Nutrien Ag Solutions™

Date: June 3, 2025

To: Government of Manitoba Environment Approvals

Regarding: Environmental Permit Approval for a plant equipment upgrade

The proposed plant upgrade to Nutrien Ag Solutions Ag Retail (SE 6-3-18) Licence 1611 RRR involves the following:

The plan is for KPIC to move an existing dry fertilizer plant from our Nutrien Ag Solutions Gladstone site to our existing Nutrien Ag Facility in Ninga (SE6-3-18) Licence 1611 RRR. The Gladstone dry plan consists of 7 bins. We would also be moving 2 hopper bins from our other location at Ninga Ag Facility (SW-19-3-18) Licence 3159 to this site as well.

The Nutrien Ag Solutions site SE 6-3-18 Licence 1611 RRR would then include an 8 short ton vertical blender, 12 MT weigh hopper, 9 bins system, leg for receiving, as well as two small buildings – on containing mechanical controls and the other will have a pump for liquid product to be treated on dry fertilizer.

Currently at this site we have a 42X80 chem shed, 1 60 MT Ammonia Vessel – 1979 Trinity (Serial # 112707, and 2 -1000 Gal Fuel Tanks – Northern Steel – Serial #2 163441-3, 16441-4 (1 gas and 1 diesel).

I am including two maps – one is a current map of the location and the other is a new map with the proposed upgrade.

[redacted]

Karlene Zeller
SH&E Admin
Nutrien Ag Solutions (Canada) Inc.
Karlene.zeller@nutrien.com

Environment Act Proposal Form

Manitoba

Name of the development:

Ninga Bulk Material Handling Facility

Type of development per Classes of Development Regulation (Manitoba Regulation 164/88):

Class 1

Legal name of the applicant:

Nutrien Ag Solutions (Canada) Inc.

Mailing address of the applicant: Suite 240, 2725 Broadmoor Blvd

Contact Person: Devon Hillyer

City: Sherwood Park Province: Alberta Postal Code: T8H 2W7

Phone Number: 780-608-6592 Fax: email: Devon.hillyer@nutrien.com

Location of the development: PTH # 3 & PR 346 Ninga, Manitoba

Contact Person: Kevin Nicholson

Street Address: PTH 3 & PR 346

Legal Description: SE 6-3-18W PART EX RD PL 315

City/Town: Ninga Province: Manitoba Postal Code:

Phone Number: 204-534-6806 Fax: email: kevin.nicholson@nutrien.com

Name of proponent contact person for purposes of the environmental assessment:

Kevin Nicholson

Phone: 204-534-6806 Fax:	Mailing address: Box 1240 Killarney, MB R0K 1G0

Email address: kevin.nicholson@nutrien.com

Webpage address: www.nutrienagsolutions.com

Date: August 13.2025	Signature of proponent, or corporate principal of corporate proponent: Devon Hillyer [redacted] Printed name:

PRINT RESET

A complete **Environment Act Proposal (EAP)** consists of the following components:

- ☐ **Cover letter**
- ☐ **Environment Act Proposal Form**
- ☐ **Reports/plans supporting the EAP** (see "Information Bulletin - Environment Act Proposal Report Guidelines" for required information)
- ☐ **Application fee** (Cheque, payable to Minister of Finance, for the appropriate fee)

Per Environment Act Fees Regulation (Manitoba Regulation 168/96):

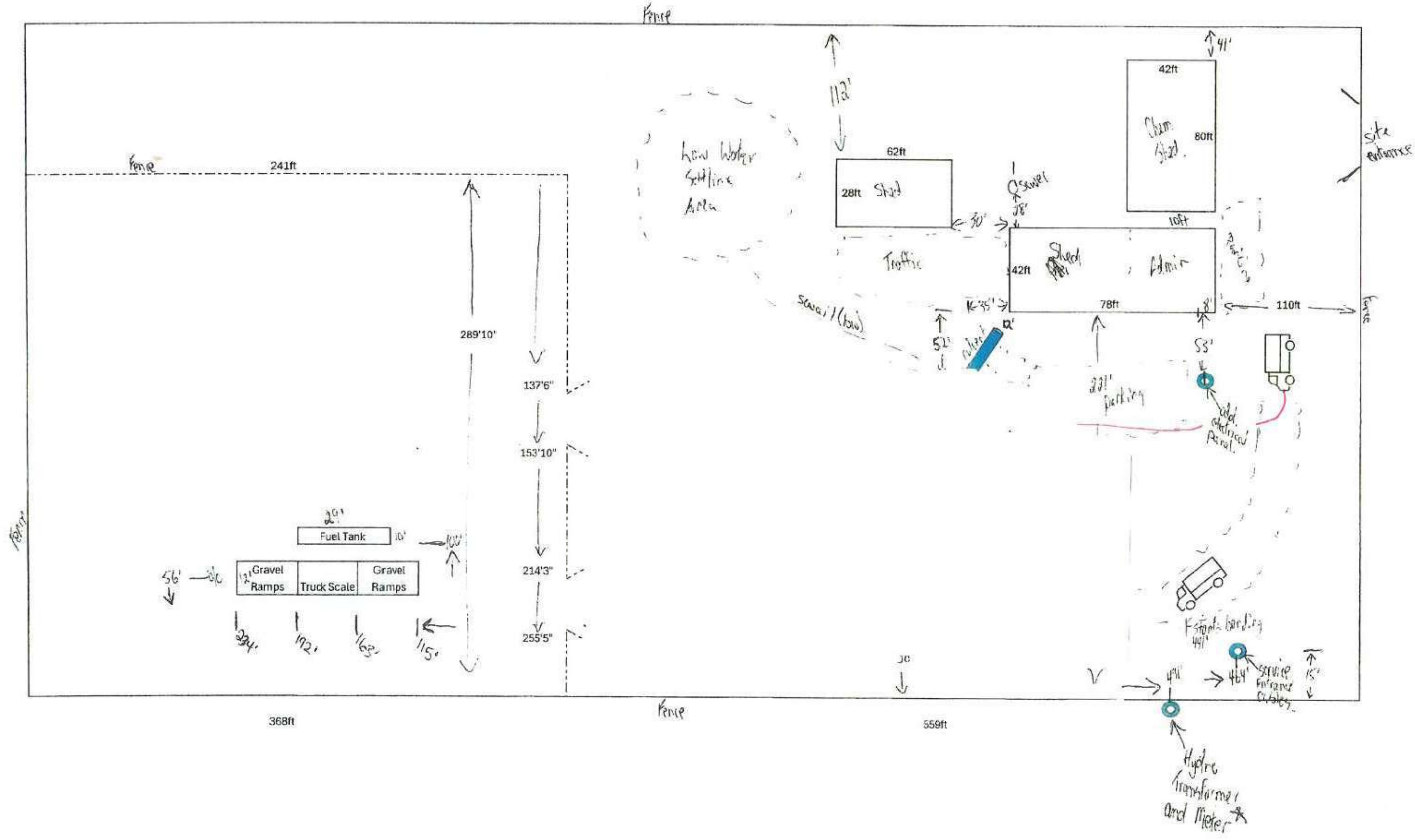
Class 1 Developments	$1,000
Class 2 Developments	$7,500
Class 3 Developments:	
Transportation and Transmission Lines	$10,000
Water Developments	$60,000
Energy and Mining	$120,000

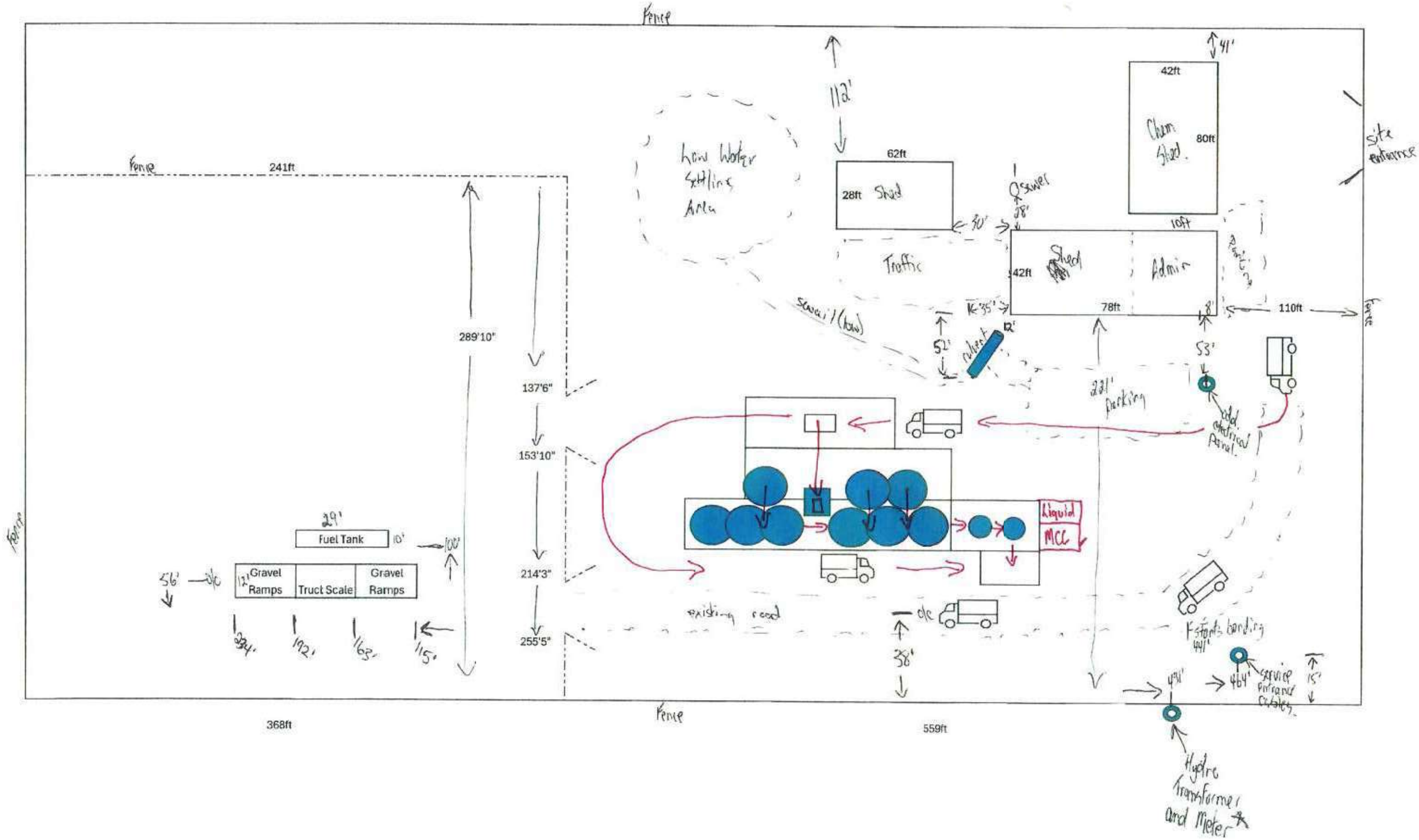
Submit the complete EAP to:
Director
Environmental Approvals Branch
Environment and Climate Change
Box 35, 14 Fultz Boulevard
Winnipeg MB R3Y 0L6
EABDirector@gov.mb.ca

For more information:
Toll-Free: 1-800-282-8069
Phone: 204-945-8321
Fax: 204-945-5229

https://www.gov.mb.ca/sd/permits_licenses_approvals/eal/licence/index.html

Internal Use Only
$1,000.....C1 B-02
$7,500.....C2 B-02
$10,000....TT B-02
$60,000.....WD B-02
$120,000...EM B-02

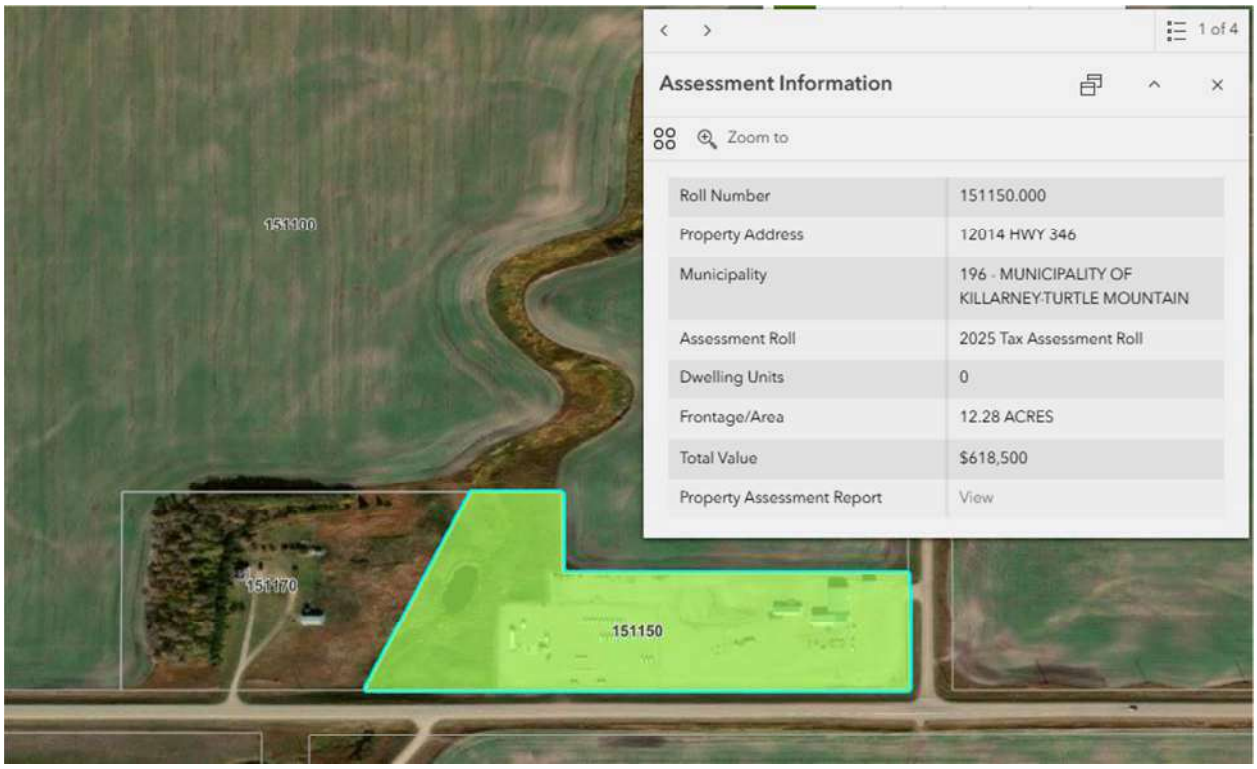

Fence
241ft
289'10"
137'6"
153'10"
214'3"
255'5"
Fuel Tank
Gravel Ramps
Truck Scale
Gravel Ramps
368ft
559ft
62ft
28ft
Shed
42ft
80ft
42ft
78ft
10ft
110ft
Traffic
Admin
Low Water Settling Area
Gravel
Site entrance
Hydro transformer and Meter
Service Entrance Cables
Parking


Fence
241ft
289'10"
137'6"
153'10"
214'3"
255'5"
Fuel Tank
Gravel Ramps
Truct Scale
Gravel Ramps
Low Water Settling Area
62ft
28ft
Shed
Traffic
42ft
78ft
10ft
Admin
42ft
80ft
Chem Shed.
110ft
site entrance
Liquid
MCC
existing road
368ft
559ft
Hydro transformer and Meter

Table

Description of Development

Land Title –



DATE: 2013/10/16
TIME: 22:52

MANITOBA

STATUS OF TITLE

TITLE NO: 2689562/2

PAGE: 1

STATUS OF TITLE.....	ACCEPTED	PRODUCED FOR..	PITBLADO LLP
ORIGINATING OFFICE...	BRANDON	ADDRESS.....	2500 - 360 MAIN ST.
REGISTERING OFFICE...	BRANDON		WINNIPEG, MB. R3C 4H6
REGISTRATION DATE....	2013/10/04		
COMPLETION DATE.....	2013/10/16	LTO BOX NO....	111
		CLIENT FILE...	27807.128 BHK
		PRODUCED BY...	SYSTEM for Series: 1347181/2

LEGAL DESCRIPTION:

CROP PRODUCTION SERVICES (CANADA) INC.

IS REGISTERED OWNER SUBJECT TO SUCH ENTRIES RECORDED HEREON IN THE FOLLOWING DESCRIBED LAND:

ALL THAT PORTION OF THE SLY 441.5 FEET PERP
OF THE SE 1/4 OF SECTION 6-3-18 WPM WHICH LIES EAST OF A LINE DRAWN
NLY AT RIGHT ANGLES TO SLY LIMIT OF SAID QUARTER SECTION FROM A POINT
IN SAME DISTANT WLY THEREON 785 FEET FROM THE ELY LIMIT THEREOF
EXC ROAD PLAN 315 BLTO (BO DIV)

ACTIVE TITLE CHARGE(S):

65478BO/2 ACCEPTED EASEMENT **REG'D:** 1964/11/16
FROM/BY: MANITOBA HYDRO-ELECTRIC BOARD - PART
TO:
CONSIDERATION: **NOTES:** PT

70751BO/2 ACCEPTED CAVEAT **REG'D:** 1972/03/09
DESCRIPTION: ELY 40FT
FROM/BY: MANITOBA TELEPHONE SYSTEM
TO:
CONSIDERATION: **NOTES:** ELY 40 FT

1105158/2 ACCEPTED CAVEAT **REG'D:** 2001/12/10
DESCRIPTION: EASEMENT AGREEMENT DATED 21 JANUARY 1991
FROM/BY: MTS COMMUNICATIONS INC.
TO: WILLIAM F. JOHNSTONE AS AGENT
CONSIDERATION: **NOTES:** E 20 M

ADDRESS(ES) FOR SERVICE:

EFFECT	NAME AND ADDRESS	POSTAL CODE
ACTIVE	CROP PRODUCTION SERVICES (CANADA) INC. 3005 ROCKY MOUNTAIN AVENUE LOVELAND COLORADO USA 80538	

CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA
STORAGE SYSTEM ON 2013/10/16 OF TITLE NUMBER 2689562/2

********** STATUS OF TITLE 2689562/2 CONTINUED ON NEXT PAGE **********

DATE: 2013/10/16
TIME: 22:52
CST

MANITOBA

STATUS OF TITLE

TITLE NO: 2689562/2

STATUS OF TITLE.....	ACCEPTED	PRODUCED FOR..	PITBLADO LLP
ORIGINATING OFFICE...	BRANDON	ADDRESS.....	2500 - 360 MAIN ST.
REGISTERING OFFICE...	BRANDON		WINNIPEG, MB. R3C 4H6
REGISTRATION DATE....	2013/10/04		
COMPLETION DATE.....	2013/10/16	LTO BOX NO....	111
		CLIENT FILE...	27807.128 BHK
		PRODUCED BY...	SYSTEM for Series: 1347181/2

ORIGINATING INSTRUMENT(S):

REGISTRATION NUMBER	TYPE	REG. DATE	CONSIDERATION	SWORN VALUE
1347185/2	T	2013/10/04	$2.00	$488,300.00

PRESENTED BY: PITBLADO LLP
FROM: VITERRA INC.
TO: CROP PRODUCTION SERVICES (CANADA) INC.

FROM TITLE NUMBER(S):

2307997/2 ALL

LAND INDEX:

LOT	QUARTER SECTION	SECTION	TOWNSHIP	RANGE
	SE	6	3	18W

NOTE: PART EX RD PL 315

ACCEPTED THIS 4TH DAY OF OCTOBER, 2013
BY K.GRAINGER FOR THE DISTRICT REGISTRAR OF
THE LAND TITLES DISTRICT OF BRANDON.

CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA
STORAGE SYSTEM ON 2013/10/16 OF TITLE NUMBER 2689562/2.

********** END OF STATUS OF TITLE 2689562/2 **********

DATE: 2013/10/16
TIME: 22:52

MANITOBA

STATUS OF TITLE

TITLE NO: 2689563/2

PAGE: 1

STATUS OF TITLE.....	ACCEPTED	PRODUCED FOR..	PITBLADO LLP
ORIGINATING OFFICE...	BRANDON	ADDRESS.....	2500 - 360 MAIN ST.
REGISTERING OFFICE...	BRANDON		WINNIPEG, MB. R3C 4H6
REGISTRATION DATE....	2013/10/04		
COMPLETION DATE.....	2013/10/16	LTO BOX NO....	111
		CLIENT FILE...	27807.128 BHK
		PRODUCED BY...	SYSTEM for Series: 1347181/2

LEGAL DESCRIPTION:

CROP PRODUCTION SERVICES (CANADA) INC.

IS REGISTERED OWNER SUBJECT TO SUCH ENTRIES RECORDED HEREON
IN THE FOLLOWING DESCRIBED LAND:

ALL THAT PORTION OF THE SE 1/4 OF SECTION 6-3-18 WPM
DESCRIBED AS FOLLOWS:
COMMENCING AT A POINT IN THE SLY LIMIT OF SAID QUARTER SECTION
WLY THEREON 1243.35 FEET FROM SE CORNER OF SAID QUARTER SECTION;
THENCE ELY ALONG SAID SLY LIMIT 458.35 FEET;
THENCE NLY AT RIGHT ANGLES TO SAID SLY LIMIT 720 FEET;
THENCE WLY PARALLEL WITH SAID SLY LIMIT 205 FEET;
THENCE SWLY TO THE POINT OF COMMENCEMENT
EXC ROAD PLAN 315 BLTO (BO DIV)

ACTIVE TITLE CHARGE(S):

NO ACTIVE TITLE CHARGES EXIST ON THIS TITLE

ADDRESS(ES) FOR SERVICE:

EFFECT	NAME AND ADDRESS	POSTAL CODE
ACTIVE	CROP PRODUCTION SERVICES (CANADA) INC. 3005 ROCKY MOUNTAIN AVENUE LOVELAND COLORADO USA 80538	

ORIGINATING INSTRUMENT(S):

REGISTRATION NUMBER	TYPE	REG. DATE	CONSIDERATION	SWORN VALUE
1347185/2	T	2013/10/04	$2.00	$488,300.00

PRESENTED BY: PITBLADO LLP
FROM: VITERRA INC.
TO: CROP PRODUCTION SERVICES (CANADA) INC.

FROM TITLE NUMBER(S):

2307998/2 ALL

LAND INDEX:

LOT	QUARTER SECTION	SECTION	TOWNSHIP	RANGE
	SE	6	3	18W

NOTE: PART EX RD PL 315

CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA
STORAGE SYSTEM ON 2013/10/16 OF TITLE NUMBER 2689563/2

********** STATUS OF TITLE 2689563/2 CONTINUED ON NEXT PAGE **********

STATUS OF TITLE.....	ACCEPTED	PRODUCED FOR..	PITBLADO LLP
ORIGINATING OFFICE...	BRANDON	ADDRESS.....	2500 - 360 MAIN ST.
REGISTERING OFFICE...	BRANDON		WINNIPEG, MB. R3C 4H6
REGISTRATION DATE....	2013/10/04		
COMPLETION DATE.....	2013/10/16	LTO BOX NO....	111
		CLIENT FILE...	27807.128 BHK
		PRODUCED BY...	SYSTEM for Series: 1347181/2

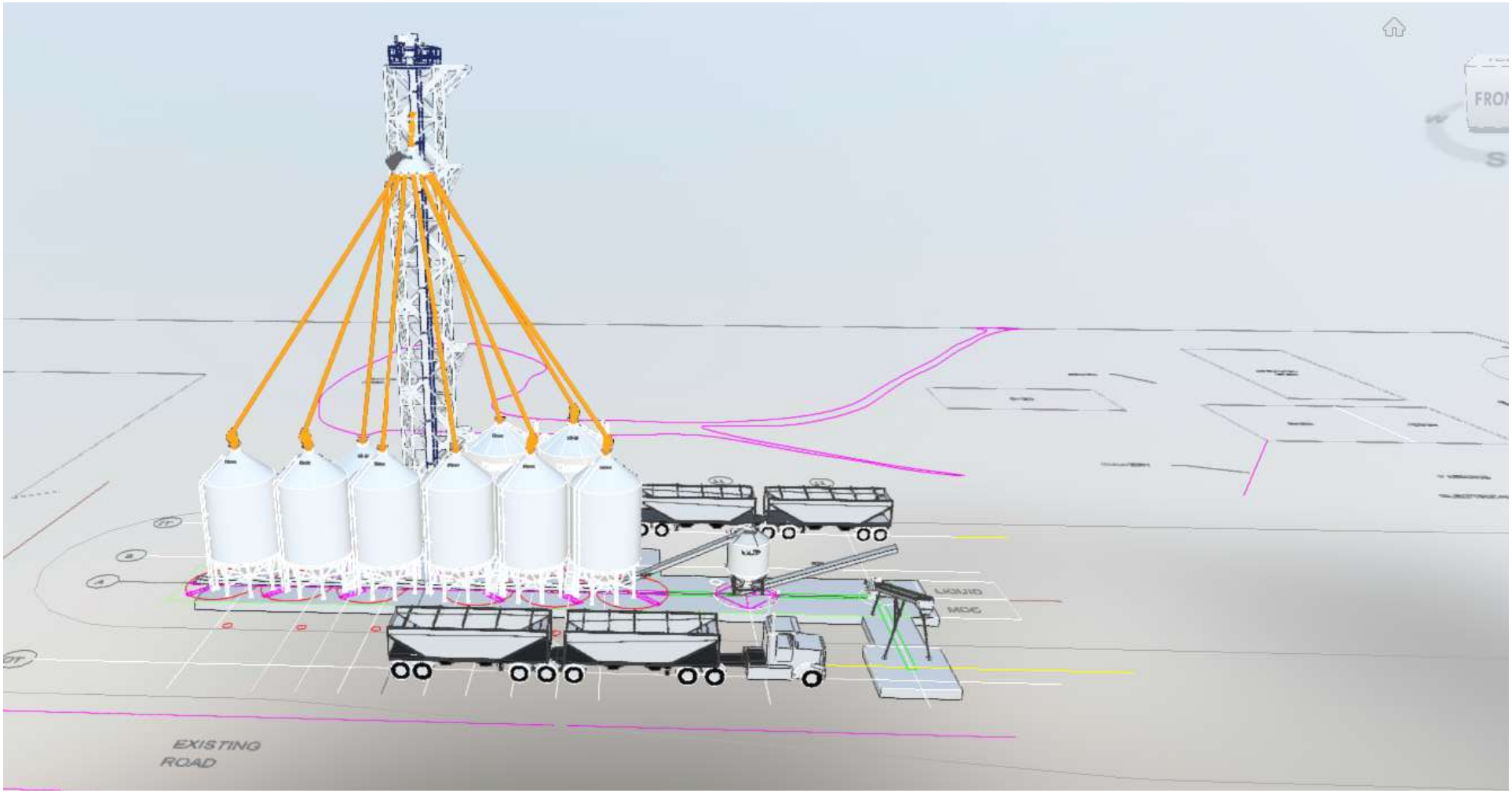
**ACCEPTED THIS 4TH DAY OF OCTOBER, 2013
BY K.GRAINGER FOR THE DISTRICT REGISTRAR OF
THE LAND TITLES DISTRICT OF BRANDON.**

CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA
STORAGE SYSTEM ON 2013/10/16 OF TITLE NUMBER 2689563/2.

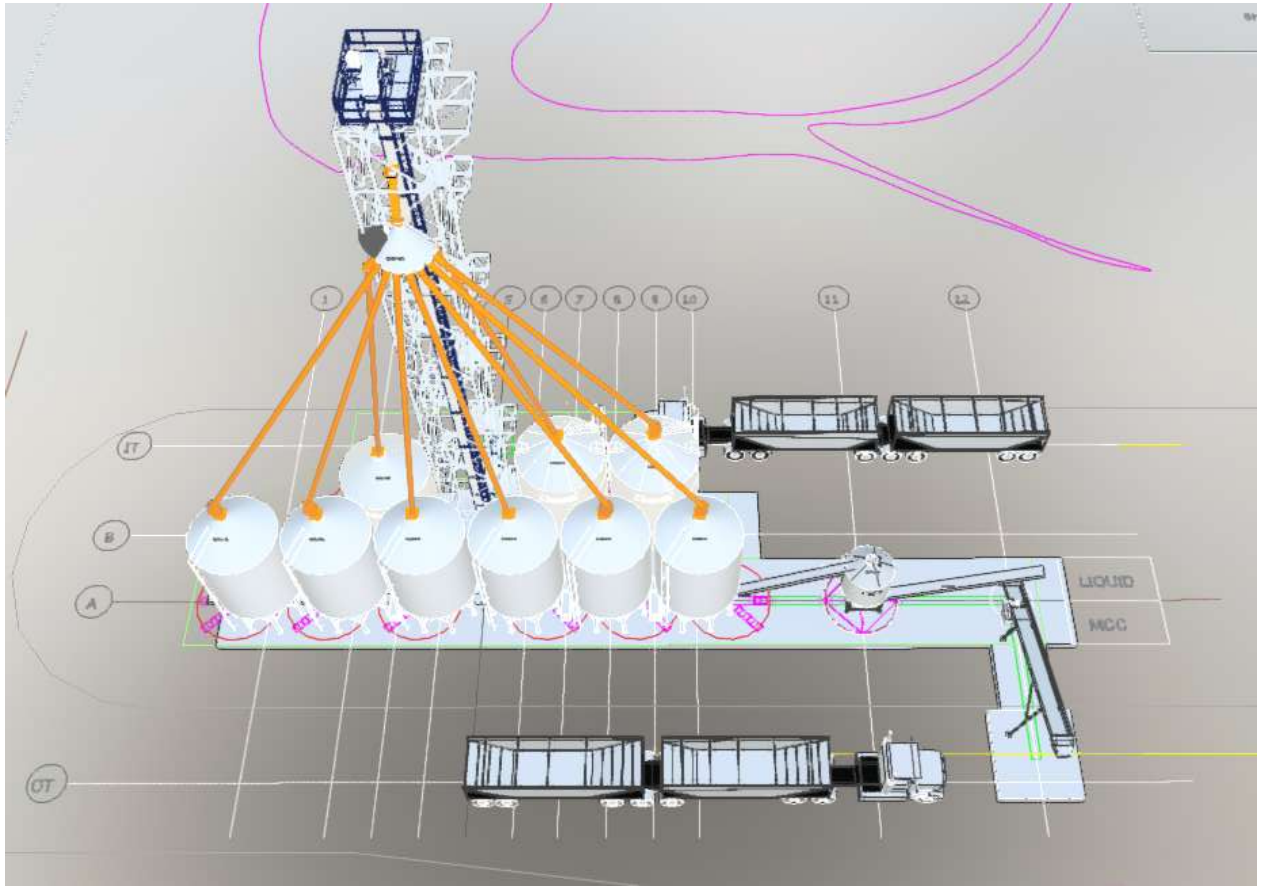
********** END OF STATUS OF TITLE 2689563/2 **********

Drawings and Maps

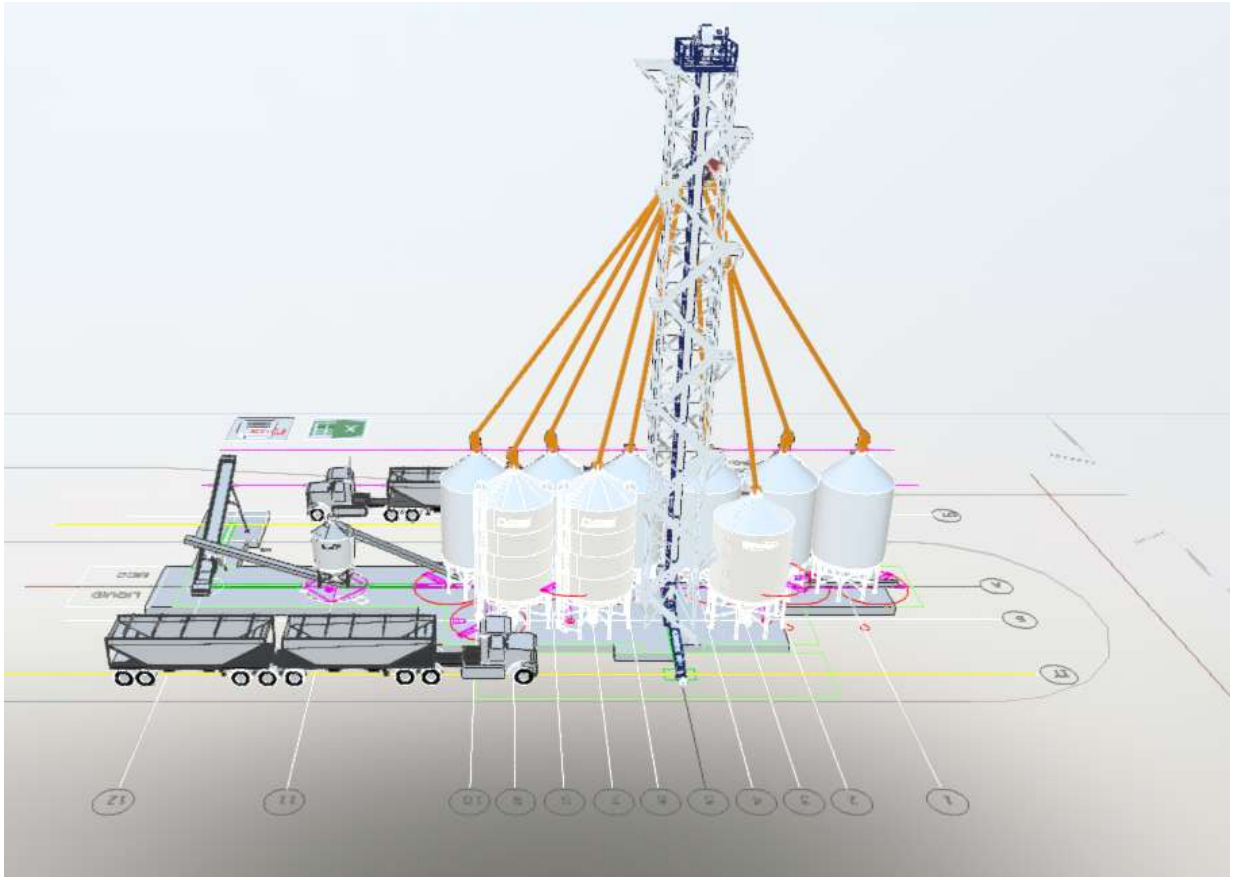
Documents were prepared and provided by KPIC (division of FWS)



View of proposed new Fert distribution, looking north



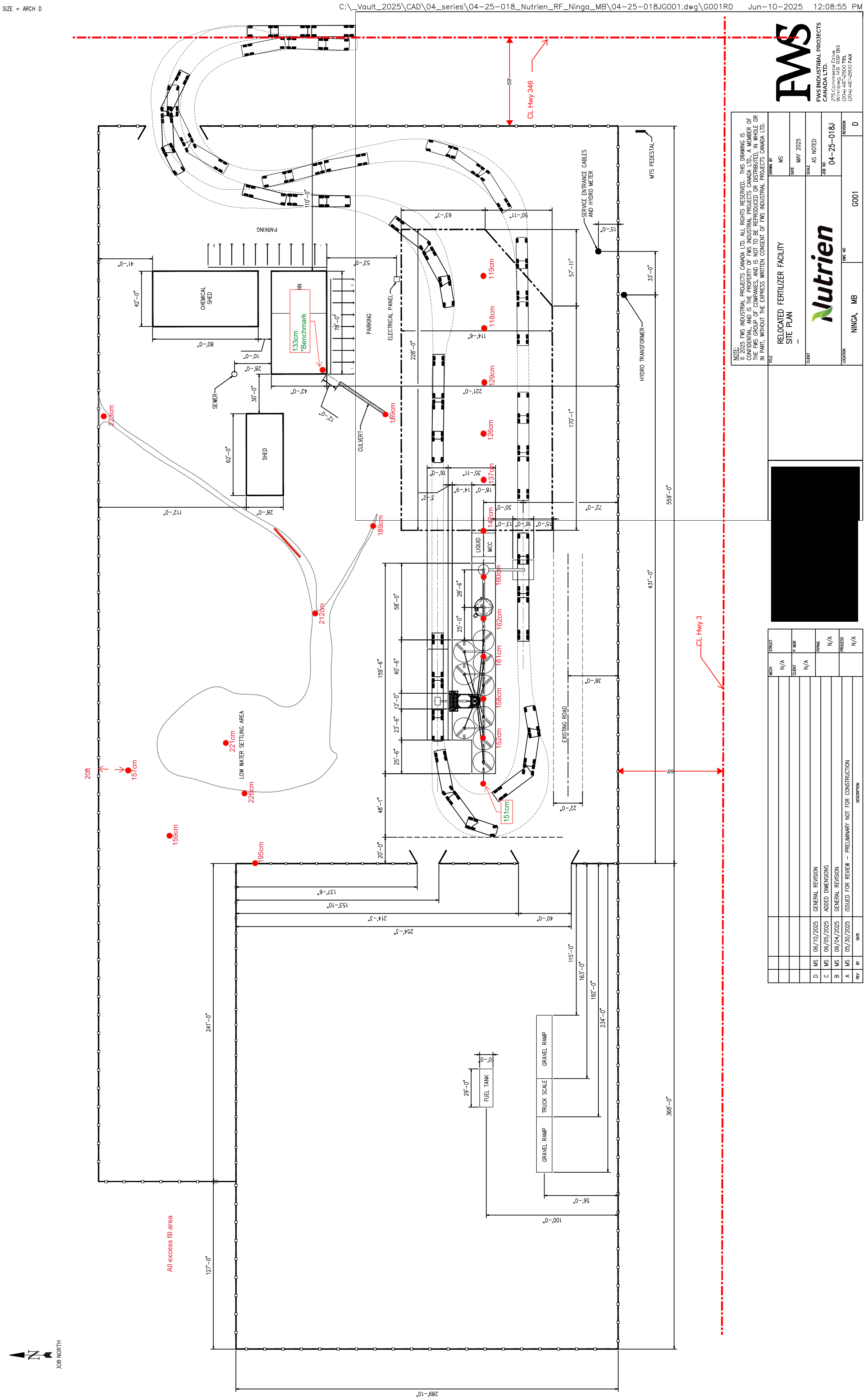
View of proposed new Fert distribution, looking north from above

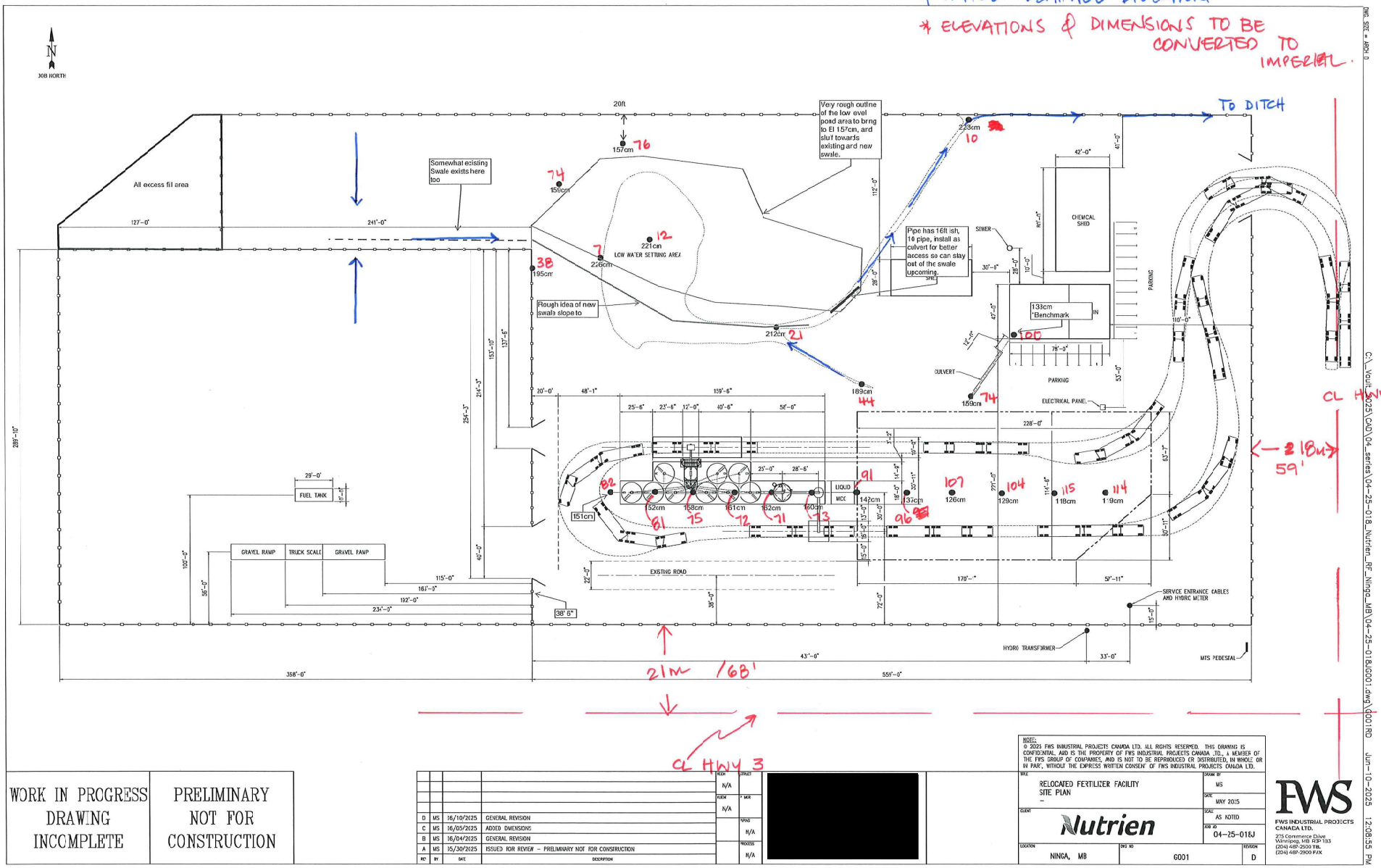


View of proposed new Fert distribution, looking south

DWG. SIZE = ARCH D

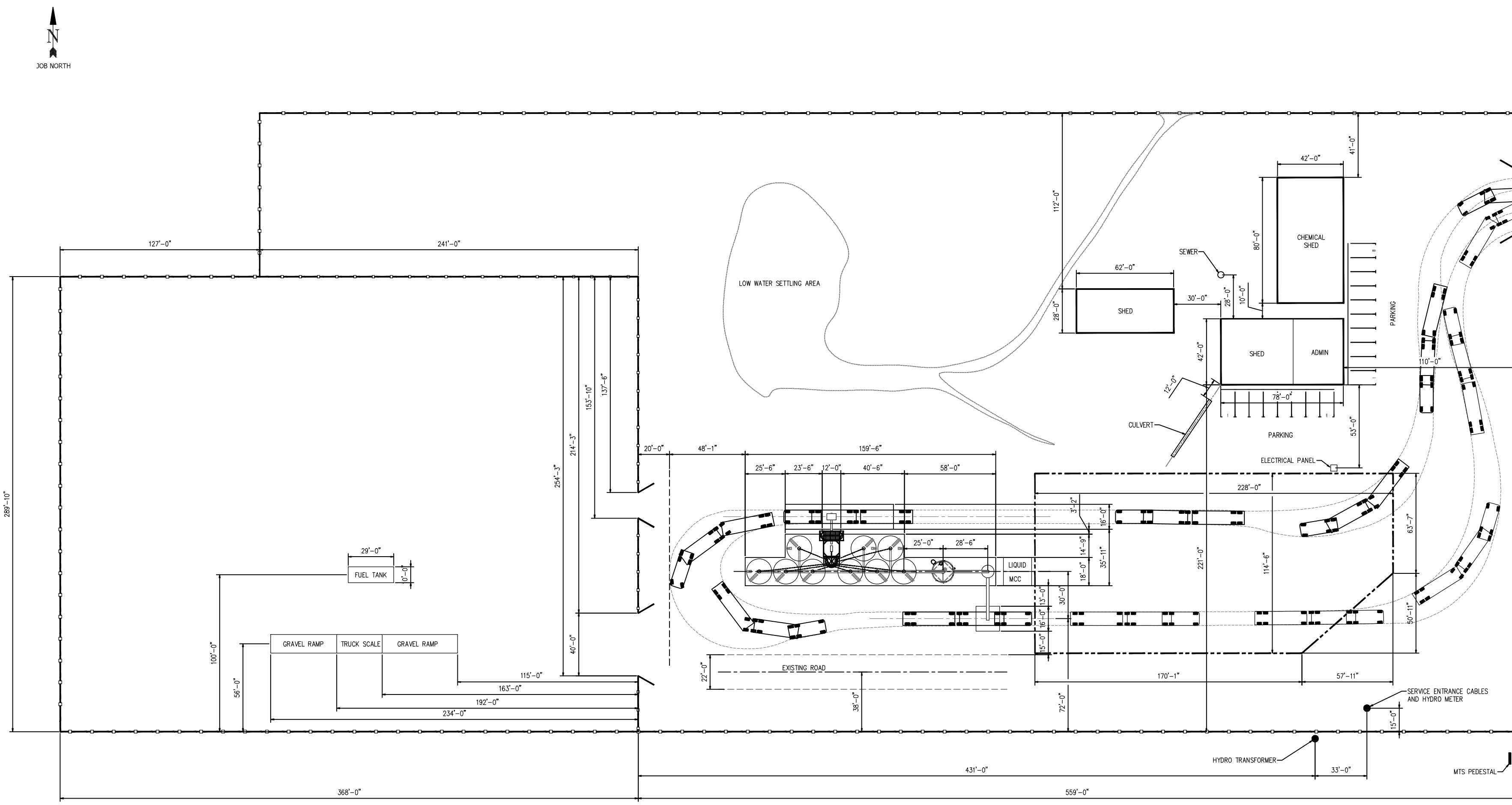
C:_Vault_2025\CAD\04_series\04-25-018_Nutrien_RF_Ninga_MB\04-25-018JG001.dwg\G001RD Jun-10-2025 12:08:55 PM





D	MS	16/10/2025	GENERAL REVISION
C	MS	16/05/2025	ADDED DIMENSIONS
B	MS	16/04/2025	GENERAL REVISION
A	MS	25/30/2025	ISSUED FOR REVIEW – PRELIMINARY NOT FOR CONSTRUCTION
REV	BY	DATE	DESCRIPTION

DWG. SIZE = ARCH D



C:_Vault_2025\CAD\04_series\04-25-018_Nutrien_RF_Ninga_MB\04-25-018JG001.dwg\G001RD Jun-10-2025 12:08:55 PM

[redacted]

TITLE: RELOCATED FERTILIZER FACILITY SITE PLAN –	DRAWN BY: MS
	DATE: MAY 2025
CLIENT: Nutrien	SCALE: AS NOTED
	JOB NO: 04-25-018J
LOCATION: NINGA, MB	DWG NO: G001 / REVISION: D

FWS
FWS INDUSTRIAL PROJECTS CANADA LTD.
275 Commerce Drive
Winnipeg, MB R3P 1B3
(204) 487-2500 TEL
(204) 487-2900 FAX

Operations

Detail prepared and presented was entered by Devon Hillyer – General Manager Canada Operations

Operations –

b. Products - Purpose of the facility will be for thru-put blending of raw dry material products into a consumable blend, in season only. Seasonal storage of dry fertilizer products…
    i. Nitrogen materials – Urea (46-0-0 GA%) ESN (44-0-0 GA% Polymer Coated) Super U (Urea coated with Urease Inhibitor)
    ii. Phosphate materials – MAP (11-52-0 GA%), MAP+MST (9-43-0-16 GA%)
    iii. Potash materials – Potassium Chloride (0-0-60-0 GA%)
    iv. Sulphate materials – Sulphur (20.5-0-0-24 GA%)
    v. Atlas XC – microbial based biocatalyst used as a coating on MAP (11-52-0) and MAP+MST (9-43-0-16)
    vi. Target product volume of material storage on site, might vary based on seasonal demand, however, estimation and allocation will be…
        1. Urea – 2 bins (180 mt)
        2. MAP – 1 bin (90 mt)
        3. MAP + MST – 1 bin (90 mt)
        4. Potash – 1 bin (90 mt)
        5. ESN – 1 bin (90 mt)
        6. Sulphur – 2 bins (180 mt)
        7. Super U – 1 bin (90 mt)
        8. Atlas XC – 1 tote (500 L) – secondary containment included
c. Traffic - Shifting of truck traffic from in town fertilizer shed to highway location.
    i. Inbound Truck volume – 1500 mt
        1. Fall Movement = 500 mt (12 x 42.5 mt trucks)
        2. Spring Movement = 1000 mt (24 x 42.5 mt trucks)
    ii. Outbound Truck volume – 1500 mt
        1. Fall Movement = 500 mt (41 trucks, based on average of 12 mt per truck)
            a. Smaller truck size on the outbound, result of grower truck size may vary (Super B, Tridem Trailer, Tandem Trailer, Tandem Grain box, Single Axle Grain box)
        2. Spring Movement = 1000 mt (82 trucks, based on average of 12 mt per truck)
            a. Smaller truck size on the outbound, result of grower truck size may vary (Super B, Tridem Trailer, Tandem Trailer, Tandem Grain box, Single Axle Grain box)
d. Security - AWSA building is equipped with TYCO security monitoring system. The compound is fully fenced with chain link as additional security, and a key requirement under the ACOP.
e. Disposal of Sanitation - Sanitary waste is captured in septic tank, located on north side of shop. Sanitation waste is picked up onsite by Southwest Vac and disposed of offsite at a proper collection facility.
f. Foreign Material & Waste – damaged or out of condition material that is generated from the upgraded dry fertilizer facility will be swept, shoveled, and placed in a

sack. The material will be put back through our blending system, conditioned and sold to local growers for spreading on crop land.

   i. Material that is not suitable for crop land will be documented within our SH&E system. The location is required to contact a third-party outfit to pick up the waste from the site (GFL, Clean Harbors) and pay the required amount for proper disposal.

g. Business Days & Hours - Standard business hours are Monday to Friday (8am to 5pm). Seasonal hours are set by location to meet demand. These hours are dictated by weather, season demand and do not exceed a 3–4-week window in spring, 2-3-week window in fall.
h. Petroleum - Two fuel storage tanks on site, located within NH3 compound, as part of the original EAL. Both tanks are 1000-gal, double walled containment and store diesel and gasoline, independently.

Maintenance

Detail prepared and presented was entered by Devon Hillyer – General Manager Canada Operations

Maintenance –

i. NH3 equipment is maintained mechanically by onsite staff, specifically to the rolling stock. Nutrien Ag Solutions works with Maxfield Inc. to ensure all equipment is inspected and maintain as part of our ACOP. This equipment **must** comply to boil plate standards, specific to pressure testing, along with visual inspection, and 3-5-year hydro on smaller tanks, M10 (ten year) mag particle on larger vessel. All maintenance is tracked and maintained in a program called "OATS".
j. AWSA warehouse is inspected annually. We perform electrical inspections on all facilities and complete gas line inspections on heated facilities as part of standard Nutrien Ag Solutions SH&E.
k. Dry Fertilizer system (**Proposed Upgrade**), upon completion, this equipment will be part of a standard annual maintenance program with KPIC. The scale equipment will be inspection minimum 1x per year to comply with Weights & Measures, but it is recommended by Nutrien Ag Solutions that we check our scales 2x per year to maintain integrity of our process. The mechanical maintenance of the equipment will include all bearings, rollers, pulleys, electrical motors, gear boxes, belts, piping, structural integrity, gates, etc…, we also require our sites to have infrared inspections completed on bearings while in operation to look for hot spots.
l. Site maintenance, regarding yard is recommended to control weeds and foreign material. Yards will be dragged to remove larger rocks and debris, low spots will be leveled to remove standing water, and offsite contractors will be brought into help control water flow off the property to align with current grading.

Decommissioning

Closure package provided is for the Gladstone Facility located west of the town of Gladstone. Location is located at intersection of Hwy. 16 & 260.

Closure Plan – Gladstone, Manitoba (EAL 2212RR)

Details of plan…

- Salvageable assets are in process of being torn down and relocated to new locations
    - 2 AWSA warehouses will be removed from the property and placed at Carberry Nutrien Ag Solutions facility located north of Carberry on Highway 5
    - Fertilizer tank system will be moved to Ninga Nutrien Ag Solutions facility located at the intersection of Highway 3 & Provincial Rd 346
- Remaining outbuildings that are non-salvageable will be demolished and disposed of at a local landfill under contract of KPIC
- Old concrete will be broken up and taken to a designated landfill for proper disposal
- An old NH3 vessel that is decommissioned will be removed from property and disposed of as scrap steel
- The land site will be brought to grade level with material available on the property
- The dugout to the west of the property will not be touched and left in its current form

Demo plans include….

- All buildings, being: chem shed, admin, dry control room, ammonia control room, septic tank & fill, and all perimeter fencing.
- All concrete foundations & footings, and bollards/piles. All bollards/piles will be attempted to pull out, if CIP piles or bollards deep, they excavate 3ft below grade and cut them off, fill back over.
- Level, bring in fill & smooth out all demolished areas.
- One mob & demob included, to all complete at one time.
- Note: all salvage rights, contractor retains rights for any materials removed from the location.
- KPIC assistance in managing the job site and cutting of materials as required when exposed.
- All items removed from site, clean slate when completed.

The site at Gladstone was effectively closed in September 2024. The decision was not made until that time to shut down operations. It was later discussed to move assets from the location, but not officially approved by Leadership until May 2025. We are in process of this clean up and will follow through on our closure plan until the property is clean up to grade level.

A map to depict our plan, is attached on second page….

Red Highlighted area – buildings that will be removed from property and disposed. Contractor completing clean up reserves right to salvage.

Gold Highlighted area – assets that will be relocated to Ninga & Carberry

Green Stars – equipment that has already been removed as well as concrete that will be broken up and removed

Purple Highlighted area – burrow pit pond used during construction for clay, will be left as is.


seums
Transit
Pharmacies
ATMs
N
260
260
260
260
260

Description of Environment

Documents were prepared M. Block & Associates Ltd. and provided by KPIC (Division of FWS)

M. Block & Associates Ltd.

Consulting Engineers

CSA CERTIFIED CONCRETE LABORATORY

▪ Geotechnical Investigations ▪ Environmental Assessments ▪ C.S.A. Certified Material Testing

June 17th, 2025

KPIC Maintenance Services Inc.
275 Commerce Drive
Winnipeg, Manitoba
R3P 1B3
Attention: Ms. Donna McAlpine, PMP Project Manager

Dear Madam:

RE: GEOTECHNICAL INVESTIGATION FOR THE PROPOSED TOWER AND FERTILIZER BINS TO BE LOCATED AT NUTRIEN NINGA SITUATED ALONG PTH #3 AND P.R. #346, NEAR NINGA, MANITOBA

1.0 TERMS OF REFERENCE

On May 29th, 2025, M. Block & Associates Ltd. (MBA) received a written contract from Ms. Donna McAlpine, P. Eng., representing KPIC Maintenance Services Inc., the project's design-builder and owner's representative, to proceed with the geotechnical investigation for the proposed tower and fertilizer bins to be located at Nutrien Ninga situated along PTH #3 and P.R. #346 near Ninga, Manitoba. Therefore, on June 12th, 2025, three test holes were bored implementing a track-mounted Acker B-57X drill rig, using interconnected 5' long x 5" diameter continuous flight solid stem augers, supplied by Maple Leaf Drilling Ltd. of Winnipeg, Manitoba. Representative "disturbed" soil samples were retrieved from those test holes and brought back to MBA's CSA certified materials testing laboratory in Winnipeg for moisture content testing and verification of the field soil classifications. Alternatively, during the field investigation, the predominantly fine-grained silty clay's respective 'disturbed' undrained shear strengths were measured implementing a hand-held calibrated Pocket Geotester (PG). Upon the completion of this investigation, the test holes' elevations and the groundwater elevations in them, if any, were measured and referenced to their respective surfaces, as illustrated on pages 16 – 19 of this report. In addition, the test holes were completely backfilled with bentonite and the soil cuttings.

2.0 SOIL LITHOLOGY AND GROUNDWATER CONDITIONS

Test holes #1, #2 and #3 were overlain with, approximately, 6" of brown, damp, silty gravelly sand fill. Next, black, becoming grey in colour with increasing depth, alluvially deposited, stiff to firm, moist, clayey silt was observed in test holes #1, #2 and #3 down to the 2'6" depth. Brown, alluvially deposited, soft, wet to saturated, sandy silt was then traversed in test holes #1, #2 and #3 down to the 5'6", 4'6" and 3'6" depths, respectively. Brown, stiff to very stiff, moist to damp, compact to very dense, clayey sandy silt with potential cobbles and boulders (glacial till) was next recorded in test holes #1, #2 and #3 down to the 7', 11' and 16' depths, respectively. Brown, alluvially deposited, saturated, poorly-graded, silty sand was next recorded in test holes #1, #2 and #3 down to the 15'6", 17'6" and 17' depths, respectively. Finally, grey, heavily overconsolidated, very stiff to hard, damp, shale bedrock was recorded in test holes #1, #2 and #3 down to the 16', 18' and 17'6" depths, respectively, where the auger refused on the suspected solid shale bedrock. Therefore, the deep test holes were terminated at the aforementioned depths. During this investigation, groundwater seepage and soil sloughing, emanating from the soft, saturated, sandy silt and silty sand stratae, currently flowed and sloughed into all the test holes at significant and severe inflow rates, respectively. The soil lithology in the test holes and their specific locations were appended to this report on pages 16 – 19.

3.0 SUMMARY OF FIELD AND LABORATORY TESTS

The soils' measured PG strength vs. Depth graphs are located on the test holes' log sheets.
Moisture content vs. Depth graphs are located on the test holes' log sheets.
A summary of the laboratory data is appended to this report on page 22.

4.0 FOUNDATION DESIGN ALTERNATIVES

4.1 SHALLOW CONCRETE STRIP FOOTINGS

Based upon the very deep depth of the alluvially deposited, soft, saturated, sandy silt stratum observed in the test holes, it is the writer's professional opinion that a shallow

concrete footing foundation design, potentially constructed on or over the aforementioned potentially deleterious deposition underlying this site, is susceptible to significant and/or differential foundation settlement, and, as such, strongly not recommended as a feasible superstructure support system for the proposed tower and fertilizer bins to be located at Nutrien Ninga situated along PTH #3 and P.R. #346 near Ninga, Manitoba.

4.2 DRILLED CAST IN PLACE CONCRETE FRICTION PILES

Similarly, drilled cast in place concrete friction piles are also not a feasible foundation system for this project, due to the shallow depth of the very stiff to hard, damp, shale bedrock and of practical auger refusal encountered in all the deep test holes.

4.3 DRIVEN TREATED DOUGLAS FIR TIMBER END BEARING PILES

Next, driven treated Douglas Fir timber end-bearing piles are also a feasible foundation system for the proposed tower and fertilizer bins to be located at Nutrien Ninga situated along PTH #3 and P.R. #346 near Ninga, Manitoba. These piles shall have minimum tip and butt diameters of 8" and 12", respectively. All treated timber piles shall only be pre-drilled through the depth of frost penetration, if any, prior to being driven down to refusal onto a dense stratum, such as, the shale bedrock. The estimated length of treated timber piles required at this site would be **in the order of 15' - 20' from the present ground elevation of test hole #1.** Based upon the material strength of this type of timber pile, a properly driven treated Douglas Fir timber pile, with the previously stated dimensions, would safely transfer 50 kips of axial compressive load from the superstructure down to the underlying soil. The foundation contractor shall still verify the length of timber piles required at this site and become fully cognizant with the contents of this report. The following pile driving criteria shall be implemented with a driving energy of 10 foot kips. Furthermore, the geotechnical engineer's personnel should inspect the foundation installation in order to verify the FGR, using ULS where $\Phi = 0.4$, based upon the following pile driving criteria:

SAFE PILE LOADING (kips)	MIN. TIP	MIN. BUTT	REFUSAL CRITERIA
50	8"	12"	10 blows / inch

Note: Max 1" (25.4 mm) penetration per set, for 3 consecutive sets

The advantages of this piling system are its anticipated extremely short pile length, moderately heavy end bearing pile capacity and minimal magnitude of modeled long-term foundation settlement. The disadvantages of this piling system are the potentially variable depths to practical pile refusal across this site, its ineffective frost jacking resistance, due to the pile's tapering, greater cost per lineal foot of timber specie and cost per lineal foot of timber pile that is approaching that of pre-cast concrete piles.

4.4 DRIVEN TREATED LODGEPOLE PINE TIMBER END BEARING PILES

Likewise, driven treated Lodgepole Pine timber end-bearing piles are also a feasible foundation system for the proposed tower and fertilizer bins to be located at Nutrien Ninga situated along PTH #3 and P.R. #346 near Ninga, Manitoba. These piles shall have minimum tip and butt diameters of 8" and 12", respectively. All treated timber piles shall only be pre-drilled through the depth of frost penetration, if any, prior to being driven down to refusal onto a dense stratum, such as, the shale bedrock. The estimated length of treated timber piles required at this site would be **in the order of 15' - 20' from the present ground elevation of test hole #1.** Based upon the material strength of this type of timber pile, a properly driven treated Lodgepole Pine timber pile, with the previously stated dimensions, would safely transfer 35 kips of axial compressive load from the superstructure down to the underlying soil. The foundation contractor shall still verify the length of timber piles required at this site and become fully cognizant with the contents of this report. The following pile driving criteria shall be implemented with a driving energy of 10 foot kips. Due to the lower modulus of elasticity of this wood that increases the probability of pile distress during pile driving, the geotechnical engineer's personnel shall inspect the pile driving to determine if they have been damaged during installation or that they are capable of supporting the FGR, using ULS where $\Phi = 0.4$, and meet the following refusal specifications.

SAFE PILE LOADING (kips)	MIN. TIP	MIN. BUTT	REFUSAL CRITERIA
35	8"	12"	5 blows / inch

Note: Max 1" (25.4 mm) penetration per set, for 3 consecutive sets

The advantages of this piling system are its extremely short pile length, moderate end bearing pile capacity, minimal magnitude of modeled long-term foundation settlement and lower cost per foot of timber specie. The disadvantages of this piling system are its ineffective frost jacking resistance, due to the pile's tapering, the potentially variable depths to the specified pile refusal across this site, pile settlement from loading an unrecognized broken pile and the additional cost of extra piles, should these piles break during installation.

4.5 DRIVEN PRE-CAST CONCRETE END BEARING PILES

Finally, driven pre-cast concrete end-bearing piles could also be implemented as the foundation design for the proposed tower and fertilizer bins to be located at Nutrien Ninga situated along PTH #3 and P.R. #346 near Ninga, Manitoba. All driven pre-cast concrete piles should be pre-drilled no more than through the depth of frost penetration, if any, prior to being driven down to refusal onto a dense stratum, such as, the shale bedrock. The estimated length of properly driven pre-cast concrete piles required at this location would be **in the order of 4.5 m – 6.0 m from the present ground elevation of test hole #1.** However, the foundation contractor should still verify the estimated length of pre-cast concrete piles required at this site and become fully cognizant with the contents of this report. Following their successful installation, in order to maximize their lateral support, all the piles' oversized pre-bores should then be backfilled with clean sand or another pre-approved equivalent substitute alternative. Furthermore, the geotechnical engineer's personnel should inspect the foundation installation in order to verify the FGR, using ULS where $\Phi = 0.4$, based upon the following pile driving criteria:

PILE DIAMETER	MIN. CONCRETE COMP. STRENGTH	DRIVING ENERGY	REFUSAL CRITERIA	ULS FGR	SLS
305 mm	35 mPa	30 foot * kips	5 blows / 1" (25 mm)	550 kN	450 kN
350 mm	35 mPa	30 foot * kips	8 blows / 1" (25 mm)	800 kN	625 kN
400 mm	35 mPa	30 foot * kips	12 blows / 1" (25 mm)	1000 kN	800 kN

Note: Max 1" (25.4 mm) penetration per set, for 3 consecutive sets

MBA has performed many pile load tests in The City of Winnipeg during the 1960s. It was through these static pile load tests in The City of Winnipeg that the SLS criteria used by all the labs here were established for the geology underlying The Red River Valley and, as such, The City of Winnipeg. As such, when the new ULS criteria was mandated, MBA just reviewed those pile load tests and modified the pile driving criteria based upon the direct relationship between driving energy, deflection for a set number of blows at that energy and ultimate pile capacity to establish the ULS pile capacities based upon these static load tests inside The City of Winnipeg. Furthermore, based upon these static load tests, all design work in the City of Winnipeg from the 1960s onwards was based upon a direct relationship between driving energy, deflection for a set number of blows at that energy and ultimate pile capacity. In the last few years, these pre-cast pile capacities have been also verified to be true through PDA testing. However, these static pile load test reports cannot be forwarded due to the privacy laws in Canada. However, they are on file at MBA. However, as critically mentioned previously though, all the design and construction work, previously implemented from the 1960s onwards, was using the data from these static load tests that did not require to be constantly re-proven from site to site inside of Winnipeg from the 1960s to 2010.

In addition to the aforementioned specifications for driven pre-cast concrete piles, MBA offers the following recommendations:

- Pre-drilling through the zone of frost may be required for winter or early spring construction.
- If a drop hammer is to be used to install these piles, the mass of the hammer shall be 3 times greater than the mass of the pile.

- Pile spacing shall not be less than three pile diameters, on center.
- Piles driven within five pile diameters, on center, shall be monitored for heave and where it is observed; the piles shall be re-driven to the aforementioned refusal criteria.
- Once pile driving is initiated, all piles shall be driven continuously to their respective refusal depth.

The advantages of this piling system are its anticipated extremely short pile length, very heavy allowable axial compressive capacities and minimal magnitude of modeled long-term foundation settlement. The disadvantages of this piling system are its frequently greater cost per foot of pile and the potentially variable depths to practical refusal across this site.

5.0 CONCRETE DESIGN

Due to the low concentration of sulphate in all the depositions encountered at this site, Normal Portland Cement shall be used in all the concrete implemented for this project. The aforementioned foundation systems' concrete shall have a minimum 28-Day laboratory compressive strength of 30 MPa. Furthermore, the concrete shall contain at least 550 pounds of cement per cubic yard, have a maximum water cement ratio, a plastic concrete air content and slump of 0.45, 4 to 6 percent and 60 mm to 100 mm, respectively.

All other concrete exposed to freezing and thawing cycles shall contain an air entraining admixture that corresponds to the applicable class of exposure listed in tables 2-4 of the recent addition of CSA. Concrete poured in cold weather shall be heated and protected in accordance with CSA A23.1-04 clause 21.2.3.

In addition, all concrete poured shall be tested in accordance with CSA A23.1-04 every day and at least once every 50 m^3 per day by a CSA certified concrete testing laboratory.

6.0 SURFACE SLAB ON GRADE CONCRETE FLOOR SLAB DESIGN (stress<20 kPa)

The designated working sub-grade elevation for the proposed addition's concrete slab on grade shall be situated at an approved elevation near existing site grading. As such, all the soil located above the project's recommended working sub-grade elevation shall be excavated and then transported off of the property. In addition, any additional deleterious soil encountered at or below the project's recommended working sub-grade elevation shall also be excavated and then transported off of the site. Next, prior to placing the proposed concrete floor slab's granular base structure, the in-situ, coarse-grained granular fill located at or below the working sub-grade elevation shall then be proof-rolled by a heavy roller until it has at least 95 % of its standard proctor density (SPD). Areas failing the aforementioned proof-roll test and any other deleterious material encountered at or below the working sub-grade elevation shall be verified and documented by the geotechnical engineer's personnel. Predicated upon this consultant's recommendations, the project's slab on grade sub-contractor shall then excavate and replace the documented failed proof-rolled soil and the other deleterious material encountered at or below the working sub-grade elevation with 100 mm or 50 mm down crushed rock fill or another pre-approved equivalent bridging material placed in sufficient 200 mm deep lifts and compacted until each layer has at least 95 % of its SPD.

Next, any segments of the proposed building's footprint naturally lower than the proposed sub-grade elevation, if any, shall then be brought up to the sub-grade elevation implementing either a 100 mm or 50 mm down crushed rock fill, granular C-Base fill or another pre-approved equivalent bridging material, placed in sufficient 150 mm deep lifts and compacted until each layer has at least 95 % of its SPD.

In order to raise the proposed floor up to the underside of the granular base course elevation, the sub-base, consisting of at least two lifts of C-Base, 50 mm or 20 mm down crushed rock fill or another pre-approved equivalent material shall be placed in 150 mm deep layers and compacted until every lift has at least 98 % of its SPD. Finally, the granular

base course, composed of a 150 mm deep lift of A-Base, shall be placed and compacted until it has at least 100 % of its SPD. The 150 mm deep reinforced concrete slab shall then be poured having a slump in the range of 70 mm to 100 mm. The concrete shall have a maximum water cement ratio of 0.45 and contain a water reducing admixture. An elevation drawing of the slab on grade's base structure is illustrated on page 20 of this report.

However, if the structural engineer or owner cannot accept the possibility of differential slab displacement of up to 25 mm and 50 mm, in heated and unheated applications, respectively, then a structurally supported concrete floor slab shall be implemented for this project.

7.0 PAVEMENT DESIGNS

All the soil depositions located above the pavements' designated working sub-grade elevation, as designated by the project's forthcoming civil engineering consultant, shall be stripped and then transported off of the site. In addition, all the deleterious soil encountered at or below the project's recommended working sub-grade elevation, if any, shall also be excavated and then transported off of the site. Next, prior to placing the proposed pavement structures' granular sub-base and base courses, the in-situ coarse-grained granular fill located at or below the working sub-grade elevation, shall then be proof-rolled using a heavy roller until it has at least 95 % of its SPD. Areas failing the aforementioned proof-roll test and any other deleterious material encountered at or below the working sub-grade elevation shall be verified and documented by the geotechnical engineer's personnel. Predicated upon this consultant's recommendations, the project's pavement sub-contractor shall then excavate and replace the documented failed proof-rolled soil and any other deleterious material encountered at or below the working sub-grade elevation with 100 mm or 50 mm down crushed rock fill or another pre-approved equivalent bridging material placed in sufficient 200 mm deep lifts and compacted until each layer has at least 95 % of its SPD.

Next, any segments of the proposed pavement areas naturally lower than the proposed sub-grade elevation, if any, shall then be brought up to the working sub-grade elevation

implementing either a highly plastic silty clay; 100 mm or 50 mm down crushed rock fill; granular C-Base fill or another pre-approved equivalent bridging material, placed in sufficient 200 mm deep lifts and compacted until each layer has at least 95 % of its SPD.

In order to provide adequate structural support in areas designated for heavy truck traffic and the sidewalk's concrete slab, their sub-bases shall consist of at least two layers of 50 mm down crushed rock fill, C-Base fill or another pre-approved equivalent material placed in 150 mm deep lifts and compacted until each layer has at least 98 % of its SPD. However, only one lift of granular sub-base is structurally required for the light car traffic's pavement construction. Alternatively, in all traffic areas, the granular base course shall be composed of a 150 mm deep layer of A-Base, compacted until it has at least 100 % of its SPD. Finally, the light car traffic's asphalt pavement shall be laid in two layers with each lift having a minimum thickness of 32 mm. Similarly, areas with heavier truck traffic shall have 2-45 mm lifts of asphalt pavement. Each asphalt pavement area shall be consolidated until it has at least 98 % of its respective laboratory Marshall Density. An elevation drawing of the car and heavy truck traffic's pavement structures is illustrated on page 21 of this report.

The sidewalk's concrete slab shall have a design thickness of 150 mm, overlying its aforementioned granular base's structural support, and an air-entrainment, slump and water cement ratio in accordance with all the relevant CSA standards in A23.1-04.

The asphalt aggregate shall have a crushed count of >60%. The asphalt shall be placed at a temperature of 125°C to 155°C. The ambient temperature may be no less than 6°C when the asphalt is to be laid. The geotechnical engineer's personnel shall test the asphalt of the following aggregate gradation specifications and physical properties.

METRIC SIEVE SIZE (microns)	(% Passing)
16,000	100
10,000	70 – 85
5,000	55 – 70
2,500	40 – 60
1,250	25 – 50
630	15 – 40
315	5 – 20
160	4 – 11
80	3 – 7

Asphalt Cement, % total sample weight	5.0 % - 6.0 %
Voids in Mineral Aggregate	14% minimum
Air Voids	3.0% - 5.0%
Marshall Stability, N at 60° C	7 kN minimum
Flow Index, units of 250 µm	6.0 – 16.0

The pavement's slope and catch basin placement shall be designed by the project's municipal engineering consultant. Currently, the writer has not been provided the proposed municipal site plan indicating proposed cut and fill depths and, as such, it is unknown if the aforementioned soft silty deposition will be near the project's designated sub-grade elevations. However, if the sub-grade elevations are lowered substantially from the test holes' respective current elevations, then additional excavation and granular fill replacement of this soft silt should be included as a cost per unit of volume in the pavement contractors' respective base bids. Finally, the pavement shall be sufficiently sloped at a minimum grading of 2 % for expedient drainage into catch basins or towards the perimeter of the property.

8.0 SIESMIC ANALYSES

The 2020 NBCC has re-introduced to Manitoba criterion for engineers to obtain, evaluate, calculate and ascertain whether or not a structural engineering seismic analyses is required for any development. MBA has reviewed the 2020 NBCC section 4.18 of division B. Based upon MBA's knowledge of this project, a tower and fertilizer bins to be located at Nutrien Ninga situated along PTH #3 and P.R. #346 near Ninga, Manitoba, would likely have an importance factor of I_e of 1.0. Based upon the depth, estimated undrained shear strength and density (angle of friction) of the underlying glacial till matrix underlying this site down to the shale bedrock, the site coefficient, F_s , would be 1.0, where the average s_u is greater

than 100 kPa and/or N_{60} > 50 over the upper 30 m of soil at this site. Therefore, similarly, the site class, S, would be a class C or higher for this site.

9.0 RECOMMENDATIONS

Predicated upon the soils' aforementioned respective strength parameters, lithology and physical properties, the current and modeled groundwater elevations, if any, the field and laboratory test data, and the proposed structures' anticipated heavy foundation stresses, driven treated Douglas Fir or Lodgepole Pine timber end-bearing piles or driven pre-cast concrete end-bearing piles could be implemented as the foundation design for the proposed tower and fertilizer bins to be located at Nutrien Ninga situated along PTH #3 and P.R. #346 near Ninga, Manitoba. Based upon the aforementioned advantages and disadvantages of these foundation systems, a driven end-bearing piled foundation design would likely be a well performing, more economical and efficient one for the proposed heavily-loaded structures placed on a property with the aforementioned geotechnical design parameters and implemented in an unheated service condition. However, the choice of foundation type implemented for this project will ultimately depend upon their respective, previously described, advantages and disadvantages, estimated installation costs and the applied foundation loads that will be calculated by the project's structural engineering consultant.

It is recommended in the strongest of terms that the geotechnical engineer's personnel inspect the installation of all the foundation elements in order to verify that they all conform with the contents of this report, the structural drawings and the project's specifications.

Any areas of the yard naturally lower in elevation, if any, shall be brought up to its future grade implementing a highly plastic silty clay fill, 50 mm down crushed rock fill, granular C-Base fill or another pre-approved equivalent material, placed in sufficient 200 mm deep lifts and compacted until each layer has at least 95 % of its SPD.

The backfill material around the perimeter of the proposed structure shall be brought up to its future grade implementing either a 20 mm down crushed rock fill; granular C-Base fill; or another pre-approved equivalent material, placed in sufficient 150 mm deep lifts and compacted until each layer has densities in the range of 92 % to 97 % of its SPD.

The selected 50 mm down and 20 mm down crushed rock, A-Base and C-Base gravels implemented for this project shall meet the following gradation specifications:

METRIC SIEVE SIZE (µm)	20 mm Crushed rock (% Passing)	50 mm Crushed rock (% Passing)	A-BASE (% Passing)	C-BASE (% Passing)
50,000		100		
25,000			100	100
20,000	100		80 – 100	
5,000	40 – 70	25 – 80	40 – 70	25 – 80
2,500	25 – 60		25 – 55	
315	8 - 25		13 – 30	
80	6 - 17	5 – 18	5 – 15	5 – 18

The building's superstructure and its concrete main floor, unless constructed as stipulated as described in section 6.0 of this report, should be entirely structurally supported by only one of the aforementioned approved foundation systems. In addition, in all the aforementioned feasible piled foundation designs, a void space, of at least 150 mm in thickness, shall be constructed under all pile caps, grade beams and/or walls to allow for the potential expansive capability of the various filled and alluvial depositions underlying this site. A structurally supported concrete main floor shall overlay either a minimum 600 mm deep vented crawlspace or a minimum 150 mm thick biodegradable void form. The surface of any crawlspace shall be covered by a minimum 100 mm deep layer of clean sand fill overlying a 6 mm thick impervious poly vapour barrier. Lastly, the writer understands that a basement and/or crawl space are not intended for the proposed structure.

All the various proposed asphalt pavement surfaces shall be constructed as per the recommendations outlined in section 7.0 of this report. Furthermore, the pavement contractor shall also take precautions to prevent the fine-grained sub-grade soil from the following conditions; freezing, excessive soil moisture loss or gain, water ponding and heavily loaded axle traffic. In addition, the granular fill placed for this project shall be free of frost, frozen material and placed at an ambient air temperature of at least 6° Celsius. In order to verify compliance with the aforementioned standard proctor and Marshall Density specifications, field compaction tests shall be taken on every lift of granular material and asphalt placed for this project, respectively. All concrete poured shall be tested in accordance with CSA A23.1-04 every day and at least once every 50 m^3 per day by a CSA Certified concrete testing laboratory.

In order to minimize frost penetration under the building, 50 mm thick rigid horizontal insulation, or another pre-approved equivalent frost protection, shall be placed around the structure's entire exterior. This insulation shall be placed along the faces of the proposed building out to a distance 1200 mm away from it at a depth of 300 mm below future ground elevation and also along the outside faces of the structure's exterior concrete grade beams.

If any of the aforementioned design elements are modified or deleted, please contact the undersigned to determine if that course of action will be acceptable.

In addition, MBA respectfully requests an opportunity to review all the relevant finalized structural drawings and the project's foundation and materials testing specifications for this project in order to verify their conformance with the contents of this report.

The test holes drilled during the investigation represent only those specific areas tested. The soil conditions on this site may vary from that described in this report. Should that situation occur, please contact this office for further instructions.

All the geotechnical engineering design recommendations presented in this report are predicated upon the assumption that a sufficient degree of inspection will be provided during the project's construction and that a qualified and experienced foundation contractor properly installs an aforementioned pre-approved, engineered and sealed foundation type.

Any uses which a third party makes of this report, or any reliance on decisions to be made based on it, are the sole responsibility of such third parties. MBA accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based upon this report.

Yours Truly,
M. Block & Associates Ltd.

Jeffrey Block, P. Eng., Senior Geotechnical Engineer

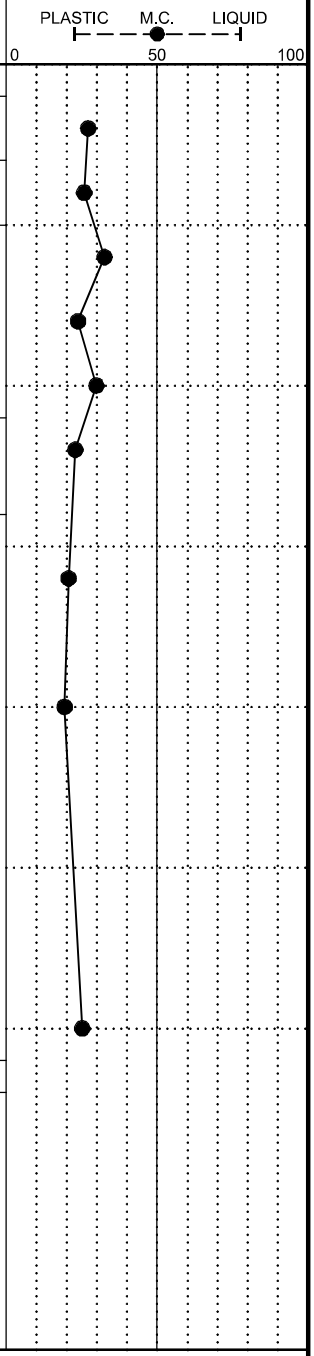
M. Block & Associates Ltd.
2484 Ferrier Street
Winnipeg, Manitoba, R2V 4P6
Telephone: 204-334-5356
Fax: 204-339-7976

TEST HOLE NO.: 1

Sheet 1 of 1

Client:	KPIC Maintenance Services Inc.	Job No.: 2025-2517	Logged By:	J. Block, P. Eng.	Date: 12/6/25
Project:	tower and fertilizer bins		Reviewed By:	J. Block, P. Eng.	Time: 10:00 AM
Location:	along PTH #3 & P.R. #346 near Ninga, Manitoba	Elevation: GRADE	Drawing Number:	6166	

Depth, ft	Sample Type	Sample Number	USCS	Graphic Log	MATERIAL DESCRIPTION
0.0			SPG		Brown, damp, silty gravelly SAND FILL
		1	CL		Black, alluvially deposited, stiff, moist, clayey SILT
		2	CL		Grey, alluvially deposited, firm, moist, clayey SILT
2.5		3	ML		Brown, alluvially deposited, soft, saturated, sandy SILT - Moderate soil sloughing and groundwater seepage
		4			
5.0		5			
		6	CI		Brown,stiff, moist, compact, clayey sandy SILT with potential cobbles and boulders (GLACIAL TILL)
7.5		7	SM		Brown, alluvially deposited, saturated, poorly-graded, silty SAND - Moderate soil sloughing and groundwater seepage
10.0		8			
12.5					
15.0		9			
			SHALE		Grey, heavily overconsolidated, very stiff to hard, damp, SHALE BEDROCK
17.5					16' - Auger refusal on suspected SHALE BEDROCK; - Upon completion, the groundwater & sloughed soil was measured at the 3'6" and 11'6" depths, respectively
20.0					



SAMPLE TYPE SYMBOLS

- Split Spoon
- Shelby Tube
- Vane Shear
- Auger Cuttings
- Grab Sample
- Rock Core

Drill Rig:	Track-mounted B57X drill rig
Auger:	5" dia. continuous flight augers
Contractor:	Maple Leaf Drilling Ltd.

WATER LEVELS

▽ Phreatic Surface #1:	3.5 ft

TEST HOLE LOG 2025-2517-KPIC-GEOTECHNICAL INVESTIGATION REPORT FOR THE PROPOSED NUTRIEN PROJECT NINGA - JUNE 2025.GPJ M BLOCK ASSOC.GDT 17/6/25

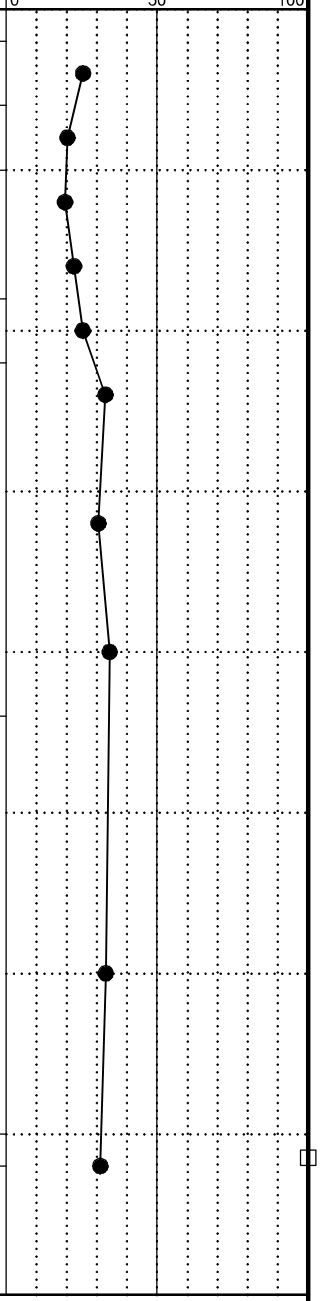
M. Block & Associates Ltd.
2484 Ferrier Street
Winnipeg, Manitoba, R2V 4P6
Telephone: 204-334-5356
Fax: 204-339-7976

TEST HOLE NO.: 2

Sheet 1 of 1

Client:	KPIC Maintenance Services Inc.	Job No.:	2025-2517	Logged By:	J. Block, P. Eng.	Date:	12/6/25
Project:	tower and fertilizer bins			Reviewed By:	J. Block, P. Eng.	Time:	11:00 AM
Location:	along PTH #3 & P.R. #346 near Ninga, Manitoba	Elevation:	GRADE	Drawing Number:	6166		

Depth, ft	Sample Type	Sample Number	USCS	Graphic Log	MATERIAL DESCRIPTION
0.0			SPG		Brown, damp, silty gravelly SAND FILL
		10	CL		Black, alluvially deposited, stiff, moist, clayey SILT
		11	CL		Grey, alluvially deposited, firm, moist, clayey SILT
2.5		12	ML		Brown, alluvially deposited, soft, wet, sandy SILT - Moderate soil sloughing and groundwater seepage
▽		13			
5.0		14	Cl		Brown,stiff, moist, compact, clayey sandy SILT with potential cobbles and boulders (GLACIAL TILL)
		15	Cl		Brown, very stiff, damp, very dense, clayey sandy SILT with potential cobbles and boulders (GLACIAL TILL)
7.5		16			
10.0		17			
			SM		Brown, alluvially deposited, saturated, poorly-graded, silty SAND - Moderate soil sloughing and groundwater seepage
12.5					
15.0		18			
17.5			SHALE		Grey, heavily overconsolidated, very stiff to hard, damp, SHALE BEDROCK
		19			18' - Auger refusal on suspected SHALE BEDROCK; - Upon completion, the groundwater & sloughed soil was measured at the 3'6" and 11'6" depths, respectively
20.0					



SAMPLE TYPE SYMBOLS

- Split Spoon
- Shelby Tube
- Vane Shear
- Auger Cuttings
- Grab Sample
- Rock Core

Drill Rig:	Track-mounted B57X drill rig
Auger:	5" dia. continuous flight augers
Contractor:	Maple Leaf Drilling Ltd.

WATER LEVELS

▽ Phreatic Surface #1: 3.5 ft

TEST HOLE LOG 2025-2517-KPIC-GEOTECHNICAL INVESTIGATION REPORT FOR THE PROPOSED NUTRIEN PROJECT NINGA - JUNE 2025.GPJ M BLOCK ASSOC.GDT 17/6/25

M. Block & Associates Ltd.
2484 Ferrier Street
Winnipeg, Manitoba, R2V 4P6
Telephone: 204-334-5356
Fax: 204-339-7976

TEST HOLE NO.: 3

Sheet 1 of 1

Client:	KPIC Maintenance Services Inc.	Job No.:	2025-2517	Logged By:	J. Block, P. Eng.	Date:	12/6/25
Project:	tower and fertilizer bins			Reviewed By:	J. Block, P. Eng.	Time:	12:30 PM
Location:	along PTH #3 & P.R. #346 near Ninga, Manitoba	Elevation:	GRADE	Drawing Number:	6166		

Depth, ft	Sample Type	Sample Number	USCS	Graphic Log	MATERIAL DESCRIPTION
0.0			SPG		Brown, damp, silty gravelly SAND FILL
		20	CL		Black, alluvially deposited, stiff, moist, clayey SILT
		21	CL		Grey, alluvially deposited, firm, moist, clayey SILT
2.5		22	ML		Brown, alluvially deposited, soft, wet, sandy SILT
		23	CI		Brown,stiff, moist, compact, clayey sandy SILT with potential cobbles and boulders (GLACIAL TILL)
5.0		24			
		25	CI		Brown, very stiff, damp, very dense, clayey sandy SILT with potential cobbles and boulders (GLACIAL TILL)
7.5		26			
10.0		27			
12.5					
15.0		28			
▽			SM		Brown, alluvially deposited, saturated, poorly-graded, silty SAND - Moderate soil sloughing and groundwater seepage
			SHALE		Grey, heavily overconsolidated, very stiff to hard, damp, SHALE BEDROCK
17.5		29			17'6" - Auger refusal on suspected SHALE BEDROCK; - Upon completion, the groundwater & sloughed soil was measured at the 16' depth
20.0					

UNDRAINED SHEAR STRENGTH (psf)
Pocket Pen ☐
0 3000 6000
PLASTIC M.C. LIQUID
0 50 100

SAMPLE TYPE SYMBOLS

- Split Spoon
- Shelby Tube
- Vane Shear
- Auger Cuttings
- Grab Sample
- Rock Core

Drill Rig:	Track-mounted B57X drill rig
Auger:	5" dia. continuous flight augers
Contractor:	Maple Leaf Drilling Ltd.

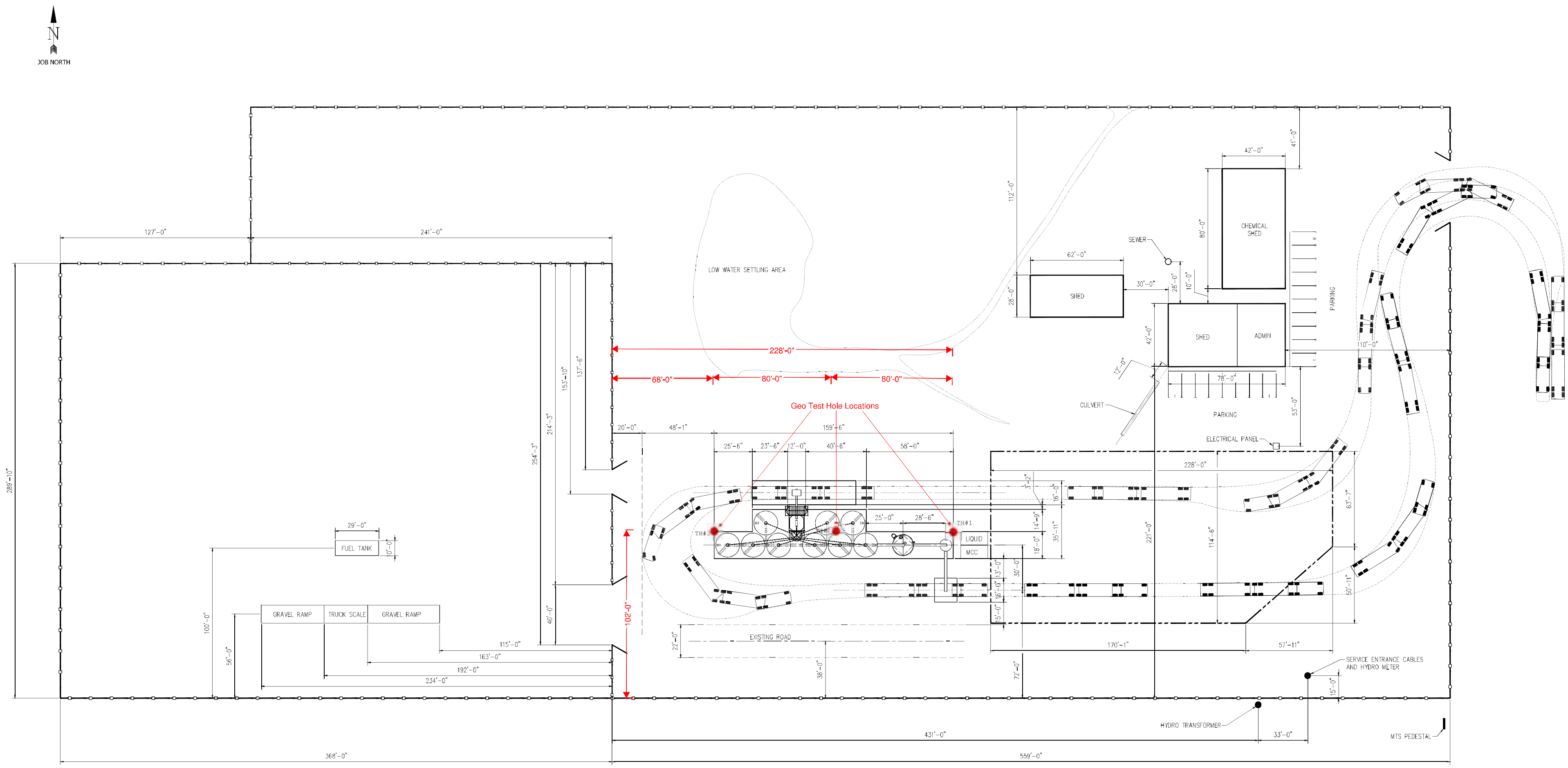
WATER LEVELS

▽ Phreatic Surface #1: 16.0 ft

TEST HOLE LOG 2025-2517-KPIC-GEOTECHNICAL INVESTIGATION REPORT FOR THE PROPOSED NUTRIEN PROJECT NINGA - JUNE 2025.GPJ M BLOCK ASSOC.GDT 17/6/25

DWG. SIZE = ARCH D

C:_Vault_2025\CAD\04_series\04-25-018_Nutrien_RF_Ninga_MB\04-25-018JG001.dwg\G001RD   Jun-10-2025   12:08:55 PM



REV	BY	DATE	DESCRIPTION
D	MS	06/10/2025	GENERAL REVISION
C	MS	06/05/2025	ADDED DIMENSIONS
B	MS	06/04/2025	GENERAL REVISION
A	MS	05/30/2025	ISSUED FOR REVIEW – PRELIMINARY NOT FOR CONSTRUCTION

MECH: N/A — STRUCT: — CLIENT: N/A — P. MGR: — PIPING: N/A — PROCESS: N/A

[redacted]

WORK IN PROGRESS DRAWING INCOMPLETE

PRELIMINARY NOT FOR CONSTRUCTION

TITLE: RELOCATED FERTILIZER FACILITY SITE PLAN –

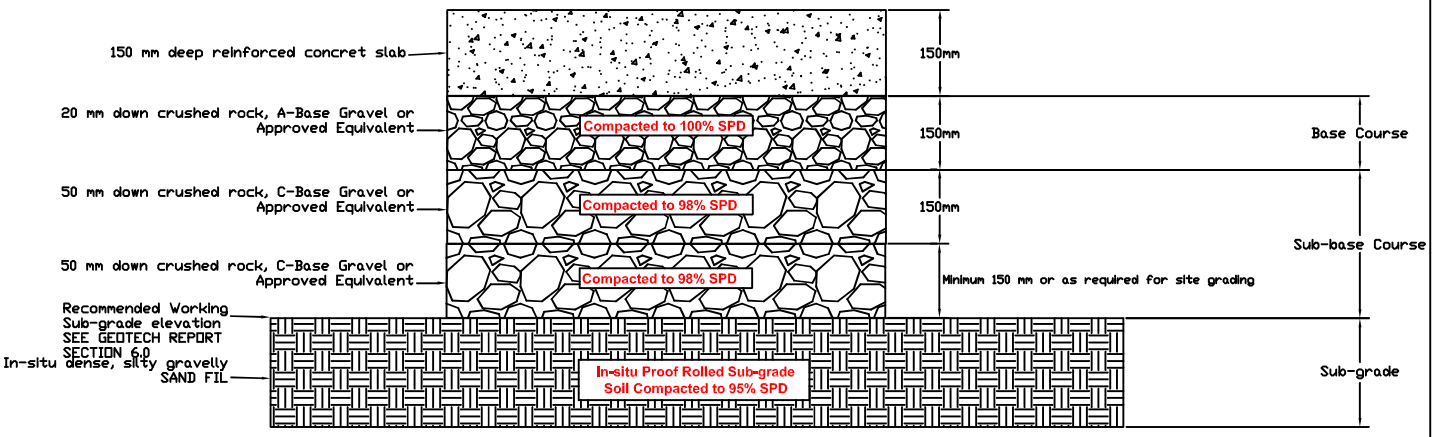
CLIENT: Nutrien

LOCATION: NINGA, MB

DRAWN BY: MS
DATE: MAY 2025
SCALE: AS NOTED
JOB NO: 04-25-018J
DWG NO: G001
REVISION: D

FWS
FWS INDUSTRIAL PROJECTS CANADA LTD.
275 Commerce Drive
Winnipeg, MB R3P 1B3
(204) 487-2500 TEL
(204) 487-2900 FAX

SURFACE CONCRETE SLAB-ON-GRADE FLOOR DESIGN



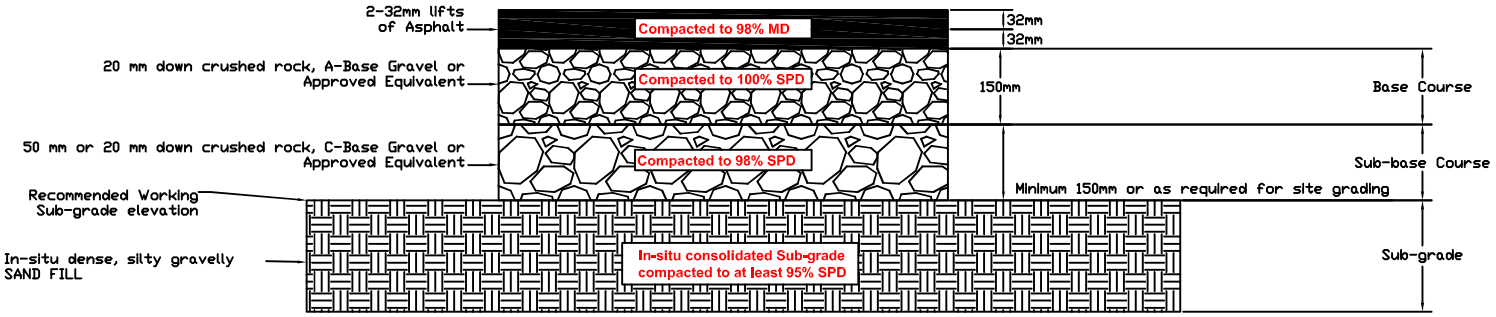
M. Block & Associates Ltd.
2484 Ferrier Street
Winnipeg, Manitoba
R2V 4P6
Phone: (204)-334-5356
Fax: (204)-339-7976

Drawing: Surface Slab-on-grade Design
Drawn By: TG/JB
Reviewed By: J. Block, P. Eng.

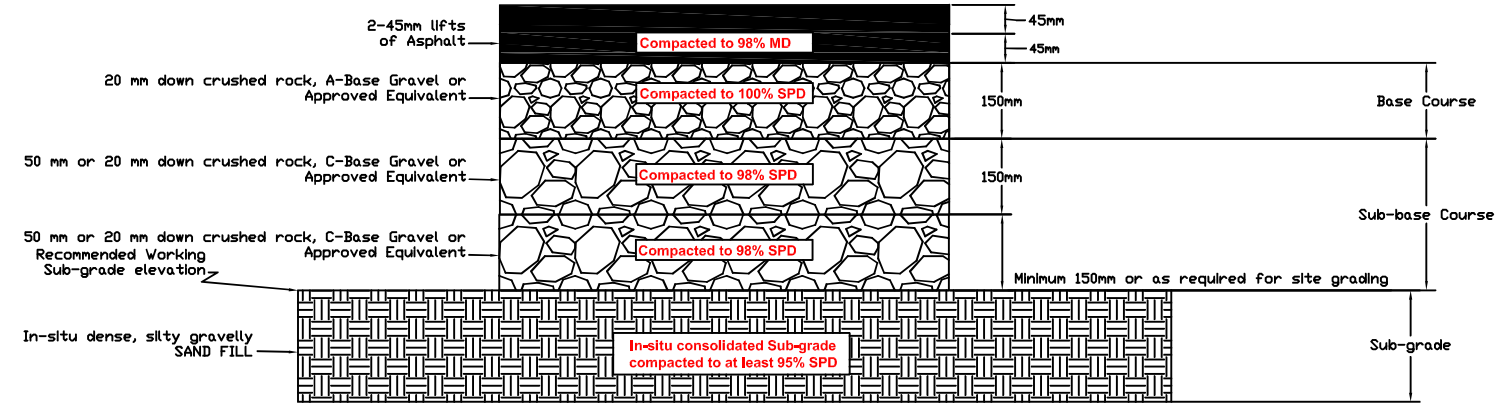
Project: Nutrien Ninga, Ninga, Manitoba
Project Number: 2025-2517
Drawing Number: 6166

PAVEMENT DETAILS

Car Traffic Areas



Truck Traffic Areas



M. Block & Associates Ltd.
2484 Ferrier Street
Winnipeg, Manitoba
R2V 4P6
Phone: (204)-334-5356
Fax: (204)-339-7976

Drawing: PAVEMENTS' STRUCTURES
Drawn By: J. Block, P. Eng.
Reviewed By: J. Block, P. Eng.

Project: Nutrien Ninga, Ninga, Manitoba
Project Number: 2025-2517
Drawing Number: 6166

Borehole	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
1	1.0							27.1			
1	2.0							25.8			
1	3.0							32.5			
1	4.0							23.8			
1	5.0							29.8			
1	6.0							22.9			
1	8.0							20.6			
1	10.0							19.3			
1	15.0							25.1			
2	1.0							25.4			
2	2.0							20.2			
2	3.0							19.4			
2	4.0							22.4			
2	5.0							25.3			
2	6.0							32.8			
2	8.0							30.5			
2	10.0							34.2			
2	15.0							32.9			
2	18.0							31.1			
3	1.0							10.3			
3	2.0							12.5			
3	3.0							14.1			
3	4.0							18.8			
3	5.0							19.7			
3	6.0							24.9			
3	8.0							27.9			
3	10.0							27.0			
3	15.0							37.1			
3	17.5							36.1			

M. Block & Associates Ltd.
2484 Ferrier Street
Winnipeg, Manitoba, R2V 4P6
Telephone: 204-334-5356
Fax: 204-339-7976

Summary of Laboratory Results

Client: KPIC Maintenance Services Inc.
Project: tower and fertilizer bins
Location: along PTH #3 & P.R. #346 near Ninga, Manitoba
Number: 2025-2517

Description of Environment Impact and Mitigation Measures

ERAP Plan (AWSA) and E2 plan (ACOP) clearly outline the liability and requirements by Nutrien Ag Solutions, partners, and associated parties during an Emergency Incident. This involves, and is not limited to Emergency Controls, Communication, and Handling instructions in the event of an event that produces potential for waste material. The plan also outlines all adjacent land owners, local residents and communities that might be impacted. These plans are updated annually, reviewed annually, or when there is a change required.

Agrichemical Warehousing Standards Association (AWSA) and Seed Emergency Response Plan

OWNER: Nutrien Ag Solutions Canada **ELEMENT: Risk Management**

REVISION: #05 // REVISION DATE: 03-08-2023

TABLE OF CONTENTS

REQUIREMENTS

EMERGENCY PRE-FIRE PLAN

The greatest risk to the environment with a warehouse fire is spreading of materials off site by water or foam used to fight the fire. Because of firefighting efforts, diking and damming of any runoff of water or foam must be implemented. Every effort to block off all culverts and water runs should take place to prevent any contaminated run off from entering dug outs, sloughs or streams. Run off should be contained to Retail sites.

1. FACILITY INFORMATION

BRANCH ID

7209 - Ninga MB

ADDRESS

Ninga

R0K 1S0

SE 6-3-18 W1

PHONE NUMBER

204-534-6806

MUSTER POINT FOR YOUR FACILITY

Main office east end of site

2. EMERGENCY CONTACT NUMBERS

POSITION	NAME	DAY/NIGHT/CELL
Facility Manager	Kevin Nicholson	204-534-6806/ 204-534-6806
Alternate Contact	James Spurrill	204-534-6806/ 204-305-0304
General Manager	Sara Cockerill	403-690-6835
Area Manager	Kyle Bates	204-403-371-7709
Safety, Health and Environment (SH&E) Advisor	Henry Nickel	204-823-1696
Police	Killarney RCMP	911/ 204-523-7255
Fire Department	killarney- Turtle Mountain	911
Ambulance	Killarney Ambulance	911
Hospital	Tri-Lake Health Centre	911/ 204-523-4661
Poison Control Centre	Saskatchewan	1-866-454-1212

Poison Control Centre	Saskatchewan	1-866-454-1212
Poison Control Centre	Manitoba	911 or 204-787-2591
Poison Control Centre	Alberta	1-800-332-1414
Environment	Saskatchewan	1-800-667-7525
Environment	Manitoba	1-855-944-4888
Environment	Alberta	1-780-422-4505/1-800-222-6514
Nutrien Ag Solutions 24-Hour		**1-800-792-8311**

3. EMERGENCY REPORTING

As soon as practical notify:

- 911 to alert RCMP, Fire & Paramedics
- The company 24-hour incident call center phone number **1-800-792-8311**
- Provincial Environment
- Transport Canada or Alberta Transport (if the incident involves transportation)
- Provincial OHS

CONTAINMENT PLAN

The Local Fire Authority has been contacted and advised of our fire control tactics explained in **Appendix A** of this plan.

Chemical Storage Warehouse Containment Information

Identifier	Width	Length	Curb Height	Containment Capacity	Estimated Product Stored at full Capacity
Ninga AWSA	40ft	80ft	6in	45280L	40776L

4. FACILITY AND SURROUNDING AREA DESCRIPTION

FACILITY SITE PLAN:

Create a facility site plan (**Attach to this plan, Appendix B**) illustrating:

- Access and Emergency Exits
- Emergency Equipment
- Emergency Shut-off Locations (Power & Gas)

- Runoff water flow directions
- Secondary Containment

SURROUNDING LAND USE DRAWING:

Utilizing Rural Municipality, Town or City Maps define a 1.6-kilometer (1 mile) radius around the storage facility to create a Surrounding Land Use Drawing (**Attach to this plan, Appendix C**) of the area that may be affected by an environmental emergency.

a) Indicate all residences, hospitals, schools, commercial or industrial buildings, highways, roads, environmentally sensitive areas including water sources or water bodies (ponds, irrigation canals, lakes, etc.) parks, forests, wildlife habitats within the radius.

b) Highlight and indicate by establishing an alpha-numeric reference for all residences, hospitals, schools and commercial or industrial buildings.

c) Develop a contact list **(Attach to this plan, Appendix D)** referencing all indicated properties identified above include contact names and phone numbers for the occupants referenced by the alpha-numeric character established.

5. RISK ANALYSIS

EVENT	EXAMPLE OF POSSIBLE CAUSES	IMMEDIATE CONSEQUENCES	CONTROL MECHANISM TO ELIMINATE/ REDUCE	PREVENTATIVE MEASURES
1. FIRE	Electrical Heater	Smoke/Fumes generated from the fire and runoff	Initiate Emergency Reporting	Pre-Planning Monthly Inspections
2. SPILL	Puncture/Leak	Inhalation Hazard Environmental Impact	Clean up spill according to the requirements of the SDS and Release Response Report Standard Sec3.3.3	Training and observations
3. MAJOR INJURY	Employee Exposure to Chemical, Struck by object	Personal Injury	Emergency First Aid Initiate Emergency Reporting	Training, Observations and Operating Procedures

HAZARDS

The Hazard Recognition Standards can be referenced for additional hazards and controls at this facility.

6. ON-SITE RESOURCES

LOCATION AND TYPES OF WATER SUPPLIES:

Sprinklers

None

Hydrant Thread Type/Capacity/Water Pressure/Flow Rates

None

Reservoirs approximate gallons

Holding pond in middle of the site

RESPONSE EQUIPMENT (include details of quantity, make, exact location stored)

Powered Mobile Equipment

Propane forklift (chem warehouse), mobility and skid steer (shop area)

Site Communication

Cell phones, air horns in all buildings,

Spill Control

Skid steer on site to move dirt/ gravel

First Aid Equipment / Eye Wash

Main office has large first aid kit in the washroom. All vehicles have first aid kits, Nh3 office has first aid kit and eye wash, safety water at all transfers points at the bullet has eye wash bottles

Personal Protective Equipment

Extra suits and respirators in main office and shop cabinet

7. SERVICES PROVIDED BY CONTRACTORS

Spill Containment Equipment (earth moving, diking, etc.)

Pumps- on site and Killarney-Turtle Mountain Fire Department
Dike on north and west side of Warehouse
Absorbent in warehouse and shop

Other Emergency Equipment or Expertise

Safety Data Sheets located in office and online

8. ASSIGNED POSITIONS OF ON-SITE EMERGENCY PERSONNEL

EMERGENCY COORDINATOR

The role of the Emergency Coordinator is to co-ordinate the activities of Nutrien Ag Solutions personnel with other emergency response organizations involved in the emergency response effort. The responsibilities of this position are:

- Ensure that personal are aware of and understand the emergency plan.
- Ensure the safety of personnel during an incident.
- Coordinates communication activities with Head office, residents, and news agencies.
- Ensures that all necessary resources (i.e. equipment, materials, personnel, etc.) are made available for an effective response.
- Ensures that personnel understand the reporting structure between them and the external emergency responders.
- Ensure all personnel are accounted for.
- Maintain an activity log of incident.

In the event of an incident the Emergency Coordinator shall:

1. Conduct initial notifications as per Section 2.
2. Determine Affected Zones and Scene Security Plan
    a. Notify affected people/entities.
    b. Determine on site personal shelter in place or evacuation.
3. In conjunction with local authorities and the on-call coordinator establish an action plan:
    a. Identify responders.
    b. Determine the decontamination plan.
    c. Identify PPE requirements.
    d. Determine responders' objectives.
    e. Determine equipment required to achieve objectives.
    f. Develop a communication plan.

Name:	Kevin Nicholson
Address:	Box 1240
Phone Numbers:	204-534-6806/ 204-523-6397

Alternate

Name:	James Spurrill
Address:	Box1240
Phone Numbers:	204-534-6806/ 204-305-0304

ON-SITE EMERGENCY PERSONNEL

The role of on-site personnel is to perform duties assigned by the emergency coordinator to include but not limited to:

- Respond to an incident if appropriately trained and capable.
- Establish a perimeter to control access.
- Collect incident information.
- Conduct notifications to affected people/entities.

9. RESPONSIBILITIES OF LOCAL FIRE DEPARTMENTS

- Local fire departments to participate in development of Emergency Action Plan and sign-off on the plan every year. Discuss what happens when someone calls 9-1-1.
- Local fire departments should be invited to inspect your facility at least once a year.
- They should be familiar with your Emergency Action Plan and should be given advance information on quantities, locations, and type of hazardous material in the facility.
- Establish with the Fire Department their rescue capabilities for confined space and high angle rescue.
- Discuss "Controlled Burn" recommendation and control tactics with Fire Department. (see Appendix A)

10. REMEDIAL/RECOVERY MEASURES

If a situation does occur that requires remedial action, locations will work in conjunction with internal and external resources. Recovery operations at the site will include:

- Assessment, repair, and replacement of damaged structures.
- Restoring services such as power, heat and communications.
- Restoring systems to operational status.
- Clearing access routes.
- Assessment and repair of any environmental impact.

Recovery operations for the facility:

- Investigate and conduct reporting of the incident.
- Medical assessment/stress counseling.
- Finalizing of any litigation.
- Identify and implement corrective actions.

11. SIGN OFF

DATE OF CURRENT EMERGENCY PLAN: Sep 11, 2024 8:43 AM

FACILITY MANAGER: [redacted] (signature) Sept 11/2024 (date)

FIRE DEPT. OFFICIAL: [redacted] (signature) Sept 11/2024 (date)

NAME OF FIRE DEPARTMENT KILLARNEY TURTLE MOUNTAIN FIRE DEPT.

NEXT SCHEDULED REVIEW OR UPDATE Sep 12, 2025

REFERENCES

1. Agrichemical Warehousing Standards Association (AWSA) Protocols
2. Provincial Occupation Health and Safety Regulations/Codes

APPENDICES

1. Appendix A – Fire Control Tactics
2. Appendix B – Site Drawing showing Emergency Routes, Secondary Containment and Drainage
3. Appendix C – Surrounding Land Use Drawing
4. Appendix D – Surrounding Land Use Drawing Contact List
5. Appendix E – Distribution of the Plan

APPROVAL AND REVISION HISTORY

Revision Number	Revision Date (DD-MM-YYYY)	Description of Revision(s)	Owner
#01	09-09-2020	Initial release.	Nutrien Ag Solutions
#02	15-11-2021	Updated supplier emergency numbers in section D page 3.	Nutrien Ag Solutions
#03	18-01-2022	Removed references to the Handi-Plan. We are no longer ordering them from Asmark.	Nutrien Ag Solutions
#04	16-01-2023	No changes to the template at this time	Nutrien Ag Solutions
#5	03-08-2023	Mirror the format of the Environmental Emergency (E2) Plan and set it up in EtQ.	Nutrien Ag Solutions

Appendix A

Fire Control Tactics

Analysis of major fires over the past 15 years that involved pesticides in prepackaged containers indicate that these products in and of themselves do not constitute a special risk when stored in industrial type warehouses. In no case was there any evidence to suggest that the pesticide, even with a flammable formulation provided the source of ignition or the cause of the fire. Occasionally however, pesticides do become involved when a fire erupts in a facility, when this occurs special fire control tactics are required.

Experience from documented incidents involving pesticides in structural fires has shown that standard fire-fighting techniques can create additional and more serious problem than posed by the original fire.

A typical industrial occupancy, storing or processing pesticides will have a combination of various formulations which can range from relativity non – toxic, non – flammable products to those which are either extremely toxic, highly flammable or both. It must be assumed when developing and implementing emergency response plans for these facilities that fire control and extinguishments of these products must address the worst of these products.

Environmental Concerns

Historical evidence has shown that environmental damage, resulting from fires involving pesticides increases in proportion to the volumes of water used in an attempt to control and extinguish the fire. First and foremost is the fact that the resulting effluent is normally heavy clay soils with diking. Secondly, product of incomplete combustion due to low temperature burns, tend to be substantially more toxic and less stable than the original compounds.

Air quality during a pesticide fire, at or near ground level, will deteriorate dramatically as the combustion temperature is reduced. A combustion temperature of 982 degrees Celsius for example provides complete thermal decomposition of pesticides with resulting emissions of primarily carbon and water. At this temperature all contaminants are carried into the high atmosphere where dispersion ensures that toxic levels at or near ground level do not occur.

As the combustion temperature is reduced, various noxious and toxic gases can be created, in addition, steam generated from the addition of water to the fire carries contaminated particles into lower levels of the atmosphere where they return quickly to the ground. As an example, air dispersion models run on pesticides indicate that where exit temperatures drop from 650 degrees Celsius to 400 degrees Celsius, the level of ground level contaminants rises by a factor of three.

Life Safety Concerns

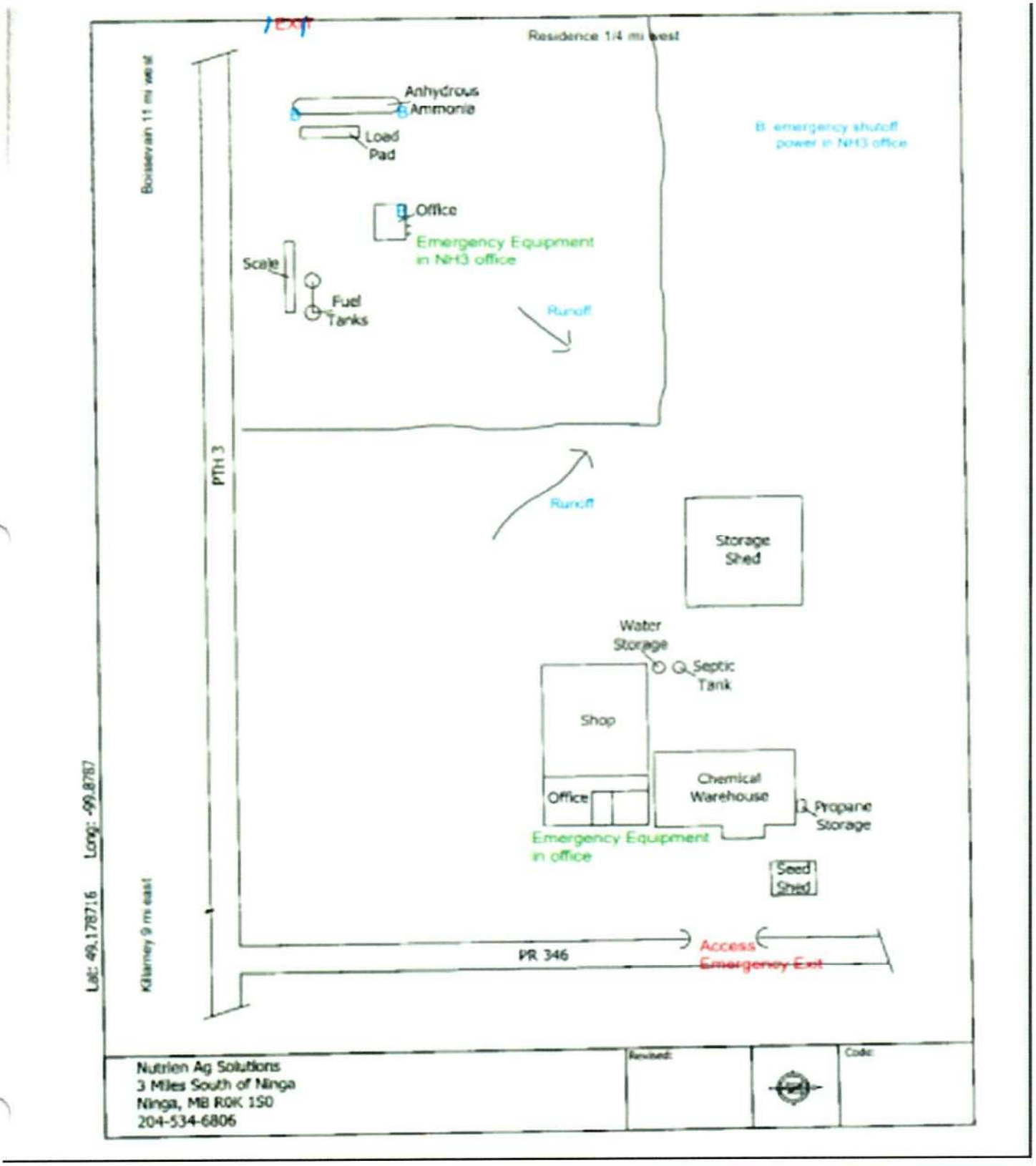
Protection of first responders and the public is a major concern with fires involving pesticides. Historically, pesticides have not been the cause of serious casualties among the public and First Responders who have been adequately trained.

As demonstrated in the previous discussion on air quality, the management of respirable contaminants at ground level hinges on the temperature of combustion, and the exit temperatures from a structure. When fires have been allowed to burn at high temperatures, the risk has been lowered significantly. First responders at an incident involving pesticides must be protected with a minimum of self – contained breathing apparatus and standard turn – out gear. If a facility is fully involved or free burning, life safety is greatly enhanced by remaining outside the structure upwind of smoke and exhaust gases to protect exposures of other buildings while the pesticide structure burns itself out.

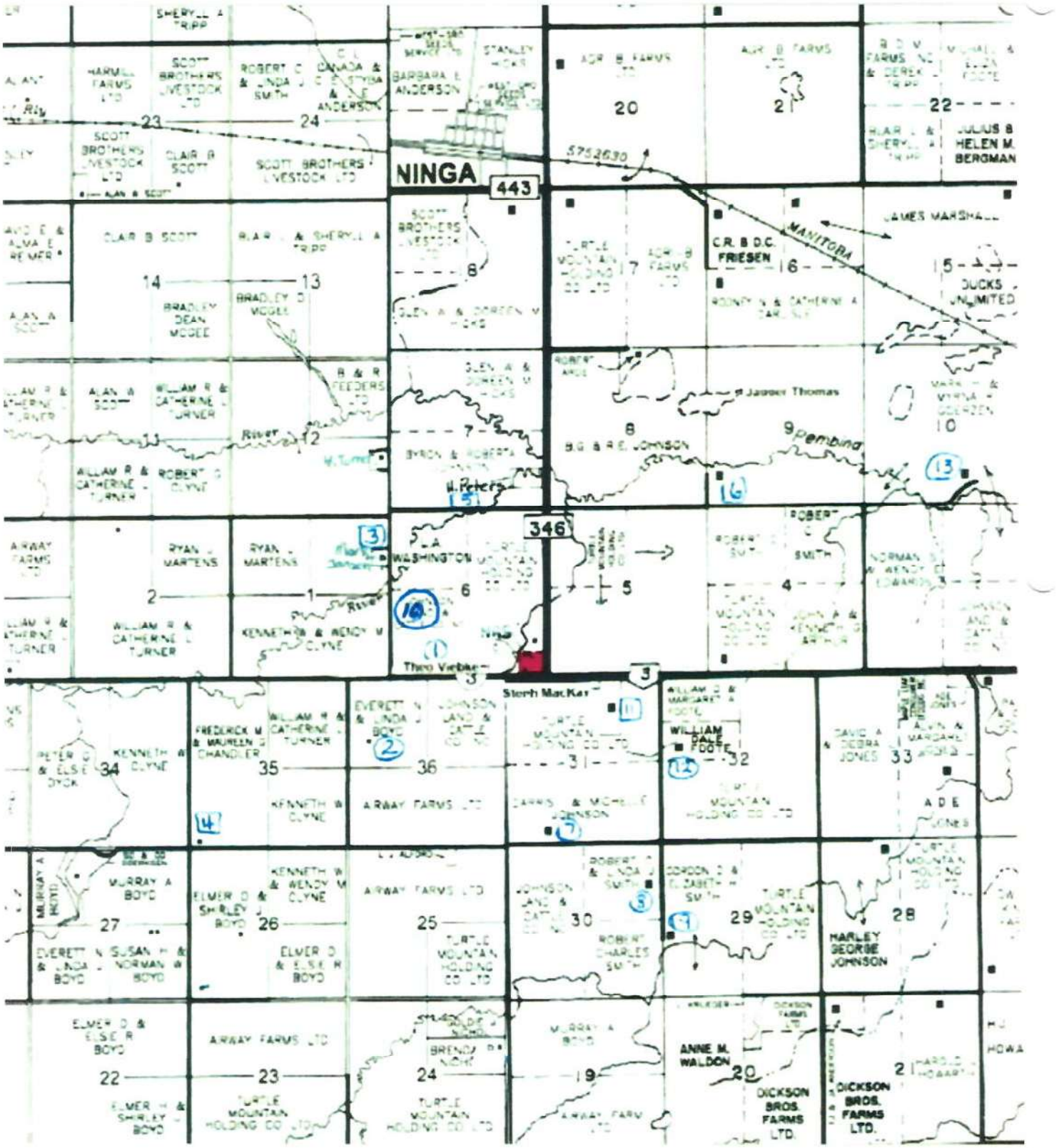
Fire Control Facts

Fire control tactics where pesticides are involved, should follow protocols developed by the National Fire Academy of the U.S. Federal Emergency Management Agency. Where an incident cannot be addressed at the incipient stage, and where it is possible to ventilate and let burn, the fire control tactics must be given serious consideration.

APPENDIX B – FACILITY SITE PLAN



APPENDIX C – LAND USE



APPENDIX D – OCCUPANCY LIST

Reference number	Name	Location	Phone Number	Contact procedure
1	Harrey Hodgens	1/4 west	204-215-0162	call
2	Everett Boyd	1 w 3/4 south	204-534-7825	call
3	Mark Janzen	1w 3/4 north	204-305-0115	call
4	Rick Chandler	2w 1 south	204-534-6751	call
5	Harvey Peters	1 north	431-734-1987	call
6	Jagger Thomas	1n 1 east	204-871-4496	call
7	Darris Johnson	1 south	204-534-8209	call
8	Bob Smith	1.5s 1 east	204-534-2520	call
9	Gordon Smith	1.5s 1 east	204-534-7933	call
10	Kieran Johnson	1w 1/2 north	204-305-0107	call
11	Stephanie Mackay	3/4 east	780-718-8993	call
12	Dale Foote	1e 1/2 south	204-534-7954	call
13	Mark Goerzen	2.5e 1 north	204-534-6271	call

APPENDIX E - DISTRIBUTION

Name	Organization	Phone
Troy Cuvelier	Fire Department	204-534-8065
Killarney RCMP	RCMP Detachment	204-523-7255
Ambulance	Killarney Ambulance	call 911
RM Killarney Turtle Mountain	Municipality	204-523-7247
Kevin Nicholson	Branch Manager	204-523-6397

AWSA
Agrichemical Warehousing Standards Association

Emergency Response Numbers

In case of a fire, spill, damaged containers or other medical emergencies, report immediately to the emergency number of the product manufacturer. If a company cannot be reach call:

CANUTEC – 888-226-8832 or 613-996-6666 or *666 on cellular phones.

ADAMA Agricultural Solutions Canada Ltd.
877-250-9291 or 855-264-6262

Albaugh Canada Inc.
CHEMTREC (800-424-9300)

AMVAC Chemical Corporation
800-454-2673 or CHEMTREC (800-424-9300)

BASF Canada
800-454-2673 or CANUTEC (888-226-8832)

Bayer Inc.
800-334-7577

Belchim Crop Protection Canada
866-336-2983 or CHEMTREC (800-424-9300)

Corteva Agriscience Canada
CANUTEC (888-226-8832)

FMC Canada
866-831-7485 or CHEMTREC (800-424-9300)

Gowan Canada
CHEMTREC (800-424-9300)

Interprovincial Co-operative Ltd.
CANUTEC (888-226-8832)

Loveland Products Canada Inc.
800-561-8273 or CANUTEC (888-226-8832)

N.M. Bartlett Inc.
CANUTEC (888-226-8832)

NovaSource
CHEMTREC (800-424-9300)

Nufarm Agriculture Inc.
CHEMTREC (800-424-9300)

Petro-Canada Lubricants / Suncor
403-296-3000

Plant Products Inc.
CANUTEC (888-226-8832)

Premier Tech Home and Garden
800-268-2806

Scotts Canada
800-668-5669

Syngenta Canada Inc.
800-327-8633

United Agri Products Ltd.
800-561-8273 or CANUTEC (888-226-8832)

UPL AgroSolutions Canada
866-303-6952 or CHEMTREC (800-424-9300)

Winfield United Canada Inc.
306-222-6978

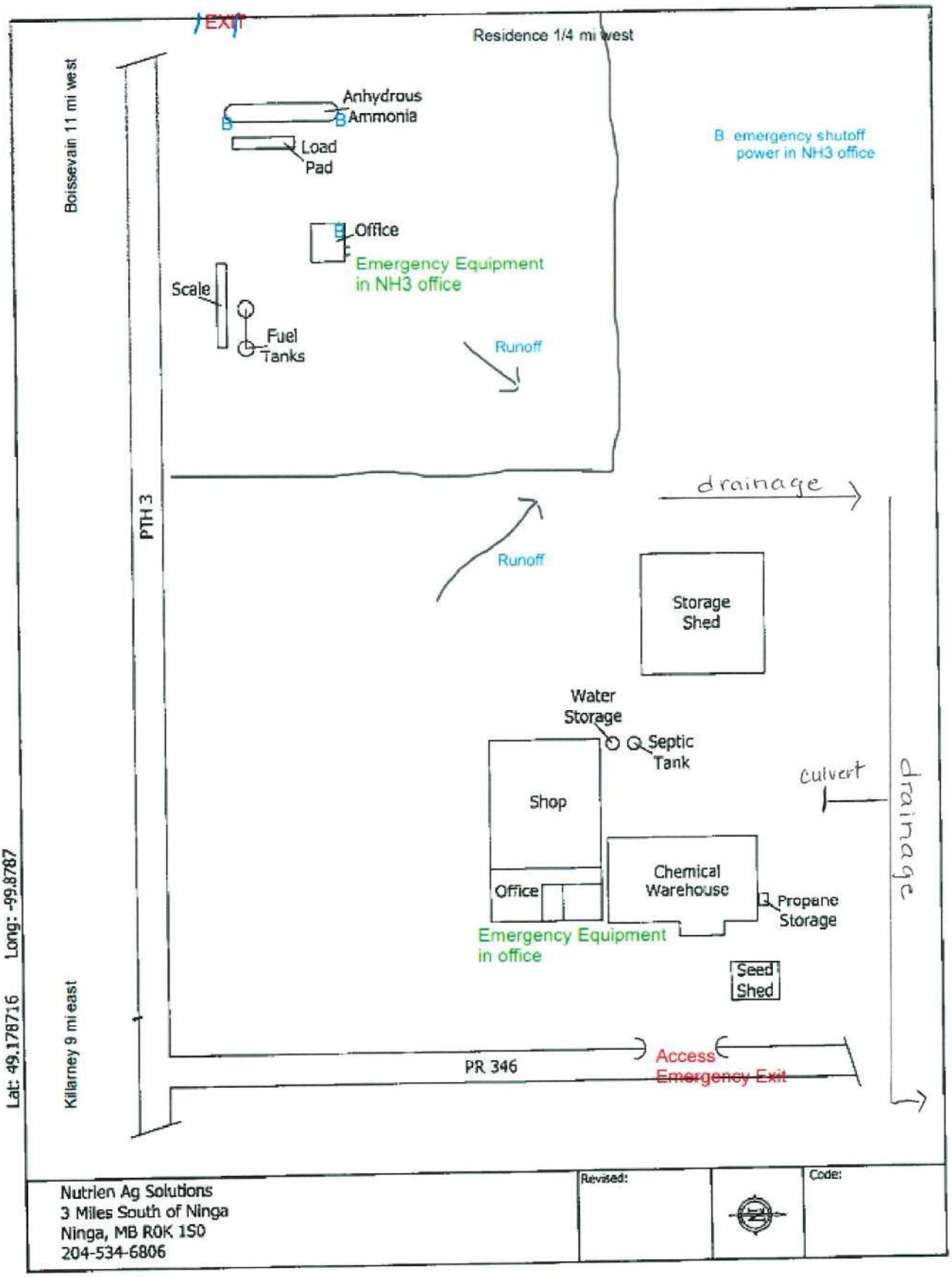
Univar Canada Ltd.
866-333-6376

Valent Canada Inc.
800-682-5368 or CHEMTREC (800-424-9300)

Note: If the safety or environmental incident is serious please contact AWSA.

Business hours: 877-236-2972. After hours: 416-471-8100.

Disclaimer: the information provided is general in nature and was verified for accuracy on the date indicated to serve as a guide. AWSA certified facilities are encouraged to keep all records and emergency contact information current.


EXIT
Residence 1/4 mi west
Boissevain 11 mi west
Anhydrous Ammonia
Load Pad
B emergency shutoff power in NH3 office
Office
Emergency Equipment in NH3 office
Scale
Fuel Tanks
Runoff
drainage
PTH 3
Runoff
Storage Shed
Water Storage
Septic Tank
culvert
drainage
Shop
Office
Chemical Warehouse
Propane Storage
Emergency Equipment in office
Seed Shed
Lat: 49.178716 Long: -99.8787
Killarney 9 mi east
PR 346
Access
Emergency Exit
Nutrien Ag Solutions
3 Miles South of Ninga
Ninga, MB R0K 1S0
204-534-6806
Revised:
Code:

NAS – Environmental Emergency (E2) Plan Anhydrous Ammonia

OWNER: Nutrien Ag Solutions (NAS) **ELEMENT: Emergency Management**

REVISION: #09 // REVISION DATE: 10-10-2021

Table of Contents

REQUIREMENTS

EMERGENCY PRE-PLAN

The Canadian Environment Protection Act (CEPA) provides various authorities to address the **prevention** of, **preparedness** for, **response** to and **recovery** from environmental emergencies caused by uncontrolled, unplanned or accidental releases, and to reduce any foreseeable likelihood of releases of toxic or other hazardous substances listed in the E2 Regulations.

Last updated in EtQ: Mar 11, 2025 4:46 PM

1. FACILITY INFORMATION

BRANCH ID

Name: Ninga MB

Location Branch ID 4-digit Number: 7209 - Ninga MB

ADDRESS

Longitude/Latitude: -99.8787 / 49-178716

Land Location: SE 6-3-18 W1

P.O. Box and Town/City: Box 1240 Ninga, R0K 1S0

PHONE NUMBER

204-534-6806

MUSTER POINT FOR YOUR FACILITY

Main office east end of site

2. EMERGENCY CONTACT NUMBERS

POSITION	NAME	DAY/NIGHT/CELL
Facility Manager	Kevin Nicholson	204-534-6806/204-523-6397
Alternate Contact	Kevin Lamb	204-534-6806/204-523-0388
Division Manager	Kyle Bates	1-403-371-7709
SH&E Advisor	Henry Nickel	204-823-1696
Regional Manager	Jesse Hamonic	1-314-409-9883
Police	Killarney RCMP	911/204-523-7255
Fire Department	Killarney-Turtle Mountain	911
Ambulance	Killarney Ambulance	911
Hospital	Tri-Lake Health Centre	911/204-523-4661
Poison Control Centre	Saskatchewan	1-866-454-1212

Poison Control Centre	Manitoba	911 or 204-787-2591
Poison Control Centre	Alberta	1-800-332-1414
Provincial Environment	Alberta Manitoba Saskatchewan	1-800-222-6514 1-204-944-4888 1-800-667-7525
Transport Canada	Canada (CANUTEC) Alberta Transport	1-613-996-6666 1-800-272-9600
Nutrien Ag Solutions 24-Hour	**Incident Call Center**	**1-800-792-8311**
OHS	Alberta Manitoba Saskatchewan	1-866-415-8690 1-855-957-7233 1-800-567-7233
Nutrien Emergency Response & Preparedness Manager	Matthew Paynter	Cell: 706-564-8118
Nutrien SH&E Senior Manager Canada	Henry Ens	Cell: 306-290-9587
Nutrien NH3 Operations Advisor	Chad Szymesko	Cell: 306-338-7287
Nutrien NH3 Operations Advisor	Greg Nelson	Cell: 587-545-4891

3. EMERGENCY REPORTING

As soon as practical notify:

- 911 to alert RCMP, Fire & Paramedics
- The company 24-hour incident call center phone number **1-800-792-8311**
- Provincial Environment
- Transport Canada or Alberta Transport (if the incident involves transportation)
- Provincial OHS

4. ANHYDROUS AMMONIA PROPERTIES & CHARACTERISTICS (2a)

CAS Registration Number: (7664-41-7)
TDG Class: 2.3 (8)
Color: Colorless
Odor Threshold: Variable ~17 ppm
Melting point: -77.7°C (-107.9°F)
Flash point: N/A
Explosive limits: Lower- 16%, Upper- 25%
IDLH: 300 ppm

UN Number: 1005
Physical State: Gas (Compressed gas)
Odor: Pungent. Ammonia (Strong)
pH: 11.6
Boiling point: -33°C (-27.4°F)
Evaporation rate: N/A
Auto-ignition temp: 651°C (1203.8°F)
TWA Exposure: 25 ppm

Flammability: Slightly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat. Gas may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back, causing fire or explosion. Product will burn with difficulty if kept between the Lower Explosive Limit of 16% and Upper Explosive Limit of 25%. This product is generally regarded as non-flammable due

to the difficulty of ignition. However, the presence of oil or other combustible materials will increase the fire hazard and may ignite with explosive force under favorable conditions.

Reactivity: Reactive with acids. Incompatible with halogens, hydrogen peroxide, chlorinated hydrocarbons, fluorine, nitric acid, oxidizing agents and sulfuric acid. Incompatible with copper alloys, copper, and zinc.

5. ACTIVITIES TAKING PLACE INVOLVING ANHYDROUS AMMONIA (2b)

This facility stores Anhydrous Ammonia for the purpose of supplying nitrogen fertilizer to agricultural customers. The product is stored in large tank(s) and is transferred onsite into the tank(s) from a highway transport truck. The product is then transferred into delivery units or nurse wagons for transportation to the customer for use.

6. FACILITY AND SURROUNDING AREA DESCRIPTION (2c)

6.1 Facility Site Plan:

Create a facility site plan (**Attach to this plan, Appendix A**) illustrating:

- Access and Emergency Exits
- Emergency Equipment
- Emergency Shut-off Locations (Power & NH3)
- Runoff water flow directions

6.2 Surrounding Land Use Drawing:

Utilizing Rural Municipality, Town or City Maps define a 5-kilometer (3 mile) radius around the storage facility to create a Surrounding Land Use Drawing (**Attach to this plan, Appendix B**) of the area that may be affected by an environmental emergency.

a) Indicate all residences, hospitals, schools, commercial or industrial buildings, highways, roads, environmentally sensitive areas including water sources or water bodies (ponds, irrigation canals, lakes, etc.) parks, forests, wildlife habitats within the radius.

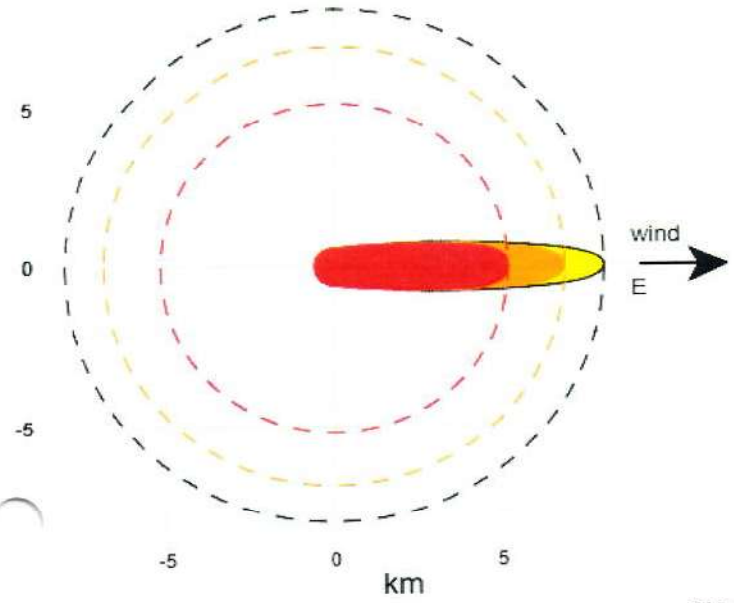
b) Highlight and indicate by establishing an alpha-numeric reference for all residences, hospitals, schools and commercial or industrial buildings.

c) Develop a contact list **(Attach to this plan, Appendix C)** referencing all indicated properties identified above include contact names and phone numbers for the occupants referenced by the alpha-numeric character established.

7. RISK ANALYSIS

A release of Anhydrous Ammonia into the atmosphere will have a possible impact on the public. Due to Anhydrous Ammonia's high attraction to water if the release is near a water body there may also be concern of environmental impact. Anhydrous Ammonia is very toxic to aquatic life. The below scenario examples were created using plume modeling software with the data below.

Worst Case Scenario (paragraph 4(2)(d) & 4(2)(e))



Concentration	Distance
≥300 ppm (IDLH [30 min])	5.2 km
≥200 ppm	6.9 km
≥160 ppm (PAC-2 - AEGL-2 [60 min])	8 km

- Tank Size – 12 ft in diameter and 60 ft length
- Tank Volume – 45,000 gallons, 85% full
- Duration of Leak – 51 minutes
- Release from 3-4" opening in the bottom of the tank
- Average amount release – 60,848 lbs/min
- Total Amount Released – 215,826 lbs.
- Release amount per minute decreased significantly at the 12-minute mark

Weather

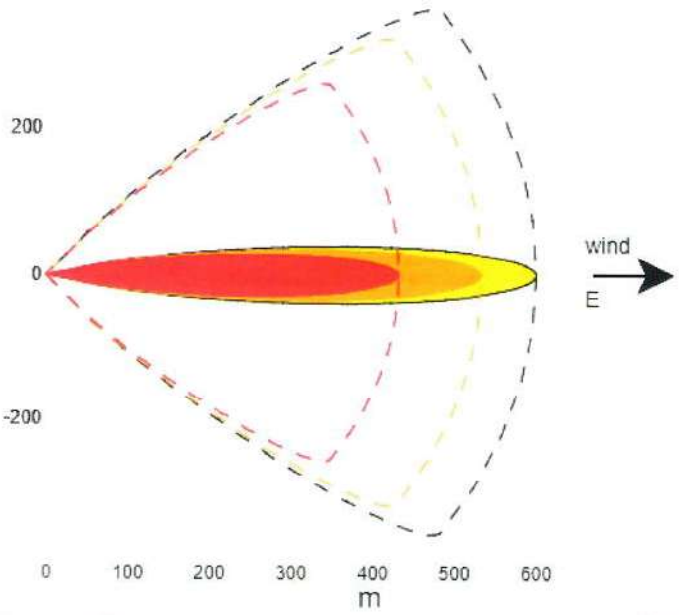
- Wind – 1.5 m/s
- Air Temperature – 25 C
- Stability Class – F
- Humidity – 50%

Example of worst-case scenario(s) are:

i. Release of hazardous substances from piping due to complete failure of a valve, flange, flex line, or pipe.

Worst-case scenario(s) would have an estimated impact distance of 5 km outside the boundary of the facility.

Alternate Scenario (paragraph 4(2)(f))



- Tank Size – 12 ft in diameter and 60 ft in length
- Tank Volume – 45,000 gallons, 85% full
- Duration of Leak – 1 hour
- Pressure Relief Valve Release – 1.25-inch opening
- Average amount release – 288 lbs. per min
- Total Amount Released – 13876 lbs.
- Release amount per minute drops from 288 lb/min to 187 lb/min at 1 hour

Weather

- Wind – 1.5 m/s
- Air Temperature – 25 C
- Stability Class – F
- Humidity – 50%

Examples of alternative to worst-case scenario(s) are:

i. *Release of hazardous substances from a pressure relief valve located in the vapour space of the tank.*

Examples of alternative to worst-case scenario(s) would have an estimated impact distance of less than 1 km outside the boundary of the facility.

8. QUANTITIES OF ANHYDROUS AMMONIA AT THIS FACILITY (2e & 2i)

Storage Tank Capacity		Truck Vessel Capacity All Trucks		Nurse Wagon Capacity All Wagons		Largest Means of Containment
# of Vessels	Total Capacity	# of Trucks	Total Capacity	# of Wagons	Total Capacity	Tonnes
1	60 metric ton	2	13 metric ton	26	125 metric ton	198

9. PREVENTATIVE MEASURES (2g)

The company has put the following practices in place:

- Internal Annual & Monthly Safety Inspections of properties and equipment
- Internal Tri-annual Audits
- CSA B620 inspections conducted on all mobile equipment used for Anhydrous Ammonia conducted by 3rd Party certified vendor
- Visual & Leakage inspection conducted on stationary pressure vessels annually and internal inspections are conducted every 10 years by a 3rd Party certified vendor

- Equipment is stored within locking compounds and utilize locking boxes for all stationary transfer hoses
- Two-windsock are located at each site
- All process piping and emergency shut off activation points are labeled and color coded
- Emergency Shut-off valves are installed and maintained on all storage vessels
- NH3 Sites are certified and meet the standards outlined in the Fertilize Canada's Anhydrous Ammonia Code of Practice and are audited every 2 years to maintain this certification
- Train all staff on our safe operating procedures
- Internal and external agency reporting system along with an internal investigation to identify root causes and identify any corrective actions to prevent similar incidents or spills/releases.

10.REMEDIAL/RECOVERY MEASURES

If a situation does occur that requires remedial action, locations will work in conjunction with internal and external resources. Recovery operations at the site will include:

- Assessment, repair, and replacement of damaged structures.
- Restoring services such as power, heat and communications.
- Restoring systems to operational status.
- Clearing access routes.
- Assessment and repair of any environmental impact.

Recovery operations for the facility:

- Investigate and conduct reporting of the incident.
- Medical assessment/stress counseling.
- Finalizing of any litigation.
- Identify and implement corrective actions.

11.ASSIGNED POSITIONS OF ON-SITE EMERGENCY PERSONNEL (2h)

11.1 Emergency Coordinator

The role of the Emergency Coordinator is to co-ordinate the activities of Nutrien Ag Solutions personnel with other emergency response organizations involved in the emergency response effort. The responsibilities of this position are:

- Ensure that personal are aware of and understand the environmental emergency plan.
- Ensure the safety of personnel during an incident.
- Coordinates communication activities with Head office, residents, and news agencies.
- Ensures that all necessary resources (i.e. equipment, materials, personnel, etc.) are made available for an effective response.
- Ensures that personnel understand the reporting structure between them and the external emergency responders.
- Ensure all personnel are accounted for.
- Maintain an activity log of incident.

In the event of an incident the Emergency Coordinator shall:

1. Conduct initial notifications as per Section 2.
2. Determine Plume Modeling utilizing your surrounding land use maps. (Appendix B)
3. Determine Affected Zones and Scene Security Plan
   a. Notify affected people/entities.

b. Determine on site personal shelter in place or evacuation.

4. In conjunction with local authorities and the on-call coordinator establish an action plan:
   a. Identify responders
   b. Determine the decontamination plan
   c. Identify PPE requirements
   d. Determine responders' objectives
   e. Determine equipment required to achieve objectives
   f. Develop a communication plan

Name:	Kevin Nicholson
Address:	Box 1240
Phone Numbers:	204-534-6806/ 204-523-6397

Alternate

Name:	James Spurrill
Address:	Box1240
Phone Numbers:	204-534-6806/ 204-305-0304

11.2 On-Site Personnel

The role of on-site personnel is to perform duties assigned by the emergency coordinator to include but not limited to:

- Respond to an incident if appropriately trained and capable.
- Establish a perimeter to control access.
- Collect incident information.
- Conduct notifications to affected people/entities.

12.ENVIRONMENTAL EMERGENCY TRAINING (2i)

This training consists of:

- Properties and Characteristics of NH3
- PPE – Use, maintenance & limitations
- Preventative Maintenance
- Reporting Requirements
- Transfer Procedures
- First Aid
- Fire Extinguisher
- WHIMS
- TDG

13.EMERGENCY RESPONSE EQUIPMENT (2j)

RESPONSE EQUIPMENT (include details of quantity, make, exact location stored)

a. Spill Control
Skid steer on site to move dirt/ gravel

b. Site Communication
Cell phones, air horns in all buildings,

c. First Aid Equipment / Safety Water / Eye Wash
Main office has large first aid kit in the washroom. All vehicles have first aid kits, Nh3 office has first aid kit and eye wash, safety water at all transfers points at the bullet has eye wash bottles

d. Personal Protective Equipment
Extra suits and respirators in main office and shop cabinet

14.PUBLIC COMMUNICATION (2k,l,m)

The Emergency Coordinator or designate will review, complete and conduct annual communication with all residences that may be adversely affected in the event of a release as outlined in the Ammonia Code of Practice Sections A 1.3 utilizing the documentation – Occupancy within 500m & Occupancy within surrounding area.

The Emergency Coordinator or designate in conjunction with the local Fire Department or a member of the RCMP will communicate by phone or in person with the members of the public who may be adversely affected by an environmental emergency either during or after the incident to provide guidance concerning the actions to be taken to reduce the potential harm resulting from the environmental emergency.

15.RESPONSIBILITIES OF LOCAL FIRE DEPARTMENTS

RESPONSIBILITIES OF LOCAL FIRE DEPARTMENTS:

- Local authorities are invited to participate in development of the Environmental Emergency Plan (E-2) and are provided a copy of the plan.
- Local fire departments should be invited to tour your facility at least once a year and review Environmental Emergency Plan, discuss their capabilities and roles within potential scenarios and provide a signature upon review.
- Participate in annual exercises to include a full-scale exercise every 5 years.
- Reviewed the locations communication plan for environmental emergencies.

16.SIGN – OFF

17. DATE OF CURRENT E-2 PLAN: Sep 12, 2024

FACILITY MANAGER: Kevin Nicholson [redacted] (signature) Sep 12, 2024 Sept 12/2024. (date)

FIRE DEPT. OFFICIAL: [redacted] (signature) Sep 12, 2024 (date)

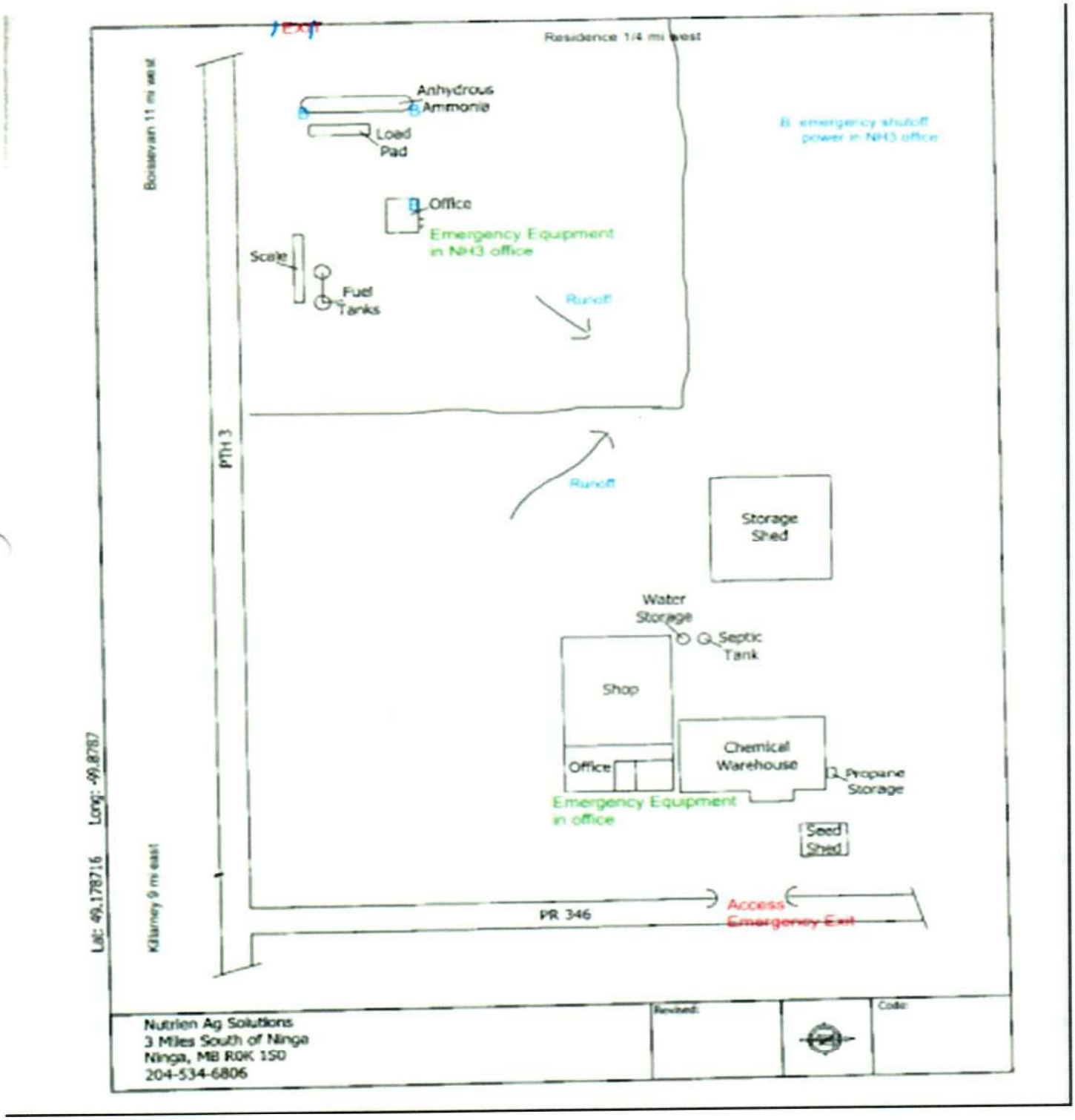
Has reviewed and received a copy of the plan.

NAME OF FIRE DEPARTMENT killarney- Turtle Mountain

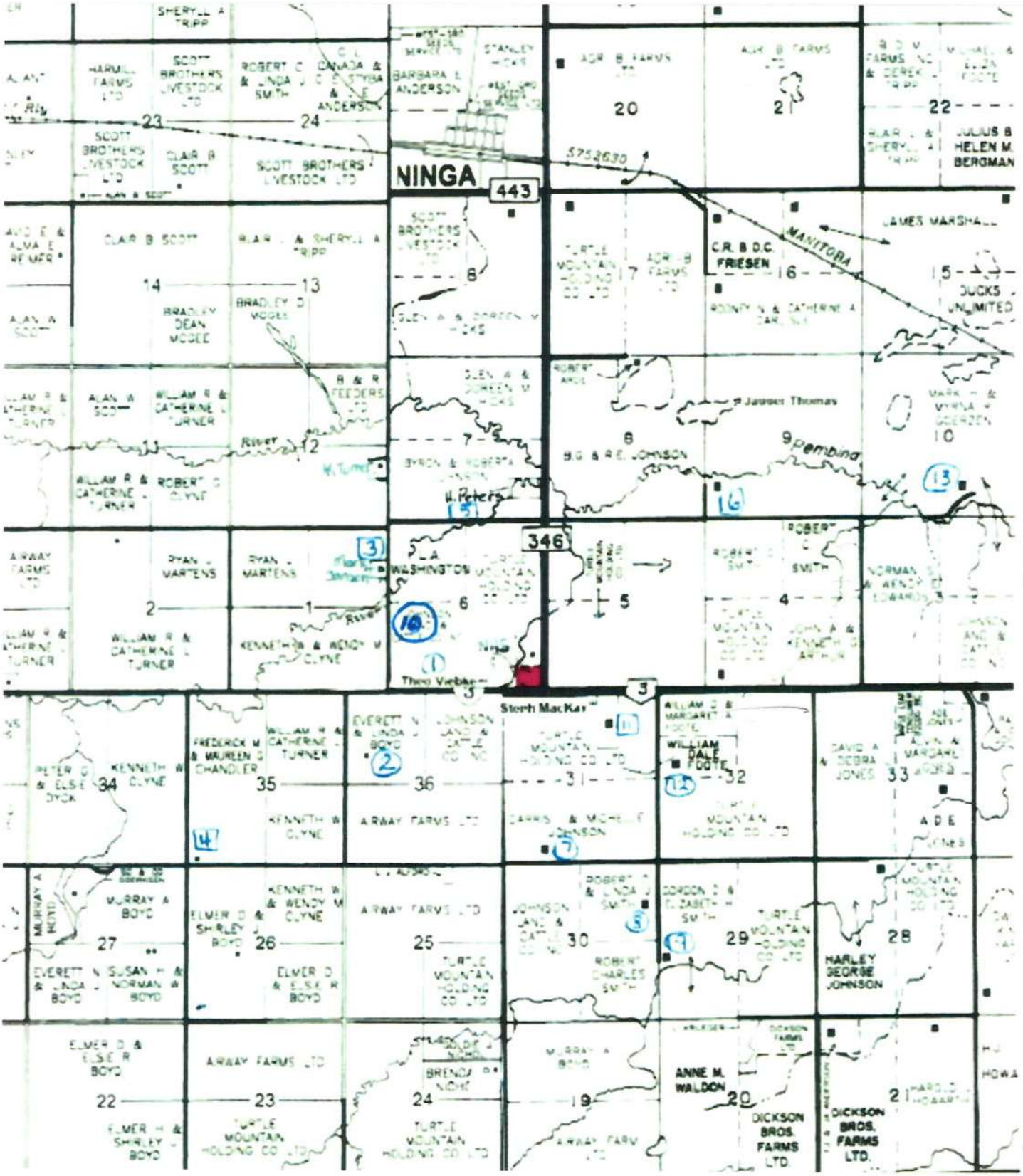
NEXT SCHEDULED REVIEW OR UPDATE Sep 12, 2025

APPENDICES

APPENDIX A - FACILITY SITE PLAN



APPENDIX B - SURROUNDING LAND USE DRAWING



APPENDIX C - LIST OF OCCUPANTS AS INDICATED ON AREA DRAWING

Reference number	Name	Location	Phone Number	Contact procedure
1	Harrey Hodgens	1/4 west	204-215-0162	call
2	Everett Boyd	1 w 3/4 south	204-534-7825	call
3	Mark Janzen	1w 3/4 north	204-305-0115	call
4	Rick Chandler	2w 1 south	204-534-6751	call
5	Harvey Peters	1 north	431-734-1987	call
6	Jagger Thomas	1n 1 east	204-871-4496	call
7	Darris Johnson	1 south	204-534-8209	call
8	Bob Smith	1.5s 1 east	204-534-2520	call
9	Gordon Smith	1.5s 1 east	204-534-7933	call
10	Kieran Johnson	1w 1/2 north	204-305-0107	call
11	Stephanie Mackay	3/4 east	780-718-8993	call
12	Dale Foote	1e 1/2 south	204-534-7954	call
13	Mark Goerzen	2.5e 1 north	204-534-6271	call

APPENDIX D – DISTRIBUTION OF THE PLAN

Name	Organization	Phone
Troy Cuvelier	Fire Department	204-534-8065
Killarney RCMP	RCMP Detachment	204-523-7255
Ambulance	Killarney Ambulance	call 911
RM Killarney Turtle Mountain	Municipality	204-523-7247
Kevin Nicholson	Branch Manager	204-523-6397

REFERENCES

1. Canadian Environmental Protection Act (CEPA)
   Canadian Environmental Protection Act, 1999 (justice.gc.ca)

APPROVAL AND REVISION HISTORY

Revision Number	Revision Date (DD-MM-YYYY)	Description of Revision(s)	Owner
#01	15-12-2011	Initial release.	Nutrien Ag Solutions
#04	01-01-2018	Update contact numbers, formatting, and content minor revisions.	Nutrien Ag Solutions
#06	28-03-2019	Name change, update contact numbers, formatting, and minor content revisions.	Nutrien Ag Solutions
#09	10-10-2021	Update template format and content revisions to include regulatory changes.	Nutrien Ag Solutions

Section 1: Facility Information

Facility Name:	Ninga	Facility Branch ID #	1108
Responsible Person:	Kevin Nicholson	Responsible Person's Title:	Manager

Section 2: Exercise Types

Type of Simulated Exercise (Annual Simulation Exercise or Full-Scale Simulation Exercise):	Annual Simulation Exercise(Flange gasket fails)

Section 3: Internal Participants

	Name	Email	Phone Number
1	James Spurrill	james.spurrill@nutrien.com	204-305-0304
2	Melissa klassen	melissa.klassen@nutrien.com	204-523-6665
3	Kevin Nicholson	kevin.nicholson@nutrien.com	204-523-6397
4	Kevin Lamb	kevin.lamb@nutrien.com	204-523-0388
5	David Sanders	david.sanders@nutrien.com	204-523-2470
6			
7			
8			
9			
10			

Section 4: External Participants & Agencies

	Name	Email	Phone Number	Agency
1				
2				
3		Letter sent no responce		
4				
5				
6				
7				
8				
9				
10				

Section 5: Scenario

Full-Scale Exercise	A pressure relief valve (PRV) on the main storage (MSV) has failed and is releasing NH3 vapour to the atmosphere.
Annual Exercise	While loading a TDU, a flange gasket fails causing a significant leak.

Section 6: Expected Results

1	Conduct notifications (as per Facility's Environmental Emergency Plan, Section 2): a. Regulatory b. Internal
2	Determine Impacted Area, Affected Zones, and Scene Security Plan (i.e., Plume Dispersion Modeling, ERG, and/or other approved resources) a. Identify affected people/entities and confirm current contact information b. Determine on site personnel shelter in place or evacuation
3	Conduct a Severity Assessment utilizing the Damage Assessment Form
4	In conjunction with local authorities and the on-call coordinator establish an action plan: a. Identify responders b. Determine the decontamination plan c. Identify PPE requirements d. Determine responders' objectives e. Determine equipment required to achieve objectives f. Develop a communication plan
5	Execute the action plan, re-group as required to discuss updates to the action plan.

Section 7: Exercise Results

1	Complete a summary of the exercise results in section 8 of this form
2	Conduct a de-brief with the entire group reviewing the outcomes of the exercises
3	Complete recommended modification to the E2 Plan (if noted) in section 9 of this form
4	Complete the register of updates to the E2 Plan in section 10 of this form
5	Complete this form and: a. Print copy for facility's records b. Email copy to SH&E Retail, Administrator, Canada
6	**(FOR FULL-SCALE EXERCISE ONLY)** Submit a Schedule 5 utilizing SWIM

Section 8: Summary of Exercise

1- Shutt off the system using the emergancy shut off at either end of the bullet
2- Shut off the TDU using the truck emergancy shut off remote
3- Call 911 and the Emergancy number 1-800-792-8311
4- Tell 911 to inform the fire department that they can not get to the site from the east on highway 3. They would have to go around and come in from the west.
5- Gather at the muster point on the west side of the compound
6- Get Melissa who is just coming to work to stop traffic form the west.
7- Wait for fire department to arrive

Section 9: Plan Modifications Required

1	Update the surounding occupants list and surounding map
2	Update the emergancy contact list and numbers
3	
4	
5	
6	
7	
8	
9	
10	

Section 10: E2 Plan Review & Update Register

Date	Review or Update	Description	Responsible Person
Sept 26/24	Update	Surounding occupants	James Spurrill
Sept 26/24	Update	Surounding map	James Spurrill
Sept 26/24	Update	Emergancy contact list and numbers	James Spurrill

Section 11: Certification

I, Kevin Nicholson, [redacted] certify that the information contained in this report with respect to the ***Environmental Emergency Regulations, 2019*** is accurate and complete.

Signature of Responsible Person or Alternate: [redacted]

Date: Sept 26 2024

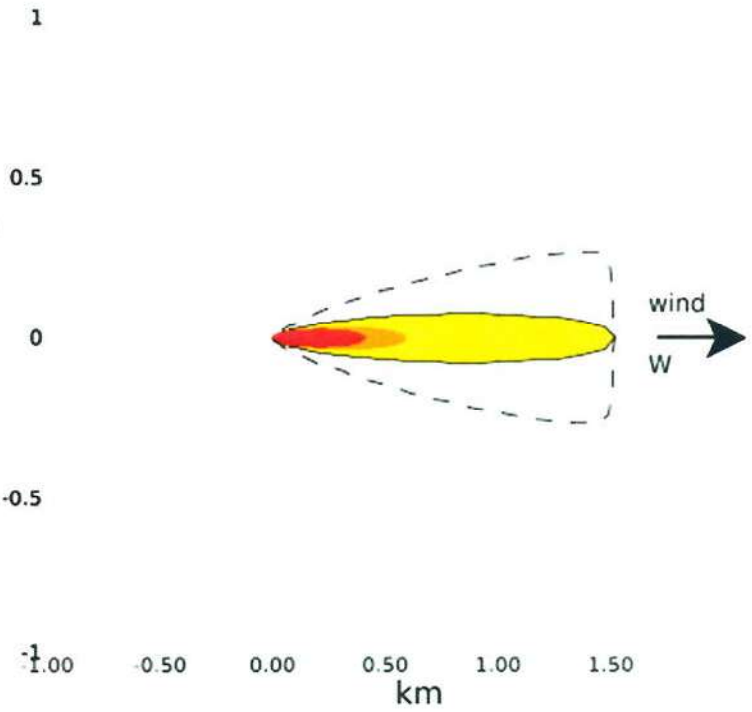
Toxic Report

Time: September 26, 2024 8:05 AM
Location: 54H9+75 Lyonshall, MB, Canada (49.17823N, 99.88211W)
Chemical Name: AMMONIA

Wind: 24.1 km/h from 270.0° (W) true at 33 ft

THREAT ZONE:
Model Run: Heavy Gas
Red: 401 m --- ≥300 ppm (IDLH [30.0 min])
Orange: 584 m --- ≥150 ppm (ERPG-2 [60.0 min])
Yellow: 1.5 km --- ≥25 ppm (ERPG-1 [60.0 min])

Threat Zone (Plume Impacted Zone)

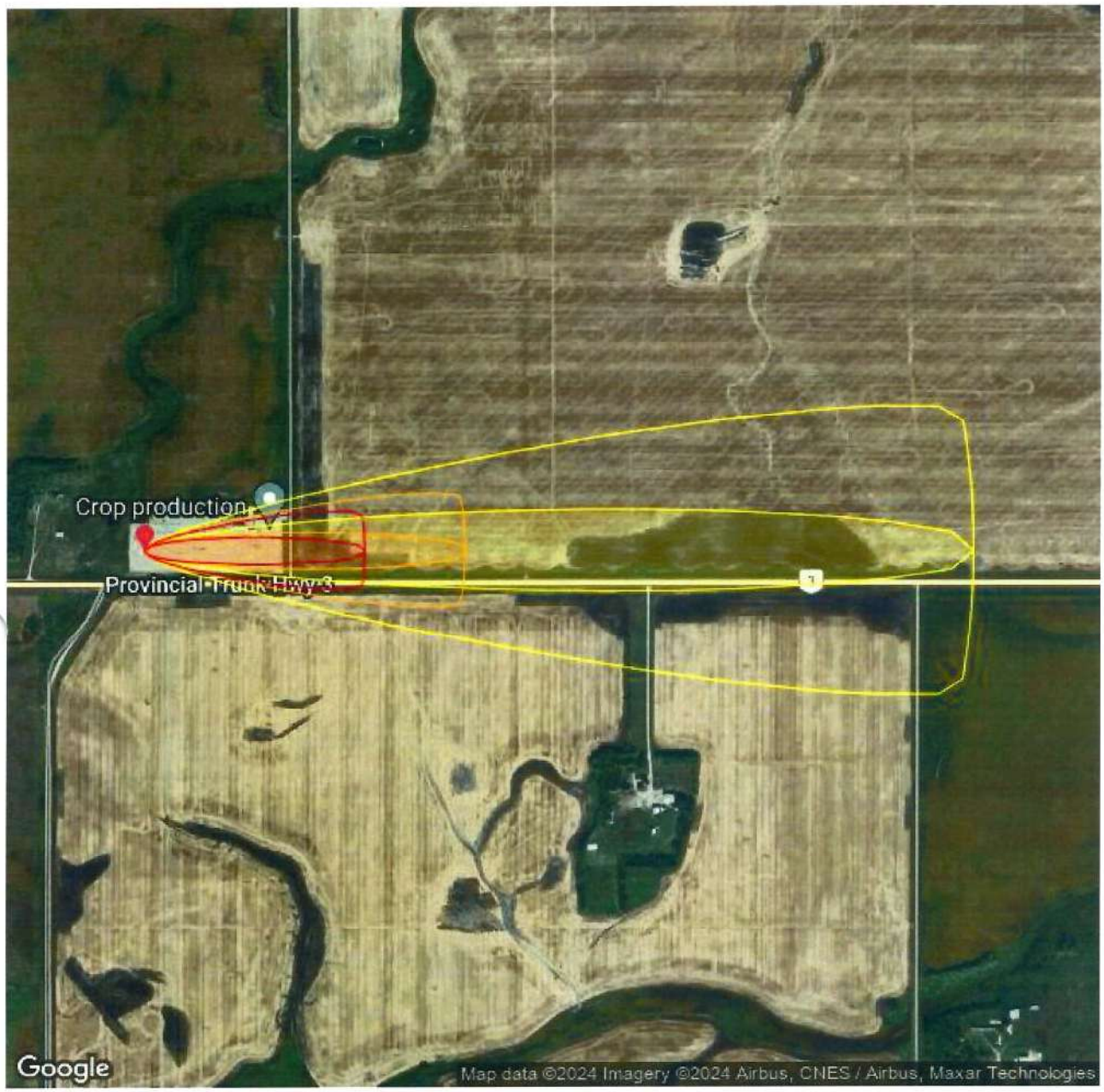


Concentration	Population	Distance
≥300 ppm (IDLH [30.0 min])	N/A	401 m
≥150 ppm (ERPG-2 [60.0 min])	N/A	584 m
≥25 ppm (ERPG-1 [60.0 min])	N/A	1.5 km

..... wind direction confidence lines

Note: ALOHA limited the duration to 1 hour

Map Image

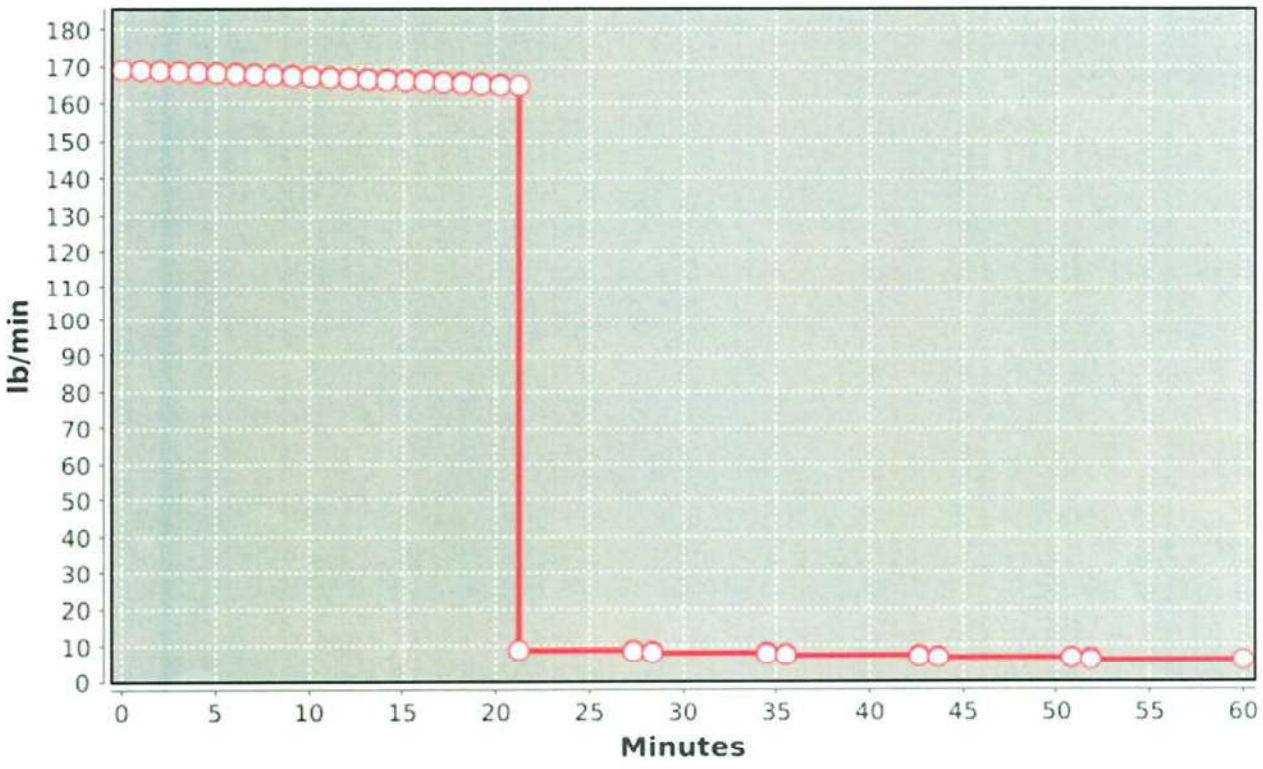

Crop production
Provincial Trunk Hwy 3
Google
Map data ©2024 Imagery ©2024 Airbus, CNES / Airbus, Maxar Technologies

Source Strength (Release Rate)

Time: September 26, 2024 8:05 AM

Chemical Name: AMMONIA

SOURCE STRENGTH:
Leak from hole in horizontal cylindrical tank
Flammable chemical escaping from tank (not burning)
Tank Diameter: 4.13 ft
Tank Length: 20 ft
Tank Volume: 2,000 US gallon
Tank contains: liquid
Internal Temperature: 75 °F
Chemical Mass in Tank: 4.29 Metric ton
Tank is: 85% full
Opening Length: 1 in
Opening Width: 0.1 in
Opening is: 2.07 ft
from tank bottom
Release Duration: 1 hour
ALOHA limited the duration to 1 hour
Max Average Sustained Release Rate
(averaged over a minute or more): 168.87 lb/min
Total Amount Released: 3,824.98 lb
The chemical escaped as a mixture of gas and aerosol (two phase flow).



Places Impacted by Plume Impacted Zone

Impact	Type	Name	Distance	Address	Phone
Low	House	office	0.13 mi		

Threat at point: office

Address:

Phone:

Type: House

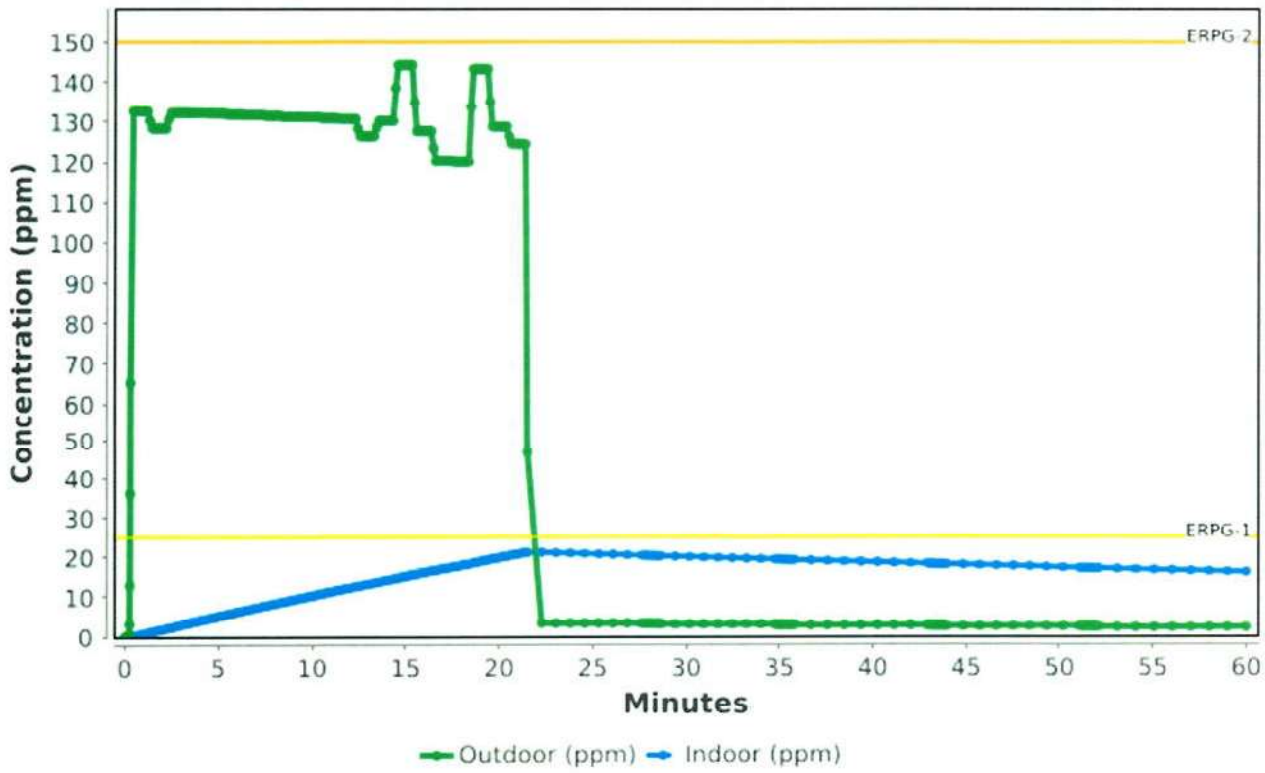
Location: 49.17852N, 99.87922W

Building Air Exchanges Per Hour: (Enclosed office building)

Max Concentration:

Outdoor: 144 ppm

Indoor: 21.1 ppm



Text Summary

```
SITE DATA:
    Location: 54H9+75 Lyonshall, MB, Canada (49.17823N, 99.88211W)
    Time: September 26, 2024 8:05 AM

 CHEMICAL DATA:
   Chemical Name: AMMONIA
   CAS Number: 7664-41-7                  Molecular Weight: 17.03 g/mol
   AEGL-1 (60 min): 30 ppm   AEGL-2 (60 min): 160 ppm   AEGL-3 (60 min): 1100 ppm
   IDLH: 300 ppm      LEL: 150000 ppm     UEL: 280000 ppm
   Ambient Boiling Point: -34.6deg C
   Vapor Pressure at Ambient Temperature: greater than 1 atm
   Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

 ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
   Wind: 24.1 km/h from 270.0° (W) true at 33 ft
   Ground Roughness: 3.28 ft  Cloud Cover: 5 tenths
   Air Temperature: 23.9 °C   Stability Class: D
   No Inversion Height        Relative Humidity: 50%

 SOURCE STRENGTH:
      Leak from hole in horizontal cylindrical tank
      Flammable chemical escaping from tank (not burning)
      Tank Diameter: 4.13 ft
      Tank Length: 20 ft
      Tank Volume: 2,000 US gallon
      Tank contains: liquid
      Internal Temperature: 75 °F
      Chemical Mass in Tank: 4.29 Metric ton
      Tank is: 85% full
      Opening Length: 1 in
      Opening Width: 0.1 in
      Opening is: 2.07 ft
 from tank bottom
      Release Duration: 1 hour
      ALOHA limited the duration to 1 hour
      Max Average Sustained Release Rate
(averaged over a minute or more): 168.87 lb/min
      Total Amount Released: 3,824.98 lb
      The chemical escaped as a mixture of gas and aerosol (two phase flow).

 THREAT ZONE:
      Model Run: Heavy Gas
      Red: 401 m --- ≥300 ppm (IDLH [30.0 min])
      Orange: 584 m --- ≥150 ppm (ERPG-2 [60.0 min])
      Yellow: 1.5 km --- ≥25 ppm (ERPG-1 [60.0 min])
```