Application for Amendment

NRCB Natural Resources Conservation Board

Application under the *Agricultural Operation Practices Act* to amend a permit for a confined feeding operation, manure collection area and/or manure storage facility(ies). ("Permit" means an NRCB-issued or grandfathered approval, registration, or authorization, including a grandfathered municipal development permit.)

NRCB USE ONLY	NRCB Application number	Date Stamp
☑ Approval ☐ Registration ☐ Authorization AMENDMENT	LA23048A	NRCB APPLICATION 04 SEP 2025 RECEIVED

CONTACT INFORMATION

Applicant Information

Name:	Corporate Name (if applicable)
Johan Bennen	Hejo Farms
Address: (Street/P.O. Box)	
City/Town: Coaldale	Province: AB / Postal Code: T1M 1M5

Agent consent *(if applicable)*

I, _____, hereby give consent for _____
(name of applicant) *(name of agent and company)*

to act on my behalf or as my agent for this application.

Signed this ____day of _____, 20____. _____
Signature of Applicant

LOCATION OF DEVELOPMENT

Which permit do you wish to amend? (List permit number and issuing agency.)	LA 23048
Legal Land Description(s)	SW-25-8-20 W4 (Qtr-Sec-Twp-Rg-W Mer)

APPLICATION DISCLOSURE

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

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

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

4-9-2025
Date of signing

[redacted]

Corporate name (if applicable)

Print name

Application for Amendment – contd.

NRCB Natural Resources Conservation Board

AMENDMENT INFORMATION REQUIREMENTS

Instructions:
For each part of your permit that you would like amended, please detail what change you would like made and why, and how your proposed change will meet the AOPA requirements. You may attach additional pages to this form to provide this information.

Please note that an approval officer may require a page (or pages) of the Part 2 application forms to be completed as part of this application for amendment, depending on what changes are proposed.

The as built dimentions of te barns
change Concrete Liner to natrual clay Liner

Approval LA23048 approved the construction of a new sheep facility with a concrete liner. This application for amendment seeks to amend the liner to a naturally occuring protective layer with the following as-built dimensions:

- Ewe/lambing barn: 36 m x 311.7 m (118' x 1022' 8")
- Feeder barn: 32.2 m x 120.9 m (105' 8" x 396' 8")

Part 2 — Technical Requirements

NRCB Natural Resources Conservation Board

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

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

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

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

1. Laming Barn
2. feeder Barn.

Manure storage capacity

	Length (m)	Width (m)	Depth below ground level (m)	NRCB USE ONLY Estimated storage capacity (m^3)
1.	1,022' 8" ~~550~~ Feet	118 Feet	0	
2.	396 Feet	105 Feet	0	
			TOTAL CAPACITY	

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

Surface water control systems

Describe the run-on and runoff control system

Onder Roof

Naturally occurring protective layer details

Thickness of naturally occurring protective layer	_____(m)	Provide details (as required) see atathe Report.	
Soil texture	_____% sand	_____% silt	_____% clay
Hydraulic conductivity - naturally occurring protective layer	Depth and type of soil tested	Hydraulic conductivity (cm/s)	Describe test standard used

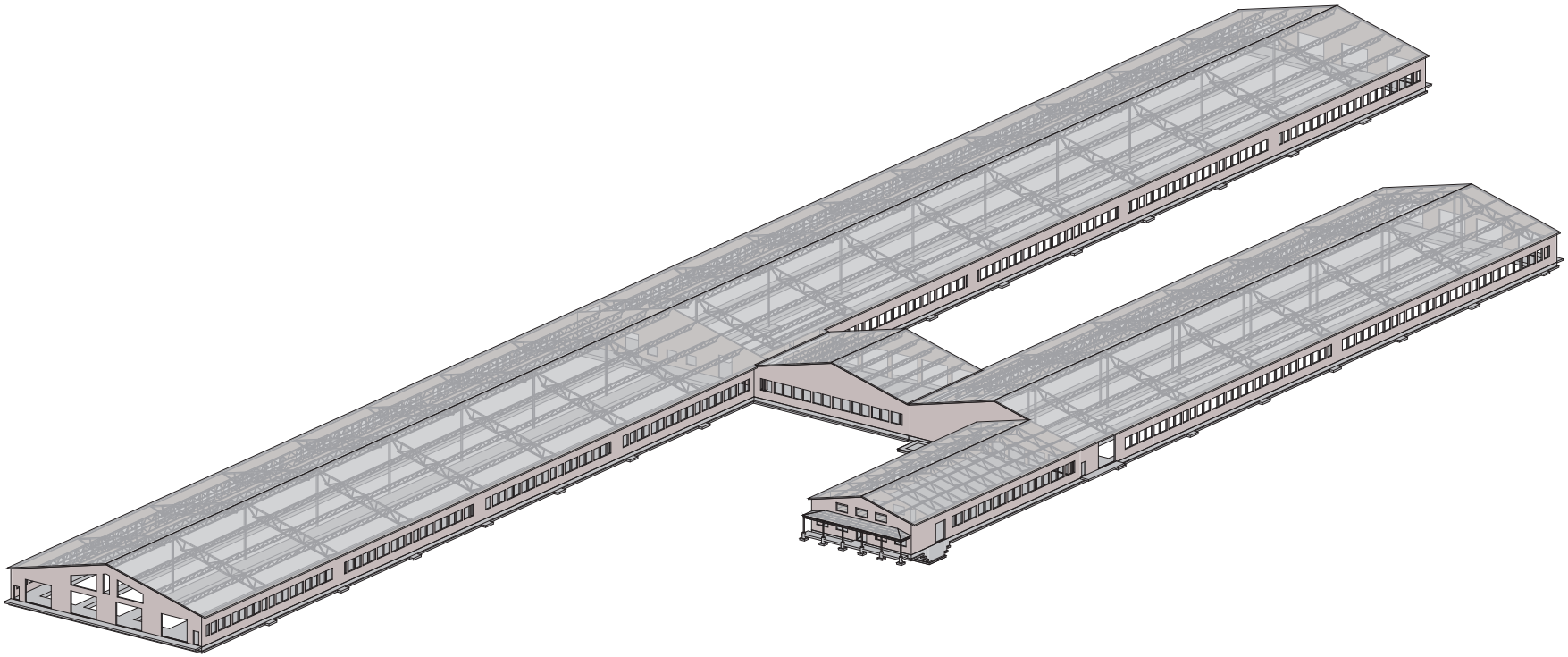
Additional information *(attach copies of soil test reports)*

NRCB USE ONLY

Requirements met: ☐ YES ☐ NO

Condition required: ☐ YES ☐ NO

Report attached: ☐ YES ☐ NO



Structural Sheet List		
Sheet Number	Sheet Name	Rev
S001	Structural Cover Page	1
S101	Foundation Plan - NW and NE	0
S102	Foundation Plan - South, and Details	1
S121	Foundation Sections	1
S201	Mezzanine Floor Framing Plan and Sections	1
S211	Roof Framing Plan - NW and NE	0
S212	Roof Framing Plan - South	0
S301	Framing Elevations and Connection Details	0
S511	Roof Framing Sections	0
S512	Roof Framing Sections	1
S601	Structural Notes	0

Total Sheet Count: 11

01 45 17 SITE REVIEWS

1 SITE REVIEWS OF EXCAVATION, SHORING & UNDERPINNING, GROUNDWATER INVESTIGATION & CONTROL, STRUCTURAL CAPACITY OF SOILS AND BACKFILL MATERIAL & COMPACTION ARE TO BE PERFORMED BY THE GEOTECHNICAL CONSULTANT, AS PER THEIR REQUIREMENTS.

2 THE CONTRACTOR MUST CONTACT GRUBB ENGINEERING TO PERFORM SITE REVIEWS AT THE FOLLOWING STAGES OF CONSTRUCTION:

2a FORMS AND REINFORCING FOR FOOTINGS AND/OR PILE CAPS.

2b FORMS AND REINFORCING FOR FOUNDATION WALLS, CONCRETE PIERS, GRADE BEAMS AND/OR PILASTERS.

2c FORMS AND REINFORCING FOR STRUCTURAL SLABS AND TOPPINGS .

2d REINFORCING AND CORE FILLS OF CONCRETE MASONRY WALLS, BEARING BEARS, LINTELS, COLUMNS AND PILASTERS, PRIOR TO PLACEMENT OF CONCRETE.

2e OVERALL STRUCTURAL FRAMING, PRIOR TO APPLYING ARCHITECTURAL FINISHES. (MORE THAN ONE (1) REVIEW MAY BE REQUIRED DEPENDING ON THE PHASING OF THE CONSTRUCTION).

3 CONSULTANT IS TO BE INFORMED SUFFICIENTLY PRIOR TO EACH REVIEW AS NOTED BELOW. THESE SITE REVIEWS BY CONSULTANT(S) ARE REQUIRED REGARDLESS OF INSPECTIONS or REVIEWS PERFORMED BY OTHER PERMIT ISSUING AGENCIES. FAILURE TO OBTAIN THESE SITE REVIEWS WILL RESULT IN THE CONSULTANT(S) NOT ISSUING THE LETTERS OF ASSURANCE WHICH MAY BE REQUIRED WHEN APPLYING FOR OCCUPANCY PERMIT.

4 TO ARRANGE A SITE REVIEW, PLEASE E-MAIL sitereviews@grubb-engineering.ca, INCLUDING CONTACT INFORMATION, PROJECT NAME AND LOCATION, TIMELINE, AND TYPE OF REVIEW REQUIRED (FOOTING, FRAMING, ETC.).

5 PLEASE PROVIDE MINIMUM OF 3 FULL BUSINESS DAY(S) NOTICE FOR SITE REVIEWS.

01 45 18 QUALITY ASSURANCE

1 COMPACTION TESTS ARE TO BE PERFORMED ON THE SLAB SUB-GRADE, THE SLAB BASE GRAVEL AND FOR GRAVEL BENEATH FOOTINGS, AS REQUIRED, TO THE SATISFACTION OF THE GEOTECHNICAL CONSULTANT.

2 CONCRETE TESTS ARE TO BE PERFORMED DURING POURING OF ALL STRUCTURAL CONCRETE (INCLUDING, BUT NOT LIMITED TO, FOOTINGS, FOUNDATION WALLS, PILE CAPS, GRADE BEAMS, PILASTERS, RETAINING WALLS, SLAB ON GRADE, WALLS, COLUMNS, BEAMS, STRUCTURAL SLABS, MASONRY WALL CORE*FILLS & MORTAR AND Q-DECK TOPPING) WITH COPIES OF THE TEST RESULTS SUBMITTED TO GRUBB ENGINEERING CORP.

3 CONTRACTOR SHALL SUBMIT TO GRUBB ENGINEERING CORP CERTIFICATES FOR QUALIFICATION OF WELDED STEEL FABRICATORS AND ERECTORS.

01 45 19 SHOP DRAWINGS

1 DISTRIBUTION OF SHOP DRAWINGS TO TRADES AFFECTED IS THE RESPONSIBILITY OF THE CONTRACTOR.

2 CONSULTANTS REVIEW OF SHOP DRAWINGS AND DATA SHEETS COVERS GENERAL DESIGN CONCEPT ONLY. ERRORS OR DISCREPANCIES WILL BE MARKED IF NOTICED, BUT THIS REVIEW WILL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY TO COMPLETE THE WORK AS SHOWN AND SPECIFIED IN THE CONTRACT DOCUMENTS.

3 SHOP DRAWING SUBMITTALS, AS REQUIRED PER DISCIPLINE, SHALL CONSIST OF ONE (1) ELECTRONIC FILE FOR EACH REQUIRED SHOP DRAWING, MUST BEAR EVIDENCE OF REVIEW BY GENERAL CONTRACTOR AND BE SUBMITTED A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO DATE REVIEWED SUBMITTALS WILL BE NEEDED.

NOTE: 3D VIEWS SHOW LIMITED AMOUNT OF INFORMATION AND ARE PROVIDED TO ILLUSTRATE OVERALL CONTEXT ONLY.
REFER TO DRAWINGS AND SPECIFICATIONS FOR DETAILED INFORMATION.

EAGLE BUILDERS

Grubb

PROJECT CONTACT
Brian Wang - (587) 876-4351
brianw@grubb-engineering.ca

PERMIT TO PRACTICE
GRUBB ENGINEERING CORPORATION
PERMIT NUMBER: P 11111
Signature
Date YYYY-MM-DD

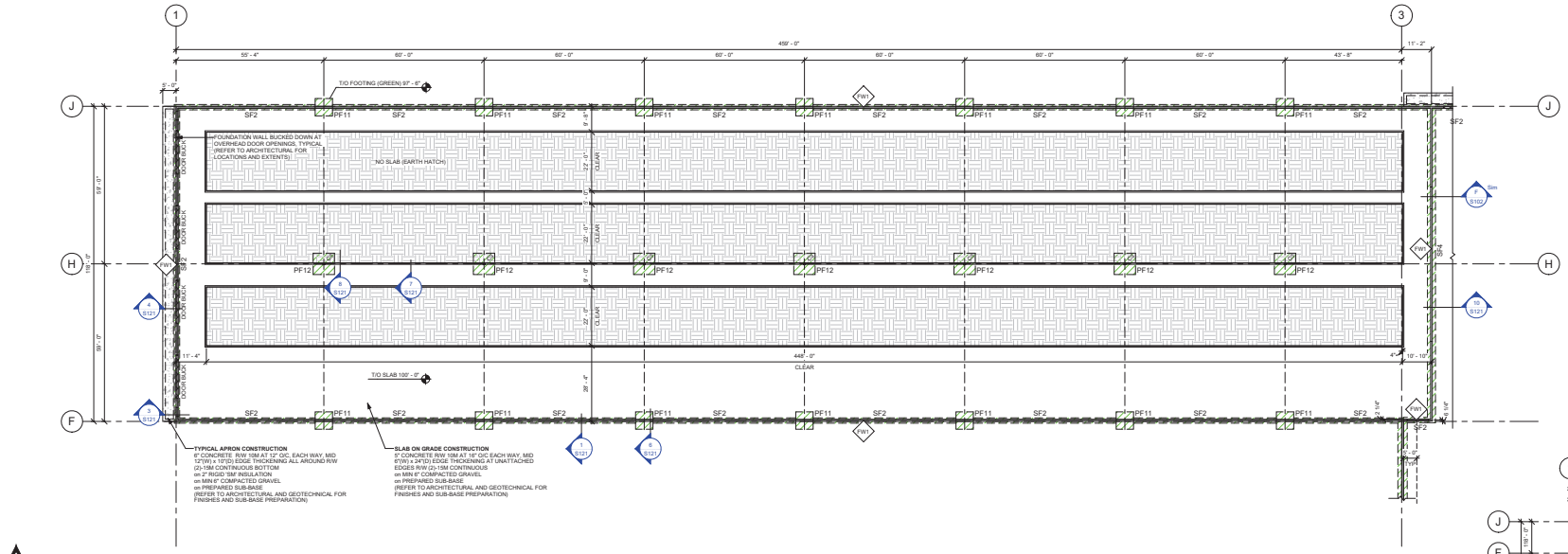
PROFESSIONAL ENGINEER ALBERTA
BRIAN JAMES WANG
2025-11-27

No.	Issue Description	Date
1	ISSUED FOR PERMIT	2025-11-27
0	ISSUED FOR PERMIT	2025-10-31

Hejo Farms, Sheep Barn
Lethbridge County, Alberta

PROJECT NUMBER: 25-184

Structural Cover Page | S001



A Foundation Plan - North West
1/16" = 1'-0"

CAST-IN-PLACE CONCRETE FOUNDATION WALLS			
Type	Width	Reinforcing	
FW1	8"	(2) 15M HORIZONTALS TOP AND BOTTOM AND 15M VERTS OR DOWELS FROM FOOTING AT 48" O/C, MID	
FW11	8"	15M AT 12" O/C EACH WAY ON OPEN FACE. PROVIDE (2) 15M HORIZONTALS TOP AND BOTTOM	

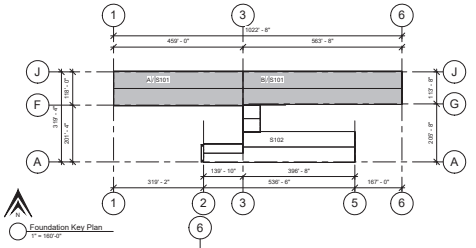
CAST-IN-PLACE CONCRETE PAD FOOTINGS				
Type	Width	Length	Depth	Reinforcing
PF1	5' - 0"	5' - 0"	10"	(4) 15M EACH WAY, BOTTOM
PF5	5' - 0"	5' - 0"	10"	(6) 15M EACH WAY, BOTTOM
PF11	8' - 6"	8' - 6"	12"	(7) 15M EACH WAY, BOTTOM
PF12	8' - 0"	8' - 0"	14"	(11) 15M EACH WAY, BOTTOM
PF14	4' - 8"	10' - 8"	12"	(5) 15M LONG AND (11) 15M SHORT, TOP AND BOTTOM
PF15	6' - 6"	10' - 8"	14"	(7) 15M LONG AND (11) 15M SHORT, TOP AND BOTTOM

CAST-IN-PLACE CONCRETE STRIP FOOTINGS			
Type	Width	Depth	Reinforcing
SF1	20"	10"	(2) 15M CONTINUOUS AND 10M CROSS BARS AT 48" O/C
SF2	24"	10"	(2) 15M CONTINUOUS AND 10M CROSS BARS AT 48" O/C
SF3	30"	10"	(3) 15M CONTINUOUS AND 15M CROSS BARS AT 16" O/C
SF4	36"	10"	(4) 15M CONTINUOUS AND 15M CROSS BARS AT 16" O/C
SF5	42"	10"	(4) 15M CONTINUOUS AND 15M CROSS BARS AT 16" O/C

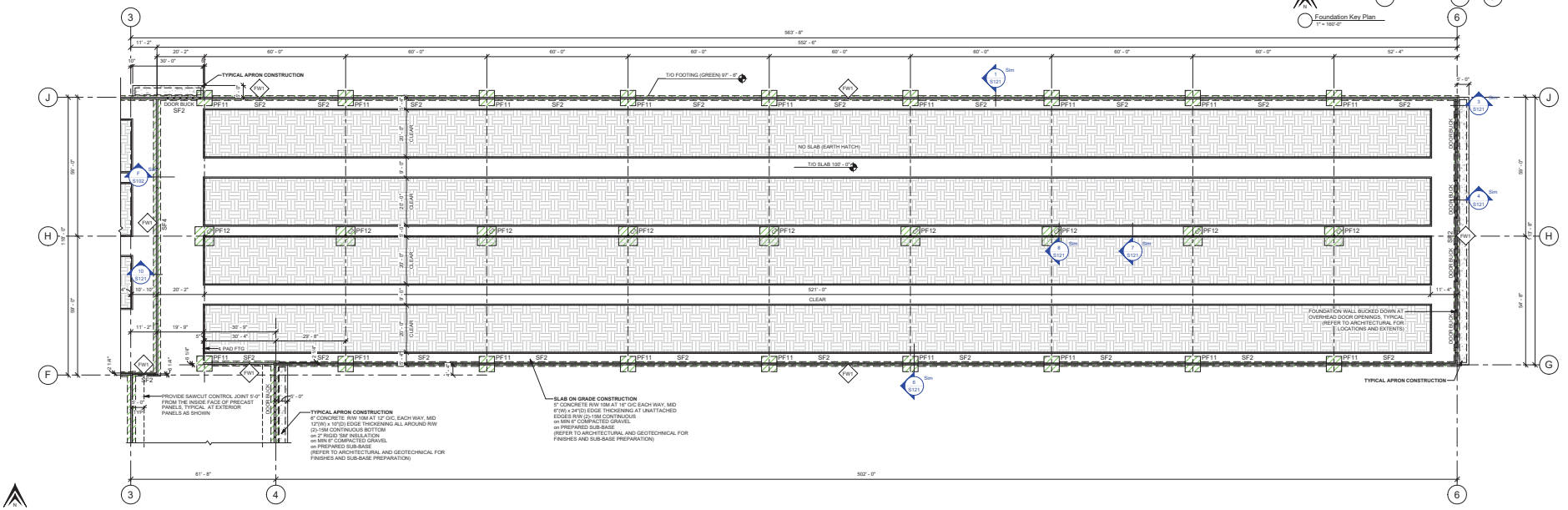
STEEL COLUMN SCHEDULE	
Type	Imperial Name
C1	HSSSX6X0.25
C2	HSS7X7X0.375
C3	HSS8X8X0.375

01 33 17 FOUNDATION PAGE NOTES (FOOTING)

1 REFER TO DETAILS AND SECTIONS FOR ADDITIONAL INFORMATION.
2 FOOTING DESIGN BASED ON THE FOLLOWING FACTORED ULS BEARING PRESSURES. REFER TO GEOTECHNICAL REPORT FOR MORE INFORMATION.
2a STRIP FOOTINGS: 1500 psf (71.8 kPa)
2b PAD FOOTINGS: 1500 psf (71.8 kPa)
3 ENSURE ALL ROOF AND SITE WATER IS DIRECTED WELL AWAY FROM THE BUILDING FOUNDATIONS.
4 REFER TO SEPARATE NOTES PAGE FOR FURTHER INFORMATION



Foundation Key Plan
1" = 160'-0"



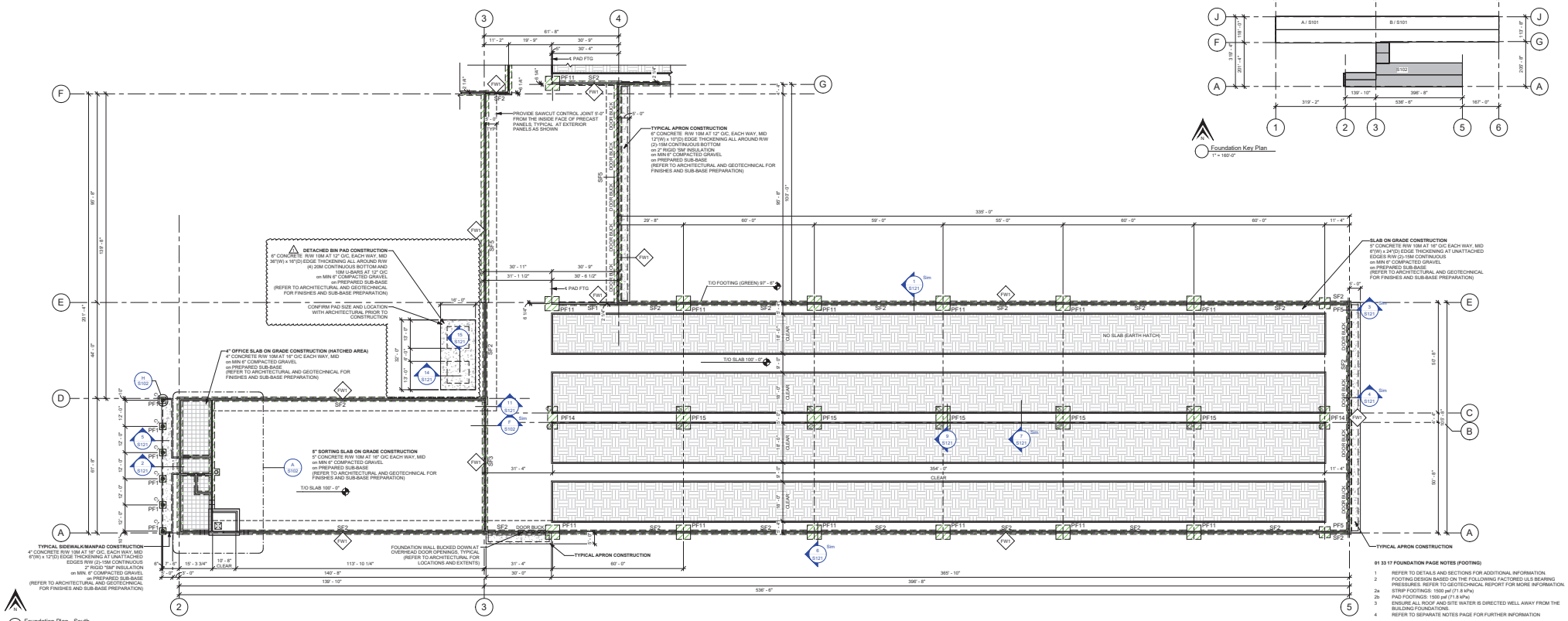
B Foundation Plan - North East
1/16" = 1'-0"

EAGLE BUILDERS
Grubb
Brian Wang - (587) 876-4351
brian@grubb-engineering.com
PERMIT TO PRACTICE

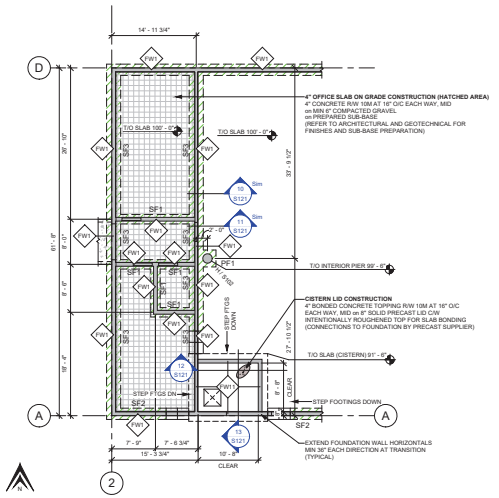
Helo Farms, Sheep Barn
Lethbridge County, Alberta

Foundation Plan - NW and NE

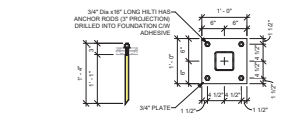
S101



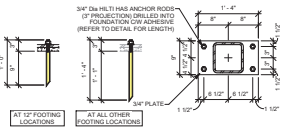
Foundation Plan - South
1/16" = 1'-0"



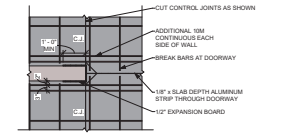
Enlarged Office Plan
1/8" = 1'-0"



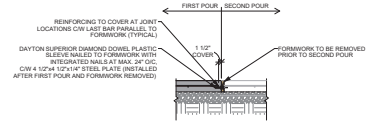
Base Plate - EBP1 (HSS 5x5)
1" = 1'-0"



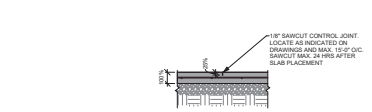
Base Plate - EBP2 (HSS 7x7, 8x8)
1" = 1'-0"



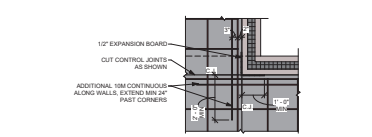
Concrete Slab Break at Opening
1/2" = 1'-0"



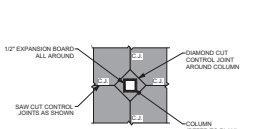
5"-6" Concrete Slab Diamond Plate Dowel Construction Joint
1/2" = 1'-0"



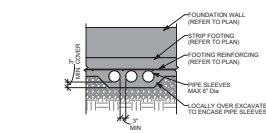
Concrete Slab Control Joint
1/2" = 1'-0"



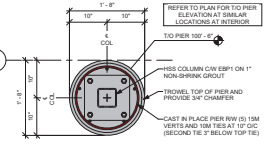
Concrete Slab at Re-entrant Corner and OH Doors
1/2" = 1'-0"



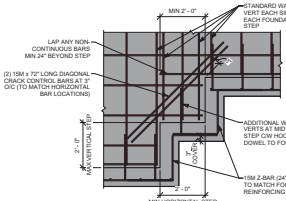
Concrete Slab at Interior Column
1/2" = 1'-0"



Pipe Sleeves Under Footing
1/2" = 1'-0"



Typical Exterior Pier
1" = 1'-0"



Concrete Multi-Stepped Footing
1/2" = 1'-0"

CAST-IN-PLACE CONCRETE FOUNDATION WALLS

Type	Width	Reinforcing
FW1	8"	(2) 15M HORIZONTALS TOP AND BOTTOM AND 15M VERTS ON DOWELS FROM FOOTING AT 48" O/C, MID
FW11	8"	15M AT 12" O/C EACH WAY ON OPEN FACE PROVIDE (2) 15M HORIZONTALS TOP AND BOTTOM

CAST-IN-PLACE CONCRETE STRIP FOOTINGS

Type	Width	Depth	Reinforcing
SF1	20"	10"	(2) 15M CONTINUOUS AND 10M CROSS BARS AT 48" O/C
SF2	24"	10"	(2) 15M CONTINUOUS AND 10M CROSS BARS AT 48" O/C
SF3	30"	10"	(3) 15M CONTINUOUS AND 15M CROSS BARS AT 18" O/C
SF4	36"	10"	(4) 15M CONTINUOUS AND 15M CROSS BARS AT 18" O/C
SF5	42"	10"	(4) 15M CONTINUOUS AND 15M CROSS BARS AT 18" O/C

STEEL COLUMN SCHEDULE

Type	Imperial Name
C1	HSS5X5X0.25
C2	HSS7X7X0.375
C3	HSS8X8X0.375

CAST-IN-PLACE CONCRETE PAD FOOTINGS

Type	Width	Length	Depth	Reinforcing
PF1	3' - 0"	3' - 0"	10"	(4) 15M EACH WAY, BOTTOM
PF5	5' - 0"	5' - 0"	10"	(6) 15M EACH WAY, BOTTOM
PF11	8' - 6"	8' - 6"	12"	(7) 15M EACH WAY, BOTTOM
PF12	9' - 0"	9' - 0"	14"	(11) 15M EACH WAY, BOTTOM
PF14	4' - 6"	10' - 6"	12"	(5) 15M LONG AND (11) 15M SHORT, TOP AND BOTTOM
PF15	5' - 6"	10' - 6"	14"	(7) 15M LONG AND (11) 15M SHORT, TOP AND BOTTOM

01 33 17 FOUNDATION PAGE NOTES (FOOTING)

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4 REFER TO SEPARATE NOTES PAGE FOR FURTHER INFORMATION

EAGLE BUILDERS

Grubb

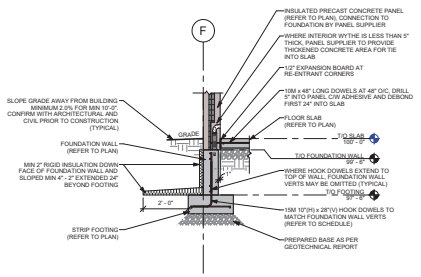
PERMIT TO PRACTICE
EAGLE BUILDERS LTD.
RM OF WILLOW BUNCH NO. 42
SIGNATURE
DATE: 2025 / 11 / 27

PROFESSIONAL ENGINEER
ALBERTA
2025 / 11 / 27

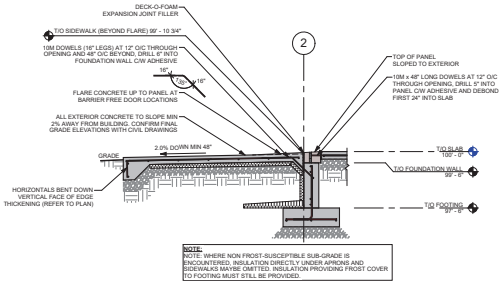
NO.	ISSUED FOR / REVISION	DATE
1	ISSUED FOR PERMIT	2025-11-27

Helo Farms, Sheep Barn
Lethbridge County, Alberta

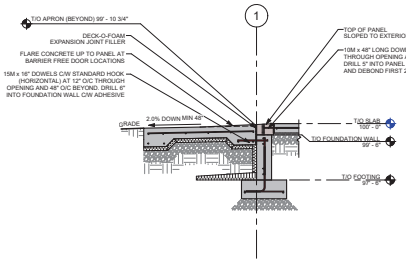
Foundation Plan - South, and Details
S102



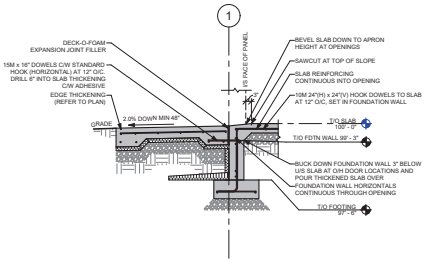
1 Typical Exterior Panel at Foundation Wall
1/2" = 1'-0"



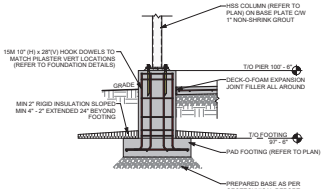
2 Typical Sidewalk (Opening and Beyond)
1/2" = 1'-0"



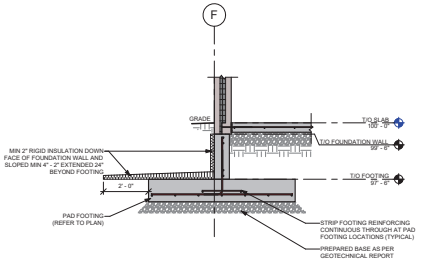
3 Apron at Exterior Panel (Opening and Beyond)
1/2" = 1'-0"



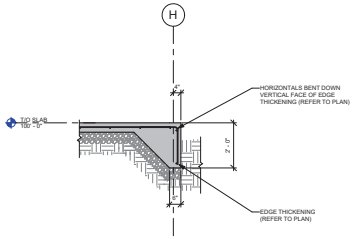
4 Apron at Overhead Door Opening
1/2" = 1'-0"



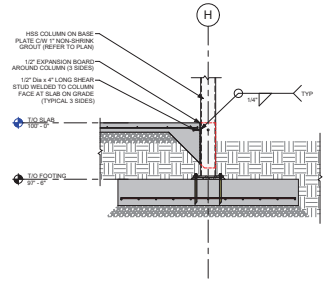
5 Exterior Pier
1/2" = 1'-0"



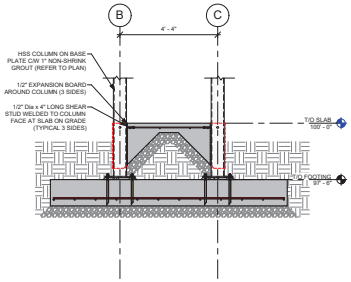
6 Exterior Foundation at Pad Footing
1/2" = 1'-0"



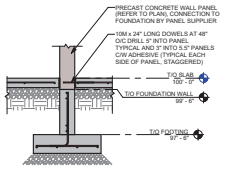
7 Slab Thickening at Pit
1/2" = 1'-0"



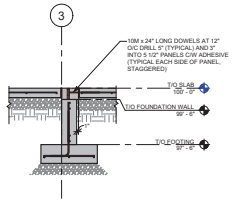
8 Interior Column at Footing
1/2" = 1'-0"



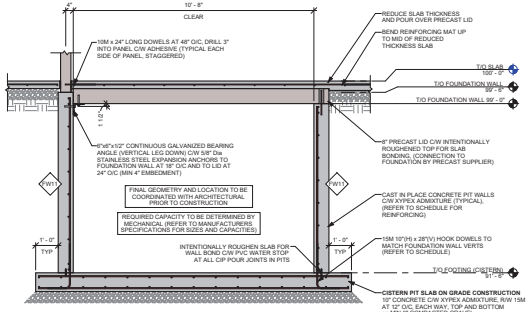
9 Interior Columns at Footing
1/2" = 1'-0"



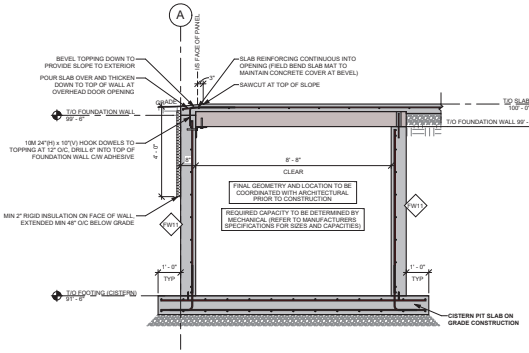
10 Typical Interior Panel at Foundation
1/2" = 1'-0"



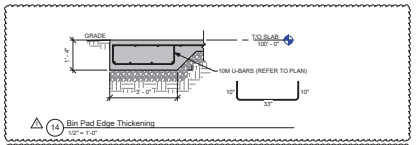
11 Typical Interior Panel at Foundation Opening
1/2" = 1'-0"



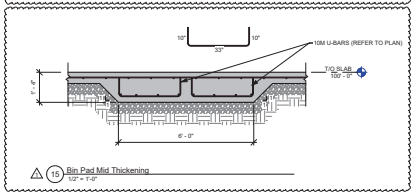
12 Cistern Section (Long)
1/2" = 1'-0"



13 Cistern Section (Short)
1/2" = 1'-0"



14 Bin Pad Edge Thickening
1/2" = 1'-0"



15 Bin Pad Mid Thickening
1/2" = 1'-0"

EAGLE BUILDERS

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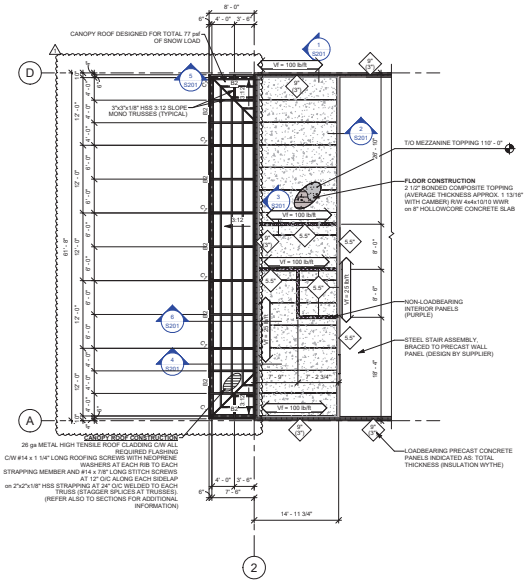
PROFESSIONAL ENGINEER ALBERTA

2025.11.27

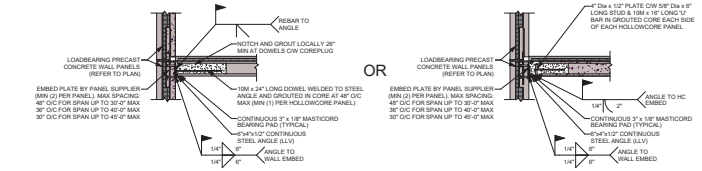
No.	Issued For	Date
1	ISSUED FOR PERMIT	2025.11.27

Hejo Farms, Sheep Barn
Lethbridge County, Alberta

Foundation Sections | S121



Mezzanine Floor Framing Plan
1/8" = 1'-0"



A Hollowcore Bearing at Precast Wall (Angle)
1/2" = 1'-0"

B Hollowcore Parallel to Precast Wall
1/2" = 1'-0"

STEEL BEAM SCHEDULE

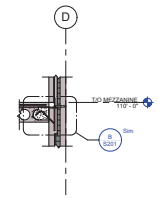
Type	Imperial Name	Shear Force (Factored ULS)
B1	W8X10	5 kip
B2	W8X18	10 kip
B3	W14X34	11 kip

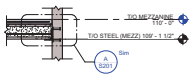
STEEL COLUMN SCHEDULE

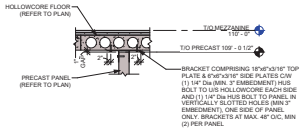
Type	Imperial Name
C1	HSS5X5X0.25
C2	HSS7X7X0.375
C3	HSS8X8X0.375

01 33 16 DESIGN LOADS

1. THE APPLICABLE PROVINCIAL OR NATIONAL BUILDING CODE USED FOR THIS PROJECT IS: - NATIONAL BUILDING CODE ALBERTA 2023 EDITION
2. ALL STRUCTURAL ELEMENTS ARE DESIGNED TO CONFORM TO THE SPECIFIED APPLICABLE PROVINCIAL OR NATIONAL BUILDING CODE
3. REFERENCE LOADS USED IN THE STRUCTURAL DESIGN ARE:
   GROUND SNOW LOAD:
   Ss = 25.1 psf (1.2 kPa)
   Sr = 2.1 psf (0.1 kPa)
   LATERAL LOADS:
   q1/0 = 11.1 psf (0.5 kPa)
   IMPORTANCE CATEGORY: LOW
   CONCENTRATED LOADS (UNLESS NOTED OTHERWISE):
   ROOFS = 292 lbs (1.3 kN)
   FLOORS = 2,022 lbs (9 kN)
4. BUILDING DESIGN LOADS USED ARE:
   a. ROOFS:
      DESIGN SNOW LOAD: 29.2 psf (1.0 kPa)
      DESIGN DEAD LOAD (SELF-WEIGHT & SUPERIMPOSED): 12.0 psf (0.6 kPa)
      NET FACTORED WIND UPLIFT: 14.0 psf (0.7 kPa)
   b. ADDITIONAL LOADS DUE TO SNOW BUILD-UP ARE AS SHOWN ON THE ROOF FRAMING PLAN.
   c. SNOW LOAD SHOWN IS FOR ULTIMATE LIMIT STATE (ULS), FOR SERVICEABILITY LIMIT STATE (SLS) MULTIPLY BY 0.90.
   d. ADDITIONAL LOADS DUE TO MECHANICAL EQUIPMENT SHALL BE INCLUDED. REFER TO MECHANICAL DRAWINGS FOR LOCATIONS AND WEIGHTS.
   e. SECOND FLOOR:
      DESIGN LIVE LOAD: 100.0 psf (4.8 kPa)
      DESIGN DEAD LOAD (SELF-WEIGHT): 87.0 psf (4.2 kPa)
      DESIGN DEAD LOAD (SUPERIMPOSED): 8.0 psf (0.4 kPa)



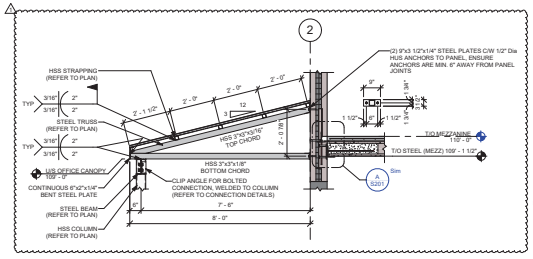


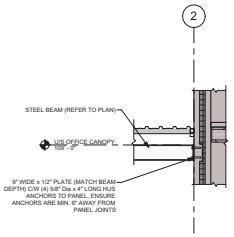


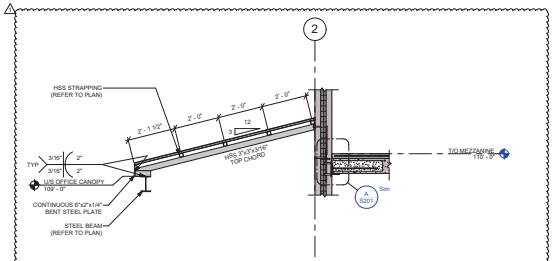
1 Hollowcore Parallel to Precast Wall
1/2" = 1'-0"

2 Hollowcore Bearing at Interior Panel
1/2" = 1'-0"

3 Hollowcore over Panel (Non-Bearing)
1/2" = 1'-0"



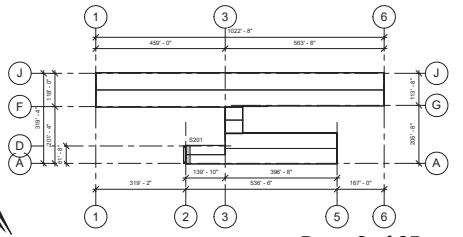




4 Office Canopy at Exterior Panel (At Columns)
1/2" = 1'-0"

5 Canopy Beam Connection to Precast
1/2" = 1'-0"

6 Office Canopy at Exterior Panel (Between Columns)
1/2" = 1'-0"



Floor Framing Key Plan
1" = 160'-0"

EAGLE BUILDERS

Grubb

PROJECT CONTACT
Brian Wang - (587) 876-4351
brian@grubb-engineering.com

PERMIT TO PRACTICE
GRUBB ENGINEERING CONSULTANTS LTD.
PERMIT NUMBER: P 12,345
APEGA

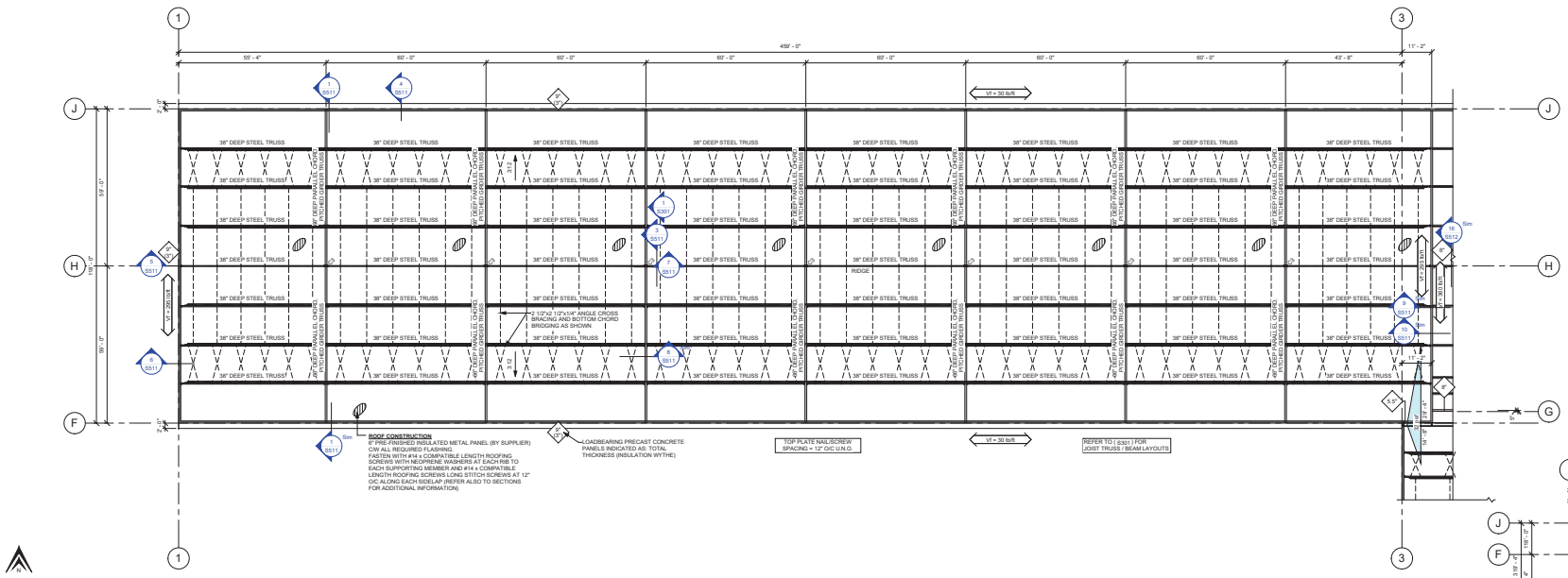
PROFESSIONAL ENGINEER
BRIAN WANG
2025.11.27

No.	Issue/Revision	Date
1	ISSUED FOR PERMIT	2025.11.27

Hejo Farms, Sheep Barn
Lethbridge County, Alberta

Mezzanine Floor Framing Plan and Sections

S201



A Roof Framing Plan - North West
1/16" = 1'-0"

B Roof Framing Plan - North East
1/16" = 1'-0"

Roof Framing Key Plan
1" = 160'-0"

01 33 16 DESIGN LOADS

1. THE APPLICABLE PROVINCIAL OR NATIONAL BUILDING CODE USED FOR THIS PROJECT IS: - NATIONAL BUILDING CODE ALBERTA 2023 EDITION
2. ALL STRUCTURAL ELEMENTS ARE DESIGNED TO CONFORM TO THE SPECIFIED APPLICABLE PROVINCIAL OR NATIONAL BUILDING CODE
3. REFERENCE LOADS USED IN THE STRUCTURAL DESIGN ARE:
   GROUND SNOW LOAD:
   Ss = 25.1 psf (1.2 kPa)
   Sr = 2.1 psf (0.1 kPa)
   LATERAL LOADS:
   q10 = 11.1 psf (0.5 kPa)
   IMPORTANCE CATEGORY: LOW
   CONCENTRATED LOADS (UNLESS NOTED OTHERWISE):
   ROOFS = 292 lbs (1.3 kN)
   FLOORS = 2,022 lbs (9 kN)
4. BUILDING DESIGN LOADS USED ARE:
   a. ROOFS:
      DESIGN SNOW LOAD: 20.2 psf (1.0 kPa)
      DESIGN DEAD LOAD (SELF-WEIGHT & SUPERIMPOSED): 12.0 psf (0.6 kPa)
      NET FACTORED WIND UPLIFT: 14.0 psf (0.7 kPa)
   b. ADDITIONAL LOADS DUE TO SNOW BUILD-UP ARE AS SHOWN ON THE ROOF FRAMING PLAN.
   c. SNOW LOAD SHOWN IS FOR ULTIMATE LIMIT STATE (ULS), FOR SERVICEABILITY LIMIT STATE (SLS) MULTIPLY BY 0.90.
   d. ADDITIONAL LOADS DUE TO MECHANICAL EQUIPMENT SHALL BE INCLUDED. REFER TO MECHANICAL DRAWINGS FOR LOCATIONS AND WEIGHTS.
   e. SECOND FLOOR:
      DESIGN LIVE LOAD: 100.0 psf (4.8 kPa)
      DESIGN DEAD LOAD (SELF-WEIGHT): 87.0 psf (4.2 kPa)
      DESIGN DEAD LOAD (SUPERIMPOSED): 8.0 psf (0.4 kPa)

STEEL BEAM SCHEDULE

Type	Imperial Name	Shear Force (Factored ULS)
B1	W8X10	5 kip
B2	W8X18	10 kip
B3	W14X34	11 kip

STEEL COLUMN SCHEDULE

Type	Imperial Name
C1	HSS5X5X0.25
C2	HSS7X7X0.375
C3	HSS8X8X0.375

ROOF CONSTRUCTION
6" PRE-FINISHED INSULATED METAL PANEL (BY SUPPLIER) C/W ALL REQUIRED FLASHING. FASTEN WITH #14 x COMPATIBLE LENGTH ROOFING SCREWS WITH NEOPRENE WASHERS AT EACH RIB TO EACH SUPPORTING MEMBER AND #14 x COMPATIBLE LENGTH ROOFING SCREWS LONG STITCH SCREWS AT 12" O/C ALONG EACH SIDELAP (REFER ALSO TO SECTIONS FOR ADDITIONAL INFORMATION)

EAGLE BUILDERS
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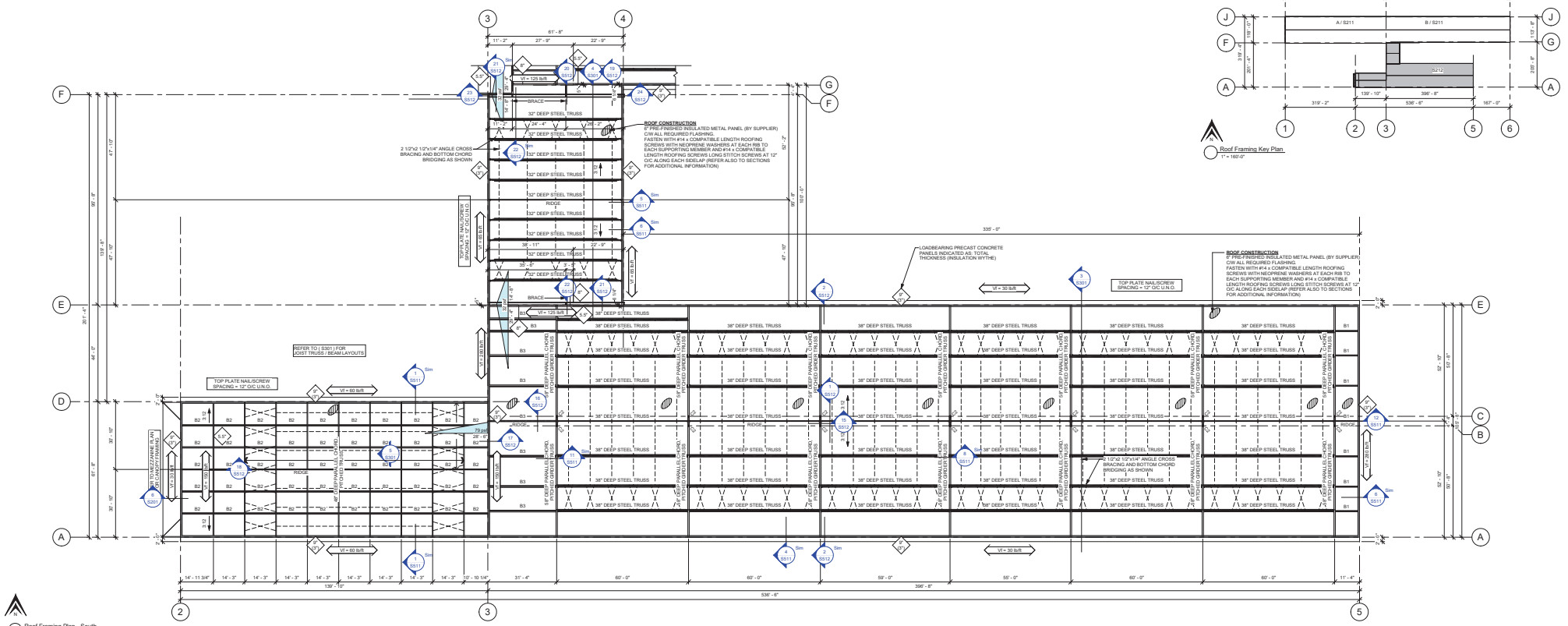
PROFESSIONAL ENGINEER
BRIAN HIBBS
2025 / 11 / 27

Heip Farms, Sheep Barn
Lethbridge County, Alberta

Roof Framing Plan - NW and NE
S211



STEEL BEAM SCHEDULE		
Type	Imperial Name	Shear Force (Factored ULS)
B1	W8X15	5 kip
B2	W8X18	10 kip
B3	W14X24	11 kip

STEEL COLUMN SCHEDULE	
Type	Imperial Name
C1	HSS5X5X0.25
C2	HSS7X7X0.375
C3	HSS8X8X0.375

01 33 16 DESIGN LOADS

1. THE APPLICABLE PROVINCIAL OR NATIONAL BUILDING CODE USED FOR THIS PROJECT IS: - NATIONAL BUILDING CODE ALBERTA 2023 EDITION
2. ALL STRUCTURAL ELEMENTS ARE DESIGNED TO CONFORM TO THE SPECIFIED APPLICABLE PROVINCIAL OR NATIONAL BUILDING CODE
3. REFERENCE LOADS USED IN THE STRUCTURAL DESIGN ARE:
   GROUND SNOW LOAD:
   Ss = 25.1 psf (1.2 kPa)
   Sr = 2.1 psf (0.1 kPa)
   LATERAL LOADS:
   q1/50 = 11.1 psf (0.5 kPa)
   IMPORTANCE CATEGORY: LOW
   CONCENTRATED LOADS (UNLESS NOTED OTHERWISE):
   ROOFS = 292 lbs (1.3 kN)
   FLOORS = 2,022 lbs (9 kN)
4. BUILDING DESIGN LOADS USED ARE:
   a. ROOFS:
      DESIGN SNOW LOAD: 20.2 psf (1.0 kPa)
      DESIGN DEAD LOAD (SELF-WEIGHT & SUPERIMPOSED): 12.0 psf (0.6 kPa)
      NET FACTORED WIND UPLIFT: 14.0 psf (0.7 kPa)
   b. ADDITIONAL LOADS DUE TO SNOW BUILD-UP ARE AS SHOWN ON THE ROOF FRAMING PLAN.
   c. SNOW LOAD SHOWN IS FOR ULTIMATE LIMIT STATE (ULS), FOR SERVICEABILITY LIMIT STATE (SLS) MULTIPLY BY 0.30.
   d. ADDITIONAL LOADS DUE TO MECHANICAL EQUIPMENT SHALL BE INCLUDED. REFER TO MECHANICAL DRAWINGS FOR LOCATIONS AND WEIGHTS.
   e. SECOND FLOOR:
      DESIGN LIVE LOAD: 100.0 psf (4.8 kPa)
      DESIGN DEAD LOAD (SELF-WEIGHT): 87.0 psf (4.2 kPa)
      DESIGN DEAD LOAD (SUPERIMPOSED): 8.0 psf (0.4 kPa)

EAGLE BUILDERS

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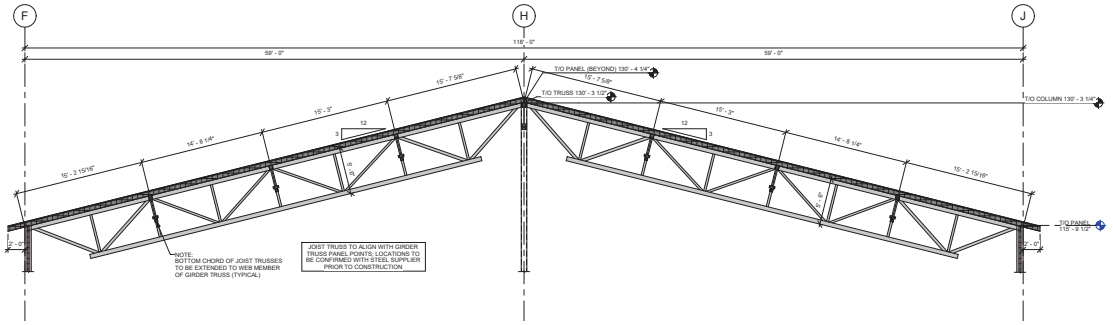
PROFESSIONAL ENGINEER ALBERTA

2025 21 27

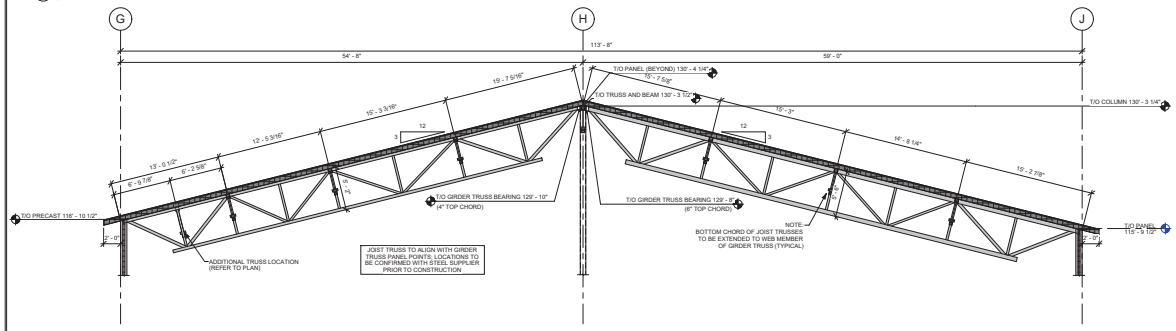
Heip Farms, Sheep Barn
Lethbridge County, Alberta

Roof Framing Plan - South

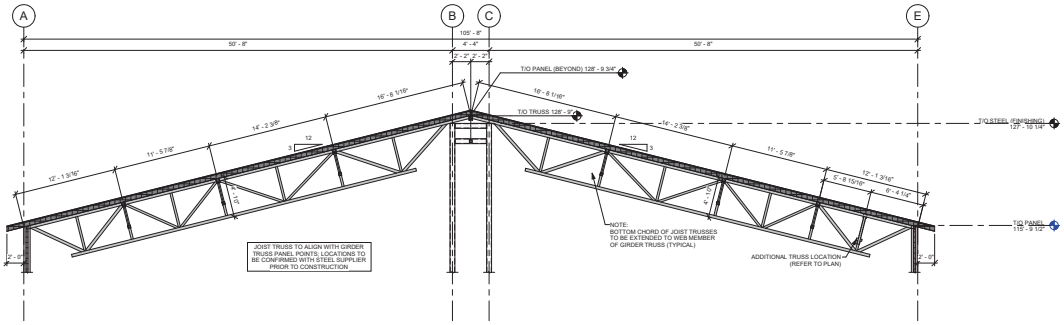
S212



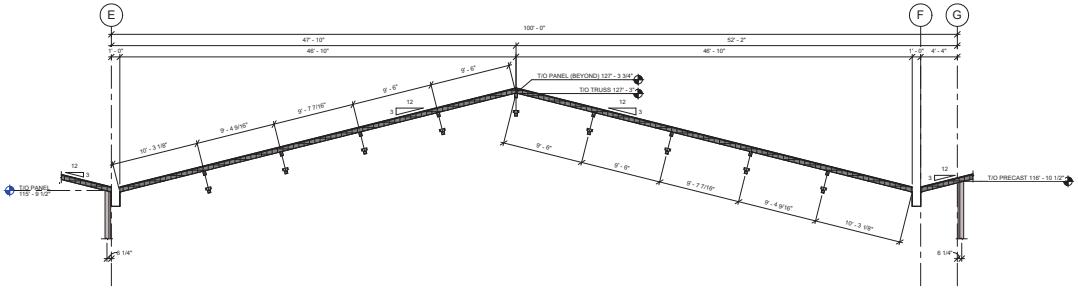
1 Girder Truss Elevation - Lamb Barn
3/16" = 1'-0"



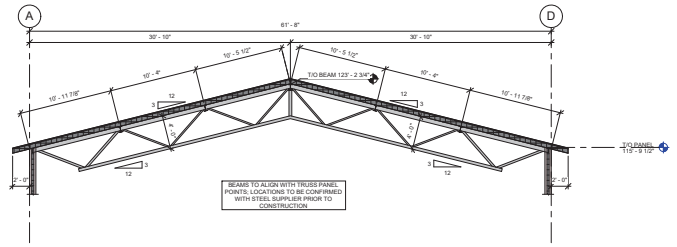
2 Girder Truss Elevation - Ewe Barn
3/16" = 1'-0"



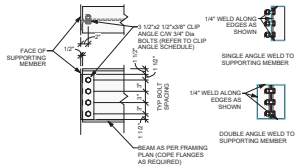
3 Girder Truss Elevation - Finishing Barn
3/16" = 1'-0"



4 Truss Layout - Link
3/16" = 1'-0"



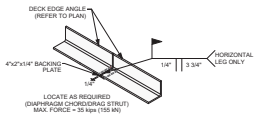
5 Truss Elevation - Sorting Area
3/16" = 1'-0"



A Bolted Connection - 90degree
1" = 1'-0"

CLIP ANGLE SCHEDULE

BEAM DEPTH	CLIP LENGTH	# OF BOLTS	FACTORED SHEAR RESISTANCE	
			SINGLE CLIP	DOUBLE CLIP
W8 / W10 [W200 / W250]	6" [150]	2	36 kips [158 kN]	71 kips [316 kN]
W12 / W14 [W310 / W360]	9" [230]	3	53 kips [237 kN]	107 kips [474 kN]
W16 [W410]	12" [310]	4	71 kips [316 kN]	142 kips [632 kN]
W18 [W460]	15" [390]	5	89 kips [395 kN]	178 kips [790 kN]
W21 [W530]	18" [470]	6	107 kips [474 kN]	213 kips [948 kN]
W24 [W610]	21" [550]	7	124 kips [553 kN]	250 kips [1110 kN]
W27 [W690]	24" [630]	8	142 kips [632 kN]	283 kips [1260 kN]
W30 [W760]	27" [710]	9	160 kips [710 kN]	319 kips [1420 kN]
W33 [W840]	30" [790]	10	178 kips [790 kN]	355 kips [1580 kN]
W36 [W920]	33" [870]	11	196 kips [870 kN]	391 kips [1740 kN]



6 Deck Angle Butt Splice Detail
1" = 1'-0"

EAGLE BUILDERS

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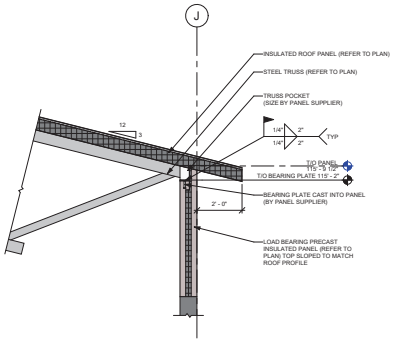
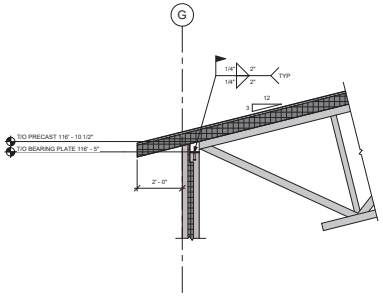
PROFESSIONAL ENGINEER ALBERTA
BRIAN HENRY ALLEN
2025.11.27

Helo Farms, Sheep Barn
Lethbridge County, Alberta

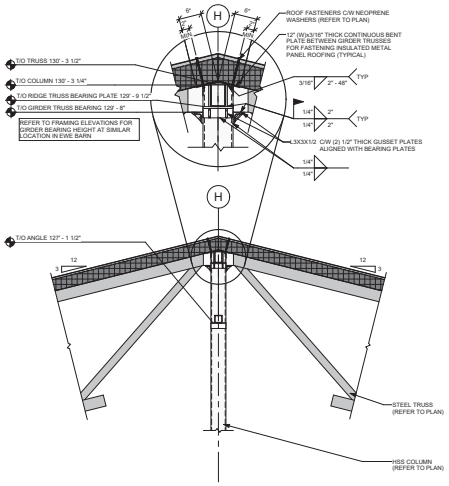
Framing Elevations and Connection Details | S301



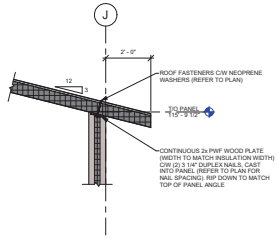
1 Typical Girder Truss at Exterior Panel (6" Top Chord) - Lamb
1/2" = 1'-0"



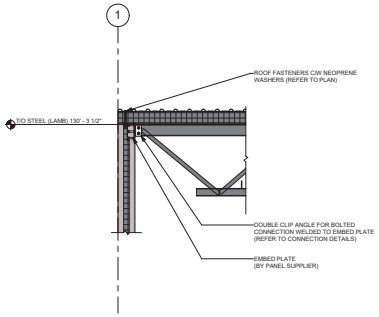
2 Typical Girder Truss at Exterior Panel (GL G) 4" Top Chord
1/2" = 1'-0"



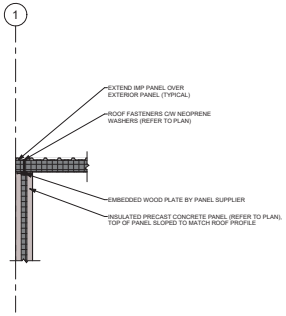
3 Truss Ridge - Lamb
1/2" = 1'-0"



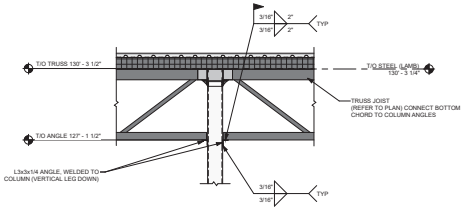
4 IMP to Panel Connection
1/2" = 1'-0"



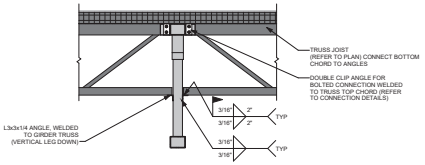
5 Joist Truss at Exterior Panel
1/2" = 1'-0"



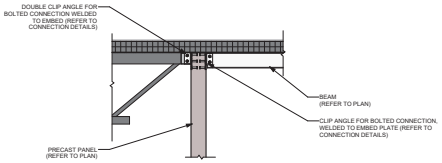
6 Typical IMP Over Exterior Panel - Endwall
1/2" = 1'-0"



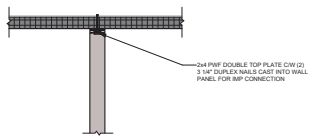
7 Truss Bottom Chord Tie-in
1/2" = 1'-0"



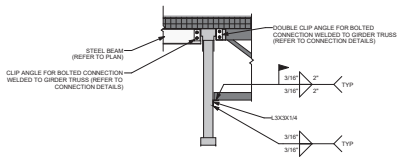
8 Truss to Girder Truss
1/2" = 1'-0"



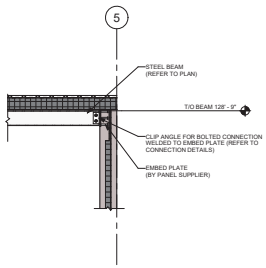
9 Beam and Truss Bearing at Interior Panel
1/2" = 1'-0"



10 Typical IMP Over Interior Panel
1/2" = 1'-0"



11 Beam and Truss Bearing at Girder Truss
1/2" = 1'-0"



12 Beam at Exterior Panel
1/2" = 1'-0"

EAGLE BUILDERS

Grubb

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brian@grubb-engineering.ca

PERMIT TO PRACTICE
GRUBB ENGINEERING CONSULTANTS LTD.
PERMIT NUMBER: P 12,345
Date: 2025.11.27

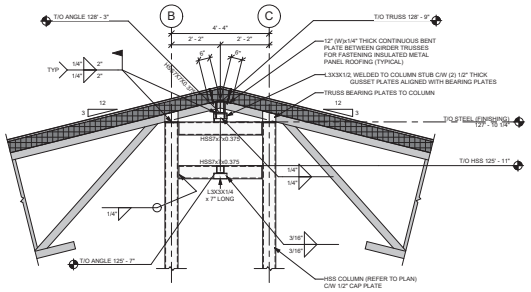
PROFESSIONAL ENGINEER
BRIAN WANG
2025.11.27

ISSUED FOR	DATE

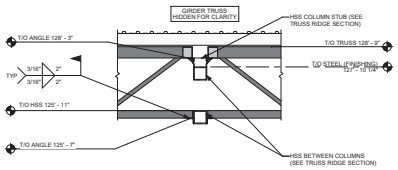
Hejo Farms, Sheep Barn
Lethbridge County, Alberta

PROJECT NUMBER: 25-154

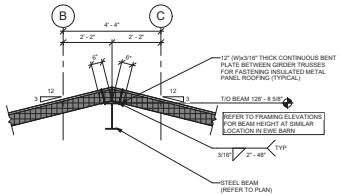
Roof Framing Sections | S511



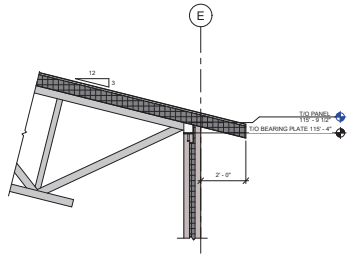
1 Truss Ridge - Finishing
1/2" = 1'-0"



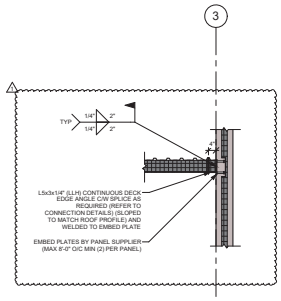
15 Truss Tie-in - Finishing
1/2" = 1'-0"



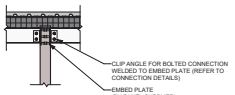
16 Beam at Ridge - Finish Barn
1/2" = 1'-0"



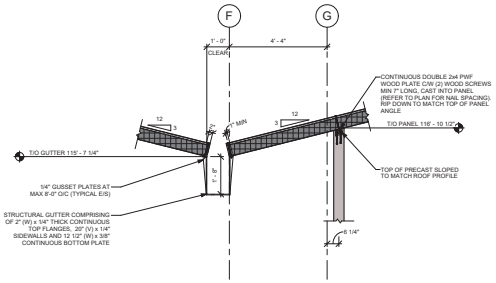
2 Typical Girder Truss at Exterior Panel (4" Top Chord)
1/2" = 1'-0"



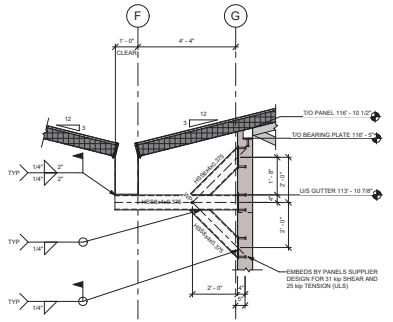
17 IMP Support Exterior Panel - Roof Transition
1/2" = 1'-0"



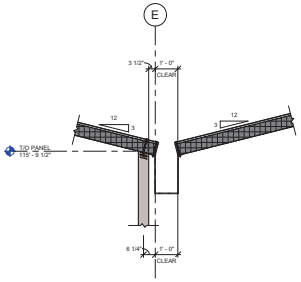
18 Beam Bearing Each Side of 5 1/2" Panel
1/2" = 1'-0"



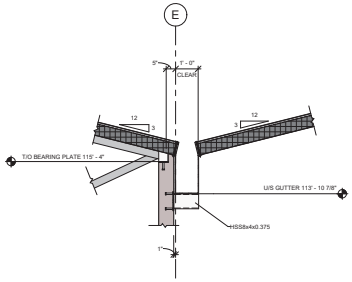
19 Link Roof at Gutter (North)
1/2" = 1'-0"



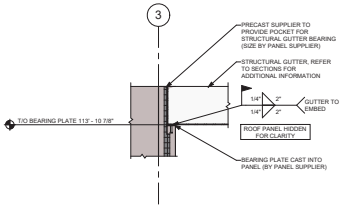
20 Link Roof at Gutter Brace (GL G)
1/2" = 1'-0"



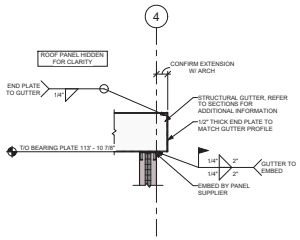
21 Link Roof at Gutter (South)
1/2" = 1'-0"



22 Link Roof at Gutter Brace (South)
1/2" = 1'-0"



23 Gutter Bearing GL 3
1/2" = 1'-0"



24 Gutter Bearing GL 4
1/2" = 1'-0"

EAGLE BUILDERS

Grubb

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brian@grubb-engineering.com

PERMIT TO PRACTICE
GRUBB ENGINEERING LTD.
PROFESSIONAL ENGINEER ALBERTA
2025.11.27

NO.	ISSUE	DATE
1	ISSUED FOR PERMIT	2025.11.27

Hejo Farms, Sheep Barn
Lethbridge County, Alberta

PROJECT NUMBER 25-156

Roof Framing Sections | S512

00 00 01 GENERAL NOTES

1 READ STRUCTURAL DRAWINGS IN CONJUNCTION WITH THE ARCHITECTURAL, CIVIL, MECHANICAL, AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.

2 THE STRUCTURAL DRAWINGS ARE FOR THE COMPLETED PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR THE SAFETY OF WORKERS AND THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION. CONSTRUCTION LOADS SHALL NOT EXCEED THE LOADS TABULATED IN THE DESIGN NOTES. ANY REQUIRED TEMPORARY WORKS AND BRACING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

3 MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE APPLICABLE PROVINCIAL/MUNICIPAL/NATIONAL BUILDING CODE.

4 REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR ALL ASPECTS OF BUILDING ENVELOPE DETAILING INCLUDING, BUT NOT LIMITED TO, WATERPROOFING, SEALANTS, FLASHINGS, VAPOUR BARRIERS, MEMBRANES, AND OTHER DRAINAGE DETAILS.

00 31 01 FOUNDATION MECHANICAL REQUIREMENTS

1 THE FOUNDATION CONTRACTOR SHALL BE RESPONSIBLE FOR REVIEWING THE MECHANICAL DETAILED DRAWINGS TO ENSURE THAT ALL SLEEVES, HOLES, OR OPENINGS REQUIRED FOR THE MECHANICAL WORK ARE ALLOWED FOR IN THE FOUNDATION, PRIOR TO POURING ANY CONCRETE.

2 THESE REQUIREMENTS ARE ALSO TO BE REVIEWED WITH THE MECHANICAL CONTRACTOR.

3 IF THIS IS NOT DONE THEN THE FOUNDATION CONTRACTOR SHALL BE RESPONSIBLE FOR THE RELATED COSTS OF INSTALLING SLEEVES, HOLES, OR OPENINGS IN THE FOUNDATION WHEN THE WORK IS DONE.

00 31 33 GEOTECHNICAL CONSULTANT

1 THE FOUNDATION CONTRACTOR SHALL CONSULT WITH A GEOTECHNICAL ENGINEER FOR INFORMATION RELATED TO THE SITE PREPARATION, FOUNDATION CONSTRUCTION, INSPECTIONS, SLAB PREPARATION AND CONSTRUCTION, BACK FILLING AND MATERIALS AND RELATED PROCEDURES IN GENERAL.

2 GEOTECHNICAL CONSULTANT IS TO CONFIRM/VERIFY ALL NOTED GEOTECHNICAL ASSUMPTIONS AND INFORM GRUBB ENGINEERING CORPORATION IF ANY CONDITIONS EXIST THAT DO NOT MEET OR EXCEED THE REQUIREMENTS.

01 31 27 USE OF ELECTRONIC FILES

1 SUPPORTING ELECTRONIC FILES (PLANS AS AUTOCAD OR 3D MODELS AS REVIT, AUTOCAD, IFC EXPORT OR SIMILAR) MAY BE REQUESTED TO ASSIST WITH THE DELIVERY OF THE PROJECT. THESE ELECTRONIC FILES ARE TO BE USED SUBJECT TO THE FOLLOWING TERMS AND CONDITIONS.

1a DATA CONTAINED IN ELECTRONIC FILES ARE PART OF OUR INSTRUMENTS FOR SERVICE AND SHALL NOT BE USED FOR ANY PURPOSE OTHER THAN AS A CONVENIENCE IN THE DELIVERY OF THE SPECIFIC PROJECT.

1b WITH THE EXCEPTION OF SEALED PDF FILES, SUPPLIED ELECTRONIC FILES ARE NOT CONSTRUCTION DOCUMENTS. DIFFERENCES MAY EXIST BETWEEN THESE ELECTRONIC FILES AND CORRESPONDING CONSTRUCTION DOCUMENTS. WE MAKE NO REPRESENTATION REGARDING THE ACCURACY OR COMPLETENESS OF THE ELECTRONIC FILES YOU RECEIVE. IN THE EVENT THAT A CONFLICT ARISES BETWEEN THE SEALED CONSTRUCTION DOCUMENTS PREPARED BY US AND THE SUPPORTING ELECTRONIC FILES, THE SEALED CONSTRUCTION DOCUMENTS SHALL GOVERN. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING IF ANY CONFLICT EXISTS. BY USING AND RELYING ON THE ELECTRONIC FILES, THE CONTRACTOR AGREES OF THEIR DUTY TO FULLY COMPLY WITH THE CONSTRUCTION DOCUMENTS, INCLUDING THE NEED TO CHECK, CONFIRM AND COORDINATE ALL DIMENSIONS AND DETAILS, TAKE FIELD MEASUREMENTS, VERIFY FIELD CONDITIONS AND COORDINATE WORK WITH THAT OF OTHER CONTRACTORS FOR THE PROJECT.

01 35 00 CONCRETE WEATHER REQUIREMENTS

1 COLD WEATHER REQUIREMENTS:

1.1 COLD WEATHER PROTECTION SHALL BE AS PER CAN/CSA A23.1 AND THE FOLLOWING MINIMUM REQUIREMENTS.

1.2 CONTRACTOR IS RESPONSIBLE TO PREVENT SOIL IN EXCAVATED AREAS FROM FREEZING.

1.3 CONCRETE IS NOT TO BE PLACED AGAINST ANY SURFACE WITH A TEMPERATURE LESS THAN 4° C. (40° F.).

1.4 PROVISIONS MUST BE MADE TO PROTECT FRESH CONCRETE FROM TEMPERATURES BELOW 4° C. (40° F.). THIS PROTECTION CAN BE ACHIEVED BY ADEQUATE INSULATION BLANKETS, ENCLOSING CONCRETE SURFACES WITH RAISED TARPS OR ENCLOSE STRUCTURE COMPLETE WITH HEAT. TAKE EXTRA CARE TO HEAT EDGES OF CONCRETE SLABS.

1.5 THE TEMPERATURE OF THE CONCRETE IS NOT TO BE LESS THAN 16° C. (60° F.) OR MORE THAN 27° C. (80° F.) WHEN BEING POURED.

1.6 ALL SURFACES OF CONCRETE JUST CAST MUST BE MAINTAINED AT 21° C. (70° F.) OR MORE FOR THE FIRST THREE DAYS, BUT NOT LESS THAN 10° C. (50° F.) FOR THE FIRST FIVE DAYS. AT THE END OF THIS PERIOD THE CONCRETE MAY BE COOLED DOWN BY 1° C. (2° F.) PER HOUR UNTIL REACHING OUTSIDE OR ROOM TEMPERATURE.

2 HOT WEATHER REQUIREMENTS:

2.1 HOT WEATHER PROTECTION REQUIREMENTS SHALL BE AS PER CAN/CSA-A23.1 AND THE FOLLOWING MINIMUM REQUIREMENTS.

2.2 FORMWORK, REINFORCING AND CONCRETING EQUIPMENT IS TO BE PROTECTED FROM THE SUNS RAYS, OR COOLED BY FOGGING OR EVAPORATION.

2.3 WHEN THE AIR TEMPERATURE IS AT OR ABOVE 25° C. (75° F.) CONCRETE IS TO BE MAINTAINED AS LOW A TEMPERATURE AS PRACTICAL, AND IN NO CASE MORE THAN 30° C. (85° F.).

2.4 PROVISIONS MUST BE MADE TO PROTECT FRESH CONCRETE FROM DRYING. THIS PROTECTION CAN BE ACHIEVED BY DAMPENING THE SUBGRADE PRIOR TO PLACING CONCRETE, ERECTING SUNSHADES DURING FINISHING, LOWERING THE CONCRETE TEMPERATURE, COVERING THE CONCRETE WITH POLYETHYLENE SHEETING BETWEEN FINISHING OPERATIONS, BEGINNING CURING IMMEDIATELY AFTER TROWELLING OR PLACING AND FINISHING AT NIGHT.

01 45 17 SITE REVIEWS

1 SITE REVIEWS OF EXCAVATION, SHORING & UNDERPINNING, GROUNDWATER INVESTIGATION & CONTROL, STRUCTURAL CAPACITY OF SOILS AND BACKFILL MATERIAL & COMPACTION ARE TO BE PERFORMED BY THE GEOTECHNICAL CONSULTANT, AS PER THEIR REQUIREMENTS.

2 THE CONTRACTOR MUST CONTACT GRUBB ENGINEERING TO PERFORM SITE REVIEWS AT THE FOLLOWING STAGES OF CONSTRUCTION:

2a FORMS AND REINFORCING FOR FOOTINGS AND/OR PILE CAPS.

2b FORMS AND REINFORCING FOR FOUNDATION WALLS, CONCRETE PIERS, GRADE BEAMS AND/OR PILASTERS.

2c FORMS AND REINFORCING FOR STRUCTURAL SLABS AND TOPPINGS .

2d REINFORCING AND CORE FILLS OF CONCRETE MASONRY WALLS, INCLUDING BEAMS, LINTELS, COLUMNS AND PILASTERS, PRIOR TO PLACEMENT OF CONCRETE.

2e OVERALL STRUCTURAL FRAMING, PRIOR TO APPLYING ARCHITECTURAL FINISHES. (MORE THAN ONE (1) REVIEW MAY BE REQUIRED DEPENDING ON THE PHASING OF THE CONSTRUCTION).

3 CONSULTANT IS TO BE INFORMED SUFFICIENTLY PRIOR TO EACH REVIEW AS NOTED BELOW. THESE SITE REVIEWS BY CONSULTANT(S) ARE REQUIRED REGARDLESS OF INSPECTIONS or REVIEWS PERFORMED BY OTHER PERMIT ISSUING AGENCIES. FAILURE TO OBTAIN THESE SITE REVIEWS WILL RESULT IN THE CONSULTANT(S) NOT ISSUING THE LETTERS OF ASSURANCE, WHICH MAY BE REQUIRED WHEN APPLYING FOR OCCUPANCY PERMIT.

4 TO ARRANGE A SITE REVIEW, PLEASE E-MAIL sitereviews@grubb-engineering.ca, INCLUDING CONTACT INFORMATION, PROJECT NAME AND LOCATION, TIMELINE, AND TYPE OF REVIEW REQUIRED (FOOTING, FRAMING, ETC.).

5 PLEASE PROVIDE MINIMUM OF 3 FULL BUSINESS DAY(S) NOTICE FOR SITE REVIEWS.

01 45 18 QUALITY ASSURANCE

1 COMPACTION TESTS ARE TO BE PERFORMED ON THE SLAB SUB-GRADE, THE SLAB BASE GRAVEL AND FOR GRAVEL BENEATH FOOTINGS, AS REQUIRED, TO THE SATISFACTION OF THE GEOTECHNICAL CONSULTANT.

2 CONCRETE TESTS ARE TO BE PERFORMED DURING POURING OF ALL STRUCTURAL CONCRETE (INCLUDING, BUT NOT LIMITED TO, FOOTINGS, FOUNDATION WALLS, PILE CAPS, GRADE BEAMS, PILASTERS, RETAINING WALLS, SLAB ON GRADE, WALLS, COLUMNS, BEAMS, STRUCTURAL SLABS, MASONRY WALL CORE FILLS, CONCRETE AND G-DECK TOPPING) WITH COPIES OF THE TEST RESULTS SUBMITTED TO GRUBB ENGINEERING CORP.

3 CONTRACTOR SHALL SUBMIT TO GRUBB ENGINEERING CORP CERTIFICATES FOR QUALIFICATION OF WELDED STEEL FABRICATORS AND ERECTORS.

01 45 19 SHOP DRAWINGS

1 DISTRIBUTION OF SHOP DRAWINGS TO TRADES AFFECTED IS THE RESPONSIBILITY OF THE CONTRACTOR.

2 CONSULTANTS REVIEW OF SHOP DRAWINGS AND DATA SHEETS COVERS GENERAL DESIGN CONCEPT ONLY. ERRORS OR DISCREPANCIES WILL BE MARKED IF NOTICED, BUT THIS REVIEW WILL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY TO COMPLETE THE WORK AS SHOWN AND SPECIFIED IN THE CONTRACT DOCUMENTS.

3 SHOP DRAWING SUBMITTALS, AS REQUIRED PER DISCIPLINE, SHALL CONSIST OF ONE (1) ELECTRONIC FILE FOR EACH REQUIRED SHOP DRAWING. MUST BEAR EVIDENCE OF REVIEW BY GENERAL CONTRACTOR AND BE SUBMITTED A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO DATE REVIEWED SUBMITTALS WILL BE NEEDED.

03 06 30 CAST-IN-PLACE CONCRETE

1 ALL CONCRETE SHALL HAVE A MAX. AGGREGATE SIZE OF 3/4" (20mm) (UNO), BE NORMAL WEIGHT CONCRETE WITH A UNIT WEIGHT OF 150 pcf (23.6 kN/m3) AND BE OF TYPE & STRENGTH AS NOTED FOR THE LOCATIONS INDICATED IN THE TABLE BELOW.

2 CONCRETE TYPE & STRENGTH FOR CONCRETE IN CONTACT WITH SOIL ARE TO BE CONFIRMED WITH GEOTECHNICAL ENGINEER.

3 STATED WATER CEMENT RATIO IS A MAXIMUM ALLOWED.

4 CURING TYPE 1, BASIC, CURE FOR 3 DAYS TO ATTAIN 40% OF SPECIFIED STRENGTH. CURING TYPE 2, ADDITIONAL, CURE FOR 7 DAYS TO ATTAIN 70% OF SPECIFIED STRENGTH.

5 NO CALCIUM CHLORIDE, IN ANY FORM, IS PERMITTED IN ANY CONCRETE MIX WITHOUT WRITTEN APPROVAL OF THE ENGINEER.

6 MASONRY COREFILLS REQUIRE 3/8" MAX AGGREGATE & 10" (250 mm) SLUMP.

7 CONCRETE TOPPING ON HOLLOWCORE PANEL FLOORS REQUIRE 1/2" MAX AGGREGATE.

8 Glb CEMENT MAY BE USED AS A SUBSTITUTE FOR HS CEMENT PROVIDED THAT IT PRODUCES SULPHATE RESISTANCE EQUIVALENT TO OR SUPERIOR TO CONCRETE MADE WITH TYPE HS.

03 06 31 (AG) CONCRETE TYPE & STRENGTH

	STRENGTH	DAYS	TYPE	W/C RATIO	AIR	CURING	EXPOSURE CLASS
FOOTINGS	30 MPa	28	HS	0.45	4%-7%	TYPE 1	S-2
FOUNDATION WALLS, PILASTERS & PIERS	30 MPa	28	HS	0.45	4%-7%	TYPE 1	S-2
MANURE PIT WALLS	32 MPa	28	HS	0.45	4%-7%	TYPE 1	A-2
SLAB ON GRADE	25 MPa	28	GU	0.45	N/A	TYPE 2	-
SLAB ON GRADE (SIDEWALK & APRON)	32 MPa	28	GU	0.45	5%-8%	TYPE 2	C-2
PRECAST CONCRETE COMPONENTS	45 MPa	28					
EXTERIOR WALLS & COLUMNS	30 MPa	28	GU	0.45	4%-7%	TYPE 1	F-2
INTERIOR WALLS & COLUMNS	30 MPa	28	GU	0.45	N/A	TYPE 1	-
CONCRETE TOPPING (G-DECK OR HOLLOWCORE)	30 MPa	28	GU	0.45	N/A	TYPE 1	-

03 21 00 FOUNDATION REINFORCING

1 REINFORCING SHALL BE BILLET STEEL CONFORMING TO CAN/CSA-G30.18 GRADE 400W MINIMUM YIELD STRENGTH 60ksi (400MPa).

2 ALL REINFORCING TO BE DETAILED, FABRICATED, AND PLACED IN ACCORDANCE WITH THE LATEST A.C.I. DETAILING MANUAL. SUBMIT SHOP DRAWINGS TO GRUBB ENGINEERING CORP FOR REVIEW PRIOR TO FABRICATION.

3 CONCRETE COVER OVER REINFORCEMENT SHALL BE:

3a SURFACE IN CONTACT WITH GROUND, 3" (75mm).

3b FORMED SURFACE EXPOSED TO EARTH or WEATHER, 2" (50mm) (BUT 1 1/2" (40mm) TO GRADE BEAM TIES).

3c PILASTERS (TO VERTICAL BARS), 2" (50mm).

3d SLABS; SINGLE MAT CENTRED, DOUBLE MAT TOP STEEL 1.5" (40mm) & BOTTOM STEEL 1.5" (40mm).

3e RETAINING WALLS, 1 1/2" (40mm).

4 PROVIDE 15M x 24" (610mm) LONG (EACH LEG) CORNER BARS TO MATCH HORIZONTAL REINFORCING AT ALL CORNERS AND INTERSECTIONS.

5 ALL REINFORCING BARS ARE TO HAVE A MINIMUM SPLICE LENGTH OF 48 BAR DIAMETERS, GRADE BEAM REINFORCING BARS ARE TO BE CONTINUOUS, LAPPING TOP BARS AT MID SPAN BETWEEN PILE LOCATIONS AND BOTTOM BARS AT PILE LOCATIONS, AS REQUIRED.

6 FOR PILE/GRADE BEAM CONSTRUCTION, PLACE FIRST TIE EACH SIDE OF SUPPORTS AT HALF OF THE SPECIFIED SPACING.

7 VOID FORM BELOW GRADE BEAMS SHALL BE MATERIAL WITH A MAXIMUM COMPRESSIVE STRENGTH OF 2 psi (15 kPa).

03 31 13 SLAB ON GRADE CONSTRUCTION

1 SUBGRADE PREPARATION SHOULD BE IN ACCORDANCE WITH GEOTECHNICAL ENGINEER'S INSTRUCTIONS. REFER TO GEOTECHNICAL REPORT FOR FURTHER INFORMATION.

2 CONCRETE SLAB (SEE PLAN FOR THICKNESS AND REINFORCING) SHALL BE LAID ON MOISTURE BARRIER (REFER TO ARCHITECTURAL DRAWINGS).

3 THE GENERAL CONTRACTOR IS TO ENSURE THAT THE GEOTECHNICAL ENGINEER IS ON SITE TO INSPECT THE SLAB SUBGRADE AND WATER CONDITIONS PRIOR TO ANY CONCRETE BEING DONE TO DETERMINE WHETHER OR NOT THE EXPOSED SUBGRADE IS ACCEPTABLE AND TO DETERMINE IF FURTHER EXCAVATION, FILL OR COMPACTION IS REQUIRED. ALL SUBGRADE MATERIAL AND SLAB BASE GRAVEL AND THEIR COMPACTION ARE TO BE REVIEWED, TESTED & APPROVED BY THE GEOTECHNICAL ENGINEER. IF THIS IS NOT DONE AND IF LATER THE SLAB ON GRADE SETTLES OR HEAVES CAUSING DAMAGE WITHIN THE BUILDING, THEN THE GENERAL CONTRACTOR WILL BE RESPONSIBLE FOR REPAIRING THE SAME TO THE SATISFACTION OF THE OWNER, AT NO EXTRA COST.

4 PROVIDE 1/8" (3mm) WIDE SAW CUT CONTROL JOINTS AT MAX. 15'-0" (4.57m) CENTERS EACH WAY. UNLESS NOTED OTHERWISE.

5 FOR ALL AREAS OF THE FLOOR SLAB WHICH WILL BE EXPOSED TO WATER, THE SAW CUT CONTROL JOINTS ARE TO BE FILLED COMPLETELY WITH A COLD APPLIED RUBBER ASPHALT COMPOUND, 'W158 SEALANT BY W.R. MEADOWS' OR EQUIVALENT, APPLIED IMMEDIATELY AFTER THE SAW CUTS ARE DONE.

03 31 14 SLAB ON GRADE RATINGS

1 SLAB-ON-GRADE CONSTRUCTION IS DESIGNED FOR THE FOLLOWING LOADS AND ASSUMES THAT TO CONSULT WITH GEOTECHNICAL ENGINEER TO ENSURE A MINIMUM SUBGRADE MODULUS OF 82,000 kN/m³ (300 pci) DIRECTLY UNDERNEATH THE SLAB, AND ADJUST THE COMPACTION OF THE SOIL OR THE DEPTH OF GRAVEL ACCORDINGLY TO ACHIEVE THIS. IF LOADS THAT EXCEED THOSE SHOWN ARE ANTICIPATED, CONTRACTOR IS TO ADVISE GRUBB ENGINEERING CORPORATION SO THAT THE SLAB DESIGN CAN BE REVISED APPROPRIATELY.

1a 127mm (5") THICK SLAB: 36 kN (8,000 lb) WHEEL LOAD OR DUAL WHEEL LOAD (MAXIMUM 72 kN (16,000 lb) AXLE LOAD).

1b 152mm (6") THICK SLAB: 54 kN (12,000 lb) WHEEL LOAD OR DUAL WHEEL LOAD (MAXIMUM 108 kN (24,000 lb) AXLE LOAD).

1c 178mm (7") THICK SLAB: 74 kN (16,500 lb) WHEEL LOAD OR DUAL WHEEL LOAD (MAXIMUM 148 kN (33,000 lb) AXLE LOAD).

1d 203mm (8") THICK SLAB: 89 kN (20,000 lb) WHEEL LOAD OR DUAL WHEEL LOAD (MAXIMUM 178 kN (40,000 lb) AXLE LOAD).

1e 254mm (10") THICK SLAB: 139 kN (31,000 lb) WHEEL LOAD OR DUAL WHEEL LOAD (MAXIMUM 278 kN (62,000 lb) AXLE LOAD).

2 RATINGS STATED ABOVE ASSUME A MAXIMUM CONTACT PRESSURE OF 690 kN/m² (100 psi) AND A MINIMUM SPACING OF 1200mm (4'-0"). LOADING THAT EXCEEDS THIS SHOULD BE IDENTIFIED TO GRUBB ENGINEERING CORPORATION SO THAT THE ADEQUACY OF THE SLAB CAN BE ASSURED.

03 41 16 PRECAST CONCRETE FLOORS

1 PRECAST CONCRETE SUPPLIER TO DESIGN & FABRICATE COMPONENTS, INCLUDING CONNECTIONS, NOTED ON DRAWINGS TO LOADS SPECIFIED.

2 PRECASTER TO SUBMIT SHOP DRAWINGS, AUTHENTICATED BY A PROFESSIONAL ENGINEER LICENSED IN THE APPLICABLE PROVINCE, TO GRUBB ENGINEERING CORP. PRIOR TO FABRICATION.

3 ALL TOPPINGS TO BE FULLY BONDED IN ACCORDANCE WITH CSA A23.1.

4 SEE ARCHITECTURAL & MECHANICAL DRAWINGS FOR FLOOR DRAIN LOCATIONS & FLOOR SLOPES.

03 41 33 PRECAST CONCRETE WALL PANELS

1 PRECAST CONCRETE PANELS SHALL BE INSULATED OR UNINSULATED, OF THICKNESS AND STYLE AS INDICATED ON THE ARCHITECTURAL DRAWINGS CONFORMING TO THE REQUIREMENTS OF CSA-A23.4.

2 FINISH SHALL BE SMOOTH APPEARANCE GRADE CONCRETE WITH REVEALS AND/OR BLOCKOUTS AS INDICATED, READY TO RECEIVE PAINT FINISH.

3 PANEL DESIGN, ATTACHMENT AND JOINTING SHALL BE BY MANUFACTURER TO CREATE A WEATHER TIGHT ENVELOPE.

4 DETAILED SHOP DRAWINGS WITH DESIGN, ANCHORAGE AND PLACEMENT DETAILS ARE TO BE SUBMITTED TO GRUBB ENGINEERING CORPORATION PRIOR TO ANY FABRICATION OR CONSTRUCTION. SHOP DRAWINGS SHALL BE AUTHENTICATED BY A PROFESSIONAL ENGINEER LICENSED IN THE APPLICABLE PROVINCE.

05 05 19 POST-INSTALLED CONCRETE ANCHORS

1 EXCEPT AS INDICATED ON DRAWINGS, ADHESIVE USED FOR THE POST-INSTALLATION OF ANCHORS AND REINFORCING BAR MUST BE HILTI HIT-HY 200 OR ACCEPTED ALTERNATE.

2 THREADED RODS PLACED WITH ADHESIVE SHALL BE HILTI HAS ROD OR ACCEPTED ALTERNATE MEETING OR EXCEEDING THE REQUIREMENTS OF ASTM F1554 GRADE 55, THREADED FOR THEIR ENTIRE LENGTH AND BEVELLED 45° AT BASE.

3 EXCEPT AS INDICATED ON DRAWINGS, EXPANSION ANCHORS SHALL BE HILTI KWIK BOLT 3 OR ACCEPTED ALTERNATE. SCREW ANCHORS ARE TO BE HILTI KWIK HUS OR ACCEPTED ALTERNATE. ANCHORS IN CONTACT WITH GALVANIZED STEEL SHALL BE EITHER HOT-DIP GALVANIZED OR STAINLESS STEEL.

4 CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL POST-INSTALLED ANCHORS ARE INSTALLED ACCORDING TO THE MANUFACTURER'S REQUIREMENTS. SPECIFICALLY, CARE MUST BE TAKEN IN RELATION TO DRILLING AND CLEANING OF HOLES.

05 12 23 STRUCTURAL AND MISCELLANEOUS STEEL

1 ALL STEEL AND WORK SHALL CONFORM TO THE LATEST REFERENCE STANDARDS:

1a CAN/CSA - S16 'DESIGN OF STEEL STRUCTURES'.

1b CAN/CSA - G40.21 'STRUCTURAL QUALITY STEELS'.

1c CSA W59 'WELDED STEEL CONSTRUCTION'.

1d CAN/CSA - S136-13 "COLD FORMED STEEL STRUCTURAL MEMBERS".

2 ALL STEEL PLATES AND MISC. STEEL ARE TO BE GRADE 300W WITH A MINIMUM YIELD STRENGTH OF 44ksi (300 MPa).

3 ALL HSS AND W-SECTION MEMBERS ARE TO BE GRADE 350W WITH A MINIMUM YIELD STRENGTH OF 50ksi (350 MPa).

4 ALL COLD FORMED MEMBERS ARE TO BE MANUFACTURED FROM STEEL POSSESSING A MINIMUM YIELD STRENGTH OF 50ksi (350MPa) PRIOR TO ROLLING AND CONFORM TO CSA - S136.

5 ALL ANCHOR RODS ARE TO BE TYPE ASTM F1554, UNLESS NOTED.

6 ALL OTHER BOLTS ARE TO BE TYPE A325, UNLESS NOTED.

7 ALL STRUCTURAL STEEL NOT EXPOSED TO VIEW OR WEATHER IS TO BE COMPLETE WITH ONE COAT OF SHOP PRIMER CONFORMING TO CGSC/PMA CPW-3 UNLESS NOTED. ALL STRUCTURAL STEEL EXPOSED TO VIEW OR WEATHER IS TO BE PAINTED WITH ONE COAT OF STRUCTURAL STEEL PRIMER CONFORMING TO CSC/SPMA 2-75 AND 2 COATS OF BASE PAINT, LOW GLOSS.

8 STRUCTURAL STEEL FABRICATOR SHALL PROVIDE SHOP DRAWINGS TO GRUBB ENGINEERING CORP FOR REVIEW, PRIOR TO FABRICATION.

9 ALL GROUT UNDER BASE PLATES OR BEARING PLATES IS TO BE MIN. 5000psi (35MPa) STRENGTH, NON-EXPANDING AND NON-SHRINKING, UNLESS NOTED.

10 STRUCTURAL STEEL FABRICATOR AND ERECTOR ARE TO SUBMIT COPIES OF CANADIAN WELDING BUREAU DIVISION 1 OR DIVISION 2.1 CERTIFICATION TO GRUBB ENGINEERING CORP. FAILURE TO DO SO WILL RESULT IN ENGINEER NOT BEING ABLE TO ISSUE LETTERS OF ASSURANCE THAT MAY BE REQUIRED FOR ISSUANCE OF THE BUILDING OCCUPANCY PERMIT.

05 21 00 STEEL TRUSSES

1 DESIGN TRUSSES TO CAN/CSA S16 AND CAN/CSA S136, TO LOADS STATED ON DRAWINGS.

2 SUPPLY AND INSTALL STEEL TRUSSES, BRIDGING, ANCHORS, AND RELATED ACCESSORIES REQUIRED TO SET TRUSSES.

3 THE WORK OF THIS SECTION WILL BE REVIEWED BY THE STRUCTURAL ENGINEER FOR DEFECTS AND IRREGULARITIES.

4 TRUSS FABRICATOR IS TO PROVIDE SHOP DRAWINGS, AUTHENTICATED BY A PROFESSIONAL ENGINEER LICENSED IN THE APPLICABLE PROVINCE TO GRUBB ENGINEERING FOR REVIEW PRIOR TO FABRICATION.

5 MATERIALS USED SHALL MEET THE FOLLOWING MINIMUM STANDARDS:

5a STRUCTURAL STEEL SHALL CONFORM TO CSA G40.20.

5b STRUCTURAL STEEL SHAPES SHALL BE GRADE 350W, CSA G40.21M OR EQUIVALENT MATERIAL MANUFACTURED TO AN ACCEPTED SPECIFICATION.

5c STRUCTURAL STEEL PLATES AND BARS SHALL BE GRADE 350W, CSA G40.21M OR EQUIVALENT MATERIAL MANUFACTURED TO AN ACCEPTED SPECIFICATION.

5d WELDING SHALL CONFORM TO CSA W59.1 AND W48.1M.

5e PRIMER SHALL CONFORM TO CGSC/PMA 2-75.

6 SHOP APPLY PRIMER TO ALL EXPOSED STEEL MEMBERS AND ACCESSORIES EXCEPT SURFACES TO BE WELDED.

7 DEFLECTION UNDER LIVE/SNOW LOAD NOT TO EXCEED 1/240 SPAN FOR ROOFS AND 1/360 SPAN FOR FLOORS. DEFLECTION UNDER TOTAL LOAD NOT TO EXCEED 1/180 SPAN FOR ROOFS AND 1/240 SPAN FOR FLOORS.

8 SUPPLY CEILING SUPPORT EXTENSIONS TO BOTTOM CHORD AS REQUIRED OR NOTED ON DRAWINGS.

9 BRIDGING FOR TRUSSES TO MEET CSA S16 AND ERECTION SHALL BE TO CSA S136 AND TO CSA S16.

10 BEAR TRUSS SEAT ON CENTRE LINE OF STEEL, 4" (100mm) MINIMUM ON MASONRY SUPPORTS, OR AS DETAILED.

11 DO NOT PERMIT ERECTION OF DECKING UNTIL JOIST AND BRIDGING ERECTION IS COMPLETE AND REVIEWED BY ENGINEER.

12 PERMISSION OF THE ENGINEER IS REQUIRED PRIOR TO FIELD CUTTING OR ALTERING OF TRUSSES OR BRIDGING.

13 NO WELDING IS PERMITTED FOR ATTACHMENT OF ANY OTHER WORK TO TRUSS UNLESS NOTED IN DRAWINGS. ALL SUSPENDED WORK IS TO BE CLAMPED, BOLTED, OR WELDED TO WELD PLATES PROVIDED BY THE TRUSS FABRICATOR.

06 11 00 WOOD FRAMING

1 ALL BUILT-UP BEAMS, LEDGERS, LINTELS, STUDS AND JOISTS ARE TO BE OF SPF#2 GRADE MATERIAL OR BETTER, UNLESS NOTED OTHERWISE.

2 ALL OSB SHEATHING IS TO CONFORM TO CSA STANDARD O325 "CONSTRUCTION SHEATHING". ALL PLYWOOD SHEATHING IS TO CONFORM TO O151 "CANADIAN SOFTWOOD PLYWOOD".

3 INSTALL SOLID BLOCKING AT MID-HEIGHT OF ALL LOAD BEARING STUD WALLS BETWEEN ALL STUDS.

4 ALL BOTTOM PLATES IN CONTACT WITH CONCRETE ARE TO BE UNDERLAIN WITH POLY SILL GASKETS AND BE PRESSURE TREATED WOOD.

5 THE WOOD FRAMER SHALL BE RESPONSIBLE FOR REVIEWING THE MECHANICAL DETAILED DRAWINGS TO ENSURE THAT ALL SLEEVES, HOLES AND/OR OPENINGS REQUIRED FOR THE MECHANICAL WORK ARE ALLOWED FOR IN THE WOOD FRAMING ELEMENTS. THESE REQUIREMENTS ARE ALSO TO BE REVIEWED WITH THE MECHANICAL CONTRACTOR. IF THIS IS NOT DONE THEN THE FRAMING CONTRACTOR SHALL BE RESPONSIBLE FOR THE RELATED COSTS OF INSTALLING THE SLEEVES, HOLES AND/OR OPENINGS IN THE FRAMING ELEMENTS WHEN THE WORK IS DONE.

6 ANY OPENINGS TO BE CUT IN THE LOAD BEARING ELEMENTS SHALL BE REVIEWED BY THE ENGINEER PRIOR TO DOING THE WORK.

7 GENERAL CONTRACTOR/CONSTRUCTION MANAGER IS TO ENSURE THAT THE MOISTURE CONTENT WITHIN THE WOOD FRAMING ELEMENTS AND THE BUILDING ENVELOPE DOES NOT EXCEED 19% BEFORE APPLYING ANY INSULATION, VAPOUR BARRIER, EXTERIOR SHEATHING, AIR BARRIER OR INTERIOR FINISHES.

8 ENSURE PROPER LOAD TRANSFER BELOW ALL SAWN TIMBER AND BUILT-UP POSTS BY INSTALLING FULL DEPTH WOOD BLOCKING WHERE POSTS SIT ON A PLYWOOD FLOOR OR FRAMING, AS APPLICABLE.

31 23 17 FOOTING PREPARATION ON UNDISTURBED SOIL

1 ALL FOOTINGS ARE TO BEAR ON FIRM UNDISTURBED NATURAL SOIL OR COMPACTED GRAVEL, AS REQUIRED BY THE GEOTECHNICAL ENGINEER. THE FOOTING BASE IS TO BE INSPECTED BY AN INDEPENDENT LICENSED GEOTECHNICAL ENGINEER, TO VERIFY THAT A MINIMUM SOIL PRESSURE AS STATED ON FOUNDATION PLAN IS GUARANTEED ALL OVER AND THAT NO ADVERSE CONDITIONS EXIST THAT MIGHT CAUSE ANY DIFFERENTIAL SETTLEMENT.

2 THE SOIL UNDER FOOTINGS IS NOT TO BE ALLOWED TO FREEZE OR GET WET, WHICH COULD CAUSE THE SUPPORTING SOIL TO LOSE ITS BEARING STRENGTH.

3 IF THE SUBGRADE SOILS ARE DISTURBED, BECOME SOFT OR WET DURING EXCAVATION OR EVEN PRIOR TO POURING THE CONCRETE, THEN THE SUBGRADE SOILS SHOULD BE UNDERCUT DOWN TO A FIRM BASE AND THEN BUILT UP TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER.

4 PRIOR TO FORMING AND PLACEMENT OF CONCRETE, ALL LOOSE AND DISTURBED MATERIAL WITHIN THE FOOTING ZONE MUST BE REMOVED.

31 23 33 BACKFILLING ONE SIDE OF FOUNDATION WALL

1 PRIOR TO BACKFILLING THE FOUNDATION WALL, THE BASEMENT SLAB IS TO BE IN PLACE, WEEPING TILE AND GRAVEL COVER SHALL BE IN PLACE, EXTERIOR FACE OF WALL IS TO BE DAMPPROOFED AND/OR INSULATED (IF APPLICABLE - REFER TO ARCHITECTURAL GENERAL NOTES FOR DAMPROOFING SPECIFICATION) AND THE MAIN FLOOR SYSTEM IS TO BE IN PLACE, FULLY INSTALLED AND CONNECTED TO TOP OF WALL TO PROVIDE LATERAL SUPPORT.

2 BACKFILLING MUST BE WITH A NON-EXPANSIVE, NON-ORGANIC TYPE OF SOIL IN MAX 12" (300mm) HIGH LIFTS.

3 A WEDGE OF POROUS MATERIAL, GRAVEL/SAND, IS TO BE PLACED ADJACENT TO THE FOUNDATION WALL BETWEEN THE WALL AND THE EXCAVATION. THE TOP 2'-0" (600mm) OF BACKFILL PLACED AGAINST THE WALL IS TO BE OF A NON-POROUS MATERIAL, CLAY / SILT AND TOPSOIL.

4 IF A POROUS, SAND / GRAVEL, FREE DRAINING MATERIAL IS NOT USED AS A BACKFILL MATERIAL BELOW THE TOP 2'-0" (600mm) OF BACKFILL, THEN 2" (50mm) OF FIBREGLASS BARRIER/LAP INSULATION IS TO BE INSTALLED ON THE OUTSIDE FACE OF ALL CONCRETE WALLS BELOW GRADE FROM BOTTOM OF WALL TO WITHIN 2'-0" (600mm) OF FINAL GRADE LEVEL.

5 IF BACKFILL IS TO BE DONE PRIOR TO INSTALLATION OF MAIN FLOOR SYSTEM THE CONTRACTOR IS TO PROVIDE TEMPORARY LATERAL SUPPORT FOR THE TOP OF ALL FOUNDATION WALLS SO THAT THEY ARE FIRMLY HELD IN POSITION.

6 THIS TEMPORARY LATERAL SUPPORT CAN BE REMOVED ONLY WHEN THE MAIN FLOOR SYSTEM HAS BEEN ENTIRELY INSTALLED AND CONNECTED TO THE TOP OF ALL FOUNDATION WALLS.

**31 23 34 BACKFILLING BOTH SIDES OF FO

15 February 2024

WSP File: CA0022671.6721 / BX30775

3102 – 12 Avenue South
Lethbridge, Alberta T1H 5V1
T: +1 403 327-7474
www.wsp.com

Hejo Farms Ltd.
PO Box 491
Coaldale, Alberta T1M 1N5

Attention: Johan Bennen

Re: Geotechnical Review and Evaluation
NRCB Permitting of Proposed Manure Storage Lagoon
SW-25-008-20-W4M, near Coaldale, Alberta

As requested, WSP E&I Canada Limited (WSP) has carried out a geotechnical review and evaluation of the above-captioned site relative to the required protection of the groundwater resource, as required by the Agricultural Operation Practices Act, AB Reg. 267/2001 (hereinafter referred to as "AOPA"). This letter describes site soil conditions to support a permit application related to proposed liquid manure storage lagoon to be located in the northwest area of SW-25-008-20-W4M (refer to Figure 1, attached).

In order to demonstrate the suitability of the naturally existing soils for consideration as a naturally occurring protective layer to the groundwater, four boreholes were advanced at the site on January 2, 2024. The boreholes were advanced at the approximate locations denoted as JB1-24 to JB4-24 on Figure 1, attached.

The boreholes were advanced by a truck-mounted drill rig owned and operated by Chilako Drilling Services and extended to depths ranging between 11.6 m and 12.0 m below existing grades. The boreholes were logged by Larry Delong of Chilako Drilling Services.

In general, the natural mineral soils encountered within the boreholes consisted of a thin lacustrine silty clay layer which was underlain by clay till. While minor groundwater accumulation was noted during the drilling in JB2-24 at approximately 8.2 m depth, no groundwater resource (as defined by the AOPA) was identified within the 12 m investigation depth at the proposed lagoon site.

Samples of soil collected from the screened zone of boreholes JB1-24 to JB4-24 were subjected to laboratory grain size (i.e., hydrometer) analyses. The results (attached) indicate a textural breakdown of approximately:

Table 1: Soil Textural Analyses

Borehole/Depth	% Gravel	% Sand	% Silt	% Clay
JB1-24 / 9.0-10.5m	1	34	48	17
JB2-24 / 9.0-10.5m	1	35	46	18
JB3-24 / 9.0-10.5m	0	35	45	20
JB4-24 / 9.0-10.5m	0	30	52	18

To measure the *in situ* permeability of the subsurface soils, a 50 mm diameter PVC monitoring well was constructed in borehole JB1-24. The test well was screened from 7.7 m to 11.6 m depth. Well saturation of the 50 mm diameter monitoring well was carried out by filling the monitoring well to the top for

several consecutive days. After several days of testing, a three-hour water drop of 0.84 m was determined.

To calculate the permeability of the screened portion of the clay till strata at the test well location, a modified falling head test (as outlined in the USBR Engineering Geology Field Manual Volume 2 [2001]) was used. The input variables and output data are outlined on the attached In Situ Permeability Test report. The results of the permeability testing indicate an *in situ* hydraulic conductivity, k_s, of 1.5×10^{-7} cm/s at JB1-24.

Using the measured permeability of the clay stratum, the 3.9 m of clay screened at JB1-24 is estimated to represent the equivalent of approximately 26 m of naturally occurring materials having a hydraulic conductivity of 1×10^{-6} cm/s (the reference standard in AOPA). This represents natural material protection in excess of the minimum requirements outlined by the AOPA for liquid manure storage (minimum 10 m, Section 9.5-a).

Conclusion

Based on the results of the current investigation, permeability testing, and our understanding of the site and proposed development at the site, it is WSP's opinion that the naturally occurring materials at the site satisfy the AOPA requirements for permitting the proposed liquid manure storage lagoon at this location.

We trust that this report satisfies your present requirements. Should you have any questions, please contact the undersigned at your convenience.

Yours truly,

WSP E&I Canada Limited

15 Feb 2024

[redacted]

John Lobbezoo, P.Eng.
Principal Geotechnical Engineer

Reviewed by:
Kevin Spencer, P.Eng., M.Eng.
Sr. Associate, Geotechnical Engineer

PERMIT TO PRACTICE
WSP E&I [redacted] A LIMITED
RM SIGNATURE: [redacted]
RM APEGA ID #: 10450
DATE: 15 Feb 2024
PERMIT NUMBER: P004546
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Attachments
- Figure 1 Borehole Locations
- In Situ Permeability Test Calculations
- Hydrometer Tests
- Soil Profile and Parent Material Description, Chilako Drilling Services

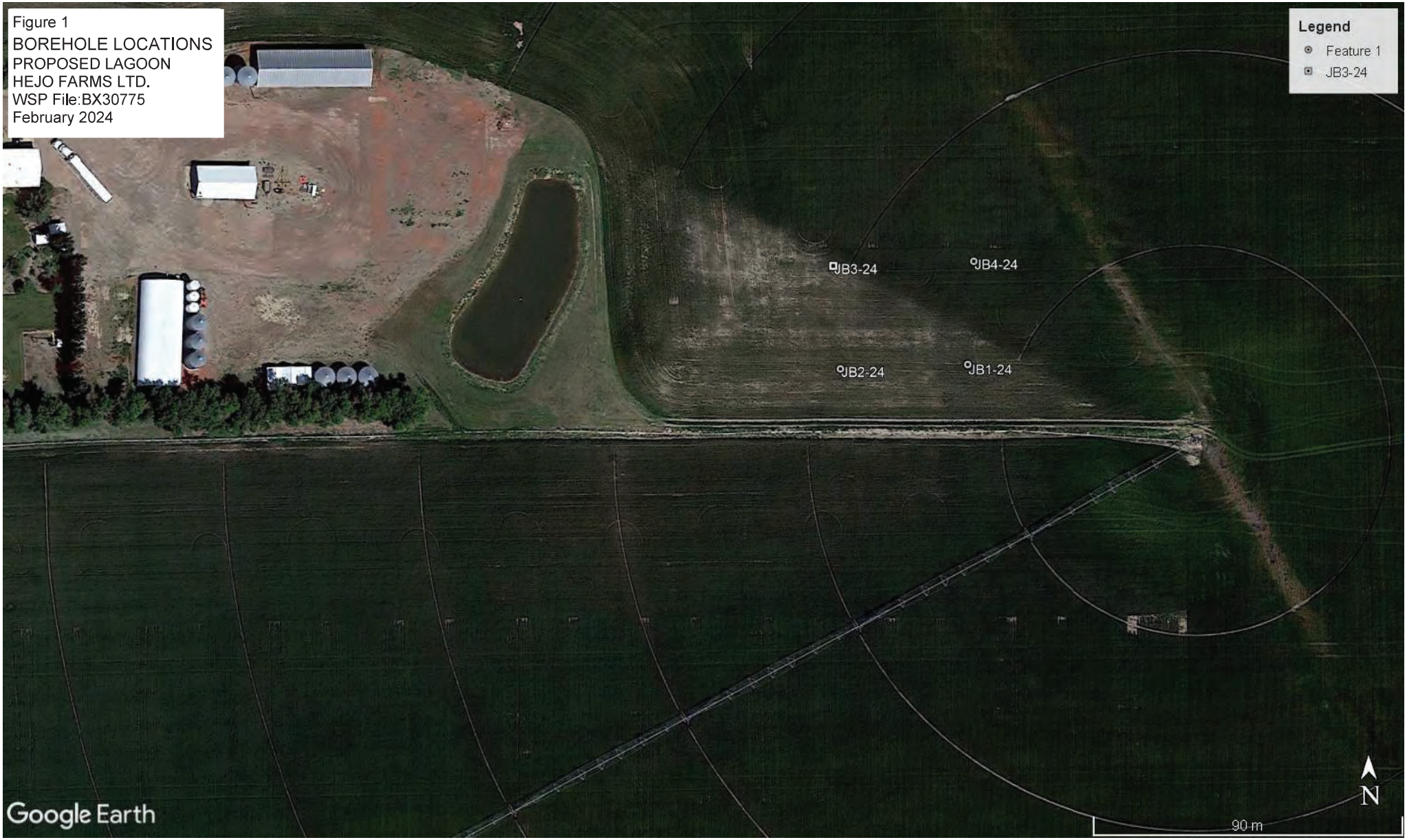


Figure 1
BOREHOLE LOCATIONS
PROPOSED LAGOON
HEJO FARMS LTD.
WSP File:BX30775
February 2024
Legend
Feature 1
JB3-24
JB3-24
JB4-24
JB2-24
JB1-24
Google Earth
N
90 m

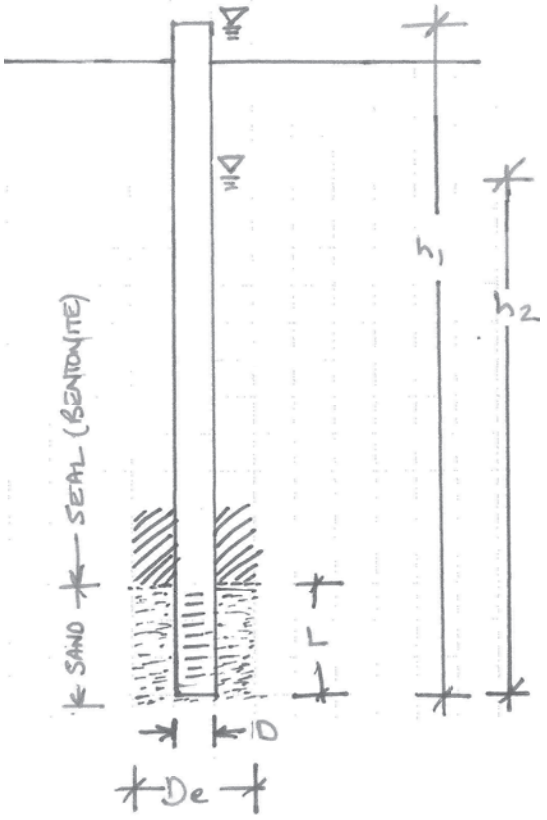
JB1-24

In Situ Permeability Test

Modified Falling Head Permeability Equation

$$K_s = \frac{r^2}{2\ell\Delta t}\left[\frac{\sinh^{-1}\frac{\ell}{r_e}}{2}\ln\left[\frac{2H_1-\ell}{2H_2-\ell}\right]-\ln\left[\frac{2H_1H_2-\ell H_2}{2H_1H_2-\ell H_1}\right]\right]$$

taken from USBR Engineering Geology Field Manual Volume 2 (2001)



JB1-24 - Hejo Farms

WSP File: BX30775

INPUT VARIABLES

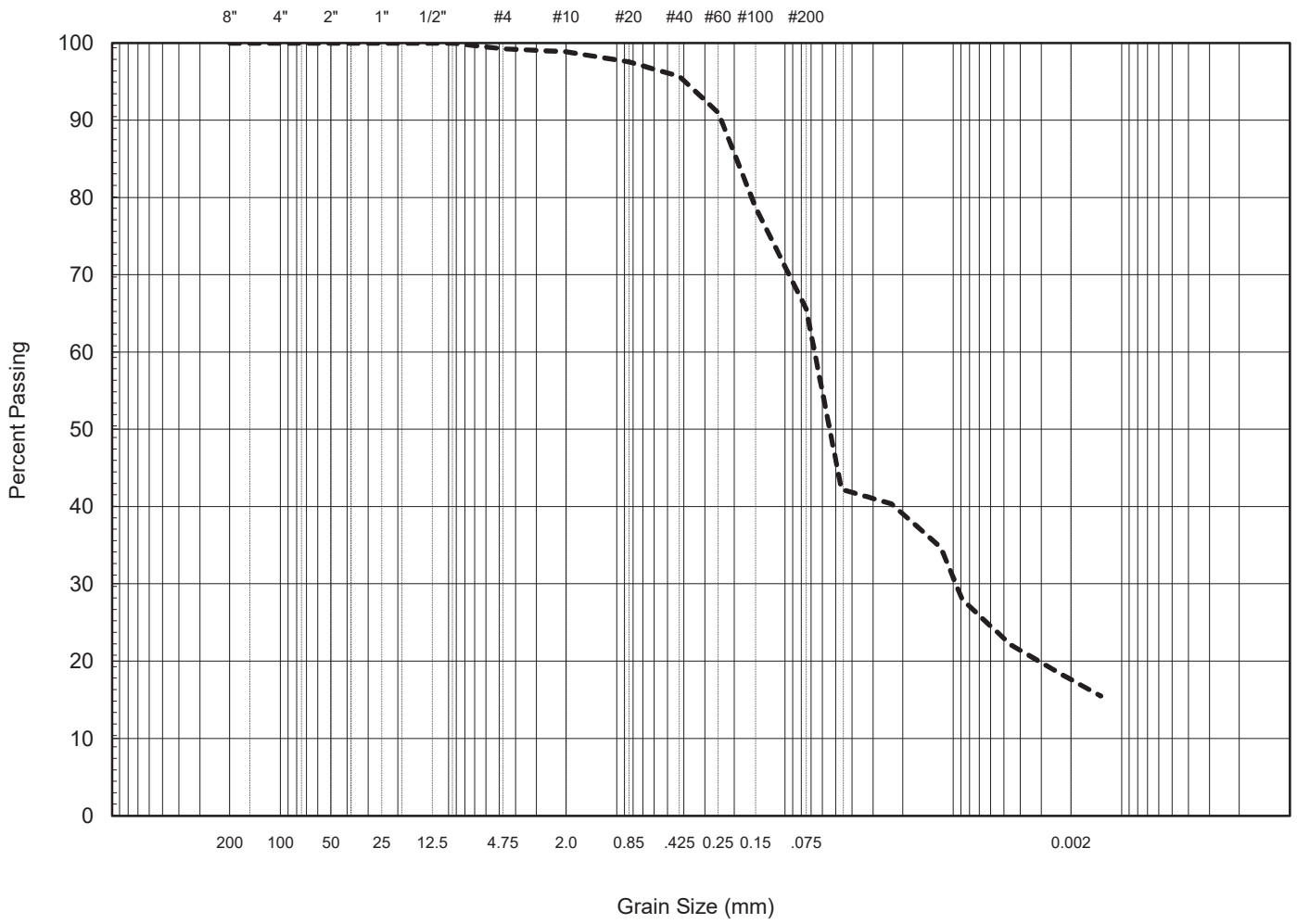
Terms	Value	Definition
D	0.0520	diameter of standpipe (m)
De	0.1500	diameter of borehole (m)
L	3.90	length of sand section (m)
h1	12.10	initial height of water above base of hole (m)
h2	11.26	final height of water above base of hole (m)
t	3.0	time of test (h)

k_s = 1.5E-07 cm/sec

HYDROMETER TEST

WSP Environment & Infrastructure Solutions

COBBLES	GRAVEL		SAND			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Summary					
D10 =	#N/A	mm	**Gravel**	1	%
D30 =	0.0098	mm	**Sand**	34	%
D60 =	0.0681	mm	**Silt**	48	%
Cu =	#N/A		**Clay**	17	%
Cc =	#N/A				

Project No: BX30775
Hole No: JB1-24
Depth (m): 9.0-10.5

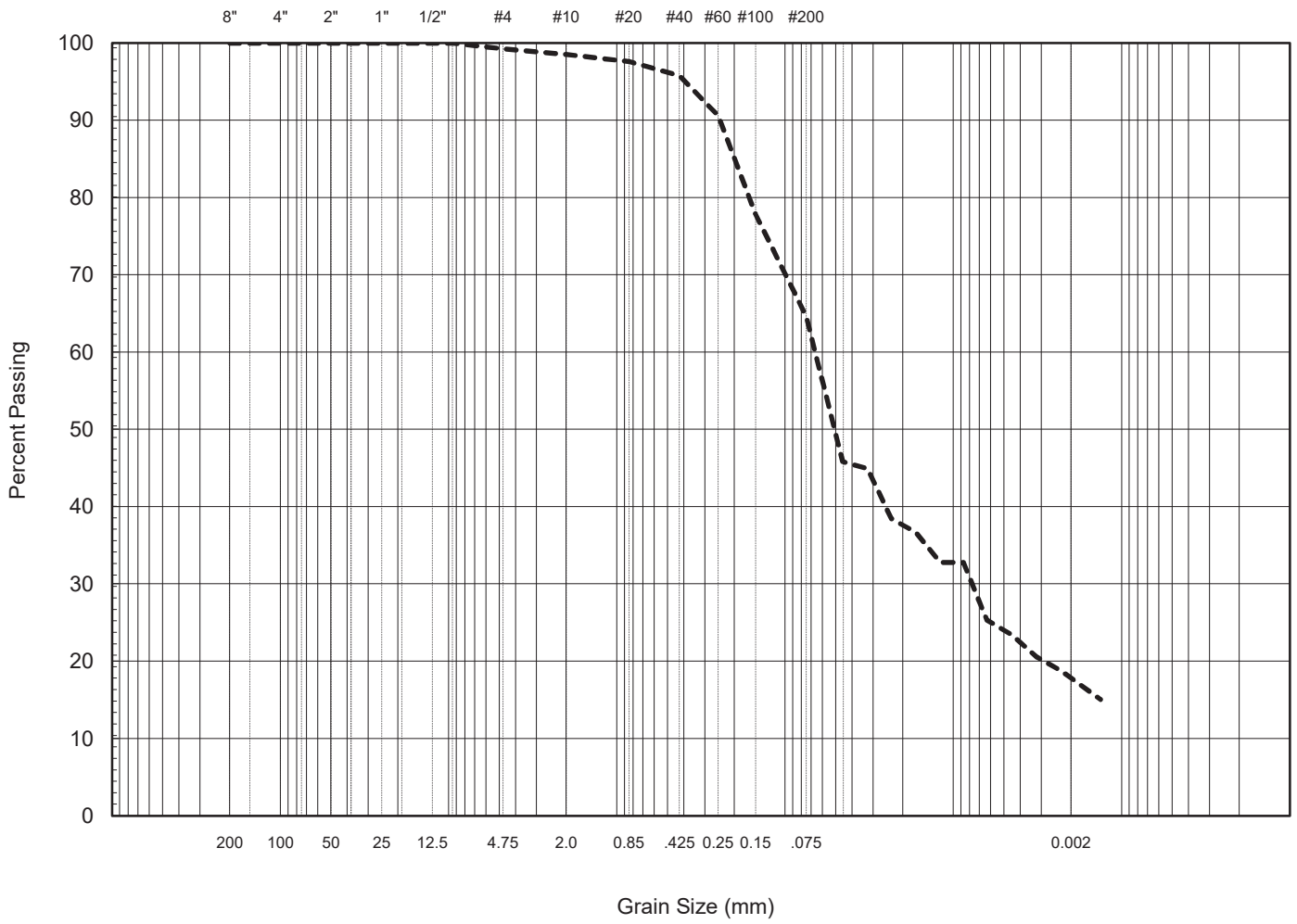
Client: J. Bennan
Sample: Sample # 3
Date: February 8, 2024

Tech: CA

HYDROMETER TEST

WSP Environment & Infrastructure Solutions

COBBLES	GRAVEL		SAND			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Summary					
D10 =	#N/A	mm	**Gravel**	1	%
D30 =	0.0099	mm	**Sand**	35	%
D60 =	0.0677	mm	**Silt**	46	%
Cu =	#N/A		**Clay**	18	%
Cc =	#N/A				

Project No: BX30775
Hole No: JB2-24
Depth (m): 9.5-10.5

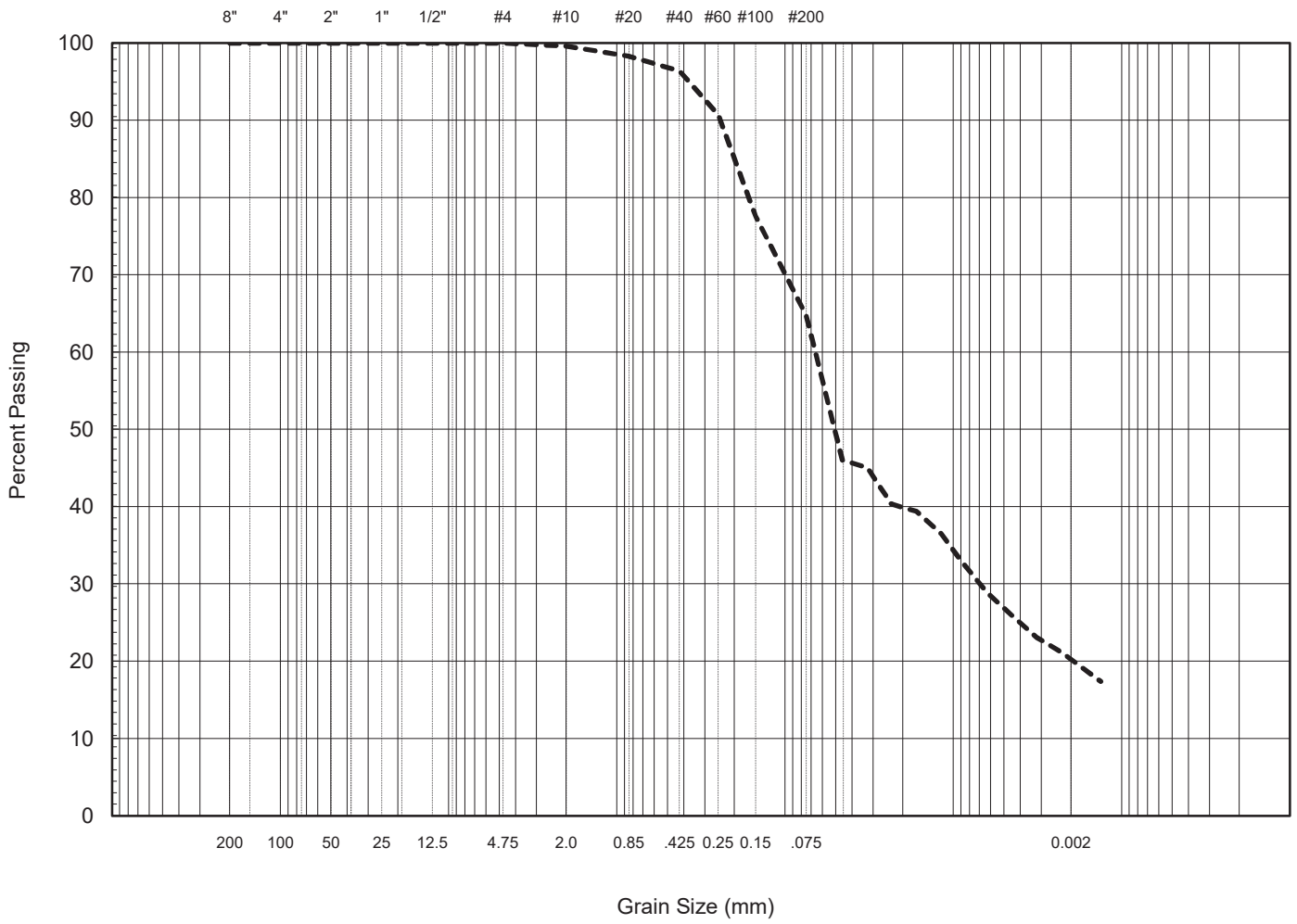
Client: J. Bennan
Sample: Sample # 3
Date: February 8, 2024

Tech: CA

HYDROMETER TEST

WSP Environment & Infrastructure Solutions

COBBLES	GRAVEL		SAND			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Summary					
D10 =	#N/A	mm	**Gravel**	0	%
D30 =	0.0070	mm	**Sand**	35	%
D60 =	0.0676	mm	**Silt**	45	%
Cu =	#N/A		**Clay**	20	%
Cc =	#N/A				

Project No: BX30775
Hole No: JB3-24
Depth (m): 9.0-10.5

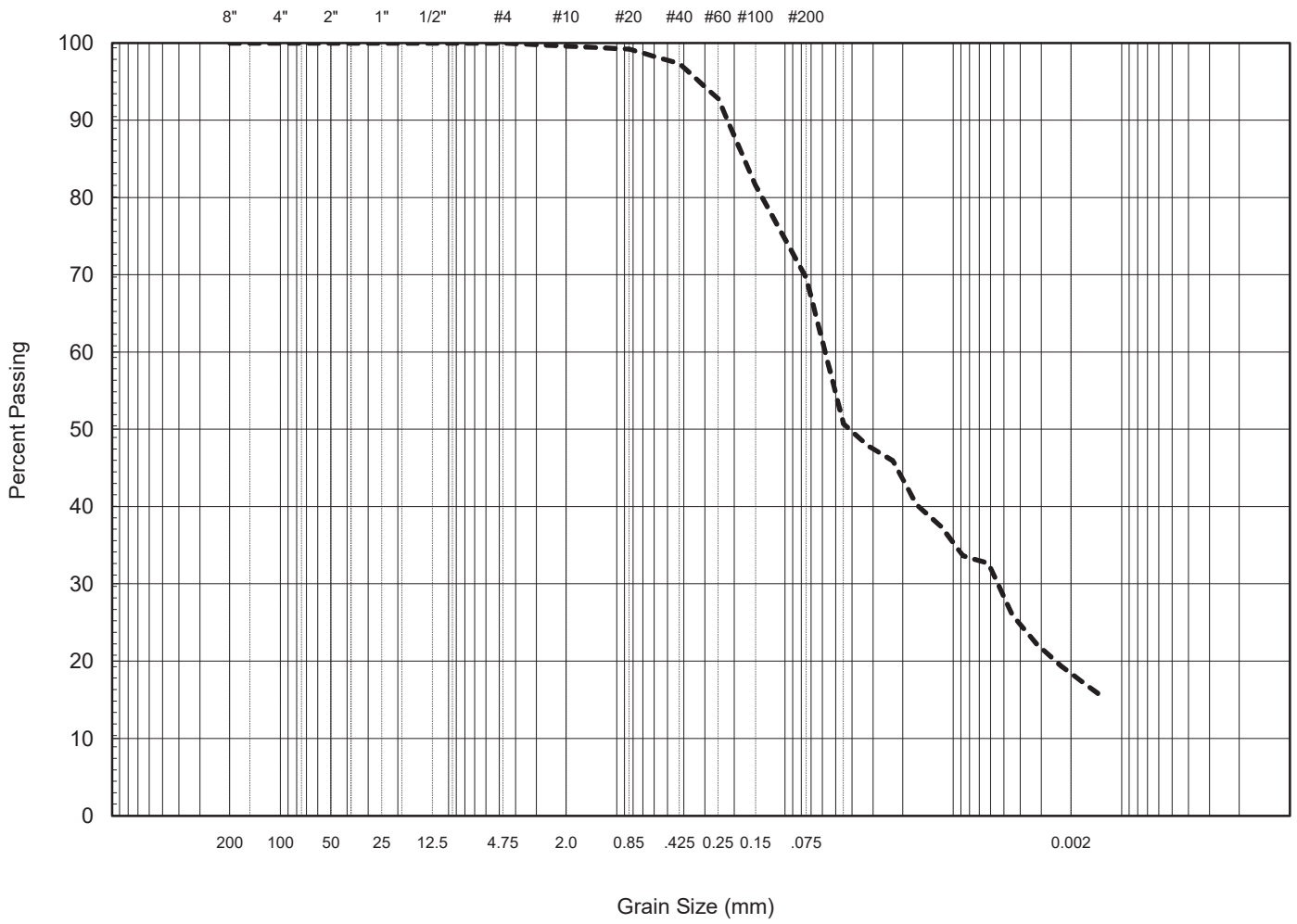
Client: J. Bennan
Sample: Sample # 1
Date: February 8, 2024

Tech: CA

HYDROMETER TEST

WSP Environment & Infrastructure Solutions

COBBLES	GRAVEL		SAND			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Summary					
D10 =	#N/A	mm	**Gravel**	0	%
D30 =	0.0055	mm	**Sand**	30	%
D60 =	0.0597	mm	**Silt**	52	%
Cu =	#N/A		**Clay**	18	%
Cc =	#N/A				

Project No: BX30775
Hole No: JB4-24
Depth (m): 9.0-10.5

Client: J. Bennan
Sample: Sample # 2
Date: February 8, 2024

Tech: CA

CHILAKO DRILLING SERVICES LTD

Box 942 Coaldale, Alberta, T1M 1M8
(403) 345-3710

SOIL PROFILE AND PARENT MATERIAL DESCRIPTION

Site Location: SW25-8-20W4, Hejo Farms (Johan Bennen) Date: 2-Jan-24

Hole #	Location	Depth	Texture	Moisture	Geological	Sample	Remarks
JB1-24	0384841	0-0.15	CL	M	Topsoil		
	5503531	0.15-0.8	CL-SiCL	M	Lac		V. Firm, med plastic, brown
		0.8-6.4	CL	M	Till		Stiff, med plastic, brown
		6.4-7.6	CL	M	Till		Stiff, med plastic, brown, oxidized
		7.6		Sat			Sat sand streaks
		7.6-8.5	CL-C	M	Till		Stiff, med plastic, brown
		8.5-11.6	CL-C	M	Till	9.0-10.5	Stiff, med plastic, dark brown
							50mm H.C. Well installed to 11.6m BGS
							Screen: 11.6-8.6m
							Sand: 11.6-7.7m
							Bentonite: 7.7-0.0m
							Stickup: 0.5m
							Hole Diameter: 0.15m
JB2-24	0384803	0-0.15	CL	M	Topsoil		
	5503531	0.15-0.7	CL-SiCL	M	Lac		V. Firm, med plastic, brown
		0.7-6.2	CL	M	Till		Stiff, med plastic, brown
		6.2-8.2	CL-C	M	Till		Stiff, med plastic, brown, oxidized
		8.2-9.3	CL	M	Till		Sat Sand lensing, water in test hole
		9.3-12.0	CL-C	M	Till	9.5-10.5	Stiff, med plastic, dark brown
JB3-24	0384803	0-0.15	CL	M	Topsoil		
	5503561	0.15-0.8	CL-SiCL	M	Lac		V. Firm, med plastic, brown
		0.8-4.0	CL	M	Till		V. Firm, med plastic, brown
		4.0-5.0	CL	M	Till		V. Firm, med plastic, yellow brown, some oxidation
		5.0-10.5	CL-C	M	Till	9.0-10.5	Stiff, med plastic, brown, some oxidation
		10.5-12.0	CL-C	M	Till		Stiff, med plastic, oxidized, VM sand streaks
JB4-24	0384843	0-0.15	CL	M	Topsoil		
	5503561	0.15-0.75	CL-SiCL	M	Lac		
		0.75-4.5	CL	M	Till		V. Firm, med plastic, brown
		4.5-6.2	CL	M	Till	4.0-4.5	V. Firm, med plastic, brown, M sand streaks
		6.2-8.1	CL	M	Till		Firm, med plastic, brown, sat sand streaks
		8.1-12.0	CL-C	M	Till	9.0-10.5	Stiff, med plastic, brown

Legend:

L	Loam
C	Clay
S	Sand
Gr.	Gravel
Si	Silt
F	Fine (sand)
VF	Very Fine (sand)

NUCLEAR DENSITY FIELD TEST REPORT

ROSEKE ENGINEERING 3614 - 18th Avenue North Lethbridge, AB T1H 5S7	CLIENT: Dennis Dirtworx LTD.	ATTENTION: James Van Braak	REL JOB NO.: 242-450	Dennis' Dirtworx 1009 13th Avenue Coaldale, AB T1M 0E4
	PROJECT: Hejo Farms - Sheep Barn Pad	CONSULTANT:	JOB NO.: 24-251	
	LOCATION: Hejo Farms - Rg Rd 201	ACTIVITY: Compaction - Subgrade	INSPECTOR: Z. Wittke	
REPORT NO.: #2	CONTRACTOR: Dennis Dirtworx LTD.	SPECIFIED COMPACTION: 98.0 % Minimum		DATE: 2-Oct-2024

TEST NO.	DATE TESTED	GRADE DEPTH (m)	TEST LOCATION	SOIL TYPE	PROBE DEPTH	DENSITY MODE	STANDARD PROCTOR (ASTM D698)		Material Percent Oversized	CONSTRUCTED			% PROCTOR DENSITY (ASTM 6938)	REMARKS
							DENSITY (kg/m³)	MOISTURE		DENSITY (kg/m³) (Initial)	DENSITY (kg/m³) (Corrected)	MOISTURE		
1	2/Oct/24	0.5m BG	50m E, 7m S of NW Corner of Pad	CLAY	300	NDT	1740	17.0%		1761		17.4%	101.2%	Retest of Shot #3, Report #1
2	2/Oct/24	0.5m BG	70m E, 5m S of NW Corner of Pad	CLAY	300	NDT	1740	17.0%		1717		16.7%	98.7%	Retest of Shot #4, Report #1
3	2/Oct/24	0.5m BG	90m E, 5m S of NW Corner of Pad	CLAY	300	NDT	1740	17.0%		1705		16.8%	98.0%	Retest of Shot #5, Report #1
4	2/Oct/24	@ Grade	20m S, 10m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%	5%	1774	1746	15.1%	100.3%	
5	2/Oct/24	@ Grade	20m S, 40m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%	5%	1777	1749	15.0%	100.5%	
6	2/Oct/24	@ Grade	20m S, 70m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%	10%	1813	1760	15.5%	101.2%	
7	2/Oct/24	@ Grade	20m S, 100m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%		1767		15.2%	101.6%	
8	2/Oct/24	@ Grade	20m S, 130m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%		1725		15.0%	99.1%	
9	2/Oct/24	@ Grade	20m S, 160m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%		1773		16.5%	101.9%	
10	2/Oct/24	@ Grade	20m S, 160m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%		1707		15.4%	98.1%	
11	2/Oct/24	@ Grade	20m S, 190m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%		1705		15.3%	98.0%	
12	2/Oct/24	@ Grade	30m S, 160m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%	10%	1814	1761	15.9%	101.2%	
13	2/Oct/24	@ Grade	30m S, 130m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%	5%	1787	1759	15.0%	101.1%	
14	2/Oct/24	@ Grade	30m S, 100m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%	5%	1799	1772	16.4%	101.8%	
15	2/Oct/24	@ Grade	30m S, 70m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%		1757		15.8%	101.0%	
16	2/Oct/24	@ Grade	50m S, 70m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%	10%	1799	1745	15.3%	100.3%	
17	2/Oct/24	@ Grade	50m S, 100m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%	10%	1792	1737	15.2%	99.8%	
18	2/Oct/24	@ Grade	50m S, 130m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%	15%	1833	1757	15.2%	101.0%	
19	2/Oct/24	@ Grade	50m S, 160m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%		1732		15.9%	99.5%	
20	2/Oct/24	@ Grade	70m S, 160m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%		1717		15.0%	98.7%	
21	2/Oct/24	@ Grade	70m S, 130m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%	5%	1776	1748	15.1%	100.4%	
22	2/Oct/24	@ Grade	70m S, 100m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%	20%	1863	1768	16.3%	101.6%	
23	2/Oct/24	@ Grade	70m S, 70m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%		1716		18.3%	98.6%	
24														
25														
26														
												Moisture %	Compaction %	
			AVERAGE	CLAY								15.8%	100.2%	

Additional Comments:
Fill Material Consisting of Clay
Sheeps Foot Packer Used

Distribution List:
1. James Van Braak - jamesvb@dennisdirtworx.ca

Authorized Signatures:

[redacted]
Materials Technician: Zayne Wittke

Contractor's Representative

[redacted]
Reviewed By: Devon Rowley

Project Manager

NUCLEAR DENSITY FIELD TEST REPORT

ROSEKE ENGINEERING 3614 - 18th Avenue North Lethbridge, AB T1H 5S7	CLIENT: Dennis Dirtworx LTD.	ATTENTION: James Van Braak	REL JOB NO.: 242-450	Dennis' Dirtworx 1009 13th Avenue Coaldale, AB T1M 0E4
	PROJECT: Hejo Farms - Sheep Barn Pad	CONSULTANT:	JOB NO.: 24-251	
	LOCATION: Hejo Farms - Rg Rd 201	ACTIVITY: Compaction - Subgrade	INSPECTOR: Z. Wittke	
REPORT NO.: #3	CONTRACTOR: Dennis Dirtworx LTD.	SPECIFIED COMPACTION: 98.0 % Minimum		DATE: 4-Oct-2024

TEST NO.	DATE TESTED	GRADE DEPTH (m)	TEST LOCATION	SOIL TYPE	PROBE DEPTH	DENSITY MODE	STANDARD PROCTOR (ASTM D698)		Material Percent Oversized	CONSTRUCTED			% PROCTOR DENSITY (ASTM 6938)	REMARKS
							DENSITY (kg/m³)	MOISTURE		DENSITY (kg/m³) (Initial)	DENSITY (kg/m³) (Corrected)	MOISTURE		
1	4/Oct/24	@ Grade	30m S, 10m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%		1707		15.4%	98.1%	
2	4/Oct/24	@ Grade	30m S, 40m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%	5%	1787	1759	17.0%	101.1%	
3	4/Oct/24	@ Grade	30m S, 80m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%		1748		17.1%	100.5%	
4	4/Oct/24	@ Grade	30m S, 120m W of NE Corner of Pad	CLAY	300	NDT	1740	17.0%		1731		15.1%	99.5%	
5	4/Oct/24	@ Grade	20m S, 120m W of NW Corner of Pad	CLAY	300	NDT	1740	17.0%		1710		15.5%	98.3%	
6	4/Oct/24	@ Grade	20m S, 80m W of NW Corner of Pad	CLAY	300	NDT	1740	17.0%		1740		16.5%	100.0%	
7	4/Oct/24	@ Grade	20m S, 40m W of NW Corner of Pad	CLAY	300	NDT	1740	17.0%		1752		15.0%	100.7%	
8	4/Oct/24	@ Grade	15m S, 80m W of NW Corner of Pad	CLAY	300	NDT	1740	17.0%		1752		15.4%	100.7%	
9	4/Oct/24	@ Grade	15m S, 50m W of NW Corner of Pad	CLAY	300	NDT	1740	17.0%		1769		16.5%	101.7%	
10	4/Oct/24	@ Grade	15m S, 30m W of NW Corner of Pad	CLAY	300	NDT	1740	17.0%		1752		15.3%	100.7%	
11	4/Oct/24	@ Grade	15m S, 10m W of NW Corner of Pad	CLAY	300	NDT	1740	17.0%		1752		15.5%	100.7%	
24														
25														
26														
												Moisture %	Compaction %	
AVERAGE				CLAY								15.8%	100.2%	

Additional Comments:
Fill Material Consisting of Clay
Sheeps Foot Packer Used

Distribution List:
1. James Van Braak - jamesvb@dennisdirtworx.ca

Authorized Signatures:

[redacted]
Materials Technician: Zayne Wittke

Contractor's Representative

[redacted]
Reviewed By: Devon Rowley

Project Manager