REPORT

September 2014

SaskWater

ENVIRONMENTAL IMPACT STATEMENT

SaskWater Buffalo Pound Non-Potable Water System - East: Regional Expansion Project

Submitted to:
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Associated Engineering
GLOBAL PERSPECTIVE. LOCAL FOCUS.

Golder Associates

Executive Summary

SaskWater is proposing an expansion to the Buffalo Pound Non-Potable Water Supply System – East: Regional Expansion Project (the Project). This Executive Summary highlights findings and conclusions from the Environmental Impact Statement (EIS) submission to regulatory authorities.

Introduction

The proposed Project is located near Buffalo Pound Lake in south-central Saskatchewan within the Rural Municipalities (R.M.) of Moose Jaw, Pense, Sherwood, and Edenwold (Figure 1). The proposed Project will consist of a non-potable water intake, breakwater, pump station, pipeline, and booster station, which will deliver a maximum flow rate of 168 million litres per day (ML/d). Phase 1 of the Project will deliver a flow rate of 96 ML/d with most of that flow (60 ML/d) being delivered to a proposed potash mine site near Kronau, Saskatchewan (SK). The remaining 36 ML/d is available for other existing water commitments and anticipated future water demands. Phase 2 of the proposed Project would expand water delivery capacity to the maximum of 168 ML/d.

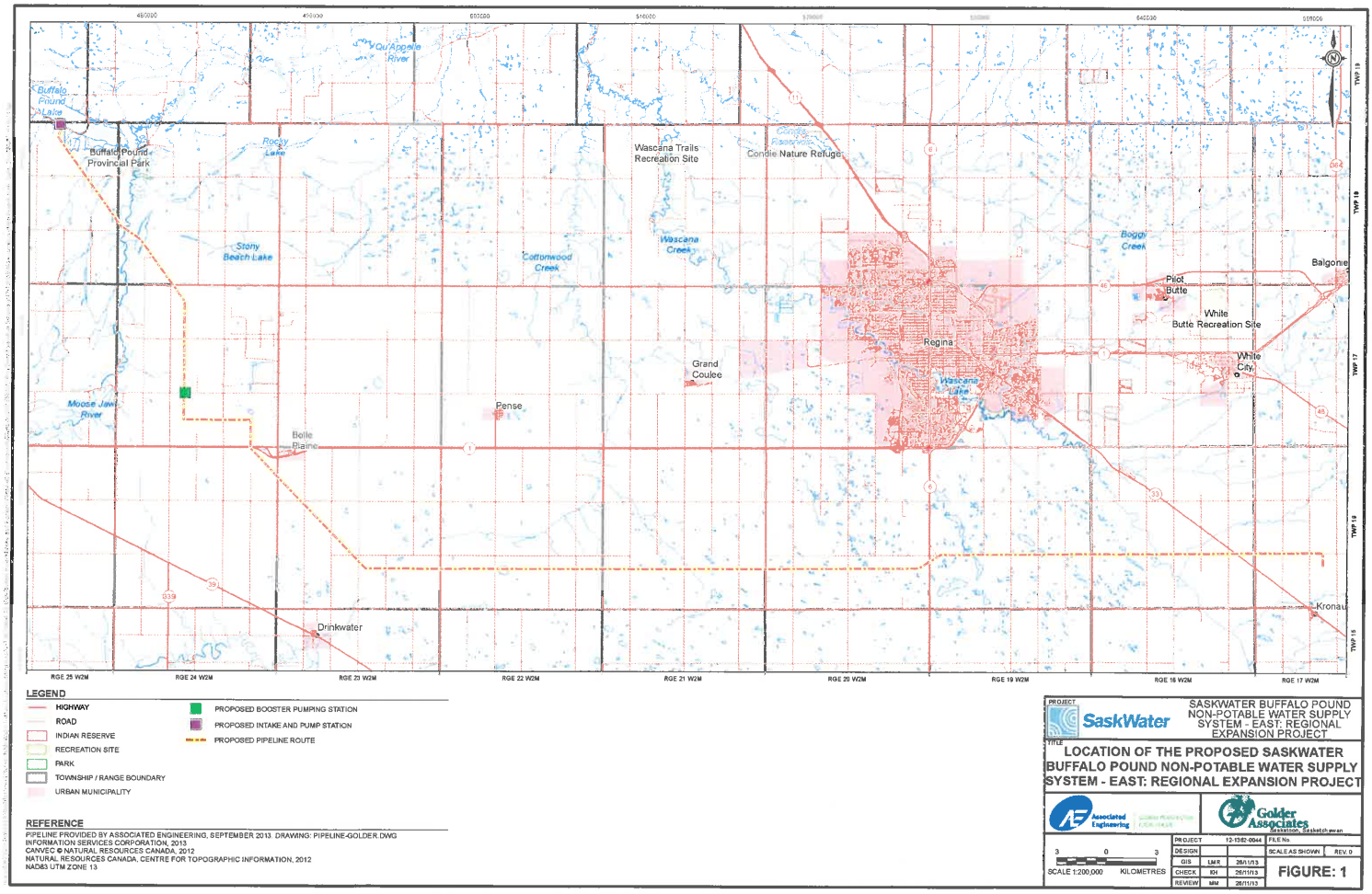
During the planning and design process, SaskWater identified and addressed concerns to avoid, reduce, and mitigate potential Project environmental effects. SaskWater is proposing to develop specific components of the system that would permit expansion of capacity in the future, but avoid the need for future in-water construction to limit shoreline and fish habitat disruption and the overall environmental footprint. Developing a regionally based water supply system that would service multiple customers is viewed to have environmental, economic, and technical advantages over stand-alone customer specific infrastructure servicing individual customers.

Project Location and Environmental Setting

The Project is located in south-central Saskatchewan about 25 kilometres (km) northeast of Moose Jaw (Figure 1). The proposed intake, breakwater, and pump station will be located on parcels of land on the south shore of Buffalo Pound Lake that are currently registered to the Ministry of Agriculture, Ministry of Environment (MOE), the Ministry of Parks, Sport and Culture, and the Ministry of Highways. The proposed pipeline route and booster station between the pump station and end delivery point will cross mainly privately owned parcels of land.

The Project area includes Buffalo Pound Provincial Park and three recreation sites (White Butte Trails, Condie Nature Refuge, and Wascana Valley Natural Area Recreation Sites; Saskatchewan Conservation Data Centre 2012). Buffalo Pound Provincial Park is located northeast of Moose Jaw, and the northwest end of the pipeline route terminates at the water intake location in the park.

The area experiences large seasonal temperature variations, which are characteristic of southern prairie continental climates. The Project is located on a former glacial lake (glacial Lake Regina) characterized by level to very gently undulating topography. Extensive potash deposits of the Devonian Prairie Evaporite Formation underlie the area at a depth of about 1,500 metres (m).



LEGEND

- HIGHWAY
- ROAD
- INDIAN RESERVE
- RECREATION SITE
- PARK
- TOWNSHIP / RANGE BOUNDARY
- URBAN MUNICIPALITY
- PROPOSED BOOSTER PUMPING STATION
- PROPOSED INTAKE AND PUMP STATION
- PROPOSED PIPELINE ROUTE

REFERENCE

PIPELINE PROVIDED BY ASSOCIATED ENGINEERING, SEPTEMBER 2013. DRAWING: PIPELINE-GOLDER.DWG
INFORMATION SERVICES CORPORATION, 2013
CANVEC © NATURAL RESOURCES CANADA, 2012
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
NAD83 UTM ZONE 13

PROJECT: SaskWater

SASKWATER BUFFALO POUND NON-POTABLE WATER SUPPLY SYSTEM - EAST: REGIONAL EXPANSION PROJECT

TITLE

LOCATION OF THE PROPOSED SASKWATER BUFFALO POUND NON-POTABLE WATER SUPPLY SYSTEM - EAST: REGIONAL EXPANSION PROJECT

Associated Engineering

Golder Associates Saskatoon, Saskatchewan

3 0 3
SCALE 1:200,000 KILOMETRES

PROJECT		12-1382-0044	FILE No
DESIGN			SCALE AS SHOWN / REV. 0
GIS	LMR	26/11/13	
CHECK	IDH	26/11/13	
REVIEW	MM	26/11/13	

FIGURE: 1

Buffalo Pound Lake inflows and outflows are highly regulated by the operation of the Qu'Appelle Dam on Lake Diefenbaker and the Buffalo Pound Dam. The lake is about 29 km long and 1 km wide with an average depth of 3 m. Buffalo Pound Lake is the municipal water supply source for the cities of Moose Jaw and Regina. As well, the lake is the main source of water for the Mosaic Belle Plaine potash mine, K+S Potash, Terra Grain ethanol plant, and the Yara Belle Plaine fertilizer plant, and will be the main source for a proposed potash mine near Kronau, SK.

The Moose Jaw River and Wascana Creek are the major tributaries of the Qu'Appelle River. The tributary streams usually carry high volumes of flow during the spring runoff period, but have little or no flow for the remainder of the year. Most of the surface water runoff in the watershed originates from snowmelt.

Up to 30 species of fish have been reported in the Qu'Appelle River system. Large-bodied fish species such as walleye (*Sander vitreus)*, northern pike (*Esox lucius)*, burbot (*Lota lota)*, bigmouth buffalo (*Ictiobus cyprinellus)*, and white sucker (*Catostomus commersonii*) are known to migrate upstream in the upper Qu'Appelle River from Buffalo Pound Lake during the spring spawning season. Fewer adult northern pike and walleye were present in the upper Qu'Appelle River during the summer; however, abundant young-of-the-year (YOY) fish of both species were found. By fall, most fish were absent and only small numbers of YOY large-bodied fish and small-bodied fish were present.

Fish species reported to inhabit Buffalo Pound Lake are primarily spring or summer spawning species, with the exception of burbot, cisco (*Coregonus artedi*), and lake whitefish (*Coregonus clupeaformis*). Cisco and lake whitefish typically spawn in fall; burbot are a winter-spawning species. Since the installation of the Buffalo Pound Dam fishway in 2000, fish species from the Qu'Appelle River potentially can access the lake from the lower Qu'Appelle River system. Two fish species of special concern (i.e., bigmouth buffalo and chestnut lamprey [*Ichthyomyzon castaneus]*) have been reported in the Qu'Appelle River and Buffalo Pound Lake.

The Project is located within the Regina Plains of the Moist Mixed Grasslands Ecoregion. Dark Brown Chernozemic soils predominate throughout this ecoregion due to the relatively large additions of organic matter and slower rates of decomposition on the cooler parts of the mixed-grass prairie. The area is a mix of woodland, shrubland, and open grassland. Woodlands are limited to small areas around sloughs and major river systems. The Project crosses mostly private land in consisting primarily of cultivated agricultural land and some mixed farming. Wheat, canola, and lentils are the major crops in the area. Natural vegetation is located in areas otherwise unsuitable for cultivation (i.e., valley complexes and non-arable pasturelands)

Mammals found within the Moist Mixed Grasslands Ecoregion include Richardson's ground squirrel (*Urocitellus richardsonii)*, coyote (*Canis latrans)*, striped skink (*Mephitis mephitis)*, least weasel (*Mustela nivalis)*, mule deer (*Odocoileus hemionus),* white-tailed deer (*Odocoileus virginianus)*, and red fox (*Vulpes vulpes)*. Many bird species are found within this ecoregion including western meadowlark (*Sturnella neglecta)*, eastern kingbird (*Tyrannus tyrannus)*, yellow-headed blackbird (*Xanthocephalus xanthocephalus)*, sharp-tailed grouse (*Tympanuchus phasianellus)*, and Franklin's gull (*Leucophaeus pipixcan)*. The most common reptiles and amphibians are the tiger salamander (*Ambystoma tigrinum)*, Great Plains toad (*Bufo cognatus)*, painted turtle (*Chrysemys picta)*, plains garter snake (*Thamnophis radix)*, boreal chorus frog (*Pseudacris maculata)*, and wood frog (*Rana sylvatica;* Acton et al. 1998).

The proposed pipeline crosses two major water drainages, Wascana Creek and the Moose Jaw River, which were observed to contain water and fish habitat during the baseline studies. The proposed pipeline also crosses

several smaller watercourses, some of which were dry, modified by agriculture, and did not contain fish habitat. The Project crosses Highways No. 1, No. 6, No. 33, and No. 641, as well as more than 50 unpaved roads. There are four railway crossings on the proposed pipeline route and several existing pipelines and buried utilities will be crossed (Figure 1).

The population in the area is about 240,000 across the four R.M.s of Moose Jaw, Pense, Sherwood, and Edenwold, and the nearby communities. Most of the population resides in the City of Regina, City of Moose Jaw, and the towns of White City, Pilot Butte, and Balgonie. There are nine First Nation communities within approximately 100 km of the Project: Piapot Cree First Nation, Pasqua First Nation, Muscowpetung First Nation, Standing Buffalo Dakota First Nation, Peepeekisis First Nation, Okanese First Nation, Star Blanket First Nation, Little Black Bear First Nation, and Carry the Kettle First Nation (Figure 1). The Métis Nation Eastern Region 3 encompasses the region east of Regina, Saskatchewan. The Métis Nation Western Region 3 encompasses the region west of Regina, Saskatchewan.

Many of the R.M.s and villages in the area have unemployment rates below the provincial average. High labour force participation rates and low unemployment rates often are found in agricultural areas and many R.M.s and villages had a high proportion of labour force in agricultural and resource-based industries. The higher than average labour force participation rate and the low unemployment rate in many communities, particularly in Regina, might indicate a labour shortage in the area. However, the low labour force participation rate and high unemployment rate in First Nation communities in the area suggest that there might be potential for First Nation and Métis communities to become involved in this Project or future projects in the area.

Project Overview

SaskWater currently operates two pump stations on the south shore of Buffalo Pound Lake within Buffalo Pound Provincial Park to supply non-potable water to customers in the region. The proposed Project will be situated on the south shore of Buffalo Pound Lake (adjacent to an existing SaskWater non-potable intake and pump station) and will extend into the lake approximately 70 m from the shoreline of Buffalo Pound Lake. The proposed intake, pump station, pipeline, and booster station will be required to deliver a maximum flow rate of 96 ML/d (4,000 cubic metres per hour [m^3/h]) to meet anticipated demands.

SaskWater will operate the Project to supply non-potable water in accordance with water allocations that have been granted to SaskWater and its customers by the Water Security Agency (WSA). The WSA has assured SaskWater of a water license approval for the initial non-potable water demands. Additional end-users who wish to tie in to the regional system in the future will be required to obtain water licenses from WSA who will review and allocate water licenses annually. SaskWater will obtain approval for, and construct the infrastructure to deliver the allocated water volumes to users.

Project Schedule

After SaskWater has received an approval to proceed and the required licensing, the Project would proceed in three phases: construction, operation, and closure.

Construction of the Project is expected to take approximately three years to complete. The construction phase will include the development of infrastructure such as the water intake, breakwater, pump station, pipeline, and booster station. The proposed potash mine will start approximately two years prior to the processing plant to develop caverns for production. For the purposes of the assessment, operation of the Project is currently

estimated at 70 years and is directly related to the operational life of the proposed potash mine. However, because the Project is a regional system it is expected that the operational period would extend beyond this period. After the Project has exceeded life expectancy, decommissioning will take place within one year of closure. Closure of the Project includes decommissioning and reclamation activities associated with the intake, pump house, and booster station.

Project Need and Benefits

SaskWater is forecasting an increase in the demand for non-potable water in the region and over the next five to ten years. The region is well positioned for continued industrial and commercial growth because of its proximity to transportation, labour markets, utilities, and natural resources including potash. Projected non-potable water demands include potash developments southeast of Regina and other industrial activities in the Regina region. SaskWater currently operates two pump stations on the south shore of Buffalo Pound Lake with a common non-potable water intake along with two pipelines and a booster station. This existing infrastructure does not have the capacity to provide non-potable water for forecasted demands. SaskWater, as the provincial Crown water utility, has an opportunity to support this economic growth by expanding its infrastructure in the region.

The Project will provide equipment and infrastructure to develop a regional and expandable non-potable water supply system that will meet immediate and future water demands. This regional water supply system would service industrial customers in the region and the proposed potash mine in a cost efficient, responsible, and sustainable way. The proposed configuration promotes economic development, while reducing in-water works and potential environmental effects during future expansion. The Project will provide the necessary infrastructure for the conveyance of non-potable water with a planned initial pumping capacity of up to 96 ML/d. The Project has the potential for infrastructure sharing with other industrial partners, which may further reduce costs and future environmental effects due to anticipated industrial development in the region.

Regulatory Process

Under Section 8 of the *Canadian Environmental Assessment Act* (*CEAA)* 2012, a Project Description is required to initiate the screening process through which the Canadian Environmental Assessment Agency (Agency) will determine if a federal environmental assessment is required for all designated projects. A Project Description was submitted to the Agency for review on October 2, 2013. Based on the review of the provided information, the Agency determined that the Project does not meet the definition of a designated project under the *Regulations Amending the Regulations Designating Physical Activities* under *CEAA* 2012. As a result, an environmental assessment under *CEAA*, 2012 is not required.

The provincial environmental assessment process begins with the submission of a Technical Proposal to the Environmental Assessment Branch of the MOE to determine if the Project is considered a "development." Technical Proposals for the proposed intake and for the proposed pipeline were submitted to the MOE in January 2013. The MOE determined that the Project is a "development" as defined by Section 2(d) of the *Saskatchewan Environmental Assessment Act* (*SEAA)*. As such, an environmental assessment is required and an EIS must be submitted for the Project that satisfies the provincial environmental assessment process.

Draft Terms of Reference (TOR) were submitted to MOE in July 2013 providing a detailed description of the information required to address potential concerns and issues associated with the development. Comments on the draft TOR were received from MOE and the TOR were revised as necessary following additional discussion with MOE. The MOE accepted the TOR as final in August 2013.

Project Alternatives

Technically and economically feasible alternative means of carrying out the proposed Project were evaluated using environmental, engineering, and socio-economic criteria. The following alternatives to the Project were considered.

- Construct a water intake and pump station at Katepwa Lake with a pipeline to deliver non-potable water to a proposed potash mine near Kronau, SK. Analysis concluded that sufficient water could be delivered to support demands, but that a water intake and pump station at Buffalo Pound Lake would still be required to deliver non-potable water to other customers in the region.
- Construct a regional system including a water intake and pump station at Buffalo Pound Lake with a pipeline to deliver non-potable water to customers in the region and a customer at an end delivery point near Kronau, SK. A hydrological study concluded that 2.1 cubic metres per second (m^3/s) (181 ML/d) can be allocated from Buffalo Pound Lake additional to existing allocation licenses.

Although capital costs for both options are similar, several economic, social, and environmental factors support Buffalo Pound Lake as the most feasible and sustainable water source for the Project. Social advantages of a regional system originating at Buffalo Pound Lake include the promotion of economic development and employment opportunities in the Buffalo Pound Lake area, as well as lower stakeholder concern with the Project than what is expected from stakeholders at Katepwa Lake.

Environmental advantages of a regional system originating at Buffalo Pound Lake include lower risk of water shortages during drought than Katepwa Lake, reduced downstream flows in the Qu'Appelle River improving flood control in downstream lakes, fewer drawdown restrictions than at Katepwa Lake, and disruption of fish habitat and alteration of shoreline at a single location rather than in multiple locations or lakes. The downstream flows could be maintained by increasing the capacity of the Upper Qu'Appelle Channel between Lake Diefenbaker and Buffalo Pound Lake.

Project Description

The proposed Project will consist of a non-potable water intake, pump station, pipeline, and booster station, which will deliver a maximum flow rate of 96 ML/d. Most of the water will be delivered to a proposed potash mine site near Kronau, SK, with the remainder of the water available for future water demands.

Project activities will include constructing, operating, maintaining, and decommissioning permanent and temporary facilities required to construct the Project.

Principal structures for the proposed Project will consist of the following:

- a water intake, breakwater, pump station, and generator located on the south shore of Buffalo Pound Lake and extending about 70 m into the lake from the shoreline;
- a water pipeline that will extend approximately 93 km southeast and east from the intake and pump station at Buffalo Pound Lake to the proposed potash mine site near Kronau, SK; and
- a booster station located approximately 20 km from the intake and pump station.

Construction of the proposed water intake, pump station, and site works will consist of constructing a level site, preparing site access for vehicle traffic, security fencing, excavation, and backfill for the pump station structure, and landscaping. Topsoil and the associated vegetation groundcover will be stripped, salvaged, and stored prior to construction. Excavation surrounding the pump station will require shoring and dewatering during construction. The shoreline that has been affected by the pump station construction will be armoured with clean riprap to reduce erosion.

An earthen cofferdam will be used to isolate the work area needed for construction of the proposed water intake structure and conduit; the cofferdam will be converted to a permanent breakwater at the end of construction. The breakwater will have an estimated 10,000 square metres (m^2) permanent footprint. Limited shoreline alteration is expected upon completion of the intake and breakwater and efforts will be made to recontour the shoreline using clean riprap or other erosion control materials to reduce long-term erosion and sedimentation. It is anticipated that this will disrupt some fish habitat and interfere with some recreational use of the lake. However, the permanent breakwater will act as an intake forebay, protect the intake from ice and silt buildup, provide access to the screens for maintenance, installation, and removal and limit the in-water works and fish habitat disruption during future capacity upgrades.

Access to the pump station will be provided from the existing access road to the two existing pump stations on the south shore of Buffalo Pound Lake. A short gravelled access road with an 8 m wide travel surface will be constructed to the Project site from the road that parallels the southeastern shore of Buffalo Pound Lake or will extend from the adjacent existing SaskWater facility. A gravelled area around the pump station will provide space for parking and turnaround. The pump station will be secured with a fence lining the perimeter and will have one access gate.

The proposed pipeline crosses two major water drainages (Wascana Creek and the Moose Jaw River), which were observed to contain water and fish habitat during the baseline studies. The proposed pipeline also crosses a number of smaller watercourses, some of which were dry, modified by agriculture, and did not contain fish habitat. The Project crosses Highways No. 1, No. 6, No. 33, and No. 641, as well as more than 50 unpaved roads. There are four railway crossings on the proposed pipeline route and several existing pipelines and buried utilities will be crossed (Figure 1).

The proposed pipeline will be installed using conventional trench construction for most of the proposed pipeline route, except where trenchless methods are required to prevent disturbance to existing infrastructure (e.g., highways or railway lines) or the surrounding environment (e.g., watercourse crossings). Topsoil and the associated vegetation groundcover will be stripped, salvaged, and stored prior to construction. Phases associated with conventional trenching include preparation of the right-of-way, clearing, soil stripping, grading, trenching, stringing, pipe connecting, lowering of pipe, backfilling, clean up, and reclamation.

The peak construction workforce required for the intake and pump station is expected to be 40 workers. The peak construction workforce for the pipeline and booster station is expected to be 50 workers. Operation of the proposed intake, pump station, pipeline, and booster station is expected to require three permanent employees. The proposed water intake, pump house, and booster station will operate automatically and be remotely controlled, with the option of manual operation for maintenance and testing purposes.

Site-specific programs and procedures will be developed as part of the overall environmental, health, and safety management system for the safe implementation of the Project. These programs will include, but are not limited to occupational health and safety, emergency preparedness and response, and an environmental protection plan.

Public, First Nations, Métis, and Regulatory Engagement

The purpose of the engagement activities was to receive input that is taken into consideration for the final design and routing of the proposed pipeline, and to document these meetings and presentations as required for the environmental assessment process under Saskatchewan's *Environmental Assessment Act*. A description of the approach, stakeholder activities (including names of individuals and groups, locations, dates, and formats), results, and feedback of previous consultations that have been conducted to date in support of the Project are summarized in the EIS for the following four broad categories of stakeholders:

- public (R.M.s, local communities, and other concerned members of the public);
- First Nations and Metis communities;
- landowners; and
- government and regulatory agencies.

Engagement activities were initiated during the spring of 2012 and are ongoing. Future communication and engagement activities, including schedules and linkages to Project milestones and the environmental assessment process, are described in an overall Stakeholder Communication and Engagement Plan that is being used to solicit feedback and integrate recommendations to meet intended outcomes through the various stages of Project development.

Environmental Effects Assessment

SaskWater has completed an assessment of the potential environmental effects of the Project in accordance with guidelines issued by regulatory authorities. The assessment first describes the existing environment and then compares it to the predicted future condition with the Project. After predicting potential environmental effects of the Project, the SaskWater identified ways to avoid or mitigate any adverse effects. A full range of topics was studied under the general categories of the biophysical environment and the socio-economic environment. Some components were selected from these topics for more detailed analysis as valued components (VCs), based on their scientific and cultural importance and potential to be affected by the Project. A number of analyses were completed to evaluate the potential effects on VCs during the construction, operation, and closure phases of the Project.

The overall environmental assessment approach progresses through the following steps:

- description of existing conditions for environmental components so that changes from the Project can be measured;
- identification of VCs, including valued ecosystem components and valued socio-economic components, and associated assessment endpoints and measurement endpoints;
- establishment of environmental assessment boundaries (i.e., spatial and temporal boundaries);

- identification of potential Project-environment interactions, environmental effects pathways, and environmental design features and mitigation practices (i.e., pathways analysis);
- residual effects analysis (i.e., Project-specific effects and cumulative effects);
- consideration of uncertainty;
- determination of significance; and
- development of monitoring and follow-up programs to address the uncertainties and to verify the residual effect predictions.

The identification of key Project-environment interactions and the initial VC selection process were used to guide the design of scientifically robust programs to describe the existing environment. Baseline surveys were completed to document conditions in the area. Observations collected during baseline surveys represent part of the range of variation in the ecological and socio-economic systems produced by historical and current environmental selection pressures (both human and natural). As such, baseline conditions represent the cumulative effects from previous and existing land use practices and natural processes that have shaped the biophysical, cultural, and socio-economic components during the period of human settlement. Results of the baseline surveys were used to support the final VC selection. The final list of VCs for the Project is shown in Table 1 and rationale for the selection of these VCs is provided.

Table 1: Rationale for Selection of Valued Components

Discipline	Valued Component	Rationale
Surface Water Environment	Hydrology	■ Natural and human-related disturbances to hydrology can alter the timing and nature of the interaction between physical and biological components. ■ Maintenance of surface water levels for sustaining recreational activities on Buffalo Pound Lake and downstream lakes has been identified as a concern by local communities.
	Fish and Fish Habitat	■ Fish habitat is critical to the growth and development of the various life stages of fish species including species of concern. Species of concern identified as VCs include: ▪ Bigmouth Buffalo (*Ictiobus cyprinellus*). ▪ Chestnut Lamprey (*Ichthyomyzon castaneus*). ■ Project construction and operation activities may lead to changes in surface water quality, fish habitat, and fish mortality. ■ Changes in water flows can alter water quality and downstream lake levels and change fish habitat.
Terrestrial Environment	Soils	■ Agriculture is the primary land use and economic activity in the Project region. ■ Changes to soil quality have potential to affect the quality and quantity of various crops produced in the region.
	Vegetation	■ Plant populations and communities provide food and habitat for wildlife. ■ Protection of listed (rare) plant species designated by federal and provincial legislation. Species selected as VCs include: ▪ Big Bluestem (*Andropogon gerardii*). ▪ Few Flowered Aster (*Aster pauciflorus*). ▪ Low Milkvetch (*Astragalus lotiflorus*). ▪ Kelsey's Cryptanthe (*Cryptantha kelseyana*). ▪ Lesser Navarretia (*Navarretia leucocephala* ssp. *minima*).

Table 1: Rationale for Selection of Valued Components (continued)

Discipline	Valued Component	Rationale
Terrestrial Environment	Wildlife	■ Protection of listed wildlife species as designated by federal and provincial legislation (*SARA* and COSEWIC) is an important consideration. Listed species identified as VCs include: ▪ burrowing owl (*Athene cunicularia*); ▪ piping plover (*Charadrius melodus*); and ▪ northern leopard frog (*Lithobates pipiens*). ■ Given the large number of species that could potentially interact with the Project, it is neither possible, nor necessary to attempt to measure effects on all possible receptors. Thus, wildlife VCs are identified as surrogates to focus or structure the environmental effects assessment with the understanding that the effects on other components of the environment would be similar. Other selected wildlife VCs include the following: ▪ upland birds; and ▪ Waterbirds.
Cultural	Heritage	■ Heritage resources are important for revealing past and present land use, cultural identity, and relationships with other cultures and the social and biophysical environments. ■ Potential alteration or loss of heritage resources may have an effect on First Nations and Métis people.
Socio-Economics	Employment and Economy	■ Economic and employment opportunities that will be generated by the Project are important to local communities. ■ Changes to the local, regional, and provincial economy by the Project are an important consideration.
	Community Services and Infrastructure	■ Increased traffic volume on local access roads has been identified as a concern by local residents. ■ Increased employment and economy can cause increased demands on community services and infrastructure.
	Land Use	■ Potential change in agricultural capability of land. ■ Potential change in agricultural use of land.

VCs = valued components; *SARA* = *Species at Risk Act*; COSEWIC = Committee on the Status of Endangered Wildlife in Canada.

Residual Effects Classification and Determination of Significance

To meet the Project's water demand the proposed Project will increase water withdrawal from Buffalo Pound Lake, which would be compensated for by additional water inflows from Lake Diefenbaker. The Project has the potential to modify established water levels and discharge levels in lakes and channels of the Qu'Appelle River system. The most obvious effect will be an increase in flow rate in the upper Qu'Appelle River channel and decreased releases in outflow from the Buffalo Pound Dam. The increased flow in the upper Qu'Appelle River likely would result in increased flow velocity, which could affect erosion and sediment transport, potentially altering surface water quality, but can be mitigated by suitable channel maintenance. The decreased outflow is largely dampened downstream in the Qu'Appelle River system when natural inflows from the Moose Jaw River, Wascana Creek, and other tributaries join the main channel of the system. From a hydrological point of view, increased flows mean more availability of water supply, which is a positive effect. These effects on hydrology are considered low in magnitude, medium term in duration, and local in extent. Under these considerations, the residual effects from the Project on the sustainability of the spatial and temporal distribution of water quantity for fish and fish habitat, as well as human use were determined to be not significant.

Effects on the economy would result from the construction, operation, and closure of the Project and its associated employment and business opportunities. Employment from the Project would provide increased income opportunities for residents of the area. About 40 workers will be employed during the pump station and water intake construction phase and about 50 workers will be employed during the pipeline and booster station construction phase. Operation of the proposed intake, pump station, pipeline, and booster station will require about three permanent employees. These effects on the Project area's economy are considered positive, moderate in magnitude, medium to long-term in duration, and regional in extent.

Minor changes from increased demand on infrastructure and services, use of local transportation infrastructure, and increased traffic are anticipated in the area, but this effect will be limited to the period of construction (short-term) and is predicted to have a negligible residual effect on community services and infrastructure. As such, residual effects from the Project on community services and infrastructure are considered to be not significant.

Monitoring Programs

Monitoring programs are proposed to deal with the uncertainties associated with the effect predictions and environmental design features. Monitoring verifies effect predictions and determines the effectiveness of environmental design features. Monitoring is also used to identify unanticipated effects and implement adaptive management. Monitoring can include compliance inspection, environmental monitoring, and follow-up programs. If monitoring or follow-up detects effects that are different from predicted effects or the need for improved or modified design features is identified, then adaptive management will be implemented. This may include increased monitoring, changes in monitoring plans, or additional mitigation.

Monitoring and follow-up programs will be designed and implemented under the following categories:

- Compliance inspection - monitoring the activities, procedures, and programs undertaken to confirm the implementation of approved design standards, mitigation, and conditions of approval and proponent commitments:

- confirm compliance with established lake level and riparian flow targets, set out by WSA as operating limits, to maintain water levels and riparian flows in the Qu'Appelle River system. The WSA is responsible for managing water allocation in the Qu'Appelle River system; and
- include regular inspections for detection of leaks to confirm the integrity of the underground pipeline. Compliance inspections will also be completed to confirm that weed species, as listed under the *Weed Control Act* (2010) are not introduced into new areas.

- Environmental monitoring - monitoring to track conditions or issues during the development lifespan, and subsequent implementation of adaptive management:
  - environmental monitor will be on-site during the course of the Project construction;
  - routine inspection and survey of the right-of-way to assess the effectiveness of mitigation and reclamation (i.e., effectiveness of revegetation and erosion prevention). If areas of concern are noted during the inspection, appropriate measures will be implemented to correct the problem.
- Follow-up monitoring:
  - evaluate the hydrology model and test effect predictions, reduce uncertainty, and determine the effectiveness of environmental design features; and
  - complete detailed site assessments prior to construction to identify listed plant species that may be present in the areas to be disturbed, which were not identified during previous surveys. If listed plant species are identified then appropriate mitigation practices will be developed in consultation with MOE.
  - if unanticipated archaeological materials or features (including but not limited to, hearth features, lithic, ceramic and faunal artifacts, and human remains) are encountered because of construction activities, all work in the immediate area will cease and the Heritage Conservation Branch will be contacted for further direction.

Summary and Conclusions

Based on the detailed Project information and assessment of effects provided in this EIS, SaskWater believes that the Project can be constructed and operated in a manner that, taking into account environmental design features and mitigation, is not likely to cause significant adverse effects on the biophysical or socio-economic environments.