in the applicable permits or authorizations prior to discharge. [2049]
	110. Manage the water at the excavation sites and the tunnel, as warranted. Place pumps above ground on a tray or within an excavated sump lined with polyethylene sheeting. Pump water into appropriate water conveyance and storage features (such as, settling ponds) for containment and treatment prior to discharge. Monitor precipitation forecasts and proactively manage water for surface excavations to avoid the collection/infiltration of volumes that may overwhelm existing water control measures. [NR-461]
	111. Discharge pumped trench water without causing erosion and filter pumped trench water through established vegetation and stable soils. Pumped trench water must be clear of suspended solids before entering wetlands. Do not permit unfiltered trench water to enter any wetland, watercourse, or NCD. [R-811]
	112. Water management must maintain the stable conditions (that is, the size, shape, and concentrations) of the existing contamination plume on the property adjacent to the leased area, as defined in the CofC for the northern portion of the East Portal site. [NR-593]

Activity/ Concern	Mitigation Measure
Water Management and Treatment (cont'd)	113. Groundwater to be discharged will be sampled and sent to a laboratory for analysis. Upon receipt of the laboratory results, mitigation or disposal options will be determined by FortisBC in consultation with the CEC and QP. [NR-594]
	114. Confirm that appropriate discharge permits and approvals are in place, if required, before commencing water management activities. Contact the QP for further information. [NR-595]
	115. Completely remove any contaminants of concern on the water prior to water management activities. Methodology to remove the oil, oil sheen or non-aqueous phase liquid, shall be left to the Contractor and approved by FortisBC and the QP. [NR-596]
	116. If excavating in contaminated soil, petroleum compounds may be dissolved in trench water (such as, groundwater or surface runoff) in amounts that require treatment or special water management approaches (such as, a tank truck). Before discharging potentially contaminated water, contact the EI or CEC. [R-961]
	117. Suspect contaminated water if free product is present, the soil under the water is a notably different colour than the surrounding soil (black, shades of grey, blue, and green), hydrocarbon odours are present or there is sheen on excavation water. Notify the EI or CEC as soon as feasible. [R-962]
	118. Collect a sample of the water and send to a laboratory for analysis. Confirm sampling protocols and required laboratory analyses with the EI or CEC and the QP. To the extent practical, leave contaminated water in the trench while waiting for the results of the laboratory analysis. Any potentially contaminated trench water that is removed must be transferred to an on-site tank that has been approved by the EI or CEC. Upon receipt of the laboratory results, mitigation or disposal options will be determined by the QP in consultation with the EI or CEC. Laboratory results and proposed mitigation or disposal options will be provided to the the QP for review and comment prior to disposal or implementation of mitigation measures. [R-963]
	119. If mitigation of contamination is not feasible, water will be disposed of at an approved facility. Lab results will be communicated to the disposal facility. Determine the need for a waste manifest prior to hauling. If required, the waste manifest should be issued by the EI or CEC before hauling. [R-964]
	120. Before trench water management activities, any oil (free product) on the water must be removed or contained in the excavation. [R-966]

8.9.6 Monitoring

FortisBC's Construction Management Team will monitor tunnel construction activities to determine whether the regulatory requirements are being met and the Contractors TEPP are being successfully implemented. The Tunnel Contractor will also have a full-time team of dedicated staff to control, manage and inspect the works continually. Open and timely communication between the FortisBC Construction Management Team and the Contractors supervisory staff must be maintained.

8.9.7 Reporting

The results of monitoring (Ínexwantas) and laboratory testing will be documented as described in the Contractors TEPP. The QP will use monitoring (Ínexwantas) results to determine if additional measures or corrective actions are warranted, through consultation and engagement with regulatory agencies, as required. The result of monitoring (Ínexwantas) will be communicated to the regulatory agencies depending on the location and type of storage.

8.9.8 Adaptive Management

Contingency measures will be prepared and implemented to respond to potential issues resulting from deficiencies in the design, construction or operation of mitigation, or the release or leak of potentially contaminated material or water (Stak̲w) into the environment. Contingency measures will be described in Contractors TEPP.

9. Contingency Plans

9.1 Unexpected Fish Presence Contingency Plan

This subsection will provide mitigation measures to be implemented in the event that fish (Sts'úkwi7) are discovered during pre-construction surveys or during construction of the EGP Project.

Depending upon the pipeline construction schedule, additional fish (Sts'úkwi7) and aquatic habitat studies may be necessary if watercourse construction is to be conducted during the instream window of least risk or if the recommended watercourse crossing method(s) outside of the window of least risk is not technically or economically feasible (such as, due to anticipated high flows during the planned watercourse crossing construction period or subsurface materials are not suitable for a trenchless crossing).

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
General	1. In the event that fish are discovered during instream construction activities, the discovery will be assessed by a QP (such as, aquatic specialist) based on the following criteria: ▪ location of the fish discovery with respect to construction activities; ▪ the timing of construction versus the appropriate instream work window for the fish species; ▪ the quality of associated fish habitat and potential for an alteration of construction activities to reduce disturbance; and ▪ the need for regulatory notification or review. [R-915]	x		x	x	x	x
	2. An Unexpected Fish Presence may require new approvals. Confirm that Provincial and Federal approvals (such as, those under the *Fisheries Act)* are obtained prior to the commencement of construction and instream activities. Confirm the necessary notifications are conducted prior to construction of watercourse and other waterbody crossings. [R-663]	x		x	x	x	x
	3. Confirm activities in or around watercourses and other waterbodies have been assessed and can follow permit and approval Conditions and regulatory guidelines, including the DFO's Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2019), any relevant DFO Code of Practice, and navigable waters guidance from Transport Canada. [R-664]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
General (cont'd)	4. Once the assessment is completed, regulators will be notified by FortisBC as required. Mitigation measures will be developed by a QP, such as: ▪ isolate the workspace and salvage and relocate any fish from within the isolation; ▪ reschedule instream works to comply with timing constraints for sensitive life history periods; ▪ alter vehicle crossing methods to reduce disturbance (such as, use existing bridges or install temporary bridge; Detail No. 16); ▪ alter construction activities to partial bypass or trenchless crossing techniques (such as bore); ▪ implement temporary or permanent sediment control measures (such as, geotextiles, sediment fences, temporary berms; Detail Nos. 4, 19, 20, and 22) to prevent increased sediment loading; ▪ implement site-specific habitat restoration measures post-disturbance; and ▪ if deemed warranted, or as required for a DFO authorization, offset the loss of habitat and monitor to confirm that offsetting measures were effective. [R-916]	x		x	x	x	x
	5. Apply mitigation measures found in subsection 6.9, as directed by the QP.	x		x	x	x	x
Reporting	6. Document the fish discovery and steps taken to avoid harm and mitigate any impacts to fish and fish habitat. Provide the report to regulators, including BC OGC and DFO, as required. [R-917]	x		x	x	x	x

9.2 Flood and Excessive Flow Contingency Plan

This subsection will provide mitigation measures to be implemented if flood or excessive flow conditions are predicted to occur during construction of the EGP Project. Excessive flows are flows that are greater than the seasonally expected normal range based on existing and predicted flow data. Signs that indicate excessive flows include water levels above the ordinary high watermark or topping the banks, increased turbidity compared to baseline conditions, transport of wood debris, and erosion. Heavy or continuous rain in the weather forecast should be used as an indicator of the potential for excessive flows. The Contractor will also consider the ability of crossing infrastructure and equipment to manage flows before starting a crossing or modifying or halting instream works when a crossing is underway. The FortisBC Construction Manager and EI should be notified if there is potential concern with excessive flows to evaluate conditions and help to inform construction decisions.

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Excessive Flow or Flood Conditions Anticipated Prior to Commencing Watercourse Crossing Construction	1. Assess the capability to handle the forecasted flow rate with the crossing method. If use of the crossing method is determined to be practical by the FortisBC Construction Manager and the Contractor, the crossing will proceed. [R-918]	x	x	x	x	x	x
	2. Defer watercourse crossing construction to a later time when flows have subsided, if determined by each of the FortisBC Construction Manager, EI, and Contractor that the crossing method is not practical under the forecasted flow rate. [R-919]	x	x	x	x	x	x
	3. Alternatively, where the forecasted flow rates and approved instream work window combine to preclude the crossing method, evaluate the feasibility of using an alternative crossing method or working outside the instream work window (subject to assessment and regulatory approvals). [R-920]	x	x	x	x	x	x
Excessive Flow or Flood Conditions During Watercourse Crossing Construction	4. Withdraw equipment or tanks containing fuel, oil, or other hazardous materials from potential flood areas. [R-921]	x	x	x	x	x	x
	5. Relocate topsoil piles at the direction of the CEC. [R-922]	x	x	x	x	x	x
	6. Relocate spoil piles, to the extent practical, to a position above the anticipated flood water level. [R-923]	x	x	x	x	x	x
	7. Remove stationary and mobile equipment deployed at the crossing site to a safe area above the anticipated flood water level. [R-924]	x	x	x	x	x	x
	8. Remove any instream flume or dam equipment that may impede stream flow, as safe work conditions allow. [R-925]	x	x	x	x	x	x
	9. Evaluate vehicle crossing structure to determine whether adequate freeboard is present on bridges and adequate capacity is available in culverts. Take corrective measures as appropriate to avoid flooding of adjacent lands. [R-926]	x	x	x	x	x	x

9.3 Heritage Resource Discovery Contingency Plan

This subsection will provide mitigation measures to be implemented if previously unidentified heritage resources are found throughout any of the EGP Project phases Mitigation for chance finds of archaeological and heritage sites and resources were developed through consultation and engagement with the local communities and Indigenous nations affected by the EGP Project Footprint. Policies and procedures described by the Indigenous nations through consultation and engagement may outline specific procedures and expectations for conducting work around heritage resources. The following heritage resources information was considered while creating the: Archaeological- Heritage Resources Plan (Inlailawatash 2021) and may be consulted for additional mitigation measures:

- Archaeological Chance Find Procedure (Inlailawatash 2020)
- Ancestral Remains Interim Policy for External Stakeholders (Squamish Nation 2020)
- Cultural Cedar Tree Program Policy 2021 (Squamish Nation 2021)
- Heritage Policy 2021 (Squamish Nation 2021)

1 The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Heritage Resource Discovery During Construction	1. Suspend work in the vicinity of any newly suspected or identified archaeological, palaeontological, or historical sites. Work at that location may not resume until the following measures are conducted. [R-929]	x		x	x	x	x
	2. Notify the CEC who will notify the FortisBC Lead EI and the FortisBC Archaeology Lead. [R-930]	x		x	x	x	x
	3. The FortisBC Archaeology Lead will notify the Indigenous Monitor(s) of the discovery. [R-931]	x		x	x	x	x
	4. The FortisBC Archaeology Lead will develop an appropriate mitigation plan in consultation with Indigenous Monitors and Representatives, CEC, Lead EI, and the appropriate applicable regulatory agency. The mitigation measures available include: ▪ Site Avoidance – may include amending the development footprint or temporarily covering the site using geotextile pads, swamp mat(s) or subsoil ramps. ▪ Systematic Data Recovery – ranging from artifact collection and site documentation to salvage excavations. ▪ Surveillance/Monitoring – this involves assigning an FortisBC Archaeological Monitors or Indigenous Monitor(s) to be on-site for the remainder of the topsoil salvage, grading and trenching operations. [R-932]	x		x	x	x	x
Squamish Nation Heritage Permit	5. Prohibit the collection of historical, archaeological, or palaeontological resources by EGP Project personnel. [R-174]	x		x	x	x	x
	6. Heritage sites and objects on Squamish Nation territory will not be disturbed without a Squamish Nation Heritage Permit, and all archaeological activities must be conducted by the permit holder or a Squamish Nation archaeologist [2030].	x		x	x	x	x
Human Remains Discovery During Construction	7. Stop work in the vicinity of any newly suspected or identified human remains. Record the location and leave the remains in place. Do not resume work until the Lead EI clears the site. [NR-561]	x		x	x	x	x
	8. Immediately notify the CEC, FortisBC Lead EI, and the FortisBC, and Lead Archaeologist. The FortisBC Lead Archaeologist must immediately notify the BC LWRS Archaeology Branch, RCMP, local Indigenous nation representatives and Indigenous Monitors, and the Coroner's Office. [NR-562]	x		x	x	x	x
	9. If the Coroner's Office determines the remains are not of forensic concern, the BC LWRS will consult with Indigenous nation representatives, who may have their own policies for human remains. [NR-563]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Human Remains Discovery During Construction (cont'd)	10. If there is potential for disturbance to the site due to traffic or high public visibility, assign the FortisBC and Indigenous Archaeological Monitors to stand watch until regulatory agencies arrive. [NR-564]	x		x	x	x	x
	11. Stake, temporarily fence, or flag off the location to secure avoidance. [NR-565]	x		x	x	x	x
	12. Do not attempt to move, cover, or inspect human remains except at the direction of the local police authority until such time as the remains are deemed not to be a forensic concern. Following this, observe any directions provided by the BC LWRS, Indigenous nation representatives, or Indigenous Monitors. [NR-566]	x		x	x	x	x
	13. Provide the following information to the Squamish Nation Archaeological Manager for ancestral remains belonging to Squamish Nation: ▪ The specific location of remains; ▪ The archaeological context (intact versus disturbed deposits); ▪ Degree of integrity (complete individual or burial, or isolated element); and ▪ The number of individuals represented (if applicable), and number of identified elements.	X		x	x	x	x
	14. If directed by Squamish Nation or an Indigenous Monitor, the FortisBC Archaeological Monitor will provide photographs of the remains.	X		x	x	x	x
	15. Do not backfill. If excavated fill has been loaded into a truck, empty the excavated fill at a nearby secure location for the local police FortisBC Archaeological Monitor, and Indigenous Monitor to inspect. The Contractor will resume work in that area only once the archaeological and forensic studies are complete, the local police and regulatory agency have granted clearance, and FortisBC has been advised that work can continue. [NR-567] 16. Comply with the direction of the Archaeology Lead if emergency systematic excavation of the remains is requested by the Indigenous nation representatives.	X		x	x	x	x
	17. The FortisBC Archaeological Monitor will protect the ancestral remains from viewing and weathering with an appropriate ground cover (such as soil) and access to the area will be restricted to archaeological personnel and representatives of the Indigenous nations.	X		x	x	x	x
	18. Provide the Indigenous Nation members with time and space to conduct cultural ceremonies associated with the collection and disturbance of the remains.	X		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Human Remains Discovery During Construction (cont'd)	19. Allow Indigenous archaeological personnel to conduct investigations for additional remains in the surrounding area.	X		x	x	x	x
	20. A report of activities and the outcome of findings at the archaeological site will be provided to affected Indigenous nation representatives.						
Intact Burial Features	21. The Archaeology Lead will notify Indigenous Monitors, of the feature and anticipate whether additional features may be located in the area. Provide the estimated measurements, surrounding sediments, elements and their disposition. [2044]	X		x	x	x	x
	22. Comply with provincial authorities and Indigenous nation representatives to enable excavation of the burial features.	X		x	x	x	x
Fire Prevention and Response	23. Refer to subsection 8.5 for general mitigation measures relating to fire preparedness.	x		x	x	x	x
	24. Consult with affected Indigenous nations for additional setback distances for certain machinery or activities. [2009]	x		x	x	x	x
Sediment and Erosion Control	25. Follow measures for controlling runoff from the EGP Project Footprint (Section 8.1) to prevent erosion and sedimentation impacts to heritage resources. [2013]	x		x	x	x	x

9.4 Plant Species and Vegetation Communities of Concern Discovery Contingency Plan

In the event that rare plant species or rare ecological communities are discovered during pre-construction vegetation surveys along the EGP Project Footprint, or during construction, the plant or ecological community will be assessed, and appropriate mitigation measures will be determined prior to disturbance. The appropriate mitigation measures will be determined following an assessment, which may include:

- the location of the plant species or vegetation community of concern within or relative to the EGP Project Footprint;
- construction activity timing and practical requirements;
- the relative rarity of the plant or ecological community (regionally, nationally, and so forth);
- community or population size and abundance in the local area;
- the growth habit and propagation strategy of the community components or species;
- the habitat preferences of the community or species and proximity of available habitat;
- expected or known sensitivity or resilience to disturbance of the community components or species;
- expected or known population viability or sustainability (both pre-construction and post-construction);

- past mitigation success of the same or similar communities or species; and
- requirements or recommendations based on consultation and engagement with regulatory agencies.

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor if plant species or ecological communities of concern are discovered during pre-construction surveys or during construction at the EGP Project. Details on specific Red- and Blue-listed plants and ecological community information will be provided in the Red- and Blue-listed Plants and Ecological Communities Mitigation and Monitoring Plan.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Staking	1. Flag or fence-off site-specific resource features (that is, rare plant populations or communities) as indicated on the EAS (Detail No. 1). [R-193, mitigation edited for the CEMP]	x		x	x	x	x
	2. The EI will confirm that flagging, staking, and fencing installed during survey activities (Section 5) to identify site-specific resource features (that is, rare plant locations) are in place and are maintained throughout topsoil salvage and grading activities. [R-300, mitigation edited for the CEMP]	x		x	x	x	x
Rare Plants Monitoring	3. Depending upon specific biophysical element requirements for the EGP Project, rare plant monitoring may be conducted for specific plant species of conservation concern found on the EGP Project Footprint. The effectiveness of the construction measures (including restoration measures) implemented will be determined through species-specific assessments. [R-1167]	x		x	x	x	x
Discovery of Plant Species and Vegetation Communities of Concern Prior to Construction	4. The CEC will consider mitigation options. The suite of mitigation options (that is, staged mitigation) that may be implemented includes the following. [R-934]	x		x	x	x	x
	5. Avoidance: ▪ narrow down or reorient the area of disturbance and mark the site using fencing, staking or flagging; ▪ relocate workspace or adjust the equipment layout or location of the EGP Project Footprint to avoid the site; ▪ leave a gap in the topsoil storage berm to avoid the area of concern; ▪ provide alternative measures for equipment to avoid the area of concern (such as, alternate access, shoo-fly); ▪ inform all users of identified avoidance sites and access restrictions in the vicinity of flagged or fenced sites; ▪ extend road or watercourse and wetland bores to reduce impact on the rare community or species; and ▪ re-align the route to avoid the community or species of concern. See Detail No. 1 for reference. [R-934]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Discovery of Plant Species and Vegetation Communities of Concern Prior to Construction (cont'd)	6. Reduce disturbance: ▪ prevent ground vegetation disturbance by using a protective layer such as geotextile pads, matting, flex net, and so forth; ▪ reduce topsoil salvage, grading or grubbing to the extent practical to protect plant root systems; and ▪ conduct careful topsoil salvage at the site, store topsoil separately from grade spoil or borrow material. [R-934]	x		x	x	x	x
	7. Alternative construction and restoration techniques: ▪ propagate plants or component species of vegetation communities of concern via vegetative or reproductive means (such as, salvaging and transplanting portions of sod and surrounding vegetation or collecting of cuttings). Transplanted materials may be moved to a suitable location off the EGP Project Footprint and in some instances, post-construction revegetation efforts may require transplanting back onto the restored EGP Project Footprint; ▪ collect seed and sow onto the EGP Project Footprint following construction; or ▪ conduct an additional survey prior to clearing in locations on the EGP Project Footprint where there is a high potential for rare occurrences. [R-934]	x		x	x	x	x
Discovery of Plant Species and Vegetation Communities of Concern During Construction	8. In the event that potential plant species or vegetation communities of concern are discovered on or within 30 m of the EGP Project Footprint during construction activities (such as, during survey activities, prior to clearing and topsoil salvage), follow the measures outlined as follows. ▪ notify the CEC; ▪ avoid further disturbance to the location or within 30 m of the location until the QP has been consulted; ▪ send a photograph, location information and any additional information regarding the area of concern to a QP; and ▪ the QP will determine if site-specific mitigation is required and if it is necessary to develop an appropriate site-specific mitigation plan in consultation with FortisBC Construction Manager and, where appropriate, regulatory agencies. The appropriate mitigation measures will be determined following an assessment, which will take into account the above-mentioned site-specific conditions and habitat criteria of the identified element. [R-935]	x		x	x	x	x
Reporting	9. The EAS will be updated to include new occurrences of plant species and vegetation communities of concern and will outline appropriate mitigation to be implemented at each site. [R-936]	x		x	x	x	x

9.5 Sedimentation of Watercourses, Non-Classified Drainages, and the Marine Environment Contingency Plan

Sediment-laden runoff from construction sites can enter waterbodies and harm aquatic life by increasing suspended sediment and causing sedimentation of habitats. Any water that has mobilized sediment from a construction site must be managed to avoid direct entry into a natural waterbody and exceedance of Provincial turbidity or total suspended solids (TSS) guidelines in the BC Approved Water Quality Guidelines (BC ENV 2021). The Contractor is expected to manage and monitor construction sites for the risk of sediment migration off-site. In the event that construction activities are anticipated or observed to be resulting in the sedimentation of a watercourse, NCD, or the marine environment, contingency mitigation measures must be implemented as quickly as practical to reduce potential impacts on fish (Sts'úkwi7) and fish (Sts'úkwi7) habitat and water (Staq̓w) quality.

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor to prevent or reduce sedimentation of watercourses and the marine environment during construction of the EGP Project. See also the Flood and Excessive Flow Contingency Plan (subsection 9.2) for the measures to be implemented when high water (Staq̓w) levels are anticipated or observed that could result in erosion and sedimentation of watercourses.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Inspection	1. Conduct water quality monitoring at watercourses and other waterbodies that are flowing at the time of construction per recommendations in the watercourse crossing table. Water quality monitoring will be conducted per specifications in Condition 10 of the EAC, including for construction activities in RRZs. The magnitude and scope of water quality monitoring will be site-specific based on construction activity, fish and fish habitat presence, risk of sediment mobilization, and other factors (such as, steep slopes and blasting requirements). If monitoring reveals that sediment values are approaching threshold values, the water quality monitors will notify the EI and Contractor, who will develop corrective actions. If the corrective actions are not successful, the EI may temporarily suspend crossing construction until an effective solution is developed. [R-678]	x		x	x	x	x
Water Erosion	2. Shut-down or relocate construction temporarily until the risk of erosion and sediment transport has been addressed or the conditions improve as determined by the CEC. [R-853]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Potential for HADD	3. Monitor crossing construction at fish-bearing watercourses and take immediate action to remedy or mitigate the potential effects of any activities that could result in death of fish or HADD of fish habitat, including introduction of deleterious materials. Water quality monitoring will be conducted at watercourse crossings in accordance with Condition 10 of the EAC, including for works a) instream; b) within the RRZ of streams with a Riparian Class of S1, S2, or S3, as defined in the Environmental Protection and Management Regulation under the *OGAA*; refer to subsection 4.5.1 of the FMMP for more information on stream classification); or c) within 20 m of a stream with a Riparian Class of S4 under the *Environmental Protection and Management Regulation* under the *OGAA*. [R-681]	x		x	x	x	x
General Mitigation	4. Install additional sediment fencing or sandbags to prevent sediment-laden water from entering watercourse or NCD. Additional methods to control water and sediment include construction of sediment ponds and use of pumps. Methods, equipment and materials used will be approved by the CEC. [R-972]	x		x	x	x	x
	5. Excavate cross-ditches to divert runoff away from watercourses or NCDs (Detail No. 8). [R-973]	x		x	x	x	x
	6. Construct soil berms on approach slopes or banks to divert runoff from the EGP Project Footprint and onto well-vegetated lands (Detail No. 8). The location and material of the sediment control structures will be determined by the CEC. [R-974]	x		x	x	x	x
	7. Import sandbags and place strategically to help stabilize and add height to banks to prevent flooding of nearby areas, especially where vegetation has been removed. [R-975]	x		x	x	x	x
	8. Implement erosion control measures on approach slopes (such as, mulches or blankets) to reduce the source of sedimentation. [R-976]	x		x	x	x	x
	9. Water quality monitoring protocols, including threshold and exceedance levels, will be followed per the FMMP. If there is potential for an exceedance of the Provincial water quality guidelines or threshold break that may be harmful to aquatic life, the CEC will assess the situation and consider a need to modify construction activities or mitigation measures or to temporarily stop work to allow turbidity levels to become compliant. Water quality monitoring protocols will be implemented by monitoring crews or CEL or CEC depending on availability and optimizing efficiency. A QP will oversee the water quality monitoring program. [R-1261]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
General Mitigation (cont'd)	10. The water quality monitors will notify the CEC in the event of a potential exceedance in turbidity or TSS of the BC Approved Water Quality Guidelines in watercourses, NCDs, or the marine environment. Releases of sediment into these waterbodies, whether by construction activities or associated erosional events, that elevate instream turbidity and may result in accumulations of fine materials on the streambed will be considered potential sedimentation events, per discretion of the EI or CEC and in consideration of input from a QP. The CEC, with the support of the EI, will assess potential sedimentation events and modify the activity or stop work until the issue can be resolved (such as, by identifying and addressing erosional issues or water management issues). Notification, mitigation, and reporting procedures are to be followed per the FMMP. [R-1260]	x		x	x	x	x

9.6 Spill, Fuel, and Hazardous Materials Contingency Plan

FortisBC outlines the procedures to respond to and cleanup a spill in the Spill Reporting Response and Cleanup document (FortisBC 2020). The document includes information for internal FortisBC reporting and external reporting to applicable regulatory agencies. Information relevant to the Contractor is provided in this section.

Table 9-1 provides information on reportable spills for potential substances on the EGP Project.

Table 9-1. Reportable Spills for Potential Substances on the EGP Project

Substance	UN No./TDG Class	Report to Emergency Management British Columbia
Acetylene, Dissolved	UN 1001 Class 2.1	≥ 10 kg
Asbestos	UN 2580 Class 9	≥ 50 kg
Diesel	UN 1202 Class 3	≥ 100 L
Drilling Fluid with NO additives	N/A	≥ 100 L to land (BC OGC spill)
Drilling Fluid containing toxic substances	N/A	>25 L
Explosives	Various UN Class 1	≥ 50 kg, or any quantity that could pose danger to public safety
Gasoline	UN 1203 Class 3	≥ 100 L
Glycol – unused and waste (heat transfer solutions, vehicle radiator fluids, ethylene glycol, propylene glycol, antifreeze)	N/A	≥ 25 L
Leachable Toxic Waste (such as, waste blasting abrasive/waste antifreeze confirmed leachable toxic)	N/A	≥ 25 kg for solids ≥ 25 L for liquids

Table 9-1. Reportable Spills for Potential Substances on the EGP Project

Substance	UN No./TDG Class	Report to Emergency Management British Columbia
Liquefied Petroleum Gas (liquid propane)	UN 1075 Class 2.1	≥ 10 kg
Mercury	UN 2809 Class 8	≥ 5 kg (370 millilitres [ml])
Methanol (wood naphtha)	UN 1230 Class 3 (6.1)	≥ 100 L
Natural Gas (sudden and uncontrolled release due to a breakage of a pipeline or fitting operated above 700 kPa/100 pounds per square inch)	UN 1971 Class 2.1	≥ 10 kg (14 cubic metres)
Natural Gas – Compressed Natural Gas released from a receptacle other than a pipeline which results in a sudden uncontrolled release.	Class 2.1	≥ 10 kg (23 L)
Natural Gas – Liquefied Natural Gas released from a receptacle other than a pipeline which results in a sudden uncontrolled release.	Class 2.1	≥ 10 kg (23 L), or any quantity that enters (or is likely to enter) a waterbody.
Nitrogen	Class 2.2	≥ 10 kg
Contaminated naturally occurring radioactive materials (pigging liquids or sludges)	7	To be determined by EA
Odorant – mercaptan (spill of liquid, release of gas from odorant tank)	UN 3336 Class 3	≥ 100 L or any quantity that has potential for public impact
Oil – unused and waste (engine oil, lubricating oil, hydraulic oil)	N/A	≥ 100 L
Paint – solvent based	UN 1263 Class 3	≥ 100 L
Paint – water based	N/A	≥ 200 L
Pest Control Product – waste	N/A	≥ 5 kg for solids ≥ 5 L for liquids
Polychlorinated biphenyl (PCB) liquid containing 2 to 49 milligram per kilogram (mg/kg) PCB (insulating oil with 2 to 49 mg/kg PCB)	N/A	Storage/waste – any quantity In-use equipment – if greater than 1 gram of PCB released.
PCB liquid containing ≥ 50 mg/kg PCB (insulating oil with ≥ 50 mg/kg PCB)	UN 2315 Class 9	Storage/waste – any quantity In-use equipment – if greater than 1 gram of PCB released.
PCB liquid containing ≥ 50 mg/kg PCB (light ballasts, paper-insulated lead covered, oil-filled equipment drained of oil ≥ 50 mg/kg PCB)	UN 3432 Class 9	Storage/waste – any quantity In-use equipment – if greater than 1 gram of PCB released.
Propane	UN 1978 Class 2.1	≥ 10 kg
Solvent	Various UN Class 3	≥ 100 L
Sulphur Hexafluoride (SF6) Non-flammable gas	UN 1080 Class 2.2	≥ 10 kg
Any other spill that can cause pollution to land (such as, drilling mud, contaminated hydrostatic test water, chlorinated water, sewage)	N/A	≥ 200 kg for solids ≥ 200 L for liquids ≥ 25 L (BC OGC requirements)

The mitigation measures in this subsection will be implemented by FortisBC, the Contractor, or the Subcontractor in the event there is a spill relating to fuel or hazardous materials.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Notification	1. If a spill occurs, or is at imminent risk of occurring, responsible persons (spillers) must immediately report to the EMBC by calling 1-800-663-3456.	x	x	x	x	x	x
Prevention of Spills to the Environment	2. Refer to spill prevention measures provided in subsection 6.1.	x	x	x	x	x	x
Initial Response	3. In the event of a spill of hazardous material or regulatory reportable spill, the first person on the scene will follow the actions presented in the Spill Scene Checklist (Appendix D). [R-838]	x	x	x	x	x	x
	4. When notified of a spill of hazardous material or regulatory reportable spill, the CEC or the first person on the scene will: ▪ take action to control danger to human life including the appointment of an on-site Safety Supervisor; ▪ designate the first person on-scene as Incident Commander until relieved of duty, who will follow the actions listed in the Spill Scene Checklist; and ▪ mobilize necessary equipment and implement measures to control and contain the spill. The Contractor will be required to make all resources available to contain and clean-up a spill. [R-839] A reportable spill under the BC *Environmental Management Act, Spill Reporting Regulation* includes: spills that enter or is likely to enter a waterbody, and the quantity of the substance spilled is, or is likely to be, equal to or greater than the listed quantity for the listed substance in the Schedule. Refer to Table 9 for reportable spill volumes.	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
General Spill Containment Procedures	5. The following general guidelines will be followed for containment of most hazardous materials. ▪ Address personal safety and the safety of others on-site. ▪ Assess the safety hazards of the situation. ▪ Remove sources of ignition, if safe to do so. ▪ Identify the product, stop source and physically contain spill as soon as safe to do so. ▪ Avoid use of water or fire extinguishing chemicals on non-petroleum product spills unless it is necessary to control a fire or prevent an explosion, since many chemicals react violently with water and chemical extinguishing agents may release toxic fumes. In addition, chemicals may be soluble in water and dispersal makes containment and clean-up more difficult. ▪ Avoid traffic on contaminated soils. ▪ Use natural depressions or berms constructed with materials and equipment in proximity to the site to physically contain a spill on land. Deploy booms to contain spills on water. ▪ Use vacuum trucks, sorbent materials or sorbent pads to recover spilled material. ▪ Deploy booms, skimmers, sorbents, etc., to the extent practical, to contain and recover spilled material from the watercourse, wetland or other NCD. ▪ Do not attempt clean-up without advice from the CEC. ▪ Dispose of sorbent pads, contaminated soil and vegetation at an approved facility. ▪ Treat or dispose of soil in accordance with BC *Hazardous Waste Regulation* [R-841].	x	x	x	x	x	x
	6. Follow the checklist provided in Appendix D.	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
General Spill Containment Procedures (cont'd)	7. At a minimum, implement the general spill responses noted above and adhere to the following general guidelines for containment and clean-up of most hazardous materials if spilled from a fuel truck: ▪ contain spilled petroleum product; ▪ pump tanker dry (into appropriate containers or another tanker); ▪ remove tanker from site; ▪ recover spilled product; ▪ clean-up contaminated area; and ▪ dispose of sorbent pads, heavily contaminated soil, and vegetation at an approved facility. On lightly contaminated soil areas where remediation is feasible, add amendments (such as, fertilizer, green feed, alfalfa pellets), sample the soil and seed if appropriate. Repeat, if warranted. [R-843]	x	x	x	x	x	x
Spills Adjacent to or into a Watercourse, Wetland or NCD or the Marine Environment	8. At a minimum, implement the general spill responses noted above and adhere to the following general guidelines for containment and clean-up of most hazardous materials if spilled adjacent to, or into, a watercourse, wetland, NCD, or the marine environment. ▪ construct berms or trenches to contain spilled product prior to entry into a watercourse, wetland, or NCD; ▪ deploy booms, skimmers, sorbents, and so forth, if feasible, to contain and recover spilled material from the surface of the water; ▪ recover spilled product; ▪ clean-up contaminated area including downstream shorelines; and ▪ dispose of heavily contaminated soil and vegetation at an approved facility. On lightly contaminated soil areas where in situ restoration is feasible, add amendments (such as, fertilizer, green feed, alfalfa pellets), sample the soil and seed if appropriate. Repeat, if warranted. [R-844]	x	x	x	x	x	x
Spot Spills	9. Spot spills of hydrocarbons onto the ground less than or equal to 1 L) will be contained, cleaned up and then reported to the CEC. [R-845]	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Spot Spills (cont'd)	10. At a minimum, the following general guidelines will be followed while cleaning up spot spills (≥1 L) of hydrocarbons: ▪ notify CEC; ▪ the CEC will provide a report to FortisBC containing: the material and volume spilled, the surface it was spilled on, the cause and equipment involved in the spill, and how it will be cleaned up; ▪ the CEC in consultation with the QP will determine appropriate methods to remove or restore contaminated soils. Soil and vegetation heavily contaminated with petroleum products will be disposed of at an approved facility; ▪ record locations where spot spills have occurred such that PCM of the site can be conducted; ▪ add amendments (for example, fertilizer, green feed, alfalfa pellets) to lightly contaminated sites, cultivate beyond the depth of contamination, sample the soil and seed if appropriate. Repeat, if warranted; ▪ implement the general spill responses in Section 9 for regulatory reportable spills; and ▪ refer to the FortisBC Corporate Emergency Response Plan or the Contractor Emergency Preparedness and Response Plan for direction in liaising with Squamish Nation to identify potential impacts to cultural sites. [R-846]	x	x	x	x	x	x

9.7 Traditional Land Use Sites Discovery Contingency Plan

In the event that TLU sites which were not previously identified through consultation and engagement with Indigenous nations are found during any phases of the EGP Project, the sites will be assessed, and appropriate mitigation measures will be determined. Policies and procedures described by the Indigenous nations through consultation and engagement may outline specific procedures and expectations for conducting work around heritage resources. Additional mitigation for chance finds and previously identified TLU sites are described in the Archaeological - Heritage Resources Plan (Inlailawatash 2021).

Previously unidentified TLU sites will be assessed based on the following criteria:

- the location of the TLU site with respect to the EGP Project Footprint;
- the relative importance of the TLU site to the community; and
- the potential for an alteration of construction activities to reduce or avoid sensory disturbance. [R-1003]

Where avoidance is not feasible, mitigation strategies will be developed with the guidance and approval of the BC Archaeology Branch and BC OGC. Applicable Indigenous nations will be consulted on these mitigation strategies. The following table defines different types of Indigenous activities that may be affected by EGP Project construction and recommends mitigation measures that have been successful on past projects.

In addition, these resources may be considered in developing additional mitigation measures:

- Cultural Cedar Tree Program Policy 2021 (Squamish Nation 2021)
- Heritage Policy 2021 (Squamish Nation 2021)

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Notifications and Permitting	1. Obtain an archaeology or heritage permit from Squamish Nation for archaeological studies or heritage investigations within Squamish Nation Territory. [Squamish Nation Policies]	x		x	x	x	x
Indigenous Monitoring	2. The Indigenous Monitor and Archaeology Lead should be on-site during construction activities conducted within 200 m of the TLU site.	x		x	x	x	x
	3. Flag a 'No Work Zone' buffer during on-site monitoring.	x		x	x	x	x
Erosion and Sediment Control	4. Follow measures for controlling runoff from the EGP Project Footprint (Section 8.1) to prevent erosion and sedimentation impacts to TLU sites [2013].	x		x	x	x	x
Chance Find Procedures	5. If unanticipated archaeological or cultural materials are encountered, stop construction until a mitigation strategy is determined by the Indigenous Monitor, the Archaeology Lead, applicable Indigenous Nations, and/or other local heritage stakeholder(s). [2051]	x		x	x	x	x
	6. Contact the EI and Archaeology Lead who are responsible for notifying any stakeholders or Emergency Contacts (Appendix A).	x		x	x	x	x
	7. The FortisBC Archaeological Monitor will temporarily secure the site using fencing, flagging, or a barricade. [2052]	x		x	x	x	x
	8. If the investigative process requires time, post signs on nearby EGP Project to notify EGP Project personnel of no-stopping zones within the 10 m buffer area of the TLU site. [2053]	x		x	x	x	x
	9. The Archaeology Lead will determine when construction can resume. [2054]	x		x	x	x	x
	10. Chance find procedures will apply during PCM. [2055]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Chance Find Procedures (cont'd)	11. Monitoring of operations activities by Indigenous Monitors may be required where significant TLU resources remain following an Archaeological Impact Assessment (AIA), or if the TLU resources are deeply buried. [2056]	x		x	x	x	x
	12. Prohibit the collection of historical, archaeological, or palaeontological resources by EGP Project personnel. [R-174]	x		x	x	x	x
Fishing Areas	13. The practice of traditional fisheries relates to the species harvested, fishing techniques and the nature of specific reaches of lakes and rivers. Fishing methods may include but are not limited to: angling; gigging; spear-fishing; dip netting; gill netting; and the construction and use of fish traps and weirs. While fishing activities vary with changes in seasonal water flow and variation in fish stocks, fisheries often exhibit habitual repeated use. Fishing areas include watercourses and wetlands often in proximity to staging areas and access points to the waters. Secondary fishing activities relate to the processing of harvests, and may include processing yards, smokehouses, drying racks and fish-grease rendering features. Standard and effective mitigation measures for fishing areas may include: ▪ follow the regulations, standards and guidelines set by Provincial and Federal regulatory agencies for watercourse and NCD crossings. [R-1007]	x		x	x	x	x
Plant Gathering Area	14. Many Indigenous individuals harvest medicinal, ceremonial and food source plants. Plants are gathered in a variety of environments, which include old forests, along watercourses and in rugged or mountainous areas. Detailed information regarding medicinal plants is passed down from the Elders and is considered proprietary by the Indigenous nations. To protect these plants, implement the following measures to the extent practical: ▪ seek to avoid the sites, where reasonable and practical, of plant gathering areas identified by Indigenous individuals. ▪ limit the use of chemical applications such as herbicides; and ▪ replace plant species during restoration (subsection 8.7.3). [R-1009]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Habitation Sites	15. Habitation sites include traditional campsites, cabins, and settlements. Campsites typically have defined hearths (fire rings), de-limbed trees, tent frames and miscellaneous cached or discarded camping supplies and equipment. Cabin structures represent a more permanent occupation of the land and include central log or timber-framed structures, traditional activity areas such as drying racks and smoking tents, and ancillary equipment storage areas. A group of cabins or campsites may signify a long-term or intermittent occupation. A settlement may have been used seasonally or throughout the year, depending on location or necessity. The relative size and nature of habitation sites continuously evolve based on how families and communities grow and often expand from campsites to cabins and possibly to settlements. Conduct detailed mapping, photographic recording, and avoidance of the location by the EGP Project Footprint. Should avoidance of a site not be practical, mitigation measures consisting of detailed recording and controlled excavations may be implemented. [R-1012]	x		x	x	x	x
Gathering Places	16. Indigenous people often gather to share in ceremonial activities, exchange items of trade, arrange and celebrate marriages, and for other activities. Additionally, Indigenous grave sites are sometimes recorded in the general area of large gathering places. Such gathering places have historical, ceremonial, cultural, and economic significance to Indigenous nations. Potential effects on gathering places may be mitigated through detailed recording, mapping, and avoidance, however, the visual impact will be assessed in the field and mitigation measures will be refined and optimized, if warranted. [R-1014]	x		x	x	x	x
Sacred Areas	17. These areas include burials, vision quest locations, rock art panels, birth locations and ceremonial places, among others. A particular element is often only a small component of a larger spiritual complex, which can encompass topographic features and may, by its very nature in the context of Indigenous spirituality, be inestimable and irreplaceable. Mitigation measures for sacred areas may include detailed recording, mapping, and avoidance, however, additional mitigation measures, if warranted, will be refined and optimized in the field and through community discussions. [R-1016]	x		x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Hunting and Wildlife Areas	18. Hunting and wildlife sites are areas where large mammals (such as elk, moose, deer, and bear) are commonly harvested. Key wildlife species are identified both in community discussion and by observed game ambushes, blinds and hunting stands, dry meat racks and butchered animal remains. Furthermore, areas where game can be expected, such as mineral licks, calving areas and well-used game trails, are typically prized hunting areas. Successful and accepted mitigation for hunting sites include: ▪ adhere to wildlife hunting timing constraints; ▪ leave breaks in the pipeline trench to allow animals to cross; and ▪ limit the use of chemical applications such as herbicides where warranted. [R-1004]	x		x	x	x	x
Trapping Sites	19. Indigenous nations continue the practice of trapping and snaring for food and pelts. These traps and snares may or may not be located within registered trap lines. Seek to avoid accidental damage where the pipeline transects a trap line by considering the following mitigation options: ▪ maintaining access to the trap line; and ▪ moving of trap line equipment by the trapper prior to construction. [R-1006]	x		x	x	x	x

9.8 Wet Soil Contingency Plan

Soil may become saturated and too wet to conduct a particular construction activity, referred to as 'wet soil'. A QP with sufficient training and soils-related experience will be available to identify soils that are too wet for a particular activity and when conditions allow the activity to resume.

The decision to continue or suspend particular construction activities on lands with excessively wet soils will be made by the EI in consultation with the FortisBC Construction Manager and the Contractor. A record of the location, timing, and reason for implementation of the Wet Soil Contingency Plan will be maintained by the EI.

In the event that activities are suspended, the landowner or regulatory agency will be notified, as required, and as soon as practical by the EI. The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Orientation Program	1. The Contractor will be responsible for identifying when soils are too wet to conduct work. This will be included in the Orientation Program. [2050]	x		x	x	x	x
Wet Soil	2. In the event that wet soil conditions are encountered during construction, some or all of the following measures will be considered in accordance with the Wet Soils Contingency Plan: ▪ Restrict construction traffic, to the extent practical, to equipment with low-ground-pressure tires or wide track pads. ▪ Reduce rubber-tired traffic (such as, pick-ups and graders) from driving along the EGP Project Footprint or construction site. ▪ Postpone work in highly sensitive areas and shift effort to low sensitivity areas. ▪ Restrict work to non-problem areas, such as well-drained soils, until conditions improve. ▪ Salvage an additional width of topsoil in potential problem areas; note that topsoil salvage will not be permitted during wet soil conditions (this may be practical in anticipation of wet weather in some areas). ▪ Salvage topsoil from the EGP Project Footprint to prevent mixing and rutting. ▪ Install matting in high moisture areas or where wet soil conditions are anticipated in the proposed season of construction. ▪ Suspend construction activities and traffic in areas with wet soil conditions until authorized to proceed by the CEC. Grade the travel lane smooth to prevent puddling and expedite drying. [R-980]	x		x	x	x	x

9.9 Wildlife Encounter Contingency Plan

The objective of the Wildlife Encounter Contingency Plan for the EGP Project is to avoid or reduce direct wildlife (Sekw'ekw'inexw) mortalities as a result of human-wildlife conflicts during EGP Project activities . A human-wildlife (Sekw'ekw'inexw) conflict can be described as any interaction between wildlife (Sekw'ekw'inexw) and humans which causes or may cause harm to humans, wildlife (Sekw'ekw'inexw), or property. For example, vehicle-animal collisions, aggressive behaviour or nuisance animals, or obtained food or garbage. If a human-wildlife (Sekw'ekw'inexw) encounter occurs during the construction or operation phase of the EGP Project, either at the construction site or on the commute to and from the construction site, follow the measures outlined as follows:

1) Report any incidents with wildlife (Sekw'ekw'inexw) to the CEC who will notify the EI and applicable Provincial agency (that is, BC OGC, BC LWRS) and, if warranted, the local police detachment (Appendices A and C) [R-982]. A Wildlife Sighting/Incident Reporting Card is included in Appendix G;
2) Report any trapped, injured, or dead animals on the site to the CEC. The CEC will contact the EI and applicable regulatory agency to consult on appropriate action [R-983];
3) The CEC will report location and details of collisions with wildlife (Sekw'ekw'inexw) to the Lead EI. The Lead EI will, if warranted, notify the applicable Provincial authorities (such as, BC Conservation Branch Regional staff) and the local police detachment (Appendices A and C) [R-984]; and
4) Once the preceding contacts have been made, the CEC will document the incident. [R-985]

A primary concern with Project-related bear mortality risk stems from attraction of bears to EGP Project temporary workforce accommodation or facilities, which has potential to create conflict situations that require intervention from a Conservation Officer. Additional mitigation may be required for temporary workforce accommodation sites and other EGP Project facilities that will have frequent or ongoing human presence and will need waste storage. The need for additional mitigation will determined through the adaptive management process (Section 7 of the GBMMP).

Any wildlife incidents observed by construction personnel will be recorded on the Wildlife Sighting/Incident Reporting Card (Appendix G), which will include, at a minimum, the following: date, location, wildlife species encountered, number observed, the type of encounter (such as, passive, aggressive), and, if applicable, any actions taken by Project personnel to address the situation. Wildlife Sighting/Incident Reporting Cards will be kept on file by FortisBC and provided to the applicable regulatory agencies and Indigenous nations upon request.

FortisBC will follow-up on problem wildlife (Sekw'ekw'inexw) incidents and adverse human-wildlife (Sekw'ekw'inexw) encounters. Wildlife (Sekw'ekw'inexw) incidents will be reviewed by the CEC and the Contractor Project Manager. If current mitigation is not effective, the existing mitigation may be modified, or new mitigation may be introduced, in consultation with the Wildlife (Sekw'ekw'inexw) QP or relevant regulatory agency.

It is the responsibility of every worker to report wildlife (Sekw'ekw'inexw) incidents to the CEC. The content of the Wildlife Encounter Contingency Plan will be communicated to Project personnel through the site orientation process, ongoing EGP Project communication and signage. The Contractor is responsible for site personnel having adequate environmental and compliance training. The site orientation will include bear awareness training and the process to follow should a human-wildlife conflict occur.

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Human-Wildlife Conflict Planning	1. In accordance with EAC Condition 18, FortisBC will retain a QP to develop and implement a Grizzly Bear Mitigation and Monitoring Plan, which will include a human-bear conflict management component with measures designed to prevent any direct bear mortalities associated with the construction of the EGP Project [NR-344 - partial].	x	x	x	x	x	x
Human and Wildlife Conflict - Mortality	2. Implement the Wildlife Encounter Contingency Plan, to reduce direct wildlife mortalities associated with the construction of the EGP Project. [NR-21]. Measures include: ▪ Prohibit the recreational use of all-terrain vehicles or snowmobiles by construction personnel on the EGP Project Footprint or at associated EGP Project facility sites. [R-150] ▪ Do not harass or feed wildlife. Prohibit EGP Project personnel from having pets on the EGP Project Footprint or at associated EGP Project facility sites. [R-177] ▪ Collect construction garbage, food, industrial waste, and debris on a regular basis, and dispose of waste at an appropriate facility to avoid the attraction of wildlife and to reduce odours. Waste containers shall accompany each working unit. No waste shall be disposed of in the trench or on the EGP Project Footprint. [R-141] ▪ Store garbage with potential to be a wildlife-attractant in wildlife-proof containers. [R-145] ▪ Prohibit EGP Project personnel from having firearms on the EGP Project Footprint, at associated facility sites or in EGP Project vehicles. [R-179]	x	x	x	x	x	x
Bear Awareness Training	3. Field personnel that will be on the pipeline construction footprint will receive bear awareness training [NR-16]	x	x	x	x	x	x
Human and Wildlife Conflict - Incident	4. In the event of human-wildlife conflict during the construction phase of the Project, either at the construction site or on the commute to and from the construction site, the Wildlife Encounter Contingency Plan will be implemented, and the Contractor will contact the CEC immediately. The following measures will be followed: ▪ Report any incidents with Wildlife (including any trapped, injured or dead animals on the site) to the CEC, who will notify the FortisBC EI, who may then contact the Wildlife QP, the applicable regulatory agency (such as, BC OGC, BC LWRS) and, if warranted, the local police detachment (Appendices A and C). ▪ Report location and details of collisions with Wildlife to the Lead EI. The Lead EI will, if warranted, notify the applicable Provincial authorities (such as, BC Conservation Branch regional staff) and the local police detachment (Appendices A and C). ▪ Once the preceding contacts have been made, the CEC will document the incident. [NR-7]	x	x	x	x	x	x

9.10 Wildlife Species of Concern and Habitat Discovery Contingency Plan

The following procedures provide contingency measures for wildlife species of concern or habitat discovery. A wildlife species of concern refers to a wildlife species at risk or a wildlife species that has increased potential to be affected by Project activities due to spatial or temporal overlap with the EGP Project during sensitive life stages and therefore may have identified setbacks and timing windows.

A wildlife species at risk refers to wildlife species listed as Special Concern, Threated, or Endangered on Schedule 1 of the *Species at Risk Act* or by the Committee on the Status of Endangered Wildlife in Canada, or are Provincially Red- or Blue-listed under the BC *Wildlife Act*. Wildlife species with special conservation status that have potential to occur in the EGP Project area are found in Appendix A of the WMMP.

In the event that a wildlife (Sekw'ekw'inexw) species of concern or their wildlife (Sekw'ekw'inexw) habitat feature (such as, a stick nest or den) is discovered prior to or during construction of the EGP Project, the discovery will be reviewed, and appropriate mitigation measures will be determined. The wildlife (Sekw'ekw'inexw) species of concern or wildlife (Sekw'ekw'inexw) habitat feature will be reviewed based on the following criteria:

- the wildlife species, its conservation status and specific habitat needs relative to the area of development;
- the location of the wildlife (Sekw'ekw'inexw) species of concern or wildlife (Sekw'ekw'inexw) habitat feature in relation to the EGP Project Footprint and in consideration of the recommended setback distance as provided by regulatory guidelines, where applicable;
- the presence of topographic features or vegetation to effectively screen the wildlife (Sekw'ekw'inexw) species of concern or wildlife (Sekw'ekw'inexw) habitat feature from construction activities;
- the timing of construction versus the sensitive timing windows or restricted activity period for the wildlife (Sekw'ekw'inexw) species of concern or wildlife (Sekw'ekw'inexw) habitat feature (refer to Table 5-1 in the WMMP); and
- the potential to alter the construction activities to reduce or avoid sensory disturbance [R-986].

In the event that a wildlife species of concern or their habitat is discovered and requires mitigation, the discovery will be assessed by a QP based on the criteria provided above, and appropriate mitigation will be implemented from the list described in the following table (that is, mitigation R-1002) The mitigation will vary depending on the species.

For example, observations of songbirds and/or large mammals, where no associated habitat feature (that is, active nest or mammal den) is present, may not warrant mitigation given their ability to move away from the construction area. For other species (such as, amphibians that may be restructured to a discrete area), mitigation measures (such as, salvage of individual in compliance with appropriate permit) will be reviewed and implemented as required.

The legislation, regulatory guidelines, BMPs, and policy documents used to develop wildlife (Sekw'ekw'inexw) mitigation measures and procedures in the CEMP, the WMMP, and the GBMMP are summarized in the WMMP and the GBMMP.

The locations of known wildlife species of concern and their habitat encountered along the EGP Project Footprint and appropriate mitigation to be implemented are identified on the EAS. It is the responsibility of every worker to report wildlife (Sekw'ekw'inexw) sightings and incidents to the CEC. The content of the Wildlife Species of Concern and Habitat Discovery Contingency Plan will be communicated to EGP Project

personnel through the site orientation process, ongoing EGP Project communication, and signage, including potential species at risk that could be encountered by the EGP Project. The site orientation will include the process to follow should a wildlife species or concern of their habitat feature be discovered.

The following mitigation measures will be implemented by FortisBC, the Contractor, or the Subcontractor.

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Orientation Program	1. Wildlife species of concern and their habitat features that have the potential to occur within the EGP Project Footprint will be identified in the Orientation Program for the CEC. The CEC will be provided with information on identifying wildlife species of concern and their habitat. [R-1001]	x	x	x	x	x	x
Wildlife Species of Concern and Habitat Discovery Prior to or During Construction	2. In the event that wildlife species of concern or a wildlife habitat feature is discovered prior to or during construction, potential mitigation measures for species of concern include, to the extent practical and as required: ▪ Comply with the sensitive timing windows or restricted period for the wildlife species of concern or wildlife habitat feature (WMMP Table 5-1); ▪ Comply and plan to incorporate the recommended or required setback distance for any wildlife species of concern or wildlife habitat features (WMMP Table 5-1); ▪ Extend road or watercourse bores to avoid or reduce adverse effects on the site; ▪ Inform all project personnel of access restrictions in the vicinity of flagged or fenced sites; and, ▪ With the appropriate permit or regulatory consent, relocate species (such as, amphibians) as necessary. [R-987]	x	x	x	x	x	x
	3. In the event a wildlife species of concern or wildlife habitat feature (such as, nest or den) is observed during construction, implement the Wildlife Species of Concern and Habitat Discovery Contingency Plan, and report any observations to the CEC. These observations will be collected and submitted to the applicable regulatory agency (such as, BC LWRS or ECCC). [NR-9]	x	x	x	x	x	x

Activity/ Concern	Mitigation Measure	Applicable EGP Project Components					
		Pipeline	Tunnel	East Portal	Woodfibre Portal	Facilities	TIS
Wildlife Species of Concern and Habitat Discovery Prior to or During Construction (cont'd)	4. Contingency measures to be followed during construction include [R-1002]: ▪ Suspend work in the vicinity of any newly discovered wildlife species of concern or wildlife habitat feature. Work at that location may not resume until the measures as follows are implemented. ▪ Notify the CEC who will notify the Contractor Project Manager and FortisBC Lead EI. The CEC, Contractor Project Manager and FortisBC's Lead EI will assess the discovery, consult with the QP where necessary, and, either allow construction to be resumed or, in the event of a confirmed or potential discovery, mitigation options will be discussed with the QP. ▪ The QP may deem it necessary to visit the site and will, regardless of whether a site visit is warranted, develop an appropriate mitigation plan in consultation with FortisBC's Environmental Staff, and if required, the appropriate regulatory agencies (such as, BC LWRS or ECCC). The mitigation measures available include, but not limited to those listed previously.	x	x				
Bat Hibernacula and Maternity Roosts	5. In the event active bat roosts or hibernacula are discovered, implement the Wildlife Species of Concern and Habitat Discovery Contingency Plan (Section 9). Consult with the appropriate regulatory authority where disturbance of a hibernacula or maternity roost is unavoidable. Until the QP determines the roost or hibernacula is vacated, implement these mitigation measures: ▪ avoid high-impact activities (such as, blasting, removal of rock or talus); and ▪ avoid using heavy equipment, or construction of new access roads within 100 m of the roost or hibernacula.	x	x				
	6. Sensitive timing windows for bat habitat features are: ▪ Maternity roost sites: June 1 to September 1 ▪ Hibernaculum sites: September 1 to April 30 [NR-82]	x	x				

10. Monitoring

Monitoring is used to determine the effectiveness of mitigation in reducing environmental impacts as a result of the EGP Project, to meet legal and permitting requirements, and to identify trends and possible means for improvement. Monitoring (Ínexwantas) will be conducted to confirm mitigation is implemented as described in the management plans, and if not, the corrective action process will be implemented. Monitoring (Ínexwantas) will occur during the construction and post-construction phases. Monitoring (Ínexwantas) during the operations phase of the Project is described in the EAC Condition management plans outlined in the EAC conditions, where operations phase monitoring is specified as applicable (that is, in the FMMP, AMP, VMMP, TSS, WMMP, and GBMMP). Monitoring also involves an adaptive management to be implemented if measures are not mitigating impacts (Section 11).

FortisBC will conduct a pre-construction route walk and follow-up biophysical survey for baseline data collection prior to construction. The data will be used to verify the information on the EAS. Pre-construction route walks are multi-disciplinary and conducted jointly with Contractor. New information that was not identified in baseline surveys, will be documented.

10.1 Monitoring during Construction

Monitoring (Ínexwantas) will take place during construction to determine that the mitigation measures are effective at reducing potential effects. Various performance indicators and targets will be used for this, as described in the EGP Project EAC Condition management plans. If a mitigation measure is found to be ineffective at reducing potential effects, corrective measures will be taken. These corrective measures are outlined in Section 11 as part of the adaptive management of the CEMP as well as each EAC Condition management plan.

Monitoring (Ínexwantas) will include construction inspections and periodic field visits by FortisBC personnel or their Consultants. Monitoring (Ínexwantas) data collected by the FortisBC Environmental Inspection Team and the Contractor Environmental Team, documented during construction, will help determine the effectiveness of mitigation and inform the need for corrective actions if necessary. The FortisBC Environmental Inspection Team and Contractor Environmental Team will be supported, when needed, by QPs that have expertise in a particular discipline or issue. The QP will be consulted by FortisBC or the EI or CEC when necessary.

Environmental information (such as, equipment cleanliness, use of temporary erosion and sediment controls, as well as areas or activities of environmental concern) will be collected throughout construction for documentation and the assessment of effectiveness of procedures or measures used to aid or inform the decision-making process during construction and post-construction. The EI will be responsible for the preparation of daily Environmental Inspection reports to document construction methods, decisions related to implementation and location of mitigation measures or corrective actions, and final restoration measures and issues encountered.

The Lead EI will review, collect, organize, and disseminate environmentally-related information and documentation during construction, including environmental incidents and non-compliances. The Lead EI documents communication records for discussion with regulatory agencies.

The CEC will also prepare summary reports of daily construction activities, implemented mitigation measures, actual or potential environmental issues and associated corrective actions. These daily

summaries will be provided to the CEL who will communicate with the FortisBC Environmental Inspection Team on environmental compliance.

Information for these activities are designed for verifying EGP Project-specific compliance requirements have been fulfilled, and proactive identification of non-compliance issues. Information is documented in the Environmental Summary Table (EST). Subsection 2.3 describes the roles for monitoring (Ínexwantas) follow through on environmental and socio-economic commitments and compliance with applicable legal requirements, regulations, permits, and approval Conditions.

Compliance data is mostly qualitative in nature, collected to document that mitigation was implemented during construction as per written plans. FortisBC will use this information for EAC compliance reporting under Condition 4.

Information collected during monitoring will document the following:

- Mitigation was followed as described in the management plans and no residual effect is discovered post-construction, including residual effects identified for any new environmental issues that may have arisen following construction and restoration.
- Commitments made to Indigenous nations, landowners, tenure holders, and others, are documented and addressed.
- Post-construction conditions are supporting a positive trajectory to equivalent land capability on and off the right-of-way..

Follow-up monitoring (Ínexwantas) and remediation will be conducted until identified issues are resolved.

10.2 Post-Construction Monitoring

FortisBC has developed the PCM Framework to provide information that will be included in the final PCM Plan to support the PCM Program. Planning for PCM includes review of environmental surveys conducted prior to construction as well as the EST. Monitoring (Ínexwantas) will occur in the first five growing seasons following completion of restoration, and will be conducted as described in the final PCM Plan. FortisBC will report on post-construction monitoring for the first, third, and fifth growing seasons, or more frequently, as warranted, The Post-Construction Monitoring Framework (Jacobs 2022) outlines the PCM Program and is available for review alongside the CEMP.

During the PCM Program, potential issues relating to the efficacy of mitigation measures and restoration work are identified and followed up with recommendations for additional restoration work. The EST is updated to reflect the observations of additional survey, where issues have been resolved, landowner engagement, and remedial action taken to address areas for improvement.

During each survey to support monitoring, environmental features along the right-of-way are examined against a comparable control (off right-of-way) by QPs (such as, soil, restoration, aquatic, wetland, and vegetation professionals) to determine a positive trajectory toward equivalent land capability. FortisBC will complete a final evaluation of the effectiveness of mitigation upon completion of the 5-year PCM period and will determine if targets have been met and whether additional monitoring (Ínexwantas) may be warranted. For example, if corrective measures are needed at site-specific locations, additional monitoring (Ínexwantas) will be completed following their implementation until targets are met.

Any restoration issues remaining after the fifth year of the PCM Program will continue to be monitored, with corrective measures implemented by FortisBC representatives through ongoing routine monitoring of the permanent right-of-way.

The PCM Program reports will be available by January 31 in each year following the year of PCM and will be provided as directed by the appropriate regulatory agency. Refer to EAC Conditions 4 and 5 for compliance and verification reporting to BC EAO. The PCM Program reports will describe the methodology used for monitoring (Ínexwantas) and the criteria established for evaluating restoration success based on qualitative and quantitative analysis, where warranted. The first year PCM Program report will include the environmental as-built report. The PCM Program reports will document environmental issues (referred to as the EST) identified during the EGP Project PCM Program, including locations, subsequent inspections and monitoring (Ínexwantas), and additional mitigation necessary to resolve the outstanding environmental issue. Issues that are successfully mitigated will be listed as resolved. The effectiveness of the mitigation applied against the criteria for success will be assessed.

10.3 Compliance Tracking and Notification

Field-based issues identification will follow these classifications:

- **Issue**: An area that requires attention or documentation but is not out of alignment with any written mitigation, plan, permit, or authorization.
- **Non-conformance**: An observation of a minor mitigation measure or written guidance in a plan, permit, or authorization that is not being implemented but should be and can easily be fixed.
- **Non-compliance**: An issue or non-conformance that is identified by EGP Project personnel or a regulator as being not in accordance with written mitigation or a plan, permit, or authorization that must be followed and must be corrected.

Observations of potential non-compliance must be reported to supervisory level personnel and the EI or CEC, who will determine if the issue is non-compliant to a regulated condition or requires an action item to resolve an issue. Minor issues and non-conformances will be resolved promptly, where practical, to avoid escalation into non-compliances. Correction of a non-compliance will also be addressed promptly but may require development of a corrective action plan. Non-compliances will be assessed, resolved, and documented. Non-compliance trends will be used to identify areas for improvement. If the non-compliance is in violation of legal requirements, the EI or CEC will provide the information required for FortisBC to report to regulatory agencies (EAC Condition 7).

11. Adaptive Management

This section outlines an adaptive management approach to how mitigation measures will be re-evaluated should monitoring (Ínexwantas) programs indicate that the measures implemented were not adequate/effective at avoiding or reducing potential residual effects on the environment.

The results of the monitoring (Ínexwantas) programs will inform the need for corrective measures. If monitoring (Ínexwantas) results identify issues, corrective measures will be implemented as soon as feasible. Where corrective measures may be implemented to achieve objectives of the CEMP, additional monitoring (Ínexwantas) will be completed following their implementation until monitoring (Ínexwantas) results indicate the objectives have been met. Figure 11-1 illustrates this adaptive management approach.

Field-based decisions often require prompt actions or may be readily addressed with better implementation of existing mitigation and could therefore take a shorter path between identification of an environmental issue and implementation of a corrective measure. Refer to measures in subsection 2.4 for the roles and responsibilities that outline the decision-making process for implementing on-site inspection and monitoring in the field for various levels of severity.

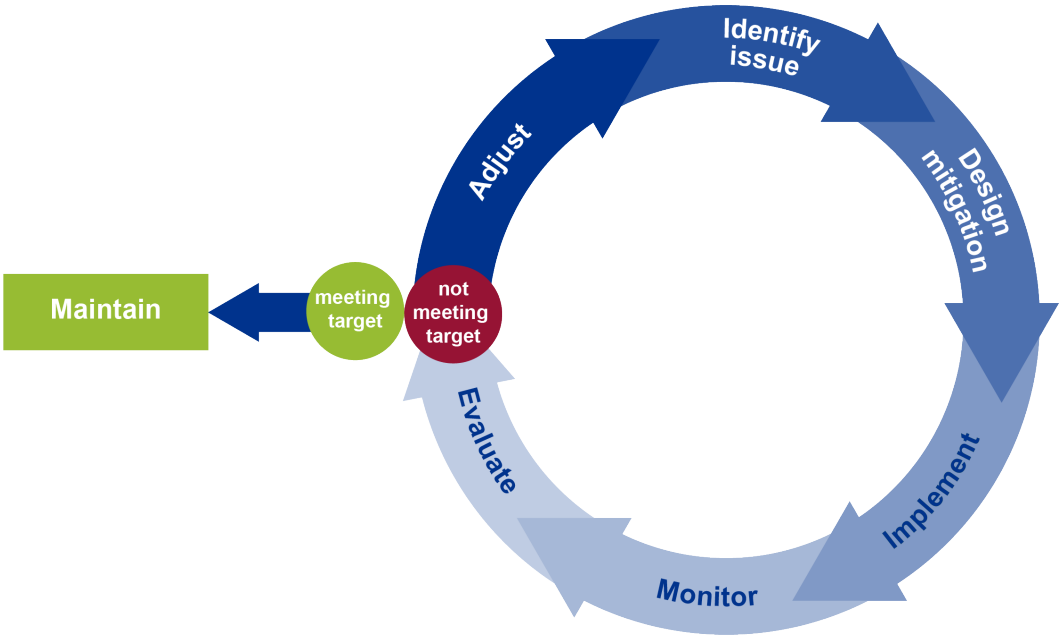


Figure 11-1. Adaptive Approach for the Application of Corrective Measures

Corrective Measures

Should it be determined that mitigation measures are not addressing EGP Project effects, other aspects of the EGP Project as described in the CEMP, depending on the situations, the EI or CEC, FortisBC, or Contractor Project Manager, and other members of the Construction Management Team, in co-operation with appropriate QPs, will determine the corrective measure for the situation. The decision will consider a variety of factors including but not limited to: weather conditions, environmental conditions, construction activity, safety, and regulatory requirements.

Corrective measures may include:

- Proper implementation of existing mitigation;
- Implement new mitigation; and
- Implement mitigation in an alternate location.

Corrective measures will be implemented in a timely manner. Where corrective measures may be implemented to achieve the targets and goals of the CEMP, additional monitoring (Ínexwantas) will be completed following their implementation until monitoring (Ínexwantas) results indicate that the target has been met. Corrective actions scenarios are included in Table 11-1.

The specific corrective measures implemented will vary depending on the feature. Specific corrective measures for issues are included in Section 7 of the WMMP, GBMMP, FMMP, WMP, AMP, Section 8 of the VMMP, and Section 11 of the TCMP. Adaptive management and corrective measures will also be discussed and included in the PCM Program.

Table 11-1. Corrective Action Scenario

Goal	Target	Underperforming Mitigation	Corrective Action
Adequately address EGP Project effects.	Construction practices and mitigation is meeting the intended result.	Not fully mitigating EGP Project effects.	▪ EIM and Lead EI may implement a stop work order where necessary. ▪ FortisBC and Contractor discuss modifying or adding new mitigation. ▪ Involve and QP where warranted.

Adaptive Management for Siiyamin ta Skwxwú7mesh (Cultural Sites)

Mitigation measures for the Siiyamin ta Skwxwú7mesh s has been provided throughout the CEMP. Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) requested adaptive management information regarding noise near the Siiyamin ta Skwxwú7mesh s and the information is included here. Correction actions are described in Table 11-2.

Table 11-2. Corrective Actions

Goal	Target	Underperforming Mitigation	Corrective Actions
Avoid noise impacts to Siiyamin ta Skwxwú7mesh visitors.	No noise disturbance to Siiyamin ta Skwxwú7mesh visitors that changes the visitors use of the site.	Noise complaints from Siiyamin ta Skwxwú7mesh visitors ▪ Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) receives complaints that the noise levels are too high at the Siiyamin ta Skwxwú7mesh in order for the site to be used or enjoyed in the way it is intended. ▪ Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) notices a reduced use of the site.	FortisBC engaged Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) on potential actions. These may include: ▪ Implementing daily or weekly timing restrictions on the access adjacent the Siiyamin ta Skwxwú7mesh. ▪ Implementing equipment or travel restrictions in proximity to the site.

12. Compliance Reporting Requirements

FortisBC will provide a report to BC EAO on the status of compliance at the following times:

- at least 30 days prior to the start of Construction;
- on or before January 31 in each year after the start of Construction;
- at least 30 days prior to the start of Operations; and
- on or before January 31 in each year after the start of Operations.

As part of reporting, FortisBC will provide a Table of Concordance outlining the EAC Condition, the activity conducted to date to fulfill and requirements and status of completion Reports will be submitted electronically to applicable regulatory agencies, Squamish Nation (Sḵwx̱wú7mesh Úxwumixw), Tsleil-Waututh Nation, Musqueam Indian Band, and Kwikwetlem First Nation. Reports will be made available to the public through BC EAO Project Information Center portal (EPIC).

PCM reports will be available on or before January 31 of the first, third, and fifth years following final clean-up and restoration. Reporting will include detail on the implementation of site-specific mitigation and habitat restoration measures, information on the indicators measured and their performance in reaching the monitoring (Ínexwantas) target, the monitoring (Ínexwantas) methods used, details of corrective actions taken (if any), as well as an updated consultation and engagement record.

The environmental monitoring (Ínexwantas) report filed after the fifth PCM year will include information on the effectiveness of mitigation and corrective actions and will identify any goals that have not been achieved and the need for any further corrective actions and monitoring (Ínexwantas). The need for additional reporting will be determined through consultation with BC EAO.

13. Professional Authentication

The CEMP has been developed by a QP. This individual is directly responsible for providing professional services and submitting accurate work as directed by FortisBC in support of the CEMP as required by BC EAO.

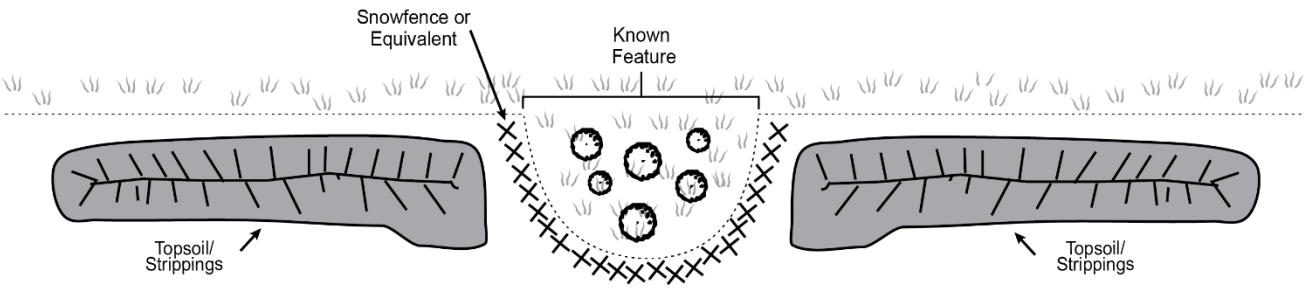


Tara Lindsay, B.Sc., MCIP, RPP, P.Ag.

14. Details

This section provides the details as referenced in the mitigation for surveying, access, and clearing, topsoil salvage and grading, backfilling, clean-up and restoration, watercourse crossing, watercourse crossing restoration, and wetland crossing.

Detail Number	Detail Name
1	Narrow Down Fencing
2	Bar Ditch Ramp Installation
3	Timber Salvage Deck Site Preparation
4	Sediment Fence Installation
5	Trench Breakers/Ditch Plugs
6	Trench "Sack" Breaker – Watercourse or Wetland
7	Subdrain
8	Cross-Ditches and Diversion Berms
9	Watercourse Crossing – Dam and Pump
10	Watercourse Crossing – Flume
11	Trenched Crossing – Dry Watercourses
12	Streambank Restoration – Shrubs and Live Staking
13	Streambank Protection – Hedge/Brush Layering
14	Streambank Protection – Coniferous Tree Revetment
15	Wetland Crossing – Trenched Crossing - Push Pull Method
16	Vehicle Crossing – Temporary Bridge
17	Vehicle Crossing – Ramp and Culvert
18	Subsurface Drainage Control – Pole Drains
19	Sediment and Erosion Control – Coir Logs
20	Streambank and Riparian Slope Protection – Contour Wattles
21	Weed Cleaning Station
22	Grass Rolls
23	Spoil Berms



Plan View
(Not to Scale)
Representation Only

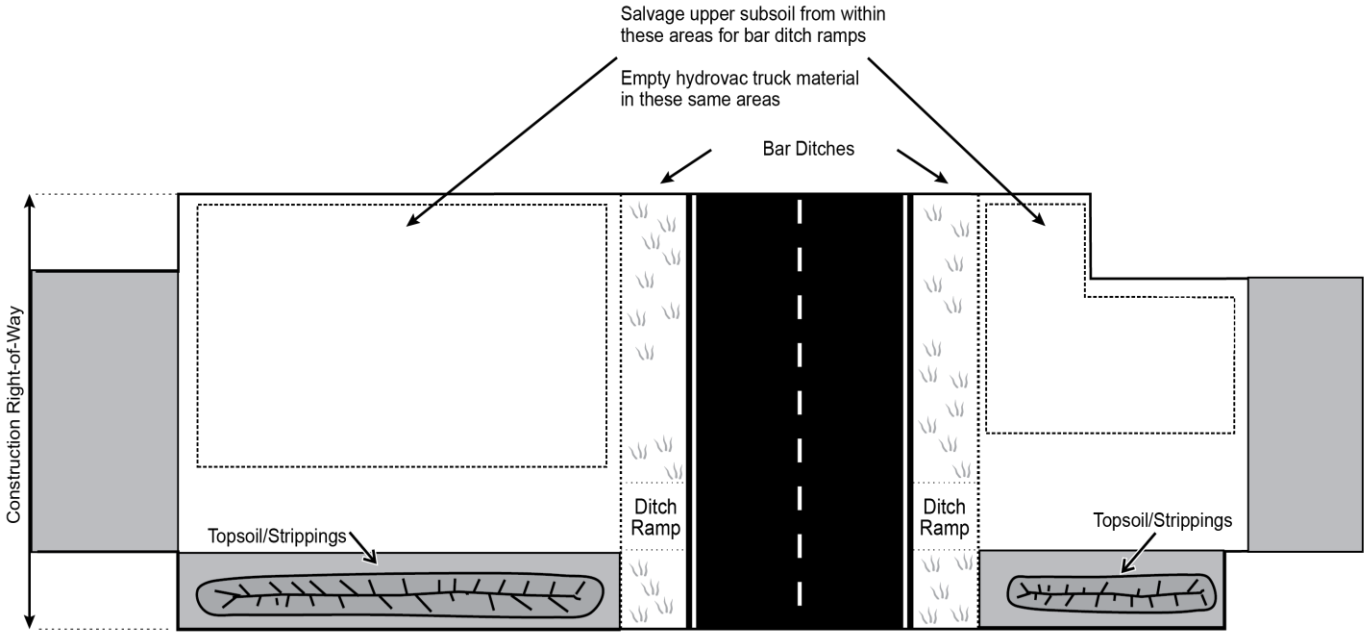
Criteria for Implementation:

Measures to avoid site-specific features (such as, rare plant populations or communities, archaeological sites) include isolating the feature and narrowing work around, where feasible. The specific features are to remain protected throughout the duration of construction.

Notes:

1. Identify, stake, flag and/or erect a barrier (such as a fence or rope) around the feature to be protected prior to clearing or grading.
2. Clearly post signs prohibiting workers or equipment from entering the identified area.
3. Maintain barriers until all construction and reclamation activities are completed.
4. Where it isn't possible to completely avoid a site-specific feature due to workspace limitations, consider measures to reduce ground disturbance using ramps, matting or spans.

Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	NARROW DOWN/BARRIERS		
	CE833400	September 2022	Detail No. 1

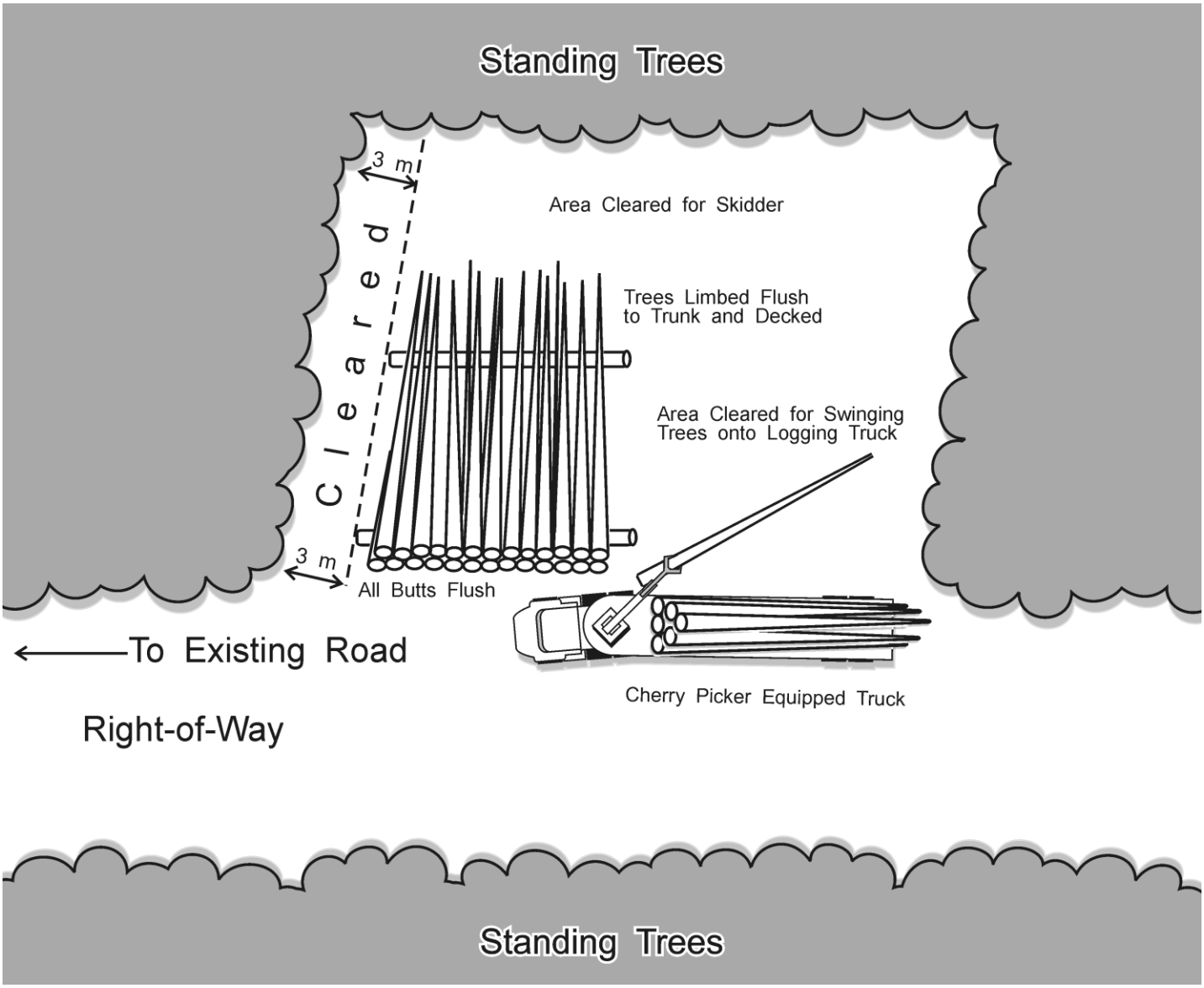


Plan View
(Not to Scale)
Representation Only

Notes:

1. Acquire and mark sufficient temporary workspace. Restrict the area of temporary workspace where native vegetation is encountered.
2. At a minimum, salvage topsoil/strippings from area where upper B horizon (upper subsoil) will be salvaged for use as ditch ramping material. Restrict the area subject to topsoil/strippings salvage where native vegetation is encountered.
3. Install subsoil bar ditch ramps; do not salvage topsoil/strippings from bar ditches.
4. Install culverts in bar ditch ramp to maintain drainage along bar ditch.
5. Empty the hydrovac truck onto subsoil at approved locations (such as, at road crossings where the topsoil has been salvaged.
6. Contain hydrovac material within the designated release area (that is, where it will not migrate to a watercourse, wetland, or drainage/non-classified drainage, or onto topsoil).

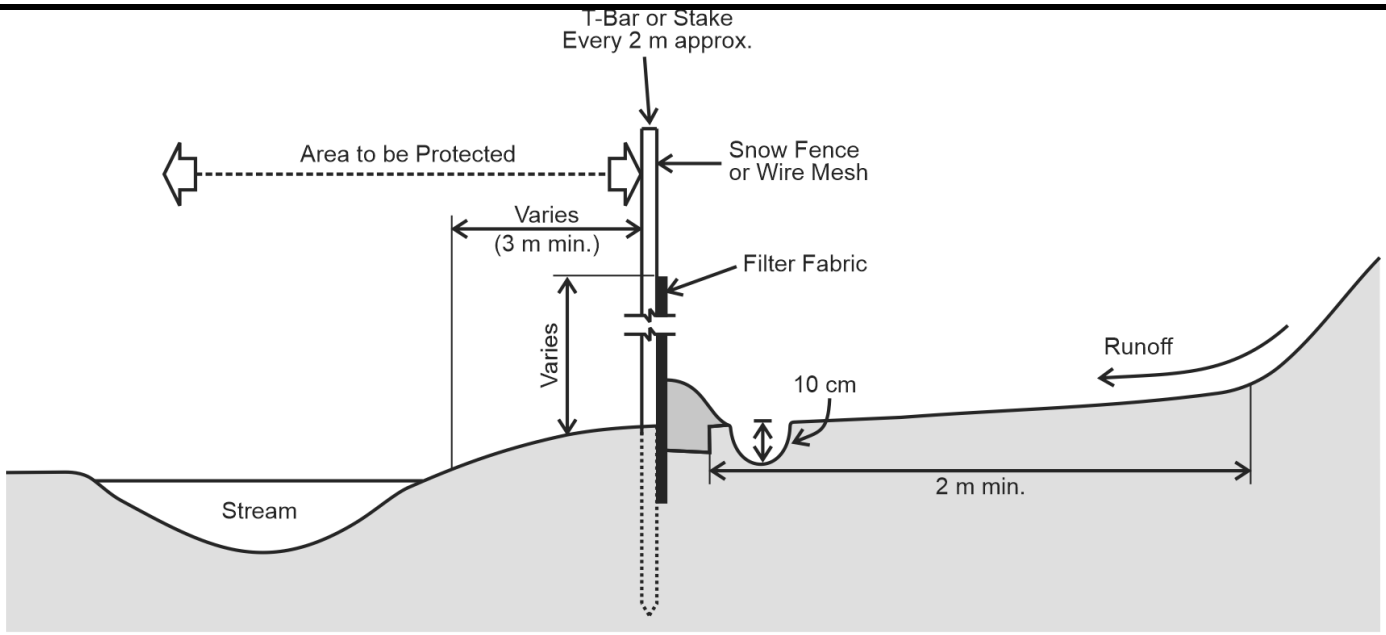
Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	BAR DITCH RAMP INSTALLATION		
	CE833400	September 2022	Detail No. 2



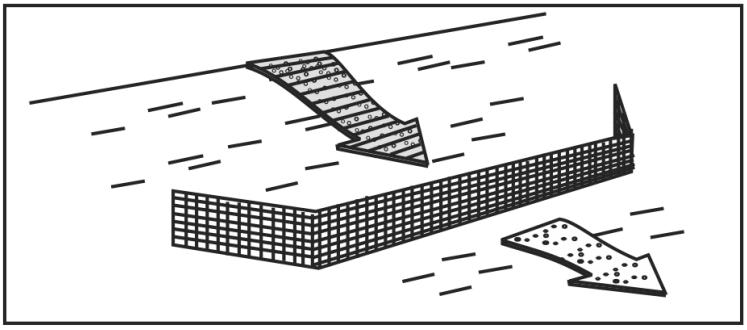
Notes:

1. Salvage timber as per the EGP Project-specific Timber Salvage Strategy and recommended mitigation measures in clearing and hauling plans.
2. Salvage progressively if feasible.
3. Ensure that the butt ends of piled tree lengths are flush. Do not top skid. Face the butt ends towards the right-of-way or direction of haul. Pulpwood and sawlogs must be decked separately. Decks must be clean with no sticks, branches, plastic, metal, tangled stems, standing trees, or roots.
4. Locate decks in natural clearings, old cleared areas, seismic line intersections, and other areas which do not require clearing, if practical. Avoid landings in low areas or within the riparian buffer of watercourses, wetlands, or other waterbodies. Where no existing sites are available, hot log timber to a suitable location or clear a deck site as shown above. Deck locations must be approved by the Appropriate Government Authority.

Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	TIMBER SALVAGE DECK SITE PREPARATION		
	CE833400	September 2022	Detail No. 3



Side View of Sediment Fence
(Not to Scale)



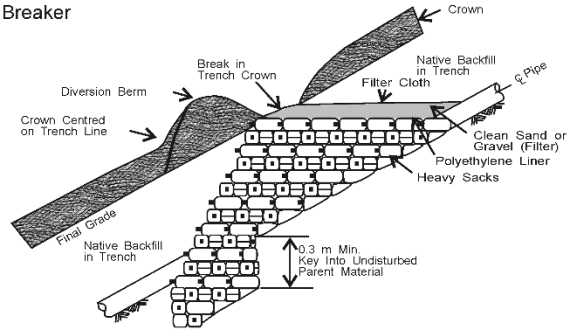
Oblique View
(Not to Scale)

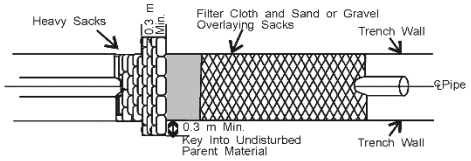
Notes:

1. Install sediment fences in proximity to watercourses and wetlands, and their upland approaches or in other areas where erosion and sedimentation controls are warranted during construction, as determined by the Construction Environmental Coordinator (CEC) and/or the Environmental Inspector (EI).
2. Install sediment fences prior to or immediately following clearing and grading using the method and materials above or other approved designs.
3. Ensure the sediment fence is keyed into the substrate. Excavate a narrow trench, place the base of the sediment fence in the trench and place the fill back into the trench, securing the sediment fence in place.
4. Place sediment fences a minimum 2 metres, if feasible, from the toe of the slope in order to increase ponding volume.
5. Monitor temporary erosion control structures including sediment fences on a regular basis and repair, if warranted. Remove accumulated sediment/debris on a regular basis.
6. Maintain sediment fences in place throughout the construction phase and until vegetation has established.

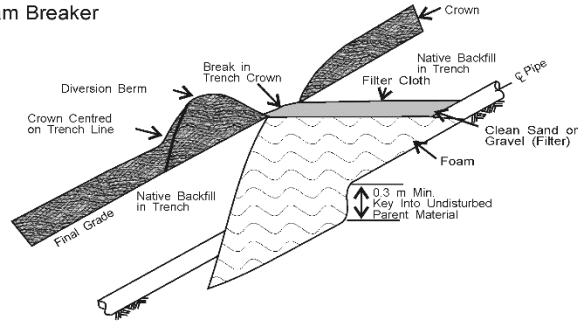
Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	EROSION AND SEDIMENT CONTROL - SEDIMENT FENCE INSTALLATION		
	CE833400	September 2022	Detail No. 4

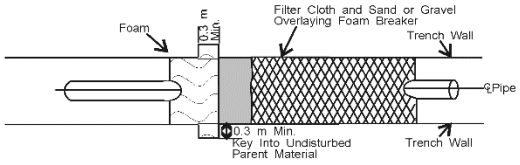
Sack Breaker



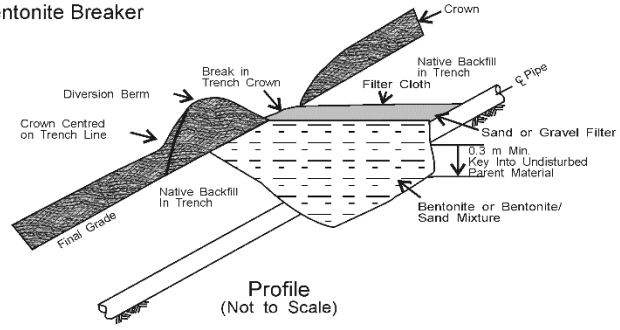


Foam Breaker

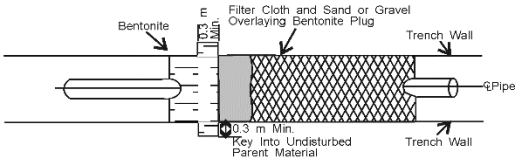




Bentonite Breaker



Profile
(Not to Scale)



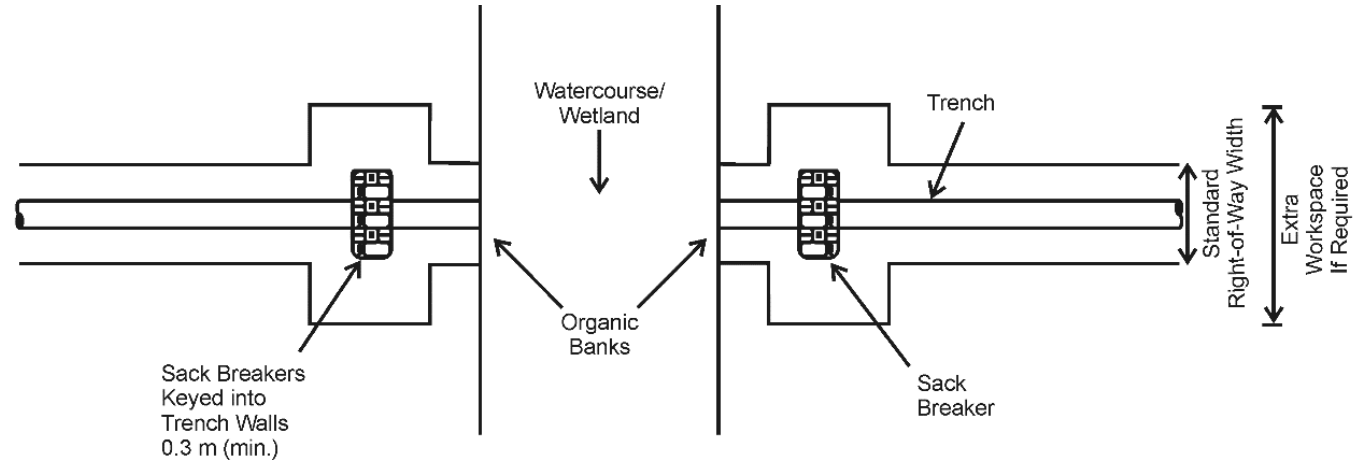
Plan View
(Not to Scale)

Notes:

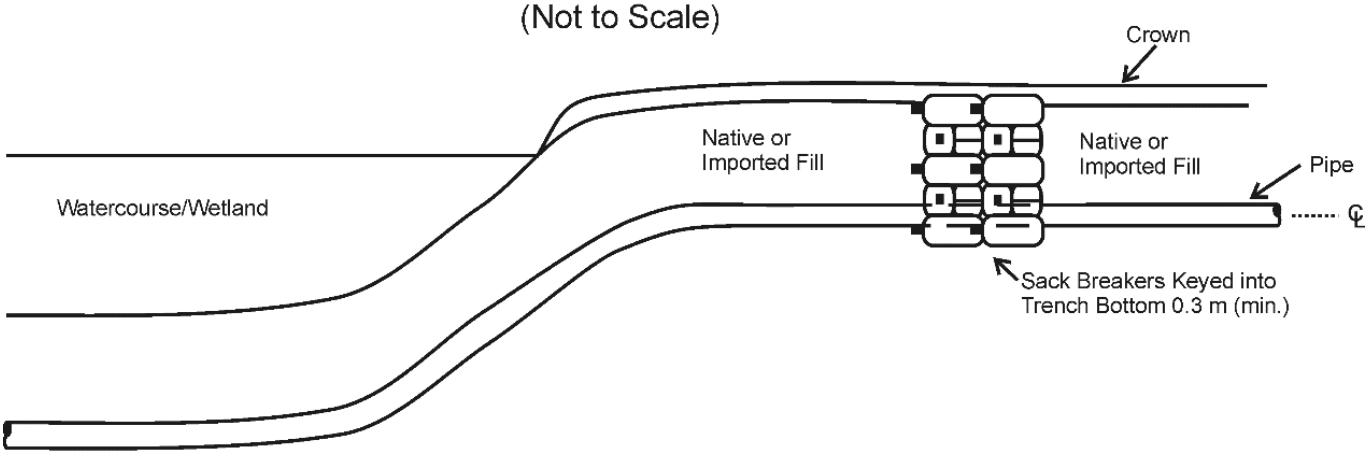
1. Install trench breakers, where warranted, on moderate to steep slopes to control water seepage along the trench line and prevent erosion of backfill materials.
2. Trench breakers may be constructed using earth-filled sacks, bentonite, foam, or equivalent materials to provide a barrier to water seepage.
3. The drawings above provide a schematic representation of trench breaker installation. Trench breakers will typically be specified on the construction drawings. However, final locations and design of trench breakers are the responsibility of the FortisBC construction representative, in consultation with the FortisBC Environmental Inspector and/or Project Engineer, and will be located on the basis of field observations, local topography, and drainage patterns.
4. Dig keys into the trench bottom and sides to the extent feasible for added stability.
5. Install a prefabricated drain or a layer of sand or gravel covered with filter cloth over the breaker.
6. Mark the location of each breaker prior to backfilling with native material to facilitate the correct placement, where warranted, of a diversion berm immediately downslope of the breaker.
7. Ensure cross ditches are located over the end of the drain.
8. Construct diversion berms downslope from the breaker but not over the end of the drain.
9. Ensure that the trench crown, if used, does not encroach upon the breaker drain or cross ditch.
10. Backfill the trench on the downslope side of the breaker before the upslope side.

Adapted from CAPP et al. (2005).

Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	TRENCH BREAKERS/DITCH PLUGS		
	CE833400	September 2022	Detail No. 5



Plan View
(Not to Scale)

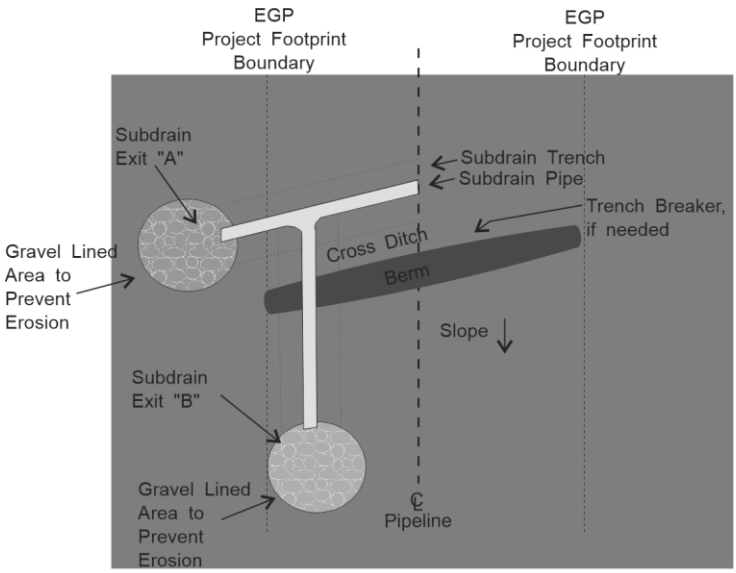


Profile
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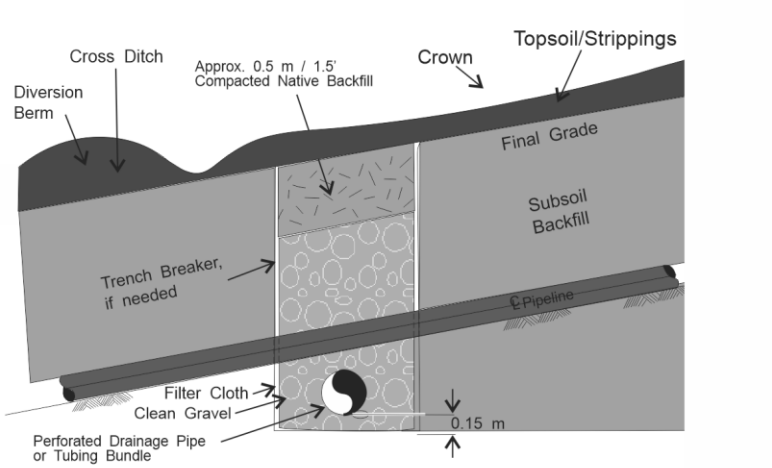
Notes:

1. Install sack breakers, where warranted, within the trench adjacent to watercourses and wetlands to prevent erosion of backfill material into the watercourse and at wetlands to prevent the pipe trench from acting as a drain.
2. Place the breaker as close to the watercourse or wetland bank as feasible while not affecting the growth (that is, inhibiting root penetration) of shrubs that would provide cover and shade for the watercourse or wetland.
3. The drawings above provide a schematic representation of trench sack breaker installation. Trench sack breakers will typically be specified on the construction drawings. The use, location, and type of sack breakers will be determined on-site by the Fortis BC construction representative in consultation with the FortisBC Environmental Inspector and/or Project Engineer and will take into consideration the potential for subsurface flow, erodibility and stability of the backfill material, and location of the pipe crossing sag bends.
4. Fill sacks with earth, bentonite clay, or sand. Do not use foam in proximity to water owing to its floatation properties.
5. Dig keys into the trench bottom and sides for added stability.
6. Place and interlock sacks by hand around the pipe to the top of the trench.
7. Backfill with native material above and below the trench breaker.

Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	TRENCH ("SACK") BREAKER – WATERCOURSE OR WETLAND		
	CE833400	September 2022	Detail No. 6



Plan View
(Not to Scale)



Profile
(Not to Scale)

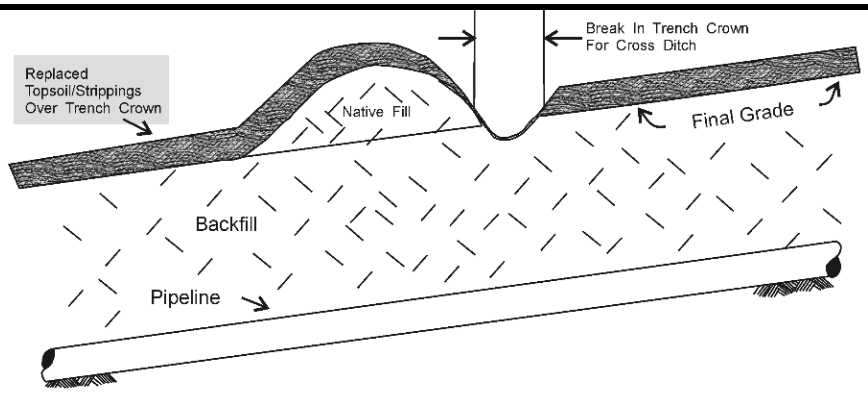
Notes:

1. The need for, location and positioning of subdrains is the responsibility of the FortisBC authorized construction representative, in consultation with the FortisBC Environmental Inspector and/or the Project Engineer. Local topography, drainage patterns, soil type and observed groundwater conditions, particularly after trench excavation, will govern the final subdrain location.
2. Install subdrains to divert shallow groundwater flow away from the pipeline and improve slope stability.
3. Clean gravel and a filter cloth ditch liner permit drainage aiding in retention of backfill.
4. Install trench breaker downslope of drain, where drains cross the pipeline trench, to prevent drain water flowing down the pipe trench.
5. Discharge may either be off the EGP Project Footprint on the downslope side of the subdrain (see Subdrain Exit "A") or on the Footprint downslope of the berm (see Subdrain Exit "B"). Land approval will be required to construct a subdrain exit off the EGP Project Footprint. Ensure discharge is onto a well protected area with gravel, rip-rap, or vegetation.
6. Skew cross drain approximately 5 degrees off horizontal to ensure sufficient drainage.

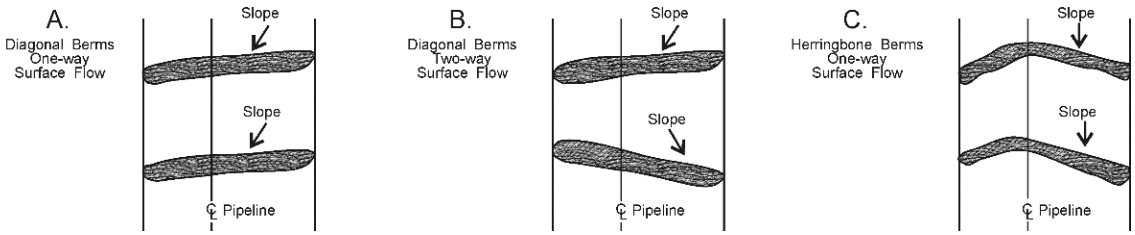
Design details to follow construction specifications, or as otherwise approved by a qualified professional.
Adapted from CAPP et al. (2005).

Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	SUBDRAIN		
	CE833400	September 2022	Detail No. 7

Profile
(Not to Scale)



Plan View
(Not to Scale)



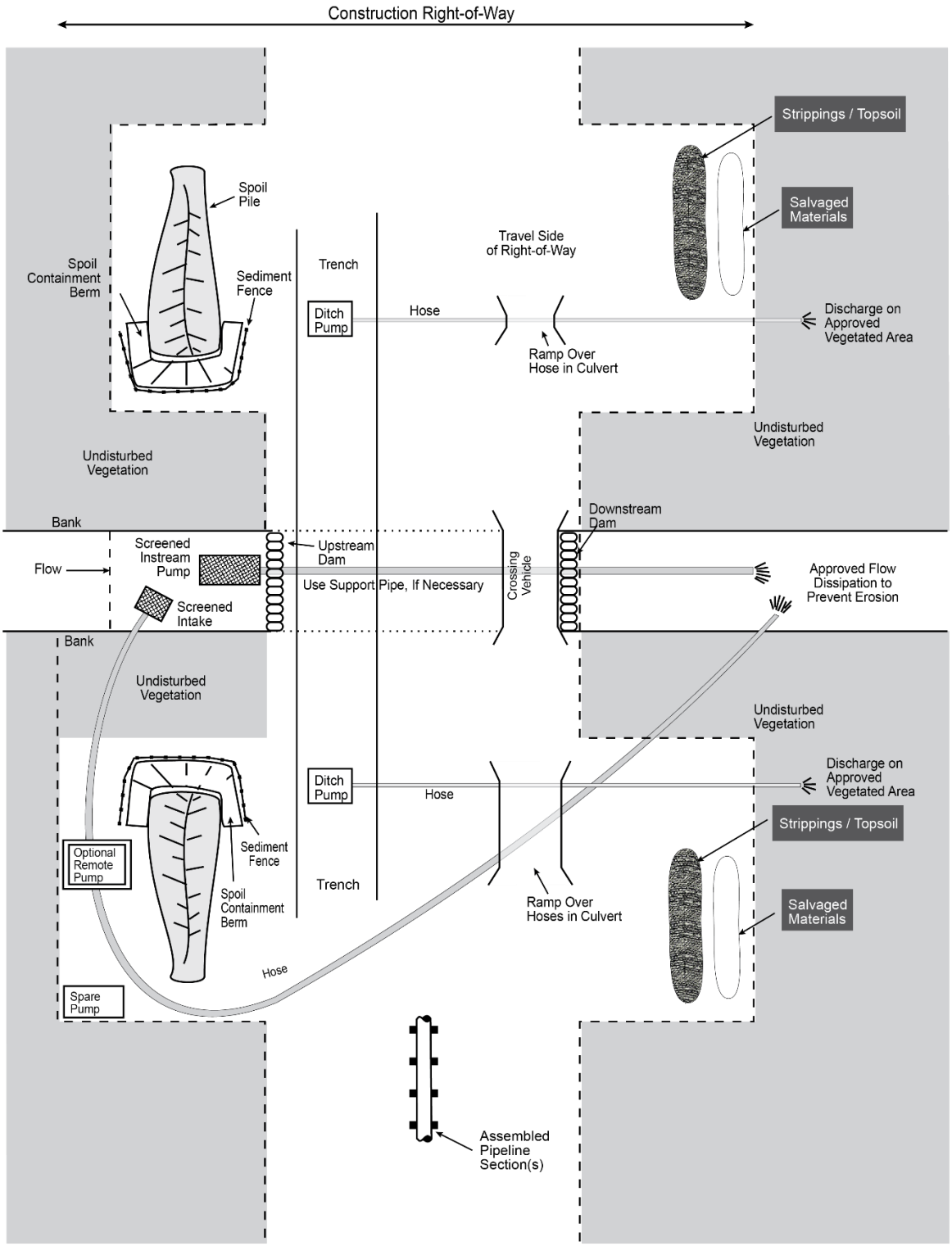
Notes:

1. Install diversion berm(s) and cross ditch(es) on moderate and steep slopes on treed and forested lands to divert surface water off disturbed soils and onto vegetated areas to prevent erosion. Install berms immediately downslope of trench breakers.
2. Skew berm across the construction right-of-way at downhill gradient of approximately 5 to 10 percent.
3. Construct diversion berms of compacted native subsoils capped with topsoil/strippings where grading or extensive disturbance of the sod layer has occurred. Avoid use of organic material. Where native material is highly erodible, protect the upslope of the berm and base of the cross ditch by burying a geotextile liner approximately 16 to 20 centimetres below the surface or armour the upslope face of the berm with earth-filled sand bags.
4. Typical diversion berm height and widths are approximately 0.75 metres (m) (summer) 1 m (winter). Inspect diversion berms after heavy rains and the first spring following construction; replace or restore berms, if warranted.
5. Leave a break in the trench crown immediately upslope of diagonal berm, where applicable, and cross ditch to allow passage of water across the EGP Project footprint.
6. Use diagonal berms where the direction of slope and surface water movement is oblique to the EGP Project footprint (A or B above).
7. Use herringbone berms and cross ditches where the direction of slope and surface water movement is parallel to the EGP Project footprint (C above) so runoff does not cross the trench line.
8. The FortisBC authorized construction representative in consultation with the FortisBC Environmental Inspector and/or Project Engineer will determine the location, spacing and direction of berms based on local topography, slope gradient, soil type and drainage patterns.
9. Typical diversion berm spacing is indicated below for general guidance

Slope Gradient (°; %)	Typical Spacing (m) Erosion Hazard*		
	High	Medium	Low
< 7; < 12	30-45	45-60	60 or more
7; 12	25	38	51
8; 14	22	33	44
9; 16	19	29	38
11; 19	16	24	32
14; 25	12	18	24
18; 33	9	14	18
27; 50	6	9	12

* High = fine sand silts; Medium = clays and coarse sands; Low = rock or gravel

Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	CROSS DITCHES AND DIVERSION BERMS		
	CCE833400	September 2022	Detail No. 8



Plan View
(Not to Scale)
Representation Only

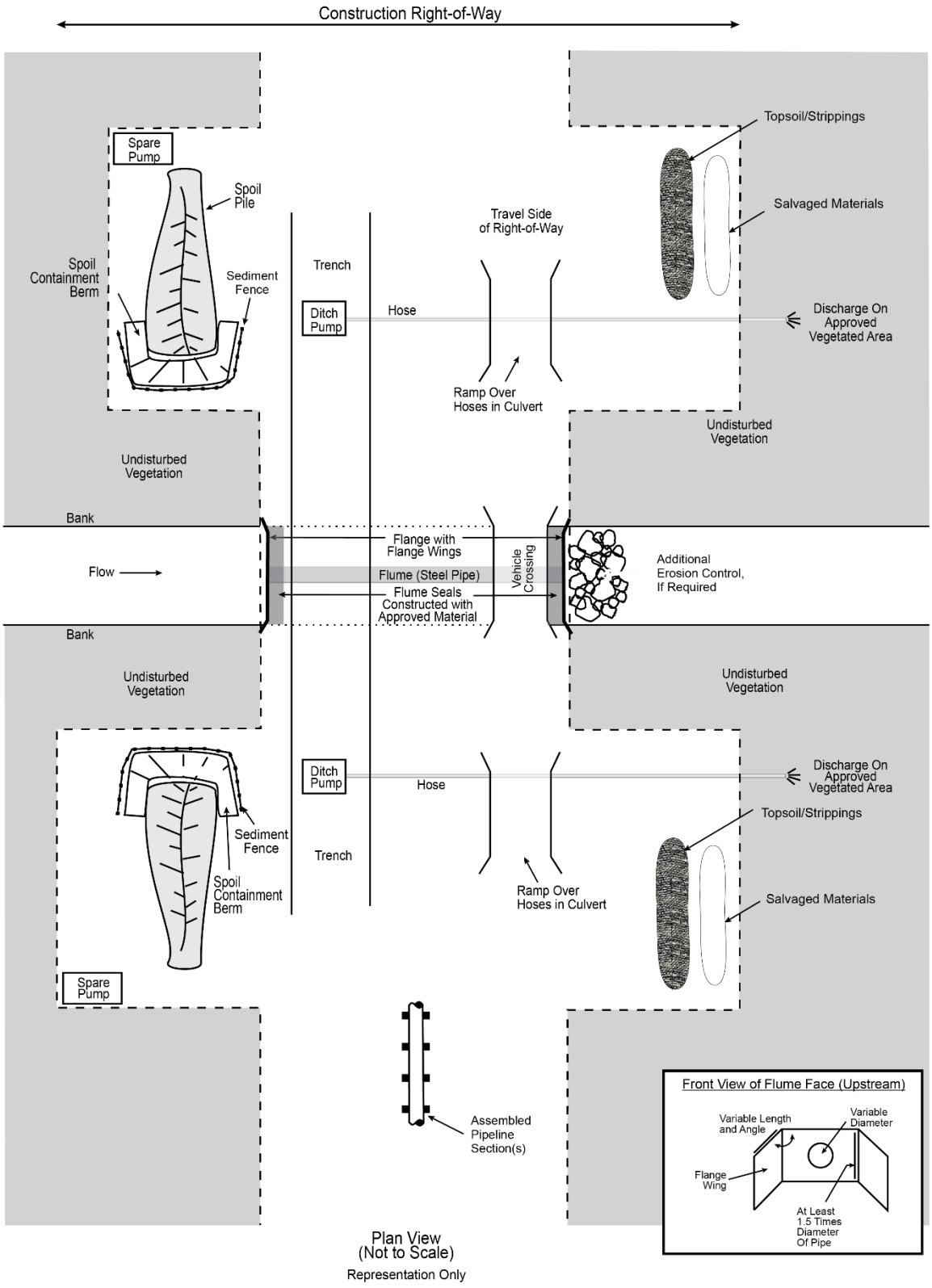
Configuration of pumps and hoses are dependent on site conditions

Jacobs	**EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT**		
	WATERCOURSE CROSSING – DAM AND PUMP		
	CE833400	September 2022	Detail No. 9

Notes:

1. Install the vehicle crossing, if needed, on the of the right-of-way to allow for a wide excavation.
2. Stockpile all necessary materials and equipment on-site prior to beginning instream work.
3. Complete construction of the instream pipe section. Weld, coat and, if warranted, weight and pre-test the pipe prior to the commencement of instream activity.
4. Begin crossing construction activities in the early morning to allow for same day installation if practical.
5. Ensure applicable fish/amphibian salvage and beaver dam removal permit(s) are acquired prior to commencing instream construction activities.
6. Install the pump(s) in a natural pool upstream of the excavation, if present. Excavate a temporary sump within the construction right-of-way if no natural pool exists. Check pump and check operation to equalize flow. Screen pump intakes with screen openings no larger than 2.54 millimetres. Size the screen to ensure that water approach velocities do not result in entrainment or entrapment of fish. Comply with DFO Interim Code of Practice: End-of-pipe fish protection screens for small water intakes in freshwater (DFO 2020).
7. Bypass pumping unit must be capable of handling 150% of the flow anticipated. A back-up unit of equal capacity must be installed and ready to use in case of main pump failure.
8. Construct the upstream dam far enough upstream to allow for a wide excavation. Ensure the dam is impermeable by installing a polyethylene liner. Dams may be constructed with sand bags, Aquadam, sheet piling, or other approved material that ensures a tight seal with the bed and banks.
9. Construct the downstream dam, if required. The downstream dam should also be constructed far enough downstream to allow for a wide excavation.
10. Initiate fish/amphibian salvage prior to isolating the work area and again within the isolated area, as required. Assess the need to dewater the isolated section of the watercourse and ensure tight seal about dams prior to trenching.
11. Salvage the upper 0.5 metres (m) (minimum) of clean granular material, if present, and stockpile separately from the remainder of the trench spoil.
12. Create spoil containment sumps, if warranted, to prevent spoil from flowing back into the stream channel. Excavate the trench as rapidly as practical.
13. Install the pipe.
14. Backfill the stream channel first by pushing the silted water back into the bank excavations. Pump or drain the bank excavations while progressively backfilling from the stream channel outward. Construct water containment sumps if warranted.
15. Complete backfill, leaving a small, shallow (less than 0.5 m) sump(s) just upstream from the downstream dam. Install a pump intake in each sump.
16. Cap the upper 0.5 m (minimum) of the trench with the salvaged clean granular material.
17. Temporarily suspend pump bypass and/or slowly elevate a corner of the upstream dam and allow isolated channel to be flushed with water. Allow silt-laden water to flow into the shallow sump. Pump water from the sump onto a well-vegetated area.
18. Remove any accumulations of silt and sediment from the streambed.
19. Restore the bed banks of the stream channel to pre-construction profiles.
20. Remove the downstream dam followed by the upstream dam.
21. Restore and stabilize the bed and banks of the stream channel to the pre-construction profiles.

Adapted from CAPP et al. (2005).



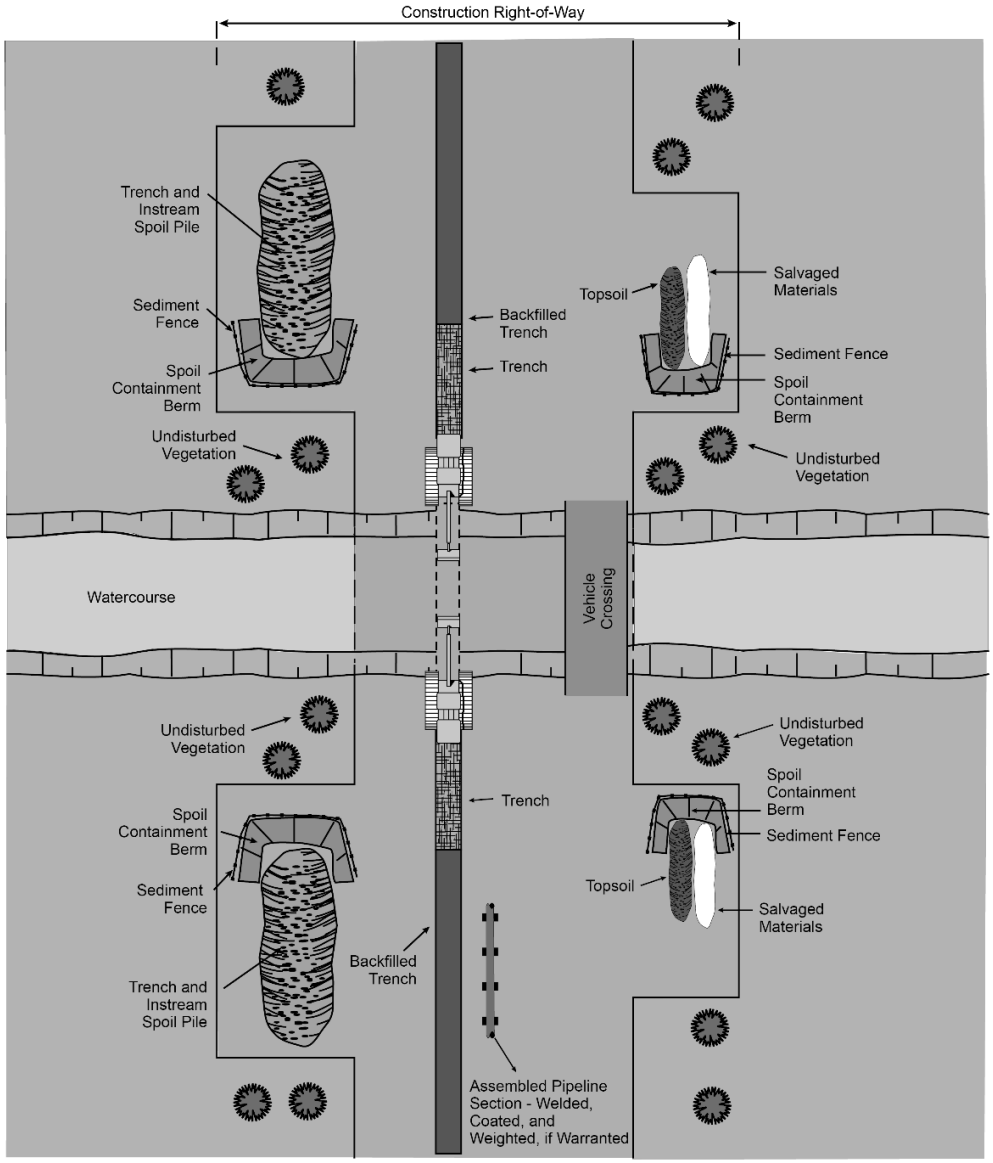
Plan View
(Not to Scale)
Representation Only

Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	WATERCOURSE CROSSING – FLUME		
	CE833400	September 2022	Detail No. 10

Notes:

1. Install the vehicle crossing, if needed, on the work side edge of the right-of-way to allow for a wide excavation.
2. Size the flume(s) to handle anticipated flows.
3. Stockpile all required materials prior to beginning instream work. Complete construction of the instream pipe section. Weld, coat and, if warranted, weight and pretest the pipe prior to commencing instream activity.
4. Ensure fish and amphibian salvage and beaver dam removal permit(s) are acquired prior to commencing instream activities.
5. Install a pre-assembled flume or construct a flume and install both an upstream and downstream dam. Ensure the flume and dams are far enough apart to allow for a wide excavation. Dams may be constructed with sand bags, Aquadams, sheet piling, or other approved material that ensures a tight seal with the bed and banks. Use auxiliary bypass pump units as necessary to facilitate the isolation of the work area.
6. Install scour protection downstream of the flume outlet(s). Create spoil containment sumps or berms, if warranted, to keep spoil from flowing back into the stream channel.
7. Complete fish/amphibian salvage prior to commencing instream construction activities.
8. Ensure a tight seal about the dam and flume prior to undertaking trench excavation. Beginning in the early morning, and with the work area effectively isolated, salvage the upper 0.5 metres (m) (minimum) of clean granular material, if present, and stockpile separately from the remainder of the trench spoil. Excavate the trench as quickly as practical placing spoil out of the stream channel.
9. Pump the excavation, if necessary, to manage the isolation and prevent downstream outflow of silted water. Direct the pumped trench water onto vegetated areas well away from the watercourse and monitor the discharge. Construct water containment sumps, if warranted.
10. Install the pipe.
11. Backfill the stream channel first, squeezing the silted water into the bank excavations. Pump or drain the bank excavations while progressively backfilling from the stream channel outward.
12. Cap the upper 0.5 m (minimum) of the trench with salvaged clean granular material.
13. Complete backfill and stabilize the bed; leaving small, shallow (less than 0.5 m) sump(s) upstream of the downstream dam. Install pump intake(s) in the sump(s)
14. Slowly elevate a corner of flume (or edge of upstream dam) and/or shut-down some of the auxiliary bypass pumps and allow isolated channel to be flushed with water. Allow silt-laden water to flow into the shallow sump(s). Pump silt-laden water onto a well-vegetated area and continue to monitor the discharge.
15. Remove any accumulations of silt and sediment from the streambed.
16. Shutdown auxiliary clean water bypass pumps followed by downstream dam materials.
17. Remove upstream dam materials.
18. Remove the flume(s).
19. Restore and stabilize the bed and banks of the stream channel to the pre-construction profiles.

Adapted from CAPP et al. (2005).



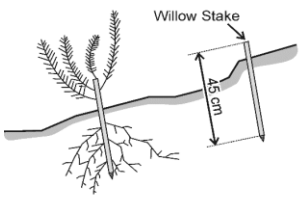
Plan View
(Not to Scale)
Representation Only

Notes:

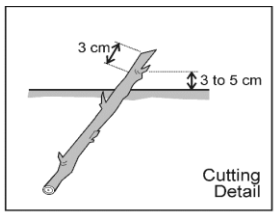
1. Non-isolated open cut crossings can only be undertaken on watercourses or non-classified drainages that are dry.
2. Obtain additional temporary workspace to allow instream spoil to be stored on banks.
3. Install vehicle crossing if warranted.
4. Install sediment and erosion control, as required. Locate spoil piles at least 3 m back from the top of the banks, to the extent practical.
5. Salvage the upper 0.5 m (minimum) of clean granular material, if present, and stockpile separately from the remainder of trench spoil. Trench through watercourse and assess the need to manage groundwater within the trench.
6. Lower-in and backfill. Restore stream channel to approximate pre-construction profile and substrate.
7. Cap the upper 0.5 m (minimum) of trench with the salvaged clean granular material.
8. If necessary, to control groundwater flow and trench sloughing, during backfill, install temporary soft plugs and dewater trench on to stable vegetated land, not directly to watercourse.
9. Restore and stabilize watercourse or non-classified drainage banks and approaches.

Adapted from CAPP et al. (2005).

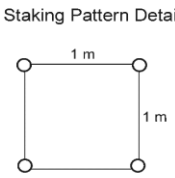
Jacobs	EAGLE MOUNTAIN- WOODFIBRE GAS PIPELINE PROJECT		
	TRENCHED CROSSING – DRY WATERCOURSES		
	CE833400	September 2022	Detail No. 11



Profile
(Not to Scale)



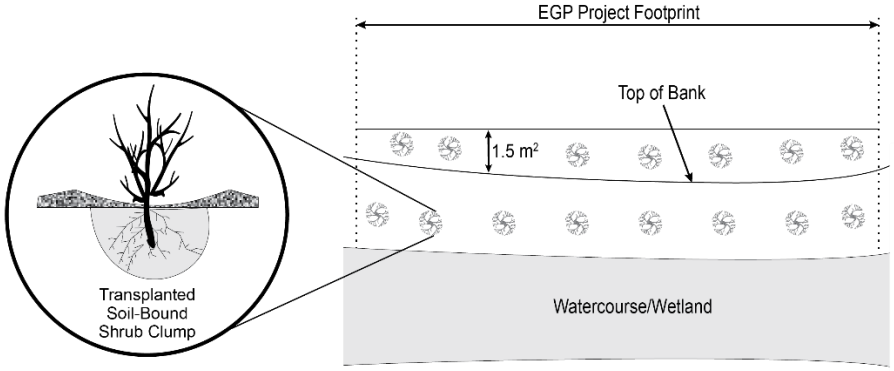
Profile
(Not to Scale)



Plan View
(Not to Scale)

Notes:

1. Install stakes of suitable species (such as, willow, dogwood) on watercourse and wetland banks.
2. Make clean cuts with unsplit ends using pruning shears, hand saw, or chain saw.
3. Select stock from bottom of branches not tips.
4. Mark basal ends to ensure correct installation.
5. Ensure during planting there is at least one lateral bud above the ground surface and three below. Plant cutting at an angle.
6. Protect material from drying out. Install as quickly as practical.
7. Trim side shoots close to the main stock.
8. Use a frost pin or re-bar to make a pilot hole. Avoid damage to stakes when driving by making the pilot hole large enough to reduce friction and/or by using a neoprene lined post hole pounder or rubber mallet.
9. Install live stakes on the banks and 1.5 metres (approximately) back from banks for entire disturbed width of the EGP Project Footprint.



Profile
(Not to Scale)

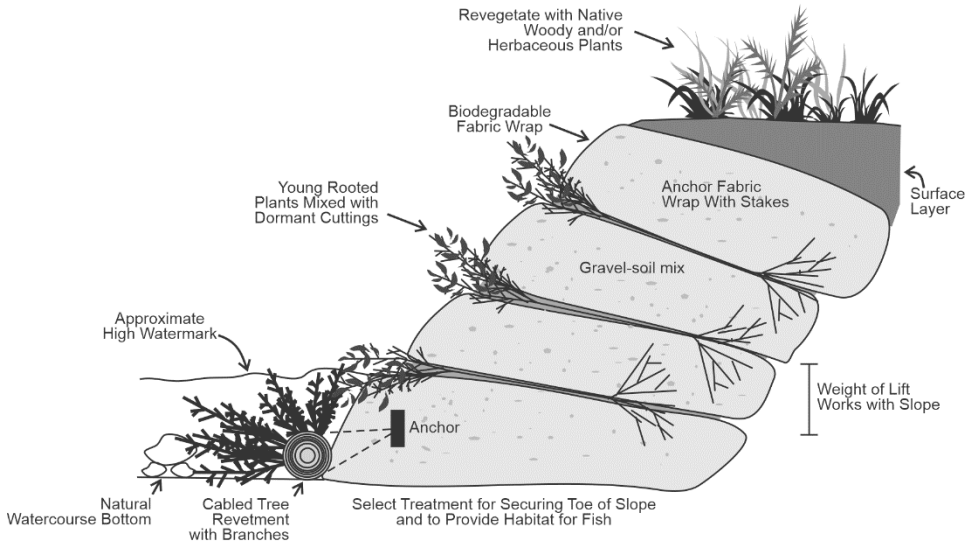
Plan View
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Representation Only

Notes:

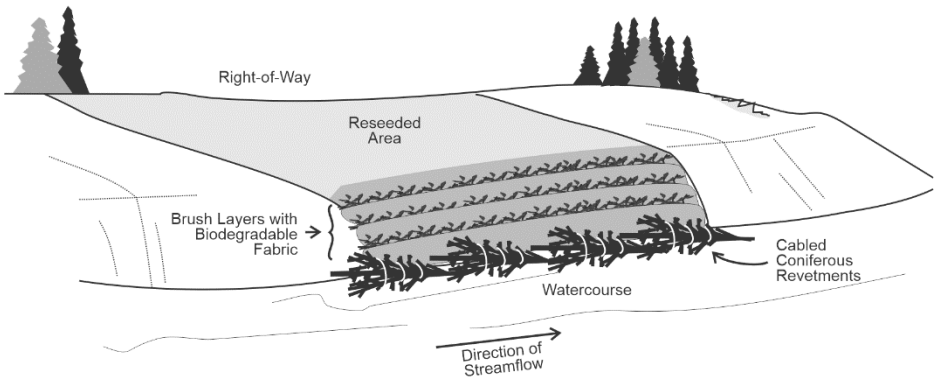
1. Salvage and replace shrubs on watercourse and wetland banks where shrubs are present on the construction right-of-way and will be disturbed by crossing construction activities.
2. Salvage whole bushes from the construction right-of-way during grading of banks. Ensure that the bulk of the root mass is surrounded by soil.
3. Store salvaged shrubs on the edge of the construction right-of-way. Cover the salvaged shrubs with soil and do not let dry out; water if warranted.
4. Transplant as quickly as practical when reconstructing the watercourse and wetland banks.
5. Soak the ground around the transplant with water.

Adapted from CAPP et al.(2005).

Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	STREAMBANK RESTORATION – SHRUBS AND LIVE STAKING		
	CE833400	September 2022	Detail No. 12



Profile
(Not to Scale)



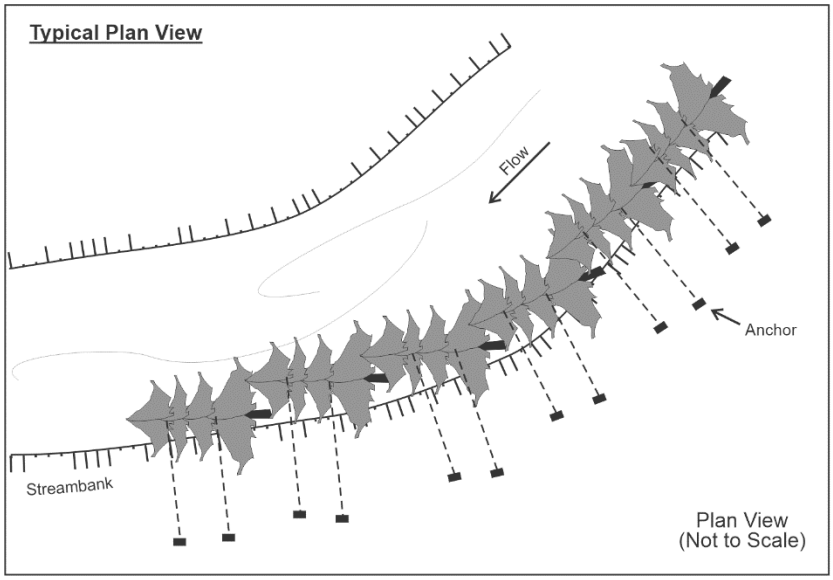
Oblique View
(Not to Scale)

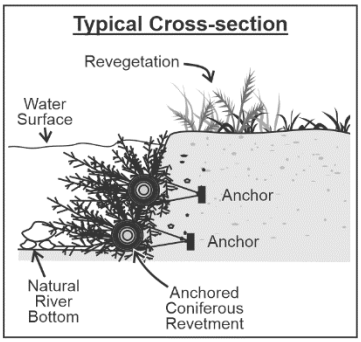
Notes:

1. Proper placement and design are critical and qualified professionals (QP) should be involved.
2. Secure the toe of the slope with appropriate technique (such as, coniferous tree revetments)
3. Begin layering at the bottom of slope with first hedge/brush layer situated at the approximate high water mark or lower. Select plant species suitable for site conditions and approved by the Environmental Inspector.
4. Excavate the first bench approximately 0.5 to 1 metres deep, angled slightly down into the slope. To make each layer, roll out the biodegradable fabric (such as, coir or equivalent) parallel with the bank with one-third into the bank and two-thirds on the watercourse side. On top of the fabric, lay locally salvaged branches and transplants (at 18 to 25 stems per metre), slightly criss-crossing, with shoots extending beyond the edge of the bench by approximately 20 percent of their length. Use higher densities of stems for more erosive sites of if the cutting's diameter is small. Cover with approximately 5 to 10 centimetres (cm) of soil and tamp into place.
5. Form a step of soil approximately 30 to 40 cm high over the bank side fabric. Fold the watercourse side fabric over the soil step and firm into place.
6. Continue building layers with damp soil and cuttings until the pre-construction bank height is reached. Vary spacing between layers based on erosion potential.
7. For best results collect transplants during plant dormancy or in the spring or late summer. Keep collected plant material moist and, if practical, plant the same day. A mixture of plant species can mimic adjacent undisturbed vegetation.

Adapted from CAPP et al. (2005).

Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	STREAMBANK PROTECTION - HEDGE/BRUSH LAYERING		
	CE833400	September 2022	Detail No. 13



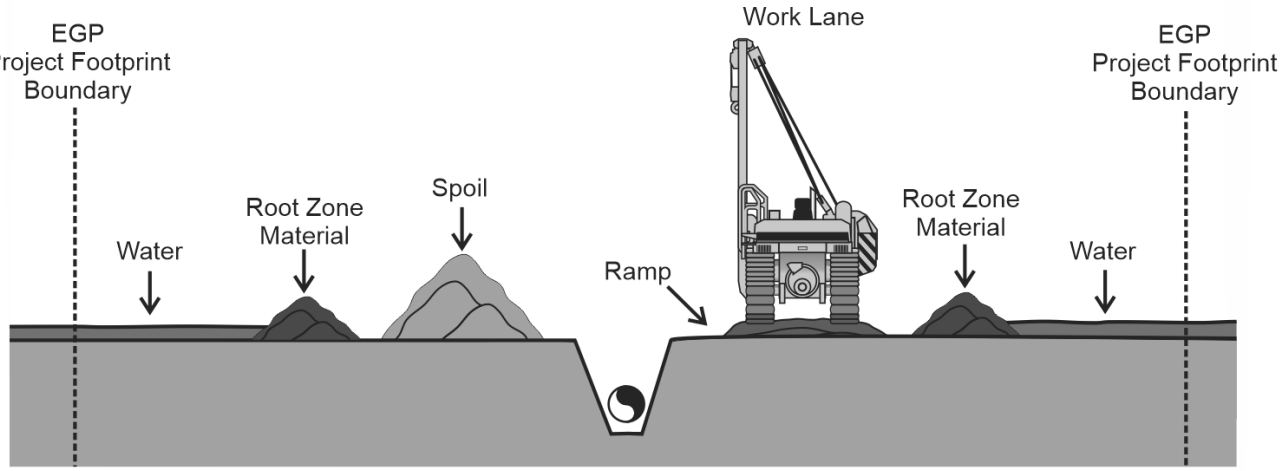


Notes:

1. Proper placement and design is critical and qualified specialists should be involved.
2. Select only good, sound, straight coniferous trees with adequate branches and a minimum length of 10 m.
3. Do not trim any branches and handle with care. Leave root ball intact if possible and transport the trees to the site with a minimum of handling to reduce damage to the branches. To the extent practical, remove soil material from the rootball before placing the tree instream. Place the trees lengthwise along or across the eroding bank to be protected beginning at the downstream end with the tips of the trees pointed in the downstream direction.
4. Begin assembly of the tree revetment at the downstream end and place tie back cable on the tree butt (that is, the largest end). Attach the cable to a suitable deadman or large armour rock with a drilled hole. Bury the anchor securely in the adjacent bank.
5. Place the butt of the next tree one-half the length of the previous tree or less upstream along the bank, so there is an overlap of the trees. If possible, cable the trees together in addition to cabling to an anchor buried in the bank.
6. Rock armour may be added along the toe of the slope, beneath the trees to reinforce the level of protection provided.
7. Maintenance, consisting of replacing severely damaged trees, will extend the life span.
8. Coniferous tree revetments also may be used as instream cover, if warranted.

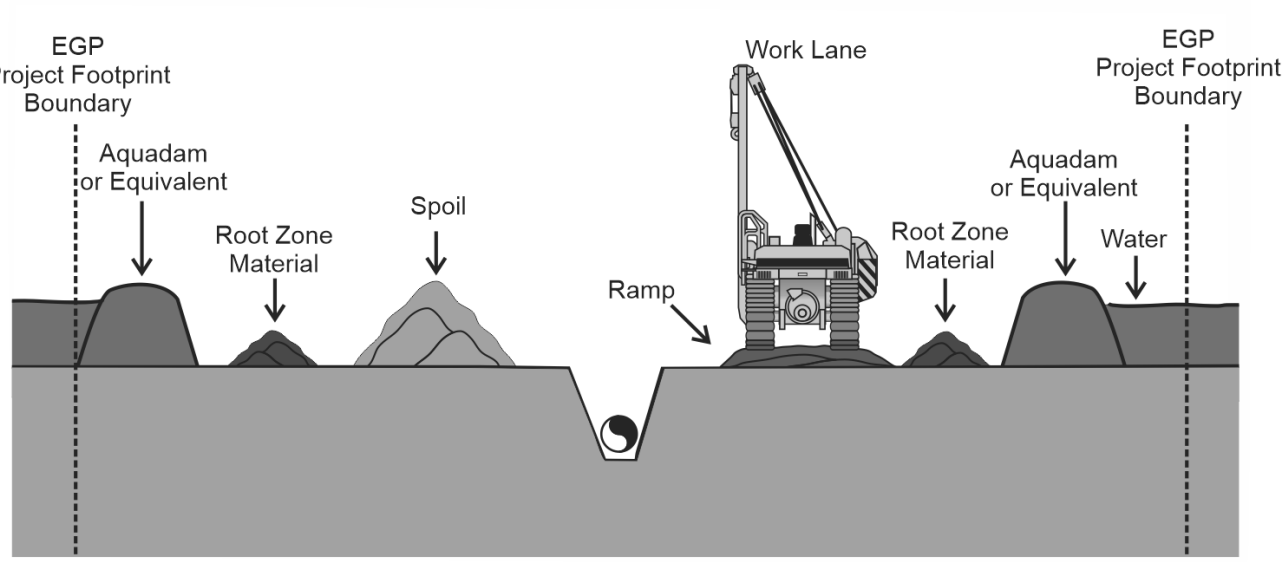
Adapted from CAPP et al. (2005).

A.



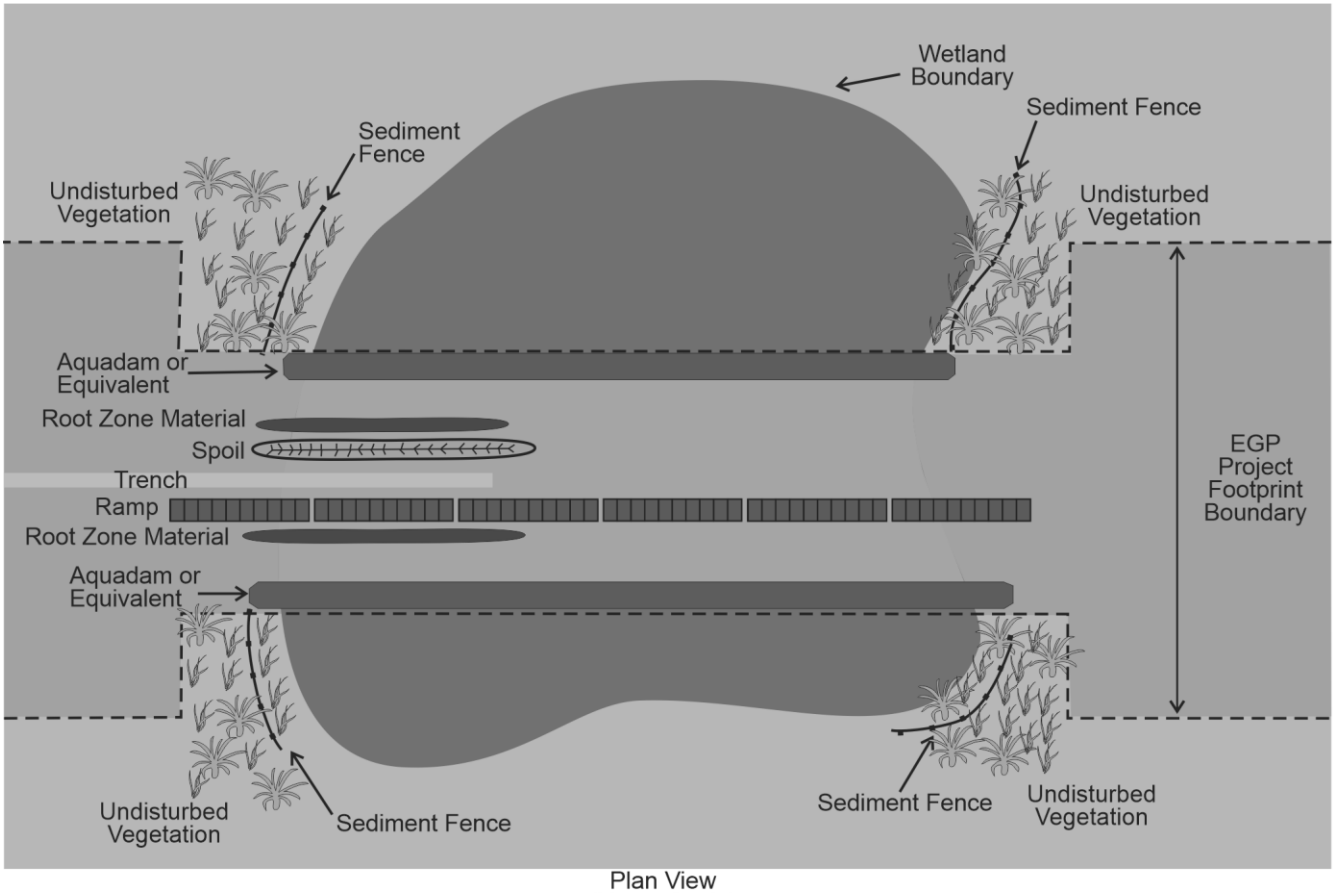
Profile View
(Not to Scale)

B.



Profile View
(Not to Scale)

Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	WETLAND CROSSING - GENERAL		
	CE833400	September 2022	Detail No. 15a



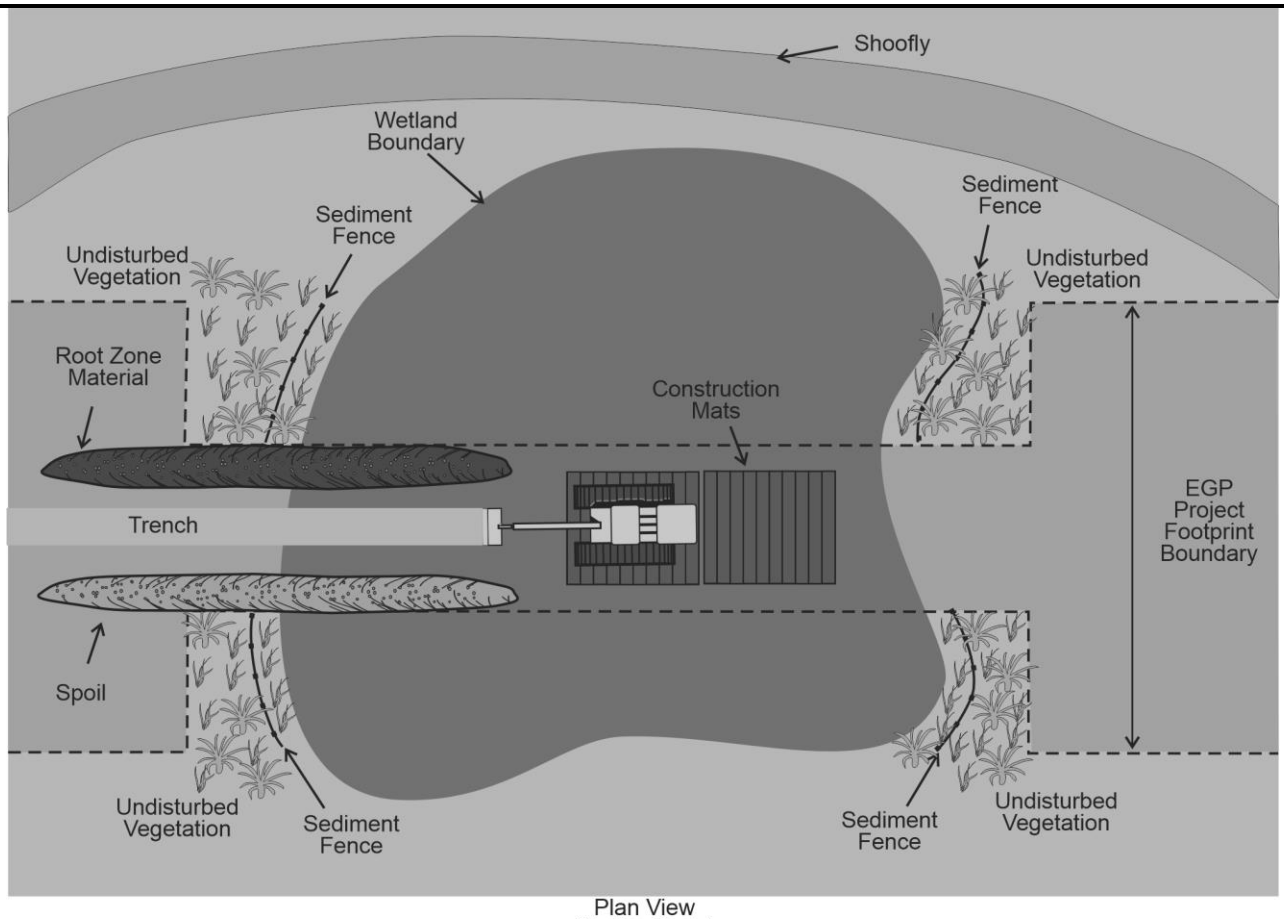
Plan View
(Not to Scale)

Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	WETLAND CROSSING - GENERAL		
	CE833400	September 2022	Detail No. 15b

Notes:

1. *Test Holes:* Excavate test holes on the trench line to determine mineral soil/organic content and water table depth that could influence trench stability and water management needs.
2. *Workspace:* Locate workspace areas a minimum 10 metres from wetland boundaries except where adjacent upland consists of actively cultivated land or other disturbed land. Ensure landowner and/or regulatory approvals are in place for all additional work areas prior to use.
3. *Access:* Utilize shoo-flies in upland areas for access, where possible. Where shoo-flies in upland areas do not provide reasonable access, consider ramping options to support work side traffic and pipeline installation.
4. *Equipment:* Use wide pad, low-ground-pressure equipment or have standard equipment work off mats (see Plan View) to install or create containment berms/barriers. Avoid rutting and admixing of wetland with appropriate ramping options such as mats (timber or swamp mats) or geotextile and spoil ramps.
5. *Clearing/Grading:* Restrict vegetation removal only to that area necessary for pipeline construction. Utilize appropriate machinery (that is, wide pad machines) and swamp mats or equivalent.
6. *Isolation:* If deep water is encountered, salvaged surface material and trench spoil may be used as a containment berm/barrier (see A above). Consider using spoil material from the trench line as a containment barrier where salvaged surface material is not able to support a berm/barrier. Alternate dam devices such as an Aquadam or meter bags are other options (see B above). Pump excess water from work area and trench to opposite side of berm or work ramp.
7. *Dewatering:* Do not dewater any wetland. If the trench requires dewatering prior to lowering-in, pump water into stable and well-vegetated areas. Monitor discharge areas and change discharge location if adequate natural filtration is no longer possible and sedimentation occurs.
8. *Trench Plugs:* Ensure trench does not provide drainage conduit into or out of wetland during or after construction. Install trench plugs where warranted or monitor hard plugs.
9. *Trench Breakers:* Install trench breakers, where warranted, at the edge of wetlands to prevent the pipe trench from acting as a drain and to prevent unconsolidated organic soils from sloughing into the channel.
10. *Buoyancy:* If warranted, weight pipe as per engineering plans prior to installation.
11. *Backfill:* Backfill and do not leave a trench crown during clean-up of mineral wetlands. Leave a low trench crown during clean-up of peatlands to allow for settlement of backfill. Leave breaks in trench crown at obvious drainages.
12. *Restoration:* Restore surface hydrology patterns within the construction right-of-way as close to pre-construction contours as practical during reclamation. Regrade areas with vehicle ruts, erosion gullies or where the trench has settled.
13. *Restoration:* Do not seed wetlands (that is, allow for natural regeneration). Seed the riparian areas adjacent to wetlands with an appropriate native or riparian seed mix if it is deemed warranted.
14. *Erosion and Sediment Control:* Maintain sediment fences in place at wetland boundaries until revegetation of adjacent construction right-of-way is stable.

Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	WETLAND CROSSING – GENERAL		
	CE833400	September 2022	Detail No. 15b

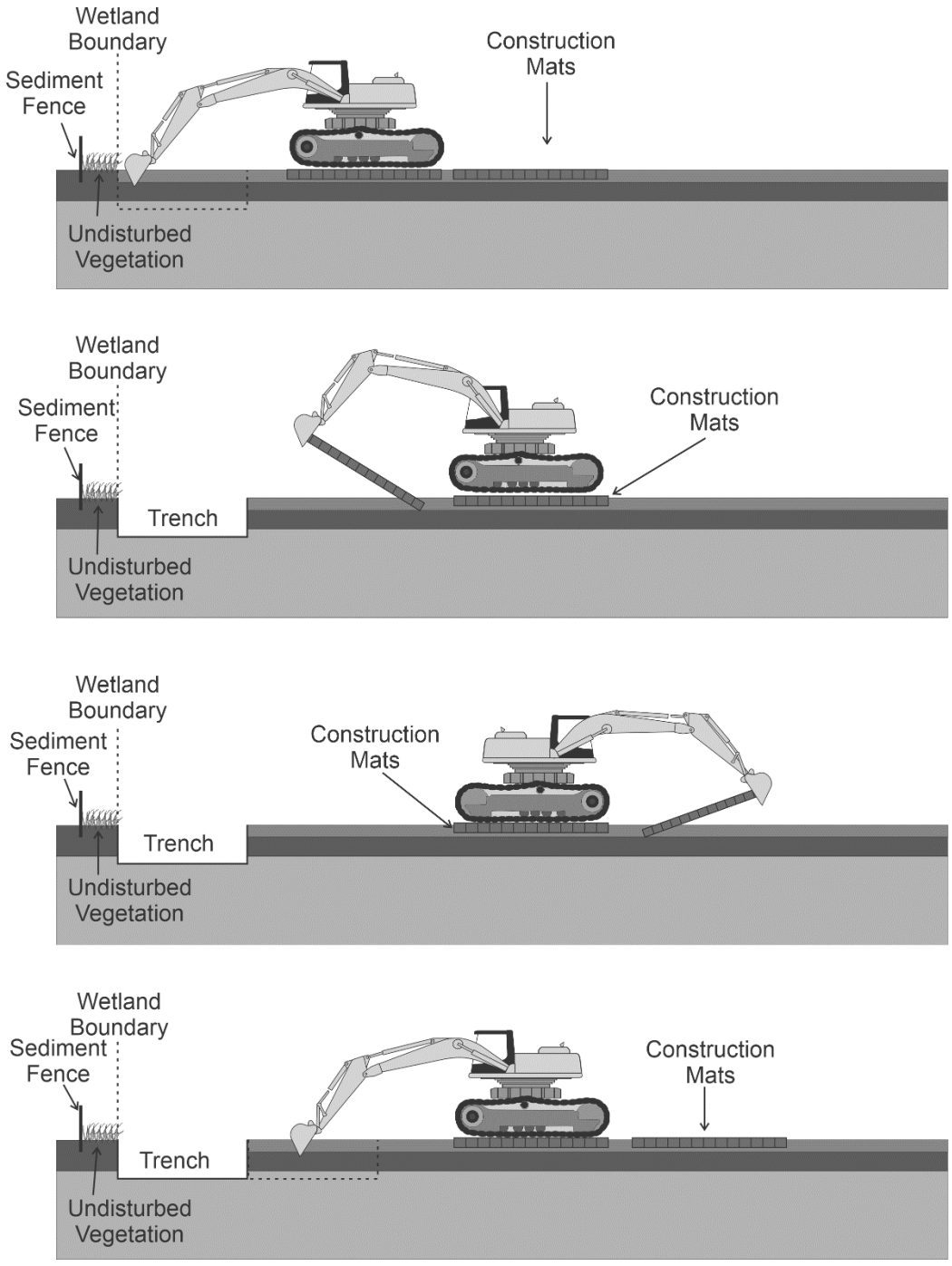


Plan View
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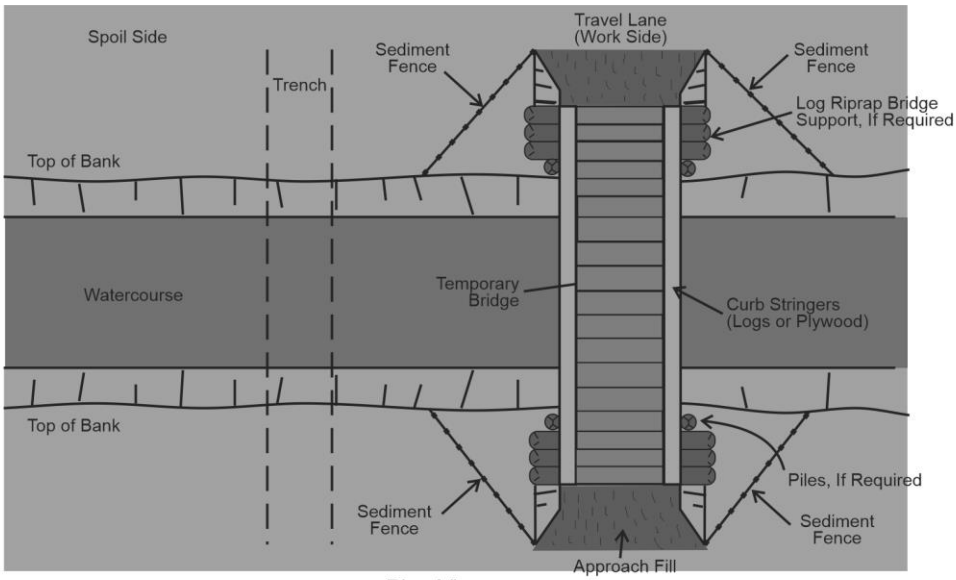
Notes:

1. The Push-Pull method is generally used for small, shallow wetlands in otherwise upland areas.
2. Locate workspace areas a minimum 10 m from wetland boundaries. Ensure landowner and/or regulatory approvals are in place for all extra temporary workspace prior to use.
3. Utilize shoo-flies in upland areas for access. Only equipment necessary for excavation will enter the wetland.
4. Complete construction of the wetland pipe section. Weld, coat and, if warranted, pretest and weight pipe prior to commencement of activity within the wetland. Attach a cable to the pipeline cap in order to facilitate pulling across the wetland.
5. Use wide pad, low ground pressure equipment operated from swamp mats when working on saturated soils to avoid compaction. See the next page for details on equipment travel through the wetland using mats.
6. Review and adhere to the surface material salvage measures presented in Section 7.8 – Wetland Crossings.
7. A service vehicle will deliver the cable to the excavator, using the shoofly, once trenching is complete. The excavator will winch the pipeline into the trench.
8. Backfill and do not leave a permanent trench crown during clean-up of wetlands.
9. Restore surface hydrology patterns within the construction right-of-way as close to pre-construction contours as practical during reclamation. Regrade areas with vehicle ruts, erosion gullies or where the trench has settled.
10. Hand broadcast Seed Mix No. 23 or 24, based on Ecoregion, within the margins of Class I and II wetlands, unless otherwise requested by the landowner (see Detail 36).
11. Allow wetlands to naturally regenerate following construction. Replant salvaged trees/shrubs along the disturbed margin(s) of the wetland as directed by the Environmental Inspectors. Install willow staking along the wetland to stabilize disturbances and reduce sedimentation risk to wetland where shrubs were present prior to construction and where instructed by the Environmental Inspector.
12. Maintain silt fences in place at wetland boundaries until revegetation of adjacent construction right-of-way is stable.

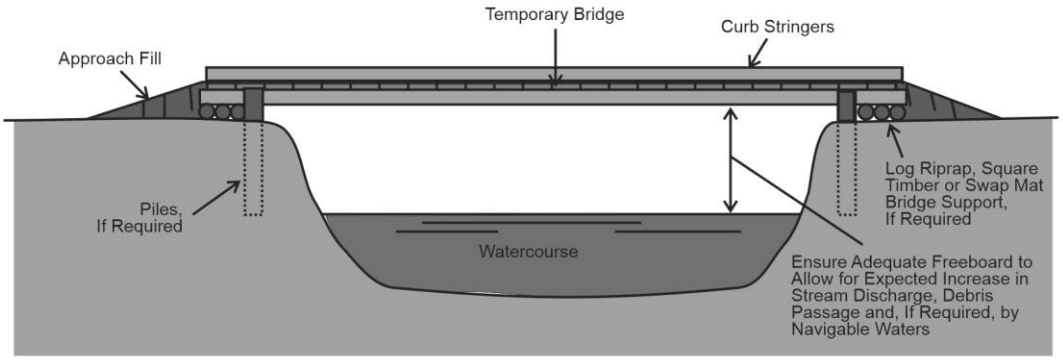
Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	WETLAND CROSSING – TRENCHED CROSSING WITH PUSH-PULL METHOD		
	CE833400	September 2022	Detail No. 15c



Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	WETLAND CROSSING – TRENCHED CROSSING WITH PUSH-PULL METHOD		
	CE833400	September 2022	Detail No. 15d



Plan View
(Not to Scale)



Profile View
(Not to Scale)

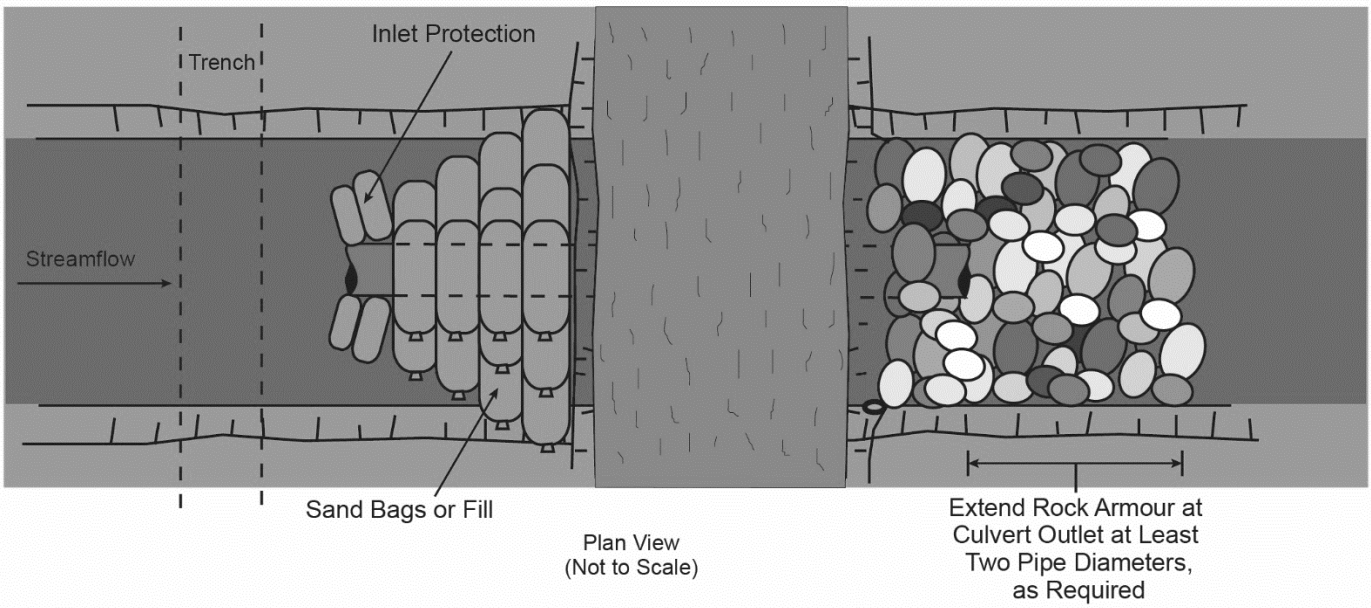


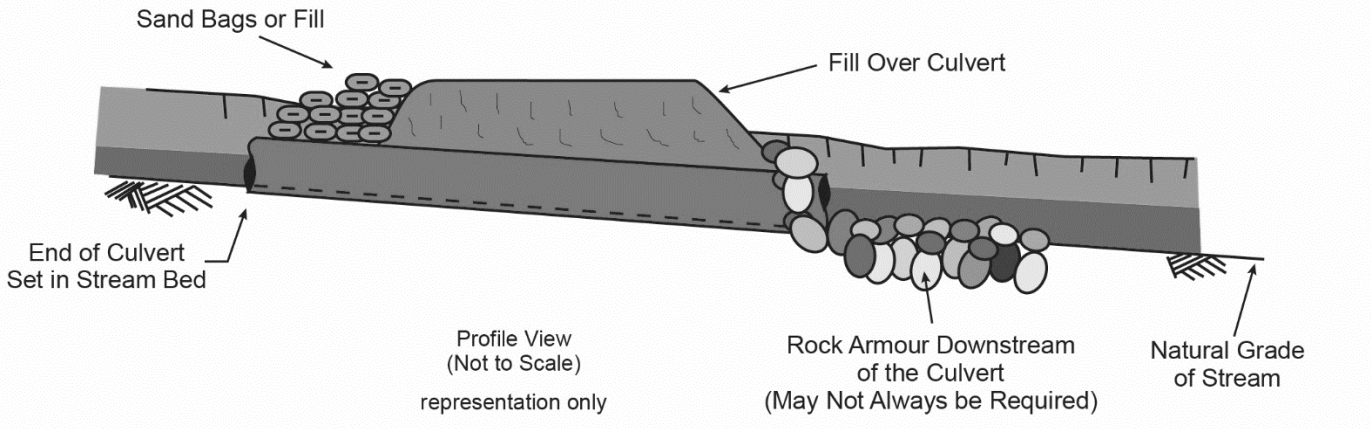
Profile View
(Not to Scale)

Notes:

1. Install a temporary bridge (*such as,* log, pre-fabricated span) to allow vehicles to cross watercourses that are sensitive (that is, fish-bearing streams with a classification of S1 through S4) or that have unstable bed and banks. Bridges are also used where watercourses are too deep, wide or fast to permit an alternative crossing structure. This method minimizes sedimentation of the watercourse, and bank and bed restoration work. It is generally limited to watercourses less than 30 m in width.
2. Utilize approach fills rather than cuts in banks to minimize erosion potential. Do not constrict flow with approach fill or support structures. Ensure adequate free-board to handle anticipated streamflows. Use a geotextile liner to prevent fine material from entering watercourse.
3. Install curb stringers of logs or plywood to ensure that fill material does not spill into the watercourse, where required.
4. Remove bridge after use. If bridge is to remain in place through spring break-up to access final clean-up, it must receive regulatory approval to remain in place, and it must be designed for high water events and ice jams. Remove support structures and approach fills. Restore and stabilize banks.

Adapted from CAPP et al. (2005).

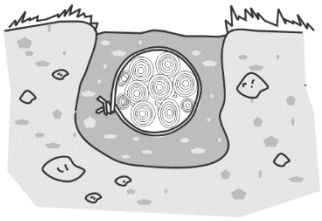




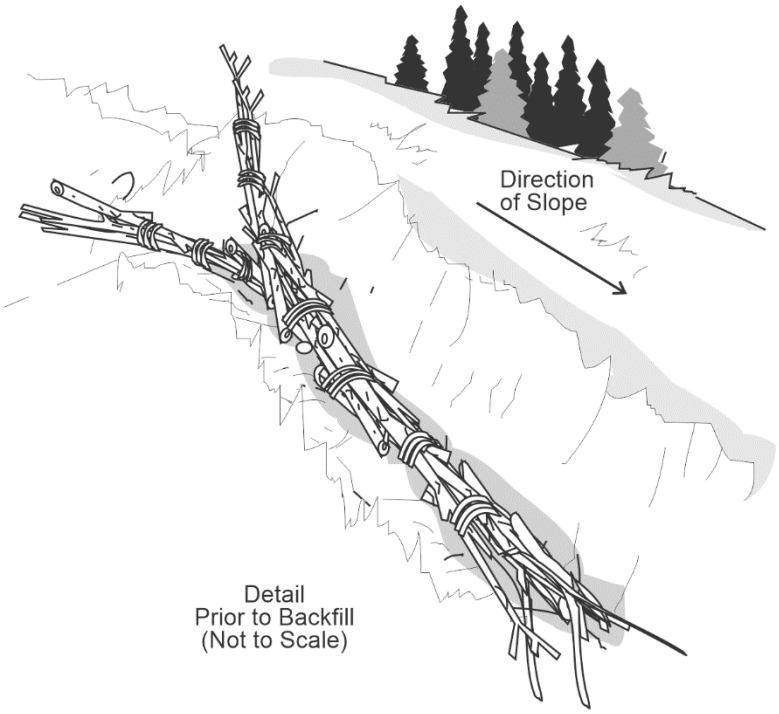
Notes:

1. Install ramp and culverts on non-fish bearing watercourses and non-classified drainage with limited or no flow.
2. Ensure upstream and downstream dams are impermeable. Design culverts to handle 150% of maximum anticipated flows. Use sand bags or fill around the culvert.
3. Place ends of culverts below the natural grade of watercourse at an angle that does not exceed normal watercourse gradient. Depth of placement is dependent upon bed type, culvert size and expected flow conditions.
4. Install additional erosion and sediment controls (such as, filter fabric and sediment fence) on culvert ramp and approaches, as determined by the Environmental Inspector.
5. Install sediment and erosion control where disturbance has occurred.
6. Remove temporary culverts and ramp materials when no longer required. Remove culvert and ramp prior to freeze-up (summer construction) and prior to spring break-up (winter construction).
7. Restore and stabilize bed and banks to pre-construction profiles.

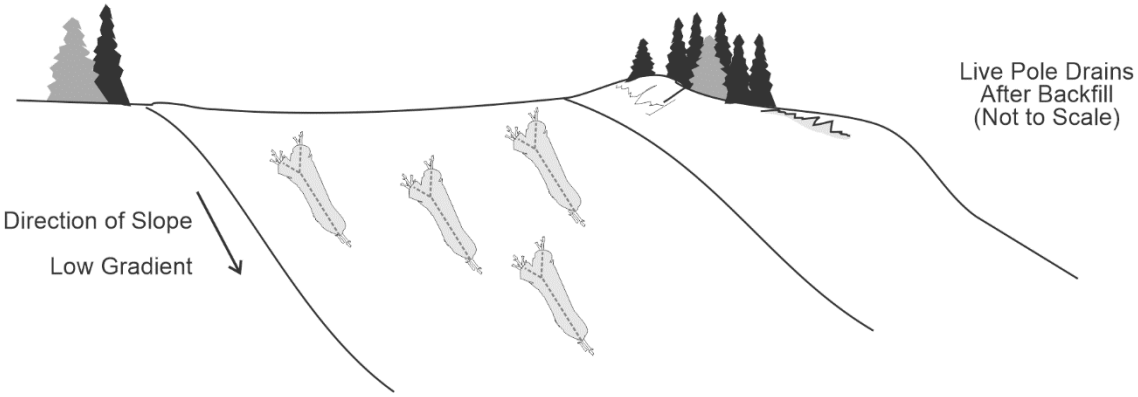
Source: Adapted from CAPP et al. (2005).



Profile
(Not to Scale)



Detail
Prior to Backfill
(Not to Scale)

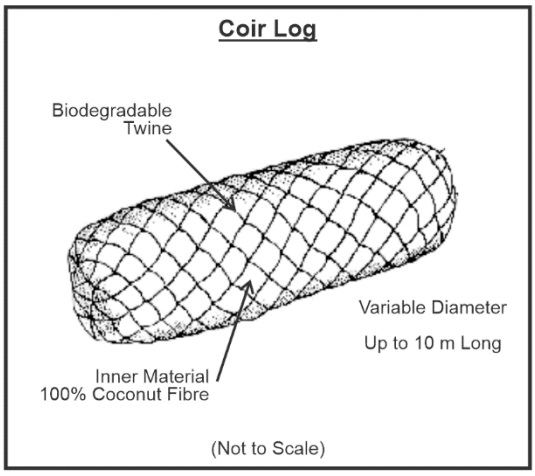


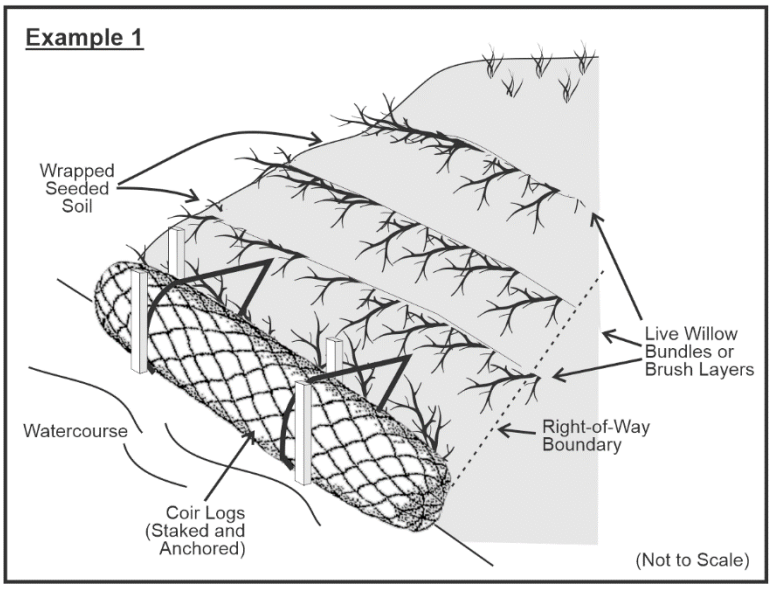
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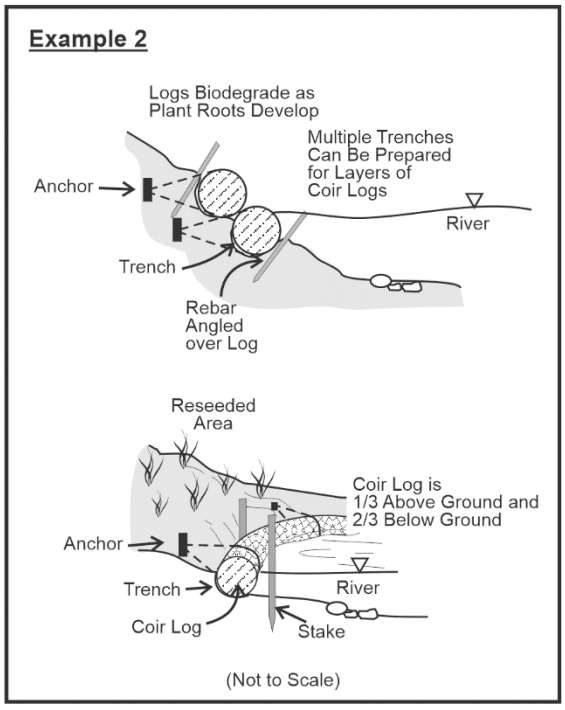
1. Proper placement and design are critical and qualified specialists should be involved.
2. Excavate a shallow trench parallel with the slope and within regions of excessive moisture.
3. Construct a bundle of willow cuttings, alternating tips and butts, by tying with twine as tightly as practical. Twigs and branches should not be trimmed unless inhibiting the tightness of the bundle.
4. Backfill over the bundle except for bundle ends. Tamp to compact the soil. The bundles may be anchored or staked on erosion prone slopes.

Adapted from CAPP et al. (2005).

Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	SUBSURFACE DRAINAGE CONTROL – POLE DRAINS		
	CE833400	September 2022	Detail No. 18



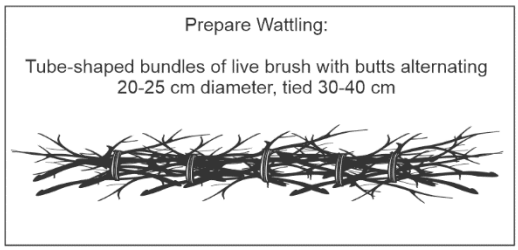


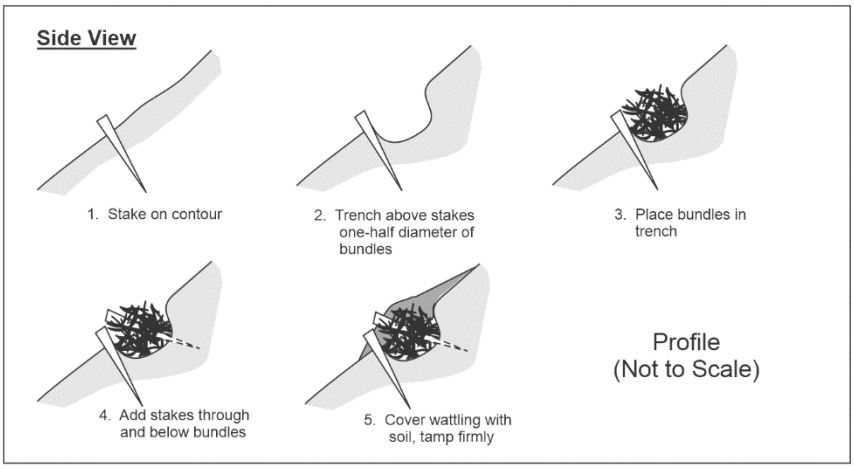


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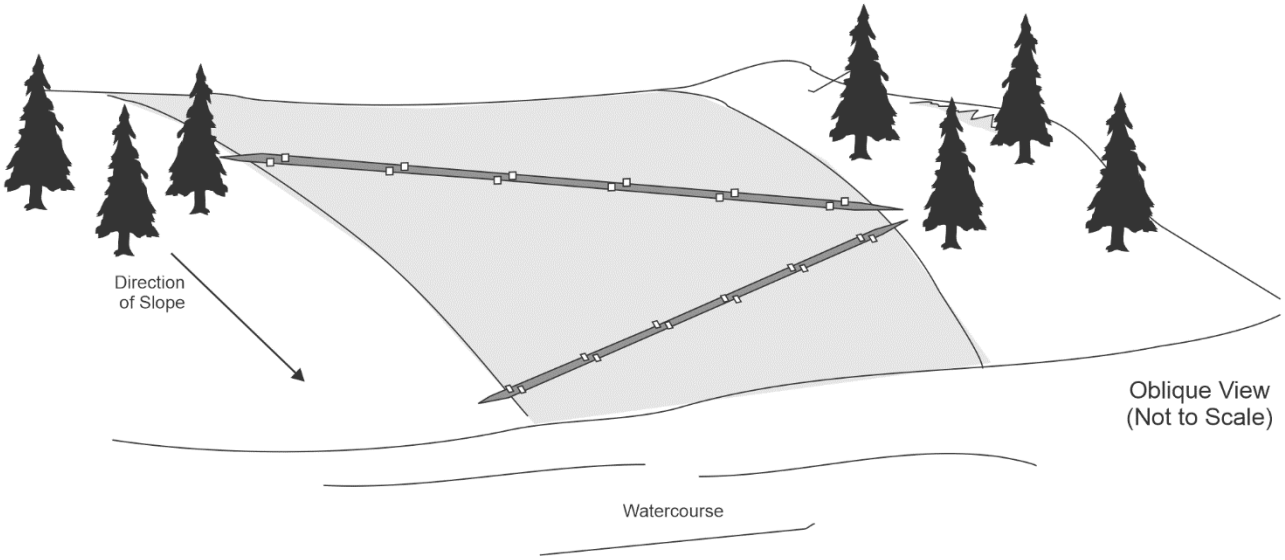
1. Proper placement and design in proximity to watercourses is critical and qualified specialists should be involved.
2. Install partially buried logs across entire width of disturbance. Anchor logs securely to prevent damage from ice and/or streamflow. Wooden/live stakes, curved rebar or earth anchors may be used. Additional cable anchors may be warranted.
3. Store, move and install when dry.
4. Coir logs may be seeded, or cuttings and plantings may be inserted.
5. Coir logs may also be used upland on approach slopes or at the outlet of diversion berms for additional erosion and sediment control and scour protection, respectively.

Adapted from CAPP et al. (2005).





Top View



Notes:

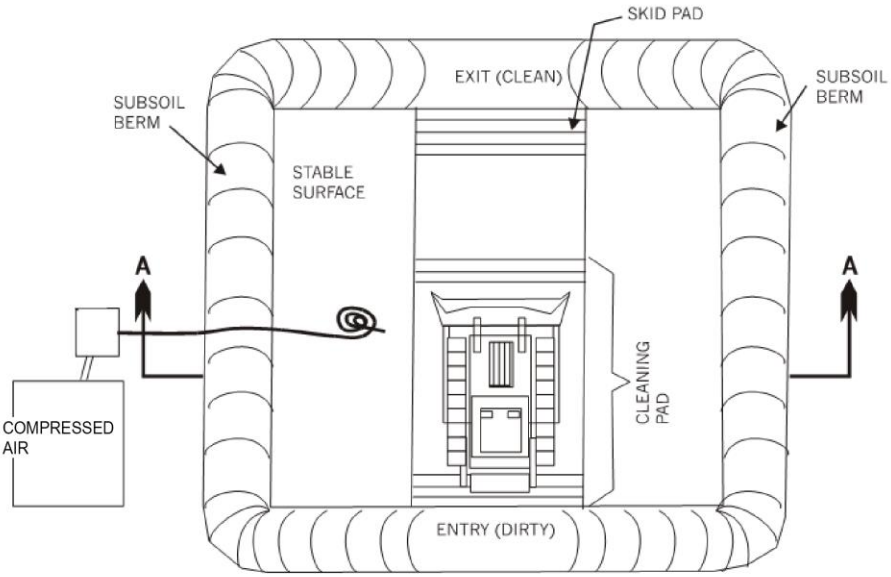
1. Proper placement and design is critical, and qualified specialists should be involved.
2. Plant materials should be about 1-4 cm in diameter and approximately 2 m in length. Lay butt ends and top ends alternately until a bundle has been created approximately 20-25 cm in diameter. Tied bundles together using untreated lengths of twine, approximately every 30-40 cm. Repeat across entire contour length.
3. Live stake the downslope side of the trenches to hold the wattles in the trench overlapping the ends of bundles slightly. Place dead stakes through the wattles approximately every metre.
4. Pull the soil from the trench excavation down into the wattles and compact into the trench. Ensure good soil-plant contact around and in the wattle. Completely cover with soil to intercept water and create mild slope terraces.
5. Continue to excavate the next upslope trench. It is important to get the plant materials into the trenches before they have a chance to lose critical stem moisture.
6. Seeding and mulching, where undertaken, should follow immediately after installation.

Adapted from CPWCC (1999).

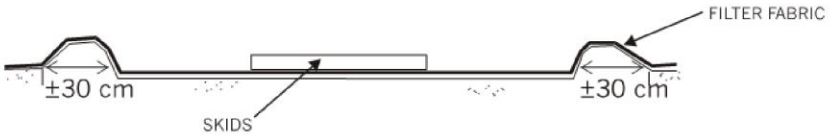
Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	STREAMBANK AND RIPARIAN SLOPE PROTECTION – CONTOUR WATTLES		
	CE833400	September 2022	Detail No. 20

Criteria For Implementation:

- Weed clean-off stations use compressed air and track shovels for cleaning soil from construction equipment and may be set up at locations where track cleaning by hand and other weed control measures are determined by the Construction Environmental Coordinator (CEC) and/or the Environmental Inspector (EI) to be insufficient. Clean-off requirements will apply to all construction equipment involved in handing surface materials known or suspected of containing weeds.



PLAN VIEW



SECTION A-A

Not to Scale

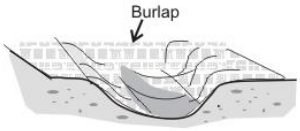
Representation Only

Notes:

1. During nonfrozen soil conditions, construct cleaning stations at approved locations by stripping topsoil and constructing containment berms out of subsoil.
2. Cleaning pad will be constructed of filter fabric under skids. Cleaning shall be carried out under the supervision of the Construction Environmental Coordinator (CEC) and to the satisfaction of the Environmental Inspector (EI).
3. Ensure that the size of the station is adequate to accommodate the maximum size of equipment expected.
4. Equipment is to consistently enter at one end and exit at another.
5. Skids are to be cleaned between independent pieces of equipment.
6. Filter fabric will be removed to an acceptable landfill when the cleaning station is dismantled.
7. The depression will be backfilled with bermed material. Any soils contaminated by petroleum-based or other undesirable materials from cleaning stations shall be removed in accordance with applicable requirements.
8. Topsoil will be returned and the area reclaimed.
9. Cleaning sites will be geo-referenced and recorded to facilitate follow-up weed surveys, and will be monitored during the post-construction monitoring program and weeds controlled, as required.

Preparation

(a) Line Trench With Burlap



(b) Fill With Grass Clumps



(c) Fold Burlap over Grass Clumps so Clumps are Snug Against each other.

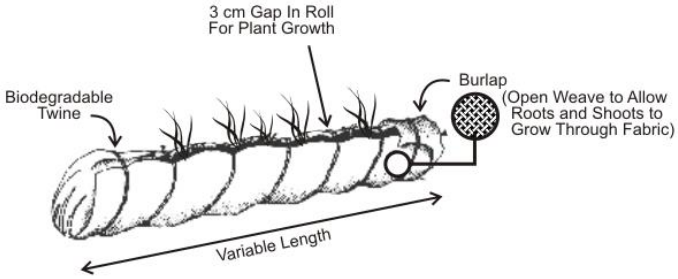


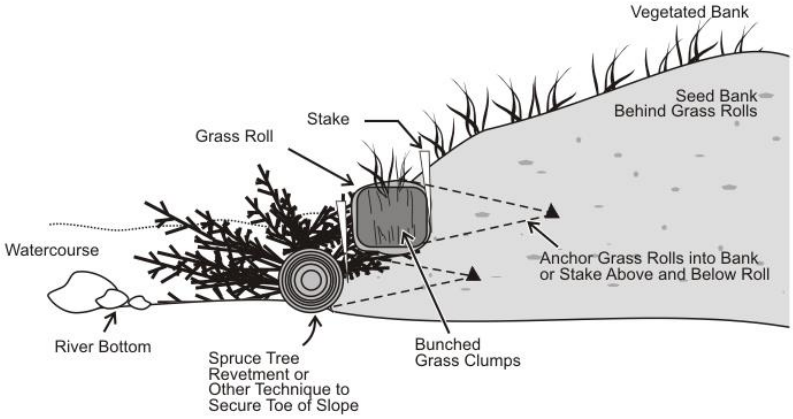
(d) Pull Shoots Through Wrap

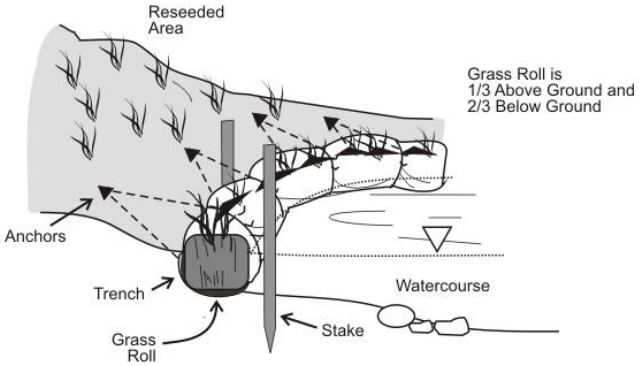


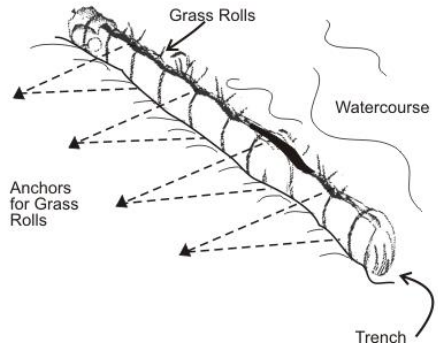
Profile
(Not to Scale)

Implementation









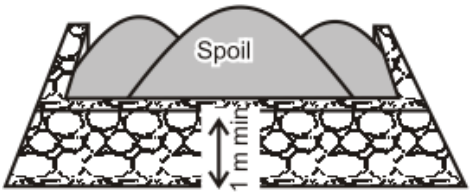
(Not to Scale)

Notes:

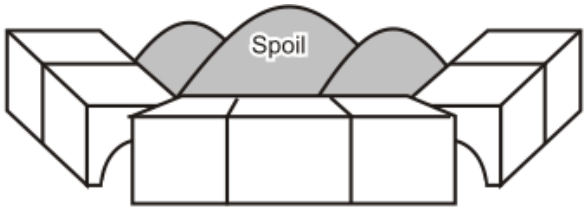
1. Proper placement and design is critical and qualified specialists should be involved.
2. Excavate a shallow trench along the high water mark parallel to the toe of the bank and line with burlap.
3. Install sod in the middle of the roll and wrap with burlap covers. Tie with twine and cut slits to expose sections of sod.
4. Stake or anchor firmly ensuring up and downstream ends are secured to prevent washing out.

Adapted from CAPP et al. (2005).

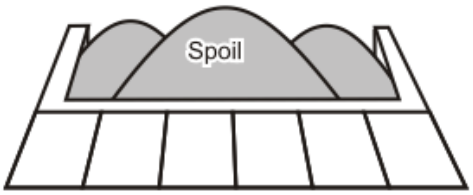
Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	STREAMBANK PROTECTION – GRASS ROLLS		
	CE833400	September 2022	Detail No. 22



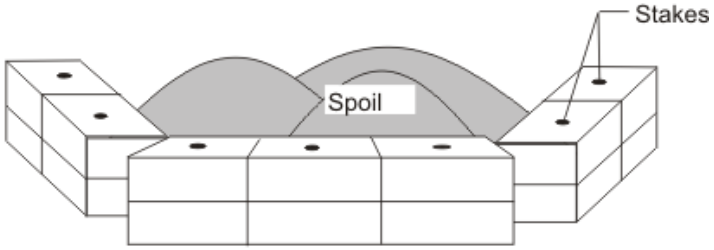
1. Windrow Boulders and Shot Rock



2. Saddle Weights



3. Subsoil Berm



4. Straw Bales (staked)

Not to Scale

Notes:

1. Construct sump or berms, where warranted, to contain excavated instream spoil so that runoff does not enter a watercourse or flow off right-of-way.

2. Strip topsoil from area to be used as spoil storage.

3. Maintain a sufficient vegetated buffer from the top of the streambank.

4. Berms that do not adequately prevent leakage, such as those made of boulders, shotrock or saddle weights may need a geotextile liner to prevent silty water from entering a watercourse.

Adapted from CAPP *et al* (2005), Alliance (1997)

Jacobs	EAGLE MOUNTAIN – WOODFIBRE GAS PIPELINE PROJECT		
	SEDIMENT CONTROL – SPOIL BERMS		
	CE833400	September 2022	Detail No. 23

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Appendix A
Emergency Contacts

Appendix A. Emergency Contacts

Contact		Contact Number
Police/Ambulance/Fire		**911**
FortisBC Natural Gas Safety		1-800-663-9911
Emergency Management BC		1-800-663-3456
DFO Spill Reporting Line		1-800-465-4336
BC ENV Conservation and Natural Resource Officers		1-877-952-7277
BC Safety Authority Safety Manager (Gas)		1-866-566-7233
BC One-Call		1-800-474-6886
BC Forest Fire Reporting Centre		1-800-663-5555 (or *5555)
BC Oil and Gas Commission Incident Reporting		1-866-663-3456
24 Hour Emergency Line (Squamish [Sḵwx̱wú7mesh])		1-877-890-5711
Local Contact*	**Location**	
RCMP	City of Coquitlam	1-604-945-1550
	District of Squamish	1-604-892-6100
Ambulance	City of Coquitlam	1-866-952-2448
	District of Squamish	1-604-872-5151
Hospital	City of Coquitlam	1-604-777-8730
	District of Squamish	1-604-894-6371
Fire	City of Coquitlam	1-604-927-6400
	District of Squamish	1-604-898-9666
Squamish Nation	Senior Environmental Manager	Kathleen Edwards, 604-351-4610 & kathleen_edwards@squamish.net
	Emergency Response Coordinator:	David Harrison 604-374-2687 & david_harrison@squamish.net

Notes:

* non-emergengy

BC = British Columbia
BC ENV = British Columbia Ministry of Envrionment and Climate Change Strategy
DFO = Fisheries and Oceans Canada

Appendix B
Potential Permit Requirements for the EGP Project

Table B-1. Potential Permit Requirements for the EGP Project

Responsible Authority	Statute/Regulation	Type of Permit/Need for Authorization
Federal		
Transport Canada	*Aeronautics Act, Canadian Aviation Regulations*	Air Operator Certificate (Aerodrome Registration) **Activity:** Helipad landing sites and airstrips.
	Airport Zoning Regulations	Aeronautical Assessment Obstruction Evaluation **Activity**: Obstacles to air navigation such as overhead cranes, telecommunication towers and cranes
	Canadian Navigable Waters Act	Notice to the Minister (for minor works) or Navigation Protection Act approval (for substantial interference) **Activity:** Work in, on, over, under or through any navigable water (Stak̲w) (vehicle and pipeline crossings, etc.) mentioned in Schedule 2 of the *Canadian Navigable Waters Act.*
Natural Resources Canada, Explosives Regulatory Division	*Explosives Act*	Sections 6 and 7: Explosives Transportation Permit **Activity:** Transportation of explosives.
		Temporary Magazine License **Activity:** Explosives storage.
		Temporary Blaster's Licence or Blaster's Permit **Activity:** Use of explosives.
DFO, Fisheries Protection Program	*Fisheries Act*	Request for Review **Activity:** Watercourse crossings and other activities requiring clearing of riparian vegetation or instream disturbance which may result in serious harm to fish (Sts'úkwi7) that are part of a commercial, recreational, or Aboriginal fishery, or to fish (Sts'úkwi7) that support such a fishery.
		Fisheries Act Authorization for Paragraph 35(2)(b) **Activity:** Watercourse crossings and other activities requiring clearing of riparian vegetation or instream disturbance which will result in serious harm to fish (Sts'úkwi7) that are part of a commercial, recreational, or Aboriginal fishery, or to fish (Sts'úkwi7) that support such a fishery.
	Fisheries Act	Application to Collect Fish (Sts'úkwi7) for Scientific Purpose (Scientific Licence) **Activity:** Harvest fish (Sts'úkwi7) for scientific purposes.
Industry Canada	*Radio Communication Act*	Radio Licence **Activity:** Radio communication
Vancouver Fraser Port Authority	*Canada Marine Act; Canadian Environmental Assessment Act, 2012; Canadian Environmental Protection Act, 1999; and Fisheries Act* (for dredging)	EGP Project Permit **Activity:** Proposed development, construction and demolition projects within the Authority's jurisdiction.

Table B-1. Potential Permit Requirements for the EGP Project

Responsible Authority	Statute/Regulation	Type of Permit/Need for Authorization
Provincial		
BC MoTI	*Commercial Transport Act*	Non-Resident Commercial Vehicle Permit **Activity:** Required for a vehicle with a gross weight between 6,000-50,000 kg and is a: commercial vehicle, industrial vehicle (x-plated) or a farm vehicle.
BC MoTI	*Transportation Act*	Oversize-Overweight Vehicle Permits **Activity:** Operation of an oversize or overweight vehicle on a highway.
		Work Notification or Lane Closure Request Permit **Activity:** When work requires a closure of a BC MoTI right-of-way.
		Development Approvals (within highway right-of-way) **Activity:** Minor undertakings such as the construction of small water (Stak̲w) pipes, culverts under roads, retaining walls, bridges etc.
		Permit for Works on Highway Right-of-Way (Utility Permit) **Activity:** Crossing over or under highways.
		Sign Permit **Activity:** Erecting a traffic sign.
	Transportation Act, Section 49 and Section 62	Highway Access Permit (Controlled Access Highways) **Activity:** Required for all access except single residential driveways on side roads.
BC LWRS and MoF	*Wildlife Act*	Fish (Sts'úkwi7) Collection Permit **Activity:** Required for fish (Sts'úkwi7) research at watercourse crossings and fish (Sts'úkwi7) salvage.
		General Wildlife (Sekw'ekw'inexw) Permit Application (Amphibian Salvage) **Activity:** Visual surveys/instream surveys, tadpole capture/ release for identification purposes, mesh funnel traps.
	Forest and Range Practices Act	Section 22(1): Road Use Permits **Activity:** Required for use of all forest service roads including Riparian Management Areas.
		Works Permit **Activity:** To change, reconstruct, or modify a forest service road.
		Consent to Connect **Activity**: When proponents wish to connect a road to a forest service road

Table B-1. Potential Permit Requirements for the EGP Project

Responsible Authority	Statute/Regulation	Type of Permit/Need for Authorization
BC LWRS and MoF (cont'd)	*Wildfire Act* *Environmental Management Act, Open Burning Smoke Control Regulation*	Burning Permit **Activity:** Burning slash
	Heritage Conservation Act	Site Inspection Permit (Section 14) **Activity:** The Archaeology Branch issues permits under Section 14 of the *Heritage Conservation Act* for archaeologists to conduct field investigations.
	Dike Maintenance Act	*Dike Maintenance Act* Approval Application **Activity:** For permission to cross underneath a dike or through the right-of-way of a dike.
BC Ministry of Energy, Mines and Low Carbon Innovation	*Mineral Tenure Act*	Request for reserve **Activity:** So that persons or corporations filing an interest for subsurface minerals are aware of the EGP Project.
BC OGC	Various Acts The BC OGC has been granted authority under Section 1 of the *Oil and Gas Activity Act*, for specified enactments under the following Acts: *Environmental Management Act* *Forest Act* *Heritage Conservation Act* *Land Act* *Water Sustainability Act*	Temporary Permit or Licence of Occupation for Crown Land (Temíxw) **Activity:** Any activity required to carry out an oil and gas activity authorized through a specified enactment (such as, investigative activities, heritage inspection, road construction).
	Oil and Gas Activities Act	Pipeline Permit **Activity:** Required for construction and operation of the pipeline.
		Facility Permit **Activity:** Required for construction and operation of compressor stations.
	Water Sustainability Act, Section 9	Water (Stak̲w) License **Activity:** To divert or use water (Stak̲w) for certain purposes.
	Water Sustainability Act, Section 10	Short-Term Use of Water (Stak̲w) Permit **Activity:** To conduct water (Stak̲w) withdrawal activities.

Table B-1. Potential Permit Requirements for the EGP Project

Responsible Authority	Statute/Regulation	Type of Permit/Need for Authorization
BC OGC (cont'd)	*Water Sustainability Act,* Section 11	Changes in and About a Stream Authorization **Activity:** Changes in and about a stream (such as, bridge installation, large debris removal, gravel removal, construction/maintenance of a pipeline crossing).
	Forest Act and *Regulations* *Land Act*	Road Use Permits **Activity:** Industrial use of existing forest service roads.
	Forest Act	Cutting Permit/Master Licence to Cut **Activity:** Required where the removal of timber from Crown land (Temíxw) is necessary to conduct oil and gas activities.
	Land Act	Investigative Use Permit **Activity:** Temporary use or occupation of land (Temíxw) for technical studies and new access (that is, geotech drilling sites and helipads).
	Land Act	Associated Oil and Gas Activity **Activity:** To excavate or quarry soil, clay, rock, sand, or gravel for construction (such as, road construction).
	Environmental Management Act	Waste Discharge Authorization **Activity**: Discharge of wastewater or air contaminants during construction activities.
Regional and Municipal		
District of Squamish	Fire Prevention and Life Safety Bylaw No. 3712, 2005	Burning Permit **Activity:** Any fire at the construction site.
	Building Bylaw No. 1822, 2004	Building Permit **Activity:** Construction of a compressor station, industrial buildings, plumbing alterations, water (Stak̲w)/sanitary/storm service, demolition.
		Demolition Permit **Activity:** To completely remove any type of building or structure.
	Traffic Bylaw No. 2220, 2012	Work Permits **Activity:** Any work on District property that affects Municipal infrastructure (that is, roads, sidewalks, parks, easements).
		Temporary Use Permit **Activity:** For temporary work in a zone where it is not usually permitted.
	Zoning Bylaw No. 2200, 2011	Construction Water (Stak̲w) Supply Fee **Activity:** Any development or construction site requiring a water (Stak̲w) supply will be charged a water (Stak̲w) supply fee.

Table B-1. Potential Permit Requirements for the EGP Project

Responsible Authority	Statute/Regulation	Type of Permit/Need for Authorization
District of Squamish (cont'd)	Bylaw No. 2474, 2016, A bylaw to regulate Sanitary Sewer and Storm Sewer Use in the District of Squamish (Sḵwx̱wú7mesh)	Permission to connect to the District of Squamish (Sḵwx̱wú7mesh) sewer works **Activity**: discharge water (Staḵw) from construction activities into the Municipal sewer
	Sign Bylaw No. 1582, 2000	Sign Permit **Activity:** Posting construction signs.
	Fire Service Bylaw No. 2314, 2014	Burning Permit **Activity:** Any fire at the construction site.
	Noise Regulation Bylaw No. 2312, 2014	Temporary Noise Exemption Permit **Activity:** Noise from construction activities outside the allowable hours provided in the Bylaw.
	Schedule 'A' of Blasting Bylaw No. 188, 1965 as amended by Bylaw No. 742	Blasting Permit **Activity:** Blasting within the outer boundaries of the District.
Squamish-Lillooet Regional District	Building Bylaw	Building Permit **Activity:** Construction of a compressor station, industrial buildings, plumbing alterations, water (Staḵw)/sanitary/storm service, demolition.
	Zoning Bylaw	Zoning Amendment **Activity**: A Zoning Amendment is required if the proposed land (Temíxw) use is not permitted under the existing zoning.
	Official Community Plan	Development Permit **Activity**: Development Permit is required when the property to be developed is situated within a Development Permit Area designated in an Official Community Plan
	Soil Deposit and Removal Bylaw No. 1423-2015.	Soil Deposit and Removal Permits **Activity**: A permit is required to deposit or remove soil within the Squamish-Lillooet Regional District, where the deposit or removal involves 10 cubic metres or more of soil.
Squamish Nation (Sḵwx̱wú7mesh Úxwumixw)	Heritage Policy and Ancestral Remains Interim Policy	Archaeology and Heritage Permit **Activity:** A permit is required if investigation is required to confirm the presence of heritage or cultural artifacts or ancestral remains, or if excavation of cultural assets is required.

Notes:

BC LWRS = British Columbia Ministry of Land, Water and Resource Stewardship
BC MoTI = British Columbia Ministry of Transportation and Infrastructure
BC OGC = British Columbia Oil and Gas Commission
DFO = Fisheries and Oceans Canada
EGP Project = Eagle Mountain – Woodfibre Gas Pipeline Project
kg = kilogram(s)

Appendix C
EGP Project Contacts

This appendix will be completed prior to commencement of construction when all the contacts are known including:

- EGP Project management personnel
- Subject Matter Experts, Qualified Professionals including the (Squamish Nation [Sḵwx̱wú7mesh Úxwumixw] Archaeology QP)
- Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) Regulatory contacts
- Indigenous Nation (Sḵwx̱wú7mesh Úxwumixw) contacts
- Representatives for regulatory agencies

EGP PROJECT-SPECIFIC CONTACTS		
Title	**Contact**	**Contact Number**
FortisBC Energy Inc.		
Indigenous Contacts		
Provincial Regulatory Agencies		
Federal Regulatory Agencies		
Subject Matter Experts		

Appendix D
Spill Scene Checklist

Spill Scene Checklist

Step 1: Ensure Personal and Public Safety

▪ Immediately stop work in the vicinity of the spill.	
▪ Remove or eliminate all ignition sources.	
▪ If safe to do so, stop or control the release.	
▪ Tend to injuries and casualties, as required.	
▪ Protect yourself. – Carry out actions only if they can be performed without incurring personal injury or exposure. – Use appropriate PPE. – Approach the spill from upwind.	
▪ Secure the area (stop traffic and cordon off immediate spill area)	

Step 2: Notification

▪ For Reportable Spills, notify Emergency Management British Columbia (EMBC) by calling 1-800-663-3456. Reportable spill volumes are provided in the Spill, Fuel, and Hazardous Materials Contingency Plan (subsection 9.6).	
▪ Assess the situation to determine the magnitude of the spill and the degree of response required.	
▪ Fill out the Spill Report Form	
▪ Identify Siiyamin ta Skwxwú7mesh (s) in proximity to spill and contact Squamish Nation (Sḵwx̱wú7mesh Úxwumixw) Contacts as necessary.	

Step 3: Control and Contain the Spill

▪ Determine the best method of containment and cleanup.	
▪ Contain spills to water using water repelling sorbent booms and/or pads.	
▪ Protect drains, sewers, culverts, ditches and waterways. As appropriate: – Cover drains with rubber mats or other impermeable material. – Block flow of spilled material to any culverts, ditches, bodies of water, or environmentally sensitive areas. – Install booms or create diversion channels.	
▪ Contain spills to land using sorbent booms and/or pads, earth and/or sod, or diking.	

Step 4: Clean up the Spill and Site

▪ Absorb small spills with sorbent material and pads. Request cleanup assistance for larger spills.	
▪ Place contaminated absorbents pads, booms, etc. in plastic bags and seal them. Place the bags in a sealed container with a tight-fitting lid (that is, a steel drum). Label the container to identify contents and store containers in a low traffic area away from heat, sparks, flame, and water. Protect containers from the weather.	
▪ Place small volumes of contaminated soil in a sealed container with tight fitting lids or in tote bags. Store in a secured area protected from the weather. Label container to identify contents.	
▪ Store larger volumes of contaminated soil on a polyethylene tarp and cover with another polyethylene tarp to prevent contaminant seepage. Inspect the tarps for tears or holes before use.	
▪ Dispose of all cleanup waste and spill debris in accordance with the applicable regulations.	

Spill Report Form

Type of Material Spilled:
Gasoline _____
Diesel _____
Lube Oil _____
Hydraulic Fluid _____
Vehicle Antifreeze _____
Developing Fluids _____
Other (specify) _____

Date and Time of Spill or Discovery: _____
Source of Spill: _____
Area of Spill (m^2): _____
Depth of Spill (cm): _____
Volume of Spill (L): _____
Estimated Release Rate: _____
Duration of Release: _____
Location (land, water): _____
Soil Type (for example, sandy, clay): _____
Legal Location: LSD _____ Sec _____ Twp _____ Rg _____ W _ M; KP _____
UTM Coordinates: Zone _____ Easting _____ Northing _____

Land Use: _____

Environmentally sensitive areas potentially affected: _____
_____
_____

Weather conditions at time of discovery: _____

Procedures taken to reduce, control or stop the release: _____
_____
_____

Remediation plan and schedule of implementation, if warranted: _____
_____
_____

Current status of the remediation program: _____
_____
_____

(dd/mm/yy) (hr:min): _____

Form Completed by:

Name: _____ (printed) _____ (signed)

Appendix E
Watercourse and Wetland Crossing Checklists

Jacobs

ONSITE CHECKLIST FOR VEHICLE WATERCOURSE CROSSINGS

2100, Metrotower II 4720
Kingsway
Burnaby, BC V5H 4N2
Canada
T +1.604.684.3282
www.jacobs.com

The FortisBC Environmental Inspector or appointed designate will complete this onsite checklist prior to and during crossing construction. Mitigation and restoration activities will follow the Construction Environmental Management Plan (CEMP) and Details, site-specific measures or plans specified in the watercourse crossing table, and implementation and monitoring protocols in the Fish Mitigation Management Plan (FMMP). The site records provide baseline conditions at the time of assessment.

Project Name: _____

Project Owner: _____

Pipeline Contractor: _____

FortisBC Representative: _____

Watercourse Name and/or ID: _____

KP reference (if available): _____

UTMs: _____

On-Site Checklist Completed By: _____

Vehicle Crossing Method (*Describe technique and materials used, if applicable*)

- ☐ Clear span bridge: _____
- ☐ Culvert: _____
- ☐ Matting: _____
- ☐ Temporary ford: _____
- ☐ Other: _____

Date Vehicle Crossing Installed: _____

Date Vehicle Crossing Removed: _____

DATE/TIME OF INSTREAM WORKS AND WEATHER AND FLOW CONDITIONS *(Weather: forecasted temperature and precipitation; Flow Conditions: low, moderate, or high relative to bankfull)*

Date and Time	Weather Information and Flow Conditions

KEY CONSIDERATIONS (*Refer to the CEMP for all mitigation measures*)

Requirement	Applicability			Notes
	Yes	No	N/A	
Permits to conduct work are in place				
Forecast and flow conditions favourable				
Equipment is clean and free of leaks				
Adequate flow bypass pumping capacity				
Backup flow bypass pumps available				

Flow bypass established and clean downstream flow is maintained				
Fish screens installed and monitored				
Fish salvage conducted by a QP				
Sediment and erosion controls installed, maintained, and monitored				
Water quality monitoring required				
Monitoring of fish migration at isolations				

MITIGATION AND RESTORATION *(Document mitigation and restoration methods used per the CEMP and Details, and any site-specific measures or plans*)

Measure/Plan	Description of Activities

RECOMMENDATIONS/ACTIONS (*List any outstanding issues that need addressing, such as erosion concerns*)

Task	Responsible Party	Date

NOTES/COMMUNICATIONS

PHOTOGRAPHS[1] OF THE CROSSING PRIOR TO RIGHT-OF-WAY CLEARING AND VEHICLE CROSSING INSTALLATION

Photo No.	Comments - Required Photos
	View immediately upstream from the crossing.
	View immediately downstream from the crossing.
	View of left bank (approach to crossing) taken from right bank*.
	View of right bank (approach to crossing) taken from left bank*.

Photo No.	Comments - Additional Photos

* The left bank is on your left hand side when facing downstream. Use a compass to determine the directions of the left and right banks. For watercourses with no discernible flow; indicate direction of photo and GPS photo location so photos can be taken from the same vantage during and following vehicle crossing installation.

PHOTOGRAPHS[1] OF THE CROSSING DURING AND AFTER VEHICLE CROSSING INSTALLATION

Photo No.	Comments - Required Photos
	View immediately upstream from the crossing.
	View immediately downstream from the crossing.
	View of left bank (approach to crossing) taken from right bank*.
	View of right bank (approach to crossing) taken from left bank*.

Photo No.	Comments - Additional Photos

* The left bank is on your left hand side when facing downstream. Use a compass to determine the directions of the left and right banks. For watercourses with no discernible flow; indicate direction of photo and use GPS locations of the pre-construction photos so photos are taken from the same vantage as the pre-construction photos.

PHOTOGRAPHS[1] OF THE CROSSING DURING AND AFTER VEHICLE CROSSING REMOVAL

Photo No.	Comments - Required Photos
	View immediately upstream from the crossing.
	View immediately downstream from the crossing.
	View of left bank (approach to crossing) taken from right bank*.
	View of right bank (approach to crossing) taken from left bank*.

Photo No.	Comments - Additional Photos

* The left bank is on your left hand side when facing downstream. Use a compass to determine the directions of the left and right banks. For watercourses with no discernible flow; indicate direction of photo and use GPS locations of the pre-construction photos so photos are taken from the same vantage as the pre-construction photos.

1 Retain photos and on-site checklist as part of the Project's record.

PHOTOS

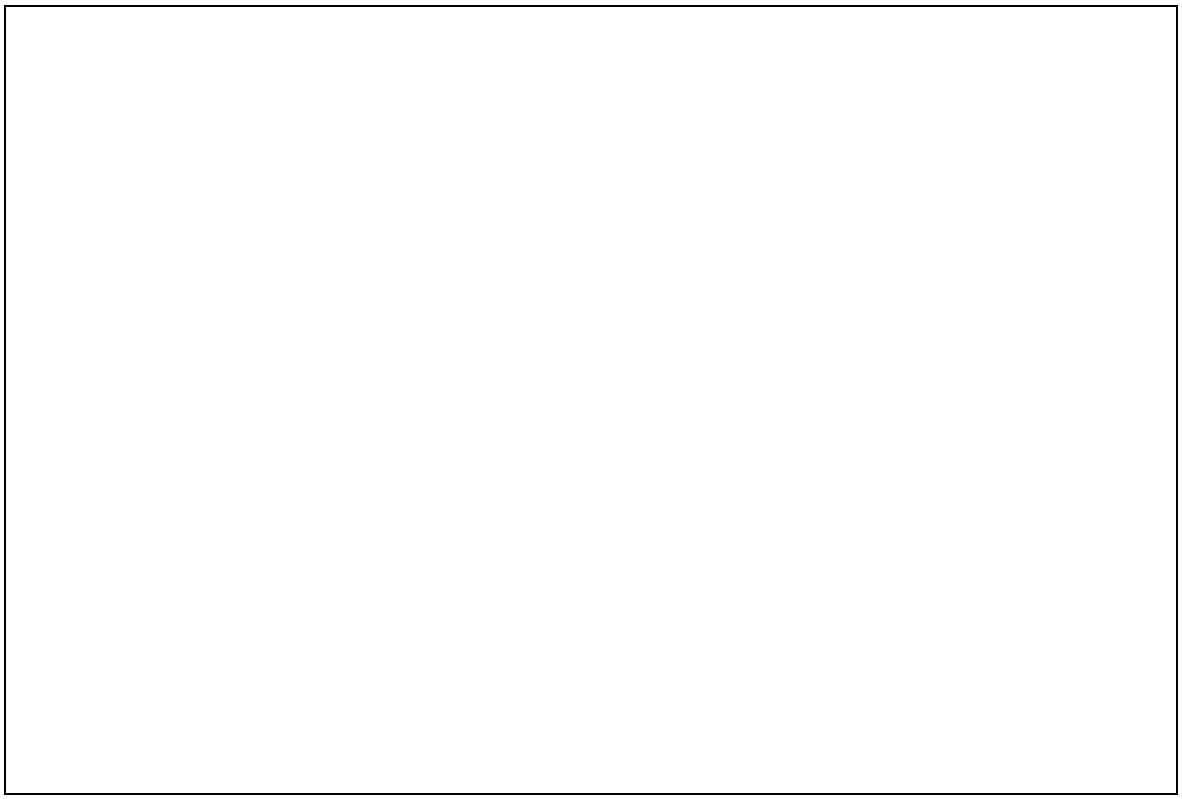


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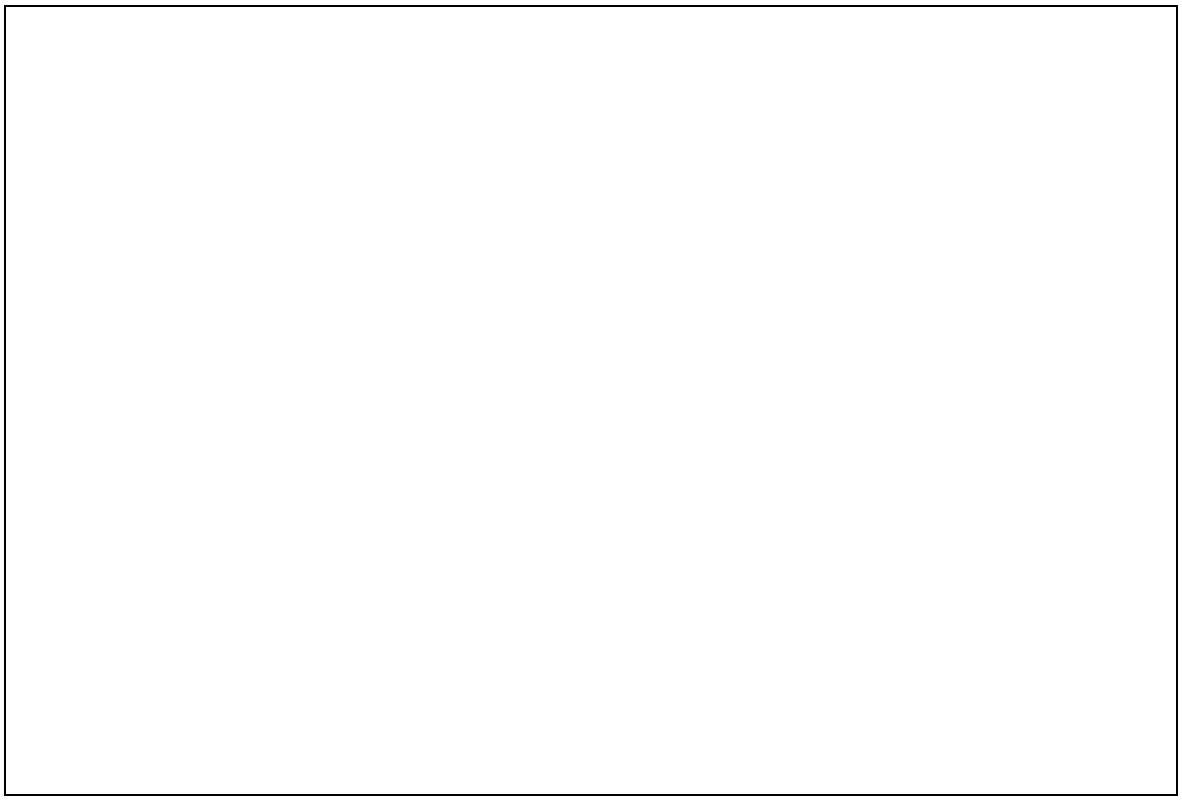


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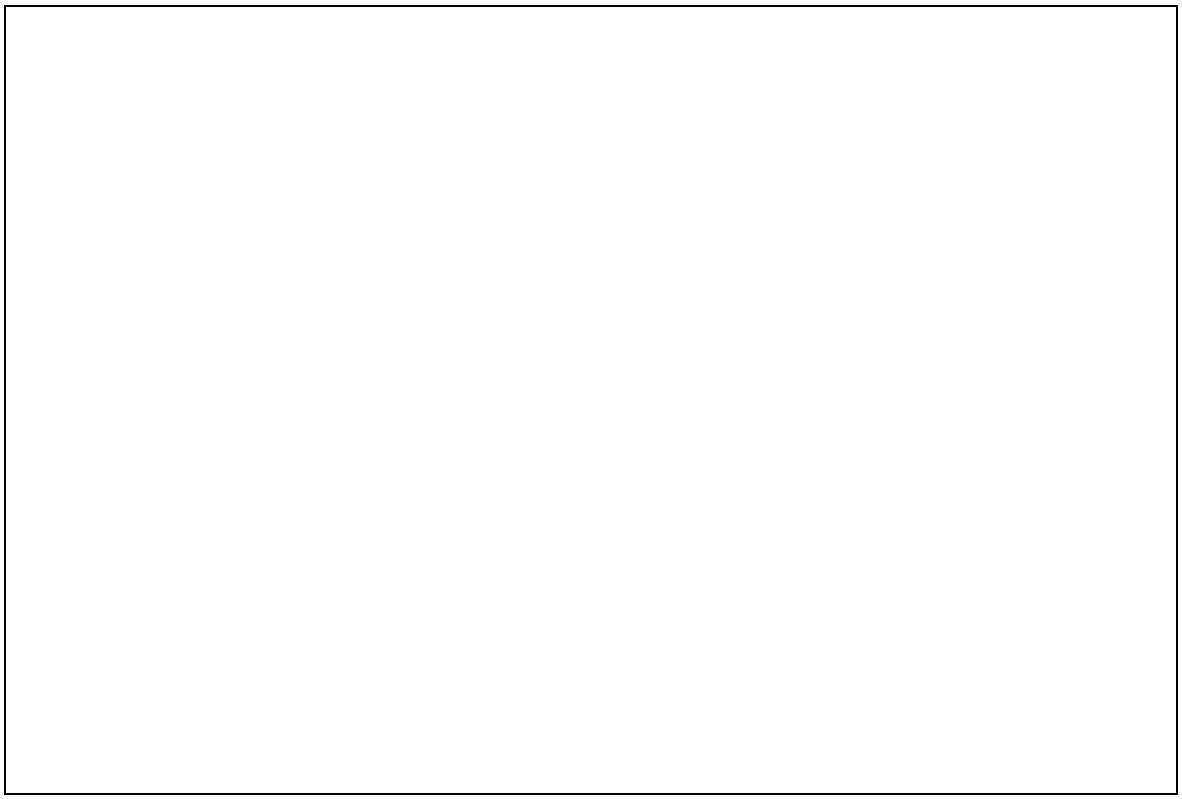


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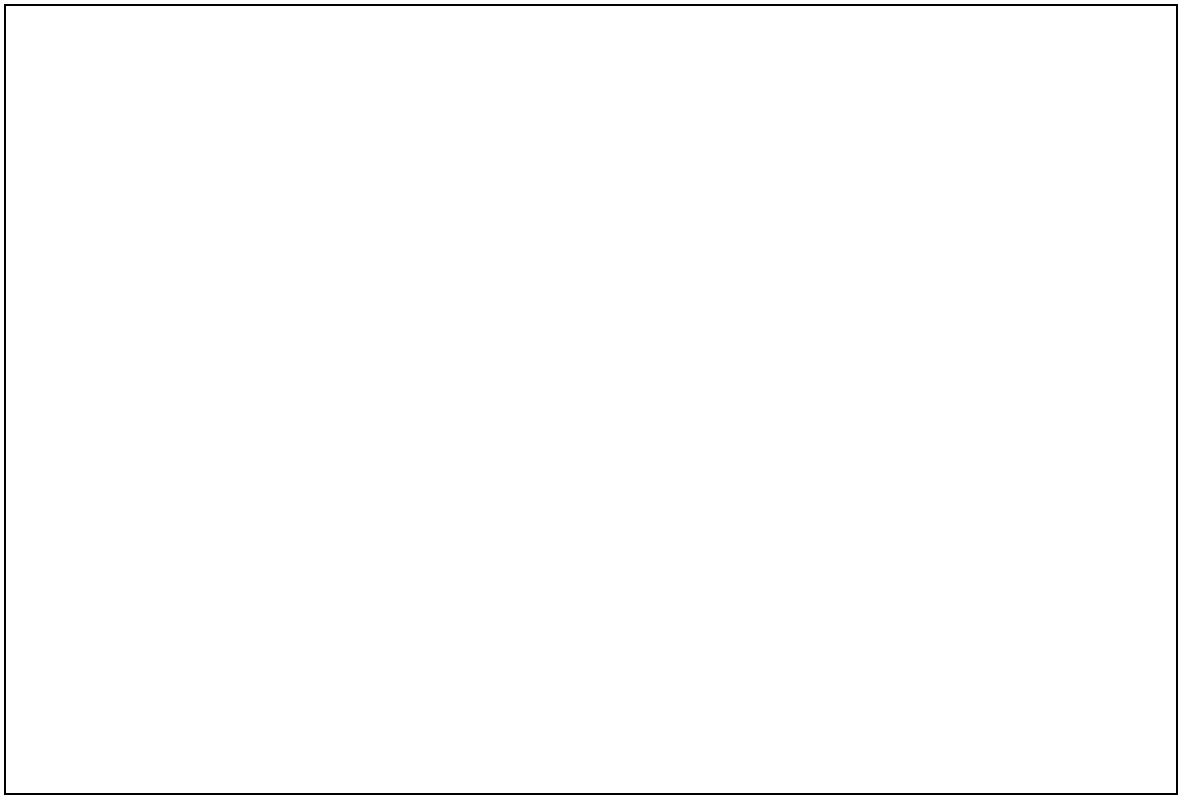


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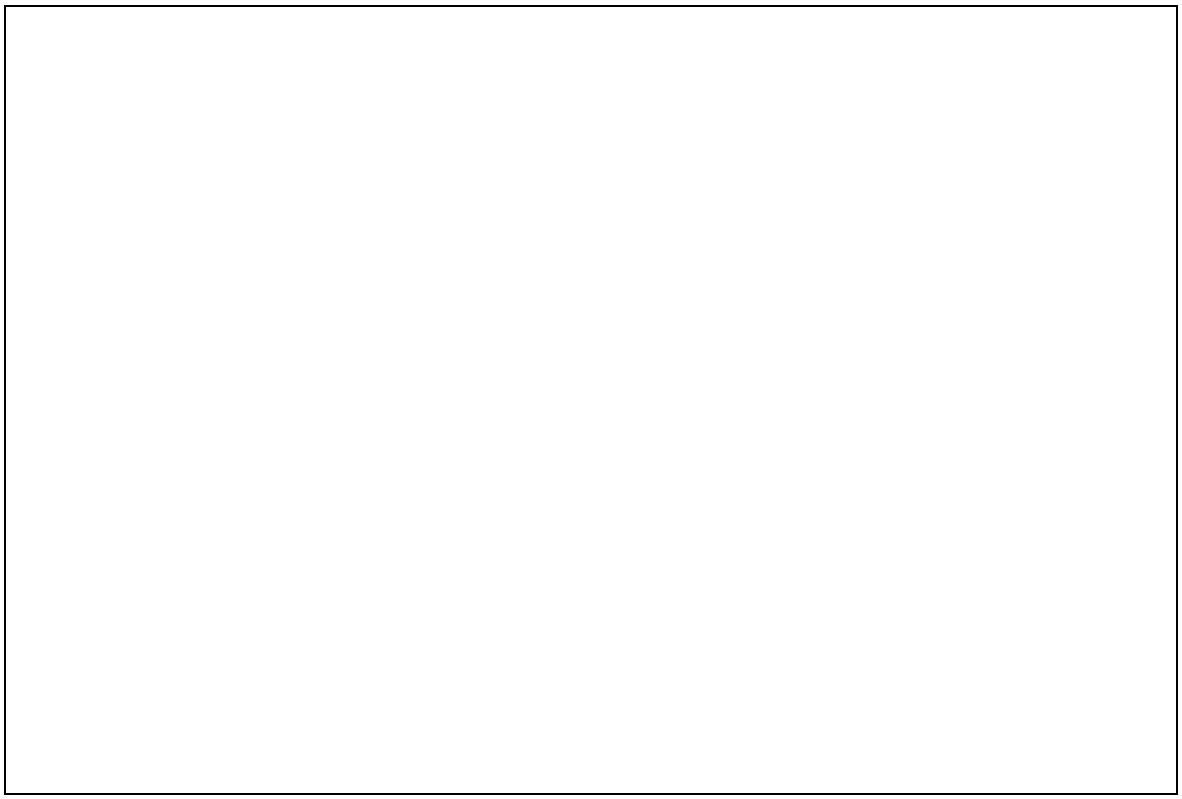


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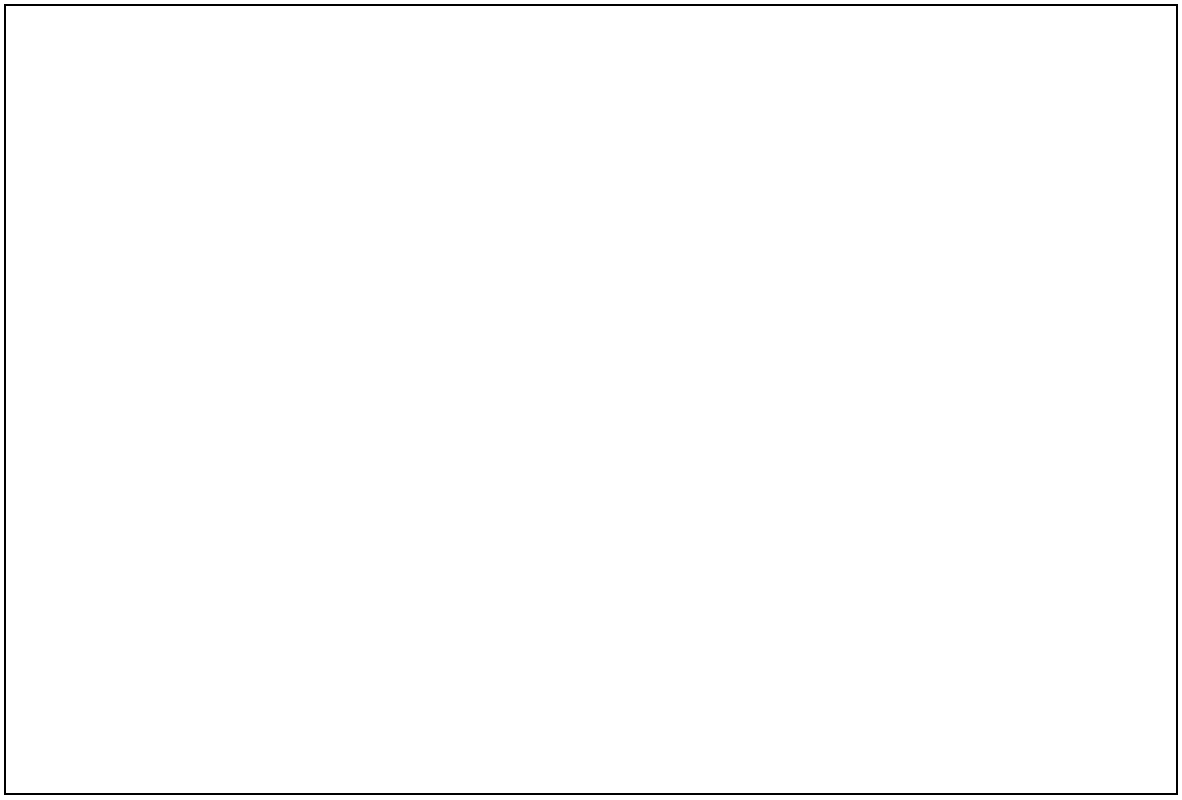


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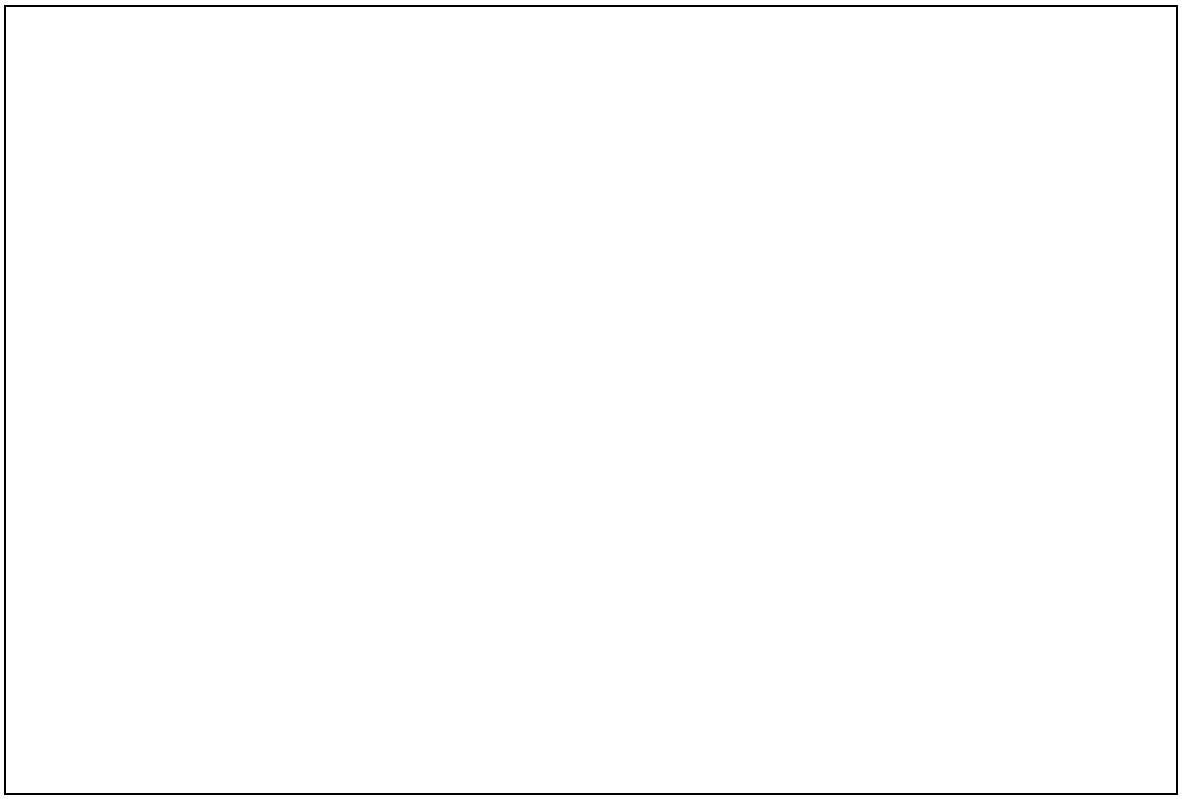


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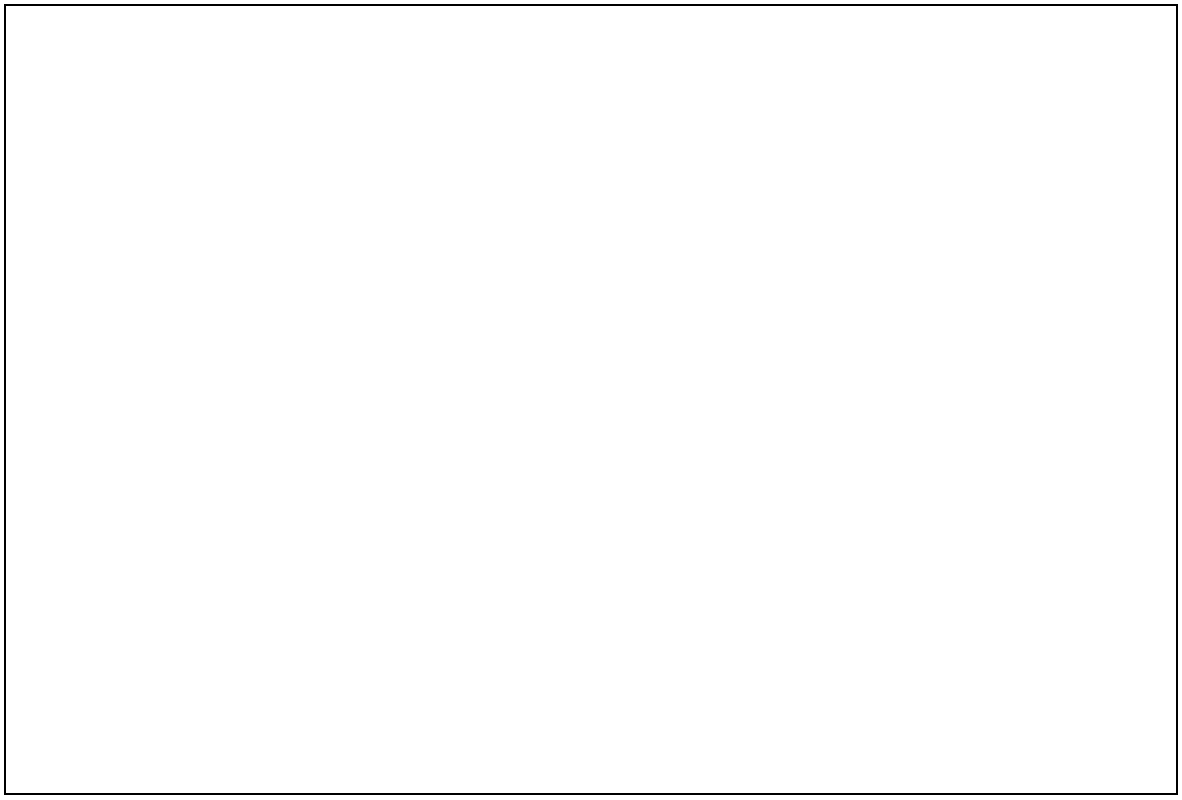


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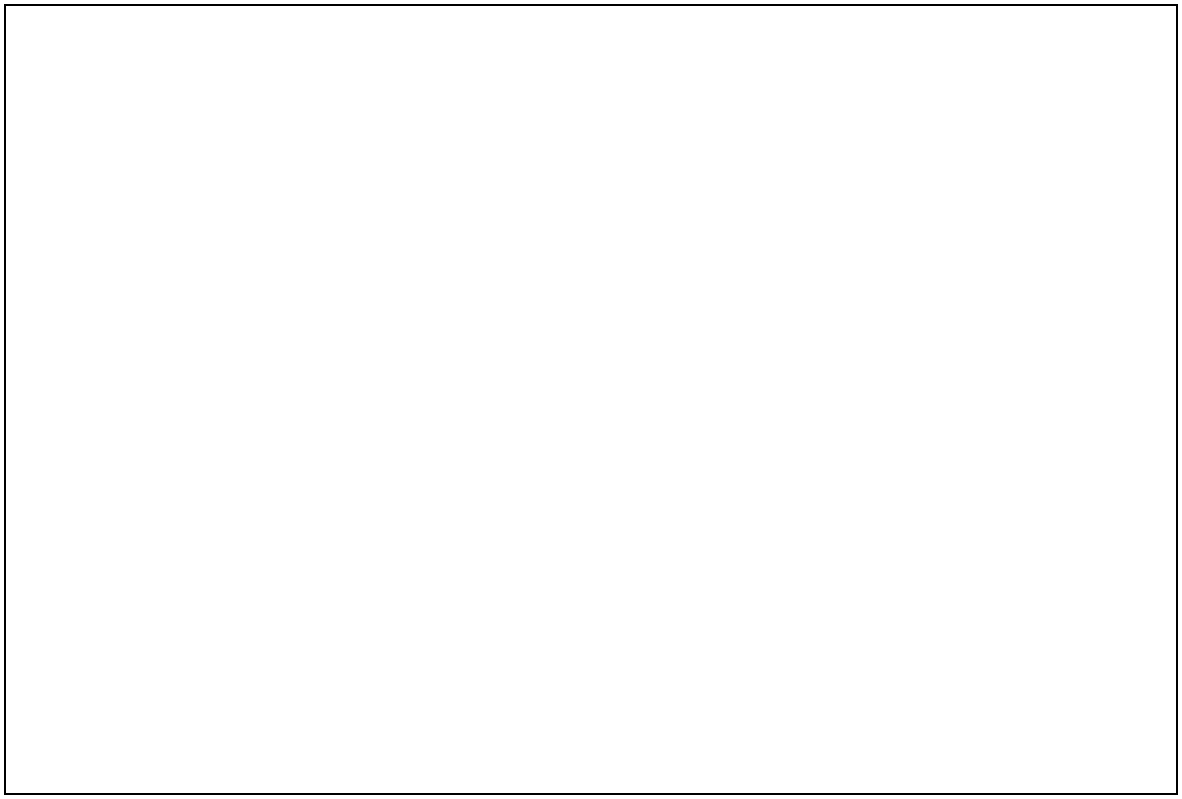


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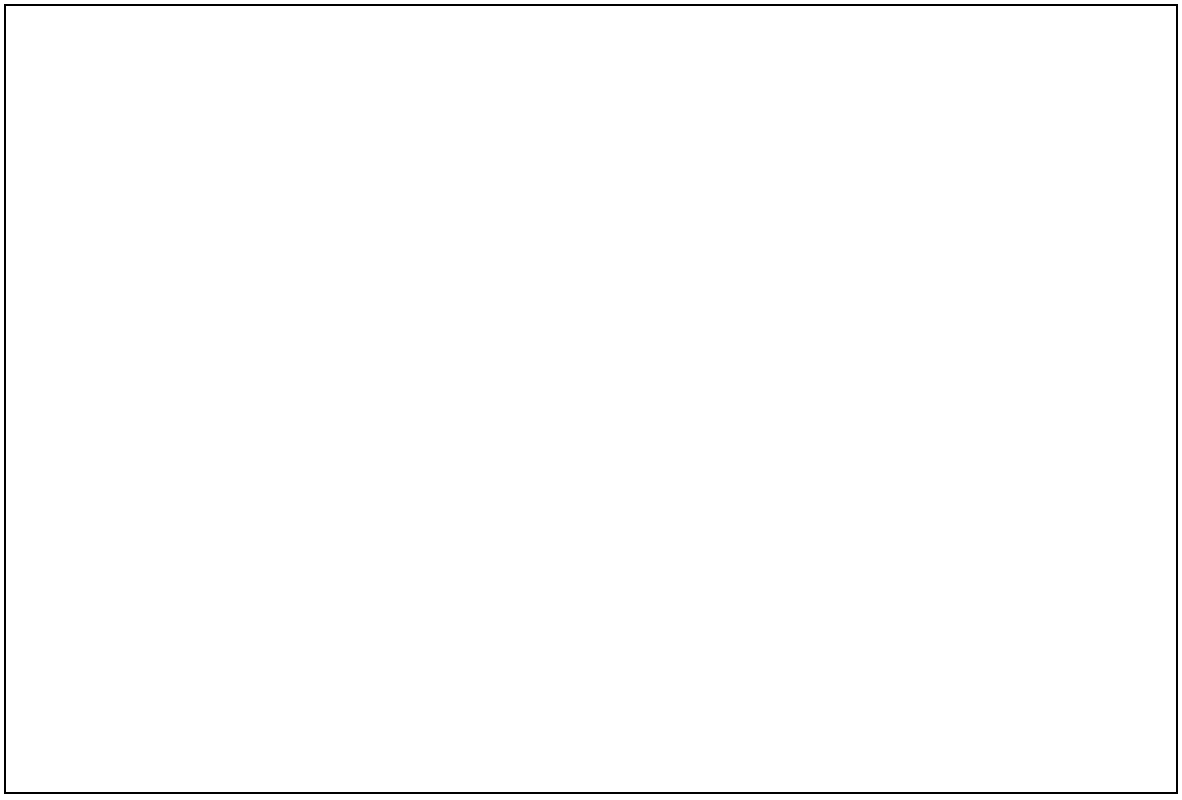


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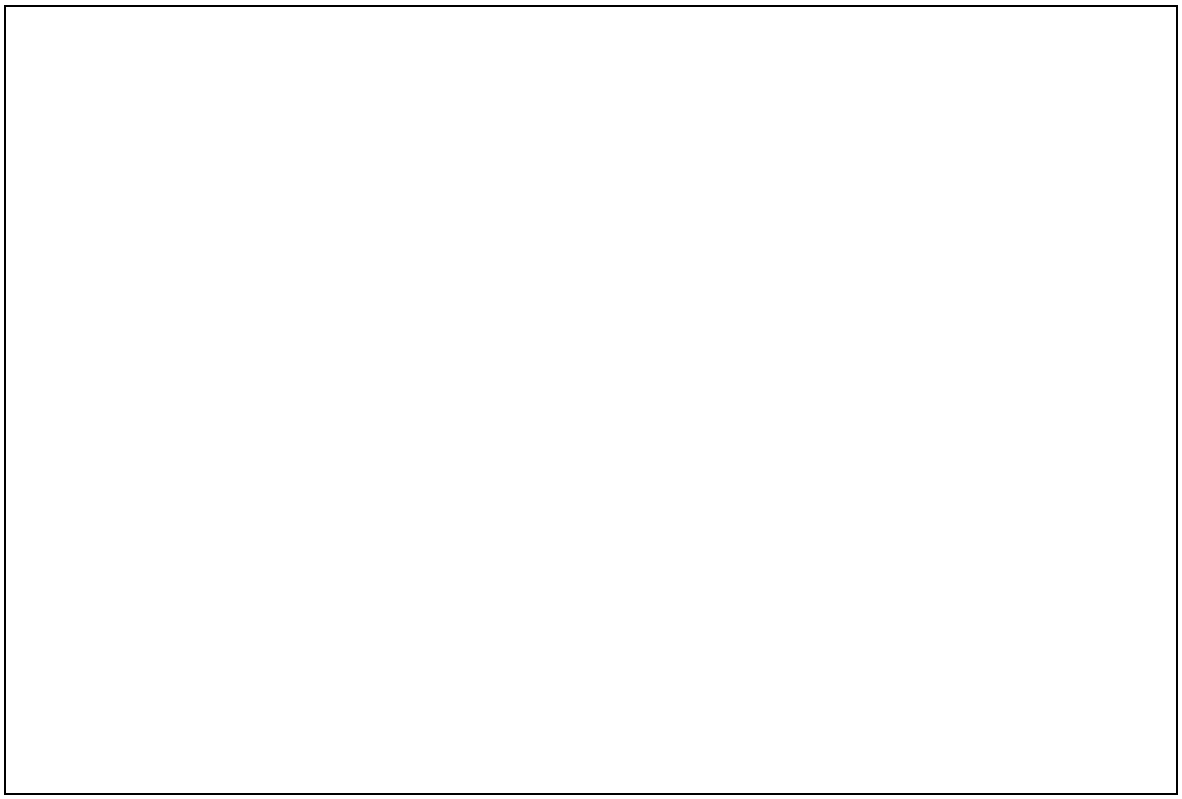


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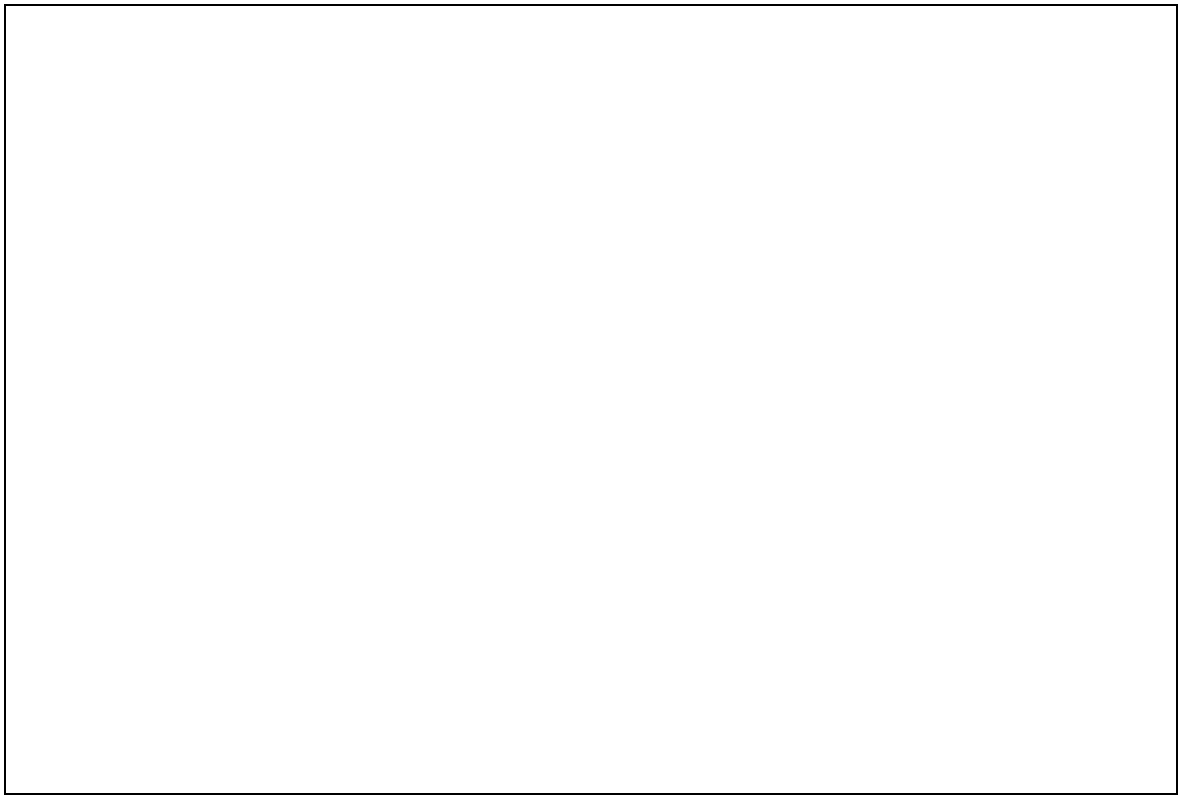


Plate 12 _____

Jacobs

ONSITE CHECKLIST FOR PIPELINE WATERCOURSE CROSSINGS

2100, Metrotower II 4720
Kingsway
Burnaby, BC V5H 4N2
Canada
T +1.604.684.3282
www.jacobs.com

The FortisBC Environmental Inspector or appointed designate will complete this onsite checklist prior to and during crossing construction. Mitigation and restoration activities will follow the Construction Environmental Management Plan (CEMP) and Details, site-specific measures or plans specified in the watercourse crossing table, and implementation and monitoring protocols in the Fish Mitigation Management Plan (FMMP). The site records provide baseline conditions at the time of assessment.

Project Name: _____

Project Owner: _____

Pipeline Contractor: _____

FortisBC Representative: _____

Watercourse Name and/or ID: _____

KP reference (if available): _____

UTMs: _____

On-Site Checklist Completed By: _____

Pipeline Crossing Method (*Describe technique and materials used, if applicable*)

☐ Isolated Method: _____

☐ Trenched (if dry): _____

☐ Drill or bore: _____

☐ Aerial: _____

☐ Other: _____

Date Crossing Preparation Started: _____

Date Instream Works Started: _____

Date Instream Works Ended: _____

DATE/TIME OF INSTREAM WORKS AND WEATHER AND FLOW CONDITIONS *(Weather: forecasted temperature and precipitation; Flow Conditions: low, moderate, or high relative to bankfull)*

Date and Time	Weather Information and Flow Conditions

KEY CONSIDERATIONS (*Refer to the CEMP for all mitigation measures*)

Requirement	Applicability			Notes
	Yes	No	N/A	
Permits to conduct work are in place				
Forecast and flow conditions favourable				
Equipment is clean and free of leaks				

Adequate flow bypass pumping capacity					
Backup flow bypass pumps available					
Flow bypass established and flow downstream is maintained					
Fish screens installed and monitored					
Fish salvage conducted by a QP					
Sediment and erosion controls installed, maintained, and monitored					
Water quality monitoring required					
Monitoring of fish migration at isolations					

MITIGATION AND RESTORATION *(Document mitigation and restoration methods used per the CEMP and Details, and any site-specific measures or plans*)

Measure/Plan	Description of Activities

RECOMMENDATIONS/ACTIONS (*List any outstanding issues that need addressing, such as erosion concerns*)

Task	Responsible Party	Date

NOTES/COMMUNICATIONS

PHOTOGRAPHS[1] OF THE CROSSING PRIOR TO RIGHT-OF-WAY CLEARING AND PIPELINE CROSSING INSTALLATION

Photo No.	Comments - Required Photos
	View immediately upstream from the crossing.
	View immediately downstream from the crossing.
	View of left bank (approach to crossing) taken from right bank*.
	View of right bank (approach to crossing) taken from left bank*.

Photo No.	Comments - Additional Photos

* The left bank is on your left hand side when facing downstream. Use a compass to determine the directions of the left and right banks. For watercourses with no discernible flow; indicate direction of photo and GPS photo location so photos can be taken from the same vantage during and following pipeline crossing installation.

PHOTOGRAPHS[1] OF THE CROSSING DURING AND AFTER PIPELINE CROSSING INSTALLATION

Photo No.	Comments - Required Photos
	View immediately upstream from the crossing.
	View immediately downstream from the crossing.
	View of left bank (approach to crossing) taken from right bank*.
	View of right bank (approach to crossing) taken from left bank*.

Photo No.	Comments - Additional Photos

* The left bank is on your left hand side when facing downstream. Use a compass to determine the directions of the left and right banks. For watercourses with no discernible flow; indicate direction of photo and use GPS locations of the pre-construction photos so photos are taken from the same vantage as the pre-construction photos.

1 Retain photos and on-site checklist as part of the Project's record.

PHOTOS

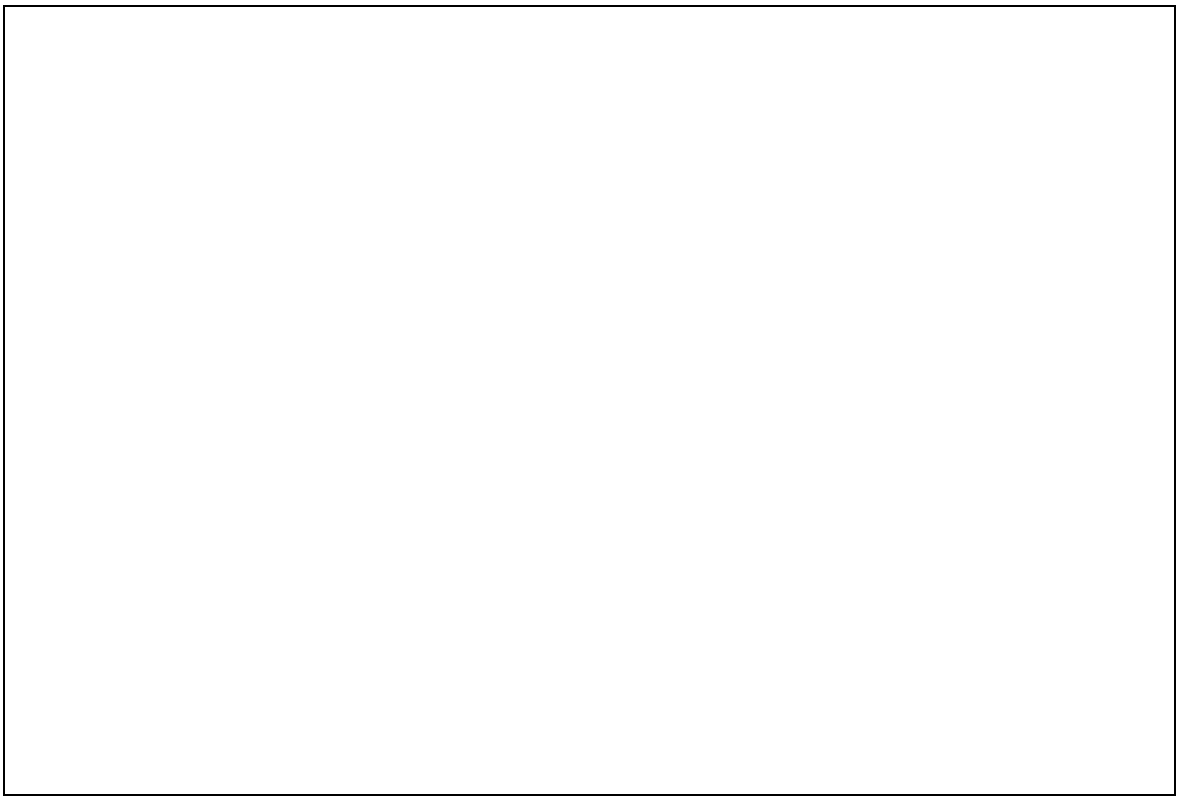


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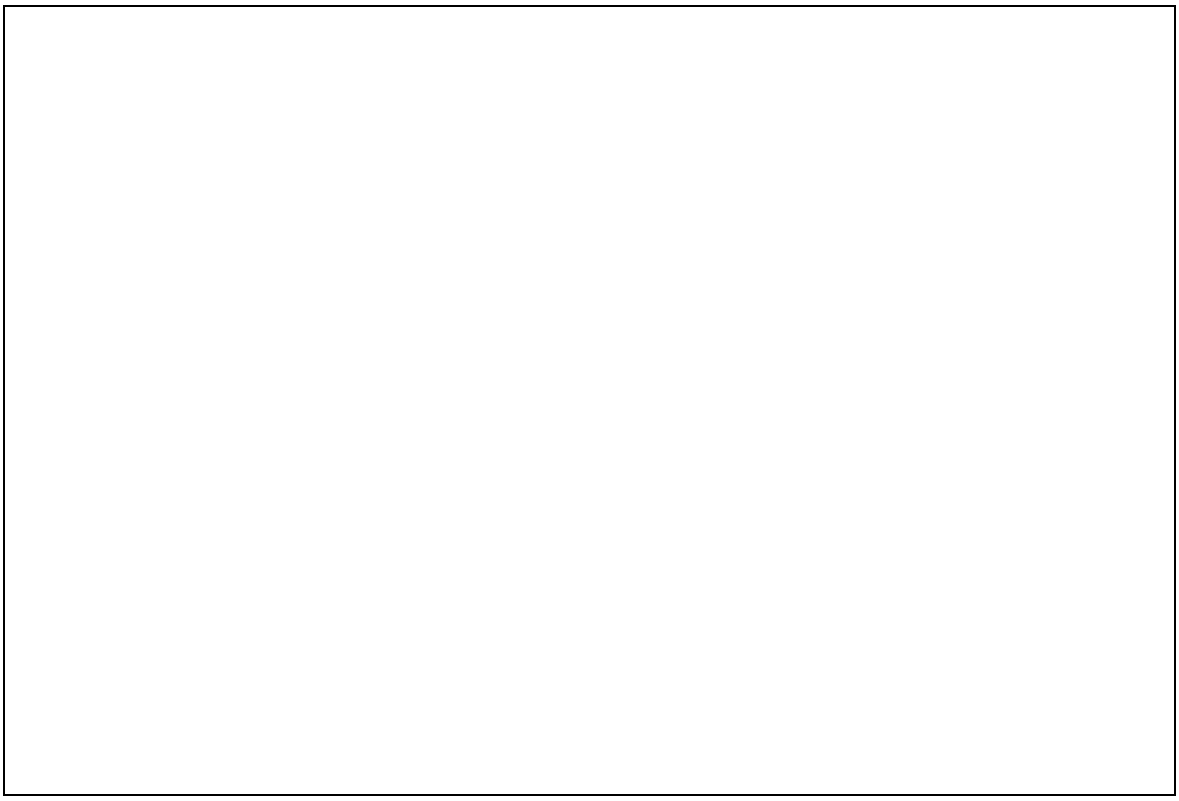


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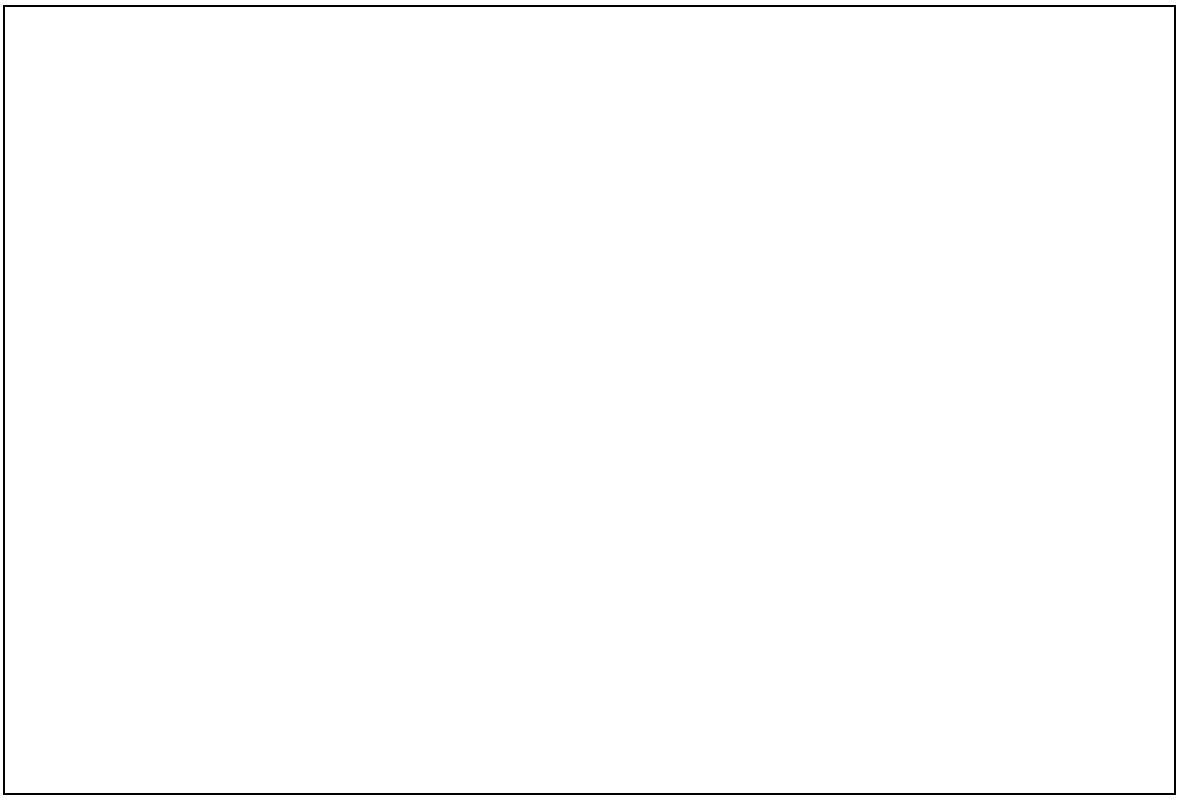


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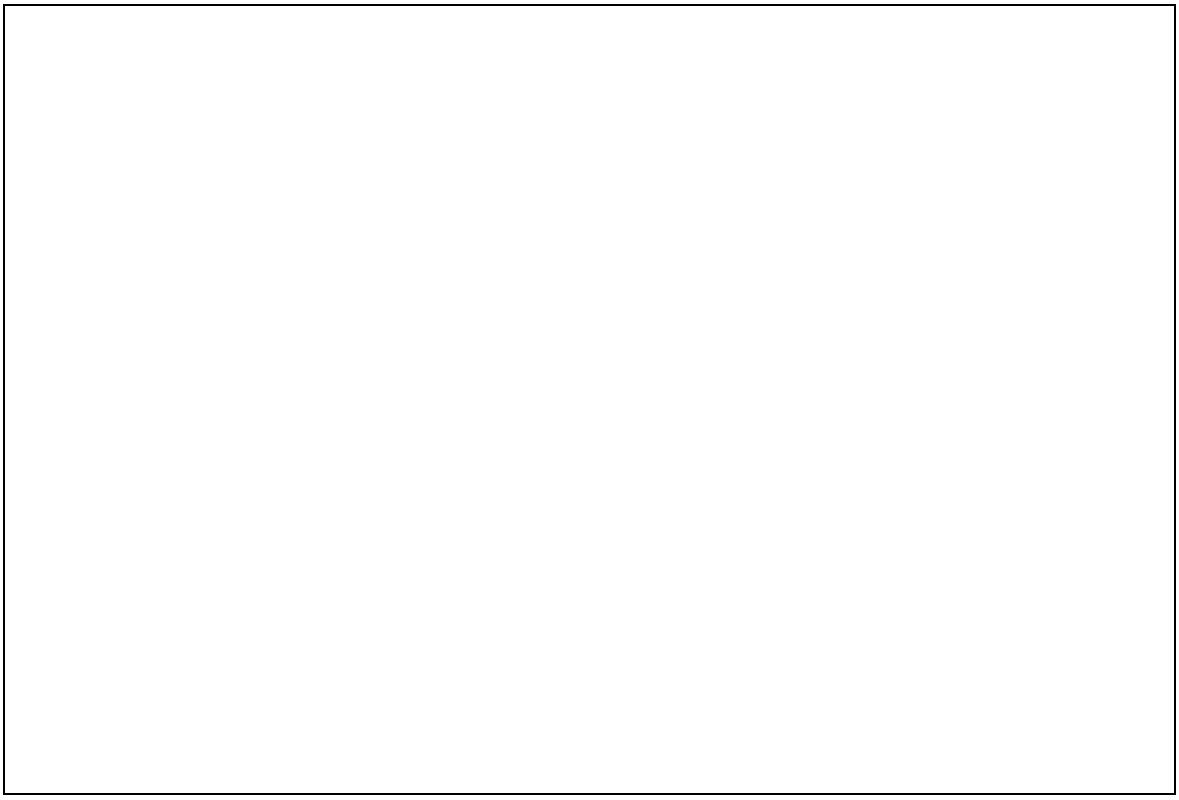


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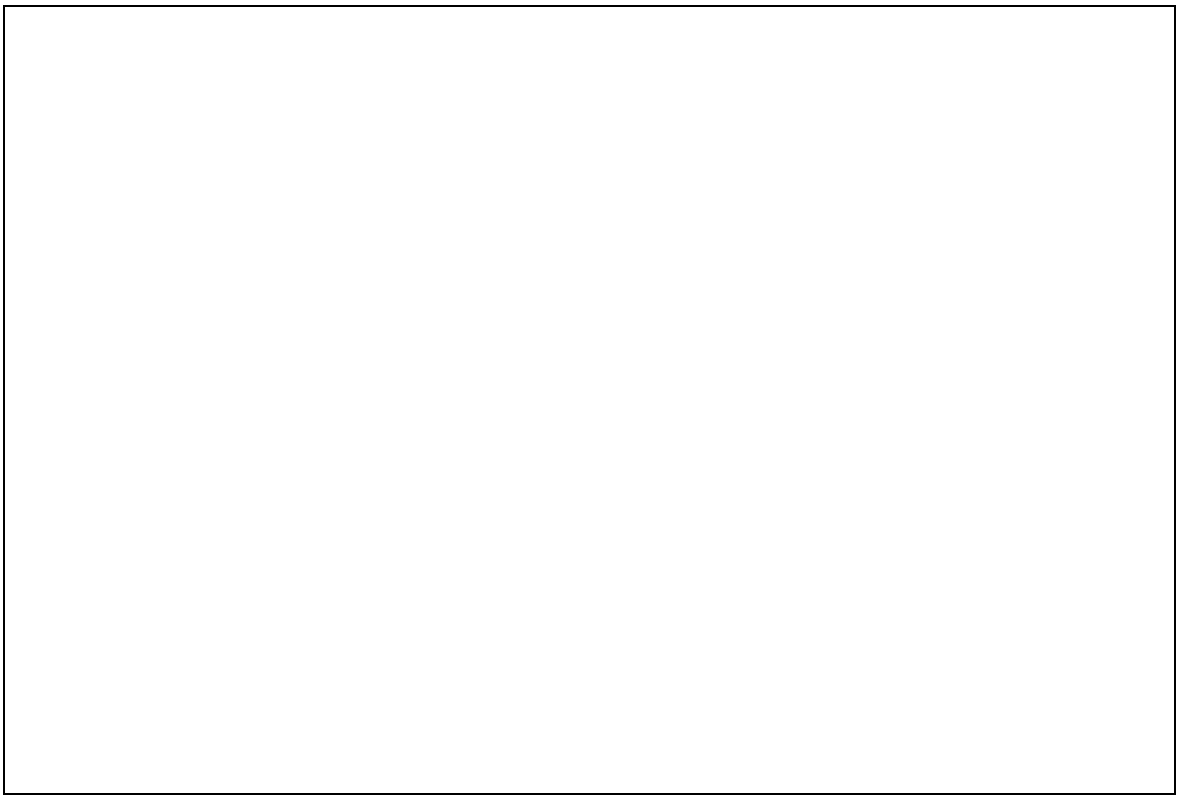


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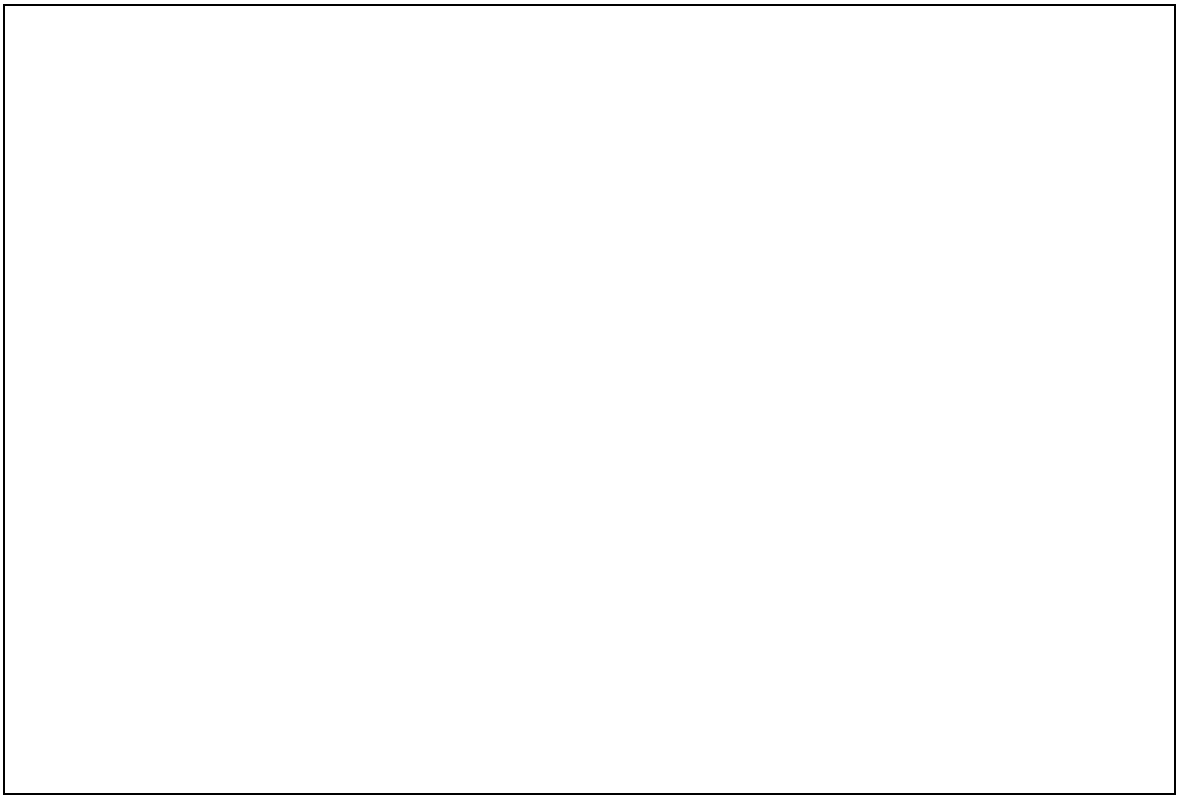


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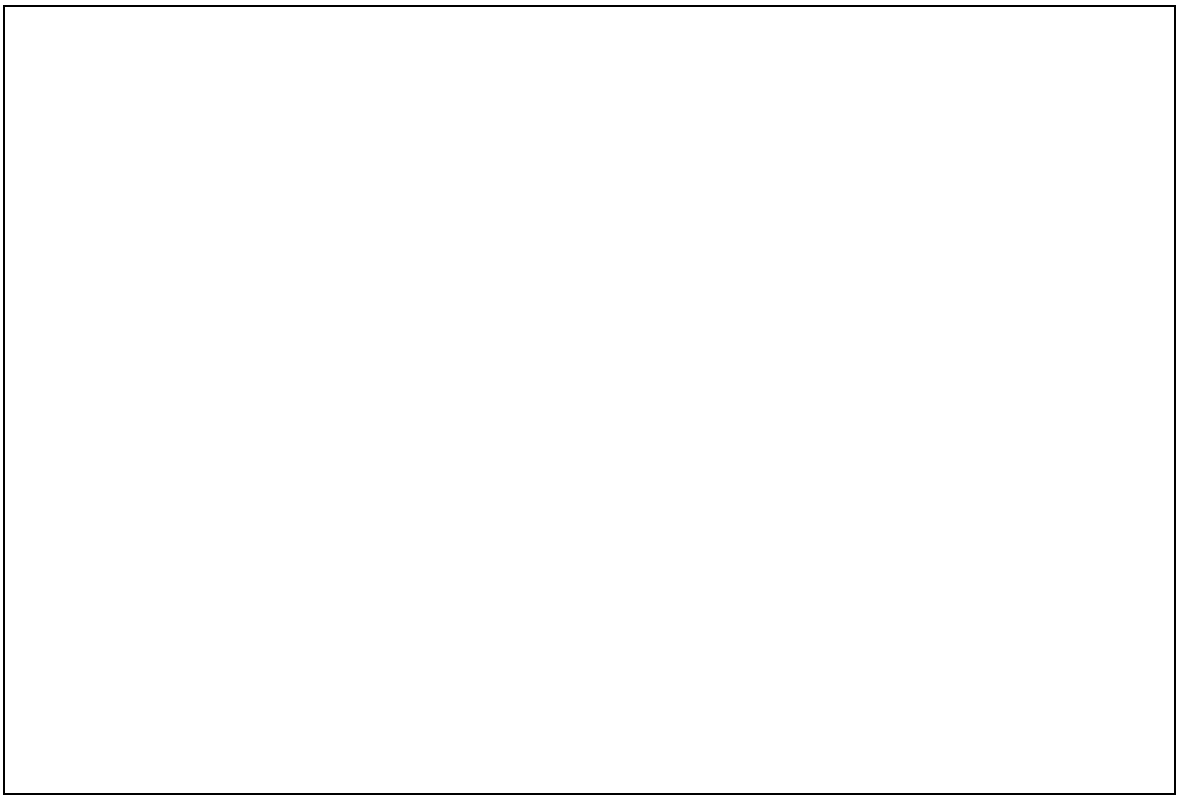


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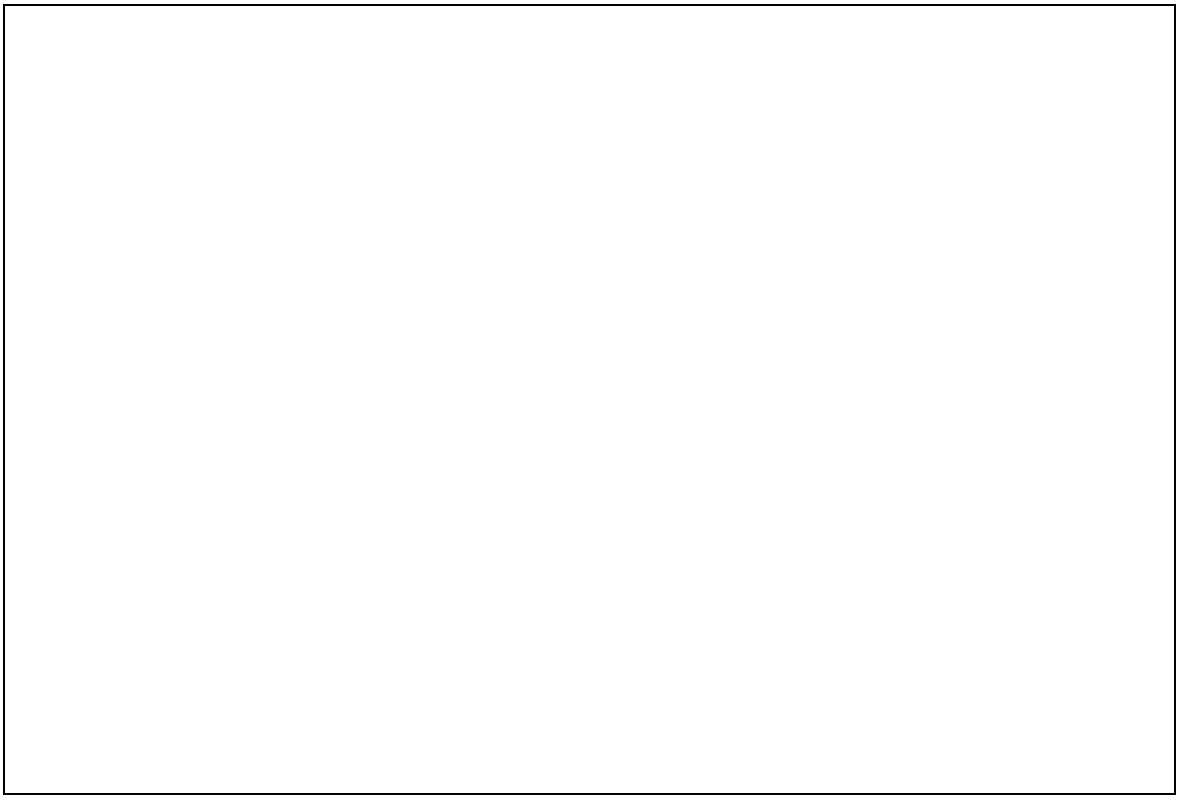


Plate 8 _____

Jacobs

ONSITE CHECKLIST FOR VEHICLE WETLAND CROSSINGS

2100, Metrotower II 4720
Kingsway
Burnaby, BC V5H 4N2
Canada
T +1.604.684.3282
www.jacobs.com

The FortisBC Environmental Inspector (or appointed designate) will complete the onsite checklist prior to crossing construction. The Master Wetland Crossing Table, Environmental Alignment Sheets, site records, and Environmental Management Plans should be used to inform baseline conditions for each crossing, and to direct construction and restoration activities for each site.

Project Name: _____
Project Owner: _____
Pipeline Contractor: _____
FortisBC Representative: _____

Wetland Classification and/or ID: _____
KP reference (if available): _____
UTMs: _____
On-Site Checklist Completed By: _____

Vehicle Crossing Method *(Describe technique and materials used, if applicable)*:

☐ Shoofly: _____
☐ Ramp and culvert: _____
☐ Ford with mats: _____
☐ Snow/ice fill: _____
☐ Other: _____

Date Vehicle Crossing Installed: _____
Date Vehicle Crossing Removed: _____

DATE/TIME OF WETLAND WORKS AND WEATHER AND WATER CONDITIONS - *Note higher or lower water levels than anticipated (e.g., flooding beyond wetland boundaries due to recent precipitation events, or wetland dried out due to hot/dry weather events)*

Date and Time	Weather Information and Water Level (e.g., as anticipated/flooded/dry)

KEY CONSIDERATIONS CHECKLIST (*Refer to the CEMP for all mitigation measure requirements*)

Requirement	Applicability			Notes
	Yes	No	N/A	
Permits to conduct work are in place				
Equipment is clean and free of leaks				
Sediment and erosion controls installed, maintained, and monitored				
Appropriate matting has been installed at crossing to prevent ground disturbance (e.g., rutting/compaction)				
Matting and other equipment removed following construction				

MITIGATION AND RESTORATION *(Document mitigation and restoration methods used per the CEMP and Details, and any site-specific methods as included in the EAS/Master Wetland Crossing Table. Reference the WMP for implementation plans and links to other plans.)*

Measure/Plan	Description of Activities

RECOMMENDATIONS/ACTIONS (*List any outstanding issues that need addressing, such as erosion concerns*)

Task	Responsible Party	Date

NOTES/COMMUNICATIONS

PHOTOGRAPHS[1] OF THE CROSSING PRIOR TO RIGHT-OF-WAY CLEARING AND VEHICLE CROSSING INSTALLATION

Photo No.	Comments - Required Photos
	Overview across wetland from boundary on ROW prior to crossing
	Overview across wetland from alternate boundary on ROW prior to crossing
	View of any potential issues within wetland prior to crossing (e.g., impounded water on workspace)
	Overview of any environmental features of note within wetland (e.g., wildlife, weeds)

Photo No.	Comments - Additional Photos
	Alternate views showing wetland prior to construction
	If wetland associated with a watercourse, capture photo of watercourse prior to crossing

* Provide direction of photos and coordinates for location, with descriptor of what photo is showing

PHOTOGRAPHS[1] OF THE CROSSING DURING AND AFTER VEHICLE CROSSING INSTALLATION

Photo No.	Comments - Required Photos
	Overview across wetland from boundary on ROW during crossing
	Overview across wetland from alternate boundary on ROW during crossing
	Overview across wetland from boundary on ROW after crossing
	Overview across wetland from alternate boundary on ROW after crossing

Photo No.	Comments - Additional Photos
	View of any issues that occurs with crossing (e.g., impounded water not previously in wetland or sedimentation issues)
	View of mitigation measures being implemented (e.g., sediment fencing)
	Alternate view of central area of disturbance in wetland at crossing
	View of wettest portion of wetland during construction

* Provide direction of photos and coordinates for location, with descriptor of what photo is showing

PHOTOGRAPHS[1] OF THE CROSSING DURING AND AFTER VEHICLE CROSSING REMOVAL

Photo No.	Comments - Required Photos
	Overview across wetland from boundary on ROW during removal
	Overview across wetland from alternate boundary on ROW during removal
	Overview across wetland from boundary on ROW after removal
	Overview across wetland from alternate boundary on ROW after removal

Photo No.	Comments - Additional Photos
	View of any issues that occurs with crossing (e.g., impounded water not previously in wetland or sedimentation issues)
	View of mitigation measures being implemented (e.g., sediment fencing)
	Alternate view of central area of disturbance in wetland at crossing
	View of wettest portion of wetland during construction

* Provide direction of photos and coordinates for location, with descriptor of what photo is showing

1 Retain photos and on-site checklist as part of the Project record.

PHOTOS

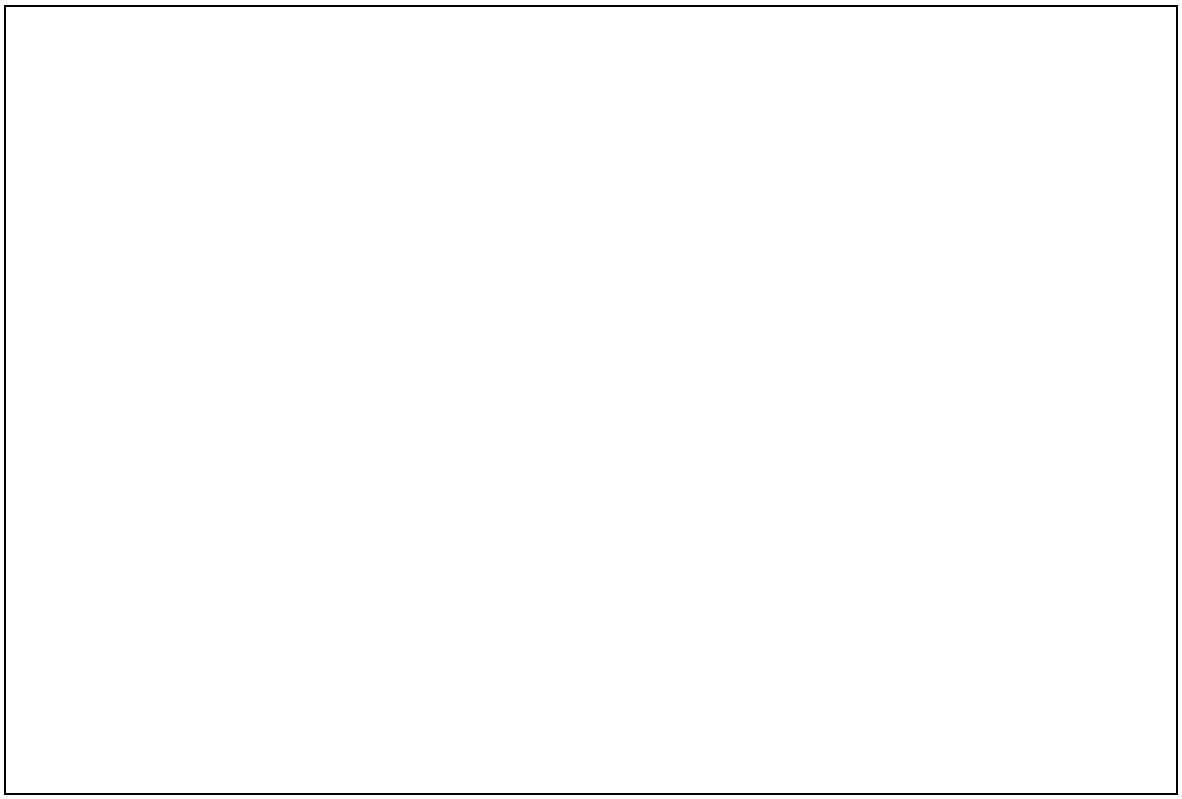


Plate 1 _____

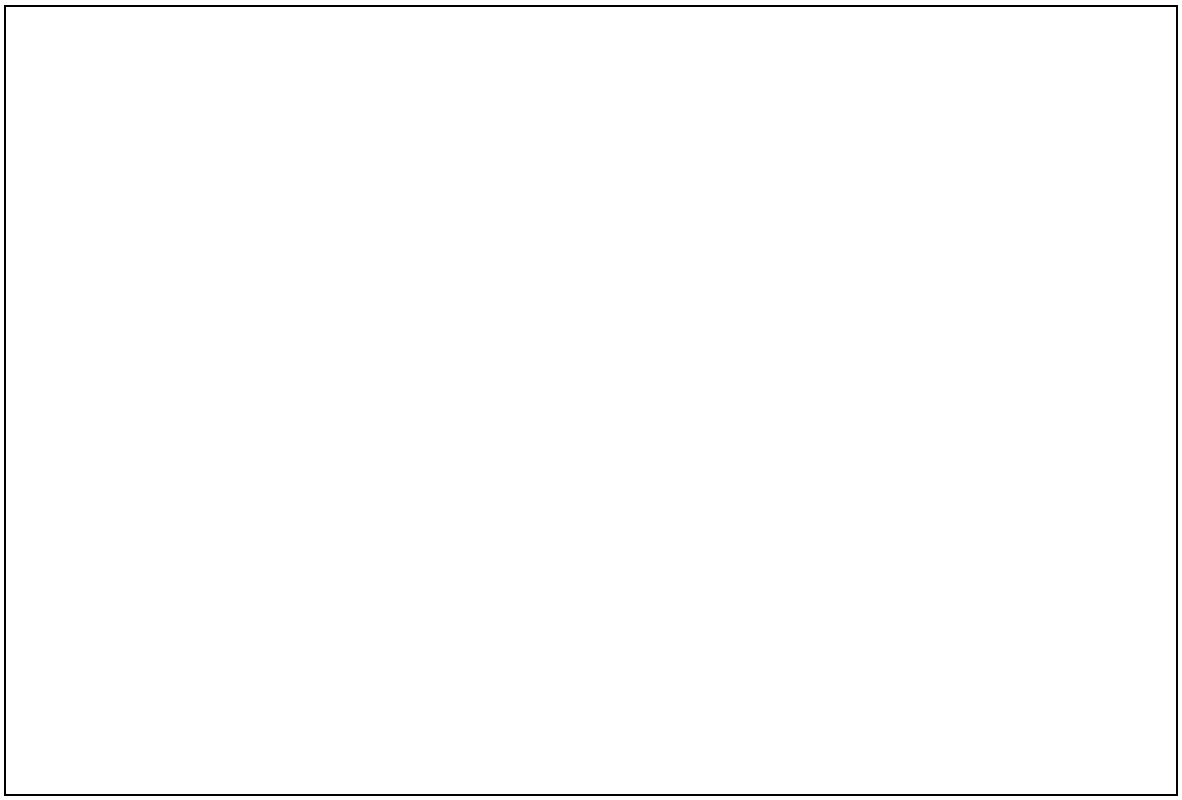


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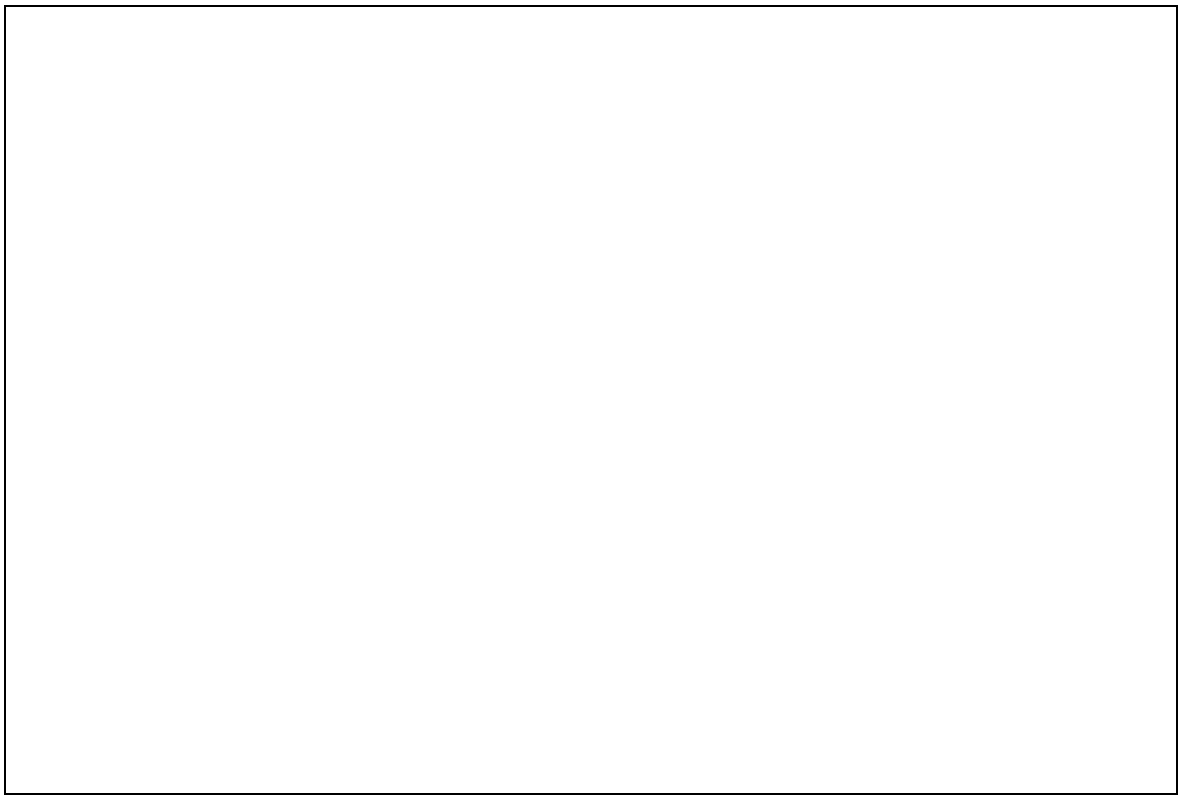


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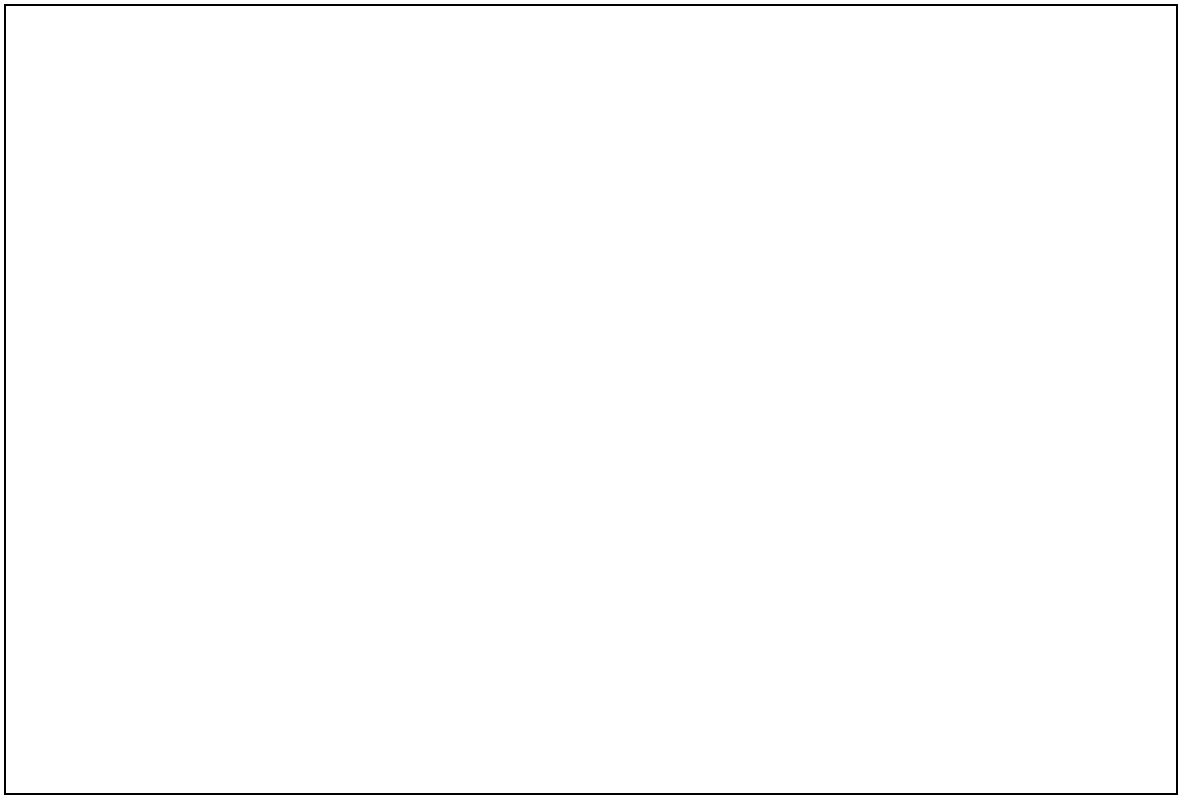


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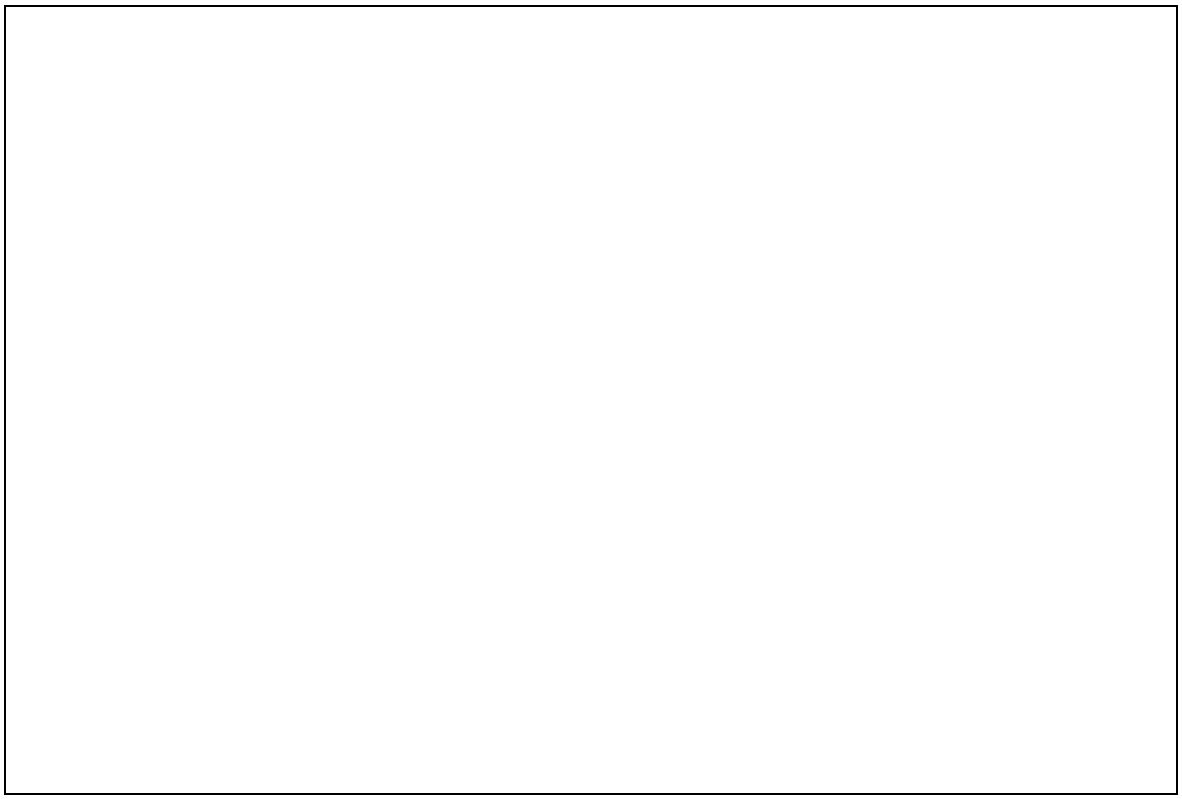


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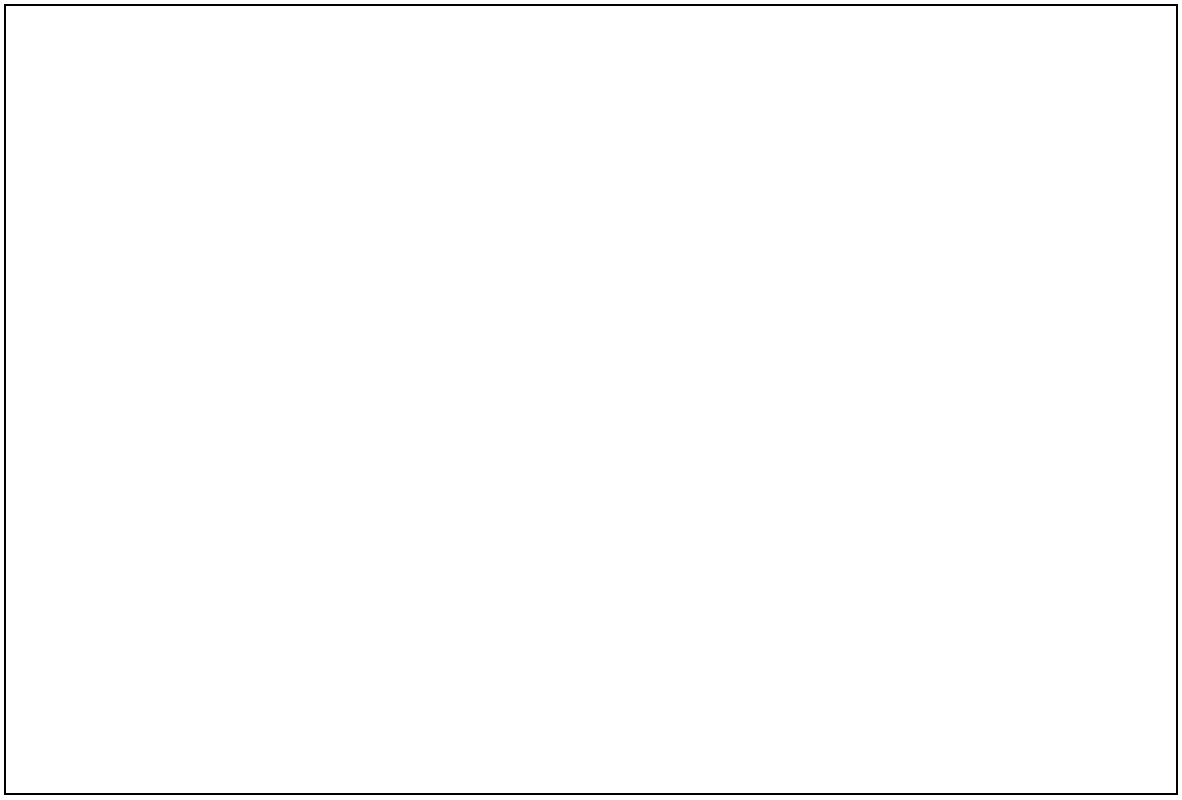


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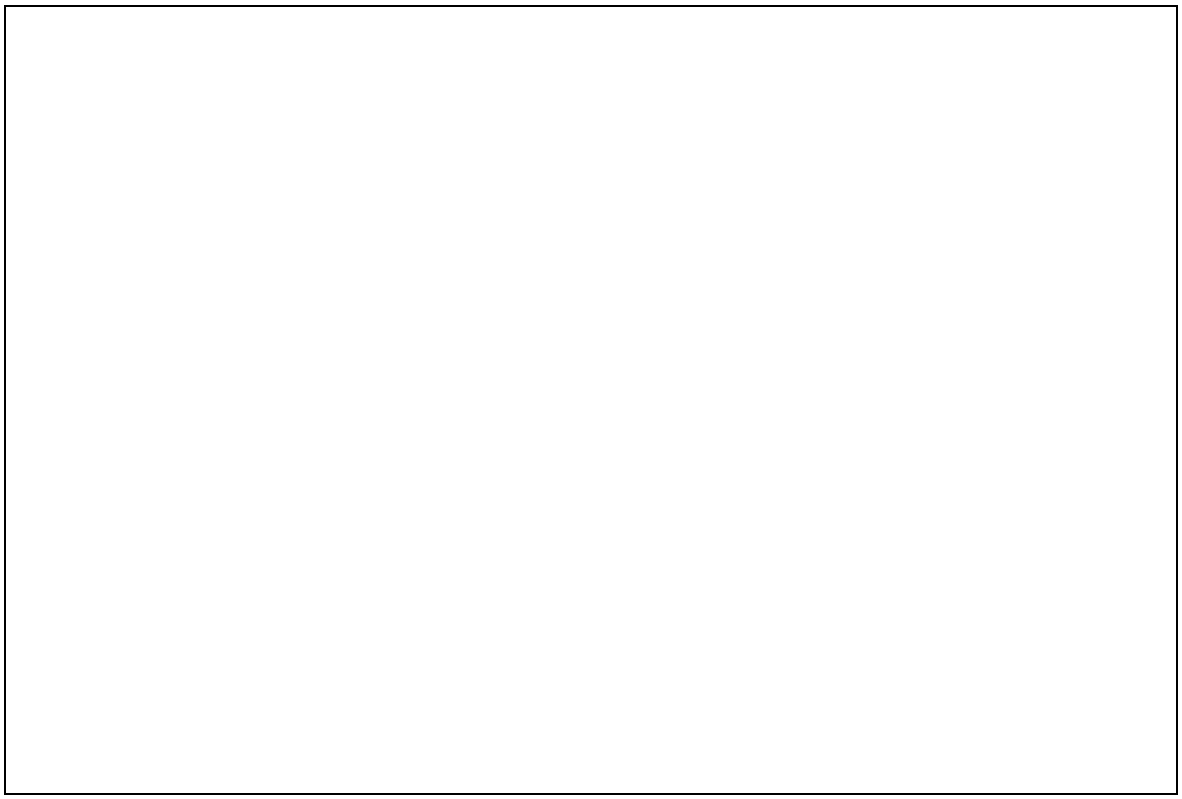


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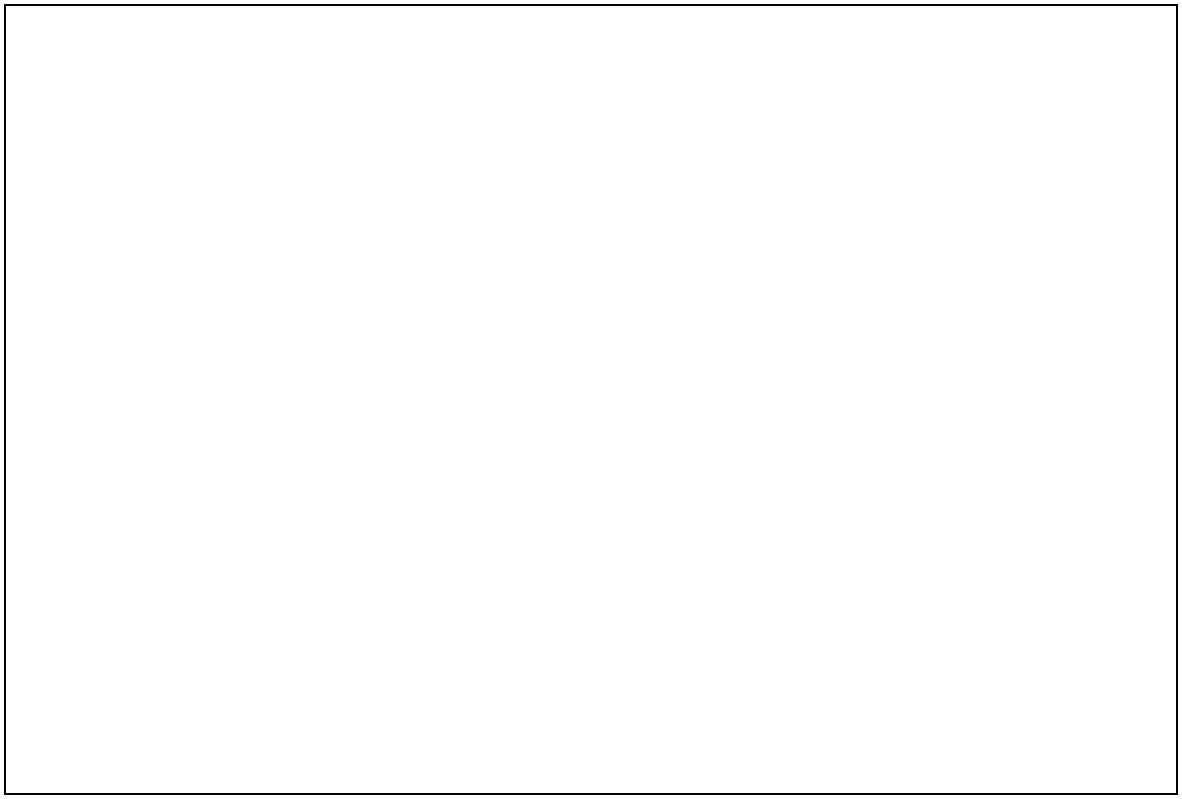


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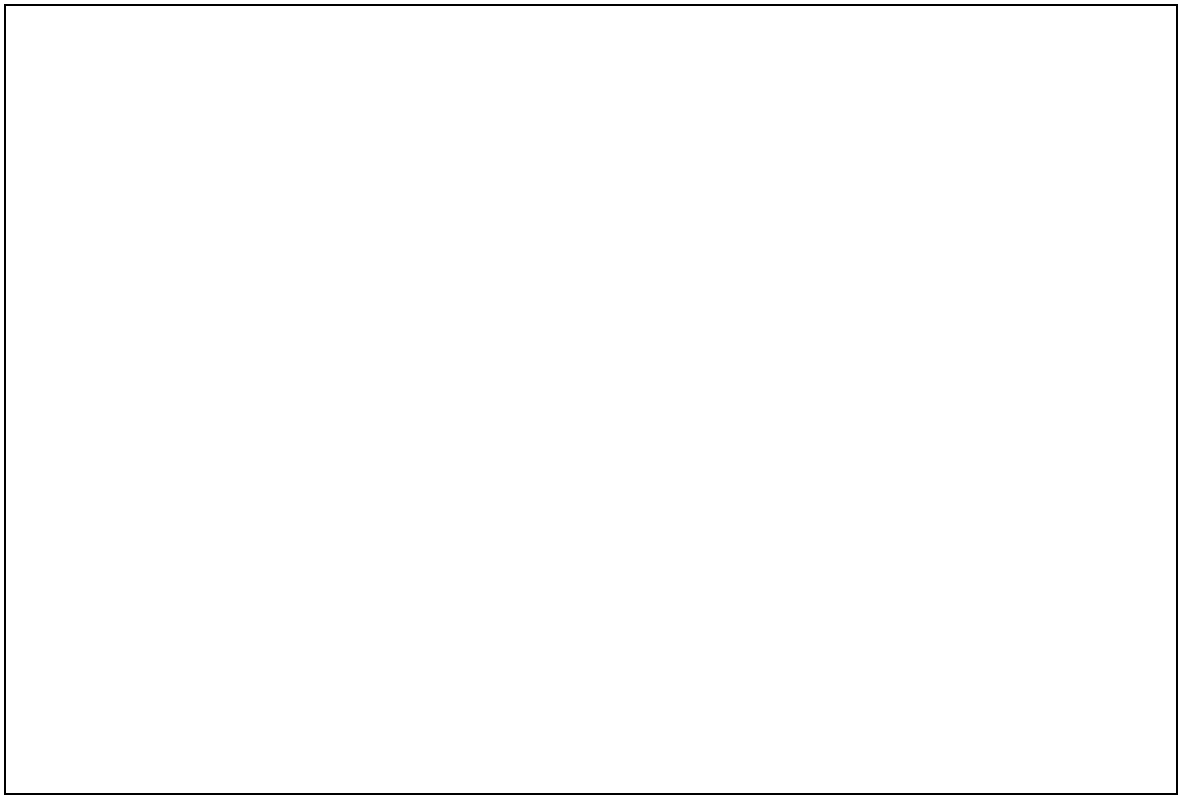


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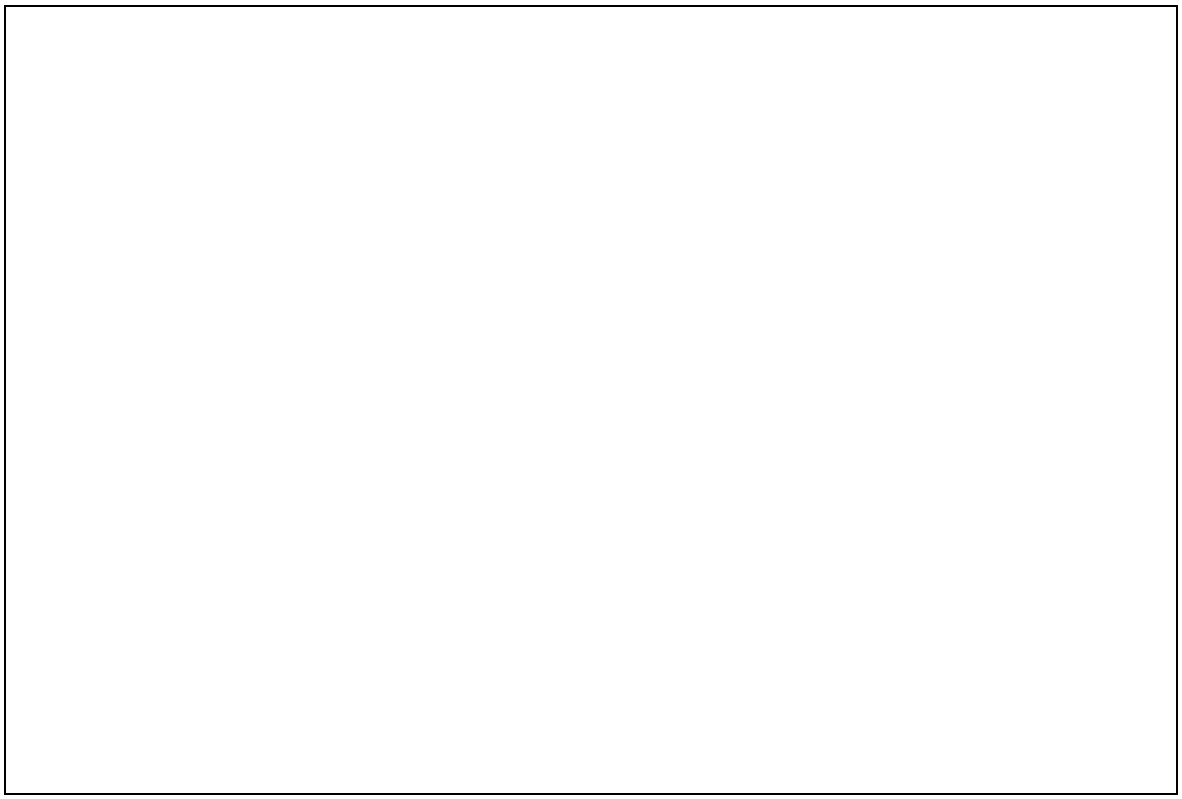


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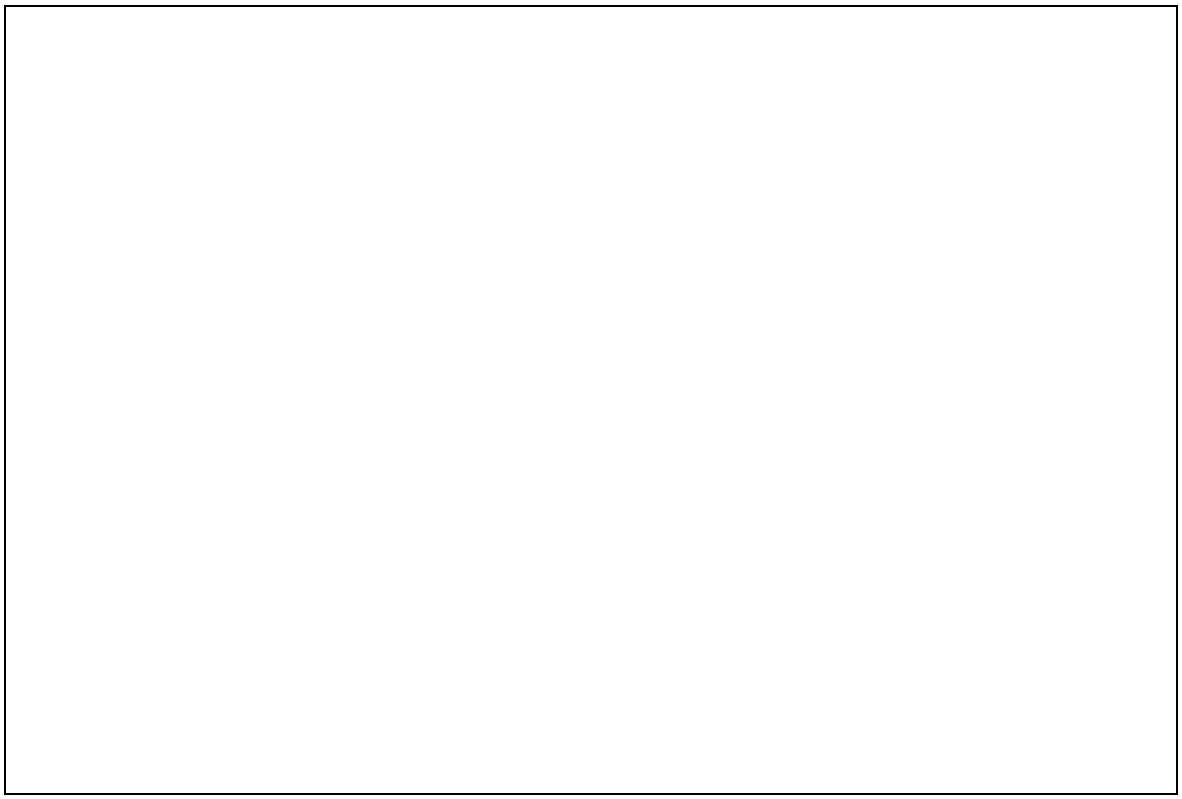


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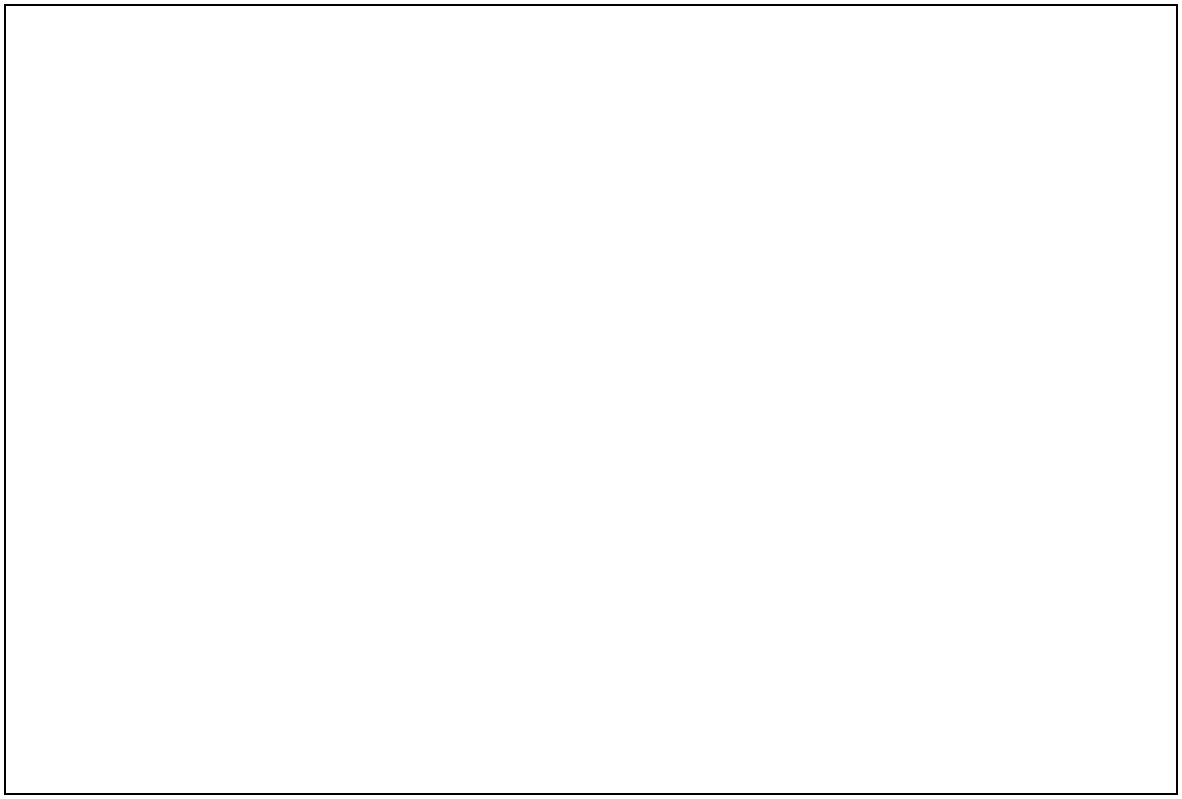


Plate 12 _____

2100, Metrotower II 4720
Kingsway
Burnaby, BC V5H 4N2
Canada
T +1.604.684.3282
www.jacobs.com

ONSITE CHECKLIST FOR PIPELINE WETLAND CROSSINGS

The FortisBC Environmental Inspector (or appointed designate) will complete the onsite checklist prior to crossing construction. The Master Wetland Crossing Table, Environmental Alignment Sheets, site records, and Environmental Management Plans should be used to inform baseline conditions for each crossing, and to direct construction and restoration activities for each site.

Project Name: _____
Project Owner: _____
Pipeline Contractor: _____
FortisBC Representative: _____

Wetland Classification and/or ID: _____
KP reference (if available): _____
UTMs: _____
On-Site Checklist Completed By: _____

Pipeline Crossing Method Used *(describe technique and materials used, if applicable)*:

☐ Trenched crossing: _____

☐ Isolation: _____

☐ Trenchless: _____

☐ Other: _____

Date Crossing Preparation Started: _____
Date Instream Works Started: _____
Date Instream Works Ended: _____

DATE/TIME OF WETLAND WORKS AND WEATHER AND WATER CONDITIONS - *Note higher or lower water levels than anticipated (e.g., flooding beyond wetland boundaries due to recent precipitation events, or wetland dried out due to hot/dry weather events)*

Date (yy/mm/dd) and Time	Weather Information	Water Level

KEY CONSIDERATIONS (*Refer to the CEMP for all mitigation measures*)

Requirement	Applicability			Reasoning
	Yes	No	N/A	
Permits to conduct work are in place				
Equipment is clean and free of leaks				
Sediment and erosion controls installed, maintained, and monitored				
Consider weather conditions (e.g., in excessive rain or flood conditions consider postponing crossing)				
Options to narrow down within wetland have been considered				
Substrate is appropriately separated and stored				
Cross right-of-way hydrology is maintained				
Wetland is recontoured following construction				
Trench water management				

MITIGATION AND RESTORATION *(Document mitigation and restoration methods used per the CEMP and Details, and any site-specific methods as included in the EAS/Master Wetland Crossing Table. Reference the WMP for implementation plans and links to other plans.)*

Measure/Plan	Description of Activities

RECOMMENDATIONS/ACTIONS (*List any outstanding issues that need addressing, such as erosion concerns*)

NOTES/COMMUNICATIONS

PHOTOGRAPHS[1] OF THE CROSSING PRIOR TO RIGHT-OF-WAY CLEARING AND PIPELINE CROSSING INSTALLATION

Photo No.	Comments - Required Photos
	Overview across wetland from boundary on ROW prior to crossing
	Overview across wetland from alternate boundary on ROW prior to crossing
	View of any potential issues within wetland prior to crossing (e.g., impounded water)
	Overview of any environmental features of note within wetland (e.g., wildlife, weeds)

Photo No.	Comments - Additional Photos
	Alternate views showing wetland prior to construction
	If wetland associated with a watercourse, capture photo of watercourse prior to crossing

* Provide direction of photos and coordinates for location, with descriptor of what photo is showing

PHOTOGRAPHS[1] OF THE CROSSING DURING AND AFTER PIPELINE CROSSING INSTALLATION

Photo No.	Comments - Required Photos
	Overview across wetland from boundary on ROW during crossing
	Overview across wetland from alternate boundary on ROW during crossing
	Overview across wetland from boundary on ROW after crossing
	Overview across wetland from alternate boundary on ROW after crossing

Photo No.	Comments - Additional Photos
	View of any issues that occurs with crossing (e.g., impounded water not previously in wetland or sedimentation issues)
	View of mitigation measures being implemented (e.g., sediment fencing)
	Alternate view of central area of disturbance in wetland at crossing
	View of wettest portion of wetland during construction

* Provide direction of photos and coordinates for location, with descriptor of what photo is showing

1 Retain photos and on-site checklist as part of the Project records.

PHOTOS

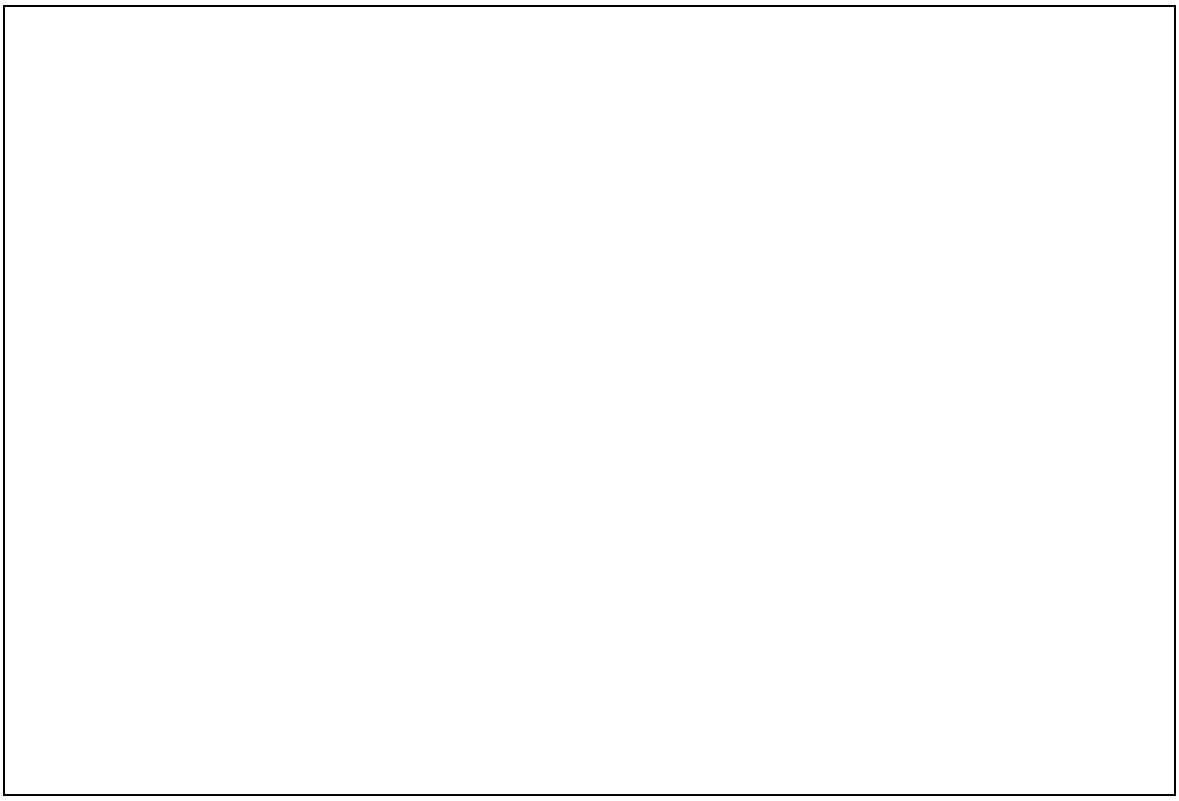


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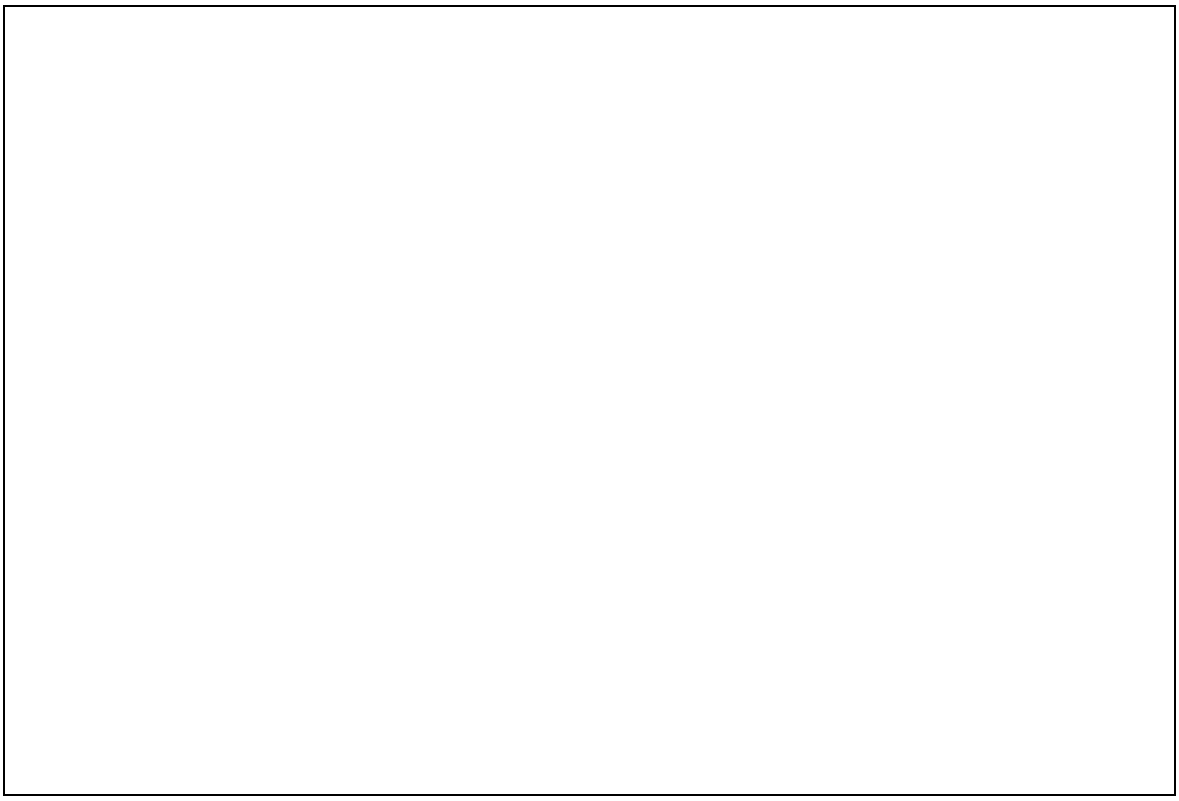


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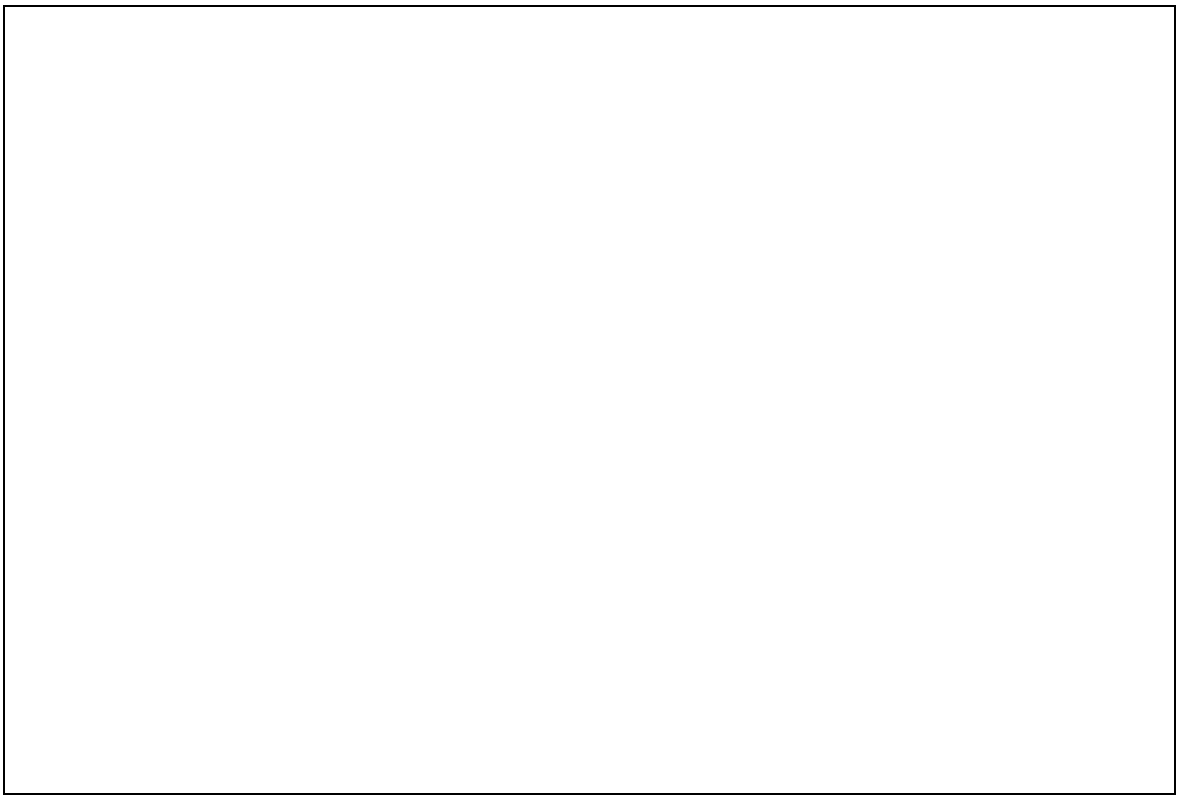


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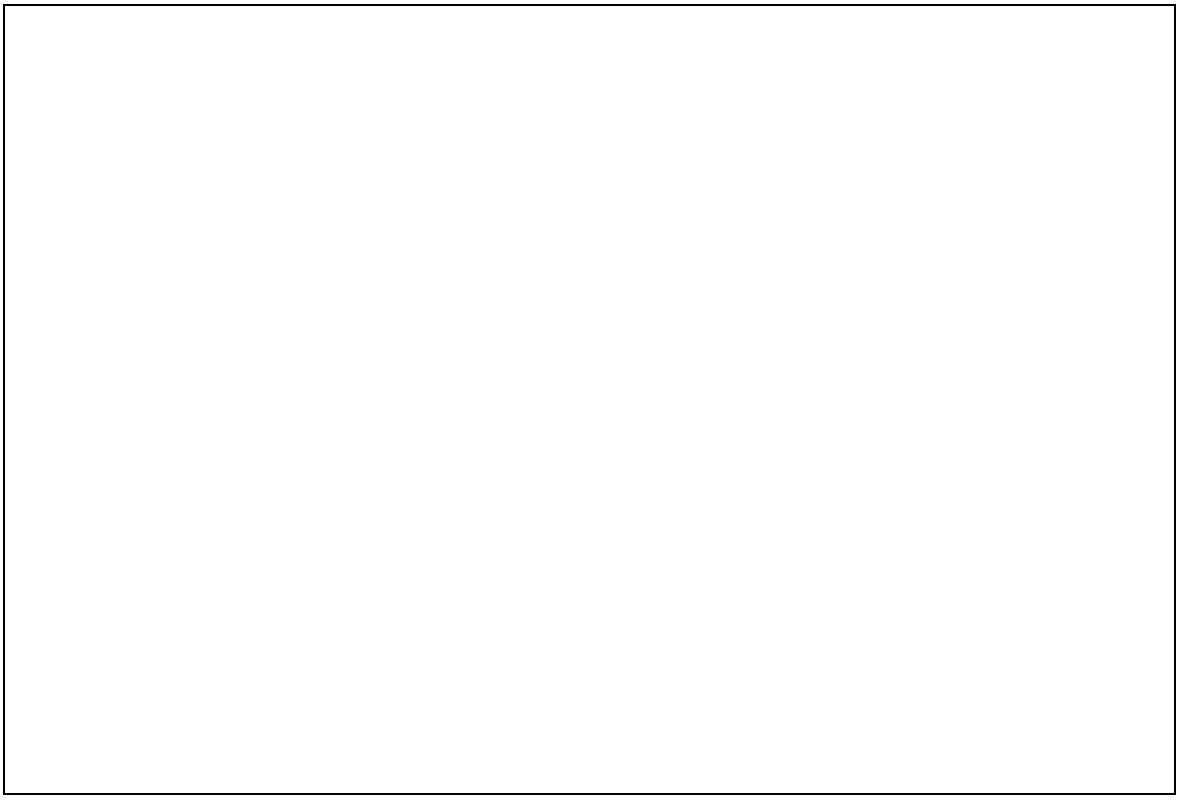


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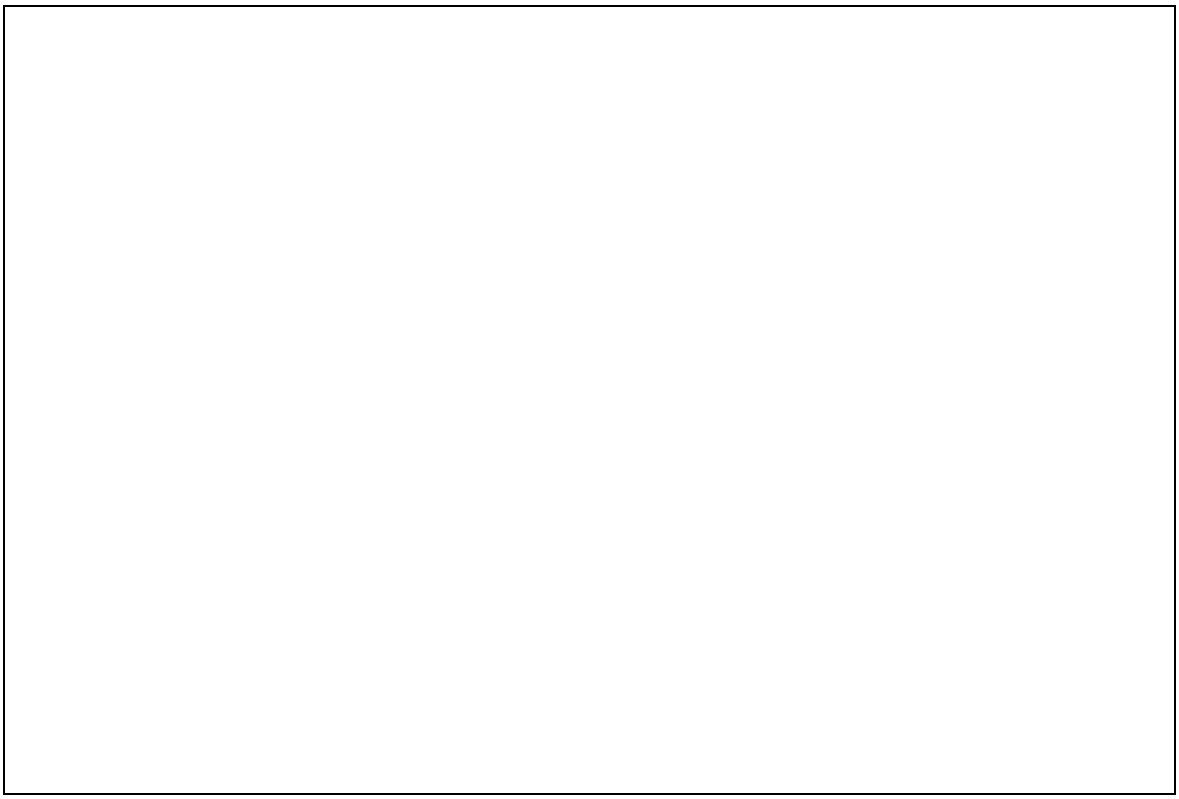


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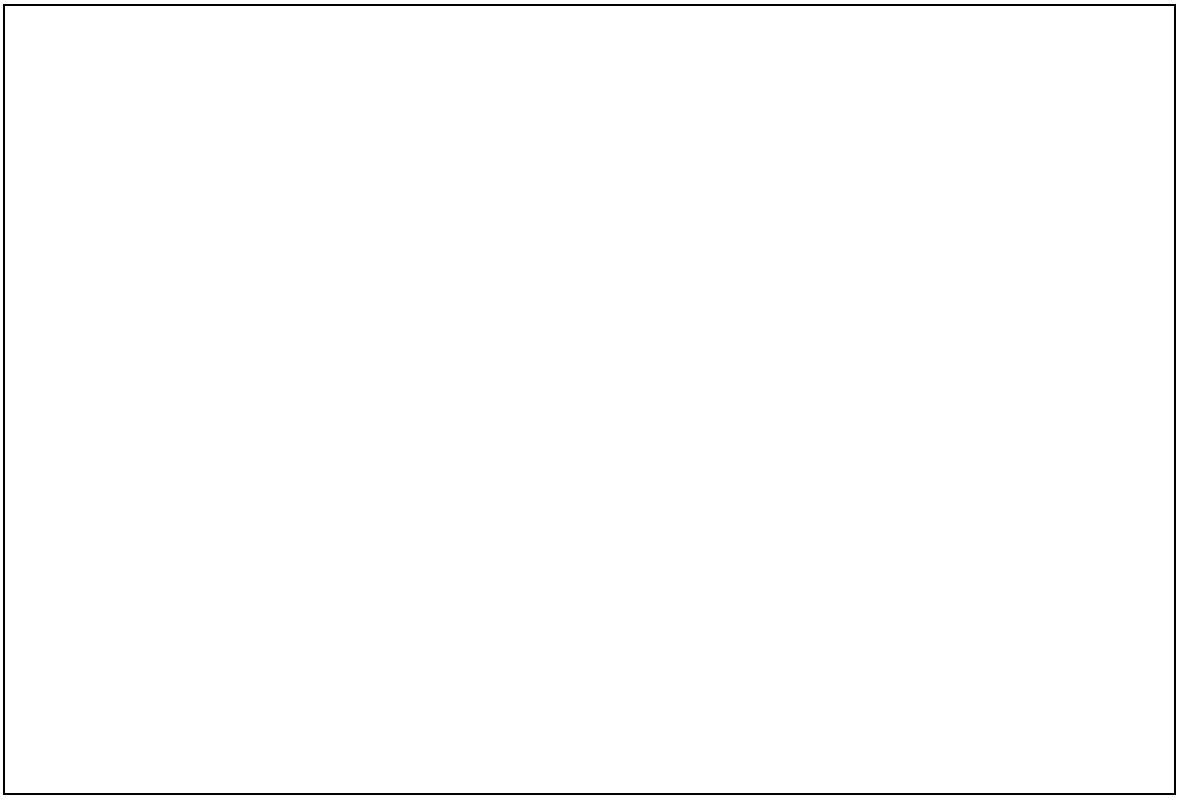


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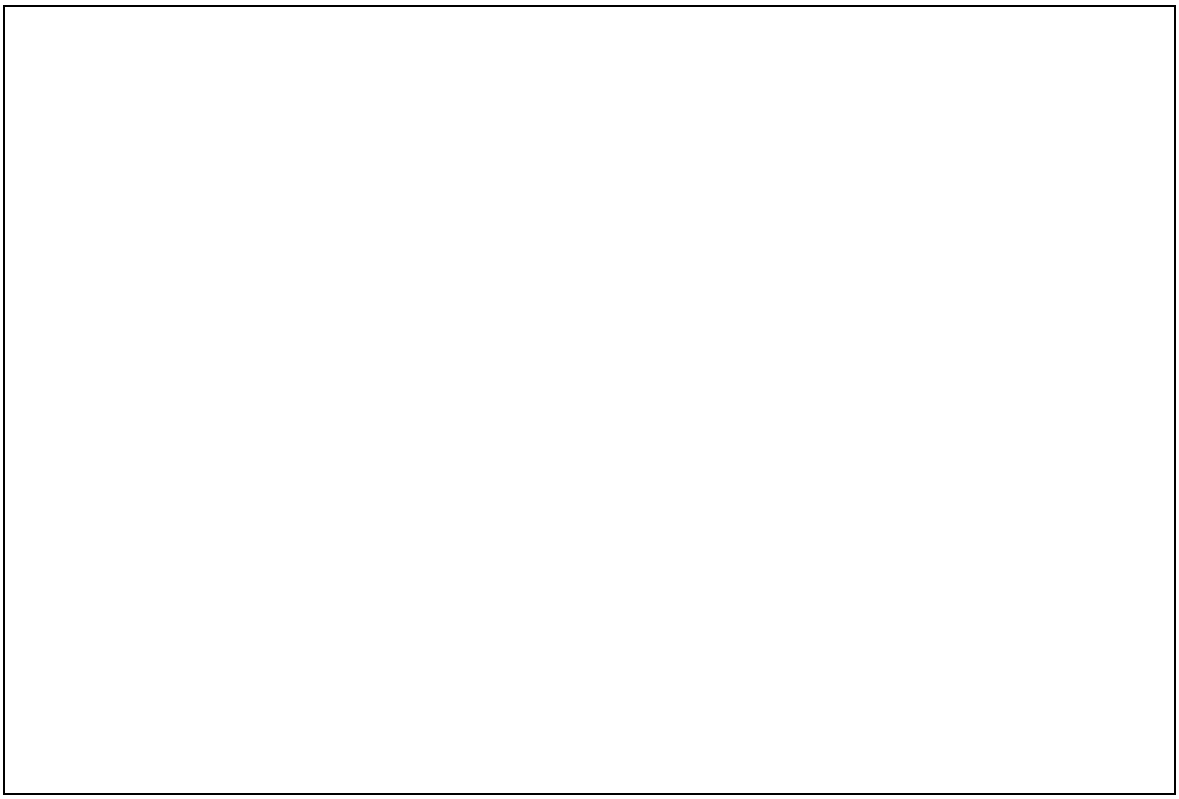


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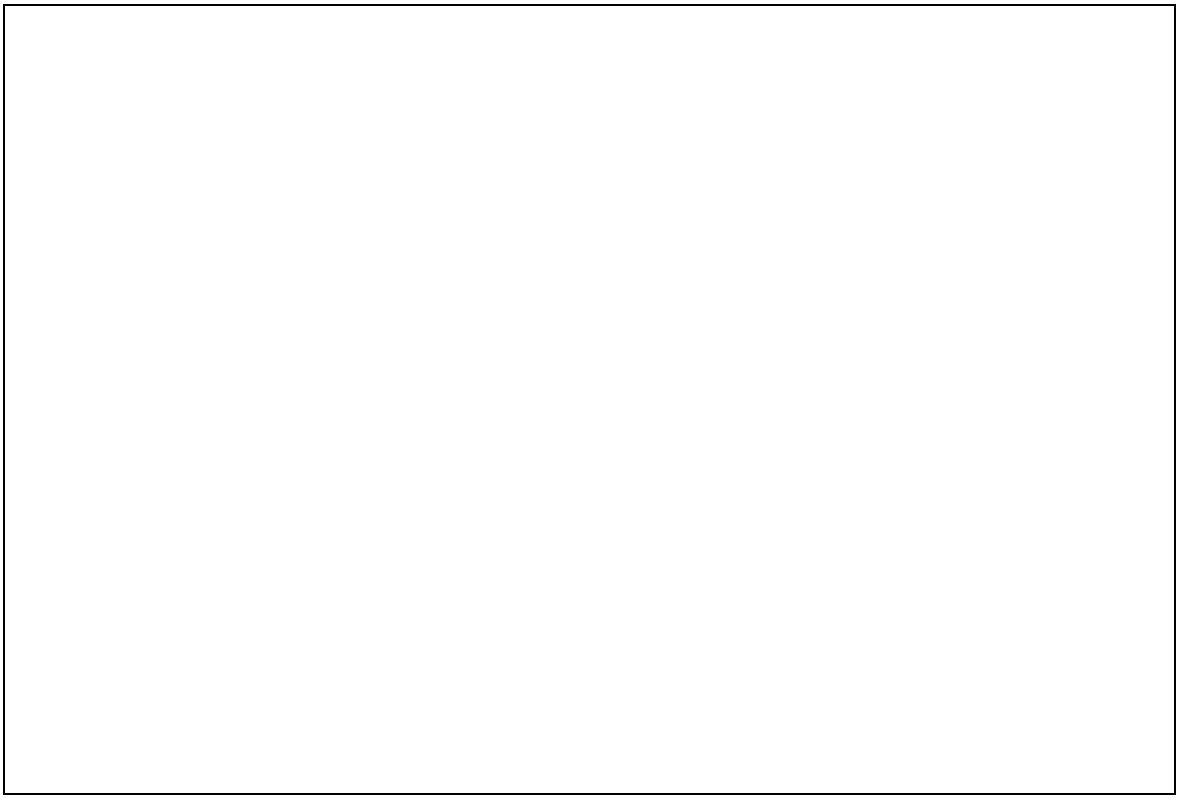


Plate 8 _____

Appendix F
Potential Regionally- and Provincially-Listed Invasive Plant Species of Concern in the Project Area

Potential Regionally- and Provincially-Listed Invasive Plant Species of Concern in the EGP Project Area

Common Name	Scientific Name[a]	Provincial Listing	SSISC Category	ISCMV Category
alkanet	*Anchusa officinalis*	--	Eradicate	--
annual sow-thistle	*Sonchus oleraceus*	Noxious	Strategic Control	--
baby's breath	*Gypsophila paniculata*		Prevent	
bighead knapweed	*Centaurea macrocephala*	--	Contain	--
black bindweed	*Fallopia convolvulus*	--	Strategic Control	--
black henbane	*Hyoscyamus niger*	--	Prevent	--
bladder campion	*Silene vulgaris*	--	Strategic Control	--
Bohemian knotweed	*Fallopia x bohemica*	Noxious	Contain	Control
broad-leaved peavine	*Lathyrus latifolius*	--	Eradicate	--
bull thistle	*Cirsium vulgare*	--	Strategic Control	--
bugle-weed	*Ajuga reptans*	--	Strategic Control	--
bur chervil	*Anthriscus caucalis*	Noxious	Prevent	Eradicate
butterfly-bush	*Buddleja davidii*	--	Contain	Control
Canada thistle	*Cirsium arvense*	Noxious	Strategic Control	Control
carpet burweed	*Soliva sessilis*		Prevent	
cherry-laurel	*Prunus laurocerasus*	--	Strategic Control	--
chicory	*Cichorium intybus*	--	Strategic Control	--
common burdock	*Arctium minus*	--	Strategic Control	--
common comfrey	*Symphytum officinale*	--	Contain	--
common dead-nettle	*Lamium amplexicaule*	--	Prevent	--
common evening-primrose	*Oenothera biennis*	--	Strategic Control	--
common foxglove	*Digitalis purpurea*	--	Strategic Control	--
common hawthorn	*Cratageus monogyna*	--	Strategic Control	--
common periwinkle	*Vinca minor*	--	Strategic Control	Control
common reed	*Phragmites australis ssp. australis*	Noxious	Prevent	Eradicate
common St. John's-wort	*Hypericum perforatum*	--	Strategic Control	Control
common tansy	*Tanacetum vulgare*	--	Strategic Control	Control
common toadflax	*Linaria vulgaris*	Noxious	Strategic Control	--
cornflower	*Centaurea cyanus*	--	Strategic Control	--
corn-spurry	*Spergula arvensis*		Prevent	
common crupina	*Crupina vulgaris*	Noxious	Prevent	--

Potential Regionally- and Provincially-Listed Invasive Plant Species of Concern in the EGP Project Area

Common Name	Scientific Name[a]	Provincial Listing	SSISC Category	ISCMV Category
curled pondweed	*Potamogeton crispus*	--	Eradicate	--
cutleaf evergreen blackberry	*Rubus laciniatus*	--	Contain	Control
cypress spurge	*Euphorbia cyparissias*	--	Eradicate	--
Dalmatian toadflax	*Linaria gentistifolia ssp. dalmatica*	Noxious	Strategic Control	Eradicate
Dame's rocket	*Hesperis matronalis*	--	Strategic Control	--
dense-flowered cordgrass	*Spartina densiflora*	Noxious	Prevent	Prevent
diffuse knapweed	*Centaurea diffusa*	Noxious	Contain	Eradicate
dodder	*Cuscuta spp.*	Noxious	--	--
English cordgrass	*Spartina anglica*	Noxious	Prevent	Eradicate
English holly	*Ilex aquifolium*	--	Contain	Control
English ivy	*Hedera helix*	--	Contain	Control
Eurasian water-milfoil	*Myriophyllum spicatum*	--	Prevent	--
field bindweed	*Convolvulus arvensis*	--	Strategic Control	--
field scabious	*Knautia arvensis*		Prevent	
flat pea	*Lathyrus sylvestris*		Eradicate	
flowering-rush	*Butomus umbellatus*	Noxious	Eradicate	Prevent
Fuller's teasel	*Dipsacus fullonum ssp. sylvestris*	--	Prevent	--
garlic mustard	*Alliaria petiolata*	Noxious	Prevent	Prevent
giant hogweed	*Heracleum mantegazzianum*	Noxious	Eradicate	Eradicate
giant knotweed	*Fallopia sachalinensis*	Noxious	Prevent	Contain
giant mannagrass	*Glyceria maxima*	Noxious	--	--
giant reed	*Arundo donax*	--	Prevent	--
gorse	*Ulex europaeus*	Noxious	Prevent	Eradicate
great mullien	*Verbascum thapsus*	--	Strategic Control	--
hairy cat's ear	*Hypochaeris radicata*		Strategic Control	
hedge false bindweed	*Calystegia sepium ssp. sepium*	--	Strategic Control	--
hedge mustard	*Sisymbrium officinale*		Strategic Control	
Himalayan blackberry	*Rubus discolor*	--	Contain	Control
Himalayan knotweed	*Persicaria wallichii*	Noxious	Eradicate	Contain
hoary alyssum	*Berteroa Incana*	--	Contain	--
hound's-tongue	*Cynoglossum officinale*	Noxious	Prevent	--

Potential Regionally- and Provincially-Listed Invasive Plant Species of Concern in the EGP Project Area

Common Name	Scientific Name[a]	Provincial Listing	SSISC Category	ISCMV Category
hydrilla	*Hydrilla verticillata*	Proposed Prohibited Noxious	--	--
Iberian starthistle	*Centaurea iberica*	--	Contain	--
Japanese knotweed	*Fallopia japonica*	Noxious	Contain	Control
jimsonweed	*Datura stramonium*	--	Prevent	--
jointed goatgrass	*Aegilops cylindrical*	Noxious	--	--
kudzu	*Pueraria montana var. lobata*	--	Prevent	Prevent
lady's-thumb	*Persicaria maculata*	--	Strategic Control	--
lamb's-quarters	*Chenopodium album ssp. album*	--	Strategic Control	--
large periwinkle	*Vinca major*	--	Prevent	--
large yellow loosestrife	*Lysimachia punctata*	--	Strategic Control	--
leafy spurge	*Euphorbia esula*	Noxious	Prevent	Prevent
Loesel's tumble-mustard	*Sisymbrium loeselii*	--	Strategic Control	--
marsh cudweed	*Gnaphalium uliginosum*	--	Strategic Control	--
marsh plume thistle	*Cirsium palustre*	--	Prevent	--
meadow hawkweed	*Hieracium caespitosum*	--	Strategic Control	--
meadow knapweed	*Centaurea debeauxii*	--	Prevent	--
milk thistle	*Silybum marianum*	Noxious	Prevent	Prevent
orange-red king devil	*Hieracium aurantiacum*	--	Strategic Control	Eradicate
oxeye daisy	*Leucanthemum vulgare*	--	Strategic Control	--
parrot's feather	*Myriophyllum aquaticum*	--	Prevent	Contain
perennial sow-thistle	*Sonchus arvense*	Noxious	Strategic Control	--
poison-hemlock	*Conium maculatum*	--	Prevent	--
policeman's helmet	*Impatiens glandulifera*	--	Contain	Control
prickly lettuce	*Lactuca serriola*	--	Strategic Control	--
puncture vine	*Tribulus terrestris*		Prevent	
purple dead-nettle	*Lamium purpureum var. purpureum*	--	Contain	--
purple loosestrife	*Lythrum salicaria*	Noxious	Eradicate	Control
purple nutsedge	*Cyperus rotundus*	Noxious	Prevent	--
purple starthistle	*Centaurea calcitrapa*	--	Contain	--
reed canarygrass	*Phalaris arundinacea*	--	Strategic Control	--
Queen devil hawkweed	*Hieracium praealtum*	--	Strategic Control	--

Potential Regionally- and Provincially-Listed Invasive Plant Species of Concern in the EGP Project Area

Common Name	Scientific Name[a]	Provincial Listing	SSISC Category	ISCMV Category
Russian knapweed	*Acroptilon repens*	--	Prevent	--
saltmeadow cordgrass	*Spartina patens*	Noxious	Prevent	Prevent
scentless mayweed	*Tripleurospermum inodorum*	Noxious	Strategic Control	--
Scotch broom	*Cytisus scoparius*	--	Contain	Control
Scotch thistle	*Onopordum acanthium*	--	Eradicate	--
sulphur cinquefoil	*Potentilla recta*	--	Contain	--
skeletonweed	*Chondrilla juncea*	Noxious	Eradicate	--
small touch-me-not	*Impatiens parviflora*	--	Contain	--
smooth cordgrass	*Spartina alterniflora*	Noxious	Prevent	Eradicate
Smooth sumac	*Rhus glabra*		Strategic Control	
Spanish broom	*Spartium junceum*		Prevent	
spring water-starwort	*Callitriche palustris*	--	Contain	--
spotted hawkweed	*Hieracium maculatum*		Strategic Control	
spurge-laurel	*Daphne laureola*	--	Eradicate	Control
spotted knapweed	*Centaurea stoebe ssp. micranthos*	Noxious	Contain	Eradicate
tall hawkweed	*Hieracium piloselloides*		Strategic Control	
tansy ragwort	*Senecio jacobaea*	Noxious	Eradicate	--
traveler's joy	*Clematis vitalba*	--	Prevent	--
tufted vetch	*Vicia cracca ssp. cracca*	--	Strategic Control	--
velvet-leaf	*Abutilon theophrasti*	Noxious	Prevent	--
ventenata	*Ventenata dubia*	Noxious	--	--
viper's bugloss	*Echium vulgare*	--	Contain	Eradicate
wild carrot	*Daucus carota*	--	Strategic Control	--
wild chervil	*Anthriscus sylvestris*	--	Prevent	Contain
wild mustard	*Sinapis avensis*	--	Strategic Control	--
wild oat	*Avena fatua*	Noxious	--	--
wild parsnip	*Pastinaca sativa*	--	Eradicate	--
whiplash hawkweed	*Hieracium flagellare*	--	Prevent	--
White Spanish broom	*Cytisus multiflorus*	--	Eradicate	--
wormwood	*Artemisia absinthium*	--	Strategic Control	--
yellow archangel	*Lamium galeobdolon*	--	Contain	Control

Potential Regionally- and Provincially-Listed Invasive Plant Species of Concern in the EGP Project Area

Common Name	Scientific Name[a]	Provincial Listing	SSISC Category	ISCMV Category
yellow iris	*Iris pseudacorus*	Noxious	Eradicate	Control
yellow nutsedge	*Cyperus esculentus var. leptostachyus*	Noxious	Prevent	--
yellow salsify	*Tragopogon dubius*	--	Strategic Control	--
yellow starthistle	*Centaurea solstitialis*	Noxious	Prevent	Prevent

Sources:

Invasive Species Council of Metro Vancouver. 2013. Current Priority Invasive Plant Species. Accessed January 2021. http://iscmv.ca/docs/ISCMV_Priority_Plant_Spp_List_2013.pdf

Sea-to-Sky Invasive Species Council. 2018. SSISC Priority Species List (Plants). Accessed January 2021. https://ssisc.ca/wp-content/uploads/2018/12/SSISC-SPECIES-LIST-Priority-by-Sub-Region-2018-11-20-Website.pdf

Notes:

[a] Scientific names are reflective of the most recent British Columbia terminology and may differ from those listed in the Provincial and Regional Invasive plant species lists.

ISCMV = Invasive Species Council of Metro Vancouver

SSISC = Sea-to-Sky Invasive Species Council

Appendix G
Wildlife Sighting/Incident Reporting Card

Wildlife Sighting / Incident Reporting Form

SIGHTING INFORMATION		
Date of Observation:		
Time of Observation:		
Name of Observer:		
Location of Observation		
KP:	**Location Name (if applicable):**	
UTM		
Zone:	**Easting:**	**Northing:**

WILDLIFE OBSERVATION INFORMATION	
Species Observed	
Observation Type (that is, visual, heard animal, observed sign such as tracks, scat)	
Age (young, adult, unknown)	
Sex (male, female, unknown)	
Number observed (include number of males/females if known)	
Behaviour of Animal (describe what the animal was doing)	
Aggressive Behaviour (Yes/No, if Yes describe)	

ADDITIONAL COMMENTS

SUBMISSION INFORMATION
Name of Contractor Environment Coordinator the card was submitted to:
Date of Submission: