

## Part 2 – Technical Requirements

Application under the *Agricultural Operation Practices Act* for a confined feeding operation, manure collection area, and/or manure storage facility(ies)

<b>NRCB USE ONLY</b>	Application number	Legal land description
<input checked="" type="checkbox"/> Approval <input type="checkbox"/> Registration <input type="checkbox"/> Authorization <input type="checkbox"/> Amendment	<u>RA23007</u>	<u>SW-10-31-1-W5</u>

### APPLICATION DISCLOSURE

This information is collected under the authority of the *Agricultural Operation Practices Act (AOPA)*, and is subject to the provisions of the *Freedom of Information and Protection of Privacy Act*. This information is public unless the NRCB grants a written request that certain sections remain private.

**Any construction prior to obtaining an NRCB permit is an offence and is subject to enforcement action, including prosecution.**

I, the applicant, or applicant's agent, have read and understand the statements above, and I acknowledge that the information provided in this application is true to the best of my knowledge.

Date of signing Envirowest Engineering	Signature Emily Jocelyn Low -- P. Eng. - APEGA <small>Digitally signed by Emily Jocelyn Low -- P. Eng. - APEGA Date: 2023.09.18 14:50:36 -06'00'</small>
Corporate name <span style="background-color: yellow;">(if applicable)</span>	Print name

### GENERAL INFORMATION REQUIREMENTS

<b>Proposed facilities:</b> list all proposed confined feeding operation facilities and their dimensions. Indicate whether any of the proposed facilities are additions to existing facilities. (attach additional pages if needed)	
Proposed facilities	Dimensions (m) (length, width, and depth)
Feedlot <span style="color: blue;">(includes already constructed and not yet constructed pens)</span>	320 x 160
Catch Basin	45 x 45 x 3.8

<b>Existing facilities:</b> list <b>ALL</b> existing confined feeding operation facilities and their dimensions		
Existing facilities	Dimensions (m) (length, width, and depth)	NRCB USE ONLY
No permitted CFO facilities exist.		

<b>NRCB USE ONLY</b>
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## DECLARATION AND ACKNOWLEDGMENT OF APPLICANT CONCERNING *WATER ACT* LICENCE

issued by Alberta Environment and Parks (AEP) for a confined feeding operation (CFO)

*Date and sign one of the following four options*

### **OPTION 1: Applying through the NRCB for both the AOPA permit and the *Water Act* licence**

I **DO** want my water licence application coupled to my AOPA permit application.

Signed this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
*Signature of Applicant or Agent*

### **OPTION 2: Processing the AOPA permit and *Water Act* licence separately**

1. I (we) acknowledge that the CFO will need a new water licence from AEP under the *Water Act* for the development or activity proposed in this AOPA application.
2. I (we) request that the NRCB process the AOPA application **independently** of AEP's processing of the CFO's application for a water licence.
3. In making this request, I (we) recognize that, if this AOPA application is granted by the NRCB, the NRCB's decision will not be considered by AEP as improving or enhancing the CFO's eligibility for a water licence under the *Water Act*.
4. I (we) acknowledge that any construction or actions to populate the CFO with livestock pursuant to an AOPA permit in the absence of a *Water Act* licence will **not** be relevant to AEP's consideration of whether to grant the *Water Act* licence application.
5. I (we) acknowledge that any such construction or livestock populating will be at the CFO's sole risk if the *Water Act* licence application is denied or if the operation of the CFO is otherwise deemed to be in violation of the *Water Act*. This risk includes being required to depopulate the CFO and/or to cease further construction, or to remove "works" or "undertakings" (as defined in the *Water Act*).
6. **AS RELEVANT:** I (we) acknowledge that the CFO is located in the South Saskatchewan River Basin and that, pursuant to the *Bow, Oldman and South Saskatchewan River Basin Water Allocation Order* [Alta. Reg. 171/2007], this basin is currently closed to new surface water allocations.

Signed this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Emily Jocelyn Low -- P.  
Eng. - APEGA

Digitally signed by Emily Jocelyn Low --  
P. Eng. - APEGA  
Date: 2023.09.18 14:50:57 -06'00'

\_\_\_\_\_  
*Signature of Applicant or Agent*

### **OPTION 3: Additional water licence not required**

1. I (we) declare that the CFO will not need a new licence from AEP under the *Water Act* for the development or activity proposed in this AOPA application.

Signed this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

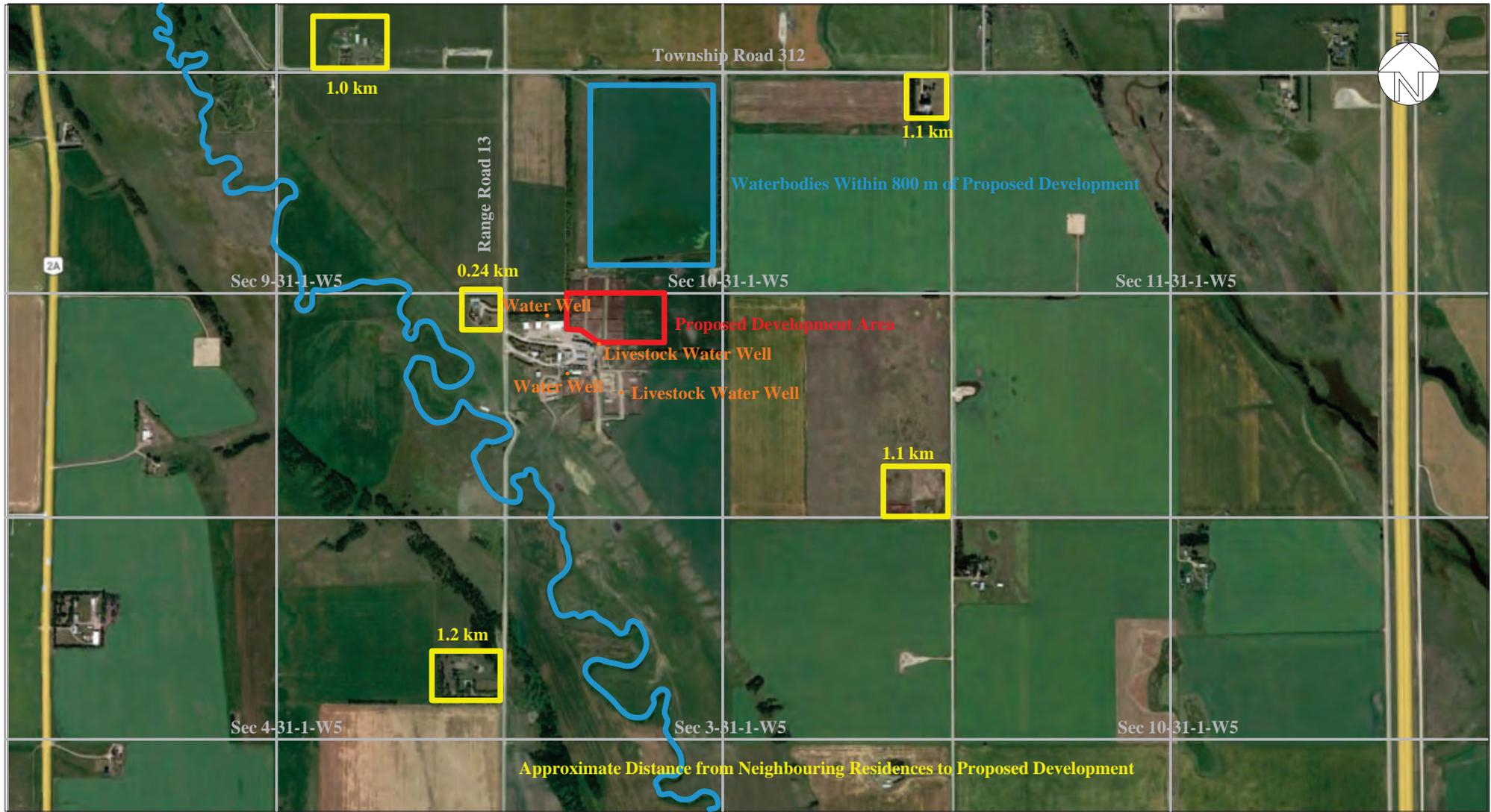
\_\_\_\_\_  
*Signature of Applicant or Agent*

### **OPTION 4: Uncertain if *Water Act* licence is needed; acknowledgement of risk (for existing CFOs only)**

1. At this time, I (we) do not know whether a new water licence is needed from AEP under the *Water Act* for the development or activity proposed in this AOPA application.
2. If a new *Water Act* licence is needed, I (we) request that the NRCB process the AOPA application **independently** of AEP's processing of the CFO's application for a water licence.
3. In making this request, I (we) recognize that, if this AOPA application is granted by the NRCB, the NRCB's decision will not be considered by AEP as improving or enhancing the CFO's eligibility for a water licence under the *Water Act*.
4. I (we) acknowledge that any construction or actions to populate the CFO with additional livestock pursuant to an AOPA permit in the absence of a *Water Act* licence will **not** be relevant to AEP's consideration of whether to grant my *Water Act* licence application, if a new water licence is needed.
5. I (we) acknowledge that any such construction or livestock increase will be at the CFO's sole risk if the *Water Act* licence application is denied or if the operation of the CFO is otherwise deemed to be in violation of the *Water Act*. This risk includes being required to depopulate the CFO and/or to cease further construction, or to remove "works" or "undertakings" (as defined in the *Water Act*).
6. **AS RELEVANT:** I (we) acknowledge that the CFO is located in the South Saskatchewan River Basin and that, pursuant to the *Bow, Oldman and South Saskatchewan River Basin Water Allocation Order* [Alta. Reg. 171/2007], this basin is currently closed to new surface water allocations.

Signed this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
*Signature of Applicant or Agent*



**Title:**

Area/Large Scale Plan  
 Part II Technical Requirements  
 Westway Farms Ltd.  
 SW-10-031-01-W5M  
 Mountain View County, Alberta

**Project No:**

2211-43015

**Date:**

May 4, 2023

**Scale:**

20,000

**Prepared By:**

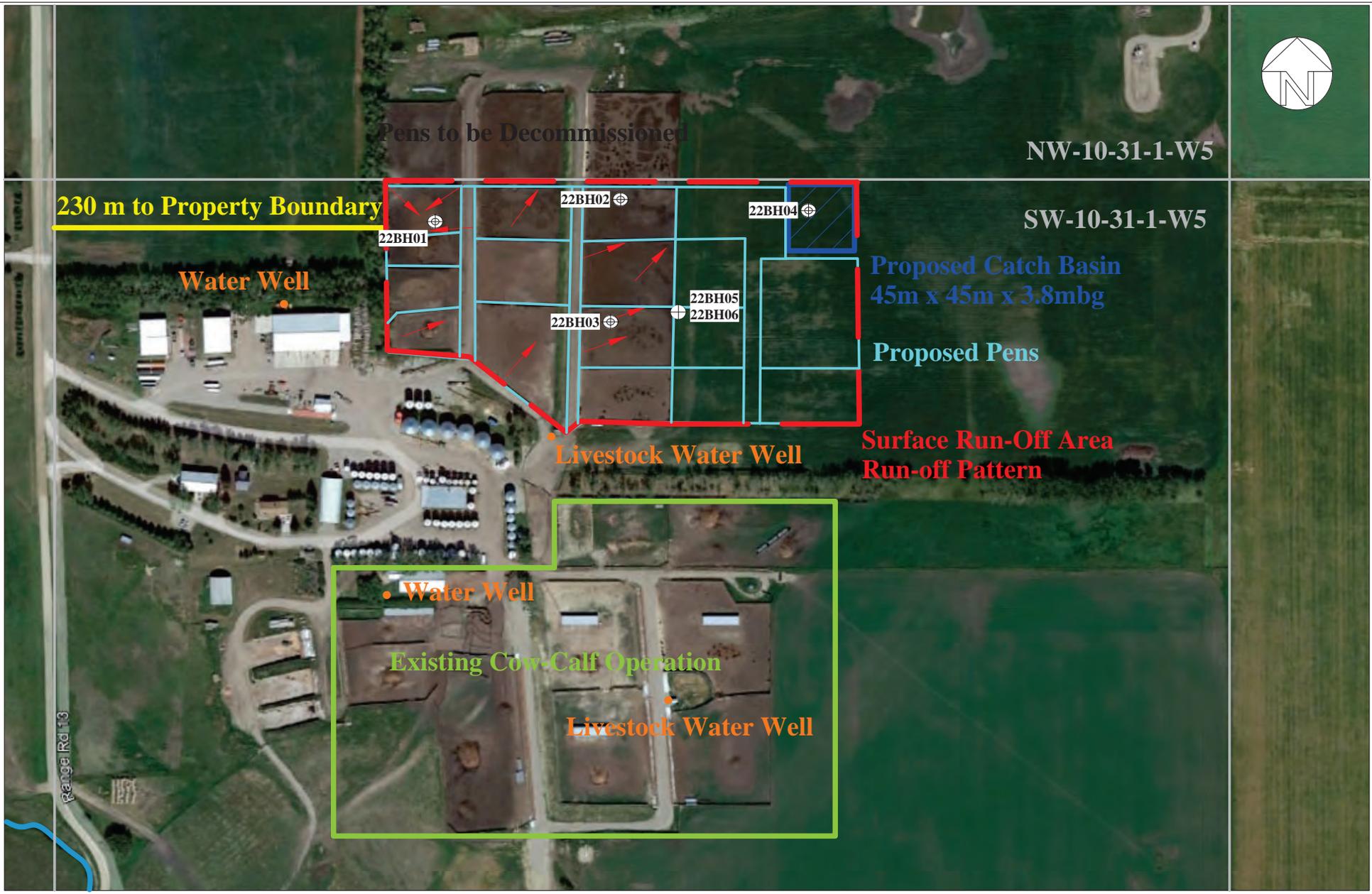
L. Predy

**Image Source:**

Google Earth Pro (2022)

**Figure No.:**

**1.0**



**Title:**

Detailed Site Layout Plan  
 Part II Technical Requirements  
 Westway Farms Ltd.  
 SW-10-031-01-W5M  
 Mountain View County, Alberta

**Project No:**

2211-43015

**Date:**

May 4, 2023

**Scale:**

3,500

**Prepared By:**

L. Predy

**Image Source:**

Google Earth Pro (2022)

**Figure No.:**

**2.0**

# Discharge ROW



## Legend

- ATS Section with Road Allowance Below Hydro
- ATS Quarter Section with Road Allowance Below Hydro
- ATS Legal SubDivision with Road Label Below Hydro
- ATS Township Index Outline 8
- ATS Section with Road Allowance
- ATS Quarter Section with Road Allowance Outline
- ATS Legal SubDivision with Road Outline
- ⊕ Abandoned Wells (Large Scale)
- Abandoned\_Well\_Revised (Large Scale)
- Abandoned\_Well\_Loc\_Pointer
- - Cadastral Right of Way Line
- Cadastral Block and Lot Line
- - Cadastral Survey Plan Line
- ATS v4\_1 Alberta Provincial Boundary

This map was supplied by the Town of Didsbury's Director of Engineering & Infrastructure, in response to the AO's request for more information.

The red dashed lines represent the Town's wastewater pipeline and associated right-of-way.

The Director concluded that it appears that the proposed CFO facilities will not be in conflict with the right-of-way.

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Thursday, February 08, 2024 11:01:19 -07:00



# Part 2 – Technical Requirements

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## GENERAL ENVIRONMENTAL INFORMATION

*(complete this section for the worst case of the existing facility which is the closest to water bodies or water wells and for each of the proposed facilities)*

Facility description / name *(as indicated on site plan)*

Existing: N/A

Proposed 1: Feedlot Pens

Proposed 2: Catch Basin

Proposed 3: \_\_\_\_\_

Facility and environmental risk information		Facilities				NRCB USE ONLY	
		Existing	Proposed 1	Proposed 2	Proposed 3	Meets requirements	Comments
Flood plain information	What is the elevation of the floor of the lowest manure storage or collection facility above the 1:25 year flood plain or the highest known flood level?	<input type="checkbox"/> >1 m <input type="checkbox"/> ≤ 1 m	<input checked="" type="checkbox"/> >1 m <input type="checkbox"/> ≤ 1 m	<input checked="" type="checkbox"/> >1 m <input type="checkbox"/> ≤ 1 m	<input type="checkbox"/> > 1 m <input type="checkbox"/> ≤ 1 m	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	Confirmed
	How many springs are within 100 m of the manure storage facility or manure collection area?		0	0		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	None observed on site
Surface water information	How many water wells are within 100 m of the manure storage facility or manure collection area?		2	0		<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES with exemption	2 wells located within 100 m
	What is the shortest distance from the manure collection or storage facility to a surface water body? (e.g., lake, creek, slough, seasonal)		125	145		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	Rosebud River approx 392 m
Groundwater information	What is the depth to the water table?		10.85	10.85		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	WT found during soils investigation
	What is the depth to the groundwater resource/aquifer you draw water from?		32-85	32-85		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	UGR Identified at 22.3 m in ww 2090951

Additional information (attach supporting information, e.g. borehole logs, records, etc. you consider relevant to your application)

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### DISTANCE OF ANY MANURE STORAGE FACILITY (EXISTING OR PROPOSED) TO NEIGHBOURING RESIDENCES

Neighbour name(s)	Legal land description	Distance (m)	NRCB USE ONLY				
			Zoning (LUB) category	MDS category (1-4)	Distance (m)	Waiver attached (if required)	Meets regulations
Fleming, M	SE-9-31-1-W5M	240	Ag	1	320 m	Attached, not req'd	
Westway Farms Limited	SE-16-31-1-W5M	1000	N/A, this is applicant				
Brado, DC	NE-10-31-1-W5M	1100	Ag	1	>1000 m		Yes
Miller, R & J; Miller, D	SE-10-31-1-W5M	1100	Ag	1	>1000 m		Yes
Westway Farms Limited	SE-4-31-1-W5M	1200	N/A, this is applicant				

### LAND BASE FOR MANURE AND COMPOST APPLICATION (complete only if an increase in livestock or manure production will occur)

Name of land owner(s) *	Legal land description	Usable area** (ha)	Soil zone ***	NRCB USE ONLY	
				Usable area (ha)	Agreement attached (if required)
See attached					
Attached document provided >570 ha of usable spreading lands					
Total					

\* If you are **not** the registered landowner, you must attach copies of land use agreements signed by all landowners.

\*\* Available manure spreading area (excluding setback areas from residences, common bodies of water, water wells, etc. as identified in Agdex 096-5 [Manure Spreading Regulations](#))

\*\*\* Brown, dark brown, black, grey wooded, or irrigated

**Additional information (attach any additional information as required)**

# Minimum Distance Separation (MDS) Waiver (declaration)

Applicant information

NRCB application number: \_\_\_\_\_

Operator/operation name: Westway Farms Ltd.

Address: Box 544 Postal Code: TOM 0W0

Legal land location of confined feeding operation: SW-10-031-01 W5M

I have requested the residence owner(s) named below to waive the required minimum distance separation (MDS) to their residence for the *Agricultural Operation Practices Act* (AOPA) permit application identified above. In making this request, I have provided the owner(s) with an opportunity to review my permit application and a copy of the Natural Resources Conservation Board (NRCB) Fact Sheet "Minimum Distance Separation (MDS) Waivers" available on the NRCB website at [www.nrcb.ca](http://www.nrcb.ca). I have also explained:

- The MDS requirement set out in section 3 of the Standards and Administration Regulation of AOPA. I have advised the owner(s) that section 3(6)(a) of the Standards and Administration Regulation allows this requirement to be waived by the owners of residences, if they agree in writing to grant a waiver;
- That my proposed development does not meet the required MDS to the owner's residence; and,
- That this waiver applies only to this application as described. An increase in livestock capacity, annual manure production, level of odour production, change to the site plan or change to a facility that would increase the MDS would require a new waiver.

Following is a summary of the proposed development:

- The current scope of my confined feeding operation (CFO), including the type, number, and category of livestock, if any, is:  
1000 head of beef feeders

- My application for a new AOPA permit proposes the following changes to the existing livestock category, type and/or capacity at my CFO:  
N/A

- The proposed new CFO facility(ies), or changes to the existing CFO facilities, including manure storage, manure storage volume and any other pertinent details, if any, are (attach a site layout plan if available):  
Proposed feedlot pens (solid manure storage), catch basin

**I the applicant understand that the waiver is not valid unless ALL registered owners of the residence sign this document**

Permit Applicant: \_\_\_\_\_ Date: Sept. 4, 2023

Residence owner(s) to initial \_\_\_\_\_

# Minimum Distance Separation (MDS) Waiver (declaration)

## Residence owner(s) information

ALL Names on land title: MARK FLEMING

Legal land location of residence(s): SE 9-31-1 W5

Telephone number(s)<sup>1</sup>: [REDACTED] Email address(es)<sup>1</sup>: [REDACTED]

Address(es)<sup>1</sup> and Postal code(s)<sup>1</sup>: [REDACTED]

<sup>1</sup> Please note that personal contact information is for NRCB use ONLY and not publicly released

I am/we are the legal landowner(s) of a residence(s) located at the above noted legal land location/address:

- I/we have read the NRCB Fact Sheet "Minimum Distance Separation (MDS) Waivers";
- I/we have discussed this application with the applicant and understand its potential impacts to our residence(s);
- I/we understand that the application **does not** meet the MDS requirement to my/our residence(s), under the *Agricultural Operation Practices Act (AOPA)*;
- **I/we understand that this waiver is not valid unless signed by ALL parties identified on the land title as owners;**
- **I/we are not obligated to waive the MDS requirement to our residence(s);**
- I/we understand that if I/we choose to waive the MDS requirement, I/we can revoke the waiver, by providing written notice to the NRCB approval officer, as set out in the "Minimum Distance Separation (MDS) Waivers" Fact Sheet; and
- I/we understand that this waiver is a public document.

Having considered my/our rights, I/we hereby waive the MDS requirement to my/our residence, with respect to

Application number: [REDACTED]

Mark Fleming  
Printed names of all residence owner(s) on title

Date: Sept 4 / 2023

**Land Base for Manure and Compost Application**  
**Part II: Technical Requirements**  
**Westway Farms Ltd.**

				NRCB USE ONLY	
Name of Landowner(s)	Legal Land Description	Usable Area (ha)	Soil Zone	Usable Area (ha)	Agreement attached (if required)
Hadway, C	SW-21-31-1-W5	65	Black		
Westway Farms Ltd.	SE-21-31-1-W5	63	Black		
Westway Farms Ltd.	NW-21-31-1-W5	63	Black		
Westway Farms Ltd.	7-31-1-W5	61	Black		
Westway Farms Ltd.	SE-8-31-1-W5	63	Black		
Scheidt, W	SW-16-31-1-W5	55	Black		
Westway Farms Ltd.	E½-16-31-1-W5	121	Black		
Westway Farms Ltd.	SE-4-31-1-W5	61	Black		
Westway Farms Ltd.	SW-4-31-1-W5	61	Black		
Westway Farms Ltd.	NW-4-31-1-W5	59	Black		
Westway Farms Ltd.	SW-3-31-1-W5	18	Black		
Hadway, W	NE-32-30-1-W5	55	Black		
			Total	> 570 ha	

Applicant has provided 570 hectares owned by Westway Farms Ltd. Since this exceeds the minimum requirement, spreading agreements for the lands not owned by Westway Farms Ltd. are not required.

# Part 2 – Technical Requirements

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## RUNOFF CONTROL CATCH BASIN: Compacted soil liner

*(complete a copy of this section for EACH proposed runoff control catch basin with a compacted soil liner)*

Facility description / name *(as indicated on site plan)*

1. Proposed Catch Basin
2. \_\_\_\_\_
3. \_\_\_\_\_

### Determination of runoff area

Provide a plan and show how you calculated the area contributing to runoff for each catch basin  
 See attached Site and Soil Assessment (Envirowest Engineering 2023), Section 5.1 and attached Figure 2.0.  
 Didsbury precipitation data was obtained from Alberta Agriculture and Irrigation. The proposed area of contributing run-off was determined to conservatively be 50 000 m<sup>3</sup>.  
**AO Note: The applicant has proposed to use alternate borrow material, from the same quarter section. An engineering report from Envirowest dated March 8, 2024, provided lab analysis to show that the new borrow material is considered uniform and equivalent to material tested below.**

### Catch basin capacity

	Length (m)	Width (m)	Depth (m)	Depth below ground level (m)	Slope run:rise			NRCB USE ONLY Calculated storage capacity (excl. 0.5 m freeboard) (m <sup>3</sup> )
					Inside end walls	Inside side walls	Outside walls	
1.	45	45	3.8	3.8	3:1	3:1		3508 cubic metres
2.								
3.								
TOTAL CAPACITY								3508 cubic metres

### Compacted soil liner details

Thickness of compacted soil liner	0.5 (m)	Provide details (as required)	
Soil texture	32 % sand	28 % silt	40 % clay
Atterberg limits	Plastic limit 15	Liquid limit 33	Plasticity index 18
Hydraulic conductivity	Hydraulic conductivity (cm/s) 8.22 x 10 <sup>-8</sup>		
	Describe test standard used ASTM D 5084 - Method A (Constant Head)		

Catch Basin – Design and management requirements can be found in Technical Guideline Agdex 096-101

NRCB USE ONLY	
Requirements met:	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Condition required:	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Report attached:	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

**AO Note: The engineering report had a typo regarding the soil textures. I assessed the file based on the attached lab result showing 40% sand, 28 % silt, and 32% clay (for clay loam classification). This aligns with subsequent soil analysis.**

# Part 2 – Technical Requirements

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## SOLID MANURE, COMPOST, & COMPOSTING MATERIALS: Barns, feedlots, & storage facilities - Naturally occurring protective layer

*(complete a copy of this section for EACH barn, feedlot, and storage facility for solid manure, composting materials, or compost with a naturally occurring protective layer for the liner)*

Facility description / name *(as indicated on site plan)*

1. Proposed Feedlot
2. \_\_\_\_\_

### Manure storage capacity

	Length (m)	Width (m)	Depth below ground level (m)	NRCB USE ONLY Estimated storage capacity (m <sup>3</sup> )
1.	320	160	0.33	9 months
2.				
TOTAL CAPACITY				9 months

I plan to use a short-term solid manure storage (STMS) as part of my manure storage and handling plan for this CFO. (The AOPA requirements for STMS are set out in the NRCB [Short-Term Solid Manure Storage Requirements Fact Sheet](#).)

### Surface water control systems

Describe the run-on and runoff control system

A catch basin is proposed to be constructed to the east/northeast of the proposed feedlot, which will capture run off from the feedlot facility.

### Naturally occurring protective layer details

Thickness of naturally occurring protective layer	Provide details (as required) See attached Site and Soil Assessment (Envirowest 2023) Section 4.1.		
	0.5-2.5 (m)		
Soil texture	40 % sand	26 % silt	35 % clay
Hydraulic conductivity - naturally occurring protective layer	Depth and type of soil tested 0.75 m / Clay Loam	Hydraulic conductivity (cm/s) 1.67x10 <sup>-7</sup>	Describe test standard used In-situ falling head test

Additional information *(attach copies of soil test reports)*

#### NRCB USE ONLY

Requirements met:  YES  NO  
 Condition required:  YES  NO  
 Report attached:  YES  NO

# Part 2 – Technical Requirements

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NRCB USE ONLY	
RUNOFF CONTROL CATCH BASIN CAPACITY SUMMARY (if applicable)	
<b>Facility 1</b>	
Name / description Catch Basin	Capacity 3508 cubic metres
<b>Facility 2</b>	
Name / description	Capacity
<b>Facility 3</b>	
Name / description	Capacity
<b>Facility 4</b>	
Name / description	Capacity
<b>TOTAL CAPACITY</b>	3508 cubic metres
<b>RUNOFF VOLUME FROM CONTRIBUTING AREAS</b>	3221 cubic metres*
<b>MEETS AOPA RUNOFF CONTROL VOLUME REQUIREMENTS</b>	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

\*The proposed feedlot is irregularly shaped; the listed dimensions (320 m x 160 m) are of the largest dimensions. In order to accurately assess the runoff area, I utilized aerial photography tools to determine the exact area of the existing and proposed feedlot pens. I found that the area was approximately 46,000 cubic metres; this requires a minimum storage volume of 3,221 cubic metres.

# Part 2 – Technical Requirements

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**NRCB USE ONLY**  
**WATER WELL AND SURFACE WATER INFORMATION**

Well IDs: 1245035 1245294 2090951

Surface water related concerns from directly affected parties or referral agencies:  YES  NO

Groundwater related concerns from directly affected parties or referral agencies:  YES  NO

**Water wells**  N/A

If applicable, exemption for 100 m distance requirements applied:  YES  NO Condition required:  YES  NO

**Surface water**  N/A

If applicable, exemption for 30 m distance requirements applied:  YES  NO Condition required:  YES  NO

**Water Well Exemption Screening Tool**  N/A

Water Well ID	Preliminary Screening Score	Secondary Screening Score	Facility
2090951	5-exemption more likely	not required	
1245294	9-exemption more likely	not required	

**Groundwater or surface water related comments:**

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## NRCB USE ONLY

### MINIMUM DISTANCE SEPARATION

Methods used to determine distance (if applicable): aerial photography

Margin of error (if applicable): \_\_\_\_\_

Requirements (m): Category 1: 306 m Category 2: 408 m Category 3: 509 m Category 4: 815 m

Technology factor:  YES  NO

Expansion factor:  YES  NO

MDS related concerns from directly affected parties or referral agencies:  YES  NO

### LAND BASE FOR MANURE AND COMPOST APPLICATION

Land base required: 50 ha

Land base listed: >570 ha

Area not suitable: already accounted for

Available area: >570 ha

Requirement met:  YES  NO

Land spreading agreements required:  YES  NO

Manure management plan:  YES  NO If yes, plan is attached:

### PLANS

Submitted and attached construction plans:  YES  NO

Submitted aerial photos:  YES  NO

Submitted photos:  YES  NO

### GRANDFATHERING

Already completed:  YES  NO  N/A

If already completed, see \_\_\_\_\_

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**NRCB USE ONLY**

**ALL SIGNATURES IN FILE**  YES  NO

**DATES OF APPROVAL OFFICER SITE VISITS**

October 18, 2023	

**CORRESPONDENCE WITH MUNICIPALITIES AND REFERRAL AGENCIES**

Date deeming letters sent: October 31, 2023

Municipality: Mountain View County

letter sent     response received     written/email     verbal     no comments received

**Alberta Health Services:**

letter sent     response received     written/email     verbal     no comments received

**Alberta Environment and Parks:**     N/A

letter sent     response received     written/email     verbal     no comments received

**Alberta Transportation:**     N/A

letter sent     response received     written/email     verbal     no comments received

**Alberta Regulatory Services:**     N/A

letter sent     response received     written/email     verbal     no comments received

**Other:** Foothills Natural Gas Co-op, Town of Didsbury (ROW Holder)     N/A

letter sent     response received     written/email     verbal     no comments received

**Other:** Whitecap Resources Inc., EQUUS, Gryphon Petroleum Corp     N/A

letter sent     response received     written/email     verbal     no comments received



# Water Well Drilling Report

**View in Imperial** **Export to Excel**

GIC Well ID 407964  
GoA Well Tag No.  
Drilling Company Well ID  
Date Report Received 1988/11/16

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

Well Identification and Location										Measurement in Metric	
<b>Owner Name</b> HADWAY, TOM		<b>Address</b> P.O. BOX 544 DIDSBURY			<b>Town</b>		<b>Province</b>		<b>Country</b>		<b>Postal Code</b> TOM 0W0
<b>Location</b>	<b>1/4 or LSD</b>	<b>SEC</b>	<b>TWP</b>	<b>RGE</b>	<b>W of MER</b>	<b>Lot</b>	<b>Block</b>	<b>Plan</b>	<b>Additional Description</b>		
	SW	10	31	1	5						
<b>Measured from Boundary of</b>					<b>GPS Coordinates in Decimal Degrees (NAD 83)</b>						
_____ m from _____					Latitude <u>51.638431</u>		Longitude <u>-114.066601</u>			Elevation _____ m	
_____ m from _____					How Location Obtained					How Elevation Obtained	
					Map					Not Obtained	

Drilling Information	
<b>Method of Drilling</b> Cable Tool	<b>Type of Work</b> New Well
<b>Proposed Well Use</b> Domestic & Stock	

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
0.61		Topsoil	
10.67		Brown Clay & Boulders	
19.20		Brown Clay & Gravel	
23.16		Gray Clay & Rocks	
24.08		Gray Sand	
25.30	Yes	Gray Water Bearing Sandstone	
32.00		Sticky Shale	

Yield Test Summary			Measurement in Metric
<b>Recommended Pump Rate</b>		<u>45.46 L/min</u>	
<b>Test Date</b>	<b>Water Removal Rate (L/min)</b>	<b>Static Water Level (m)</b>	
1988/09/13		17.68	

Well Completion				Measurement in Metric
<b>Total Depth Drilled</b>	<b>Finished Well Depth</b>	<b>Start Date</b>	<b>End Date</b>	
32.00 m		1988/08/26	1988/09/13	
<b>Borehole</b>				
<b>Diameter (cm)</b>	<b>From (m)</b>	<b>To (m)</b>		
0.00	0.00	32.00		
<b>Surface Casing (if applicable)</b>		<b>Well Casing/Liner</b>		
Steel		Plastic		
Size OD : <u>17.78 cm</u>		Size OD : <u>12.70 cm</u>		
Wall Thickness : <u>0.587 cm</u>		Wall Thickness : <u>0.544 cm</u>		
Bottom at : <u>24.08 m</u>		Top at : <u>22.86 m</u>		
		Bottom at : <u>32.00 m</u>		
<b>Perforations</b>				
<b>From (m)</b>	<b>To (m)</b>	<b>Diameter or Slot Width (cm)</b>	<b>Slot Length (cm)</b>	<b>Hole or Slot Interval (cm)</b>
24.08	27.43	0.318		45.72
Perforated by Machine				
<b>Annular Seal</b> Driven				
Placed from <u>10.67 m</u> to <u>24.08 m</u>				
Amount _____				
<b>Other Seals</b>				
Type		At (m)		
<b>Screen Type</b>				
Size OD : <u>0.00 cm</u>				
<b>From (m)</b>	<b>To (m)</b>	<b>Slot Size (cm)</b>		
Attachment _____				
Top Fittings _____		Bottom Fittings _____		
<b>Pack</b>				
Type _____		Grain Size _____		
Amount _____				

Contractor Certification	
<b>Name of Journeyman responsible for drilling/construction of well</b> UNKNOWN NA DRILLER	<b>Certification No</b> 1
<b>Company Name</b> BERNWAY ENTERPRISES LTD.	<b>Copy of Well report provided to owner</b> <b>Date approval holder signed</b>



# Water Well Drilling Report

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GIC Well ID 407964  
GoA Well Tag No.  
Drilling Company Well ID  
Date Report Received 1988/11/16

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

Well Identification and Location										Measurement in Metric	
<b>Owner Name</b> HADWAY, TOM		<b>Address</b> P.O. BOX 544 DIDSBURY			<b>Town</b>		<b>Province</b>		<b>Country</b>		<b>Postal Code</b> TOM 0W0
<b>Location</b>	<i>1/4 or LSD</i> SW	<i>SEC</i> 10	<i>TWP</i> 31	<i>RGE</i> 1	<i>W of MER</i> 5	<i>Lot</i>	<i>Block</i>	<i>Plan</i>	<i>Additional Description</i>		
<b>Measured from Boundary of</b>					<b>GPS Coordinates in Decimal Degrees (NAD 83)</b>						
_____ m from _____					Latitude <u>51.638431</u>		Longitude <u>-114.066601</u>			Elevation _____ m	
_____ m from _____					How Location Obtained					How Elevation Obtained	
					Map					Not Obtained	

Additional Information										Measurement in Metric	
Distance From Top of Casing to Ground Level _____ cm											
Is Artesian Flow _____					Is Flow Control Installed _____						
Rate _____ L/min					Describe _____						
Recommended Pump Rate _____ 45.46 L/min					Pump Installed _____					Depth _____ m	
Recommended Pump Intake Depth (From TOC) _____ 27.43 m					Type _____		Make _____		H.P. _____		
										Model (Output Rating) _____	
Did you Encounter Saline Water (>4000 ppm TDS) _____					Depth _____ m		Well Disinfected Upon Completion _____				
Remedial Action Taker _____					Gas _____		Depth _____ m		Geophysical Log Taken _____		
										Submitted to ESRD _____	
										Sample Collected for Potability _____	
										Submitted to ESRD _____	
Additional Comments on Well _____											

Yield Test			Taken From Ground Level	Measurement in Metric
			Depth to water level	
Test Date 1988/09/13	Start Time 12:00 AM	Static Water Level 17.68 m		
			Pumping (m)	Recovery (m)
			Elapsed Time Minutes:Sec	
<b>Method of Water Removal</b>				
Type <u>Bailer</u>				
Removal Rate _____ L/min				
Depth Withdrawn From <u>22.25 m</u>				
If water removal period was < 2 hours, explain why _____				

Water Diverted for Drilling		
Water Source	Amount Taken	Diversion Date & Time
	L	

X

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well UNKNOWN NA DRILLER	Certification No 1
Company Name BERNWAY ENTERPRISES LTD.	Copy of Well report provided to owner Date approval holder signed



# Water Well Drilling Report

**View in Imperial** **Export to Excel**

GIC Well ID 1245035  
GoA Well Tag No.  
Drilling Company Well ID  
Date Report Received

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

Well Identification and Location										Measurement in Metric	
<b>Owner Name</b> HADWAY, TOM		<b>Address</b> P.O. BOX 544			<b>Town</b> DIDSBURY		<b>Province</b> AB	<b>Country</b> CA	<b>Postal Code</b> T0M 0W0		
<b>Location</b>	<b>1/4 or LSD</b>	<b>SEC</b>	<b>TWP</b>	<b>RGE</b>	<b>W of MER</b>	<b>Lot</b>	<b>Block</b>	<b>Plan</b>	<b>Additional Description</b>		
	SW	10	31	1	5						
<b>Measured from Boundary of</b>					<b>GPS Coordinates in Decimal Degrees (NAD 83)</b>						
_____ m from _____					Latitude <u>51.638400</u>		Longitude <u>-114.067000</u>		Elevation _____ m		
_____ m from _____					How Location Obtained					How Elevation Obtained	
					Not Verified					Not Obtained	

Drilling Information	
<b>Method of Drilling</b> Combination	<b>Type of Work</b> New Well
<b>Proposed Well Use</b> Domestic	

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
9.45		Brown Till & Clay	
10.97		Till & Gravel	
18.59		Brownish Gray Sandy Till & Clay	
22.56		Gray Shale	
25.60		Gray Very Fine Grained Sandstone & Shale Strg's	
29.26		Gray Shale	
32.61		Gray Very Fine Grained Sandstone	
43.28		Gray Shale & Sandy Stringers	
43.89		Greenish Gray Carbonaceous Shale	
46.63		Gray Shale	
47.24		Gray Very Fine Grained Sandstone	
57.00		Gray Shale	
57.61		Greenish Gray Carbonaceous Shale	
64.01		Gray Shale	
66.14		Greenish Gray Carbonaceous Shale	
78.94		Gray Fine Grained Sandstone	

Yield Test Summary			Measurement in Metric
<b>Recommended Pump Rate</b>		<u>45.46</u> L/min	
<b>Test Date</b>	<b>Water Removal Rate (L/min)</b>	<b>Static Water Level (m)</b>	
2004/12/17	54.55	43.10	

Well Completion				Measurement in Metric
<b>Total Depth Drilled</b>	<b>Finished Well Depth</b>	<b>Start Date</b>	<b>End Date</b>	
78.94 m		2004/12/16	2004/12/17	
<b>Borehole</b>				
<b>Diameter (cm)</b>	<b>From (m)</b>	<b>To (m)</b>		
20.32	0.00	78.94		
<b>Surface Casing (if applicable)</b>		<b>Well Casing/Liner</b>		
Steel		Plastic		
Size OD : <u>14.13</u> cm		Size OD : <u>11.43</u> cm		
Wall Thickness : <u>0.655</u> cm		Wall Thickness : <u>0.544</u> cm		
Bottom at : <u>34.14</u> m		Top at : <u>5.79</u> m		
		Bottom at : <u>78.94</u> m		
<b>Perforations</b>				
<b>From (m)</b>	<b>To (m)</b>	<b>Diameter or Slot Width (cm)</b>	<b>Slot Length (cm)</b>	<b>Hole or Slot Interval (cm)</b>
68.58	77.72	0.318		15.24
Perforated by Saw				
<b>Annular Seal</b> Cement/Grout				
Placed from <u>0.00</u> m to <u>67.06</u> m				
Amount _____				
<b>Other Seals</b>				
Type		At (m)		
<b>Screen Type</b>				
Size OD : _____ cm				
<b>From (m)</b>	<b>To (m)</b>	<b>Slot Size (cm)</b>		
Attachment _____				
Top Fittings _____		Bottom Fittings _____		
<b>Pack</b>				
Type <u>Unknown</u>		Grain Size _____		
Amount _____		Unknown		

Contractor Certification	
<b>Name of Journeyman responsible for drilling/construction of well</b> RORY WAGNER	<b>Certification No</b> 14061Q
<b>Company Name</b> DOERING DRILLING LTD.	<b>Copy of Well report provided to owner</b> <b>Date approval holder signed</b>



# Water Well Drilling Report

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GIC Well ID 1245035  
GoA Well Tag No.  
Drilling Company Well ID  
Date Report Received

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

Well Identification and Location										Measurement in Metric
<b>Owner Name</b> HADWAY, TOM		<b>Address</b> P.O. BOX 544			<b>Town</b> DIDSBURY		<b>Province</b> AB	<b>Country</b> CA	<b>Postal Code</b> TOM 0W0	
<b>Location</b>	<b>1/4 or LSD</b> SW	<b>SEC</b> 10	<b>TWP</b> 31	<b>RGE</b> 1	<b>W of MER</b> 5	<b>Lot</b>	<b>Block</b>	<b>Plan</b>	<b>Additional Description</b>	
<b>Measured from Boundary of</b> _____ m from _____ _____ m from _____					<b>GPS Coordinates in Decimal Degrees (NAD 83)</b> Latitude <u>51.638400</u> Longitude <u>-114.067000</u> How Location Obtained Not Verified			Elevation _____ m How Elevation Obtained Not Obtained		

Additional Information										Measurement in Metric	
Distance From Top of Casing to Ground Level _____ 168.00 cm					Is Artesian Flow _____					Is Flow Control Installed _____	Describe _____
Rate _____ L/min		Recommended Pump Rate _____ 45.46 L/min			Pump Installed Yes _____		Depth _____ m				
Recommended Pump Intake Depth (From TOC) _____ 67.06 m		Type SUB @ 220'		Make BERKLEY		H.P. _____ Model (Output Rating) _____					
Did you Encounter Saline Water (>4000 ppm TDS) _____			Depth _____ m		Well Disinfected Upon Completion _____						
Remedial Action Taker _____			Gas _____		Depth _____ m		Geophysical Log Taken _____ Submitted to ESRD _____				
Additional Comments on Well PROPOSED WELL USE ALSO BACKUP, 4 107 ALSO WB V HARD, 155 ALSO WB 99' V HARD/HIGH IRON, ALSO WB 147 2 GPM - 900 TDS - 12 GR, ALSO WB 225'-248' & 2G-600 TDS, BOREHOLE DIAMETER ALSO 5" & 4.75", SEAL ALSO DRIVEN & K-PACKER, NON PUMPING STATIC WATER LEVEL ALSO MEASURED FROM GRN LEVEL					Sample Collected for Potability _____		Submitted to ESRD _____				

Yield Test			Taken From Ground Level		Measurement in Metric
Test Date	Start Time	Static Water Level	Depth to water level		
2004/12/17	12:00 AM	43.10 m	Pumping (m)	Elapsed Time Minutes:Sec	Recovery (m)
<b>Method of Water Removal</b> Type Air Removal Rate _____ 54.55 L/min Depth Withdrawn From _____ 64.01 m				1:00	57.95
If water removal period was < 2 hours, explain why				2:00	52.22
				3:00	48.84
				4:00	47.66
				5:00	47.02
				6:00	46.60
				7:00	46.44
				8:00	46.26
				9:00	46.12
				10:00	46.00
				15:00	45.63
				20:00	45.41
				25:00	45.29
				30:00	45.19

Water Diverted for Drilling		
Water Source	Amount Taken _____ L	Diversion Date & Time

Contractor Certification		
Name of Journeyman responsible for drilling/construction of well RORY WAGNER	Certification No 14061Q	
Company Name DOERING DRILLING LTD.	Copy of Well report provided to owner	Date approval holder signed



# Water Well Drilling Report

**View in Imperial** **Export to Excel**

GIC Well ID 1245294  
GoA Well Tag No.  
Drilling Company Well ID  
Date Report Received

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

Well Identification and Location										Measurement in Metric
<b>Owner Name</b> WESTWAY FARMS		<b>Address</b> P.O. BOX 544			<b>Town</b> DIDSBURY		<b>Province</b> ALBERTA	<b>Country</b> CA	<b>Postal Code</b> T0M 0W0	
<b>Location</b>	<i>1/4 or LSD</i>	<i>SEC</i>	<i>TWP</i>	<i>RGE</i>	<i>W of MER</i>	<i>Lot</i>	<i>Block</i>	<i>Plan</i>	<i>Additional Description</i>	
	5	10	31	1	5					
<b>Measured from Boundary of</b>					<b>GPS Coordinates in Decimal Degrees (NAD 83)</b>					
_____ m from _____					Latitude <u>51.641350</u> Longitude <u>-114.069650</u>			Elevation <u>1024.74</u> m		
_____ m from _____					How Location Obtained			How Elevation Obtained		
					Hand held autonomous GPS 20-30m			Hand held autonomous GPS 20-30m		

Drilling Information	
<b>Method of Drilling</b> Rotary	<b>Type of Work</b> New Well
<b>Proposed Well Use</b> Domestic	

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
16.76		Brown Till & Clay	
23.77		Gray Till & Clay	
26.82		Gray Shale	
29.87	Yes	Gray Water Bearing Sandstone	
36.27		Gray Shale	
39.62		Gray Shale & Sandstone Ledges	
40.23		Light Brown Siltstone	
46.94		Gray Shale & Sandstone Ledges	
49.07		Gray Very Fine Grained Sandstone	
50.29		Gray Shale	
53.34		Gray Fine Grained Sandstone	
56.08		Gray Very Fine Grained Sandstone	
57.00		Light Gray Shale	
60.96	Yes	Gray Water Bearing Sandstone	
64.62		Gray Bentonitic Shale & Sandstone Ledges	
69.19		Gray Shale & Sandstone Ledges	
70.71		Brownish Gray Shale & Coal	
73.15		Gray Shale	
77.42		Gray Very Fine Grained Sandstone	
85.34	Yes	Gray Water Bearing Sandstone	

Yield Test Summary			Measurement in Metric
<b>Recommended Pump Rate</b>		<u>45.46</u> L/min	
<b>Test Date</b>	<b>Water Removal Rate (L/min)</b>	<b>Static Water Level (m)</b>	
2007/12/19	45.46	46.63	

Well Completion				Measurement in Metric
<b>Total Depth Drilled</b>	<b>Finished Well Depth</b>	<b>Start Date</b>	<b>End Date</b>	
85.34 m		2007/12/13	2007/12/19	
<b>Borehole</b>				
<b>Diameter (cm)</b>		<b>From (m)</b>	<b>To (m)</b>	
22.86		0.00	85.34	
<b>Surface Casing (if applicable)</b>			<b>Well Casing/Liner</b>	
Plastic			Plastic	
<b>Size OD :</b>		<u>15.24</u> cm	<b>Size OD :</b> <u>11.43</u> cm	
<b>Wall Thickness :</b>		<u>0.953</u> cm	<b>Wall Thickness :</b> <u>0.554</u> cm	
<b>Bottom at :</b>		<u>35.97</u> m	<b>Top at :</b> <u>12.19</u> m	
			<b>Bottom at :</b> <u>85.34</u> m	
<b>Perforations</b>				
<b>From (m)</b>	<b>To (m)</b>	<b>Diameter or Slot Width (cm)</b>	<b>Slot Length (cm)</b>	<b>Hole or Slot Interval (cm)</b>
67.06	83.82	0.318		15.24
Perforated by <u>Saw</u>				
<b>Annular Seal</b> <u>Bentonite Chips/Tablets</u>				
<b>Placed from</b>		<u>0.00</u> m	<b>to</b> <u>35.97</u> m	
<b>Amount</b> _____				
<b>Other Seals</b>				
<b>Type</b>			<b>At (m)</b>	
Shale Trap & Bentoni			66.14	
<b>Screen Type</b>				
<b>Size OD :</b> _____ cm				
<b>From (m)</b>		<b>To (m)</b>		<b>Slot Size (cm)</b>
<b>Attachment</b> _____				
<b>Top Fittings</b>		<b>Bottom Fittings</b>		
<b>Pack</b>				
<b>Type</b> <u>Unknown</u>		<b>Grain Size</b> _____		
<b>Amount</b>		<u>Unknown</u>		

Contractor Certification	
<b>Name of Journeyman responsible for drilling/construction of well</b> RORY WAGNER	<b>Certification No</b> 14061Q
<b>Company Name</b> DOERING DRILLING LTD.	<b>Copy of Well report provided to owner</b> <b>Date approval holder signed</b>





# Water Well Drilling Report

**View in Imperial** **Export to Excel**

GIC Well ID 2090951  
GoA Well Tag No. A2402  
Drilling Company Well ID  
Date Report Received 2020/01/05

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

Well Identification and Location										Measurement in Metric	
<b>Owner Name</b> WESTWAY SEED FARMS		<b>Address</b> P.O. BOX 544			<b>Town</b> DIDSBURY		<b>Province</b> ALBERTA	<b>Country</b> CANADA	<b>Postal Code</b> T0M 0W0		
<b>Location</b>	<i>1/4 or LSD</i> SW	<i>SEC</i> 10	<i>TWP</i> 31	<i>RGE</i> 1	<i>W of MER</i> 5	<i>Lot</i>	<i>Block</i>	<i>Plan</i>	<i>Additional Description</i> EAST WELL		
<b>Measured from Boundary of</b>					<b>GPS Coordinates in Decimal Degrees (NAD 83)</b>						
_____ m from _____					Latitude <u>51.638453</u>		Longitude <u>-114.066632</u>		Elevation _____ m		
_____ m from _____					How Location Obtained Not Verified					How Elevation Obtained Not Obtained	

Drilling Information	
<b>Method of Drilling</b> Combination	<b>Type of Work</b> New Well
<b>Proposed Well Use</b> Domestic & Stock	

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
5.49		Brown Clay	
10.06		Brownish Gray Sandy Clay	
22.25		Brownish Gray Clay & Gravel	
35.97	Yes	Gray Siltstone & Sandstone	
38.71		Gray Hard Siltstone	
45.11		Gray Shale & Siltstone	
46.02		Gray Hard Sandstone	
56.39	Yes	Gray Carbonaceous Siltstone	
69.19		Gray Shale & Siltstone	
79.55	Yes	Gray Medium Grained Sandstone	

Yield Test Summary			Measurement in Metric
<b>Recommended Pump Rate</b>		<u>68.19</u> L/min	
<b>Test Date</b>	<b>Water Removal Rate (L/min)</b>	<b>Static Water Level (m)</b>	
2020/01/02	63.65	44.45	

Well Completion				Measurement in Metric
<b>Total Depth Drilled</b>	<b>Finished Well Depth</b>	<b>Start Date</b>	<b>End Date</b>	
79.55 m	79.55 m	2019/12/28	2019/12/31	
<b>Borehole</b>				
<b>Diameter (cm)</b>	<b>From (m)</b>	<b>To (m)</b>		
22.86	0.00	5.49		
20.32	5.49	24.38		
16.51	24.38	39.62		
13.02	39.62	64.01		
12.07	64.01	79.55		

<b>Surface Casing (if applicable)</b>		<b>Well Casing/Liner</b>	
Plastic		Plastic	
<b>Size OD :</b>	<u>15.24</u> cm	<b>Size OD :</b>	<u>11.43</u> cm
<b>Wall Thickness :</b>	<u>0.991</u> cm	<b>Wall Thickness :</b>	<u>0.554</u> cm
<b>Bottom at :</b>	<u>60.96</u> m	<b>Top at :</b>	<u>5.49</u> m
		<b>Bottom at :</b>	<u>78.64</u> m

<b>Perforations</b>				
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)
64.01	77.72	0.318	15.24	60.96

Perforated by Saw

**Annular Seal** Bentonite Slurry  
Placed from 0.00 m to 64.01 m  
Amount 200.00 Pounds

Other Seals

Type	At (m)
K-Packer	64.01

**Screen Type**

Size OD : \_\_\_\_\_ cm

From (m)	To (m)	Slot Size (cm)
_____	_____	_____

Attachment \_\_\_\_\_  
Top Fittings \_\_\_\_\_ Bottom Fittings \_\_\_\_\_

**Pack**

Type \_\_\_\_\_ Grain Size \_\_\_\_\_

Contractor Certification	
<b>Name of Journeyman responsible for drilling/construction of well</b> RORY WAGNER	<b>Certification No</b> 14061Q
<b>Company Name</b> WILD ROSE WATER WELLS LTD.	<b>Copy of Well report provided to owner</b> <b>Date approval holder signed</b> Yes 2020/01/05



# Water Well Drilling Report

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GIC Well ID 2090951  
GoA Well Tag No. A2402  
Drilling Company Well ID  
Date Report Received 2020/01/05

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

Well Identification and Location										Measurement in Metric	
<b>Owner Name</b> WESTWAY SEED FARMS		<b>Address</b> P.O. BOX 544			<b>Town</b> DIDSBURY		<b>Province</b> ALBERTA	<b>Country</b> CANADA	<b>Postal Code</b> T0M 0W0		
<b>Location</b>	1/4 or LSD SW	SEC 10	TWP 31	RGE 1	W of MER 5	Lot	Block	Plan	Additional Description EAST WELL		
<b>Measured from Boundary of</b>					<b>GPS Coordinates in Decimal Degrees (NAD 83)</b>						
_____ m from _____					Latitude <u>51.638453</u>		Longitude <u>-114.066632</u>		Elevation _____ m		
_____ m from _____					How Location Obtained Not Verified					How Elevation Obtained Not Obtained	

Additional Information										Measurement in Metric
Distance From Top of Casing to Ground Level <u>81.28</u> cm										
Is Artesian Flow _____					Is Flow Control Installed _____					
Rate _____ L/min					Describe _____					
Recommended Pump Rate <u>68.19</u> L/min					Pump Installed <u>Yes</u>		Depth <u>64.01</u> m			
Recommended Pump Intake Depth (From TOC) <u>64.01</u> m					Type <u>Submersible</u>		Make <u>WEBTROL</u>		H.P. <u>1.5</u>	
										Model (Output Rating) <u>15</u>
Did you Encounter Saline Water (>4000 ppm TDS) _____					Depth _____ m		Well Disinfected Upon Completion <u>Yes</u>			
Remedial Action Taker _____					Gas _____		Depth _____ m		Geophysical Log Taken _____	
										Submitted to ESRD _____
Additional Comments on Well										Sample Collected for Potability _____
										Submitted to ESRD _____
80.130 20 GPM POOR QUALITY 60 FT STATIC 130-200 3GPM SOFT 115 FT STATIC 200-261 20 GPM SOFT 600 TDS 145 FT STATIC										

Yield Test			Taken From Top of Casing		Measurement in Metric
			Depth to water level		
Test Date 2020/01/02	Start Time 11:00 AM	Static Water Level 44.45 m			
<b>Method of Water Removal</b>					
Type <u>Pump</u>					
Removal Rate <u>63.65</u> L/min					
Depth Withdrawn From <u>60.96</u> m					
If water removal period was < 2 hours, explain why					
			Pumping (m)	Elapsed Time Minutes:Sec	Recovery (m)
			44.45	0:00	51.23
			50.08	2:00	
			50.24	3:00	46.68
			50.37	4:00	46.42
				5:00	46.28
			50.70	10:00	45.96
			50.88	20:00	45.73
			51.02	30:00	45.61
			51.04	40:00	45.55
			51.97	50:00	45.50
			51.00	60:00	45.45
			51.18	90:00	45.36
			51.23	120:00	45.31

Water Diverted for Drilling			
Water Source ON SITE WELL	Amount Taken 4546.09 L	Diversion Date & Time 2019/12/28 9:00 AM	

Contractor Certification			
Name of Journeyman responsible for drilling/construction of well RORY WAGNER		Certification No 14061Q	
Company Name WILD ROSE WATER WELLS LTD.		Copy of Well report provided to owner Yes	Date approval holder signed 2020/01/05



# Water Well Drilling Report

**View in Imperial** **Export to Excel**

GIC Well ID 2091008  
GoA Well Tag No. A5805  
Drilling Company Well ID  
Date Report Received 2022/03/03

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

Well Identification and Location										Measurement in Metric		
<b>Owner Name</b> WESTWAY SEED FARMS		<b>Address</b> P.O. BOX 544			<b>Town</b> DIDSBURY		<b>Province</b> ALBERTA		<b>Country</b> CANADA		<b>Postal Code</b> T0M 0W0	
<b>Location</b>	<b>1/4 or LSD</b>	<b>SEC</b>	<b>TWP</b>	<b>RGE</b>	<b>W of MER</b>	<b>Lot</b>	<b>Block</b>	<b>Plan</b>	<b>Additional Description</b> SE WELL			
<b>Measured from Boundary of</b>					<b>GPS Coordinates in Decimal Degrees (NAD 83)</b>							
_____ m from _____					Latitude <u>51.638453</u>		Longitude <u>-114.066632</u>		Elevation _____ m			
_____ m from _____					How Location Obtained Not Verified					How Elevation Obtained Not Obtained		

Drilling Information	
<b>Method of Drilling</b> Combination	<b>Type of Work</b> New Well
<b>Proposed Well Use</b> Domestic & Stock	

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
3.66		Brown Clay	
5.18		Gray Silty Clay	
11.89		Gray Rocky Clay	
17.98		Brownish Gray Gravel	
30.48		Gray Sandy Clay	
35.36		Gray Clay	
44.50		Gray Shale & Siltstone	
53.34	Yes	Gray Siltstone & Sandstone	

Yield Test Summary			Measurement in Metric
<b>Recommended Pump Rate</b>		<u>45.46 L/min</u>	
<b>Test Date</b>	<b>Water Removal Rate (L/min)</b>	<b>Static Water Level (m)</b>	
2022/02/25	81.83	22.53	

Well Completion				Measurement in Metric
<b>Total Depth Drilled</b>	<b>Finished Well Depth</b>	<b>Start Date</b>	<b>End Date</b>	
53.34 m	53.34 m	2022/02/09	2022/02/09	
<b>Borehole</b>				
<b>Diameter (cm)</b>	<b>From (m)</b>	<b>To (m)</b>		
22.86	0.00	5.49		
20.32	5.49	35.97		
17.15	35.97	38.10		
15.24	38.10	38.40		
12.07	38.40	53.34		
<b>Surface Casing (if applicable)</b>		<b>Well Casing/Liner</b>		
Plastic		Plastic		
Size OD : <u>15.24 cm</u>		Size OD : <u>11.43 cm</u>		
Wall Thickness : <u>0.991 cm</u>		Wall Thickness : <u>0.554 cm</u>		
Bottom at : <u>38.40 m</u>		Top at : <u>16.76 m</u>		
		Bottom at : <u>53.34 m</u>		
<b>Perforations</b>				
<b>From (m)</b>	<b>To (m)</b>	<b>Diameter or Slot Width (cm)</b>	<b>Slot Length (cm)</b>	<b>Hole or Slot Interval(cm)</b>
44.20	53.34	0.318	15.24	30.48
Perforated by <u>Saw</u>				
<b>Annular Seal</b> <u>Bentonite Slurry</u>				
Placed from <u>5.49 m</u> to <u>38.40 m</u>				
Amount <u>150.00 Pounds</u>				
Other Seals				
Type		At (m)		
Shale Trap		35.97		
<b>Screen Type</b>				
Size OD : <u>_____ cm</u>				
From (m)		To (m)		Slot Size (cm)
Attachment _____		Bottom Fittings _____		
Top Fittings _____		Bottom Fittings _____		
<b>Pack</b>				
Type _____		Grain Size _____		

Contractor Certification			
<b>Name of Journeyman responsible for drilling/construction of well</b> RORY WAGNER		<b>Certification No</b> 14061Q	
<b>Company Name</b> WILD ROSE WATER WELLS LTD.		<b>Copy of Well report provided to owner</b> Yes	<b>Date approval holder signed</b> 2022/03/03



# Water Well Drilling Report

[View in Imperial](#) [Export to Excel](#)

GIC Well ID 2091008  
GoA Well Tag No. A5805  
Drilling Company Well ID  
Date Report Received 2022/03/03

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

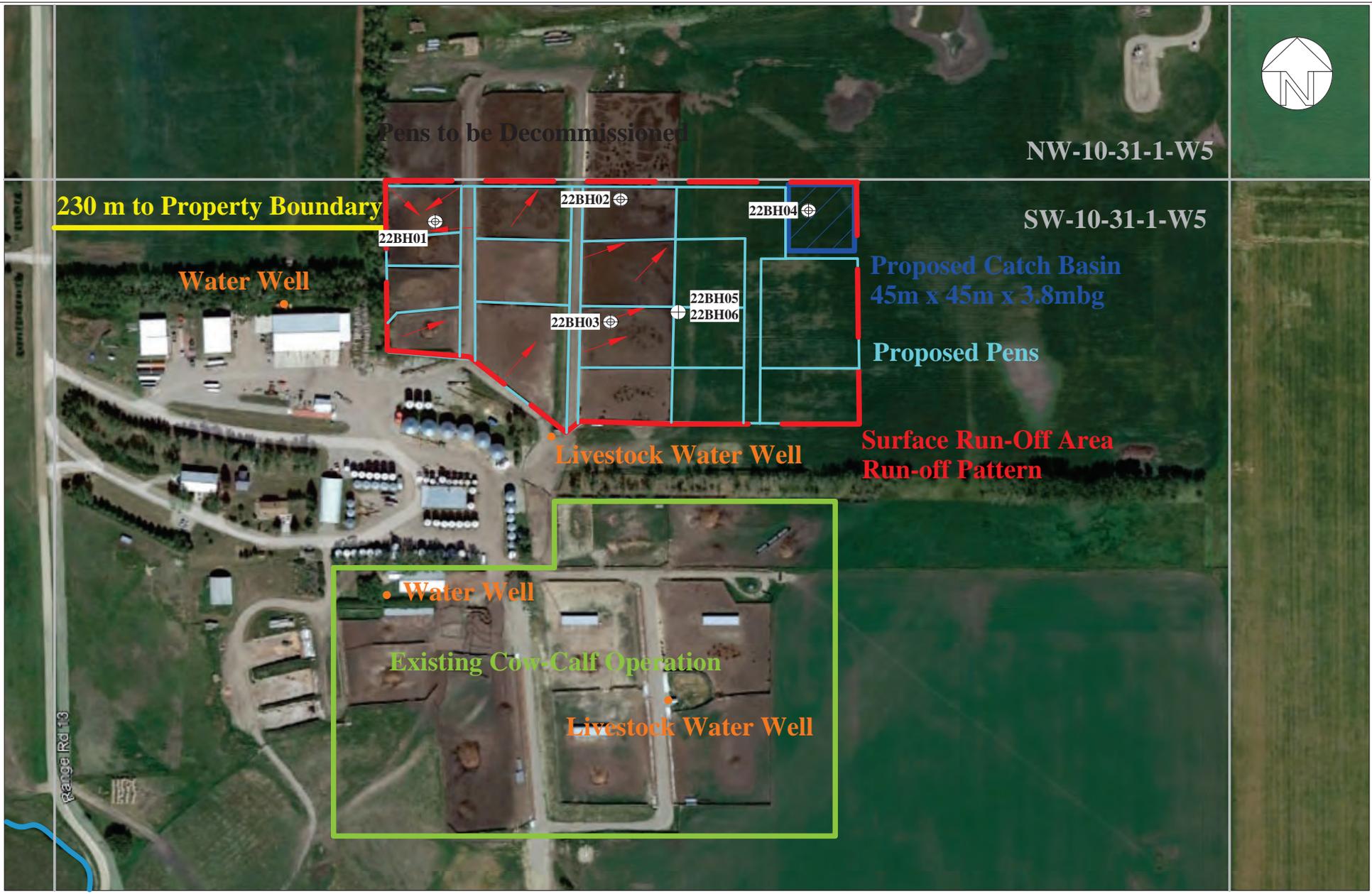
Well Identification and Location										Measurement in Metric
<b>Owner Name</b> WESTWAY SEED FARMS		<b>Address</b> P.O. BOX 544			<b>Town</b> DIDSBURY		<b>Province</b> ALBERTA	<b>Country</b> CANADA	<b>Postal Code</b> T0M 0W0	
<b>Location</b>	1/4 or LSD SW	SEC 10	TWP 31	RGE 1	W of MER 5	Lot	Block	Plan	Additional Description SE WELL	
<b>Measured from Boundary of</b>					<b>GPS Coordinates in Decimal Degrees (NAD 83)</b>					
_____ m from _____					Latitude <u>51.638453</u> Longitude <u>-114.066632</u>			Elevation _____ m		
_____ m from _____					How Location Obtained Not Verified			How Elevation Obtained Not Obtained		

Additional Information										Measurement in Metric
Distance From Top of Casing to Ground Level <u>81.28</u> cm										
Is Artesian Flow _____					Is Flow Control Installed _____					
Rate _____ L/min					Describe _____					
Recommended Pump Rate <u>45.46</u> L/min					Pump Installed _____		Depth _____ m			
Recommended Pump Intake Depth (From TOC) <u>42.67</u> m					Type _____		Make _____		H.P. _____	
Model (Output Rating) _____										
Did you Encounter Saline Water (>4000 ppm TDS) _____					Depth _____ m		Well Disinfected Upon Completion <u>Yes</u>			
Gas _____					Depth _____ m		Geophysical Log Taken _____			
Remedial Action Taker _____					Submitted to ESRD _____					
Additional Comments on Well 10-18 FEET BENT PELLETS					Sample Collected for Potability _____		Submitted to ESRD _____			

Yield Test			Taken From Top of Casing		Measurement in Metric
			Depth to water level		
Test Date 2022/02/25	Start Time 11:00 AM	Static Water Level 22.53 m			
<b>Method of Water Removal</b>					
Type <u>Pump</u>					
Removal Rate <u>81.83</u> L/min					
Depth Withdrawn From <u>42.67</u> m					
If water removal period was < 2 hours, explain why					
			Pumping (m)	Elapsed Time Minutes:Sec	Recovery (m)
			22.53	0:00	36.53
			25.08	1:00	33.33
			26.60	2:00	32.04
			27.41	3:00	31.13
			28.07	4:00	30.51
			28.64	5:00	29.97
			30.42	10:00	28.16
			32.08	20:00	26.41
			32.06	25:00	25.95
			33.12	30:00	25.57
			33.89	40:00	25.01
			34.48	50:00	24.65
			34.93	60:00	24.37
			35.90	90:00	24.18
			35.53	120:00	

Water Diverted for Drilling		
Water Source ON SITE WELL	Amount Taken 2727.66 L	Diversion Date & Time 2022/02/09 9:00 AM

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well RORY WAGNER	Certification No 14061Q
Company Name WILD ROSE WATER WELLS LTD.	Copy of Well report provided to owner Yes
	Date approval holder signed 2022/03/03



**Title:**

Detailed Site Layout Plan  
 Part II Technical Requirements  
 Westway Farms Ltd.  
 SW-10-031-01-W5M  
 Mountain View County, Alberta

**Project No:**

2211-43015

**Date:**

May 4, 2023

**Scale:**

3,500

**Prepared By:**

L. Predy

**Image Source:**

Google Earth Pro (2022)

**Figure No.:**

**2.0**



## **SITE AND SOIL ASSESSMENT**

Westway Farms Ltd.  
SW-10-31-1-W5M

Mountain View County, Alberta



**Site and Soil Assessment**  
Westway Farms Ltd.  
SW-10-31-1-W5M  
Mountain View County, Alberta

Prepared For: Tom Hadway  
Westway Farms Ltd.

Prepared By: Envirowest Engineering  
Box 4248, Ponoka, AB, T4J 1R6  
(403) 783-8229

Report Date: August 2, 2023

Project Number: 2211-43015

**Private and Confidential**



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- B. Boreholes Logs
- C. Certificates of Analysis



## **1.0 Introduction and Scope of Work**

Envirowest Engineering (Envirowest) was retained by Tom Hadway on behalf of Westway Farms Ltd. to conduct a Site and Soil Assessment for the proposed construction of a solid manure storage facility and catch basin for a 1000 head feedlot.

The assessment was completed to determine conditions beneath the proposed construction areas and assess soil properties for construction of the proposed facilities. The operation, herein referred to as “the Site,” is located on SW-10-31-01-W5M in Mountain View County, as shown on Figure 1.0.

The assessment has been completed in accordance with the standards and regulations associated with the amended Agricultural Operation Practices Act (2022) and associated regulations which govern all new and modified confined feeding operations.

### **Scope of Work**

Six investigative boreholes were drilled using a truck-mounted rotary auger and completed to depths between 3.0 and 12.0 metres below ground surface (mbgs) on December 7, 2022. The boreholes were completed in the areas proposed for solid manure storage and a catch basin. Two boreholes were completed as groundwater monitoring wells to allow for in-situ hydraulic conductivity testing, which was completed on February 9, 2023.

Soil samples were collected from the strata beneath the proposed solid manure storage location and submitted to an accredited third-party laboratory for analysis of soil properties. A composite sample of borrow material was also collected and submitted to an accredited third-party laboratory for analysis of soil properties as applicable for use in the construction of a compacted earthen liner.



## 2.0 Assessment Results

The results of the soil analysis completed by a third-party accredited laboratory are presented in Table 1 below. The soil sample locations are presented on Figure 1.0. Borehole logs and well completion details can be found in Appendix B.

**Table 1: Soil Properties Results**

Parameter	22BH03	22BH05-01	22BH05-02	Composite Sample
Sample Depth (m)	1.25	0.75	5.0	Borrow Material
Particle Size (%clay)	43	35	17	40
Particle Size (%sand)	34	40	62	32
Particle Size (%silt)	24	26	22	28
Texture Class	Clay	Clay Loam	Sandy Loam	Clay Loam
Liquid Limit (%)	-	-	-	33
Plastic Limit (%)	-	-	-	15
Plasticity Index (%)	-	-	-	18
Moisture Content (%)	-	-	-	18.6
Hydraulic Conductivity (lab)	-	-	-	$8.22 \times 10^{-9}$
Hydraulic Conductivity (field)	-	$1.67 \times 10^{-7}$	-	-

The composite soils were identified as Clay Loam. The hydraulic conductivity was determined to be  $8.22 \times 10^{-9}$  cm/sec at 99% compaction. The maximum dry density was found to be 1860 kg/m<sup>3</sup> at with an optimum moisture content of 13.3%.

Conservatively, a safety factor of 10 is to be applied to the hydraulic conductivity based on the NRCB Approvals Policy (2016-7), Section 8.7.2, stating “lab measurements of a sample of material taken from the field are not considered an accurate representation of the actual field hydraulic conductivity values. This is because of the potential variability of soils, differences in compaction methods, and variances in compaction.” The field hydraulic conductivity of the composite material tested is  $8.22 \times 10^{-8}$  cm/sec.



The monitoring well installed at borehole 22BH05 (22MW01) was sufficiently hydrated prior to completing the in-situ hydraulic conductivity testing. The in-situ hydraulic conductivity test was completed on February 9, 2023. The monitoring well was placed to assess the material below surface, screened from 0.5 to 1.5 meters. An assessment of monitoring well 22MW02 was not completed as field data indicated that the material tested does not provide sufficient protection for a natural barrier.

The initial depth to water was measured in the well. A volume of water was then added to the well and the change in depth measured over time to assess hydraulic conductivity of the clay strata. It is assumed (as per AGDEX 096-01) that all flow occurs under saturated conditions. The depth was measured every 30 seconds for 10 minutes and every 5 minutes for forty-five minutes. The results of the test were analyzed as a falling head test using AQTESOLV Bouwer-Rice method for unconfined wells. The results of the assessment were an in-situ hydraulic conductivity of  $1.67 \times 10^{-7}$  cm/sec in monitoring well 22MW01.

A saturated water table was noted at approximately 10.9 meters below ground surface at borehole 22BH04 within the proposed catch basin construction area. There was no bedrock encountered during the assessment to a maximum depth of investigation at 12.0 meters below ground surface.



### **3.0 Conclusions**

The following conclusions are based on the discussed scope of construction.

#### **Solid Manure Storage Area**

The native soils were determined to present properties that will provide sufficient protection for a solid manure storage area as a natural barrier. Contouring of the proposed and current solid manure storage area to direct surface water flow to the catch basin should be done with caution so as to not remove this protective barrier. Minor surface flow redirection within the current pens may be required. Recontouring of the proposed area to the east should restrict cutting to 1.0 metres below grade as measured from 22BH05.

#### **Catch Basin**

The native soils in the area of the proposed catch basin were found to not provide sufficient protection for use as a natural barrier. However, the borrow material that is present on site was determined to be appropriate for the construction of a compacted clay liner.



## 4.0 Liner Assessments

### 4.1 Natural Barrier Assessment (Solid Manure Storage)

Based on the information obtained it was determined that the native clay within the proposed area of construction for solid manure storage was found to range in thickness from 0.5 to 2.5 meters, generally at surface. The proposed solid manure storage area is approximately 160 m x 320 m, and is shown on Figure 2.0.

Minimum Required Liner Depth for a natural barrier for solid manure storage:

$$\frac{2 \text{ m}}{1 \times 10^{-6} \text{ cm/sec}} = \frac{\text{X m}}{1.67 \times 10^{-7} \text{ cm/sec}}$$

$$\text{X} = 0.33 \text{ m}$$

A minimum of 0.33 meters of native clay is required to be present to provide a sufficient protective barrier. It is found that there is sufficient protection across the proposed solid manure storage area.

### 4.2 Earthen Lined Catch Basin

Based on the information obtained it was determined that the borrow material to the northwest of the current operation presents properties to create a sufficient protective liner. The catch basin design is shown on Figure 2.0.

Minimum Required Liner Thickness for Catch Basin:

$$\frac{1 \text{ m}}{5 \times 10^{-7} \text{ cm/sec}} = \frac{\text{X m}}{8.22 \times 10^{-8} \text{ cm/sec}}$$

$$\text{X} = 0.16 \text{ m}$$

A minimum of 0.16 meters of compacted clay is required to provide a sufficient protective liner.

*However, it is recommended that a liner 0.5 meters is installed to accommodate for freeze/thaw, erosion and other environmental or construction factors.*



## 5.0 Design and Construction Considerations

### 5.1 Catch Basin Sizing

#### Surface Run-off Area

The proposed area of contributing run-off is conservatively 50,000 m<sup>3</sup>. A catch basin size is recommended with a storage capacity of 3,500 m<sup>3</sup>, based on Didsbury precipitation data.

The north boundary of the proposed pens is required to be contoured to direct 'impacted' runoff towards the catch basin and berm or redirect unimpacted runoff from entering the catch basin.

The storage capacity required is 3,500 m<sup>3</sup> and will have the following specifications:

- To provide the required capacity the new catch basin should be 45 m in length x 45 m in width. The overall depth has been designed as 3.8 m. The overall capacity of the catch basin will be 4,455 cubic metres, which accounts for the required 0.5 m of freeboard, a storage capacity of 3,508 cubic metres. The sizing is based on an inside end and side wall slope of 3:1 (run/rise).
- The bottom of the liner must be not less than 1.0 m above the top of an aquifer and the shallow groundwater level at the time of construction.
- The overall depth of 3.8 m will be achieved through a below grade depth of 3.8 m. Above-grade dykes may be needed to redirect unimpacted surface flow. The outside dyke walls should be completed to a slope of 4:1. The crest of the dyke should be sloped slightly outward to direct rainfall away from the storage facility.
- The bottom of the 0.5 metre liner will be 4.3 metres below grade.



## **Catch Basin Construction**

The following general construction procedures are recommended, though some modifications may be required based on actual site conditions encountered during construction:

- The topsoil should be stripped from the area for construction. The topsoil can be reused on the freeboard area after construction completion.
- Sand and gravel seams, if encountered, should be excavated during construction and should be removed.
- Construction of the lagoon should be supervised by a professional engineer.
- Following completion of the lagoon the operator should:
  - Ensure that shrubs, trees, and deep-rooted plants are not allowed to grow on or near the walls of the facility.



## 6.0 Closure

Envirowest Engineering is pleased to submit the report to Tom Hadway of Westway Farms Ltd. The information and conclusions contained in this report are for their sole use. No other party is to rely upon the information contained within the report without the express written authorization of Envirowest Engineering.

Envirowest Engineering is not responsible for any damages that may be suffered as the result of any unauthorized use of, or reliance on, this report. Envirowest Engineering has performed the work and made the findings and conclusions set out in the report in a manner consistent with the level of care and skill normally exercised by members of the environmental engineer profession practicing under similar conditions at the time the work was performed. Envirowest Engineering accepts no responsibility for any deficiency, misstatement or inaccuracy in this report resulting from misinformation from any individuals or parties that provided information as part of this report.

We trust that this report meets your present needs. Please feel free to contact the undersigned with any questions or should you require additional information.

Respectfully submitted,



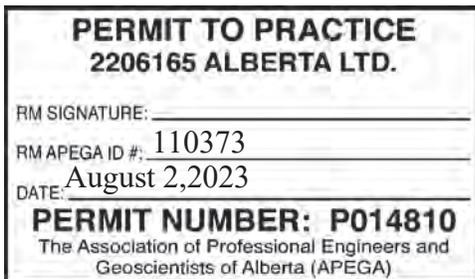
August 2, 2023

**Prepared by:**

Emily J. Low, P.Eng.  
Envirowest Engineering

**Reviewed by:**

Leah Predy, P.Ag.  
Envirowest Engineering



2206165 Alberta Ltd. o/a Envirowest Engineering  
Association of Professional Engineers and Geoscientists of Alberta  
Permit to Practice No. P14810



## 7.0 Qualifications of Assessors

Ms. Emily Low, B.Sc., P.Eng, is an Environmental Engineer with Envirowest Engineering and has approximately 15 years of environmental assessment, monitoring, and remediation experience in the agricultural, industrial, real estate and development, and oil and gas sectors. Ms. Low has a Bachelor of Science in Chemical Engineering from the University of Alberta and is a certified Professional Engineer in Alberta (Association of Professional Engineers and Geoscientists of Alberta).

Leah Predy, B.A., B.Sc., P.Ag., is a Professional Agrologist with Envirowest Engineering and has approximately 4 years of experience in the environmental field, both in field data collection and report preparation for environmental assessments, monitoring, and remediation, as well as agricultural projects. Prior to her employment with Envirowest Engineering, Leah had five years of experience managing rangelands and navigating legislation and regulations as a Rangeland Agrologist with the Government of Alberta. She is a Professional Agrologist in Alberta (Alberta Institute of Agrologists).



## 8.0 References

GOA (Government of Alberta). (November 2022). Agricultural Operation Practices Act and Regulations. Edmonton, AB: Author.

GOA (Government of Alberta). (December 2020). Agricultural Operation Practices Act: Standards and Administration Regulation. Edmonton, AB: Author.



## **Environmental Assessment Report – General Conditions**

### **1.0 Use of Report**

This report pertains to a specific site, a specific development, and a specific scope of work. It is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site or proposed development would necessitate a supplementary assessment.

This report and the assessments and recommendations contained in it are intended for the sole use of Envirowest Engineering's (Envirowest's) client. Envirowest does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than Envirowest's client (hereunder referred to as the "Client") or an approved agent of the Client. Any unauthorized use of or reliance on the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of Envirowest. The Client agrees that it shall use the report for its own internal purposes and it shall not provide the report to another party other than an approved agent.

### **2.0 Limitation of Report**

This report is based solely on the conditions that existed on site at the time of Envirowest's investigation. The Client, and any other parties using this report with the express written consent of the Client and Envirowest, acknowledge that conditions affecting the environmental assessment of the site can vary with time and that the conclusions and recommendations set out in this report are time sensitive.

The Client, and any other party using this report with the express written consent of the Client and Envirowest, also acknowledge that the conclusions and recommendations set out in this report are based on limited observations and testing on the subject site and that conditions may vary across the site which, in turn, could affect the conclusions and recommendations made.

The Client acknowledges that Envirowest is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the site, the decisions on which are the sole responsibility of the Client.

### **3.0 Information Provided to Envirowest by Others**

During the performance of the work and the preparation of this report, Envirowest may have relied on information provided by persons other than the Client. While Envirowest endeavours to verify the accuracy of such information when instructed to do so by the Client, Envirowest accepts no responsibility for the accuracy or the reliability of such information that may affect the report.



#### **4.0 Limitation of Liability**

The Client recognizes that property containing contaminants and hazardous wastes creates a high risk of claims brought by third parties arising from the presence of those materials. In consideration of these risks, and in consideration of Envirowest providing the services requested, the Client agrees that Envirowest's liability shall be limited as follows:

(1) With respect to any claims brought against Envirowest by the Client for damages of any kind whatsoever, including without limitation, incidental, consequential, exemplary or punitive, for any reason whatsoever arising out of the provision or failure to provide services hereunder the amount of such claim and the extent of Envirowest's liability shall be limited to the amount of fees paid by the Client to Envirowest under this Agreement.

(2) With respect to claims brought by third parties arising out of the presence of contaminants or hazardous wastes on the subject site, the Client agrees to indemnify, defend, and hold harmless Envirowest from and against any and all claim or claims, action or actions, demands, damages, penalties, fines, losses, costs and expenses of every nature and kind whatsoever, including solicitor-client costs, arising or alleged to arise either in whole or part out of services provided by Envirowest.

#### **5.0 Disclosure of Information by Client**

The Client agrees to fully cooperate with Envirowest with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client acknowledges that in order for Envirowest to properly provide the service, Envirowest requires and shall rely upon the full disclosure and accuracy of any and all such information.

#### **6.0 Standard of Care**

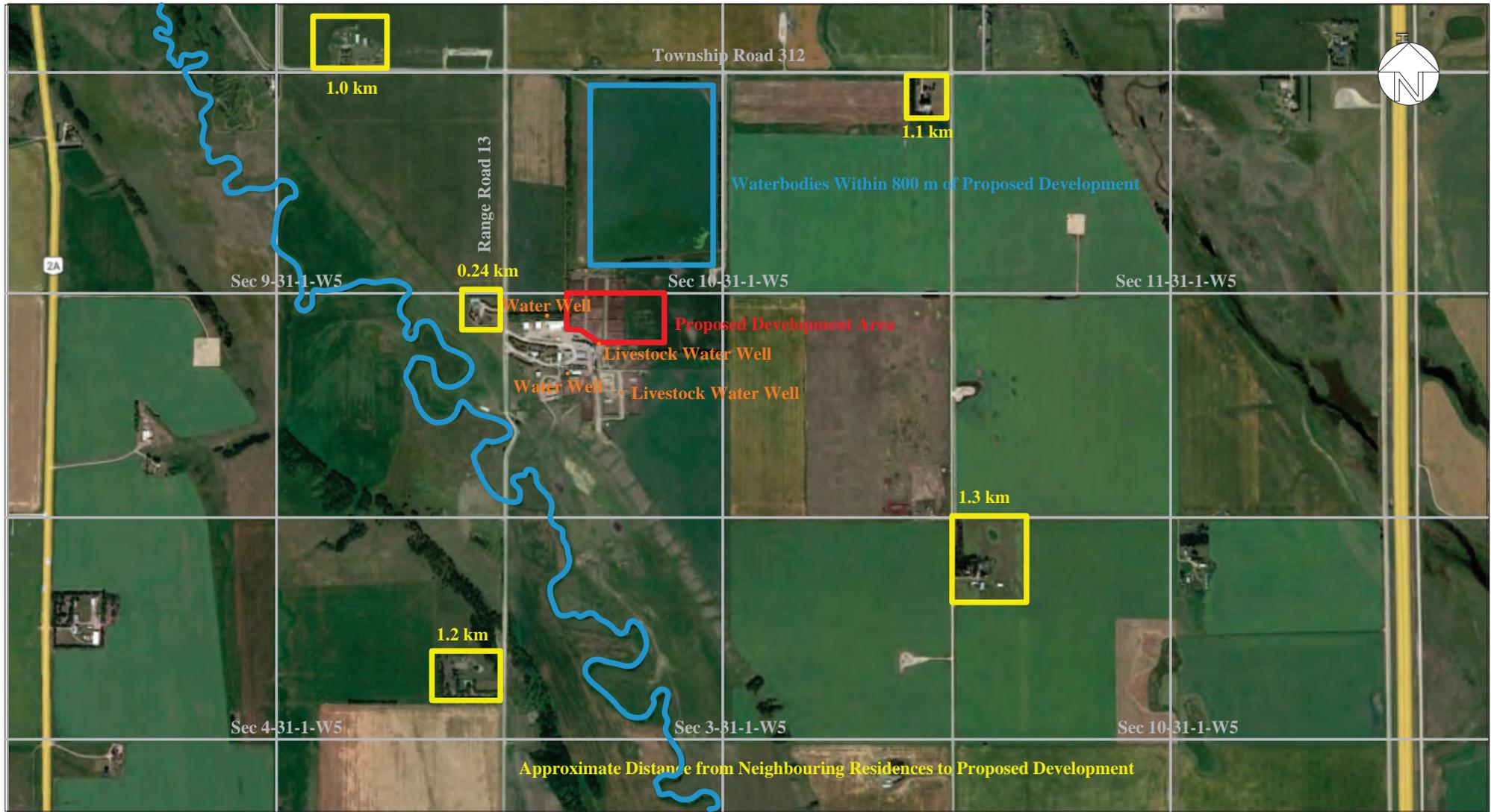
Services performed by Envirowest for this report have been conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Engineering and scientific judgment have been applied in developing the conclusions and/or recommendations provided in this report. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of this report.

#### **7.0 Ownership of Instruments of Service**

The Client acknowledges that all reports, plans, and data generated by Envirowest during the performance of the work and other documents prepared by Envirowest are considered its professional work product and shall remain the copyright property of Envirowest.

## Appendix A

### Figures



**Title:**

Area/Large Scale Plan  
 Part II Technical Requirements  
 Westway Farms Ltd.  
 SW-10-031-01-W5M  
 Mountain View County, Alberta

**Project No:**

2211-43015

**Date:**

May 4, 2023

**Scale:**

**Prepared By:**

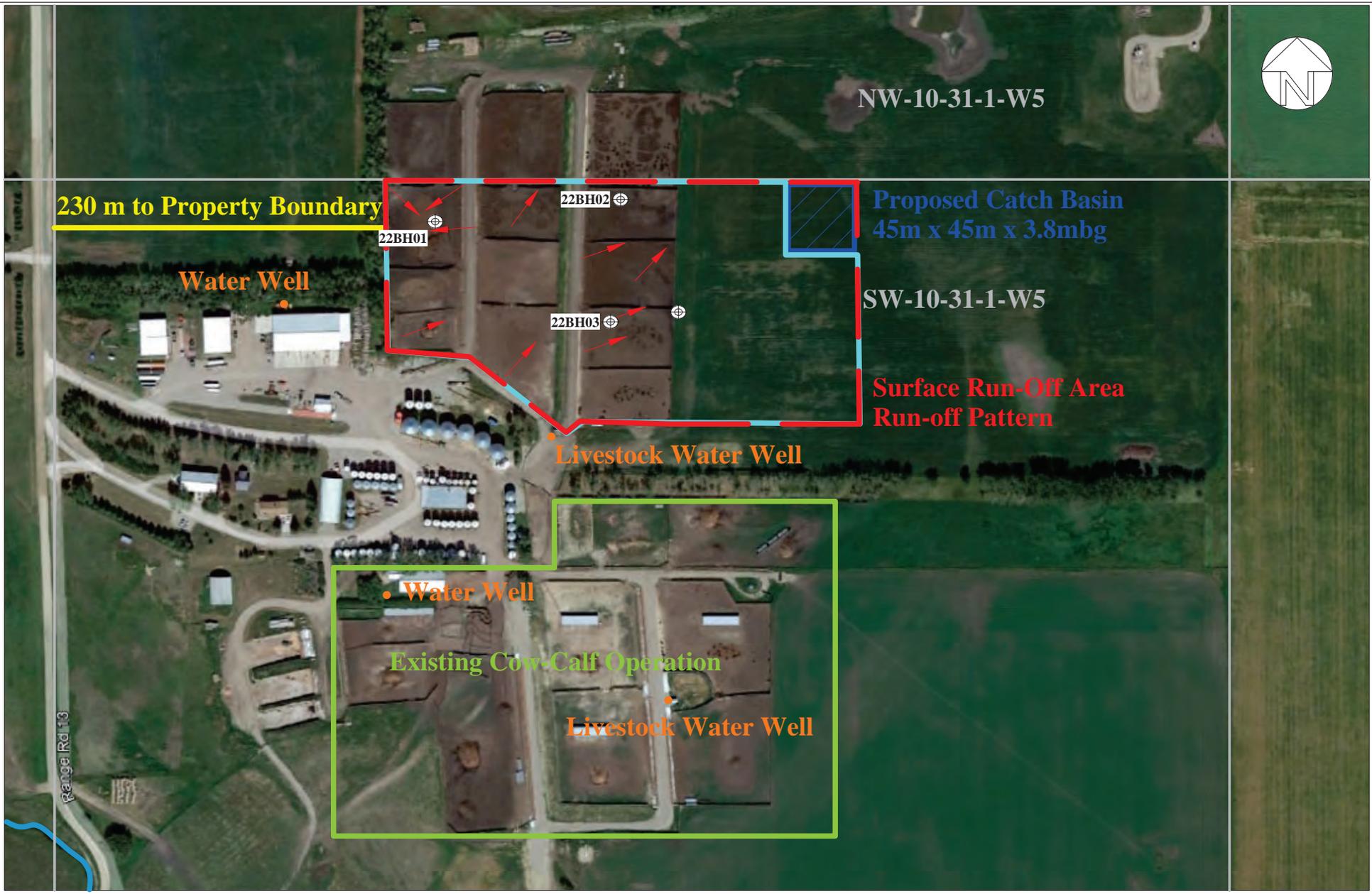
L. Predy

**Image Source:**

Google Earth Pro (2022)

**Figure No.:**

**1.0**



**Title:**

Detailed Site Layout Plan  
Part II Technical Requirements  
Westway Farms Ltd.  
SW-10-031-01-W5M  
Mountain View County, Alberta

**Project No:**

2211-43015

**Date:**

May 4, 2023

**Figure No.:**

**2.0**

**Scale:**

**Prepared By:**

L. Predy

**Image Source:**

Google Earth Pro (2022)

**Appendix B**

**Borehole Logs**





# LOG OF BORING 22BH01

(Page 1 of 1)

Site and Soil Assessment  
 SW-10-31-1-W5M  
 Mountain View County, Alberta  
 Project Number: 2211-43015

Driller: : Evergreen Drilling  
 Drilling Method: : Truck Mounted Auger  
 Drill Date : December 7, 2022  
 Logged By: : Leah Predy, P.Ag.

Depth in Meters	Gastech Reading (ppm)	VOC Reading	GRAPHIC	DESCRIPTION	Well Elev.:	Water Level
0.0				SILTY CLAY, grey-brown, firm, moist		
0.3						
0.5						
0.8						
1.0				SANDY CLAY, grey-brown, firm, moist		
1.3						
1.5				CLAYEY SAND, soft, crumbly		
1.8						
2.0				SILT, trace clay, grey-brown, moist		
2.3						
2.5						
2.8						
3.0				SAND, grey-brown, dry		
3.3						
3.5						
3.8						
4.0						
4.3						
4.5						
4.8				GRAVEL/CLAY		
5.0						
5.3						
5.5						
5.8						
6.0						

06-05-2023 Z:\Operations\Client Data\43015 Westway Farms (Tom Hadway)\22BH01.bor



# LOG OF BORING 22BH02

(Page 1 of 1)

Site and Soil Assessment  
 SW-10-31-1-W5M  
 Mountain View County, Alberta  
 Project Number: 2211-43015

Driller: : Evergreen Drilling  
 Drilling Method: : Truck Mounted Auger  
 Drill Date : December 7, 2022  
 Logged By: : Emily Low, P.Eng.

Depth in Meters	Gastech Reading (ppm)	VOC Reading	GRAPHIC	DESCRIPTION	Well Elev.:	Water Level
0.0				SANDY CLAY, grey-brown, firm, moist		
0.3						
0.5						
0.8						
1.0						
1.3						
1.5						
1.8						
2.0						
2.3				SAND, grey-brown, loose, dry		
2.5						
2.8						
3.0						
3.3						
3.5						
3.8						
4.0						
4.3						
4.5						
4.8						
5.0				GRAVEL/CLAY		
5.3						
5.5						

06-05-2023 Z:\Operations\Client Data\43015 Westway Farms (Tom Hadway)\22BH02.bor



# LOG OF BORING 22BH03

(Page 1 of 1)

Site and Soil Assessment  
 SW-10-31-1-W5M  
 Mountain View County, Alberta  
 Project Number: 2211-43015

Driller: : Evergreen Drilling  
 Drilling Method: : Truck Mounted Auger  
 Drill Date : December 7, 2022  
 Logged By: : Emily Low, P.Eng.

Depth in Meters	Gastech Reading (ppm)	VOC Reading	GRAPHIC	DESCRIPTION	Well Elev.:	Water Level
0.0				SAND, trace clay, moist		
0.3						
0.5				SANDY CLAY, grey-brown, firm, moist		
0.8						
1.0				SILTY CLAY, grey-brown, moist		
1.3						
1.5						
1.8						
2.0						
2.3				crumbly		
2.5						
2.8				loose		
3.0						
3.3						
3.5						
3.8						
4.0				GRAVEL/CLAY		
4.3						
4.5						

06-05-2023 Z:\Operations\Client Data\43015 Westway Farms (Tom Hadway)\22BH03.bor



# LOG OF BORING 22BH04

(Page 1 of 1)

Site and Soil Assessment  
 SW-10-31-1-W5M  
 Mountain View County, Alberta  
 Project Number: 2211-43015

Driller: : Evergreen Drilling  
 Drilling Method: : Truck Mounted Auger  
 Drill Date : December 7, 2022  
 Logged By: : Emily Low, P.Eng.

Depth in Meters	Gastech Reading (ppm)	VOC Reading	GRAPHIC	DESCRIPTION	Well Elev.:	Water Level
0.0				SANDY CLAY, grey-brown, firm, moist		
0.3						
0.5						
0.8						
1.0						
1.3						
1.5				damp		
1.8						
2.0						
2.3						
2.5				SILTY SAND, trace clay, loose, dry		
2.8				trace gravel		
3.0						
3.3						
3.5						
3.8						
4.0						
4.3						
4.5						
4.8						
5.0						
5.3						
5.5						
5.8						
6.0						
6.3						
6.5						
6.8						
7.0						
7.3						
7.5						
7.8						
8.0						
8.3						
8.5						
8.8						
9.0						
9.3						
9.5						
9.8						
10.0						
10.3						
10.5						
10.8						
11.0				saturated water table		
11.3						
11.5						
11.8						
12.0						

06-05-2023 Z:\Operations\Client Data\43015 Westway Farms (Tom Hadway)\22BH04.bor

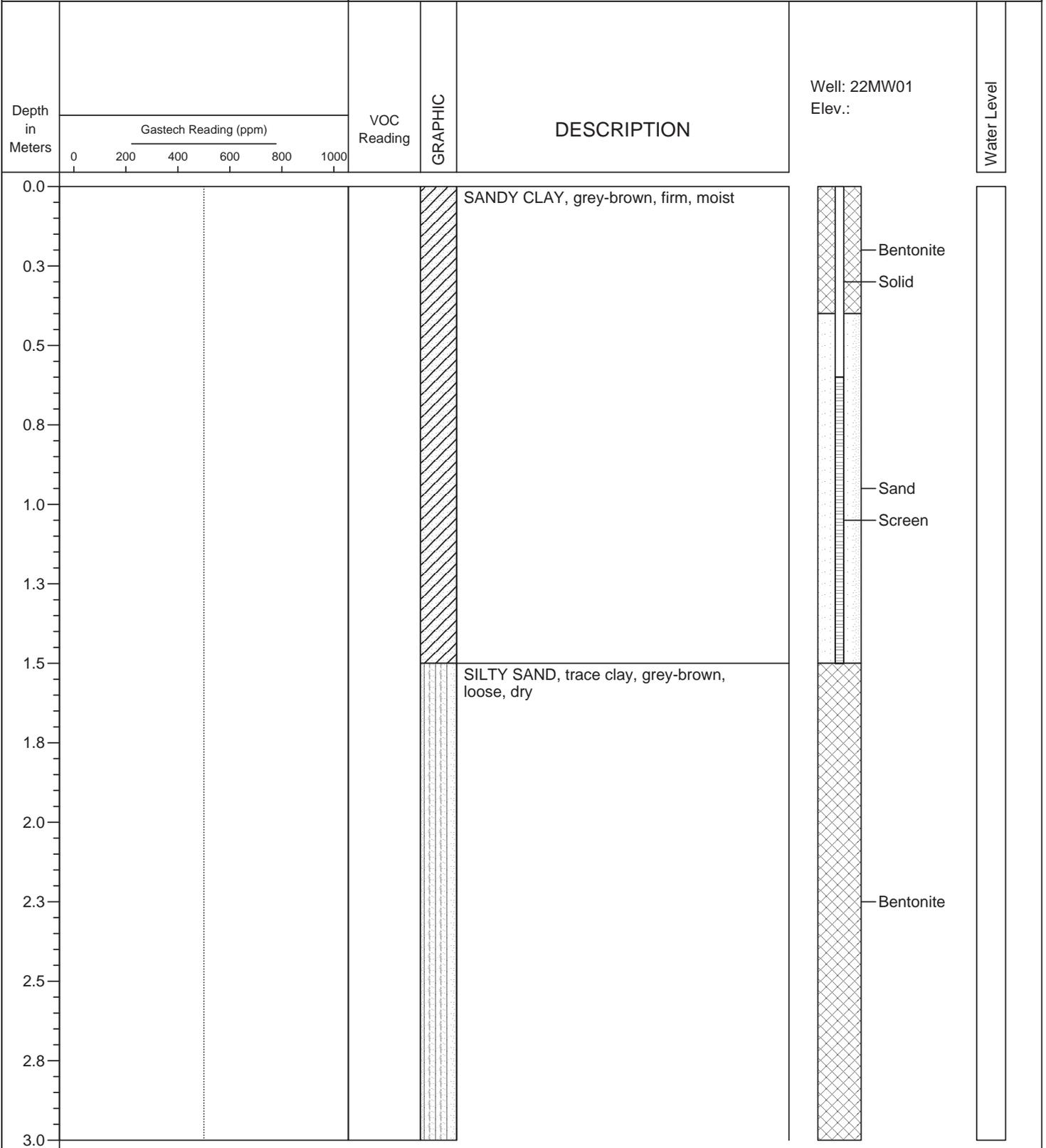


# LOG OF BORING 22BH05

(Page 1 of 1)

Site and Soil Assessment  
 SW-10-31-1-W5M  
 Mountain View County, Alberta  
 Project Number: 2211-43015

Driller: : Evergreen Drilling  
 Drilling Method: : Truck Mounted Auger  
 Drill Date : December 7, 2022  
 Logged By: : Emily Low, P.Eng.



06-05-2023 Z:\Operations\Client Data\43015 Westway Farms (Tom Hadway)\22BH05.bor

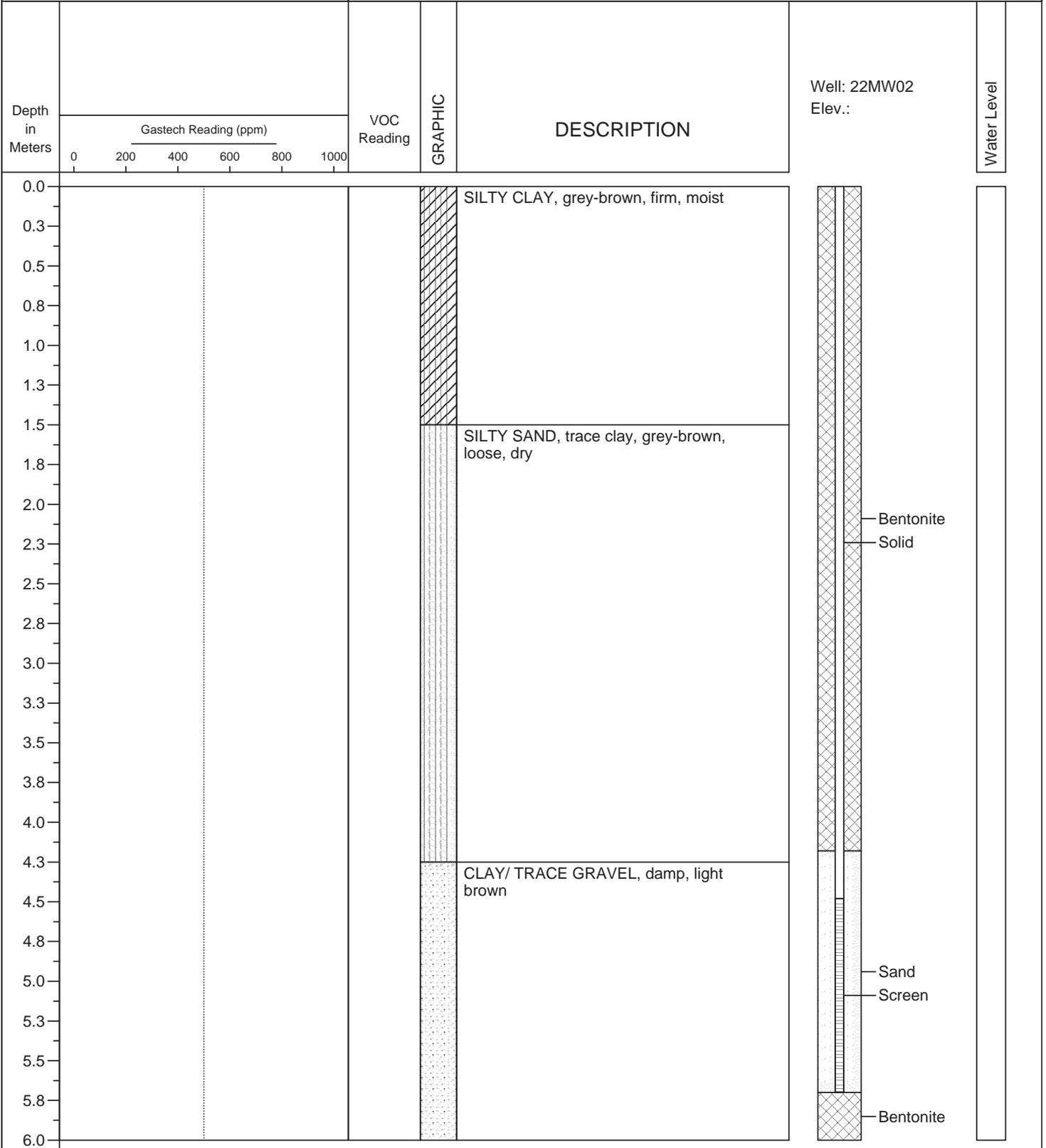


# LOG OF BORING 22BH06

(Page 1 of 1)

Site and Soil Assessment  
 SW-10-31-1-W5M  
 Mountain View County, Alberta  
 Project Number: 2211-43015

Driller: : Evergreen Drilling  
 Drilling Method: : Truck Mounted Auger  
 Drill Date : December 7, 2022  
 Logged By: : Emily Low, P.Eng.



06-05-2023 Z:\Operations\Client Data\43015 Westway Farms (Tom Hadway)\22BH06.bor

**Appendix C**  
**Certificates of Analysis**

CLIENT NAME: ENVIROWEST  
BOX 4248, 5118-50th STREET  
PONOKA, AB T4J1R6  
(403) 783-8229  
ATTENTION TO: SHAWNA LOW  
PROJECT: Hadway  
AGAT WORK ORDER: 23R002758  
SOIL ANALYSIS REVIEWED BY: Jennifer Liu, Analyst  
DATE REPORTED: Mar 16, 2023  
PAGES (INCLUDING COVER): 8  
VERSION\*: 1

Should you require any information regarding this analysis please contact your client services representative at (403) 735-2005

\*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.



## Certificate of Analysis

AGAT WORK ORDER: 23R002758

PROJECT: Hadway

2910 12TH STREET NE  
CALGARY, ALBERTA  
CANADA T2E 7P7  
TEL (403)735-2005  
FAX (403)735-2771  
<http://www.agatlabs.com>

CLIENT NAME: ENVIROWEST

ATTENTION TO: SHAWNA LOW

SAMPLING SITE:

SAMPLED BY:

### Soil Analysis - Atterberg Limits

DATE RECEIVED: 2023-03-02

DATE REPORTED: 2023-03-16

Parameter	Unit	Composite		
		G / S	RDL	4825001
Liquid Limit	%		3	33
Plastic Limit	%		3	15
Plasticity Index	%		3	18

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
 4825001 Plasticity Index is a calculated parameter. The calculated value is the difference between the liquid limit and the plastic limit.  
 Particles larger than 425um are removed prior to analysis by wet sieve analysis.  
 Moisture contents during analysis are reported by oven drying of the sample.  
 Plastic limit is determined by hand-rolling of the sample.  
 A plastic grooving tool is used to groove the sample once placed in the cup of the Casagrande apparatus.  
 Liquid limit determined using one-point method as outlined in ASTM D4318.

Analysis performed at AGAT Calgary (unless marked by \*)

Certified By:





## Certificate of Analysis

AGAT WORK ORDER: 23R002758

PROJECT: Hadway

2910 12TH STREET NE  
CALGARY, ALBERTA  
CANADA T2E 7P7  
TEL (403)735-2005  
FAX (403)735-2771  
<http://www.agatlabs.com>

CLIENT NAME: ENVIROWEST

ATTENTION TO: SHAWNA LOW

SAMPLING SITE:

SAMPLED BY:

### Soil Analysis - Moisture

DATE RECEIVED: 2023-03-02

DATE REPORTED: 2023-03-16

		SAMPLE DESCRIPTION:		Composite
		SAMPLE TYPE:		Borrow
		DATE SAMPLED:		Soil
		DATE SAMPLED:		2023-03-02
Parameter	Unit	G / S	RDL	4825001
% Moisture	%		0.01	18.60

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
Analysis performed at AGAT Calgary (unless marked by \*)

Certified By:



## Quality Assurance

CLIENT NAME: ENVIROWEST  
 PROJECT: Hadway  
 SAMPLING SITE:

AGAT WORK ORDER: 23R002758  
 ATTENTION TO: SHAWNA LOW  
 SAMPLED BY:

Soil Analysis															
RPT Date: Mar 16, 2023			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Soil Analysis - Atterberg Limits**

Liquid Limit	4825001		33	32	3.1%	< 3	100%	80%	120%					
Plastic Limit	4825001		15	15	0.0%	< 3	100%	80%	120%					
Plasticity Index	4825001		18	16	11.8%	< 3	100%	80%	120%					

Comments: Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.

**Soil Analysis - Moisture**

% Moisture	3635	0617	47.1	47.1	0.0%	< 0.01								
------------	------	------	------	------	------	--------	--	--	--	--	--	--	--	--

Comments: Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.

Certified By: 

## Method Summary

CLIENT NAME: ENVIROWEST

AGAT WORK ORDER: 23R002758

PROJECT: Hadway

ATTENTION TO: SHAWNA LOW

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Liquid Limit	SOIL-0655	ASTM D4318	LIQUID LIMIT DEVICE
Plastic Limit	SOIL-0655	ASTM D4318	BALANCE
Plasticity Index	SOIL-0655	ASTM D4318	LIQUID LIMIT DEVICE
% Moisture	SOIL 0230	BAROID	MUD BALANCE





# AGAT Laboratories

## SAMPLE INTEGRITY RECEIPT FORM

### RECEIVING BASICS - Shipping

Company/Consultant: Envirowest Engineering  
 Courier: Jazoo Prepaid  Collect   
 Waybill# \_\_\_\_\_  
 Branch: EDM GP FN FM  VAN LYD FSJ EST SASK Other: \_\_\_\_\_  
 If multiple sites were submitted at once: Yes  No   
 Custody Seal Intact: Yes  No   
 TAT: <24hr 24-48hr 48-72hr Reg Other \_\_\_\_\_  
 Cooler Quantity: 1 Large

### TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes  No   
 Inorganic Tests (Please Circle): Mibi, BOD, Nitrate/Nitrite, Turbidity, Color, Microtox, Ortho PO4, Tedlar Bag, Residual Chlorine, Chlorophyll\*, Chloroamines\*  
 Earliest Expiry: \_\_\_\_\_  
 Hydrocarbons: Earliest Expiry \_\_\_\_\_

### SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES  NO  Precaution Taken: \_\_\_\_\_  
 Legal Samples: Yes  No   
 International Samples: Yes  No   
 Tape Sealed: Yes  No   
 Coolant Used:  Icepack  Bagged Ice  Free Ice  Free Water  None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

### FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) Soil = \_\_\_\_\_ °C    2 (Bottle/Jar) \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_ °C  
 3 (Bottle/Jar) \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_ °C    4 (Bottle/Jar) \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_ °C  
 5 (Bottle/Jar) \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_ °C    6 (Bottle/Jar) \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_ °C  
 7 (Bottle/Jar) \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_ °C    8 (Bottle/Jar) \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_ °C  
 9 (Bottle/Jar) \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_ °C    10 (Bottle/Jar) \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_ °C

(If more than 10 coolers are received use another sheet of paper and attach)

### LOGISTICS USE ONLY

Workorder No: 23 R 002745  
 Samples Damaged: Yes  No  If YES why?  
 No Bubble Wrap  Frozen  Courier   
 Other: \_\_\_\_\_  
 Account Project Manager: \_\_\_\_\_ have they been notified of the above issues: Yes  No   
 Whom spoken to: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 CPM Initial \_\_\_\_\_  
 General Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

\* Subcontracted Analysis (See CPM)

## SAMPLE INTEGRITY RECEIPT FORM – BRANCH RECEIPT

Sending From Branch:

EDM  GP  FN  FM  RD  VAN  LYD  FSJ  EST  SASK  Other: \_\_\_\_\_

93R 002 758

Company/Consultant: ENVIROWEST ENGINEERING

TAT: <24hr  24-48hr  48-72hr  Reg  Other \_\_\_\_\_ Cooler Quantity: 1

**TIME SENSITIVE ISSUES:**

Earliest Date Sampled: \_\_\_\_\_

ALREADY EXCEEDED? YES  NO

Microbiology: Test: \_\_\_\_\_

Expiry: \_\_\_\_\_

Hydrocarbons: Test: \_\_\_\_\_

Expiry: \_\_\_\_\_

Are samples received >5 days after sampling: YES  NO

**(TEMPERATURE MUST BE MAINTAINED IF RECEIVED <10 DEGREES C)**

3 temperatures of samples\* and average of each cooler (taken on jars only): NA (only bags on coolers)

(1) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C (2) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C (3) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C (4) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C

Additional integrity issues (note here and on COC next to the sample ID):

**SAMPLE INTEGRITY ISSUES:**

Legal Samples: YES  NO

Custody Tape Sealed: YES  NO

International Samples: YES  NO

Coolant Used: Icepack  Bagged Ice  Free Ice  Free Water  NONE

Additional Comments: MARCH 2/23 1:25pm

168985

CLIENT NAME: ENVIROWEST  
BOX 4248, 5118-50th STREET  
PONOKA, AB T4J1R6  
(403) 783-8229  
ATTENTION TO: SHAWNA LOW  
PROJECT: 43015  
AGAT WORK ORDER: 23R998313  
SOIL ANALYSIS REVIEWED BY: Max Dou, Report Writer  
DATE REPORTED: Feb 24, 2023  
PAGES (INCLUDING COVER): 8  
VERSION\*: 1

Should you require any information regarding this analysis please contact your client services representative at (403) 735-2005

\*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



## Certificate of Analysis

AGAT WORK ORDER: 23R998313

PROJECT: 43015

2910 12TH STREET NE  
 CALGARY, ALBERTA  
 CANADA T2E 7P7  
 TEL (403)735-2005  
 FAX (403)735-2771  
<http://www.agatlabs.com>

CLIENT NAME: ENVIROWEST

ATTENTION TO: SHAWNA LOW

SAMPLING SITE:

SAMPLED BY:

### Particle Size - Texture

DATE RECEIVED: 2023-02-14

DATE REPORTED: 2023-02-24

SAMPLE DESCRIPTION: Westway

SAMPLE TYPE: Soil

DATE SAMPLED: 2023-02-13

Parameter	Unit	G / S	RDL	4780575
Particle Size Distribution (Sand)	%		2	40
Particle Size Distribution (Silt)	%		2	28
Particle Size Distribution (Clay)	%		2	32
Soil Texture				Clay Loam

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4780575 Soil Texture is a calculated parameter. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

% Silt is a calculated parameter. The calculated value is determined by subtracting the percent sand and clay values from 100 percent.

Analysis performed at AGAT Calgary (unless marked by \*)

Certified By:



## Quality Assurance

CLIENT NAME: ENVIROWEST  
 PROJECT: 43015  
 SAMPLING SITE:

AGAT WORK ORDER: 23R998313  
 ATTENTION TO: SHAWNA LOW  
 SAMPLED BY:

Soil Analysis															
RPT Date: Feb 24, 2023			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Particle Size - Texture												
Particle Size Distribution (Sand)	4776706	4776706	8	7	12.7%	< 2	101%	80%	120%			
Particle Size Distribution (Silt)	4776706	4776706	20	21	5.0%	< 2	88%	80%	120%			
Particle Size Distribution (Clay)	4776706	4776706	71	71	0.1%	< 2	103%	80%	120%			

Comments: Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.

Certified By: 

## Method Summary

CLIENT NAME: ENVIROWEST  
 PROJECT: 43015  
 SAMPLING SITE:

AGAT WORK ORDER: 23R998313  
 ATTENTION TO: SHAWNA LOW  
 SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Particle Size Distribution (Sand)	SOIL 0520; SOIL 0110; SOIL 0120	JONES 2001	HYDROMETER
Particle Size Distribution (Silt)	SOIL 0520; SOIL 0110; SOIL 0120	JONES 2001	HYDROMETER
Particle Size Distribution (Clay)	SOIL 0520; SOIL 0110; SOIL 0120	JONES 2001	HYDROMETER





## SAMPLE INTEGRITY RECEIPT FORM – BRANCH RECEIPT

Sending From Branch:

EDM  GP  FN  FM  RD  VAN  LYD  FSJ  EST  SASK  Other: \_\_\_\_\_

Company/Consultant: ENVIROWEST ENGINEERING

TAT: <24hr  24-48hr  48-72hr  Reg  Other \_\_\_\_\_ Cooler Quantity: 1

### TIME SENSITIVE ISSUES:

Earliest Date Sampled: \_\_\_\_\_

ALREADY EXCEEDED? YES  NO

Microbiology Test: \_\_\_\_\_

Expiry: \_\_\_\_\_

Hydrocarbons Test: \_\_\_\_\_

Expiry: \_\_\_\_\_

Are samples received >5 days after sampling: YES  NO

### (TEMPERATURE MUST BE MAINTAINED IF RECEIVED <10 DEGREES C)

3 temperatures of samples\* and average of each cooler (taken on jars only): NA (only bags on coolers)

(1) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C (2) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C (3) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C (4) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C

Additional integrity issues (note here and on COC next to the sample ID):  
\_\_\_\_\_

### SAMPLE INTEGRITY ISSUES:

Legal Samples: YES  NO

Custody Tape Sealed: YES  NO

International Samples: YES  NO

Coolant Used: Icepack  Bagged Ice  Free Ice  Free Water  NONE

Additional Comments: FEB 13/23 @ 3:40 PM



# JAZOO EXPRESS COURIER

www.jazooCourier.com

### CLIENT USE ONLY

Contact Name:	April Shannon	Contact Location:	AGAT RED DEER	Billed To:	AGAT
Date:	FEB 13/23	Delivery From:	#12 - 7471 Edgar Industrial Bend		
		Delivery To:	2910 - 12 Street NE, Calgary, AB T2E 7P7		
Total # Items:	4	Item Description:	1 X SM-COOLER - CITY OF RED DEER - WTP		
			1 X SM-COOLER - ENVIROWEST ENGINEERING		
			1 X LRG-COOLER - NOVA CHEMICALS.		
			1 MED. COOLER		
		Job/PO/Reference #:			

Authorized Shipper Signature:

### DRIVER USE ONLY

U Driver Name:	<i>Jsh</i>	P/U Time:	12 am	D/O Time:	6.45 am
Items J:	4		pm		pm
Overweight		TDG			

Total # Items Dropped Off:	4	D/O Driver Name:	<i>Jsh</i>
Authorized Receiver Signature:			

### HOTSHOT DETAILS

Or Total Charge (\$):	
-----------------------	--

### OFFICE USE ONLY

Invoiced By:	
--------------	--

To schedule a pickup please contact dispatch at the city nearest you:

- Calgary 403-660-5504
- Edmonton 780-903-3628
- Fort McMurray 587-645-6364
- Grande Prairie 587-297-8406

THANK YOU FOR SUPPORTING LOCAL AND CHOOSING JAZOO EXPRESS COURIER.

Document ID: SR-50-9508.004  
 Revised: November 7, 2019



# AGAT Laboratories

## SAMPLE INTEGRITY RECEIPT FORM

### RECEIVING BASICS - Shipping

Company/Consultant: Environmental Engineering

Courier: JAZZO Prepaid Collect

Waybill# \_\_\_\_\_

Branch: EDM GP FN FM RD VAN LYD FSJ EST Other: \_\_\_\_\_

If multiple sites were submitted at once: Yes No

Custody Seal Intact: Yes No NA

TAT: <24hr 24-48hr 48-72hr Reg Other \_\_\_\_\_

Cooler Quantity: 1

### TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes No

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll\* , Chloroamines\*

Earliest Expiry: \_\_\_\_\_

Hydrocarbons: Earliest Expiry \_\_\_\_\_

### SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES NO Precaution Taken: \_\_\_\_\_

Legal Samples: Yes No

International Samples: Yes No

Tape Sealed: Yes No

Coolant Used: Icepack Bagged Ice Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

### FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) \_\_\_+\_\_\_+\_\_\_=\_\_\_°C 2(Bottle/Jar)\_\_\_+\_\_\_+\_\_\_=\_\_\_°C

3 (Bottle/Jar)\_\_\_+\_\_\_+\_\_\_=\_\_\_°C 4 (Bottle/Jar)\_\_\_+\_\_\_+\_\_\_=\_\_\_°C

5 (Bottle/Jar)\_\_\_+\_\_\_+\_\_\_=\_\_\_°C 6 (Bottle/Jar)\_\_\_+\_\_\_+\_\_\_=\_\_\_°C

7 (Bottle/Jar)\_\_\_+\_\_\_+\_\_\_=\_\_\_°C 8 (Bottle/Jar)\_\_\_+\_\_\_+\_\_\_=\_\_\_°C

9 (Bottle/Jar)\_\_\_+\_\_\_+\_\_\_=\_\_\_°C 10 (Bottle/Jar)\_\_\_+\_\_\_+\_\_\_=\_\_\_°C

(If more than 10 coolers are received use another sheet of paper and attach)

### LOGISTICS USE ONLY

Workorder No: 23R998313

Samples Damaged: Yes No If YES why?

No Bubble Wrap Frozen Courier

Other: \_\_\_\_\_

Account Project Manager: \_\_\_\_\_ have they been notified of the above issues: Yes No

Whom spoken to: \_\_\_\_\_ Date/Time: \_\_\_\_\_

CPM Initial \_\_\_\_\_

General Comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\* Subcontracted Analysis (See CPM)

**CLIENT NAME: ENVIROWEST**  
**BOX 4248, 5118-50th STREET**  
**PONOKA, AB T4J1R6**  
**(403) 783-8229**

**ATTENTION TO: Emily Low**  
**PROJECT: 43015**  
**AGAT WORK ORDER: 23R998927**

**SOIL ANALYSIS REVIEWED BY: Thomas Yoo, Report Writer**  
**DATE REPORTED: Feb 28, 2023**  
**PAGES (INCLUDING COVER): 8**  
**VERSION\*: 1**

Should you require any information regarding this analysis please contact your client services representative at (403) 735-2005

\*Notes

*Disclaimer:*

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
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- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*



# Certificate of Analysis

AGAT WORK ORDER: 23R998927

PROJECT: 43015

2910 12TH STREET NE  
 CALGARY, ALBERTA  
 CANADA T2E 7P7  
 TEL (403)735-2005  
 FAX (403)735-2771  
<http://www.agatlabs.com>

CLIENT NAME: ENVIROWEST

ATTENTION TO: Emily Low

SAMPLING SITE:

SAMPLED BY:

Particle Size - Texture						
DATE RECEIVED: 2023-02-17				DATE REPORTED: 2023-02-28		
		SAMPLE DESCRIPTION:		22BH03	22BH05-01	22BH05-02
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2022-12-09	2022-12-09	2022-12-09
Parameter	Unit	G / S	RDL	4787623	4787624	4787625
Particle Size Distribution (Sand)	%		2	34	40	62
Particle Size Distribution (Silt)	%		2	24	26	22
Particle Size Distribution (Clay)	%		2	43	35	17
Soil Texture				Clay	Clay Loam	Sandy Loam

**Comments:** RDL - Reported Detection Limit; G / S - Guideline / Standard

**4787623-4787625** Soil Texture is a calculated parameter. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.  
 % Silt is a calculated parameter. The calculated value is determined by subtracting the percent sand and clay values from 100 percent.

Analysis performed at AGAT Calgary (unless marked by \*)

Certified By:



## Quality Assurance

CLIENT NAME: ENVIROWEST  
 PROJECT: 43015  
 SAMPLING SITE:

AGAT WORK ORDER: 23R998927  
 ATTENTION TO: Emily Low  
 SAMPLED BY:

Soil Analysis															
RPT Date: Feb 28, 2023			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Particle Size - Texture**

Particle Size Distribution (Sand)	4787523		28	28	0.1%	< 2	106%	80%	120%
Particle Size Distribution (Silt)	4787523		32	32	0.1%	< 2	84%	80%	120%
Particle Size Distribution (Clay)	4787523		41	41	0.0%	< 2	104%	80%	120%

Comments: Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.

Certified By: 

## Method Summary

CLIENT NAME: ENVIROWEST

PROJECT: 43015

SAMPLING SITE:

AGAT WORK ORDER: 23R998927

ATTENTION TO: Emily Low

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
<b>Soil Analysis</b>			
Particle Size Distribution (Sand)	SOIL 0520; SOIL 0110; SOIL 0120	JONES 2001	HYDROMETER
Particle Size Distribution (Silt)	SOIL 0520; SOIL 0110; SOIL 0120	JONES 2001	HYDROMETER
Particle Size Distribution (Clay)	SOIL 0520; SOIL 0110; SOIL 0120	JONES 2001	HYDROMETER



# AGAT

## Laboratories

17-FEB-23 AM 8:29

2910 12 Street NE

Calgary, Alberta T2E 7P7

P: 403-735-2005 • F: 403-735-2771

webearth.agatlabs.com

### Laboratory Use Only

Arrival Temperature: \_\_\_\_\_

Cooler Quantity: Small

Custody Seal Intact:  Yes  No  N/A

AGAT Job Number: 23R988927

## Chain of Custody Record

Emergency Support Services Hotline **1-855-AGAT 245 (1-855-242-8245)**

### Report Information

Company: EnviroWest Engineering

Contact: E. Low / L. Pedy

Address: \_\_\_\_\_

Phone: 403-783-8229

### Project Information

Client Project #: 43015

Site Location: \_\_\_\_\_

Sample By: \_\_\_\_\_

AGAT Quote #: \_\_\_\_\_

If a quotation number is not provided, client will be billed at standard rates. See terms and conditions of quote for full details.

### Invoice To

Same as Report to

Company: \_\_\_\_\_

Contact: \_\_\_\_\_

Email: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

PO/CC #: \_\_\_\_\_

### Report Information

1. Name: Emily Low

Email: elaw@envirowestengineering.ca

2. Name: Leah Pedy

Email: lpedy@envirowestengineering.ca

3. Name: \_\_\_\_\_

Email: \_\_\_\_\_

### Requirements (Selection may impact detection limits)

#### CCME

- Agricultural
- Industrial
- Residential/Park
- Commercial
- FWAL

#### AB Tier 1

- Agricultural
- Industrial
- Residential/Park
- Commercial
- Natural Area

#### Alberta Surface Water

- Chronic
- Acute
- SK Notice of Site Cond.
- Drinking Water
- Other:

Is this part of the Alberta SRP program?  YES  NO (if yes, please fill below)

Application Number: \_\_\_\_\_

Grant Amount: \_\_\_\_\_

Well/Facility/Location ID: \_\_\_\_\_

UWI: \_\_\_\_\_

### Turnaround Time Required (TAT)

Regular TAT

5 to 7 Business Days

<24 Hours (200%)

Next Business Day (100%)

Rush TAT

2 Business Days (50%)

3 Business Days (25%)

Date Required: \_\_\_\_\_

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	DEPTH	DATE/TIME SAMPLED	SAMPLE MATRIX	COMMENTS	# OF CONTAINERS			Field Filtered (Y/N)	Preserved (Y/N)	Detailed Salinity: <input type="checkbox"/> AB <input type="checkbox"/> SK <input type="checkbox"/> BC <input type="checkbox"/> D50	<input type="checkbox"/> CCME/AB : BTEX/F1-F4 <input type="checkbox"/> CCME/AB : BTEX/F1-F2	<input type="checkbox"/> BC: BTEX/APH/EPH <input type="checkbox"/> BC: LEPH/HEPH	SK: BTEX/TVH/C11-C22, C23-O60	Soil Metals: <input type="checkbox"/> HWS-B <input type="checkbox"/> SP-B <input type="checkbox"/> Hg <input type="checkbox"/> Cr <sup>6+</sup>	Water Metals: <input type="checkbox"/> Dissolved <input type="checkbox"/> Total <input type="checkbox"/> Hg <input type="checkbox"/> Cr <sup>6+</sup>	Routine Water Chemistry	Landfill: <input type="checkbox"/> AB Class 2 <input type="checkbox"/> BC <input type="checkbox"/> SK	Coliforms: Total <input type="checkbox"/> Fecal <input type="checkbox"/> E.coli	Particle Size: <input type="checkbox"/> Sieve (75µm) <input checked="" type="checkbox"/> Texture	Hold For 30 Days No Analysis (Additional Fee)	Long Term Storage - 6 Months	Long Term Storage - 1 Year	Hazardous (Y/N)	
						VIALS / JARS	BAGS	BOTTLES																	
1	22B1103		Dec 9/22	Soil																					
2	22B1105-01		"	"																					
3	22B1105-02		"	"																					
4																									
5																									
6																									
7																									
8																									
9																									
10																									

Samples Relinquished By (Print Name and Sign): <u>Leah Pedy</u>	Date/Time: <u>Feb 16 1:38pm</u>	Samples Received By (Print Name and Sign): <u>APRIL PEREE</u>	Date/Time: <u>FEB 16/23</u>	Page ____ of ____
Samples Relinquished By (Print Name and Sign): _____	Date/Time: _____	Samples Received By (Print Name and Sign): <u>Leah Pedy</u>	Date/Time: <u>2/17/23</u>	Pink Copy - Client
Samples Relinquished By (Print Name and Sign): _____	Date/Time: _____	Samples Received By (Print Name and Sign): _____	Date/Time: _____	Yellow Copy - AGAT
				White Copy - AGAT
				Nº: AB <b>168603</b>



# AGAT Laboratories

## SAMPLE INTEGRITY RECEIPT FORM

**RECEIVING BASICS - Shipping**

Company/Consultant: Enviro west

Courier: Juzos Prepaid Collect

Waybill# \_\_\_\_\_

Branch: EDM GP FN FM RD VAN LYD FSJ EST SASK Other: \_\_\_\_\_

If multiple sites were submitted at once: Yes No

Custody Seal Intact: Yes No N/A

TAT: <24hr 24-48hr 48-72hr Reg Other \_\_\_\_\_

Cooler Quantity: 1 small

**TIME SENSITIVE ISSUES - Shipping**

ALREADY EXCEEDED HOLD TIME? Yes No

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Color , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll\* , Chloroamines\*

Earliest Expiry: \_\_\_\_\_

Hydrocarbons: Earliest Expiry \_\_\_\_\_

**SAMPLE INTEGRITY - Shipping**

Hazardous Samples: YES NO Precaution Taken: \_\_\_\_\_

Legal Samples: Yes No

International Samples: Yes No

Tape Sealed: Yes No

Coolant Used: icepack Bagged Ice Free Ice Free Water None

**Temperature** (Bottles/Jars only) (N/A) if only Soil Bags Received

**FROZEN** (Please Circle if samples received Frozen)

1 (Bottle/Jar) Soil + \_\_\_ = \_\_\_ °C    2 (Bottle/Jar) \_\_\_ + \_\_\_ = \_\_\_ °C

3 (Bottle/Jar) \_\_\_ + \_\_\_ = \_\_\_ °C    4 (Bottle/Jar) \_\_\_ + \_\_\_ = \_\_\_ °C

5 (Bottle/Jar) \_\_\_ + \_\_\_ = \_\_\_ °C    6 (Bottle/Jar) \_\_\_ + \_\_\_ = \_\_\_ °C

7 (Bottle/Jar) \_\_\_ + \_\_\_ = \_\_\_ °C    8 (Bottle/Jar) \_\_\_ + \_\_\_ = \_\_\_ °C

9 (Bottle/Jar) \_\_\_ + \_\_\_ = \_\_\_ °C    10 (Bottle/Jar) \_\_\_ + \_\_\_ = \_\_\_ °C

(If more than 10 coolers are received use another sheet of paper and attach)

**LOGISTICS USE ONLY**

Workorder No: 23R 998927

Samples Damaged: Yes No If YES why?

No Bubble Wrap Frozen Courier

Other: \_\_\_\_\_

Account Project Manager: \_\_\_\_\_ have they been notified of the above issues: Yes No

Whom spoken to: \_\_\_\_\_ Date/Time: \_\_\_\_\_

CPM Initial \_\_\_\_\_

General Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\* Subcontracted Analysis (See CPM)

## SAMPLE INTEGRITY RECEIPT FORM – BRANCH RECEIPT

Sending From Branch:

EDM  GP  FN  FM  RD  VAN  LYD  FSJ  EST  SASK  Other: \_\_\_\_\_

Company/Consultant: ENVIRONMENTAL ENGINEERING

TAT: <24hr  24-48hr  48-72hr  Reg  Other \_\_\_\_\_ Cooler Quantity: 1

**TIME SENSITIVE ISSUES:**

Earliest Date Sampled: \_\_\_\_\_

ALREADY EXCEEDED? YES  NO

Microbiology: Test: \_\_\_\_\_

Expiry: \_\_\_\_\_

Hydrocarbons: Test: \_\_\_\_\_

Expiry: \_\_\_\_\_

Are samples received >5 days after sampling: YES  NO

**(TEMPERATURE MUST BE MAINTAINED IF RECEIVED <10 DEGREES C)**

3 temperatures of samples\* and average of each cooler (taken on jars only): NA (only bags on coolers)

(1) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C (2) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C (3) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C (4) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C

Additional integrity issues (note here and on COC next to the sample ID): \_\_\_\_\_

**SAMPLE INTEGRITY ISSUES:**

Legal Samples: YES  NO

Custody Tape Sealed: YES  NO

International Samples: YES  NO

Coolant Used: Icepack  Bagged Ice  Free Ice  Free Water  NONE

Additional Comments: \_\_\_\_\_



# JAZOO EXPRESS COURIER

www.jazooexpresscourier.com

### CLIENT USE ONLY

Contact Name:	April / Shannon	Contact Location:	AGAT RED DEER	Billed To:	AGAT
Date:	FEB 10 / 23	Delivery From:	#12 - 7471 Edgar Industrial Bend		
		Delivery To:	2910 - 12 Street NE, Calgary, AB T2E 7P7		
Total # Items:	1	Item Description:	1 X SM-COOLER - ENVIRONMENTAL ENGINE		
		envelope, sm/med/lg box, cooler, etc.			
		Job/PO/Reference #:			
Authorized Shipper Signature:					

### DRIVER USE ONLY

P/U Driver Name:		P/U Time:		am	D/O Time:	6:15	am
# Items P/U:	1		11:55	pm			pm
Overweight		TDG					

Total # Items Dropped Off:	1	D/O Driver Name:	
Authorized Receiver Signature:			

### HOTSHOT DETAILS

Total Km:		Or Total Charge (\$):	
-----------	--	-----------------------	--

### OFFICE USE ONLY

Verified By:		Invoiced By:	
--------------	--	--------------	--

To schedule a pickup please contact dispatch at the city nearest you:

Calgary 403-660-5504  
Edmonton 780-903-3628

Fort McMurray 587-645-6364  
Grande Prairie 587-297-8406

THANK YOU FOR SUPPORTING LOCAL AND CHOOSING JAZOO EXPRESS COURIER.

Document ID: SR-50-9508.004  
Date Revised: November 7, 2019

## Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter ASTM D 5084 - Method A

Client: Envirowest	Client Project ID.: NA	AGAT ID: 23-0156	Work Order: 23R002758
Project: Hadway	Client Sample ID: NA	Sampling Date: NA	By: Client
Location: NA	Sample Location: NA	Testing Date: 3/13/2023	By: GH
Project ID: NA	Report Revision No.: 4/10/2023	Reporting Date: 4/10/2023	
ATTN: Shawna Low			

Soil Description: Silty Clay

Sample Source NA

Specimen Type: Remolded

### Remolding information

Optimum MC %	MAXDD (g/cm3)	Remolding %	Target Density
13.3	1.860	99%	1.841

### Specimen information

	Diameter (mm)	Length (mm)	MC (%)	Mass (g)	Dry mass (g)	Est. Saturation
Pre - Test	64.8	86.0	12.7	593.5	526	78
Post - Test	66.3	84.3	16.9	614.6		96

### Test Information

Tail Pressure (kPa)	Head Pressure (kPa)	Cell Pressure (kPa)	Effective Stress (kPa)	Hydraulic Gradient
520.0	590.0	660.0	140.0	20.3

### Test Results

Interval #	Time (Sec)	Temp. (°C)	Rt	Δ V in (mL)	Δ V Out (mL)	K20 (cm/sec)
1	59,040	22	0.95	1.49	1.51	8.44E-09
2	14,940	22	0.95	0.38	0.38	8.42E-09
3	13,800	22	0.95	0.33	0.32	7.86E-09
4	56,880	22	0.95	1.33	1.38	8.14E-09

Average Hydraulic Conductivity (K20) = 8.22E-09 cm/sec

8.22E-11 m/sec

Ghareib H.  
Reviewer

4/10/2023  
Review Date

Signature

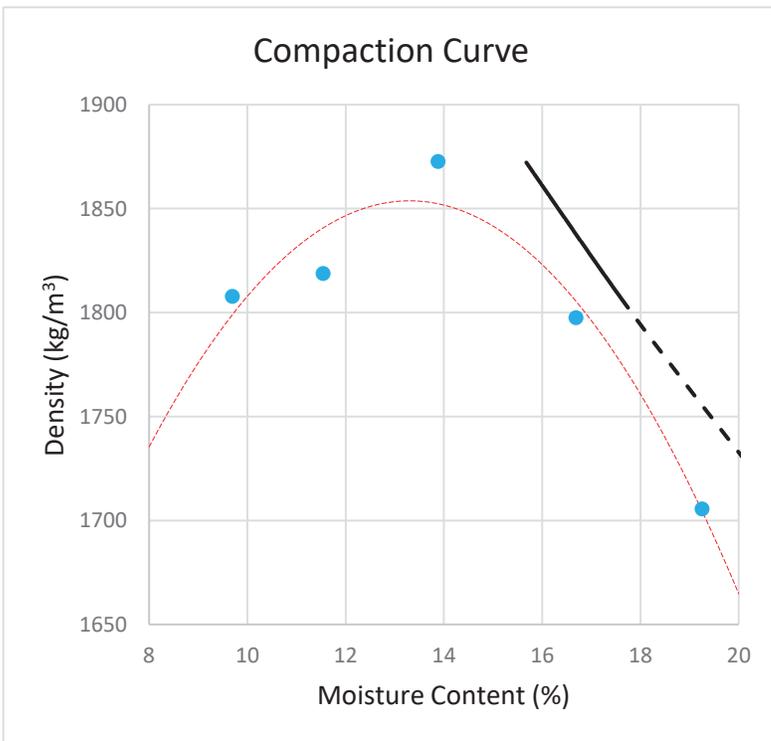
## Proctor Test Report

**Project:** Hadway  
**Location:** NA  
**Project ID:** NA  
**Client:** Envirowest  
**ATTN:** Shawna Low

**AGAT Sample ID:** 23-0156 (23R002758)  
**Client Sample ID:** NA  
**Sample Depth:** NA  
**Sample Location:** NA  
**Sampling Date:** NA  
**Sampled By:** Client

**Sample Description:** Silty Clay  
**Sample Preparation:** Air Dry  
**Number of Test Points:** 5  
**Test Date:** 8-Mar-23

**Test:** Standard Effort (ASTM D698)  
**Rammer Type:** Mechanical  
**Test Method:** A - 4" Mold  
**Tested Soil Passing:** 4.75 mm    **Override:** 3 %  
**Tested By:** Ghareib Harran    **Reviewed By:** Ghareib Harran



### Test Results

Moisture Content (%)	Wet Density (kg/m³)	Dry Density (kg/m³)	Plotted (Y/N)
7.6	1950		N
9.7	1983	1808	Y
11.5	2029	1819	Y
13.9	2133	1873	Y
16.7	2098	1798	Y
19.3	2034	1706	Y

### Summary of Results

Maximum Dry Density: 1854 kg/m³  
 Optimum Water Content: 13.3 %

### Field Oversize Correction

Correction Factor (%)	Corrected OMC (%)	Corrected MDD (%)
5	12.7	1882
10	12.1	1911
15	11.5	1941
20	10.9	1972
25	10.4	2004
30	9.8	2037

### Notes:

Specific gravity of soil (assumed)    2.65 cc/g  
 Specific gravity of rock (assumed)    2.65 cc/g  
 Rock % is based on sieve size    4.75 mm

Ghareib Harran  
**Reviewer**

10-Mar-23  
**Review Date**

  
**Signature**

Data Set: Z:\Operations\Client Data\43015 Westway Farms (Tom Hadway)\SlugTest.aqt  
 Date: 06/02/23  
 Time: 14:20:44

PROJECT INFORMATION

Company: Envirowest Engineering  
 Client: Westway Farms Ltd.  
 Project: 2211-43015  
 Test Date: February 9, 2023  
 Test Well: 22MW01

AQUIFER DATA

Saturated Thickness: 1.46 m  
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: New Well

X Location: 0. m  
 Y Location: 0. m

Initial Displacement: 1.46 m  
 Static Water Column Height: 0.1 m  
 Casing Radius: 0.0255 m  
 Well Radius: 0.075 m  
 Well Skin Radius: 0.075 m  
 Screen Length: 0.95 m  
 Total Well Penetration Depth: 1.46 m

No. of Observations: 25

Observation Data			
Time (min)	Displacement (m)	Time (min)	Displacement (m)
0.	1.12	6.5	1.12
0.5	1.12	7.	1.12
1.	1.12	7.5	1.12
1.5	1.12	8.	1.12
2.	1.12	8.5	1.12
2.5	1.12	9.	1.12
3.	1.12	9.5	1.12
3.5	1.12	10.	1.12
4.	1.12	15.	1.12
4.5	1.12	20.	1.12
5.	1.12	25.	1.12
5.5	1.12	30.	1.12
6.	1.12		

SOLUTION

Slug Test  
 Aquifer Model: Unconfined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 2.076

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	1.671E-7	cm/sec
y0	1.122	m

$T = K \cdot b = 2.439E-5 \text{ cm}^2/\text{sec}$



March 8, 2024

Westway Farms Ltd.  
Delivered via Email: Tom Hadway, [REDACTED]

Cc: NRCB, Lynn Stone, lynn.stone@nrcb.ca

**Re: Borrow Material Assessment  
SW-10-031-01-W5M  
Mountain View County, Alberta**

Dear Tom Hadway,

Envirowest Engineering (Envirowest) was retained to conduct an analysis on borrow material collected for a potential compacted liner for the proposed construction of a catch basin. The analysis was completed following a Site and Soil Assessment (Envirowest, August 2023). The proposed operation, herein referred to as “the Site,” is located on SW-10-031-01-W5M in Mountain View County, Alberta.

The work has been completed in accordance with the standards and regulations associated with the amended Agricultural Operation Practices Act (GOA, 2020) and associated Standards and Administration Regulation (GOA, 2017) which govern all new and modified confined feeding operations.

**Assessment Results**

The soil samples were provided to Envirowest by Mr. Hadway and submitted to AGAT Laboratories for analysis. Envirowest reviewed the results, which are tabulated below. Analytical reports are attached.

**Table 1: Soil Properties Results**

Parameter	Composite
Sample Depth (mbgs)	0- 2.0
Particle Size (% sand)	42
Particle Size (% silt)	26
Particle Size (% clay)	32
Texture Class	Clay Loam

The soils tested from the proposed borrow area were identified as clay loam, the same texture class as the original material tested for compacted clay liner properties. The borrow area is south of the cow calf pens. This area is within the operating quarter section. Based on the consistency of the strata found during the original assessment, this area was also found to be of the same subsoil strata. The material was collected between ground surface and 2.0 meters.

## **Conclusions**

The following conclusions are based on the discussed scope of the construction at the time of this report. The composite soils were determined to be consistent with the original material analyzed for a compacted clay liner and are therefore suitable to be used as a compacted clay liner for the proposed catch basin. All construction and design recommendations and considerations from the previous report (Envirowest, August 2023) should be adhered to.

## Closure

Envirowest Engineering is pleased to submit the report to Lynn Stone of the NRCB and Tom Hadway of Westway Farms. The information and conclusions contained in this report are for their sole use. No other party is to rely upon the information contained within the report without the express written authorization of Envirowest Engineering.

Envirowest Engineering is not responsible for any damages that may be suffered as the result of any unauthorized use of, or reliance on, this report. Envirowest Engineering has performed the work and made the findings and conclusions set out in the report in a manner consistent with the level of care and skill normally exercised by members of the environmental engineer profession practicing under similar conditions at the time the work was performed. Envirowest Engineering accepts no responsibility for any deficiency, misstatement or inaccuracy in this report resulting from misinformation from any individuals or parties that provided information as part of this report.

We trust that this report meets your present needs. Please feel free to contact the undersigned with any questions or should you require additional information.

Respectfully submitted,

Emily J. Low, P.Eng  
Envirowest Engineering



2206165 Alberta Ltd. o/a Envirowest Engineering  
Association of Professional Engineers and Geoscientists of Alberta  
Permit to Practice No. P14810

Attachments: Analytical Reports

**CLIENT NAME: ENVIROWEST**  
**BOX 4248, 5118-50th STREET**  
**PONOKA, AB T4J1R6**  
**(403) 783-8229**

**ATTENTION TO: Emily Low**  
**PROJECT: Hadway**  
**AGAT WORK ORDER: 24R117589**

**SOIL ANALYSIS REVIEWED BY: Max Dou, Report Writer**  
**DATE REPORTED: Feb 09, 2024**  
**PAGES (INCLUDING COVER): 7**  
**VERSION\*: 1**

Should you require any information regarding this analysis please contact your client services representative at (403) 735-2005

\*Notes

**Disclaimer:**

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
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- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*
- *For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.*



## Certificate of Analysis

AGAT WORK ORDER: 24R117589

PROJECT: Hadway

2910 12TH STREET NE  
 CALGARY, ALBERTA  
 CANADA T2E 7P7  
 TEL (403)735-2005  
 FAX (403)735-2771  
<http://www.agatlabs.com>

CLIENT NAME: ENVIROWEST

ATTENTION TO: Emily Low

SAMPLING SITE:

SAMPLED BY: E Low

### Particle Size - Texture

DATE RECEIVED: 2024-02-03

DATE REPORTED: 2024-02-08

SAMPLE DESCRIPTION: SSO1

SAMPLE TYPE: Soil

DATE SAMPLED:

5625237

Parameter	Unit	G / S	RDL	5625237
Particle Size Distribution (Sand)	%		2	42
Particle Size Distribution (Silt)	%		2	26
Particle Size Distribution (Clay)	%		2	32
Soil Texture				Clay Loam

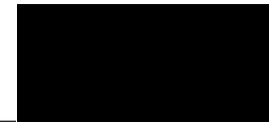
Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5625237 Soil Texture is a calculated parameter. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

% Silt is a calculated parameter. The calculated value is determined by subtracting the percent sand and clay values from 100 percent.

Analysis performed at AGAT Calgary (unless marked by \*)

Certified By:



## Quality Assurance

CLIENT NAME: ENVIROWEST  
 PROJECT: Hadway  
 SAMPLING SITE:

AGAT WORK ORDER: 24R117589  
 ATTENTION TO: Emily Low  
 SAMPLED BY: E Low

Soil Analysis															
RPT Date:			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Particle Size - Texture**

Particle Size Distribution (Sand)	5625237	5625237	42	43	2.3%	< 2	114%	80%	120%
Particle Size Distribution (Silt)	5625237	5625237	26	26	0.0%	< 2	91%	80%	120%
Particle Size Distribution (Clay)	5625237	5625237	32	31	3.2%	< 2	91%	80%	120%

Comments: Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.

Certified By: [REDACTED]

## Method Summary

CLIENT NAME: ENVIROWEST

PROJECT: Hadway

SAMPLING SITE:

AGAT WORK ORDER: 24R117589

ATTENTION TO: Emily Low

SAMPLED BY: E Low

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
<b>Soil Analysis</b>			
Particle Size Distribution (Sand)	SOIL 0520; SOIL 0110; SOIL 0120	JONES 2001	HYDROMETER
Particle Size Distribution (Silt)	SOIL 0520; SOIL 0110; SOIL 0120	JONES 2001	HYDROMETER
Particle Size Distribution (Clay)	SOIL 0520; SOIL 0110; SOIL 0120	JONES 2001	HYDROMETER





**RECEIVING BASICS - Shipping**

Company/Consultant: Environwest

Courier: 10200 Prepaid Collect

Waybill# \_\_\_\_\_

Branch: EDM GP FN FM RD VAN LYD FSJ EST SASK Other: \_\_\_\_\_

If multiple sites were submitted at once: Yes No

Custody Seal Intact: Yes No NA

TAT: <24hr 24-48hr 48-72hr Reg Other \_\_\_\_\_

Cooler Quantity: 1 Soil bag

**TIME SENSITIVE ISSUES - Shipping**

ALREADY EXCEEDED HOLD TIME? Yes No

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Color , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll\* , Chloroamines\*

Earliest Expiry: \_\_\_\_\_

Hydrocarbons: Earliest Expiry \_\_\_\_\_

**SAMPLE INTEGRITY - Shipping**

Hazardous Samples: YES NO Precaution Taken: \_\_\_\_\_

Legal Samples: Yes No

International Samples: Yes No

Tape Sealed: Yes No

Coolant Used: Icepack Bagged Ice Free Ice Free Water None

**Temperature** (Bottles/Jars only) N/A if only Soil Bags Received

**FROZEN** (Please Circle if samples received Frozen)

1 (Bottle/Jar) \_\_\_+\_\_\_+\_\_\_ = MIA °C    2 (Bottle/Jar) \_\_\_+\_\_\_+\_\_\_ = \_\_\_ °C

3 (Bottle/Jar) \_\_\_+\_\_\_+\_\_\_ = \_\_\_ °C    4 (Bottle/Jar) \_\_\_+\_\_\_+\_\_\_ = \_\_\_ °C

5 (Bottle/Jar) \_\_\_+\_\_\_+\_\_\_ = \_\_\_ °C    6 (Bottle/Jar) \_\_\_+\_\_\_+\_\_\_ = \_\_\_ °C

7 (Bottle/Jar) \_\_\_+\_\_\_+\_\_\_ = \_\_\_ °C    8 (Bottle/Jar) \_\_\_+\_\_\_+\_\_\_ = \_\_\_ °C

9 (Bottle/Jar) \_\_\_+\_\_\_+\_\_\_ = \_\_\_ °C    10 (Bottle/Jar) \_\_\_+\_\_\_+\_\_\_ = \_\_\_ °C

(If more than 10 coolers are received use another sheet of paper and attach)

**LOGISTICS USE ONLY**

Workorder No: 24R117589

Samples Damaged: Yes No If YES why?

No Bubble Wrap Frozen Courier

Other: \_\_\_\_\_

Account Project Manager: \_\_\_\_\_ have they been notified of the above issues: Yes No

Whom spoken to: \_\_\_\_\_ Date/Time: \_\_\_\_\_

CPM Initial \_\_\_\_\_

General Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\* Subcontracted Analysis (See CPM)



### CLIENT USE ONLY

Contact Name:	melissa	Contact Location:	AGAT RED DEER	Billed to:	AGAT
Date:	Feb 2/24	Delivery From:	Agat, #12-7471 Edgar Industrial Bend		
		Delivery To:	AGAT, 2910 12TH ST. NE CALGARY		
Total Items:	3+1	Item Description:	Envirowest 3 coolers		
		envelope, sm/med/lg box, cooler, etc.	1 LG COOLER		
Authorized Shipper Signature:		[Redacted Signature]			

### DRIVER USE ONLY

J Driver Name:	[Signature]	P/U Time:	am	D/O Time:	5-30 am
Items P/U:	4		11-55 pm		pm
Overweight		TDG			

Total # items dropped Off:	4	D/O Driver Name:	[Signature]
Authorized Receiver Signature:			

### HOTSHOT DETAILS

Or Total Charge (\$):	
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### OFFICE USE ONLY

Invoiced By:	
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To request a hot shot please contact dispatch at the city nearest you:

Calgary 403-660-5504

Fort McMurray 587-645-6364

Edmonton 780-903-3628

Grande Prairie 587-297-8406

THANK YOU FOR SUPPORTING LOCAL AND CHOOSING JAZOO EXPRESS COURIER LTD.