



January 2013

## INTAKE AND PUMP STATION

# Technical Proposal for the SaskWater Buffalo Pound Non-Potable Water System Expansion Project

**Submitted to:**

SaskWater  
#200 - 111 Fairford Street East  
Moose Jaw, Saskatchewan  
S6H 1C8

REPORT



**Project Number:** 12-1362-0044

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Saskatoon, Saskatchewan  
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Saskatoon, Saskatchewan





# Table of Contents

<b>1.0 INTRODUCTION.....</b>	<b>1</b>
1.1 Proponent .....	1
1.2 Contact Information .....	3
1.3 Regulatory Requirements .....	3
1.3.1 Potential Permits, Approvals, and Authorizations .....	4
1.3.1.1 Federal Regulations.....	5
1.3.1.2 Provincial Regulations .....	5
1.3.2 Municipal Regulations .....	7
1.4 Construction Schedule.....	7
<b>2.0 PROJECT DESCRIPTION.....</b>	<b>8</b>
2.1 Project Overview.....	8
2.2 Intake.....	8
2.2.1 Site Selection and Alternatives .....	10
2.2.2 Construction Techniques .....	10
2.2.3 Operations and Maintenance .....	13
2.3 Pump Station .....	13
2.3.1 Site Selection and Alternatives .....	13
2.3.2 Pump Station Description.....	13
2.3.3 Construction Techniques .....	15
2.3.4 Operations and Maintenance .....	15
2.4 Site Access .....	15
2.5 Related Construction Considerations .....	15
2.5.1 Fuel Handling.....	15
2.5.2 Waste Management .....	16
2.5.3 Weed Management.....	16
2.5.4 Decommissioning and Abandonment.....	16
2.5.5 Emergency Response Plan.....	16
2.5.6 Human Safety .....	16



### Table of Contents(continued)

<b>3.0</b>	<b>EXISTING ENVIRONMENT .....</b>	<b>17</b>
3.1	Introduction .....	17
3.2	Land Use .....	17
3.2.1	Sensitive Areas .....	17
3.3	Climate .....	17
3.4	Air Quality .....	19
3.5	Noise .....	19
3.6	Terrain and Soils.....	20
3.6.1	Terrain.....	22
3.6.2	Soils .....	22
3.6.2.1	Erosion Sensitivity .....	22
3.6.2.2	Compaction .....	23
3.6.2.3	Contaminated Sites .....	23
3.7	Vegetation .....	24
3.7.1	Listed Plant Species.....	24
3.7.2	Weed Species.....	25
3.8	Wildlife and Wildlife Habitat .....	29
3.8.1.1	Mammals .....	29
3.8.1.2	Birds .....	30
3.8.1.3	Reptiles and Amphibians .....	31
3.8.2	Listed Wildlife Species .....	32
3.9	Hydrology and Regional Geology .....	39
3.9.1	Hydrology .....	39
3.9.2	Regional Geology.....	45
3.9.3	Bathymetry .....	45
3.9.4	Lake Bed.....	46
3.9.5	Stratigraphy of Upland and Valley Slope.....	46
3.10	Aquatic Resources.....	46



### Table of Contents(continued)

3.10.1	Water Quality .....	48
3.10.2	Fish Community .....	48
3.10.3	Sensitive Fish Species .....	51
3.10.4	Fish Habitat Assessment .....	52
3.11	Heritage Resources .....	53
3.12	Socio-economics .....	56
3.12.1	Socio-economic Study Area .....	56
3.12.2	Human Occupancy and Resource Use .....	58
3.12.2.1	Population .....	58
3.12.2.2	Land Use .....	60
3.12.2.3	Traditional Land and Resource Use .....	60
3.12.2.4	Parks, Protected Areas, and Recreation .....	60
3.12.2.5	Hunting, Trapping, and Fishing .....	60
3.12.3	Infrastructure and Services .....	62
3.12.3.1	Traffic .....	62
3.12.3.2	Emergency and Health Care Services .....	62
3.12.3.3	Temporary Accommodation .....	62
3.12.4	Employment and Economy .....	63
3.12.4.1	Local, Regional, and Aboriginal Participation .....	63
3.13	Engagement .....	63
3.13.1	Public Stakeholders .....	63
3.13.2	Local Community Officials .....	65
3.13.3	Community Information Sessions .....	65
3.13.4	Results and Feedback .....	67
3.13.4.1	Sun Valley Community Information Session .....	67
3.13.4.2	Pense Community Information Session .....	70
3.13.4.3	Kronau Community Information Session .....	73
3.13.4.4	Questions and Responses from Community Information Sessions .....	75



### Table of Contents(continued)

3.13.5	Landowners .....	77
3.13.6	First Nations and Métis Communities.....	77
3.13.6.1	First Nations and Métis Engagement Activities.....	78
3.13.6.2	Questions and Responses from First Nations and Métis Engagement Activities.....	80
3.13.6.3	Traditional Land Use.....	81
3.13.6.3.1	Methods .....	81
3.13.6.3.2	Results .....	82
3.13.7	Regulatory Engagement .....	83
<b>4.0</b>	<b>ENVIRONMENTAL ASSESSMENT .....</b>	<b>84</b>
4.1	Assessment Approach.....	84
4.2	Valued Environmental Components .....	84
4.3	Potential Interactions and Mitigation .....	85
<b>5.0</b>	<b>RESIDUAL ENVIRONMENTAL EFFECTS AND DETERMINATION OF SIGNIFICANCE .....</b>	<b>93</b>
5.1	Incremental Residual Environmental Effects from the Project.....	95
5.2	Cumulative Environmental Effects.....	95
<b>6.0</b>	<b>PUBLIC CONSULTATION .....</b>	<b>97</b>
<b>7.0</b>	<b>MONITORING PROGRAMS.....</b>	<b>98</b>
<b>8.0</b>	<b>FISH HABITAT COMPENSATION PLAN .....</b>	<b>99</b>
<b>9.0</b>	<b>CLOSURE.....</b>	<b>100</b>
<b>10.0</b>	<b>LITERATURE CITED.....</b>	<b>101</b>

#### TABLES

Table 1:	Summary of Potential Permits/Approvals/Authorizations Required Prior to Construction .....	4
Table 2:	Restricted Construction Timing Windows (Saskatchewan) .....	10
Table 3:	Mean Monthly Temperature and Precipitation at Moose Jaw, Saskatchewan Climate Station .....	17
Table 4:	Ambient Air Quality Guidelines.....	19
Table 5:	Listed Plant Species that Have Potential to Occur or Have Been Observed in the Project Area .....	26
Table 6:	Bird Species Observed during Wildlife Field Assessments, 2012 .....	30
Table 7:	Provincial and Federal Listed Species with the Potential to Occur in the Project Area .....	33



### Table of Contents(continued)

#### TABLES (continued)

Table 8: Buffalo Pound Lake Level Desirable Operating Ranges .....	42
Table 9: Buffalo Pound Lake Area-Volume-Elevation Relationship.....	42
Table 10: Buffalo Pound Lake Water Quality Data 1980-1986 <sup>(a)</sup> and 2007-2009 <sup>(b,c)</sup> .....	49
Table 11: Common and Scientific Names of Fishes Reported in the Qu'Appelle River and Buffalo Pound Lake .....	51
Table 12: Sensitive Fish Species that May Occur in the Project Area Based on Historical Ranges.....	52
Table 13: Population Statistics for the Socio-economic Study Area.....	59
Table 14: Population Statistics for First Nations Communities within approximately 100 km of the Project.....	59
Table 15: Agriculture Statistics for Rural Municipalities in the Socio-economic Study Area.....	61
Table 16: Average Annual Daily Traffic in 2006 and 2011 in the Socio-economic Study Area .....	62
Table 17: 2006 Education and Employment Statistics for Rural Municipalities and Communities in the Socio-economic Study Area .....	64
Table 18: Education and Employment Statistics for First Nation Communities within approximately 100 km of the Project.....	64
Table 19: List of Meetings with Rural Municipalities.....	65
Table 20: List of Community Information Sessions .....	65
Table 21: Placement of Newspaper Advertisements.....	66
Table 22: Placement of Posters .....	66
Table 23: Communities Represented at the Sun Valley Community Information Session .....	67
Table 24: Question 1 - Sun Valley Community Information Session.....	68
Table 25: Question 3 - Sun Valley Community Information Session.....	69
Table 26: Communities Represented at the Pense Community Information Session .....	71
Table 27: Question 1 - Pense Community Information Session.....	72
Table 28: Question 3 - Pense Community Information Session.....	73
Table 29: Communities Represented at the Kronau Community Information Session.....	74
Table 30: Question 1 - Kronau Community Information Session.....	74
Table 31: Question 3 - Kronau Community Information Session.....	75
Table 32: Questions and Answers from the Community Information Sessions.....	76
Table 33: List of all First Nations and Métis Community Meetings .....	79
Table 34: Questions and Answers from First Nations and Métis Engagement Activities .....	81
Table 35: List of Participants in the Traditional Land Use Survey .....	82
Table 36: List of Regulatory Meetings.....	83



### Table of Contents(continued)

#### TABLES (continued)

Table 37: Potential Environmental Effects, Proposed Mitigation, and Predicted Residual Effects .....	86
Table 38: Native Seed Mixture for the Project.....	90
Table 39: Criteria for the Determination of Significance of Residual Environmental Effects .....	93
Table 40: Determination of Significance of Residual Environmental Effects to Fish and Fish Habitat .....	95

#### FIGURES

Figure 1: Location of the Proposed SaskWater Buffalo Pound Non-Potable Water System Intake and Pump Station Project.....	2
Figure 2: Site Plan for the Proposed SaskWater Buffalo Pound Non-Potable Water System Intake and Pump Station Project.....	9
Figure 3: Environmental Sensitivities for the Proposed SaskWater Buffalo Pound Non-Potable Water System Intake and Pump Station Project.....	18
Figure 4: Soil Associations Map and Soil Sampling Points in the Project Area .....	21
Figure 5: Annual Releases from Qu'Appelle Dam for the Period of Record 1984-2010.....	41
Figure 6: Mean Daily Releases from Qu'Appelle Dam for the Period of Record 1984-2010 .....	41
Figure 7: Annual Water Elevation for Buffalo Pound Lake for the Period of Record 1984-2011.....	43
Figure 8: Mean Daily Water Elevation for Buffalo Pound Lake for the Period of Record 1984-2011.....	43
Figure 9: Daily Hydrograph on the Qu'Appelle River Downstream of Buffalo Pound Dam (1984-1994) .....	44
Figure 10: Annual Water Elevation for Last Mountain Lake.....	45
Figure 11: Interpreted Stratigraphic Cross Section.....	47
Figure 12: Habitat Map for Buffalo Pound Lake.....	54
Figure 13: Bathymetry – Southeast Section of Buffalo Pound Lake .....	55
Figure 14: Socio-economic Study Area .....	57
Figure 15: Question 2 - Sun Valley Community Information Session .....	69
Figure 16: Question 2 - Pense Community Information Session .....	72
Figure 17: Question 2 - Kronau Community Information Session.....	75

#### PHOTOS

Photo 1: Community Information Session in Pense .....	71
Photo 2: Community Information Session in Kronau.....	74



## **Table of Contents(continued)**

### **APPENDICES**

#### **APPENDIX A**

Pre-Design Report

#### **APPENDIX B**

Soil Data

#### **APPENDIX C**

Community Information Session Materials

SaskWater Information, Facts Sheets, Feedback Forms, and Information Sessions

Advertising

SaskWater Letter to Vale

Traditional Land Use Questionnaire



### 1.0 INTRODUCTION

SaskWater is proposing an expansion to the Buffalo Pound Non-Potable Water Supply System (BPNPWSS). The Project is located in south-central Saskatchewan approximately 23 kilometres (km) northeast of Moose Jaw in the Rural Municipality (R.M.) of Moose Jaw (Figure 1). The proposed intake and pump station will be required to deliver a maximum flow rate of 87 ML/d (3,625 m<sup>3</sup>/h). The majority of the flow will be delivered to the Vale Potash Canada Ltd. (Vale) potash mine site near Kronau with the remainder of the flow designated for customers in the Belle Plaine Industrial Corridor. The expected maximum flow rate for the first years of operation beginning in the first quarter of 2016 for the intake and pump station is expected to be 1,000 m<sup>3</sup>/h. The demand for water is expected to reach the full capacity of 3,625 m<sup>3</sup>/h by the year 2019.

Associated Engineering (Sask) Ltd. (AE) prepared conceptual design reports for the Project (Appendix A). Infrastructure for this Project includes a raw water intake and an intake pipeline (intake conduit) connecting the water intake to the pump station. A Technical Proposal (TP) for the pipeline will be submitted under separate cover.

Golder Associates Ltd. (Golder) was retained by AE to prepare and submit a TP on behalf of SaskWater. The scope of this report includes a Project overview coupled with the proposed construction, site stabilization, operation, and decommissioning of the Project. The following provides a summary of the report contents:

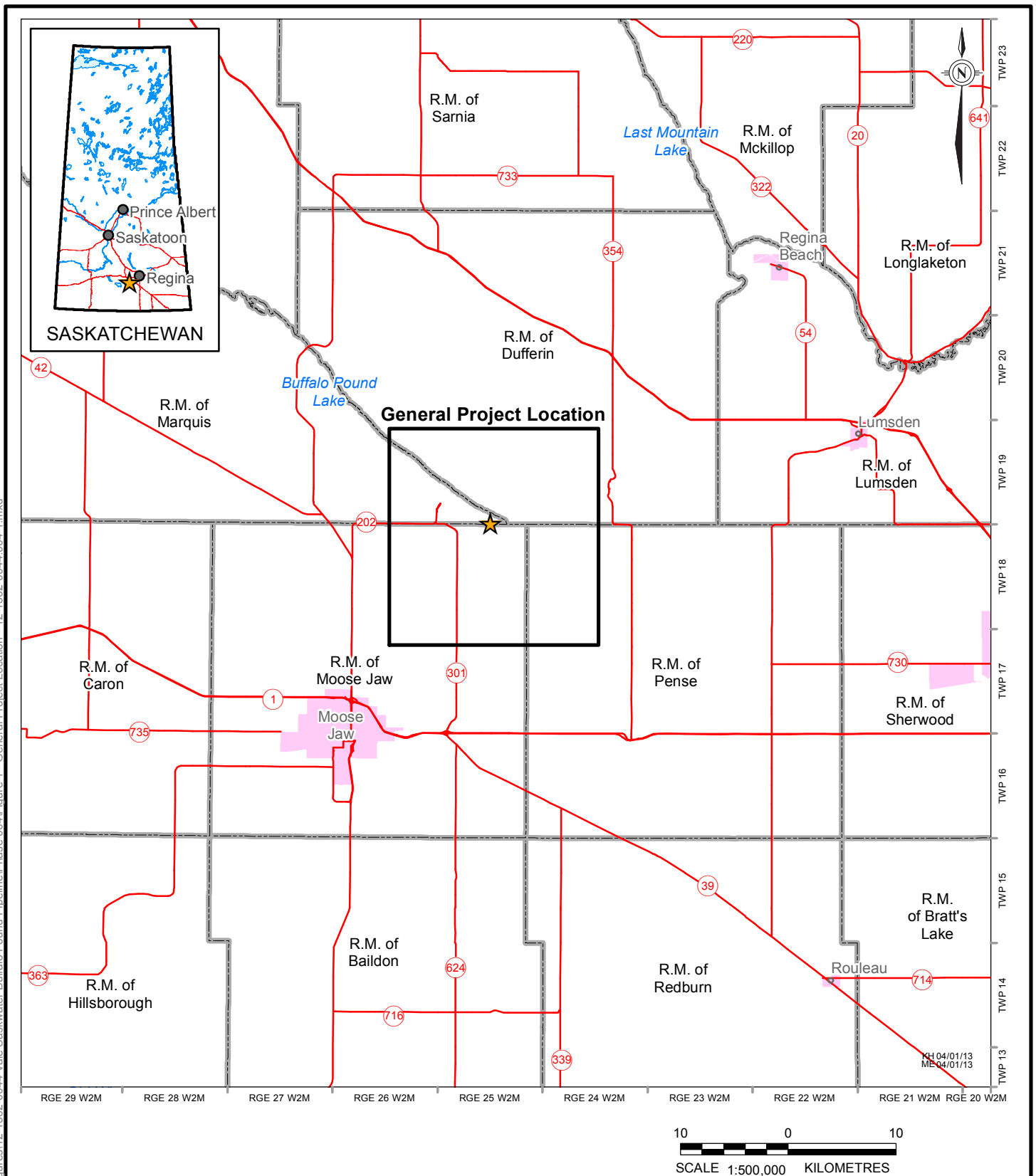
- **Section 1:** an overview of the Project, including regulatory requirements.
- **Section 2:** a description of the Project including components, construction methods, and operation.
- **Section 3:** a description of the biophysical setting in the Project area.
- **Section 4:** a description of the proposed environmental protection and/or mitigation and prediction of the potential impacts from the Project.
- **Section 5:** a description of any potential residual impacts from the Project on the environment after applying mitigation.
- **Section 6:** a description of engagement and public consultation for the Project.
- **Section 7:** a description of monitoring and inspection programs for the Project.
- **Section 8:** a description of compensation for fish habitat.

### 1.1 Proponent

SaskWater is Saskatchewan's Crown water utility and water service provider, providing access to potable and non-potable water and wastewater services for Saskatchewan communities, First Nations, and industry (SaskWater 2008).

Headquartered in Moose Jaw, SaskWater employs approximately 100 people in 13 operating locations and owns/operates seven water treatment plants, three wastewater facilities, 38 pump stations, and over 800 km of pipeline. SaskWater also maintains customer-owned systems and provides operator training to 39 Saskatchewan First Nations communities.

G:\CLIENTS\VALE\VALE Potash Project\Figures\12-1362-0044 Vale SaskWater Buffalo Pound Pipeline\Phase 004\Figure 1- General Project Location - 12-1362-0044.004-1.mxd



#### REFERENCE

ROADS AND HIGHWAYS © DMTI, 2011  
NTS MAPSHEET:721  
NAD 83 UTM ZONE 13



**SaskWater**

PROPOSED SASKWATER BUFFALO POUND  
NON-POTABLE WATER SYSTEM EXPANSION  
PROJECT - INTAKE AND PUMPSTATION

TITLE

### LOCATION OF THE PROPOSED SASKWATER BUFFALO POUND NON-POTABLE WATER SYSTEM INTAKE AND PUMP STATION PROJECT



Saskatoon, Saskatchewan

PROJECT		12-1362-0044	FILE No.	
DESIGN	LMR	04/01/13	SCALE AS SHOWN	REV. 0
GIS	LMR	04/01/13	<b>FIGURE: 1</b>	
CHECK	KH	04/01/13		
REVIEW	ME	04/01/13		



### 1.2 Contact Information

SaskWater contact person for the regulatory and environmental approvals component of the Project is:

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The engineering consultant for the proposed Project is AE. The contact person for AE is:

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The Golder contact person for the environmental assessment component and associated reporting of the Project is:

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### 1.3 Regulatory Requirements

The following sections contain a summary of the potential permits and regulatory approvals required prior to the construction and operation of the Project. Although the TP will serve as the primary environmental application for the Project in conjunction with the Pre-Design Report, other provincial and federal approvals may also be necessary.



The provincial government is in the process of moving to a results based environmental management model to be more responsive to changing demands of the economy and enhance opportunities for sustainable development in the province. This change will include the amalgamation of some current provincial *Acts* (e.g., *Clear Air Act*, *Litter Control Act*, and *State of the Environment Act*) with the current *Environmental Management and Protection Act (EMPA)*. This will allow a movement away from controlling activities with permits and approvals to establishing a Saskatchewan Environmental Code. While many of the current permits and approvals will be eliminated, high risk activities will remain permitted.

SaskWater has or will be discussing the Project with various regulatory agencies including:

- Saskatchewan Ministry of Environment (MOE): to discuss water supply alternatives and other potential Project impacts.
- Saskatchewan Water Security Agency (SWSA): to discuss current water availability from Buffalo Pound Lake.
- SaskPower: to discuss power requirements.
- SaskTel: to discuss communication and data services requirements.
- Fisheries and Oceans Canada (DFO): to discuss water supply and fish habitat compensation.
- Transport Canada: Navigable Waters.

### 1.3.1 Potential Permits, Approvals, and Authorizations

Table 1 contains a summary of the potential permits and regulatory approvals required prior to construction of the Project.

**Table 1: Summary of Potential Permits/Approvals/Authorizations Required Prior to Construction**

Act or Code	Applicable Section or Associated Regulations	Permit/Approvals or Review Process Required	Primary Contact Agent
<b>Canada</b>			
<i>Fisheries Act</i>	35(2)	Authorization for Lost and Altered Fish Habitat	DFO
<i>Canadian Environmental Assessment Act</i>	5 (1) (i, ii)	Review required	DFO
<i>Species at Risk Act</i>	N/A	Review required	DFO/Environment Canada
<i>Migratory Bird Conventions Act</i>	N/A	Review required	Environment Canada
<i>Navigable Waters Protection Act</i>	5(1)	Review required	Transport Canada
<b>Saskatchewan</b>			
<i>Heritage Property Act</i>	63	HRIA	PCS
<i>Wildlife Act</i>	N/A	Review required	MOE
<i>Environmental Management and Protection Act</i>	36(1)	AHPP	MOE
	Hazardous Substances and Waste Dangerous Goods Regulations (Section 10)	If storing hazardous substances or waste dangerous goods, Approval to Construct or Upgrade a Storage Facility will be required	



**Table 1: Summary of Potential Permits/Approvals/Authorizations Required Prior to Construction (continued)**

Act or Code	Applicable Section or Associated Regulations	Permit/Approvals or Review Process Required	Primary Contact Agent
<b>Saskatchewan (continued)</b>			
<i>Environmental Assessment Act</i>	9(1)	Review Required	MOE
<i>The Saskatchewan Watershed Authority Act</i>	50	Water Rights Licensing and Approval to Construct and Operate	Watershed Authority

DFO = Fisheries and Oceans Canada; HRIA = Heritage Resources Impact Assessment; PCS = Saskatchewan Ministry of Parks, Culture and Sport; MOE = Saskatchewan Ministry of Environment; AHPP = Aquatic Habitat Protection Permit.

### 1.3.1.1 Federal Regulations

#### **Fisheries Act**

The Project may require authorizations and/or Letters of Advice pursuant to Subsection 35(2) of the *Fisheries Act* (1985).

#### **Canadian Environmental Assessment Act**

The Environmental Assessment processes, to which the Project is set, are from the *Canadian Environmental Assessment Act*.

#### **Species at Risk Act**

A consultation regarding the *Species at Risk Act* (SARA) (2009) may be required to determine if requirements of the *Act* are met using the proposed mitigation anticipated by this Project.

#### **Migratory Bird Conventions Act**

A consultation regarding the *Migratory Bird Convention Act* (MCBA) (1994) may be required to determine if requirements of the *Act* are met using the proposed mitigation anticipated by this Project.

#### **Navigable Waters Protection Act**

The Project will require approvals pursuant to Section 5(1) of the *Navigable Waters Protection Act* (NWPA) (1985). The NWPA will apply to the intake when construction takes place within Buffalo Pound Lake. A Project description and application will be submitted to Navigable Waters Protection Branch of Transport Canada for their review under the NWPA prior to construction.

### 1.3.1.2 Provincial Regulations

#### **Heritage Property Act**

Heritage resources, as defined under the *Heritage Property Act*, include all of Saskatchewan's historic and pre-contact archaeological sites, architecturally significant structures, and paleontological resources. As per Section 66 of the *Heritage Property Act*, all heritage resources on privately owned land and Crown land are considered to be property of the Crown. The Heritage Conservation Branch within the Saskatchewan Ministry of Parks, Culture and Sport (PCS) manages these sites.



Section 63 of the *Heritage Property Act* empowers PCS to require a developer to complete a Heritage Resources Impact Assessment (HRIA) for any Project that has the potential to impact significant heritage resources. It is the responsibility of the proponent to submit all proposed operations for regulatory review to the Heritage Conservation Branch. The review will detail what assessments will be required for the proposed operations. Developers are obligated to commission a qualified archaeologist to conduct any required assessment or mitigative procedures.

### **Wildlife Act**

Species listed in the provincial regulations of the *Wildlife Act* (1998) provides protection for all federally listed species under the SARA and provincially listed species classified as endangered or threatened. A consultation regarding the *Wildlife Act* may be required to determine if requirements of the *Acts* are met using the proposed mitigation anticipated by this Project.

### **Environmental Management and Protection Act**

As the Project will involve the alteration of aquatic habitat, an Aquatic Habitat Protection Permit (AHPP) will be required under the *EMPA*. Under *EMPA*, waterbodies and watercourses are protected as per Section 36 (1): Without a valid permit authorizing the activity, no persons shall, directly, or indirectly:

- a) alter or cause to be altered the configuration of the bed, bank, or boundary of any river, stream, lake, creek, marsh or other watercourse or waterbody;
- b) remove, displace or add any sand, gravel or other material from, in or to the bed, bank or boundary of any river, stream, lake, creek, marsh or other watercourse or water body; or
- c) remove vegetation from the bed, bank, or boundary of any river, stream, lake, creek, marsh, or other watercourse or water body.

An AHPP application will be completed prior to construction.

### **Environmental Assessment Act**

The MOE is authorized under the *Environmental Assessment Act* to review potential environmental effects of any proposed projects. A development is defined as any project, operation or activity, or any alteration or expansion of any project, operation, or activity, which is likely to:

- have an effect on a unique, rare or endangered feature of the environment;
- substantially utilize any provincial resource and in so doing pre-empt the use, or potential use of that resource for any other purpose;
- cause the emission of any pollutants or create by-products, residual or waste products which require handling or disposal in a manner that is not regulated by any other *Act* or regulation;
- cause widespread public concern because of potential environmental changes;
- involve a new technology that is concerned with resource utilization and that may induce significant environmental change; or



- have a significant impact on the environment or necessitate a further development, which is likely to have a significant impact on the environment.

Any project defined as a “development” must be approved by the MOE before it may proceed. The *Act* also outlines the criteria used to determine whether or not a project is a development and provides opportunities for the public to contribute in the decision making process (MOE 2008).

### ***The Saskatchewan Watershed Authority Act***

Consultation with the Watershed Authority (now referred to as the Saskatchewan Water Security Agency) may be required to determine if water rights licensing and approval to construct and operate the Project may be required under the *Saskatchewan Watershed Authority Act* (2005).

### **1.3.2 Municipal Regulations**

The Project is located within the R.M. of Moose Jaw. The R.M. will need to approve any road use for construction, and will need to be consulted regarding any local building code requirements that may apply to the Project. Formal approval from a R.M. regarding roadways is typically required before permits can be obtained from the Saskatchewan Ministry of Highways and Infrastructure.

## **1.4 Construction Schedule**

Subject to regulatory approval, it is anticipated that construction will begin the second quarter of 2014. Due to restrictions imposed by allowable construction windows (i.e., ice formation and in water activity restrictions), construction activities may not be continuous, nonetheless, completion is anticipated for first quarter of 2016.



## 2.0 PROJECT DESCRIPTION

### 2.1 Project Overview

The proposed Project will be situated on the south shore of Buffalo Pound Lake within the NE 34-18-25 W2M and will extend into the lake approximately 50 metre (m) from the shoreline of Buffalo Pound Lake (Figure 2). For a more detailed description of the facility design, the reader is referred to the Pre-Design Report (Appendix A).

SaskWater currently operates two pump stations on the south shore of Buffalo Pound Lake within the Buffalo Pound Provincial Park to supply non-potable water to customers in the Belle Plaine Industrial Corridor.

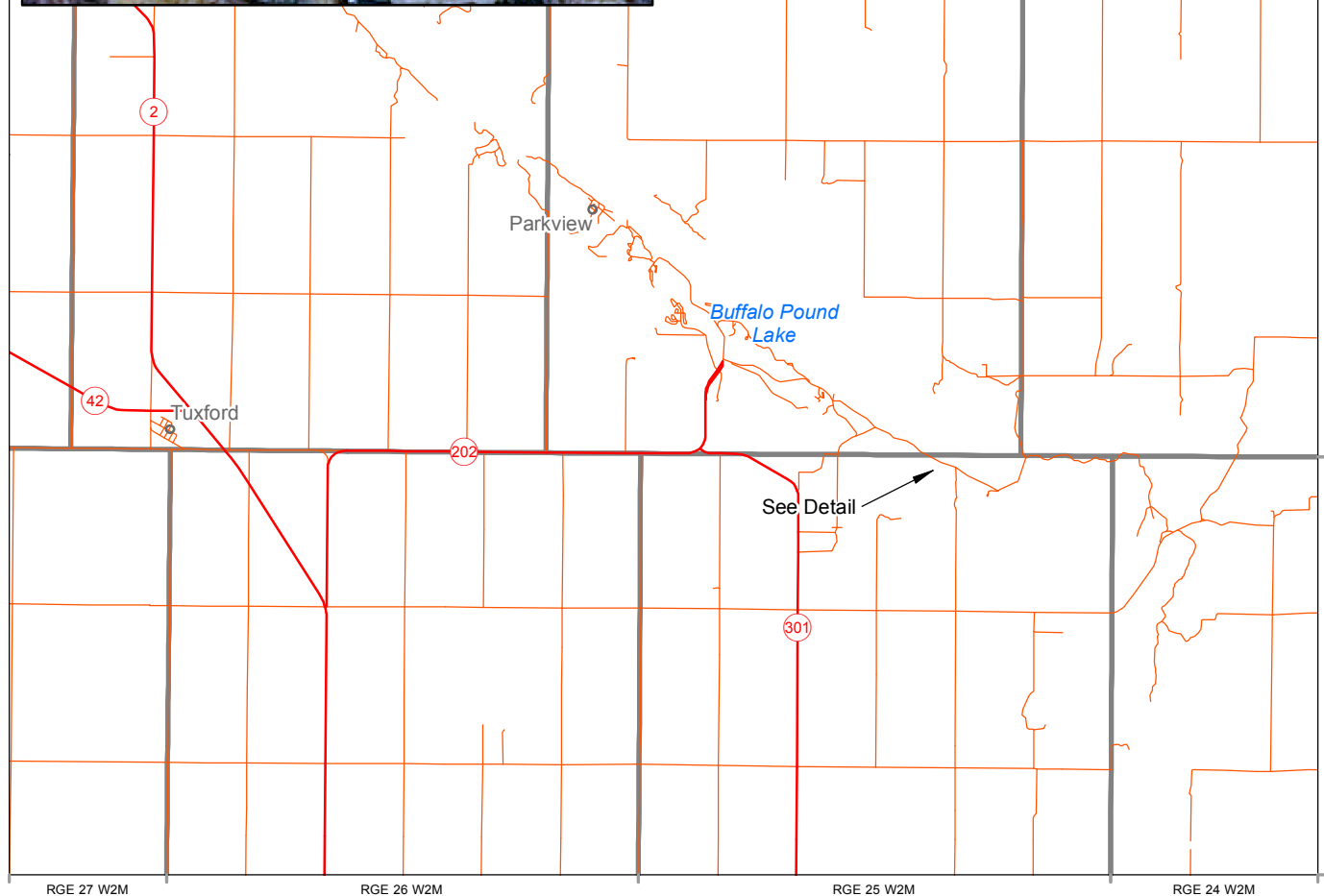
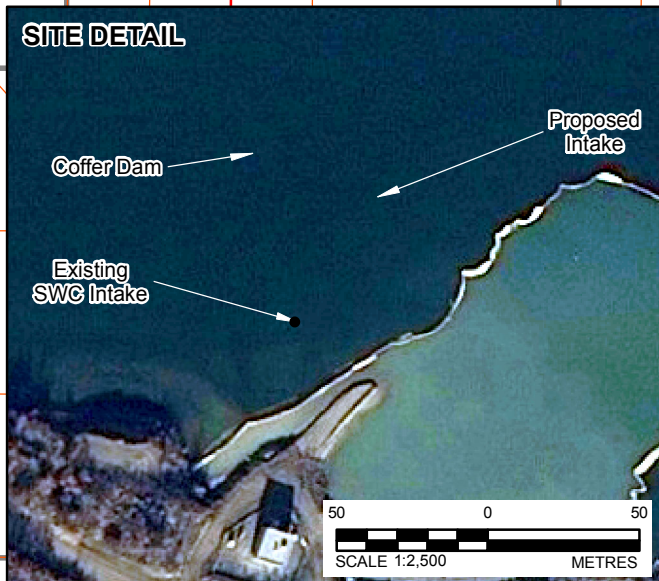
In order to confine operations to a simple area, improve maintenance efficiency, mitigate aquatic/terrestrial habitat fragmentation and take advantage of suitable in water conditions and profile (i.e., bathymetry), the proposed intake and pump station will be located near the existing stations within the provincial park.

### 2.2 Intake

The proposed structure will include an intake chamber with a connecting intake pipeline to the pump station. The proposed intake design consists of a 6.7 m by 6.7 m concrete encased structure with a bell mouthed entrance covered by coarse bar screening with 75 millimetre (mm) spacing, incorporating a 90 degree bend at the end of the intake conduit. The proposed bottom of intake port elevation will be 507.3 m in relation to a lake bottom elevation of 507.0 m, which are the same elevations as those incorporated into the existing adjacent SaskWater intake structure (Yara) and SaskWater BPNPWSS – East (Mosaic) intake, which has performed satisfactorily since installation (Appendix A). The intake entrance will be covered by a reinforced steel plate creating a vertical inlet port below the design ice level allowing a maximum entrance velocity of 0.13 metres per second (m/s) at a flow capacity of 94 ML/day (3,917 cubic metres per hour [ $\text{m}^3/\text{hr}$ ]) (Appendix A). A minimum elevation of approximately 1.0 m from the top of the intake structure to the low water level in winter will be necessary for protecting the structure from lake ice (Appendix A).

A 1,350 mm internal diameter conduit pipe is proposed to connect the water intake structure to the proposed pump station. This design will limit maximum velocity to 0.76 m/s (Appendix A). Given the soft and variable soil conditions encountered and the potential for non-uniform bedding support, the use of flexible pipe material for the intake conduit is recommended to allow distortion capacity. Flexible couplings will be required at the connection to the intake structure to allow for potential differential settlement. Lined and coated steel pipe with a 1,350 mm diameter with a 9.5 mm wall thickness is recommended for the intake conduit, assuming conventional installation. The proposed route for the intake conduit crosses the existing Yara intake conduit, assuming that the existing pipe and intake will be decommissioned. Portions of the Yara intake conduit may be removed if required.

Construction of the water intake structure will occupy approximately 10,000 square metres ( $\text{m}^2$ ) of fish habitat; however, limited permanent alteration of fish habitat is expected, given the proposed construction techniques (i.e., limited area of the intake structure, conduit pipeline to be buried, and no substantial protrusion and/or spur is proposed into the lake). It is estimated that approximately 50  $\text{m}^2$  of fish habitat will be permanently altered and/or lost and approximately 10,000  $\text{m}^2$  of shoreline will be altered. A conceptual Fish Habitat Compensation Plan will be prepared by Golder and will be submitted under a separate cover (Section 7.0).

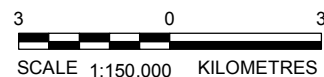


### LEGEND

- TOWNSHIP AND RANGE BOUNDARY
- HIGHWAY
- ROAD
- COMMUNITY
- POTENTIAL WATER INTAKE/PUMP STATION

### REFERENCE

SASKATCHEWAN GEOSPATIAL IMAGERY COLLABORATIVE, ORTHO IMAGERY DATASET  
 ROADS AND HIGHWAYS © DMTI, 2011  
 NTS MAPSHEET: 72I/05, 06, 11 12  
 NAD 83 UTM ZONE 13



**SaskWater**

PROPOSED SASKWATER BUFFALO POUND  
 NON-POTABLE WATER SYSTEM EXPANSION  
 PROJECT - INTAKE AND PUMPSTATION

TITLE

## SITE PLAN FOR THE PROPOSED SASKWATER BUFFALO POUND NON-POTABLE WATER SYSTEM INTAKE AND PUMP STATION PROJECT



Saskatoon, Saskatchewan

PROJECT	12-1362-0044	FILE No.
DESIGN		
GIS	LMR/SM	04/01/13
CHECK	KH	04/01/13
REVIEW	ME	04/01/13

SCALE AS SHOWN	REV. 2
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**FIGURE: 2**



### 2.2.1 Site Selection and Alternatives

In May 2012, nine potential sites were examined as possible development locations for the intake and pump station. Six sites were along the south shore of Buffalo Pound Lake between the existing BPNPWSS and the Buffalo Pound Water Treatment Plant, and three sites were examined near existing pump stations. Site selection for the proposed intake was evaluated on the basis of topographic and bathymetric data, consideration of the preferred pump station location, as well as proximity and design of nearby facilities, and construction cost. Bathymetric data collected by Golder indicated that there were no significant changes in the lake depth west of the existing intakes. As such, an in-lake intake structure similar to the recently constructed SaskWater BPNPWSS – East (Mosaic) intake will be suitable for the water depths at this site (Appendix A). The proposed location of the intake structure is also similar in distance from the shore as the other nearby facilities, as well as having the same lake bottom elevation and bottom of port elevation as the adjacent SaskWater intake structure (Yara) and SaskWater BPNPWSS – East (Mosaic) intake, which has performed satisfactorily since installation (Appendix A).

### 2.2.2 Construction Techniques

It is expected that an earthen coffer dam will be used to isolate the work area needed for construction of the intake structure and conduit. Construction of the coffer dam will take into account the in-water construction timing window. Restricted activity timing windows have been identified by DFO (2009) to protect fish during spawning and incubation periods (Table 2). These restricted activity periods are determined based on the species of fish in the water body, timing of spawning, and the location of the water body in the province. Immediately prior to in-water construction, it is anticipated that a floating silt curtain will be installed around the work area followed by a fish salvage program completed within the perimeter of the silt curtain. A Total Suspended Solids (TSS) monitoring program will run concurrently with in-water work to monitor the effectiveness of the silt curtain. A TSS Monitoring Plan will be provided in advance to DFO and MOE and results of the monitoring program will be reported to the appropriate regulatory authorities at regular intervals. The silt curtain is expected to remain in place during the entire in-water construction phase of the Project, which is expected to be approximately 12 to 18 months in duration. By maintaining it in place, works can be completed within the silt curtain during restricted construction periods (October 1 to May 31).

**Table 2: Restricted Construction Timing Windows (Saskatchewan)**

Location	Spring Spawning Fish	Fall/Winter Spawning Fish
southern Saskatchewan	April 1 – May 31	October 1 – May 31

The design and source of borrow material for the coffer dam will be the responsibility of the contractor using a qualified engineer. It is expected that material for construction of the coffer dam will be sourced from outside of the Project area from suitable and approved borrow sites. However, if a suitable source site is identified near the Project site, it may be considered as a borrow location. If the former option is pursued, the contractor will be responsible for the sourcing of the materials and the correct disposal of materials once the coffer dam is removed. If material will be sourced from within Buffalo Pound Provincial Park, the Park Manager, and PCS will be consulted. Further, the contractor, in conjunction with SaskWater, will obtain all the necessary approvals to obtain, transport, and dispose of surplus material during and after construction. All surplus borrow material will be stored in a secured area above the high watermark or will be contained within the area encompassed within the silt curtain (coffer dam) during construction and reclamation.



In the event that an identified borrow site is located on Crown land, the contractor and/or subcontractor will complete the necessary site assessment, including the submission of stabilization or reclamation plans. It is expected that a portion of the coffer dam material will be available from the excavation for the pump station structure, as well as from road re-allocation (discussed further in Section 2.3).

The first step in coffer dam construction will consist of fill being deposited on the shore and pushed into the lake. Truck setback distances will be determined in the field. The fill placement technique will have the dozer push the leading edge of the fill down into the water. This technique will increase the scouring potential of the fill as it is placed across the lake bottom, which will, in general, improve the foundation conditions. Additionally, this method will help to maintain the water-softened leading edge of the fill without covering it with fresh fill. Fill placement using the technique described may result in the formation of a zone of soft sediments at the leading edge of the fill. If a zone of soft sediments is produced, its extents will be determined and monitored to assess potential impacts on the geotechnical performance.

During the placement of fill into the lake, it is important that all personnel maintain awareness of any signs of unplanned fill movement into the lake (e.g., over-steepening of fill, cracks, or settlement of the fill). This method of fill placement should be used to construct the working surface to an elevation of approximately 0.5 m above the level of the lake. Fill above this elevation will be placed in compacted lifts. The fill will be placed to an elevation, which provides adequate freeboard against overtopping due to water level fluctuations or wave run-up.

During dewatering of the interior of the coffer dam, observations will be made for excessive seepage and any indications of slope movement (e.g., cracks, sloughing). Also, monitoring wells around the perimeter of the fill will be measured for TSS throughout construction. Prior to the excavation of the base of the intake structure, a small test pit will be advanced to assess the fill stability and seepage conditions. Scheduling of the construction work will also include provisions for minimizing the amount of open excavations and trenches.

After the site has been prepared, forms for the intake concrete foundation will be installed. After the concrete foundation has been poured, the substructure walls and elevated floor slabs will be constructed. Once the coffer dam is no longer required at the end of the Project, using industry best practices and lake elevation monitoring, it will be removed. At the completion of construction, it is anticipated that fill material not required for the final configuration will be removed from the lake and transported off-site. Limited shoreline alteration is expected upon completion, and efforts will be made to recontour the shoreline using rip rap or other erosion control materials to reduce long-term erosion and sedimentation.

A dewatering system within the isolated area will be required by the contractor. The work area inside the coffer dam will be dewatered by pumping water onto the riparian vegetation located adjacent to the site, where it will be filtered naturally before returning to the lake. Use of silt fence will be incorporated to filter sediment, if considered necessary.



On the upland area, SaskWater will secure a right-of-way (ROW) or lease area and, as required, temporary work space of sufficient width and size to accommodate construction activities, including the short-term storage of excavated spoil. Above the shoreline, any topsoil on the site will be stripped and stored for replacement during site clean-up and reclamation. Before starting any earthwork above the shoreline, appropriate sediment control (e.g., filter fencing, sediment traps, berms, and straw bale grid) will be installed above and along the high water mark (i.e., bank top) to contain and prevent stripped topsoils and grade/excavated subsoil from migrating to the lake edge. Sediment control measures will be left in place and maintained throughout the duration of construction activities and until reclaimed disturbed areas are stabilized. A temporary containment area up slope and away from the shoreline may be required for excavated material if sufficient room is not available in the coffer dam area. The storage area will be of sufficient size to accommodate the storage of saturated soils.

During the final sizing and site selection for storage, SaskWater and/or their contractor will take into consideration that the water pipeline trench may generate a sufficient volume of spoil if the trench walls need to be sloped to reduce sloughing. Alternatively, shoring may be used to maintain trench wall integrity and thereby reduce spoil storage requirements. If an on land storage area is required, it will be designed with primary containment to prevent excavated material from entering the lake.

Immediately after the pipeline has been lowered, the trench will be filled with the excavated subsoil. Any stones/rocks encountered will be buried in the trench as long as the pipeline integrity is not compromised. Rock too large (400 mm diameter or 50 mm diameter within 0.5 m of the surface) to place back into the trench will be removed and used for shoreline rip rap during site reclamation or disposed of off-site. Clean rock salvaged during excavation may also be placed on the trenchline within the water to provide surface stability and possible aquatic habitat structure.

After the ditch has been filled to the level of the surrounding ground, it will be compacted. The final step in backfilling is the replacement of any salvaged topsoil and/or sod material on the trenchline and recontoured graded areas on the upland portions of the Project. Topsoil replacement will only be completed during dry soil conditions to ensure even redistribution of the soil.

A geotechnical investigation by Golder of the lake substrate in the vicinity of the intake and conduit will be completed prior to construction to characterize the site conditions. This investigation will help determine if additional stabilization of the area beneath the intake structure foundation and conduit pipeline will be required. The results of this geotechnical investigation will be provided in a report under a separate cover. The intake pipeline subgrade will also be assessed when the excavation is open to determine if additional pipeline support is required. If required, additional stabilization may include the use of over-excavation of the subgrade and replacement with select fill, such as granular material and geotextile, to provide for adequate pipeline support.

The contractor will be responsible for ensuring that the existing nearby intakes are not affected by construction. This may require additional slope reinforcement or sheet piling in the vicinity of these structures (Appendix A). It is assumed that the existing SaskWater Yara intake will be abandoned as the proposed coffer dam may interfere with this structure (Appendix A).

It is expected that the access to the existing nearby SaskWater facilities will be used for construction access. Following construction, the road around the site will be cleaned up and the contract will include a cash allowance for remedial work of the road from the park gate to the site and any haul roads affected.



### 2.2.3 Operations and Maintenance

Considering that the intake port location is within 0.5 m of the lake bottom, there is potential for lake bed sediment to be transported into the intake (Appendix A); however, sediment build up has not been a significant operational issue in the existing nearby SaskWater pump station wet-well, and thus is not expected to be a major issue for the proposed intake. Nonetheless, limited deposition and periodic cleaning can be expected depending on routine inspections completed by SaskWater. Given possible settlement of the intake structure, additional foundation requirements such as piles will be considered in structural detailed design to limit any differential settlement between the intake structure and conduit.

There is a low probability of intake blockages, because of the proposed design of the intake, which incorporates 75 mm wide openings and has been used successfully in other similar projects in the immediate area (Appendix A). The intake elements that are submerged in the lake will be designed to withstand anticipated ice forces. The end of the intake structure will likely require measures to warn watercraft.

## 2.3 Pump Station

### 2.3.1 Site Selection and Alternatives

Several potential sites in proximity to the existing pump stations within Buffalo Pound Provincial Park were examined. During the initial planning, consultation and investigation, two viable sites were identified for the intake and pump station expansion, including south of the existing Yara pump station and Mosaic pump station and another site 1,500 m northwest of the existing stations. Following further investigations and stakeholder discussion, the site in proximity to the existing Yara pump station was identified as the preferred site. The conditions at this site are known from the previous construction projects in the area and the location has been found to be suitable for intake and pump station construction. The proposed site also would provide common access to SaskWater's facilities on the south side of the lake, and is removed from the most frequently used areas of the Buffalo Pound Provincial Park, thereby minimizing disruption to visitors (Appendix A).

The proposed pump station site is south of the existing Yara pump station and Mosaic pump station, on the existing parks roadway. The proposed pump station will be located approximately 40 m from the shore of Buffalo Pound Lake, which is above the 1:500 peak calm water level. To facilitate this location, the existing parks roadway will require alignment relocation to the south and the existing access road to the Yara pump station may require relocation to the west. However, as discussed in the previous section regarding intake construction, it is expected that access for the existing nearby SaskWater facilities will be used for pump station construction access. The total area of disturbance for road relocation and pump station construction is approximately 6,000 m<sup>2</sup>. Relocation of existing power lines in proximity to the proposed Project will also be required.

### 2.3.2 Pump Station Description

Foundation design and construction methods will be based on characteristics of the site and on recommendations from Golder's geotechnical investigation. It is anticipated that site conditions are such to allow a similar foundation as the nearby SaskWater's BPNPWSS – East (Mosaic) site. The expected foundation will be a cast-in-place concrete raft slab for the wet wells and piles for the remainder of the building (Appendix A).



The pump station design is similar to the adjacent Mosaic pump station including substructure, superstructure, and fish handling equipment. The pump station will be 59 m long and 14 m wide and consist of a concrete substructure containing the intake fore-bay, low lift wet-well, low lift discharge chamber, screening chambers, and high lift pump wells (Appendix A). The flow design includes an intake entrance with coarse screens having a 75 mm bar spacing, followed by low-lift fish handling pumps and subsequently by fine fish screening inside the pump station. The fish handling pumps to be used will be the same make and model as the pumps used in a nearby existing pump station. Post-construction monitoring has shown that the pumps are effective in safely passing fish through the station (Appendix A). The flow design also allows for the pump station capacity of 87 ML/day (3,625 m<sup>3</sup>/hr) with an additional 7 ML/d (292 m<sup>3</sup>/hr) for fish return flow back to the lake. Screen chamber design was developed to provide a low approach velocity of 0.038 m/s through the screens and provide even flow distribution across the screen face, which limits the risk of fish being impinged on the screens (Appendix A). The proposed screen chambers are designed to divert fish to a fish return chamber and subsequently into a common fish return channel and ramp, with pipe installed in the chamber at the bottom of the ramp to allow fish to return back into the lake (Appendix A). The substructure will be designed to resist buoyancy.

Piping within the facility will consist of carbon steel pipe lined and coated with liquid epoxy. Pipe thickness will be determined during detailed design based on maximum pressure in the pump station. A swab launch will be installed to facilitate cleaning of the pipes. Isolation valves will be in place to isolate system components for service or removal. Check valves, pressure relief valves, air release valves, and surge protection will be incorporated into the water system (Appendix A).

The plumbing system will include a non-potable and potable water supply, floor drainage, roof drainage and sanitary sewer services for washrooms. Heating, cooling, and ventilation will be operated by electrical power.

A standby diesel generator will be included in a separate room that will have a two-hour fire separation. Diesel fuel storage will be comprised of a day tank located in the Generator Room and a storage tank located in the Fuel Storage Room. Both tanks will incorporate double walled construction, and an outside fill box with spill containment will be provided (Appendix A).

A three-phase electrical service will be required from SaskPower for the pump station. To supply the power, SaskPower plans to construct a portable 72 kilovolt (kV)/25 kV sub-station approximately equal distances between the proposed SaskWater intake and pipeline booster stations (the TP for the pipeline and booster station will be submitted under a separate cover). A 25 kV feed would then be built from this sub-station to each site and provide transformers at each location (Appendix A).

Telephone service will be required from SaskTel for voice and data communication. The telephone line will be installed in a narrow trench excavated by a chain ditcher that will extend from the SaskTel pedestal to the pump station building. Power provided by SaskPower will be supplied via a concrete duct from the service transformers to the pump station and overhead from the substation to the pump station.

Not including the fish return flow, the proposed pump station will have a capacity of the 3,625 m<sup>3</sup>/hr. The majority of the flow will be delivered to the Vale mine site and the remainder designated for supplying customers in the Belle Plaine Industrial Corridor. The maximum flow rate for the initial years of operation, beginning in the third quarter of 2015, is expected to be 1,000 m<sup>3</sup>/hr, with demand anticipated to reach the full capacity by the year 2019 (Appendix A).



### 2.3.3 Construction Techniques

Topsoil and the associated vegetation groundcover will be stripped, salvaged, and stored prior to construction. After preparing (levelling and excavating) the surface area, forms for the foundation of the pump station will be installed and the concrete foundation poured. It is anticipated the wet well walls and floor slab will be constructed from cast-in-place reinforced concrete. A hardener will be applied to the floor slab, and the floor will be sloped towards drains (Appendix A). The substructure walls and elevated floor slabs will be constructed and then the rest of the pump station will follow. Once the coffer dam is no longer required at the end of the Project, it will be slowly removed from the downslope side to the upslope side using industry best practices.

Although the pump station will be located above the 1:500 peak calm water level, erosion control techniques (e.g., filter fence) will be installed around areas where the ground has been disturbed to prevent sediment from entering Buffalo Pound Lake. The selected techniques will remain in place for the duration of construction and until disturbed soils are stabilized. Upon completion of earthworks for the pump station, the areas surrounding the building will be contoured to a stable profile and landscaped. Non operation areas will be vegetated by seeding and planting of native species. This will include placement of erosion control matting in the disturbed areas, as considered appropriate and necessary.

### 2.3.4 Operations and Maintenance

The pump station will operate automatically and be remotely controlled, with the option of manual operation for maintenance and testing purposes (Appendix A). Maintenance programs are expected; however, based on the activity surrounding the existing pump stations, on-site traffic is not expected to increase.

The intake system will incorporate travelling screens, which employ a screen wash system to clear the screen of debris, as required. The screens rotate to clean the entire screen area and cleaning cycles can be initiated based on time or headloss across the screen. In winter, the screen can be continuously rotated at a reduced speed, to mitigate the impact of frazil ice. Slide gates will be utilized for isolation of the intake fore-bay, low lift pump wells and vertical turbine pump bays. Stop logs and stop log rails will be utilized for infrequent isolating of the screening chambers (Appendix A). Isolation valves will also be in place to isolate system components for service or removal.

## 2.4 Site Access

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.

## 2.5 Related Construction Considerations

### 2.5.1 Fuel Handling

If necessary, the contractor will set up temporary fuel storage tanks at designated staging areas or their temporary office/storage yards. The storage facilities will be subjected to provincial environmental and health and safety regulations. Environmental regulations include a recommended setback distance of at least 100 m from the waterbody edge. Alternatively, local bulk dealers will be employed to transport fuel to Project equipment. Again, these persons/firms are subject to provincial legislation respecting these activities.



The majority of the equipment will be refuelled on the Project site with light vehicles typically obtaining fuel in nearby cities and towns. No refuelling will take place within 100 m of the lake, with attention being paid to avoiding inadvertent release of fluids. Any stationary equipment (e.g., generators) on site and within 100 m of the lake's edge will have both primary and secondary containment in the advent of accidental fluid release or spill.

### 2.5.2 Waste Management

Contractors are required to comply with all applicable legislation in the handling, storage, transport, and disposal of wastes. Wastes generated by the Project are expected to include scrap building material, used lubricants and domestic garbage. All wastes will be disposed of at an approved site, or in the case of the chemical containers, returned to the supplier. The contractor will handle waste management and disposal during Project construction.

### 2.5.3 Weed Management

Prohibited, noxious, nuisance, and invasive weed species also have potential to spread during construction of the Project. Construction equipment will be inspected and regularly cleaned, which can reduce the spread of weed species during construction activities. More stringent cleaning expectations and inspections will be required on equipment coming from outside the region in order to prevent the introduction and/or spread of weed species (i.e., prohibited, noxious and nuisance weeds).

### 2.5.4 Decommissioning and Abandonment

The structures are expected to be in place permanently. Nonetheless, if they are decommissioned in the future, they will be abandoned and removed in accordance with the regulatory requirements established at that time.

### 2.5.5 Emergency Response Plan

SaskWater and all of its contractors will prepare an Emergency Response Plan in the event of a Project emergency. SaskWater will immediately notify the appropriate regulators in the event of any health or environmentally threatening emergency or off-site spills. A spill prevention program will be implemented and followed throughout construction and operation of the Project. Equipment will be maintained and inspected by the contractors on a regular basis to limit the potential for malfunctions. Any spills that do occur as a result of equipment refuelling or leaks will be isolated, reported, and cleaned up immediately using appropriate absorbent materials, containment berms, floating booms, and any other required or appropriate measures.

### 2.5.6 Human Safety

The contractor will be responsible for developing and incorporating a safety program that conforms to the *Saskatchewan Occupational Health and Safety Act and Regulations*. This program should include, but not be limited to, providing for worker and visitor orientations, daily tailgate meetings and on-site hazard assessments prior to work commencing along with appropriate hazard controls. As the proposed work will take place within a provincial park, additional safety precautions for park visitors may be required (i.e., adequate warning signs, signalmen, barricades, detours).

A fire protection system will be incorporated, including the provision of fire extinguishers, throughout the pump station building to meet the requirements of the National Building and Fire Codes. A fire alarm system will also be included in this facility. A lightning rod array is also recommended to be installed on the roof of the pump station with proper connection to a ground grid. Emergency lighting and exit light signage will be provided at the pump station from a central battery supply in the event of power outages.



### 3.0 EXISTING ENVIRONMENT

#### 3.1 Introduction

Information presented in this section pertains to the proposed Project area including a 2 km radius centered on the proposed Project (Figure 3). Information was obtained and summarized from a number of sources including field surveys completed in 2012 and literature reviews. The purpose of this section is to describe the existing environmental conditions in the Project area as a basis to assess the potential environmental effects of the Project on the biophysical, socio-economic, and cultural environments (Section 4.0).

#### 3.2 Land Use

Nature viewing, sightseeing, camping, fishing, boating, biking, swimming, hunting, and hiking are a few of the activities that occur on Buffalo Pound Lake and within the area. Other land uses include year-round and seasonal cabin use and livestock grazing. Within the immediate vicinity of the proposed Project, there is other nearby facilities, which include the SaskWater intake structure (Yara) and SaskWater BPNPWSS – East (Mosaic) intake. There is also a road that provides access around the southeastern portion of the lake that may have to be re-routed as a result of this Project.

##### 3.2.1 Sensitive Areas

The Project is located within Buffalo Pound Lake and adjacent to provincial Resource Crown Land administered by MOE and deeded land that is associated with the valley on each side of the lake (Figure 3). The proposed Project does not occur on lands designated by the Saskatchewan Ministry of Agriculture (MOA), Fish and Wildlife Development Fund, Saskatchewan Wildlife Federation, or Ducks Unlimited Canada (DUC). Nicolle Flats, located on the southeast side of Buffalo Pound Lake, is designated as an Important Bird Area (IBA) and is DUC land. The IBA Program is an international conservation initiative coordinated by BirdLife International. The Canadian co-partners for the IBA Program are Bird Studies Canada and Nature Canada.

#### 3.3 Climate

The Project is located in the Moist Mixed Grassland Ecoregion, which has a sub-humid continental climate (Acton et al. 1998). The climate is characterized by dry, sunny weather with temperatures extreme in both summer and winter. The mean July temperature is 19.4 degrees Celsius (°C) while in January the mean temperature is -13.7°C (Environment Canada 2012a). The mean annual precipitation is approximately 365 mm with 265 mm falling as rain primarily from April to September. The mean monthly temperature and precipitation at the Moose Jaw climate station is presented in Table 3 (Environment Canada 2012a).

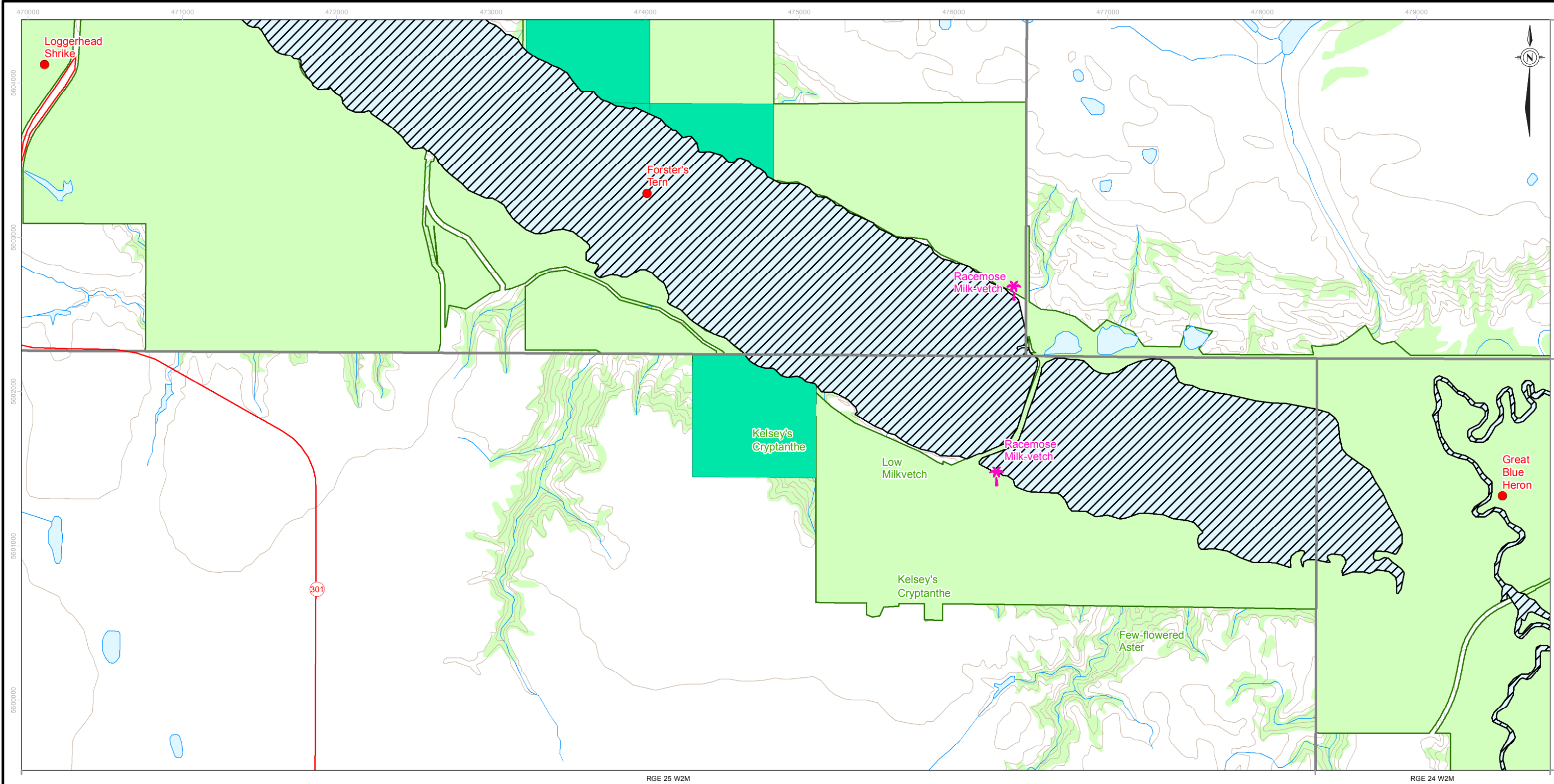
**Table 3: Mean Monthly Temperature and Precipitation at Moose Jaw, Saskatchewan Climate Station**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Temperature (°C)	-13.7	-10.0	3.4	5.0	12.1	17.1	19.4	18.6	12.4	5.8	-4.2	-11.4
Rainfall (mm)	0.4	0.4	2.7	16.7	45.8	60.2	57.3	39.8	33.2	11.2	1.9	0.6
Snowfall (cm)	21.3	15.8	19.8	7.1	2.9	0	0	0	2.4	7.0	16.8	22.5
Precipitation (mm)	16.6	12.9	19.3	23.2	48.9	60.2	57.3	39.8	35.7	17.6	15.6	18.2

Source: Environment Canada (2012a).

°C = degrees Celsius; mm = millimetres; cm = centimetres.

G:\CLIENTS\VALE\Kronau Potash Project\Figures\12-1362-0044 Vale Saskwater Buffalo Pound Pipeline\Phase 004\Figure 3 - Environmental Sensitivities Map - 12-1362-0044\_004-1.mxd Date: 1/4/2013 4:55:02 PM



LEGEND

- TOWNSHIP AND RANGE BOUNDARY

HIGHWAY

MIGRATORY BIRD CONCENTRATION SITE

AGRICULTURAL CROWN LAND

PARKS AND RECREATION

LISTED WILDLIFE OCCURRENCE

LISTED PLANT OCCURRENCE (HISTORICAL OBSERVATION)
- REFERENCE
- SASKATCHEWAN LAND RESOURCES UNIT © 2004  
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CANVEC © NATURAL RESOURCES CANADA, 2012  
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|---------|---------|--|--------------|----------------|--------|
| PROJECT |         | PROPOSED SASKWATER BUFFALO POUND<br>NON-POTABLE WATER SYSTEM EXPANSION<br>PROJECT - INTAKE AND PUMPSTATION                             |              |                |        |
| TITLE   |         | ENVIRONMENTAL SENSITIVITIES FOR THE<br>PROPOSED SASKWATER BUFFALO POUND<br>NON-POTABLE WATER SYSTEM INTAKE<br>AND PUMP STATION PROJECT |              |                |        |
|         | PROJECT |  | 12-1362-0044 | FILE No.       |        |
|         | DESIGN  |  |              | SCALE AS SHOWN | REV. 0 |
|         | GIS     | LMR  | 04/01/13     | FIGURE: 3      |        |
|         | CHECK   | KH   | 04/01/13     |                |        |
|         |         | REVIEW   | ME           | 04/01/13       |        |



### 3.4 Air Quality

The Project is within Buffalo Pound Provincial Park; however, the surrounding area outside the valley is characterized by agricultural and residential land. Other facilities in the Project area include the SaskWater, Mosaic, and Buffalo Pound Filtration Plant intake and pump stations located on the southeast side of the lake.

During construction, several air quality compounds of concern will be emitted. These include but are not limited to sulphur dioxide (SO<sub>2</sub>), oxides of nitrogen (NO<sub>x</sub>), and particulate matter (PM). SO<sub>2</sub> and NO<sub>x</sub> are emitted directly from the combustion of fossil fuels (diesel) and PM is directly emitted from combustion and also forms as a secondary process in the atmosphere after combustion. Table 4 provides the ambient air quality standards for Saskatchewan for the compounds that will be released during construction (Government of Saskatchewan 1996).

**Table 4: Ambient Air Quality Guidelines**

Pollutant	Average Concentration for Applicable Time Period		
	1 Hour	24 Hours	Annual
Particulate Matter (Suspended Particulates)	NA	120 µg/m <sup>3</sup>	70 <sup>(a)</sup> µg/m <sup>3</sup>
Sulfur Dioxide (SO <sub>2</sub> )	450 (0.17) <sup>(b)</sup> µg/m <sup>3</sup>	150(0.06) <sup>(b)</sup> µg/m <sup>3</sup>	30 <sup>(c)</sup> (0.01) <sup>(b)</sup> µg/m <sup>3</sup>
Nitrogen Dioxide (NO <sub>2</sub> )	400 (0.2) <sup>(b)</sup> µg/m <sup>3</sup>	NA	100 <sup>(c)</sup> (0.05) <sup>(b)</sup> µg/m <sup>3</sup>

Source: Modified from Government of Saskatchewan (1996).

<sup>(a)</sup> Geometric mean.

<sup>(b)</sup> Bracketed numbers are volume units in parts per million.

<sup>(c)</sup> Arithmetic mean.

NA = not available; µg/m<sup>3</sup> = micrograms per cubic metre.

### 3.5 Noise

The province of Saskatchewan does not currently have environmental noise guidance or regulations. Therefore, the assessment of noise was completed based on guidance for the Alberta Energy Resource Conservation Board *Directive 38: Noise Control Directive* (ERCB Directive 38) (AEUB 2007). This method focuses on the nearest sensitive noise receivers to the Project (within a 1.5 km radius) which, for this Project, is the portion of Buffalo Pound Lake and associated riparian and valley zone surrounding the non-potable water intake.

Users of Buffalo Pound Lake will have a reasonable expectation of quiet associated with an undeveloped setting. Specific sensitive receivers identified within the Project area to date are primarily users of the Buffalo Pound Provincial Park. No cabin, summer cottages, or farm houses have been identified within 1.5 km of the Project. No medical, educational, spiritual institutions or special First Nations sites of interest to federal or provincial regulators were identified during a site inspection and the literature review.

The response of animal populations to human development likely depends on the intensity and duration of exposure to disturbance and the adaptive capacity of a species (Holling 1973; Folke et al. 2004; Folke 2006). Noise affects wildlife species differently. The Project is located in an area where human activities and traffic are not uncommon and it is likely that most wildlife species have habituated to these noise sources. However, some species are expected to be more sensitive to noise.



Wildlife survival and reproduction can be negatively affected by increased noise levels during construction because animals may avoid (i.e., change movement patterns or flee the area) or move more quickly through areas with human disturbance (Tyler 1991; Fortin and Andruskiw 2003; Bayne et al. 2008). Some studies have shown no responses (e.g., no changes in activity levels from baseline conditions) (Telesco and VanManen 2006) or transitory responses (e.g., returning to normal hormone, heart rate, or activity levels within a few minutes) (Krausman and Hervert 1983; Weisenberger et al. 1996) to human disturbance. Other studies note longer increases in activity, hormone, or heart rate levels with disturbance (e.g., returning to normal levels within a few hours or days) (Weimerskirch et al. 2002). These responses may be related to how accustomed species are to disturbance, the time of year (e.g., breeding or non-breeding season), and intensity of the disturbance (Fortin and Andruskiw 2003; Bayne et al. 2008; Fahrig and Rytwinski 2009).

A baseline noise study was not completed for this Project; however, the existing noise levels at sensitive noise receivers are expected to be typical of relatively low-density or rural development areas. Based on ERCB Directive 38, ambient noise levels in rural areas can be expected to range between 25 A-weighted decibels (dBA) and 35 dBA (AEUB 2007). Baseline noise levels are assumed to be 35 dBA during the day and 25 dBA at night, where day is defined as 07:00 to 23:00 and night is defined as 23:00 to 07:00.

Noise within the Project area is defined as continuous natural sounds, with intermittent continuous and intermittent tonal events during local agricultural activity and possible recreational use by boaters on Buffalo Pound Lake during the summer months.

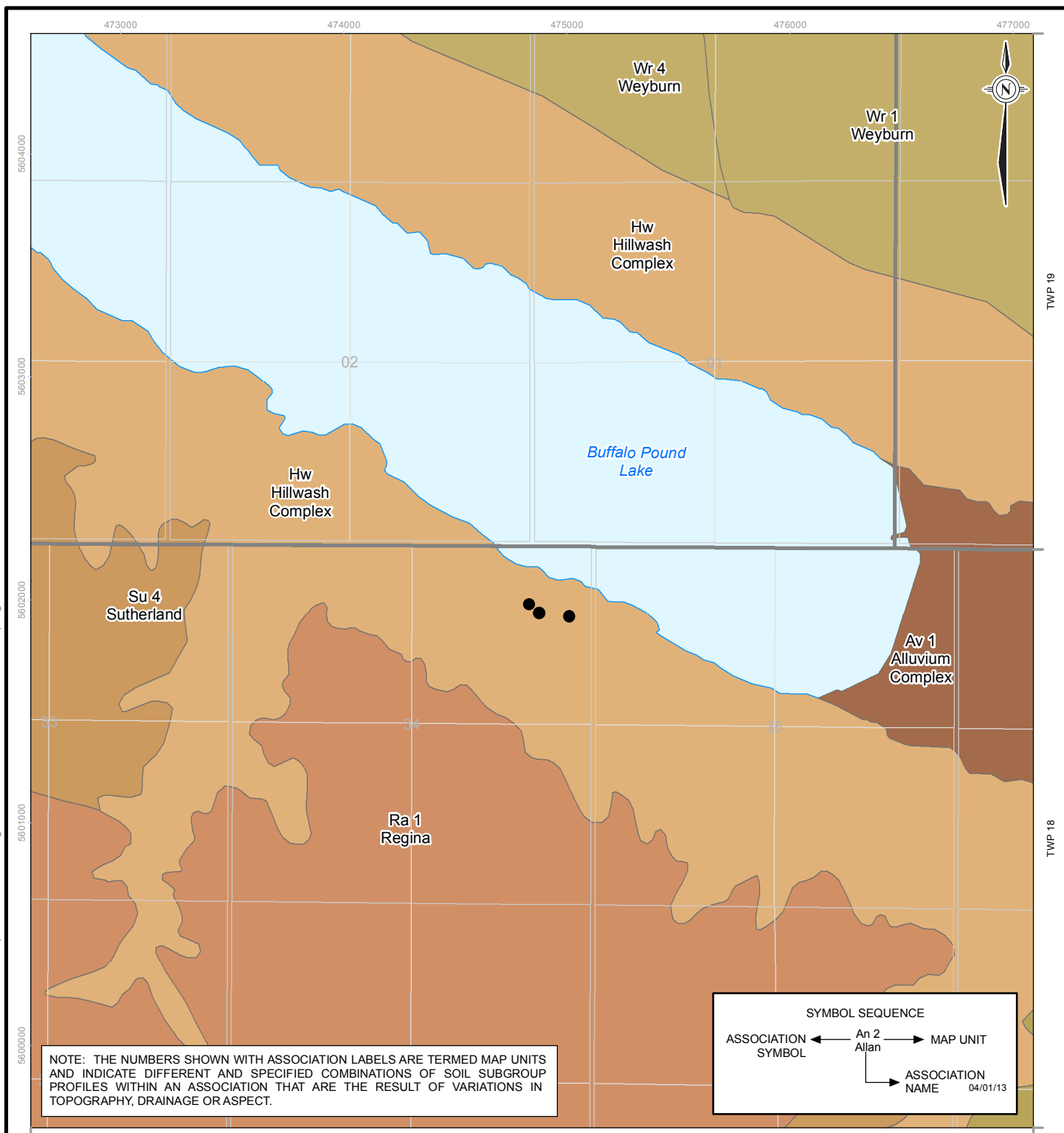
### 3.6 Terrain and Soils

Terrain and soils play key roles in ecosystem function. Terrain influences how soils develop within an area and how soils are distributed across the landscape. Soil is the medium that supports plant communities and agriculture in the Project area. It can also provide habitat for wildlife such as amphibians, reptiles, insects, and small rodents.

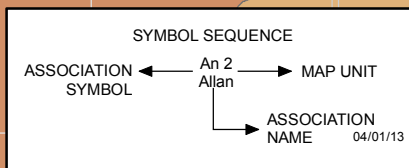
Soil supports a diverse fauna of soil macro- and micro-organisms that are critical for healthy ecosystem functioning. Soil macro- and micro-organisms are responsible for organic matter decomposition, nutrient cycling, and organic waste decomposition, which in turn influence the health and state of the ecosystem.

A field program was completed on July 10 and July 11, 2012 to collect general terrain characteristics and classify soils in the Project area. Three representative locations were selected within the map unit delineated by the provincial soil surveys (Saskatchewan Land Resource Unit [SLRU] 2009). Classification of soils followed The Canadian System of Soil Classification (Soil Classification Working Group 1998) and criteria outlined in the CanSIS manual (Agriculture Canada 1982). A total of three representative sites were selected within the area adjacent to the location of the Project (Figure 4).

The terrain characteristics collected included topographic class, surface expression, slope position, aspect, slope length, and land use. Terrain characteristics were identified using the criteria outlined in the CanSIS manual (Agriculture Canada 1982).



NOTE: THE NUMBERS SHOWN WITH ASSOCIATION LABELS ARE TERMED MAP UNITS AND INDICATE DIFFERENT AND SPECIFIED COMBINATIONS OF SOIL SUBGROUP PROFILES WITHIN AN ASSOCIATION THAT ARE THE RESULT OF VARIATIONS IN TOPOGRAPHY, DRAINAGE OR ASPECT.



## LEGEND

- TOWNSHIP AND RANGE BOUNDARY
- SECTION BOUNDARY
- QUARTERSECTION BOUNDARY
- PROJECT AREA
- PROPOSED WATER INTAKE/PUMP STATION
- SOIL SAMPLE LOCATION

## REFERENCE

SASKATCHEWAN LAND RESOURCES UNIT © 2004.  
 SKSISV2, DIGITAL SOIL RESOURCE INFORMATION  
 FOR AGRICULTURE SASKATCHEWAN, 1:100,000 SCALE.  
 AGRICULTURE AND AGRI-FOOD CANADA, SASKATOON, SASKATCHEWAN.  
 NAD 83 UTM ZONE 13

RGE 25 W2M

500 0 500  
 SCALE 1:25,000 METRES

PROJECT



**SaskWater**

PROPOSED SASKWATER BUFFALO POUND  
 NON-POTABLE WATER SYSTEM EXPANSION  
 PROJECT - INTAKE AND PUMPSTATION

TITLE

## SOIL ASSOCIATIONS MAP AND SOIL SAMPLING POINTS IN THE PROJECT AREA



**Golder  
 Associates**  
 Saskatoon, Saskatchewan

PROJECT	12-1362-0044	FILE No.	
DESIGN		SCALE AS SHOWN	REV. 0
GIS	LMR	15/10/12	
CHECK	KH	04/01/13	
REVIEW	ME	04/01/13	

**FIGURE: 4**



Soils were classified by excavating test pits using a shovel and a Dutch auger to a maximum depth of 1.2 m. Soil characteristics examined included horizonation, colour, texture, structure, drainage class, moisture regime, nutrient regime, surface stoniness, stoniness class, degree of effervescence (indicating presence of carbonates), and presence of salts. At selected sites from each soil association, soil horizons were sampled and analyzed at Australian Laboratory Services Laboratory Group in Saskatoon for pH, particle size and texture, available nitrogen, phosphorus, potassium and sulphur, potassium, electrical conductivity, sodium adsorption ratio, soluble calcium, sodium, magnesium, potassium, chloride, cation exchange capacity, percent saturation, percent organic carbon, percent inorganic carbon, percent organic matter, and calcium carbonate equivalent. Results are summarized in Appendix B.

### 3.6.1 Terrain

The Project area is located within the Arm River Plain Landscape Area of the Moist Mixed Grassland Ecoregion (Acton et al. 1998). The terrain adjacent to the proposed intake location consists of steep to very steep slopes on the valley sides of Buffalo Pound Lake/Qu'Appelle River Valley. Terrain encountered during the field program was generally rolling topography with 10% to 15% slopes and locally up to 45%.

### 3.6.2 Soils

The majority of the Project is located within Buffalo Pound Lake; however, the proposed pump station is located on uplands along the lake edge. This latter portion is located within the Hillwash Complex soil association within the Dark Brown soil zone (Saskatchewan Agriculture and Food 2005). Hillwash Complex association soils are described as dominantly shallow, eroded, and weakly developed soils on steep, gullied valley side slopes. Hillwash Complex soils have variable surface textures and the parent material is described as variable deposits from valley slopes and eroding escarpments.

Soils encountered during the field program were well drained Orthic Dark Brown Chernozems and an Orthic Humic Regosol. Surface textures ranged from loam to loamy sand (Appendix B), and the surface stoniness was generally non-stony.

#### 3.6.2.1 Erosion Sensitivity

The sensitivity of soil to water and/or wind erosion is influenced by many factors and include soil particle size and surface texture, organic matter content, water content, permeability, topography, slope gradient, vegetation cover, and natural events (e.g., freeze-thaw, large rainfall events) or human activities that cause soil disturbance (Cruse et al. 2001; Transportation Association of Canada (TAC) 2005). Erosion involves the detachment of soil particles, the transport of the sediments, and the deposition of the sediments (Cruse et al. 2001; TAC 2005). Water and wind erosion differ through the processes that move detached soil particles, and each process of erosion affects soil textures differently. The outcome of soil erosion is important because of potential off-site effects (Kuhn and Bryan 2004). These effects include the sedimentation of adjacent water bodies, and the release of compounds that may be present in the sediment that can dissolve and be released into water, both of which can potentially cause changes to water quality. Many of the factors that affect soil erosion can be controlled to some extent during construction (TAC 2005).

Erosion can occur during short-term construction activities, including soil handling, water transfers, slope failures, in-stream work, and temporary roads. The purpose of assessing erosion potential is to determine which best management practices should be considered during and following construction to decrease the possibility of soil loss through erosion and to decrease effects of erosion on sensitive habitats (e.g., fish bearing waterbodies).



Hillwash Complex soils are unclassified for water and wind erosion potential (SLRU 2004). Based on terrain and soil textures observed during the field program, soils in the Project area are rated to have with medium to high sensitivity to wind erosion and moderate to high sensitivity to water erosion.

Upland soils disturbed during construction will be contoured to a stable profile and non-operation areas will be revegetated following reclamation; therefore, soil loss due to wind and water erosion is anticipated to reduce this potential to negligible. Plant cover shields soils from rainfall impacts, reduce runoff velocity, disperse surface flows, improve soil permeability, and act to physically bind soil particles. Plant cover also acts to provide protection from wind erosion, provide organic matter to the soil, and help to improve moisture holding capacity.

Even though the water and wind erosion potentials for disturbed soils in the Project area are medium to high, the location of the Project is next to a fish-bearing water body and within a waterbird migration staging area (Nicolle Flats), it is expected that the consequence of erosion from the Project would be high. Procedural best management practices are required to reduce the erosion potential, and include the following:

- appropriate erosion control measures will be installed during construction to limit the potential for sediment to transfer outside of the construction area;
- stripped or graded soils will be stored well back from the lake edge and contained to prevent direct transfer into the lake; and
- seeding disturbed upland areas as soon as possible following planned and non-planned soil disturbance.

### 3.6.2.2 *Compaction*

Soils capability to support plant growth can be reduced if the soil becomes compacted. Compaction of soils can also influence the success of reclamation by influencing plant establishment and subsequent plant growth. Compacted topsoil and subsoil can lead to a decrease in long-term productivity (Heuer et al. 2008; Blouin et al. 2008). The decrease in long-term productivity is a result of increases in soil bulk density and soil strength, reductions in soil aeration (i.e., soil oxygen), reduced water infiltration and available soil water, restricted root growth, reductions in soil microbiological activity, and nutrient uptake.

Well-drained, medium-textured soils (e.g., loams and sandy loams) are less prone to compaction than fine-textured soils (e.g., silty clay loam, silty clay, clay loam, and clay); although this is dependent on soil moisture conditions. For example, loamy textured soils under wet conditions are more prone to compaction than the same soil texture under dry conditions.

Hillwash Complex soils in the Project area have surface texture, ranging from loamy sand to loam and therefore have a range of low to moderate sensitivity to compaction. Regardless of the soil texture, if construction takes place under dry or frozen conditions, potential for compaction decreases.

### 3.6.2.3 *Contaminated Sites*

According to the Saskatchewan spill database (Government of Saskatchewan 2009), as of October 1, 2012 there were no reported spills and no hazardous material storage within legal land sections overlapped by the Project area.



### 3.7 Vegetation

The Project area is located within the Regina Plain Landscape Area of the Moist Mixed Grassland Ecoregion (Acton et al. 1998). In its natural state, the Moist Mixed Grassland Ecoregion is described as having a mix of woodland, shrubland, and open grassland; however, woodlands are generally restricted to small bluffs around depressions or on steep north facing slopes or coulees. Most of the ecoregion is cultivated, with natural vegetation located in remnant patches or in areas (i.e., valley complexes) otherwise unsuitable for cultivation.

A vegetation survey of the Project area was completed on July 12, 2012. An inventory of species was recorded, including any listed (e.g., tracked, rare, endangered) plant species and weed species. Vegetation types associated with the Project area include the riparian plant community present along the shore of Buffalo Pound Lake and the matrix of native grassland and wooded areas on the valley slopes.

The riparian area along the lake edge is characterized by a narrow fringe of mesic vegetation with an exposed rock and sand/silt beach, as well as an abrupt bank on Buffalo Pound Lake. Along the shore edge and transition ecozone to the upland, vegetation present includes marsh reed grass (*Calamagrostis canadensis*), common reedgrass (*Phragmites australis*), silverweed (*Potentilla anserina*), wild mint (*Mentha arvensis*), marsh hedge nettle (*Stachys pilosa* var. *pilosa*), dock (*Rumex* spp.), wire rush (*Juncus* spp.), horsetail (*Equisetum* spp.), slough grass (*Beckmannia syzigachne*), foxtail barley (*Hordeum jubatum*), and sedge (*Carex* spp.). An introduced and invasive species, smooth brome (*Bromus inermis* spp. *inermis*) was also found to be established in this area.

The habitat present on the terrace and slopes of Qu'Appelle River Valley and Moose Jaw River consists of a matrix of open, upland native grassland and wooded areas. Common shrub species present in the area include western snowberry (*Symphoricarpos occidentalis*), prickly rose (*Rosa acicularis*), prairie rose (*Rosa arkansana*), silverberry (*Elaeagnus commutata*), northern hawthorn (*Crataegus chrysocarpa*), Canada buffaloberry (*Shepherdia argentea*), Saskatoon (*Amelanchier alnifolia* var. *alnifolia*), and chokecherry (*Prunus virginiana* var. *virginiana*). Tree species present include trembling aspen (*Populus tremuloides*), Manitoba maple (*Acer negundo*), and green ash (*Fraxinus pennsylvanica*).

Open native grassland areas on the terrace and uplands are dominated by a mix of spear grass species (*Nassella viridula*, *Hesperostipa comata*, and *Hesperostipa curtisetia*) and wheatgrass species (*Agropyron* spp., *Elymus* spp., and *Pascopyrum smithii*). Other graminoids include upland sedges (*Carex* spp.), june grass (*Koeleria macrantha*), blue grama grass (*Bouteloua gracilis*), fescue species (*Festuca* spp.), and bluegrasses (*Poa* spp.). Common forbs include pasture and prairie sage (*Artemisia frigida* and *A. ludoviciana*), common yarrow (*Achillea millefolium*), species of milk-vetch (*Astragalus* spp.), cut-leaved anemone (*Anemone multifida*), and small leaf pussytoes (*Antennaria microphylla*). Sporadic patches of prairie rose, western snowberry, and silverberry are frequently found throughout the tracts of native grassland.

#### 3.7.1 Listed Plant Species

Plant species at risk in Canada are protected under provincial and federal conservation legislation and documents. These include the following:

- the Saskatchewan Conservation Data Centre (SKCDC) (2012a);
- the Saskatchewan *Wildlife Act* (1998);



- the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (2012); and
- the SARA (2009).

For the purpose of this report, listed species or species at risk includes all species that are designated as rare, endangered, threatened, special concern, or otherwise tracked by federal and provincial regulatory agencies. A list of species at risk that are known to occur or have potential to occur within the Project area was compiled using federal and provincial status documents, provincial tracking lists, references/literature, and known distributions (Table 5; Figure 3). The habitat requirements of potentially present listed plant species were reviewed and compared to availability of that habitat type in the Project area.

There are 51 provincial and federal listed plant species that have potential to occur or have been observed within the Project area (Table 5). Of the species that have potential to occur within the Project corridor, four are listed by COSEWIC (three as threatened; one as special concern), and are listed as threatened under Schedule 1 of SARA. Two of these four species are also listed under the provincial *Wildlife Act*. If listed species are encountered during construction, they will be addressed as per mitigation measures listed in Section 4.3.

Four provincially tracked plant species were observed within 3 km of the Project area during the 2012 field season and are presented in bold in Table 5. These included big bluestem (*Andropogon gerardii*), few-flowered aster (*Aster pauciflorus*), low milk-vetch (*Astragalus lotiflorus*), and Kelsey's cryptanthus (*Cryptantha kelseyana*). In addition, there are historical records of racemose milk-vetch (*Astragalus racemosus* var. *racemosus*) within 2 km of the Project.

The 2012 field program results do not preclude the potential for other listed plant occurrences within the Project area. Listed plants are not identifiable at all times during the growing season, and temporal variation in germination and flowering patterns may limit listed plant species detection. A listed plant survey cannot confirm the absence of listed plants or plant communities; it can only confirm their presence.

### 3.7.2 Weed Species

Weed species in the province of Saskatchewan are defined as prohibited under Schedule 1, noxious under Schedule 2, and nuisance under Schedule 3 of the *Weed Control Act* (2010). Under the *Weed Control Act*, prohibited weeds located on the land must be eradicated, isolated infestations of noxious weeds must be eradicated, established infestations of noxious weeds must be contained and controlled, and nuisance weeds are to be controlled. The purpose of this *Act* is to prevent weeds from being introduced into areas that do not contain these species and prevent the spread of new weeds into and through the province. The *Weed Control Act* also protects natural areas such as native grassland, forests, and aquatic habitats from the introduction of these species.

No prohibited weeds were documented in the Project area. One noxious species, leafy spurge (*Euphorbia esula*), was observed to be well established within the Project area, southeast of the proposed pumphouse and intake. This weed is especially problematic because it is a long-lived perennial with an extensive root system from which it can re-sprout, can form dense stands, and is a prolific seed producer. Leafy spurge is very resilient and only a few herbicides are successful at controlling infestations of this species. Special care should be taken when moving in and out of areas with known infestations of this species to prevent the spread of this species into new areas. However, this species was not observed in the immediate area containing the proposed Project.



Table 5: Listed Plant Species that Have Potential to Occur or Have Been Observed in the Project Area

Common Name	Scientific Name	COSEWIC Status <sup>(a)</sup>	SARA Status <sup>(b)</sup>	Provincial Status <sup>(c)</sup>	Habitat	Potential for Occurrence
Narrow-leaved water plantain	<i>Alisma gramineum</i>	Not Listed	Not Listed	S3	Wet to drying muddy lakeshores, mud-flats and sloughs (Harms et al. 1992)	Moderate - small areas of suitable habitat present in the Project corridor
Geyer onion	<i>Allium geyeri</i>	Not Listed	Not Listed	S1	Moist meadows above stream shores (Harms et al. 1992)	High - historical record near the Project area; small areas of suitable habitat present in the Project corridor
Bur ragweed	<i>Ambrosia acanthicarpa</i>	Not Listed	Not Listed	S2	Active to semi-stabilized sand-dunes (Harms et al. 1992)	Very Low - small areas of sandy soils present; however, no active sand dunes were observed in the Project corridor
<b>Big bluestem</b>	<b><i>Andropogon gerardii</i></b>	Not Listed	Not Listed	S3S4	Lower south facing prairie slopes, just above grass/sedge marshy and shrubby river shores; mesic upland and valley slope grasslands (Harms et al. 1992)	Very High - observed during field program within the Project corridor and historical observations of this species in the area
<b>Few-flowered aster</b>	<b><i>Aster pauciflorus</i></b>	Not Listed	Not Listed	S3	Moist to drying alkaline or saline shores, meadows and sloughs (Harms et al. 1992)	Very High - observed during field program within the Project corridor
<b>Low milk-vetch</b>	<b><i>Astragalus lotiflorus</i></b>	Not Listed	Not Listed	S3	Sandy often eroded grasslands (Harms et al. 1992)	Very High - observed during field program within the Project corridor and historical observations of this species in the area
Racemose milk-vetch	<i>Astragalus racemosus</i> var. <i>racemosus</i>	Not Listed	Not Listed	S2	Dry, eroded, clayey slopes and banks (Harms et al. 1992)	High - historical record near the Project area; small areas of suitable habitat present in the Project corridor
Tall beggar's-ticks	<i>Bidens frondosa</i>	Not Listed	Not Listed	S2S3	Wet shores and ditches (Harms et al. 1992)	Moderate - small areas of suitable habitat in the Project corridor
Aster-like boltonia	<i>Boltonia asteroides</i> var. <i>recognita</i>	Not Listed	Not Listed	S2	Wet sloughs and ditches (Harms et al. 1992)	Moderate - small areas of suitable habitat in the Project corridor
Prairie dunewort	<i>Botrychium campestre</i>	Not Listed	Not Listed	S1	Above prairie sloughs and stabilized sand-dune meadows (Harms et al. 1992)	Low - likely some suitable habitat within the Project corridor
Mingan moonwort	<i>Botrychium minganense</i>	Not Listed	Not Listed	S1	Mesic open woods and ditches (Harms et al. 1992)	Moderate - small areas of suitable habitat in the Project corridor
Tall grama	<i>Bouteloua curtipendula</i>	Not Listed	Not Listed	S3	Eroded or stony prairie slopes (Harms et al. 1992)	High - suitable habitat present in Project area
Foxtail sedge	<i>Carex alopecoidea</i>	Not Listed	Not Listed	S2	Moist riparian woods, open shores and sedge meadows (Harms et al. 1992)	Moderate - small areas of suitable habitat in the Project corridor
Assiniboia sedge	<i>Carex assiniboinensis</i>	Not Listed	Not Listed	S2	Moist, shaded, deciduous, riparian woods and shrub thickets (Harms et al. 1992)	Moderate - small areas of suitable habitat in the Project corridor
Crawe's sedge	<i>Carex crawei</i>	Not Listed	Not Listed	S1	Wet, seepy, often calcareous sedge meadows, fens, marly "bogs" and shores (Harms et al. 1992)	Low - likely some suitable habitat within the Project area
Rigid sedge	<i>Carex tetanica</i>	Not Listed	Not Listed	S1	Moist, often calcareous, groundwater-fed areas (Harms et al. 1992)	Low - likely some suitable habitat within the Project area
Chaffweed	<i>Centunculus minimus</i>	Not Listed	Not Listed	S2	Drying slough margins and prairie depressions (Harms et al. 1992)	Moderate - Small areas of suitable habitat in the Project corridor
Smooth arid goosefoot	<i>Chenopodium subglabrum</i>	Threatened	Threatened Schedule 1	S2	Active to stabilized sand dune blowouts (Harms et al. 1992)	Very Low - small areas of sandy soils present; however, no active sand dunes were observed in the Project area
American bugseed	<i>Corispermum americanum</i> var. <i>americanum</i>	Not Listed	Not Listed	S2	Sandy prairie barrens, shores, sand-dune blowouts, roadsides, sandy waste-lands and old fields (Harms et al. 1992)	Very Low - small areas of sandy soils present; however, no active sand dunes were observed in the Project area
Clustered oreocarya	<i>Cryptantha celosioides</i>	Not Listed	Not Listed	S1	Eroding grasslands slopes (Harms et al. 1992)	High - some suitable habitat present in the Project corridor
<b>Kelsey's cryptanthe</b>	<b><i>Cryptantha kelseyana</i></b>	Not Listed	Not Listed	S2	Dry, eroded grassland (Harms et al. 1992)	Very High - observed during field program within the Project corridor
Hazel dodder	<i>Cuscuta coryli</i>	Not Listed	Not Listed	S1?	Parasitic on grassland herbs (Harms et al. 1992)	High - some suitable habitat present in the Project corridor
Schweinitz's flatsedge	<i>Cyperus schweinitzii</i>	Not Listed	Not Listed	S2	Active sand dune blowouts (Harms et al. 1992)	Very Low - small areas of sandy soils present; however, no active sand dunes were observed in the Project area
Hairy prairie clover <sup>(d)</sup>	<i>Dalea villosa</i> var. <i>villosa</i>	Special Concern	Threatened Schedule 1	S1	Stabilized to semi-active sand-dune blowouts (Harms et al. 1992)	Very Low - small areas of sandy soils present; however, no active sand dunes were observed in the Project area
Two-leaf water-weed	<i>Elodea bifoliata</i>	Not Listed	Not Listed	S2	Floating, shallow-water aquatic in lakes, ponds, and sloughs (Harms et al. 1992)	High - historical documentation in Buffalo Pound Lake



Table 5: Listed Plant Species that Have Potential to Occur or Have Been Observed in the Project Area (continued)

Common Name	Scientific Name	COSEWIC Status <sup>(a)</sup>	SARA Status <sup>(b)</sup>	Provincial Status <sup>(c)</sup>	Habitat	Potential for Occurrence
Sand-dune wheatgrass	<i>Elymus lanceolatus</i> ssp. <i>psammophilus</i>	Not Listed	Not Listed	S2	Active sand dune blowouts (Harms et al. 1992)	Very Low - small areas of sandy soils present; however, no active sand dunes were observed in the Project area
Compound fleabane	<i>Erigeron compositus</i>	Not Listed	Not Listed	S3?	Dry, calcareous, eroded, rocky slopes and hilltops (Harms et al. 1992)	High - some suitable habitat present in the Project corridor
Moss gentain	<i>Gentiana fremontii</i>	Not Listed	Not Listed	S2	Moist, springy, calcareous or saline meadow depressions (Harms et al. 1992)	Moderate - small areas of suitable habitat in the Project corridor
Slender mouse-ear cress <sup>(e)</sup>	<i>Halimolobos virgata</i>	Threatened	Threatened Schedule 1	S1	Dry, eroded, silty, grassland slopes and flats (Harms et al. 1992)	High - some suitable habitat present in the Project corridor
Rough pennyroyal	<i>Hedeoma hispida</i>	Not Listed	Not Listed	S3	Dry, eroded, grassland slopes and flats, barrens, cultivated field depressions (Harms et al. 1992)	High - some suitable habitat present in the Project corridor
Tufted hymenopappus	<i>Hymenopappus filifolius</i> var. <i>polycephalus</i>	Not Listed	Not Listed	S3	Dry, eroding, short-grassland slopes (Harms et al. 1992)	Moderate - some suitable habitat present in the Project corridor
Marsh felwort	<i>Lomatogonium rotatum</i>	Not Listed	Not Listed	S2	Moist meadow depressions and marshy shores, usually calcareous or saline (Harms et al. 1992)	Moderate - small areas of suitable habitat in the Project corridor
Small lupine	<i>Lupinus pusillus</i> ssp. <i>pusillus</i>	Not Listed	Not Listed	S3	Sand-dunes, stabilized sand-hill grasslands, and sandy river-bluff slopes (Harms et al. 1992)	Very Low - small areas of sandy soils present; however, no active sand dunes were observed in the Project corridor
Pepperwort	<i>Marsilea vestita</i>	Not Listed	Not Listed	S2S3	Wet depressions (SKCDC 2012a)	Moderate - some suitable habitat present in the Project corridor
Least mousetail	<i>Myosurus minimus</i>	Not Listed	Not Listed	S2S3	Wet to drying slough margins, mud-flat shores, prairie and cultivated field depressions (Harms et al. 1992)	Moderate - some suitable habitat present in the Project corridor
Lesser navarretia	<b><i>Navarretia leucocephala</i> ssp. <i>minima</i></b>	Not Listed	Not Listed	S3	Drying sloughs and prairie depressions, receding mud-flat shores (Harms et al. 1992)	Very High - observed during field surveys in the Project corridor and historical observations of this species
Prairie false-dandelion	<i>Nothocalais cuspidata</i>	Not Listed	Not Listed	S2	Dry, often eroded grassland slopes (Harms et al. 1992)	High - historical record in the Project corridor
Low yellow evening-primrose	<i>Oenothera flava</i>	Not Listed	Not Listed	S3	Moist clay flats in prairie and cultivated field depressions, slough bottoms, creek mud-flat shores, roadside ditches (Harms et al. 1992)	Moderate - some suitable habitat present in the Project corridor
Narrow-leaved plantain	<i>Plantago elongata</i>	Not Listed	Not Listed	S2S3	Drying, often alkaline or saline, clay-flats, slough bottoms, and eroded prairie hillsides (Harms et al. 1992)	Moderate - some suitable habitat present in the Project corridor
Upright narrow-leaved pondweed	<i>Potamogeton strictifolius</i>	Not Listed	Not Listed	S2	Immersed aquatics in shallow water of protected lake bays, ponds, and slow streams (Harms et al. 1992)	Moderate - some suitable habitat present in the Project corridor
Bushy cinquefoil	<i>Potentilla paradoxa</i>	Not Listed	Not Listed	S2S3	Moist sandy shores and slough margins (Harms et al. 1992)	Low - small areas of sandy soils present in the Project corridor
Self-heal	<i>Prunella vulgaris</i> ssp. <i>lanceolata</i>	Not Listed	Not Listed	S1	Moist, seepage, grassy, and shrubby meadows and slopes (Harms et al. 1992)	High - historical record in the Project area; small areas of suitable habitat present in the Project corridor
Alkaline wing-nerved moss	<i>Pterygoneurum kozlovii</i>	Threatened	Threatened Schedule 1	S1	Alkaline, mainly sandy-silty soil, rarely on litter, along the edges of seasonally wet ponds (SKCDC 2012a)	Moderate - some suitable habitat present in the Project corridor
Lemmon's alkali-grass	<i>Puccinellia lemmonii</i>	Not Listed	Not Listed	S1?	Saline or alkaline marshy areas (Harms et al. 1992)	Moderate - some suitable habitat present in the Project corridor
Heart-leaved buttercup	<i>Ranunculus cardiophyllus</i>	Not Listed	Not Listed	S1S2	Mesic open upland fescue grasslands, grassy ravine slopes, and open aspen woods (Harms et al. 1992)	Moderate - some suitable habitat present in the Project corridor
Tumble grass	<i>Schedonnardus paniculatus</i>	Not Listed	Not Listed	S2S3	Dryish, usually clayey and gravelly grassland (Harms et al. 1992)	Moderate - some suitable habitat present in the Project corridor
Mad dog skullcap	<i>Scutellaria lateriflora</i> var. <i>lateriflora</i>	Not Listed	Not Listed	S3	Wet shorelines (Harms et al. 1992)	Moderate - small areas of suitable habitat along the Souris River Valley
Prairie ragwort	<i>Senecio plattensis</i>	Not Listed	Not Listed	S3S4	Mesic grassland, sloughs, shores, and open woods (Harms et al. 1992)	High - historical record near the Project area; small areas of suitable habitat present in the Project corridor



Table 5: Listed Plant Species that Have Potential to Occur or Have Been Observed in the Project Area (continued)

Common Name	Scientific Name	COSEWIC Status <sup>(a)</sup>	SARA Status <sup>(b)</sup>	Provincial Status <sup>(c)</sup>	Habitat	Potential for Occurrence
Beaked annual skeleton-weed	<i>Shinnersoseris rostrata</i>	Not Listed	Not Listed	S2	Semi-active to stabilised sand-dunes (Harms et al. 1992)	Very Low - small areas of sandy soils present; however, no active sand dunes were observed in the Project corridor
Menzies' catchfly	<i>Silene menziesii</i>	Not Listed	Not Listed	S3	Moist open woods, clearings, shores and meadows (Harms et al. 1992)	Moderate - small areas of suitable habitat along the Souris River Valley
Hairy germander	<i>Teucrium canadense</i> var. <i>occidentale</i>	Not Listed	Not Listed	S2	Moist lake and stream shore flats, prairie depressions (Harms et al. 1992)	Moderate - small areas of suitable habitat along the Souris River Valley

Note: Species presented in **bold** were observed in the Project corridor during the 2012 field survey.

<sup>(a)</sup> COSEWIC (2012).

<sup>(b)</sup> SARA (2012).

<sup>(c)</sup> Saskatchewan Vascular Plant Tracked Species List (SKCDC 2012a), where:

S1 = extremely rare (5 or fewer occurrences in Saskatchewan, or very few remaining individuals);

S2 = rare (6 to 20 occurrences in Saskatchewan or few remaining individuals);

S3 = rare to uncommon (21 to 100 occurrences in Saskatchewan; may be rare and local throughout the province or may occur in a restricted provincial range; may be abundant in places);

S4 = common (more than 100 occurrences in Saskatchewan, generally widespread and abundant, may be rare in part of its range);

S5 = very common (more than 100 occurrences in Saskatchewan, widespread and abundant, may be rare in part of its range); and

? = rank uncertain.

<sup>(d)</sup> Listed as Endangered under the *Wildlife Act* (1998).

<sup>(e)</sup> Listed as Threatened under the *Wildlife Act* (1998).



### 3.8 Wildlife and Wildlife Habitat

The Moist Mixed Grassland Ecoregion supports numerous terrestrial species due to the combination of grasslands, shrubland, woodland and wetland habitat that compose it (Acton et al. 1998). Woodland habitat is limited and primarily located adjacent to wetlands and at homesteads. Agriculture is an important part of this ecoregion comprising approximately 80% of the area (Acton et al. 1998). Extensive landscape modification has in turn influenced the distribution and occurrence of wildlife, as well as the carrying capacity of the remnant and modified habitat types. Species commonly found in the area are generally those that have adapted to or readily utilize habitats influenced by human activity.

Key wildlife habitat within the Project area is associated with native grassland areas, wetlands, treed areas, and coulee systems. The Qu'Appelle River Valley system provides a wildlife movement corridor within southern Saskatchewan. Due to the continuous tract of native habitat within the valley system, coupled with the terrain structure, this landscape supports a variety of wildlife species. Within the Project area, uplands outside of the Qu'Appelle River that contain wildlife habitat are often associated with native grasslands used as pastures, as well as wetlands surrounded by tree and shrub communities.

Within the Qu'Appelle River Valley, Buffalo Pound Lake has been identified as a waterbird migration staging area (SKCDC 2012b). A 250 m buffer from the perimeter of the waterbody, portion thereof, or a nesting colony, is usually required for low, medium, and high intensity activities during periods of peak use. As such, specific guidelines regarding construction during these periods (i.e., spring and fall seasons) may be required. If any issues arise during construction, mitigation decisions will be made in consultation with appropriate governing agencies.

Ducks Unlimited Canada was contacted to determine if there are any of their wetland or upland projects or properties located within the area that could be in conflict with the proposed Project. Nicolle Flats is a DUC project and the Project is adjacent to Nicolle Flats in NE of 27-18-25 W2M (Figure 3). There are no other DUC projects within 1 km or in direct conflict with the Project.

Wildlife surveys were completed at survey plots within and adjacent to the Project footprint on July 3, 2012. Visual assessments and breeding bird point count surveys were completed on foot within a 2.0 km buffer around the proposed intake and pump house location. Point count surveys consisted of a passive scan (visual and auditory) of a 400 m radius surrounding a central point, which lasted for approximately ten minutes, per protocols based on Ralph et al. (1993). All wildlife species seen or heard at the point were recorded. Selected habitats were also surveyed if the potential for listed species occurrence seemed likely (e.g., small woodland areas and wetlands). Additionally, all wildlife species seen or heard while in transit between points were recorded as incidental observations.

#### 3.8.1.1 Mammals

Fifty-one species of mammals are known to occur in the Moist Mixed Grassland Ecoregion (Acton et al. 1998). Some prevalent species include mule deer (*Odocoileus hemionus*), white tailed deer (*Odocoileus virginianus*), red fox (*Vulpes vulpes*), coyote (*Canis latrans*), striped skunk (*Mephitis mephitis*), porcupine (*Erethizon dorsatum*), and many species of mice and voles (Acton et al. 1998).



Eleven mammal species were observed within the Project area during the July field assessment. These species include white-tailed deer, coyote, Richardson's ground squirrel (*Urocyon richardsonii*), thirteen-lined ground squirrel (*Ictidomys tridecemlineatus*), raccoon (*Procyon lotor*), beaver (*Castor canadensis*), pronghorn antelope (*Antilocapra americana*), and a cottontail rabbit (*Sylvilagus* spp.).

### 3.8.1.2 Birds

One-hundred and ninety-eight species of birds have been observed in the Moist Mixed Grassland Ecoregion (Acton et al. 1998). The abundance of wetlands in this ecoregion and the proximity of the Project area to the Buffalo Pound Lake and the Moose Jaw River create an attractive area for waterbirds, while the mixed grassland habitats and patches of woodland and shrubland habitats attract many passerine species. The combination of these habitats allows for high species richness in the ecoregion.

Forty-eight species of birds were observed within the Project area during the wildlife survey (Table 6). Although these species are listed with their associated habitat preferences, a majority of the species were associated with Buffalo Pound Lake, the riparian and marsh habitat and the treed coulees that extend along the southern portion of the valley.

**Table 6: Bird Species Observed during Wildlife Field Assessments, 2012**

Common Name	Scientific Name	Habitat Association
Western grebe	<i>Aechmophorus occidentalis</i>	Wetland
American white pelican	<i>Pelecanus erythrorhynchos</i>	Wetland
Mallard	<i>Anas platyrhynchos</i>	Wetland
Gadwall	<i>Anas strepera</i>	Wetland
Swainson's hawk	<i>Buteo swainsoni</i>	Woodland
Merlin	<i>Falco columbarius</i>	Woodland
Marbled godwit	<i>Limosa fedoa</i>	Wetland
Upland sandpiper	<i>Bartramia longicauda</i>	Grassland
Wilson's snipe	<i>Gallinago delicata</i>	Wetland
Willet	<i>Catoptrophorus semipalmatus</i>	Wetland
Ring-billed gull	<i>Larus delawarensis</i>	Wetland
Mourning dove	<i>Zenaidura macroura</i>	Urban
Rock pigeon	<i>Columba livia</i>	Urban
Belted kingfisher	<i>Megasceryle alcyon</i>	Wetland
Downy woodpecker	<i>Picoides pubescens</i>	Woodland
Northern flicker	<i>Colaptes auratus</i>	Woodland
Least flycatcher	<i>Empidonax minimus</i>	Woodland
Eastern kingbird	<i>Tyrannus tyrannus</i>	Shrubland
Eastern phoebe	<i>Sayornis phoebe</i>	Woodland
Red-eyed vireo	<i>Vireo olivaceus</i>	Woodland
Black-billed magpie	<i>Pica hudsonia</i>	Urban
American crow	<i>Corvus brachyrhynchos</i>	Urban
Horned lark	<i>Eremophila alpestris</i>	Grassland



**Table 6: Bird Species Observed during Wildlife Field Assessments, 2012 (continued)**

Common Name	Scientific Name	Habitat Association
Tree swallow	<i>Tachycineta bicolor</i>	Woodland
Barn swallow	<i>Hirundo rustica</i>	Urban
Cliff swallow	<i>Petrochelidon pyrrhonota</i>	Urban
Black-capped chickadee	<i>Poecile atricapillus</i>	Woodland
House wren	<i>Troglodytes aedon</i>	Shrubland
Mountain bluebird	<i>Sialia currucoides</i>	Urban
American robin	<i>Turdus migratorius</i>	Urban
Veery	<i>Catharus fuscescens</i>	Woodland
Gray catbird	<i>Dumetella carolinensis</i>	Shrubland
Brown thrasher	<i>Toxostoma rufum</i>	Shrubland
Cedar waxwing	<i>Bombycilla cedrorum</i>	Woodland
Black-and-white warbler	<i>Mniotilta varia</i>	Woodland
Yellow warbler	<i>Dendroica petechia</i>	Shrubland
Common yellowthroat	<i>Geothlypis trichas</i>	Shrubland
Lark sparrow	<i>Chondestes grammacus</i>	Shrubland
Clay-coloured sparrow	<i>Spizella pallida</i>	Shrubland
Savannah sparrow	<i>Passerculus sandwichensis</i>	Grassland
Vesper sparrow	<i>Pooecetes gramineus</i>	Grassland
Song sparrow	<i>Melospiza melodia</i>	Shrubland
Spotted towhee	<i>Pipilo maculatus</i>	Shrubland
Red-winged blackbird	<i>Agelaius phoeniceus</i>	Wetland
Brewer's blackbird	<i>Euphagus cyanocephalus</i>	Wetland
Brown-headed cowbird	<i>Molothrus ater</i>	Urban
Bobolink	<i>Dolichonyx oryzivorus</i>	Grassland
Western meadowlark	<i>Sturnella neglecta</i>	Grassland
American goldfinch	<i>Carduelis tristis</i>	Shrubland

### 3.8.1.3 Reptiles and Amphibians

The Moist Mixed Grassland Ecoregion supports five snakes, six frogs and toads, one turtle, and one salamander species (Acton et al. 1998). Common amphibian and reptile species in the region include the tiger salamander (*Ambystoma tigrinum*), great plains toad (*Bufo cognatus*), plains garter snake (*Thamnophis radix*), boreal chorus frog (*Pseudacris maculata*), wood frog (*Rana sylvatica*), and northern leopard frog (*Rana pipiens*). During the wildlife surveys, only boreal chorus frogs were heard in the marsh area on the eastern edge of Buffalo Pound Lake. However, northern leopard frogs have in the past been observed along the shores of Buffalo Pound Lake, in wetlands on and above the valley slopes, and in the Moose Jaw River (M. Ealey, pers. comm. 2012).



### 3.8.2 Listed Wildlife Species

A list of wildlife species at risk was developed after reviewing federal status documents, provincial tracking lists, and known wildlife distributions within the Project area (Table 7).

Federal status documents include the assessments and updated status reports on wildlife species created by COSEWIC and SARA. The COSEWIC is an independent body of experts that identifies and assesses which wildlife species are considered to be at risk. The Canadian government takes COSEWIC's designations into consideration when determining which species are protected under SARA. Species listed under SARA are separated into three different schedules. Schedule 1 is the official list of wildlife species at risk, and classifies species as being extirpated, endangered, threatened, or of special concern. Once listed, actions to protect and recover a listed species are implemented. Schedule 2 and Schedule 3 lists species that were designated as species at risk by COSEWIC prior to October 1999 and must be reassessed using revised criteria before they can be added to Schedule 1 of SARA (2009). Provincially, status determination of wildlife species was based on a review of the SKCDC (2012c,d) tracking list. This list provides standardized information on the ecological status of wildlife species and communities within the province. The SKCDC has a ranking system that indicates a species' risk of extirpation from the province, and does not necessarily reflect its management policy. For example, some species may be rare within Saskatchewan but are considered common within North America.

Thirteen species that have the potential to occur within the Project area are listed under SARA (2012) (Table 7). Of these species, three species are listed as 'endangered', two species are listed as 'threatened', and five species are listed as 'special concern' under Schedule 1 of SARA (2009). Three species are listed under Schedule 3 of SARA (2012), with one species listed as 'threatened' and two species listed as 'special concern'. An additional eight species that have the potential to occur within the Project area are listed under COSEWIC (2012). Of the additional COSEWIC (2012) listed species, one species is listed as 'endangered', four species are listed as 'threatened', and three species are listed as 'special concern'.

Twenty-eight provincially tracked species have the potential to occur within the Project area (SKCDC 2012c,d) (Table 7). Of these species, the piping plover (*Charadrius melodus circumcinctus*), burrowing owl (*Athene cunicularia*), and Sprague's pipit (*Anthus spragueii*) are currently listed in the provincial regulations of the *Wildlife Act* (1998). This provides protection for all federally listed species under Schedule 1 in the SARA (2012) and provincially listed species classified as endangered or threatened. All migratory bird species are protected by the *Migratory Birds Convention Act* (1994).

A search of the SKCDC database revealed two historic records of Forster's tern (*Sterna forsteri*) and trumpeter swan (*Cygnus buccinators*) within 3 km of the proposed Project. These species was not observed during the field survey; however, one western grebe (*Aechmophorus occidentalis*) (Universal Transverse Mercator North American Datum 83) (13U 473785E 5602645N), one monarch butterfly (*Danaus plexippus*) (13U 476934E 5597388N), one pronghorn antelope (13U 494567E 5574554N) and 24 American white pelicans (*Pelecanus erythrorhynchos*) (flyovers and on Buffalo Pound Lake [19-25 W2M and 18-25 W2M]) were observed.



## SaskWater Expansion Project - Intake and Pump Station

**Table 7: Provincial and Federal Listed Species with the Potential to Occur in the Project Area**

Common Name	Scientific Name	SARA Status <sup>(a)</sup>	COSEWIC Status <sup>(b)</sup>	Provincial Status <sup>(c)</sup>	Potential for Occurrence in the Project Region <sup>(d)</sup>	Species Observed During Wildlife Surveys
Cougar	<i>Puma concolor</i>	No Status	No Status	S2S3	Low - species prefers habitats of dense forests, mountains, and deserts (Currier 1983).	No
Bobcat	<i>Lynx rufus</i>	No Status	No Status	S3S4	Moderate - species prefers habitats compiled of rock, grassland, and dry areas and has adapted to agricultural landscapes (Ealey, pers. comm. 2012); suitable habitat is present in the 72 I/11 map sheet.	No
Badger	<i>Taxidea taxus</i>	No Status	Not at Risk	S3S4	High - species prefers habitats comprised of dry, open grasslands, fields, and pastures where ground squirrels (their main prey base) are abundant (Long 1973).	No
Pronghorn antelope	<i>Antilocapra americana</i>	No Status	No Status	S3	Moderate to High - species range extends into southern Saskatchewan where they prefer grassland and shrubland habitats (Gara 1978).	Yes
Clark's grebe	<i>Aechmophorus clarkii</i>	No Status	No Status	S1B	Moderate - species is a confirmed breeder near Regina as well as a spring and fall transient through the 72 I/11 map sheet (Smith 1996). Little is known on provincial distribution.	No
Western grebe	<i>Aechmophorus occidentalis</i>	No Status	No Status	S5B	High - species is a confirmed breeder in map sheet 72 I/11, 13, and 14 (Smith 1996).	Yes
Horned grebe	<i>Podiceps auritus</i>	No Status	Special Concern	S5B	High - species is a confirmed breeder in the 72 I/11 (Smith 1996). Species prefers small ponds with a mixture of emergent vegetation and open water for breeding (Stedman 2000).	No
American white pelican	<i>Pelecanus erythrorhynchos</i>	No Status	No Status	S3B	High - species is a summer visitor within the 72 I/11 map sheet (Smith 1996).	Yes
Great blue heron	<i>Ardea herodias</i>	No Status	No Status	S3B	High - species is a confirmed breeder within the 72 I/11 map sheet (Smith 1996).	No
Trumpeter swan	<i>Cygnus buccinator</i>	No Status	Not at Risk	S3B	Low - species may breed but more likely migrates through the 72 I/11 map sheet (Smith 1996).	No
Tundra swan	<i>Cygnus columbianus</i>	No Status	No Status	S5M	Moderate - species has been documented as a winter resident in the 72 I/11 map sheet (Smith 1996); however, species likely migrates through the Project region.	No



## SaskWater Expansion Project - Intake and Pump Station

**Table 7: Provincial and Federal Listed Species with the Potential to Occur in the Project Area (continued)**

Common Name	Scientific Name	SARA Status <sup>(a)</sup>	COSEWIC Status <sup>(b)</sup>	Provincial Status <sup>(c)</sup>	Potential for Occurrence in the Project Region <sup>(d)</sup>	Species Observed During Wildlife Surveys
Golden eagle	<i>Aquila chrysaetos</i>	No Status	Not at Risk	S3B S4M S3N	High - species is a confirmed breeder and winter resident within the 72 I/11 map sheet (Smith 1996) and has been observed previously near the northern terminus of the pipeline (Ealey pers. comm. 2012). Prefer nesting on cliff and sheer escarpment slopes (usually along major river valleys) but will occasionally establish a nest tree (Kochert et al. 2002).	No
Bald eagle	<i>Haliaeetus leucocephalus</i>	No Status	Not at Risk	S5B S4M S4N	Moderate - species nests in trees near large bodies of open water. Species may migrate through the Project region (Buehler 2000).	No
Peregrine falcon	<i>Falco peregrinus</i>	No Status	Special Concern	S1B S4M S2N	Moderate - species prefers to nest on steep cliffs, as well as tall buildings (White et al. 2002). Species may migrate through the Project region.	No
Prairie falcon	<i>Falco mexicanus</i>	No Status	Not at Risk	S3B S3M S3N	Low - species prefers dry open areas with cliffs and bluffs for nesting (Steenhof 1998). Species may be a summer visitor in the Project region (Smith 1996).	No
Cooper's hawk	<i>Accipiter cooperii</i>	No Status	Not at Risk	S4B S2M S2N	Moderate - species is a possible breeder in the 72 I/11 map sheet (Smith 1996). Species prefer forested areas near edges and rivers for nesting (Curtis et al. 2006).	No
Ferruginous hawk	<i>Buteo regalis</i>	Threatened Schedule 3	Threatened	S4B S4M	Moderate - species is a confirmed breeder adjacent to the 72 I/11 map sheet (Smith 1996). Species prefers sparsely treed native grassland areas for nesting and large open areas for hunting (Bechard and Schmutz 1995).	No
Turkey vulture	<i>Cathartes aura</i>	No Status	No Status	S2S3B S2M S2N	High - species prefers to nest in abandoned buildings, and primarily feeds on carrion (Kirk and Mossman 1998). Species is a summer visitor to areas adjacent to the 72 I/11 map sheet (Smith 1996).	No
Whooping crane	<i>Grus americana</i>	Endangered Schedule 1	Endangered	SXB S1M	Low to Moderate - species may use the area as a stop-over or staging ground during the spring and/or fall migration periods (Smith 1996).	No
Sandhill crane	<i>Grus canadensis</i>	No Status	Not at Risk	S2B S4M	Moderate - unlikely to breed within the Project region; however, species may occur during spring and fall migration periods (Smith 1996).	No



## SaskWater Expansion Project - Intake and Pump Station

**Table 7: Provincial and Federal Listed Species with the Potential to Occur in the Project Area (continued)**

Common Name	Scientific Name	SARA Status <sup>(a)</sup>	COSEWIC Status <sup>(b)</sup>	Provincial Status <sup>(c)</sup>	Potential for Occurrence in the Project Region <sup>(d)</sup>	Species Observed During Wildlife Surveys
Yellow rail	<i>Coturnicops noveboracensis</i>	Special Concern Schedule 1	Special Concern	S3B S2M	Low to Moderate - species is a possible breeder in the 72 I/11 map sheet (Smith 1996). Potential habitat may exist along the shores of large permanent sloughs or wetlands with developed marsh habitat (Bookhout 1995).	No
Long-billed curlew	<i>Numenius americanus</i>	Special Concern Schedule 1	Special Concern	S3B S4M	Moderate to High - species is a probable breeder in the 72 I/11 map sheet (Smith 1996). Species prefers shortgrass or mixedgrass native grassland habitats for breeding (Dugger and Dugger 2002).	No
Piping plover	<i>Charadrius melodus circumcinctus</i>	Endangered Schedule 1	Endangered	S3B	Moderate - species was known to breed in the 72 I/11 map sheet prior to 1966, and is a confirmed breeder in adjacent areas (Smith 1996). Species prefers to nest on the barren gravelly to sandy shores of large wetlands (Elliott-Smith and Haig 2004).	No
Semipalmated plover	<i>Charadrius semipalmatus</i>	No Status	No Status	S1B	Low - species breeds in the arctic (Nol and Blanken 2004); however, species likely migrates through the Project region (Smith 1996).	No
Red knot	<i>Calidris canutus</i>	No Status	Endangered	S2M	Low - species breed in the tundra (Harrington 2001), but may migrate through the Project region (Smith 1996).	No
Short-billed dowitcher	<i>Limnodromus griseus</i>	No Status	No Status	S1B S4M	Low - species breeds in marshes and bogs of the boreal forest (Jehl et al. 2001). Species may migrate through the Project region (Smith 1996).	No
Glaucous gull	<i>Larus hyperboreus</i>	No Status	No Status	S2N S2M	Low - species breeds in the arctic (Gilchrist 2001); however, species may migrate through the Project region (Smith 1996).	No
Caspian tern	<i>Sterna caspia</i>	No Status	Not at Risk	S2B S2M	Moderate - species has been documented as a summer visitor adjacent to the 72 I/11 map sheet (Smith 1996). Species prefers saltwater wetlands during the breeding season (Cuthbert and Wires 1999).	No
Forster's tern	<i>Sterna forsteri</i>	No Status	No Status	S4B	High - species is a possible breeder within the 72 I/11 map sheet (Smith 1996). Species prefers fresh and saltwater marshes for breeding (McNicholl et al. 2001).	No



## SaskWater Expansion Project - Intake and Pump Station

**Table 7: Provincial and Federal Listed Species with the Potential to Occur in the Project Area (continued)**

Common Name	Scientific Name	SARA Status <sup>(a)</sup>	COSEWIC Status <sup>(b)</sup>	Provincial Status <sup>(c)</sup>	Potential for Occurrence in the Project Region <sup>(d)</sup>	Species Observed During Wildlife Surveys
Burrowing owl	<i>Athene cunicularia</i>	Endangered Schedule 1	Endangered	S2B	Moderate to High - species is a confirmed breeder in the 72 I/11 map sheet (Smith 1996). Species prefers short-grass prairie grasslands or heavily grazed pasturelands for nesting (Haug et al. 1993).	No
Short-eared owl	<i>Asio flammeus</i>	Special Concern Schedule 3	Special Concern	S3B S2N	High - species is a possible breeder in the 72 I/11 map sheet (Smith 1996). Species prefers open areas such as grasslands, marshes, and agricultural areas (Wiggins et al. 2006).	No
Common nighthawk	<i>Chordeiles minor</i>	No Status	Threatened	S4S5B S4S5M	High - species is a possible breeder in the 72 I/11 map sheet (Smith 1996). Species prefers forest clearings, rocky outcrops, prairies and pastures for breeding (Poulin et al. 1996).	No
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	Special Concern Schedule 3	Threatened	S1B S1M	Low - suitable habitat limited to old farmstead sites (Smith et al. 2000). Species is a confirmed breeder in areas adjacent to the 72 I/11 map sheet (Smith 1996).	No
Barn swallow	<i>Hirundo rustica</i>	No Status	Threatened	S5B S5M	High - nesting sites include buildings, bridges, and mobile structures such as ferries and farm equipment (Smith 1996).	Yes
Olive-sided flycatcher	<i>Contopus cooperi</i>	No Status	Threatened	S4B S4M	Low - species prefers to nest in coniferous forests (Altman and Sallabanks 2000); however, species may migrate through the Project region (Smith 1996).	No
Loggerhead shrike	<i>Lanius ludovicianus excubitorides</i>	Threatened Schedule 1	Threatened	S3B	High - species is a possible breeder in the 72 I/11 map sheet (Smith 1996). Potential habitat includes planted hedgerows and/or tall shrub clumps (Yosef 1996).	No
Northern shrike	<i>Lanius excubitor</i>	No Status	No Status	S1B S4M	Low to Moderate - species has been documented as a winter resident in the Project region and surrounding area (Smith 1996). Species breeds in the northern boreal forest (Cade and Atkinson 2002).	No
Eastern bluebird	<i>Sialia sialis</i>	No Status	Not at Risk	S4B	Moderate - species is a confirmed breeder in areas adjacent to the 72 I/11 map sheet (Smith 1996). Species is a cavity nester that prefers open habitats with little ground cover (Gowaty and Plissner 1998).	No



## SaskWater Expansion Project - Intake and Pump Station

**Table 7: Provincial and Federal Listed Species with the Potential to Occur in the Project Area (continued)**

Common Name	Scientific Name	SARA Status <sup>(a)</sup>	COSEWIC Status <sup>(b)</sup>	Provincial Status <sup>(c)</sup>	Potential for Occurrence in the Project Region <sup>(d)</sup>	Species Observed During Wildlife Surveys
Northern mockingbird	<i>Mimus polygottos</i>	No Status	No Status	S3S4B	Low - species inhabits dense, low shrubs and areas of open ground (Derrickson and Breitwisch 1992). Species is documented as a possible breeder in the 72 I/11 map sheet (Smith 1996).	No
Sprague's pipit	<i>Anthus spragueii</i>	Threatened Schedule 1	Threatened	S4B	High - species is a confirmed breeder for the 72 I/11 map sheet (Smith 1996). Suitable nesting habitat for this species is limited to areas of open grassland (Robbins and Dale 1999).	No
Canada warbler	<i>Wilsonia canadensis</i>	No Status	Threatened	S5B	Low - species breeds in the boreal mixed-wood forest (Reitsma et al. 2010); however, species may migrate through the Project region (Smith 1996).	No
Black-throated blue warbler	<i>Dendroica caerulescens</i>	No Status	No Status	S2B	Low - species nests in deciduous forests (Holmes et al. 2005). Species may migrate through the Project region (Smith 1996).	No
Scarlet tanager	<i>Piranga olivacea</i>	No Status	No Status	S1B	Low to Moderate - species nests in deciduous forests (Mowbray 1999). Species likely migrates through the Project region (Smith 1996).	No
McCown's longspur	<i>Calcarius mccownii</i>	Special Concern Schedule 1	Special Concern	S3S4B	Low to Moderate - species is a possible breeder in areas adjacent to the 72 I/11 map sheet (Smith 1996). Species prefers shortgrass prairie and shrubland habitat for nesting (With 2010).	No
Rusty blackbird	<i>Euphagus carolinus</i>	No Status	Special Concern	S4B	Low to Moderate - species nests in the boreal forest near wetlands and swamps while wintering in damp woodlands and cultivated fields (Avery 1995). Species is documented as a winter resident in the 72 I/11 map sheet (Smith 1996).	No
Pine grosbeak	<i>Pinicola enucleator</i>	No Status	No Status	S2B S4N	Low - species breeds in the sub-arctic and boreal conifer forests (Adkisson 1999). Species has been documented as a winter resident in areas adjacent to the 72 I/11 map sheet (Smith 1996).	No
Baird's sparrow	<i>Ammodramus bairdii</i>	No Status	Special Concern	S4B	Moderate - species is a possible breeder in map sheet 72 I/4, 5, 6, and 11 (Smith 1996). Species prefers native prairie grassland habitat for nesting and foraging (Green et al. 2002).	No



**Table 7: Provincial and Federal Listed Species with the Potential to Occur in the Project Area (continued)**

Common Name	Scientific Name	SARA Status <sup>(a)</sup>	COSEWIC Status <sup>(b)</sup>	Provincial Status <sup>(c)</sup>	Potential for Occurrence in the Project Region <sup>(d)</sup>	Species Observed During Wildlife Surveys
Northern leopard frog	<i>Lithobates pipiens</i>	Special Concern Schedule 1	Special Concern	S3	Moderate to High - permanent wetlands or water drainages in the Project region may provide suitable habitat (COSEWIC 2010).	No
Plains spadefoot	<i>Spea bombifrons</i>	No Status	Not at Risk	S3	Low - species prefers habitats containing loose, sandy soil in arid regions, and rely on ephemeral and temporary wetlands for breeding (Lauzon 1999).	No
Monarch butterfly	<i>Danaus plexippus</i>	Special Concern Schedule 1	Special Concern	S3B	Moderate to High - exist primarily wherever milkweed ( <i>Asclepias</i> spp.) occurs (COSEWIC 2010). This includes abandoned farmland, along roadsides, and other open spaces where these plants grow. Monarchs are migratory, leaving the Prairies in August.	Yes

Note: Species presented in **bold** were observed in the Project area during the 2012 field survey.

<sup>(a)</sup> SARA (2012).

<sup>(b)</sup> COSEWIC (2012).

<sup>(c)</sup> SKCDC (2012c,d):

### Provincial Rank Definitions

S1 Extremely Rare – 5 or fewer occurrences in Saskatchewan, or very few remaining individuals

S2 Rare – 6 to 20 occurrences in Saskatchewan or few remaining individuals.

S3 Rare/Uncommon – 21 to 100 occurrences in Saskatchewan; may be rare and local throughout province or may occur in a restricted provincial range (may be abundant in places).

S4 Common – more than 100 occurrences; generally widespread and abundant, but may be rare in parts of its range.

S5 Very Common – more than 100 occurrences widespread and abundant, but may be rare in parts of its range.

B – for a migratory species, rank applies to the breeding population in the province.

M – for a migratory species, rank applies to the transient population in the province.

N – for a migratory species, rank applies to the non-breeding population in the province.

<sup>(d)</sup> Species are protected in Saskatchewan under the *Wildlife Act* (1998).



### 3.9 Hydrology and Regional Geology

#### 3.9.1 Hydrology

Buffalo Pound Lake is one of the seven major water bodies along the Qu'Appelle River system. The Qu'Appelle River is the main stream draining the Qu'Appelle River basin. This basin encompasses an area of approximately 52,000 km<sup>2</sup> and extends about 400 km from headwaters near Lake Diefenbaker to its confluence with the Assiniboine River (Hall and Leavitt 1999). The topography is mainly flat to gently undulating, except for the Qu'Appelle Valley, which is incised 30 m to 90 m into the plain (Qu'Appelle Basin Study Board 1972). The valley has a relatively flat bottom with steep side slopes and varies from 1.6 km to 3.2 km in width (Qu'Appelle Valley Management Board 1977).

The Qu'Appelle River flows through the Qu'Appelle Valley and is a mature stream characterized by freely developed meanders, a low gradient, and a considerable change in channel capacity throughout its length. Channel depth seldom exceeds 4.5 m, with depths of 1.5 m to 3 m common (Qu'Appelle Valley Management Board 1977).

There are about 10 major tributaries draining into the Qu'Appelle River, with Moose Jaw River and Wascana Creek being the most significant (Qu'Appelle Basin Study Board 1972). The tributary streams generally 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 basin originates from snowmelt. Approximately 90% of the total volume of water contributed to the Qu'Appelle River by its tributaries occurs during the period from March to May. For the remainder of the year, the tributary streams add little or no flow to the river (Qu'Appelle Basin Study Board 1972).

The major lakes in the Qu'Appelle system are used mainly for recreation and water supply. From west to east, the string of lakes includes Buffalo Pound, Pasqua, Echo, Mission, Katepwa, Crooked, and Round. Most of the four dams and five control structures on the Qu'Appelle system were constructed for irrigation development and to maintain water supply by increasing storage potential in the lakes (SaskWater 1999). In general, the lakes are lowered in the fall and winter to enable them to store as much spring runoff as possible the following year.

Specifically, the Qu'Appelle River system operates such that:

- The Qu'Appelle Dam on Lake Diefenbaker permits controlled releases of water from the South Saskatchewan River into the Qu'Appelle River. Releases typically begin shortly after spring runoff and are made to provide for downstream spring and summer water demands (SaskWater 1999). By 2009, the average releases through the Qu'Appelle Dam were approximately 140,000 cubic dam<sup>3</sup>/yr (Grajczyk 2008/09). In the spring, the release was approximately 10 m<sup>3</sup>/s. As the channel capacity is reduced due to vegetation growth, the summer release was reduced to approximately 5 m<sup>3</sup>/s. Fall and winter releases are typically 2 m<sup>3</sup>/s (Grajczyk 2008/09).



- The Qu'Appelle River flows from the Qu'Appelle Dam to Buffalo Pound Lake, where a dam and control structure are used to maintain desirable lake levels and permit the controlled release of water downstream, once spring runoff has subsided. Buffalo Pound Lake is the municipal water supply source for cities of Moose Jaw and Regina. As well, the lake is the main source of water for the Mosaic potash mine and the SaskFerco fertilizer plant and will be the main source for the proposed Potash One mine. Since the 1980s to 2009 average releases through the Buffalo Pound Dam have been approximately 70,000 dam<sup>3</sup>/yr (Grajczyk 2008/09). Most of the water released from the Qu'Appelle Dam passes through Buffalo Pound Lake to meet downstream requirements (Grajczyk 2008/09).
- In the Craven area, there are two control structures: the Craven Dam on the Qu'Appelle River and the Valeport Dam near the south end of Last Mountain Lake. The Qu'Appelle River and Last Mountain Lake are joined by Last Mountain Creek. Using the two control structures, the direction of flow in Last Mountain Creek can be directed into or out of Last Mountain Lake (SaskWater 1999).
- From the Craven area, the Qu'Appelle River flows to Pasqua Lake. The control structure on Echo Lake is used to control water level of Echo and Pasqua Lakes once spring runoff has subsided.
- From Pasqua Lake, the river flows on to Mission Lake. Water levels on Mission and Katepwa Lakes are controlled by a structure equipped with two radial gates which are typically only operated during high-flow events. Although the gates provide some control, water levels on Mission and Katepwa Lakes generally depend on upstream inflow into the lake.
- From Katepwa, the Qu'Appelle River flows on to Crooked Lake and then to Round Lake. At the downstream ends of both lakes, control structures maintain desired water levels. During above normal or extreme flows, these structures are left open and the systems flows in an unregulated or natural manner (SaskWater 1999).

Buffalo Pound Lake inflows and outflows are highly regulated by the operation of the Qu'Appelle Dam and Buffalo Pound Dam. There is virtually no natural inflow to the reservoir during the summer, fall and winter months. Therefore, inflows to Buffalo Pound Lake are maintained by releases from Lake Diefenbaker through the Qu'Appelle Dam. Channel conveyance capacity is a predominate factor with regard the amount of water that can be released from the Qu'Appelle Dam. Under the existing conditions, during the active weed growth period generally in July and August, the channel capacity can be reduced to about 6 m<sup>3</sup>/s to 8 m<sup>3</sup>/s (Acharya and Kells 2005), but rarely drops below 4 m<sup>3</sup>/s (Grajczyk 2008/09).

The daily mean releases for each year and for complete historical records from the Qu'Appelle Dam, as recorded by Environment Canada's hydrometric station just downstream of the Qu'Appelle Dam (Environment Canada 2012d) are illustrated in Figures 5 and 6. Due to a change in operation in the 1980s, only data from 1984 to 2010 were used in this analysis. The lowest release occurred in 1994 when it dropped to 0.02 m<sup>3</sup>/s. The highest release occurred in 1989 when it reached 15.70 m<sup>3</sup>/s. The average of the mean daily releases for the period of record 1984 to 2010 is 3.53 m<sup>3</sup>/s, while the average of the maximum daily annual releases is 9.7 m<sup>3</sup>/s.



## SaskWater Expansion Project - Intake and Pump Station

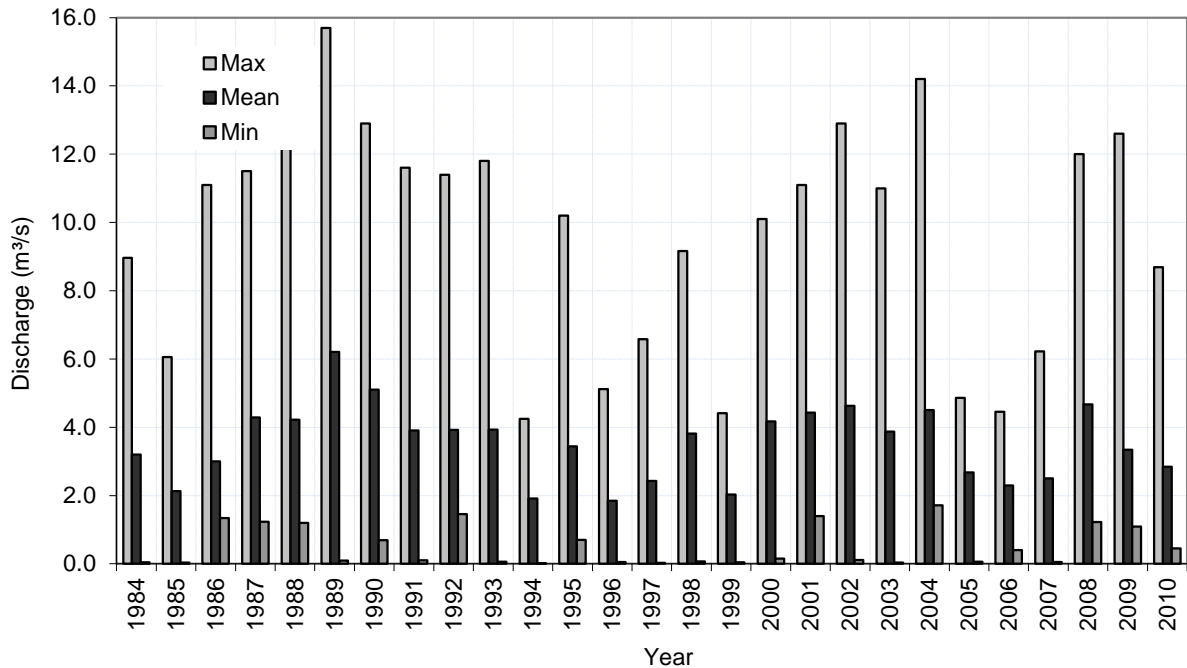


Figure 5: Annual Releases from Qu'Appelle Dam for the Period of Record 1984-2010

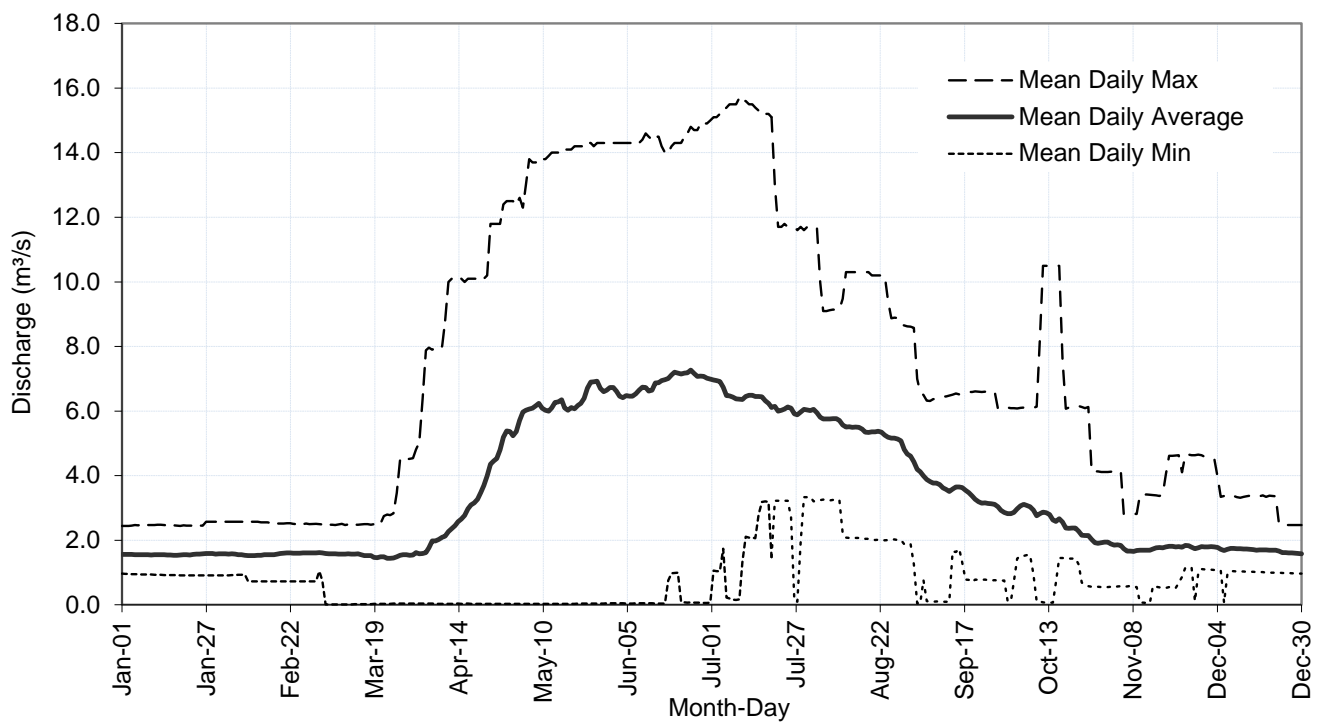


Figure 6: Mean Daily Releases from Qu'Appelle Dam for the Period of Record 1984-2010



Buffalo Pound Dam control structure gates are operated as required to maintain the lake level within the desirable operating range. Table 8 outlines the desirable operating ranges for Buffalo Pound Lake levels, while Table 9 lists the Buffalo Pound Lake area-volume-elevation relationship (Grajczyk 2008/09).

**Table 8: Buffalo Pound Lake Level Desirable Operating Ranges**

Season	Desirable Operating Range (masl)
Winter	509.17 to 509.32
Spring	508.86 to 509.93
Summer	509.17 to 509.47
Fall	508.86 to 509.32

masl = metre above sea level.

**Table 9: Buffalo Pound Lake Area-Volume-Elevation Relationship**

Elevation (masl)	Volume (dam <sup>3</sup> )	Area (ha)	Mean Depth (m)
503.80	0	0	0.0
505.00	4710	785	0.6
506.00	16195	1512	1.1
507.00	33570	1963	1.7
508.86 (LDOL)	76587	2770	2.8
509.44 (MAL)	91232	2916	3.1
509.93 (HDOL)	107261	3015	3.7
510.00	109585	3030	3.6
511.00	140735	3200	4.4
512.00	173585	3370	5.2
513.60	229274	3680	6.2

masl = metres above sea level; LDOL = lowest desirable operating level; MAL = mean annual level; HDOL = highest desirable operating level; dam<sup>3</sup> = cubic decametres; ha = hectare; m = metre.

The mean daily annual and mean daily Buffalo Pound Lake water elevations are illustrate in Figures 7 and 8, respectively (Hallborg 2012). The mean annual minimum and mean annual average water elevations are maintained within the desirable operating range. For the period 1984-2011, the lowest water elevation occurred in 1988 when it dropped to 509.06 metres above sea level (masl), while highest water elevation occurred in 2011 when it reached 511.15 masl. The average annual water elevation for the period of record 1984 to 2006 is 509.44 masl.



## SaskWater Expansion Project - Intake and Pump Station

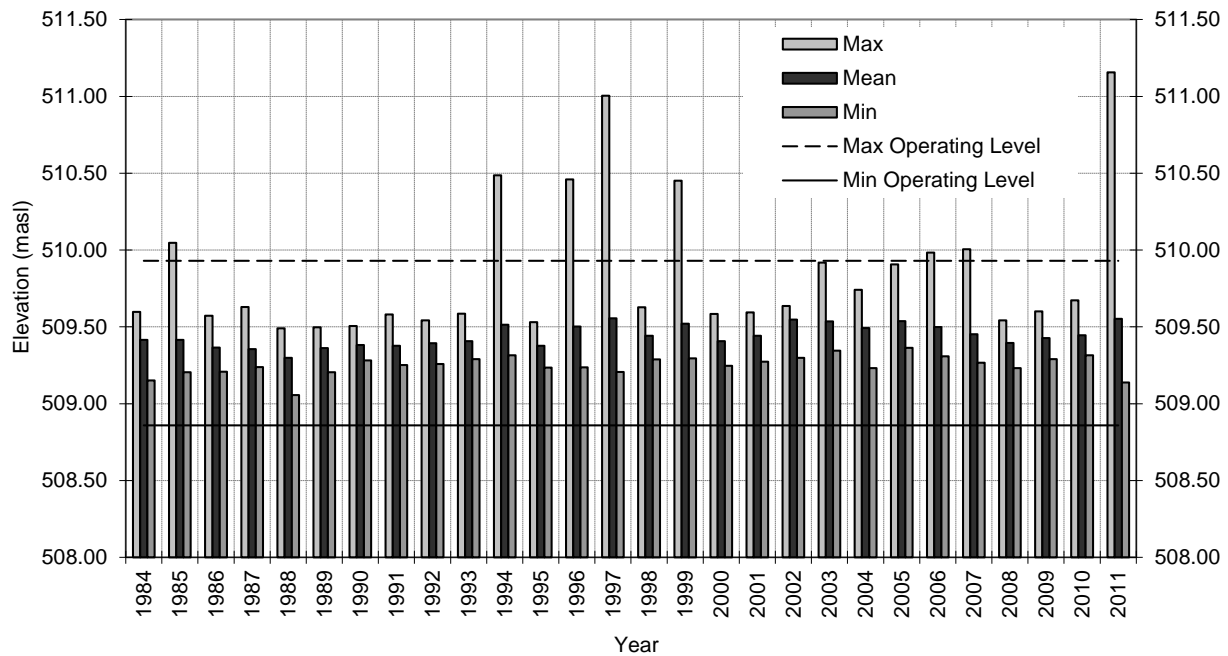


Figure 7: Annual Water Elevation for Buffalo Pound Lake for the Period of Record 1984-2011

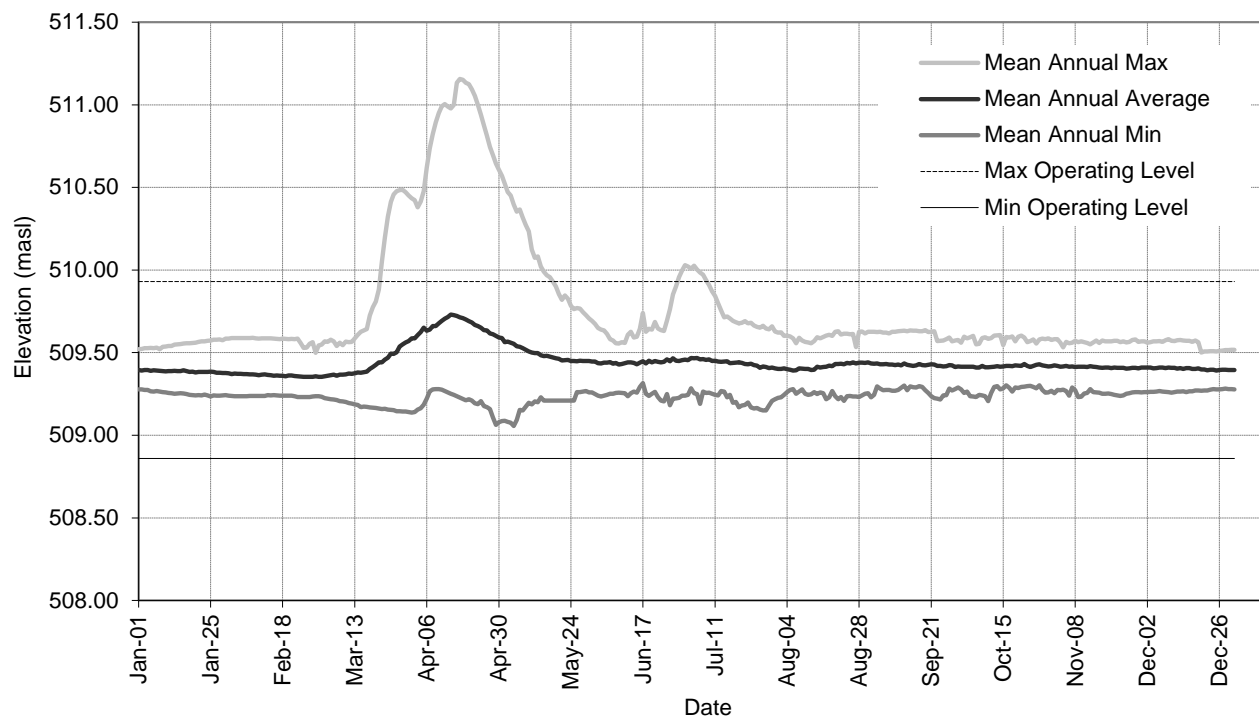
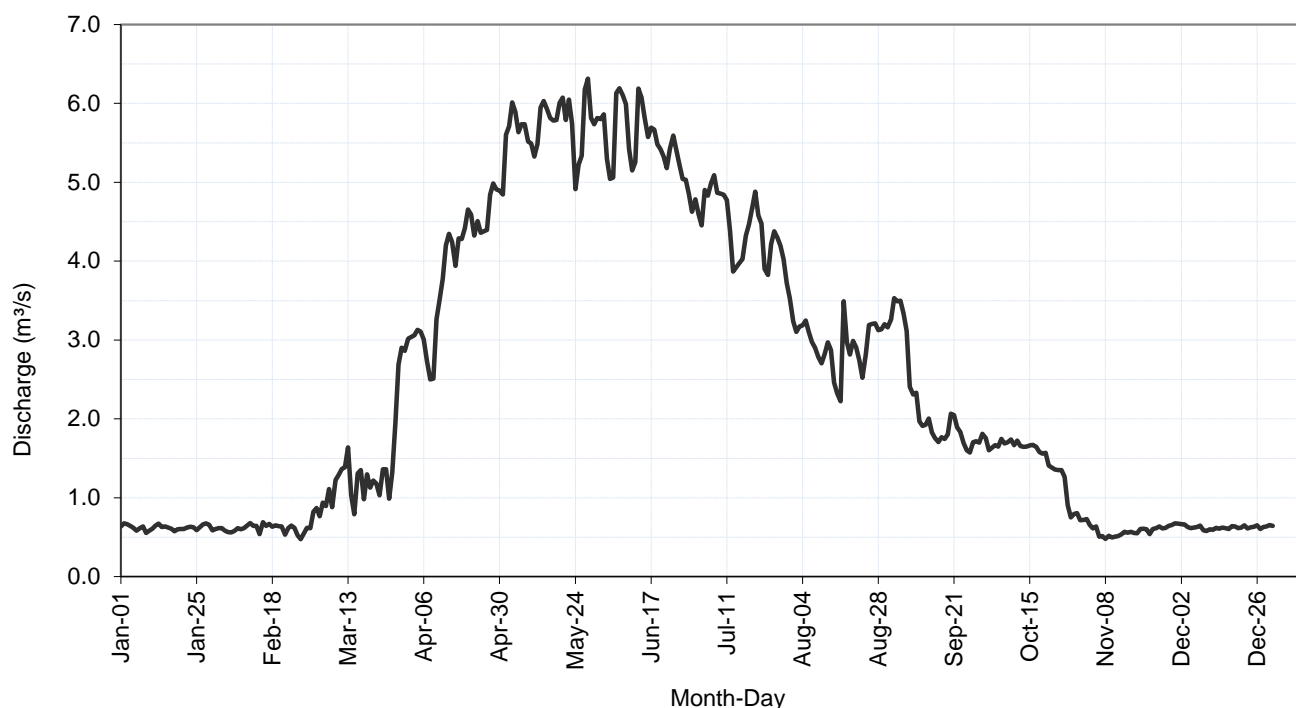


Figure 8: Mean Daily Water Elevation for Buffalo Pound Lake for the Period of Record 1984-2011



Discharges being released from the Buffalo Pound Lake control structure were estimated using downstream discharge data. The EC hydrometric station, Qu'Appelle River below Moose Jaw River (Station 05JG007), located approximately 10 km downstream of the Buffalo Pound Dam, has records for the period 1944-1994. The Moose Jaw River joins the Qu'Appelle River upstream of this station approximately 7 km. Moose Jaw River has been recorded by Environment Canada at Moose Jaw River near Burdick (Station 05JE006) located approximately 30 km upstream of its confluence with the Qu'Appelle River (Environment Canada 2012d). Data from the hydrometric station on the Moose Jaw River can be subtracted from the Qu'Appelle River discharges to estimate the releases from the Buffalo Pound Dam for the period that both stations have simultaneous data. Figure 9 shows the mean annual hydrograph on the Qu'Appelle River downstream of Buffalo Pound Lake based on the Period of Record 1984-1994.



*Figure 9: Daily Hydrograph on the Qu'Appelle River Downstream of Buffalo Pound Dam (1984-1994)*

Downstream of the Buffalo Pound Dam (approximately 50 km), the Qu'Appelle River and Last Mountain Lake are joined by Last Mountain Creek. The link area is extremely flat with no appreciable gradient in either direction; therefore, the natural direction of water flow depends on which water level is higher, that of the lake or that of the Qu'Appelle River (SaskWater 1999). Next to the confluence, there are the Craven Dam on the Qu'Appelle River, and the Valeport Dam near the south end of Lake Mountain Lake. Under normal flow conditions, there is some opportunity for regulating flow in the system through these two control structure operations. When Last Mountain Lake levels are low, water may be diverted into the lake through the use of the Craven and Valeport control structures. During flood years, the structures are left fully open and the system flows in an unregulated or natural condition.



The maximum and minimum desirable operating levels for Last Mountain Lake are 490.27 masl and 489.36 masl, respectively (SaskWater 1999). Figure 10 illustrates the historical annual Last Mountain Lake water elevations for the period of record 1984 to 2011 (Environment Canada 2012d). The lowest water elevation occurred in 1988 when it reached the minimum operating level of 489.36 masl. The highest water elevation occurred in 2011 (similar to Buffalo Pound Lake) when it reached 491.97 masl. The average of the mean annual water elevations for the period of record 1984 to 2011 is 490.03 masl.

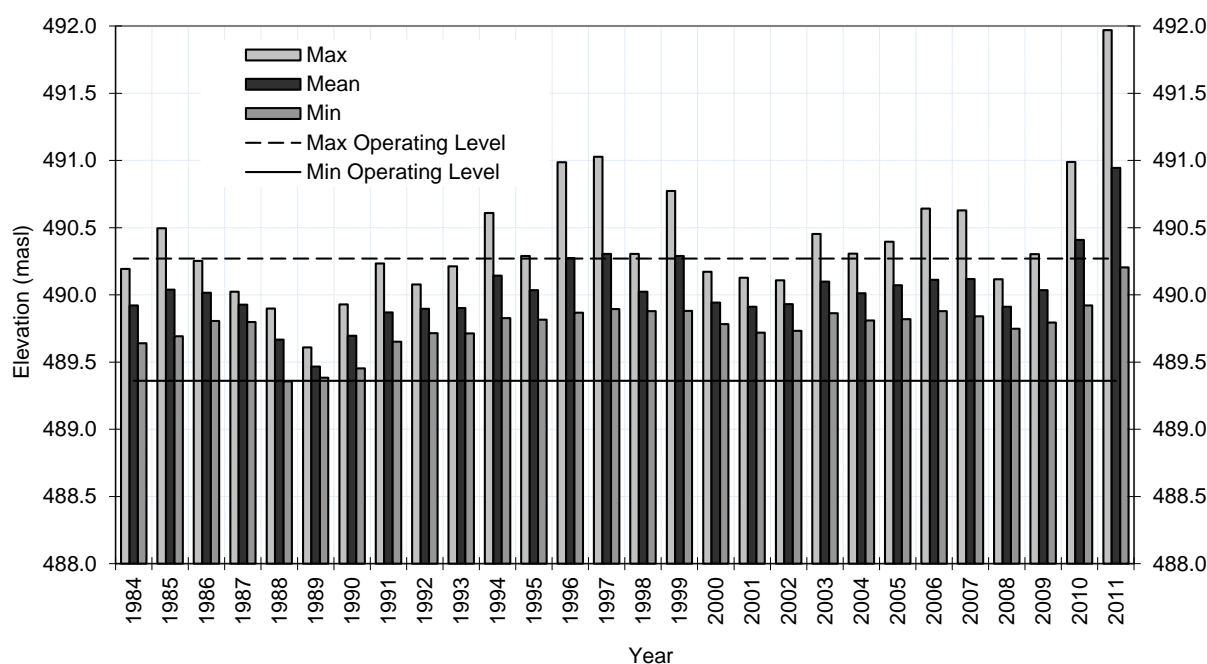


Figure 10: Annual Water Elevation for Last Mountain Lake

### 3.9.2 Regional Geology

Maps of the Buffalo Pound Lake area published by Saskatchewan Research Council (SRC) indicate that the west side of the valley has up to 50 m of surficial stratified drift and glacial till overlying the bedrock Bearpaw Formation. The Bearpaw Formation consists of grey, noncalcareous silt, and clay. The Bearpaw Formation is mapped as ranging in thickness from approximately 150 m outside of the incised valley to about 50 m in thickness at the centre of the valley. Cross sections of the valley near the proposed Project location indicate that alluvium in the centre of the incised valley may be up to 60 m thick. The bedrock is reported on SRC maps to be an approximate elevation of 475 m in the valley bottom and up to 550 m on the upland.

### 3.9.3 Bathymetry

The water depth ranged from 0.3 m to 2.1 m at the borehole locations. Buffalo Pound Lake depth near the proposed Project location ranged from 0 m at the shoreline to about 2.1 m at the north side of the pump station.



### 3.9.4 Lake Bed

Lake bed sediments encountered at the borehole locations consisted of very loose sand in Borehole GA-08-04 and very soft to soft, black, clay with some fibrous organic material in Boreholes GA-08-05 to GA-08-07. The depth of very soft clay was determined by the depth to which the SPT sampler penetrated into the sediments under self weight of the sampler and A-Rods. The very soft clay ranged from 0.4 m to 1.0 m in thickness at the borehole locations.

The stratigraphy within the lake was variable, as shown on Figure 11. Borehole GA-08-04 was advanced through 0.86 m of water to a depth of 12.7 m below lake level. The soil strata encountered consisted of very loose sand, firm silty clay (Till), loose sand, stiff clayey silt, and compact sand. Borehole GA-08-05 was advanced through 1.8 m of water with the stratigraphy encountered consisting of soft clay underlain by compact sand, firm silty clay (Till), very stiff varved clay and hard, silty clay (Till) to a depth of 10.9 m below lake level. Borehole GA-08-06 was advanced through 2.0 m of water with the stratigraphy consisting of very soft to soft, clay underlain by soft silty clay (Till), medium to coarse sand, silty clay (Till) and, hard silty clay (Till) encountered at a depth of 7.8 m which extended to the end of drilled depth at 11.3 m.

Borehole GA-08-07 was advanced through 2.2 m of water with the stratigraphy consisting of very soft clay to soft clay underlain by stiff silty clay (Till) at a depth of 8.3 m, which extended to the end of drilled depth at 10.4 m. The Atterberg limits of the soft clay were 36 and 78 for the plastic and liquid limits respectively. Based on a correlation with the liquid limits, the estimated compression index of the soft clay is 0.5.

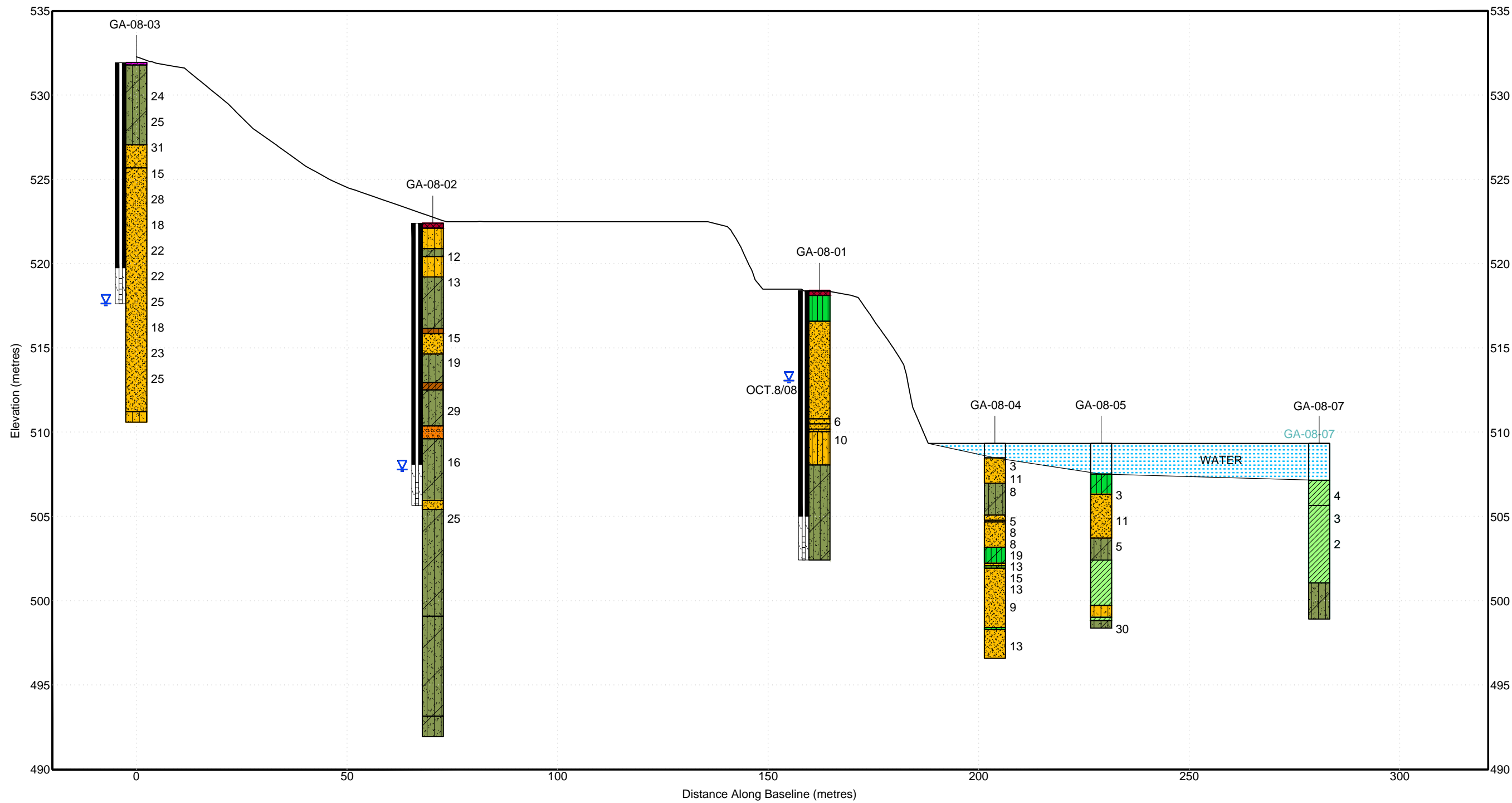
### 3.9.5 Stratigraphy of Upland and Valley Slope

The stratigraphy along the upslope area of the site was variable as shown on Figure 11. The stratigraphy encountered in Borehole GA-08-01 consisted of silt fill underlain by laminated silt, loose fine sand, and hard silty clay (Till) at a depth of 8.4 m to the end of drilled depth at 16.0 m below ground surface. The stratigraphy in Borehole GA-08-02 consisted of a thin layer of fill underlain by fine silty sand, very stiff silty clay (Till), fine sand, silty clay, silty clay (Till), fine to medium sand and very stiff to hard, silty clay (Till) from 17.0 m to the end of drilled depth at 30 m below ground surface. The stratigraphy in Borehole GA-08-03 consisted of a thin layer of topsoil underlain by very stiff silty clay (Till) to a depth of 4.9 m below ground surface. The very stiff silty clay (Till) was underlain by compact, fine sand which became wet at approximately 13.9 m below ground surface, grey and oxidized at approximately 19.2 m below ground surface. The fine sand was underlain by grey silt with sand at about 20.7 m and extended to the end of drilled depth at 21.3 m.

## 3.10 Aquatic Resources

Buffalo Pound Lake reservoir and outlet control structure are owned and operated by the SWSA (formerly the Saskatchewan Watershed Authority [SWA]) (2008). It is the primary water source for Moose Jaw, Regina, and a number of smaller communities throughout southern Saskatchewan (SWA 2008). It is also a source of water for agricultural, industrial, and recreational purposes. Buffalo Pound Lake is 29 km long and has a maximum depth of 5.5 m. The reservoir has a drainage area of approximately 3,310 square kilometres (km<sup>2</sup>) and a surface area of 2,920 ha at full supply level (SWA 2008). Fish are able to move into Buffalo Pound Lake from the Upper Qu'Appelle River via a fish ladder located within the Buffalo Pound Dam (SWA 2008). The Upper Qu'Appelle River watershed drains 23,443 km<sup>2</sup> and flows from the outlet of the Qu'Appelle Dam on Lake Diefenbaker, through Buffalo Pound Lake, and finally to its confluence with Last Mountain Creek near Lumsden (SWA 2005).

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#### LEGEND

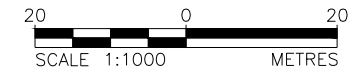
- ORGANICS
- FILL
- SAND AND GRAVEL
- SAND/SILTY\_SAND/SANDY SILT
- SILT OR CLAYEY SILT
- SILTY CLAY
- SILTY CLAY (TILL)
- CLAY



#### NOTE

VERTICAL EXAGGERATION IS 4x  
THIS STRATIGRAPHY DRAWING IS A SIMPLIFICATION OF THE SUBSURFACE CONDITIONS.  
DETAILED DESCRIPTIONS OF THE CONDITIONS ENCOUNTERED AT THE BOREHOLE  
LOCATIONS ARE FOUND ON THE RECORD OF BOREHOLE SHEETS CONTAINED IN THE  
GEOTECHNICAL INVESTIGATION REPORT

#### BOREHOLE LEGEND

BOREHOLE IDENTIFIER	SPT (N VALUE)
GA08-01	
WATER	
TOPSOIL	
FILL	
SAND and GRAVEL	
SILT	5
silty SAND	7
SAND	10
SILTY CLAY	
CLAYEY SILT	
SILTY CLAY (TILL)	
CLAY	



PROJECT		PROPOSED SASKWATER BUFFALO POUND NON-POTABLE WATER SYSTEM EXPANSION PROJECT - INTAKE AND PUMPSTATION	
 SaskWater			
TITLE			
INTERPRETED STRATIGRAPHIC CROSS SECTION			
 Golder Associates Saskatoon, Saskatchewan	PROJECT 12-1362-0044		FILE No.
	DESIGN		
	CADD	BDS	20/12/12
	CHECK	KH	04/01/13
	REVIEW	ME	04/01/13
SCALE AS SHOWN		REV.	0
FIGURE: 11			



### 3.10.1 Water Quality

Surface water quality is influenced by factors such as groundwater quality and quantity, hydrology, and sediment and soil chemistry. Land use activities (e.g., agriculture, industry) may also affect surface water quality through aerial emissions, changes in drainage patterns, and altered soil chemistry.

Determining surface water quality is important to the understanding of chemical factors, which limit aquatic plants, plankton, benthic invertebrates, and fish populations (Cole 1994). Changes to surface water quality can also affect terrestrial organisms, human health, and human activities such as recreational or subsistence fishing, hunting, and trapping.

Buffalo Pound Lake is a naturally eutrophic, polymictic, moderately saline, hard-water lake (Hammer 1971; International Lake Environment Committee [ILEC] 2008). Runoff from soils that are naturally rich in nutrients, as well as erosional inputs and agricultural activities, contribute to eutrophic conditions within Buffalo Pound Lake (Hall et al., 1999; ILEC 2008). Large-scale algal blooms and dense stands of macrophytes are often observed during summer. Because the lake is shallow (maximum depth of 5.5 m) and well-mixed by the wind, stratification of the water column is rare (Hammer 1971).

Historical surface water quality data collected from Buffalo Pound Lake is available from ILEC (2008) and reports prepared by Canada North Environmental Services (2008) and Golder (2010). These data are summarized in Table 10.

### 3.10.2 Fish Community

Data pertaining to the presence or absence of fish species in Buffalo Pound Lake can be used to determine whether certain activities (i.e., spawning) or species-specific life histories depend on fish habitat that may be impacted by the Project. Since the installation of the Buffalo Pound Dam fish ladder in 2000, fish species from the Qu'Appelle River can now potentially access the lake (SWA 2008). No studies have been carried out to determine which species of fish actively use the fish ladder. The fish species reported in Buffalo Pound Lake are primarily spring or summer spawners, with the exception of burbot (*Lota lota*), cisco (*Coregonus artedii*), and lake whitefish (*Coregonus clupeaformis*) (Table 11). Cisco and lake whitefish typically spawn in fall; burbot are a winter-spawning species (Stewart and Watkinson 2004).



Table 10: Buffalo Pound Lake Water Quality Data 1980-1986<sup>(a)</sup> and 2007-2009<sup>(b,c)</sup>

Parameters	Units	Source	Jan	Feb	Mar	May		Jun	Jul	Aug	Sep	Oct	Nov	Dec
Conventional Parameters (Field-Measured)														
Transparency	m	ILEC <sup>(a)</sup>	0.9	1.9	1.0	-		2.5	1.0	1.1	-	0.7	-	-
		CanNorth <sup>(b)</sup>	-	-	-	1.0		-	-	-	-	1	1	-
Dissolved oxygen	mg/L	ILEC <sup>(a)</sup>	-	10.9	-	10.2		8.9	7.9	7.0	9.3	11.3	12.8	-
		CanNorth <sup>(b)</sup>	-	-	-	11.1		-	-	-	-	11.32	12.83	-
		Golder <sup>(c)</sup>	-	-	-	10.2 <sup>(c1)</sup>	10.1 <sup>(c2)</sup>	-	-	-	-	9.3 <sup>(d)</sup>	-	-
pH	pH Unit	ILEC <sup>(a)</sup>	8.1	8.1	-	8.5		8.3	8.6	8.4	8.9	7.9	-	-
		CanNorth <sup>(b)</sup>	-	-	-	-		-	-	-	-	8.29	8.30	-
		Golder <sup>(c)</sup>	-	-	-	8.3 <sup>(c1)</sup>	8.3 <sup>(c2)</sup>	-	-	-	-	8.44	-	-
Water temperature	°C	CanNorth <sup>(b)</sup>	-	-	-	6.2		-	-	-	-	6.48	1.45	-
		Golder <sup>(c)</sup>	-	-	-	9.6 <sup>(c1)</sup>	9.8 <sup>(c2)</sup>	-	-	-	-	13.0	-	-
Specific conductivity	µS/cm	CanNorth <sup>(b)</sup>	-	-	-	542		-	-	-	-	544	522	-
		Golder <sup>(c)</sup>	-	-	-	460 <sup>(c1)</sup>	460 <sup>(c2)</sup>	-	-	-	-	477 <sup>(d)</sup>	-	-
Conventional Parameters (Laboratory-Measured)														
pH	pH Unit	Golder <sup>(c)</sup>	-	-	-	8.3 <sup>(c1)</sup>	8.3 <sup>(c2)</sup>	-	-	-	-	8.3	-	-
Specific conductivity	µS/cm	Golder <sup>(c)</sup>	-	-	-	483 <sup>(c1)</sup>	481 <sup>(c2)</sup>	-	-	-	-	502	-	-
Total dissolved solids	mg/L	Golder <sup>(c)</sup>	-	-	-	293 <sup>(c1)</sup>	294 <sup>(c2)</sup>	-	-	-	-	323	-	-
Total alkalinity <sup>(e)</sup>	mg/L	Golder <sup>(c)</sup>	-	-	-	153 <sup>(c1)</sup>	151 <sup>(c2)</sup>	-	-	-	-	146	-	-
Total hardness <sup>(e)</sup>	mg/L	Golder <sup>(c)</sup>	-	-	-	175 <sup>(c1)</sup>	177 <sup>(c2)</sup>	-	-	-	-	175	-	-
Total suspended solids	mg/L	ILEC <sup>(a)</sup>	5	3	-	5		5	6	4	5	12	4	-
		Golder <sup>(c)</sup>	-	-	-	6 <sup>(c1)</sup>	5 <sup>(c2)</sup>	-	-	-	-	4	-	-
Turbidity	NTU	Golder <sup>(c)</sup>	-	-	-	4.1 <sup>(c1)</sup>	3.5 <sup>(c2)</sup>	-	-	-	-	3.8	-	-
Major Ions														
Bicarbonate	mg/L	Golder <sup>(c)</sup>	-	-	-	187 <sup>(c1)</sup>	184 <sup>(c2)</sup>	-	-	-	-	178	-	-
Calcium	mg/L	Golder <sup>(c)</sup>	-	-	-	42 <sup>(c1)</sup>	43 <sup>(c2)</sup>	-	-	-	-	39	-	-
Carbonate	mg/L	Golder <sup>(c)</sup>	-	-	-	<1 <sup>(c1)</sup>	<1 <sup>(c2)</sup>	-	-	-	-	<1	-	-
Chloride	mg/L	Golder <sup>(c)</sup>	-	-	-	12 <sup>(c1)</sup>	11 <sup>(c2)</sup>	-	-	-	-	12	-	-
Fluoride	mg/L	Golder <sup>(c)</sup>	-	-	-	0.15 <sup>(c1)</sup>	0.14 <sup>(c2)</sup>	-	-	-	-	0.17	-	-
Hydroxide	mg/L	Golder <sup>(c)</sup>	-	-	-	<1 <sup>(c1)</sup>	<1 <sup>(c2)</sup>	-	-	-	-	<1	-	-
Magnesium	mg/L	Golder <sup>(c)</sup>	-	-	-	17 <sup>(c1)</sup>	17 <sup>(c2)</sup>	-	-	-	-	19	-	-
Potassium	mg/L	Golder <sup>(c)</sup>	-	-	-	4.1 <sup>(c1)</sup>	4.3 <sup>(c2)</sup>	-	-	-	-	4.5	-	-
Sodium	mg/L	Golder <sup>(c)</sup>	-	-	-	31 <sup>(c1)</sup>	31 <sup>(c2)</sup>	-	-	-	-	34	-	-
Sulphate	mg/L	Golder <sup>(c)</sup>	-	-	-	82 <sup>(c1)</sup>	84 <sup>(c2)</sup>	-	-	-	-	93	-	-
Sum of ions	mg/L	Golder <sup>(c)</sup>	-	-	-	375 <sup>(c1)</sup>	374 <sup>(c2)</sup>	-	-	-	-	380	-	-
Nutrients and Chlorophyll a														
Ammonia as nitrogen	mg/L	Golder <sup>(c)</sup>	-	-	-	-		-	-	-	-	<0.01	-	-
Nitrate	mg/L	Golder <sup>(c)</sup>	-	-	-	<sup>(c1f)</sup>	<0.04 <sup>(c2)</sup>	-	-	-	-	-	-	-
Total kjeldahl nitrogen	mg/L	ILEC <sup>(a)</sup>	0.9	0.7	-	0.8		0.6	1.3	0.7	1.2	0.9	-	0.6
		Golder <sup>(c)</sup>	-	-	-	0.5 <sup>(c1)</sup>	0.3 <sup>(c2)</sup>	-	-	-	-	0.4	-	-
Total phosphorus	mg/L	ILEC <sup>(a)</sup>	0.12	0.90	-	0.07		0.12	0.10	0.12	0.14	0.10	-	-
		Golder <sup>(c)</sup>	-	-	-	0.02 <sup>(c1)</sup>	0.03 <sup>(c2)</sup>	-	-	-	-	0.03	-	-



Table 10: Buffalo Pound Lake Water Quality Data 1980-1986<sup>(a)</sup> and 2007-2009<sup>(b,c)</sup> (continued)

Parameters	Units	Source	Jan	Feb	Mar	May		Jun	Jul	Aug	Sep	Oct	Nov	Dec
Nutrients and Chlorophyll a (continued)														
Dissolved Phosphorus	mg/L	Golder <sup>(c)</sup>	-	-	-	0.02 <sup>(c1)</sup>	0.01 <sup>(c2)</sup>	-	-	-	-	0.02	-	-
Chlorophyll a	µg/L	ILEC <sup>(a)</sup>	3	13	3	3		14	13	27	10	11	8	<1
Total Metals														
Aluminum	mg/L	Golder <sup>(c)</sup>	-	-	-	0.042 <sup>(c1)</sup>	0.032 <sup>(c2)</sup>	-	-	-	-	0.04	-	-
Antimony	mg/L	Golder <sup>(c)</sup>	-	-	-	0.0002 <sup>(c1)</sup>	0.0002 <sup>(c2)</sup>	-	-	-	-	0.0002	-	-
Arsenic	mg/L	Golder <sup>(c)</sup>	-	-	-	1.0 <sup>(c1)</sup>	1.0 <sup>(c2)</sup>	-	-	-	-	2.1	-	-
Barium	mg/L	Golder <sup>(c)</sup>	-	-	-	0.071 <sup>(c1)</sup>	0.070 <sup>(c2)</sup>	-	-	-	-	0.068	-	-
Beryllium	mg/L	Golder <sup>(c)</sup>	-	-	-	<0.0001 <sup>(c1)</sup>	<0.0001 <sup>(c2)</sup>	-	-	-	-	<0.0001	-	-
Boron	mg/L	Golder <sup>(c)</sup>	-	-	-	0.04 <sup>(c1)</sup>	0.04 <sup>(c2)</sup>	-	-	-	-	0.05	-	-
Cadmium	mg/L	Golder <sup>(c)</sup>	-	-	-	<0.0001 <sup>(c1)</sup>	<0.0001 <sup>(c2)</sup>	-	-	-	-	<0.0001	-	-
Chromium	mg/L	Golder <sup>(c)</sup>	-	-	-	<0.0005 <sup>(c1)</sup>	<0.0005 <sup>(c2)</sup>	-	-	-	-	<0.0005	-	-
Cobalt	mg/L	Golder <sup>(c)</sup>	-	-	-	0.0001 <sup>(c1)</sup>	0.0001 <sup>(c2)</sup>	-	-	-	-	0.0001	-	-
Copper	mg/L	Golder <sup>(c)</sup>	-	-	-	0.001 <sup>(c1)</sup>	0.001 <sup>(c2)</sup>	-	-	-	-	-	-	-
Iron	mg/L	Golder <sup>(c)</sup>	-	-	-	0.056 <sup>(c1)</sup>	0.053 <sup>(c2)</sup>	-	-	-	-	0.047	-	-
Lead	mg/L	Golder <sup>(c)</sup>	-	-	-	0.0001 <sup>(c1)</sup>	0.0001 <sup>(c2)</sup>	-	-	-	-	-	-	-
Manganese	mg/L	Golder <sup>(c)</sup>	-	-	-	0.011 <sup>(c1)</sup>	0.009 <sup>(c2)</sup>	-	-	-	-	0.029	-	-
Molybdenum	mg/L	Golder <sup>(c)</sup>	-	-	-	0.0014 <sup>(c1)</sup>	0.0013 <sup>(c2)</sup>	-	-	-	-	0.0021	-	-
Nickel	mg/L	Golder <sup>(c)</sup>	-	-	-	0.0013 <sup>(c1)</sup>	0.0013 <sup>(c2)</sup>	-	-	-	-	-	-	-
Selenium	mg/L	Golder <sup>(c)</sup>	-	-	-	0.0002 <sup>(c1)</sup>	0.0002 <sup>(c2)</sup>	-	-	-	-	0.0004	-	-
Silver	mg/L	Golder <sup>(c)</sup>	-	-	-	<0.0001 <sup>(c1)</sup>	<0.0001 <sup>(c2)</sup>	-	-	-	-	<0.0001	-	-
Strontium	mg/L	Golder <sup>(c)</sup>	-	-	-	0.26 <sup>(c1)</sup>	0.25 <sup>(c2)</sup>	-	-	-	-	0.28	-	-
Thallium	mg/L	Golder <sup>(c)</sup>	-	-	-	<0.0002 <sup>(c1)</sup>	<0.0002 <sup>(c2)</sup>	-	-	-	-	<0.0002	-	-
Tin	mg/L	Golder <sup>(c)</sup>	-	-	-	<0.0001 <sup>(c1)</sup>	<0.0001 <sup>(c2)</sup>	-	-	-	-	<0.0001	-	-
Titanium	mg/L	Golder <sup>(c)</sup>	-	-	-	0.0010 <sup>(c1)</sup>	0.0008 <sup>(c2)</sup>	-	-	-	-	0.0006	-	-
Uranium	µg/L	Golder <sup>(c)</sup>	-	-	-	1.4 <sup>(c1)</sup>	1.3 <sup>(c2)</sup>	-	-	-	-	1.4	-	-
Vanadium	mg/L	Golder <sup>(c)</sup>	-	-	-	0.0006 <sup>(c1)</sup>	0.0006 <sup>(c2)</sup>	-	-	-	-	0.0010	-	-
Zinc	mg/L	Golder <sup>(c)</sup>	-	-	-	0.015 <sup>(c1)</sup>	0.0011 <sup>(c2)</sup>	-	-	-	-	-	-	-

Notes: no water quality data is available for the month of April; m = metres; mg/L = milligrams per litre; °C = degrees Celsius; µS/cm = microSiemens per centimetre; NTU = nephelometric turbidity units; µg/L = micrograms per litre; < = less than; - = not applicable or not available.

<sup>(a)</sup> The ILEC (2008) received their data from the Saskatchewan Department of Environment and Public Safety (Regina, Saskatchewan) and Environment Canada, Inland Waters Directorate (Regina, Saskatchewan). Sampling was conducted between 1980 and 1986 at a station located in the middle of the lake, opposite the water treatment plant.

<sup>(b)</sup> Canada North Environmental Services (CanNorth) (2008) collected water quality samples in proximity to the Project area in October 2007, November 2007, and May 2008.

<sup>(c)</sup> Golder (2010) collected water quality samples at one site on Buffalo Pound Lake during October 2008 and at two sites during May 2009. October 2008 samples were collected in proximity to the Highway 2 bridge crossing. May 2009 samples were collected (c1) upstream of the Valley View boat launch and (c2) in proximity to the SaskWater Buffalo Pound Non-Potable Water Supply System North Intake.

<sup>(d)</sup> The sample was a composite sample comprised of water collected from the surface, middle, and bottom of the water column. The field measurements for dissolved oxygen and specific conductivity are the mean values for the limnology profile.

<sup>(e)</sup> As calcium carbonate (CaCO<sub>3</sub>).



**Table 11: Common and Scientific Names of Fishes Reported in the Qu'Appelle River and Buffalo Pound Lake**

Common Name	Scientific Name	Qu'Appelle River	Buffalo Pound Lake
Bigmouth buffalo	<i>Ictiobus cyprinellus</i>	√ <sup>(a)</sup>	√ <sup>(b, c)</sup>
Blacknose dace	<i>Rhinichthys obtusus</i>	-	√ <sup>(b, c)</sup>
Blacknose shiner	<i>Notropis heterolepis</i>	√ <sup>(b)</sup>	-
Bluntnose minnow	<i>Pimphales notatus</i>	-	√ <sup>(d)</sup>
Brook stickleback	<i>Culaea inconstans</i>	√ <sup>(b, e)</sup>	√ <sup>(b, c, d)</sup>
Burbot	<i>Lota lota</i>	-	√ <sup>(b, c, d)</sup>
Chestnut lamprey	<i>Ichthyomyzon castaneus</i>	√ <sup>(b)</sup>	-
Cisco	<i>Coregonus artedii</i>	√ <sup>(e)</sup>	√ <sup>(b)</sup>
Common carp	<i>Cyprinus carpio</i>	√ <sup>(b, e)</sup>	√ <sup>(b, c, d)</sup>
Emerald shiner	<i>Notropis atherinoides</i>	√ <sup>(b, e)</sup>	√ <sup>(b, c, d)</sup>
Fathead minnow	<i>Pimephales promelas</i>	√ <sup>(b, e)</sup>	√ <sup>(b, c, d)</sup>
Goldeye	<i>Hiodon alosoides</i>	-	√ <sup>(b, c)</sup>
Iowa darter	<i>Etheostoma exile</i>	√ <sup>(b)</sup>	√ <sup>(b, c, d)</sup>
Johnny darter	<i>Etheostoma nigrum</i>	√ <sup>(b)</sup>	√ <sup>(d)</sup>
Lake chub	<i>Couesius plumbeus</i>	-	√ <sup>(c)</sup>
Lake whitefish	<i>Coregonus clupeaformis</i>	√ <sup>(e)</sup>	√ <sup>(b, c)</sup>
Longnose dace	<i>Rhinichthys cataractae</i>	-	√ <sup>(b, c)</sup>
Longnose sucker	<i>Catostomus catostomus</i>	-	√ <sup>(d)</sup>
Ninespine stickleback	<i>Pungitius pungitius</i>	√ <sup>(b)</sup>	√ <sup>(b, c, d)</sup>
Northern pike	<i>Esox lucius</i>	√ <sup>(b, e)</sup>	√ <sup>(b, c, d)</sup>
River shiner	<i>Notropis blennioides</i>	√ <sup>(b)</sup>	√ <sup>(b, c, d)</sup>
Sand shiner	<i>Notropis stamineus</i>	√ <sup>(b)</sup>	√ <sup>(d)</sup>
Sauger	<i>Sander canadensis</i>	√ <sup>(b)</sup>	√ <sup>(b, c)</sup>
Shorthead redhorse	<i>Moxostoma macrolepidotum</i>	-	√ <sup>(b, c)</sup>
Spoonhead sculpin	<i>Cottus ricei</i>	-	√ <sup>(b, c)</sup>
Spottail shiner	<i>Notropis hudsonius</i>	√ <sup>(b)</sup>	√ <sup>(d)</sup>
Troutperch	<i>Percopsis omiscomaycus</i>	√ <sup>(b, e)</sup>	-
Walleye	<i>Sander vitreus</i>	√ <sup>(b)</sup>	√ <sup>(b, c, d)</sup>
White sucker	<i>Catostomus commersonii</i>	√ <sup>(b, e)</sup>	√ <sup>(b, c, d)</sup>
Yellow perch	<i>Perca flavescens</i>	√ <sup>(b, e)</sup>	√ <sup>(b, c, d)</sup>

- = species not reported in waterbody.

<sup>(a)</sup> SWA (2005).

<sup>(b)</sup> Saskatchewan Parks and Renewable Resources (1991).

<sup>(c)</sup> Canada North Environmental Services (2008).

<sup>(d)</sup> Golder (2012).

<sup>(e)</sup> Golder (1997).

### 3.10.3 Sensitive Fish Species

Two rare or endangered fish species have been reported in the Qu'Appelle River and/or Buffalo Pound Lake. These are the bigmouth buffalo (*Ictiobus cyprinellus*) and chestnut lamprey (*Ichthyomyzon castaneus*).



Bigmouth buffalo is listed as a species of special concern under Schedule 1 of the federal SARA and by the COSEWIC (2012) (Table 12). This species is not protected under the provincial *Wildlife Act* (1998), but is listed as rare-uncommon (S3) by the SKCDC (2012e). Rare-uncommon species may be few in number, occupy a restricted range, or are threatened by some factor related to its biology or environment (SKCDC 2012e). Because the Qu'Appelle River system occurs at the edge of this species' range, resident populations may be particularly vulnerable to large-scale disturbances, such as a reduction in spawning habitat (SWA 2005). Reproductive success is largely dependent upon spring floods, which allow fish to enter spawning areas and broadcast their eggs over flooded vegetation (Environment Canada 2012b). Although the bigmouth buffalo is documented in Buffalo Pound Lake (Saskatchewan Parks and Renewable Resources [SPRR] 1991), flooding of shoreline vegetation within the Project area is generally restricted, and therefore limits potential spawning habitat for this species.

**Table 12: Sensitive Fish Species that May Occur in the Project Area Based on Historical Ranges**

Common Name	SARA Status <sup>(a)</sup>	Saskatchewan Wildlife Act <sup>(b)</sup>	Habitat	Potential for Occurrence in the Project Area
Bigmouth buffalo	Special Concern (Schedule 1)	Not listed	Found near bottom of shallow lakes, ponds, streams, and reservoirs where benthic fauna and plankton are abundant. Prefer slow current, warm water, and eutrophic conditions. Turbidity tolerant. Shallow bays and small streams are used for spawning (Environment Canada 2012b).	Moderate – although this species is documented in Buffalo Pound Lake (SPRR 1991), potential spawning habitat is reduced in the Project area due to the limited flooding of shoreline vegetation.
Chestnut lamprey	Special Concern (Schedule 3)	Not listed	Moderately-sized rivers and large creeks. Young are sensitive to eutrophication. Spawning occurs over coarse gravel substrate (Environment Canada 2012c).	Low – although documented in the Qu'Appelle River (SPRR 1991), the species' distribution limit has been identified as below the outlet of Round Lake (SKCDC 2012e).

<sup>(a)</sup> SARA (2012).

<sup>(b)</sup> *Wildlife Act* (1998).

The chestnut lamprey is listed as a species of special concern under Schedule 3 of SARA, and as a non-active species by COSEWIC (Table 12). This species is not currently protected under the provincial *Wildlife Act* (1998). The SKCDC (2012e) lists chestnut lamprey as S3S4, or rare-uncommon (see above) to common. A common species is generally widespread, but may be rare in parts of its range (SKCDC 2012e). Chestnut lamprey distribution within the Qu'Appelle River system does not include Buffalo Pound Lake, and is limited to sections of the river below the outlet of Round Lake and the upper Assiniboine River basin.

### 3.10.4 Fish Habitat Assessment

Fish habitat data for the Project area may be useful in identifying fish species that may be affected by the Project. The habitat data is used to quantify the amount of fish habitat that will be lost or altered, which in turn helps establish requirements for fish habitat compensation.



The existing habitat conditions, habitat suitability, and sensitivity to construction activities for the proposed water intake construction site were determined from field data collected by Golder. During May to August of 2012, Golder staff assessed existing fish habitat over approximately 3 km of shoreline located between the existing SaskWater Mosaic water intake and the intake for the cities of Regina and Moose Jaw. Characteristics such as shoreline substrate type, presence/absence of vegetation, shoreline slope, bank stability, and water depth were recorded. Bathymetry measurements were also completed using a Garmin 520s GPS Sonar. All data was transferred to a Geographical Information System platform to create a fish habitat map (Figure 12) and bathymetric contour map (Figure 13).

The fish habitat documented within the proposed Project construction area was primarily of two types:

- riparian vegetation which may be inundated by spring floods or provide overhanging cover; and
- coarse shoreline substrate, which may be used as cover, or spawning substrate.

Riparian vegetation (grasses, shrubs, and trees) observed around the immediate shoreline was limited, and typical of Buffalo Pound Lake's perimeter. Due to the relatively flat bank slope (0% to 5% grade) at the proposed Project location, some flooding of riparian vegetation may occur during spring or other high-water conditions. Shoreline substrates consisted primarily of cobble and sand, with some boulders. Riprap from an existing SaskWater intake structure was observed at the southeast limit of the Project area. Lake bed materials approximately 50 m out from shore, where the proposed intake would be constructed, consisted primarily of fine substrate materials (silt and clay). No critical fish spawning, feeding, or rearing habitat was noted during the fish habitat assessment.

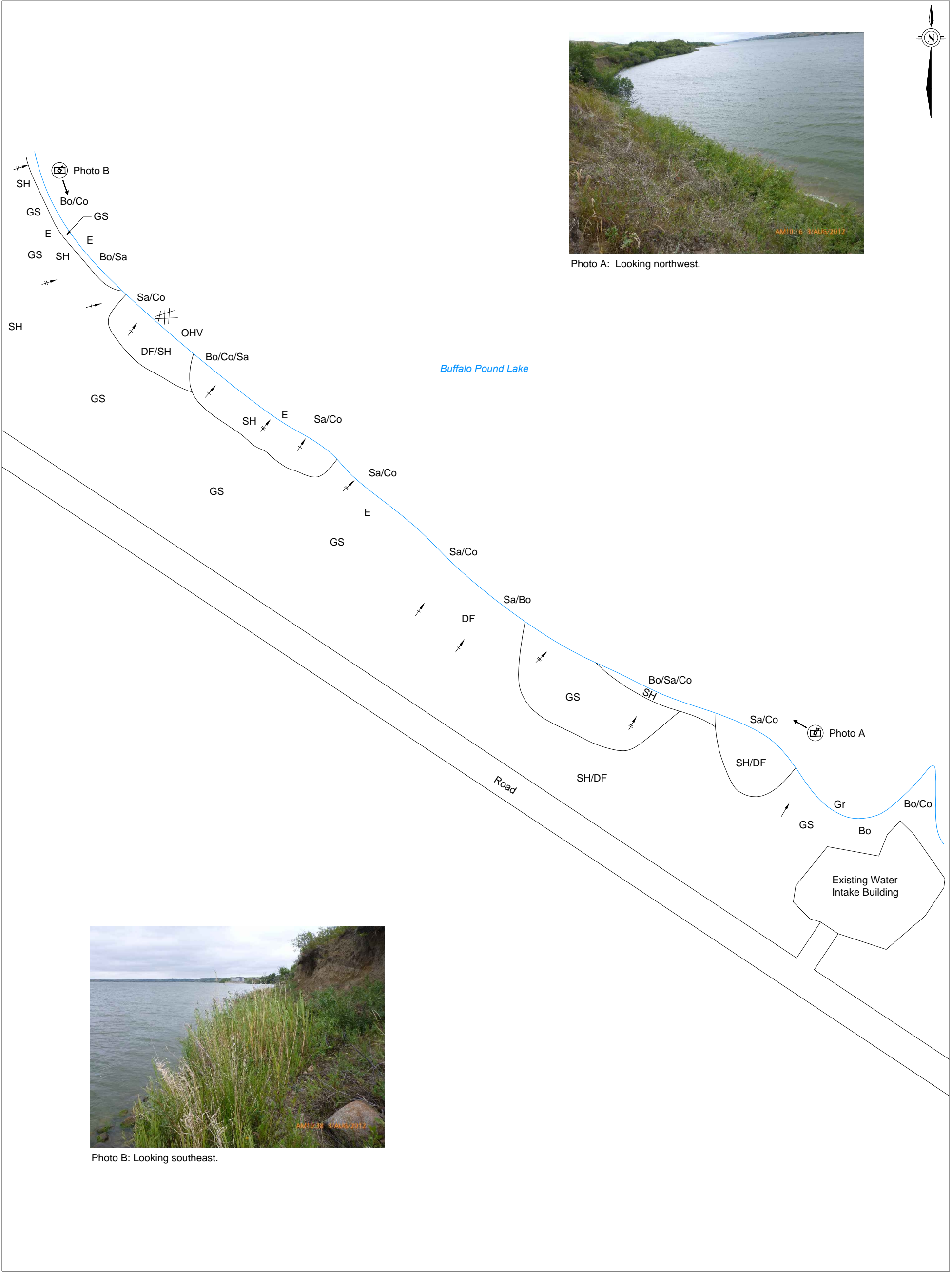
### 3.11 Heritage Resources

In Saskatchewan, a heritage resource is broadly defined as any object that is of interest for its architectural, historical, cultural, environmental, archaeological, paleontological, aesthetic, or scientific value. Heritage resources are property of the Provincial Crown, and as such, are protected under *The Heritage Property Act*.

The PCS (Heritage Conservation Branch) has identified two primary factors for determining if a HRIA is required for a project as per Section 63 of the *Heritage Property Act*. This includes the presence of previously recorded heritage resources and the archaeological sensitivity or potential for undocumented heritage resources to be present in the Project area. Secondary factors include the nature and extent of previous land disturbance (including cultivation), and nature and scope of proposed land alteration.

For southern Saskatchewan, the Heritage Conservation Branch considers lands heritage sensitive if they are:

- in the same quarter section (or within 500 m of) a Site of Special Nature or other previously recorded site(s), unless it is shown to be of low heritage significance;
- within 1 km of permanent watercourses or well formed valleys containing seasonal or permanent watercourses;
- in proximity to readily identifiable ancient lake shores;
- in hummocky terrain; and
- on escarpments, prominent uplands, and hills/ridges, including eskers.



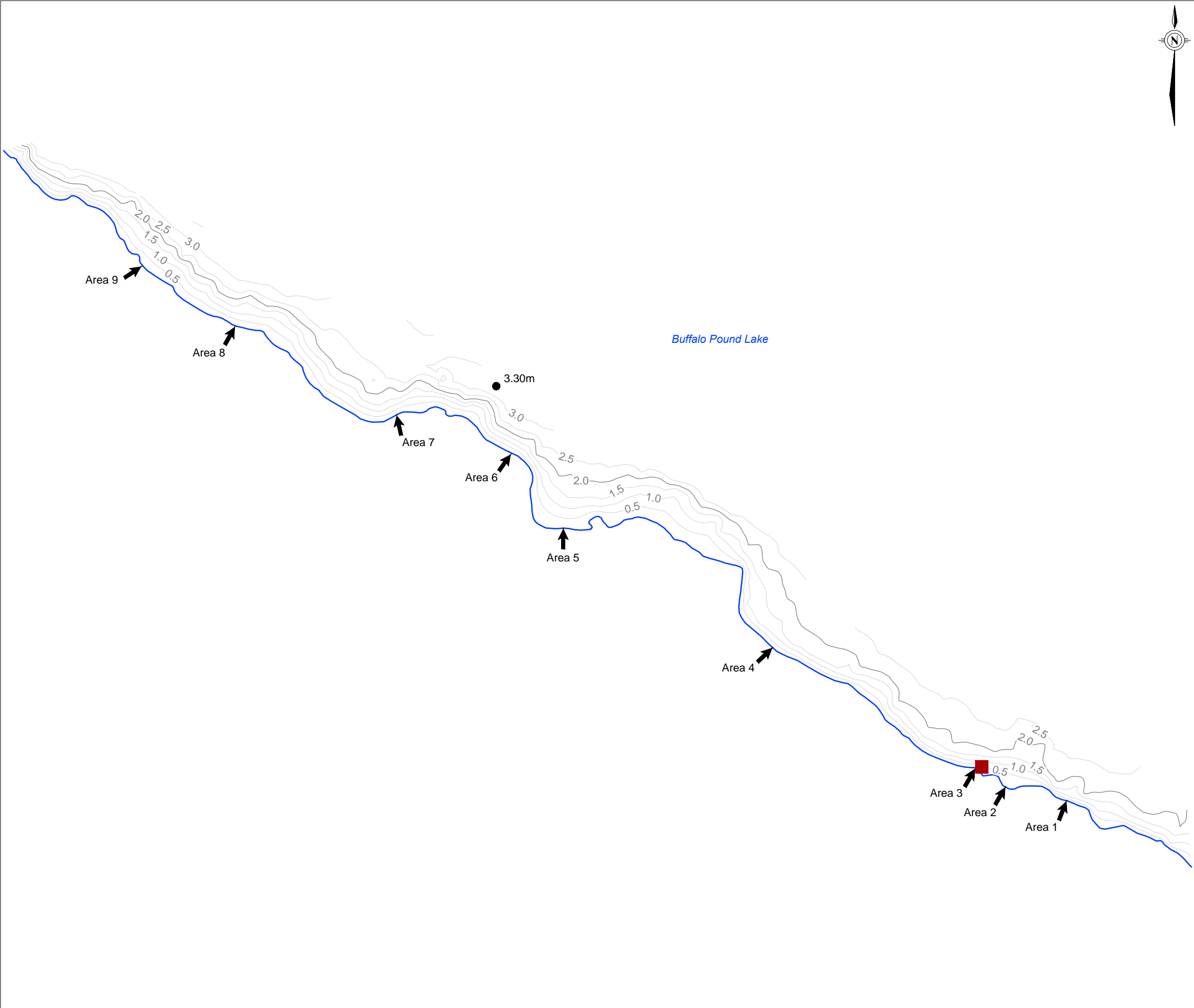
LEGEND  
SEE REVERSE FOR LEGEND

REFERENCE  
NAD83 UTM Zone 13

PROJECT		12-1362-0044		FILE No.	
DESIGN				SCALE AS SHOWN REV. 0	
CADD		AJL/JDS 30/10/12			
CHECK		KH 04/01/13			
REVIEW		ME 04/01/13			

**FIGURE: 12**

G:\CLIENTS\VALE\VALE Kronau Potash Project\Figures\12-1362-0044 Vale SaskWater Buffalo Pound Pipeline\Phase 004\12-1362-0044 Buffalo Pound Bathymetry at Intake.dwg 1/2/2013 1:15 PM



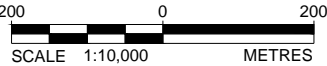
Statistics at Time of Survey	
Surface Area Surveyed	540,000 sq. m.
Mean Depth	1.79 m
Maximum Depth	3.30 m
Shoreline Surveyed	3,951 m


LEGEND

- SHORELINE
- BATHYMETRIC CONTOUR (0.5m INTERVAL)
- DEEPEST SURVEYED LOCATION
- PROPOSED WATER INTAKE / PUMP STATION

NOTES

BATHYMETRIC MAPS ARE NOT FOR NAVIGATION OR DESIGN PURPOSES. BATHYMETRIC DATA WAS COLLECTED ALONG TRANSECTS AND THE DEPTH DATA BETWEEN THE TRANSECTS HAS BEEN INTERPOLATED. BATHYMETRIC CONTOURS SHOWN AT 0.5m INTERVALS.






**SaskWater**

PROJECT  
PROPOSED SASKWATER BUFFALO POUND  
NON-POTABLE WATER SYSTEM EXPANSION  
PROJECT - INTAKE AND PUMPSTATION

TITLE  
**BATHYMETRY - SOUTHEAST SECTION  
OF BUFFALO POUND LAKE**



**Golder Associates**  
Saskatoon, Saskatchewan

PROJECT	12-1362-0044	FILE No.	-0044 Buffalo Pou
DESIGN		SCALE	AS SHOWN
CADD	JDS/AJL	05/11/12	REV.
CHECK	KH	04/01/13	
REVIEW	ME	04/01/13	

**FIGURE: 13**



As the proposed intake pump station is located immediately adjacent to Buffalo Pound Lake, the survey plans were submitted to the Heritage Conservation Branch for heritage sensitivity screening. Upon review it was determined that no previously recorded heritage resources are in conflict with the Project and although the Project will affect an area of native prairie, it is located on sloped terrain and has a limited footprint. As a result, a HRIA is not required for the proposed Project, and there are no further heritage concerns (Heritage Conservation Branch File No. 12-1337).

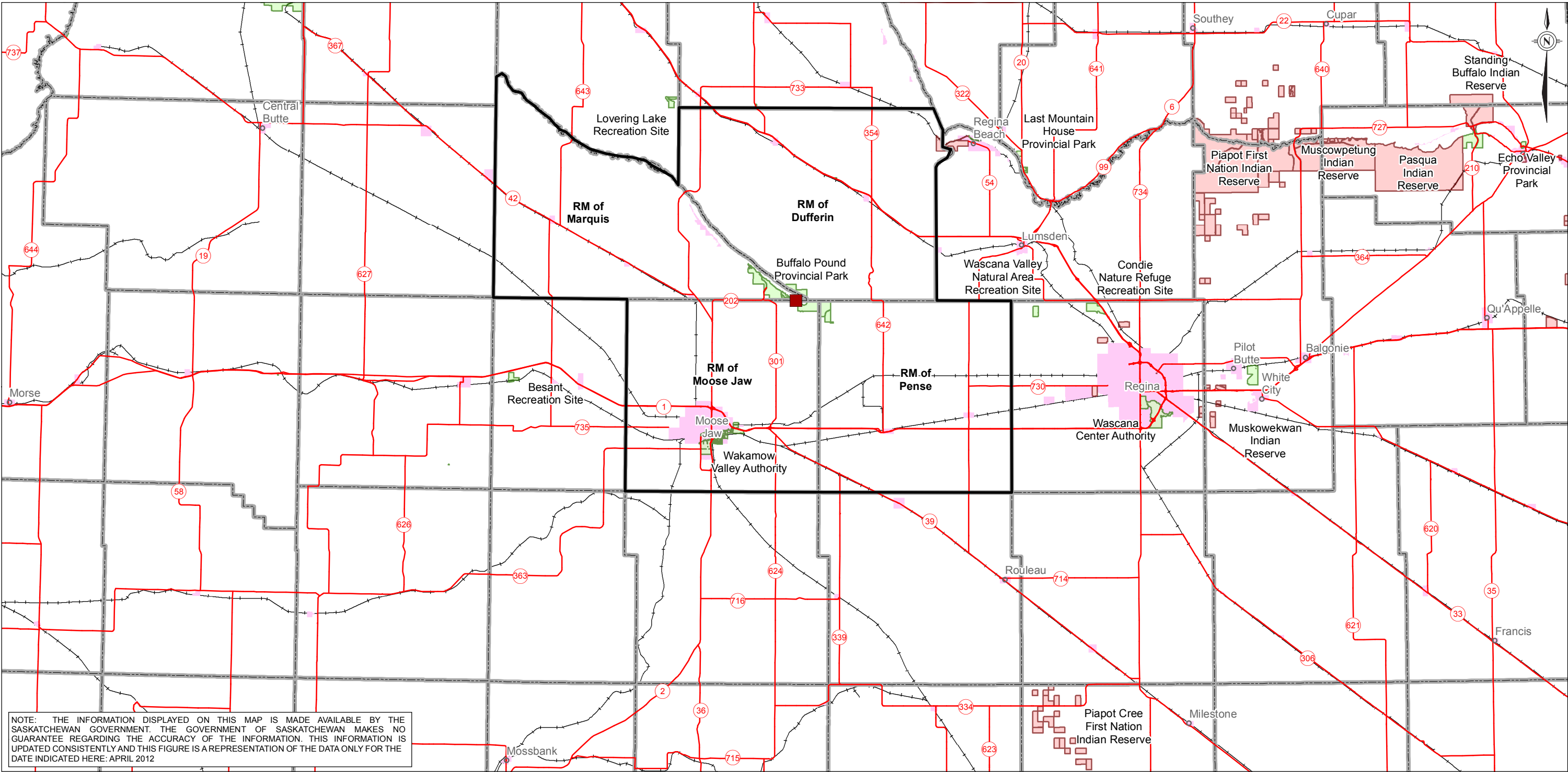
### 3.12 Socio-economics

#### 3.12.1 Socio-economic Study Area

The socio-economic study area is based on the predicted spatial extent of socio-economic effects from the Project. The R.M. with jurisdiction of land occupied by the Project has the potential to experience the greatest socio-economic effects and some benefits from the Project; however nearby R.M.s also have the potential to experience effects and modest benefits. As such, the socio-economic study area will include the R.M. in which the proposed water intake is located, as well as nearby R.M.s and all the incorporated communities within each R.M. (Figure 14). This will include four R.M.s and the associated incorporated communities.

- R.M. of Moose Jaw (No. 161):
  - City of Moose Jaw
- R.M. of Pense (No. 160):
  - Village of Pense
  - Village of Belle Plaine
- R.M. of Dufferin (No. 190):
  - Resort Village of North Grove
  - Village of Bethune
  - Village of Findlater
- R.M. of Marquis (No. 191):
  - Village of Marquis
  - Organized Hamlet of Parkview
  - Village of Tuxford
  - Resort Village of Sun Valley
  - Resort Village of South Lake
  - Village of Keeler

G:\CLIENTS\VALE\VALE Kronau Potash Project\Figures\12-1362-0044 Vale Saskwater Buffalo Pound Pipeline\Phase 004\Figure 14 - Socio-Economic Study Area - 12-1362-0044-004.mxd Date: 1/4/2013 4:44:54 PM



NOTE: THE INFORMATION DISPLAYED ON THIS MAP IS MADE AVAILABLE BY THE SASKATCHEWAN GOVERNMENT. THE GOVERNMENT OF SASKATCHEWAN MAKES NO GUARANTEE REGARDING THE ACCURACY OF THE INFORMATION. THIS INFORMATION IS UPDATED CONSISTENTLY AND THIS FIGURE IS A REPRESENTATION OF THE DATA ONLY FOR THE DATE INDICATED HERE: APRIL 2012

- LEGEND**
- RURAL MUNICIPALITY
  - URBAN MUNICIPALITY
  - HIGHWAY
  - COMMUNITY
  - SOCIO-ECONOMIC STUDY AREA
  - INDIAN RESERVE
  - PARKS AND RECREATION
  - POTENTIAL WATER INTAKE/ PUMP STATION

**REFERENCE**

SASKATCHEWAN WILDLIFE FEDERATION, 2012

SASKATCHEWAN GOVERNMENT, MINISTRY OF AGRICULTURE  
ROADS AND HIGHWAYS © DMTI, 2011  
NTS MAPSHEET: 72 E, G, H, I, J, L, M, O, P  
DATUM: NAD83 PROJECTION: UTM ZONE 13



PROJECT		12-1362-0044		FILE No.	
DESIGN				SCALE AS SHOWN	
GIS		LMR		04/01/13	
CHECK		KH		04/01/13	
REVIEW		ME		04/01/13	
REV.		0		REV.	

**FIGURE: 14**



First Nations communities near the Project were approached and provided information regarding the Project. Due to their distance from the Project, most of the consulted First Nations are not likely to experience effects. However, should some or any of the closer First Nations participate in the Project, benefits such as training and employment and procurement would accrue to that First Nation. Therefore, First Nations within 100 km were included in the socio-economic study area:

- Piapot Cree First Nation;
- Pasqua First Nation; and
- Muscowpetung First Nation.

### 3.12.2 Human Occupancy and Resource Use

#### 3.12.2.1 Population

The population of the socio-economic study area is 37,056 (Table 13). The majority of the population resides in the City of Moose Jaw (33,274), with the rest of the population living in rural villages, resort communities, and farms or acreages in the area. Overall, the population in the socio-economic study area rose by 2.1% between 2006 and 2011, below the provincial increase of 6.7% in the same period. The increase was largely a result of an increase of 3.6% in the City of Moose Jaw. All rural villages experienced increases in population as well, including the villages of Keeler (200%), Marquis (29.6%), Bethune (8.4%), Pense (4.9%), Tuxford (3.4%), Belle Plaine (3.1%), and Findlater (2.0%). In contrast, the population of the R.M.s, resort communities, and the organized hamlet all fell. The resort communities and organized hamlet populations all fell by over 25%. The R.M. populations, which include residents of farms, acreages, and unincorporated hamlets decreased between the years 2006 and 2011. Decrease in R.M. population ranged from 3.9% (19 individuals) in the R.M. of Pense, to 41.3% (167 individuals) in the R.M. of Marquis. Population decrease in the R.M.s and the increase in the City of Moose Jaw and villages suggest the socio-economic study area is experiencing urbanization as populations concentrate in urban areas.

The median age of the socio-economic study area population varies by community (Table 13). In the City of Moose Jaw it is in line with the provincial average, at 38.2. In the villages of Bethune and Pense it is slightly below the provincial average, at 37.3 and 34.2, respectively. All other communities have a median age higher than the provincial average, ranging from 40.3 to 60.0, suggesting that the younger population may be moving to larger centres for education or employment purposes. The three resort communities all have median ages over 55, suggesting they are retirement communities.

Of the three First Nation communities within approximately 100 km of the Project, all experienced an increase in population between 2006 and 2011 (Table 14). The increase in population was greatest in the Muscowpetung First Nation (25.9%) and lowest in Piapot Cree First Nation (3.6%).

Overall, the population of First Nation communities included in the socio-economic study area increased by 13.6% (165 individuals) between 2006 and 2011. The young median age in Piapot First Nation suggests that the creation of jobs in rural areas near the reserve land could improve the ability of First Nation communities to retain the on-reserve population.



## SaskWater Expansion Project - Intake and Pump Station

**Table 13: Population Statistics for the Socio-economic Study Area**

Community	2011 Population	2006 Population	2006 to 2011 Population Change (%)	2011 Median Age of Population
R.M. of Moose Jaw (No. 161)	1,147	1,228	-6.6	38.2
City of Moose Jaw	33,274	32,132	3.6	41.9
<i>Subtotal</i>	<i>34,421</i>	<i>33,360</i>	<i>3.2</i>	<i>n/a</i>
R.M. of Pense (No. 160)	471	490	-3.9	40.3
Village of Pense	532	507	4.9	34.2
Village of Belle Plaine	66	64	3.1	43.5
<i>Subtotal</i>	<i>1,069</i>	<i>1,061</i>	<i>0.8</i>	<i>n/a</i>
R.M. of Dufferin (No. 190)	512	540	-5.2	45.6
Resort Village of North Grove	49	68	-27.9	60.0
Village of Bethune	400	369	8.4	37.3
Village of Findlater	50	49	2.0	50.7
<i>Subtotal</i>	<i>1,011</i>	<i>1,026</i>	<i>-1.5</i>	<i>n/a</i>
R.M. of Marquis (No. 191)	237*	404	-41.3*	51.8
Village of Marquis	92	71	29.6	42.2
Organized Hamlet of Parkview	26	45	-42.2	-
Village of Tuxford	91	88	3.4	45.5
Resort Village of Sun Valley	46	128	-64.1	56.2
Resort Village of South Lake	48	105	-54.3	55.0
Village of Keeler	15*	5	200.0*	-
<i>Subtotal</i>	<i>555</i>	<i>846</i>	<i>-34.4</i>	<i>n/a</i>
<b>TOTAL</b>	<b>37,056</b>	<b>36,293</b>	<b>2.1</b>	<b>n/a</b>
<b>Saskatchewan</b>	<b>1,033,381</b>	<b>968,157</b>	<b>6.7</b>	<b>38.2</b>

Source: Statistics Canada (2012a).

Note: Percentage totals and subtotals may not add to the sum of the numbers in the column above them because they are calculated separately.

\* Statistics Canada has labelled this data 'use with caution' due to errors in the originally published data. Revised numbers were used for the purpose of this Project.

R.M. = rural municipality; % = percent; n/a = not applicable.

**Table 14: Population Statistics for First Nations Communities within approximately 100 km of the Project**

First Nations Community	2011 Population	2006 Population	2006 to 2011 Population Change (%)	2011 Median Age of Population
Piapot Cree First Nation	464	448	3.6	23.5
Pasqua First Nation	546	472	15.7	-
Muscowpetung First Nation	365	290	25.9	-
<b>TOTAL</b>	<b>3,788</b>	<b>3,357</b>	<b>12.8</b>	<b>n/a</b>
<b>Saskatchewan</b>	<b>1,033,381</b>	<b>968,157</b>	<b>6.7</b>	<b>38.2</b>

Source: Statistics Canada (2012a).

Note: Percentage totals may not add to the sum of the numbers in the column above them because they are calculated separately.

% = percent; n/a = not applicable; - = not available.



### 3.12.2.2 Land Use

The socio-economic study area consists primarily of private, cultivated land in a rural Saskatchewan (SKCDC 2012b; Acton et al. 1998). In 2011, there were 610 operators and 449 farms in the socio-economic study area (Table 15). The majority of farm land is cropland, although 35,944 cattle and calves were also reported during the 2011 census on agriculture. Wheat, canola, and lentils are the major crops in the area. Although the socio-economic study area is primarily agricultural, the Project does not occur on any agricultural land.

### 3.12.2.3 Traditional Land and Resource Use

Traditional land and resource use are limited in the socio-economic study area because of the extensive cultivation. Section 3.12.6.3 provides more information on traditional land use in the study area.

### 3.12.2.4 Parks, Protected Areas, and Recreation

The Canada Land Inventory has rated the majority of land in the socio-economic study area as Class 6, or low, for recreational capability (Natural Resources Canada 2010). However, there is high recreational capability where the Project is located, in the Buffalo Pound Provincial Park. The park offers a variety of recreational activities including swimming, fishing, boating, bicycling, interpretive trails, cross-country skiing, mini-golf, and hiking (Saskatchewan Parks 2012). Buffalo Pound Provincial Park has experienced an increase in the total annual visits (Saskatchewan Parks 2009). In 2004, the park had 72,377 total visits. This increased to 95,159 in 2006 and 117,428 by 2009. This is a percent change over the five year average (2004 to 2008) of 23.3%. Additional recreation facilities and activities are offered in the City of Moose Jaw and locally in some of the villages.

### 3.12.2.5 Hunting, Trapping, and Fishing

The Project is located in Wildlife Management Zone 20 (MOE 2012a). The socio-economic study area also overlaps Wildlife Management Zones 18, 19, 21, 22, and 23. Hunting seasons for large game and game birds primarily occur in fall from September to November. Fall hunting of some species, however, opens in late August and ends in December. Spring snow geese (*Chen caerulescens*) hunting is open in spring, generally in April and May. Trapping occurs over the winter months between October and May. The Project overlaps the southern fishing management zone in Saskatchewan, which opens on May 5 each year and closes on March 31 the following year (MOE 2012b).



Table 15: Agriculture Statistics for Rural Municipalities in the Socio-economic Study Area

Rural Municipality	Total Number of Operators	Total Number of Farms	Land Area (ha) <sup>(a)</sup>	Total Area of Farms (ha)	Land in Crops (ha)	Top Crops (ha) in the Socio-economic Study Area					Total Cattle and Calves
						Wheat	Canola	Lentils	Barley	Alfalfa	
R.M. of Moose Jaw (No. 161)	185	136	86,823	79,314	68,148	25,281	11,695	17,908	2,008	2,418	7,049
R.M. of Pense (No. 160)	150	103	87,743	83,879	69,213	18,703	15,111	16,113	5,805	2,671	7,893
R.M. of Dufferin (No. 190)	155	116	94,344	88,168	51,016	15,410	11,826	4,035	3,608	6,347	17,096
R.M. of Marquis (No. 191)	120	94	84,253	79,425	63,792	23,322	16,153	14,935	1,427	2,601	3,906
TOTAL	610	449	353,163	330,786	252,169	82,716	54,785	52,991	12,848	14,037	35,944

Source: Statistics Canada (2012b).

<sup>(a)</sup> The total land area includes the total area of farms and the total area of land use by others, but does not include the land used by incorporated communities within the R.M. (e.g., City of Regina).

R.M. = rural municipality; ha = hectares.



### 3.12.3 Infrastructure and Services

#### 3.12.3.1 Traffic

There are several highways in the socio-economic study area that could be used to access the Project, but the main highways used will likely be Highways No. 1, No. 2, No. 202, and No. 301. Overall, traffic on major highways near the Project increased by 15.1% between 2006 and 2011 (Table 16). The greatest percentage increases were west and south of Buffalo Pound Provincial Park, where traffic increased by 100.0% and 66.7%, respectively. Increase in traffic near Buffalo Pound Provincial Park is likely a result of the increase in the annual number of visitors to the park. Highway No. 1 (the TransCanada Highway) saw large increases as well, rising 22.3% between Moose Jaw and Regina and 17.7% just west of Regina. Highway No. 2 saw increases of 11.5% just north of Moose Jaw and 23.5% just north of the No. 42 on the way to Chamberlain.

**Table 16: Average Annual Daily Traffic in 2006 and 2011 in the Socio-economic Study Area**

Highway	Location (Community or Junction)	AADT for 2006 <sup>(a)</sup>	AADT for 2011 <sup>(b)</sup>	Percent Change 2006-2011 (%)
Highway No. 1	East of Moose Jaw	11,360	12,020	5.8
	Between Moose Jaw and Regina	8,080	9,880	22.3
	West of Regina	8,800	10,360	17.7
Highway No. 301	South of Buffalo Pound Provincial Park	150	250	66.7
	At corner of No. 301 and No. 202	130	140	7.7
Highway No. 202	West of Buffalo Pound Provincial Park	170	340	100.0
Highway No. 2	North of Moose Jaw	2915	3250	11.5
	Just north of No. 42	1790	2210	23.5
<b>TOTAL</b>		<b>33,395</b>	<b>38,450</b>	<b>15.1</b>

Note: Percentage totals may not add to the sum of the numbers in the column above them because they are calculated separately.

<sup>(a)</sup> MHI (2006).

<sup>(b)</sup> MHI (2011).

AADT = Average Annual Daily Traffic; % = percent.

#### 3.12.3.2 Emergency and Health Care Services

The socio-economic study area is located in the Five Hills and Regina Qu'Appelle Health Regions. People rely on the City of Moose Jaw emergency and health care services. Facilities in Moose Jaw include the Moose Jaw Union Hospital (Five Hills Health Region 2012). There are no other medical clinics or health care centres in the socio-economic study area communities.

#### 3.12.3.3 Temporary Accommodation

Temporary accommodation (for example, housing a temporary workforce) in the socio-economic study area is predominantly found in the City of Moose Jaw. Hotels in Moose Jaw include the Best Western (88 rooms), the Days Inn (80 rooms), the Thriftlodge (31 rooms), the Super 8 (60 rooms), the Knights Inn (80 rooms), and the Moose Jaw Travelodge (28 rooms), as well as the Temple Garden Spa and several other Inns and Motels (Saskatchewan Hotels 2012). Accommodation outside the City of Moose Jaw is mostly limited to bed and breakfasts and campgrounds; however, the villages of Bethune, Chamberlain, and Pense each have a small hotel or motel as well.



### 3.12.4 Employment and Economy

#### 3.12.4.1 Local, Regional, and Aboriginal Participation

In 2006, the socio-economic study area population had a labour force participation rate of 65.2% and an unemployment rate of 5.6% (Table 17). The four R.M.s and the majority of the villages had labour force participation rates above the provincial average (68.4%) (exception: Village of Marquis). Many of the R.M.s and villages also had unemployment rates below the provincial average (5.6%). High labour force participation rates and low unemployment rates are often found in agricultural areas, and many R.M.s and villages had a high proportion of labour force in agricultural and resource-based industry. Labour force participation was lowest in the three resort villages and the City of Moose Jaw. Unemployment rates were above the provincial average in the City of Moose Jaw, as well as several smaller communities. Approximately a quarter of the population has a high school diploma or equivalent as the highest level of education attained, and almost half the population has some form of post-secondary education.

In First Nation communities within 100 km of the Project, the labour force participation rate was 46.8%, compared to the provincial average of 68.4% (Table 18). The unemployment rate across the First Nation communities was 23.0%, including a high of 25.0% in Muscowpetung First Nation and a low of 20.0% in Piapot First Nation. Less than half of the population has a high school diploma or equivalent, and 25.9% have some form of post-secondary education.

### 3.13 Engagement

The purpose of engagement was to present Project options to various stakeholders, receive input that will be taken into consideration for the final design and routing of the pipeline, and to document these meetings and presentations as required for the provincial TP under Saskatchewan's *Environmental Assessment Act*. From the outset of Project planning, SaskWater strived to engage people within four broad categories:

- public stakeholders (e.g., local communities, and other concerned members of the public);
- landowners;
- First Nations and Métis communities; and
- government and regulatory agencies.

Engagement activities were initiated during the spring of 2012 and are on-going. This section summarizes the engagement activities that have occurred in support of the environmental process to date.

#### 3.13.1 Public Stakeholders

SaskWater has established and will continue to maintain relationships with public stakeholders through meetings with local officials and community information sessions.



Table 17: 2006 Education and Employment Statistics for Rural Municipalities and Communities in the Socio-economic Study Area

Community	Population	Total Population 15 Years and Over	Population with no Certificate, Diploma, or Degree (%)	Population with High School Certificate or Equivalent (%)	Population with Post-secondary Education Diploma or Certificate (%)	Labour Force Participation Rate (%)	Unemployment Rate (%)*	Experienced Labour Force in Agriculture and Resource-based Industries (%)
R.M. of Moose Jaw (No. 161)	1,228	980	27.6	20.4	51.5	78.6	0.0	18.1
City of Moose Jaw	32,132	25,385	28.9	26.9	44.1	63.6	5.9	6.2
Subtotal	33,360	26,365	28.9	26.7	44.4	64.1	5.6	6.7
R.M. of Pense (No. 160)	490	425	30.6	28.2	40.0	70.6	3.3	51.7
Village of Pense	507	385	23.4	26.0	49.4	77.9	0.0	8.3
Village of Belle Plaine	64	75	33.3	26.7	33.3	93.3	21.4	14.3
Subtotal	1,061	885	27.7	27.1	43.5	75.7	3.7	28.4
R.M. of Dufferin (No. 190)	540	475	45.3	29.5	25.3	73.7	2.9	47.1
Resort Village of North Grove	68	65	30.8	15.4	53.8	50.0	0.0	0.0
Village of Bethune	369	295	23.7	27.1	44.1	84.7	10.0	14.3
Village of Findlater	49	45	22.2	44.4	44.4	87.5	0.0	33.3
Subtotal	1,026	880	35.8	28.4	34.7	76.1	5.2	31.8
R.M. of Marquis (No. 191)	404	380	27.6	42.1	30.3	81.8	7.9	40.7
Village of Marquis	71	55	45.5	18.2	36.4	66.7	0.0	0.0
Organized Hamlet of Parkview	45	-	-	-	-	-	-	-
Village of Tuxford	88	65	15.4	15.4	76.9	78.6	18.2	0.0
Resort Village of Sun Valley	128	150	20.0	36.7	43.3	65.5	0.0	0.0
Resort Village of South Lake	105	75	26.7	13.3	53.3	62.5	20.0	0.0
Village of Keeler	5	-	-	-	-	-	-	-
Subtotal	846	725	26.2	33.8	40.0	76.6	8.1	22.4
TOTAL	36,293	28,855	29.0	26.9	44.0	65.2	5.6	8.9
Saskatchewan	968,157	766,235	30.2	26.8	42.9	68.4	5.6	16.3

Source: Statistics Canada (2007a).

Note: Subtotals may not add to the sum of the numbers in the column above them because they are calculated separately.

\* Communities with unemployment rates of 0% may still have had a small number of unemployed individuals as a random rounding process is used in Statistics Canada data which may result in numbers under 10 being rounded down to 0.

R.M. = rural municipality; % = percent.

Table 18: Education and Employment Statistics for First Nation Communities within approximately 100 km of the Project

First Nations Community	2006 Population	Total Population 15 Years and Over	Population with no Certificate, Diploma, or Degree (%)	Population with High School Certificate or Equivalent (%)	Population with Post-secondary Education Diploma or Certificate (%)	Labour Force Participation Rate (%)	Unemployment Rate (%)	Experienced Labour Force in Agriculture and Resource-based Industries (%)
Piapot Cree First Nation	448	310	53.2	17.7	27.4	41.0	20.0	8.7
Pasqua First Nation	472	305	50.8	23.0	26.2	54.1	24.2	6.7
Muscowpetung First Nation	290	175	62.9	17.1	22.9	44.4	25.0	0.0
TOTAL	1,210	790	54.4	19.6	25.9	46.8	23.0	6.0
Saskatchewan	968,157	766,235	30.2	26.8	42.9	68.4	5.6	16.3

Source: Statistics Canada (2007b).

Note: Subtotals may not add to the sum of the numbers in the column above them because they are calculated separately.

% = percent; = not available.



### 3.13.2 Local Community Officials

Meetings were held with local R.M. representatives to introduce SaskWater and the Project, as well as to discuss potential Project-specific details, the environmental process and potential socio economic effects. The Project crosses four R.M.s, all of which were included in the engagement process. A list of formal meetings is provided in Table 19.

**Table 19: List of Meetings with Rural Municipalities**

Rural Municipality	Date	Time
R.M. of Edenwold	Tuesday, October 9	11 a.m. to 12 p.m.
R.M. of Sherwood	Tuesday, October 9	7 p.m. to 8 p.m.
R.M. of Pense	Wednesday, October 10	10:30 a.m. to 11:30 a.m.
R.M. of Moose Jaw	Wednesday, October 10	11:45 a.m. to 12:45 p.m.

### 3.13.3 Community Information Sessions

The Project was introduced to public stakeholders through a series of community information sessions. SaskWater hosted three community information sessions in the Project area, one in the Resort Village of Sun Valley along Buffalo Pound Lake, one in the Village of Pense, which is located along the pipeline route, and one in the Organized Hamlet of Kronau, near the end location of the pipeline (Table 20). These community information sessions were designed to provide an opportunity for members of the public to come and learn about the Project and to meet members of the Project team. Each come and go information session consisted of display stations set up around the meeting room.

**Table 20: List of Community Information Sessions**

Location of Community Information Session	Date	Time
Resort Village of Sun Valley	Tuesday, October 2, 2012	4 p.m. to 8 p.m.
Village of Pense	Wednesday, October 3, 2012	4 p.m. to 8 p.m.
Organized Hamlet of Kronau	Thursday, October 4, 2012	4 p.m. to 8 p.m.

Sign in sheets were used at the front entrance to track attendance as people entered the meeting room. Attendees were provided with an information sheet about the Project and provided the option of completing a feedback form before leaving. Attendees were encouraged to make their way around the room to read information posters about the Project and the environmental assessment process, view figures and maps of the pipeline route, and ask questions to the Project team. Materials from the community information session are included in Appendix C.



## SaskWater Expansion Project - Intake and Pump Station

The community information sessions were advertised in four newspapers; Krier Kountry, the Craik Weekly News, the Moose Jaw Times, and the Regina Leader Post. Table 21 lists the newspapers, distribution area, and running dates for the ad. Copies of the ad are included in Appendix C. In addition to the newspaper advertisements, posters were put up within the communities in the Project area and 52 mail out invitations were sent to the landowners along the pipeline ROW on Friday, September 21. Table 22 lists the locations where the posters were displayed. The poster and invitation are included in Appendix C.

**Table 21: Placement of Newspaper Advertisements**

Media	Distribution	Running Dates
Krier Kountry	300 households and businesses in the Kronau, Richardson, and Lajord regions.	October edition
Craik Weekly News	800 households and businesses in the Holdfast, Dilke, Chamberlain, Bethune, Craik, Aylesbury, Liberty, Penzance, Davidson, Moose Jaw, and Regina regions.	Week of October 1
Moose Jaw Times	6,500 households and businesses in the Moose Jaw region.	Wednesday September 26-Thursdays October 4
Regina Leader Post	52,093 households and businesses in the Regina region.	Wednesday September 26-Thursdays October 4

**Table 22: Placement of Posters**

Community	Location
Kronau	Post office
	Harvest Western Insurance
Lajord	R.M. of Lajord office
	Post office of Lajord
Pense	R.M. of Pense office
	Village of Pense office
	Post office
	Pense local website
Drinkwater	Public bulletin board
	R.M. of Redburn office
	Village of Rouleau office
	Post office
Belle Plaine	Chubby's Motel
Rowatt	R.M. of Sherwood office
	Three residential homes
Buffalo Pound Provincial Park	On sign entering the park 50 m in front of entrance building on left side of road
	On window of entrance building
Parkview	On bulletin board right of "Welcome" sign
Sun Valley	On power pole left of "Welcome" sign
	On fire shed facing road at the community center parking lot
	On wall of the community center left of door



**Table 22: Placement of Posters (continued)**

Community	Location
South Lake	On "Welcome" sign entering from Sun Valley
	On bulletin board on the front of the steel Quonset building next to garbage dumpsters
	On power pole seen on right side of road entering from Sand Beach Point about 20 m from "welcome to Sand Beach Point" sign
Sand Point Beach	On "Welcome" sign entering from South Lake
	On bulletin board at the intersection of Tatanka and Sand Point
	On "Welcome" sign entering from Highway No. 2 into Sand Point Beach
North Grove	On "60 km" sign 30 m from Highway No. 2 entering North Grove
	On bulletin board next to garbage bins
Tuxford	On bulletin board next to mail boxes
	On bulletin board at community hall
Marquis	On bulletin board in post office
	On bulletin board in convenience store
	In R.M. office window
Bethune	On bulletin board inside community center
	On bulletin board inside Co-op store
	In R.M. office window
	On bulletin board next to bank (across street from R.M. office)

### 3.13.4 Results and Feedback

#### 3.13.4.1 Sun Valley Community Information Session

The community information session in the Resort Village of Sun Valley was held on Tuesday, October 2, 2012 from 4 p.m. to 8 p.m. at the Sun Valley Community Hall. Representatives from SaskWater included Chris Robart, Jeff Huang, and Randy Avery. Darin Schindel of AE, Kyle Hodgson, Phil Anaquod, and Katie Zdunich of Golder, Lara Ludwig of Vale, and Van Stewart of Scott Land and Lease were also present to assist with the session.

A total of 48 people attended the community information session at Sun Valley. Of the 48 people who attended 65% were from Moose Jaw (n=31), 19% were from Sun Valley, 4% were from North Grove, and 4% were from Tuxford (Table 23). The majority of attendees from Moose Jaw appear to have cottages within Sun Valley.

**Table 23: Communities Represented at the Sun Valley Community Information Session**

Community	Number of Attendees	Percentage (%)
Moose Jaw	31	65
Sun Valley	9	19
North Grove	2	4
Tuxford	2	4
Unknown	4	8



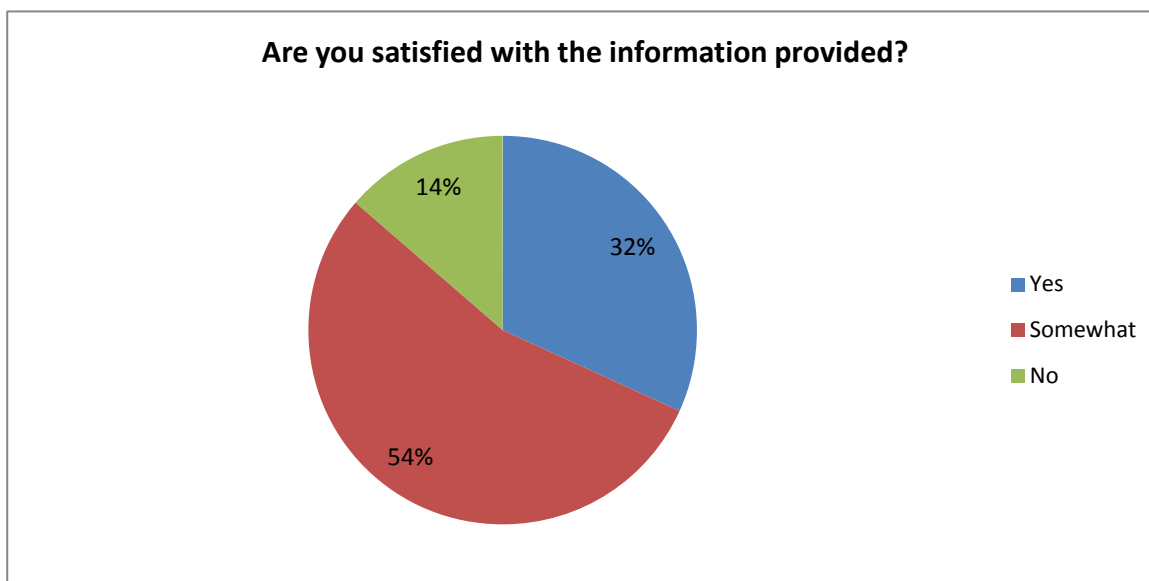
Of the 48 people who attended the meeting, 46% (n=22) filled out and returned feedback sheets. The feedback sheet consisted of three questions, as well as space to provide contact information:

- 1) What was your main reason for attending this information session?
- 2) Are you satisfied with the information provided?
- 3) What comments and questions do you have about this proposed Project?

The most common response for Question 1 was to receive additional information about the Project (Table 24). For Question 2, 32% of respondents (n=7) indicated that they were satisfied with the information provided, 54% of respondents (n=12) were somewhat satisfied, and 14% (n=3) were not satisfied (Figure 15). The majority of the responses to Question 3 were related to the water levels in Buffalo Pound Lake and how the lake will keep up with the demand for water in the region (Table 25).

**Table 24: Question 1 - Sun Valley Community Information Session**

What was your main reason for attending this information session?
Information.
To find out why you would hold a meeting about non-potable water line.
Information.
Interested in the future of Buffalo Pound Lake.
Find out what project scope is.
Concern of water levels and quality in Buffalo Pound.
Information.
To find out if lake levels are going to change.
Information.
To find out what this was all about.
For more knowledge of water systems.
We are concerned about the water level being maintained if more water is taken out.
Concern over lake water quality and quantity.
I live in Sun Valley Resort on the waterfront year round.
Concerned about existing water levels of the lake and future water levels as industrial demands use of water.
To see what it's all about.
I am interested to see how they are going to return the levels that are suitable to all.
Find out info re: transportation of water from Diefenbaker Lake.
Water coming from Diefenbaker.
To find out what studies have gone into water use projects and what the impact is going to be on the lake.
To find out what's going on.
To gather info about Buffalo Pound's future water levels.



Total number of respondents=22

Figure 15: Question 2 - Sun Valley Community Information Session

**Table 25: Question 3 - Sun Valley Community Information Session**

What comments and questions do you have about this proposed Project?
Thanks for the information.
There was only one player represented at the session, I was hoping for more information from the Watershed Authority. Will there be more information sessions forthcoming?
How much confidence is there in the sustainability of water for this project, and other existing projects, as well as future projects? How can the project contribute to increasing the quality of water in Buffalo Pound Lake?
Add info to the SaskWater website. No impact to cottage owners in terms of a water hook up. Info on website would have saved me a trip from town.
Can Buffalo Pound keep up with the supply?
All have been answered. Thanks!
How are you going to control the flow of water and maintain the current level of the lake?
I don't think this lake is capable of this much water flow. I feel we are not being told how this will impact the residents.
What will the cost be to the resident?
What cost to residents?
Many. I need to be convinced that this lake will become too low. Watershed people should have been here to assure us!
Where is the Watershed Authority? Where are they, we need them also at any further presentations.
Is there enough water for all of this? How will you improve the water flow from Lake Diefenbaker? Will quality of water be improved (e.g. cattle roaming north side of lake, land erosion along shoreline)? Are there any plans to dredge Buffalo Pound Lake to improve situation?
No major concerns for the proposed expansion for the outflow, but concerned about the proposed plans to increase flow of water into the lake (lack info-have to talk to Watershed Authority).
How will all that water suddenly show up?
I would like to see more concrete proposal from Lake Diefenbaker and the Province of Alberta.
Need a meeting to address how and what methods used to improve water channel and impact on environment.
None.



**Table 25: Question 3 - Sun Valley Community Information Session (continued)**

What comments and questions do you have about this proposed Project?
I am concerned about the limited information on a long-term impact (20-30 years) are the projections accurate and do they allow for the global warming effect-the last two years have had very dry conditions over the summer.
How does this benefit the public sector as we know this is basically for mining sector?
I do not think it matters what we think or say.
Not a lot of information.
Would have been nice to have Watershed Authority here to explain how the inflow will keep pace with the proposed outflow of the proposed expansion.
I would have liked an information session on the lake project before things were built, not after.
Not enough info on how Buffalo Pound Lake is to be fed from Lake Diefenbaker and what happens in drought years or who pays costs from Lake Diefenbaker to Buffalo Pound and so on (tax payers or mining sector).
The project proposed is very vague: what assurances have been made for adequate water supply? We hear all the objections about high water usage in the oil sands-what is different with this project? Where is the final water consumer disposing of the used water? How will the water in Buffalo Pound Lake be replaced? We need more information! The glaciers are melting and continued supply to Lake Diefenbaker is in question!

After the Sun Valley community information session the Project team summarized the main questions and concerns that were heard throughout the evening. The largest concern heard throughout the night was how this Project and others like it will impact the level of the Buffalo Pound Lake, and therefore the residents who use the lake. Most attendees expressed the desire to gain more information from SWSA about water allocation, and what is being done to increase the amount of water coming into Buffalo Pound Lake.

The SaskWater representatives explained the difference between SaskWater and SWSA, and tried to explain that it is the responsibility of SWSA to allocate the water for this Project, and SaskWater has to assume that this means there is enough water for this Project. In general it appeared that while most people had concern for water allocation, few if any showed any concern for the construction of the proposed intake or pipeline.

### **3.13.4.2 Pense Community Information Session**

The Pense community information session took place on Wednesday, October 3, 2012 from 4 p.m. to 8 p.m. at the Pense Community Hall in the Village of Pense (Photo 1). Representatives from SaskWater included Chris Robart, Jeff Huang, Marty Shaw, and Doug Matthies. Darin Schindel, Carma Holmes, and Ken Turnbull of AE, Kyle Hodgson, Phil Anaquod, and Katie Zdunich of Golder, and Van Stewart of Scott Land and Lease were also present to assist with the session.

A total of 21 people attended this meeting. Of the 21 people who attended 19% were from Moose Jaw (n=4), 19% were from Pense (n=4), and 14% were from Regina (n=3) (Table 26). Other communities that were represented include Fort Qu'Appelle, Stony Beach, Craven, Lumsden, and Belle Plaine.



Photo 1: Community Information Session in Pense

**Table 26: Communities Represented at the Pense Community Information Session**

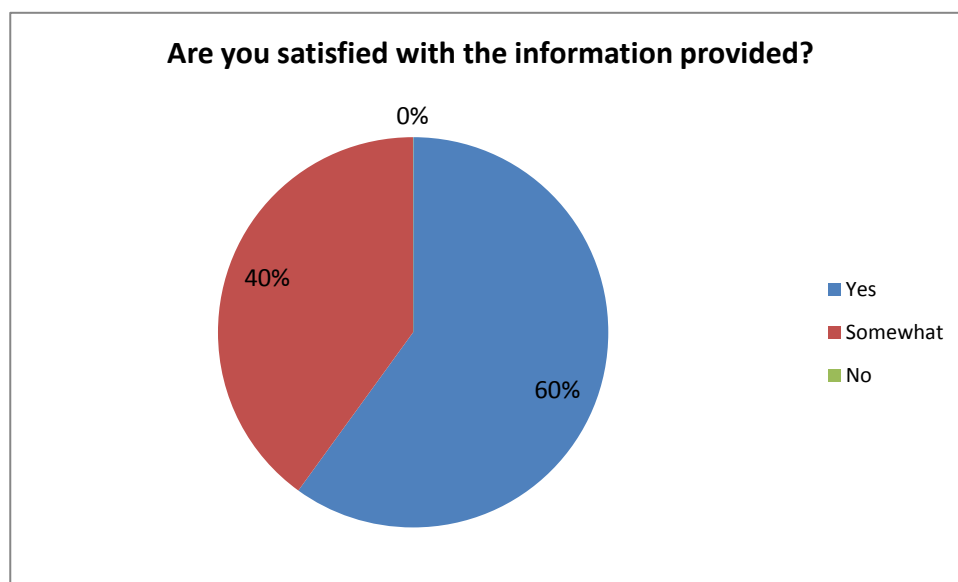
Community	Number of Attendees	Percentage (%)
Moose Jaw	4	19
Pense	4	19
Regina	3	14
Fort Qu'Appelle	2	10
Stony Beach	2	10
Craven	2	10
Lumsden	1	4
Belle Plaine	1	4
Unknown	2	10

Of the 21 people who attended the meeting, 48% (n=10) filled out and returned feedback sheets. The most common response for Question 1 was to receive additional information about the Project (Table 27). For Question 2, 60% of respondents (n=6) indicated that they were satisfied with the information provided, 40% of respondents (n=4) were somewhat satisfied, and 0% were not satisfied (Figure 16). The responses to Question 3 identified concerns related to the quantity of water coming out of Buffalo Pound Lake, and general landowner concerns and reclamation activities following construction (Table 28).



**Table 27: Question 1 - Pense Community Information Session**

What was your main reason for attending this information session?
We will have a pipeline through our pasture.
Gather information.
As a Village of Pense rep.
The proposed pipeline bisects our land.
Curious as to route.
Get up to speed on the project.
To get more information on the pipeline.
Our main reason for attending was to make sure that previous project were completed to our satisfaction before we agree to a new project.
Learn more about the "big picture": total inflows and outflows, now and in future with various industrial uses.
Landowner concerns.



Total number of respondents=10

*Figure 16: Question 2 - Pense Community Information Session*



**Table 28: Question 3 - Pense Community Information Session**

What comments and questions do you have about this proposed Project?
Many questions that can't be answered at this time. In and out fast would be the best.
Concerns regarding quantity of water. Is there or will there be enough?
I am concerned with the quality of work the contractors will leave. I do not want to be plagued with problems after the contractors leave. So long as someone is accountable and issues are dealt with in a timely manner.
Lots of planning done and to be done. Look forward to working with you and your group in the future.
Concerned about water shortages in the future.
Have to do only a little at a time so land is not out of production for 2 years. Have to pay for production for longer on light land with little topsoil. Have more contact with landowner with what is going on. Hire contractor with good equipment and money to finish the job.
For the new project our only concern is that the land be returned to the same condition it is now.
Encouraged by acknowledgement of importance of minimal disruptions to Buffalo Pound Lake. Key principle remains: inflows must match outflows (while maintaining water quality).
Drainage, liability, up keep of pipelines, compensation.

After the Pense community information session the Project team summarized the main questions and concerns that were heard throughout the evening. Most of the attendees were landowners along the pipeline route who had concerns about past SaskWater projects, and wanted assurance that SaskWater would be accountable for any issues that may arise during and after construction. Many attendees also showed concern for the quantity and sustainability of the water coming out of Buffalo Pound.

### **3.13.4.3 Kronau Community Information Session**

The Kronau community information session was held on Thursday, October 4, 2012 from 4 p.m. to 8 p.m. at the Kronau Multi-Purpose Facility in the Organized Hamlet of Kronau (Photo 2). Representatives from SaskWater included Chris Robart and Jeff Huang. Darin Schindel and Greg Schmidt of AE, Kyle Hodgson, Brad Novecosky, Brian Christensen, and Katie Zdunich of Golder, Lara Ludwig of Vale<sup><</sup> and Van Stewart of Scott Land and Lease also attended to assist with the session.

A total of 20 people attended this meeting. Of the 20 people who attended, 70% were from Kronau (n=14). Other communities represented include Regina, Lajord, Richardson, and White City (Table 29).

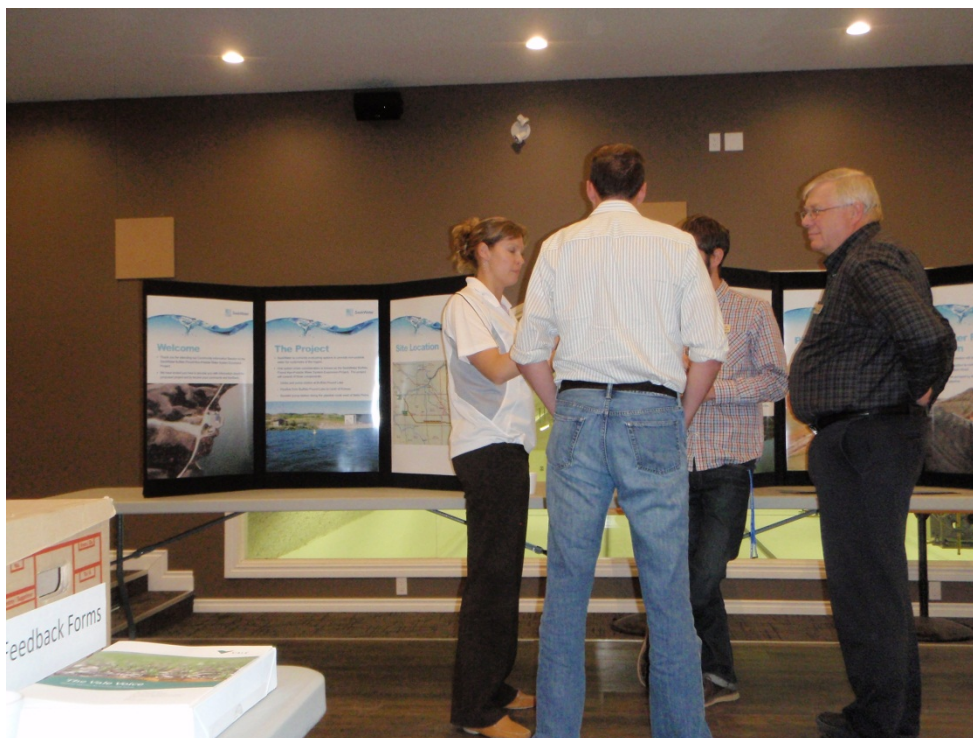


Photo 2: Community Information Session in Kronau

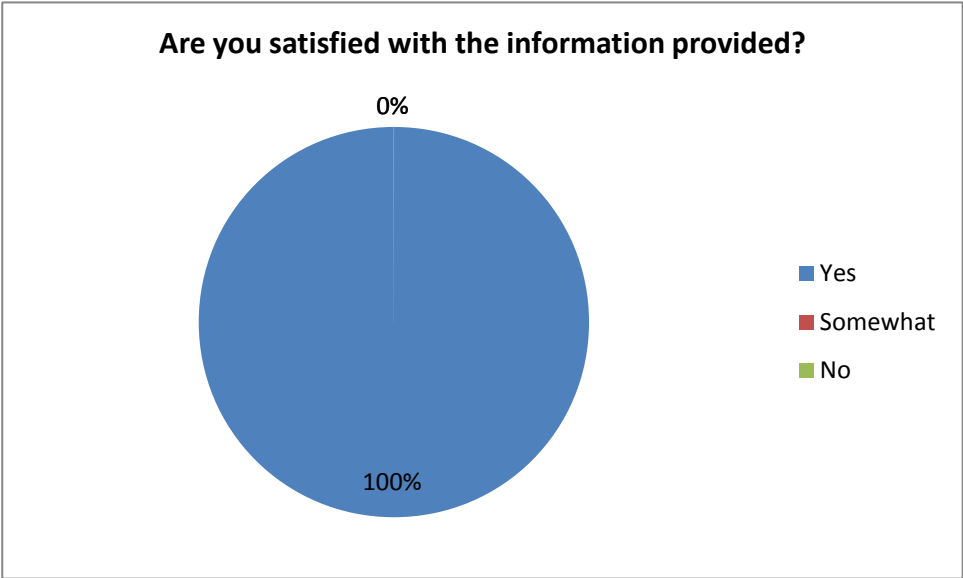
**Table 29: Communities Represented at the Kronau Community Information Session**

Community	Number of Attendees	Percentage (%)
Kronau	14	70
Regina	2	10
Lajord	2	10
Richardson	1	5
White City	1	5

Of the 20 people who attended the meeting, 15% (n=3) filled out and returned feedback sheets. The responses were related to their desire to obtain more information about the Project (Table 30). For Question 2, 100% of respondents (n=3) were satisfied with the information provided (Figure 17). Two of the three people responded to Question 3, but neither had any additional questions or comments to make at this time (Table 31).

**Table 30: Question 1 - Kronau Community Information Session**

What was your main reason for attending this information session?
See what is going on and where it will be.
What was involved?
To learn nature of the project.



Total number of respondents=3

Figure 17: Question 2 - Kronau Community Information Session

Table 31: Question 3 - Kronau Community Information Session

What comments and questions do you have about this proposed Project?
None right now.
Most answered.

After the Kronau community information session the Project team summarized the main questions and concerns that were heard throughout the evening. No major concerns were heard. The primary motivations of the people who attended the community information session were to learn more about the Project. One comment received was that it was felt that the intake and pipeline option from Buffalo Pound Lake to Kronau was preferred over the option from Katepwa Lake.

3.13.4.4 Questions and Responses from Community Information Sessions

The majority of the feedback received from the three community information sessions was related to the quantity of water being removed and the maintenance of water levels at Buffalo Pound Lake. Other questions and comments received during the information sessions were in relation to landowner questions and concerns related to construction and reclamation of the pipeline ROW. Overall, there was support from the public for the Project to proceed given the identified concerns were addressed. Table 32 details the questions and concerns received on the feedback forms, and the responses provided by the Project team.



## SaskWater Expansion Project - Intake and Pump Station

**Table 32: Questions and Answers from the Community Information Sessions**

Question	Response
Will there be more information sessions forthcoming?	SaskWater will likely provide an information package to the Buffalo Pound Community Council with information pertaining directly to water quantity and water quality. SaskWater will need to get a response from SWSA regarding this. Following this, SaskWater may have another session with stakeholders surrounding Buffalo Pound that would include SWSA.
Where is the Watershed Authority? Where are they, we need them also at any further presentations.	SaskWater did not involve the SWSA at our Community Information Sessions the same reason we did not invite other regulatory agencies. The intent of the community information session was to provide an awareness to the public about the proposed Project and give the opportunity for those potentially affected by the Project to express any concerns they may have and identify any issues that they feel need to be addressed. There were questions and concerns raised about water quantity and water quality. SWSA will need to answer those questions specifically. SaskWater will provide these questions and concerns to SWSA for their response.  The community information session responses may warrant an additional information session that would include the SWSA in order to address these concerns directly.
How much confidence is there in the sustainability of water for this project, and other existing projects, as well as future projects?	SaskWater is proposing to construct transmission works for the conveyance of non-potable water from Buffalo Pound Lake to its customers in the Belle Plaine Industrial Corridor and to a proposed potash mine near Kronau. The works include a lake intake, pump station, and pipeline. SaskWater, as part of its regulatory engagement process and its feasibility assessment, has requested SWSA to confirm the availability of water within Buffalo Pound Lake. SWSA has communicated to SaskWater that there is sufficient water to sustain this proposed Project.  SWSA has assured SaskWater that Buffalo Pound Lake has the capacity within the existing operational regime to meet the needs of this Project. The letter from SWSA is included in Appendix E.
How can the project contribute to increasing the quality of water in Buffalo Pound Lake?	
Can Buffalo Pound keep up with the supply?	
How are you going to control the flow of water and maintain the current level of the lake?	
Is there enough water for all of this?	
How will all that water suddenly show up?	
What assurances have been made for adequate water supply?	
How will the water in Buffalo Pound Lake be replaced?	
Concerns regarding quantity of water. Is there or will there be enough?	
Concerned about water shortages in the future.	
Where is the final water consumer disposing of the used water?	SaskWater does not have knowledge of its customer's water disposal methods. Each customer is required under provincial legislation and its own regulatory process to submit a project proposal that would outline water use and disposal methods for approval.
We hear all the objections about high water usage in the oil sands - what is different with this project?	The Project that SaskWater is proposing is for the construction of a lake intake, pump station, and pipeline. SaskWater has received assurances from the regulatory body that controls the allocation of water that our request for water is sustainable.



**Table 32: Questions and Answers from the Community Information Sessions (continued)**

Question	Response
How will you improve the water flow from Lake Diefenbaker?	SaskWater is not responsible to improve the water flow from Lake Diefenbaker. SWSA holds the responsibility of managing the flows from Lake Diefenbaker to Buffalo Pound.
Will quality of water be improved (e.g., cattle roaming north side of lake, land erosion along shoreline)?	SaskWater, as part of previous similar projects, had components of its projects that enhanced fish habitat and mitigated shoreline erosion.
Are there any plans to dredge Buffalo Pound Lake to improve situation?	SaskWater is not aware of any plans to dredge Buffalo Pound Lake. Any efforts to do this would be under SWSA control.
What will the cost be to the resident?	There will be no monetary cost to residents.
What cost to residents?	
How does this benefit the public sector as we know this is basically for mining sector?	SaskWater's Project will address the water supply requirements identified by industry within the Belle Plaine Industrial Corridor, namely a nitrogen fertilizer plant expansion, as well as proposed potash mine near Kronau. SaskWater, as a provincial crown utility, will ensure that water withdrawal from Buffalo Pound Lake and the transmission of this water is environmental responsible and sustainable. SaskWater is contributing to the economic success of the province.
I am concerned with the quality of work the contractors will leave. I do not want to be plagued with problems after the contractors leave. So long as someone is accountable and issues are dealt with in a timely manner.	SaskWater has a rigorous procurement process as well as project quality management system that will help to ensure that projects are completed in a cost effective, safe and industry accepted manner. SaskWater has the desire to maintain positive long-term relationships with its neighbours, stakeholders, and customers.

### 3.13.5 Landowners

The landowners along the pipeline ROW were engaged early in the Project planning. Representatives from SaskWater and Scott Land and Lease first introduced the Project to the landowners on May 29, 2012. The purpose of this meeting was to get written permission to survey and carry out environmental baseline surveys, as well as to discuss the route and any other concerns that the landowners may have with the Project. Over the next four months Scott Land and Lease met with all landowners along the route including representatives from Buffalo Pound Provincial Park. The landowners were also sent a formal invitation to attend the community information sessions in Sun Valley, Pense, and Kronau.

The Landowners have been generally accepting of the Project; however, a few route changes were made to accommodate some landowner concerns. Some of the concerns that were discussed with landowners include the cleanup and reclamation of a previous SaskWater line to Mosaic's Belle Plaine mine. These issues have been addressed by representatives at the community information sessions and by Scott Land and Lease.

### 3.13.6 First Nations and Métis Communities

This section is a summary of the First Nations and Métis engagement activities carried out in 2012 for the Project. Nine First Nations and two Métis Nation communities were identified for stakeholder engagement activities for this Project. The communities include the following:

- Piapot Cree Nation;
- Muscowpetung Saulteaux Nation;



- Pasqua First Nation;
- Standing Buffalo Dakota Nation;
- Carry the Kettle Nakota Nation;
- Okanese First Nation;
- Peepeekisis First Nation;
- Star Blanket Cree Nation;
- Little Black Bear First Nation;
- Métis Nation Eastern Region 3; and
- Métis Nation Western Region 3.

The nine First Nations identified belong to the File Hills Qu'Appelle Tribal Council of Nations. Five of the nine identified First Nations communities are situated in the File Hills district of the Tribal Council (Carry the Kettle is situated in the Indian Head district, but is categorized with the File Hills Bands). The remaining four are situated in the Qu'Appelle district of the Tribal Council. The File Hills Qu'Appelle Tribal Council office is located in the Town of Fort Qu'Appelle. The File Hills Qu'Appelle Tribal Council represent the nations that historically and currently are established along the Qu'Appelle River basin and in and around the four lakes that are situated in the Qu'Appelle Valley nearest to the Project. The five File Hills district First Nation bands are located in the R.M. of Tullymet, near the community of Balcarres, Saskatchewan. The four Qu'Appelle district First Nation bands are located in the R.M. of Edenwold.

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.

### **3.13.6.1 First Nations and Métis Engagement Activities**

Preliminary engagement activities were carried out largely in August, 2012 (Table 33). This included a tour of all the identified communities to meet with the Chiefs or designated council members of the First Nations and the Area Directors of the Métis Nation Regions. The purpose of these visits was to explain the nature of the engagement activities for the Project, and to establish a date and time for a formal presentation. Follow-up discussions over the phone were also carried out to finalize/confirm the date for the formal presentations.

As a result of the preliminary engagement, schedules were made and the formal presentations with the community leaders commenced on August 27, 2012 and concluded on October 18, 2012 (Table 33). The purpose of the presentations was to introduce the Project to the Aboriginal community leaders. An information sheet and map was utilized to help outline the Project-specific details. Representatives from SaskWater and Golder delivered the presentations and answered any questions that arose from the community leaders. Muscowpetung First Nation cancelled their meeting date and was unable to reschedule. The Council of this First Nation has received the information sheet and they have conversed with Golder representatives over the telephone. Attempts have been made to engage Standing Buffalo Dakota Nation; however the First Nation has not responded to these attempts.



## SaskWater Expansion Project - Intake and Pump Station

**Table 33: List of all First Nations and Métis Community Meetings**

First Nation or Métis Community	Attendees	Date	Description
Carry the Kettle Nakota Nation	Chief Barry Kennedy	August 2, 2012	Preliminary engagement
Carry the Kettle Nakota Nation	Chief Barry Kennedy	August 12, 2012	Preliminary engagement
Star Blanket Cree Nation	Chief Mike Starr	August 14, 2012	Preliminary engagement
Peepeekisis First Nation	Chief Mike Koochicum	August 14, 2012	Preliminary engagement
Okanese First Nation	Community Maintenance and Band Office Security	August 14, 2012	Preliminary engagement
Little Black Bear First Nation	Executive Director Cornell Bellegarde	August 14, 2012	Preliminary engagement (via telephone)
Métis Nation Eastern Region 3	Area Director Bev Worsley	August 14, 2012	Preliminary engagement
Pasqua First Nation	Chief Peigan and Council Member Lyle Peigan	August 14, 2012	Preliminary engagement
Standing Buffalo Dakota Nation	n/a	August 14, 2012	Preliminary engagement
Muscowpetung Saulteaux Nation	Chief Todd Cappel, Council Members Stan Poitras Jr., Byron Toto, Keith Pratt, Myke Agecoutay, Executive Assistant to Council Kim Pratt, Director of Operations Marcella Poitras, Business Consultant Dan Pelletier, and Legal Counsel Dwayne Stonechild	August 15, 2012	Preliminary engagement
Peepeekisis First Nation	Chief Mike Koochicum, Council Members Howard Desnomie, Francis Deiter, Enoch Poitras, Richard Ironquill, Elder Mrs. Desnomie, and Executive to Council Susan Nokusis	August 27, 2012	Formal Presentation
Little Black Bear First Nation	Executive Director Cornell Bellegarde and Council Member Lonny Bellegarde	August 27, 2012	Formal Presentation
Piapot Cree Nation	Chief Jeremy Fourhorns, Council Members Murray Ironchild, Lorne Carrier, Conrad Obey, Vernon Anaskan, Linda Obey-Lavallee, George Toto, and Director of Operations Della Chicoose	August 29, 2012	Formal Presentation
Star Blanket Cree Nation	Chief Mike Starr, Council Members Sheldon Poitras, Fred Star Blanket Jr., James Star Blanket, Edgar Starr, and 24 Community Members	August 29, 2012	Formal Presentation
Muscowpetung Saulteaux Nation	Meeting cancelled	August 30, 2012	n/a
Okanese First Nation	Chief Marie Anne Daywalker Pelletier	August 30, 2012	Preliminary engagement (via telephone)



**Table 33: List of all First Nations and Métis Community Meetings (continued)**

First Nation or Métis Community	Attendees	Date	Description
Pasqua First Nation	Chief Peigan, Council Members Leroy Obey, Lyle Peigan, Delbert Pasqua, Cecilia Asham, Kevin Missens, Gwen Cyr, Executive Development Officer Lisa Cyr, and Executive Assistant to Council Shirley Agecoutay	August 31, 2012	Formal Presentation
Okanese First Nation	Chief Marie Anne Daywalker Pelletier, Council Members Ron Elliot, Barry Tuckanow, Daniel Walker, and Richard Stonechild	September 5, 2012	Formal Presentation
Métis Nation Western Region 3	Area Director Lela Arnold	September 27, 2012	Preliminary engagement (via telephone)
Muscowpetung First Nation	Chief Todd Cappel via telephone conversation	October 1, 2012	Formal Presentation
Métis Nation Western Region 3	Area Director Lela Arnold	October 12, 2012	Formal Presentation
Carry the Kettle Nakota Nation	Chief Barry Kennedy	October 12, 2012	Preliminary engagement (via telephone)
Carry the Kettle Nakota Nation	Chief Barry Kennedy, Council Members Victor Prettyshield, Roxanne Thomson, Linda Ryder Francis, Melissa Eashappi, Band Manager Kimball Ironstar, Legal Council Wilson Olive, and Elder James O'Watch	October 18, 2012	Formal Presentation

The Métis Nation Eastern Region 3 does not currently have an area director; therefore, the former director was provided with the information sheet to pass on to the new director when they are in place.

### 3.13.6.2 Questions and Responses from First Nations and Métis Engagement Activities

The majority of the feedback received from the Aboriginal engagement activities was positive. The most common concern that was discussed was the quantity of water required, and how it will impact the potential traditional land uses carried out downstream in the Qu'Appelle River, from Buffalo Pound Lake. Table 34 details the questions and concerns received during the engagement activities, and the responses provided by the Project team. Following the formal presentation to Carry the Kettle Nakota Nation the Chief indicated that they will oppose the Project, and following a Band Council Resolution, they will be submitting an official letter of opposition.



**Table 34: Questions and Answers from First Nations and Métis Engagement Activities**

Question	Response
What is the flexibility of size with the piping and the measurement cushion?	At this early stage in the design we are looking at installing either a 750 or 900 mm diameter pipeline to provide service to the user(s) within the Belle Plaine Industrial Corridor and at Kronau. The final size determination is still being worked on and is dependant of several factors, such as, flow requirements, pressures, and pipeline materials.
What is the archaeology of the project?	The Project was submitted to the Heritage Conservation Branch for their review. A Heritage Resource Impact Assessment was carried out for this Project in heritage sensitive areas under Permit Number 12-187. Two heritage resources were identified within the Project area and will be flagged for avoidance.
Is there a level of commitment for environmental monitoring during digging?	SaskWater is planning to have environmental and First Nations monitors on site during the construction of the pipeline and intake.
How will this effect water downstream in the river systems?	SWSA has assured SaskWater that Buffalo Pound Lake has the capacity within the existing operational regime to meet the needs of this Project. The letter from SWSA can be found in Appendix E.
Is there enough water to start another pipeline?	SWSA has assured SaskWater that Buffalo Pound Lake has the capacity within the existing operational regime to meet the needs of this Project. The letter from SWSA can be found in Appendix E.
Will the Environmental reports be available for our community?	Once the Technical Report is approved by the MOE, it will become a public document.
Are you hiring aboriginals in some of the pipeline work?	SaskWater is planning to have environmental and First Nations monitors on site during the construction of the pipeline.
What happens if there is a four year drought? What would happen to the projects that require water for operations?	SWSA has assured SaskWater that Buffalo Pound Lake has the capacity within the existing operational regime to meet the needs of this Project. The letter from SWSA can be found in Appendix E.
Does SaskWater have authority for water?	SWSA has assured SaskWater that Buffalo Pound Lake has the capacity within the existing operational regime to meet the needs of this Project. The letter from SWSA can be found in Appendix E.

### 3.13.6.3 Traditional Land Use

#### 3.13.6.3.1 Methods

Information for traditional land use was gathered from interviews with First Nation and Métis communities that have been identified and included in the engagement process for the Project.

Elders and community members from a sample of the communities identified for engagement activities have been included in the traditional land use interviews. The questions on the survey were specific to the traditional uses of the area such as hunting, trapping, fishing, plant gathering, and camping during three periods:

- pre-1940;
- between 1970 and 1980; and
- recent use.

Interviews were conducted by Golder between September 23 and October 11, 2012 and included 23 Elders/community members (Table 35). Interviews were completed using a questionnaire as a guideline and maps of the area were provided. The questionnaire is included in Appendix C.



**Table 35: List of Participants in the Traditional Land Use Survey**

Group	Name	Interview Date
Piapot First Nation	Elder Sylvia Obey	September 23, 2012
	Elder Blair Carrier	September 23, 2012
	Elder Pauline Carrier	September 23, 2012
	Paul Nahnepowisk (Community Member)	September 23, 2012
	Elder Yvonne Benjoe	September 23, 2012
	Madeline Benjoe (Community Member)	September 23, 2012
	Elder Connie Iron	September 23, 2012
	Elder Valerie Stonechild	September 23, 2012
	Elder Art Watech	September 23, 2012
	Elder Mike Kaisowatum	October 4, 2012
	Elder Harry Francis	October 10, 2012
	Elder Ray Lavallee	October 10, 2012
Star Blanket First Nation	Elder Gerald Starr	October 11, 2012
	Elder Charles Bigknife	October 11, 2012
	Elder Florence Bigknife	October 11, 2012
	Elder Muriel Starr	October 11, 2012
	James Star Blanket (Council)	October 11, 2012
Muscowpetung First Nation	Elder Ron Rosebluff	October 4, 2012
	Elder Eugene Anaquod	October 4, 2012
	Elder George Cappel	October 4, 2012
	Elder Steven Cappel	October 10, 2012
	Elder Stanley Poitras	October 12, 2012
	Elder Alvina Poitras	October 12, 2012

### 3.13.6.3.2 Results

During the interviews, it was reported that no traditional activities such as hunting, trapping, fishing, or plant gathering currently take place within the Project area. Reasons provided by the Elders/community member include the following:

- private ownership of the land;
- cultivation of the land; and
- loss of interest in traditional activities.

During the interviews, the elders/community members reported that numerous plants and animals in the general region would have been utilized for traditional purposes, but these traditional activities focused more on the hillsides closer to the lake and river system.

It was reported that prior to and during the 1940s numerous traditional activities were carried out in the region. This included picking medicinal plants, berries, and other food bearing plants for personal use and for trade; picking wood for firewood, fence posts and for trade; and hunting of large and small game for both food and to trade the furs.



The Elders/community members that were interviewed identified that by the 1970s and 1980s very few people practiced traditional activities in the Project area. Modern conveniences such as grocery stores and pharmacies were replacing the traditional hunting and gathering activities. It was reported that some people did still carry on with traditional activities; however, these activities were typically carried out closer to home.

It was made clear during the interviews that in recent years very few people practice traditional activities and little to no activities are currently carried out in the Project area.

### 3.13.7 Regulatory Engagement

SaskWater has engaged government and regulatory bodies throughout the planning and environmental process. Informal and formal meetings with the PCS took place on June 18 and July 6, 2012 to discuss SaskWater's proposed expansion of its water supply infrastructure located within Buffalo Pound Provincial Park, and to identify any specific site-related issues. These meetings are summarized in Table 36. Informal meetings and telephone calls with provincial (SWSA, MOE, MOA, MHI) and federal authorities (Canadian Environmental Assessment Agency, DFO, Transport Canada) were also held throughout the process.

**Table 36: List of Regulatory Meetings**

Agency Name	Date	Meeting Context
Saskatchewan Ministry of Parks, Culture, and Sport	June 18, 2012	Initial meeting to discuss Project proposal.
Saskatchewan Ministry of Parks, Culture, and Sport	July 6, 2012	Site meeting at Buffalo Pound Lake to review proposal and identify site-specific issues.



## 4.0 ENVIRONMENTAL ASSESSMENT

### 4.1 Assessment Approach

The assessment approach is based on ecological, cultural, and socio-economic principles, and environmental assessment best practice. The approach considers how each key element of the Project may interact with the existing environment and result in an environmental effect on one or more of the biophysical and socio-economic components of the environment. Although all potential Project-environment interactions will be evaluated, the intent is to focus the assessment on those interactions with the greatest potential to result in significant residual environmental effects to the biophysical and socio-economic environments. The approach will be applied to the analysis and assessment of the environmental effects from the Project using information from the Project Description (Section 2.0) and existing conditions (Section 3.0).

Key elements of the assessment approach include:

- identify valued environmental components (VECs);
- identify all potential interactions and environmental effects the Project may have on biophysical and socio-economic VECs;
- describe SaskWater's plans to mitigate potential environmental effects from the Project due to construction and reclamation activities;
- evaluate and determination of significance of residual environmental effects (i.e., anticipated environmental effects remaining after consideration of appropriate mitigation); and
- outline monitoring programs that may be required.

The VECs identified for the Project are described in Section 4.2, and potential Project interactions and associated mitigation practices are addressed in Section 4.3. The evaluation of the significance of residual environmental effects are presented in Section 5.0.

### 4.2 Valued Environmental Components

Valued components represent physical, biological, cultural, social, and economic properties of the environment that are considered to be important by society. The inter-relationships between components of the biophysical and socio-economic (human) environments provide the structure of a social-ecological system (Folke et al. 2004; Folke 2006). An example of a physical property that can be considered a VEC includes soil. Aquatic and terrestrial biota populations represent biological properties that can be considered VECs. Traditional and non-traditional uses of plants and wildlife and other biophysical properties (e.g., ecological services or resources) can be VECs of the cultural, socio-economic environment. Environmental components such as air quality, noise, and hydrology are not considered VECs, but instead represent linkages to changes in biophysical and socio-economic VECs. The VECs were selected to because of their ecological, social, cultural, and/or economic value, and their potential sensitivity (ecologically or government administrated) to environmental effects from the Project.

The VECs selected for this assessment are:

- soils;



- vegetation, including listed plant species;
- wildlife, including listed wildlife species;
- fish and fish habitat;
- heritage resources; and
- socio-economics (i.e., employment and economy, community services and infrastructure, and land use).

### 4.3 Potential Interactions and Mitigation

This section identifies and evaluates the interactions between Project components or activities, and the correspondent potential environmental effects to VECs. The process begins with the identification of all potential interactions for the Project (Table 37). To provide a robust assessment of potential environmental effects, each interaction is initially considered to have a linkage to change in the environment and associated potential environmental effects on VECs. Each potential interaction is evaluated to determine if mitigation can be developed and incorporated to remove the interaction or limit the potential environmental effect to Each potential interaction is evaluated to determine if mitigation can be developed and incorporated to remove the interaction or limit the potential environmental effect to VECs. Mitigation includes Project design elements, environmental best practices, management policies and procedures, and social programs. Mitigation practices are developed through an iterative process between the Project's engineering and environmental teams to avoid or limit environmental effects.

Knowledge of the biophysical or socio-economic environment and mitigation is applied to each interaction to determine the expected Project-related change to the environment and if there is potential for a residual environmental effect on a VEC. Interactions that are removed through engineered design are not analyzed further because the mitigation eliminates the potential for an environmental effect on a VEC to occur. Interactions that are anticipated to result in a residual environmental effect to a VEC require further analysis to determine the significance of the residual environmental effect (Section 5.0). Table 37 summarize the potential Project interactions with VECs and the associated mitigation.

It is anticipated that some disturbances to the area will occur as a result of the Project; however, by adopting a proactive planning approach, it is anticipated that several environmental effects can be mitigated by the employment of "best practice" construction and reclamation techniques. The key mitigation options available for the Project were site selection, choice of construction techniques, and timing of construction activities. SaskWater has selected a location for the intake that is adjacent to existing disturbance areas, which include other intakes and site roads.



Table 37: Potential Environmental Effects, Proposed Mitigation, and Predicted Residual Effects

Project Interaction	Valued Environmental Component	Potential Environmental Effect	Mitigation	Predicted Residual Effect
Site Clearing, Excavation, Grading, and Construction	Soils	Disturbance to soil (i.e., soil loss and compaction, and surface drainage changes) during construction.	<ul style="list-style-type: none"><li>Where earthwork is required, topsoil will be stripped and salvaged for reclaiming non-operation area and reclamation to enhance revegetation efforts and maintain soil quality.</li><li>Progressive reclamation on disturbed areas, approved grass seed mixture appropriate for the area will be planted to stabilize soils.</li><li>If fill material is taken from slopes adjacent to the Project area for the construction of the coffer dam/man-made spur borrow pit slopes will be re-contoured to a stable profile, appropriate erosion control will be applied for stabilization, and a plant cover will be established.</li><li>Efforts will be employed to minimize the area of disturbance to that required to safely facilitate construction activities.</li><li>Cut slopes will be graded to a stable profile and appropriate erosion control for stabilization, and vegetation cover will be established.</li></ul>	No residual environmental effect anticipated
	Vegetation Wildlife	Loss/alteration of vegetation and wildlife habitat from construction.	<ul style="list-style-type: none"><li>Clearing of vegetation in riparian areas will be limited to minimal area required for construction.</li><li>A native grass mixture containing northern wheatgrass (40%), western wheatgrass (20%), western porcupine grass (15%), june grass (15%) and blue grama or plains rough fescue (15%) has been suggested for reclamation for areas that may be disturbed during construction and are not required for operation. Depending on availability of seed, needle and thread or green needle grass can be used as an alternate for western porcupine grass.</li><li>If clearing of vegetation and/or construction activities are to occur during the active breeding and nesting period, pre-construction surveys for occupied nests will be completed to identify sites for avoidance or, if a nest for listed wildlife species is found, construction in the immediate area may be delayed until the young have fledged. Activity restriction guidelines (SKCDC 2003) will be adhered to in the event a listed wildlife species is encountered during construction.</li><li>Appropriate native grass mixture has been suggested for reclaiming non-operation areas disturbed during construction, including on the area leading towards the shoreline protrusion. Species similar to those in adjacent areas will be used to reclaim and revegetate disturbed areas. In reclaimed areas, nesting and foraging habitat is anticipated to be available for wildlife in two to five growing seasons.</li><li>Natural colonization and recovery of emergent vegetation along the shoreline and riparian areas will provide suitable habitat for amphibians and semi-aquatic mammals at the proposed water intake location.</li><li>Shoreline and riparian zone will be reclaimed at the end of construction and it is anticipated that similar or enhanced habitat will be restored within two to five years.</li><li>Pre-project surveys were completed to identify raptor nesting sites and potential nesting habitat for other species. All clearing or mowing on the Project footprint will take place in the late fall or winter prior to the arrival of migratory birds and their typical breeding/nesting period. It is anticipated that the species will utilize alternate nearby habitat for breeding and nesting.</li><li>If construction occurs during the active breeding and nesting period, surveys for active nests may be required to identify sites for avoidance or, if a nest for listed species is found, construction in the immediate area may be delayed until the young have fledged. Activity restriction guidelines (SKCDC 2003) will be adhered to in the event a listed wildlife species is encountered during construction.</li><li>By salvaging and replacing topsoil on non-operation areas, the propagules in the seed bank may have the opportunity to germinate or regenerate. If deemed necessary, seeds may be collected and relocated to similar habitat or efforts can be employed to transplant individual plants into compatible growing sites.</li><li>Prior to construction of the Project, a follow-up listed plant survey should be completed to identify listed plant species that may be present in the areas to be disturbed, which were not identified during previous surveys.</li><li>Pre-construction surveys were completed to identify listed wildlife species and key habitat in the Project area. Follow-up surveys prior to and during construction will be completed to reduce potential for disturbance to listed wildlife species.</li><li>Activity restriction guidelines (SKCDC 2003) will be followed if listed species are observed adjacent to the pump station location.</li><li>If federal or provincial tracked species are discovered prior to construction and are in conflict with the Project, consultation with MOE will occur to determine their significance and an appropriate mitigation strategy.</li><li>Construction activities will be restricted to the Project footprint and use of existing roads.</li></ul>	No residual environmental effect anticipated
	Fish and Fish Habitat	Loss or alteration of fish habitat from the Project footprint.	<ul style="list-style-type: none"><li>The Project footprint and construction timeframes will be kept as small as possible.</li><li>Revegetation of non-operational portions of the shoreline will be revegetated where necessary.</li><li>Loss of fish habitat will be compensated for by restoration of shoreline and fish habitat (see Section 7.0).</li></ul>	Residual environmental effect anticipated



Table 37: Potential Environmental Effects, Proposed Mitigation, and Predicted Residual Effects (continued)

Project Interaction	Valued Environmental Component	Potential Environmental Effect	Mitigation	Predicted Residual Effect
Site Clearing, Excavation, Grading, and Construction (continued)	Soils Vegetation Wildlife Land Use	Increased erosion potential until vegetation regenerates.	<ul style="list-style-type: none"><li>Progressive revegetation of disturbed soil; erosion and sediment control measures (e.g., erosion control matting and silt fencing) to prevent sediment entering Buffalo Pound Lake.</li><li>Coffer dams and TSS/turbidity barriers will be used to isolate in-water work.</li><li>TSS/turbidity monitoring will be conducted during coffer dam construction and removal; work will be halted if the TSS limit for the Project is exceeded.</li><li>Spoil piles will be located above the high water mark and stabilized.</li><li>Sediment and erosion control measures will be used to stabilize all disturbed upland areas.</li></ul>	No residual environmental effect anticipated
	Fish and Fish Habitat	Alteration to fish habitat from increased sediment loading (e.g., bed suspended, wash load).		No residual effect anticipated
	Heritage Resources	Disturbance to known or previously undiscovered heritage and archaeological resources.	<ul style="list-style-type: none"><li>No known heritage sites occur within the Project area. In the event that a heritage resource is discovered during construction, the provincial heritage board will be notified immediately.</li></ul>	No residual effect anticipated
	Land Use	Nuisance effect on recreational activities in Buffalo Pound Provincial Park are expected during construction.	<ul style="list-style-type: none"><li>Project activity will be limited to a single location within Buffalo Pound Provincial Park.</li><li>The SWSA is responsible for water allocation in the Buffalo Pound Lake.</li><li>Good housekeeping practices will be employed and maintained through the duration of the Project activities.</li><li>All litter, garbage, and other debris generated by the Project will be collected and transported to approved disposal locations or facilities.</li><li>Natural vegetation regeneration on reclaimed areas will be encouraged; however, where required disturbed areas on native vegetation habitats will be restored, stabilized and seeded with an approved seed mixture appropriate for the area.</li></ul>	No residual effect anticipated
Operation of the Intake	Fish and Fish Habitat	Impingement/entrainment of fish in the water intake system.	<ul style="list-style-type: none"><li>Fish screens will be installed on the water intake and on applicable pump intakes during work area dewatering.</li></ul>	No residual effect anticipated
	Fish and fish Habitat	Habitat loss resulting from reduced in water level or an increase in water level variability; rate flow changes downstream of Buffalo Pound.	<ul style="list-style-type: none"><li>A licence for water withdrawal will be obtained from the SWSA.</li><li>The water withdrawn will be compensated by reducing excess capacity in Qu'Appelle River system.</li></ul>	No residual effect anticipated
	Land Use	Water withdrawal may decrease drainage flows and surface water levels, and availability of water supply for users in the area.		No residual effect anticipated
Air Emissions	Soils Vegetation Wildlife Fish and Fish Habitat	Increased exhaust emissions from stationary and mobile equipment during construction.	<ul style="list-style-type: none"><li>Complete construction in an expeditious manner, with all work limited to the designated construction area.</li><li>Equipment will comply with provincial and federal emission standards.</li><li>Construction vehicles will be regularly maintained to minimize unnecessary air emissions.</li><li>Limit vehicle idling.</li></ul>	No residual effects anticipated
	Soils Vegetation Wildlife Fish and Fish Habitat	Increased dust emissions.	<ul style="list-style-type: none"><li>Restrict clearing and grading activities to the extent necessary to safely facilitate construction activities (i.e., maintaining cover and limit earthworks will reduce dust sources).</li><li>Contractors to control dust during construction (e.g., wetting down of dry, exposed soils during site preparation).</li><li>Revegetate disturbed areas where possible or cover disturbed areas (i.e., spur) with rock, erosion blankets, clean straw or apply tackifier.</li></ul>	No residual effects anticipated
Noise Emissions	Wildlife	Increased noise levels during construction and operation activities may cause displacement of wildlife.	<ul style="list-style-type: none"><li>Clearing minimized to the extent practical; standing vegetation and terrain variations will function as a natural noise barrier; however, some noise will carry over water.</li><li>Complete maintenance activities during normal daylight hours.</li><li>Construction activities will be completed as expeditious as safety allows.</li><li>All vehicles to be equipped with proper mufflers to limit noise generation.</li><li>Limit or avoid construction and maintenance activities at night.</li><li>Leaving standing trees and tall shrubs adjacent to construction site will help localize the influence of light and noise to surrounding areas.</li><li>Construction personnel will adhere to posted speed limits to help reduce excessive noise.</li></ul>	No residual effect anticipated



Table 37: Potential Environmental Effects, Proposed Mitigation, and Predicted Residual Effects (continued)

Project Interaction	Valued Environmental Component	Potential Environmental Effect	Mitigation	Predicted Residual Effect
Waste Management	Wildlife	Wildlife may be attracted to the Project (e.g., by food, oil products), which may increase human-wildlife interactions and mortality risk to individuals.	<ul style="list-style-type: none"><li>■ A no littering policy and no feeding of wildlife policy will be implemented during construction.</li><li>■ A waste management plan will be implemented.</li><li>■ Firearms are prohibited on the Project area.</li></ul>	No residual effect anticipated
Human Resources	Community Services and Infrastructure	Increased pressure on highways and roads.	<ul style="list-style-type: none"><li>■ Travel routes will change during construction of the Project as the construction site on the pipeline moves.</li><li>■ Appropriate signage will be erected and traffic directing personnel will be used where required.</li><li>■ SaskWater will work with local R.M.s and the Saskatchewan Ministry of Highways and Infrastructure to address issues.</li></ul>	No residual effect anticipated
	Community Services and Infrastructure	Increased pressure on emergency services.	<ul style="list-style-type: none"><li>■ SaskWater will have an emergency response plan and worker health and safety policies.</li><li>■ SaskWater will work with local R.M.s to provide information on construction locations and schedule.</li></ul>	No residual effect anticipated
	Employment and Economy	Employment and business opportunities.	<ul style="list-style-type: none"><li>■ A contractor will be hired for construction and encouraged to hire locally and use local suppliers/services.</li><li>■ SaskWater has an Aboriginal Procurement Policy that promotes maximizing procurement from Aboriginal suppliers and contractors.</li><li>■ The Project will created temporary job opportunities, and may create a few long-term job opportunities.</li><li>■ Accommodation and food for construction crews will generate modest economic benefits in local communities in the socio-economic study area.</li></ul>	No residual effect anticipated
Accidents, Malfunctions, and Unplanned Events	Soil Vegetation Wildlife Fish and Fish Habitat Land Use	Contamination from spills and wastes.	<ul style="list-style-type: none"><li>■ Contractor to have a spill response and contingency plan developed. A spill containment kit and response equipment will be required on-site during construction.</li><li>■ Safe storage and handling practices (i.e., no chemicals, fluids, or washrooms will be stored or located within 100 m of a drainage or waterbody).</li><li>■ If vehicles are to be refuelled on the pump station location, it will not be done within 100 m of Buffalo Pound Lake or other watercourses.</li><li>■ Equipment will be inspected for leaks and repaired prior to entry onto the Project area and routinely inspected throughout the duration of the Project.</li><li>■ Any spills will be isolated, cleaned up immediately, and reported.</li><li>■ In the event of a spill, an appropriate soil remediation program will be implemented that addresses site-specific conditions (e.g., soil type, chemical properties of the spill material).</li><li>■ The contractor will collect all construction waste (e.g., engine oil, waste oil, and grease) in containers and disposed of at an approved disposal site.</li></ul>	No residual effect anticipated
	Vegetation Land Use	Potential for weed species introduction/expansion.	<ul style="list-style-type: none"><li>■ To avoid further introduction of prohibited, noxious, or nuisance weed communities, equipment used for construction will be sourced locally when possible and cleaned (e.g., power washed) prior to entering and exiting the Project area.</li><li>■ A survey for weeds within the Project footprint during construction and operation and a weed management plan should be implemented if required.</li><li>■ Certified seed mixture will be used for revegetation.</li><li>■ Should the introduction of prohibited weed species, occur as a result of the Project, these species will be promptly addressed using reasonable control measures determined in consultation with the appropriate regulator and landowner.</li></ul>	No residual effect anticipated

TSS = Total Suspended Solids; SWSA = Saskatchewan Water Security Agency; R.M.s = Rural Municipalities.



Prior to construction of the Project, detailed site assessments will be completed to identify listed plant and wildlife species, and nesting sites that may be present in the areas to be disturbed. These assessments will be completed, to determine if existing populations are in direct conflict with the Project or identify those species that may not have been documented during previous surveys. In addition, listed plant species are not identifiable at all times during the growing season and may experience temporal variation with climate. Migratory species, including listed wildlife species, may return and nest in or occupy new areas each year. Therefore, additional surveys prior to construction will reduce the uncertainty surrounding the presence of listed plant and wildlife species, and help to identify possible mitigation for constructing in the Project area, which has high potential to support these species. As a result of the above mitigation practices, residual effects to listed plant and wildlife species from the Project footprint are not expected.

It is expected that potential effects to soils would most likely occur during the construction phase of the Project as this period involves the greatest amount of equipment. The Project footprint will be kept as small as possible to reduce soil and vegetation disturbance from construction activities. If soils are to be excavated, topsoil will be salvaged separately from subsoil to prevent dilution of organic matter, prevent dilution of the seed bank contained in the topsoil, and reduce potential for admixing with saline subsoils. It is expected that material for the construction of the coffer dam/man-made spur will be sourced from outside of the Project area from suitable and approved borrow sites. All salvaged topsoil will be replaced over the disturbed areas not supporting the intake building or that are needed for operation. These areas will be recontoured to a pre-disturbance or stable profile after construction activities are completed so that the land use is returned to its original state. As such, no residual effects to soils from the Project footprint are anticipated.

Soil erosion can occur on disturbed soils during construction and may be an issue along the man-made spur until a vegetation cover is established. Disturbed areas will require erosion control to prevent sedimentation of Buffalo Pound Lake, and may include the use of erosion control matting and silt fencing, and revegetating areas as soon as possible. Riprap will be used to armour the man-made spur to prevent water erosion of exposed soils. Changes to the valley slopes on Buffalo Pound Lake will be mitigated through recontouring the slope profile to a stable condition, and revegetating the area to stabilize the slopes. As such, no residual effects to soils from erosion are anticipated.

For native grassland habitat, propagules contained in the replaced topsoil are expected to assist in the re-establishment of vegetation cover through natural regeneration and recovery. It is expected that progressive reclamation will occur during the Project to limit effects soils and vegetation. For example, areas not required for operations or access will be recontoured to a stable profile, topsoil replaced and seeded. Where deemed necessary, methods to stabilize disturbed vegetation and promote regeneration, including colonization by native species, will be site-specific. In addition to seeding, these may include wind fences, straw crimping, bale grids, tackifier application, and erosion control blankets. Stabilization programs will be implemented as soon as possible after construction has been completed or suitable soil conditions exist.

A suggested seed mixture for use during reclamation on disturbed areas for the Project is provided in Table 38. The intent of the mixture is to help provide an initial ground cover, assist with short-term site stabilization, and help create growing conditions that are suitable for further natural colonization by endemic species. Seeds used in the mixture will be certified and/or inspected so that they are free of prohibited, noxious, or nuisance weed seeds or other propagules. Overall, no residual effects to vegetation are anticipated from the Project footprint.



**Table 38: Native Seed Mixture for the Project**

Recommended Mixture <sup>(a)</sup>	
Species	Portion of Mixture (%)
northern wheatgrass	40
western wheatgrass	20
western porcupine grass <sup>(b)</sup>	15
june grass	15
blue grama or plains rough fescue	15

<sup>(a)</sup> Based on a seeding rate of 10 to 12 kilograms per hectare. The seeding rate assumes no-till drill seeding will be used. If broadcast seeding is used (valley wall of Buffalo Pound Lake), the rate will be increased by 30%. Only certified and/or inspected seed will be used.

<sup>(b)</sup> Depending on availability, alternate species could be used for western porcupine grass and include green needle grass, or needle and thread grass.

The introduction of weed species has the potential to displace native and/or desirable species in an area. To prevent the introduction of new weed or other invasive species, all equipment used for soil manipulation or reclamation procedures will have their undercarriages, blades, and buckets cleaned (e.g., pressure washed) prior to entry into the Project area. In addition, any hay or straw used for crimping or bale grids (i.e., temporary check dam's or containment walls) will be inspected for weed species prior to their use or treated to destroy weed propagules. Routine monitoring of the access roads and Project area will be completed to evaluate the presence and establishment of new communities of prohibited, noxious, or nuisance weeds that resulted from construction and/or operations. In the event that new prohibited, noxious, or nuisance weeds establish in the Project area, in particular, those listed in Schedules 1 through 3 of the *Weed Control Act* (2010), or existing populations of noxious weeds spread to new areas as a result of the Project, SaskWater will develop an appropriate weed management program in consultation with the R.M. and MOE.

Air emissions from construction activities are expected, although they will be mitigated primarily through controls, such as regular equipment maintenance, limiting of vehicle idling and usage, as well as fugitive dust management practices. These measures have proven to effectively limit a large portion of the emissions associated with similar construction projects. The appropriate use of mitigation, especially fugitive dust controls, will be necessary to reduce the effect of Project emissions. By applying the above mentioned mitigation, no residual effects to fish and fish habitat, soils, vegetation, wildlife, and land use from air emissions are anticipated.

It is expected that potential noise effects would most likely occur during the construction phase of Project as this period involves the greatest amount of equipment; however, there is still possibility of noise to be generated during operations. The change due to construction will be contingent on whether noise emitted by construction equipment would exceed the expected daytime ambient noise levels, which include typical occupational health noise levels requiring hearing protection or Alberta Energy and Utilities Board (AEUB) standard night-time noise criteria of 40 dBA (AEUB 2007). During operation of the water intake, the primary noise sources would be limited to small trucks or maintenance vehicles accessing the site and will occur intermittently. There are no residences in close proximity to the Project, therefore it is not expected that changes in noise will result in residual effects to local residences.



Changes in ambient noise levels also have the potential to affect wildlife in the Project area. Wildlife survival and reproduction can be negatively affected by increased noise levels during construction because animals may avoid (i.e., change movement patterns or flee the area) or move more quickly through areas with human disturbance) (Tyler 1991; Fortin and Andruskiw 2003; Bayne et al. 2008). This increase in energy expenditure may reduce individual fitness because energy that could be allocated to survival or reproduction is instead used to cope with disturbance from noise (Bisson et al. 2009). A number of mitigations have been proposed for the Project that can be used effectively to control noise generated by the Project. Noise will be generated during construction and is likely to be audible at times. The mitigation is expected to reduce disturbance and displacement of wildlife species during the Project, therefore, no residual effects to wildlife from sensory disturbance are anticipated.

The Qu'Appelle River system is highly regulated and is managed by the SWSA. The proposed Project involves the withdrawal of 22,000 dam<sup>3</sup>/y (0.697 m<sup>3</sup>/s) from Buffalo Pound Lake. Currently, WSA owns and operates the Qu'Appelle Dam at Lake Diefenbaker and water supply conveyance works at Buffalo Pound Lake and further downstream. These works deliver water to meet municipal, industrial, and other water supply needs downstream, including instream flows for water quality and environmental health. Excess capacity in the system is used to offset evaporative losses and maintain lake levels within a desired range. Therefore, the potential effect from the proposed water withdrawal on Buffalo Pound Lake level and outflow is ultimately a function of how WSA operates the water supply conveyance works.

The WSA has evaluated the potential effects of water withdrawal on Buffalo Pound Lake and the downstream environment using the base case scenario that considers the existing channel conveyance capacity and current water demands and the additional withdrawal of 22,000 dam<sup>3</sup>/y to support the Project. The modeled results indicate that Buffalo Pound Lake can be maintained above the minimum desirable level at all times, even with the additional Project withdrawal rates. For downstream lakes, the increase in the percent of months where lake levels may drop below the desirable operating ranges is between 0.1% and 1.6%. This was considered to be an insignificant change to the local hydrology (SWA 2012a,b). It was concluded that Project water demands can be provided from Buffalo Pound with the existing conveyance capacity without affecting existing water users and without significantly affecting the local hydrology of the Qu'Appelle River system.

In-water construction activities for the Project will require the use of a coffer dam. Installation of the coffer dam will be scheduled in accordance with the in-water construction timing window set by DFO for the protection of spring and fall spawning species, as well as for protection of developing eggs and fry (June 1 to September 30). The in-water work will be carried out within a work containment area surrounded by a floating silt curtain. The coffer dam and silt curtain will remain in place for the duration of in-water Project construction. Prior to installation of the earthen coffer dam and dewatering of the in-lake construction area, fish rescues will be conducted to reduce incidental mortalities. A TSS/turbidity monitoring program will run concurrently with in-water construction activities so that effectiveness of the turbidity curtain can be assessed. Additional erosion and sediment control measures (i.e., silt fences) will be implemented, where practical, to reduce sediment transfer into Buffalo Pound Lake. As a result of the above mitigation practices, residual effects to fish and fish habitat from sedimentation are not expected. Fish habitat will be permanently lost or altered as a result of the infill that will support the proposed intake structure at the Project site. As such, residual effects to fish and fish habitat are anticipated and assessed in Section 5.0.



Fuel barrels or other liquid containers will be stored on level sites with containment (expected to be located in the lay-down area) at least 100 m from Buffalo Pound Lake or other surface hydrological features. All chemicals will be clearly marked as per Workplace Hazardous Materials Information Systems requirements, and stored in a dry, secure place prior to use. Good housekeeping practices will be maintained during all phases of the construction program. All wastes will be collected in containers and transported to approved disposal sites.

SaskWater will provide adequate protection from potential spills/leaks during construction and operation of the Project. Equipment will be inspected for leaks and repaired prior to moving onto the Project area and regular inspections and maintenance is expected to occur. All identified leaks will be repaired before operations commence. During construction, spill response equipment and material, such as catchment trays and absorbent pads will be readily available and located at a strategic location on-site or within close proximity. An Emergency Response Plan will be developed for the Project that will outline leak and spill response procedures; provide emergency phone numbers and other relevant information such as the location of emergency equipment in the region (e.g., pump and vacuum trucks). Project vehicles and equipment on-site will carry fire extinguishers and shovels. SaskWater will discuss emergency response related to fire with the local R.M.s and communities (e.g., Moose Jaw and Regina).

The Project is located within Buffalo Pound Provincial Park, which provides a variety of recreational services to the socio-economic study area, and there are several communities located adjacent to Buffalo Pound Lake. Because the Project is located within a provincial park, hunting and trapping activities will not be affected, but recreational fishing activities may be limited in localized portions of Buffalo Pound Lake.

The Project will generate up to 30 or 40 temporary positions over a period of two years, and has potential to generate several long-term positions during operation. The socio-economic study area has a labour force participation rate slightly below the provincial average, as well as high levels of education and training. This suggests there may be individuals with suitable experience and skills for the Project, although Project employment is very modest. First Nations in the socio-economic study area have a low labour force participation rate and high unemployment rate, and have relatively low educational attainment. This suggests that while there are individuals who are looking for work, there may be barriers to employment within the population. If some or all the positions are filled locally, the Project will generate revenue and income within the socio-economic study area. The Project is also expected to generate modest revenue for the socio-economic study area through the use of temporary accommodation and local restaurants.



### 5.0 RESIDUAL ENVIRONMENTAL EFFECTS AND DETERMINATION OF SIGNIFICANCE

The changes in the environment that are anticipated to result residual effects in provide the foundation for determining significance from the Project on fish and fish habitat. Magnitude, geographic extent, and duration are the principal factors of consideration used to predict significance. The magnitude of a residual adverse environmental effect is determined by the change in a measurement endpoint from a particular interaction. Duration of residual adverse environmental effects is a function of the capacity of the ecosystem to tolerate disturbance and reorganize without moving to a different state controlled by a different set of processes (resilience). Geographic extent refers to the area affected, and is often expressed in relation to the study areas defined for the environmental baseline programs. Other factors of consideration, such as frequency are used as modifiers, where applicable, in the determination of significance. In this assessment, cumulative environmental effects are identified, analyzed, and assessed, following the approach used for the Project-specific residual effects analysis. Definitions for the criteria are provided in Table 39.

**Table 39: Criteria for the Determination of Significance of Residual Environmental Effects**

Criteria	Description
Direction	Direction indicates whether the effect on the environment is negative (i.e., less favourable), positive (i.e., beneficial), or neutral (i.e., no change). While the main focus of the effects assessment is to predict whether the development is likely to cause significant residual adverse effects on the environment, the positive changes associated with the Project also are reported.
Magnitude	<p>Magnitude is a measure of the intensity of a residual environmental effect, or the degree of change caused by the Project relative to baseline conditions or a guideline value. It is classified into three scales:</p> <ul style="list-style-type: none"><li>■ Negligible to Low = There is no measurable residual environmental effect to fish and fish habitat.</li><li>■ Moderate = The residual environmental effect to the fish and fish habitat is measurable, but within the anticipated resilience limits of the fish and fish habitat or is within baseline or guideline values.</li><li>■ High = The residual environmental effect is near or exceeding the anticipated resilience limits of the fish and fish habitat or exceeds baseline or guideline values.</li></ul>
Geographic Extent	<p>Geographic extent refers to the area affected, and is categorized into three scales:</p> <ul style="list-style-type: none"><li>■ Local = Local-scale residual environmental effects mostly represent changes that are directly related to the Project footprint and activities, but may also include small-scale indirect residual environmental effects, such as air emissions and dust deposition. The residual environmental effect is limited to the LSA.</li><li>■ Regional = Changes at the regional scale are largely associated with indirect residual environmental effects from the Project, and represent the maximum predicted spatial extent of direct and indirect residual environmental effects from the Project. The residual environmental effect is limited to the RSA and can include cumulative environmental effects from the Project and other developments.</li><li>■ Beyond Regional = The residual environmental effect will extend beyond the RSA and includes cumulative environmental effects from the Project and other developments.</li></ul>



**Table 39: Criteria for the Determination of Significance of Residual Environmental Effects (continued)**

Criteria	Description
Duration	<p>Duration is defined as the amount of time (usually in years) from the beginning of a residual environmental effect to when the residual environmental effect on fish and fish habitat is reversed. Typically, duration is expressed relative to Project phases. Both the duration of individual events and the overall time frame during which the residual environmental effect may occur are considered. Duration is categorized into three scales:</p> <ul style="list-style-type: none"><li>■ Short-term = The residual environmental effect is reversible at end of construction.</li><li>■ Medium-term = The residual environmental effect is reversible at the end of reclamation activities.</li><li>■ Long-term = The residual environmental effect is reversible within a defined length of time beyond reclamation activities.</li><li>■ Permanent = The residual environmental effect is irreversible.</li></ul>
Reversibility	<p>After removal of the Project activity or stressor, reversibility is the likelihood and time required for the Project to no longer influence fish and fish habitat. This term usually has only one alternative: reversible or irreversible.</p> <ul style="list-style-type: none"><li>■ Reversible = The time required for the Project to no longer influence fish and fish habitat.</li><li>■ Irreversible = The residual environmental effect is not reversible or duration of residual environmental is undefined or permanent.</li></ul>
Frequency	<p>Frequency refers to how often a residual environmental effect will occur, and is categorized into three scales:</p> <ul style="list-style-type: none"><li>■ Isolated = The residual environmental effect confined to a specific discrete period (i.e., construction phase) or Project activity.</li><li>■ Periodic = The residual environmental effect occurs intermittently, but repeatedly over the assessment.</li><li>■ Continuous = The residual environmental</li></ul>

LSA = local study area; RSA = regional study area.

The evaluation of significance for fish and fish habitat considers the entire set of interactions that are expected to result in a residual effect on fish and fish habitat, but significance is not explicitly assigned to each Project interaction. Rather, the relative contribution of each interaction is used to determine the significance of the overall Project on fish and fish habitat, which represents a weight of evidence approach. For example, an interaction with a high magnitude, large geographic extent, and long-term duration would be given more weight in determining significance relative to interactions with smaller scale residual adverse environmental effects. The relative residual environmental effect from each interaction is discussed; however, interactions that are predicted to have the greatest influence on changes to fish and fish habitat would also be assumed to contribute the most to the determination of environmental significance. As such, the evaluation of significance uses ecological principles, to the extent possible, but also involves professional judgment and experienced opinion.



### 5.1 Incremental Residual Environmental Effects from the Project

Fish habitat will be permanently lost or altered as a result of the infill that will support the proposed intake structure at the Project site. Construction of a coffer dam, which will be used to isolate work areas from the aquatic environment, will result in temporary disruption of fish habitat. The use of riprap to stabilize the banks of the new shoreline will result in habitat alteration. Riprap to be installed along the shoreline above the high water mark is not considered fish habitat. Determination of the quantity and quality of fish habitat within the Project area is necessary in order to identify the extent of the harmful alteration, disruption, and destruction (HADD) of fish habitat that will result from the Project. During the environmental assessment process, representatives from DFO will determine whether the HADD is acceptable, and if so, will issue an authorization under Section 35(2) of the *Fisheries Act* (1985). If the HADD is authorized, a Fish Habitat Compensation Plan will be implemented in order achieve the no net loss fish habitat management principle (DFO 1986). The total area of fish habitat that will be lost or altered due to construction of the proposed intake is approximately 50 m<sup>2</sup>.

A Fish Habitat Compensation Plan will be developed in consultation with DFO and will be submitted as a separate report. The altered and lost habitat has been quantified and assessed for its potential use by sensitive fish species (i.e., spawning, nursery, rearing, and foraging). Details of this assessment will be included in a Fish Habitat Compensation Plan (Section 8.0). Compensation opportunities in and around Buffalo Pound Lake have been discussed previously with the DFO, and suitable opportunities exist within the surrounding watershed. In addition, the collection of baseline fisheries data, coupled with post construction monitoring will allow for future assessment of the effectiveness of the Fish Habitat Compensation Plan.

Results of the determination of significance is in Table 40. Predicted residual environmental effects to fish and fish habitat from the Project footprint are predicted to be negligible to low in magnitude and local in geographic extent. This residual effect is anticipated to be continuous and permanent, although fish habitat that is permanently lost and altered will be compensated for in the Fish Habitat Compensation Plan. Overall, residual adverse environmental effects from the Project on fish and fish habitat are predicted to be not significant.

**Table 40: Determination of Significance of Residual Environmental Effects to Fish and Fish Habitat**

Valued Environmental Component	Predicted Residual Effect	Direction	Magnitude	Geographic Extent	Duration	Reversibility	Frequency
Fish and Fish Habitat	Loss or alteration of fish habitat from the Project footprint	Negative	Negligible to Low	Local	Permanent	Irreversible	Continuous

### 5.2 Cumulative Environmental Effects

Cumulative environmental effects are defined as the sum of residual environmental effects from all past, current, and reasonably foreseeable projects and/or activities on the physical, biological, cultural, and socio-economic components of the environment. In addition, natural disturbances such as fire, floods, insects, disease, and climate change can contribute to cumulative environmental effects.



Incremental environmental may result from the interaction of the Project with other local activities. Residual effects from the Project on fish and fish habitat are negligible or low in magnitude and local in geographic extent, and therefore, are not expected to combine with other existing disturbances or potential projects in the area. As such, no cumulative residual environmental effects are expected.

As described in Section 4.0 (Table 37), the Project will implement mitigation to reduce incremental environmental effects from the Project that will occur during construction, thereby reducing the potential of Project environmental effects to overlap with previous, existing, and future developments. As the Project progresses where necessary, SaskWater will develop site-specific mitigation to further reduce the potential for cumulative environmental effects.



### 6.0 PUBLIC CONSULTATION

As outlined in Section 3.13, SaskWater has been hosting a number of public engagement sessions for the Project. SaskWater will incorporate public comments or concerns into the Project plans where feasible.



### 7.0 MONITORING PROGRAMS

If required by the regulatory agencies, an Environmental Monitor would be on-site during critical phases of the Project (e.g., topsoil stripping and vegetation clearing). SaskWater will engage monitors to ensure compliance with mitigation and reclamation measures identified in this report as well as any conditions forwarded by regulatory agencies. The monitor would also be involved with determining the need for and implementation of site-specific reclamation measures.

Prior to construction, additional surveys may be completed to identify listed plant and wildlife species that may be present in the areas to be disturbed, to determine if existing populations are in direct conflict with the Project, or for those that were not identified during previous surveys. Additional vegetation surveys prior to construction will reduce the uncertainty surrounding the presence of listed plant species, and help to identify possible mitigation for constructing in areas that have high potential to support listed plant species. Additional wildlife surveys prior to construction will reduce the uncertainty surrounding the presence of listed wildlife and potential nests sites, and help to identify possible mitigation if nests are encountered.

Routine monitoring of the Project area will be completed to evaluate the presence and establishment of new communities of prohibited, noxious, or nuisance weeds that resulted from construction and/or operations. The introduction of weed species into areas has the potential to displace native and/or desirable species in an area. In the event that new prohibited, noxious, or nuisance weeds establish in the Project area, or existing populations of weed species have are spread to new areas, SaskWater will develop an appropriate weed management program in consultation with the R.M. and MOE.

Areas that have been disturbed during the construction of the Project and subsequently reclaimed will be inspected periodically after completion to assess the success of any reclamation efforts undertaken and to assess the necessity for any immediate remedial or follow-up work. Guidelines for determining reclamation success will follow those outlined by current industry best standard documents that include but are not limited to, provincial guidelines. If any additional remedial or follow-up work is required, additional inspection may be required.



### 8.0 FISH HABITAT COMPENSATION PLAN

Although Project structures were designed to minimize the alteration or loss of existing fish habitat, it is expected that some loss and alteration of fish habitat will occur as a result of the Project. The Fish Habitat Compensation Plan describes plans to mitigate negative effects on fish habitat and outlines the proposed habitat compensation required to meet DFO “no net loss” principle (DFO 1986) for non-mitigable residual environmental effects. The objectives of the Fish Habitat Compensation Plan are:

- to describe how habitat lost, altered, and gained were calculated;
- to assess environmental effects to fish habitat associated with the Project; and
- to develop habitat compensation measures so that the “no net loss” principle of the habitat policy will be achieved.

A Fish Habitat Compensation Plan will be developed in consultation with DFO and will be submitted under separate cover.



### 9.0 CLOSURE

The reported information is believed to provide a reasonable representation of the general environmental conditions at the Project location. Any use of this report or any reliance on, or decisions based on this report by a third party is the responsibility of such third parties. Golder will not be held responsible or liable for any damages to the physical environment, any property, or to life, which may have occurred from actions of decisions based upon any of the information within this report.

We trust this report meets your approval. If you have questions or comments, please contact the undersigned at your convenience.

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# **APPENDIX A**

## **Pre-Design Report**



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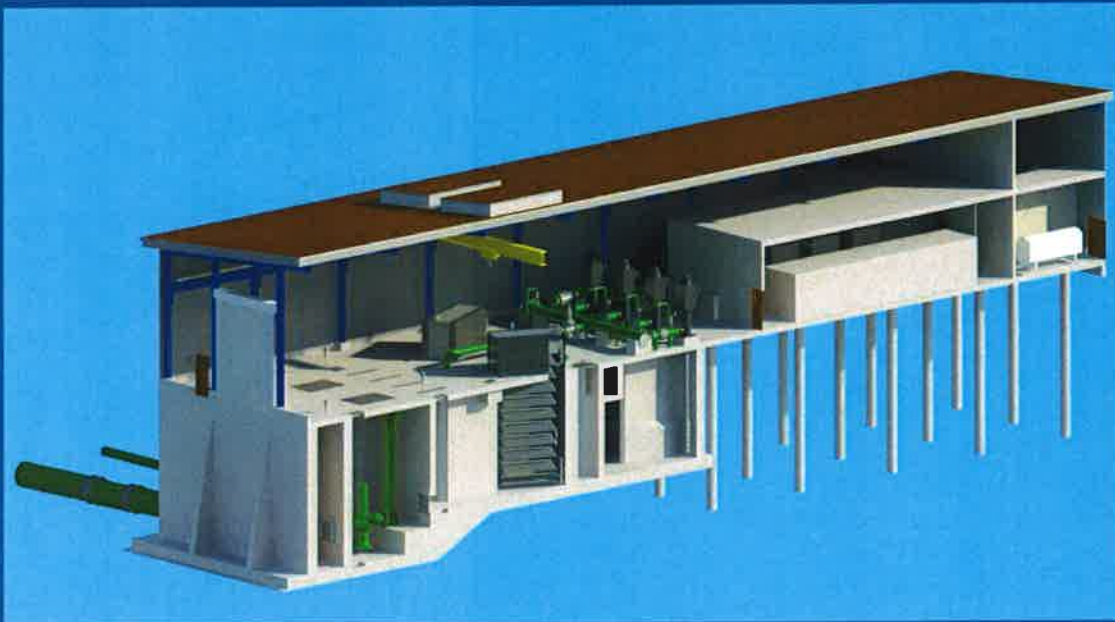
# Pre-Design Report

**SaskWater**

**Buffalo Pound Non-Potable Water  
Supply System - East (VALE)  
Expansion**

**Intake and Pump Station**

**December 2012**



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# PRE-DESIGN REPORT

## Table of Contents

SECTION	PAGE NO.
Table of Contents	i
List of Tables	iii
List of Figures	iv
<b>1 Introduction</b>	<b>1-1</b>
1.1 Background	1-1
1.2 Design Basis	1-2
1.3 Reference Codes, Standards, and Regulations	1-2
<b>2 Stakeholder and Public Engagement</b>	<b>2-1</b>
2.1 Regulatory Consultation	2-1
<b>3 Environment</b>	<b>3-1</b>
3.1 Regulatory Requirements	3-1
3.2 Project Scope	3-2
3.3 The Environmental Assessment	3-2
<b>4 System Components</b>	<b>4-1</b>
4.1 Intake	4-1
4.2 Pump Station	4-4
<b>5 Project Delivery</b>	<b>5-1</b>
5.1 Project Delivery Method	5-1
5.2 Risk Management	5-2
5.3 Procurement	5-5
5.4 Pump Testing and Commissioning	5-6
<b>6 Summary and Conclusion</b>	<b>6-1</b>
6.1 Preliminary Capital Cost Estimate	6-2
6.2 Project Delivery Schedule	6-3

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**Appendix A - Design Basis Checklists**

**Appendix B - Site Evaluation Memorandum**

**Appendix C - NHC Memorandum**

**Appendix D - Regulatory Correspondence**

**Appendix E - Power Supply and Control System Record of Meeting**

**Appendix F - Cost Estimates**

**Appendix G - Drawings**

## List of Tables

	PAGE NO.
Table 4-1 Historic Water Levels	4-4
Table 6-1 Capital Cost Estimate for Intake and Pump Station	6-2

## List of Figures

	PAGE NO.
Figure 6-1 Intake and Pump Station Preliminary Schedule	6-5

# 1 Introduction

SaskWater is considering an expansion of the Buffalo Pound Non-Potable Water Supply System (BPNPWSS) – East to supply non-potable water to the Vale potash mine located near Kronau as well as other customers in what is designated as the Belle Plaine Industrial Corridor. The Belle Plaine Industrial Corridor is located between Moose Jaw and Regina, where the Yara, Mosaic, and Terra Grain Fuels facilities are located along Kalium Road. The existing BPNPWSS – East system consists of two pump stations on the south shore at Buffalo Pound Lake. The two stations supply non-potable water to the Yara, Terra Grain, and Mosaic sites.

The water supply system expansion will consist of a new intake and pump station at Buffalo Pound Lake with a pipeline from Buffalo Pound Lake to the mine site near Kronau to deliver water to Vale. A booster pump station will be constructed along the pipeline route near the Belle Plaine Industrial Corridor to meet Vale's flow and pressure requirements. The preliminary design of the pipeline and booster pump station is described in a separate report. A connection to the pipeline at the Belle Plaine Industrial Corridor will be included as part of this project to supply additional water to the Yara site.

This pre-design report describes the design criteria for the intake and pump station at Buffalo Pound Lake, as determined through communications between SaskWater and Associated Engineering. The report also describes the general arrangement of the components in the project and how each component will be used to support the project. The technical information for the project is summarized in the Design Basis Checklist, found in Appendix A.

## 1.1 BACKGROUND

SaskWater operates two pump stations on the south shore of Buffalo Pound Lake within Buffalo Pound Provincial Park to supply their current customers in the Belle Plaine Industrial Corridor. The pump stations are located near the southeast corner of the lake. In order to supply water to the Vale mine, as well as additional customers in the industrial corridor, the new intake and pump station will be located near the existing stations within the provincial park.

The site for the pump station was selected after an evaluation of possible locations in the same area. The document that describes the evaluation of the possible sites is included in Appendix B.

### 1.1.1 Water Supply

The water source proposed for this project is Buffalo Pound Lake. The lake level is controlled by the Saskatchewan Water Security Agency (WSA) through the Qu'Appelle Dam on Lake Diefenbaker and the outlet structures at the southeast end of the lake.

### **1.1.2 Water Demands**

The intake and pump station will be required to deliver a maximum flow rate of 87 ML/d (3625 m<sup>3</sup>/h). The majority of the flow will be delivered to the Vale potash mine site near Kronau with the remainder of the flow designated for customers in the Belle Plaine Industrial Corridor. The expected maximum flow rate for the first years of operation beginning in the first quarter of 2016 for the intake and pump station is expected to be 1000 m<sup>3</sup>/h. The demand for water is expected to reach the full capacity of 3625 m<sup>3</sup>/h by the year 2019.

## **1.2 DESIGN BASIS**

The design basis was developed based on SaskWater's requirements for water supply as well as SaskWater's experience with existing pump stations in the area. A Design Basis Memorandum was developed for the intake and pump station. This document provides an overall description of the project. Some of the details have changed as more information is received and the project has developed. This report represents the most current design criteria for the project.

The design of the intake, pump station and pipeline is defined by the following major factors:

- Water source location;
- End-user location;
- Booster pump station location;
- Elevations of the relevant locations;
- Lake depth at water source; and
- Water demands.

This pre-design report describes these factors and how they impact the design criteria for the intake and pump station. The pipeline and booster pump station will be described separately.

## **1.3 REFERENCE CODES, STANDARDS, AND REGULATIONS**

### **1.3.1 General**

To ensure the project has minimal impact on the environment, the intake and pump station design must comply with regulations set out by:

- Saskatchewan Ministry of Environment;
- Department of Fisheries and Oceans;
- Transport Canada;
- Saskatchewan Water Security Agency; and
- Saskatchewan Heritage Conservation Branch.

### 1.3.2 Process Mechanical

The process mechanical design will consider standards from the following organizations:

- American Society for Testing and Materials (ASTM);
- American Society for Mechanical Engineers (ASME);
- American Waterworks Association (AWWA);
- Hydraulics Institute (HI); and
- Manufacturers Standardization Society (MSS).

### 1.3.3 Structural

The structure will be designed to the following codes and design criteria:

- National Building Code of Canada;
- Canadian Standards Association;
- Snow (Moose Jaw location):  $S_s = 1.4$  kPa;  $S_r = 0.1$  kPa; and
- Wind (Moose Jaw location):  $q_{1/10} = 0.40$  kPa;  $q_{1/50} = 0.52$  kPa.

### 1.3.4 Building Mechanical

Building mechanical systems will be designed in accordance with the following codes and standards:

- National Building Code of Canada;
- National Plumbing Code of Canada;
- National Fire Code of Canada;
- American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Standard 62.1 Ventilation for Acceptable Indoor Air Quality; and
- Canadian Standards Association CSA B139-09 Installation Code For Oil Burning Equipment.

### 1.3.5 Electrical

- National Building Code of Canada;
- National Fire Code of Canada; and
- Canadian Electrical Code CSA C22.1.

# 2 Stakeholder and Public Engagement

This section of the report summarizes the federal and provincial approvals that we anticipate will be required before the intake and pump station can be constructed.

### 2.1 REGULATORY CONSULTATION

Most of the approvals required for the construction of the intake and pump station take place during Phases one and two of this project. According to the former *Canadian Environmental Assessment Act, 2010* (CEAA 2010), the proposed project would have triggered a federal Environmental Assessment because of the required fisheries authorizations from DFO. However, the new *Canadian Environmental Assessment Act, 2012* (CEAA 2012) and its regulations offers an updated approach that streamlines the regulatory system. This allows natural resources to be developed in a responsible and timely manner while minimizing the effort that is duplicated through the provincial Environmental Assessment process. The proposed intake / pump station construction is not included as a “designated project” according to the *Regulations Designating Physical Activities* regulation under CEAA 2012. As confirmed during the July 17th, 2012 telephone discussion between AE and Peter Boothroyd (Canadian Environmental Assessment Agency), a federal Environmental Assessment and formal review of this proposed project is not required. However, a review and approval of a provincial Environmental Assessment is still required by the Environmental Assessment branch of the Saskatchewan Ministry of Environment (MOE). The provincial Environmental Assessment process is described in Section 3.

#### 2.1.1 Saskatchewan Ministry of Environment

The intake and pump station project will require authorization under the *Saskatchewan Environmental Assessment Act*. The fish habitat compensation works and aquatic habitat protection permits will be prepared based on information in the environmental assessment report prepared by Golder Associates Ltd. (Golder), and discussions between the MOE, the Department of Fisheries and Oceans (DFO), and SaskWater. The MOE will also require application for an *Aquatic Habitat Shoreline Protection Permit* for all work impacting the bed, boundary, or riparian habitat surrounding a water body along the pipeline route (see Section 2.1.4 for details).

#### 2.1.2 Saskatchewan Ministry of Parks, Culture and Sport

The project is located within Buffalo Pound Provincial Park, which is owned by the Province of Saskatchewan. The park is administered by the Ministry of Parks, Culture and Sport (MPCS) under the *Parks Act* and the *Heritage Property Act*. After initial consultations between SaskWater, Associated Engineering, and the staff of MPCS, the MPCS is in general agreement with the proposed development.

### 2.1.3 Saskatchewan Water Security Agency

Based on the hydrological modelling investigation conducted by the WSA, Buffalo Pound Lake has sufficient capacity for the proposed withdrawal for the Vale mine. SaskWater will supply the water, but the end-users will have the license to withdraw the water. An Approval to Construct leading to a Water Right and Approval to Operate is required for the project. By policy, any use (e.g., industrial water supply systems) which will consume greater than 5 cubic decameters (4 acre-feet) requires an approval.

### 2.1.4 Fisheries and Ocean Canada (DFO)

The DFO has jurisdiction for approvals under the *Fisheries Act* for projects that affect fish, fish habitat, and water quality. The intake and pump station project will require fisheries approvals and authorizations for:

- Intake sizing;
- In-water construction works that includes aquatic monitoring, environmental protection measures, and restricted activity timing windows; and
- Habitat compensation works.

Applications for authorizations and the habitat compensation plan (including the type, location, and timing of compensation) will be prepared using information gathered from Golder's environmental assessment and from consultations with DFO and SaskWater. The recently proposed changes to the habitat provisions of the *Fisheries Act* are not yet in effect, and once they are in effect, are not likely to change the requirements outlined in this paragraph.

### 2.1.5 Transport Canada – Navigable Waters

Large bodies of water such as Buffalo Pound Lake are subject to regulation by Transport Canada (TC) if they are considered to be navigable waters under the *Navigable Waters Protection Act* (NWPA). The project, which has the potential to substantially interfere with navigation, requires a formal approval from TC because it does not meet the requirements for classification as minor waters and minor works under the *Minor Works and Waters (NWPA) Order*. The project will also require adherence to the Navigable Waters Works Regulations (NWPA) and the Private Buoy Regulations (*Canada Shipping Act*).

### 2.1.6 Municipal and Public Engagement

Consultations with the rural municipalities (RM) affected by the project (e.g., RM of Moose Jaw, RM of Pense, RM of Sherwood, and RM of Edenwold) were held in the beginning of October, 2012. The purpose of these meetings was to introduce the project to the respective councils; provide an opportunity for discussion, and identify requirements for permits pertaining to road crossings, access, and development.

## 2 - Stakeholder and Public Engagement

---

Community information sessions have been conducted by representatives from SaskWater, Associated Engineering, and Golder at the following locations:

- Sun Valley;
- Pense; and
- Kronau.

### 2.1.7 First Nations and Métis Engagement

Contact has been made with First Nations and Métis communities to initiate the engagement process. Aboriginal engagement representatives from Golder and SaskWater have been conducting face to face meetings with representatives from bands within the File Hills Qu'Appelle Tribal Council as well as the Métis Nation of Saskatchewan Eastern Region 3 and Western Region 3.

# 3 Environment

### 3.1 REGULATORY REQUIREMENTS

Based on the information provided, it is assumed that the Project will require the submission of a Provincial Technical Proposal (formerly Project Proposal) only as no definitive triggers of the federal *CEAA* process have been identified at this time (see Section 2).

The Saskatchewan *Environmental Assessment Act* is the legal basis for the provincial environmental assessment (EA) process. This *Act* details how to determine if a project is a 'development' that will require an Environmental Impact Assessment. According to Provincial legislation (Government of Saskatchewan 2002), a 'development' is: any project, operation or activity or any alteration or expansion of any project, operation or activity which is likely to:

- Have an effect on any unique, rare, or endangered feature of the environment;
- Substantially use any provincial resource and in so doing pre-empt the use, or potential use, of that resource for any other purpose;
- Cause the emission of any pollutants or create by-products, residual or waste products that require handling and disposal in a manner that is not regulated by another act or regulation;
- Cause widespread public concern because of potential environmental changes;
- Involve a new technology that is concerned with resource use and that may induce significant environmental change; or
- Have a significant impact on the environment or necessitate a further development, which is likely to have a significant impact on the environment.

The process begins with the submission of a Technical Proposal to the Environmental Assessment Branch (EA Branch) of the MOE. The scope and detail of this report will provide a more detailed preliminary EA (which could fulfill federal screening requirements). The Technical Proposal will provide a:

- Project description;
- Summary of the environmental baseline conditions;
- Discussion of the potential environmental effects that could occur as a result of the project;
- Description of the proposed mitigation that can reduce the potential impacts to the environment; and
- Description and summary of stakeholders (public, landowners, First Nation and Métis) engagement.

The Technical Proposal will provide enough information to MOE so that each of the 'development' criteria can be accurately evaluated.

The MOE will review the Technical Proposal and make one of two decisions:

1. The project is not a development; therefore no further study is needed and the project can proceed to regulatory permitting; or
2. The project is a development and will require an Environmental Impact Assessment (EIA).

If an EIA is required, the EA Branch will work with the proponent to prepare the Terms of Reference that will guide the preparation of the Environmental Impact Statement (EIS). Upon submission of the EIS, the MOE coordinates an interdepartmental and intergovernmental technical review of the EIS. If the EIS is missing important information, the department will issue Preliminary Technical Review Comments and ask the proponent to provide additional information. The proponent is then required to submit a revised EIS.

When the MOE is satisfied with the EIS, the department issues final Technical Review Comments. These comments are meant to assist both the public and the government decision-makers in reviewing the EIS and evaluating the environmental acceptability of the proposed project. These comments provide information on the potential environmental impacts, the significance of those impacts, and the effectiveness of proposed mitigation. If the MOE disagrees with some of the proponent's conclusions, these issues will be discussed in the Technical Review Comments. Following completion of the review, the EIS and the Technical Review Comments are available for public review and comment. Once these reviews are completed, the MOE will make a recommendation to the Minister for a decision on whether the project can proceed. The MOE may or may not include approval conditions on a decision to allow the project to proceed. Once approval is obtained, necessary regulatory permits can be obtained.

## **3.2 PROJECT SCOPE**

The purpose of the environmental assessment is to document existing conditions, project infrastructure and activities, and identify any potential effects that may result from construction and operation of the intake and pump station. This information is then summarized in a Technical Proposal and used to complete the required regulatory review processes (outlined above).

## **3.3 THE ENVIRONMENTAL ASSESSMENT**

### **3.3.1 Literature Review**

To obtain sufficient information to characterize current site conditions, a literature search and background investigation will be conducted. Sources of information will include previously published reports, maps, and other data sources.

### **3.3.2 Aquatic Resources Baseline Collection**

The objective of the aquatic resources baseline collection program is to verify if waterbodies in the Project area are fish bearing. Fish sampling will be completed by electro-fishing and setting

minnow traps. This component of the EA will also evaluate potential to impact fish habitat (e.g., drainage coulees).

### 3.3.3 Soils Baseline Survey

The Project construction, operation, and closure may result in changes to terrain and soil quality, quantity, and distribution. Baseline data collection will be used to identify any potential adverse impacts to soil that may occur as a result of the Project, and will help to identify mitigation and protective measures that could be implemented to avoid or reduce potential adverse effects to the existing environment. Baseline soils and terrain data will be collected from existing literature and field studies. Soil laboratory analysis obtained from the field studies will be used to define the quantity and quality of the soils in the Project study area. Qualitative measures will include soil fertility and productivity, soil capability for agriculture, sensitivity to acidification, and wind and water erosion risk.

### 3.3.4 Vegetation Baseline Survey

The primary objectives of the vegetation baseline survey are as follows:

- Obtain site-specific, descriptive information on the nature and characteristics of plant communities within the Project area;
- Documentation of the types and general extent of invasive plant species (weeds) within the Project area; and
- Documentation of provincially and federally listed species present within the Project area.

### 3.3.5 Wildlife Baseline Survey

The objectives of the wildlife baseline studies are to:

- Describe the population status and distribution of wildlife species within the Project area;
- Identify habitat features that are important to wildlife in the vicinity of the Project; and
- Provide information about potential impacts resulting from the Project in preparation for the Technical Proposal.

A field program will be completed to determine the occurrence of wildlife species and wildlife habitat in the Project area. If required, Golder will also collect the relevant information that is required to facilitate the submission of an Aquatic Habitat Protection Permit.

### 3.3.6 Heritage Baseline Study

A desktop screening assessment review of the existing data relating to archaeological and historical resources within the study area and the potential for the area to contain undocumented heritage resources was completed for the entire proposed project area. The Heritage Conservation

Branch (MPCS) reviewed the project and determined that an HRIA was required.

A three day field component of the HRIA was conducted under an Archaeological Investigation Permit which involved a combination of surface reconnaissance and subsurface testing to identify heritage resources. This method is effective in identifying historic and precontact features and artifacts exposed on the ground surface.

Golder submitted survey plans for the proposed Intake Pump Station to the Heritage Conservation Branch (MPCS) for heritage sensitivity screening.

Upon review it was determined that although it will impact an area of native prairie, the Intake Pump Station is located on sloped terrain and has a limited footprint. As a result, a Heritage Resources Impact Assessment is not required for the proposed Intake Pump Station, and there are no further heritage concerns (Heritage Conservation Branch File No. 12-1337).

# 4 System Components

## 4.1 INTAKE

### 4.1.1 General

Buffalo Pound Lake is a shallow reservoir in the Qu'Appelle Valley, 29 km long, 1 km wide but with an average depth of only 3 metres presenting a challenge for intake designs under low water levels with ice cover.

The surface area of Buffalo Pound Lake is approximately 2,900 hectares and has a capacity of about 90 million cubic metres at the mean water level of 509.4 metres above sea level. Water levels in Buffalo Pound Lake are controlled by the WSA and maintained by the release of water from the Qu'Appelle Dam on Lake Diefenbaker. The average residence time of water in the lake varies from six to thirty months.

### 4.1.2 Hydraulic Requirement

The design flow requirement for intake structure and intake conduit is 94 ML/d (3917 m<sup>3</sup>/h). This flow capacity accounts for the ultimate pump station flow capacity of 87 ML/d with an additional 7 ML/d for fish return flow.

### 4.1.3 Geotechnical Investigation Results

The Geotechnical investigation is currently underway and a report will be provided once it is available.

### 4.1.4 Foundation and Structural Design

#### 4.1.4.1 Intake Screen Design

The intake design will follow the design of SaskWater's BPNPWSS – East intake structure consisting of a concrete encased 90 degree bend at the end of an intake conduit with a bell mouthed entrance covered by coarse bar screening with 75 mm spacing. The top of the structure will consist of a reinforced steel plate creating a vertical inlet port below the design ice level. The intake port allows for a maximum entrance velocity of 0.13 m/s at a flow capacity of 94 ML/d (3917 m<sup>3</sup>/h).

The proposed 6.7 m x 6.7 m square concrete structure includes a bottom of port elevation of 507.3 m in relation to a lake bottom elevation of 507.0 m. These design elevations are the same as those for the adjacent SaskWater intake structure (Yara) and SaskWater's BPNPWSS – East intake which has performed satisfactorily since installation.

**Northwest Hydraulic Consultants (NHC)** had provided a review of the proposed intake concept for the SaskWater BPNPWS – East project, and comments are included by memorandum in Appendix C. **NHC** has noted the potential exists for wave action to transport lake bed sediment into the intake with the port located within 0.5 m above the lake bottom. As sediment build up has not been a significant operational issue in the existing SaskWater pump station wet-well, it is not expected to be a major issue for the proposed intake. Some deposition and periodic cleaning can be expected.

#### **4.1.4.2 Intake Conduit Design**

A 1350 mm (54 in) intake conduit is proposed to convey the design flow while limiting maximum velocity to 0.76 m/s. It is recommended that a flexible pipe material be utilized for the required 1350 mm (54 in) internal diameter intake conduit. With the soft and variable soil conditions encountered in the in-lake geotechnical boreholes, there is potential for non-uniform bedding support. The use of flexible pipe will allow the pipeline to deform and move away from pressure concentrations that may develop as a result of this non-uniform support. Flexible couplings will be required at the connection to the intake structure to allow for the differential settlement expected given the foundation design.

Lined and coated steel pipe 1350 mm (54 in) diameter with a 9.5 mm (0.375 in) wall thickness is recommended for the intake conduit, assuming conventional installation within an isolated construction area, compacted granular bedding and backfill conditions within the pipe zone, and a 1 m depth of cover. Should alternative construction methods be proposed, pipeline material selection would need to be re-considered.

The intake conduit is routed across the existing Yara intake conduit assuming that the existing pipe and intake will be decommissioned.

#### **4.1.4.3 In-Lake Construction Requirements**

Following the method used for the adjacent intake constructions, an earthen coffer dam will likely be used to isolate the area needed for construction of the intake structure, and conduit. Final coffer dam design and construction methods will be based on the contractor's preferred method, and detailed soils information provided by Golder in the geotechnical report. For the purpose of pre-design cost estimates, an earthen coffer dam has been assumed.

Coffer dam material will be available from the excavation for the pump station structure, road re-location and from borrow sources.

Based on discussions with local contractors, the haul distance for suitable material is expected to be less than 30 km. If necessary a more detailed contractor review will be conducted in order to locate more definitively potential borrow locations and refine cost

estimates during detailed design. Following direction from Staff of Parks, Culture and Sport (PCS), existing disturbed borrow areas will be investigated for use on this project. Mitigation including re-vegetation of these areas will be required post construction, meeting PCS requirements.

Appropriate sediment and erosion control measures will be required for coffer dam side slopes in order to protect them from lake/wave erosion. Siltation curtains will be required to contain sediment to the construction area during cofferdam installation and removal, meeting regulatory requirements.

A dewatering system within the isolated area will be required by the contractor due to the large quantities of sand found in the geotechnical boreholes, which would provide a path for water flow beneath the coffer dam. This issue and potential mitigation methods will be described further in the geotechnical report.

The contractor will be responsible for ensuring that the existing SaskWater (Mosaic) and Mosaic intakes are not affected during construction of the coffer dam, and the project works. This may require additional slope reinforcement or sheet piling in the vicinity of these structures. It is assumed that the existing SaskWater (Yara) intake will be abandoned as the proposed coffer dam may interfere with this structure.

Stabilization of the area beneath the intake structure foundation and pipeline trench bottom using imported granular material and geotextile will be required due to the variable and soft soil conditions found in the lake subsurface.

### 4.1.5 Operation, Maintenance and Constructability Considerations

#### 4.1.5.1 Historical Water Levels and Ice Thickness

Buffalo Pound Lake is part of the Qu'Appelle River system. Inflows and outflows for the lake are regulated by the WSA, who operates the Qu'Appelle Dam on Lake Diefenbaker (upstream) and the Buffalo Pound Dam on the southeast end of the Lake.

Table 4-1 summarizes water level information for Buffalo Pound Lake. The information has been confirmed via correspondence with WSA, dated October 30, 2012 regarding previous projects in the Lake.

**Table 4-1  
Historic Water Levels**

Description		Elevation (m)
Peak Calm Water Levels	1:25	510.8
	1:100	511.8
	1:500	512.7
Operating Range	Summer	509.17 to 509.47
	Winter	509.17 to 509.32
	Spring and Fall	508.86 to 509.93

#### 4.1.5.2 Intake Blockages

As discussed in Section 4.1.3.1, the proposed intake design has been used successfully in other projects in the immediate area. The intake openings are 75 mm wide and there is a low probability that they will become blocked.

#### 4.1.5.3 Intake Screens

##### Screen Area Requirements

The intake structure will have a coarse bar screen with 75 mm openings. Low lift fish handling pumps will be installed in the pump station to raise the water level to provide sufficient area of fine mesh screening inside the pump station. This concept is well suited for the shallow depth of Buffalo Pound Lake and has been used successfully in previous projects. The fine screening is discussed in the sections on the pump station components.

## 4.2 PUMP STATION

### 4.2.1 Site Consideration

#### 4.2.1.1 Land Acquisitions / Land Use

The proposed pump station is located on the south shore of Buffalo Pound Lake within the Buffalo Pound Provincial Park. As such, SaskWater will require land use approval from the Saskatchewan Ministry of Parks, Culture, and Sport (MPCS) and a land lease for the pump station with MOE and intake site with Saskatchewan Ministry of Agriculture.

SaskWater will be responsible for completing negotiations for the pump station site and access points. The access points for the existing SaskWater BPNPWSS - East pump station will be used for the proposed pump station.

### 4.2.1.2 Facility Location

The proposed site for the pump station facility is situated south of the existing SaskWater Yara pump station and SaskWater BPNPWSS – East pump station. To facilitate this pump station location, the existing roadway and Yara access road will require relocation slightly to the south as shown on drawing 101, and section view on drawing 102 in Appendix G.

The proposed road will also be at lower elevation than the existing, to allow for a more gradual slope to the north and a lower, more feasible, retaining wall requirement. The retaining wall will support the road way to an elevation of approximately 515 m and allow transition to the pump station access elevation at approximately 513 m, near floor level. To accomplish the road relocation and elevation change, the existing hill-side will require excavation to allow for the road area and ditch, and provide reasonable back-slopes to existing contours. Erosion protection measures, especially during the construction period, will be required in the excavated areas and reviewed further in detailed design.

### 4.2.1.3 Facility Access

Access to the pump station will be provided from the existing access road to the Yara and BPNPWSS – East pump station. The existing turnaround area for the BPNPWSS-East pump station will be utilized for proposed pump station access. The proposed site plan and sections are illustrated in Appendix G.

### 4.2.1.4 Topographic Survey

Topographic and bathymetric survey information available from the BPNPWSS – East project has been utilized for development of site civil pre-design drawings. Associated Engineering has verified benchmarks and survey accuracy. Benchmark information will be provided on detailed design drawings for use in construction layout.

### 4.2.1.5 Geotechnical Condition

Based on the stratigraphy encountered in the borehole advanced near the SaskWater BPNPWSS - East intake location, the foundation for the proposed intake is anticipated to be founded on soft clay. Consolidation settlement of the intake may be in the range of 0.2 m to 0.3 m. Differential settlement between the intake structure and pipeline will be considered in detailed design. Further borehole testing is recommended at the exact location for the proposed intake to confirm foundation design requirements.

Due to the variable nature of the soils for the intake pipeline at the site, pipe support is also expected to be variable along the intake pipeline length. The intake pipeline subgrade should be assessed when the excavation is open to determine if over-excavation of the subgrade and replacement with select fill is required for pipeline support.

The intake will require a cofferdam or other measures to control the lake and groundwater, to facilitate the excavations and foundation construction. Based on experience from the BPNPWSS – East intake, significant seepage control will be required to maintain sufficiently dry working conditions and to control the potential for basal heave in the excavations. Seepage control may require well points and/or sheet piles.

Stability of earthen cofferdams will be influenced by the materials used, method of construction and dewatering. The cofferdam and dewatering system should be designed and constructed by a qualified engineer/contractor.

The stability of the excavation slope and cofferdam should be monitored by qualified geotechnical personnel on a continuous basis during the construction.

#### **4.2.1.6 Landscaping**

Upon completion of the earthworks for the pump station and access road, landscaping will be carried out to restore the site through seeding and planting of native species. This process will include placement of erosion control matting in the disturbed area.

To address concerns brought forward by Staff of Parks, Culture and Sport (PCS) regarding the visual impact of the proposed pump station from the lake and the roadway, landscape conservation, mediation and buffering has been considered as requested.

Conservation has been incorporated with the site selection as it makes use of the existing BPNPWSS - East pump station's site parking and turn-around area for the proposed pump station location, minimizing the extent of new disturbed area. Mediation will take place through re-establishing vegetation growth to match existing native species as noted previously. Buffering has been addressed in locating the proposed pump station directly south of the existing pump station in effect "hiding" it from the lake viewpoint. From the roadway view point, the pump station will be located at a lower elevation, buffering it somewhat from the roadway. The existing roadway will also be relocated to the south to create additional set-back from the new pump station.

### **4.2.2 Coordination of Utilities**

#### **4.2.2.1 SaskPower**

Preliminary indications are that the electrical demand for the intake facility will be less than 3 MVA and therefore a consumer-owned sub-station should not be required

SaskWater and Associated Engineering have met on-site with SaskPower to discuss the BPNPWSS - East (Vale) expansion project. Associated Engineering has coordinated with

SaskWater in the application for electrical service to SaskPower. A three-phase electrical service will be required from SaskPower at a voltage of 4160 V.

SaskPower will construct a portable 72kV / 25kV sub-station approximately equal distances between the SaskWater intake and booster pump stations. A 25kV feed would then be built from that station to each site. SaskPower will provide a 3 MVA 25kV / 4160V transformer near the building complete with underground vault.

Existing underground SaskPower service conductors may have to be relocated.

### 4.2.2.2 SaskTel

Telephone service will be required from SaskTel. It is anticipated one voice line and two data lines will be required. The data lines will be used for backup communications to TransGas SCADA and for access to a dial-in modem. Early application will allow SaskTel's Design and Engineering Department to have the required infrastructure, an extension of the Dmarc, to be in place by project completion.

## 4.2.3 Building and Structural

### 4.2.3.1 Retaining Wall

The proposed pump station will be partially surrounded by a retaining wall to the south. The structure will be designed as a cantilever type retaining wall and will resist overturning, sliding and bearing failure. It will be constructed of reinforced cast-in-place concrete, precast concrete, mechanically stabilized earth (MSE), or sheet piling. The system will be determined during detailed design.

### 4.2.3.2 Pump Station Foundation

Foundation design requirements and construction methods will be based on the selected site and on the recommendations from Golder's geotechnical investigation. It is anticipated that the foundation of the new pump station will be similar to the previous project; SaskWater's BPNPWSS – East pump station. The anticipated foundation will be a cast-in-place concrete raft slab for the pump wells and piles for the remainder of the building. The base slab will be sloped to sumps to assist with cleaning. Pile diameters and lengths will be determined after receipt of the geotechnical investigation report.

#### 4.2.3.3 Pump Station Substructure

##### Exterior Walls

The exterior walls are to be constructed of cast-in-place concrete and be designed to withstand two main loading conditions:

- The lateral pressure from backfill and groundwater on the outside of the structure when the pump wet wells are dry during operation; and,
- The hydrostatic test pressure from water at the design level inside the pump wet wells with no backfill during construction.

Due to the potential for high ground water levels, the substructure will be designed to resist buoyancy forces. Precast concrete will also be evaluated to determine if it is a suitable alternative to cast-in-place concrete.

To ensure some level of thermal insulation, the exterior walls will be covered with 50 mm of polystyrene insulation at soil level to a depth of 2.5 m.

##### Interior Walls

The interior walls are to be constructed of cast-in-place concrete, and designed to withstand unbalanced load conditions from the varying water levels in the chambers. During detailed design, precast concrete will be included where possible.

##### Pump Station Floor Slab

The floor slab is to be constructed of cast-in-place concrete, and supported by the chamber walls and additional beams as required. The floor slab will be designed to support the loads from the walls, the equipment in the building, and vehicles in loading areas.

A hardener will be applied to the floor slab, and the floor will be sloped to drains. Structural supports for piping and equipment will be anchored to the floor slab and designed to accommodate the mass of the objects as well as vibration and thrust forces where necessary.

### 4.2.3.4 Pump Station Superstructure

#### Framing

The pump station superstructure will consist of pre-engineered steel frame construction with steel girts as secondary members. The roof framing will consist of steel purlins and metal deck. The steel frame is to support the roof as well as a travelling crane.

The travelling crane is to be mounted at the necessary height, and configured to lift floor level equipment, pipe gallery level equipment, and submerged pumps for transfer to the loading area at the overhead door.

During the detailed design phase, the clearance requirements between the walls and the reach of the travelling crane will be determined to ensure that major equipment intended to be moved with the crane can be accessed by the crane and travel the length of the building. At this time, the location of equipment and/or the walls of the building will be adjusted as necessary.

#### Building Exterior

The building will be insulated and clad with prefinished metal cladding. Above grade exterior walls will be pre-finished metal wall panels having R20 formed in place polyurethane insulation. The roof will be sloped at an angle of 1/12 with R20 insulation minimum and prefinished metal cladding. The exterior walls and roof color system are to match the existing SaskWater's BPNPWSS – East pump station; Sandstone cladding for the exterior walls and Patrician Bronze for the roof.

#### Building Interior

The interior partition walls dividing the pump room from the electrical room will be constructed of masonry block to provide the required fire-resistance rating. It will be founded on a cast-in-place concrete curb. All other interior wall surfaces will be clad with a prefinished liner panel system.

The overhead door will be heavy-duty steel and insulated. Building entrance doors will be insulated steel. Un-insulated steel doors will be used inside the building, except in areas where insulation is required for sound reduction. The door hardware will be of high quality and will match SaskWater's preference.

### **Lifting Equipment**

A travelling crane system will be designed capable of lifting major valves, piping, screen components, and pump motors then conveying them to the truck loading area at the overhead door. Based on the existing SaskWater BPNPWSS – East pump station, the anticipated crane capacity is to be 10 tonnes.

### **Miscellaneous Fabrications**

The miscellaneous fabrications required in the pump station such as platforms, maintenance access cages, hatches and ladders will be designed to be durable, light, and easy to maintain. Ladders will be made out of FRP. Final design will be based on cost and maintenance considerations. Pre-manufactured hatches and ladders will be specified wherever applicable.

## **4.2.4 Process Mechanical**

### **4.2.4.1 Facility General Arrangement**

The general pump station arrangements are provided in drawings 201 through 206 in Appendix G. The general arrangement of the pump station will consist of a concrete substructure containing the intake fore-bay, low lift wet-well, low lift discharge chamber, screening chambers, and high lift pump wells. The low lift pump well floor will be at an elevation of 505.0 m. The screening chamber and high lift pump wells will be at a floor elevation of 507.0 m.

The operating floor level of the superstructure will be at elevation 513.2 m, and the roof peak will extend to an elevation of approximately 522.4 m. All elevations will be confirmed and adjusted as necessary during the design of the facility.

Operating floor level will provide access to vertical turbine pump motors, travelling screen drives, pump discharge valves, pump discharge piping, pressure gauges, interior slide gate actuators, and the electrical room. A single overhead travelling crane will run the entire length of the pump room and allow for removal of submersible low lift pumps, travelling screens, vertical turbine high lift pumps, and large diameter valves. Equipment will be removable from the facility through a coiling overhead door.

### **4.2.4.2 Wet Well Design**

The wet well design for the submersible low lift pumps is based on submersible pump manufacturers' requirements. The shape and size of the wet well will be designed to limit the possibility of vortex formation to prevent cavitation in the pumps. The pump will be

positioned in the wet well to provide good conditions for fish passage through the wet well if any are able to pass through the coarse screen on the intake structure.

The screen wells are based on the design of an existing pump station at the same location. The screen wells for that project were developed using computational fluid dynamics (CFD) modelling to provide even flow over the face of the screens. The even flow will minimize the risk of fish being impinged on the screens.

The wet well design for the high lift pumps is based on Hydraulic Institute Standards. The standards have been developed to limit the possibility of vortices in the flow, which can cause cavitation and imbalance in the operation of the pumps.

### 4.2.4.3 Pumps, Process Valves and Piping

#### Low Lift Pumps

The low lift pumps, shown in drawing 204, will be screw impeller Hidrostal pumps manufactured by Wemco. These pumps are capable of pumping live fish with a very low mortality rate. The pump proposed for the pump station is capable of passing a 229 mm (9 in) diameter sphere. This type of pump was installed at the existing pump station near the proposed site for the new pump station. The pumps operate at a relatively low speed (<600 rpm) to reduce the stress on the fish as they pass through the pump. A suction bell will be installed on the inlet to the pump to provide a smooth flow transition as the water enters the pump. Post-construction monitoring after the first year of operation at the existing station has shown that the pumps are effective in safely passing the fish through the station.

#### Travelling Screens

As shown in drawing 202, two travelling screens will be installed to meet the design capacity of 87 ML/d (3625 m<sup>3</sup>/h). The travelling screens will be installed at an angle of 24 degrees to the incoming flow direction to create a screen sweep velocity for fish diversion. Flow will be conveyed from the low lift pumps into a common channel. The common channel will empty into the two screening chambers. Flow straightening baffles will be installed upstream of the travelling screens to improve the flow pattern through the screens. The flow straightening baffles will help to provide even flow across the entire area of the screen.

Approximately 7 ML/d will sweep across and past the screens to a fish return chamber in each screen chamber. The water will flow up through the chamber downstream of the screens into a common fish return channel. The fish return channel will carry water to a ramp on the south side of the building. The ramp will ensure that fish cannot return into the pump station while minimizing the impact on the fish as they are returned to the lake. A

pipe will be installed in the chamber at the bottom of the ramp to allow the fish to swim back into the lake.

### **Screen Cleaning**

The travelling water screens employ a screen wash system to clear the screen of debris as required. The screens rotate to clean the entire screen area. A cleaning cycle will be initiated based on time or headloss across the screen. A third operating mode is to continuously rotate the screen at a reduced speed. This operating mode can be used during the winter to mitigate the impact of frazil ice.

### **Frazil Ice**

When water is super-cooled (lower than 0 degrees Celsius), small ice crystals (frazil ice) with low buoyancy can form and adhere to surfaces. Intake screen blockage from frazil ice can occur in lake intakes during periods with open water, low temperatures, clear nights and strong winds typically during late fall. Once ice cover is in place, frazil ice is much less likely to form due to the insulating effect of the ice.

Based on discussion with SaskWater, frazil ice has occurred on the travelling screens in the existing pump station on Buffalo Pound Lake.

To prevent or reduce frazil ice formation and blockage on an intake screen, there are several measures that may be taken including heating the screens, physical removal, back flushing, alternative coatings, vibration, and use of an air bubbler system. Based on literature research, there is no one method that has been proven to effectively prevent frazil ice accumulation under all circumstances.

Operational measures that should be taken to mitigate the potential for frazil ice blockage include rotating screens continuously at reduced speed, monitoring raw water temperature, and level differential between the upstream and downstream sides of the screens, lake and intake fore-bay, and reducing intake flow rate when risk is highest for frazil ice formation.

### **High Lift Pumps**

The four identical high lift pumps will be vertical turbine pumps equipped with variable speed drives. Three pumps will be used to provide the maximum pump station capacity, and the fourth will be a redundant pump. The pumps will be installed in two wet well chambers that can be isolated for maintenance. Normally, the isolating gate will be open to allow the chambers to operate as a single component.

The pumps will have discharge connections above the operating floor slab. The discharge piping for each pump will have a pressure gauge, check valve, electrically actuated

butterfly valve and air/vacuum valve. The discharge piping for each pump will connect to a common 750 mm diameter header. A pressure relief valve will be installed on the discharge header. The discharge header will also contain a flow meter, pressure meter and swab launch piping.

### **Isolation Gates**

Slide gates will be utilized for isolation of intake fore-bay, low lift pump wells and vertical turbine pump bays. Slide gates will be operated at floor level using electric actuators. The actuators will have a manual override to operate the gates in the event of an actuator failure.

Stop logs and stop log rails located upstream of the travelling screens will be utilized for infrequent isolating of the screening chambers. Stop logs will be installed instead of a slide gate because a full height opening is required upstream of the travelling screens to provide the correct flow conditions for the screens and fish return.

### **Valves**

The pump station will require various valves including isolation valves, check valves, pressure relief valves, and air release valves.

### **Isolation Valves**

Isolation valves will be in place to isolate system components for service or removal. The isolation valves on each of the vertical turbine pump headers will be electrically actuated butterfly valves. The isolation valves on the main discharge header and pressure relief lines will be butterfly valves. The valves on the discharge header will be electrically actuated. The valves on the pressure relief line will have limit switches to indicate if the valves are open or closed.

### **Check Valves**

Large diameter check valves will be provided on pump discharge lines. Check valves will be spring loaded silent check valves.

### **Pressure Relief Valves**

A pilot operated pressure relief valve will be required within the pump station for relief of potential high pressures in the pump discharge and header piping.

### **Air Release Valves**

Air/vacuum valves will be required on each pump discharge in the pump station and will be provided with isolation valves. The valves will be sized to relieve at a rate equivalent to the maximum pump discharge flow. The air valves on the pump discharges will be surge protection type valves used for vertical turbine pump service.

### **Surge Protection**

Surge protection measures are to be determined during detailed design based on a transient analysis, and incorporated into the raw water supply system as required.

### **Piping**

Piping within the facility will consist of carbon steel pipe. The steel piping wall thickness will be selected during detailed design based on the maximum pressure in the pump station. The piping will be lined and coated with liquid epoxy.

Pipe spools through concrete walls will be carbon steel. Pipe couplings will be provided on the exterior of the building where the pipe spool connects to the raw water pipeline.

A swab launch will be installed in the pump station to facilitate cleaning of the pipeline.

## **4.2.5 Building Mechanical**

Building mechanical components will include plumbing, heating, cooling, ventilation and fire protection systems as well as standby generator sub-systems. A basic schematic showing the primary building mechanical systems is shown on drawing 501 in Appendix G.

Natural gas service will not be provided to the building.

Outdoor design conditions will be as stated in the National Building Code for the area. The winter design temperature is -34°C and the summer design temperature is +32°C with a mean coincident wet bulb (MCWB) temperature of 21°C.

### **4.2.5.1 Plumbing**

Plumbing systems will include a potable water supply, washroom facilities, floor drainage and a waste water storage tank.

Potable water will be backflow protected and distributed to the washroom and to hose reels situated throughout the Pump Room. The washroom will contain a water closet and

lavatory, with hot water provided by single electric water heater. A 7950 L waste water holding tank will be buried outside of the building to collect drainage from the washroom fixtures and washroom floor drain. Pump Room floor drains and condensate drainage from air conditioning equipment will be directed back to pump wells.

Roof drainage will flow overland to the lake.

### 4.2.5.2 Heating, Cooling and Ventilation (HVAC)

Heating, cooling and ventilation will be monitored by the PLC. Where control is provided by the PLC, provisions will be made to allow manual operation in case the PLC is inoperative.

Building heating will be provided by electric heating equipment which will supplement heat rejection from electrical and mechanical equipment. Cooling will be accomplished using mechanical cooling equipment, displacement ventilation or a combination depending on the space requirements. All outside air intakes will be provided with screens or filters to remove insects and other debris.

The Electrical Room winter design temperature for the room will be 15°C, and the summer design temperature will be 30°C. The room will be cooled using air handling units equipped with air cooled mechanical DX cooling. The air handlers will include DX cooling sections, condenser sections, filters and fans, and will be located entirely within the pump station building. The units will be equipped with air side economizers to provide free cooling when outside temperatures are low enough to permit operation.

The Electrical Room will require approximately 110 KW of cooling to overcome heat rejection from electrical equipment as well as other cooling loads in the room. This will be accomplished by operating two of three air handling units, each sized at 50% of the cooling load, thus providing capacity to maintain the summer design temperature with one of the units in standby. An amount of air equal to the incoming make-up air will be transferred from the Electrical Room through dampers into the Pump Room and then exhausted from the building through a motorized relief damper. Air will be transferred from the Electrical Room by a fan into the Generator Room when heating is required in the Generator Room.

The Pump Room winter design temperature will be 15°C, and the summer design temperature will be 37°C. The room will be cooled using outside air displacement ventilation. The maximum ventilation rate will be selected to overcome equipment heat rejection created by three of four pumps operating at maximum capacity. The first stage of cooling will be provided by a continuously operated ventilation fan. Outside air supplied by this fan will be tempered by mixing with return air. An amount of air equal to the incoming make-up air will be exhausted from the building after passing through the pump room. Continuous fan operation will provide air circulation and prevent stratification. The second stage of cooling will be provided by a variable speed exhaust fan drawing in un-tempered

outside air through a louver and damper. Additional fixed speed exhaust fans will be activated as required to maintain room temperature.

The Generator Room will be air cooled by the generator radiator fan with intake and exhaust louvers, complete with recirculation, intake and exhaust modulating dampers set to maintain room temperature between 10°C and 40°C when the generator is operating. Additional room heating and ventilation will be installed to maintain room temperature at 15°C in winter and 35°C in summer when the generator is not operating. Waste heat from the Electrical Room will be provided to the Generator Room by transfer of air.

The Fuel Storage Room will be heated and ventilated to maintain room temperature between 15°C and 37°C. Ventilation air will be transferred from the Pump Room and then exhausted to outside.

The Control Room will be cooled with a split ductless AC system and will be heated by an electric baseboard heater or unit heater. Ventilation air will be transferred from the Electrical Room and then exhausted to outside.

#### **4.2.5.3 Fire Protection**

The fire protection system will include fire extinguishers throughout the building to meet the requirements of the National Building and Fire Codes. Fixed fire suppression will not be included in the building. Indoor fuel storage, if located on the first floor level, is not required by the National Fire Code to be protected. Where rooms are fire rated, fire dampers will be installed as required by the National Fire Code. Air handling equipment and motorized dampers will be interlocked with a fire alarm system to stop air flow.

#### **4.2.5.4 Generator Sub-Systems**

The diesel fuel storage system will be comprised of a day tank located in the Generator Room and a storage tank located in the Fuel Storage Room. The combined tank capacity will be enough to provide a full load run time of at least 24 hours. Both tanks will be of double walled construction. An outside fill box with spill containment will be provided.

### **4.2.6 Electrical**

SaskWater and Associated Engineering met on October 24, 2012 to discuss the requirements for the instrumentation and controls systems. The record of meeting is included in Appendix E. The items have been included in this report where possible. The remaining items will require further investigation during detailed design.

### 4.2.6.1 Site Services

SaskPower will provide a 3 MVA 25kV:4160V utility transformer and underground connection vault. The point-of-delivery will be the secondary terminals of the service transformer.

A concrete-encased underground duct bank will be used for the service cables running from the building to the transformer. Spare ducts will be installed to allow for future expansion.

In the unlikely event that both the generator and utility supply fail at the same time, provision will be made for connection to a trailer-mounted rental back-up generator. A survey of rental equipment will be done to confirm generator and step-up transformer availability.

In order to provide a more reliable electrical system, a redundant set of service cables will be installed. They would be prepared with stress cones, but would not be terminated on lugs. These could be used as well in the future for supply from a new substation.

A station fence should not be required around the electrical gear as there will be no live parts, and the entire facility will be fenced to only allow authorized personnel. The area with electrical equipment should have large crushed rock to limit touch and step potentials in a fault situation.

An underground telephone duct will be installed for SaskTel service conductors from the building to the SaskTel pedestal at the property line.

### 4.2.6.2 Facility Voltage

The large horsepower of the motors exceed the capability of most 600 V drives. The conductors for this size of electrical installation at 600 V would require very large and cumbersome cables. Therefore the design will proceed based upon 4160 V as the facility voltage.

### 4.2.6.3 Standby Power Plant

A diesel standby generator will be included in a separate room that has a two-hour fire separation. It will be sized to handle one-third of the station's pumping capacity, plus lighting, HVAC, and ancillary loads.

The Auto-Transfer Scheme will be closed transition switching to minimize disruption on return to utility power, and during generator testing. Some additional instruments on the 5kV buses are required to accomplish this. Closed transition switching requires that the

generator come into synchronization with the utility and that both are on-line for no longer than 100 ms.

The Auto-Transfer Scheme will normally operate such that when the utility fails, the generator will start and power will switch to the standby source. When stable utility power is again available, switching back to utility power will not occur automatically, but rather from a manual switch operated locally, or from the SCADA system operated remotely.

#### **4.2.6.4 Electrical Distribution**

The distribution system will be housed in a main electrical room where the incoming medium voltage main supply will be terminated in 5 kV switchgear, for distribution to 4160 V loads and transformed to voltages that will be required throughout the pump station.

For enhanced reliability and serviceability, the 5 kV bus will be divided into an A-bus which will handle half the normal loads, and a B-bus which will handle the other half. The standby generator and the feed from the rental generator will come in to a generator bus which can be tied to either the A-bus or B-bus. The switchgear line-up will have rear access for servicing and the breakers will be draw-out types. The added equipment to accomplish this increased reliability is: a backup main breaker and metering section, two 5 kV bus tie breakers, two dry transformers for 600 V supply, and a 600 V bus tie breaker. For enhanced safety, the 5 kV switchgear will be specified as being arc-resistant, and the switches will ground the load equipment when in the open position.

Control power for switchgear will be UPS-backed 120 VDC. This control power will also be provided to the medium voltage VFD's to eliminate nuisance alarms from circuit boards powering down during utility failures.

Although it may not be dictated by building code, it is recommended that the electrical room have a one-hour fire separation. Consideration will also be given to splitting the electrical room into two separate rooms so that if there is a catastrophic fire in one room the other room and its equipment could still be functional.

Equipment will be laid out in the electrical room to facilitate wiring to the motors, adequate working clearances, switchgear rear access, and considerations for personnel protection from arc-flash hazards. As such, it is recommended that the PLC panel(s) be located in a separate control room. Where switchgear is required to be controlled by the operator, provisions will be made to do this remotely, likely through the PLC / HMI system.

The 600 V Motor Control Center and low voltage (600 V) drives will be selected from SaskWater's preferred manufacturer. A non-intelligent MCC will be specified, however the

Ethernet/IP communication data on VFD's will only be used for maintenance and monitoring, and control of the starter or drive will be hard-wired to the PLC.

An electrical coordination study and an arc-flash study will be undertaken. This work will be assigned to the electrical contractor, as all the data from specific electrical equipment is necessary and can only be properly done after shop drawing reviews are completed.

### 4.2.6.5 Medium Voltage Drives

In response to the requirement of variable flow from the pumps, variable frequency drives (VFD) that control the speed of the induction motor will be provided for the pumps. These medium voltage drives are a costly and complex piece of equipment and a detailed specification will be provided so that issues of reliability, pump compatibility, harmonics mitigation, and maintainability are properly addressed. Motor protection relays will be specified to monitor and protect motor vibration and winding and bearing temperatures. The VFDs will be specified to have a communications port for set-up and configuration, along with the vendor's configuration software. Input / Output to the drives will be hard-wired for operation and alarm. The drives will also have Ethernet communications which will aid in remote troubleshooting.

Isolation contactors and motor protection relays will be located in the switchgear feeding the drives. This approach minimizes duplication of functions and floor space requirements.

Drives will be specified to be of the same manufacture as other SaskWater facilities (Toshiba). This will assist maintenance personnel with familiarity with the equipment and will reduce the amount of spare parts required.

Since the pump starters will be VFDs, their power factor will be close to unity and therefore a separate power factor correction system will not be included.

### 4.2.6.6 Wiring Methods

Wiring in the facility will be a combination of surface-mounted PVC conduit for lighting and outlets, and Teck cable in tray for motor conductors. The use of in-slab conduit will be avoided however it may be necessary in order to avoid interference with crane operation and to keep lay-down areas clear.

SaskWater prefers that ample cable length be provided at the pumps to allow for motor removal for servicing pumps, without requiring an electrician to disconnect the motor leads. However for large medium voltage motors with large diameter cables this may not be practical. This will be investigated further during detailed design.

#### 4.2.6.7 Lightning Protection

A surge suppression system will be provided to protect the electrical distribution system from damage due to power surges. The SPD units will be integrated into the switchgear and local panelboards to form a distributed surge suppression system that will provide maximum protection.

Since the building will protrude from the edge of the lake, it may be a target for lightning strikes. It is recommended that a lightning rod array be installed on the roof of the building with proper connection to a ground grid.

#### 4.2.6.8 Lighting

Illumination of the pump room will be with high-bay HID fixtures using metal halide lamps. Since the building will be unoccupied most of the time, the main function of the lighting will be for equipment maintenance tasks. Therefore lighting will be designed to a level of approximately 60 f-c. A few wall-mounted industrial fluorescent fixtures will be provided so a minimal amount of light is provided until the HID's warm up to full brightness.

If the electrical room has a high ceiling, HID high-bay fixtures will be used there as well. The control room will be illuminated using suspended industrial fluorescent fixtures and T8 lamps, or troffer fixtures for a T-bar ceiling. Lighting in the piping gallery will be with vapour-tight fluorescent fixtures rated for damp locations.

Pump bays and wet-wells will have GFCI receptacles located near the access hatches to allow for portable lighting when those areas are serviced.

Exterior lighting will be done with High Pressure Sodium HID wall-pack fixtures. They will be located by doorways and loading docks and will be photo-controlled.

#### 4.2.6.9 Life Safety

Emergency lighting and exit light signage will be provided from dedicated circuits and from a central battery supply in case of power outages, as the function of the generator is for process and not for life safety systems.

A fire alarm system will be included in this facility. A common alarm signal will be tied into the PLC for remote SCADA monitoring.

### 4.2.6.10 Security System

A security system will not be included in the design.

It is recommended that near the end of construction completion, SaskWater would enter into agreement with a security system provider for a design-build package. The electrical contractor should be retained to install conduit and outlet boxes for the security devices.

### 4.2.6.11 Grounding

The soils reports will be examined and used in the design of the electrical system grounding grid. If further investigation is required ground resistance testing will be done. A resistive neutral grounding system will be implemented in order to increase the reliability of the station and to limit the fault currents to a low level in case of a ground fault condition. Locally supported Startco NGR relays will be specified.

Building steel will be tied to the ground grid at main column locations.

## 4.2.7 Instrumentation and Controls

### 4.2.7.1 Instrumentation

The design will include measurements of flows, pressures and levels that are required to properly operate and monitor the pumping station. Other instruments will monitor alarm conditions such as a low building temperature, floor flood condition, HVAC system status, and other abnormalities. The motor protection relays for the large pumps will be monitored for motor bearing temperatures, vibrations, and winding temperatures. Flow and pressure meters are to be Rosemount as requested by SaskWater.

Instrumentation will be hard-wired to the PLC with standard 4-20 mA signals for analog devices and 24 Vdc for digital devices. HART instruments will be used where available.

### 4.2.7.2 System Control Requirements

The programmable logic controller (PLC) and the I/O modules will be designed around the Allen Bradley ControlLogix platform to meet SaskWater's standard for new installations. One PLC will be located in an Area Control Panel (ACP) with an Ethernet read remote rack if required to accommodate additional I/O as requested by SaskWater. All the analog cards will be isolated HART cards.

A spare control cabinet will house "hot" spares that can be swapped into the running system if there is a card failure. This controller will have to be updated separately whenever a programming change is made.

Desktop computers in the office will run FactoryTalk View SE to provide SCADA capabilities. One will be active with the secondary sitting idle in case of a primary SCADA station failure. The additional SCADA station will require manual intervention to be put online and the licensing transferred over as requested by SaskWater. A secondary PanelView HMI will be implemented on the plant floor with capability to control only the critical systems. The operator will be able to leave the station in full automatic or enter semi-auto mode to simulate manual control for portions of the process utilizing the PLC.

The control system design will be implemented to allow the pump station to be operated manually, by use of H-O-A switches, speed pots, and manual valve operators. Manual operation would only be undertaken in extreme circumstances, or for testing and maintenance purposes.

Detailed loop drawings and detailed panel construction drawings will not be included in the design. Rather typical loops and general panel layouts will be provided in the design drawings. A detailed specification will provide the standards of panel construction and will direct the approved panel builder to produce the detailed drawings. Careful review of the submitted shop drawings will be undertaken to ensure the integrity of the control system.

An external UPS will be included to provide PLC, HMI, and instrumentation with back-up power during short periods of utility power interruption.

#### **4.2.7.3 Electric Valve Actuators**

I/O to the actuators will be hardwired.

#### **4.2.7.4 Communications**

The main communications system will be Ethernet/IP using the Rockwell protocol. All I/O is to be hardwired. A modem will be specified to provide dial-up access into the Ethernet/IP LAN for remote programming support.

The design will include provisions for redundant communications to SaskWater's remote monitoring system utilizing a separate PLC and equipment specified by TransGas / SaskWater. In addition, provisions will be made to allow an Ethernet link utilizing Ethernet cell radios to the booster station and mine site if desired.

#### **4.2.7.5 Control Philosophy**

A control system description will be developed as a separate document. This will be done in close consultation with the process engineers and SaskWater, and will form the basis for programming the PLC and HMI.

# 5

## Project Delivery

### 5.1 PROJECT DELIVERY METHOD

The water supplied by this project is a critical component of the end-users' operations. The project schedule must be completed in conjunction with the end-users' project schedules. The projected date for completion of the water supply project is the 1<sup>st</sup> quarter of 2016. The project delivery issues must be considered to ensure the project can be completed to meet the requirements.

Alternative project delivery methods to the traditional design-bid-build method should be evaluated to ensure the schedule can be met. An alternative method may also provide additional benefits, such as more co-operation between the contractor, engineer and owner that would streamline the construction process and provide a better quality end product.

One of the most common alternative delivery methods is construction management. Construction management uses a specialized construction management team, typically a general contractor, which hires sub-trades and manages them to construct the project.

The construction management firm is typically hired based on qualifications rather than on price. The construction management firm becomes part of the project team and can aid with design and constructability reviews. Partnering is a method that can be used with various types of project delivery methods that offers many of the same benefits. The construction manager can review the drawings and often can catch errors, reducing the engineer's and owner's risk.

There are several types of construction management that depend on the arrangement between the construction management firm, owner and engineer. The two most common types of construction management are Construction Manager as Agent and Construction Manager at Risk.

The Construction Manager as Agent represents the owner's interests for a fee and takes bids from multiple sub-trade contractors but does not hold the contract and does not guarantee the costs.

The Construction Manager at Risk takes bids from multiple sub-trade contractors, holds the contracts and guarantees the cost. Normally a guaranteed maximum price is agreed to as part of the contract negotiation. The construction manager then manages the project to not exceed the guaranteed maximum price.

A full evaluation of alternative project delivery methods should be completed early in detailed design. The evaluation can be paired with a risk assessment to mitigate some of the risks associated with the project delivery.

## **5.2 RISK MANAGEMENT**

### **5.2.1 Risk Identification**

There are several risk factors that are inherent in any construction project. These risks include items, such as:

- Contractor qualifications;
- Weather;
- Equipment delivery; and
- Starting complex equipment for the first time.

The location of the project for the intake and pump station and the type of project also incorporate additional risks, such as:

- Regulatory approvals;
- Public acceptance;
- Soil conditions;
- Land procurement; and
- Labour availability.

There are also risks that are directly associated with the specific project requirements. Some of these risks are:

- Operating a new facility;
- Supplying water to a new site and end-user; and
- Reliability of the facility or required level of service.

### **5.2.2 Preliminary Risk Management Discussion**

The project risks should be identified early in the project in order to develop prevention, mitigation, or acceptance strategies to ensure the project is completed efficiently. A complete risk assessment is beyond the scope of this report. If SaskWater wishes to explore the various risk mitigation approaches, we would recommend a risk management workshop be held with all stakeholders to develop the risk management strategies to assist in delivering the project efficiently. A preliminary discussion of the risks based on experience with similar projects in the area is included below.

A significant risk to the success of the project is contractor qualifications. The Saskatchewan construction market is growing due in large part to increased activity in the oil and gas and mining sectors. This has resulted in contractors from outside Saskatchewan bidding on the relatively smaller projects, such as the intake and pump station at Buffalo Pound. The intake and pump station would typically attract contractors that more commonly work on municipal projects, which have different requirements for project delivery than an industrial sector project.

The risk posed by an open tender can be mitigated by using a contractor pre-qualification process before tendering the project. Using a construction management approach would provide similar risk mitigation in that the construction management firm can be selected on ability rather than price. These approaches can reduce the risk of a contractor with lower qualifications being awarded the project but can have impacts on the schedule and cost of the project.

If there are concerns about the contractor's qualifications, the risk can be mitigated by increasing the on-site inspections during construction while the work is being performed. Typically, it is expected that the contractor is capable of performing the work and only minimal inspection is required. The contract documents provide a visual representation of the finished product and define the grade of the items to be installed. The contractor determines the most appropriate methods to achieve the described end product. The on-site inspections usually consist of clarifying conflicts in the contract documents, inspection of the work to confirm it meets the required grade, and providing direction when unforeseen circumstances are encountered. An increased level of on-site inspection can find problems while they are still relatively easy to fix. If more direction is provided to the contractor on-site, it can also lead to a transfer of some risk from the contractor, conflicts between the owner, engineer and contractor, and an increased project cost.

A similar risk is the availability of labour. The increase in large projects in the area can stretch the ability of the labour pool to fill the necessary positions. Contractors in southern Saskatchewan have used temporary camps to house workers and brought in temporary foreign workers to ensure availability of labour to complete the work. The lack of available labour poses a significant risk to the quality and schedule for the project.

Poor weather always poses a risk to any construction project. The intake and site development for this project will require significant earthworks to be completed. These activities are directly impacted by adverse weather conditions. Based on previous experience in the area, the weather will impact the schedule but these delays can be accounted for when developing the overall project schedule and should not be a significant risk to the project.

Another project risk is the availability of equipment that will be installed in the intake and pump station. The intake screens, pumps, variable frequency drives, and switchgear are some items that are relatively specialized equipment. These items are typically sourced from suppliers outside of Saskatchewan and manufactured outside of Canada. The delivery of these items will depend on equipment availability and shipping requirements. From experience on previous projects in the area, the delivery of the equipment can be accommodated within the project schedule.

One of the risks that is mostly beyond the control of the project team is the schedule for regulatory approvals for the project. The federal government is making changes to the regulatory approval process. The changes are to make the process for obtaining the approvals less onerous than the current requirements. The government is also reducing staff levels for the regulatory bodies. The changes in staffing levels and requirements may create some confusion within the regulatory

agencies and delay the process. The risk can be mitigated by presenting the project requirements as early as possible to the regulators.

A significant risk to providing water to the mine site occurs with the commissioning process. There will always be risk in starting up equipment for the first time. The equipment must be installed properly and all related components ready to start for the commissioning process to be performed. For many components, defects in the equipment cannot be determined until this time. As mentioned above, much of the equipment is not a stock item due to its specialized nature. If there are any equipment failures during commissioning, it will take several weeks or several months to repair or replace the equipment. This risk can be mitigated by using qualified contractors, experienced equipment suppliers with local service where possible, and designing the facility with the appropriate level of redundancy to achieve the desired level of service.

The intake and pump station will be supplying water to a new site without any operating experience. The project development process, from a conceptual level to the detailed design, provides opportunity for input and revision to the project requirements. Once the design has been developed, more detailed assessments of the project requirements and how those requirements can be met are able to be determined. Tools such as a hazard and operability assessment (HAZOP) and a system failure modes and effects analysis (SFMEA) can be used to provide a detailed evaluation of the design to ensure it meets the project requirements. These tools can be used to mitigate some of the risks associated with operating a new facility but can lead to changes late in the design process. These changes must be done carefully to ensure they don't lead to construction issues due to the late stage in which they are incorporated.

The HAZOP and SFMEA can also be used to evaluate the requirements for reliability of the station. The preliminary design includes one redundant unit for the major equipment that is more likely to fail, such as an additional low lift pump and VFD, high lift pump and VFD, and air handling unit. The preliminary design also includes provisions for two back-up power supply sources:

- A permanently installed generator and a transformer; and
- Connection for a portable generator.

The required level of reliability should be evaluated during detailed design to ensure the redundancy in the pump station matches the requirements. The amount of available storage at the end user's site must be included in this evaluation. A significant storage volume can reduce the reliability requirement.

The risks during commissioning can be mitigated through planning of the process. The commissioning plan should be prepared during the detailed design phase of the project. The commissioning requirements can then be included with the tender documents. The commissioning documents that can be presented in the tender documents to provide direction to the contractor are:

- Commissioning plan;
- Commissioning task list; and
- Control philosophy or process narrative.

These documents will provide direction to the contractor on what is expected to be accomplished during the commissioning period and still leaves the responsibility for execution of the activities with the contractor. Some initial planning for commissioning of the facility is provided in this section. This should be carried forward into detailed design to prepare a comprehensive commissioning plan.

The commissioning process will require significant co-ordination, even with a detailed plan. The commissioning process works most efficiently when a team approach is followed with the contractor, owner and engineer. The process can be led by the engineer as the party that is most familiar with the system operation at the commissioning stage. In order for the work to be executed, there must be buy-in from the contractor on the commissioning plan. The team approach facilitates communication between all parties. A cohesive team is difficult to create at the end of the project and should be fostered from the beginning. A construction management approach is one method to help develop that relationship as the contractor can have more involvement early in the project. This helps to provide a sense of ownership for the project.

### 5.3 PROCUREMENT

Procurement of equipment before issuing an installation contract is one method of improving the schedule for equipment with long delivery times. It can also be used to determine the equipment that will be supplied in order for the design to be completed around a critical piece of equipment.

For this project, procurement would only be done if required to meet the schedule. The majority of the equipment has relatively short delivery times. The larger components, such as the pumps, travelling screens, motor control centers (MCCs), VFDs, and switchgear have relatively long delivery times but this equipment is not on the critical path for the construction of the pump station and do not need to be installed until the end of the project.

The benefits of procuring equipment before the main construction contract is issued will vary depending on the project delivery method and the timing of the procurement contracts. The early procurement of equipment can create confusion about responsibilities for installation of the equipment between the general contractor and the sub-trades due to the timing and method of including the procured equipment into the construction contract.

### 5.3.1 Electrical Equipment Packaging

The major electrical equipment components that should be considered for procurement are:

- 600 V Motor Control Centre;
- Medium Voltage Switchgear;
- Medium Voltage Variable Frequency Drives; and
- Generator.

### 5.3.2 Process Equipment Packaging

The major process equipment components that should be considered for procurement are:

- Slide gates;
- Pumps; and
- Screens.

The process components do not have unreasonably long delivery times. The majority of the equipment is not required until after the structure is complete. The slide gates do have components that must be installed with the substructure but these components can be manufactured before the gates and can be supplied within a few weeks of shop drawing reviews.

### 5.3.3 Procurement Summary

The project schedule and project delivery method will need to be evaluated with the procurement requirements to determine if there is a net benefit to offset the additional effort required to prepare separate procurement packages.

## 5.4 PUMP TESTING AND COMMISSIONING

It is likely that the lake pump station and booster pump station will be commissioned before the mine is able to receive water. Therefore, the pipeline cannot be fully utilized for commissioning. In order to field test and commission the pumps, alternate methods of managing flow and head will be required during testing and will be incorporated into the design of both facilities.

Tests that need to be completed during pump commissioning include the following:

- Pump control testing, which will involve running pumps at various speeds for various lengths of time;
- Generator load test, which will involve running one or two pumps at the pump station at the equivalent load of one pump running at full speed for approximately 6 hours; and
- Field performance testing, which will involve running each pump to determine approximately 6 points on the pump curve. Typically, the flow range for field performance testing is +/- 25% of the flow at the duty point for each pump. Generally, the test takes 20 - 30 minutes per pump. Field performance testing

may be performed at reduced speed and results may be adjusted to equivalent values at full speed using affinity laws.

It will be difficult to determine the volume of water that will be required for commissioning the pump station and booster pump station. The Buffalo Pound North Pump Station required approximately 5 ML to fill the pipeline and test and commission the pumps. It is estimated that commissioning of the Vale pump station and booster pump station will require approximately 19 ML total which includes approximately 12 ML to fill the pipeline.

Options that were considered for pump commissioning at the lake pump station are:

- Recirculating flow to the fish return chambers via the pressure relief valve (PRV) inside the pump station;
- Installing temporary orifice plates downstream of the pumps and recirculating flow to the fish return chambers around the PRV via the pipeline drain piping;
- Installing a V-notch ball valve on the pipeline drain piping and recirculating flow to the fish return chambers;
- Routing flow through the pipeline to Yara; and
- Installing orifice plates downstream of the pumps and running a temporary discharge pipe to the lake.

### 5.4.1 Intake / Pump Station Commissioning Options

#### Discharge through PRV

In this option the PRV would be set to open at the pressure corresponding to the hydrostatic head from the lake pump station to the top of the Buffalo Pound valley. Flow would be directed through the PRV and recirculated through the fish screening or fish return chambers. In this option, the hydrostatic head that would normally be present when pumping through the pipeline would be simulated by dropping pressure across the PRV. Additional throttling would be required through the butterfly valves in the pump station.

For this option, it is important that the piping downstream of the PRV be routed to the fish screening chambers or fish return rather than the high-lift pump bays in order to avoid irregular flow patterns and air bubbles at the suction end of the pumps.

This option has the following advantages:

- No additional temporary piping valves or orifice plates required;
- PRV has anti-cavitation trim that can handle the large pressure drop across the valve;
- Water recirculated through pump station inlet chamber vs. discharging to lake; and
- PRV will self-modulate to sustain the same pressure upstream of the valve, reducing the amount of modulation required from butterfly valves.

This option has the following disadvantages:

- PRV cannot discharge to the HLP wells otherwise irregular flow patterns and air bubbles could interfere with pump performance;
- Noise in pump station during commissioning due to discharge to fish screening chambers;
- PRV performs a safety function to prevent overpressure. This safety function could be lost if the PRV is adjusted incorrectly during or after commissioning; and
- Alternate method of flow metering required for pump testing.

#### **Discharge through PRV Bypass with Orifice Plates Located on the Pump Discharges**

In this option, temporary orifice plates would be installed downstream of the pumps to provide the majority of the pressure drop required during pump testing and commissioning. Flow would be directed through the pipeline drain piping around the PRV and into the fish screening chambers. Additional throttling would be required using the butterfly valves downstream of the pumps. The PRV would remain in service in this application but would only open if its set point was reached.

This option has the following advantages:

- No additional temporary piping required; and
- Water recirculated through pump station inlet chamber vs. discharging to lake.

This option has the following disadvantages:

- Orifice plates require installation and removal. Pressure tests will have been completed before orifice plate removal. Ideally pressure tests would be performed again; however, there is a cost associated with this;
- Cavitation across the orifice plate has the potential to cause damage to downstream piping;
- PRV and pipeline drain piping cannot discharge to the HLP wells otherwise irregular flow patterns and air bubbles could interfere with pump performance;
- Noise in pump station during commissioning due to discharge to fish screening chambers and cavitation across orifice plates; and / or
- Alternate method of measuring flow required.

#### **Install V-notch Ball Valve on Pipeline Drain Piping to Throttle Flow**

In this option a V-notch ball valve would be installed on the PRV bypass piping. The V-notch ball valve would provide the pressure drop required over the full testing and commissioning range of the pumps. V-notch ball valves are available with anti-cavitation trim.

This option has the following advantages:

- V-notch ball valve is available with noise attenuator;
- Valve is suitable for flow throttling across pump testing range. No throttling required through butterfly valves;
- Valve may remain in service after testing;
- No additional piping required; and
- Water recirculated through pump station inlet chamber vs. discharging to lake.

This option has the following disadvantages:

- Cost of additional valve;
- Noise in pump station during commissioning due to discharge to fish screening chambers; and / or
- Alternate method of measuring flow required.

### **Temporary Piping to Lake with Orifice Plates on Pump Discharge**

This method was used for commissioning the Buffalo Pound North pump station; however, for that application, water was recirculated through the intake structure located on an in-lake spur whereas the temporary piping for this application would discharge directly to the lake.

In this option, temporary orifice plates would be installed downstream of the pumps to provide a majority of the required pressure drop and the butterfly valves downstream of the pumps would be used for additional throttling.

This option has the following advantages:

- PRV discharge can be routed to the high lift pump bays as irregular flows at pump suction ends will not be a concern; and
- Alternate method of flow metering not required as flow will pass through the main flow meter in the pump station.

This option has the following disadvantages:

- Temporary piping and orifice plates required which must be removed after commissioning;
- Potential environmental issues with discharging to lake;
- Cavitation across the orifice plates has the potential to cause damage to downstream piping; and / or
- Noise within pump station due to cavitation across orifice plates.

### **Route Flow through Booster Pump Station and New Pipeline to Yara**

In this option, water would be pumped through the first 20 km of the pipeline to the booster pump station then through the new 400 mm diameter pipeline to Yara. By pumping through the pipeline, the static head and friction loss from the pump station to Yara is applied which eliminates the need for temporary orifice plates or additional valves inside the pump station to provide pressure drop. A moderate amount of throttling will be required from the butterfly valves downstream of the pumps to vary the flow during pump performance testing.

By running water through the flow meter within the booster pump station, SaskWater will be able to bill Yara for the water that is pumped during pump commissioning and testing.

This option requires that the pipeline and booster pump station are in a state to take flow at the time of pump station commissioning. This operation could require coordination between multiple contracts.

The booster pump station is not required to meet the initial demand of the mine site; therefore; there is potential that the booster pump station will not be constructed by the time that the pump station is commissioned.

The flow rate that can be pumped will depend on the demand and available capacity at Yara.

This option has the following advantages:

- Pumping through the pipeline will provide static head. No temporary piping or additional valves required;
- SaskWater may bill Yara for water used in commissioning;
- Minimal noise in pump station during commissioning; and / or
- Alternate method of flow metering not required as flow will pass through the main flow meter in the pump station.

This option has the following disadvantages:

- Pump station commissioning will be dependent on a portion of the pipeline being completed, filled and pressure tested;
- The booster pump station must be ready to handle water. There is potential that the booster pump station will not be constructed by the time that the pump station is commissioned;
- Potential for conflict between contracts; and / or
- Flow rate that can be pumped will depend on the demand and available capacity at Yara.

### Discussion

The recommended option for commissioning the lake pump station is to discharge through the fish screening chambers through the PRV.

With the PRV set at the pressure corresponding to the hydrostatic head to the top of the valley, the PRV will be set to a lower pressure for commissioning than it will be under normal operation. Thus, the PRV will still provide protection from overpressure with this option. Since the PRV will require adjusting in the field, the valve must be adjusted carefully to ensure that it is set properly for commissioning and once it is set for its intended function under normal operation.

PRV is equipped with anti-cavitation trim which allows for a large pressure drop across the valve. The PRV is self-modulating and will sustain a the same differential pressure across the valve over a wide range of flow rates, whereas the pressure drop across the orifice plates will decrease with a decrease in flow which would result in more throttling across butterfly valves.

This option has minimal potential for scheduling conflicts or conflict between contracts as the pumps at the lake pump station can be commissioned independently of the pipeline and booster pump station.

With this option, flow will not pass through the main flow meter within the pump station; therefore, an alternate method of measuring flow during pump testing is required. For this application, a flow conditioning orifice plate by which flow rate can be determined based on the pressure differential across the plate is recommended. With a flow conditioning orifice plate, flow can be measured with up to 0.5 percent accuracy with two pipe diameters of straight run pipe upstream and downstream of the orifice plate.

Alternatively, a Yatesmeter test could be conducted during pump performance testing. A Yatesmeter determines pump efficiency directly by measuring temperature changes in the water upstream and downstream of the pump. The benefit of the Yatesmeter test is that pump efficiency can be measured directly without knowing the brake horsepower of the motor shaft.

With the Yatesmeter test, the flow rate can be back-calculated based on motor curves and input power. However, motor curves do not factor in the additional losses that occur due to the pulse width modulation (PWM) of the power supplied through the VFD. The PWM loss factor could be estimated; however, this would create some uncertainty in the calculation of flow rate. For this reason, it is recommended that flow rate be measured using the differential pressure across a flow conditioning orifice plate and the Yatesmeter test be conducted solely to measure pump efficiency.

# 6

## Summary and Conclusion

SaskWater is considering an expansion to their existing Buffalo Pound Non-Potable Water Supply System (BPNPWSS) – East. The current system consists of two pump stations and their associated pipelines that deliver non-potable water to customers in the Belle Plaine Industrial Corridor.

The expansion to the system will provide additional non-potable water to Yara's site in the Belle Plaine Industrial Corridor as well as the proposed Vale potash mine located near Kronau, SK. The expansion will consist of a lake intake, pump station, pipeline and booster pump station, which will be located near the Belle Plaine Industrial Corridor. The booster pump station will supply the necessary flow and pressure to the mine site near Kronau and lower the pressure requirement for the lake pump station. This report described the preliminary design of the lake intake and pump station. The pipeline and booster pump station preliminary designs are contained in a separate report.

The pump station will have the capacity to provide 87 ML/d (3625 m<sup>3</sup>/h). In order to provide this flow rate and minimize the impact on aquatic life in the lake, the pump station will contain low lift pumps, travelling water screens and high lift pumps. The low lift pumps will raise the water level in the screen chambers to provide sufficient screen surface area to maintain an approach velocity less than 0.038 m/s.

The high lift pumps will be vertical turbine pumps to provide the necessary flow and pressure to the Belle Plaine Industrial Corridor. The pumps will all be driven by variable frequency drives in order to adjust the flow rate to match the customer's demands.

The VFDs and other electrical equipment to run the station will all be housed in a separate electrical room. The supply voltage for the high lift pumps will be 4160 V, which will increase the hazard level in the electrical room. A diesel powered generator will be installed in the pump station to provide power in the event of a utility power failure.

Mechanical cooling will be provided for the electrical room to provide the appropriate operating temperature for the electrical equipment. The mechanical equipment will be installed on a mezzanine above the electrical room.

The pump station will also contain a separate room for an office and control room for the station operators. The pump station substructure will consist of concrete wet wells in the pump area with a concrete slab for the operating floor. The electrical room and generator portion of the station will be supported by concrete piles. The pump station superstructure will consist of pre-engineered steel frame construction with steel stud walls.

## 6.1 PRELIMINARY CAPITAL COST ESTIMATE

The capital cost estimate for the intake and pump station based on the information developed for the preliminary design is summarized in Table 6-1. The cost estimate was developed using quotes from vendors, costs from previous similar projects, and other cost reference sources, such as RS Means. A breakdown of the cost estimate is included in Appendix F. The total cost estimate has been compared with similar recent projects in the area to verify the accuracy of the estimate. This estimate is considered to be a Class 3 estimate with an accuracy of – 10% to + 20% based on a 30% level of project development.

**Table 6-1**  
**Capital Cost Estimate for Intake and Pump Station**

Division No.	Division	Estimate
1	General Requirements	\$ 4,410,000
2	Sitework	\$ 5,580,000
3	Concrete	\$ 3,780,000
4	Masonry	\$ 110,000
5	Metals	\$ 900,000
7	Thermal and Moisture Protection	\$ 20,000
8	Doors and Windows	\$ 30,000
9	Finishes	\$ 20,000
10	Miscellaneous Furnishings	\$ 20,000
11	Process Mechanical	\$ 3,990,000
13	Instrumentation and Controls	\$ 760,000
14	Conveying Systems	\$ 100,000
15	Mechanical	\$ 810,000
16	Electrical	\$ 4,910,000
	<b>Sub-Total</b>	<b>\$ 25,450,000</b>
	Contingency Allowance	\$ 5,090,000
	<b>Sub-Total</b>	<b>\$ 30,540,000</b>
	Engineering	\$ 4,590,000
	Project Management	\$ 1,530,000
	<b>Sub-Total</b>	<b>\$ 36,660,000</b>
	PST (5%)	\$ 1,530,000
	<b>TOTAL ESTIMATED COST: (excluding GST)</b>	<b>\$ 38,190,000</b>

The total capital cost for the intake and pump station is estimated to be \$38.2 million based on the design information that has been developed to this date. The total includes provincial sales tax and engineering costs.

A contingency of 20% has been added to the capital cost estimate. This contingency amount is higher than the 15% that is typically used at a preliminary design level due to the higher level of uncertainty associated with the relatively remote location and the environmental protection requirements.

Due to the complexity of the project, the majority of the contractors bidding on this project will be based in Regina or Saskatoon. The contractors from out of the immediate area would use Moose Jaw as a temporary location for their project staff. This would result in higher costs for travel and accommodations to the site.

The environmental protection requirements are still in the early stages of development. Based on experience with previous projects in the area, there will be significant work required for fish habitat compensation, erosion control and other work to mitigate the impact on the environment. There will also be significant time required to work with the regulators to discuss the impact on the environment and ensure that the mitigation measures are appropriate. The costs associated with this work will be developed during the detailed design phase.

The construction market in Saskatchewan is currently relatively volatile. There are several large projects in the southern area that have been keeping the industry busy. At the same time, there was a decrease in construction activity in other provinces that resulted in contractors from Alberta and British Columbia bidding in Saskatchewan on projects similar to this one. This influx of contractors increased the volatility in bid prices for some projects. Construction activity in Alberta is increasing again, which may reduce the number of out-of-province bidders. The high amount of work in southern Saskatchewan may increase the bid prices, due to the lack of availability from contractors. This could also impact the construction schedule.

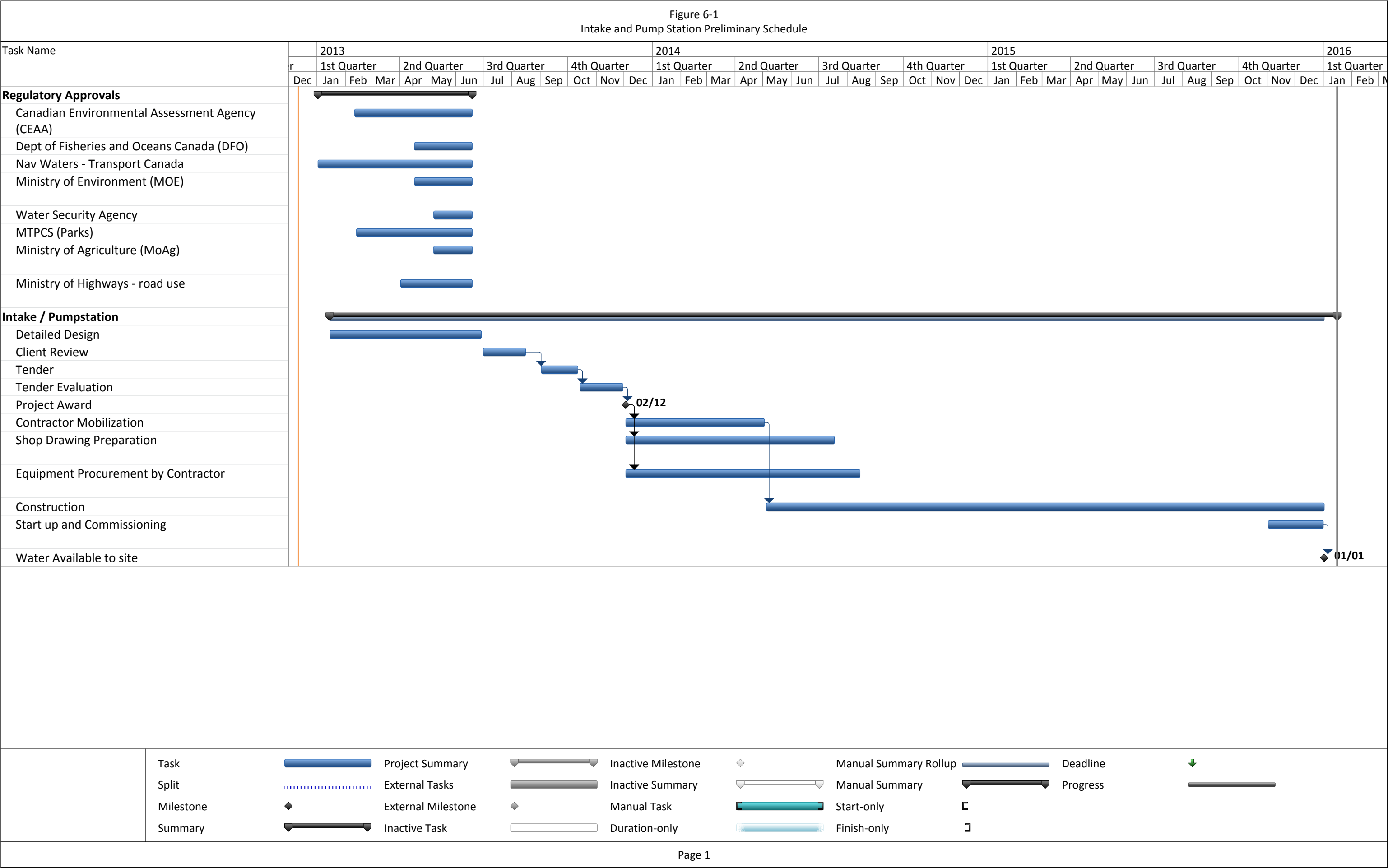
### 6.2 PROJECT DELIVERY SCHEDULE

Based on our experience with similar projects in the area, construction of the intake and pump station would take 18 to 20 months from the time of the contractor's mobilization to completion of commissioning. The estimated schedule for completion of the intake and pump station is included in Figure 6-1. In order for the pump station to be ready by the first quarter of 2016, the project should be tendered in the second quarter of 2014 at the latest. The estimated schedule for the project is included graphically in a GANTT chart at the end of this section. The schedule was prepared based on construction duration for similar projects in the area with some additional time added to account for possible delays. The required water delivery date of the first quarter of 2016 provides some flexibility in the schedule.

The tender prices and contractor availability would likely be the best if the project is tendered early in the fourth quarter of 2013 due to the seasonal nature of construction in Saskatchewan. Tendering the project early in the fourth quarter would allow the prices to be received before the year ends. The project could then be awarded early in the first quarter of 2014. This timing would provide the contractor sufficient time to mobilize and be ready to begin the site work as soon as the ground conditions are favourable.

In order to have the project tendered early in the fourth quarter of 2013, the design must be completed before the end of the third quarter. This schedule could be met if detailed design begins early in 2013. The schedule described above would eliminate the requirement for separate procurement packages for equipment in order to meet the schedule. This would simplify the tendering process and have all items as a single responsibility to one contractor.





# REPORT

## Certification Page



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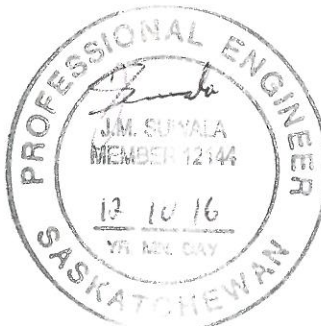
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Electrical	6705	[Signature]
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ASSOCIATED ENGINEERING QUALITY MANAGEMENT SIGN-OFF	
Signature:	<u>Colt Halliell</u>
Date:	<u>Dec. 12/12</u>



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# A

## Appendix A - Design Basis Checklists

**Design Basis Check List**  
**VALE Intake / Pump Station**  
**Rev. 3 November, 2012**

## 1 CAD DRAWINGS

Category	Response or Reference
Drawing Size	22 x 34 (D size)
Title Block	Associated Engineering c/w SaskWater logo
Drawing Numbers	SaskWater to provide
AutoCad (3D/2D) & Revit (3D)	3D Model used to generate drawings
Final Quantity	TBD
Stamp Drawings	Issued for Tender and Construction

## 2 CIVIL

### 2.1 INFORMATION

Category	Response or Reference
Geotechnical Assessment	Golder – TBD
Survey	Associated Engineering. Utilize existing topographical survey data from BPNPWSS-East (Mosaic)
Environmental Assessment	Golder – TBD

### 2.2 SURVEY

Category	Response or Reference
Legal Survey	To be completed following construction
Horizontal Control	UTM, Ground – BMs
Vertical Control	Geodetic
Site Bench Mark	Existing from BPNPWSS - East
Coordinate System	UTM – Ground
Existing Utility Layout	Locates required (existing drawings, drawings from utility agencies)

## 2.3 ROAD/SITE ACCESS

Category	Response or Reference
Site Access	Permanent paved site access from Sask Highways roadway in the Provincial Park. Gravelled access roadway and turnaround area for pump station.
Service Expectation	Maintenance truck, tandem truck, mobile crane for equipment removal
Vehicle Load Rating	Match existing (Industrial road)
Surface	Gravel base with crushed rock

## 2.4 SITE WORK

Category	Response or Reference
Signage Required	Construction Signage meeting Sask Highways requirements.
Landscaping	Gravelled surface for vehicle access areas.
Seeding	Grass seed disturbed areas outside vehicle areas
Grass Type	Native seed mix (Golder to provide recommendation)
Laydown Area	TBD
Waste Area	Waste excavation to be hauled off site
Fencing	Chain link to match existing c/w barbed wire
Grading – Building	Standard grade. Door aprons flush with finished floor and 150 mm above grade
Grading – Site	TBD
Overflow Drainage Path	Utilize existing major drainage features. Drain to lake and existing highway ditch.
Building Drainage (Sanitary)	To holding tank - TBD
Reservoir Foundation Underdrain	TBD
Backfill Type & Description	Golder geotechnical report
Sub Station Requirements	TBD

## 2.5 UNDERGROUND UTILITIES

Category	Response or Reference
Tie-ins to Existing	TBD
Underground Elec. Vault/Duct Bank	TBD
Cathodic Protection	Cathodic protection system required for steel intake conduit to match existing (BPNPWSS-East – Mosaic) Electronically isolate building piping connections for raw water supply pipeline, and intake conduit.
Tie-ins for Future	TBD
Sub-Drainage (Construction)	Site dewatering required
Intake Conduit	1350 mm diameter (for 95 ML/d). Steel, Cement Mortar line, Polyurethane coated. 0.76 m/s conduit velocity.
Fish Return Line	500 mm diameter, HDPE DR 13.5
Screenings Wash Water Line	250 mm diameter, HDPE DR 13.5
Yard Piping – Sanitary	TBD
Bedding Criteria	Granular (AE std for pipe surround)
Compaction Criteria	98%

## 2.6 INTAKE STRUCTURE

Category	Response or Reference
Design Characteristics	Match existing (BPNPWSS – East)
Entrance Velocity	0.13 m/s
Lake Bottom El.	507.00 m
Bottom of Port El.	507.30 m
Top of Port El.	507.65 m
Top of Intake El.	507.80 m
Bar Screen Opening	75 mm spacing

### 3 STRUCTURAL

#### 3.1 STANDARDS/INFORMATION

Category	Response or Reference
Building Code	National Building Code of Canada (2010)
Concrete Design	CSA A23.3 supplemented by British Standards Code 8007 for Crack Control in Water Retaining Areas
Concrete Construction	CSA A23.1
Structural Steel	CSA S16.1
Masonry	CSA S304.1
Control Joints	Before placing new concrete on hardened concrete, retighten forms, roughen the surface of hardened concrete, remove laitance and saturate the surface with water in advance of concreting
Buoyancy	TBD after receipt of Geotechnical Report
Shoring	Fabricate and erect formwork in accordance with CAN/CSA-S269.3 Minimum periods of time after placing concrete: 1: 7 days for walls and sides of beams 2: 14 days for beam soffits, slabs, decks and other structural members 3: Time intervals given are the cumulative number of days during which temperature of air in contact higher than 10°C and concrete has been damp 4: Time for walls and beam side forms may be reduced to 3 days if acceptable curing and cold weather protection is provided. Submit to Engineer for review
Dewatering	TBD after receipt of Geotechnical Report
Earth Pressure Coefficients	TBD after receipt of Geotechnical Report
Modulus of Subgrade Reaction	TBD after receipt of Geotechnical Report
Allowable Net Bearing Capacity	TBD after receipt of Geotechnical Report
Site Classification (Seismic Analysis)	TBD after receipt of Geotechnical Report
Roof Loading	Specified live load due to snow $S=1.5$ kPa ( $S_s=1.4$ kPa; $S_r=0.1$ kPa), superimposed dead load=1.0 kPa, collateral load= 1kPa (minimum)*

### 3.2 PUMP STATION STRUCTURE

Category	Response or Reference
Dimensions	TBD
Foundation	Recommended by Geotechnical Consultant
Floor Elevation	TBD
Floor Slope	Localized slope to drain
Foundation Insulation	50 mm thick by 2500 mm typical Expanded polystyrene: closed-cell, extruded with a smooth, high density skin, manufactured to CGSB 51-GP-20M and/or CAN/ULC-S701, Type 3 or 4
Drainage	No weeping tile. Roof drainage overland
Paving	TBD
Building Structure	Pre-Engineered building steel frame
Exterior Curb Size	200 mm x 400 mm c/w painted plywood/steel siding
Exterior Walls (Insulation Value)	Pre-finished insulated metal wall panels having R20 formed in place polyurethane insulation, ribbed exterior profile (colour: Sandstone) and flat interior surface (colour: Regal White)
Interior Walls	Concrete masonry units (colour: Deer Feather)
Fire Rating	TBD
Mezzanine	0.76 thick Composite Metal Deck C/W 100 concrete R/W 10M@300 each way with OWSJ
Electrical Room	Fire separation having a fire-resistance rating not less than 1 hr. See NBC clause 3.6.2.1.6
Office Control Room	65 mm Acoustical batt insulation full height, 13 mm air gap, 2 layers 13 mm gypsum board on control room side
Guard Rails	150 mm high toe kick, 1050 mm total height, steel pipe. (colour: Mid/National Blue)
Roof	R20 insulation and prefinished metal cladding (colour: Patrician Bronze)
Roof Support	Pre-Engineered framing
Roof Insulation Value	R20
Roof Drainage	Monoslope to eave trough and downspouts (colour: Patrician Bronze)
Roof Hatches	2 hatches over the traveling screens

Category	Response or Reference
Ladders	All material shall be FRP (colour: yellow)
Grating	Use FRP if capable of resisting overweight loads otherwise use galvanized steel
Floor Drains	Discharge to holding tank
Sumps	900 mm x 900 mm with 15 M @ 1200 at each corner typically for each sump. Located in Intake Forebay, Low Lift Pump Well 1 and 2, Low Lift Discharge Chamber, Screen Chamber 1 and 2, High Lift Pump Well 1 and 2
Pump Support	The mass of the foundation should be 5 times that of the pumping equipment. See Appendix A of ANSI/HI 2.4-2008
Process, Electrical, Building Mech	TBD Floor/Wall Penetrations, Thrust blocks, Pipe Supports, Equipment weights
Power Generation	TBD Fire requirement, day tank, vibration characteristics. Generator room 1 hr fire separation.
Transformer Pad	Underground vault required
Energy Recovery	TBD
Duct Bank	Concrete encased
Overhead Crane Capacity	TBD
Crane Reach Requirement	Pump room : travelling screens, high lift pumps, low lift pumps, stop logs
Equipment Access	TBD
Overhead Door Specs	TBD
Door Hardware	Manufacture hollow metal frames, doors and panels in accordance with the "Canadian Manufacturing Standards for Metal Doors and Frames"
Bollards, Sidewalk, Access Apron	TBD

### 3.3 MATERIAL SPECIFICATION

Category	Response or Reference
Concrete for Foundation and in contact with Ground	32 MPa at 28 days or 56 days using Sulphate Resistant Cement
Concrete not in contact with Ground	32 MPa at 28 days or 56 days using general use cement

Category	Response or Reference
Reinforcing Steel	Grade 400R. Grade 400W for beam and column stirrups
Waterstop	150 mm wide PVC Arctic Grade, bentonite waterstop
Floor Hardener	TBD
Chemical Waterproofing	Not required

### 3.4 FINISHES

Category	Response or Reference
Formed Surfaces in contact with liquid	Sack rub finish
Floor Slab	Steel Trowelled
Exposed Vertical Interior Surfaces in Dry Areas	Paint - Deer Feather White
Exposed Vertical Exterior Surfaces	Smooth Form Finish
Concealed Vertical Surfaces	Rough Form Finish
Corners	20 mm Chamfered edges

## 4 PROCESS MECHANICAL

### 4.1 PUMP STATION CAPACITY

Category	Response or Reference
Intake Capacity	1,087 L/s (3,913 m <sup>3</sup> /h)
Firm Pumping Capacity	1,007 L/s (3,625 m <sup>3</sup> /h)
Fish Return Flow	80 L/s (288 m <sup>3</sup> /h)
Minimum Required Flow (Mine Site)	278 L/s (1,000 m <sup>3</sup> /h)
Operating Pressure	1200 kPa (175 psi)
Maximum Operating Pressure	1400 kPa (205 psi)
Pressure Relief Valve Setting	1590 kPa (230 psi)
Minimum Lake Level	507.00 m
Delivery Pressure at Booster Station	200 kPa (29 psi)

## 4.2 PIPING

Category	Response or Reference
Material	Steel
Design Pressure	2070 kPa (300 psi)
Dismantling Joints	Flanges and Sleeve type couplings with restraint harnesses
Flange Class	ANSI B16.5 Class 300
Gaskets	Spiral Wound (Flexitallic style CG)
Max Design Velocity	3 m/s
Test Pressure	2070 kPa (300 psi)

## 4.3 VALVING

### 4.3.1 Butterfly Valves

Category	Response or Reference
Application	Isolation valves upstream of the swab launch, i.e for pump discharge, pressure relief valve, drains, header isolation
Material	Body: Carbon Steel Disc: Stainless Steel
Pressure Class	High performance valves to full ANSI B16.5 Class 300 Pressure Rating
Connections	Lugged style
Flange Class	ANSI B16.5 Class 300
Electric Actuators	For all pump discharge valves, including the low flow pump Any valve on the main process lines greater than 400 mm diameter

### 4.3.2 Check Valves

Category	Response or Reference
Application	Pump Discharge
Material	Body: Ductile Iron
Pressure Rating	2070 kPa (300 psi)
Connections	Flanged
Flange Class	ANSI B16.5 Class 300
Type	Silent Check Valve

#### 4.3.3 Knife Gate Valves

Category	Response or Reference
Application	Isolation downstream of swab launch
Material	Body: Stainless Steel Disc: Stainless Steel
Pressure Class	To full ANSI B16.5 Class 300 Pressure Rating
Connections	Flanges
Flange Class	ANSI B16.5 Class 300
Actuators	Valves greater than 400 mm diameter

#### 4.3.4 Valve Actuators

Category	Response or Reference
Manufacturers	EIM, Rotork
Power Supply	208 V, 3 phase, 60 Hz
Fail Safe	Fail last position

### 4.4 PUMPS

#### 4.4.1 Low Lift Pumps

Category	Response or Reference
Number of Pumps	Three
Pump Type	Submersible
Capacity	550 L/s @ 8 m
Solids Handling Capabilities	Maximum solids – 229 mm (9 inch) sphere Capable of pumping live fish with less than 5% mortality
VFD Driven	Yes
Motor Size	70 kW (95 hp)
Maximum Speed	600 rpm
Power Supply	600 V, 3 phase, 60 Hz
Motor Protection	Temperature sensor Leak detection

#### 4.4.2 High Lift Pumps

Category	Response or Reference
Number of Pumps	Four (3 duty and 1 standby)
Pump Type	Vertical Turbine
Capacity	340 L/s @ 140 m
VFD Driven	Yes
Motor Size	670 kW (900 hp)
Power Supply	4160 V, 3 phase
Motor Protection	Bearing Temperatures Winding Temperatures
Vibration Monitoring	Four sensors: two mounted on the top of the motor and two mounted at the bottom
Space Heater Required	Yes

#### 4.5 SCREENING

Category	Response or Reference
Number of Screens	Two
Screen Type	Vertical Travelling Water Screens
Capacity	763 L/s
Screen Opening Size	2.54 mm
Screen Approach Velocity	0.038 m/s
Required Total Screen Area	21.2 m <sup>2</sup>
Screen Width	3.66 m
Screen Bay Depth	5.0 m

### 5 BUILDING MECHANICAL

#### 5.1 PLANT UTILITIES SUPPLIED TO PLANT

Category	Response or Reference
Potable Water Supply	TBD
Natural Gas Supply	Not required

#### 5.2 PLUMBING

Category	Response or Reference
Plumbing Fixtures	TBD, Washroom w/ water closet & lavatory
Roof Drainage	Outside to grade

Category	Response or Reference
Sanitary Sewer	Underground storage tank, Capacity TBD
Plant Service Water	Independent pressure system (or PW if supplied to plant)
Hose Bibs	Pump room – wash down water
Plant Air	TBD
Chemical Dosing	TBD
Safety Shower / Eye wash	TBD
Safety Shower Water Tempering	TBD

### 5.3 HVAC

Category	Response or Reference
Heating	Electric unit heaters
Air Conditioning	Air cooled mechanical DX cooling
Ventilation	Air Displacement
Minimum Ventilation Rates	per ASHRAE for occupancy
Max / Min Allowable Temperature: Pump Room	TBD
Max / Min Allowable Temperature: Electrical Room	TBD
Max / Min Allowable Temperature: Office / Control Room	TBD
Heat Recovery / Energy Conservation	Transfer of waste heat to areas requiring heat
HVAC Controls	Combination of local control and PLC
Local Electrical Disconnects on Equip.	Yes
Preferred Equipment Vendors	TBD
Exterior Noise Criteria	TBD

### 5.4 FIRE PROTECTION

Category	Response or Reference
Plant Fire Protection	Fire extinguishers per NBC and NFC
Electrical Room Fire Suppression	TBD

## 5.5 EMERGENCY GENERATOR

Category	Response or Reference
Generator and Fuel System	per Electrical Section

## 6 ELECTRICAL

### 6.1 POWER DISTRIBUTION

Category	Response or Reference
Frequency	60 Hz
Fractional Hp Motors $\leq \frac{1}{2}$ HP	120 Vac 1 – ph
Valve Actuators	208 Vac 3 – ph
Medium Motors 3 ph to 250 HP	575 Vac 3 – ph
Large Motors > 250 Hp	4160 Vac 3 - ph
Short-Circuit Analysis	ETAP study
Lighting Voltage	347 V – High bay, 120 Vac other
Direct Lightning Building Protection	Yes
Electrical Service Lightning Protection	Yes

### 6.2 25KV SWITCH GEAR & UTILITY SERVICE

Category	Response or Reference
Main Circuit Breaker	TBD
Utility Service	TBD
Utility Service Metering	TBD
Arc-Flash Resistant	Yes
Servicing Requirements	TBD

### 6.3 TRANSFORMER

Category	Response or Reference
Oil Filled	TBD – utility or customer owned
Type	

#### 6.4 4160V SWITCH GEAR

Category	Response or Reference
Main Circuit Breaker	
Automatic Transfer Scheme	Closed Transition
Breakers and Switches	Remote operable
Arc-flash Resistant	Yes
Servicing Requirements	Split Bus for de-energized servicing
Protection Relays	Communications – Modbus TCP
Variable Frequency Drives	Meet IEE519 for harmonics, generator compatible

#### 6.5 EMERGENCY GENERATOR

Category	Response or Reference
What Equipment	Sized for 1/3 of station capacity
Prime Mover Type	Diesel Engine
Auto or Manual Restart	Auto
Inrush Control	
Fuel Storage Capacity	2 days
Fuel Storage Type	
Day Tank Capacity	2 hours
Cooling	Remote Radiator, TBD
Communication	Hardwired and communication Modbus TCP

#### 6.6 600V MCCS

Category	Response or Reference
Horiz Bus Rating	
Vert Bus Rating	
Neutral Bus	No
Feeder Entry Point	Main 600 v 13kv
Breakers	
Intelligent Overload	Yes – Devicenet or Ethernet IP
Magnetic Trip	
Lockout Location	Combination starter
Additional Lockouts	
Nema Rating	Yes
Preferred Manufacturer	AB Centerline Intellicenter
Manual Control	Yes
Surge Protection	Yes

Category	Response or Reference
Low Lift Pump VFD's	One spare – bucket change-out – no auto switch-over

#### 6.7 METERS

Category	Response or Reference
Power Monitors in all MCCs	In 5 kV Switchgear
Voltage	
Current	
kW & kVa	
Demand	
Power Factor	
Harmonics	
Separate DPM for 600V MCC	Not required
Vibration Monitoring	By PLC, 4 per pump / motor

#### 6.8 WIRING

Category	Response or Reference
Type	Teck or RW90
Cable Tray	Hot dipped galvanized
Conduit	PVC
Duct Bank	Underground concrete encased
Spares	
Materials	
Shielding	For 5kV cables to VFD's and where non-armored
Support Spacing	

## 6.9 MOTORS

Category	Response or Reference
Service Factor 1.15	
Efficiency	NEMA Premium
RTD	6 in stator, 1 on each bearing
TEFC	In wet locations
Quality Standard	NEMA MG-1
Connection Boxes	Extra Large
Insulation	Class F
Duty	Inverter Duty – Continuous
Include	Non-reverse ratchet

## 6.10 GROUNDING

Category	Response or Reference
Preference	Study required
Driven Rod	Study required
Concrete Encased	Study required
High Resistance Neutral Grounding	Yes
Sub-Station Grounding	TBD
Lightning Protection	Yes

## 6.11 LIGHTING

Category	Response or Reference
High Bay	Metal Halide – Pulse Start Ballasts
Exterior	HPS or LED
Flood	Metal Halide – Pulse Start ballasts
Control Room	T8 lamps – Prog start ballasts
Fluorescent	T8 lamps – Prog start ballasts
Site Lighting Criteria	
Controls	
-Photocell	Yes - exterior
-Manual Switch	
-Motion Sensor	
Emergency Lighting	Yes – Generator is not for life safety
Exit Lighting	LED

## 6.12 CATHODIC PROTECTION (COORDINATE WITH CIVIL)

Category	Response or Reference
Sacrificial Anode	
Test Leads	
Impressed Current	
Test Stations	

## 6.13 COMMUNICATIONS

Category	Response or Reference
Telephone	Yes
Fibre	Between 2 PLC processor racks
Wireless Ethernet	Yes, cellular
DeviceNet	Yes
Intercom	No

## 6.14 SECURITY SYSTEM

Category	Response or Reference
Third Party Design Build	
Card Access or Fob Access	Rough-in only
CCTV	No
Rough-in by Electrical	Yes
Access Detection	Rough-in only

## 6.15 FIRE ALARM SYSTEM

Category	Response or Reference
Building Code Requirements	Included for client preference
SCADA Requirements	Tie in

# 7 INSTRUMENTATION

## 7.1 CONTROL PHILOSOPHY

Category	Response or Reference
DCS	No
SCADA	Yes, Platform: Rockwell FactoryTalk View SE
SCADA Servers	2 parallel PCs to provide redundancy, 1 desktop server and 1 panel mount

Category	Response or Reference
PLC	Yes, Platform: Allen Bradley ControlLogix
Topology & Protocol	Ethernet/IP, DeviceNet, Hard Wired I/O
Valve Actuation	Electric, I/O via DeviceNet
Duplication of Control Screens	Yes, but SaskWater SCADA doing other half
Local Operator Panel	Yes
Interlock Philosophy	Fail Safe
Instrumentation Power	24 Vdc
Hard-Wired Analog I/O	4-20 mA
Hard-Wired Digital I/O	24 Vdc
Communication Type	Ethernet/IP and DeviceNet
Equipment Connection Type	Hard Wired or Communications listed above
PlantPAx Version	
I/O & Equipment Naming Standard	AE
Controls Access	Remote via phone line
Soft Operator Mode Through PLC Required?	Yes
Analog Instruments HART Enabled	Yes
HART Analog Cards	Yes
Redundant Controllers	Yes
Redundant Communications	Yes to SaskWater SCADA
ControlNet Between Remote Racks	Yes
HVAC Control on PLC	Yes
Load Shedding by PLC While on Standby Power	
UPS	Yes, one for each ACP

## 7.2 P&ID NOMENCLATURE

Category	Response or Reference
Client Standard	AE
Instrumentation Loop Nomenclature	AE
Piping Nomenclature	AE
Equipment Nomenclature	AE
Valve Actuation	Electric

## 7.3 PROCESS NARRATIVE

Category	Response or Reference
Process Narrative	To be developed during preliminary design

# B Appendix B - Site Evaluation Memorandum



**Date:** June 20, 2012 **File:** 2012-4093.00.E.03.00  
**To:** Chris Robart P.Eng  
**From:** Darin Schindel PMP, A.Sc.T., CCCA  
**Project:** BPNPWSS – East (Vale) Expansion  
**Subject:** Intake Pump Station Site Evaluation, Revision 1

## MEMO

### Project Overview

SaskWater's BPNPWSS - East currently supplies non-potable water from Buffalo Pound Lake to several customers in what is designated as the Belle Plain Industrial Corridor located between Moose Jaw and Regina. SaskWater operates two pump stations on the south shore of Buffalo Pound Lake within the Buffalo Pound Provincial Park to supply their current customers in the Industrial Corridor. The pump stations are located near the Buffalo Paddock at the southeast corner of the lake.

SaskWater is considering an expansion of the Buffalo Pound Non-Potable Water Supply System (BPNPWSS) – East to supply non-potable water to an end-user located near Kronau. The system expansion will consist of a new intake and pump station at Buffalo Pound Lake with a pipeline from Buffalo Pound Lake to the end-user's site to deliver water to the end user. A booster station will be constructed along the pipeline route.

### Site Evaluation

On Friday May 25, 2012, Darin Schindel, Greg Schmidt (Associated Engineering), Phil Bruch, and Brian Christensen (Golder Associates) met Marty Shaw (SaskWater) at the existing Buffalo Pound Non-Potable Water Supply System (BPNPWSS) – East Pump Station to view possible sites for the expansion of the system. Nine sites were examined as possible locations for development of the new intake and pump station to provide water to the Vale mine as well as users in the Belle Plaine corridor. These sites are shown on the attached overall site plan map. The sites are numbered from one to nine from east to west.

Six possible sites along the south shore of Buffalo Pound Lake between the existing BPNPWSS - East pump station and the Buffalo Pound Water Treatment Plant (BPWTP) raw water pump station were identified from satellite imagery (Areas 4, 5, 6, 7, 8 & 9):

- Area 4 - Grassy area about 500 m west of the existing pump stations.
- Area 5 - Western edge of the point that extends into the lake, located about 900 m northwest of the existing pump stations.
- Area 6 - Eastern edge of the point that extends into the lake, located about 1500 m northwest of the existing pump stations.
- Area 7 - Western edge of the point that extends into the lake, located about 1500 m northwest of the existing pump stations.
- Area 8 - Grassy area about 2200 m northwest of the existing pump stations.
- Area 9 - Grassy area about 150 m southeast of the BPWTP plant intake.

Three additional possible sites at the existing BP East pump station were also viewed in addition to the sites identified by the satellite imagery in order to perform a complete analysis of all site options (Areas 1, 2, 3):

- Area 1 - Immediately east of the Mosaic (1960s) pump station.



Memo To: Chris Robart P.Eng

June 20, 2012, Revision 1

- 2 -

- Area 2 - About 10 m south of the existing BP East pump station to provide sufficient separation for a traffic corridor between the two stations in the driving/parking area of the existing SaskWater (Mosaic) pump station.
- Area 3 - West of the existing SaskWater pump station that provides water to Yara at the location of the existing park road.

A site survey was performed on May 31, 2012 to collect topographic information at the possible sites. A bathymetric survey was also performed on May 31 and June 1, 2012 to collect information on water depths near the possible sites.

The bathymetric survey showed similar distances from shore to achieve the required lake bottom elevation of 507.0 m for the intake for all sites. The bathymetric information did not provide a differentiating factor between the sites and was not considered for this preliminary site selection. The visual survey, topographic and possible pipeline routes were used to evaluate each site, as described in the following sections.

### **Area 1 – East of Mosaic's Pump Station**

There is an area of level ground to the east of Mosaic's original 1960s pump station. This station is expected to be decommissioned. The level area provides a site in close proximity to SaskWater's current stations while providing a separation to avoid any potential impacts on the operating facilities. If Mosaic's original facility is decommissioned before construction begins on the expansion pump station, the existing area would be available as well.

This site was not considered further after the initial site reconnaissance. The available area east of Mosaic's original pump station is insufficient for the required footprint of the expansion pump station. The area containing Mosaic's original pump station would need to be available as well to avoid a significant excavation into the slope. The required co-ordination is unlikely to be completed before construction is required to begin on the expansion pump station.

### **Area 2 – Existing Pump Station**

The current parking area to the south of the existing BPNPWSS - East pump station provides a large area of available space. The expansion cannot be built adjacent to the existing station due to possible impacts of the two stations on two separate end users. The available area would allow for another pump station to be constructed with an offset from the existing station. The offset would reduce the potential impact of one station on the other.

This site was not considered further after the initial site reconnaissance. The available area is insufficient to eliminate the risk of a catastrophic event at one station impacting the second station.

### **Area 3 – West of the Existing Yara Pump Station**

This area is located about 20 m west of SaskWater's Yara pump station. The proposed area for the pump station is the current location of the park road. The location provides a significant separation between the existing facilities while still being close enough to support common operations. The road would need to be relocated further southwest toward the valley wall. The road would run through the area used by the contractor during the most recent construction project. This area has already been disturbed from its natural condition. The new construction would provide an opportunity to clean up the site from the previous construction and improve the existing road condition.

Memo To: Chris Robart P.Eng

June 20, 2012, Revision 1

- 3 -

The pump station could be split into two components at this location as an option to work within the site constraints due to the existing infrastructure. The intake structure would feed water to the low lift pumps, which would be installed in a separate structure on the lakeshore to the west of the existing Yara pump station. The low lift pumps would deliver water to the screening and high lift pumping facility located on the south side of the existing road. The two component pump station would provide more flexibility to expand the SaskWater owned facility to supply additional water to new or existing customers. This concept will be examined in more detail during preliminary design if this site is selected.

Advantages:

- Located near the existing facilities
- Most of the construction will be located on previously disturbed areas
- Lake bed conditions are well known from previous construction
- Most direct pipeline route

Disadvantages:

- Limited space for expansion
- Requires additional work to relocate the road
- Possibility of interference with existing utilities and pipelines

Additional work required related to the site:

- Park road relocation
- Possible adjustment to access for existing facilities

Pipeline Route to Top of the Valley:

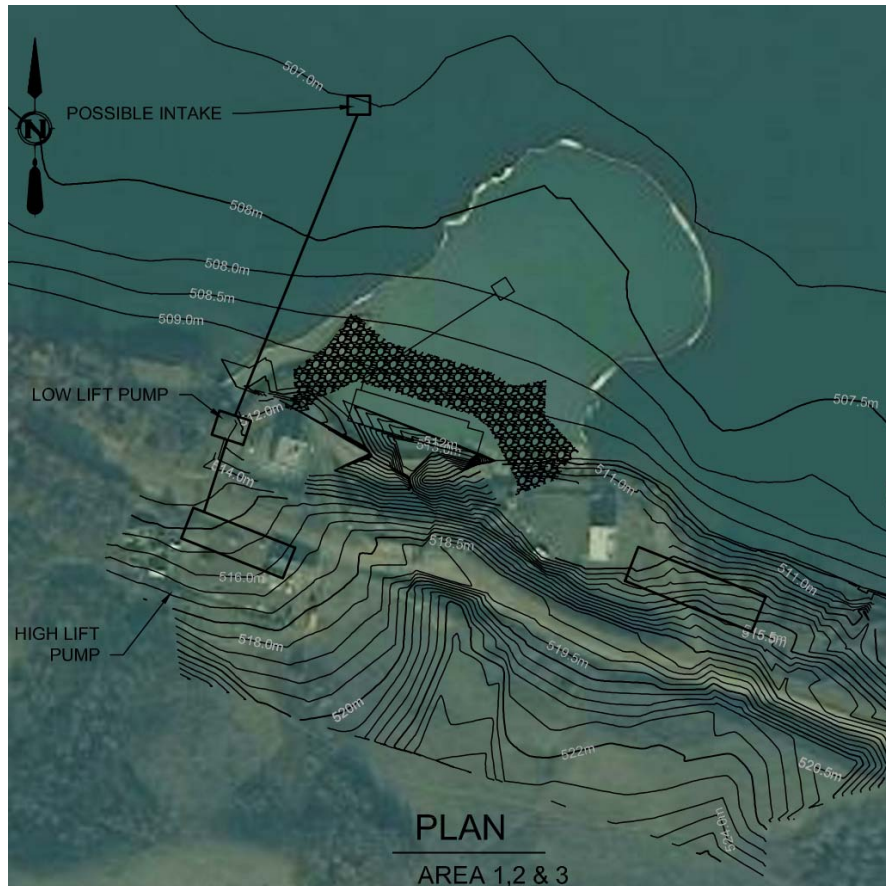
- The pipeline route would follow the existing pipelines up the valley wall. The soil conditions along this route are well known, which should minimize the risk of installing the pipeline on the slope.



Memo To: Chris Robart P.Eng

June 20, 2012, Revision 1

- 4 -



#### Area 4 – 500 m West of Existing Facilities

The grassy area located about 500 m west of the existing facilities appeared to be a promising site from the satellite imagery. However, the grassy area is actually a large earth mound, about 15 m higher than the surrounding area. The mound is located between the park road and the lake shore. The earth would need to be removed in order to create a site for the pump station.

The side of the mound on the lake shore is currently being eroded into the lake due to natural erosion. Removing the mound may improve the shoreline conditions and reduce damage to fish habitat at this location. The earth at the location could be used to build the cofferdam without having to locate and develop a separate borrow pit. The earth would need to be relocated off-site after construction of the intake. Upon completion of construction, the earth could be used to perform further restoration of the BPNPWSS - East water intake and pump station borrow pit on the north side of the lake.

Memo To: Chris Robart P.Eng

June 20, 2012, Revision 1

- 5 -

The area between the road and the lake shore is not very large and would provide only limited space. The surrounding area is very hilly and would not allow for relocation of the park road.

Advantages:

- May result in mitigation of existing, ongoing shoreline erosion
- The site is located close to the existing SaskWater pump station facilities
- Limited brush and other habitat disturbance will be required during site preparation
- The existing hill provides cofferdam material at the site

Disadvantages:

- Large amount of material must be moved
- Disposal and temporary storage areas may be required for the earth material
- Limited space between the road and the lake with no routes for road relocation
- Additional pipeline costs (at least 500 m additional pipe)

Additional Work Required:

- Disposal area
- Earth removal

Pipeline Route to Top of the Valley:

- The valley wall provides a steady slope to the top of the valley. The pipeline route would likely go straight up the slope of the valley and then run parallel to the existing pipelines.



Memo To: Chris Robart P.Eng

June 20, 2012, Revision 1

- 6 -

### **Area 5 – Western Edge of Spur 900 m from the Existing Site**

The western edge of the spur located about 900 m from SaskWater's existing facilities contains a clearing that would provide sufficient area for the expansion pump station. The area is located within a small bay that would minimize the visual impact of the pump station from Park users on the lake.

The area of land was likely created by soils being washed down the valley slope to create a delta in the lake. The soils may be poor for construction of the structural base.

The site is at the bottom of the ravine that runs from the water treatment plant's sludge lagoons to the lake. This ravine is a deep cut in the valley wall that creates a difficult route for the pipeline. The pipeline route would need to be installed up the slope of the ravine and then up the valley wall. Alternatively, the pipeline route would follow the roadway and then run up the valley wall near the existing pipelines. This alternative route would create a greater impact on the Park's users from the construction along the roadway.

#### **Advantages:**

- None

#### **Disadvantages:**

- Increased likelihood of poor soil conditions
- Difficult route for the pipeline
- Additional pipeline costs (at least 900 m additional pipe)

#### **Pipeline Route Options:**

- Directly up the ravine slope and up the valley wall



Memo To: Chris Robart P.Eng

June 20, 2012, Revision 1

- 7 -

- Along the roadway to a suitable location and up the valley wall



#### **Area 6 – Eastern Shore of Spur 1500 m from the Existing Facilities**

The eastern edge of the spur about 1500 m from the existing facilities appeared to be a suitable site from the satellite imagery. Upon viewing the site, it was unsuitable for a pump station. The area is very low and contains a pond. The area is a valuable habitat for waterfowl and other wildlife.

#### **Area 7 – Western Shore of Spur 1500 m from the Existing Facilities**

The western shore of the spur that extends into the lake, located about 1500 m from the existing facilities was examined as a possible site. The site is a large delta that extends out into the lake with a large area between the road and the lake shore. The location currently has Manitoba Maple trees on the site. The trees are not natural and have been planted in rows. The trees are not suitable for the location and the trees are either dead or in very poor condition. The construction of a pump station could be used to clean up the trees from the site. The Provincial Park management would need to be contacted to determine the plans for this site. The elevation of the land appears to be suitable for a pump station. The existing grade appears to be above the high water level without being too high to create a large

Memo To: Chris Robart P.Eng

June 20, 2012, Revision 1

- 8 -

excavation for the pump wells.

The area of land was likely created by soil being washed down the valley wall to the lakeshore. The material may provide difficult conditions for excavation and construction of the substructure.

Advantages:

- Clean-up of failed tree plantation
- Existing elevations appear to be suitable for the pump station construction
- Large area of land between the lake shore and the road for pump station and laydown areas for construction

Disadvantages:

- Park management may have plans for the site due to the tree plantation
- Soil conditions may be difficult for construction
- Significant distance from the site to the existing facilities
- Location of a pipeline route out of the valley will be difficult due to the proximity of the BPWTP intake and the ravine that carries the discharge from the plant's sludge lagoons back to Buffalo Pound Lake
- Additional pipeline costs (at least 1500 m additional pipe)

Additional Work:

- Removal of dead trees

Pipeline Route Options:

- Follow the nearby power line up the valley wall to the water treatment plant road. Adjacent to road to top of valley and across the ravine from the sludge lagoons at a shallow point near the lagoons.
- Follow the nearby power line to the top of the valley near the SaskWater radio tower. Cross the treatment plant's raw water line and run south of the water treatment plant.

Memo To: Chris Robart P.Eng

June 20, 2012, Revision 1

- 9 -

- Follow the nearby power line to the top of the valley near the SaskWater radio tower. Cross the ravine south of the sludge lagoons at a shallow point.



### Area 8 – Grassy Area about 2200 m NW of Existing Facilities

The satellite imagery shows a grassy area about 2200 m NW of the existing facilities. The area actually contains a significant amount of brush and trees. There is only a small strip of land that is grassland. The removal of large amounts of brush and trees would likely be less appealing to the Provincial Park Management. This area is about 300 m from the picnic area near the BPWTP Raw Water Pump Station. The elevations of the site appear to be suitable for the pump station. The pipeline route up the valley wall would be difficult at this location due to the proximity of the BPTWTP pipeline and other utilities. Also, there is a large hill between the site and the valley wall that would obstruct a direct pipeline route up the valley. The pipeline may need to be installed along the road towards a location that is more suitable to install the pipe up the valley side.

Advantages:

- None

Memo To: Chris Robart P.Eng

June 20, 2012, Revision 1

- 10 -

Disadvantages:

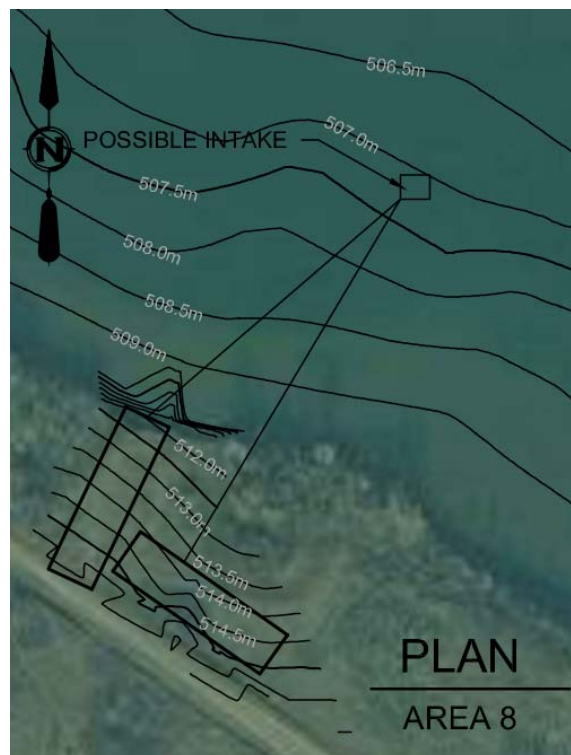
- Close to the BPWTP intake and raw water pump station
- Close to a picnic area
- Brush and trees would need to be cleared for the pump station
- Pipeline route would be difficult due to proximity of the BPWTP infrastructure
- Additional pipeline costs (at least 2200 m additional pipe)

Additional Work Required:

- Tree and brush removal

Pipeline Route Options:

- Around the nearby hill and up the slope to the road for the BPWTP. Follow the BPWTP road to the top of the valley. Cross the ravine or the plant's raw water line as described in the options for Area 7.
- Follow the road to Area 7 and follow the pipeline route options provided for that site.



Memo To: Chris Robart P.Eng

June 20, 2012, Revision 1

- 11 -

### **Area 9 – Grassy Area about 150 m SE of the WTP Raw Water Pump Station**

The ninth area reviewed was a grassy area located about 150 m southeast of the BPWTP raw water pump station. This area had been recently mowed when it was reviewed. The site is located near the BPWTP intake and raw water pump station and is also adjacent to the picnic area at the bottom of the water treatment plant's access road. The elevations of the site appear to be suitable for the pump station. Construction of the coffer dam for the intake would be close to the intake for the raw water pump station and could impact raw water quality for the treatment plant. The route for the pipeline would be difficult due to the proximity of the water line for the water treatment plant.

#### **Advantages:**

- None

#### **Disadvantages:**

- Adjacent to the BPWTP intake and raw water pump station
- Adjacent to a Buffalo Pound Provincial Park picnic area
- The area is maintained by the Provincial Park or by the BPWTP and likely has another purpose
- Additional pipeline costs (at least 2600 m additional pipe)

#### **Additional Work Required:**

- None

#### **Pipeline Route:**

- Follow the road to the site at Area 8 and use one of the pipeline route options presented in that site.



Memo To: Chris Robart P.Eng

June 20, 2012, Revision 1

- 12 -

## Site Recommendation

The two most viable options for the new intake and pump station based on proximity to existing infrastructure, topographic and bathymetric survey, and impact on the Park and pipeline route are Areas 3 and 7.

Area 7 is a large flat area that would provide a new site with room for expansion if it is required in the future. The bathymetric survey showed that the required water depth for the intake occurs at a reasonable distance from the shore. The pipeline route would be longer from this site and more difficult due to the BPWTP infrastructure and the topography of the valley wall near this site. Area 7 would be a secondary site to be considered further if the preferred site location is not available.

We recommend that Area 3 near the existing Yara pump station be the area identified as the site for the new BPNPWSS – East Vale site. This site has less available land than Area 7 but the site conditions are well known from previous construction projects in the immediate area. Construction of the pump station in Area 3 may require relocation of the Park road. This location will have all of SaskWater's assets in a common area and the proximity to the existing infrastructure may create conflicts when locating the new facility and pipeline. The common site would provide a common access to all facilities for SaskWater's operations staff.



## C Appendix C - NHC Memorandum



northwest hydraulic consultants

## memorandum

9819 – 12<sup>th</sup> Avenue S.W.

Edmonton, AB

T6X 0E3, Canada

Tel: 780-436-5868

Fax: 780-436-1645

email: eyaremko@nhc-edm.com

**To:** Scott Miller, P.Eng., Associated Engineering  
(Saskatchewan) Limited

**Date:** December 8, 2008

**From:** Eugene Yaremko P.Eng

**No. Pages:** 1

**Re:** Buffalo Pound Intake Dwgs

Frazil ice - it is noted that during freeze-up and design low lake level, the depth to the intake port invert would be about 1.7 m. Most likely, conditions where frazil ice is being generated would see the majority of frazil in a zone well above the invert level, so there is expected to be frazil reaching this level only on rare occasions.

Related to the above is the question of spacing of the coarse bars in the port opening.

Peter Hogge posed this question in a recent email and my response was to recommend a spacing of 75 mm, which would help minimize the size of fish entering and at the same time provide enough space to prevent openings becoming blocked with frazil ice during those rare times that frazil manages to reach the intake port.

I note that the height of the intake port will only be about 0.5 m above lake bed level. It should be expected that wave action at times will re-suspend bed sediments so that there will be periods of elevated sediment intake loadings that will result in deposition of this material in the wetwell. This sediment may be high in organic content. Is it possible the the top of the port cap will at times become contained within the ice?

I note that you are proposing to place a Fabriform mat over the portion of conveyance pipe exposed near the the intake - would you consider using an Armorfex mat instead?

Hope that this helps.

Respectfully submitted,

northwest hydraulic consultants

Eugene Yaremko, P.Eng.

# **D** **Appendix D - Regulatory Correspondence**



Saskatchewan  
Watershed  
Authority

Head Office

Victoria Place  
111 Fairford Street East  
Moose Jaw, Canada  
S6H 7X9

(306) 694-3900  
(306) 694-3944 Fax

[www.swa.ca](http://www.swa.ca)

March 26, 2012

(306) 694-3966

Mr. T.A.G. (Tim) Jansen, P.Eng.  
Senior Project Manager  
Major Projects  
SaskWater  
200 - 111 Fairford Street East  
MOOSE JAW SK S6H 1C8

File: E2-2-1 (Vale)

Dear Mr. Jansen:

This is in response to your March 20, 2012 letter concerning the adequacy of Buffalo Pound Lake to support the proposed water requirements for the Vale potash mine proposal.

Buffalo Pound Lake would be a more reliable water source from a water availability perspective than Katepwa Lake. The proximity of Buffalo Pound Lake to Lake Diefenbaker provides a greater level of assurance that sufficient water can be delivered to meet the water demands for the project during extreme drought conditions. Although our water availability analysis for Katepwa Lake concludes that sufficient water can be delivered to support the Vale project, the risk of water shortages, albeit rare, would be greater at Katepwa Lake than Buffalo Pound Lake.

Buffalo Pound Lake also has advantages over Katepwa Lake in terms of potential issues that may arise associated with the requested water right. For Katepwa Lake, there is uncertainty surrounding the timing and outcome of the ratification vote for the settlement of the Qu'Appelle Valley flood claims with First Nations. If the settlements are not ratified by Muscowpetung or Pasqua, there will be no flood easement and that is likely to impact the ability to deliver water through the Pasqua Lake area to Katepwa Lake. The result of the ratification vote would not affect the ability to deliver water to Buffalo Pound Lake.

In addition, general concerns related to the proposed Vale project have been raised by local ratepayers around Katepwa Lake. We would anticipate that these concerns can be addressed through the consultation process with local stakeholders. However, since residents around Buffalo Pound Lake are accustomed to the water demands being satisfied without adverse impacts to lake levels, it is unlikely that this same level of concern would be raised by local stakeholders around Buffalo Pound Lake.

.../2

Mr. T.A.G. (Tim) Jansen, P.Eng.

Page 2

March 26, 2012

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Of course, regardless of the source, as a regulator we must satisfy our obligations under the duty to consult with First Nations and we must also comply with the requirements of the TLE Framework Agreement. Unfortunately, whenever a project of the scope and high profile of the Vale Kronau Potash project is proposed, there is the potential for challenges to arise regardless of the intended water source.

If you have any questions, please contact me at (306) 694-3966.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jim Waggoner', with a stylized, cursive script.

Jim Waggoner, P.Eng.  
Director, Licensing and Water Use  
Integrated Water Services Division

JW/wr

cc: Will Longworth, President, Vale Potash Canada Limited, Regina



Ministry of  
Tourism, Parks,  
Culture and Sport

2<sup>nd</sup> Floor, 3211 Albert Street  
REGINA SK S4S 5W6

July 13, 2012

Chris Robart  
Sr Project Manager, SaskWater  
200 – 111 Fairford St East  
Moose Jaw, SK S6H 1C8

Dear Mr. Robart:

## **Re: Proposed Buffalo Pound Non-Potable Water Supply System Expansion**

Further to your letter, dated June 12, 2012, we have undertaken a preliminary review of your proposed development and provide the following.

Staff of Parks, Culture and Sport (PCS) met with SaskWater and its consultant, Associated Engineering, on two occasions to review the details of the proposal. One meeting was held at the PCS office at 3211 Albert Street (June 18, 2012); the second meeting was held on site at Buffalo Pound Lake (July 6, 2012).

The proposal is to construct a new pump station along the south shore of Buffalo Pound Lake, in proximity to the existing two pump stations already operated by SaskWater. SaskWater had prepared a review of nine potential locations and through discussions had narrowed their preferred options down to two locations. The first location is the site of the existing pump stations. The second is about 1500 m west of the existing pump stations, the location of a previous tree plantation. Through our site meeting it was determined that the preferred location is at the site of the existing pump station and these comments are based on that selection. Any changes to that selection will require a separate review.

### **General Comments**

Parks, Culture and Sport is in general agreement with building the new pump station in close proximity to the existing structure in order to minimize the overall impact on the park. Alternate locations outside of the park would also be favourable.

### **Visual Impact**

There is significant concern over the visual impact of the structures and compounds on the park, as viewed both from the road and from the water. Landscape conservation, mediation and buffering should be undertaken for the new site as well as the existing site.

Conservation – Minimize construction impact on the landscape by having a small footprint on the site size and the staging area. Identify key vegetation and design the site for best preservation of the vegetation as well as the views. Stockpile and reuse existing topsoil.

Mediation – provide shoreline revegetation to mediate views from the water. Re-seed any damaged areas, ensuring natural revegetation and controlling any weed encroachment.

Buffering - Establish building design parameters that will minimize the impact on the viewsheds within the park (low roofline, natural colours and quality materials). Provide landscape buffering and berms around the site perimeter and within the site to reduce the visual impact on the park. Apply landscape buffering to the existing site as additional mitigation.

### **Zoning/Native Vegetation**

We note that this area is zoned as N3, Natural (East of White Track), which includes a number of utility structures. As a natural zone, rigorous landscape protection and restoration will be expected. Reseeding of disturbed areas will be with a native seed mix pre-approved by PCS.

We have a policy of striving for *no net loss of native prairie* in the park system. If, upon further investigation, it is determined that the selected area is one of native prairie, the developer will be required to compensate for the loss by acquiring another piece of land, with prairie cover, adjacent to the park, that could be incorporated into the park.

To minimize the disturbance of native vegetation development areas, pipeline routing and construction staging shall be undertaken on previously disturbed areas or within development zones as much as possible. Plan submission shall identify any disturbance of native vegetation/prairie and shall be accompanied with a restoration/mediation plan.

### **Archaeological Potential**

There is high potential for archaeological finds within Buffalo Pound Provincial Park. Construction shall cease and the Heritage Conservation Branch (306-787-2817) shall be notified immediately if any suspected archaeological finds do occur.

### **Coordination with Park Operations**

The project manager will be in continual communication with the Park Supervisor to ensure coordination with park operations and minimize the impact to park use.

### **Borrow Pit**

There shall be no new intrusions for borrow pit material. Former borrow pits may be considered when further detail of requirements is known. Conditions for mitigation of impact may still result on previously disturbed sites with respect to vegetation, species

of concern and rehabilitation of impacted surface.

**Green Technology**

The Legacy Plan for Provincial Parks establishes the principle of modelling environmentally sustainable practises. The pump station should demonstrate this principle in its design and construction.

**Long-Term Planning**

A conceptual long-term plan for future lift station expansion shall be provided to support sound decision-making for current expansion, construction impacts, and overall long-term expectations.

**Permits**

Ensure all necessary permits are acquired, as necessary.

**Land Tenure/Lease Agreement**

Development of the site will be conditional upon a satisfactory lease amendment and easement agreement, which shall be executed prior to start of construction; contact Marlene Harive, Senior Land Administrator, Ministry of Environment at 306-787-2304 or email [marlene.harive@gov.sk.ca](mailto:marlene.harive@gov.sk.ca).

If you have any questions regarding the above comments or wish to arrange a meeting for further discussion, please do not hesitate to contact the undersigned at 306-798-0357 or [dominique.clincke@gov.sk.ca](mailto:dominique.clincke@gov.sk.ca).

Sincerely,



Dominique Clincke  
Park Planner  
Saskatchewan Parks Service  
Ministry of Parks, Culture and Sport

cc: Cindy E. MacDonald, Executive Director, Park Services Operations  
Bob McEachern, Manager, Park Management Services Branch  
Bob Wilson, Area Manager, Southwest Park Area  
Dave Bjornson, Supervisor, Buffalo Pound Provincial Park  
Chris Potter, Senior Park Planner  
Landscape, Protection and Planning Branch  
Heritage Conservation Branch  
Facilities Branch



Saskatchewan  
Watershed  
Authority

Head Office

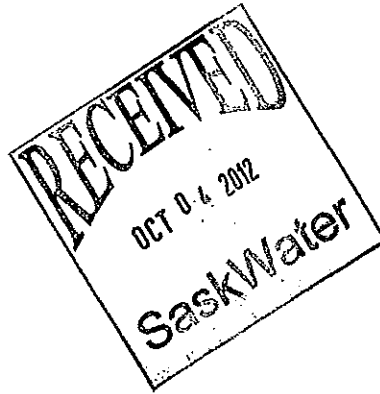
Victoria Place  
111 Fairford Street East  
Moose Jaw, Canada  
S6H 7X9

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(306) 694-3944 Fax

[www.swa.ca](http://www.swa.ca)

October 2, 2012

Mr. Matthew Wood  
Project Manager Kronau  
Vale Potash Canada Limited  
1874 Scarth Street, Suite 1900  
REGINA SK S4P 4B3



(306) 694-3966

File: E2-1 (Vale)

Dear Mr. Wood:

This letter is provided in follow-up to our meeting of September 28, 2012, and is intended to provide clarity regarding our recommended water source to support your proposed project, and the Saskatchewan Watershed Authority's (Authority) process to provide Vale with an assurance of water availability.

Buffalo Pound Lake continues to be a preferred and viable water source, with excess capacity available within the existing conveyance works and operational regime to deliver water to Buffalo Pound Lake to meet the needs of Vale.

To address the issue of competing interests for water for industrial development, the Authority has developed a process to formalize and manage requests for water from the Qu'Appelle River system. Where the intended source has sufficient water available to support the project the Authority will issue a conditional one-year-term water right. This conditional water right will be renewable, subject to fulfillment of a number of conditions including, but not limited to, Ministerial approval under the environmental assessment process, completion by the Authority of any necessary aboriginal consultations (proponent involvement may be required), the proponents compliance with any necessary mitigation efforts, and demonstrated progress by the proponent through relevant stages of the development schedule in a reasonable and timely manner.

Vale has previously filed an application for a water right identifying Buffalo Pound Lake as the intended source of an approximate annual water requirement of 22,000 dams<sup>3</sup>. To proceed with the application process, the following information should be provided to my office:

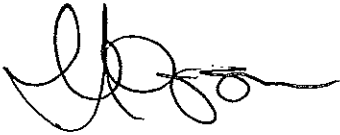
- Documentation confirming the projected annual water supply requirements. Please include the projected date that water will be required and an estimate of the annual water requirements over the foreseeable future.

- Summary of anticipated completion timelines for critical components of the project development leading to construction and production.

The Authority recognizes that an assurance of a reliable water supply is a critical consideration in the decision to invest in the development of a project. The issuance of a conditional renewable water right will provide proponents with a formal assurance of the availability of water, and the conditions that must be met in order to secure a firm water right to meet the needs of the project while work progresses towards construction.

If you have any questions, please contact me at (306) 694-3966.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jim Waggoner', with a stylized, flowing script.

Jim Waggoner, P.Eng.  
Director, Water Use and Licensing  
Integrated Water Services Division

cc: Chris Robert, SaskWater



October 30, 2012

306.694.3893

Mr. Jeff Huang  
Project Engineer  
SaskWater  
200-111 Fairford Street E  
MOOSE JAW SK S6H 1C8

File: H5-2-2

**Re: Buffalo Pound Water Levels**

As requested, below is a summary of information on Buffalo Pound Water Levels.

Peak Calm Water Level	
1:25	510.8m
1:100	511.8m
1:500	512.7m

Desirable Operating Range	
January	509.17m to 509.32m
February	509.02m to 509.17m
March	508.86m to 509.93m
April	508.86m to 509.93m
May	509.02m to 509.62m
June	509.17m to 509.47m
July	509.17m to 509.47m
August	509.17m to 509.47m
September	508.71m to 509.32m
October	508.86m to 509.32m
November	509.17m to 509.32m
December	509.17m to 509.32m

Sincerely,

A handwritten signature in black ink, appearing to read 'Martin Grajczyk', is written over a light blue horizontal line.

Martin Grajczyk  
Senior Hydrologist  
Engineering & Geoscience Division

MG/ce

# **E**

## **Appendix E - Power Supply and Control System Record of Meeting**



# AE & SWC Meeting

**Date:** October 24, 2012  
**Time:** 1:30 pm-3:00 pm  
**Location:** SWC Clarence Ave Shop

**Meeting Description:**

Review of the pre-design report for the BPNPWSS-East (VALE) Intake and Pump Station with regards to power supply and control system

**Chairperson:**

Chris Robart

**Attendees:**

Kellyn Bollinger, Darrin Orb, Bob Baumgartner, Chris Tangedal, Jared Suwala, Edwin Klassen, Call in - Darin Schindel & Erin Turner

**Regrets:**

## Discussion Items

**PLC & Instrumentation:**

- Remove PLC design redundancy and operate with a single PLC with spare cabinet.
  - Statistics on PLC failure show that there is very low chance of failure and as such there is an insignificant gain in reliability for the associated cost of adding a second PLC.
- Spare cabinet to have programmed (“hot”) cards for easy transfer to the PLC.
- Move away from Device Net system and incorporate controls through hard wiring. System will be more reliable and easier to maintain.
  - Noted by Associated that increased amount of hard wiring has potential higher value change orders. Past projects have shown that electrical change orders are not cheap. To be specified in the tender package that the wiring would be hard wired to minimize the potential for change orders.
- SaskWater would like to move the PLC into the MCC with the intent to move it closer to the I/O controls
  - Associated had left it out of the MCC due to concerns over PPE requirements inside the MCC for arc flash.
  - Different levels of PPE required for job task that is being completed inside the MCC
  - If it will not work inside the MCC then the PLC is to be positioned on the opposite side of MCC room wall.
  - Other SaskWater sites as well as other industrial sites currently have the PLC in the MCC.
  - Internally need to verify that this is not violating any OH&S rules and that the PPE requirements/rules would be manageable and acceptable to operations staff.
- Panel view installed in main pump room similar to set up at the Mosaic pump station.
- Data logging by operations personnel will be completed off of desktop computers with FT View located in the control room. Computers to be hard wired with Ethernet cables to PLC.

- Preference would be to connect CDMA radio right out of PLC cabinet and remove the DL3500 and Data Highway cards from the communication system.
  - Need to verify with Trans Gas exactly what their requirements are for SCADA system.
- Land line backup to CDMA radio required by operations.
- SCADA will be set up in house by SaskWater.
- Use of HART interface card. Use all the same cards throughout the system.
- All flow meters and pressure transmitters to be Rosemount. Flowmeters to include the meter verification license for the flow tubes to allow for in house calibration.
- SaskWater is planning to separate the PLC side of the project into its own package. Will include the programming, onsite install and hardware supply and to be tendered by SaskWater.
  - Associated to write the narrative for the package.

#### **Power Supply:**

- SaskWater would like to remove the Multilins and direct wire from the VFD to the motors.
  - Motor protection built in to the VFD and multilins are redundant equipment.
  - RTD trip points currently set up in the multilin. Wire RTD's directly into PLC RTD input modules and Vibration will be wired directly to analog input modules to set up trip points within the PLC.
  - It was suggested by Edwin that we use a multilin to protect against ground fault from the switch gear to the VFD.
  - What is the imbalance limits that the VFD can handle? Is there a vacuum contactor inside the drive?
- System to use Toshiba VFD's to match Mosaic pump station. Operators have received training on these drives and have spare parts available for both.
- NGR relays to be Startco brand.
- Use of isolated analog cards on system;
  - 24V DC on input.
  - High density design cards preferred; much easier to work with.
- SaskWater's preference is to use a shunt trip breaker with ground fault protection for the transformer feeds instead of the fused disconnect and contactor system that is currently in design.
  - What would be the cost difference on this type of system?

- SaskWater would prefer the use of a 600V gen set instead of the 480V specified in the design report.
  - The availability of 600V units is greater than the 480V and also more common with other SaskWater sites.
- Coordination and arc flash studies to be completed later in the process once design has been finalized.
- Wiring to pump motors to include sufficient cable (loop) to allow for easier servicing of motors.
  - Large diameter cable will result in a very large loop required.
  - Disconnect junction box at the pump locations could also be used to achieve the same goal but require sufficient floor space.
- The definition of the “closed transition switching” system needs to supply more detail in the design report. SaskWater would like a simple switch/button to manually return to utility power when running on backup generator system. Require remote operation from control system or remotely mounted pushbutton.
- Requirement for lightning protection on a steel building was discussed.

#### **Metering Building:**

- SaskWater requires input in the design of the building by Vale.
- Would like to have a SaskWater PLC inside the building connected directly to the flowmeter. PLC would be required to be a part of the system communication plan. SaskWater needs a direct connection to the Rosemount flow meter to gather the metering data and transmit it to the pump station.
- Would provide any required information to Vale with an Ethernet connection to the SaskWater PLC.
- One of the main intentions is to not have to go on site for meter reads.

<b>Action Items:</b>	<b>Person Responsible</b>	<b>Deadline</b>
Determine the OH&S and PPE requirements involved with locating the PLC inside the MCC	<b>Bob Baumgartner</b>	<b>Nov. 2/12</b>
Contact Trans Gas to verify the communication system requirements for SCADA with the intent to remove the DL3500 and DH Card configuration.	<b>Bob Baumgartner</b>	<b>Nov. 2/12</b>
Research the Toshiba VFD's to determine if multilins are required before pump motors.	<b>Bob Baumgartner &amp; Edwin Klassen</b>	<b>Nov. 2/12</b>
Investigate the use of a breaker with ground fault as an alternate to the fuse disconnect type system currently in the power supply design	<b>Edwin Klassen</b>	<b>Nov. 2/12</b>
Associated drawings to be redlined with the requested changes and submitted for revision	<b>Bob Baumgartner</b>	<b>Nov. 2/12</b>

## Drawing 4093-00-601 Power structure

1. PT fuses on incoming.....how do we change fuses with no disconnect in front (change live?)
2. Multilin relays are not required. Wire RTD's directly into PLC RTD input modules. Vibration will be wired directly to analog input modules.
3. For the transformer feeds, use a shunt trip breaker instead of a fused disconnect and contactor. This will reduce the switchgear footprint, and will not require us to stock spare fuses.
4. Same as 3.
5. If we go with the regional system, a second transformer would feed bus B, with the tie breakers for bus A and B open.
6. Use breakers here with fuses for better drive protection after the breaker.
7. The generator transformer will be 600 / 4160, not 480.
8. NGR relay and resistor to be Startco.
9. Use breakers on high lift pumps with fuses in the VFD for fast blow protection. Consider breakers with ground fault protection as long as they can detect the fault below the level of the NGR fault limit. **(needs to be investigated and discussed before final decision is made)**
10. Discussion required for generator(s) entry point on the bus. If we have a bus fault on the generator bus, we have no way of isolating and supplying generator power to bus A and / or B. We need to consider the risk consequences of leaving it as is, or splitting the generator feeds with two breakers, one feeding bus A and one feeding bus B
11. Feeder protection relays to be Startco with Ethernet communications, model FPS-CTU, with FPS-OPI interface, zero sequence EFCT ground fault CT, and phase CT's.
12. **More discussion needs to happen on splitting the MCC room.**
13. AE to check if we use the Startco FPS feeder relay, I believe metering is included, therefore we may not need separate digital power meter.

## Control system

1. The control system design will be the same whether we use the Vale stand alone design or the regional design, except that in the regional design there may be two SaskPower feeds from 2 separate transformers.

2. At our 95% design review meeting at SaskWater on October 24, 2012, there was a lengthy discussion on the control system. Some of the main points are listed below, however there were many more details that are not listed here.
3. What information does Vale need in their system?
4. What do they have for a control system to interface?
5. What is Vale's preferred method of interface? If all they need is pressure and flow from the metering building, we will hard wire analog signals into their I/O.
6. What does the PLC control in the HVAC system?
7. UPS.....spec Eaton true on line Powerware 9000 ...at least 2 KVA
8. Use an AEGIS surge protector in front of the UPS(s).
9. Use a desktop computer for data logging using FT View SE, with a Panelview in the pump room for on floor control and as a backup for a computer failure.
10. Discuss Vibration monitoring. Wire directly to PLC.
11. Pressure and flow to be Rosemount with remote display and flowtube baseline signature license included.
12. Use Hart analog cards.
13. Do we need a separate PLC for Scada? Sakwater will do the Scada portion from the main PLC.
14. Saskwater will discuss landline options with Transgas.
15. PLC on site spares will be in a separate cabinet, live with a spare UPS and two of each I/O cards as spares.
16. Use same processors, rack size and I/O at all locations.
17. SaskWater will administer a separate tender for programming, PLC install and PLC hardware supply.
18. Spec different programming methods for simplicity. **This needs to be discussed at a later date.**
19. Mount PLC in MCC structure instead of remotely.
20. No intelligent MCC required.
21. No DeviceNet anywhere. We will hard wire all valves.
22. See separate CAD drawing on the proposed PLC layout. This needs to be finalized before tender documents are released.

23. Other points as noted in the meeting.



**DRAWING  
REDUCED TO  
HALF SIZE**



**Associated Engineering**

### INTAKE & PUMP STATION 4160 V SINGLE LINE DIAGRAM



**SaskWater**

The Quality Advantage

# CALCULATION SHEET

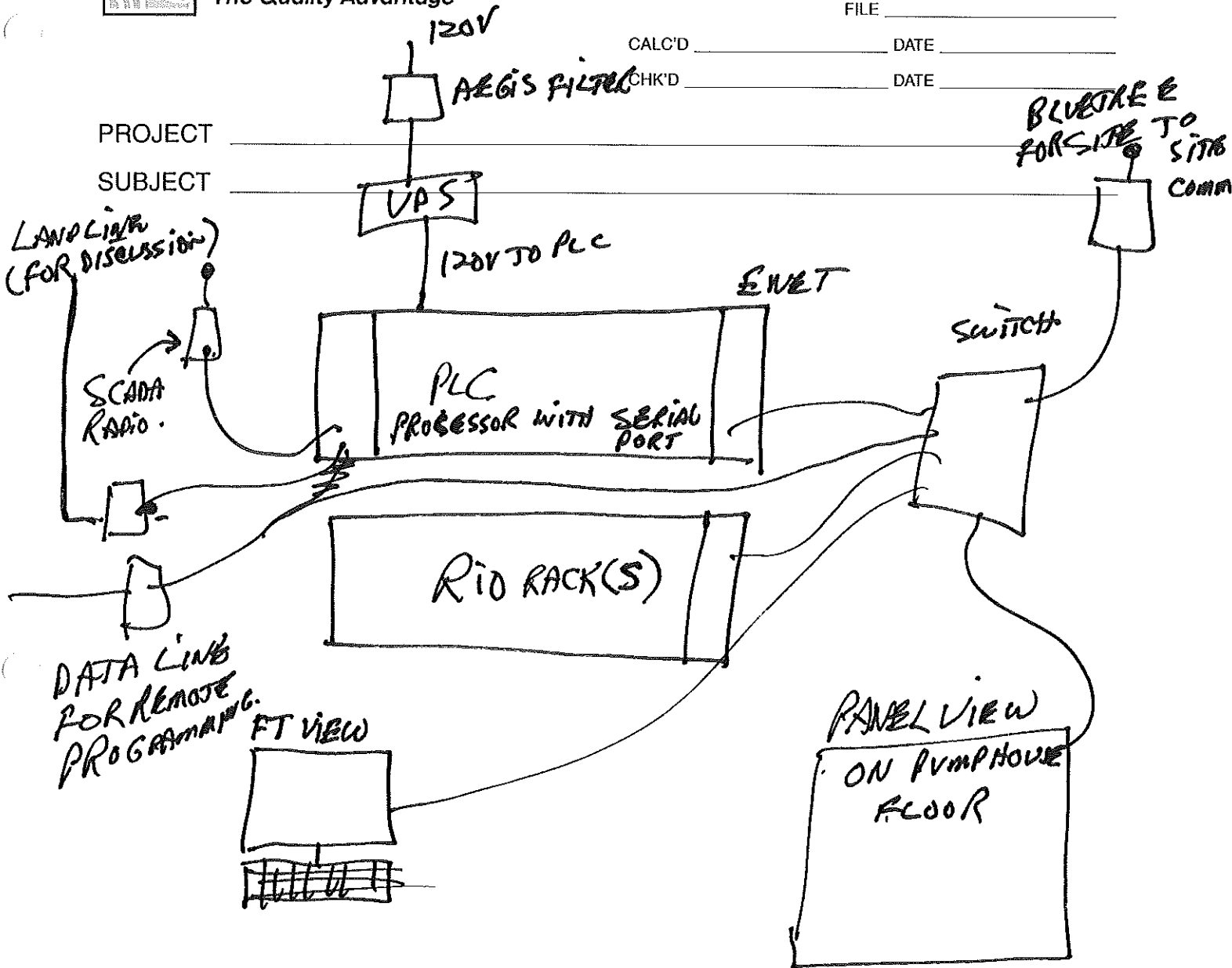
FILE \_\_\_\_\_

CALC'D \_\_\_\_\_ DATE \_\_\_\_\_

CHK'D \_\_\_\_\_ DATE \_\_\_\_\_

PROJECT \_\_\_\_\_

SUBJECT \_\_\_\_\_



CHRIS - PLEASE CAD

& send to me.

Bob

## **F** Appendix F - Cost Estimates

Project: **BNPWSS - East Expansion VALE**  
 Client: **SaskWater**  
 Project No.: 2012-4093  
 Date: December 13, 2012

DIVISION No.	DIVISION	ESTIMATE
1	General Requirements	\$ 4,410,000
2	Sitework	\$ 5,580,000
3	Concrete	\$ 3,780,000
4	Masonry	\$ 110,000
5	Metals	\$ 900,000
7	Thermal and Moisture Protection	\$ 20,000
8	Doors and Windows	\$ 30,000
9	Finishes	\$ 20,000
10	Miscellaneous Furnishings	\$ 20,000
11	Process Mechanical	\$ 3,990,000
13	Instrumentation and Controls	\$ 760,000
14	Conveying Systems	\$ 100,000
15	Mechanical	\$ 810,000
16	Electrical	\$ 4,920,000

## TOTALS

Sub-Total	\$ 25,450,000
Contingency Allowance (20%):	\$ 5,090,000
Sub-Total	\$ 30,540,000
Engineering (15%)	\$ 4,590,000
Project MGMT (5%)	\$ 1,530,000
Sub-Total	\$ 36,660,000
PST (5%)	\$ 1,530,000
<b>TOTAL ESTIMATED COST: (excluding GST)</b>	<b>\$ 38,190,000</b>

1. Direct quote from vendor / supplier
2. Quotes from vendor / supplier with adjustments for site specific project.
3. Previous project with adjustment for inflation.
4. Cost estimating resources (RS Means, Yardstick, etc.)



Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BPNPWSS - East Expansion VALE**  
 Client: **SaskWater**  
 Project No.: 2012-4093  
 Date: December 13, 2012

---

**Cost Estimate**  
**Intake & Pump Station Preliminary**

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ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
<b>DIVISION 1 - GENERAL REQUIREMENTS</b>							
<b>1</b>	<b>General</b>						
<b>1.01</b>	Bonding <sup>3</sup>		per \$1000	28000	\$10		\$280,000
<b>1.02</b>	Insurance <sup>3</sup>		per year	2	\$35,000		\$70,000
<b>1.03</b>	Shop Drawings <sup>3</sup>		LS	1	\$60,000		\$60,000
<b>1.04</b>	O&M Manuals <sup>3</sup>		LS	1	\$100,000		\$100,000
<b>1.05</b>	Start-up and Commissioning <sup>3</sup>		LS	1	\$200,000		\$200,000
<b>1.06</b>	Mobilization <sup>3</sup>		LS	1	\$200,000		\$200,000
<b>1.07</b>	Overhead <sup>3</sup>		LS	1	\$500,000		\$500,000
<b>1.08</b>	GC's Profit (approx. 10%) <sup>3</sup>		LS	1	\$3,000,000		\$3,000,000

**TOTALS**

**Sub-Total (excluding taxes):**

**\$4,410,000**

1. Direct quote from vendor / supplier
2. Quotes from vendor / supplier with adjustments for site specific project.
3. Previous project with adjustment for inflation.
4. Cost estimating resources (RS Means, Yardstick, etc.)



Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BPNPWSS - East Expansion VALE**  
Client: **SaskWater**  
Project No.: 2012-4093  
Date: December 13, 2012

**Cost Estimate**  
**Intake & Pump Station Preliminary**

ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
<b>DIVISION 2 - SITE WORK</b>							
<b>1</b>	<b>Intake Conduit</b>						
1.01	Intake Conduit Main 1370 mm <sup>3</sup>		lin.m	120	\$3,000	\$1,200	\$504,000
1.02	Cathodic Protection System <sup>3</sup>		each	1	\$13,000	incl	\$13,000
1.03	Imported Granular <sup>3</sup>		m3	100	\$72	incl	\$7,200
1.04	Geotextile <sup>3</sup>		m2	210	\$6	\$12.00	\$3,780
<b>2</b>	<b>Intake Structure</b>						
2.01	1370 mm 90 bend <sup>3</sup>		each	1	\$30,000	incl	\$30,000
2.02	Armourflex Mat <sup>3</sup>		m2	170	\$22	incl	\$3,740
2.03	Intake Rip Rap <sup>3</sup>		m3	50	\$120	incl	\$6,000
2.04	Granular <sup>3</sup>		m3	80	\$72	incl	\$5,760
<b>3</b>	<b>Pump Station Site Work</b>						
3.01	Topsoil Stripping and Replace <sup>3</sup>		m2	3800	\$7	incl	\$26,600
3.02	Surfacing Gravel <sup>3</sup>		m3	1500	\$70	incl	\$105,000
3.03	Bank Erosion Protection (Imported Rip Rap) <sup>3</sup>		m3	100	\$120	incl	\$12,000
3.04	Fences and Gates <sup>3</sup>		m	100	\$120	incl	\$12,000
3.05	150 mm HDPE (DR 13.5) Potable Water Line <sup>3</sup>		lin.m	200	\$325	incl	\$65,000
3.06	Excavation to waste <sup>3</sup>		m3	4500	\$12	incl	\$54,000
3.07	Excavation to stockpile <sup>3</sup>		m3	5000	\$12	incl	\$60,000
3.08	Excavation Pit Shoreing <sup>4</sup>		l.s.	1	\$200,000	incl	\$200,000
3.09	Backfill and Compaction on-site material <sup>3</sup>		m3	5000	\$18	incl	\$90,000
3.10	Granular Backfill and Compaction <sup>3</sup>		m3	1000	\$75	incl	\$75,000
3.11	Haul for exported waste material (4 km) <sup>4</sup>		m3	4500	\$10	incl	\$45,000

1. Direct quote from vendor / supplier

2. Quotes from vendor / supplier with adjustments for site specific project.

3. Previous project with adjustment for inflation.

4. Cost estimating resources (RS Means, Yardstick, etc.)



Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BNPWSS - East Expansion VALE**  
 Client: **SaskWater**  
 Project No.: 2012-4093  
 Date: December 13, 2012

**Cost Estimate**  
**Intake & Pump Station Preliminary**

ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
3.12	Pump Station Dewatering <sup>3</sup>		l.s.	1	\$450,000	incl	\$450,000
3.13	Road Relocation Excavation <sup>3</sup>		m3	9000	\$12	incl	\$108,000
3.14	Haul for Road Relocation waste material <sup>4</sup>		m3	9000	\$10	incl	\$90,000
3.15	Native Planting c/w mulch <sup>3</sup>		m2	1000	\$25	incl	\$25,000
3.16	Grass Seeding <sup>3</sup>		m2	3800	\$5	incl	\$19,000
4	<b>Coffer Dam and Dewatering</b>						
4.01	Embankment Construction (cofferdam) <sup>3</sup>		m3	44,000	\$25	incl	\$1,100,000
4.02	Embankment Removal (cofferdam) <sup>3</sup>		m3	44,000	\$10	incl	\$572,000
4.03	Silt Fence <sup>3</sup>		lin.m	390	\$267	incl	\$104,130
4.04	Dewatering System <sup>3</sup>		l.s.	1	\$785,000	incl	\$785,000
5	<b>Fish Habitat Compensation <sup>3</sup></b>		l.s.	1	\$1,000,000	incl	\$1,000,000
<b>TOTALS</b>							

**Sub-Total (excluding taxes):**

**\$5,571,210**

1. Direct quote from vendor / supplier
2. Quotes from vendor / supplier with adjustments for site specific project.
3. Previous project with adjustment for inflation.
4. Cost estimating resources (RS Means, Yardstick, etc.)



Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BNPWSS - East Expansion VALE**  
 Client: **SaskWater**  
 Project No.: 2012-4093  
 Date: December 13, 2012

**Cost Estimate**  
**Intake & Pump Station Preliminary**

ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
<b>DIVISION 3 - CONCRETE</b>							
<b>1</b>	<b>Concrete</b>						
<b>1.01</b>	Concrete in retaining wall <sup>3</sup>		m <sup>3</sup>	183	\$1,928		\$352,824
<b>1.02</b>	Piles in retaining wall <sup>3</sup>		m	184	\$582		\$107,088
<b>1.03</b>	Wall <sup>3</sup>		m <sup>3</sup>	767	\$1,928		\$1,477,888
<b>1.04</b>	Base Slab <sup>3</sup>		m <sup>3</sup>	419	\$1,559		\$652,620
<b>1.05</b>	Top Slab <sup>3</sup>		m <sup>3</sup>	283	\$1,877		\$530,447
<b>1.06</b>	Concrete Piles (assume 15m and 20 piles) <sup>4</sup>		m	300	\$582		\$174,642
<b>1.07</b>	Concrete Curb <sup>3</sup>		m <sup>3</sup>	12	\$1,152		\$13,824
<b>1.08</b>	Concrete Intake <sup>3</sup>		each	1	\$465,128		\$465,128
<b>TOTALS</b>							

**Sub-Total (excluding taxes):**

**\$3,774,462**

1. Direct quote from vendor / supplier
2. Quotes from vendor / supplier with adjustments for site specific project.
3. Previous project with adjustment for inflation.
4. Cost estimating resources (RS Means, Yardstick, etc.)



Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BNPWSS - East Expansion VALE**  
Client: **SaskWater**  
Project No.: 2012-4093  
Date: December 13, 2012

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**Cost Estimate**  
***Intake & Pump Station Preliminary***

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ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
<b>DIVISION 4 - MASONRY</b>							
<b>1</b>	<b>GENERAL</b>						
<b>1.01</b>	Masonry Walls <sup>4</sup>		m <sup>2</sup>	427	\$236		\$100,772
<b>TOTALS</b>							

**Sub-Total (excluding taxes):** **\$100,772**

1. Direct quote from vendor / supplier
2. Quotes from vendor / supplier with adjustments for site specific project.
3. Previous project with adjustment for inflation.
4. Cost estimating resources (RS Means, Yardstick, etc.)



Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BNPWSS - East Expansion VALE**  
 Client: **SaskWater**  
 Project No.: 2012-4093  
 Date: December 13, 2012

**Cost Estimate**  
**Intake & Pump Station Preliminary**

ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
<b>DIVISION 5 - METAL</b>							
<b>1</b>	<b>Metal</b>						
1.01	Access Hatch (Man) (1 m x 1 m)/Ladders <sup>3</sup>		Each	4	\$5,511		\$22,044
1.02	Access Hatch (Pump) (2.6 m x 2.6 m) <sup>3</sup>		Each	2	\$11,022		\$22,044
1.03	Mezzanine Struct. Steel <sup>3</sup>		lump sum	1	\$43,875		\$43,875
1.04	Metal Stairs <sup>3</sup>		lump sum	1	\$157,481		\$157,481
1.05	Embedded Steel <sup>3</sup>		lump sum	1	\$94,998		\$94,998
1.06	Roof Hatches Screen <sup>3</sup>		lump sum	1	\$116,617		\$116,617
<b>2</b>	<b>Pre-Engineered Building</b>						
2.01	Pre-Engineered Building <sup>1</sup>				\$440,000		\$440,000

**TOTALS**

**Sub-Total (excluding taxes):**

**\$897,058**

1. Direct quote from vendor / supplier
2. Quotes from vendor / supplier with adjustments for site specific project.
3. Previous project with adjustment for inflation.
4. Cost estimating resources (RS Means, Yardstick, etc.)



Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BNPWSS - East Expansion VALE**  
Client: **SaskWater**  
Project No.: 2012-4093  
Date: December 13, 2012

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**Cost Estimate**  
***Intake & Pump Station Preliminary***

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ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
<b>DIVISION 7 - THERMAL AND MOISTURE PROTECTION</b>							
<b>1</b>	<b>Insulation</b>						
<b>1.01</b>	Rigid Insulation 50 mm (Substructure Insulation) <sup>3</sup>		m <sup>2</sup>	213	\$89		\$18,957
<b>TOTALS</b>							

**Sub-Total (excluding taxes):** **\$18,957**

1. Direct quote from vendor / supplier
2. Quotes from vendor / supplier with adjustments for site specific project.
3. Previous project with adjustment for inflation.
4. Cost estimating resources (RS Means, Yardstick, etc.)



Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BNPWSS - East Expansion VALE**  
Client: **SaskWater**  
Project No.: 2012-4093  
Date: December 13, 2012

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**Cost Estimate**  
**Intake & Pump Station Preliminary**

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ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
<b>DIVISION 8 - DOORS AND WINDOWS</b>							
<b>1</b>	<b>Doors</b>						
<b>1.01</b>	Insulated Metal Double Door <sup>3</sup>		Each	1	\$2,315		\$2,315
<b>1.02</b>	Insulated Metal Single Door <sup>3</sup>		Each	3	\$1,764		\$5,291
<b>1.03</b>	Interior Doors <sup>3</sup>		Each	3	\$1,212		\$3,637
<b>1.04</b>	Roll-up Insulated Door <sup>3</sup>		Each	1	\$11,022		\$11,022

<b>TOTALS</b>							
<b>Sub-Total (excluding taxes):</b>							<b>\$22,264</b>

1. Direct quote from vendor / supplier
2. Quotes from vendor / supplier with adjustments for site specific project.
3. Previous project with adjustment for inflation.
4. Cost estimating resources (RS Means, Yardstick, etc.)



Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BNPWSS - East Expansion VALE**  
Client: **SaskWater**  
Project No.: 2012-4093  
Date: December 13, 2012

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**Cost Estimate**  
***Intake & Pump Station Preliminary***

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ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
<b>DIVISION 9 - FINISHES</b>							
<b>1</b>	<b>Finishes</b>						
<b>1.01</b>	Building Painting <sup>4</sup>		m <sup>2</sup>	762	\$13		\$9,906
<b>1.02</b>	Gypsum Wallboard <sup>4</sup>		m <sup>2</sup>	140	\$20		\$2,800.00
<b>1.03</b>	Painting of Doors <sup>3</sup>		each	7	\$165		\$1,155.00

**TOTALS**

**Sub-Total (excluding taxes):**

**\$13,861**

1. Direct quote from vendor / supplier
2. Quotes from vendor / supplier with adjustments for site specific project.
3. Previous project with adjustment for inflation.
4. Cost estimating resources (RS Means, Yardstick, etc.)



Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BNPWSS - East Expansion VALE**  
Client: **SaskWater**  
Project No.: 2012-4093  
Date: December 13, 2012

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**Cost Estimate**  
**Intake & Pump Station Preliminary**

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ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
<b>DIVISION 10 - SPECIALTIES</b>							
<b>1</b>	<b>Specialties</b>						
<b>1.01</b>	Miscellaneous Furnishings <sup>3</sup>		lot	1	\$7,715		\$7,715
<b>1.02</b>	Davit Arm & Rescue Life line		each	1	\$2,500		\$2,500
<b>1.03</b>	Tripod and Rescue Life line		each	1	\$3,800		\$3,800
<b>1.04</b>	Davit Arm Sleeve		each	1	\$250	\$500	\$750
<b>1.05</b>	Life Line		each	2	\$1,200	\$150	\$2,700
<b>TOTALS</b>							

**Sub-Total (excluding taxes):**

**\$17,465**

1. Direct quote from vendor / supplier
2. Quotes from vendor / supplier with adjustments for site specific project.
3. Previous project with adjustment for inflation.
4. Cost estimating resources (RS Means, Yardstick, etc.)



Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BPNPWSS - East Expansion VALE**  
Client: **SaskWater**  
Project No.: 2012-4093  
Date: December 13, 2012

**Cost Estimate**  
**Intake & Pump Station Preliminary**

ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
<b>DIVISION 11 Process Mechanical</b>							
<b>1</b>	<b>Pumps</b>						
1.01	Raw Water Pumps (29 ML/d @ 115 m) <sup>3</sup>		each	4	\$150,000	\$ 55,000	\$820,000
1.02	Low Lift Pumps <sup>3</sup>		each	3	\$350,000	\$ 40,000	\$1,170,000
<b>2</b>	<b>Screens</b>						
2.01	Travelling Water Screens <sup>3</sup>		each	2	\$225,000	\$ 60,000	\$570,000
<b>3</b>	<b>Piping</b>						
3.01	75 m steel (Air Release Lines) <sup>2</sup>		m	15	\$85	\$ 60	\$2,175
3.02	200 mm PVC (Screen Wash Drain) <sup>2</sup>		m	20	\$350	\$ 80	\$8,600
3.03	400 mm steel XH (Pump Discharge, Pressure Relief) <sup>2</sup>		m	30	\$1,100	\$ 350	\$43,500
3.04	600 mm steel XH (Meter Section) <sup>2</sup>		m	5	\$1,900	\$ 600	\$12,500
3.05	600 mm steel (Low Lift Pumps) <sup>2</sup>		m	18	\$1,500	\$ 400	\$34,200
3.06	750 mm steel XH (Header) <sup>2</sup>		m	60	\$3,200	\$ 800	\$240,000
3.07	900 mm lateral XH (Swab Launch) <sup>2</sup>		m	3	\$4,000	\$ 1,200	\$15,600
3.08	150 mm steel XH (Drains, screen wash) <sup>2</sup>		m	30	\$400	\$ 120	\$15,600
3.09	Epoxy Coating <sup>3</sup>		m <sup>2</sup>	350	\$110		\$38,500
<b>4</b>	<b>Fittings</b>						
4.01	750 x 400 mm tee <sup>2</sup>		each	4	\$3,500	\$ 1,200	\$18,800
4.02	750 mm 90° elbow <sup>2</sup>		each	2	\$7,000	\$ 1,800	\$17,600
4.03	150 mm 90° elbow <sup>2</sup>		each	4	\$300	\$ 100	\$1,600
4.04	750 mm blind flange <sup>2</sup>		each	1	\$1,500	\$ 500	\$2,000
4.05	400 mm CI 300 flange <sup>2</sup>		each	22	\$1,800	\$ 500	\$50,600

1. Direct quote from vendor / supplier

2. Quotes from vendor / supplier with adjustments for site specific project.

3. Previous project with adjustment for inflation.

4. Cost estimating resources (RS Means, Yardstick, etc.)



Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BPNPWSS - East Expansion VALE**  
Client: **SaskWater**  
Project No.: 2012-4093  
Date: December 13, 2012

**Cost Estimate**  
**Intake & Pump Station Preliminary**

ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$ /UNIT	\$ INSTALL	COST
4.06	750 mm CI 300 flange <sup>2</sup>		each	6	\$4,500	\$ 2,000	\$39,000
4.07	600 mm CI 300 flange <sup>2</sup>		each	4	\$3,500	\$ 600	\$16,400
4.08	150 mm CI 300 flange <sup>2</sup>		each	4	\$400	\$ 150	\$2,200
4.09	200 mm CI 300 flange <sup>2</sup>		each	8	\$600	\$ 200	\$6,400
4.10	Pipe Supports, Stands, Racks, Brackets, Hangers <sup>3</sup>		each	1	\$10,000	\$ 4,000	\$14,000
<b>5</b>	<b>Valves</b>						
5.01	CAV						
	100 mm ARV - pump discharge <sup>3</sup>		each	4	\$1,900	\$ 700	\$10,400
	75 mm header CAV <sup>3</sup>		each	1	\$1,500	\$ 500	\$2,000
5.02	BUV						
	400 mm BUV, electric actuator - pump discharge <sup>2</sup>		each	4	\$12,000	\$ 4,000	\$64,000
	750 mm BUV Flowmeter Isolation <sup>2</sup>		each	1	\$25,000	\$ 6,000	\$31,000
	400 mm BUV, manual - pressure relief line <sup>2</sup>		each	1	\$8,000	\$ 4,000	\$12,000
	200 mm BUV, PRV bypass drain <sup>2</sup>		each	1	\$1,500	\$ 800	\$2,300
	200 mm BUV with electric actuator (screen wash) <sup>2</sup>		each	2	\$9,700	\$ 1,500	\$22,400
	100 mm BUV, air lines and drain <sup>3</sup>		each	7	\$600	\$ 300	\$6,300
5.03	CHV						
	400 mm CHV - pump discharge <sup>2</sup>		each	4	\$35,000	\$ 5,000	\$160,000
5.04	PRV						
	400 mm PRV, with closed limit switch <sup>2</sup>		each	1	\$32,000	\$ 8,000	\$40,000

1. Direct quote from vendor / supplier

2. Quotes from vendor / supplier with adjustments for site specific project.

3. Previous project with adjustment for inflation.

4. Cost estimating resources (RS Means, Yardstick, etc.)



Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BNPWSS - East Expansion VALE**  
Client: **SaskWater**  
Project No.: 2012-4093  
Date: December 13, 2012

**Cost Estimate**  
**Intake & Pump Station Preliminary**

ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
5.05	KGV						
	750 mm Knife Gate Valve <sup>2</sup>		each	1	\$60,000	\$ 15,000	\$75,000
5.06	SGV						
	Sluice Gates with electric actuators (750 x 750 mm) <sup>3</sup>		each	7	\$35,000	\$ 8,000	\$301,000
	Sluice Gates with electric actuators (900 x 900 mm) <sup>3</sup>		each	1	\$42,000	\$ 12,000	\$54,000
	Stop Logs <sup>3</sup>		each	2	\$25,000	\$ 10,000	\$70,000

**TOTALS**

**Sub-Total (excluding taxes):**

**\$3,989,675**

1. Direct quote from vendor / supplier
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3. Previous project with adjustment for inflation.
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Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BNPWSS - East Expansion VALE**  
Client: **SaskWater**  
Project No.: 2012-4093  
Date: December 13, 2012

**Cost Estimate**  
**Intake & Pump Station Preliminary**

ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
<b>DIVISION 13 - INSTRUMENTATION AND CONTROLS</b>							
<b>1</b>	<b>Instruments</b>						
1.01	Misc Level <sup>3 4</sup>		ea	9	\$5,500		\$49,500
1.02	Pressure Transmitters <sup>3 4</sup>		ea	5	\$3,000		\$15,000
1.03	Temperature Transmitter <sup>3 4</sup>		ea	2	\$3,500		\$7,000
1.04	Mag Flow-meter - Fish Return <sup>3 4</sup>		ea	2	\$11,000		\$22,000
1.05	Main Flow Meter <sup>3 4</sup>		ea	1	\$45,000		\$45,000
1.06	Misc Level, temp, switches <sup>3 4</sup>		lot	1	\$11,000		\$11,000
1.07	Instrumentation Cable <sup>3 4</sup>		lot	1	\$42,000		\$42,000
1.08	Instrumentation Tray <sup>3 4</sup>		lot	1	\$35,000		\$35,000
<b>2</b>	<b>Controls</b>						
2.01	VFD control wiring <sup>3 4</sup>		lot	7	\$7,500		\$52,500
2.02	MCC Control wiring <sup>3 4</sup>		lot	1	\$50,000		\$50,000
2.03	Valve Acuator wiring <sup>3 4</sup>		lot	14	\$5,000		\$70,000
2.04	Switchgear Control Wiring <sup>3 4</sup>		lot	1	\$7,500		\$7,500
2.05	Controls Tray <sup>3 4</sup>		lot	1	\$12,000		\$12,000
<b>3</b>	<b>Control Panel</b>						
3.01	Shop Drawings - wiring diagrams <sup>3 4</sup>		lot	1	\$45,000		\$45,000
3.02	Panel Hardware - Encl, TB's, wiring, PS, UPS <sup>3 4</sup>		lot	1	\$17,500		\$17,500
3.03	Programmable Logic Controller <sup>3 4</sup>		lot	1	\$30,000		\$30,000
3.04	Misc communications equip <sup>3 4</sup>		lot	1	\$12,000		\$12,000
3.05	HMI PC Workstation <sup>3 4</sup>		ea	2	\$6,000		\$12,000

1. Direct quote from vendor / supplier
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Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BNPWSS - East Expansion VALE**  
Client: **SaskWater**  
Project No.: 2012-4093  
Date: December 13, 2012

**Cost Estimate**  
**Intake & Pump Station Preliminary**

ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
3.06	Panelview Hardware <sup>3 4</sup>		ea	1	\$10,000		\$10,000
3.07	HMI Software <sup>3 4</sup>		ea	1	\$8,000		\$8,000
<b>4</b>	<b>Programming Services</b>						
4.01	PLC programming <sup>3</sup>		lot	1	\$120,000		\$120,000
4.02	HMI programming (Done Internally) <sup>3</sup>		lot	1	\$60,000		\$60,000
<b>5</b>	<b>Generator I&amp;C</b>						
5.01	Fuel Level transmitters <sup>3 4</sup>		ea	3	\$3,500		\$10,500
5.02	Room Temp Transmitters <sup>3 4</sup>		ea	3	\$1,500		\$4,500
5.03	Diesel Tank Fill Controls <sup>3 4</sup>		lot	1	\$6,000		\$6,000

**TOTALS**

**Sub-Total (excluding taxes):**

**\$754,000**

1. Direct quote from vendor / supplier
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3. Previous project with adjustment for inflation.
4. Cost estimating resources (RS Means, Yardstick, etc.)



Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BNPWSS - East Expansion VALE**  
Client: **SaskWater**  
Project No.: 2012-4093  
Date: December 13, 2012

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**Cost Estimate**  
***Intake & Pump Station Preliminary***

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ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
<b>DIVISION 14 - CONVEYING SYSTEM</b>							
1	Overhead Crane (10 Tonne)(Span= 16 m, Lift Height= 6.5 m, Total length=32 m, Electric Crane)						
1.01	Crane <sup>1</sup>				\$95,736.00		\$95,736
<b>TOTALS</b>							

**Sub-Total (excluding taxes):** **\$95,736**

1. Direct quote from vendor / supplier
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3. Previous project with adjustment for inflation.
4. Cost estimating resources (RS Means, Yardstick, etc.)



Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BPNPWSS - East Expansion VALE**  
Client: **SaskWater**  
Project No.: 2012-4093  
Date: December 13, 2012

**Cost Estimate**  
**Intake & Pump Station Preliminary**

ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
<b>DIVISION 15 - MECHANICAL</b>							
<b>1</b>	<b>Electrical Room HVAC</b>						
1.01	Air Handling Units w/ Condenser <sup>1</sup>		each	3	\$40,000	37000	\$231,000
1.02	Louvres <sup>3</sup>		m <sup>2</sup>	17	\$550	500	\$17,850
1.03	Dampers- Motorized <sup>3</sup>		m <sup>2</sup>	12	\$1,000	900	\$22,800
1.04	Dampers- Gravity <sup>3</sup>		each	1	\$800	500	\$1,300
1.05	Ducting-Galvanized <sup>3</sup>		kg	1000	\$5	25	\$30,000
1.06	Diffusers & Grilles <sup>3</sup>		each	20	\$300	90	\$7,800
1.07	Insulation - Ducting <sup>4</sup>		m <sup>2</sup>	90	\$20	90	\$9,900
1.08	Acoustic Lining - Ducting <sup>4</sup>		m <sup>2</sup>	10	\$15	90	\$1,050
1.09	Duct Accessories <sup>3</sup>		lot	1	\$12,000	8000	\$20,000
1.10	Controls <sup>3</sup>		lot	1	\$10,000	10000	\$20,000
1.11	Unit Heater <sup>3</sup>		each	2	\$1,500	1000	\$5,000
1.12	AHU Drain & Piping <sup>3</sup>		lot	1	\$1,200	1500	\$2,700
<b>2</b>	<b>Genset Room</b>						
2.01	Dampers- Genset Intake, Discharge, Recirc <sup>3</sup>		m <sup>2</sup>	15	\$1,000	900	\$28,500
2.02	Louvres - Genset Intake, Discharge <sup>3</sup>		m <sup>2</sup>	12	\$550	500	\$12,600
2.03	Ducting - Galv <sup>4</sup>		kg	600	\$5	25	\$18,000
2.04	Insulation - Ducting <sup>4</sup>		m <sup>2</sup>	15	\$20	90	\$1,650
2.05	Exhaust Fans <sup>1</sup>		each	1	\$3,000	3000	\$6,000
2.06	Genset Muffler <sup>3</sup>		lot	1		2000	\$2,000
2.07	Exhaust Piping <sup>3</sup>		m	5	\$100	270	\$1,850
2.08	Exhaust Insulation <sup>3</sup>		lot	1	\$3,000	4000	\$7,000
2.09	Transfer Fan <sup>3</sup>		each	1	\$4,000	3000	\$7,000

1. Direct quote from vendor / supplier

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3. Previous project with adjustment for inflation.

4. Cost estimating resources (RS Means, Yardstick, etc.)

Project: **BNPWSS - East Expansion VALE**  
 Client: **SaskWater**  
 Project No.: 2012-4093  
 Date: December 13, 2012

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**Cost Estimate**  
**Intake & Pump Station Preliminary**

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ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
2.10	Diesel Piping <sup>4</sup>		m	25	\$26	85	\$2,775
2.11	Valves <sup>3</sup>		each	8	\$200	90	\$2,320
2.12	Pipe Fittings		lot	1	\$1,500	1500	\$3,000
2.13	Duct Accessories		lot	1	\$3,000	2000	\$5,000
2.14	Controls		lot	1	\$5,000	5000	\$10,000
2.15	Unit Heater		each	2	\$1,500	1000	\$5,000
2.16	Day Tank		each	1	\$12,000	7500	\$19,500
2.17	Washable Intake Air Screens		lot	1	\$8,000	3000	\$11,000
<b>3</b>	<b>Pump Room HVAC</b>						
3.01	Exhaust Fans c/w Dampers & Hoods <sup>3</sup>		each	4	\$5,000	4000	\$36,000
3.02	Motorized Dampers <sup>3</sup>		m <sup>2</sup>	9	\$1,000	900	\$17,100
3.03	Louvres <sup>3</sup>		m <sup>2</sup>	15	\$500	500	\$15,000
3.04	Unit Heaters <sup>3</sup>		each	6	\$1,500	1000	\$15,000
3.05	Inline Centrifugal Fan <sup>3</sup>		each	1	\$5,000	4000	\$9,000
3.06	Ducting - Galv <sup>4</sup>		kg	300	\$5	25	\$9,000
3.07	Duct Accessories <sup>3</sup>		lot	1	\$2,000	1500	\$3,500
3.08	Duct Insulation <sup>4</sup>		m <sup>2</sup>	10	\$20	90	\$1,100
3.09	Drum Louvres <sup>3</sup>		each	3	\$600	500	\$3,300
3.10	Controls <sup>3</sup>		lot	1	\$10,000	10000	\$20,000
3.11	Washable Intake Air Screens <sup>3</sup>		lot	1	\$6,000	3000	\$9,000

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Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BNPWSS - East Expansion VALE**  
Client: **SaskWater**  
Project No.: 2012-4093  
Date: December 13, 2012

**Cost Estimate**  
**Intake & Pump Station Preliminary**

ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
<b>4</b>	<b>Control Room HVAC</b>						
4.01	Exhaust Fan <sup>3</sup>		each	2	\$300	500	\$1,600
4.02	Transfer Damper <sup>3</sup>		each	2	\$300	400	\$1,400
4.03	Ducting <sup>4</sup>		kg	30	\$5	25	\$900
4.04	Duct Accessories <sup>3</sup>		lot	1	\$400	400	\$800
4.05	Ductless Split Heat Pump <sup>3</sup>		each	1	\$5,000	6000	\$11,000
<b>5</b>	<b>Plumbing</b>						
5.01	Potable Water Service-Valve and Strainer <sup>3</sup>		lot	1	\$500	500	\$1,000
5.02	Potable Water Service-Backflow Preventer <sup>3</sup>		each	1	\$750	500	\$1,250
5.03	Potable Water Service-Expansion Tank <sup>3</sup>		each	1	\$300	300	\$600
5.04	Potable Water Service-Flow Meter <sup>3</sup>		each	1	\$1,000	500	\$1,500
5.05	Washroom-Water Closet <sup>4</sup>		each	1	\$350	600	\$950
5.06	Washroom-Lavatory <sup>4</sup>		each	1	\$350	400	\$750
5.07	Washroom-Water Heater <sup>3</sup>		each	1	\$400	500	\$900
5.08	Floor Drains <sup>3</sup>		each	4	\$500	500	\$4,000
5.09	Drain Piping <sup>3</sup>		m	100	\$14	85	\$9,900
5.10	Copper Piping <sup>4</sup>		m	100	\$40	40	\$8,000
5.11	Hose Reels <sup>3</sup>		each	2	\$500	400	\$1,800
<b>6</b>	<b>Site &amp; Fuel Storage</b>						
6.04	Diesel Storage Tank- Fireguard <sup>3</sup>		each	1	\$16,000	10000	\$26,000
6.05	Diesel Pump <sup>3</sup>		each	1	\$3,000	1500	\$4,500
6.06	Diesel Pump- Spare <sup>3</sup>		each	1	\$3,000		\$3,000

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Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

Project: **BPNPWSS - East Expansion VALE**  
 Client: **SaskWater**  
 Project No.: 2012-4093  
 Date: December 13, 2012

**Cost Estimate**  
**Intake & Pump Station Preliminary**

ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
6.07	Diesel Piping <sup>3</sup>		m	15	\$26	85	\$1,665
6.08	Valves <sup>3</sup>		each	8	\$200	90	\$2,320
6.09	Pipe Fittings <sup>3</sup>		lot	1	\$1,500	600	\$2,100
6.10	Tank Fittings <sup>3</sup>		lot	1	\$3,000	800	\$3,800
6.11	Overfill Valve <sup>3</sup>		each	1	\$1,200	500	\$1,700
6.12	Overfill Alarm <sup>3</sup>		each	1	\$800	500	\$1,300
6.13	Fill Box <sup>3</sup>		each	1	\$2,500	1500	\$4,000
6.14	1750 FRP Waste Water Storage Tank <sup>3</sup>		each	1	\$3,000	6000	\$9,000
6.15	U/G Piping-Waste Water <sup>4</sup>		m	20	\$15	180	\$3,900
6.16	Robar Couplings <sup>3</sup>		each	2	\$300	360	\$1,320
7	<b>Miscellaneous</b>						
7.01	Fire Extinguishers - Dry Chem <sup>3</sup>		each	8	\$200	90	\$2,320
7.02	Fire Extinguishers - CO2 <sup>3</sup>		each	1	\$500	90	\$590
7.03	Hoisting <sup>3</sup>		each	5	\$1,500	0	\$7,500
7.04	Air Balance <sup>3</sup>		lot	1	\$15,000		\$15,000
7.05	Commissioning <sup>3</sup>		lot	1	\$15,000		\$15,000
<b>TOTALS</b>							

**Sub-Total (excluding taxes):**

**\$801,960**

1. Direct quote from vendor / supplier
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4. Cost estimating resources (RS Means, Yardstick, etc.)

Project: **BPNPWSS - East Expansion VALE**  
 Client: **SaskWater**  
 Project No.: 2012-4093  
 Date: December 13, 2012

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**Cost Estimate**  
**Intake & Pump Station Preliminary**

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ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
<b>DIVISION 16 - ELECTRICAL</b>							
<b>1</b>	<b>Electrical</b>						
1.01	Concrete Encased Duct Bank & Conductors & Conc Vault <sup>4</sup>					\$	125,000
1.02	Ext Transformer & Breaker for Port Generator <sup>4</sup>					\$	75,000
1.03	5kV Switchgear Arc Resistant <sup>2</sup>		lot	1	\$ 1,250,000	\$ 125,000	\$ 1,375,000
1.04	MV Variable Frequency Drives <sup>2</sup>		each	4	\$ 275,000	\$ 40,000	\$ 1,260,000
1.05	UPS Sw-Gr and VFD Control Power <sup>3</sup>		each	2	\$ 17,500	\$ 5,000	\$ 45,000
1.06	1250 kW Standby Diesel Generator <sup>4</sup>		each	1	\$ 310,000	\$ 31,000	\$ 341,000
1.07	Dry transformers 4160:600 Volt <sup>4</sup>		each	2	\$ 45,000	\$ 3,000	\$ 96,000
1.08	600V Motor Control Centre & Fish Return VFD's <sup>2 4</sup>		each	1	\$ 225,000	\$ 60,000	\$ 285,000
1.09	208V Panelboards and Dry Transformers <sup>4</sup>		each	2	\$ 12,000	\$ 12,000	\$ 48,000
1.10	Cable Trays and In-Slab Ducts and Conduits <sup>3</sup>		lot	1	\$ 45,000	\$ 65,000	\$ 110,000
1.11	5kV Cabling <sup>3</sup>		lot	1	\$ 75,000	\$ 25,000	\$ 100,000
1.12	600V Cabling <sup>3</sup>		lot	1	\$ 40,000	\$ 30,000	\$ 70,000
1.13	Grounding System <sup>3</sup>					\$	100,000
1.14	Building Lightning Rod Array & Grounding <sup>3</sup>					\$	50,000
1.15	HVAC Wiring <sup>3</sup>					\$	60,000
1.16	Building Receptacles <sup>3</sup>					\$	20,000
1.17	Building Lighting <sup>4</sup>		lot	1	\$ 45,000	\$ 65,000	\$ 110,000
1.18	Emergency & Exit Lighting <sup>4</sup>		lot	1	\$ 15,000	\$ 15,000	\$ 30,000
1.19	Fire Alarm System <sup>3</sup>		lot	1	\$ 20,000	\$ 35,000	\$ 55,000
1.20	Telephone and Data Wiring <sup>3</sup>					\$	6,000
1.21	Miscellaneous <sup>3</sup>		lot	1	\$ 50,000	\$ 50,000	\$ 100,000
1.22	Commissioning & Warranty Support <sup>3</sup>					\$	90,000

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4. Cost estimating resources (RS Means, Yardstick, etc.)



Project: **BNPWSS - East Expansion VALE**  
 Client: **SaskWater**  
 Project No.: 2012-4093  
 Date: December 13, 2012

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**Cost Estimate**  
**Intake & Pump Station Preliminary**

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ITEM NO.	ITEM	SECTION	UNIT	QUANTITY	\$/UNIT	\$ INSTALL	COST
2	SaskPower Electrical Service <sup>1</sup>					\$	350,000
3	SaskTel Phone service <sup>1</sup>					\$	15,000
<b>TOTALS</b>							
Sub-Total (excluding taxes):							<b>\$4,916,000</b>

1. Direct quote from vendor / supplier  
 2. Quotes from vendor / supplier with adjustments for site specific project.  
 3. Previous project with adjustment for inflation.  
 4. Cost estimating resources (RS Means, Yardstick, etc.)

# G

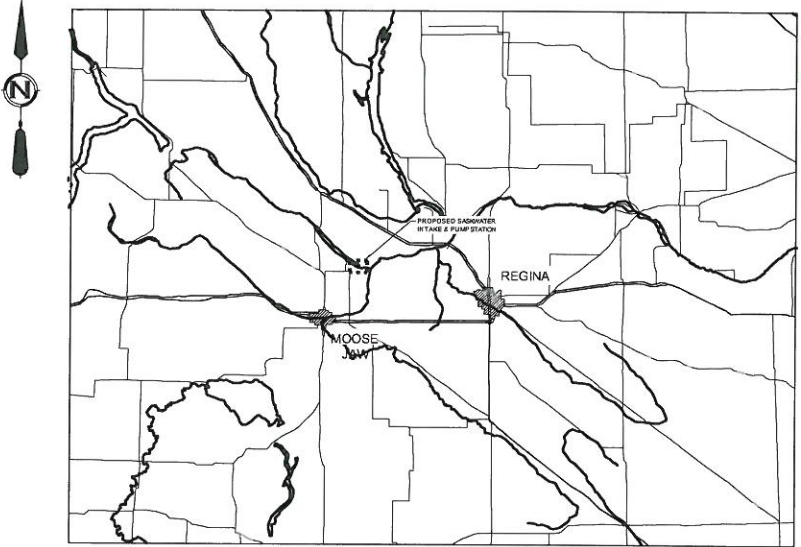
## Appendix G - Drawings

SASKWATER CORPORATION

BPNPWSS EAST  
(VALE) EXPANSION  
INTAKE & PUMP STATION

AE Project No. 2012-4093-00  
PRELIMINARY  
REPORT DRAWINGS

Sheet List Table	
Drawing No.	Drawing Title
4093-00-000	COVER PAGE
4093-00-101	SITE PLAN
4093-00-102	SECTIONS
4093-00-201	PLAN @ ELEVATION 507.000
4093-00-202	PLAN @ ELEVATION 513.200
4093-00-203	SECTION
4093-00-204	SECTIONS
4093-00-205	NORTH & EAST ELEVATIONS
4093-00-206	SOUTH & WEST ELEVATIONS
4093-00-301	INTAKE STRUCTURE
4093-00-401	INTAKE & LOW LIFT PUMPS
4093-00-402	TRAVELLING SCREENS
4093-00-403	HIGH LIFT PUMPS
4093-00-404	SWAB LAUNCH
4093-00-501	HVAC SCHEMATIC
4093-00-601	4160 V SINGLE LINE DIAGRAM
4093-00-602	4160 V SWITCHGEAR LAYOUT
4093-00-603	ELECTRICAL PLAN @ ELEVATION 513.200
4093-00-701	COMMUNICATION DIAGRAM



*David Schindler* 12-DEC-12  
PROJECT MANAGER DATE

ASSOCIATED ENGINEERING  
QUALITY MANAGEMENT SIGN-OFF  
Signature: *Colin Halliwell*  
Date: DEC 12/12

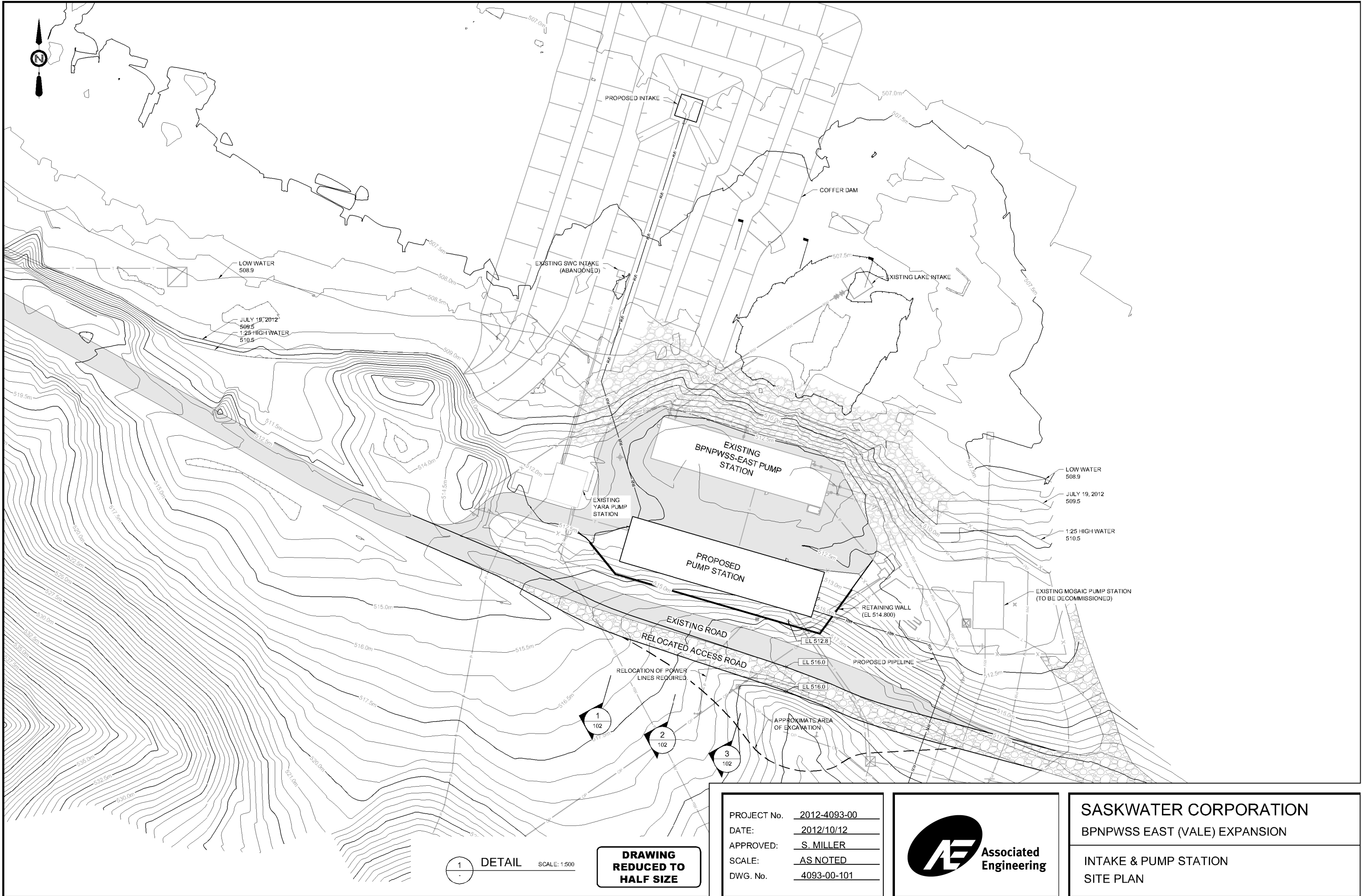


Associated  
Engineering

GLOBAL PERSPECTIVE.  
LOCAL FOCUS.

This Drawing Is For The Use Of The Client And Project Indicated  
No Representations Of Any Kind Are Made To Other Parties

\\S-sas-fs-01\projects\2012\4093\00\_Intake\_Pump\_Stat\Working\_Dwgs\100\_Civil\4093-00-101.dwg  
DATE: 2012-12-12, Adam Beatty



**DRAWING  
REDUCED TO  
HALF SIZE**

PROJECT No.	2012-4093-00
DATE:	2012/10/12
APPROVED:	S. MILLER
SCALE:	AS NOTED
DWG. No.	4093-00-101

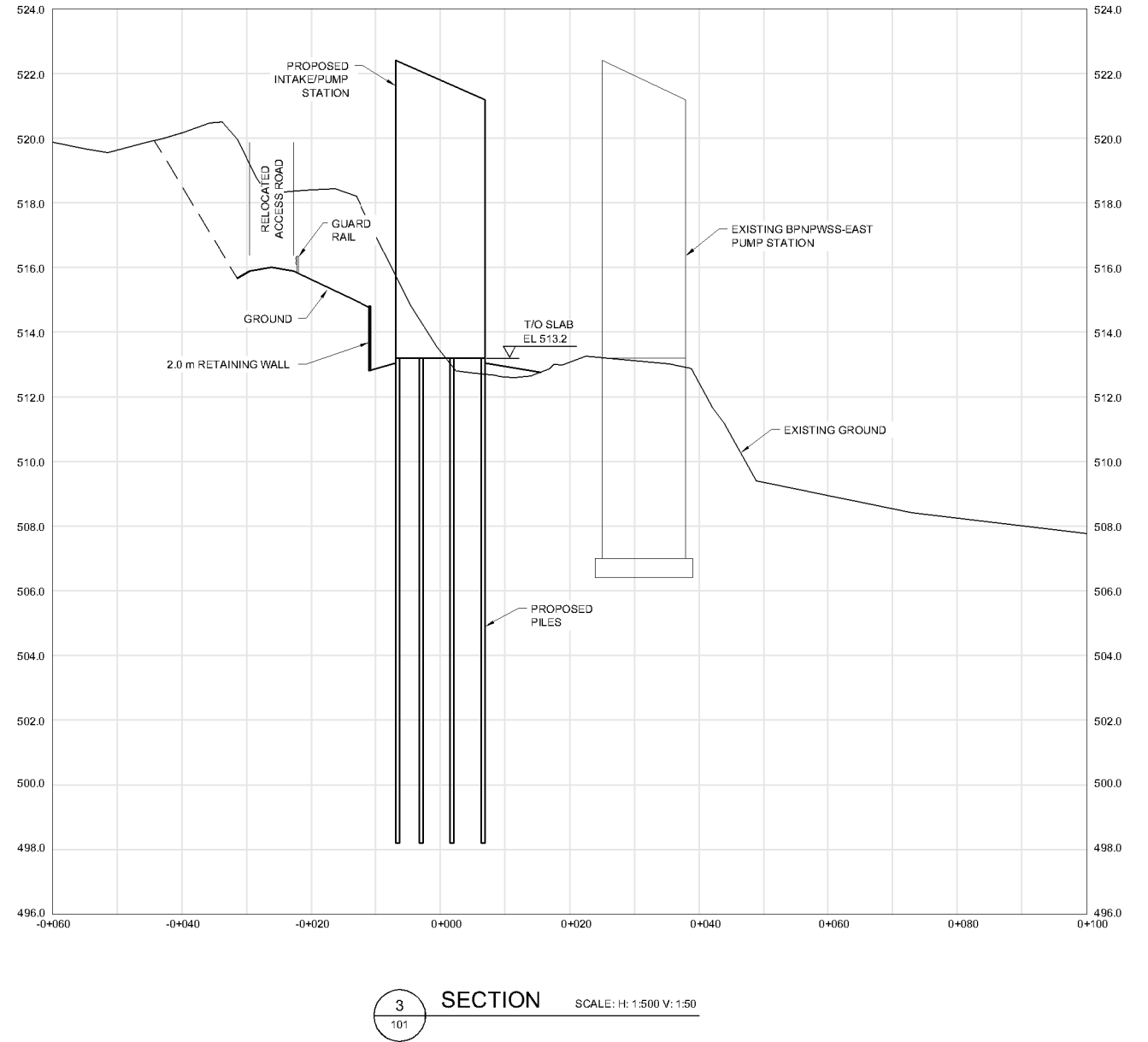
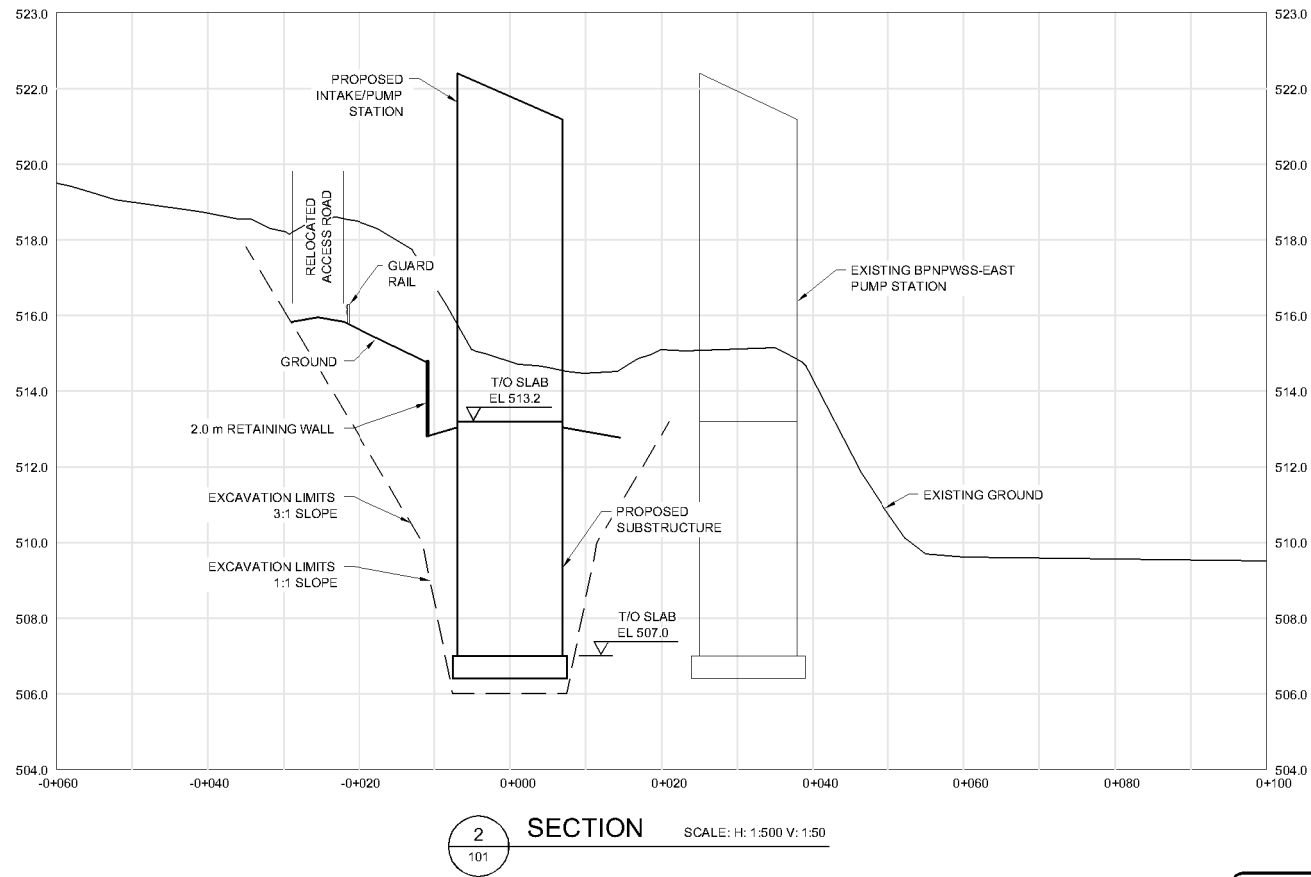
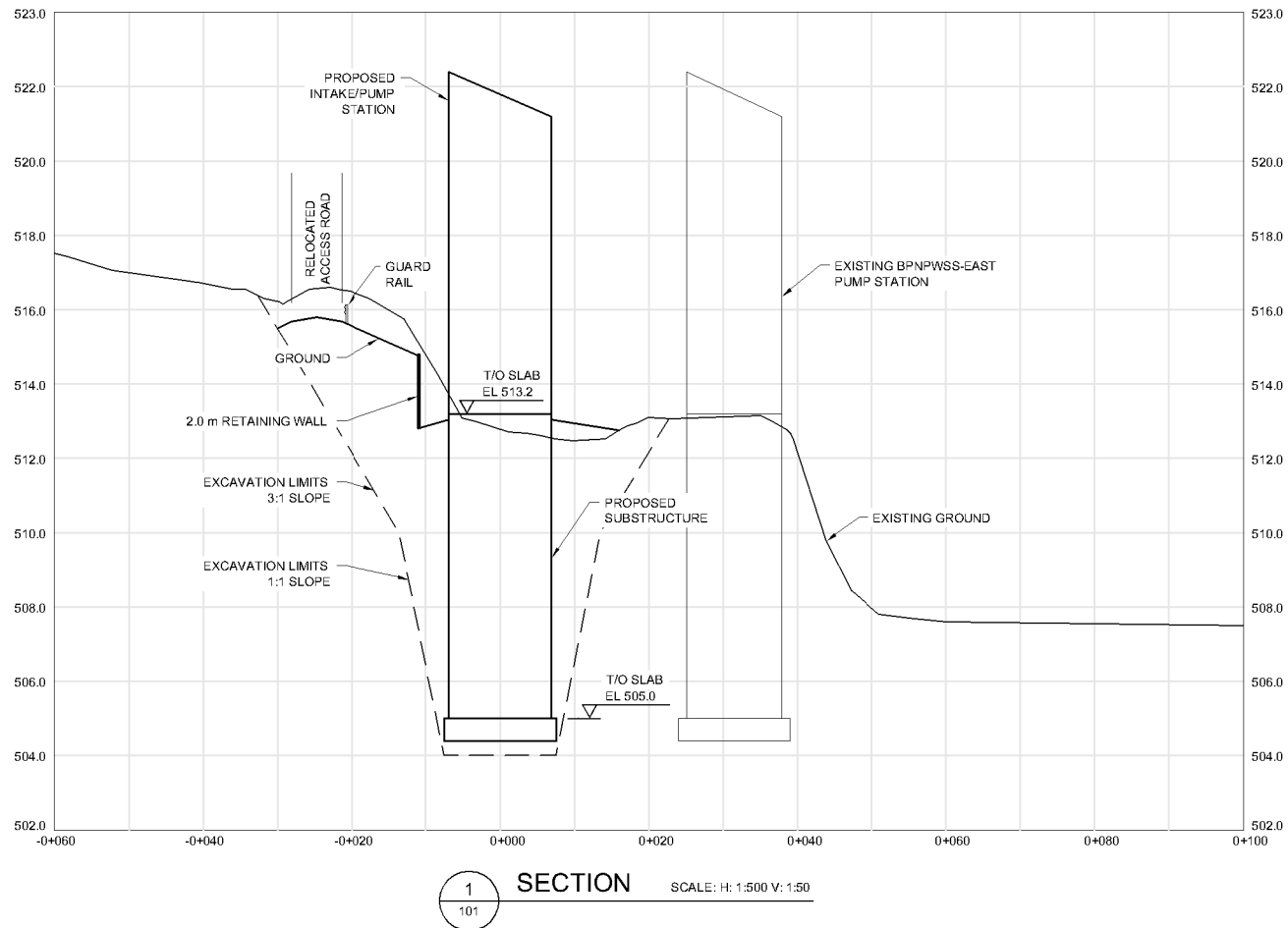


**SASKWATER CORPORATION**  
BPNPWSS EAST (VALE) EXPANSION

INTAKE & PUMP STATION  
SITE PLAN

This Drawing Is For The Use Of The Client And Project Indicated  
No Representations Of Any Kind Are Made To Other Parties

\\S-sas-fs-01\projects\2012\4093\00\_Intake\_Pump\_Stat\Working\_Dwgs\100\_Civil\4093-00-102.dwg  
DATE: 2012-12-12, Adam Beatty



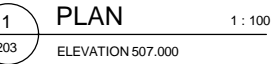
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DATE: 2012/10/12  
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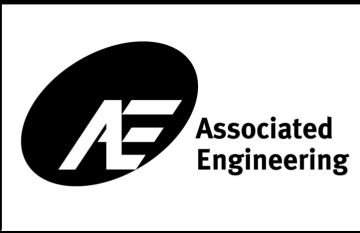
SASKWATER CORPORATION  
BPNPWSS EAST (VALE) EXPANSION

INTAKE & PUMP STATION  
SECTIONS

DRAWING  
REDUCED TO  
HALF SIZE



PROJECT No.	2012-4093-00
DATE:	2012/10/12
APPROVED:	C. HOLMES
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DWG. No.	4093-00-201

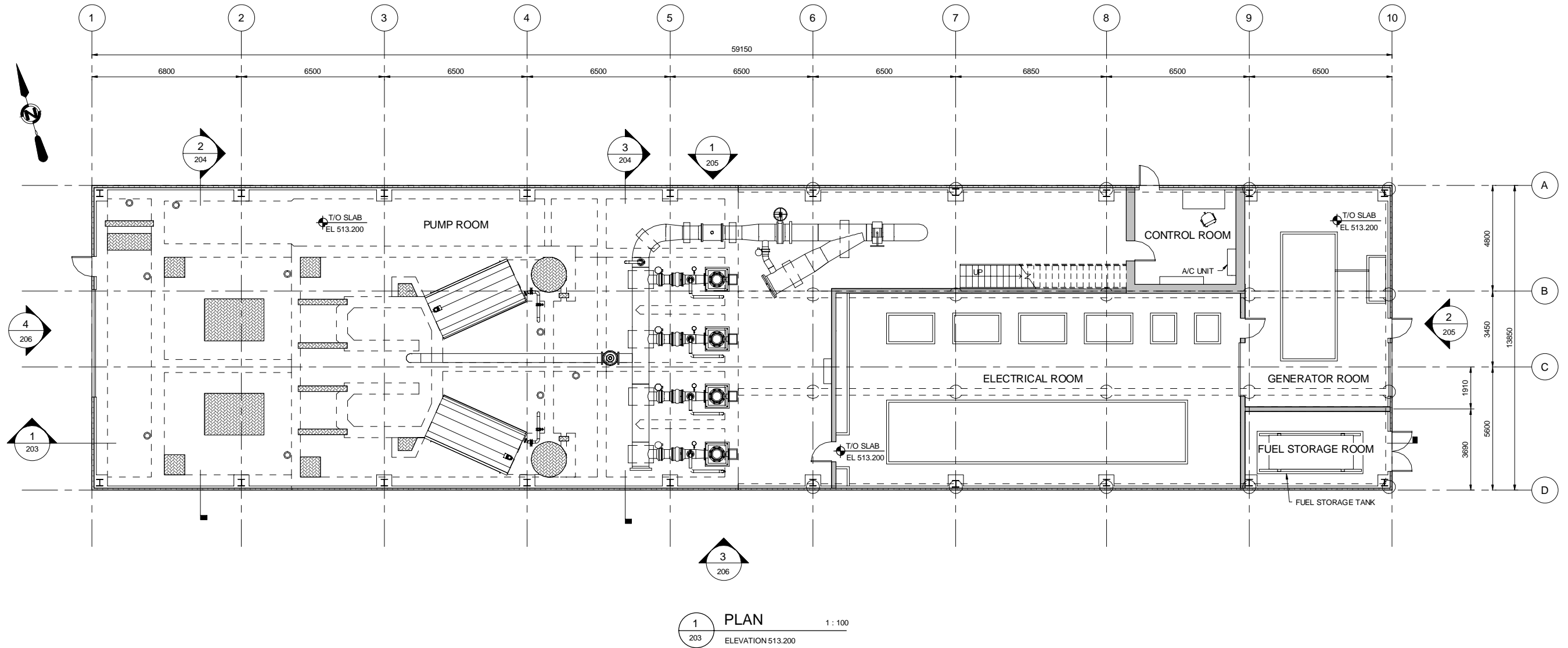


**SASKWATER COPORATION**  
**BPNPWSS EAST (VALE) EXPANSION**

**INTAKE & PUMP STATION**  
**PLAN @ ELEVATION 507.000**

This Drawing Is For The Use Of The Client And Project Indicated  
No Representations Of Any Kind Are Made To Other Parties

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DATE: 1/12/2012 1:53:04 PM



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APPROVED:	C. HOLMES
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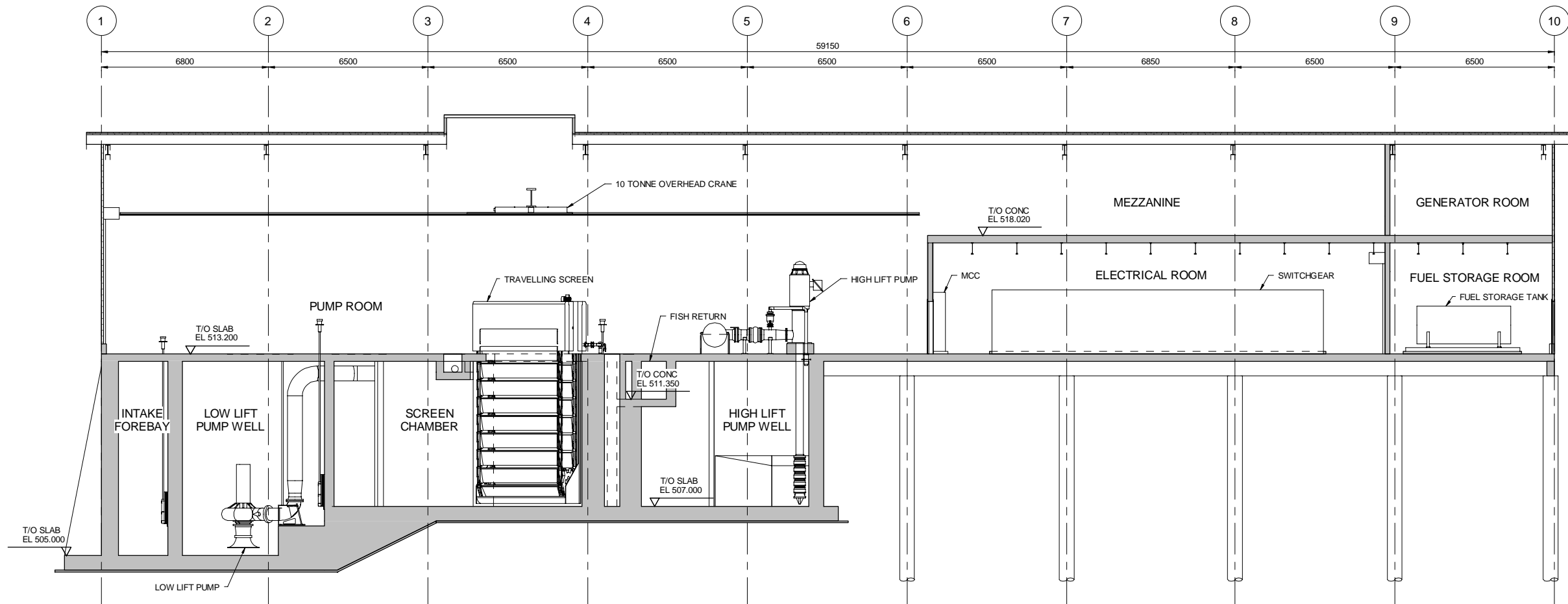


**SASKWATER COPORATION**  
BPNPWSS EAST (VALE) EXPANSION

INTAKE & PUMP STATION  
PLAN @ ELEVATION 513.200

This Drawing Is For The Use Of The Client And Project Indicated  
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1 SECTION 1 : 100  
201

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DATE: 2012/10/12  
APPROVED: C. HOLMES  
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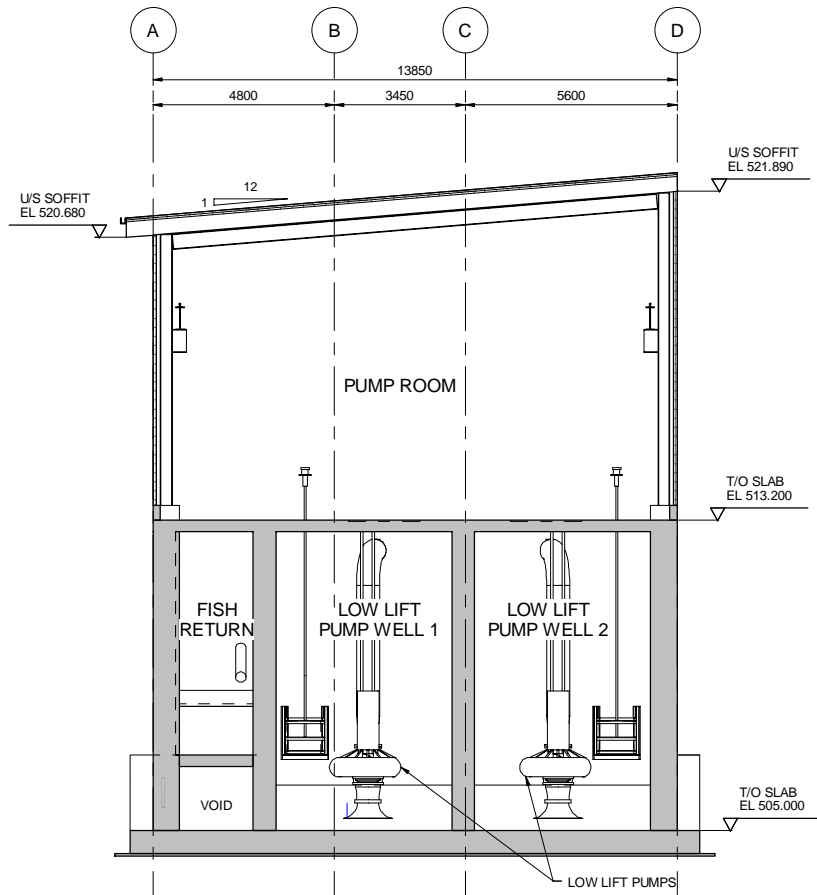


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BPNPWSS EAST (VALE) EXPANSION

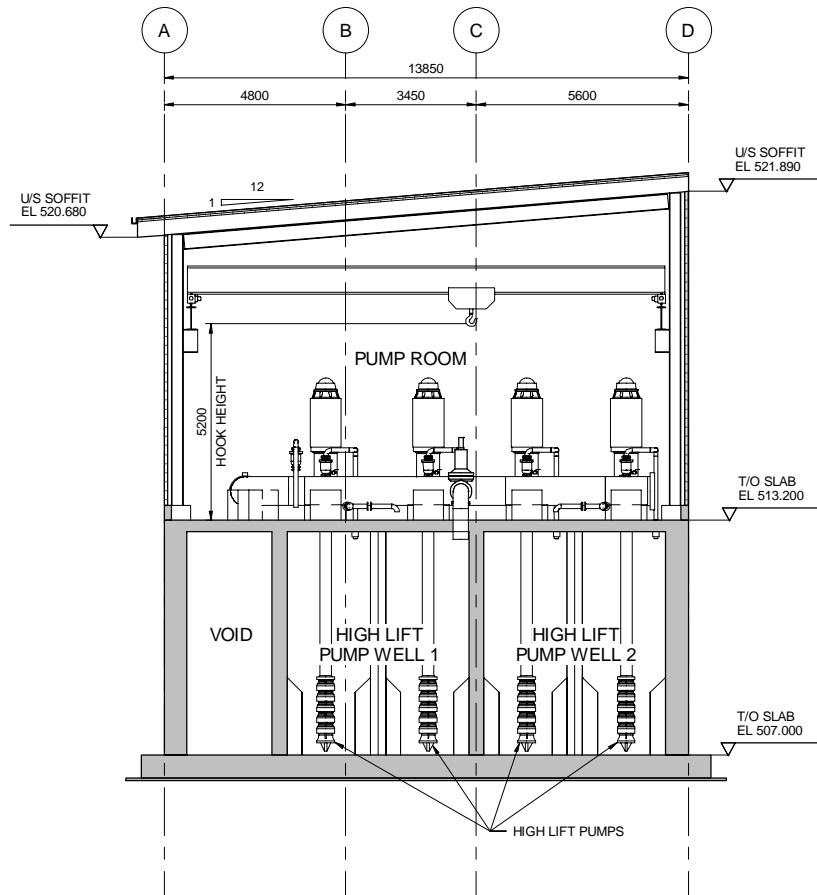
INTAKE & PUMP STATION  
SECTION

This Drawing Is For The Use Of The Client And Project Indicated  
No Representations Of Any Kind Are Made To Other Parties

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DATE: 1/12/2012 1:53:07 PM



2 SECTION 1:100  
201



3 SECTION 1:100  
201

**DRAWING  
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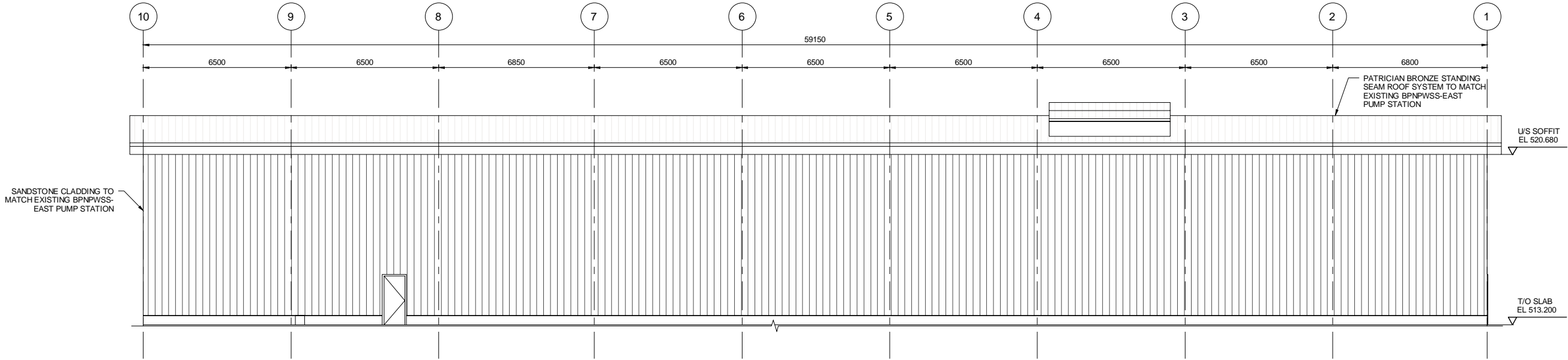
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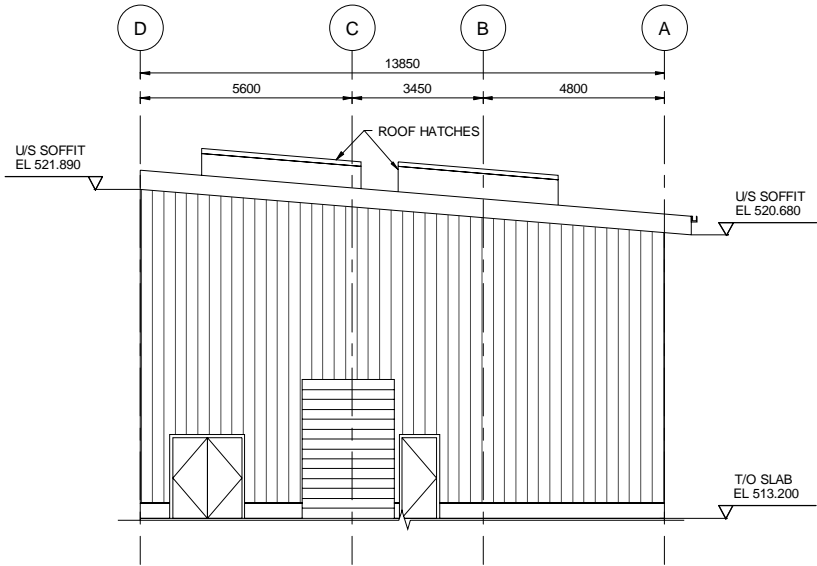
<b>SASKWATER COPORATION</b> BPNPWSS EAST (VALE) EXPANSION
INTAKE & PUMP STATION SECTIONS

This Drawing Is For The Use Of The Client And Project Indicated  
No Representations Of Any Kind Are Made To Other Parties

\\S-sas-fs-01\projects\2012\4093\00\_Intake\_Pump\_StatWorking\_Dwgs\300\_Structural\4093-00-300.rvt  
DATE: 1/12/2012 1:53:08 PM



1 ELEVATION 1 : 100  
202 NORTH



2 ELEVATION 1 : 100  
202 EAST

DRAWING  
REDUCED TO  
HALF SIZE

PROJECT No. 2012-4093-00  
DATE: 2012/10/12  
APPROVED: C. HOLMES  
SCALE: 1 : 100  
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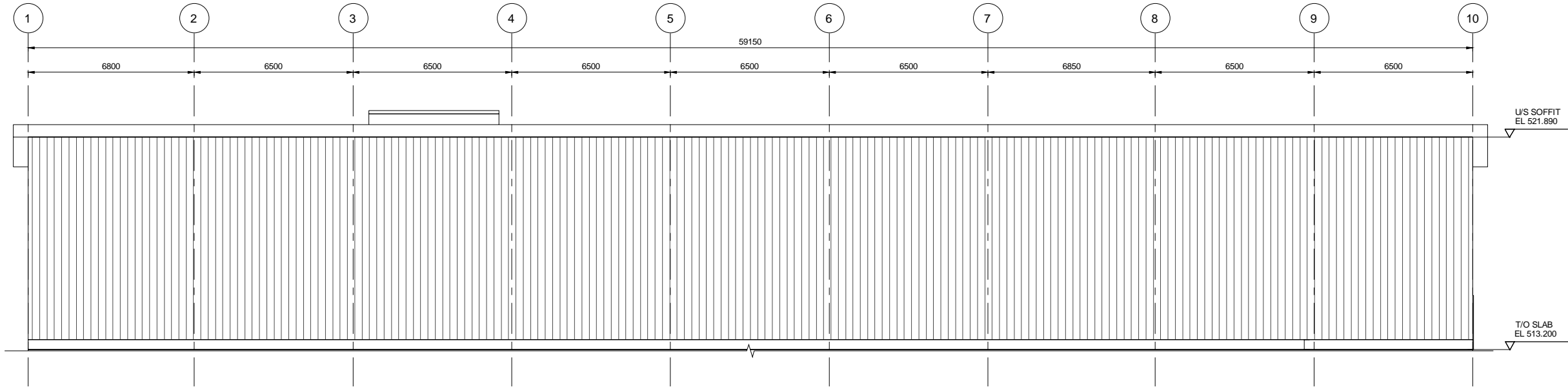


SASKWATER COPORATION  
BPNPWSS EAST (VALE) EXPANSION

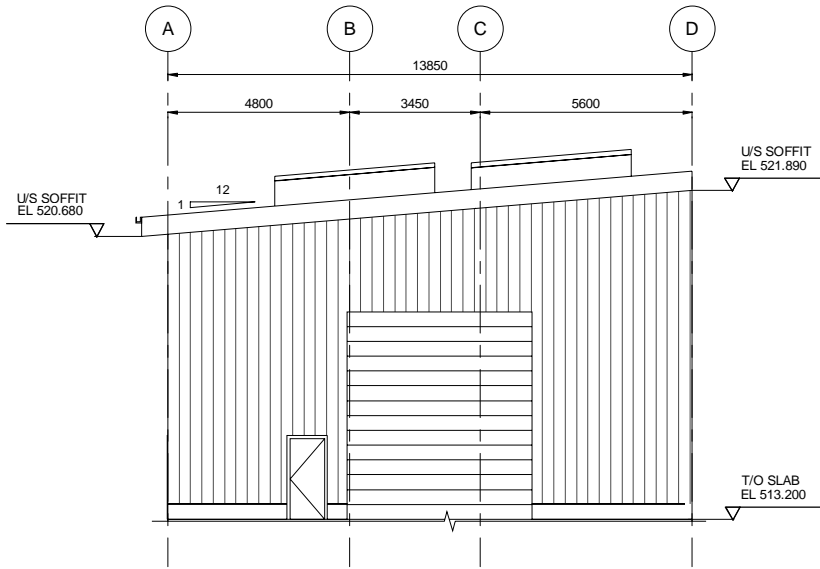
INTAKE & PUMP STATION  
NORTH & EAST ELEVATIONS

This Drawing Is For The Use Of The Client And Project Indicated  
No Representations Of Any Kind Are Made To Other Parties

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DATE: 1/12/2012 1:53:09 PM



3 ELEVATION 1 : 100  
202 SOUTH



4 ELEVATION 1 : 100  
202 WEST

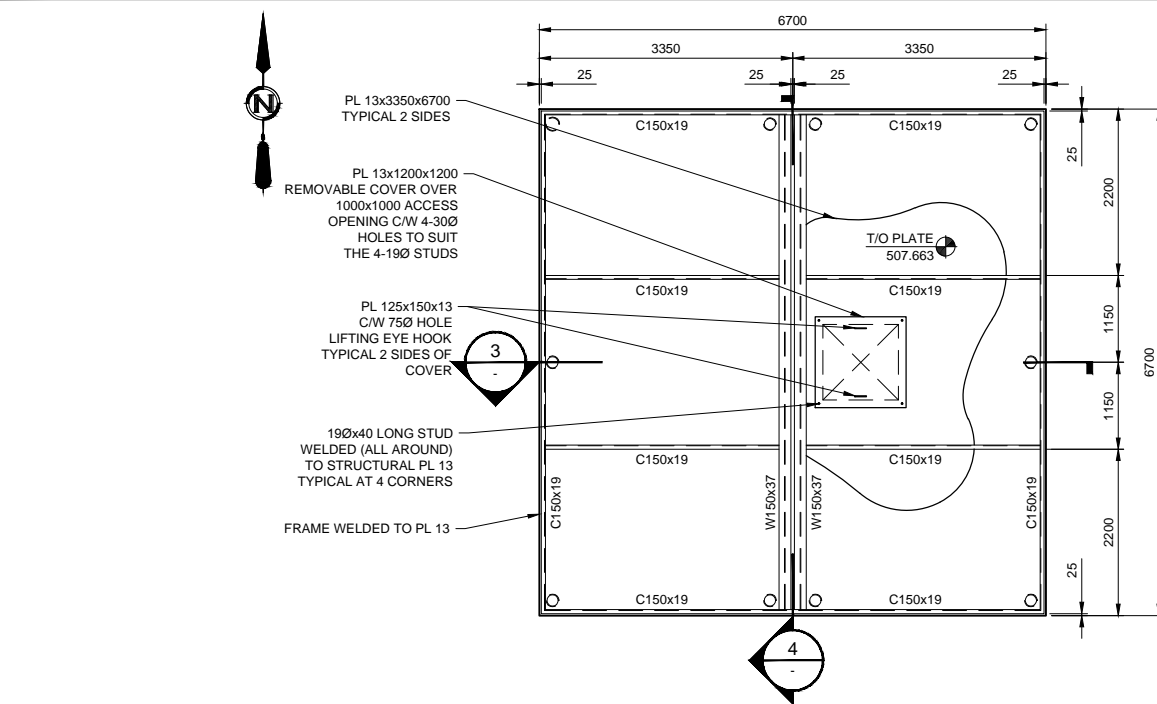
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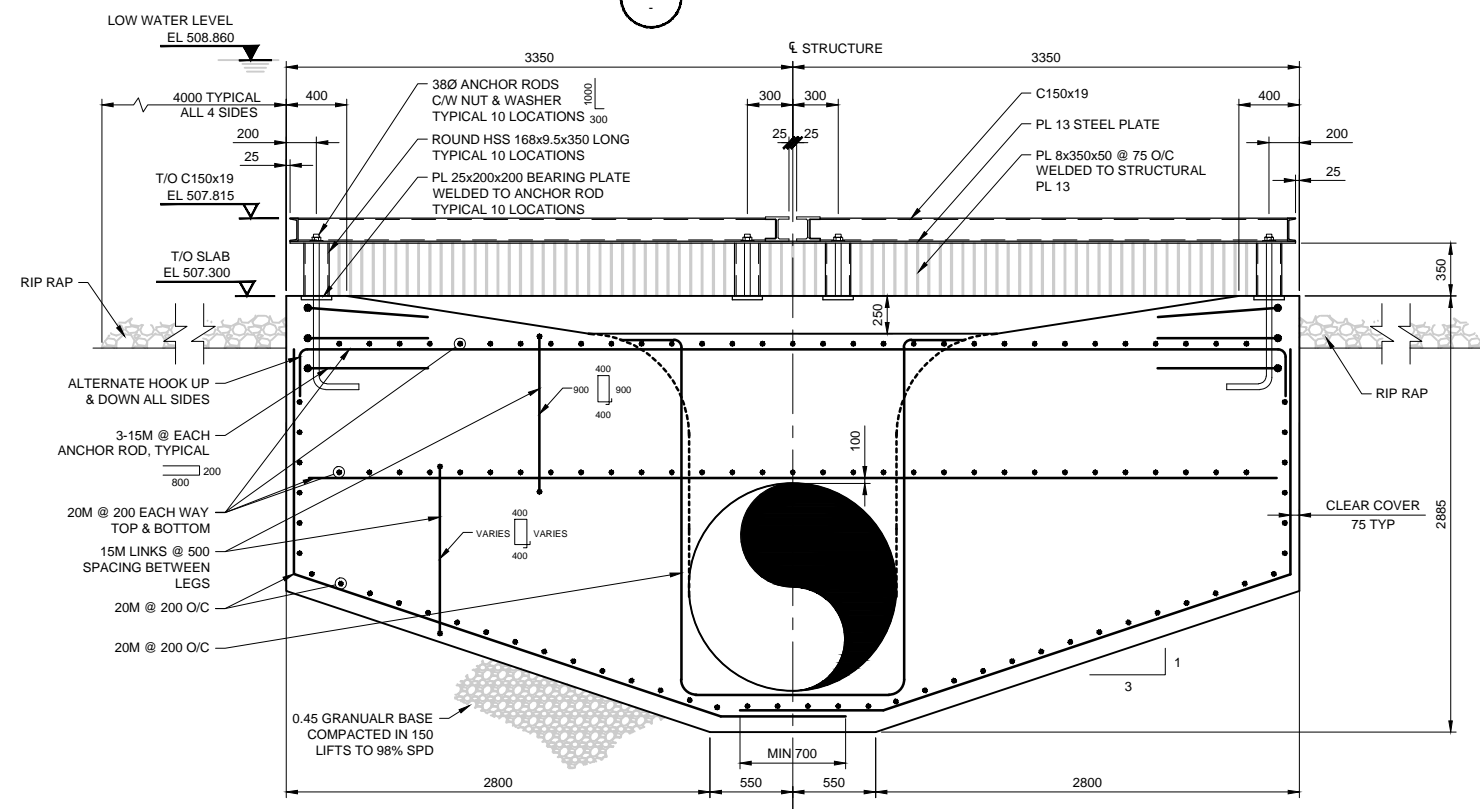


**SASKWATER COPORATION**  
BPNPWSS EAST (VALE) EXPANSION

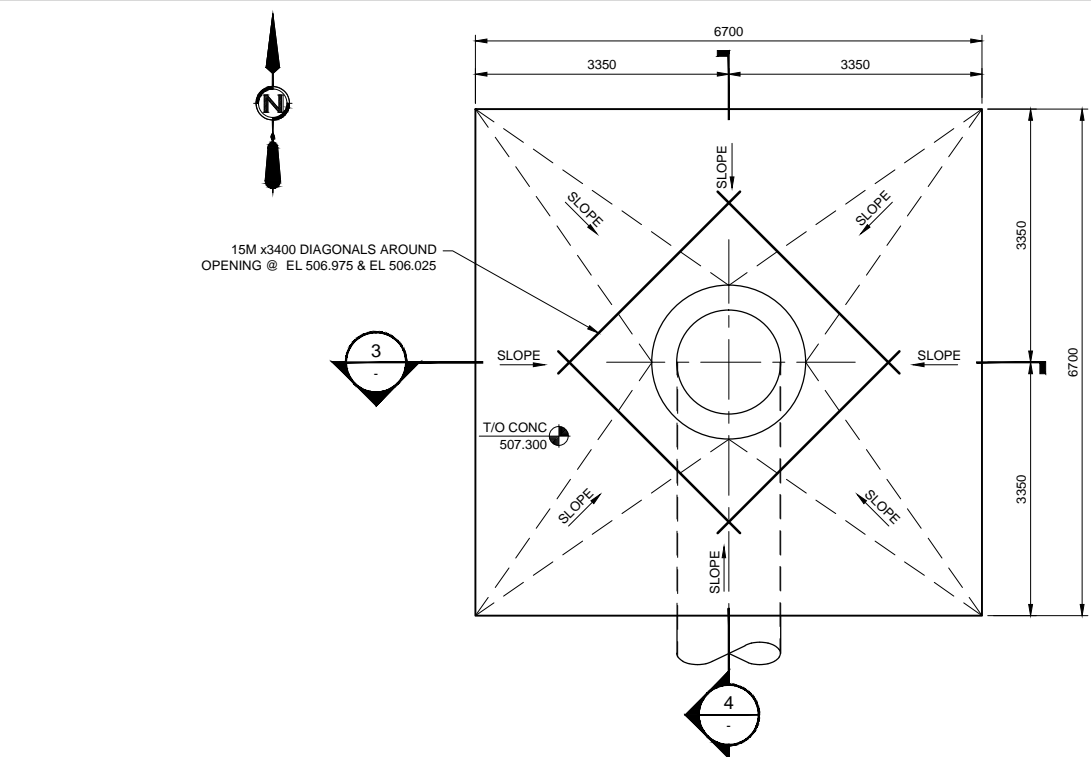
INTAKE & PUMP STATION  
SOUTH & WEST ELEVATIONS



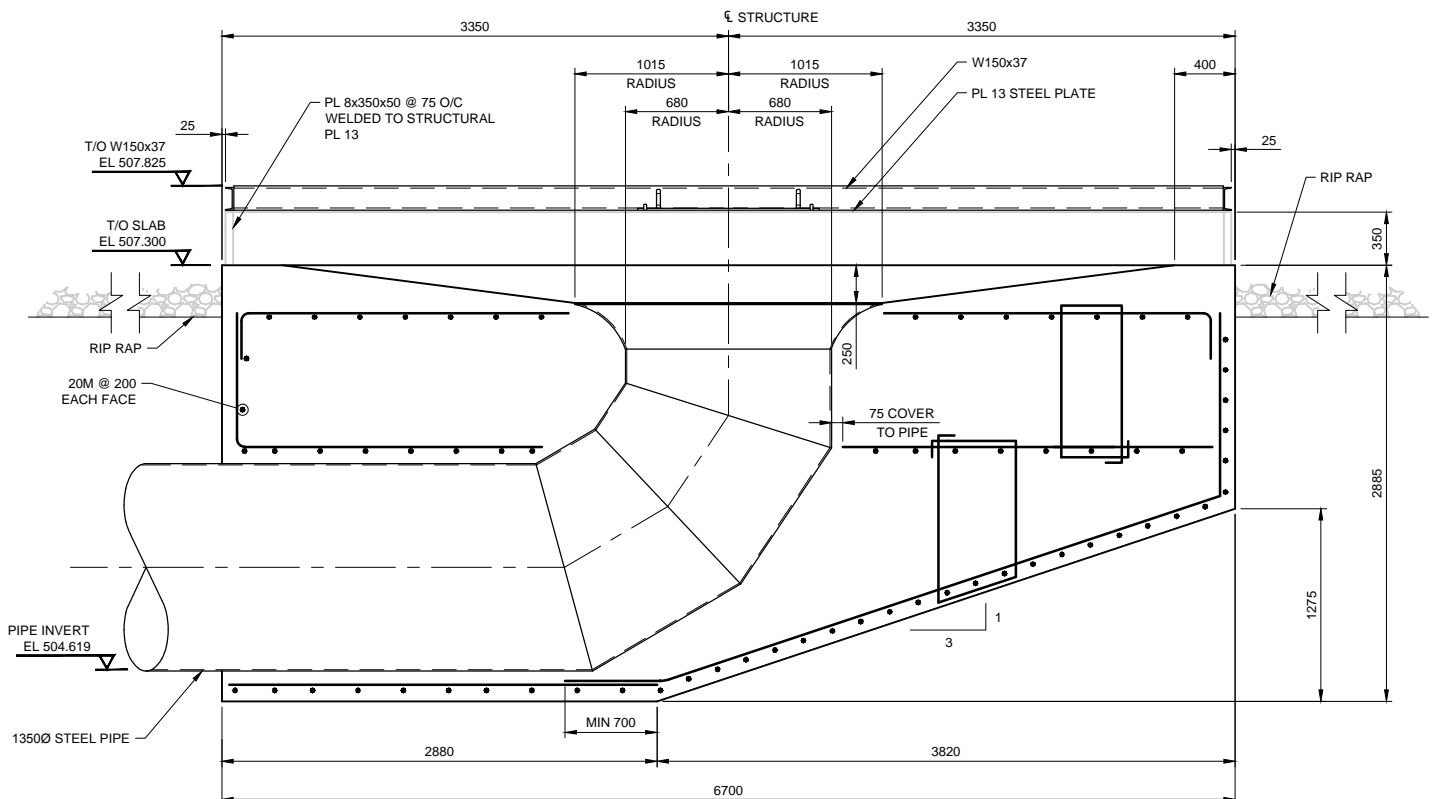
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3 SECTION 1:25



2 PLAN 1:50



4 SECTION 1:25

DRAWING  
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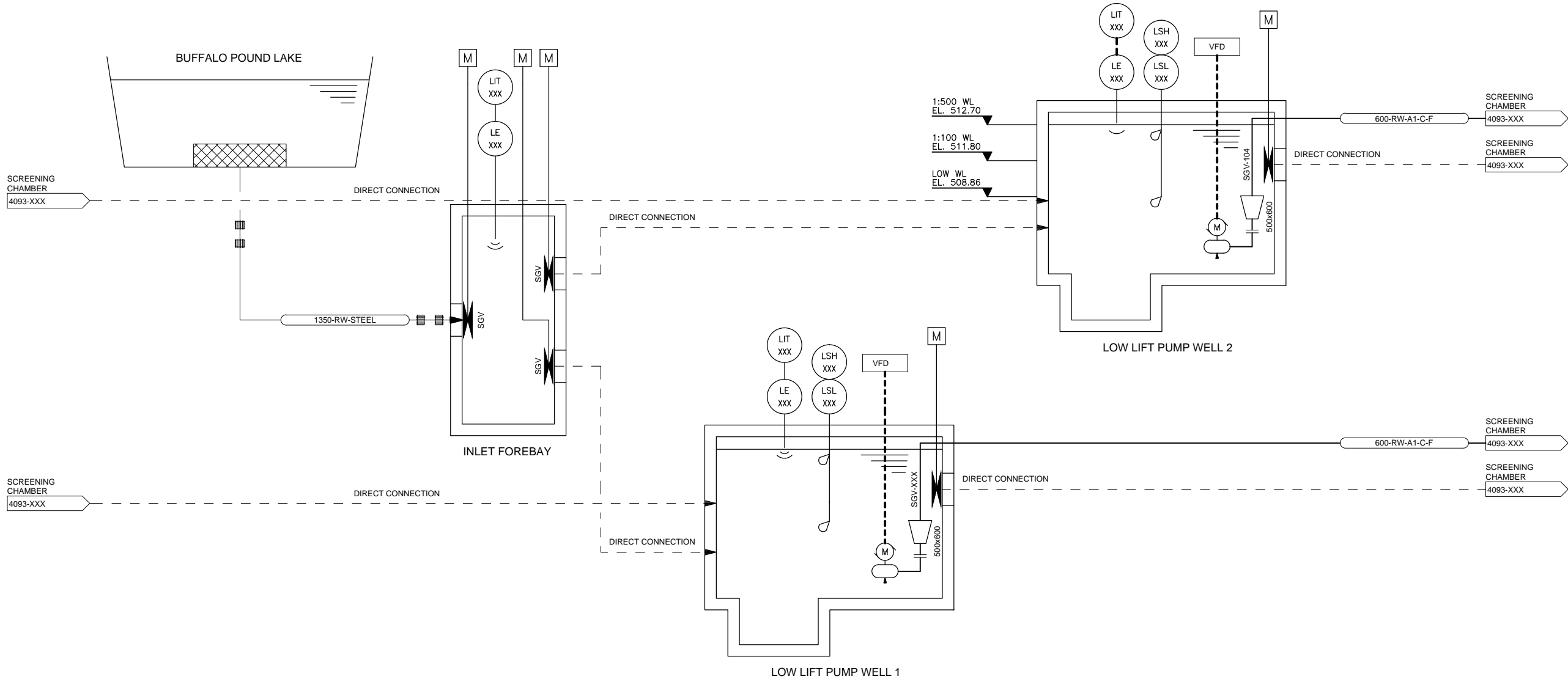


**SASKWATER CORPORATION**  
BPNPWSS EAST (VALE) EXPANSION

## INTAKE & PUMP STATION INTAKE STRUCTURE

This Drawing Is For The Use Of The Client And Project Indicated  
No Representations Of Any Kind Are Made To Other Parties

\\S-sas-fs-01\projects\2012\4093\00\_Intake\_Pump\_Stat\Working\_Dwgs\400\_Process\_Mech\4093-00-401.dwg  
DATE: 2012-10-05, Stephanie Reid



LAKE INTAKE  
94 ML/d CAPACITY  
0.13 m/s ENTRANCE VELOCITY  
0.76 m/s CONDUIT VELOCITY

LLP-XXX  
LOW LIFT PUMP 1  
100 hp (VARIABLE SPEED)  
600 rpm  
600 V/3Ø/60Hz  
49 ML/d @ 4.5 m TDH

LLP-XXX  
LOW LIFT PUMP 2  
100 hp (VARIABLE SPEED)  
600 rpm  
600 V/3Ø/60Hz  
49 ML/d @ 4.5 m TDH

DRAWING  
REDUCED TO  
HALF SIZE

PROJECT No. 2012-4093-00  
DATE: 2012/10/12  
APPROVED: G. SCHMIDT  
SCALE: AS NOTED  
DWG. No. 4093-00-401



SASKWATER CORPORATION  
BPNPWSS EAST (VALE) EXPANSION

INTAKE & PUMP STATION  
INTAKE AND LOW LIFT PUMPS

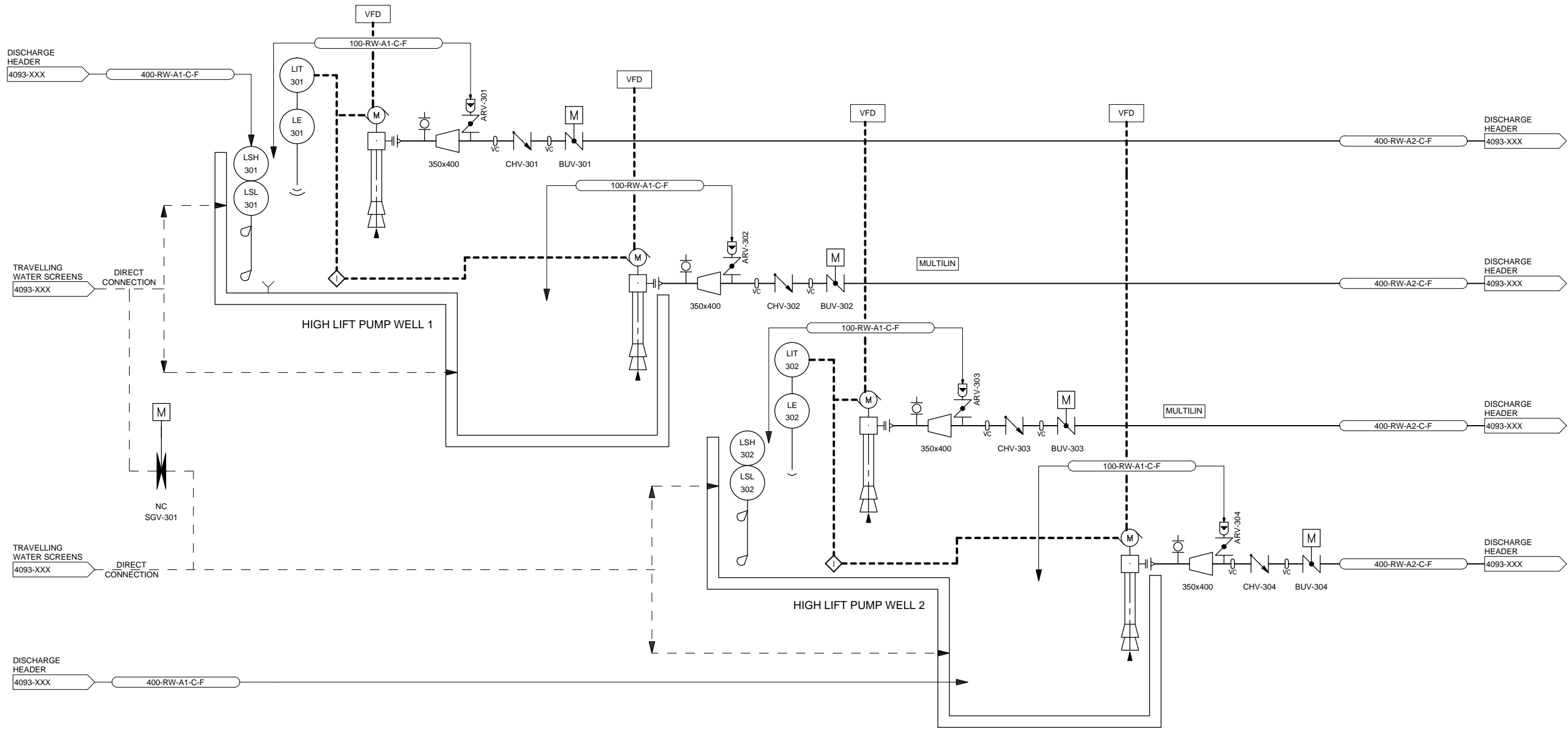


**Associated  
Engineering**

<h1>SASKWATER CORPORATION</h1> <h2>BPNPWSS EAST (VALE) EXPANSION</h2>	
<h3>INTAKE &amp; PUMP STATION</h3> <h3>TRAVELLING SCREENS</h3>	

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\\S-sas-fs-01\projects\2012\4093\00\_Intake\_Pump\_Stat\Working\_Dwgs\400\_Process\_Mech\4093-00-403.dwg  
DATE: 2012-10-05, Stephanie Reid



HLP-XXX  
HIGH LIFT PUMP 1  
900 hp (VARIABLE SPEED)  
1800 rpm  
4160 V/3Ø/60Hz  
29 ML/d @ 140 m TDH

HLP-XXX  
HIGH LIFT PUMP 2  
900 hp (VARIABLE SPEED)  
1800 rpm  
4160 V/3Ø/60Hz  
29 ML/d @ 140 m TDH

HLP-XXX  
HIGH LIFT PUMP 3  
900 hp (VARIABLE SPEED)  
1800 rpm  
4160 V/3Ø/60Hz  
29 ML/d @ 140 m TDH

HLP-XXX  
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4160 V/3Ø/60Hz  
29 ML/d @ 140 m TDH

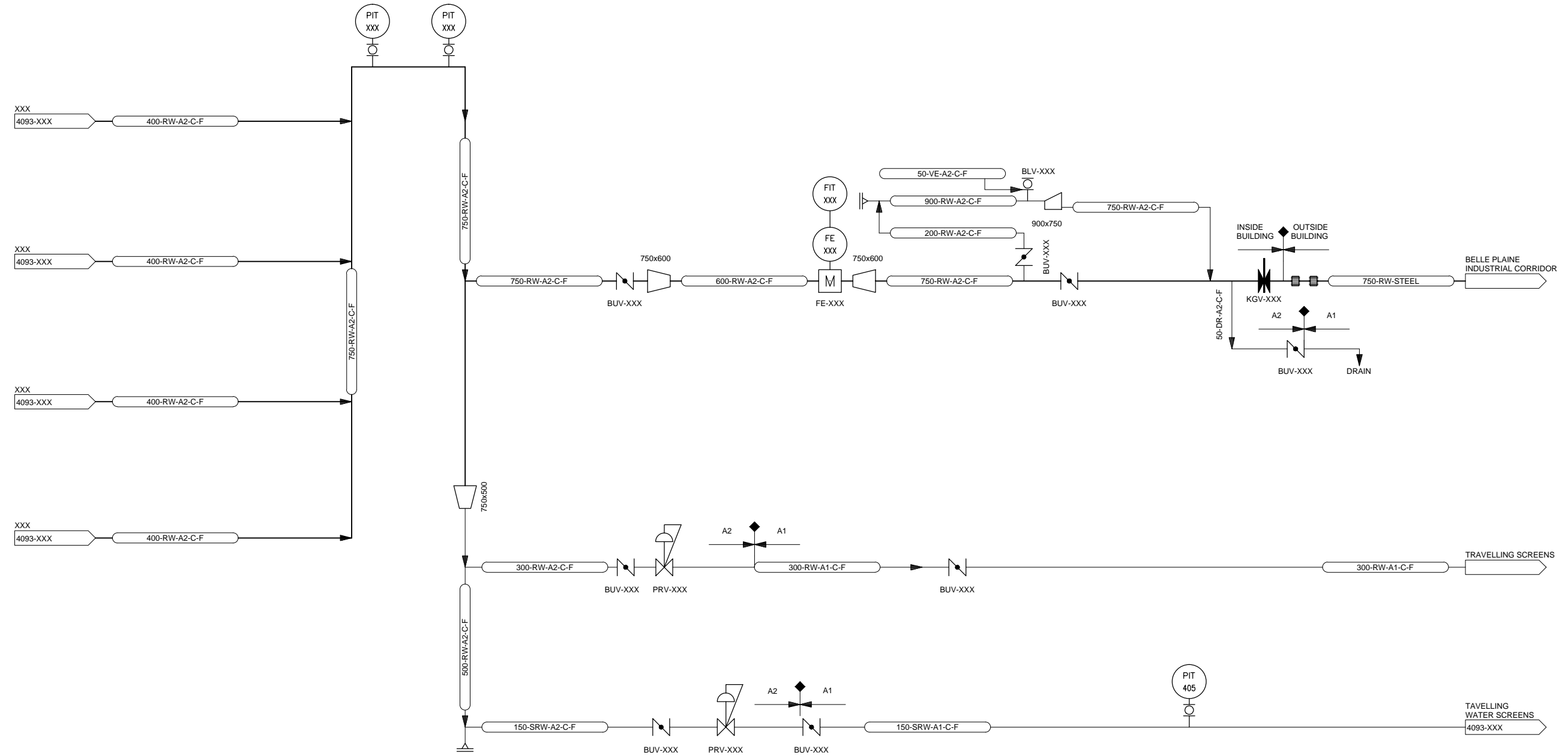
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HALF SIZE

PROJECT No. 2012-4093-00  
DATE: 2012/10/12  
APPROVED: G. SCHMIDT  
SCALE: AS NOTED  
DWG. No. 4093-00-403



SASKWATER CORPORATION  
BPNPWSS EAST (VALE) EXPANSION

INTAKE & PUMP STATION  
HIGH LIFT PUMPS



DRAWING  
REDUCED TO  
HALF SIZE

PROJECT No. 2012-4093-00  
DATE: 2012/10/12  
APPROVED: G. SCHMIDT  
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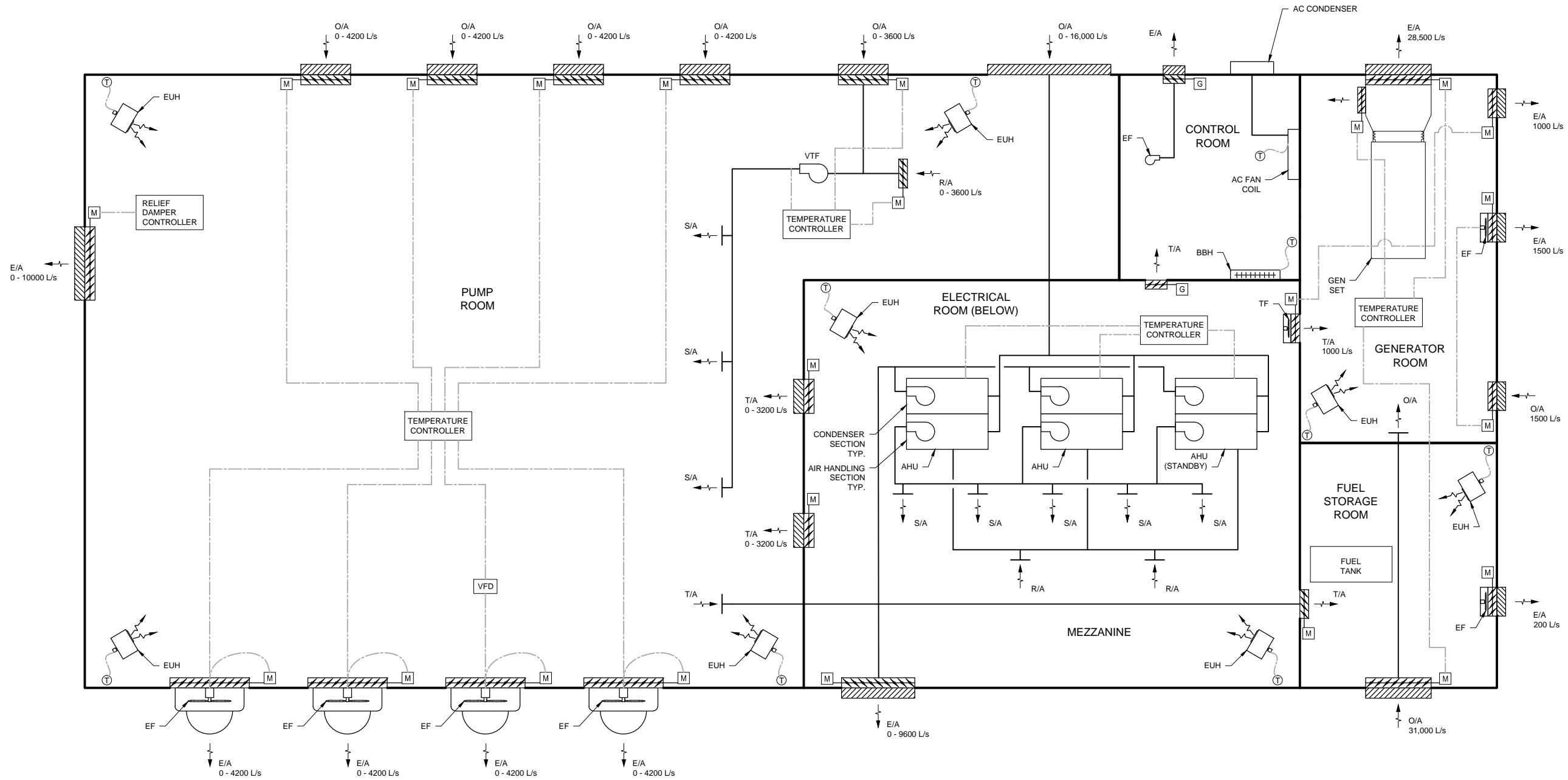


**SASKWATER CORPORATION**  
BPNPWSS EAST (VALE) EXPANSION

## INTAKE & PUMP STATION SWAB LAUNCH

This Drawing Is For The Use Of The Client And Project Indicated  
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\\S-sas-fs-01\projects\20124093\00\_Intake\_Pump\_Stat\Working\_Dwgs\500\_Building\_Mech\4093-00-501.dwg  
DATE: 2012-12-11, Stephanie Reid



1 SCHEMATIC

DRAWING  
REDUCED TO  
HALF SIZE

PROJECT No. 2012-4093-00  
DATE: 2012/10/12  
APPROVED: D. POTRATZ  
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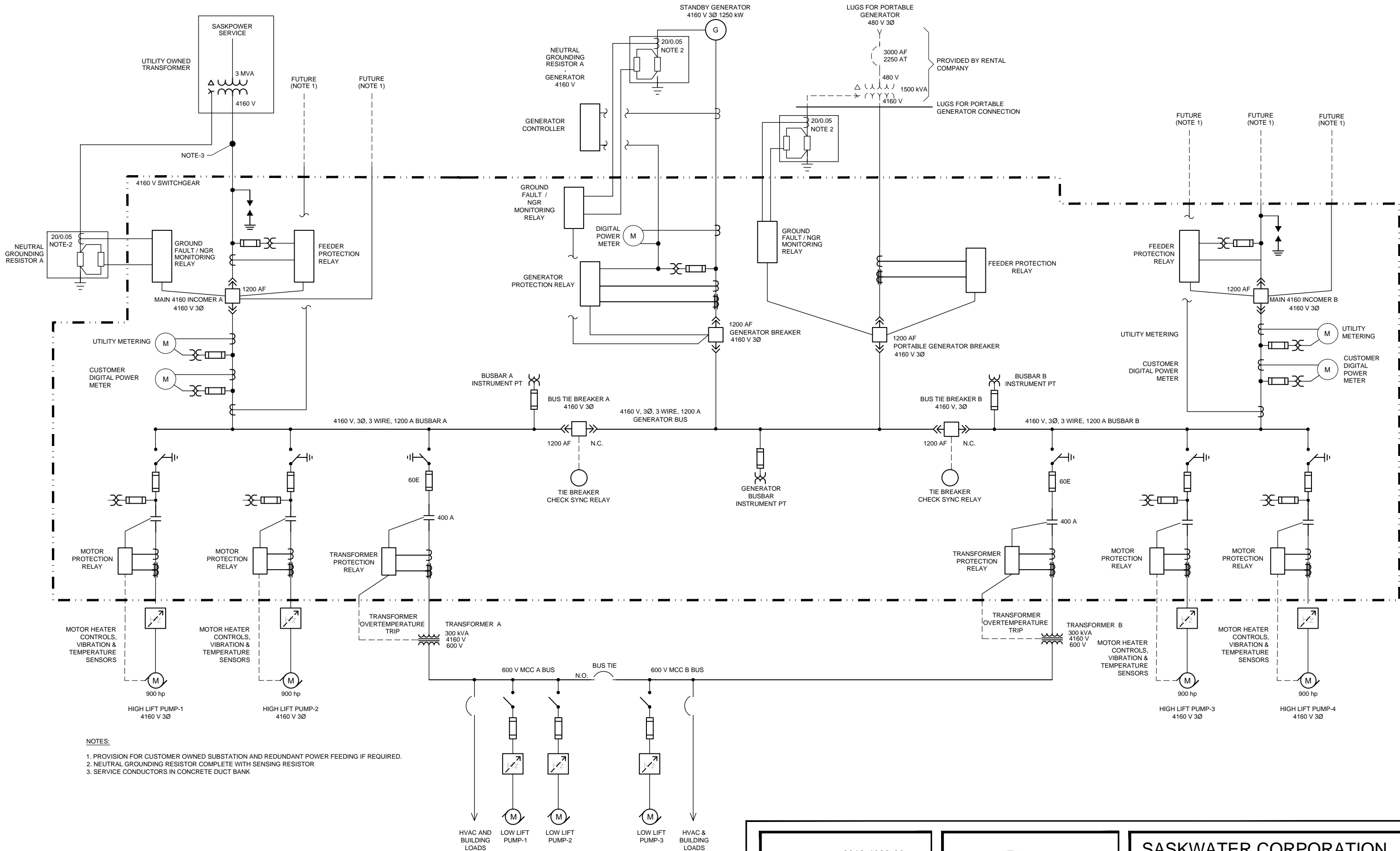


SASKWATER CORPORATION  
BPNPWSS EAST (VALE) EXPANSION

INTAKE & PUMP STATION  
HVAC SCHEMATIC

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P:\20124093\00\_Intake\_Pump\_Stat\Working\_Dwgs\600\_Electrical\4093-00-601.dwg  
DATE: 2012-12-11, Kvetla Tuma



- NOTES:
1. PROVISION FOR CUSTOMER OWNED SUBSTATION AND REDUNDANT POWER FEEDING IF REQUIRED.
  2. NEUTRAL GROUNDING RESISTOR COMPLETE WITH SENSING RESISTOR
  3. SERVICE CONDUCTORS IN CONCRETE DUCT BANK

1 DIAGRAM N.T.S.  
4160 V SINGLE LINE DIAGRAM

DRAWING  
REDUCED TO  
HALF SIZE

PROJECT No. 2012-4093-00  
DATE: 2012/10/12  
APPROVED: E. KLASSEN  
SCALE: AS NOTED  
DWG. No. 4093-00-601

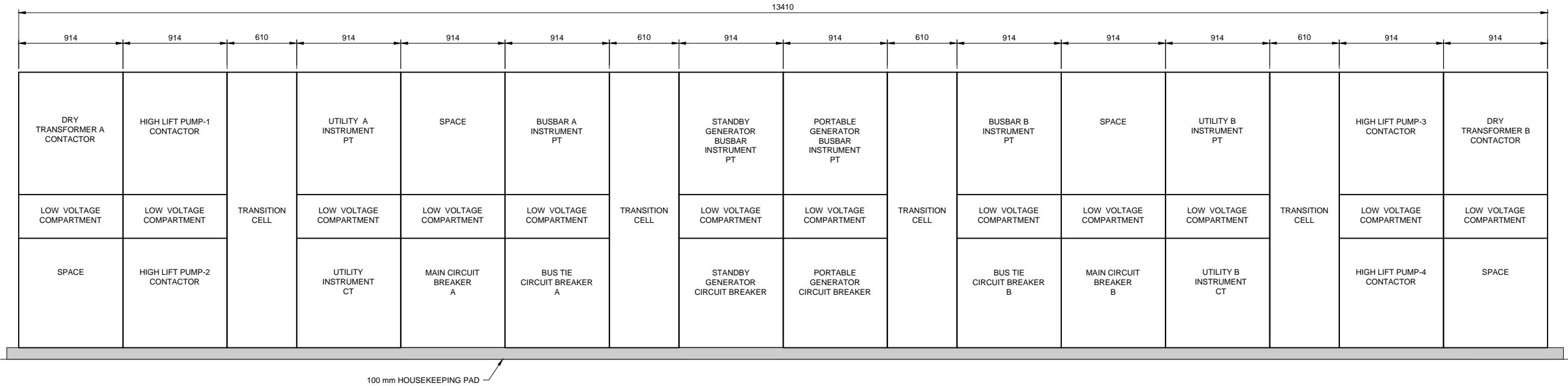


SASKWATER CORPORATION  
BPNPWSS EAST (VALE) EXPANSION

INTAKE & PUMP STATION  
4160 V SINGLE LINE DIAGRAM

This Drawing Is For The Use Of The Client And Project Indicated  
No Representations Of Any Kind Are Made To Other Parties

P:\20124093\00\_Intake\_Pump\_Stat\Working\_Dwgs\600\_Electrical\4093-00-602.dwg  
DATE: 2012-12-11, Kvetla Tuma



1  
DETAIL  
4160 V SWITCHGEAR LAYOUT

N.T.S.

DRAWING  
REDUCED TO  
HALF SIZE

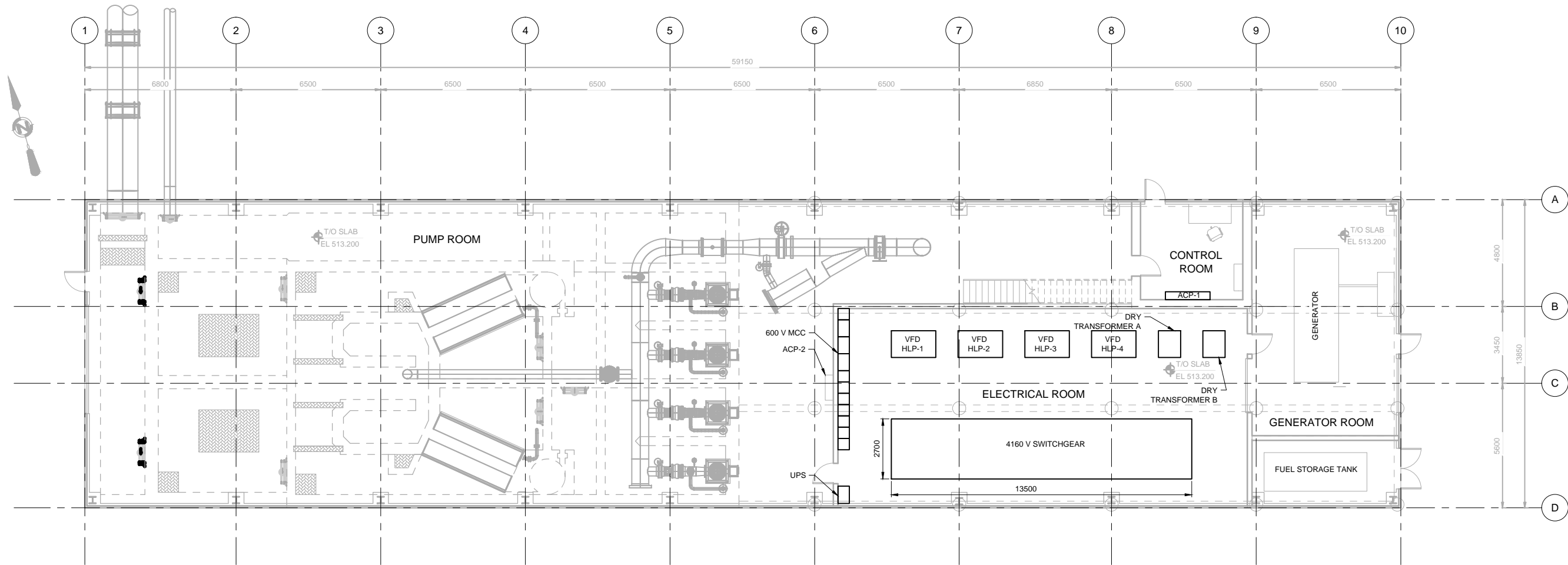
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DATE:	2012/10/12
APPROVED:	E. KLASSEN
SCALE:	AS NOTED
DWG. No.	4093-00-602



SASKWATER CORPORATION BPNPWSS EAST (VALE) EXPANSION
INTAKE & PUMP STATION 4160 V SWITCHGEAR LAYOUT

This Drawing Is For The Use Of The Client And Project Indicated  
No Representations Of Any Kind Are Made To Other Parties

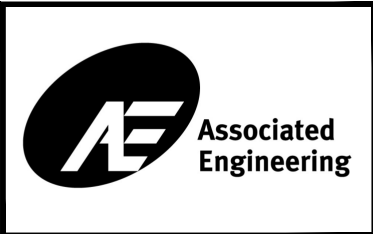
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DATE: 2012-12-11, Kvetla Tuma



1 PLAN  
ELEVATION 513.200 1:100

DRAWING  
REDUCED TO  
HALF SIZE

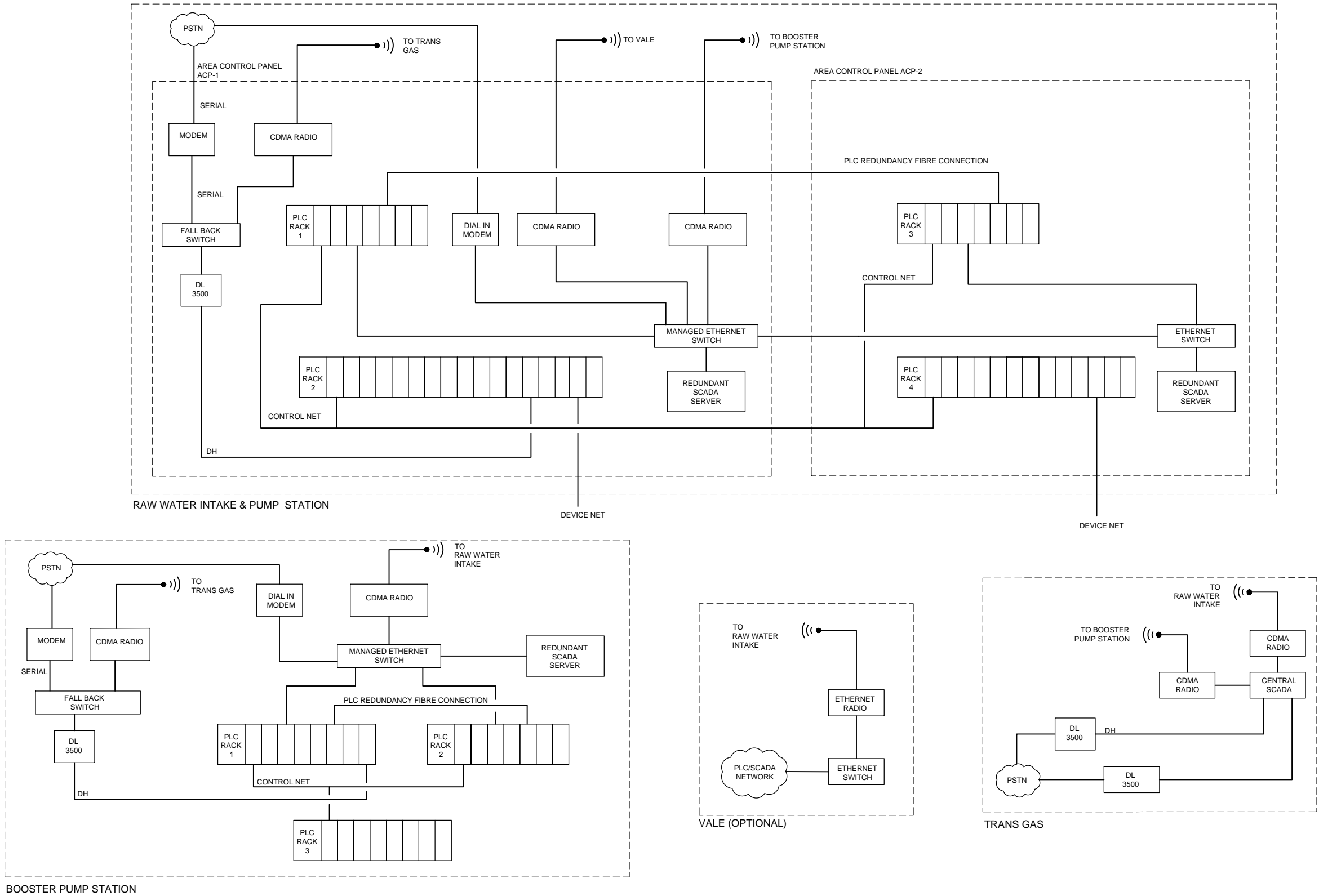
PROJECT No.	2012-4093-00
DATE:	2012/10/12
APPROVED:	E. KLASSEN
SCALE:	AS NOTED
DWG. No.	4093-00-603



SASKWATER CORPORATION BPNPWSS EAST (VALE) EXPANSION
INTAKE & PUMP STATION ELECTRICAL PLAN @ ELEVATION 513.200

This Drawing Is For The Use Of The Client And Project Indicated  
No Representations Of Any Kind Are Made To Other Parties

P:\2012\4093\00\_Intake\_Pump\_Stat\Working\_Dwgs\700\_Instrumentation\4093-00-701.dwg  
DATE: 2012-10-10, Kvetla Tuma



DRAWING  
REDUCED TO  
HALF SIZE

PROJECT No. 2012-4093-00  
DATE: 2012/10/12  
APPROVED: J. SUWALA  
SCALE: AS NOTED  
DWG. No. 4093-00-701



SASKWATER CORPORATION  
BPNPWSS EAST (VALE) EXPANSION

INTAKE & PUMP STATION  
COMMUNICATION DIAGRAM



# **APPENDIX B**

## **Soil Data**



Table B-1: Results of Analysis of Soils within the Hillwash Complex

Parameter	DL	Unit	Hillwash Complex - Hw (Hw01)			Hillwash Complex - Hw (Hw02)			Hillwash Complex - Hw (V1-001)		
			Ahk	BCK	Ck	Ah	Bm	Ck	Ah	Bm	Ck
			0 - 6 cm	6 - 26 cm	26 - 100 cm	0 - 8 cm	8 - 34 cm	34 - 100 cm	0 - 10 cm	10 - 35 cm	35 - 100 cm
Reaction (pH)	0.10	pH	7.41	7.90	7.88	7.16	7.34	7.94	6.94	6.95	7.34
Chloride (Cl)	2.0	mg/L	36	11	31	9	11	5	7	4	4
Sulphate (SO <sub>4</sub> )	5.0	mg/L	67.5	23.4	83.8	23.6	19.0	24.2	37.6	18.0	21.0
Salinity (Electrical Conductivity)	0.10	dS m-1	0.78	0.38	0.53	0.47	0.31	0.35	0.73	0.58	0.38
Calcium (Ca)	2.0	mg/L	136.0	62.1	54.4	67.9	49.5	51.4	127.0	104.0	71.7
Potassium (K)	1.0	mg/L	22.7	4.7	5.5	35.5	11.6	5.5	38.1	10.0	4.6
Magnesium (Mg)	2.0	mg/L	22.5	15.6	27.9	15.6	10.5	15.6	28.6	18.9	12.0
Sodium (Na)	4.0	mg/L	8.5	4.1	19.6	<4.0	<4.0	4.1	<4.0	<4.0	4.3
Sodium Adsorption Ratio (SAR)	0.10	SAR	0.18	0.12	0.54	<0.10	<0.10	0.13	<0.10	<0.10	0.12
Percent Saturation	1.0	%	84.1	58.3	55.0	67.6	42.8	31.2	89.6	61.6	54.2
Calcium Carbonate (CaCO <sub>3</sub> ) Equivalent	0.70	%	2.16	12.50	10.20	<0.70	<0.70	10.70	<0.70	2.21	7.76
Inorganic Carbon	0.10	%	0.26	1.50	1.23	<0.10	<0.10	1.29	<0.10	0.27	0.93
Organic Carbon	0.40	%	3.60	-	-	3.00	0.90	-	9.70	3.10	-
Organic Matter	0.70	%	6.16	-	-	5.19	1.60	-	16.70	5.33	-
Cation Exchange Capacity	0.80	meq/100g	23.80	-	-	14.30	8.49	-	44.60	25.00	-
Available Nitrogen (Nitrate+Nitrite-N)	2.0	mg/kg	<2.0	-	-	<2.0	<2.0	-	<2.0	<2.0	-
Available Phosphorus (O-Phosphate - PO <sub>4</sub> )	2.0	mg/kg	3.1	-	-	6.1	<2.0	-	10.6	9.5	-
Available Potassium	20	mg/kg	356.0	-	-	344.0	115.0	-	529.0	554.0	-
Available Sulfur (Sulfate-S)	3.0	mg/kg	18	-	-	5	<3.0	-	11	4	-
Percent Sand (2.0mm - 0.05mm)	0.10	%	47.9	38.1	36.6	75.8	81.1	73.2	45.0	37.6	43.4
Percent Silt (0.05mm - 2µm)	0.10	%	35.50	31.40	31.50	19.40	13.10	14.60	42.00	38.00	28.70
Percent Clay (<2µm)	0.10	%	16.60	30.50	31.90	4.73	5.84	12.20	13.10	24.40	27.90
Texture	-	-	Loam	Clay loam	Clay loam	Loamy sand	Loamy sand	Sandy loam	Loam	Loam	Loam / Clay loam

mg/L = milligrams per litre; dS/m = deciSiemens per metre; meq/100 g = milliequivalents of ammonium cation (NH<sub>4</sub><sup>+</sup>) adsorbed by 100 grams of dry soil; % = percent; < = below detection limit of; - = no unit; -- = not measured.



# **APPENDIX C**

## **Community Information Session Materials**

**SaskWater Information, Facts Sheets, Feedback Forms, and Information Sessions**

**Advertising**

**SaskWater Letter to Vale**

**Traditional Land Use Questionnaire**



# **SaskWater Buffalo Pound Non-Potable Water System Expansion Project**

SaskWater is currently evaluating options to provide non-potable water for customers in the region. One option under consideration is known as the SaskWater Buffalo Pound Non-Potable Water System Expansion Project. The project will consist of three components:

- Intake and pump station at Buffalo Pound Lake
- Pipeline from Buffalo Pound Lake to the mine site near Kronau
- Booster pump station along the pipeline route west of Belle Plaine

Environmental and engineering studies are currently underway that will examine the existing environment and socio-economic conditions for the project. The project is scheduled to be completed by the end of 2015.

## **Intake and Pump Station**

Water will be drawn out of Buffalo Pound Lake using an intake structure installed at the bottom of the lake, approximately 30 m from shore. The top of the intake structure will be approximately 0.8 m above the lake bottom. The pump station will be located along the south shore of Buffalo Pound Lake, near the southeast portion of the lake. SaskWater has two existing pump stations at this location. The pump station will have the capacity to pump 80-100 million litres per day.

## **Pipeline**

The pipeline will be between 36-42" diameter pipe from the pump station to the proposed end location. The pipeline route will initially follow the existing water pipelines from Buffalo Pound Lake to the Belle Plaine Industrial Corridor along Kalium Road. The proposed pipeline route will then turn south across the Trans-Canada Highway. The pipeline route then runs east to the end location near Kronau.

## Booster Pump Station

A booster pump station will be required along the pipeline route. The proposed location is north of the TransCanada Highway, about 2 km west of Kalium Road. The flow will be pumped by the booster station to the end location through the 900 mm diameter pipeline.



## Contact Information

If you have any questions about this project please contact:

**Chris Robart**, Senior Project Manager

SaskWater

200 – 111 Fairford Street East

Moose Jaw, Saskatchewan

Phone: 306.694.3875

E-mail: [chris.robart@saskwater.com](mailto:chris.robart@saskwater.com)



**SaskWater**



# Community Information Sessions

## SaskWater Buffalo Pound Non-Potable Water System Expansion Project

What was your main reason for attending this information session?

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---

Are you satisfied with the information you have been provided?

☐ Yes    ☐ Somewhat    ☐ No - *please explain*

---

---

---

What comments and questions do you have about the proposed project?

---

---

---

*continued...*

Please provide your name and address if you would like to continue to be informed about this project.

Name: \_\_\_\_\_

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Address: \_\_\_\_\_

\_\_\_\_\_

Postal Code: \_\_\_\_\_ Phone: \_\_\_\_\_

City / Town: \_\_\_\_\_

## Contact Information

If you have any questions about this project please contact:

**Chris Robart**, Senior Project Manager

SaskWater

200 – 111 Fairford Street East

Moose Jaw, Saskatchewan

Phone: 306.694.3875

Email: [chris.robart@saskwater.com](mailto:chris.robart@saskwater.com)



**SaskWater**



**SaskWater**



# Welcome

- Thank you for attending our Community Information Session on the SaskWater Buffalo Pound Non-Potable Water System Expansion Project.
- We have invited you here to provide you with information about the proposed project and to receive your comments and feedback.





**SaskWater**



# The Project

- **SaskWater is currently evaluating options to provide non-potable water for customers in the region.**
- **One option under consideration is known as the SaskWater Buffalo Pound Non-Potable Water System Expansion Project. The project will consist of three components:**
  - **Intake and pump station at Buffalo Pound Lake**
  - **Pipeline from Buffalo Pound Lake to north of Kronau**
  - **Booster pump station along the pipeline route west of Belle Plaine**





# Site Location





SaskWater



# Intake and Pump Station

- Water will be drawn out of Buffalo Pound Lake using an intake structure installed at the bottom of the lake, approximately 30 m from shore.
- The top of the intake structure will be approximately 0.8 m above the lake bottom.
- The pump station will be located along the south shore of Buffalo Pound Lake, near the southwest portion of the lake.
- SaskWater has two existing pump stations at this location.
- The pump station will have the capacity to pump 80-100 million litres per day.





**SaskWater**



# Pipeline

- The pipeline will be between 36-42" diameter pipe from the pump station to the proposed end location.
- The pipeline route will initially follow the existing water pipelines from Buffalo Pound Lake to the Belle Plaine Industrial Corridor along Kalium Road.
- The proposed pipeline route will then turn south across the trans-Canada Highway.
- The pipeline route then runs east to the end location near Kronau.





SaskWater



# Booster Pump Station

- A booster pump station will be required along the pipeline route.
- The proposed location is north of the TransCanada Highway, about 2 km west of Kalium Road.
- The flow will be pumped by the booster station to the end location through the pipeline.





# Baseline Studies

- Environmental and engineering studies are currently underway that will examine the existing environmental and socio-economic conditions for the project.
- These studies include:
  - Soils
  - Wildlife
  - Socio-Economics
  - Vegetation
  - Heritage
  - Engineering
- The project is scheduled to be completed by the end of 2015.





# Engagement

- Engagement activities are currently underway to inform and involve potential stakeholders.
- Stakeholders include:
  - The Public (local landowners, communities and other concerned members of the public)
  - First Nations and Métis Communities





**SaskWater**



# Contact Information

**If you have any questions about this project please contact:**

**Chris Robart, Senior Project Manager**

**SaskWater**

**200 – 111 Fairford Street East**

**Moose Jaw, Saskatchewan**

**Phone: 306.694.3875**

**E-mail: [chris.robart@saskwater.com](mailto:chris.robart@saskwater.com)**

SaskWater Buffalo Pound Non-Potable  
Water System Expansion Project



**SaskWater**

# **Community Information Sessions**

You are invited to attend a come and go Community Information Session to discuss the SaskWater Buffalo Pound Non-Potable Water System Expansion Project.

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**Sun Valley Community Hall - 4 pm to 8 pm**

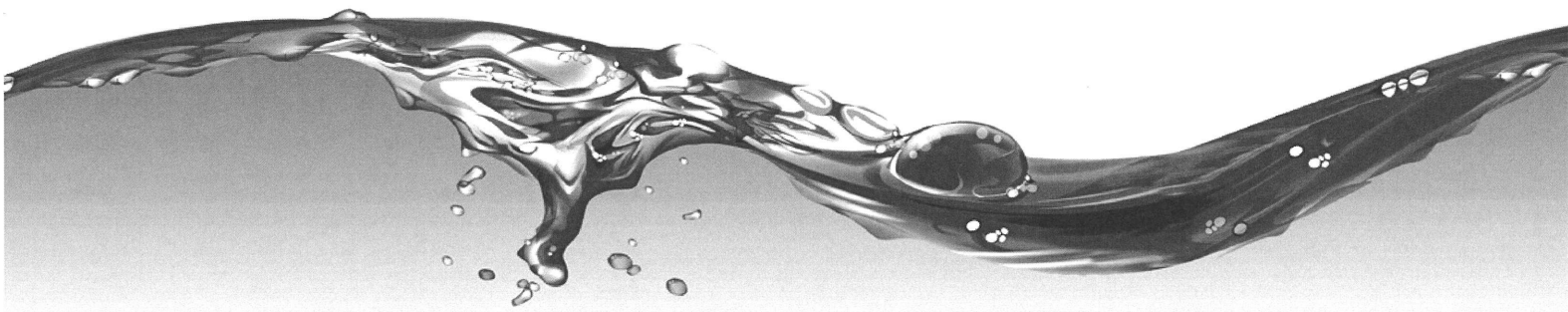
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**Kronau Multi-Purpose Facility - 4 pm to 8 pm**

Refreshments and snacks will be provided.





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# Community Information Sessions

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**Sun Valley Community Hall - 4 pm to 8 pm**

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Moose Jaw, Saskatchewan

Phone: 306.694.3875

Email: [chris.robart@saskwater.com](mailto:chris.robart@saskwater.com)

# News from Liberty



Reporter – FAYE ANDERSON – Phone 847-2035

Rhett and McKenzie McLane of Saskatoon visited over the weekend at the farm with Robert and Muriel McLane.

Ken and Ann Lanceley returned to their house after being in Manitoba spending time at their cottage at the lake and visiting all the relatives there.

Our family received the sad news of the death

of sister-in-law Donna Beatons brother, Gary Gerber, 42 years of Lloydminster, Alberta last week while out on the golf course, leaving behind his wife Candy and two sons.

He was a school teacher, a very physical person all his life. He left behind his mom June Gerber of Lloydminster, father George and sister-in-law

Margaret, sister Donna Beaton and her family of Red Deer, Alberta and Texas; sister Pat and John Spencer and niece and nephew of Red Deer, Alberta and Vancouver and Edmonton.

The weather has cooperated so that everyone is done or getting close, but we had frost lots of mornings, so hopefully they all get it done and

their winter wheat planted before too long.

Give me a call if you have any news at 847-2035.

Proposed Buffalo Pound Water Intake and Pipeline



## Community Information Sessions

You are invited to attend a come and go Community Information Session to discuss SaskWater's Proposed Buffalo Pound Water Intake and Pipeline.

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Petitioners

CONTINUED FROM A1

They help boost the local economy, she said, by spending on hotels and restaurants while in Regina. Del Frari believes the current stadium funding agreement is the best deal, adding councillors are elected to make decisions on their constituents' behalf.

Curt Hudson echoed that sentiment. The Regina man has been attending Riders games for the last 15 years and said now is the time to build a new stadium, using the proposed funding formula.

When asked why the majority of fans are opposed to a referendum, he spoke of concern that a lost vote could derail the whole deal. "Something has to happen. If (the stadium) doesn't get replaced, are they gonna say, 'Sorry, we're going to Saskatoon?'" Hudson explained.

Meanwhile, an anti-peti-

tion advertisement has been posted on an Albert Street billboard near Dewdney Avenue. The message — Support The Riders. Support The Stadium. Don't Sign The Petition — is sponsored by an election website run by the Regina and District Chamber of Commerce, the Regina & Region Home Builders' Association and the Association of Regina Realtors.

Chamber of Commerce CEO John Hopkins said the ad, which has run on the past two game days, does not reflect concern that support for a referendum might be growing. He simply wants a pro-stadium message circulated, he said.

"We just want people to be aware that when you look at the deal, it's pretty decent," Hopkins said Sunday. "The fact is, many stadiums across North America were built using public funding. What's happening in Regina

is the norm, not the exception."

Occupy the Stadium organizer Dawn Thomas said the event was successful and peaceful apart from one "minor" incident. She said a man approached her shortly before Saturday's game started, claiming he wanted to add his name to the petition. When she noticed he was instead writing obscenities, she said, she tore the paper away and he allegedly elbowed her. Thomas reported it to a nearby officer and said she intends to press charges.

Other petitioners said they had received threats of violence online, but did not feel they were in any real danger.

Thomas said petitioners collected about 450 signatures over the weekend, bringing the total to 6,500. Thomas has until Nov. 8 to accumulate 20,000 names in order to force a plebiscite.

[vbrown@leaderpost.com](mailto:vbrown@leaderpost.com)

Project

CONTINUED FROM A1

A small smile on his face, Soerensen proudly explains his current role as mentor and full-time staff member with Street Culture Project.

"There are a lot of things I like about it," he says.

"I like learning life skills with other people and not just by myself, giving back to the community, working with the teenagers ... and teaching them how to take responsibility and respect each other."

"I like being a role model. It's amazing."

His probation officer has noticed a change, too. Soerensen says his leave time has been increased to nine hours each day, compared with the nine hours a week he used to get.

Kim Sutherland is the executive director of Street Culture Project Inc., which also runs two houses for girls and a 15-bed emergency shelter for at-risk youth.

He says Soerensen is a shining example of how the organization's approach changes lives.

"Ninety-nine per cent of the time, what these kids lack in their lives is simple — a meaningful connection with a single, healthy adult," Sutherland says.

"That's what we're about and it's been our mandate from the beginning. To build

relationships. We don't have serious incidents, because we establish those relationships and we ask ourselves, 'What would a parent do?'"

In Street Culture Project's 15 years, it has grown from an unknown entity into an organization looking after the shelter needs of two-dozen at-risk youth in the Queen City, the Boys and Girls Clubs for inner-city children aged 5 to 14, and the Regina Connected Youth program, for youth aged 14 to 17.

"In Regina, there's no absence of resources and programs," explains Sutherland. "But there's a real absence of conduits to get the kids to those programs. That's what we try and do — establish those relationships early on."

The newest building is GLinn, which was purchased in February.

When Street Culture Project bought the house, a former detox centre, it had 29 bedrooms.

"We changed that so we can house 10 youth, because we didn't — and we never want — for this to become an institution," says Sutherland.

"It's a home, and the boys know this is their home. It gives them that stability which is so important."

Sutherland admits there was some concern from the community when his organi-

zation bought the house, but that soon fizzled away.

"Within a short time, the boys were helping with things like snow shovelling, they were helping out the neighbours — I think people are happy now," he says.

"Again, they created these relationships so they could fit into the community just like any other teenager."

The approach has worked well for Soerensen, which is why it will be tough for him to move.

"I know once I do leave it will be very emotional," he says.

"But hopefully these guys can follow in my steps after I leave. That's what I want."

[egraney@leaderpost.com](mailto:egraney@leaderpost.com)

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Saturday: 4798352  
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In the event of any discrepancy between this list and the official numbers, the latter shall prevail.

Motion 312

CONTINUED FROM A1

They are David Anderson, Kelly Block, Ray Boughen, Garry Breitzkreuz, Rob Clarke, Ed Komarnicki, Tom Lukowski, Gerry Ritz, Brad Trost and Maurice Vellacott.

Kim Karpa, executive director of the University of Regina Women's Centre, said she never expected the number to be that high.

"I thought maybe half would have supported it," she said, adding she doesn't think the abortion debate has ever truly been put to bed.

"MPs have constantly been trying to put this back on the agenda," she said.

When it comes to the anti-abortion movement in Saskatchewan, Karpa thinks the debate around M-312 could provide the impetus for more rallies like the one in Regina on Sunday.

"It gives fuel to that movement, for sure," she said.

"Women fought for these rights in the '60s,

and taking this road I think would really ... roll back women's rights."

Regina pro-life executive director Bob Waldegger says he thinks M-312 has "brought about a lot of discussion."

"It was interesting, because 91 of our MPs were in favour of opening up discussion and that's a

third of the people in Ottawa and we have to feel good about that," he said.

"Our signs say that abortion hurts women and kills children, and that's what we want to tell the public. We're trying to get people to think about abortion and what it does to our community."

[egraney@leaderpost.com](mailto:egraney@leaderpost.com)

SaskWater Buffalo Pound Non-Potable Water System Expansion Project



Community  
Information Sessions

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**Tuesday Oct. 2<sup>nd</sup>**  
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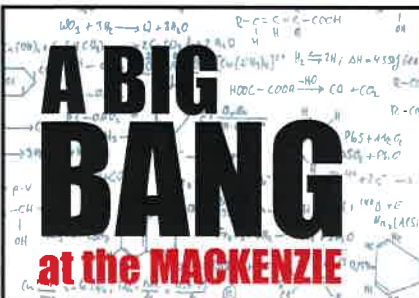
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# Land deal

CONTINUED FROM A1

Before it relocates its operations to the Global Transportation Hub, CP will remain on the land until July 2014 under a leasing agreement.

The land purchase is part of the \$1-billion Regina Revitalization Initiative inner-city redevelopment. The RRI is comprised of a \$278-million stadium at Evraz Place and approximately \$600-\$650 million in private sector funding for mixed-housing and commercial and retail space at the former Mosaic Stadium site and the CP rail yard land.

Overall, the city would transfer \$9.6 million from its general reserve fund to cover the \$7.5 million purchase price along with \$600,000 for environmental remediation and \$500,000 to remove the

two rail bridges crossing Broad Street. Site preparation, including building demolition, removing concrete structures and fencing, is expected to cost an additional \$1 million.

The arrangement gives the city permission to construct a \$16.5-million pedestrian bridge linking the Warehouse District to downtown. The city requires permission because CP will occupy a southern portion of the land that the bridge will pass over.

Originally, the city was proposing to construct a new stadium on 33 acres of CP rail yard land; however, the report states that had the city purchased the entire amount, it would have been responsible for paying up to \$30 million for CP to relocate from the remaining 15.6 acres.

[tmceachern@leaderpost.com](mailto:tmceachern@leaderpost.com)

# Standoff

CONTINUED FROM A1

"At about five to seven this morning my phone rang and they asked me to get dressed and come out with my hands up. As I came down the stairs there was a shotgun and two guns pointing at me," said Smith.

Police yelled at him: "Put your hands in the air."

Popowich said when firearms are expected, a high level of attentiveness is important.

"Everyone coming out of that building initially has to be treated as though they're a suspect," she said.

From Chilliwack, B.C., Smith planned to check out of the hotel Monday morning and go to Saskatoon where he and a team of co-workers are contracted to do work with SaskTel.

"We'll be back — we just won't be staying here," Smith said.

Bob Gratton was on a road trip that started in Banff and is ending in Montreal. After a full day of driving, Gratton decided to spend a portion of his casino winnings on a, "cheap, available" hotel.

"They knocked on our door at seven. They didn't want to say a lot and at some point they wanted us to leave our room," he said.

At first he thought it was a gas leak, but he quickly realized that wasn't the case.

"If they told us we could've taken our bags, we'd be a few hours from here," said Gratton.

Around 10:30 a.m., the man believed to be the victim of the Fillmore stabbing appeared with a heavily bandaged hand. He spoke briefly with police before leaving.

Popowich said the Fillmore stabbing is an RCMP investigation and Regina police will be assisting it. An RCMP spokesman said they are working on the case and have no further details at this time.

— with files from Pam Cowan  
[dfraser@leaderpost.com](mailto:dfraser@leaderpost.com)

# Wage Middle of pack

CONTINUED FROM A1

"Our province is experiencing significant economic growth, but currently has the lowest minimum wage in Canada," Morgan said. "This increase in minimum wage, together with the significant tax reductions our government has provided to low-income earners, means that Saskatchewan will have one of the highest rates of take-home pay in Canada for minimum wage earners."

The minimum wage hike will put the province's rate in the middle of the pack.

Alberta, which just recently raised its rate to \$9.75 will have the lowest rate, followed by Quebec at \$9.90 per hour. Saskatchewan will join New Brunswick, Newfoundland and Labrador, North West Territories and P.E.I. at \$10 per hour. Nunavut has the highest minimum wage at \$11 per hour. Manitoba raised its minimum wage to \$10.25 on Monday.

There are currently about 22,000 people in the province earning minimum wage.

"(The increase) will make sure that people at the lower end of the earnings scale have sufficient funds that they are able to adequately pay for housing, food and are able to participate in the prosperity of the province," Morgan said.

"Since taking office, our government has increased minimum wage from \$7.95 to \$10 an hour," Morgan said. "That's an increase of nearly 26 per cent in five years — well ahead of the rate of inflation."

Richard Long, professor and head of the Department of Human Resources and Organizational Behaviour with the Edwards School of Business, said

now is a good time to be raising the minimum wage.

"We've got a really strong economy, we need to attract employees and if you are going to raise the minimum wage this is a good time," said Long, who teaches a strategic compensation class at Edwards and has written the leading textbook in Canada on compensation. Strategic Compensation in Canada.

Long said many employers will still find it difficult to attract employees at the new rate.

"The reality is most employers recognize that it's very difficult to hire people at the minimum wage."

NDP labour critic David Forbes said the increase is better late than never.

Forbes said the Sask. Party shouldn't be taking credit for most of the minimum wage increases in the past five years.

"I was labour minister in September 2007 when we announced the increases that would be phased in to take us up to, I believe, \$9.25 in 2009."

Marilyn Braun-Pollon, vice-president, Prairie and Agribusiness with the Canadian Federation of Independent Business (CFIB), said there are better ways to help low income earners than raising the minimum wage.

"It is evident that the provincial government has decided to make a very politically popular decision by this and it is leaving business owners picking up the tab," Braun-Pollon said.

"Presently a full-time mini-

mum wage earner can earn about 76 per cent of their annual income before starting to pay provincial taxes. We believe the government should ensure the low-income earner keeps all of their earnings and pay no income tax at all."

Braun-Pollon said the government should also be looking at a tiered minimum wage, with lower rates for those earning tips and a training wage.

Saskatchewan Federation of Labour (SFL) president Larry Hubich said they are pleased the government is increasing the minimum wage, but said the minimum wage is too low to start with.

"We would argue that (the minimum wage) has been too low for a long time and that the government needs to bring in a formula that actually pegs it at rate of pay that provides for a living wage," Hubich said.

"This (increase) only puts us in the middle of the pack.

"If the cost of living was to increase in the way that it has been over the past couple of years, we'll soon find ourselves in Saskatchewan with the worst minimum wage in Canada (again)."

Forbes said the NDP wants to see the rate pegged to Consumer Price Index (CPI).

Morgan said the government is looking at some form of indexing the minimum wage.

It could be tied to average hourly wage, the CPI or another external indicator — and there would be an annual increase based on that, he said.

"We'll have a position formally taken on that (indexing the minimum wage) when we introduce the legislation in the fall," Morgan said.

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THURSDAY  
WHAT'S ON

The Globe Theatre is producing Billy Bishop Goes to War.

LAND DEAL

The city's executive committee looks at a deal to purchase CP Rail land.

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Outbreak Safety

CONTINUED FROM A1

"Since we became aware of this situation we've done two follow-up inspections and once again we do not have any concerns about critical issues identified in this restaurant," Diener said.

Public health is notified of all positive E.coli test results.

Of the five people who tested positive, one was hospitalized, Diener said.

She expressed appreciation to the restaurant for voluntarily closing while the investigation is underway.

"The reason that we wanted to do this today was to make sure that our customers and the people around in the community are aware that we have public safety in mind at all times," said Timothy Martin, one of the owners of Flip Eatery and Drink. "We have been working through this investigation with the health department ... With where we are at now, we all decided that it was in the best interest in the middle of this investigation to close the doors to see that we can execute and finalize the investigation in a timely manner."

He said the restaurant will open as soon as possible.

The first case of E.coli was

identified on Sept. 24 and the second case on the following day.

"We had two cases from one family that ate two different food products," said Robert Schuba, manager of the region's environmental health department.

The first inspection of the restaurant was done Sept. 25. Three more cases were identified on Sunday and a second inspection was done Monday.

Not all of the people who got sick ate dishes with beef in them.

Health officials are interviewing the staff and anybody who handled food at the restaurant.

"We've taken a number of food samples and we're continuing to look into all of the food handling practices and procedures," Schuba said.

To this point, the investigation has not identified any employees who were ill at the time that the customers got sick.

E.coli can be transmitted through contaminated food or from person to person. Proper cooking and hand-washing techniques are crucial in preventing the transmission of the organism.

"A person might actually be excreting this organism in their stool," Diener said. "They might not be symp-

tomatic yet so if you don't wash your hands well, that is one way of contracting the disease.

"As you know from the beef recall, E.coli can be in beef products and this is the other situation we are currently dealing with nationally."

Diener said it's important to realize there might be a lot of unknown E.coli in the community.

"We shouldn't just think of one restaurant in this case," she said. "We have a national beef recall. We all might have products in our fridges and freezers that we might not have noticed have been recalled. We don't know what the future is going to hold in terms of that."

She urges anyone with symptoms consistent with an E.coli infection to consult a health-care provider.

Symptoms might include a fever, abdominal cramps, diarrhea, nausea and vomiting.

"It's when it gets to the bloody diarrhea that we start to get concerned about those situations," Diener said.

Contracting the infection is particularly risky for pregnant women, small children, the elderly and those who are immune-suppressed.

[pcowan@leaderpost.com](mailto:pcowan@leaderpost.com)

CONTINUED FROM A1

The Canadian average was \$241.72 and Regina came in considerably below that at \$182.50.

Saskatoon was even lower — at \$157.50.

The survey, released this week, includes only covered or underground parking lots — as opposed to metered spots on city streets — in what is judged to be prime central business districts.

Balancing the good news, the survey said there is a long waiting list for new parking spots in both of Saskatchewan's largest cities.

It said Saskatoon drivers working in the city's central business district (CBD) can expect to wait an average of eight months for a new spot, while motorists in Victoria, Halifax and Regina can expect waiting periods of from 12 to 24 months.

"Regina is expected to be adding new parking space in the CBD in the next two years, but the limited new supply will not meet the demand," added the survey, which was done in June and includes all relevant taxes. Data was collected by third parties, parking lot operators and Colliers Interna-

tional itself.

Tom McClocklin, managing director of Colliers in Saskatchewan, said of Regina: "we are still among the most affordable cities to park in Canada. However with construction costs rising, density increases and we may continue to see increases in parking rates. The increase in office construction in the downtown sector without an increase in parking structures will add further strain on parking availability."

[wchabun@leaderpost.com](mailto:wchabun@leaderpost.com)

Stadium Ideas

CONTINUED FROM A1

"You're somebody that doesn't believe in progress. That's nonsense. That is an old mentality that we need to get rid of."

Brass wants a domed stadium, and claims it can be done for roughly the same cost as the current proposal.

She told supporters gathered at the Artesian that the public wants a domed stadium and that, "it is time to put a stop to this nonsense and get this stadium on track."

After doing some research, she found out about spherical domes. Brass consulted a few sources, including an architect, and is now proposing that a sustainable, domed facility that seats 40,000 people can cost between \$225 million and \$275 million.

"Those are preliminary quotes — and we can get more — but that is basically with your sky seats and your media boxes and good quality seats and so on," said Brass.

She said that a domed stadium will help attract private investment, but public money will still be used.

Brass is hoping to find more creative ways to

gather funds — like selling sponsorships on bathroom stalls and luxury boxes. She also plans to approach Telus about moving their head office to Regina and offer them naming rights on the stadium. The B.C. government turned down a \$35 million offer from Telus to buy the naming rights of BC Place last March.

Both candidates spoke to a handful of supporters.

Okochi also released a list of 10 items he would plan to accomplish within 100 days if elected. Topping the list was freezing his mayoral salary and office budget until a long-term fix to the city's \$293 million pension fund deficit is found. He also pledged to assemble a "Red-Tape Clean-Up Team" that would investigate and look to eliminate outdated city policies. Another item on the list was a full, independent audit of the City

Square project that went \$3.5 million over budget. He also wants to see a more long-term plan that provides tax incentives for companies who invest in community infrastructure rather than incentives based on jobs.

"If that company goes out of business in the next five years or they move to greener pastures, we lose the incentive that we've given them and we lose the jobs; so we're left with nothing," said Okochi.

Brass pledged to solve the pension deficit, but also focused on working with the provincial and federal governments to establish a foreign trade zone that would allow local industry to import, manufacture, and export final goods. If elected, she also plans to offer tax incentives to create more attainable housing and eliminate the deck tax.

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Clarifications

The story Motel standoff ends with some suspects still at large on Page A1 of Tuesday's newspaper contained unclear information. The stabbing that led to the standoff occurred in Creelman, a small town near Fillmore in southeast Saskatchewan.

The Leader-Post regrets the error.

■■■

The story Shakespeare given youthful boost on Page B1 of Tuesday's newspaper contained incorrect information provided by a source. The Broadway production of Jesus Christ Superstar closed July 1. The local production of Twelfth Night described in the story will run Oct. 3 through Oct. 5 at the Conexus Art Centre's Shumiatcher Theatre. Curtain time is 7:30 p.m.

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Investigating

CONTINUED FROM A1

"If you're unsure, then also we would recommend that you do not consume them."

The usual number of cases in Saskatchewan in September ranges from zero to four, he said.

Public health authorities are investigating the 13 cases and conducting tests to determine whether they are linked to the recall. Laboratory results are expected within the next few days.

"E.coli is one of the illnesses that we follow very closely," said Shahab. "We always take E.coli very seriously. We are currently investigating those cases. (Some) may be linked to the recall, but we will know more in a week or so. ... Not all of those cases may be linked to the recall."

"You always need to be careful in terms of handling meat in a safe manner, preparing meat on a separate cutting board than cutting

fruits and vegetables. Cook your ground beef thoroughly," Shahab said.

"But under current circumstances, there's an additional precaution that if you have products that are on the recall list, do not consume them."

Otherwise, follow good practices in any case when handling meat products," he added.

The Public Health Agency of Canada, Health Canada, CFIA and provincial health ministries are continuing to monitor the situation.

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The City of Regina gives the public a chance to look at stadium designs.

## MOVIES

Look for listings and reviews for the latest movies coming to Regina.

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## CIVIC ELECTION

Saskatoon mayoral  
candidate addresses  
assault conviction

DAVID HUTTON  
STARPHOENIX

SASKATOON — Saskatoon mayoral candidate Clay Mazurkewich has addressed an assault conviction stemming from a domestic dispute nine years ago, saying he made a mistake and has learned from it.

Mazurkewich, 50, was convicted of three counts of assault in connection with a December 2003 domestic altercation, court records say.

Before speaking to a group at a seniors home Wednesday, Mazurkewich spoke about the incident and said he served a brief stint in jail for breaching conditions imposed on his sentence when he later tried to visit his children.

"If that's going to hold me back — fine. It's up to the

public to decide," Mazurkewich said. "We all make mistakes. We learn from our mistakes."

Later, he said running for mayor is "a start" at trying to improve his life.

"It's a gamble. But I just believe that it's time for change and, you know, I'm sure there's a lot of blue-collar workers that have criminal records. Are we going to say, ... 'You can't vote anymore?'"

According to police, officers were called to a Lakeview home for a domestic dispute on Dec. 17, 2003. The victim received minor injuries, police say.

Mazurkewich received a conditional sentence, court records show.

Mazurkewich, a self-described warehouse inventory consultant, is running what he terms a "blue-collar" campaign focused on affordable

housing and tax breaks for renters.

"To represent this city, I'd say 70 per cent (of people) would be blue-collar workers. That's my background. I know what the people would like to see from a mayor," he said.

Having a criminal record does not prevent anyone from running as a candidate for mayor or city council. A person could be in jail serving time and still be eligible to run, said city clerk Janice Mann.

Council has informally discussed requiring a criminal record check, but has not implemented the provision, she said.

Any Canadian citizen who is at least 18 years of age and lives in Saskatoon can seek a position on council. A candidate is required to collect 25 signatures and a \$100 deposit.

## Women Adversarial

CONTINUED FROM A1

She said another reason why women are reluctant to run is the adversarial nature of politics.

"That's why we need to get more women elected. When we get to that critical mass, which is 30 per cent according to the U.N., that's when women can start to effect that kind of change in the tone (of politics)," said McIntyre.

Ward 4 candidate and political scientist Tina Beaudry-Mellor said that running for city council is like

running for a business, and many women don't consider themselves qualified enough to cut it in the tough world of politics.

"I certainly think the political realm tends to be viewed as a nasty place, and a lot of women find that uncomfortable," said Beaudry-Mellor.

Beaudry-Mellor added that could be one reason why more women are running for the school board.

"It doesn't take a leap of faith," she said, before adding that running for a school board is, "a logical extension

of work (moms are) already doing."

Ward 1 council candidate and current Regina public school board trustee Barb Young agreed, "Mothers — not always, but sometimes — take the lion's share of going to school conferences and being associated with the school community council," she said, adding that "very few" men sit on school community councils.

Fifteen per cent of elected municipal positions in Saskatchewan are held by women: the lowest in Canada.

[dfraser@leaderpost.com](mailto:dfraser@leaderpost.com)

## Land 'Good plan'

CONTINUED FROM A1

"What we will do from there is some of the environmental remediation, some of the site cleanup stuff, eventually come up with a community design and do some of the supporting servicing that needs to take place to build it into a new neighbourhood," said Sjoberg.

The deal also provides an agreement with CPR to allow the city to construct a pedestrian bridge over the CPR lands to connect the neighbourhood in the Warehouse District with downtown.

Along with the land acquisition,

the city will become the owners of two railway bridges on Broad Street.

The land currently has three bridges, but once the intermodal yard is transferred to the global transportation hub west of the city, CPR will require only one track. The city will inherit the two north bridges and CPR will keep the south bridge.

Sjoberg said the city has yet to decide what will become of the two bridges.

Johns Hopkins, CEO of the Regina and District Chamber of Commerce, supports the city's plans for the area.

"We think it's a good

plan," he said. "The projection is that it be generating somewhere between \$250 and \$500 million in terms of investment on that land, which is extremely positive for this community. It will generate significant tax revenue. This whole project is about more than just a stadium. It's about redeveloping the CP container site, as well as the Mosaic site and a stadium. It's a large project. It's an innovative project. We are encouraging council to continue to move ahead."

A possible design of the new stadium was looked at during the committee meeting.

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## BFA Core remains

CONTINUED FROM A1

When the program was first introduced at the U of R, it was considered the gold standard of performing arts training in Canada, but Irwin said enrolment numbers have dropped off "a little" in recent years.

There has also been a \$40,000 reduction in funding to the department over the past 16 years, which meant when one of the department's faculty retired recently, the decision was made not to replace her.

Irwin stressed the core courses in acting, design and stage management would continue, alongside "shiny new" subjects in digital performance and community-based performance.

"It sets us up to look at theatre and performance in a slightly new way, and that's a really good thing," she said.

"It's reflective of current trends in theatre right across the world."

The overhaul of the BFA is part of the university's academic program review, which has been going on across all departments since 2009.

It's partly about funding, but Thomas Chase, U of R provost and vice-president (academic), says it's also about reviewing programs so they remain relevant "not just now, but into the future."

Included in that review is a recently announced task force to study the future of the university's Institut français.

Chase hastened to say the French-language institute would not be cut.

"There's no question of closing the Institut français or our French programming — we want it to thrive," he said.

"We're looking at everything we do to refit the current curricular to suit student needs now and into the future."

The task force looking at Institut français will be chaired by Judith Woodsworth, a scholar of French literature and translation studies. She is also past chair of the World University Service of Canada.

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## Extra

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In the event of any discrepancy between this list and the official numbers, the latter shall prevail.

## Injured

CONTINUED FROM A1

He was removed by EMS crews and transported to Regina.

Police later determined that the car that rammed the man's vehicle had been

stolen from Kelliher, located 70 kilometres north of Fort Qu'Appelle, earlier in the day.

RCMP police dogs were used in the hunt for the other suspects. The matter remains under investigation.

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SaskWater Buffalo Pound Non-Potable Water System Expansion Project

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POLITICS

# Book lays out hard choices on medicare

MARK KENNEDY  
POSTMEDIA NEWS

OTTAWA — Canada's medicare system is in deep distress a decade after a royal commission proposed reforms and it's time for "political leadership" on some of the hard truths that need to be confronted, says a new book.

The book, *Chronic Condition*, is written by veteran political journalist Jeffrey Simpson, whose sharp analysis of the country's health-care system is exhaustively researched and likely to ruffle some feathers.

Simpson concludes that after years of steady funding hikes for medicare, the health system remains rooted in the past, produces relatively "middling results" despite being among the most expensive in the world, and requires major change.

"Canadians are so wedded to the medicare status quo, so fearful of change lest medicare somehow slip away and so ignorant of what other countries are doing that the political risks of candid talk, let alone serious reform, are intimidating."

Simpson cautions against believing "simple solutions" to health care because they are often wrong or "deeply suspect."

"Health care, an extremely complex system that is encumbered with so much national emotion and self-definition, cannot be changed quickly or easily," he writes. "Nor, as Canadians have seen over the past decade, do large amounts of additional money necessarily buy change."

Also in the book, Simpson chronicles how medicare, now 50 years old, was shaped into a system of comprehensive health care supplied by hospitals and doctors.

But now, he contends, Canada has to shirk the status quo by "shaking up the way services are delivered" while also extending public health insurance to areas now uninsured.

For instance, he proposes a new Canadian drug plan for seniors. Just as Canadians now contribute premiums to the Canada Pension Plan, they could pay into a drug plan they could use once they become a senior.

Furthermore, Simpson urges Canadians to look beyond their fear of U.S.-style private medicine to see how other nations with public/private systems have improved their health care.

"It will take political leadership of the highest order to alert Canadians to what is happening to their health-care system and what should be done to improve it," writes Simpson, a national columnist for the *Globe and Mail*. "Leadership of this sort will require being willing to admit that we need to talk about health care, not with slogans and ideology and wishful thinking but with

straight talk."

"The talk will mean tackling the two most difficult tasks in public life. First, place unpalatable truths in front of the people. Second, alert people to looming problems that will require hard decisions today and outline options for those decisions."

Simpson writes that the coming decade won't be easy: economic growth won't be strong as in past years; more baby boomers will retire, and demands for social programs will increase.

Simpson's book comes as the future of health care continues to simmer away quietly as a hot political issue.

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## CHILD PORNOGRAPHY

# Lorenz gets nine months

HEATHER POLISCHUK  
LEADER-POST

While sentencing a 42-year-old Regina man on Wednesday, a Regina Court of Queen's Bench judge said the mere viewing of child pornography needs to be treated as a serious crime since it enables the child porn industry to continue and thrive.

In imposing a nine-month jail sentence against Corey Allan Mathias Lorenz, Justice Lian Schwann said the sentence needed to send "a clear message to others that viewing child pornography from the privacy of one's home does not insulate the offender from the offence nor ignore the harm done to children.

"Simply stated, Internet anonymity is not a mitigating factor," the judge continued. "The sexualization of children will not be condoned and the sentence must be severe enough to reflect a strong denunciation of this type of behaviour. To be clear, this is not a victimless crime nor one done without harm having been inflicted on a vulnerable sector of our society. Children have been abused somewhere in this world in order to make the videos and images like the ones viewed by the accused, and viewing them simply propagates this abhorrent behaviour by providing a market for it. The sexualization and abuse of children must end along with its perceived normalization through Internet access."

Lorenz previously pleaded guilty to one count of possessing child pornography, but successfully fought a second charge at trial alleging he'd made available child porn.

Early this month, Schwann was asked by Crown prosecutor Roger DeCorby to impose a nine-month jail sentence to reflect the seriousness of Lorenz's actions in accruing a sizable collection of child porn. While defence lawyer Michael Scott had re-

quested a 90-day jail term that could be served on weekends, Schwann decided on Wednesday the Crown's request was appropriate given the circumstances in this case. She pointed out the range in this province for this type of offence is 45 days on the low end to one year on the upper end of the scale.

The sentence — which also accounts for a breach charge — includes a three-year probation term with conditions limiting Lorenz's access to children, the Internet, and pornography of any kind.

The possession offence spans a two-month period between late February and late April 2011. Court had heard police found 449 pictures and nine videos described as child pornography which were readily available on Lorenz's hard drive. Hundreds more were found to have been deleted but were recovered by police.

While Scott had argued his client co-operated fully with the investigation, DeCorby said Lorenz showed no sign of remorse — a submission with which Schwann agreed.

"Mr. Lorenz attempted to excuse or minimize his involvement by diverting blame to those who make and distribute child pornography," the judge said. "According to him, what he does within the confines and privacy of his own home is his own business. This line of argument has been squarely addressed and resoundingly rejected in a number of decisions in Canada, including one from the Supreme Court of Canada."

In Lorenz's favour was his near-lack of a criminal record and his guilty plea, Schwann said.

Lorenz was one of seven Saskatchewan men arrested and charged in the spring of 2011 as the result of a lengthy investigation by the Saskatchewan Internet Child Exploitation Unit.

hpolischuk@leaderpost.com

## COURT BRIEFS

## Sinclair not guilty of one offence, mistrial on second

HEATHER POLISCHUK  
LEADER-POST

A 33-year-old man who had been accused of twice kidnapping his girlfriend had been found not guilty of one of the two counts.

Ryan Gregory Sinclair stood trial last week on two counts of kidnapping, following which a Regina Court of Queen's Bench jury found him not guilty on one count and returned undecided on the second.

Because of the hung jury on the second count, defence lawyer Bob Hrycan said the matter is returning to court on Oct. 5 so the Crown can decide whether it will pursue a second trial on that single charge. Sinclair also continues to face a number of other charges, including some breaches, that will be spoken to once the second kidnapping charge is dealt with in some fashion.

Sinclair is not in custody.

According to information previously released by the RCMP, the kidnapping charges were laid following two separate alleged incidents from November in which a then-30-year-old woman told police she'd been kidnapped. The offences were alleged to have occurred on Nov. 10 and 16 in the Pangman area, about an hour's drive south of Regina.

■ ■ ■

A 23-year-old man accused of a daytime sexual assault on a young boy in downtown Regina will remain in custody for the time being.

Lwate Abdalla Ginawe made his first appearance at Regina Provincial Court on Wednesday where he faces charges of sexual assault, sexual interference and breaching a recognizance. The Crown opposed his release from custody and a defence lawyer set

the man's charges over until next Wednesday.

The breach alleges Ginawe failed to follow a condition that he not be in contact with children — a condition imposed in relation to previous, unrelated allegations of a sexual nature. Ginawe continues to face unrelated charges of sexual assault and sexual interference from May 9 of this year and a sexual assault charge from Aug. 13, 2008. He also has two other breach charges from June and July of this year.

According to information previously released by the Regina Police Service, officers were called at about 12:35 p.m. on Friday to a complaint about a three-year-old boy having been touched by an unknown man while the boy was walking in the downtown area with two female relatives.

The boy's mother told police a man had been walking behind them near the intersection of 11th Avenue and Broad Street and, when the three-year-old fell behind, the two women turned to see the man — unknown to the family — touching the child's genital area over his clothes. The mother grabbed the child and the man ran away, the woman reported.

Police searched the area but were initially unable to locate a suspect. The investigation led to charges being laid earlier this week.

hpolischuk@leaderpost.com

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## 54-40 PLAYS COSMO



PHOTOS BY RICHARD MARJAN/StarPhoenix

Two of the members of the band 54-40, Neil Osborne (above foreground) and Dave Genn, performed at Cosmo Industries in Saskatoon on Wednesday as a result of a connection to lead singer Osborne's wife, Geanine Robey. Her cousin, Karl Seel, is a participant at Cosmo, Seel (below), an exuberant fan of the band, reacts to the show. His aunt Ingrid Vincent is on his left.



## SASKATCHEWAN NDP

## NDP vows focus despite leadership campaign

JOE COUTURE  
STARPHOENIX

Saskatchewan NDP interim leader John Nilson doesn't think the party's nine-person Opposition caucus will struggle in the legislature this fall with two of its members also focused on leadership campaigns.

"In the house, we have Doyle Vermette as our whip. He's very good at co-ordinating the attendance of everybody to all the sessions and meetings," said Nilson. "We also cover for each other quite well... We anticipate that there will be some added events this fall as the leadership race develops, but we're not worried about covering the responsibility."

MLAs Cam Broten and Trent Wotherspoon have declared for the leadership.

Each of the NDP's nine MLAs has numerous critic responsibilities. The new legislative session begins on Oct. 25.

"I think it's important that they continue to do their jobs as MLAs," Nilson said about the leadership aspirants. "That's what the public expects them to do. I don't think (the race) will take away from (the Opposition's) work. I think it will actually complement our work and

provide some other ideas that will assist us."

Nilson will remain neutral throughout the process, he said, but Broten's supporters include fellow MLA Danielle Chartier, and Trent Wotherspoon has the support of MLA Warren McCall. MLAs might be divided over their choice for the leadership, but Nilson doesn't think that will cause "any particular problems," he said.

"I think that the New Democrats have four incredibly gifted candidates in this leadership race so far, and there may be more coming still, and they will be carefully evaluated as their skills become more apparent in the leadership process," Nilson said.

"I think the people who have put their names forward as leaders know that there are incredible pressures involved in public life and they have thought through how they're going to do this particular work when also members of the legislature," the interim leader said.

Ryan Meili and Erin Weir are the other two declared candidates.

Wotherspoon said the caucus is "small but mighty" and has "a lot of capacity."

"It's certainly fair to say that

it's going to be an exceptionally busy time, but it's also an exciting time," he said. "I've been elected to serve as an MLA and to represent my constituents and Saskatchewan people in that capacity and I'm committed to doing so.

"And certainly, I will ensure that's the case, but at the same time, I'm thoroughly enjoying the process of going out and listening and connecting and building relationships across Saskatchewan as it relates to the leadership."

Broten said he has been busy, "and it will continue to be busy, but it's an exciting challenge because it is about connecting with people and hearing their ideas.

"I was elected to represent my constituency," he said. "So I want to be here as much as I can. I love being an MLA and I don't want to miss (question periods) and any other action."

Broten also said while "it's important for any race to be competitive, we do need to stick together.

"Trent and I are seatmates and we've served together since 2007. We've managed well in the past and I think we can do so in the future," he said.

The leadership convention will happen in March.

jcouture@thestarphenix.com

### THE SPECTRUM EYE CENTRE

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Dr. Kayla Stevens was born and raised in Winnipeg, Manitoba, where she obtained a Bachelor of Science from the University of Manitoba in 2008. Dr. Stevens continued her education at the University of Waterloo School of Optometry and Vision Science where she played an active role in the optometric community. She received her Doctor of Optometry degree from Waterloo in 2012, graduating with honours.

During her final year of study, Dr. Stevens completed her clinical externships at various sites across North America. During her primary care rotation she had the opportunity to work alongside a board certified Developmental Optometrist in Calgary, Alberta, where she found a passion for pediatric eye care and vision therapy. She gained experience in the diagnosis and management of ocular pathologies on her Ocular Disease rotation at the Eye Associates of Pinellas Park in Florida. In addition to her domestic training, Dr. Stevens completed a vision care mission at the Foundation For International Self Help (FISH) Clinic in Kingston, Jamaica.



While her passion for her patients and vision care is great, Dr. Stevens also enjoys staying active with volleyball, tennis, and her newfound interest in golf. She enjoys spending her spare time at the cottage with friends and family. Dr. Kayla Stevens is enthusiastic about joining our team and providing full comprehensive eye exams for patients of all ages.

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## Petition Chance

CONTINUED FROM A1

"It's important to let the public know that this is about someone expressing their point of view. Our role is to keep the peace and ensure people are behaving."

That has been helped, Popowich said, by the fact organizers of the event and the city have all been in communication with one another about Occupy the Stadium's plans.

"We try to anticipate whether any problems might arise, and we recognize that debates like this can be really emotional — not just here in Regina, but anywhere these kinds of issues come up," she said.

"People have the right to express where they stand on

these issues."

When it comes to the City of Regina, bylaw enforcement manager Dwayne Flaman confirmed bylaw officers would be out to ensure the group did not break any rules — not camping, for example.

"As long as people are out of there by 11 p.m., they have the right to protest there," he said.

Before heading to the stadium, Thomas said he was gathering folding chairs, tables, signs, food and water — maybe even a radio of some kind.

Originally she expected a small group of people, but she says those numbers could swell.

"I think this is going to be a big chance of getting a lot

of signatures," she said, putting the weekend's estimate at between 2,000 and 3,000 signatures.

The movement will certainly need it.

At the moment, their petition has 5,200 signatures and Thomas said she has been told by City Hall that she'll need at least 20,000 by Nov. 8.

"After this, we're going to keep on pounding the streets," she said.

"The idea behind it all is to have a discussion, to put new ideas out there. I'm sure an eye-opener for a lot of people and I'm hoping a lot of people stop by."

Thomas said people can find more information at [urdamnright.info](http://urdamnright.info).

[egraney@leaderpost.com](mailto:egraney@leaderpost.com)

## Will Protesting

CONTINUED FROM A1

"He said he wasn't going to go off of it unless the hospital staff there told him he had to ...," said Jason Will's mother, Patty Will. "The point he's trying to get across is he did not hurt Raime. There's no way on earth he would have hurt Raime and he wants to get people to realize that he's serious about the fact that he didn't hurt Raime."

While Hrycan said he's never before had to deal with a hunger-striking client, he said he doesn't "find it difficult to understand" why Will has gone this route.

"Essentially the conviction and appeal have become a media sensation," Hrycan said. "He's being tried and retried in the media and he's not been given an opportunity to state his case and won't have that opportunity until a full appeal is heard."

A date for the conviction and sentence appeal has yet to be set, but Hrycan doesn't expect it will happen before spring.

**"THERE'S NO WAY ON EARTH HE WOULD HAVE HURT RAIME AND HE WANTS TO GET PEOPLE TO REALIZE THAT HE'S SERIOUS ABOUT THE FACT THAT HE DIDN'T HURT RAIME."**  
PATTY WILL

In the meantime, Hrycan is anticipating filing an appeal of the bail decision within the next week and will ask that a hearing be held soon after to determine whether Appeal Court Justice Maurice Herauf's bail decision should be overturned.

"We don't believe that the bail judge adequately considered the issue of public interest," Hrycan said. "We believe that he focused too narrowly on the issues that were put before him. We think that an individual

with no prior criminal record who actually returned (not then in custody) for sentencing knowing he'd be facing a federal term of incarceration should be released on appeal."

Will and his family continue to claim he's not guilty and that he didn't get a fair trial. The conviction appeal claims Queen's Bench Justice Dennis Ball made his decision based on evidence that was problematic while ignoring other evidence, including some medical testimony, that would have been helpful to Will's case.

"We all feel sorry for the loss of Raime as we have all known him and taken care of him, loved him, but it's just not right having put someone away that I know in my heart is completely innocent of this crime," said Jason Will's father, Brian Will.

The Crown has also filed an appeal in this case, asking that the sentence be upped. The Crown had initially been looking for a 10-year prison term.

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## LABOUR LEGISLATION REVIEW

## NDP encouraged by meetings

JOE COUTURE  
STARPHOENIX

More than 700 people attended the provincial NDP Opposition's public meetings about the government's ongoing labour legislation review, the party caucus says.

The meetings were held in nine communities throughout the province and concluded Wednesday with the largest turnout in Saskatoon. NDP Labour Critic David Forbes said more than 200 attended that event.

"There's a general need for education about what's in place right now, so workplaces can be safer and fair and businesses can do their work and keep the economy thriving," Forbes said Thursday.

"We heard that a lot of

people weren't even aware the (government's labour legislation review) process was taking place."

The purpose of the meetings was to discuss the government's controversial planned overhaul of labour laws and in October,

Forbes will present a report on the Your Work, Your Say forum findings to the government.

Forbes said the issues discussed at the meetings included minimum wage, retail-sector safety and agricultural concerns. He encouraged the government to put its review of the legislation on hold and take a "second look" at the changes being considered.

"We worked really hard to make sure that we had a broad cross-section of people," he said.

"We're very encouraged to move forward.

As the Opposition, we can only talk in the house about what we've heard and if we haven't heard much, we can't really say much. This is a way of saying this is what we heard in communities right across this province."

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In the event of any discrepancy between this list and the official numbers, the latter shall prevail.

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SaskWater Buffalo Pound Non-Potable Water System Expansion Project

Community  
Information Sessions

You are invited to attend a come and go Community Information Session to discuss the SaskWater Buffalo Pound Non-Potable Water System Expansion Project.

**Tuesday Oct. 2<sup>nd</sup>**  
Sun Valley Community Hall - 4 pm to 8 pm

**Wednesday Oct. 3<sup>rd</sup>**  
Pense Community Hall - 4 pm to 8 pm

**Thursday Oct. 4<sup>th</sup>**  
Kronau Multi-Purpose Facility - 4 pm to 8 pm

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The Leader-Post's photojournalists had a busy week. To see their best shots head to [leaderpost.com/news/photos](http://leaderpost.com/news/photos).

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MONDAY  
RCMP

Read some of the war stories from the RCMP air service pilots.

ROUGHRIDERS

Get the latest news following tonight's game against the B.C. Lions.

LEADER-POST

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522-7355

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Life Killed for a stereo

CONTINUED FROM A1

"Rob died alone. Not surrounded by his loved ones," she sobbed. "You took someone who was very loved ... Rob did nothing to deserve this or leave the world the way he did."

Rob's grandmother "lost her will to live" and died on May 28 — what would have been Rob's 26th birthday, she said. Also, the day Rob was murdered was his younger brother Daniel's birthday. After the sentencing, she said she was disappointed with the justice system and that the charge was changed from first-degree murder to second-degree murder.

Crown prosecutor Bill Jennings told the court that in the early morning hours of Oct. 10, 2010, Vicente, 25, from Bladworth, met More and Schmit at a party in Davidson, about 147 kilometres northwest of Regina. At 2:45 a.m., the three men left the party to get more beer. Vicente let More drive his car because he had too much to drink. When Schmit and More saw the car stereo, they began planning how they could steal it, said

Jennings.

At 3:46 a.m., More and Vicente left the party again to get cigarettes at a gas station in Davidson. More then drove Vicente, who was passed out in the passenger seat, to Schmit's family farm in Davidson and parked the vehicle. About two hours later, More went back to the party before he and Schmit returned to the farm. Once there, Schmit opened the passenger door and as Vicente slumped toward the ground, he shot him twice in the head with a rifle, said Jennings.

More and Schmit then dragged Vicente's body into a nearby wooded area where Schmit shot him again in the back to "finish him off" and then buried him in a shallow grave, he said.

Later that day, More drove the car to Saskatoon to try to sell it and the stereo but was unsuccessful. He was pulled over by police and given a speeding ticket.

That night, the men removed the stereo and speakers from the car and set it on fire 29 kilometres west of Davidson.

About a week later, police searched More's home and found

the stereo in his room. Over the next four months, the two men bragged about the crime to friends until they were arrested and charged on Feb. 11, 2011. While in custody, they confessed to the murder. Days later on Feb. 14, Vicente's body was recovered after More led police its location, said Jennings.

Schmit's lawyer Andrew Hitchcock said his client doesn't blame anyone but himself. He then described Schmit's life growing up in an abusive home and his consumption of drugs and alcohol since he was 10 years old. He had been drinking alcohol and taking drugs that night, and after killing Vicente, Schmit looked at himself in the mirror and cried for 20 minutes, said Hitchcock.

More's lawyer Darren Armitage spoke briefly to say his client had no excuses for his behaviour and that the charge and the sentence recommendation were appropriate.

More and Schmit also received a lifetime firearms ban and were ordered to provide a sample of their DNA to police.

[tmceachern@leaderpost.com](mailto:tmceachern@leaderpost.com)

Petition

CONTINUED FROM A1

This was because some people interested in signing had told her it was difficult to find.

"Businesses don't want to host it, it's a controversial issue."

Friday night's event was the beginning of Occupy the Stadium, a plan by the group to maintain a presence at Mosaic Stadium throughout the weekend.

Protesters will be set up just outside the Mosaic Stadium practice field all day today including during tonight's game between the Saskatchewan Roughriders and B.C. Lions. Normal pre-game activities that take place on the practice field will go ahead as always.

Thomas' group worked with the Roughriders and the City of Regina to find a space where it would be visible but would not disrupt game day activities.

The city also forbade the group from camping overnight at the stadium.

"Actually, they've been really good," said Thomas, noting that city and stadium officials reached out to her and her supporters early on as they were setting up the event.

The lease agreement between the team and the city states that the practice field, the surrounding parking lot and the plaza on the west side of the stadium all belong to the Riders on game days.

While many of those outside Mosaic Stadium will be thinking about the possibility of a new stadium as the protest group sets up camp, some of those working on the field inside have allowed themselves only fleeting thoughts about playing in a new facility by 2017.

"Not really, because that's so far away," said Roughriders quarterback Darian Durant.

"We're realists, and we know that the average career in football is 2 1/2 or three years, so a lot of

us won't even be here.

"At the same time, for someone like myself who would love an opportunity to change history and be the longest-tenured quarterback here and to make a statement myself in this organization, I think about it — because I would love to be the first quarterback to start in that new stadium.

"I think about it a little bit, but not anything that takes over because it's so far away."

Veteran linebacker Mike McCullough, who has spent seasons playing in Mosaic Stadium, hasn't given much thought to the prospect at all.

"I don't follow it," he said.

"I really don't follow what's going on, so I don't know much about what's going on. It's going to happen whether you like it or not."

"You can't do much about it."

— with files  
from Leader-Post staff

LOTTERY  
NUMBERS

Pick 3

Friday: 054

Extra

Friday: 2397794

Lotto Max

Friday: 5, 6, 32, 33, 39, 42, 47

Bonus 9

In the event of any discrepancy between this list and the official numbers, the latter shall prevail.

SaskWater Buffalo Pound Non-Potable Water System Expansion Project



Community  
Information Sessions

You are invited to attend a come and go Community Information Session to discuss the SaskWater Buffalo Pound Non-Potable Water System Expansion Project.

**Tuesday Oct. 2<sup>nd</sup>**  
Sun Valley Community Hall - 4 pm to 8 pm

**Wednesday Oct. 3<sup>rd</sup>**  
Pense Community Hall - 4 pm to 8 pm

**Thursday Oct. 4<sup>th</sup>**  
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**HIGHLAND CURLING CLUB**  
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**New Rocks for 2012 Season**

Correction

Team Canada in 1972 was led by four co-captains (who wore the letter A on their jerseys): Phil Esposito, Frank Mahovlich, Stan Mikita and Jean Ratelle. Pete Mahovlich led the "rescue" of series organizer Alan Eagleson from the stands during the final game of the series in Moscow. Incorrect information appeared Sept. 25 in a Matthew Fisher column.



## GENERAL LISTINGS

Whole Soul Connection of Moose Jaw and raw food chef Juana Veters will have the first raw food class, Raw Basics. It will feature green smoothies, onion bread, zucchini with marinara sauce and a dessert.



★ Tours of the Moose Jaw and District Seniors Centre, 11 a.m. to 2 p.m. and ice cream social at 3 p.m. Seniors are free.



Free baby clothes for expecting mothers and newborns to age 2, 2-4 p.m. at the Right to Life Resource Centre, 107 B Main St. N.



Free legal clinic between 2 and 5 p.m. at the Salvation Army Family Services Office, 175 First Ave. N.E. by appointment only. The clinic offers legal assistance for individuals who don't qualify for legal aid, but cannot afford the services of lawyers. To book an appointment, call 1-855-833-7257.



**LOTTO 6/49**  
For Saturday: 2, 7, 18, 20, 41, 48. Bonus 29.

For Saturday: 8, 12, 13, 29, 43, 46. Bonus 20.

For Saturday: 2, 9, 3.  
For Sunday: 0, 5, 8.

Winning number for the top prize of \$250,000 was:  
4, 7, 9, 8, 3, 5, 2 on Saturday.  
4, 2, 5, 7, 8, 0, 9 Sunday.

In the event of a discrepancy between these lists and the winning number, the official lists shall prevail.

To be included in this guide, announcements must be sent to the Times-Herald by the previous Wednesday.

- Kinsmen Sportsplex swim schedule: 6-10:15 a.m., morning swim (part of pool); 10:45-11:45 a.m., mid-morning swim (part of pool); 11:45 a.m.-1:15 p.m., adult noon hour swim; 3:30-5 p.m. and 7-9 p.m., public swim; 5-7 p.m. lap swim (part of pool); 9-10 p.m. adult swim.
- Moose Jaw and District Seniors will have a pancake breakfast, 8-10 a.m. Seniors are free.
- The Bullying Sucks Tour, featuring young punk band Childsplay who teamed up with Pink Shirt Day, performing at Riverview Collegiate
- Whole Soul Connection of Moose Jaw and raw food chef Juana Veters will have the first raw food class, Raw Basics. It will feature green smoothies, onion bread, zucchini with marinara sauce and a dessert.
- A luncheon with University of Regina president Vianne Timmons, 11:45 a.m. to 1 p.m. at the Heritage Inn. Timmons will be speaking on the highlights from the Conference Board of Canada Report.
- Grandmothers 4 Grandmothers are meeting at 1:30 p.m. in the Rosewood social room, 140 High St. E. The group raises money for orphaned children in Africa and members do not have to be grandmothers. New members are welcome. Call 693-4408 for more information.
- The Woodcrafters Guild of Moose Jaw will hold its monthly meeting on Oct. 1 at 7 p.m. at Riverview Collegiate in the home ec room. For more information, call Gerry at 693-0671.

- Kinsmen Sportsplex swim schedule: 6-10:15 a.m., morning swim (part of pool); 10:45-11:45 a.m., mid-morning swim (part of pool); 11:45 a.m.-1:15 p.m., adult noon hour swim; 3:30-5 p.m. and 7-9 p.m., public swim; 5-7 p.m. lap swim (part of pool).
- The next meeting for Common Ground, grief support for women who experienced the loss of their husband, will take place from 10 to 11:30 a.m.
- Tours of the Moose Jaw and District Seniors Centre, 11 a.m. to 2 p.m. and ice cream social at 3 p.m. Seniors are free.
- The Moose Jaw Public Library will hold the program e-Readers 101: An Introduction with expert September Brooke at 7 p.m. Try out Kobo Touches, iPads, Sony e-Readers and Galaxy Tabs and a demonstration on how to access eBooks from the library using library2go for free. Admission is free and everyone is welcome.

- Kinsmen Sportsplex swim schedule: 6-10:15 a.m., morning swim (part of pool); 10:45-11:45 a.m., mid-morning swim (part of pool); 11:45 a.m.-1:15 p.m., adult noon hour swim; 3:30-5 p.m. and 7-9 p.m., public swim; 5-7 p.m. lap swim (part of pool); 9-10 p.m. adult swim.
- The Moose Jaw and District Seniors will have a Seniors Trade Show, 9 a.m. to 3 p.m. Admission is free for all.
- The Mental Health and Addictions Services of the Five Hills Health Region will hold Addictions: Community Education Course, 9 a.m. to 4 p.m. in the solarium on the sixth floor of the Moose Jaw Union Hospital.
- Free baby clothes for expecting mothers and newborns to age 2, 2-4 p.m. at the Right to Life Resource Centre, 107 B Main St. N.
- Anavets will have a baron of beef supper, 5:30-7 p.m. Advance tickets only. For more information, call 692-4412 or 693-1656.
- The Alzheimer Society of Saskatchewan and Telehealth Saskatchewan via the Saskatchewan Telehealth network will hold an educational event, Understanding Dementia, 7-9 p.m. It will be available at the following Five Hills Health Region sites: Moose Jaw Union Hospital, Assiniboia Union Hospital, St. Joseph's Hospital in Gravelbourg, Central Butte Regency Hospital and Grasslands Health Centre in Rockglen. The video conference is provided at no cost to participants but pre-registration is required. To register, contact Lisa Taylor, regional telehealth consultant, at 691-2635 or ltaylor@hbhr.ca.

- Kinsmen Sportsplex swim schedule: 6-10:15 a.m., morning swim (part of pool); 10:45-11:45 a.m., mid-morning swim (part of pool); 11:45 a.m.-1:15 p.m.,

★ Moose Jaw Public Library will hold Not Your Grandmother's Knitting (for Teens) with Helen Wattam at 11 a.m. in the young adult section of the public library to learn knitting basics and make knitting friends. No registration is required and admission is free.



adult noon hour swim; 3:30-5 p.m. and 7-9 p.m., public swim; 5-7 p.m. lap swim (part of pool).

The fall rally of Chinook East Presbyterial will be held in the Community Hall at Limerick, 9:30 a.m.-3:30 p.m. Noon lunch will be available. It is a celebration of the 50th anniversary of United Church Women. It will include a short business meeting, music and history presentation. People are asked to come prepared to share some exciting events and past accomplishments of the group over the years as well as to bring photos and items for a memorabilia display. Anniversary cake will be served. All United Church Women welcome. For more information, call Joyce at 692-0731.

Moose Jaw and District Seniors fall bake sale, 1-4 p.m. and a potluck supper at 5:30 p.m.

Free legal clinic between 2 and 5 p.m. at the Salvation Army Family Services Office, 175 First Ave. N.E. by appointment only. The clinic offers legal assistance for individuals who don't qualify for legal aid, but cannot afford the services of lawyers. To book an appointment, call 1-855-833-7257.

Gardening: Lilies at the Moose Jaw Public Library at 2:30 p.m. with speaker Gladys Ning, president of the South Saskatchewan Lilies Society. Admission is free and everyone is welcome.

MS Society of Saskatchewan and Telehealth Saskatchewan via the Saskatchewan Telehealth network will host an educational event Multiple Sclerosis and Exercise for anyone who wants to learn more about ways people living with MS can exercise to benefit their health and fitness will take place, 7:15-8:45 p.m. It will be available at the following Five Hills Health Region Telehealth sites: Moose Jaw Union Hospital, Assiniboia Union Hospital, St. Joseph's Hospital in Gravelbourg, Central Butte Regency Hospital, Craik and District Health Centre and Grasslands Health Centre in Rockleigh. The video conference is provided at no cost to participants, but pre-registration is required. To register contact Lisa Taylor, regional telehealth consultant at 691-2635 or ltaylor@rhn.ca.

Kinsmen Sportsplex swim schedule: 6-10:15 a.m., morning swim (part of pool); 10:45-11:45 a.m., mid-morning swim (part of pool); 11:45 a.m.-1:15 p.m., adult noon hour swim; 3:30-5 p.m. and 7-9 p.m., public swim; 5-7 p.m. lap swim (part of pool); 6-7 p.m., family swim; 9-11:30 p.m. free teen swim (ages 12-18 years).


■ Moose Jaw and District Seniors will have a cake and coffee afternoon at 2 p.m. Seniors are free.

- Kinsmen Sportsplex swim schedule: 10 a.m. to noon, family swim; 10 a.m. to noon, lap swim; noon-1 p.m., adult noon hour swim; 1-4 p.m. and 7-9 p.m., public swim.
- United Church Festival of Creative Crafts and Trade Show will take place at the Central Butte Arena from 11 a.m. to 4 p.m.
- Moose Jaw Public Library will hold Not Your Grandmother's Knitting (for Teens) with Helen Wattam at 11 a.m. in the young adult section of the public library to learn knitting basics and make knitting friends. No registration is required and admission is free.
- First annual Oktoberfest will take place in Central Butte. The event will begin at 2 p.m. with specialty beer sampling, followed by a Ukrainian supper at 5:30 p.m. and a Dance to Wonderland at 9 p.m. There will also be a Senior Hockey Sports Memorabilia Silent Auction.
- Harvest Hoe Down Dance will take place at Moose Jaw and District Seniors at 8 p.m. Tickets are \$10.

◆ Kinsmen Sportsplex swim schedule: 10:45-11:45 a.m. women's only swim (third Sunday of the month only) noon to 1 p.m. adult noon hour swim; 1-4 p.m. and 7-9 p.m. public swim.



SaskWater Buffalo Pound Non-Potable  
Water System Expansion Project

 **SaskWater**

# Community Information Sessions


You are invited to attend a come and go Community Information Session to discuss the SaskWater Buffalo Pound Non-Potable Water System Expansion Project.

**Tuesday Oct. 2<sup>nd</sup>**  
Sun Valley Community Hall - 4 pm to 8 pm

**Wednesday Oct. 3<sup>rd</sup>**  
Pense Community Hall - 4 pm to 8 pm

**Thursday Oct. 4<sup>th</sup>**  
Kronau Multi-Purpose Facility - 4 pm to 8 pm

Refreshments and snacks will be provided.



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# State funeral planned for Fedoruk

In 1988, Fedoruk, a native of Canora, was appointed 17th lieutenant-governor of Saskatchewan, becoming the first woman to hold the post. She maintained the

— *StarPhoenix*

Lisa Goudy can be reached  
at 691-1289.

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**Natalie & Michael Nagel**  
of Mossbank, SK  
Sept. 22 @ 8:23 a.m.  
a son weighing  
8 lbs 1/2 oz

—

**Michelle Kahnape & Fred Brass**  
of Moose Jaw, SK  
Sept. 22 @ 11:44 a.m.  
a son weighing  
6 lbs 1/2 oz

—

**Lisa & Greg Holovach**  
of Moose Jaw, SK  
Sept. 24 @ 2:06 a.m.  
a daughter weighing  
8 lbs 5 oz

—

**Amy & Derek Duzan**  
of Moose Jaw, SK  
Sept. 26 @ 4:24 a.m.  
a son weighing  
8 lbs 13 oz

—

**Jacqueline & Jerred Williams**  
of Moose Jaw, SK  
Sept. 26 @ 8:26 a.m.  
a daughter weighing  
7 lbs 5 3/4 oz

—

**Michelle Kerr & Terry Zwarich**  
of Moose Jaw, SK  
Sept. 26 @ 11:06 a.m.  
a daughter weighing  
9 lbs 1 oz

—

**Jennise Hook & Todd Looze**  
of Moose Jaw, SK  
Sept. 27 @ 2:11 p.m.  
a daughter weighing  
6 lbs 1 oz

—


**Jenalee Yakivchuk & Rem Oddy**  
of Moose Jaw, SK  
Sept. 28 @ 1:50 a.m.  
a son weighing  
8 lbs 5 3/4 oz

## LOTTERY NUMBERS

**PICK 3**  
For Monday: 8, 0, 7


**EXTRA**  
Winning number for the  
top prize of \$250,000 was:  
3, 4, 8, 3, 3, 3, 3

In the event of a discrepancy between these lists  
and the winning number,  
the official lists shall  
prevail.



Be part of something monumental.  
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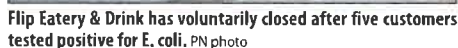
**endMS.ca**  
It's time. Give now.

1-800-361-2005 

## WALMART CORRECTION NOTICE

Our flyer distributed on Sept. 26 - 28 and effective Sept. 28  
— Oct. 4 : Page 10 : Due to unforeseen circumstances, the  
George Ladies' Topper Coats (#30340263/4/5/6) at \$40  
will not be available in all stores.  
*We apologize for any confusion this may have caused.*

 <p><b>Contact us</b></p> <ul style="list-style-type: none"> <li>➤ For any department call (306) 692-6441 or call from our list of departments and managers at the right.</li> <li>➤ Our office hours are 9:00 a.m. to 5:00 p.m. Monday to Friday.</li> <li>➤ Our office is located at 44 Fairford St. W., Moose Jaw, Sask. S6H 1V1</li> <li>➤ The Moose Jaw Times-Herald claims copyright on all advertising and editorial matter. No material contained herein can be reproduced in another publication without written consent.</li> </ul> <p><a href="http://mjtimes.sk.ca/Our-Team">mjtimes.sk.ca/Our-Team</a></p>	<p><b>TO SUBSCRIBE</b></p> <p>Call Circulation Department ..... (306) 692-6441 Press option 3</p> <p>Email: ..... <a href="mailto:circulation@mjtimes.sk.ca">circulation@mjtimes.sk.ca</a></p> <p><b>Advertising</b></p> <p>For advertising inquiries ..... (306) 692-6441 Press option 2</p> <p>Email: ..... <a href="mailto:sales@mjtimestsk.ca">sales@mjtimestsk.ca</a></p> <p>For classified inquiries ..... (306) 692-6441 Press option 1</p> <p>Email: ..... <a href="mailto:classifieds@mjtimestsk.ca">classifieds@mjtimestsk.ca</a></p>	<p><b>NEWSROOM CONTACTS</b></p> <p>Lesley Sheppard, Managing Editor ..... (306) 691-1262 Carter Haydu, News Reporter ..... (306) 691-1265 Joel van der Veen, News Reporter ..... (306) 691-1256 Colo Caruthers, News Reporter ..... (306) 691-1258 Lisa Goudy, News Reporter ..... (306) 691-1289 Aaron Studiel, Intern Reporter ..... (306) 691-1263 Matthew Gourlie, Sports Reporter ..... (306) 691-1257 Katie Bridgman, Sports Reporter ..... (306) 691-1260</p> <p>➤ The Canadian Press is exclusively entitled to the use of publication of all news dispatched to this paper, credited to it or the Associated Press or Reuters and also the local news published herein.</p> <p>The Times-Herald is published by</p> <p><b>tc • MEDIA</b></p>	<p><b>DEPARTMENT MANAGERS</b></p> <p>Rob Clark, Publisher ..... (306) 691-1254 <a href="mailto:rrob.clark@mjtimestsk.ca">rrob.clark@mjtimestsk.ca</a> Polly Veroba, Business Manager ..... (306) 691-1253 <a href="mailto:pveroba@mjtimestsk.ca">pveroba@mjtimestsk.ca</a> Lesley Sheppard, Managing Editor ..... (306) 691-1262 <a href="mailto:editorial@mjtimestsk.ca">editorial@mjtimestsk.ca</a> Glenn Haug, Advertising Manager ..... (306) 691-1277 <a href="mailto:glen.haug@mjtimestsk.ca">glen.haug@mjtimestsk.ca</a> Doug Leitz, Circulation Manager, Reader Sales &amp; Service ..... (306) 691-1285 <a href="mailto:doug.leiz@mjtimestsk.ca">doug.leiz@mjtimestsk.ca</a> Wanda White, Sask. Centralized Production Manager ..... (306) 691-1241 <a href="mailto:wanda.white@mjtimestsk.ca">wanda.white@mjtimestsk.ca</a> Marlon Hector, Sask. Centralized E&amp;L Layout Manager ..... (306) 691-1293 <a href="mailto:marlon.hector@tpc-tr.com">marlon.hector@tpc-tr.com</a></p>	<p><b>E-MAIL</b></p> <p>Letters to the Editor ..... <a href="mailto:editorial@mjtimestsk.ca">editorial@mjtimestsk.ca</a> News ..... <a href="mailto:editorial@mjtimestsk.ca">editorial@mjtimestsk.ca</a> Sports ..... <a href="mailto:sports@mjtimestsk.ca">sports@mjtimestsk.ca</a> Advertising ..... <a href="mailto:sales@mjtimestsk.ca">sales@mjtimestsk.ca</a> Classifieds ..... <a href="mailto:classifieds@mjtimestsk.ca">classifieds@mjtimestsk.ca</a> Circulation ..... <a href="mailto:circulation@mjtimestsk.ca">circulation@mjtimestsk.ca</a></p> <p><b>SOCIAL MEDIA</b></p> <p> <a href="https://twitter.com/MJTimesHerald">twitter.com/MJTimesHerald</a></p> <p> <a href="https://facebook.com/MJ-Times-Herald">facebook.com/MJ-Times-Herald</a></p> <p><small>Mail Registered as Number: K06-00185-0001-0001-MJS-Billing-mjtimes.ca/canadapost</small></p>
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**REGINA (Postmedia News)** — A Regina restaurant has temporarily closed its doors after five of its customers tested positive for E.coli.

She expressed appreciation to the restaurant for voluntarily closing while the investigation is underway.

**PICK 3**  
For Tuesday: 8. 5. 0

**EXTRA**  
Winning number for the top prize of \$250,000 was: 5, 7  
0, 4, 7, 9, 7

In the event of a discrepancy between these lists and the winning number, the official lists shall prevail.

*Dubinsky Family Scholarship awarded to student with 95.3 per cent average*

**LISA GOUDY**  
SE JAW TIMES-HERALD

With a seven-subject average of 95.3 per cent, student Kayla Busch was awarded the 2012 Dubinsky Family Scholarship.

Mayor Glenn Hagel presented the award during Monday's regular council meeting.

"I am very, very proud to present the scholarship to Kayla Busch," said Hagel during Monday's meeting.

"Kayla's not here because, not surprisingly, she's away studying right now. But she has a very, very proud mother and father who are here (at council) to accept the award on her behalf."

Busch graduated from Peacock Collegiate and has begun studies at the University of Saskatchewan studying arts and sciences with a goal of pursuing medicine.

In a letter to city council from the selection committee, it stated outside of the classroom Busch played volleyball, softball and did track and field and wrestling.

She was a coach and mentor in softball and wrestling and volunteered at the Bantam Softball Westerns and 2010 Saskatchewan Winter Games.

Outside of the world of sports, Busch was a volunteer tutor, volunteered at the food bank and helped make Operation Christmas Child and the Kinsmen Santa Parade successful.

Other items considered during Monday's meeting:

- Council approved the

exemption of the entire off-street parking requirement for 20 off-street parking spaces at 12 High St. E. in exchange for a payment of \$5,000 per exempted space. The request came from Shaw Chartrand, vice president of Zarkor Construction Ltd. who requested to move forward with the parking spots for future development of 40 suits in the Walter Scott Building.

Council passed an amendment to the zoning bylaw to reduce the parking requirement to 0.5 parking spaces per dwelling unit for existing buildings. The developer is proposing to utilize a zoning bylaw option to buy out the parking requirement at \$5,000 per space.

- Council received and filed two decisions of the development appeals board for two residential appeals for variance under the zoning bylaw. The requests were for lower site frontage than required and a smaller site area than required.

• Notice was given of the next development appeals board meeting to be held on Oct. 16 at 5 p.m. at city hall. Council received and filed the report.

• The Murals Project Management Committee recommended council approve the appointment of Richard Dawson as citizen-at-large to the Murals Project Management Committee for a term of office to begin immediately and to conclude on Aug. 31, 2014. It was passed unanimously.

- Michael Westrum of Westrum Lumber Ltd. sub-

mitted a request for a discretionary use application for a building supply establishment at Grayson Business Park, Plan 81MJ08260. All expenses will be borne by the applicant. Council approved it in its entirety.

• Council approved the condominium plan at 221 Main Street South. All costs will be borne by the applicant. Administration found the plan to be in accordance with The Condominium Property Act, 1993.

• Council unanimously passed a proposed text amendment to zoning bylaw No. 5346 by adding the term "industrial, light" to the list of discretionary uses in the C1 neighbourhood commercial district as well as adding the term to the list of required parking spaces for commercial districts. Industrial, light is defined in the zoning bylaw as "development used for small to medium-sized industries with on-site production, cleaning, servicing, repairing, testing, processing, manufacturing, or assembly of raw materials, semi-finished or finished goods, products or equipment." It is also not to create a nuisance for neighbouring uses or services of the city.

The applicant is operating a modular home manufacturing business that hopes to produce 25 homes per year. The majority of the business will be operated inside and noise or fumes will not affect neighbours.

All necessary changes will be made to the table of contents sections and re-

pagination of the bylaws will be completed where necessary. All costs will be borne by the applicant.

• Council authorized the city clerk, on behalf of the city, to execute the Surveyor's Certificate Form B and the plan for survey for 205 Fairford St. E. The applicant applied for approval of the condominium plan to allow for the sale of individual units in the building. Administration is expecting no problems with the plan, which is in accordance with The Condominium Property Act, 1993.


\* Council approved the proposed subdivision plan of Plan 81MJ08260 at 21 and 27 Highland Road subject to the subdivision review process be completed by administration and that no negative comments are received. Further, upon satisfaction of the above conditions, the mayor and city clerk are authorized to endorse the proposed subdivision plan and issue a certificate of approval. All costs will be borne by the applicant.

The business development division presented a report providing comments to the approving authority of subdivisions in rural areas regarding a subdivision within the R.M. of Moose Jaw No. 161. The report recommended the authorization of the mayor and the city clerk to forward to the approving authority for rural subdivisions that the city has two comments regarding the approval of the subdivision.

See 'COUNCIL NOTEBOOK' on Page 3



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# Weather



## The Weather Network


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<b>Today</b> Showers (60%) Moderate winds High 5, Low -5	<b>Thursday</b> Partly sunny High 5, Low -9	<b>Friday</b> Partly cloudy High 6, Low -8	<b>Saturday</b> Partly cloudy High 10, Low -1	<b>Sunday</b> Showers (40%) High 15, Low 4
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**Skies**  
 Sunset: 6:34 p.m. today  
 Sunrise: 7:06 a.m. tomorrow  
 Moonset: 10:57 a.m.  
 Moonrise: 8:03 p.m.

**UV Index:** 3  
 Today's UV Index: 3



Map showing weather systems across Canada. High (H) and Low (L) pressure centers are indicated. Fronts are shown with various symbols: Cold Front (blue line with triangles), Warm Front (red line with semicircles), Trough (dashed line), and Occlusion (dashed line with alternating triangles and semicircles).

**Today's Almanac**

Temperature	High	Low
Yesterday	16.2°	8.5°
Normal	17°	2.3°
Record	31.1° (1943)	-8.3° (1988)
Precipitation (in mm)		
Normal	1.3	Record 22.9 (1969)
Yesterday (to 1pm)	0	
	Month	Year
To date	0	315.7
Average to date	3.2	318.9

**Asinibolia:** Cloudy with showers with 60% probability of precipitation. Winds northerly 30km/h. High 6. Cloudy in the evening with a few flurries developing overnight (pop 40%). Low -3.

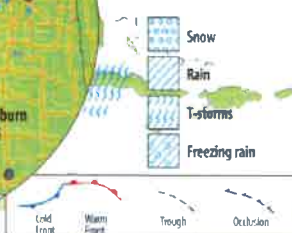
**Avonlea:** Cloudy with showers with 60% probability of precipitation. Winds northerly 30km/h. High 7. Cloudy with a few breaks overnight. Low -4. Tomorrow, cloudy with showers (pop 40%). High 5. Low -9.

**Bethune:** Cloudy with showers with 60% probability of precipitation. Winds northerly 30km/h. High 7. Cloudy with a few breaks overnight. Low -5. Tomorrow, cloudy with sunny breaks. High 5. Low -9.

**Coronach:** Cloudy with showers with 60% probability of precipitation. Winds northerly 30km/h. High 5. Cloudy with a few flurries (pop 40%). Low -4. Tomorrow, mixed precipitation (pop 70%). High 3. Low -8.

**Marquis:** Cloudy with showers with 60% probability of precipitation. Winds northerly 30km/h. High 7. Cloudy with a few breaks overnight. Low -5. Tomorrow, cloudy with sunny breaks. High 5. Low -9.


**Regina:** Cloudy with showers with 60% probability of precipitation. Winds northerly 30km/h. High 7. Mainly cloudy. Low -4. Tomorrow, variably cloudy. High 6. Low -9.



Legend for weather symbols:

- Snow
- Rain
- T-storms
- Freezing rain
- Cold Front
- Warm Front
- Trough
- Occlusion

SaskWater Buffalo Pound Non-Potable  
Water System Expansion Project

 **SaskWater**

# Community Information Sessions


You are invited to attend a come and go Community Information Session to discuss the SaskWater Buffalo Pound Non-Potable Water System Expansion Project.

**Tuesday Oct. 2<sup>nd</sup>**  
Sun Valley Community Hall - 4 pm to 8 pm

**Wednesday Oct. 3<sup>rd</sup>**  
Pense Community Hall - 4 pm to 8 pm

**Thursday Oct. 4<sup>th</sup>**  
Kronau Multi-Purpose Facility - 4 pm to 8 pm

Refreshments and snacks will be provided.




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Get \$5.00 off any service with the correct answer. 1 coupon per person.

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Hope for Tomorrow.**

Today, 1 in 15 Canadians over 65 is affected by Alzheimer Disease and related dementias.\*

For more information, contact your local Alzheimer Society or visit our Web site at [www.alzheimer.ca](http://www.alzheimer.ca)

**Alzheimer Society**

\*Canadian study of 60,000 and 1990

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IN BRIEF

## Vets to get special plates for choppers

**SASKATOON (CP)** — Veterans in Saskatchewan will soon be able to roar around with specialty licence plates.

SGL says starting Oct. 1, people who served in the military can get veterans' plates for motorcycles and snowmobiles, not just cars.

The change came after Sgt. Patrick Barbar contacted Premier Brad Wall via Twitter in August to ask about offering veteran plates for motorcycles.

Wall tweeted back that it would be done.

The plates will be a smaller version of the regular-sized plates, which will include the letter "V" followed by three numbers.

The program was originally developed for those who served in the Second World War and Korean War or those who were involved in various peacekeeping missions.

"I ride my motorcycle abroad frequently and it gives me great pride to display a licence plate that not only lets everyone know where I'm from, but allows me to display the pride I feel in having served my country, province and community," Barbar said in a news release.

The cost of veteran licence plates is \$5, payable to the Royal Canadian Legion, to cover the application cost. Personalized plates cost an additional \$75 plus GST.

## Firefighters find dead man in burned house in Nipawin, Saskatchewan

**NIPAWIN, Sask. (CP)** — A 40-year-old man has been found dead in a burned home in northern Saskatchewan.

Mounties say they were called to a house fire at a home in Nipawin Wednesday afternoon.

Fire officials put out the blaze and found the man dead inside the home. The man's name will not be released pending notification of next of kin.

There was only minor damage to the house.

The cause of the fire is unknown.



PotashCorp miners walk out of the Rocanville potash mine Tuesday night after being rescued from an underground fire. CP photo

## MINERS

Continued from Page 1

It is not the first time a fire has broken out at a Saskatchewan potash mine.

In January 2006, 72 miners survived a fire at Mosaic's potash mine in Esterhazy.

When heat from a cutting torch ignited a fire in some plastic piping on Jan. 29, the 72 miners on shift were able to retreat to refuge

rooms sealed off from the toxic smoke. It took 30 hours, but all of the miners were brought to the surface without so much as a cough, according to company officials.

Esterhazy has been her-

alded as a textbook example of mine rescue.

Cooper said PotashCorp's emergency action plan worked well.

"Thankfully all of our employees are safe and healthy," he said.

## PORK

Continued from Page 1

Pork will stay cheaper than beef and chicken but sticker shock could lead some to cut back on the traditional breakfast meat, he said.

The threat of a shortage sparked a frenzy online, with many posting tongue-in-cheek messages of distress.

"Who wants to start hoarding bacon with me?" one read.

Still, the impact on Canadian bacon lovers pales in comparison to the hit felt by the country's pig farmers, many of whom are struggling to stay afloat, Rice said.

A severe drought in the U.S. has driven up the price of grain, a major staple in hog feed, several industry

groups report.

Rice said that's forcing farmers to sell their herds because retail prices aren't rising fast enough to cover the record-high pig-feed costs.

Those concerns mirror those raised by a British farming organization now sounding the alarm over what it predicts will turn into a worldwide shortage of bacon and pork next year.

Britain's National Pig Association said pig farmers around the world are feeling the squeeze and selling their stock.

At least two major Canadian hog producers have filed for bankruptcy in recent weeks and Rice said others may soon follow suit unless they get some relief.

Saskatchewan-based Big Sky Farms, the second-

largest hog producer in Canada, and Manitoba's Puratone Corp. both cited the high cost of feed in filing for bankruptcy protection this month.

Rice said it costs roughly \$180 to raise a hog that only fetches about \$150 on the market.

While hog prices are expected to rise again by next summer, he said many farmers simply don't have the savings to hold on until then.

"The hog industry is really going through a struggle here," he said.

Federal Agriculture Minister Gerry Ritz said this month he has asked officials to explore all assistance options under current programs.

In the United States, the government has introduced a pork-buying program in a

bid to keep its pig farmers in business. And the Chinese government is putting pork into cold storage, as a buffer against shortages and high prices next year.

Meanwhile, Major League Eating — the regulating body for competitive eating — issued a moratorium on bacon-eating contests in light of the projected shortage.

The league said in a statement it couldn't "in good conscience" allow its members to eat bacon, given that one alone could consume nine kilograms in a 10-minute race.

Canada is the world's third-largest pork exporter, sending more than \$2.6 billion worth of pork products to more than 100 countries each year, according to the department of agriculture.

**ANNOUNCING...**

SaskWater Buffalo Pound Non-Potable Water System Expansion Project

**Community Information Sessions**

You are invited to attend a come and go Community Information Session to discuss the SaskWater Buffalo Pound Non-Potable Water System Expansion Project.

**Tuesday Oct. 2<sup>nd</sup>**  
Sun Valley Community Hall - 4 pm to 8 pm

**Wednesday Oct. 3<sup>rd</sup>**  
Pense Community Hall - 4 pm to 8 pm

**Thursday Oct. 4<sup>th</sup>**  
Kronau Multi-Purpose Facility - 4 pm to 8 pm

Refreshments and snacks will be provided.

**Weather**

The Weather Network

Today: Sunny, Light winds, High 24, Low 6

Friday: Sunny, High 26, Low 11

Saturday: Sunny, High 26, Low 8

Sunday: Mainly sunny, High 20, Low 7

Monday: Variable, High 18, Low 5

Skies: Sunset: 6:47 p.m. today, Sunrise: 6:58 a.m. tomorrow, Moonset: 4:18 a.m., Moonrise: 5:28 p.m.

UV Index: 4

Today's Almanac

Temperature	High 23°	Low -0.5°
Yesterday	16.6°	3.2°
Normal	30° (1962)	-5° (1974)
Precipitation (in mm)	0	10.4 (1972)
Normal	0.8	Record 10.4
Yesterday (to 1pm)	Month 0	Year 314.7
To date	33.5	313.9

Average to date

Assiniboia: Mainly sunny with a few morning clouds. Winds light. High 24. Humidex 23. Clear. Low 8. Tomorrow, sunny. High 25. Low 11.

Averona: Mainly sunny with a few morning clouds. Winds light. High 24. Humidex 23. Clear. Low 6. Tomorrow, sunny. High 26. Low 11.

Bethune: Mainly sunny with a few morning clouds. Winds light. High 24. Humidex 23. Clear. Low 6. Tomorrow, sunny. High 26. Low 11.

Coronach: Mainly sunny with cloudy periods in the morning, becoming mainly sunny in the afternoon. Winds light. High 24. Humidex 23. Mainly clear with a few evening clouds. Low 9.

Marquis: Mainly sunny with a few morning clouds. Winds light. High 24. Humidex 23. Clear. Low 6. Tomorrow, sunny. High 26. Low 11.

Regina: Mainly sunny. Winds light. High 24. Humidex 23. Clear. Low 5. Tomorrow, sunny. High 26. Low 10.

Legend: Snow, Rain, T-storms, Freezing rain, Cold Front, Warm Front, Strong, Occlusion

**LOTTERY NUMBERS**

**LOTTO 649**  
For Wednesday: 2, 5, 9, 13, 22, 38 Bonus: 37

**WESTERN 649**  
For Wednesday: 4, 6, 26, 31, 39, 41 Bonus: 25

**PICK 3**  
For Wednesday: 4, 1, 0

**EXTRA**  
Winning number for the top prize of \$250,000 was: 1, 6, 6, 8, 6, 8, 0  
In the event of a discrepancy between these lists and the winning number, the official lists shall prevail.

**WALMART CORRECTION NOTICE**  
Our flyer distributed on Sept. 26 - 28 and effective Sept. 28 - Oct. 4 : Page 11 : Due to unforeseen circumstances, the Ladies' G21 Flutter Sleeve Chiffon Top (#30406340/1/2/3) at \$14 will not be available. We apologize for any confusion this may have caused.

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The Times-Herald is published by

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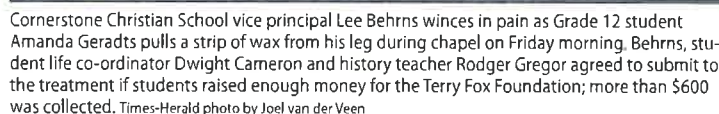
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➤ Yeeeeoooowwcchh!!!!!!

The federal government says it won't take back the broadband spectrum that SaskTel uses for its wireless Internet service until the end of March 2014. Ottawa plans to auction off the spectrum to telecom companies and says the move will improve connectivity.



# DWAY

the family she still has here, happy to be performing close enough for family

and friends to watch.  
"This is the biggest show I've been back home with — I'm so grateful I can do this. It's nice to be home where people have access to see the show and

Ticket prices start at \$50. Call 1.888.639.7770, or visit [www.tcutickets.ca](http://www.tcutickets.ca) for more information.

**Moose Jaw Public Library**  
invites you to attend  
**e-Readers 101: An Introduction**  
with  
**September Brooks.**  
Tuesday, October 2<sup>nd</sup>, 2012  
at 7:00 p.m.  
At the Public Library  
Come and try out Kobo  
Touche, iPads, Sony  
e-Readers and Galaxy Tabs!  
*Funding assistance provided by  
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**Admission is FREE.**  
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be turned for the winter.  
**Thank you - Inquiries 692-8855**

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**WALMART CORRECTION NOTICE**

Our flyer distributed on Sept. 26 - 28 and effective Sept. 28 – Oct. 4 : Page 14 : Zantac 24s + 6 or Imodium 20s (#30193928) at 8.96. The description and photo of the Imodium are incorrect. The correct description is as follows: Imodium 10s. The correct photo is as follows:



*We apologize for any confusion this may have caused.*

**Classifieds  
Get Results**

## LOTTERY NUMBERS

**LOTTO MAX**  
For Friday: 5, 6, 32, 33, 39, 42, 47. Bonus: 9.

**PICK 3**  
For Friday: 0, 5, 4.

**EXTRA**  
Winning number for the top prize of \$250,000 was: 2, 3,  
9, 7, 7, 9, 4.

In the event of a discrepancy between these lists and the winning number, the official lists shall prevail.

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[illegible]



**SaskWater**



# Community Information Sessions

You are invited to attend a come and go Community Information Session to discuss the SaskWater Buffalo Pound Non-Potable Water System Expansion Project.

**Tuesday Oct. 2<sup>nd</sup>**

**Sun Valley Community Hall - 4 pm to 8 pm**

**Wednesday Oct. 3<sup>rd</sup>**

**Pense Community Hall - 4 pm to 8 pm**

**Thursday Oct. 4<sup>th</sup>**

**Kronau Multi-Purpose Facility - 4 pm to 8 pm**

Refreshments and snacks will be provided.

For more information please contact:

**Chris Robart**, Senior Project Manager

SaskWater

200 – 111 Fairford Street East

Moose Jaw, Saskatchewan

Phone: 306.694.3875

Email: [chris.robart@saskwater.com](mailto:chris.robart@saskwater.com)

September 20, 2012

To Whom It May Concern:

**Subject: SaskWater Buffalo Pound Non-Potable Water System Expansion Project**

**Community Information Sessions**

SaskWater is proposing to expand its water transmission works at Buffalo Pound Lake to supply non-potable water to the Belle Plaine Industrial Corridor and a proposed potash mine, operated by Vale Potash Canada Inc., located near Kronau, Saskatchewan.

SaskWater cordially invites you to attend a Community Information Session to discuss the proposed Project. The purpose of these sessions will be to provide information about the engineering aspects of the Project, the environmental and regulatory approval processes, and to gather feedback from the public. In addition, representatives from SaskWater's land management group will be available to discuss aspects relating to pipeline easements and compensation structures.

The information sessions are scheduled to be held in the communities closest to the Project area on the following dates:

Tuesday October 2<sup>nd</sup>, 2012  
Sun Valley Community Hall  
4 pm to 8 pm

Wednesday October 3<sup>rd</sup>, 2012  
Pense Community Hall  
4 pm to 8 pm

Thursday October 4<sup>th</sup>, 2012  
Kronau Multi-Purpose Facility  
4 pm to 8 pm

The community information sessions will follow a come and go style, and refreshments and snacks will be provided.

If you are not able to attend any one of these sessions, please feel free to contact me and I would be happy to discuss the project with you. In the meantime, if you have any questions, please don't hesitate to contact me directly.

Yours truly,



Chris Robart, P.Eng.,  
Senior Project Manager  
SaskWater  
Phone: 306.694.3875



Saskatchewan  
Watershed  
Authority

Head Office

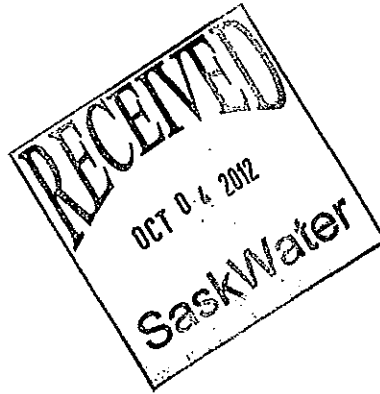
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(306) 694-3900  
(306) 694-3944 Fax

[www.swa.ca](http://www.swa.ca)

October 2, 2012

Mr. Matthew Wood  
Project Manager Kronau  
Vale Potash Canada Limited  
1874 Scarth Street, Suite 1900  
REGINA SK S4P 4B3



(306) 694-3966

File: E2-1 (Vale)

Dear Mr. Wood:

This letter is provided in follow-up to our meeting of September 28, 2012, and is intended to provide clarity regarding our recommended water source to support your proposed project, and the Saskatchewan Watershed Authority's (Authority) process to provide Vale with an assurance of water availability.

Buffalo Pound Lake continues to be a preferred and viable water source, with excess capacity available within the existing conveyance works and operational regime to deliver water to Buffalo Pound Lake to meet the needs of Vale.

To address the issue of competing interests for water for industrial development, the Authority has developed a process to formalize and manage requests for water from the Qu'Appelle River system. Where the intended source has sufficient water available to support the project the Authority will issue a conditional one-year-term water right. This conditional water right will be renewable, subject to fulfillment of a number of conditions including, but not limited to, Ministerial approval under the environmental assessment process, completion by the Authority of any necessary aboriginal consultations (proponent involvement may be required), the proponents compliance with any necessary mitigation efforts, and demonstrated progress by the proponent through relevant stages of the development schedule in a reasonable and timely manner.

Vale has previously filed an application for a water right identifying Buffalo Pound Lake as the intended source of an approximate annual water requirement of 22,000 dams<sup>3</sup>. To proceed with the application process, the following information should be provided to my office:

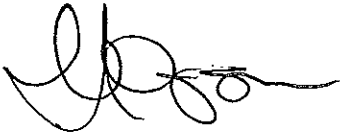
- Documentation confirming the projected annual water supply requirements. Please include the projected date that water will be required and an estimate of the annual water requirements over the foreseeable future.

- Summary of anticipated completion timelines for critical components of the project development leading to construction and production.

The Authority recognizes that an assurance of a reliable water supply is a critical consideration in the decision to invest in the development of a project. The issuance of a conditional renewable water right will provide proponents with a formal assurance of the availability of water, and the conditions that must be met in order to secure a firm water right to meet the needs of the project while work progresses towards construction.

If you have any questions, please contact me at (306) 694-3966.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jim Waggoner', with a stylized, flowing script.

Jim Waggoner, P.Eng.  
Director, Water Use and Licensing  
Integrated Water Services Division

cc: Chris Robert, SaskWater

## **Traditional Land Use Questionnaire**

This questionnaire was prepared to facilitate the collection of Traditional Land Use data as it pertains to the SaskWater Buffalo Pound Non-Potable Water System Expansion Project. The information collected remains the intellectual property of individual who provided the data and will be only be used for the purpose of completing the environmental assessment.

Date:

Interviewee:

Interviewer:

Location:

### **Traditional Use of the Area**

For most questions please refer to three general time periods.

1 – Early use of the region (pre-1940s)

2 – 1970s/1980s

3 – Recent use (i.e. last 2-3 years)

### **Where did you do the following activities? How much time is spent doing these activities?**

Hunt

Trap

Fish

Camp

Gather Plants (e.g. berries, fence pickets, maple sugar, and medicines)

Collect eggs

How were these activities undertaken (alone, with a partner, with family, etc.)?

**What kind of activities did you do in each season?**

Spring

Summer

Fall

Winter

**Animals**

What animals did you hunt and what were they used for?

How many of each animal did you hunt in a year?

How many traps or snares did you set? Where did you set them?

How much of your meat came from the store.

Did you collect eggs? How often and what kinds?

Did you fish at Buffalo Pound Lake? Qu'Appelle River?

**Plants**

What plants (or plant parts) did you collect most often? What are they used for?

What types of berries were picked?

Did you collect maple sugar? When and where was this completed?

How much of your medicines came from the land versus from the drugstore?

Did you collect firewood from the area? Materials for fence posts?

**Do you think your ability to hunt, trap, and collect plants etc. has changed over the years?  
What are some reasons for this?**

**To the best of your knowledge, do you think a new water pipeline will change your current practice of hunting, trapping, fishing, or plant use?**

**Do you know of any special areas in the area (grave sites, spiritual significance)?** *\*Please ensure the interviewee that they do NOT have to indicate the nature of these places if they do not want to.*

**Do you know of any historical or archaeological sites in the area?**

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