

BC Hydro Site C Clean Energy Project

An Introduction to the Invasive Weed Mitigation and Adaptive Management Plan

Robin Routledge P.Ag., R.P. Bio.

Agenda

- Introduction
- The Site
- IWMAMP
- Challenges
- Successes
- Q and A



 **BC Hydro**
Power smart

Smart about power in all we do.

Site C and IWMAMP

1. Site C

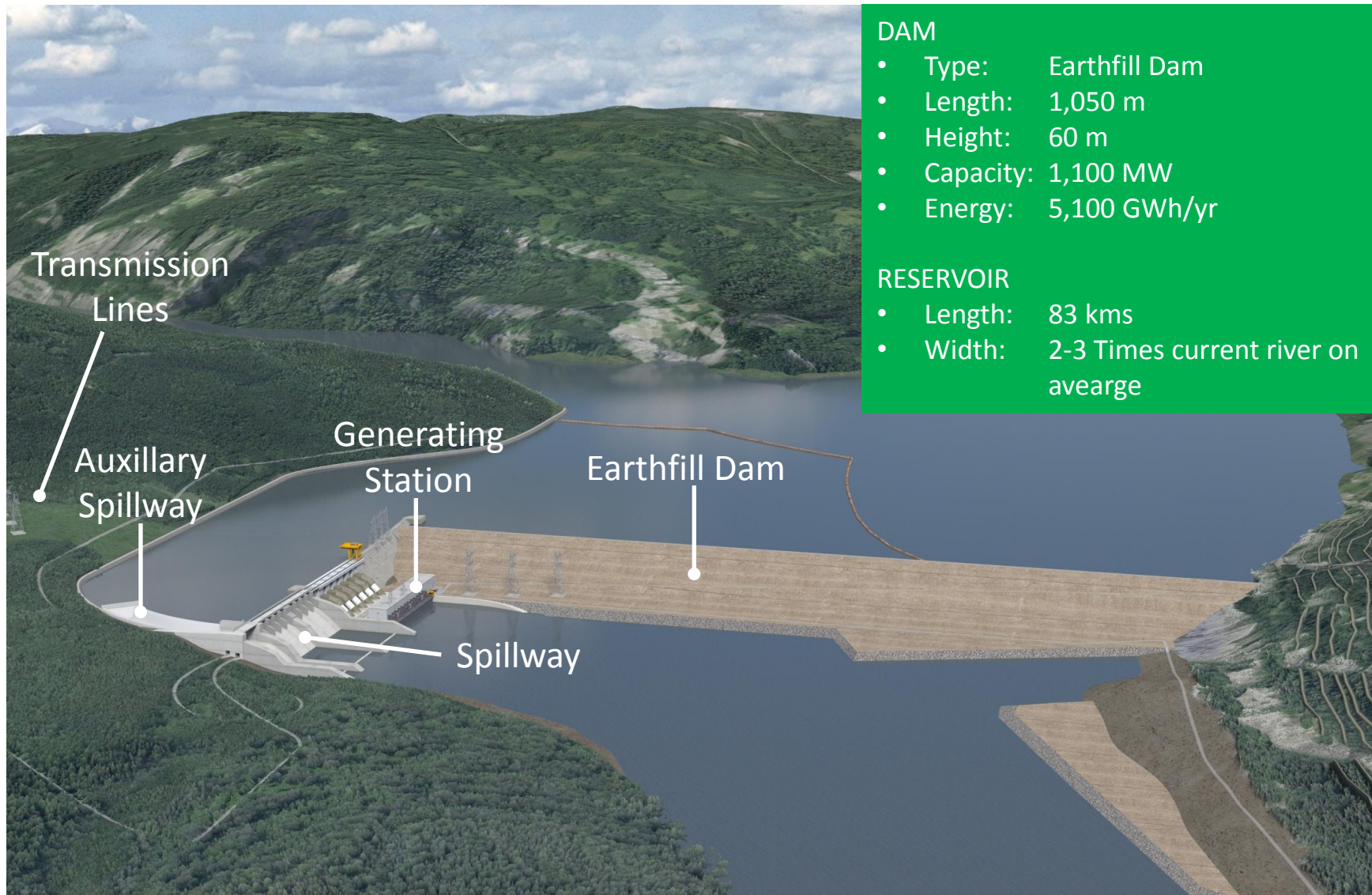
- Intro/History/Current Events

2. IWMAMP

- Objectives
- Plan Development
- Educate the Work Force
- Implement Control and Mitigation
- Implementation
- Assess Effectiveness
- Monitor and Enforce Processes
- Reporting
- Frequency of Program Activities

Site C





DAM

- Type: Earthfill Dam
- Length: 1,050 m
- Height: 60 m
- Capacity: 1,100 MW
- Energy: 5,100 GWh/yr

RESERVOIR

- Length: 83 kms
- Width: 2-3 Times current river on average

General Site Information

- Over 2200 Hectares of cleared area for construction activities with 1200 Hectares that will remain unflooded.
- Removal and replacement of over 30 million cubic meters of material
- Realignment of over 30 kms of Highway 29
- Shoreline Protection at Hudson's Hope
- Over 80 Kms of two New 500 KV Transmission Lines
- Access roads and a temporary construction access bridge
- Two 12m Diameter Diversion Tunnels and Associated cofferdams
- Worker Accommodations
- 3 separate quarries
- New Railway sidings



Power smart

Smart about power in all we do.



Environmental Assessment Certificate

- EA Certificate, E14.02, was issued in 2014 to BC Hydro and Power Authority for the Site C Clean Energy Project.

Environmental Assessment Office

In the matter of the
ENVIRONMENTAL ASSESSMENT ACT
S.B.C. 2002, c. 43
(Act)

and

in the matter of an
Application
for an
Environmental Assessment Certificate

by

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
(Proponent)

for the

SITE C CLEAN ENERGY PROJECT

ENVIRONMENTAL ASSESSMENT CERTIFICATE # E14-02

Whereas:

A. The Proponent proposes to construct and operate a dam and an 1100 megawatt hydroelectric generating station and associated structures on the Peace River known as the Site C Clean Energy Project as described in the document listed in Schedule A (the "Project").

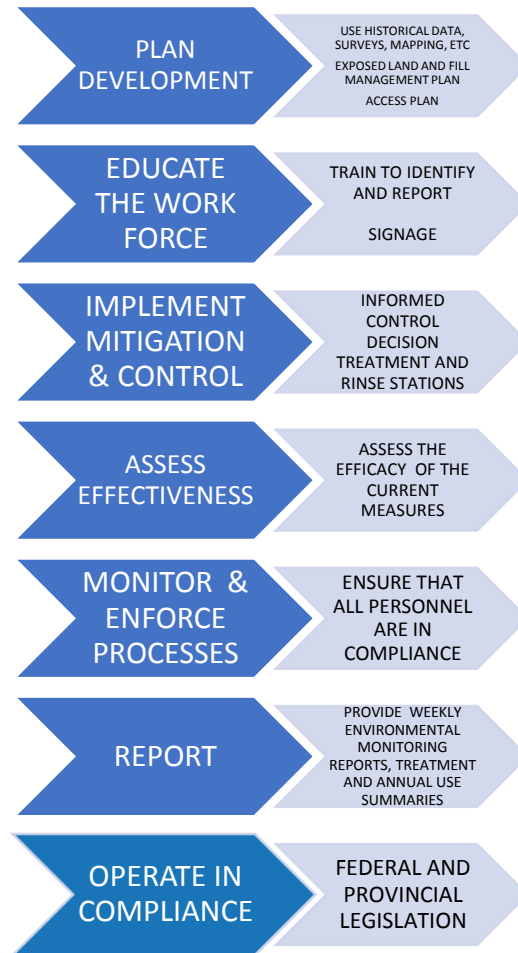
CEMP and EPP

- Construction Environmental Management Plan
 - Over Arching BC Hydro developed management plan
 - Sec. 4.15 – Vegetation and Invasive Plant Management
 - Appendix K – **Invasive Weed Management and Adaptive Mitigation Plan.**
- Environmental Protection Plans
 - Contractor and contract specific
 - Reviewed and approved by BC Hydro
 - Addresses measures to be actioned at the site level.

Intro to the IWMAMP

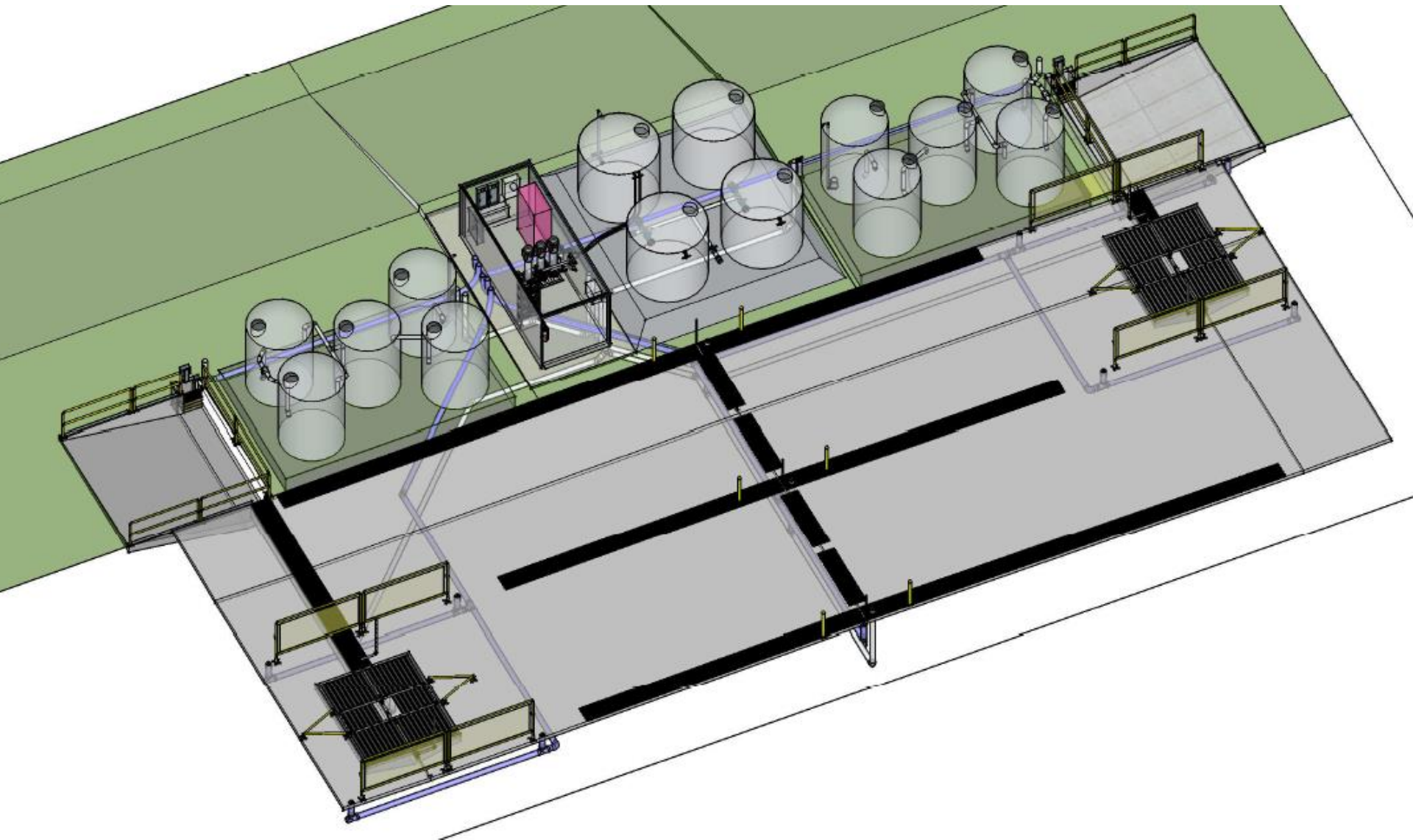
- Invasive Weed Mitigation and Adaptive Management Plan
- Prevention and Management of Invasive Weed Populations
- Create and Implement an Effective Plan to address current and potential future invasive and noxious weed populations
- Provide mitigation measures to prevent cross contamination
- Uses Industry Best Management Practices and the entire program is based around an Early Detection and Rapid Response (EDRR) process.

Objectives



1. Plan Development

- PMP (Pest Management Plan)
- Review Historical Data, Field Surveys, and Inventories
- Vehicle and Equipment Access Plan
 - Limitations
 - On-Site cleaning Facilities





yellow toadflax (*Linaria vulgaris*)

- several slender stems, erect and often branched.
- distinct snapdragon-like flower that is yellow or even a pale cream
- numerous pale green, narrow leaves that are pointed at both ends



creeping (Canada) thistle (*Cirsium arvense*)

- rose-purple, lavender, or sometimes white flower heads
- stems are branched, often slightly hairy, and ridged, 30 to 80 cm tall.
- leaves are lance shaped, irregularly lobed and prickly



Dalmatian toadflax (*Genistifolia dalmatica*)

- bright yellow snapdragon-like flowers with orange spot on the lower lip
- pale green waxy leaves clasp the stem and are heart-shaped with a pointed tip
- can grow up to 1.2 m tall



oxeye daisy (*Chrysanthemum vulgare*)

- daisy-like flowers at the end of slender stems
- lower spoon-shaped leaves.



scentless chamomile (*Matricaria maritima*)

- single, white, daisy-like flowers with yellow centers at the ends of each branched stem
- semi-erect stems that are smooth and branched with fern-like leaves



Best Management Practices

- ❖ Rinse vehicles and equipment after travelling through vegetative areas
- ❖ Avoid accessing known invasive infestations, when practical
- ❖ Be aware of the vegetation in operation areas
- ❖ Encourage workers and contractors to report sightings
- ❖ Avoid staging equipment and supplies in invasive infestations

To Report, Call or Email Pathfinder



1-855-612-1782



Site-C@pathfinderltd.ca

- ❖ Give location
- ❖ Approximate size of infestation
- ❖ Type of invasive species found

3.0 Implement Control and Mitigation

- Herbicide Application
- Mechanical Control
- Rinse Station
Mitigation
- Seasonal Mitigation

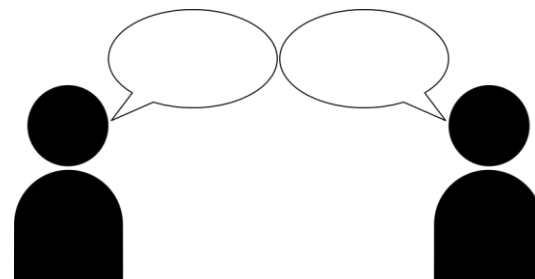
3.0 Implement Control and Mitigation

- 3.1 - Determine treatment plan
- 3.2 - Prioritize treatment sites
- 3.3 - Determine best application method
- 3.4 - Determine treatment frequency
- 3.5 - Determine treatment boundaries
- 3.6 - Prepare Equipment
- 3.7 - Complete Herbicide Treatment
- 3.8 - Communication

3.0 Implement Control and Mitigation

3.1 Determine treatment plan

- Plan Treatments prior to February 1st based on prior years invasive weed inventory and treatment data.
- Provide estimated treatment area that may occur in the upcoming year to the owner of the applicable Pest management Plan (PMP)
- Complete NOITT – First Nations Consultation



3.0 Implement Control and Mitigation

3.1 Determine treatment plan

3.2 Prioritize treatment sites

- Prioritize in accordance with the PRRD (Peace River Regional District) “Invasive Plant Program Strategic Plan and Profile” for the most current year.
 - » EDDR and Category A - highest priority
 - » Category B – Secondary Priority
 - Unless size of infestation is large (0.25ha) or if land values are threatened.

3.0 Implement Control and Mitigation

3.1 Determine treatment plan

3.2 Prioritize treatment sites

3.3 Determine best application method

- Herbicide applicator and QP invasives must consider which herbicide is best to use for the species present and their location
 - » Proximity to water, riparian, rare plants, etc.



3.0 Implement Control and Mitigation

3.1 Determine treatment plan

3.2 Prioritize treatment sites

3.3 Determine best application method

3.4 Determine Treatment Frequency

- May require multiple control applications to attain successful control.

3.0 Implement Control and Mitigation

- 3.1 Determine treatment plan
- 3.2 Prioritize treatment sites
- 3.3 Determine best application method
- 3.4 Determine Treatment Frequency

3.5 Determine Treatment Boundaries

- Field mark all zones applicable to the PMP and Herbicide Labels, establish buffer zones to rare plants, and other features.

3.0 Implement Control and Mitigation

- 3.1 Determine treatment plan
- 3.2 Prioritize treatment sites
- 3.3 Determine best application method
- 3.4 Determine Treatment Frequency
- 3.5 Determine Treatment Boundaries

3.6 Prepare Treatment Equipment

- Check and Calibrate equipment



3.0 Implement Control and Mitigation

- 3.1 Determine treatment plan
- 3.2 Prioritize treatment sites
- 3.3 Determine best application method
- 3.4 Determine Treatment Frequency
- 3.5 Determine Treatment Boundaries
- 3.6 Prepare Treatment Equipment

3.7 Complete Herbicide/Mechanical Treatment

- Chemically or Mechanically treat invasive weeds as per the treatment plan using Certified Pesticide Applicators and Assistant Applicators

3.0 Implement Control and Mitigation

- 3.1 Determine treatment plan
- 3.2 Prioritize treatment sites
- 3.3 Determine best application method
- 3.4 Determine Treatment Frequency
- 3.5 Determine Treatment Boundaries
- 3.6 Prepare Treatment Equipment
- 3.7 Complete Herbicide/Mechanical Treatment
- 3.8 Communication

- Invasive Weed Management section in weekly environmental monitoring reports completed by the contractors.

PATHFINDER

ENDEAVOURS LTD.

Weekly Environmental Monitoring Report

Contractor:	Pathfinder Endeavours Ltd.
Contract Number:	9977
Reporting Period:	September 24 th to October 1 st , 2018
Date Prepared:	October 1 st , 2018
Revision No:	0
Prepared By:	Rick Matthe

Summary

Weather Conditions	Ranges from 10°C to 18°C. Mix of overcast with clear days, winds between 2-5 km/hr with gusts up to 15km/hr.		
--------------------	--	--	--

Summary of Works

- Worked on site September 24th to September 26th 2018
- Chemical treatment of:
 - Lynx Creek Highway Realignment
 - Halfway River Highway Realignment
 - 85th Avenue
 - Transmission Line structures 35-6 to 42-5 and 66-03 to 78-06
 - Transmission Line access roads.

Total Amount of Herbicide Used:	Clearview: 0.963 L Gateway: 2.325 L Round Up: 1.68 L	Total Area Treated:	4.51 ha 4.51 ha 0.42 ha
Total Area Mechanically Treated:	n/a	Total Weight Disposed of:	n/a

Summary of Environmental Monitoring Communications

- Daily tailboards were delivered prior to the start of work each day (see attached).

Summary of Environmental Monitoring Findings

Air Quality Management –

- Not applicable during reporting period.

Erosion Prevention and Sediment Control Management –

- Not applicable during reporting period.

Fisheries and Aquatic Habitat Management –

- Not applicable during reporting period.

Fuel Handling and Storage Management –

- Vehicles filled at commercial facilities, storage containers remained away from water course.

Groundwater Protection –

- Not applicable during reporting period.

Hazardous Waste Management –

- Pesticide jugs were stored in locked containers on trailers and disposed of as per regulations.

Heritage Resources Management –

- Not applicable during reporting period.

23-09-2018 to 01-10-2018

Pathfinder Endeavours Ltd.

1

Rinse Station

- Who, What, When, Where, Why
 - All Contractors
 - All equipment entering and exiting the work site
 - Anytime
 - At the designated wash station at Gate B or offsite locations
 - Mitigate the transfer of invasive species coming from offsite and from leaving site.

Seasonal Control

- Winter Control
 - Use snow to bury known infestations to cover entire plants
 - Leave a snow pack on access routes (safely) to prevent debris and material from contaminating equipment and being transported
 - Remove known infestations prior to new access construction.
 - Steam Cleaning and Air Blasting

River Road- Dalmatian Toadflax/Canada Thistle

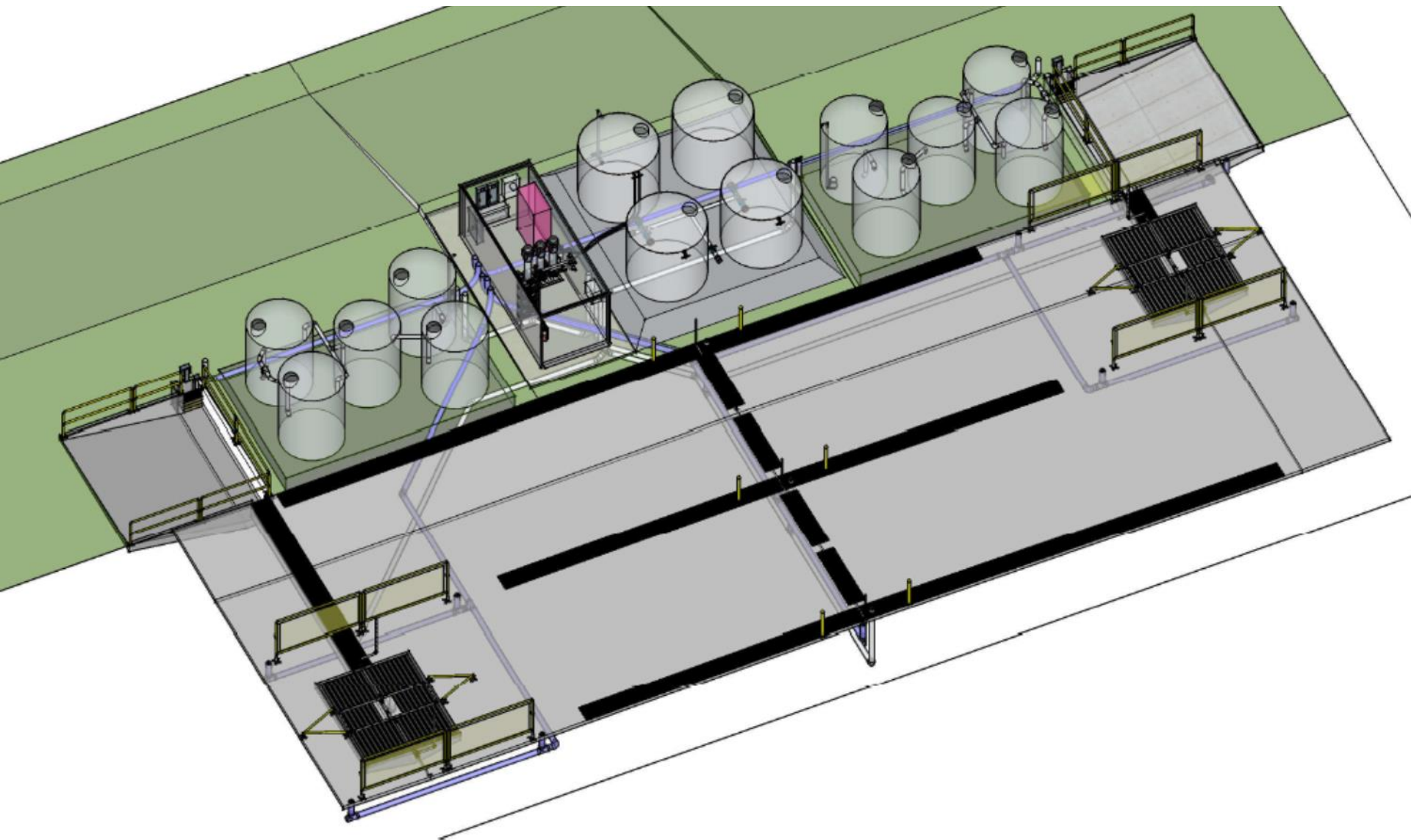


85th Ave



Area 27





Right Bank



HWY 29 Re-Alignment Areas



Area 24 - Septimus Rd. - Gate C



Challenges

- Large Foot Print
- Regulatory
- Multiple Contractors/Prime Contractors
- Accessibility
- Resources



Successes

- Site C IWMAMP – Developed August 2017
- Permanent Wash Station Procurement May 2018
- Increasing Contractor Education and Awareness
- Implementation of the IWMAMP – Controlling Invasive Species across all project locations!!

Questions?

