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**ROCKY MOUNTAIN
EQUIPMENT
CIVIL SITE DESIGN**

**NEEPAWA, MB
SE 34-14-15W**

CIVIL DRAWINGS

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DATE

DECEMBER 18, 2014

PROJECT NO:

BMCE-13-159

**ROCKY MOUNTAIN EQUIPMENT
CIVIL SITE DESIGN
NEEPAWA, MB (SE 34-14-15W)**

APPLICATION

SPECIFICATIONS TO BE USED WHERE APPROPRIATE AND AS APPLICABLE.

GENERAL NOTES

- ALL RELEVANT BUILDING CODES APPLY. WORK AND SHALL BE COMPLETED IN COMPLIANCE WITH THE MANITOBA BUILDING CODE 2011 AND ALL APPLICABLE LOCAL BYLAWS AND REGULATIONS.
- ALL WORK TO BE CARRIED OUT WITH GOOD WORKMANSHIP TO ENSURE THE QUALITY AND SERVICEABILITY OF THE STRUCTURE.
- CONSTRUCTION SAFETY REQUIREMENTS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR.
- PRINCIPLE APPLIED DESIGN LOADS ARE INDICATED AS APPROPRIATE. DESIGN LIVE LOADS SHALL NOT BE EXCEEDED AT ANY TIME DURING CONSTRUCTION.
- DO NOT SCALE DRAWINGS.
- CONTRACTOR TO VERIFY ALL DIMENSIONS, ELEVATIONS, SLOPES, DETAILS, CONDITIONS, ETC. SHOWN ON THE DRAWINGS PRIOR TO CONSTRUCTION OR PREFABRICATION OF ANY COMPONENTS.
- DISCREPANCIES OR AMBIGUITIES ON THE DRAWINGS AND/OR THE SITE, SHALL BE REPORTED TO THE DESIGN ENGINEER. WHERE AN OVERLAP OR DUPLICATION OCCURS ON THE DRAWINGS, THE MORE COSTLY SOLUTION SHALL BE CONSIDERED CORRECT, UNLESS APPROVED BY THE DESIGN ENGINEER. MODIFICATIONS, ALTERATIONS OR SUBSTITUTIONS MUST BE AUTHORIZED IN WRITING BY THE DESIGN ENGINEER.
- FOR PENETRATIONS THROUGH SLABS, FLOORS, WALLS, ROOFS, ETC. REFER TO PERTINENT DRAWINGS.
- THE GENERAL CONTRACTOR SHALL LOCATE ALL EXISTING SITE SERVICES PRIOR TO CONSTRUCTION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF ALL NECESSARY SHORING AND BRACING FOR THE WORK. FORM WORK FOR NEW CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND MUST BE APPROVED BY THE DESIGN ENGINEER.
- CALL THE DESIGN ENGINEER FOR INSPECTIONS BEFORE EACH CONCRETE POUR AND PRESSURE TEST AND AS APPROPRIATE. THE GENERAL CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER AT LEAST 48 HOURS (72 HOURS FOR OUT-OF-TOWN PROJECTS) PRIOR TO ALL CONCRETE POURS AND/OR PRESSURE TESTING, TO ALLOW FOR SITE INSPECTIONS.

SOIL CONDITIONS/SITE PREPARATIONS

SUB-BASE/BASE PREPARATION

- THE SUB-BASE/BASE SHALL BE PREPARED IN STRICT ACCORDANCE WITH THE GEOTECHNICAL REPORT. IF A GEOTECHNICAL REPORT IS NOT PROVIDED, PREPARE THE SUB-BASE IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS.
- EXCAVATE TO DESIGN SUBGRADE ELEVATION, ENSURING THAT ALL TOPSOIL, SILT, LOOSE FILL, DEBRIS, ORGANIC MATERIAL (INCLUDING TREE ROOTS), EXISTING FOUNDATION ELEMENTS, TANKS ETC. ARE REMOVED.
- THE EXPOSED SUB-GRADE SHOULD BE INSPECTED BY THE DESIGN ENGINEER AND PROOF ROLLED AS DIRECTED BY THE DESIGN ENGINEER TO IDENTIFY WEAK AREAS. WEAK AREAS SHOULD BE SUB-CUT AND REPLACED. CAUTION SHOULD BE EXERCISED TO LIMIT CONSTRUCTION TRAFFIC ON THE SUB-GRADE AT ALL TIMES. TO REPLACE SUB-CUT AREAS OR TO BRING THE SITE UP TO GRADE, A WELL GRADED GRANULAR FILL (GRANULAR PIT RUN) FREE FROM AGGREGATES LARGER THAN 3" IN DIAMETER SHOULD BE UTILIZED. THE FILL SHOULD BE PLACED IN MAXIMUM 6" THICK LIFTS AND COMPACTED TO A MINIMUM OF 98% STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMDD).
- WHERE PROOF ROLLING DOES NOT IDENTIFY THE PRESENCE OF UNDERLYING WEAK ZONES, THE SUB-GRADE SURFACE SHOULD BE COMPACTED TO A MINIMUM OF 98% SPMDD.
- DURING AND SUBSEQUENT TO EXCAVATION, THE SUB-GRADE SHOULD NOT BE DISTURBED OR SUBJECT TO FROST, DESICCATION, INUNDATION, OR HEAVY TIRE LOADS. FOR WINTER OR EARLY SPRING STARTS, THAW ALL FROZEN AREAS PRIOR TO THE INSTALLATION OF GRANULAR MATERIAL.
- PLACE SUB-BASE AND BASE COURSE OVER THE COMPACTED SUB-GRADE IN MAXIMUM 6" LIFTS AND COMPACT TO A MINIMUM OF 98% SPMDD.
- THE GENERAL CONTRACTOR OR PROJECT MANAGER SHALL ENSURE THAT A COMPACTION TEST BE PERFORMED BY AN INDEPENDENT TESTING COMPANY DURING THE INSTALLATION OF ALL GRANULAR MATERIAL. THE RESULTS SHALL BE FORWARDED TO THE DESIGN ENGINEER.
- REQUIRED SOIL BEARING CAPACITY IS 1500 PSF. THE OWNER / CONTRACTOR IS RESPONSIBLE TO VERIFY. BMCE ASSUMES NO LIABILITY FOR THIS ASSUMPTION RESULTING FROM CONTRARY SOIL CONDITIONS.
- PROVIDE 6 MIL POLY MOISTURE BARRIER (WELL LAPPED) BETWEEN COMPACTED GRANULAR BASE AND CONCRETE SLAB OR AS SHOWN ON THE DRAWINGS.
- INSTALL GEOTEXTILE FABRIC BETWEEN SUB-GRADE AND SUB-BASE IN ASPHALT PARKING AND TRAFFIC AREAS.
- ELEVATION OF FINISHED PROJECT GRADE SHALL BE A MINIMUM OF 12" ABOVE THE HIGHEST ADJACENT GRADE AND SLOPED 2% AWAY FROM THE STRUCTURE TO ENSURE WATER WILL BE APPROPRIATELY MITIGATED.

TABLE 1: REQUIREMENTS FOR GRANULAR BASE COURSE		
GRADATION		AGGREGATE QUALITY REQUIREMENTS
SIEVE SIZE	% PASSING (BY DRY MASS)	1. THE AGGREGATE SHALL CONSIST OF DURABLE, SOUND PARTICALS OF CRUSHED GRAVEL, STONE, ROCK, SAND, AND FINE SOIL. IT SHALL NOT CONTAIN ROOTS, PLANTS, SODS, TOPSOIL OR THIN ELONGATED PARTICLES. 2. AGGREGATE SHALL HAVE A MINIMUM CBR (CALIFORNIA BEARING RATIO) OF 60%. 3. THE AGGREGATE COARSE FRACTION SHALL HAVE A MAXIMUM LOS ANGELES ABRASION LOSS OF 35%. 4. A MINIMUM 35% OF THE MATERIAL RETAINED BY THE # 4 SIEVE SHALL CONSIST OF CRUSHED PARTICLES (EXCLUDING IRONSTONE OR SHALE). 5. A MAXIMUM OF 12% OF THE MATERIAL RETAINED BY THE #4 SIEVE (BY WEIGHT) MAY CONSIST OF IRONSTONE AND/OR SHALE. 6. MATERIAL PASSING THE #40 SIEVE SHALL HAVE A LIQUID LIMIT LOWER THAN 25% AND A PLASTICITY INDEX LOWER THAN 6%.
19 mm	100%	
15 mm	75 - 90%	
# 4	45 - 70%	
# 10	25 - 55%	
# 40	15 - 35%	
# 200	8 - 15%	

TABLE 2: REQUIREMENTS FOR GRANULAR SUB BASE		
GRADATION		AGGREGATE QUALITY REQUIREMENTS
SIEVE SIZE	% PASSING (BY DRY MASS)	1. THE AGGREGATE SHALL CONSIST OF DURABLE, SOUND PARTICALS OF CRUSHED GRAVEL, STONE, ROCK, SAND, AND FINE SOIL. IT SHALL NOT CONTAIN ROOTS, PLANTS, SODS, TOPSOIL OR THIN ELONGATED PARTICLES. 2. AGGREGATE SHALL HAVE A MINIMUM CBR (CALIFORNIA BEARING RATIO) OF 30%. 3. THE AGGREGATE COARSE FRACTION SHALL HAVE A MAXIMUM LOS ANGELES ABRASION LOSS OF 40%. 4. A MINIMUM 15% OF THE MATERIAL RETAINED BY THE # 4 SIEVE SHALL CONSIST OF CRUSHED PARTICLES (EXCLUDING IRONSTONE OR SHALE). 5. A MAXIMUM OF 20% OF THE MATERIAL RETAINED BY THE #4 SIEVE (BY WEIGHT) MAY CONSIST OF IRONSTONE AND/OR SHALE. 6. MATERIAL PASSING THE #40 SIEVE SHALL HAVE A LIQUID LIMIT LOWER THAN 25% AND A PLASTICITY INDEX LOWER THAN 6%.
37.5 mm	100%	
25 mm	85 - 100%	
# 4	25 - 80%	
# 40	15 - 40%	
# 200	8 - 18%	

TABLE 2: REQUIREMENTS FOR GRANULAR PIT RUN		
GRADATION		AGGREGATE QUALITY REQUIREMENTS
SIEVE SIZE	% PASSING (BY DRY MASS)	1. THE AGGREGATE SHALL CONSIST OF DURABLE, SOUND PARTICALS OF CRUSHED GRAVEL, STONE, ROCK, SAND, AND FINE SOIL. IT SHALL NOT CONTAIN ROOTS, PLANTS, SODS, TOPSOIL OR THIN ELONGATED PARTICLES. 2. AGGREGATE SHALL HAVE A MINIMUM CBR (CALIFORNIA BEARING RATIO) OF 30%. 3. THE AGGREGATE COARSE FRACTION SHALL HAVE A MAXIMUM LOS ANGELES ABRASION LOSS OF 40%. 4. A MINIMUM 15% OF THE MATERIAL RETAINED BY THE # 4 SIEVE SHALL CONSIST OF CRUSHED PARTICLES (EXCLUDING IRONSTONE OR SHALE). 5. A MAXIMUM OF 20% OF THE MATERIAL RETAINED BY THE #4 SIEVE (BY WEIGHT) MAY CONSIST OF IRONSTONE AND/OR SHALE. 6. MATERIAL PASSING THE #40 SIEVE SHALL HAVE A LIQUID LIMIT LOWER THAN 25% AND A PLASTICITY INDEX LOWER THAN 6%.
75	100%	
# 4	45 - 70%	
# 200	8 - 15%	
# 40	15 - 40%	
# 200	8 - 18%	

SHORT FORM CONSTRUCTION SPECIFICATIONS

- ALL PRODUCTS INCORPORATED IN THE WORK SHALL CONFORM TO MWSB STANDARD SPECIFICATIONS AND SHALL BE REGISTERED IN THE MWSB LISTING OF APPROVED PRODUCTS. ALL CONSTRUCTION SHALL CONFORM TO MWSB STANDARD SPECIFICATIONS.
- ALL WATERMAIN PIPELINE SHALL BE HIGH DENSITY POLYETHYLENE (HDPE) DR17.
- VALVES SHALL BE AWWA C509, (LEFT-HAND OPENING) c/w DEPTH ADJUSTABLE BOXES. HYDRANTS SHALL BE AWWA C502 AND MWSB APPROVED WITH WCU / MANITOBA STANDARD OPERATING NUTS AND THREADS. VALVES AND HYDRANTS SHALL BE LEFT-HAND OPENING.
- FITTINGS (TEES, ELBOWS, ETC.) SHALL BE CAST IRON (AWWA C110, CLASS 250) EXCEPT THAT PVC FITTINGS MAY BE USED WITH PVC PIPE AND HDPE FITTINGS MAY BE USED WITH HDPE PIPE. ALL FITTINGS FOR BOTH PVC AND HDPE SHALL BE INSTALLED WITH A CONCRETE THRUST BLOCK AND RESTRAINT.
- UNLESS NOTED OTHERWISE ON THE PLAN OR STAKED OTHERWISE BY THE ENGINEER, THE MINIMUM DEPTH OF BURY SHALL BE 2.75m (9ft) BELOW FINAL GROUND DESIGN ELEVATION.
- UNLESS OTHERWISE NOTED ON PLANS OR IN THE SPECIAL PROVISIONS, PIPE SHALL BE LAID ON CLASS "B" BEDDING WITH COMMON BACKFILL. GRANULAR BACKFILL SHALL BE USED IN ALL TRENCHES THROUGH DRIVEWAYS AND ROADWAYS. TYPE "C" BEDDING SHALL BE FINE, LOOSE MATERIAL OR SAND. BEDDING AND GRANULAR BACKFILL SHALL BE TAMPED INTO PLACE IN LIFTS OF 100mm (4in) AND 200mm (8in) RESPECTIVELY. BACKFILL SHALL CONTAIN NO LUMPS EXCEEDING 150mm (6in), NOR FROZEN MATERIAL.
- WATERMANS SHALL BE INSTALLED TO GRADES AND ALIGNMENTS SHOWN ON THE PLANS OR AS STAKED BY THE CONTRACT ADMINISTRATOR. HYDRANTS AND VALVE BOXES SHALL BE INSTALLED PLUMB.
- WATERMANS SHALL BE PRESSURE TESTED AT 1000 kPa (150 psi) FOR AT LEAST TWO HOURS. THE TEST SHALL SHOW A PRESSURE LOSS OF NO MORE THAN 7 kPa (1 psi) PER HOUR, AND A WATER LOSS OF NO MORE THAN 0.05 LITRES PER JOINT PER HOUR PER 100mm OF PIPE DIAMETER (0.0025 I.G. PER JOINT PER HOUR PER INCH DIAMETER). LEAKAGE IN EXCESS OF THIS SHALL BE LOCATED, CORRECTED AND THE LINE RETESTED AND THE ENTIRE PROCEDURE REPEATED UNTIL THE TESTS ARE SATISFACTORY.
- WATERMANS SHALL BE FLUSHED WITH ADEQUATE WATER FLOWS TO ACHIEVE 0.75 METRE / SECOND (2.5 FPS) VELOCITY, AND SHALL BE DISINFECTED WITH CHLORINE IN ACCORDANCE WITH AWWA C601, AND REFRESHED. AFTER THIS PROCEDURE, SAMPLES OR WATER FROM THE MAIN SHALL BE SUBMITTED FOR BACTERIOLOGICAL ANALYSIS BY A PUBLIC HEALTH LABORATORY. THE RESULTS SHALL BE SATISFACTORY ("COUNT LESS THAN ONE") AND THE PROCEDURE MUST BE SATISFACTORY TO THE PUBLIC HEALTH INSPECTOR BEFORE THE MAIN SHALL BE CONSIDERED ACCEPTABLE.
- ALL AREAS SUBJECT TO CONSTRUCTION OPERATIONS SHALL BE RESTORED TO THE CONDITION IN WHICH THEY EXISTED PRIOR TO CONSTRUCTION. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO PAVEMENT REPAIRS, RE-GRAVELLING, TRENCH SETTLEMENT CORRECTION AND RE-SEEDING OF GRASSED AREAS.
- NO RESPONSIBILITY SHALL BE ASSUMED BY THE OWNER, THE MUNICIPAL CORPORATION OR THE ENGINEER FOR CORRECTNESS OR COMPLETENESS OF THE PLANS OR DRAWINGS WITH RESPECT TO EXISTING UTILITIES, PIPES, LEGAL SURVEY MARKERS, OR STRUCTURES EITHER UNDER OR ABOVE GROUND AND NEITHER THE OWNER, THE MUNICIPAL CORPORATION OR THE ENGINEER SHALL BE LIABLE FOR INCORRECTNESS AND INADEQUACY THEREOF. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATIONS OF SUCH UTILITIES, PIPE, LEGAL SURVEY MARKERS OR STRUCTURES AND IF ENCOUNTERED, TO ADEQUATELY PROTECT THEM DURING CONSTRUCTION AND TO REPLACE OR RESET THEM TO ORIGINAL POSITION AND CONDITION.
- ALL RELEVANT UTILITIES (WATER-WORKS, HYDRO, MTS, GAS, HIGHWAYS, ETC.) SHALL BE NOTIFIED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION. CONTROLS (INCLUDING VALVES) SHALL BE OPERATED BY PERSONNEL OF THE RESPECTIVE UTILITIES.
- ALL RELATIVE AND APPLICABLE FEDERAL, PROVINCIAL AND LOCAL STATUTES, BY-LAWS, CODES AND REGULATIONS SHALL BE OBSERVED IN THE COURSE OF CONSTRUCTION, WHERE REQUIRED. THE CONTRACTOR SHALL SECURE AND PAY FOR THE APPROPRIATE CONSTRUCTION PERMITS.



POLYETHYLENE PIPE

- ALL CONSTRUCTION AND PRODUCTS INCORPORATED IN THE WORK SHALL CONFORM TO THE MWSB STANDARD CONSTRUCTION SPECIFICATIONS AND LISTING OF APPROVED PRODUCTS.
- POLYETHYLENE PIPE, TUBING, AND FITTINGS SHALL CONFORM TO ALL APPLICABLE PROVISIONS AND REQUIREMENTS OF THE LATEST REVISION OF AWWA C901, C906 OR CSA B137.1 AND BY INCLUSION ALL APPROPRIATE STANDARDS REFERENCED THEREIN.
- POLYETHYLENE COMPOUNDS UTILIZED IN THE MANUFACTURE OF PRODUCTS SHALL HAVE A GRADE OF PE34 WITH A MINIMUM CELL CLASSIFICATION OF PE 34544 [C, D, OR E] FOR PE3408 MATERIALS, AS DEFINED IN ASTM D3350. IN CONFORMANCE WITH AWWA C901, AWWA C906 OR CSA B137.1, THEY SHALL HAVE A PPI RECOMMENDED HYDROSTATIC DESIGN BASIS (HDB) OF 1600 PSI (PE3408) AT A TEMPERATURE OF 73.4 °F (23 °C).
- ALL MATERIALS WHICH WILL COME IN CONTACT WITH WATER, INCLUDING LUBRICANTS, SHALL BE EVALUATED, TESTED AND CERTIFIED FOR CONFORMANCE WITH NSF/ANSI STANDARD 61, IF REQUIRED BY THE PRODUCTION STANDARD OR REQUESTED BY THE END USER.
- CLEAN RE-WORK MATERIAL OF THE SAME TYPE, GRADE AND CELL CLASSIFICATION GENERATED FROM THE MANUFACTURER'S OWN PIPE AND FITTING PRODUCTION MAY BE USED BY THE SAME MANUFACTURER AS LONG AS THE PIPE, TUBING AND FITTINGS PRODUCED MEET ALL THE REQUIREMENTS OF AWWA C901, AWWA C906 OR CSA B137.1.
- PIPE AND TUBING SHALL BE MANUFACTURED USING COMPOUNDS COMPLYING WITH THE REQUIREMENTS ABOVE. DIMENSIONAL AND PERFORMANCE CHARACTERISTICS SHALL CONFORM TO THE REQUIREMENTS OF AWWA C901, AWWA C906 OR CSA B137.1.
- POLYETHYLENE FITTINGS SHALL BE MANUFACTURED USING COMPOUNDS COMPLYING WITH THE REQUIREMENTS OF THE SPECIFICATIONS ABOVE AND ALL APPROPRIATE REQUIREMENTS OF AWWA C901, AWWA C906 OR CSA C137.1. SOCKET TYPE FITTINGS SHALL COMPLY WITH ASTM D2883. BUTT FUSION FITTINGS SHALL COMPLY WITH ASTM D3261. ELECTROFUSION FITTINGS SHALL COMPLY WITH ASTM F1055. FABRICATED FITTINGS SHALL BE AS STRONG OR STRONGER THAN THE PIPE TO WHICH FITTINGS WILL BE JOINED. MECHANICAL FITTINGS SHALL BE APPROVED ONLY AFTER SUBMISSION OF THE APPROPRIATE TEST DATA AND SERVICE HISTORIES INDICATING THEIR ACCEPTABILITY FOR THE INTENDED SERVICE. IN ALL CASES THE SPECIFICATIONS AND REQUIREMENTS FOR THE FITTINGS SUPPLIED SHALL COMPLY WITH THE APPROPRIATE SECTIONS OF AWWA C901, AWWA C906 OR CSA B137.1.
- THE PRESSURE CLASS OF PE PIPE AND PE FITTINGS SHALL BE SPECIFIED ON THE BASIS OF THE WORKING PRESSURE RATING OF THE WATER SYSTEM AS DEFINED IN AWWA C906. RECURRING POSITIVE PRESSURE SURGES OF UP TO ONE HALF OF THE PIPE'S NOMINAL PRESSURE CLASS MAY BE IGNORED DUE TO THE FATIGUE ENDURANCE OF THE POLYETHYLENE MATERIALS. NON-POLYETHYLENE FITTINGS SHALL BE SPECIFIED AND USED IN ACCORDANCE WITH THE SURGE TOLERANCE OF THE PARTICULAR APPURTENANCE IN USE.

FOR PE 3408, THE NET PRESSURE CAPABILITY SHALL BE THE WORKING PRESSURE RATING (WPR) @ 73°F AS FOLLOWS:				
DR	WPR (PSI)	WPR + SURGE (PSI)	HYDROTEST (PSI)	NOMINAL 60 SEC. BURST (PSI)
32.5	51	76	76	200
26.0	64	96	96	256
21.0	80	120	120	320
17.0	100	150	150	400
15.5	110	165	165	440
13.5	128	192	192	512
11.0	160	240	240	640
9.0	200	300	300	800
7.0	266	400	400	1064

- PIPE AND TUBING SHALL BE MARKED IN ACCORDANCE WITH EITHER AWWA C901, AWWA C906, OR CSA B137.1 WHICH EVER APPLIES. MARKING SHALL BE LEGIBLE AND SHALL REMAIN LEGIBLE UNDER NORMAL HANDLING AND INSTALLATION PRACTICES. INDENT MARKING MAY BE UTILIZED PROVIDED THE MARKING DOES NOT REDUCE THE WALL THICKNESS TO LESS THAN THE MINIMUM VALUE FOR THE PIPE OR TUBING. IT HAS BEEN DEMONSTRATED THAT THESE MARKS HAVE NO EFFECT ON THE LONG TERM STRENGTH OF THE PIPE OR TUBING AND THE MARKS DO NOT PROVIDE LEAKAGE CHANNELS WHEN ELASTOMERIC GASKET COMPRESSION FITTINGS ARE USED TO MAKE THE JOINTS.
- FITTINGS SHALL BE MARKED ON THE BODY OR HUB. MARKING SHALL BE IN ACCORDANCE WITH EITHER ASTM D2683, ASTM D3161, AWWA C906 OR ASTM F1055, DEPENDING ON FITTING TYPE AND THE STANDARD THAT APPLIES. MECHANICAL FITTINGS SHALL BE MARKED WITH SIZE, BODY MATERIAL DESIGNATION CODE, PRESSURE RATING AND MANUFACTURER'S NAME OR TRADEMARK.
- PIPE, TUBING AND FITTINGS SHALL BE HOMOGENEOUS THROUGHOUT AND FREE OF VISIBLE CRACKS, HOLES, FOREIGN INCLUSIONS, BLISTERS, DENTS OR OTHER INJURIOUS DEFECTS. THE PIPE, TUBING AND FITTINGS SHALL BE AS UNIFORM AS COMMERCIAL PRACTICABLE IN COLOR, OPACITY, DENSITY AND OTHER PHYSICAL PROPERTIES.
- PIPE, TUBING AND FITTINGS FURNISHED UNDER THIS SPECIFICATION SHALL COMPLY WITH AWWA C901, AWWA C906 OR CSA B137.1 WHICH EVER APPLIES.
- THE MANUFACTURER OF PIPE, TUBING AND FITTINGS SHALL ESTABLISH AND QUALIFY HEAT FUSION PROCEDURES FOR THE JOINING OF THE MATERIALS SUPPLIED IF REQUIRED.

NO.	DATE	APP.	BY	DESCRIPTION
1	MAY 30, 2014	D.A.B.	C.R.	ISSUED FOR CONSTRUCTION
0	FEB. 21, 2014	D.A.B.	C.R.	ISSUED FOR TENDER
A	FEB 7, 2014	D.A.B.	C.R.	ISSUED FOR 90% CLIENT REVIEW
REVISIONS				

 Certificate of Authorization Burns Maendel Consulting Engineers Ltd. No. 4559 Expiry: April 30, 2015	 30-May-2014	DESIGNED BY: --	REVIEWED BY: D.A.B.	PROJECT NAME: ROCKY MOUNTAIN EQUIPMENT CIVIL SITE DESIGN NEEPAWA, MB (SE 34-14-15W)	DRAWING TITLE: SPECIFICATIONS
		DRAWN BY: C.R.			
		PROJECT START DATE: DEC 12, 2013			
		PLOT SIZE: A1 (594x841)			
SCALE: N/A				1331 Princess Ave. Brandon, Manitoba R7A 0R4 Tel: (204) 728-7364 Fax: (204) 728-4418	PROJECT NUMBER: BMCE-13-159
					DRAWING NO.: C0.1



LOCATION PLAN
SCALE: N.T.S.

LEGEND	
PROPERTY LINE	---
EXISTING DRAIN	---
MAJOR DRAINAGE ARROW	→
CONTOUR ELEVATION	100.00
BUSH LINE	~ ~ ~
TREE LINE	○ ○ ○
OVERHEAD POWER LINE	—P—
POWER POLE	PP
FIRE HYDRANT	◇
UTILITY MARKER (AS NOTED)	*

NOTES:

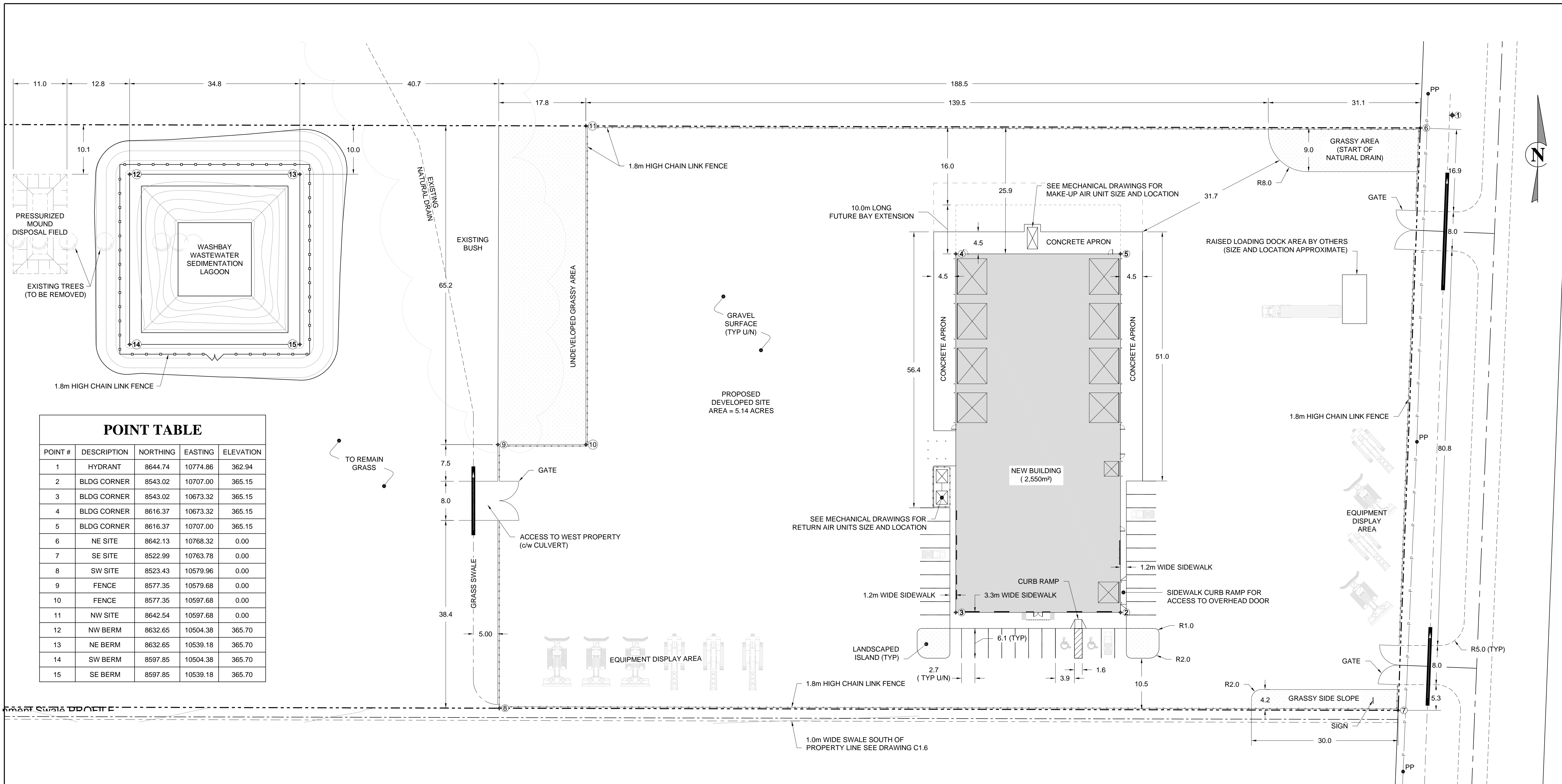
- 1) ALL DISTANCES ARE IN METRES AND DECIMALS THEREOF.
- 2) EXISTING PROPERTY LINE AND TOPOGRAPHICAL INFORMATION OBTAINED FROM A DRAWING CREATED BY ALTUS GEOMATICS MANITOBA. PROPERTY BOUNDARIES SHOWN ON THE DRAWING(S) HAVE BEEN CERTIFIED BY TIMOTHY W. LONGSTAFF, MLS ON APRIL 24, 2014.
- 3) GOOGLE EARTH WAS REFERENCED TO ADD NATURAL FEATURES, SUCH AS BUSH AND TREES.
- 4) ELEVATIONS ARE GEODETIC AND ARE REFERRED TO PROVINCE OF MANITOBA CONTROL MONUMENT No. 83R531, ELEVATION 351.494.
- 5) PRIOR TO CONSTRUCTION THE INDIVIDUAL UTILITY COMPANIES MUST BE CONTACTED FOR UTILITY LOCATES.
- 6) PRIOR TO CONSTRUCTION OF SITE DRAINAGE, THE OWNER SHOULD CONTACT CONSERVATION AND WATER STEWARDSHIP (WATER CONTROL WORKS AND DRAINAGE LICENSING SECTION) TO ENSURE THAT A 'LICENSE TO CONSTRUCT WATER CONTROL WORKS' IS NOT REQUIRED. THE WATER RESOURCE OFFICER FOR THE RM OF ROSEDALE IS INGRID ROTHNIE (204-841-3862).



SITE SURVEY
SCALE: 1:2000

NO.	DATE	APP.	BY	DESCRIPTION
1	MAY 30, 2014	D.A.B.	C.R.	REVISED SITE PROPERTY BOUNDARY
0	FEB. 21, 2014	D.A.B.	C.R.	ISSUED FOR TENDER
B	JAN 16, 2014	D.A.B.	C.R.	ISSUED FOR CLIENT REVIEW
A	DEC 19, 2013	D.A.B.	C.R.	ISSUED FOR REVIEW AND COMMENT
REVISIONS				

DESIGNED BY: C.R.	REVIEWED BY: D.A.B.	PROJECT NAME: ROCKY MOUNTAIN EQUIPMENT CIVIL SITE DESIGN NEEPAWA, MB (SE 34-14-15W)	DRAWING TITLE: LOCATION PLAN AND SITE SURVEY	
DRAWN BY: C.R.	PROJECT START DATE: DEC 12, 2013	 1331 Princess Ave. Brandon, Manitoba R7A 0R4 Tel: (204) 728-7364 Fax: (204) 728-4418	PROJECT NUMBER: BMCE-13-159	
PLOT SIZE: A1 (594x841)	SCALE: AS NOTED			DRAWING NO.: C1.1



POINT TABLE

POINT #	DESCRIPTION	NORTHING	EASTING	ELEVATION
1	HYDRANT	8644.74	10774.86	362.94
2	BLDG CORNER	8543.02	10707.00	365.15
3	BLDG CORNER	8543.02	10673.32	365.15
4	BLDG CORNER	8616.37	10673.32	365.15
5	BLDG CORNER	8616.37	10707.00	365.15
6	NE SITE	8642.13	10768.32	0.00
7	SE SITE	8522.99	10763.78	0.00
8	SW SITE	8523.43	10579.96	0.00
9	FENCE	8577.35	10579.68	0.00
10	FENCE	8577.35	10597.68	0.00
11	NW SITE	8642.54	10597.68	0.00
12	NW BERM	8632.65	10504.38	365.70
13	NE BERM	8632.65	10539.18	365.70
14	SW BERM	8597.85	10504.38	365.70
15	SE BERM	8597.85	10539.18	365.70

PROPOSED SITE PLAN
SCALE: 1:400

NO.	DATE	APP.	BY	DESCRIPTION
5	DEC 18, 2014	D.A.B.	C.R.	ISSUED FOR PERMIT
4	DEC 11, 2014	D.A.B.	C.R.	REVISED TREATMENT MOUND SIZE AND ADDED SEDIMENTATION LAGOON
3	AUG 21, 2014	D.A.B.	C.R.	RELOCATED GRASS SWALE AT SOUTH PROPERTY LINE
2	MAY 30, 2014	D.A.B.	C.R.	ISSUED FOR CONSTRUCTION
1	MAY 15, 2014	D.A.B.	C.R.	ISSUED FOR REVIEW AND APPROVAL
0	FEB. 21, 2014	D.A.B.	C.R.	ISSUED FOR TENDER

REVISIONS

APEGM
Certificate of Authorization
Burns Maendel Consulting
Engineers Ltd.
No. 4559 Expiry: April 30, 2015

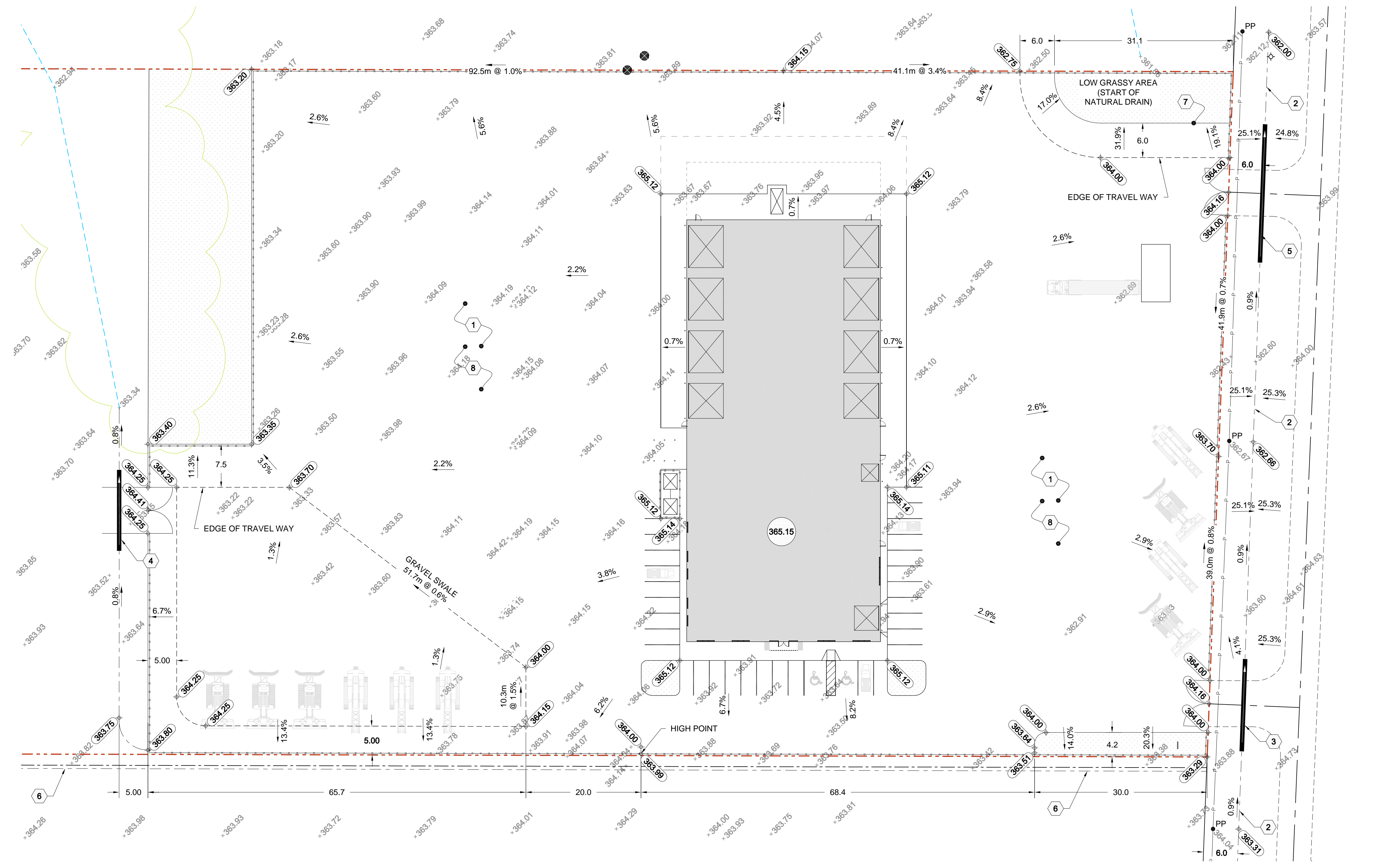
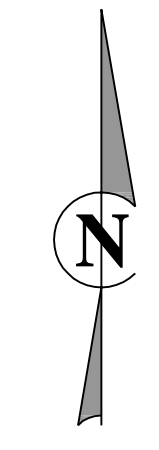


DESIGNED BY: C.R. REVIEWED BY: D.A.B. PROJECT NAME: **ROCKY MOUNTAIN EQUIPMENT CIVIL SITE DESIGN NEEPAWA, MB (SE 34-14-15W)**

DRAWN BY: C.R. PROJECT START DATE: DEC 12, 2013 PLOT SIZE: A1 (594x841) SCALE: AS NOTED

BURNS MAENDEL CONSULTING ENGINEERS LTD.
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Tel: (204) 728-7364 Fax: (204) 728-4418

DRAWING TITLE: PROPOSED SITE PLAN	
PROJECT NUMBER: BMCE-13-159	DRAWING NO.: C1.2



LEGEND	
PROPERTY LINE	- - - - -
EXISTING DRAIN	- - - - -
MAJOR DRAINAGE ARROW	→
CONTOUR ELEVATION	100.00
BUSH LINE	~ ~ ~ ~ ~
OVERHEAD POWER LINE	—○—
POWER POLE	● PP
FIRE HYDRANT	⊕
PROPOSED CULVERT	— —
GRADE BREAK	- - - - -
CENTRELINE SWALE	- - - - -
GRADE SLOPE w/ DISTANCE	10.0m @ 2.0%
EXISTING ELEVATION	⊕100.00
PROPOSED ELEVATION	⊕(100.00)
T.O. SLAB ELEVATION	(100.00)

KEYNOTES

1. FOR A MORE DETAILED GRADING ELEVATION GRID SEE DRAWING C1.4.
2. EXISTING DITCH SHALL BE REPROFILED TO RELOCATE EXISTING DRAINAGE PATTERN OFF SITE. SEE EAST DITCH DETAIL ON DRAWING C2.1.
3. NEW Ø450 x 16m LONG CORRUGATED STEEL CULVERT
SOUTH INVERT = 363.00m
NORTH INVERT = 362.90m
4. NEW Ø450 x 14m LONG CORRUGATED STEEL CULVERT
SOUTH INVERT = 363.40m
NORTH INVERT = 363.30m
5. NEW Ø450 x 24m LONG CORRUGATED STEEL CULVERT
SOUTH INVERT = 362.25m
NORTH INVERT = 362.05m
6. SWALE TO DIRECT STORMWATER FROM TOWN OF NEEPAWA PROPERTY AROUND SITE. SEE DRAWING C1.6 FOR SWALE PLAN AND PROFILE.
7. BLEND GRADES TO EXISTING ELEVATIONS ALONG EDGE OF GRAVEL AREA. MAINTAIN DRAINAGE OUTLET INTO EXISTING NATURAL DRAIN.
8. GRAVEL PARKING AREA AND DRIVEWAYS TO BE CONSTRUCTED AS PER THE GEOTECHNICAL RECOMMENDATIONS ON DRAWING C2.2.

DRAINAGE PLAN
SCALE: 1:400

NO.	DATE	APP.	BY	DESCRIPTION
2	AUG 21, 2014	D.A.B.	C.R.	ADDED SWALE SOUTH OF SOUTH PROPERTY LINE
1	MAY 30, 2014	D.A.B.	C.R.	REVISED DRAINAGE TO SUIT NEW PROPERTY BOUNDARY; ISSUED FOR CONSTRUCTION
0	FEB. 21, 2014	D.A.B.	C.R.	ISSUED FOR TENDER
A	FEB 7, 2014	D.A.B.	C.R.	ISSUED FOR 90% CLIENT REVIEW

REVISIONS

APEGM
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Burns Maendel Consulting
Engineers Ltd.
No. 4559 Expiry: April 30, 2015



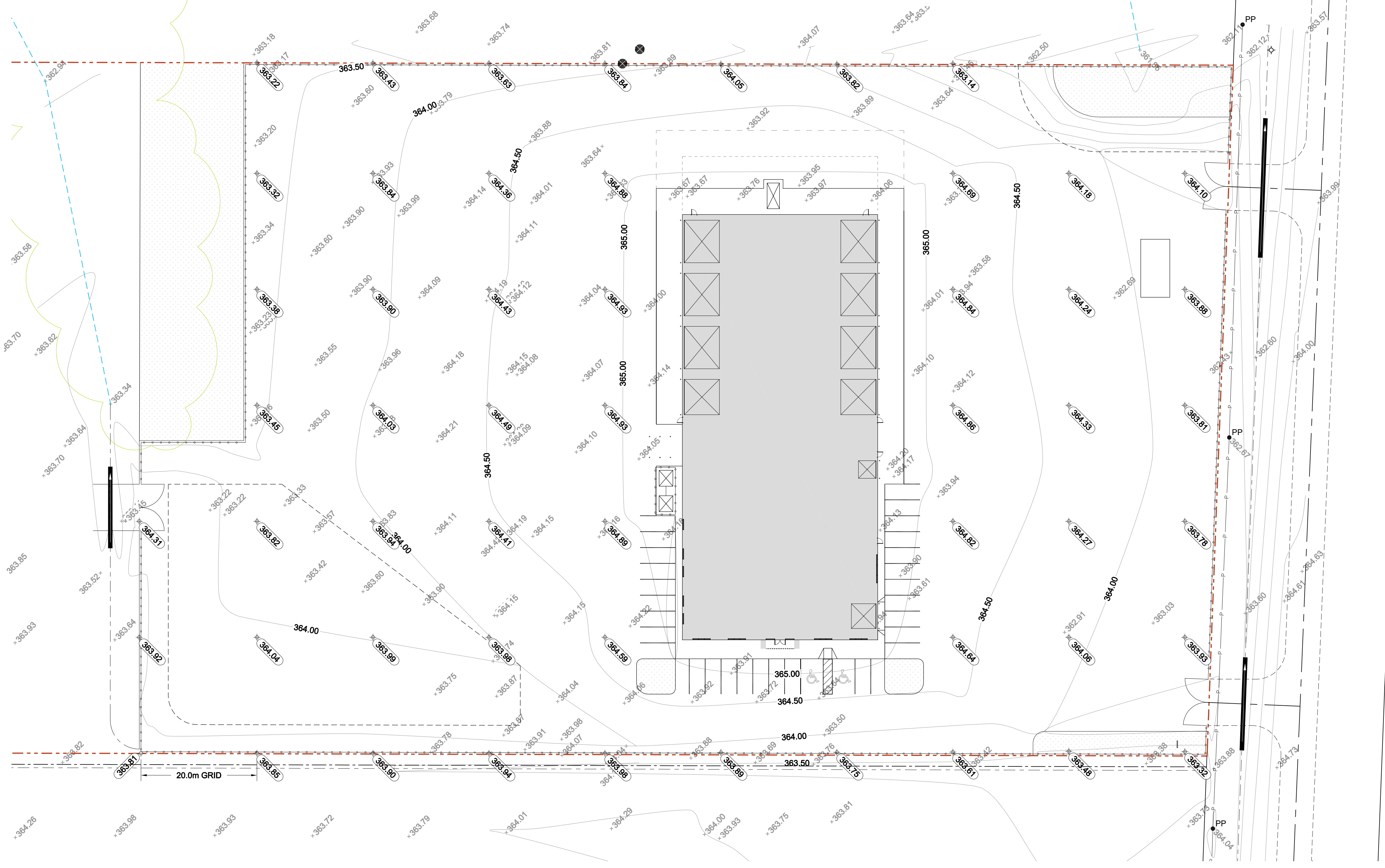
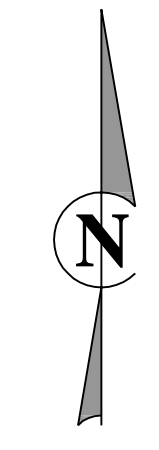
DESIGNED BY: C.R.
REVIEWED BY: D.A.B.
DRAWN BY: C.R.
PROJECT START DATE: DEC 12, 2013
PLOT SIZE: A1 (594x841)
SCALE: AS NOTED

PROJECT NAME:
**ROCKY MOUNTAIN EQUIPMENT
CIVIL SITE DESIGN
NEEPAWA, MB (SE 34-14-15W)**

**BURNS MAENDEL
CONSULTING ENGINEERS LTD.**
1331 Princess Ave.
Brandon, Manitoba
R7A 0R4
Tel: (204) 728-7364
Fax: (204) 728-4418

DRAWING TITLE:
DRAINAGE PLAN

PROJECT NUMBER: **BMCE-13-159**
DRAWING NO.: **C1.3**



LEGEND	
PROPERTY LINE	---
EXISTING DRAIN	---
MAJOR DRAINAGE ARROW	→
CONTOUR ELEVATION	100.00
BUSH LINE	~
OVERHEAD POWER LINE	—○—
POWER POLE	● PP
FIRE HYDRANT	⊕
PROPOSED CULVERT	—
GRADE BREAK	---
CENTRELINE SWALE	---
GRADE SLOPE w/ DISTANCE	10.0m @ 2.0%
EXISTING ELEVATION	⊕100.00
PROPOSED ELEVATION	⊕(100.00)
T.O. SLAB ELEVATION	⊕100.00

GRIDDED GRADING PLAN
SCALE: 1:400

NO.	DATE	APP.	BY	DESCRIPTION
1	MAY 30, 2014	D.A.B.	C.R.	REVISED GRADING GRID; ISSUED FOR CONSTRUCTION
0	FEB. 21, 2014	D.A.B.	C.R.	ISSUED FOR TENDER
A	FEB 7, 2014	D.A.B.	C.R.	ISSUED FOR 90% CLIENT REVIEW

REVISIONS

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Engineers Ltd.
No. 4559 Expiry: April 30, 2015



DESIGNED BY: C.R.
DRAWN BY: C.R.
PROJECT START DATE: DEC 12, 2013
PLOT SIZE: A1 (594x841)
SCALE: AS NOTED

REVIEWED BY: D.A.B.

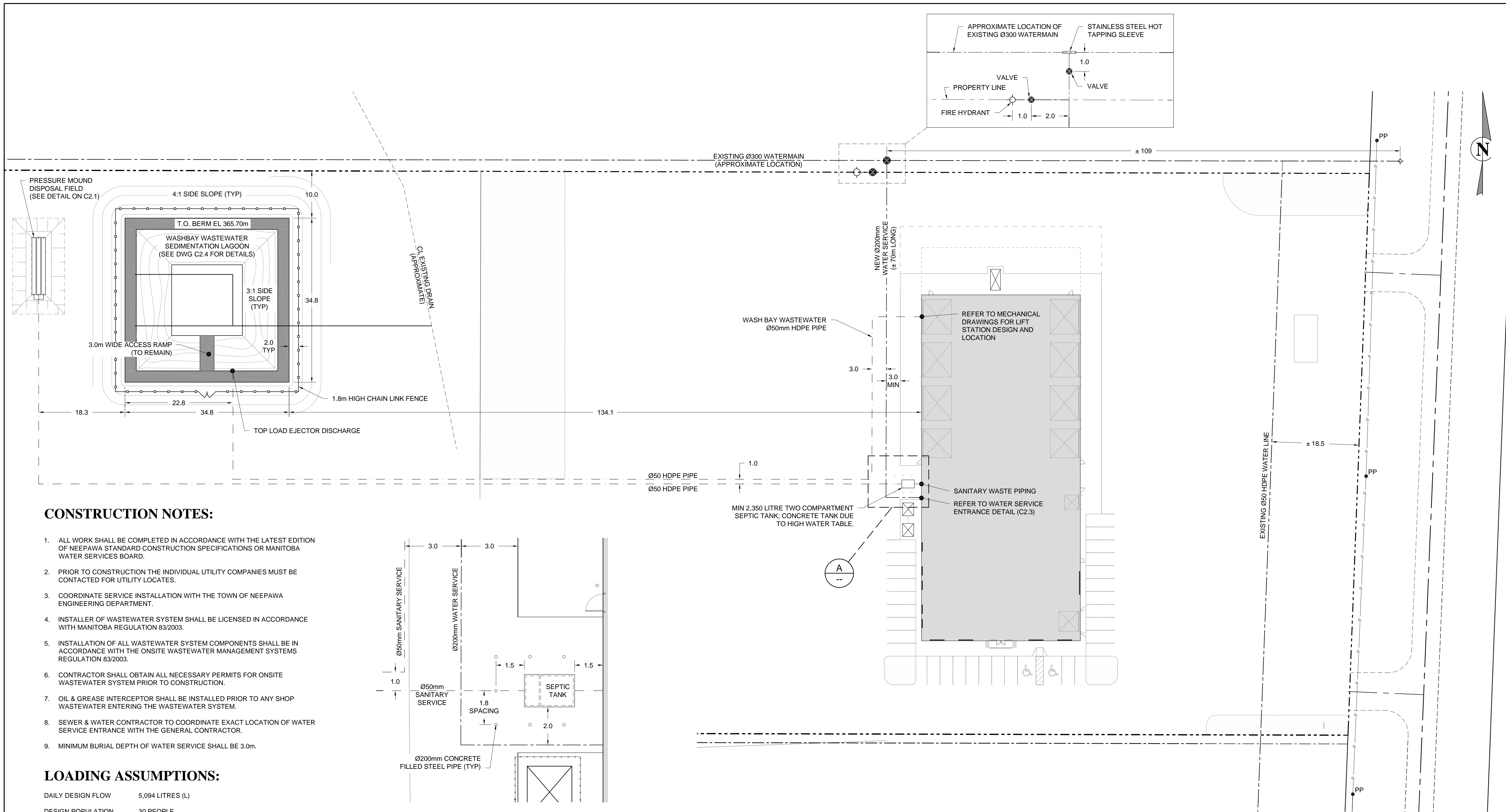
PROJECT NAME:
ROCKY MOUNTAIN EQUIPMENT
CIVIL SITE DESIGN
NEEPAWA, MB (SE 34-14-15W)

BURNS MAENDEL
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1331 Princess Ave.
Brandon, Manitoba
R7A 0R4
Tel: (204) 728-7364
Fax: (204) 728-4418

DRAWING TITLE:
GRIDDED GRADING PLAN

PROJECT NUMBER: **BMCE-13-159**
DRAWING NO: **C1.4**



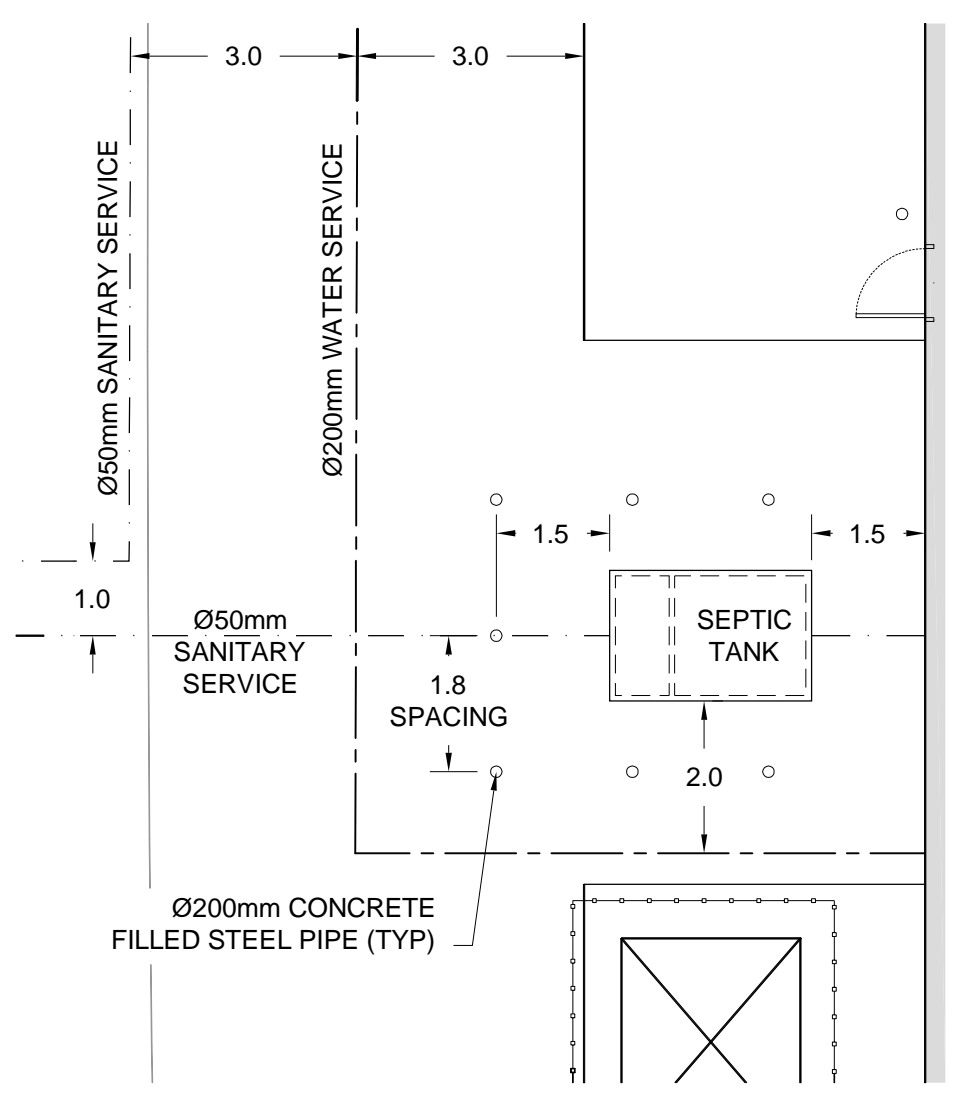
CONSTRUCTION NOTES:

1. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE LATEST EDITION OF NEPAWA STANDARD CONSTRUCTION SPECIFICATIONS OR MANITOBA WATER SERVICES BOARD.
2. PRIOR TO CONSTRUCTION THE INDIVIDUAL UTILITY COMPANIES MUST BE CONTACTED FOR UTILITY LOCATES.
3. COORDINATE SERVICE INSTALLATION WITH THE TOWN OF NEPAWA ENGINEERING DEPARTMENT.
4. INSTALLER OF WASTEWATER SYSTEM SHALL BE LICENSED IN ACCORDANCE WITH MANITOBA REGULATION 83/2003.
5. INSTALLATION OF ALL WASTEWATER SYSTEM COMPONENTS SHALL BE IN ACCORDANCE WITH THE ONSITE WASTEWATER MANAGEMENT SYSTEMS REGULATION 83/2003.
6. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR ONSITE WASTEWATER SYSTEM PRIOR TO CONSTRUCTION.
7. OIL & GREASE INTERCEPTOR SHALL BE INSTALLED PRIOR TO ANY SHOP WASTEWATER ENTERING THE WASTEWATER SYSTEM.
8. SEWER & WATER CONTRACTOR TO COORDINATE EXACT LOCATION OF WATER SERVICE ENTRANCE WITH THE GENERAL CONTRACTOR.
9. MINIMUM BURIAL DEPTH OF WATER SERVICE SHALL BE 3.0m.

LOADING ASSUMPTIONS:

DAILY DESIGN FLOW	5,094 LITRES (L)
DESIGN POPULATION	30 PEOPLE
EXPECTED SEWAGE	49 L PER PERSON
TOTAL SEWAGE	1,470 L
ONE WASH BAY	4 HOURS PER DAY (CONTINUOUS FLOW)
WASH WATER USAGE	15.1 L PER MINUTE
TOTAL WASH BAY WATER	3,624 L PER DAY
ASTM C33 SAND LAYER INFILTRATIVE RATE	29.35 L/m ²
SANDY LOAM INFILTRATIVE RATE	22.02 L/m ²

SAFETY FACTOR OF 1.5 USED AS PER MANITOBA CONSERVATION REQUIREMENTS



SITE SERVICING PLAN
SCALE: 1:400

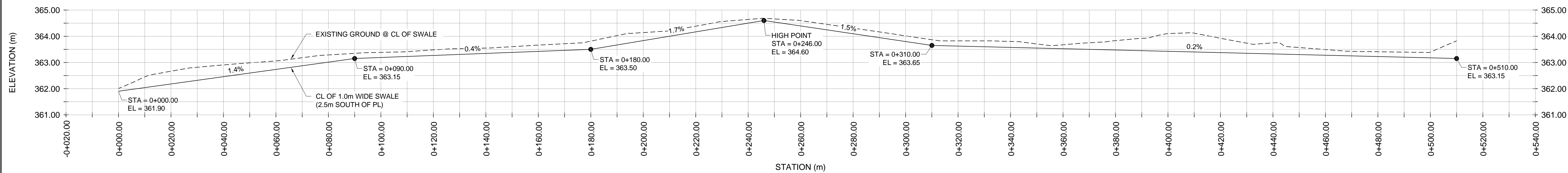
NO.	DATE	APP.	BY	DESCRIPTION
5	DEC 18, 2014	D.A.B.	C.R.	ISSUED FOR PERMIT
4	DEC 11, 2014	D.A.B.	C.R.	REVISED TREATMENT MOUND SIZE AND ADDED SEDIMENTATION LAGOON
3	AUG 21, 2014	D.A.B.	C.R.	REVISED WATERMAIN SIZE; ADDED FIRE HYDRANT
2	JULY 7, 2014	D.A.B.	C.R.	REVISED SANITARY SEWER
1	MAY 30, 2014	D.A.B.	C.R.	REVISED DISPOSAL FIELD AND SERVICES LOCATIONS; ISSUED FOR CONSTRUCTION
0	FEB. 21, 2014	D.A.B.	C.R.	ISSUED FOR TENDER
A	FEB 7, 2014	D.A.B.	C.R.	ISSUED FOR 90% CLIENT REVIEW

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Engineers Ltd.
No. 4559 Expiry: April 30, 2015



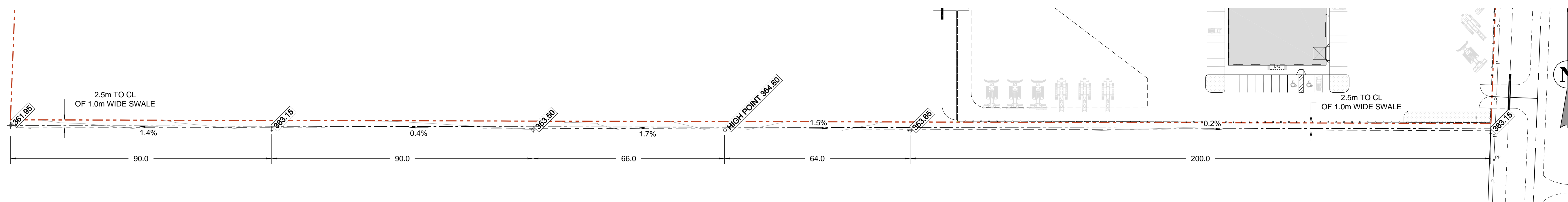
DESIGNED BY: C.R.	REVIEWED BY: D.A.B.	PROJECT NAME: ROCKY MOUNTAIN EQUIPMENT CIVIL SITE DESIGN NEPAWA, MB (SE 34-14-15W)
DRAWN BY: C.R.		BURNS MAENDEL CONSULTING ENGINEERS LTD.
PROJECT START DATE: DEC 12, 2013		
PLOT SIZE: A1 (594x841)		1331 Princess Ave. Brandon, Manitoba R7A 0R4 Tel: (204) 728-7364 Fax: (204) 728-4418
SCALE: AS NOTED		PROJECT NUMBER: BMCE-13-159

DRAWING TITLE: SITE SERVICING PLAN	
DRAWING NO.:	C1.5



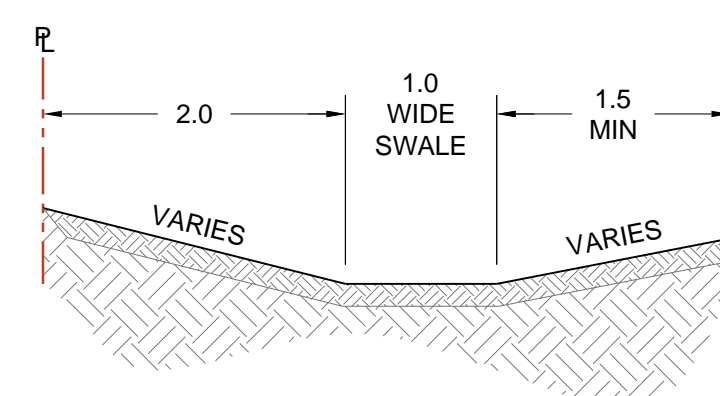
PROFILE VIEW

SCALE: VERT = 1:75
HOR = 1:750



PARTIAL PLAN - SOUTH SWALE

SCALE: 1:750



SWALE DETAIL

SCALE: 1:50

NO.	DATE	APP.	BY	DESCRIPTION
0	AUG 21, 2014	D.A.B.	C.R.	ISSUED FOR CONSTRUCTION
REVISIONS				

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Engineers Ltd.
No. 4559 Expiry: April 30, 2015



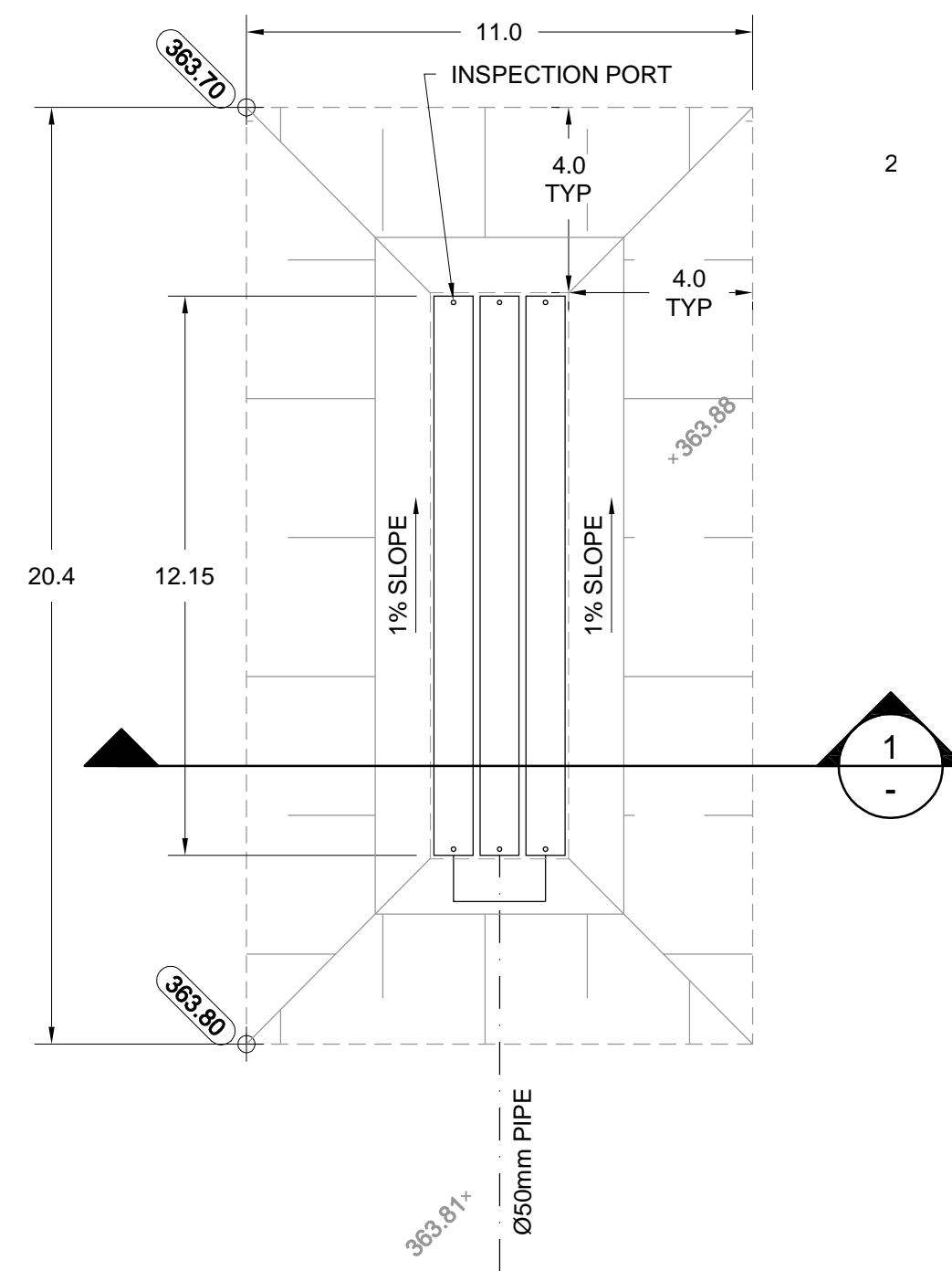
DESIGNED BY: C.R.
REVIEWED BY: D.A.B.
DRAWN BY: C.R.
PROJECT START DATE: DEC 12, 2013
PLOT SIZE: A1 (594x841)
SCALE: AS NOTED

PROJECT NAME:
**ROCKY MOUNTAIN EQUIPMENT
CIVIL SITE DESIGN
NEEPAWA, MB (SE 34-14-15W)**

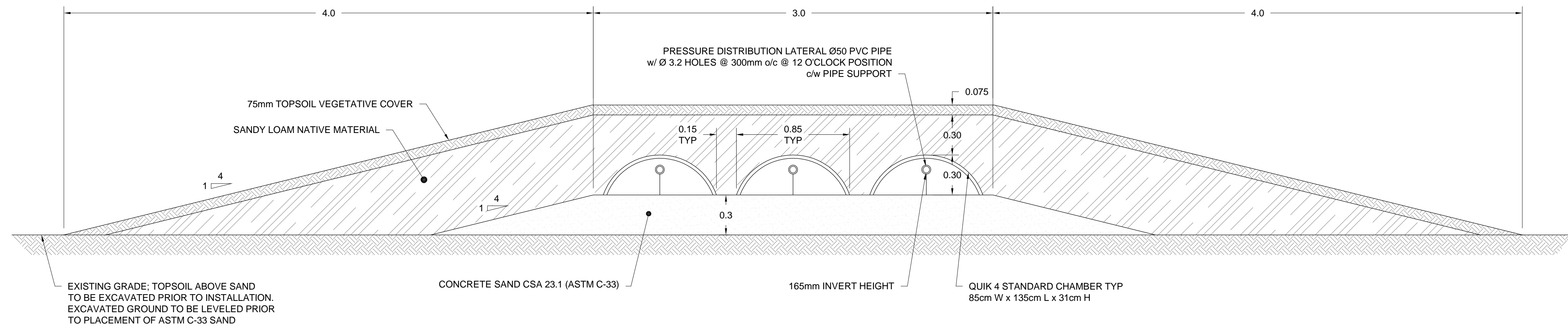
**BURNS MAENDEL
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1331 Princess Ave.
Brandon, Manitoba
R7A 0R4
Tel: (204) 728-7364
Fax: (204) 728-4418

DRAWING TITLE:
**SOUTH SWALE
PLAN AND PROFILE**

PROJECT NUMBER: **BMCE-13-159**
DRAWING NO: **C1.6**



PLAN VIEW PRESSURIZED SAND TREATMENT MOUND
SCALE: 1:150



SECTION VIEW PRESSURIZED SAND TREATMENT MOUND
SCALE: 1:20

NO.	DATE	APP.	BY	DESCRIPTION
4	DEC 18, 2014	D.A.B.	C.R.	ISSUED FOR PERMIT
3	DEC 11, 2014	D.A.B.	C.R.	RESIZED TREATMENT MOUND
2	JULY 7, 2014	D.A.B.	C.R.	REVISED TREATMENT MOUND DETAILS
1	MAY 30, 2014	D.A.B.	C.R.	RELOCATED DISPOSAL FIELD
0	FEB. 21, 2014	D.A.B.	C.R.	ISSUED FOR TENDER
A	FEB 7, 2014	D.A.B.	C.R.	ISSUED FOR 90% CLIENT REVIEW
REVISIONS				

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No. 4559 Expiry: April 30, 2015



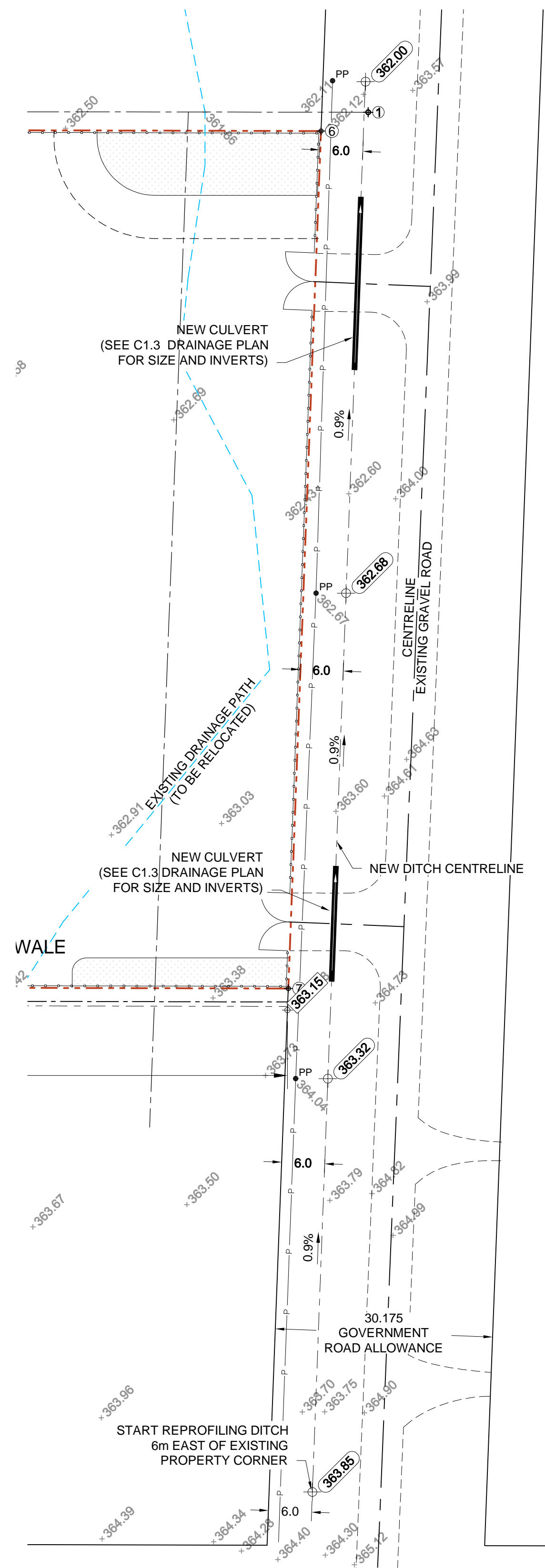
DESIGNED BY: C.R.
REVIEWED BY: D.A.B.
DRAWN BY: C.R.
PROJECT START DATE: DEC 12, 2013
PLOT SIZE: A1 (594x841)
SCALE: AS NOTED

PROJECT NAME:
**ROCKY MOUNTAIN EQUIPMENT
CIVIL SITE DESIGN
NEEPAWA, MB (SE 34-14-15W)**

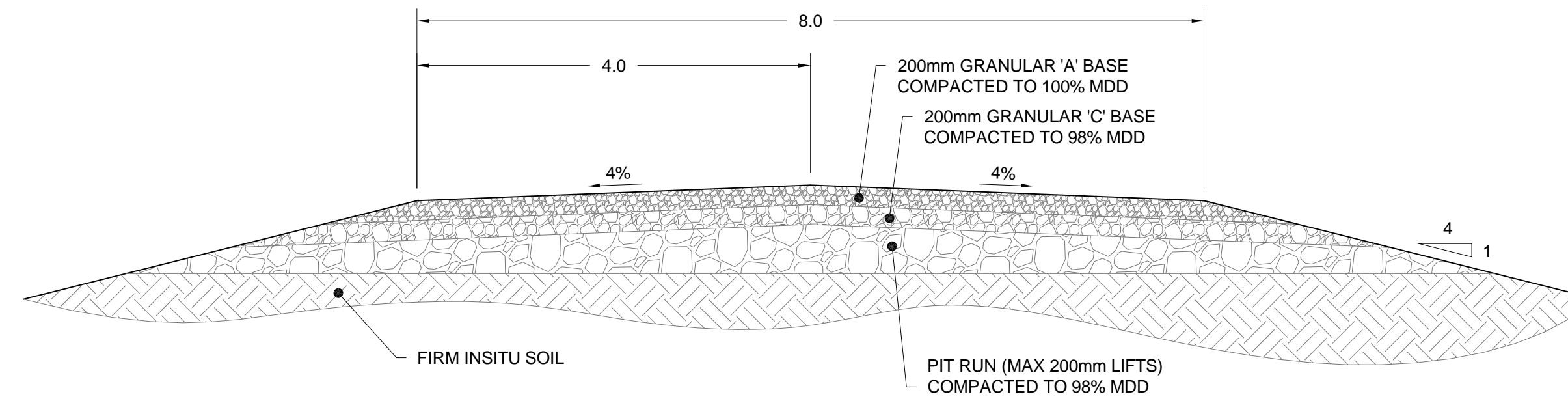
**BURNS MAENDEL
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1331 Princess Ave.
Brandon, Manitoba
R7A 0R4
Tel: (204) 728-7364
Fax: (204) 728-4418

DRAWING TITLE:
TREATMENT MOUND DETAILS

PROJECT NUMBER: **BMCE-13-159**
DRAWING NO: **C2.1**



EAST DITCH DETAIL
SCALE: 1:500



DRIVEWAY DETAIL
SCALE: 1:50

NOTE:

THE FOLLOWING MATERIAL QUANTITIES PERTAIN TO THE DEVELOPED GRAVEL SITE AND ARE BASED ON IN PLACE COMPACTED VOLUMES.

MATERIAL QUANTITIES	
CUT (WASTED MATERIAL)	5,640 m ³
A-BASE (1)	4,030 m ³
C-BASE (2)	3,660 m ³
PIT RUN	8,670 m ³
TOPSOIL STRIPPING (3)	480 m ³

- 1) A-BASE QUANTITY INCLUDES 200mm FOR SURFACE PARKING/DRIVEWAYS AND 150mm UNDER THE BUILDING SLAB.
- 2) C-BASE QUANTITY INCLUDES 200mm FOR SURFACE PARKING AND DRIVEWAYS.
- 3) TOPSOIL STRIPPING QUANTITY IS FOR AN ASSUMED 50mm TOPSOIL DEPTH AND EXCLUDES THE SURVEYED AREA WHERE TOPSOIL HAS ALREADY BEEN REMOVED.
- 4) QUANTITIES DO NOT INCLUDE SWALE ON SOUTH TOWN OF NEEPAWA PROPERTY.

GEOTECHNICAL RECOMMENDATIONS FOR GRAVEL SURFACES

THE FOLLOWING GEOTECHNICAL RECOMMENDATIONS ARE FOR HEAVY TRUCK TRAFFIC AND PERTAIN TO THE STRUCTURE AND CONSTRUCTION SEQUENCE FOR GRAVEL SURFACE PARKING LOTS AND DRIVEWAYS:

- 1) EXCAVATE ALL VEGETATION, ORGANICS, SILT AND SOFT SOILS FROM THE SURFACE TO THEIR FULL DEPTH WITHIN THE FOOTPRINTS OF THE PARKING LOTS AND DRIVEWAYS; CONTINUE TO EXCAVATE (AS REQUIRED) TO OBTAIN THE MINIMUM DEPTH OF 450mm BELOW THE TOP OF FINAL GRAVEL SURFACE DESIGN ELEVATION.
- 2) THE SUB-GRADE SOIL AT THE BASE OF THE EXCAVATION MUST CONSIST OF NATIVE SAND, AND MUST BE FREE OF ORGANIC CONTENT.
- 3) THE EXCAVATED SAND SOIL WILL NOT LIKELY BE SUITABLE TO RE-USE AS BASE AND SUB-BASE MATERIALS FOR ROAD CONSTRUCTION. ANY EXCAVATED AND STOCKPILED SAND MUST BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT AS BASE OR SUB-BASE.
- 4) COMPACT THE UPPER 300mm OF THE SUB-GRADE USING A SMOOTH FACED ROLLER TO A MINIMUM OF 95% MAXIMUM DRY DENSITY (MDD) NEAR OPTIMUM MOISTURE CONTENT.
- 5) SOFT AREAS SHALL BE SUB-EXCAVATED AN ADDITIONAL 300mm FOLLOWED BY PLACEMENT OF A GEOTEXTILE (MIRAFI HP370 WOVEN OR EQUIVALENT) AND THEN 50mm TO 150mm OF GRANULAR SUB-BASE MATERIAL IN A SINGLE LIFT FOLLOWED BY LIGHT COMPACTION WITH A SMOOTH FACED ROLLER (NON-VIBRATORY MODE). THE SUB-GRADE SHOULD BE INSPECTED BY THE ENGINEER PRIOR TO PLACEMENT OF GEOTEXTILES OR SUB-BASE.
- 6) PLACE PIT RUN (AS REQUIRED) IN MAXIMUM 200mm LIFTS COMPACTED TO 98% MDD.
- 7) PLACE 200mm GRANULAR 'C' BASE COMPACTED TO 98% MDD.
- 8) PLACE 200mm GRANULAR 'A' BASE COMPACTED TO 100% MDD.

NO.	DATE	APP.	BY	DESCRIPTION
1	JULY 7, 2014	D.A.B.	C.R.	MOVED WATER SERVICE DETAIL TO C2.3
0	MAY 30, 2014	D.A.B.	C.R.	ISSUED FOR CONSTRUCTION
REVISIONS				

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No. 4559 Expiry: April 30, 2015



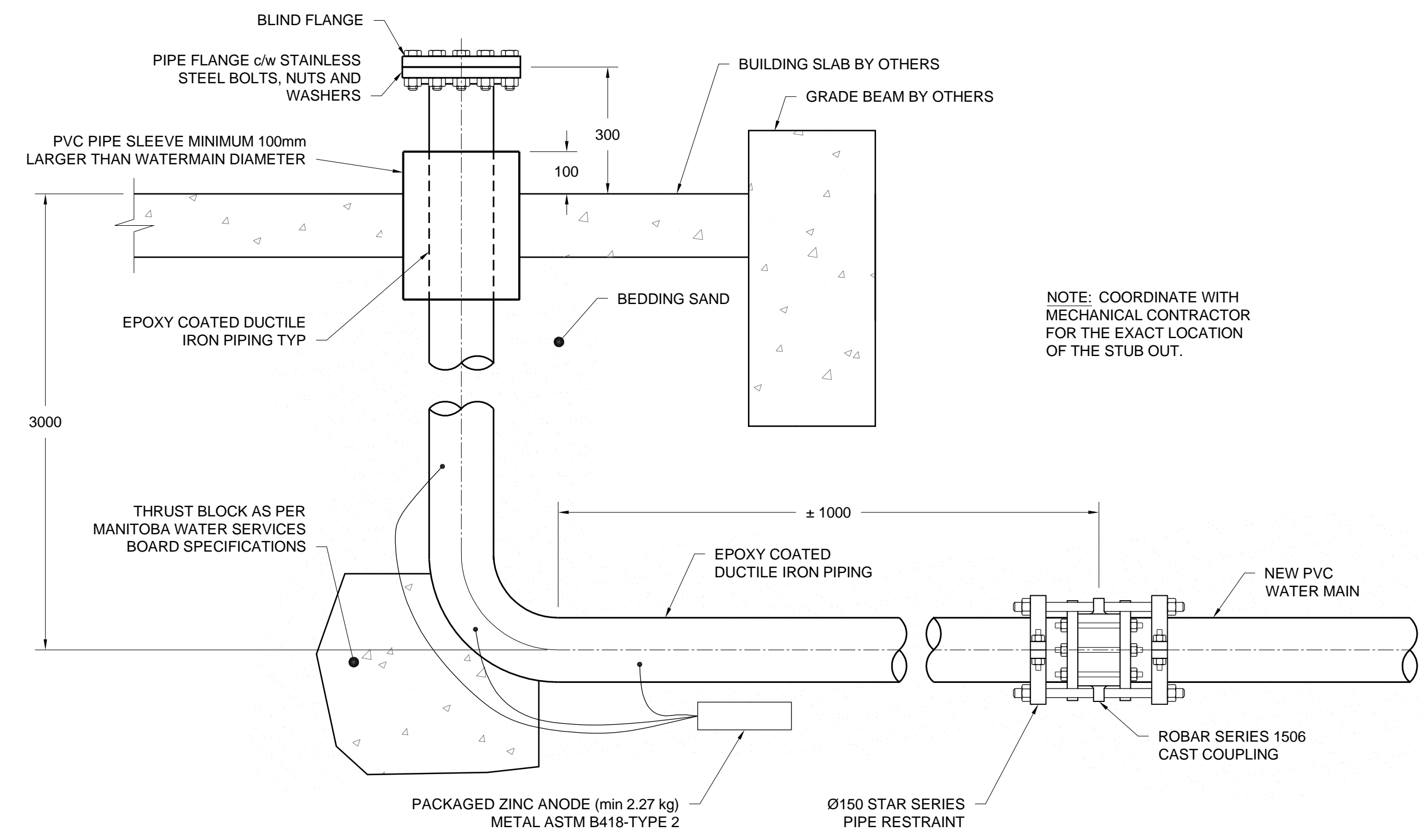
DESIGNED BY: C.R.
REVIEWED BY: D.A.B.
DRAWN BY: C.R.
PROJECT START DATE: DEC 12, 2013
PLOT SIZE: A1 (594x841)
SCALE: AS NOTED

PROJECT NAME:
**ROCKY MOUNTAIN EQUIPMENT
CIVIL SITE DESIGN
NEEPAWA, MB (SE 34-14-15W)**

**BURNS MAENDEL
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Brandon, Manitoba
R7A 0R4
Tel: (204) 728-7364
Fax: (204) 728-4418

DRAWING TITLE:
**GRAVEL SURFACE
AND DITCH DETAIL**

PROJECT NUMBER: **BMCE-13-159**
DRAWING NO: **C2.2**



WATER SERVICE ENTRANCE DETAIL
SCALE: 1:10

NO.	DATE	APP.	BY	DESCRIPTION
1	DEC 18, 2014	D.A.B.	C.R.	REMOVED EFFLUENT PIPE AND BASIN ASSEMBLY; REMOVED DISTRIBUTION HUB SECTION
0	JULY 7, 2014	D.A.B.	C.R.	ADDED SANITARY SYSTEM DETAILS
REVISIONS				

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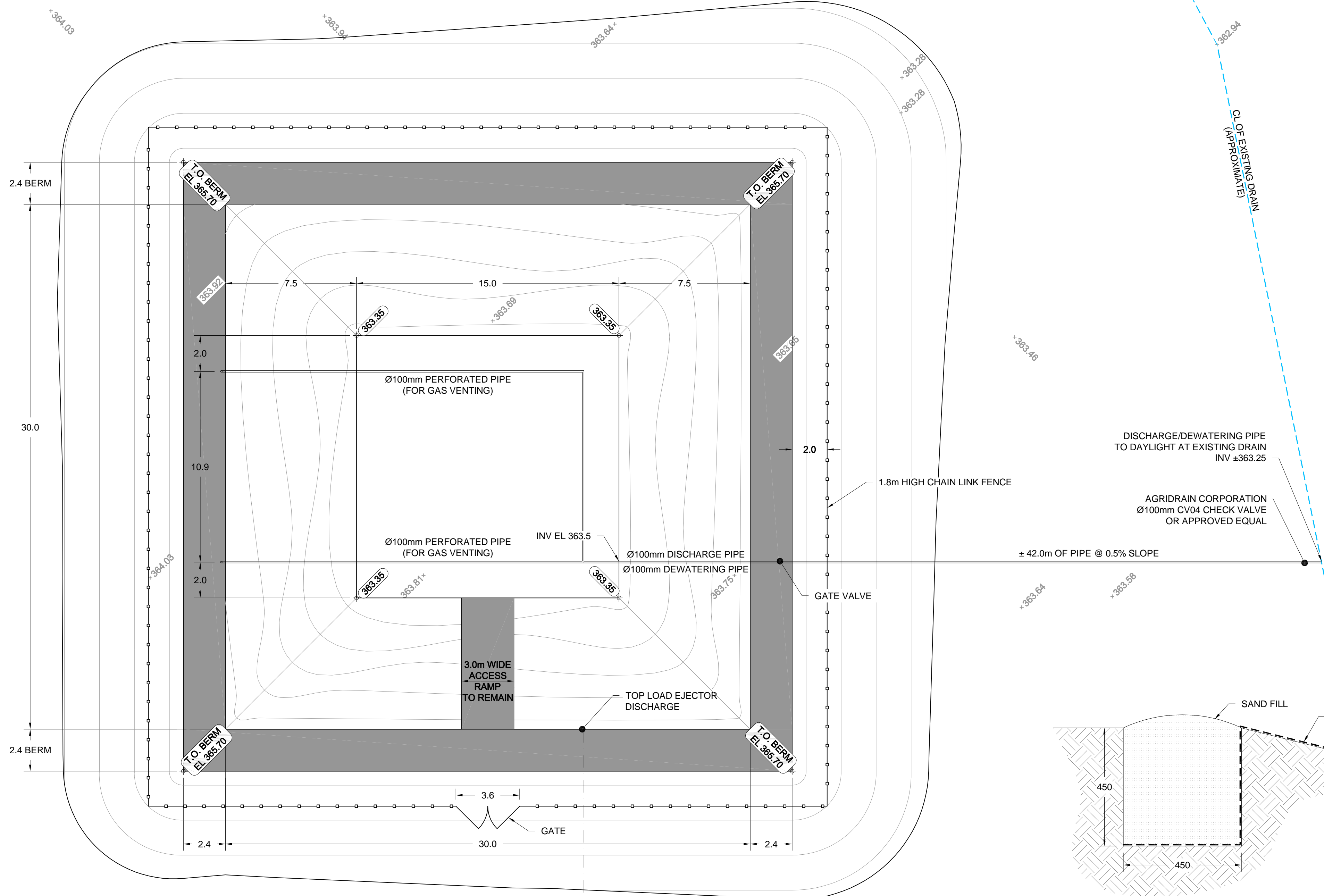
DESIGNED BY: C.R.
REVIEWED BY: D.A.B.
DRAWN BY: C.R.
PROJECT START DATE: DEC 12, 2013
PLOT SIZE: A1 (594x841)
SCALE: AS NOTED

PROJECT NAME:
**ROCKY MOUNTAIN EQUIPMENT
CIVIL SITE DESIGN
NEEPAWA, MB (SE 34-14-15W)**

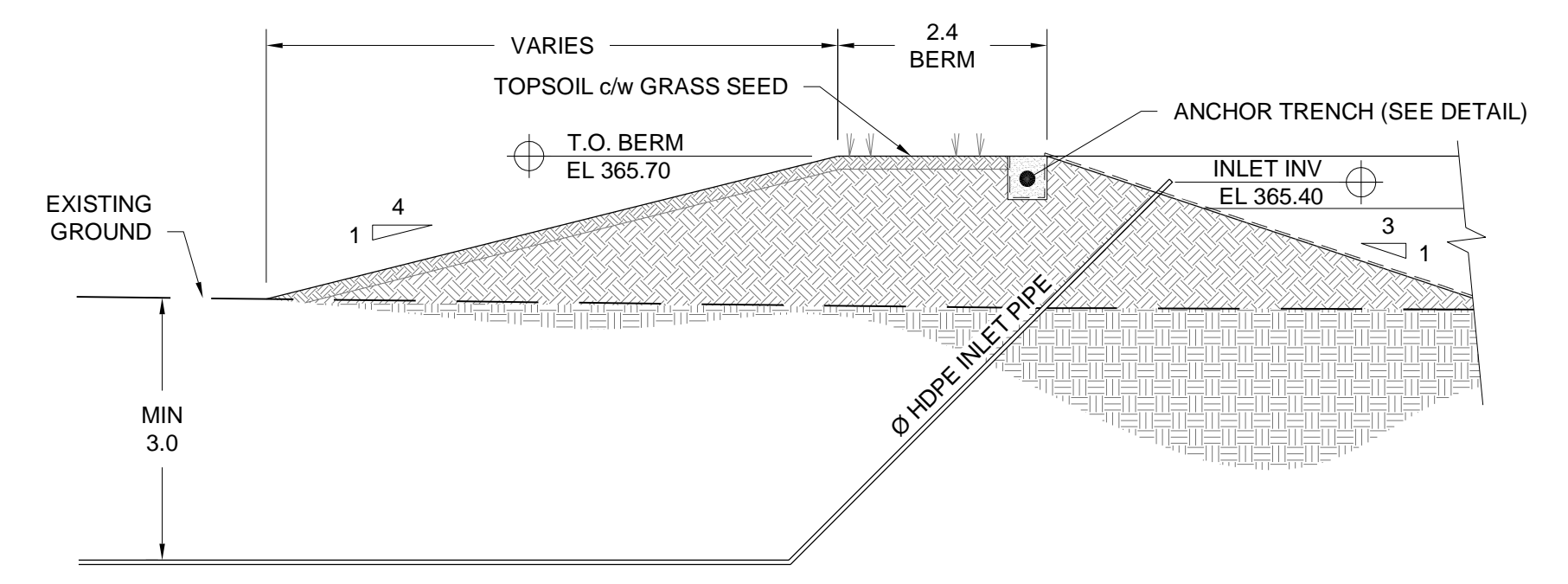
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Brandon, Manitoba
R7A 0R4
Tel: (204) 728-7364
Fax: (204) 728-4418

DRAWING TITLE:
SEWER AND WATER DETAILS

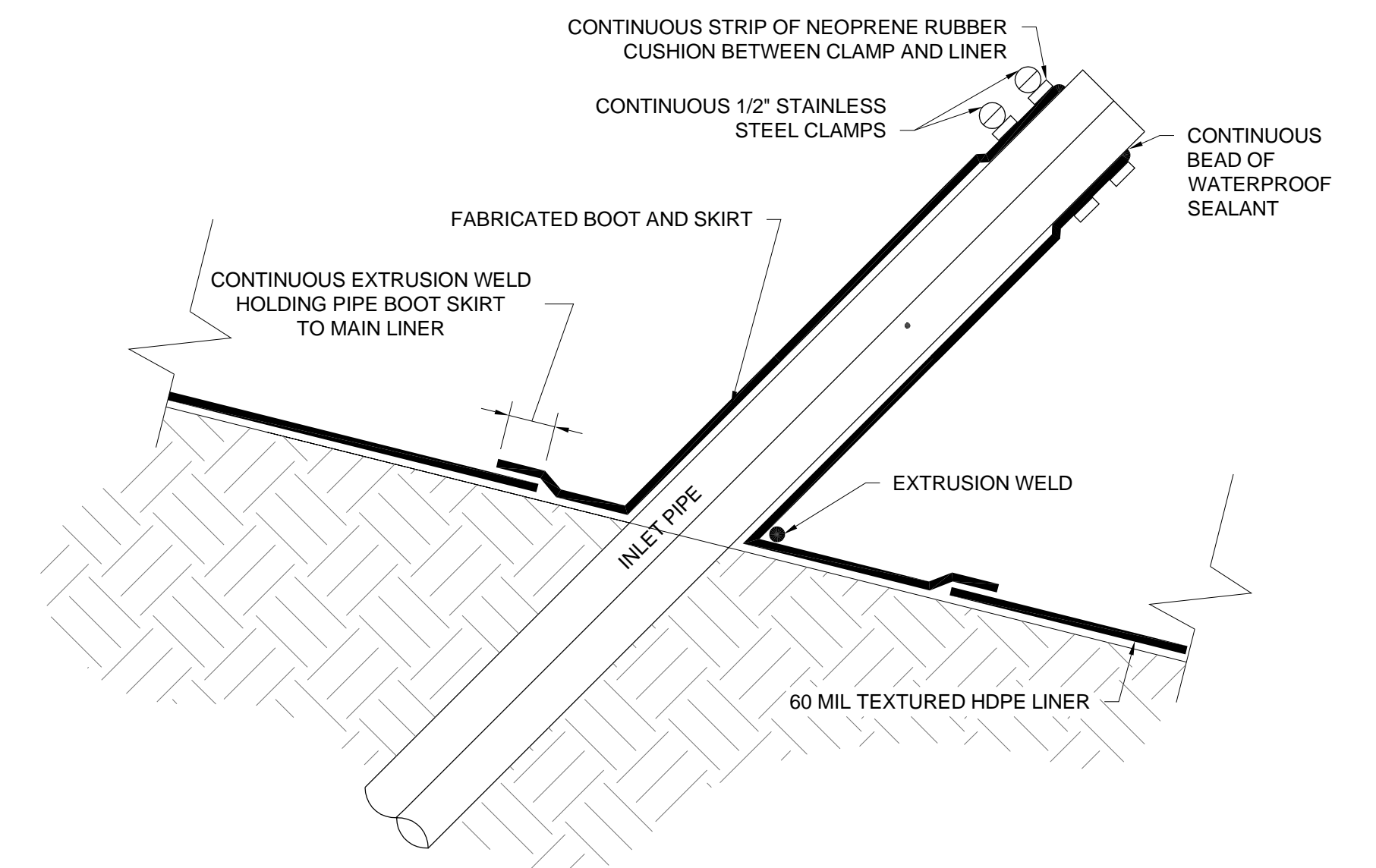
PROJECT NUMBER: **BMCE-13-159**
DRAWING NO: **C2.3**



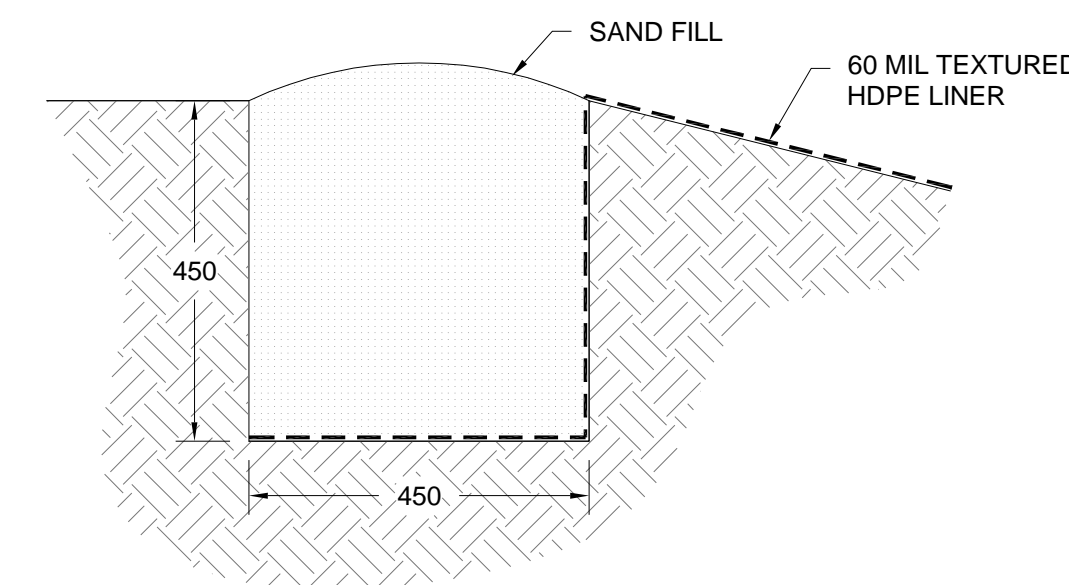
LAGOON PLAN VIEW
SCALE: 1:150



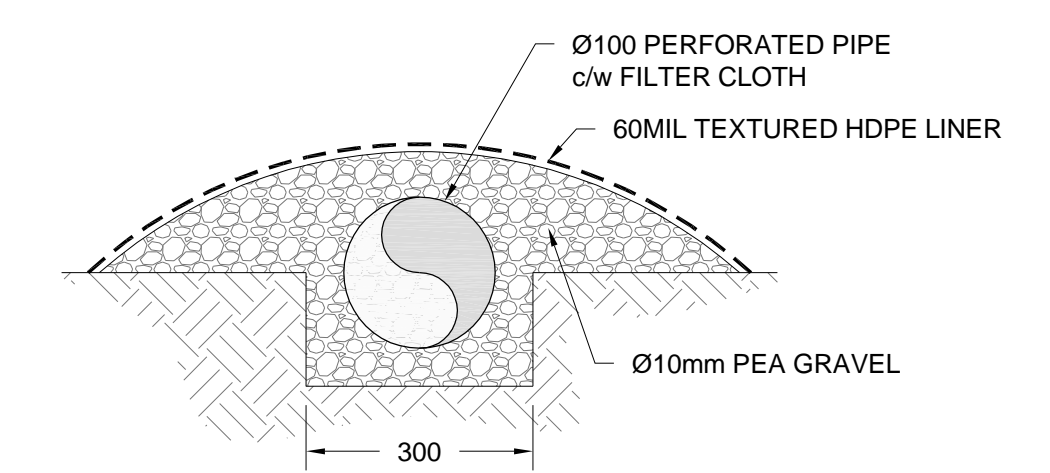
INLET DETAIL
SCALE: 1:75



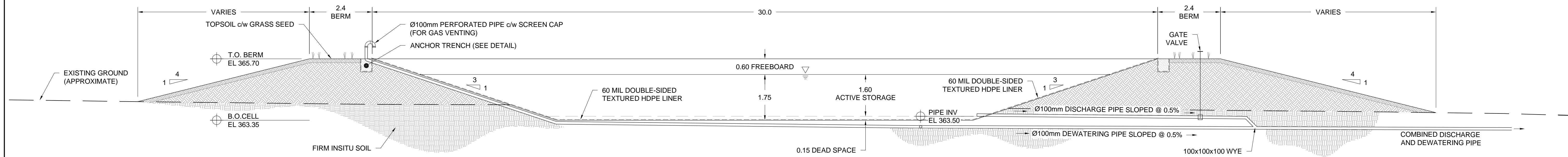
PIPE BOOT DETAIL
SCALE: 1:10



LINER ANCHOR DETAIL
SCALE: 1:10



DEWATERING PIPE DETAIL
SCALE: 1:10



LAGOON CROSS SECTION
SCALE: 1:75

NO.	DATE	APP.	BY	DESCRIPTION
0	DEC 18, 2014	D.A.B.	C.R.	ISSUED FOR PERMIT
A	DEC 11, 2014	D.A.B.	C.R.	ISSUED FOR PRICING
REVISIONS				

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No. 4559 Expiry: April 30, 2015



DESIGNED BY: J.A.
REVIEWED BY: D.A.B.
DRAWN BY: C.R.
PROJECT START DATE: DEC 9, 2014
PLOT SIZE: A1 (594x841)
SCALE: AS NOTED

PROJECT NAME:
**ROCKY MOUNTAIN EQUIPMENT
CIVIL SITE DESIGN
NEEPAWA, MB (SE 34-14-15W)**

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R7A 0R4
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Fax: (204) 728-4418

DRAWING TITLE:
**SEDIMENTATION LAGOON
AND CROSS SECTION**

PROJECT NUMBER: **BMCE-13-159**
DRAWING NO: **C2.4**