GEOHAZARD ASSESSMENT PROGRAM

NORTH CENTRAL REGION – ATHABASCA

2017 INSPECTION

THURBER ENGINEERING LTD.

Site Number	Location	Hwy	Km
NC 004-1	Town of Athabasca	55:10 and 813:02 Intersection	Hwy 55:10: km 0.34 to 0.84 Hwy 813:02: km 0.00 to 1.97
Legal Description		**UTM Co-ordinates (NAD 83)**	
21-066-22 W4M		12 E 6066180	N 353385

	Date	PF	CF	Total
Previous Inspection:	May 18, 2016	12	4	48
Current Inspection:	May 17, 2017	12	4	48
Road AADT:	9100		**Year:**	2016
Inspected By:	Tarek Abdelaziz, José Pineda (Thurber) Roger Skirrow, Arthur Kavulok, Ron Hilligas, Paula Campbell (TRANS)			
Report Attachments:	☑ Photographs ☑ Plans ☑ Maintenance Items			

Primary Site Issue:	Light to severe erosion of Hwy 55 highway side slopes/ditches, Hwy 813 south ditch, and the NE and NW corners of the Tawatinaw River bridge (BF1517-2) approach fill side slopes	
Dimensions:	Refer to attached drawings and notes below	
Maintenance:	**May 2015:** Hwy 55 south side slope: TRANS placed cold mix along the shoulder of the side slope to fill in erosion gully. Hwy 55 south ditch: TRANS placed Class 1M riprap along a short section of the ditch, and installed synthetic ditch barriers. TRANS placed an ACP patch on Hwy 55 to correct an area of settlement that had occurred over the former Tawatinaw River channel. **September 2015:** TRANS lined the eroded south ditch of Hwy 55 with Class 1 M riprap between Gabion weirs G4 and G9, backfilled the two 900 mm holes near existing light standards, lined the existing swale between 50 Ave and the south ditch of Hwy 55 with Class 1 M riprap, installed additional synthetic ditch barriers in Hwy 55 south ditch, and repaired the damaged guardrail section along the northwest corner of Hwy 813 and Hwy 55. **September 2016:** TRANS backfilled existing erosion gullies at the NE and the NW corners of the Bridge with gravel.	
Observations:	**Description**	**Worse?**
☐ Pavement Distress	N/A	☐
☐ Slope Movement	N/A	☐
☑ Erosion	Slight to severe erosion gullies between the widely-spaced gabion weirs installed in the ditches of Hwy 55 and Hwy 813; rill erosion in the south and north side slopes of Hwy 55, along the side slope of the Hwy 813 tie-in to Hwy 55, the northwest side slope of the intersection of Hwy 55 and 43 St.; severe erosion gully along the NE corner of the bridge side slope; erosion beside and below the existing drain trough at the NW corner of the bridge; existing riprap-lined bowl at the outlet of the bridge NE corner drain trough is full of sediment	☐

☐ Seepage	N/A	☐
☑ Bridge/Culvert Distress	Some fill settlement has occurred around the Hwy 55 south ditch manhole/drop pipe that drains the median ditch to the storm sewer pipe	☐
☑ Other	Slight damage in the sides of the Hwy 55 north ditch G14 and G17 wire baskets (a few rocks came out of the baskets); sections of the existing guardrail at the NE corner of the bridge area got damaged again; low area (filled with water) in the highway 55 south ditch to the west of the manhole/drop pipe	☐

Instrumentation: (1PN)
The slope inclinometers installed at this site were either sheared off prior to construction or damaged during the construction of the intersection improvement project.

The only operational pneumatic piezometer (PN04-2) located in the south ditch of Hwy 55 indicates that the groundwater level at this location is about 3.4 m below existing ground surface.

Assessment:

The site condition did not change significantly since the last site visit completed in 2016.

The erosion that has been occurring along the side slopes is due to concentrated runoff flowing over bare slopes in sandy soils. Hwy. 55 and Hwy. 813 have curved alignments at the areas of concern with super elevations that concentrate and directs runoff to the side slopes. The side slopes are generally bare of vegetation, possibly due to salting of the hill sections of Hwy 55 and Hwy 813.

The sandy soil, that is present in the side slope and median ditch bottoms, is highly susceptible to erosion when left in a bare, unprotected condition and exposed to concentrated runoff. Similar ground conditions have performed much better in other areas on site where runoff occurs as sheet flow rather than a concentrated flow.

The existing gabion type rock weirs installed in the bottom of the Hwy. 55/50 Ave. median ditch are spaced quite far apart (about 25 to 30 m). The ditch gradient is relatively steep (approximately 6 to 8 percent) and the existing weirs should have been placed at a closer spacing to prevent erosion from taking place. Otherwise, heavy armouring of the ditch bottom should have been provided between the widely-spaced weirs. The erosion control blanket placed between the weirs provided a temporary erosion control measure and a more robust permanent erosion control measure should have been considered to provide a long-term protection against erosion.

The median ditch between Hwy. 813 and Hwy. 55 has a steep gradient near the top of the hill (inclined at approximately 9 percent); however, the closely spaced weirs, which are about 7 m apart, performed relatively well with little to no significant signs of erosion between the weirs below the ECB. Severe erosion was however noted between the 25 to 30 m apart weirs within the flatter gradient of the ditch (inclined at approximately 5 to 6 percent) near the bottom of the hill.

A few of the existing riprap channels in the south ditch of Hwy 55 are not well defined (i.e. appears to be flat) with no riprap along the ditch slopes and this could result in severe erosion developing near the edges of the riprap. The swale between 50 Ave and Hwy 55 south ditch was not provided with adequate thickness of Class 1 M riprap in addition to the presence of bare spots between the rocks. This deficiency could result in future erosion issues within the bottom and the sides of the swale.

The concentrated runoff occurring at the northwest corner of the intersection of Hwy 55 and Hwy 813 (i.e. at the NE corner of the bridge) created 1 m deep and 1 m wide deep erosion gullies down the side slope. The existing erosion beside and below bridge NW corner drain trough indicates that the drain trough should have been designed with a wider taper to accommodate surface flow from the highway surface.

The damage occurred in the wire mesh of the G14 and G17 baskets could be attributed to localized settlement of fill below the affected baskets resulting is excessive stretching and failure of the wires.

The top of the catch basin, located at the outlet of the bridge NW corner drain trough, is lower than the bottom of the riprap-lined dissipation bowl by at least 300 mm. Sand, salt and erosion debris accumulate within the bowl and fall into the catch basin. The catch basin, which is connected to the river through a 300 mm diameter outflow pipe, is likely full of sediment and needs to be cleaned to prevent the transport of sediment into the river.

Recommendations:

Thurber completed a detailed designed to address the erosion issues occurring at this site. Alberta Transportation has tendered and awarded this project and the construction is scheduled to be completed in the fall of 2017.

The issued for construction drawings are attached at the end of this report. In general, the repairs consist of the following:

1. **South of HWY 55:** The existing 150 mm thick Class 1M riprap in the ditch and the 50 Ave swale will be salvaged; erosion gullies in the ditch will be repaired by removing all debris and backfilling eroded surfaces with compacted clay; the ditch and swale will be slightly regraded to build well defined channels; the south ditch and the 50 Ave swale will be lined with 300 mm thick Class 1M riprap and/or Flexamat; eroded bare side slopes will be track packed to fill in erosion rills, slightly regraded and covered with a compost blanket and TRM type C.

2. **North of HWY 55 and south of HWY 813:** Eroded bare side slopes will be track packed to fill in erosion rills, slightly regraded and covered with a compost blanket and or Flexamat. Existing gullies between gabion baskets will be repaired and the ditches will be lined with either riprap or TRM type C. Damaged gabion baskets will be repaired; fillcrete will be used to backfill erosion developed below G6 in the Hwy 55 north ditch and below the Hwy 813 culvert outlet.

3. **NE and NW corners of Tawatinaw River Bridge:** Existing drain trough and dissipation bowl located west of the bridge will be upgraded and a new drain trough and dissipation bowl will be installed on the east side of the bridge. Slope regarding and rill repairs will also be completed east of the bridge.

H:\13000\13357 Geohazard Assessment - Athabasca (CON0017605)\Drafting\JGP\2017\13357-NC004-1.dwg - Layout1 - Sep. 06, 2017

LEGEND

- TEST HOLE LOCATIONS (2008)
- TEST HOLE LOCATIONS (2004)
- SLOPE INCLINOMETER
- CLASS 1M RIPRAP PLACED IN 2015
- BARE SLOPE
- GABION BASKET WEIR
- EXISTING OVERHEAD LIGHT
- ABANDONED LIGHT FOUNDATION HOLE TO BE BACKFILLED
- G DENOTES GABION BASKET
- (1) DIRECTION AND NUMBER OF PHOTO
- CB CATCH BASIN
- EROSION GULLY

N W E S

ATHABASCA RIVER

EDGE OF WATER

PROP R/W BDY

DIVERSION CHANNEL

4.0m GRAVEL PATHWAY

HWY 813 SOUTH DITCH GABION BASKETS ARE 25m APART, MINOR EROSION IN THE DITCH BETWEEN A FEW OF THE BASKETS (2016), SAME IN 2017

GAP FORMED BELOW G6 (2016), SAME IN 2017

SEVERE EROSION GULLIES BELOW ECB TYPE C (2016) SAME IN 2017

HIGHWAY 813

G6 TO G31 GABION BASKETS AT 7m SPACING. SLIGHT DAMAGE IN THE SIDES OF G14 & G17 (2016), SAME IN 2017

HOLE 0.9m ϕ x 0.6m DEEP (AUG. 2015) BACKFILLED IN SEP. 2015

COLD MIX ASPHALT WAS PLACED TO SLOW EROSION OF SIDESLOPE (AUG. 2015) SAME IN 2016, 2017

DAMAGED GUARDRAIL REPAIRED (SEP. 2015) DAMAGED (2017)

1200mm Ø MH

ADDITIONAL EROSION RILLS DEVELOPED IN 2017

HIGHWAY 55

SEDIMENT ACCUMULATED IN THE RIPRAP LINED DISSIPATION BOWL AND FELL INTO THE CATCH BASIN

NW CORNER OF BF1517-2

NE CORNER OF BF1517-2

EROSION GULLY BELOW AND ALONG THE WEST FACING SIDE OF DRAIN TROUGH. EROSION GULLY BACKFILLED WITH GRAVEL

SPILL CONTAINMENT DITCH BLOCK WITH 300mm CSP PIPE

EROSION GULLIES BELOW ECB TYPE C (2016) SAME IN 2017

EROSION AT OUTLET OF PIPES (2016), SAME IN 2017

2-300mm ϕ STORM WATER LINES

1200mm Ø MH MH IS HIGHER THAN CULVERT OUTLET

1600mm Ø CSP STORM PIPE

LOW AREA; FILLED WITH WATER 8m WIDE x 8m LONG x 0.1m DEEP

TWO EROSION RILLS THAT WERE BACKFILLED IN 2015

G8 TRANSFORMER PEDESTAL

50 AVE.

EXISTING ROTARY TRAIL

1.95m WIDE PAVED SIDEWALK

45th ST.

43rd ST.

SCATTERED RIPRAP MIXED WITH DEBRIS- NEEDS TO BE REDONE (2016), SAME IN 2017

HOLE 0.9m ϕ x 0.4m DEEP (AUG. 2015) BACKFILLED IN SEP. 2015

UNLINED SWALE EXTENDING FROM END OF CONCRETE GUTTER TO MEDIAN DITCH. (AUG. 2015) LINED WITH CLASS 1M RIPRAP OVER NON-WOVEN GEOTEXTILE. (SEP. 2015) -AREAS BARE OF RIPRAP IN SWALE; NEED ADDITIONAL RIPRAP (2016), SAME IN 2017

EROSION NEAR EDGE OF RIPRAP. SAME IN 2017

RIPRAP CHANNEL NEEDS TO BE SHAPED. SAME IN 2017

END OF EXISTING CONCRETE CURB AND GUTTER OF 43 STREET

SEVERE EROSION GULLIES (2015) SAME IN 2016 GULLIES BACKFILLED WITH GRAVEL IN 2016. GULLIES REDEVELOPED IN 2017 (UP TO 1m WIDE AND 1m DEEP)

TAWATINAW RIVER

BF1517-2

NOTES:

1. HWY 55 SOUTH DITCH IS INCLINED AT 6~8%; HWY 55 NORTH DITCH IS INCLINED AT 5~9%.
2. ALBERTA TRANSPORTATION PLACED RIPRAP BETWEEN G4 AND G8 IN THE SOUTH DITCH IN SEP. 2015.
3. ALL GEOTECHNICAL INSTRUMENTS ARE DAMAGED EXCEPT FOR PN04-2.
4. MAY 17, 2017 SITE OBSERVATIONS ARE MADE IN RED.

0 20 40 60 80 m

SCALE 1:1500

BASE PLAN FROM THURBER DWG 17-308-379-6

Alberta Transportation

NORTH CENTRAL REGION (ATHABASCA AREA) 2017 GEOHAZARD ASSESSMENT

NC004-1: HWY 55:10 & HWY 813:02 INTERSECTION SITE PLAN SHOWING SITE FEATURES

DWG No. NC004-1

DRAWN BY	ML
DESIGNED BY	JGP
APPROVED BY	TSA
SCALE	1:1500
DATE	JULY 2017
FILE No.	13357

THURBER ENGINEERING LTD.

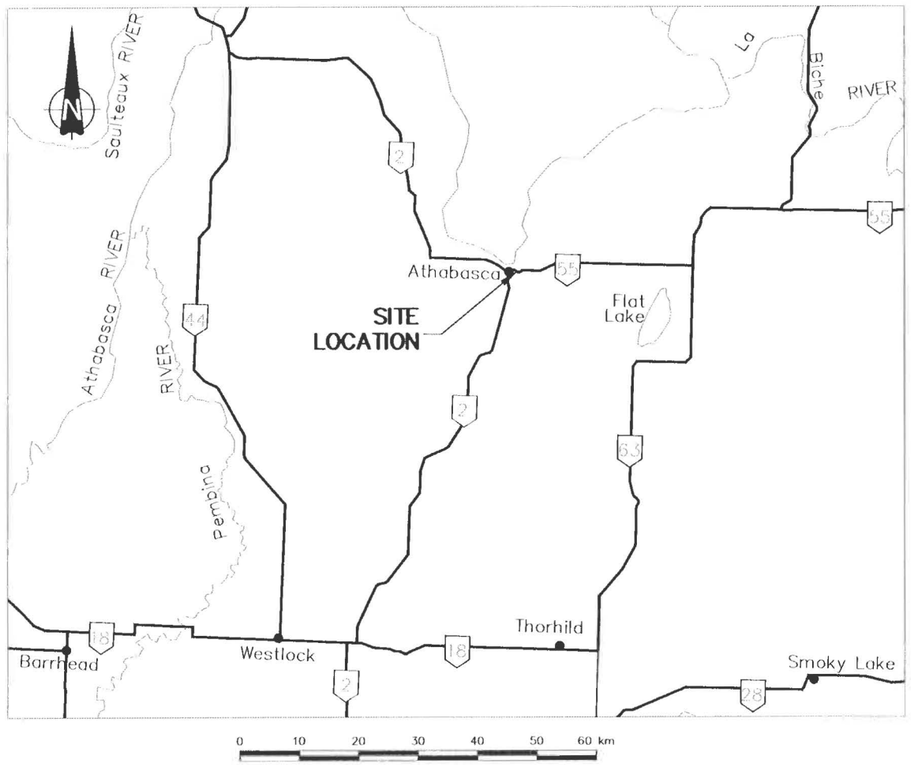
DRAWING RD-20772-P
HIGHWAY 55:10 813:02
CONTRACT 18901
DESCRIPTION PLANS of PROJECT No. 55:10 AND 813:02 EROSION REPAIRS AND OTHER WORK (NC004)
PHOTO
DATE
BY
SURVEYED
DEPARTMENT BAR CODE

PLANS of PROJECT No. 55:10 AND 813:02
EROSION REPAIRS AND OTHER WORK (NC004)

Alberta Transportation

HWY 55:10
km 0.34 to km 0.84

HWY 813:02
km 0.00 to km 1.97



SHEET	DESCRIPTION	DRAWING
	INDEX	
1	SITE LOCATION MAP	RD-20772-P
2	OVERALL SITE PLAN	RD-20773-P
3	DETAIL SITE PLAN-REPAIR AREA 1	RD-20774-P
4	DETAIL SITE PLAN-REPAIR AREA 2	RD-20775-P
5	DETAIL SITE PLAN-REPAIR AREA 3	RD-20776-P
6	DETAIL SITE PLANS-REPAIR AREAS 4 AND 5	RD-20777-P
7	CROSS-SECTIONS AND OTHER DETAILS	RD-20778-P
8	DETAIL SITE PLAN-REPAIR AREA 6	RD-20779-P
9	FLEXAMAT INSTALLATION DETAILS	RD-20780-P
10	TAWATINAW RIVER BRIDGE ON HIGHWAY 55 NW DRAIN TROUGH	RD-20781-P
11	TAWATINAW RIVER BRIDGE ON HIGHWAY 55 NE DRAIN TROUGH	RD-20782-P

NOTES:

ALL LOCATIONS ARE APPROXIMATE
AND SUBJECT TO REVISION OR DELETION.
THE INFORMATION PERTAINING TO THE DATA AS SHOWN HAS BEEN
COMPILED FOR THE USE OF ALBERTA TRANSPORTATION AND UTILITIES.
NO RESPONSIBILITY WILL BE ASSUMED BY THE DEPARTMENT FOR THE
CORRECTNESS OR COMPLETENESS OF THE DATA SHOWN AND,
SHOULD ANY SUCH DATA BE FOUND INCORRECT OR INCOMPLETE,
THE CONTRACTOR SHALL HAVE NO CLAIM ON THAT ACCOUNT.
THE GRADING LIMITS ON THESE PLANS REFER
TO PERMANENT CONSTRUCTION. TEMPORARY TRANSITIONS
MAY EXTEND BEYOND THESE LIMITS.

CONTRACT No. 18901
ISSUED FOR CONSTRUCTION

THURBER ENGINEERING LTD.

DRAWING: RD-20773-P
HIGHWAY: 55:10, 813:02
CONTRACT: 18901
DESCRIPTION: HWY 55:10 AND HWY 813:02 INTERSECTION IN ATHABASCA OVERALL SITE PLAN
PHOTO
DATE
SURVEYED
DEPARTMENT BAR CODE

2 ADDITIONAL RILL REPAIR AREAS:
AT km 1.57 RIGHT SIDESLOPE
AND AT km 1.92 – 1.97 LEFT
SIDESLOPE AND DITCH. COVER
REPAIRED SURFACE WITH
COMPOST BLANKET

ATHABASCA RIVER
EXISTING R/W BDY
REPAIR AREA 1
(SEE DWG RD-20774-P)
REPAIR AREA 2
(SEE DWG RD-20775-P)
REPAIR AREA 3
(SEE DWG RD-20776-P)
REPAIR AREA 4
(SEE DWG RD-20777-P)
REPAIR AREA 5
(SEE DWG RD-20777-P)
REPAIR AREA 6
(SEE DWG RD-20779-P)
HWY 813:02
43 ST
50 AVENUE
50 AVE
HWY 55:10
BF 1517-2
BF 1517-3
0+455.500 ℄ HWY 55
-10+000.000 ℄ 50th AVE
-1+000.000 ℄ HWY 813:02
48 ST
47 ST
46 ST
45 ST
44 ST
43 ST
SW21-66-22-4
TOWN OF ATHABASCA
TAWATINAW RIVER
21" SEWER TO DISCHARGE INTO ROCK RIPRAP
CBMH INLET
0+200
0+400
0+600
0+700
0+800
0+900
1+000
1+100
1+200
1+300
1+400
1+500
1+600
1+700
1+800
1+900
2+000

LEGEND
- COMPOST BLANKET (50mm THICKNESS) (NEW)
- TYPE C TRM (NEW)
- RIPRAP (EXISTING)
- GULLY
- EROSION RILL
- LIGHT POLE
- UNDERGROUND POWER FOR STREET LIGHTS
- TELUS (UNDERGROUND)
- FORTIS (UNDERGROUND)
- STORM SEWER
- 521 GROUND SURFACE CONTOUR IN METRES

NOTES:
UTILITY LOCATIONS PROVIDED ON THE CONTRACT DRAWINGS ARE APPROXIMATE AND FOR REFERENCE ONLY. THE CONTRACTOR SHALL CONFIRM THE LOCATION AND THE DEPTH OF ALL UTILITIES IN THE WORK AREA AND OBTAIN ANY PERMITS, AS DEEMED NECESSARY, FROM THE UTILITY OWNERS PRIOR TO CONSTRUCTION WORK.

OVERALL SITE PLAN
SCALE: 1:1250

0 10 20 30 40 50 60 70 m

CONSULTANT: THURBER ENGINEERING LTD.
PROJECT NO. 14382

PERMIT TO PRACTICE
Thurber Engineering Ltd.
PERMIT NUMBER: P 5186
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

DESIGNER: PROFESSIONAL ENGINEER ALBERTA, ORIGINAL STAMPED AND SIGNED BY K. ENGESE ON JUNE 2, 2017, P.ENG, DATE

CHECKER: PROFESSIONAL ENGINEER ALBERTA, ORIGINAL STAMPED AND SIGNED BY L.ABDELAAZIZ ON JUNE 2, 2017, P.ENG, DATE

REV	DATE	REVISION	BY
5			
4			
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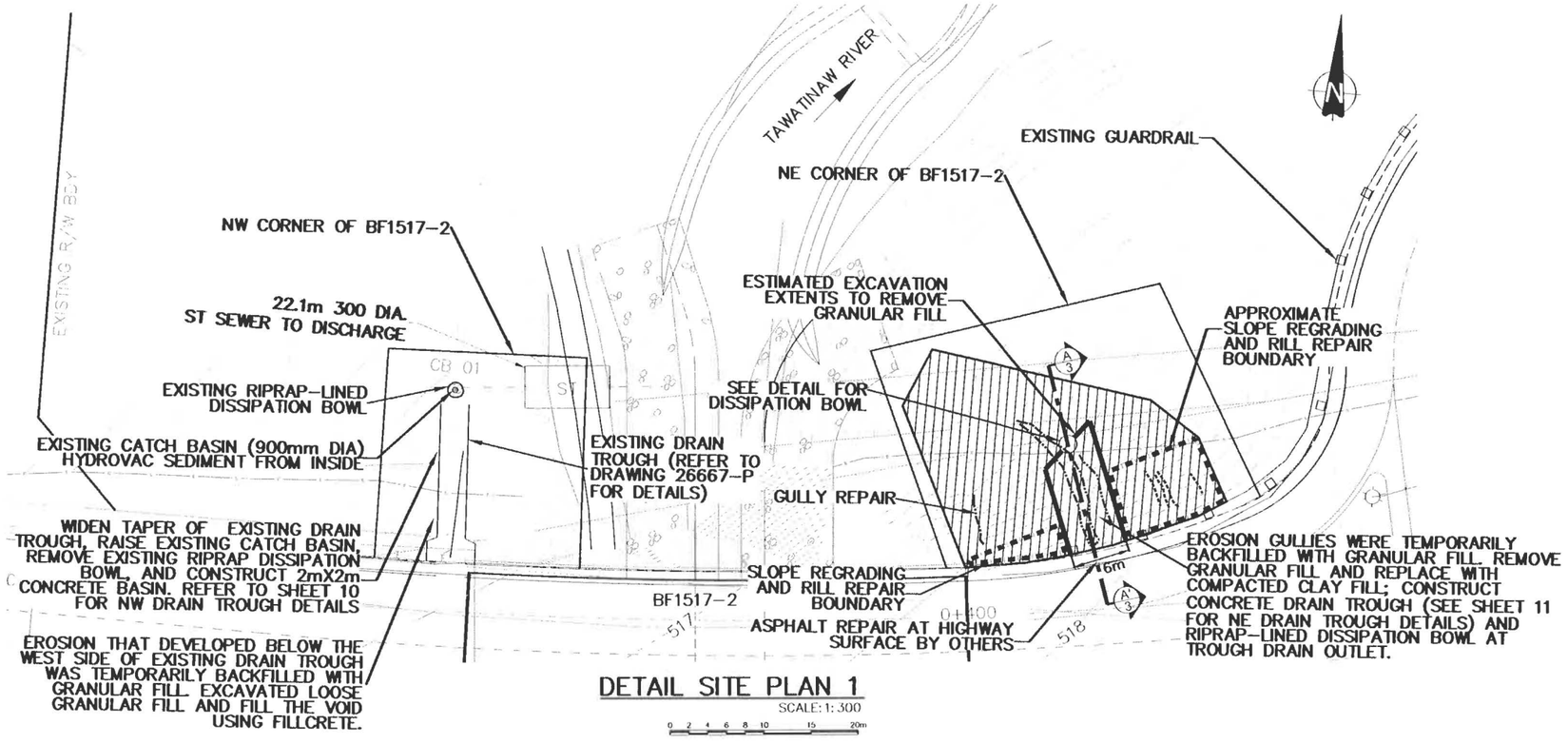
2			
1			

Alberta Transportation

HWY 55:10 AND HWY 813:02 INTERSECTION IN ATHABASCA
OVERALL SITE PLAN

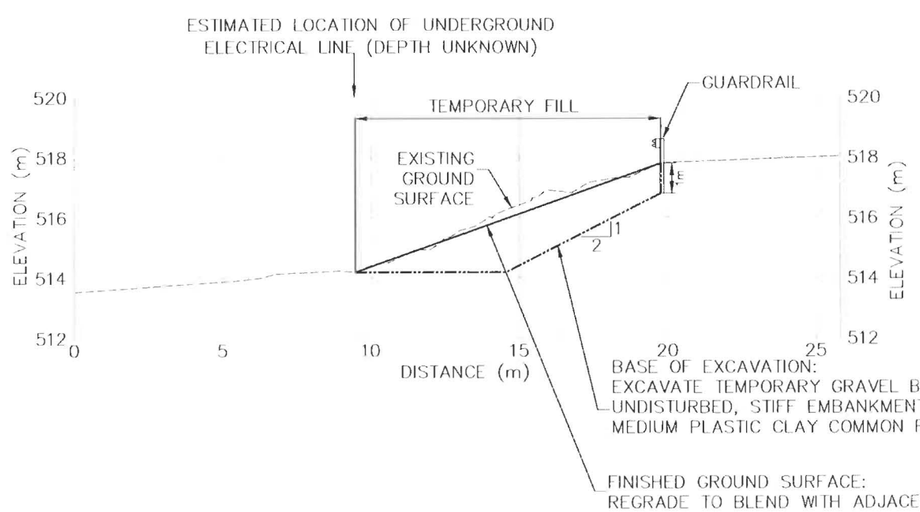
DATE	LOCATION	SITE	CONTRACT	HIGHWAY	SHEET	DRAWING
2017-04-04	ATHABASCA	NC004	18901	55:10, 813:02	2 OF 11	RD-20773-P



DETAIL SITE PLAN 1

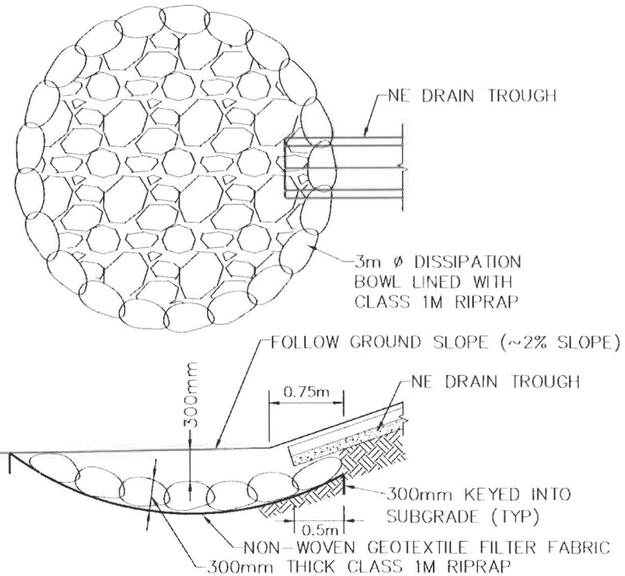
SCALE: 1:300

0 2 4 6 8 10 15 20m



A/3 CROSS-SECTION

SCALE: 1:100



DISSIPATION BOWL DETAIL

SCALE: 1:30

NOTES:
1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROTECT EXISTING GUARDRAIL DURING THE CONSTRUCTION OF THE REPAIRS. PORTIONS OF THE GUARDRAIL IN THE VICINITY ARE ALREADY DAMAGED. THE CONTRACTOR IS RESPONSIBLE FOR REPLACING THOSE SECTIONS DAMAGED BY HIS OPERATIONS AT HIS COST TO THE SATISFACTION OF THE CONSULTANT .
2. THE EXISTING OUTLET OF THE BRIDGE DRAIN PIPE LOCATED TO THE WEST OF THE NW DRAIN TROUGH SHALL BE PROTECTED BY THE CONTRACTOR AND REPLACED BY THE CONTRACTOR AT HIS COST IF DAMAGED DURING CONSTRUCTION.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONFIRM THE HORIZONTAL LOCATION AND DEPTH OF UTILITY LINES AND IMPLEMENT THE UTILITY OWNER'S REQUIREMENTS TO PROTECT SUCH FACILITIES.
4. DISTURBED AREAS SHALL BE COVERED BY 50mm THICK COMPOST BLANKET (ESCM BMP #37)

LEGEND
- COMPOST BLANKET (50mm THICKNESS) (NEW)
- RIPRAP (EXISTING)
- GULLY
- EROSION RILL
- LIGHT POLE
- UNDERGROUND POWER FOR STREET LIGHTS
- TELUS (UNDERGROUND)
- FORTIS (UNDERGROUND)
- STORM SEWER
- GUARDRAIL
- 521 GROUND SURFACE CONTOUR IN METRES

0 10 20 30 40 50 60 70 m

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DESIGNER: PROFESSIONAL ENGINEER ALBERTA, ORIGINAL STAMPED AND SIGNED BY K. FROESE ON JUNE 9, 2017, P.ENG.
CHECKER: PROFESSIONAL ENGINEER ALBERTA, ORIGINAL STAMPED AND SIGNED BY J. ANDELAZZ ON JUNE 9, 2017, P.ENG.

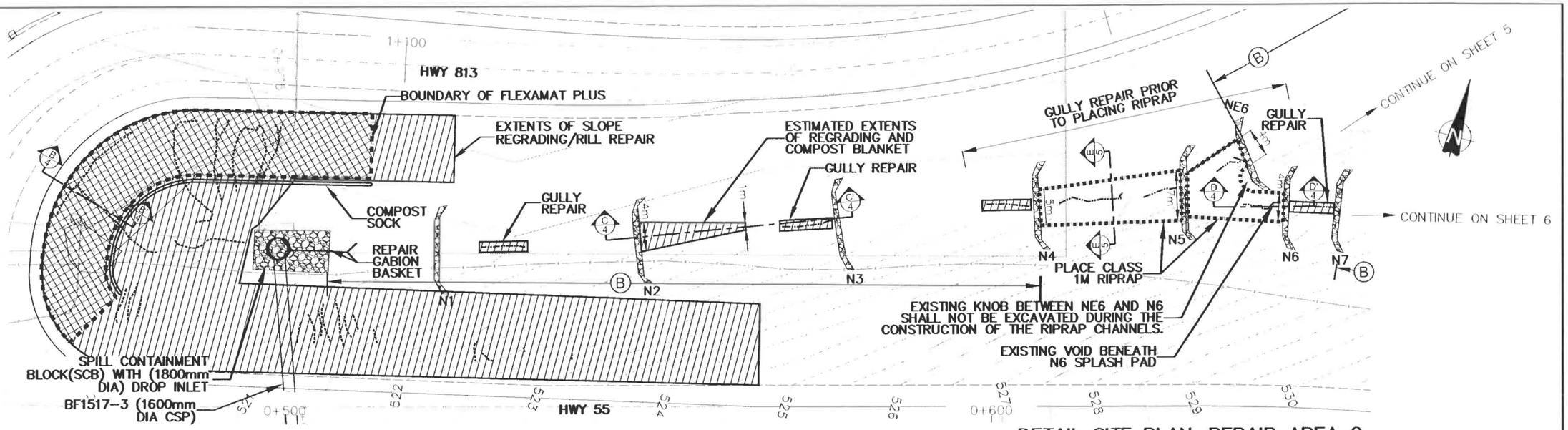
REV	DATE	REVISION	BY
5			
4			
3			
2			
1			

Alberta Transportation

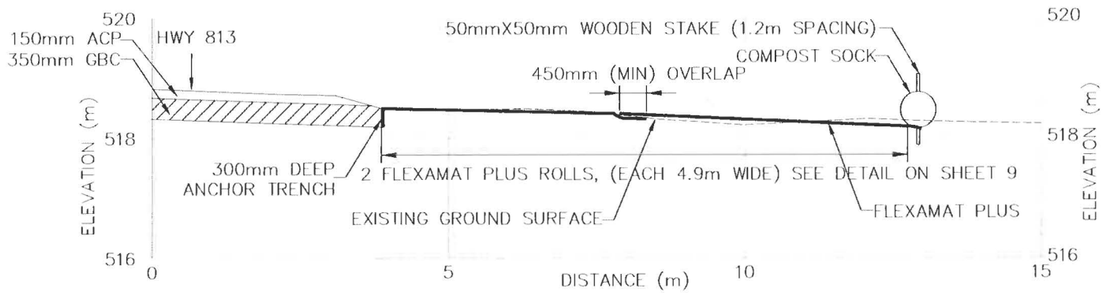
HWY 55:10 AND HWY 813:02 INTERSECTION IN ATHABASCA
DETAIL SITE PLAN – REPAIR AREA 1

DATE	LOCATION	SITE	CONTRACT	HIGHWAY	SHEET	DRAWING
2017-04-04	ATHABASCA	NC004	18901	55:10 813:02	3 OF 11	RD-20774-P

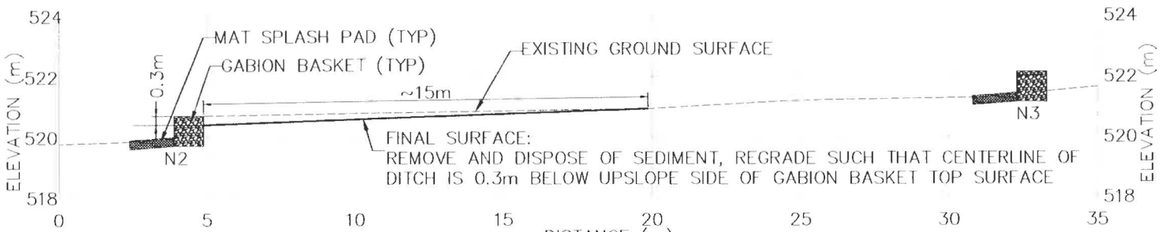
DRAWING RD-20774-P
CONTRACT 18901
HIGHWAY 55:10 813:02
DESCRIPTION HWY 55:10 AND HWY 813:02 INTERSECTION IN ATHABASCA DETAIL SITE PLAN – REPAIR AREA 1
PHOTO
DATE
BY
SURVEYED
DEPARTMENT BAR CODE



DETAIL SITE PLAN-REPAIR AREA 2
SCALE: 1:300



B/4 CROSS-SECTION B-B'
SCALE: 1:50



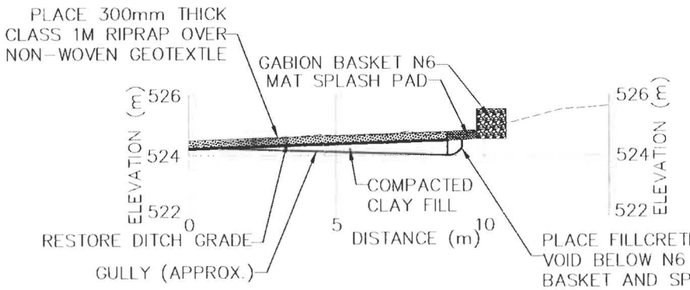
C/4 CROSS-SECTION C-C'
SCALE: 1:100

DETAIL B NOTES:
1. RILL REPAIR EXTENDS BENEATH FLEXAMAT PLUS AREA.
2. RILL REPAIR FOR THE SIDESLOPE WEST OF SCB SHALL ENSURE UNIFORM DRAINAGE TO CATCH BASIN .
3. DOWNSLOPE END OF FLEXAMAT PLUS SHALL BE LAPPED INTO DEPRESSION FOR COMPOST SOCK.
4. SEE ALBERTA TRANSPORTATION ESCM BMP #38 FOR SOCK INSTALLATION.

DETAIL C REGRADING NOTES:
1. STRIP TOPSOIL AND STOCKPILE WITHIN RIGHT- OF -WAY.
2. REGRADE DITCH BOTTOM. EXCAVATED MATERIAL TO BE RE-USED FOR GULLY FILL (IF SUITABLE) OR DISPOSED OF OFF SITE AS DIRECTED BY THE CONSULTANT.
3. COVER DISTURBED AREA WITH 50mm THICK COMPOST BLANKET (ESCM BMP #37).
4. DITCH SLOPES SHALL BE FIELD FIT TO MATCH ADJACENT SLOPES WITHIN THE EST. EXTENTS OF REGRADING.

LEGEND
- COMPOST BLANKET (50mm THICKNESS) (NEW)
- FLEXAMAT (NEW)
- RIPRAP BOUNDARY (NEW)
- RIPRAP (EXISTING)
- GULLY
- EROSION RILL
- LIGHT POLE
- UNDERGROUND POWER FOR STREET LIGHTS
- TELUS (UNDERGROUND)
- FORTIS (UNDERGROUND)
- 521 GROUND SURFACE CONTOUR IN METRES
- (B) TYPE C TRM TO BE PLACED CENTERED IN DITCH, 2 ROLLS (MIN 4m TOTAL WIDTH)
- S#/N#/NE# EXISTING GABION BASKET NUMBER

0 10 20 30 40 50 60 70 m



DETAIL D NOTES:
1. GULLY SHALL BE SHAPED AND PREPARED AS PER DETAIL. THIS SHALL INCLUDE REMOVAL OF ALL LOOSE AND DELETERIOUS MATERIAL AS DIRECTED BY THE CONSULTANT.
2. WHERE FILLCRETE EXTENDS LATERALLY BEYOND THE EDGE OF THE SPLASH PAD, IT SHALL BE NO HIGHER THAN 150mm BELOW FINISHED SUBGRADE SURFACE.
3. THE TOP OF RIPRAP SHALL BE LEVEL WITH TOP OF MAT SPLASH PAD.

D/4 CROSS-SECTION (N6 GULLY REPAIR DETAIL)
SCALE: 1:100

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P.ENG. DATE

CHECKER: PROFESSIONAL ENGINEER ORIGINAL STAMPED AND SIGNED BY T.ABOELAZIZ ON JUNE 2, 2017 ALBERTA
P.ENG. DATE

REV	DATE	REVISION	BY
5			
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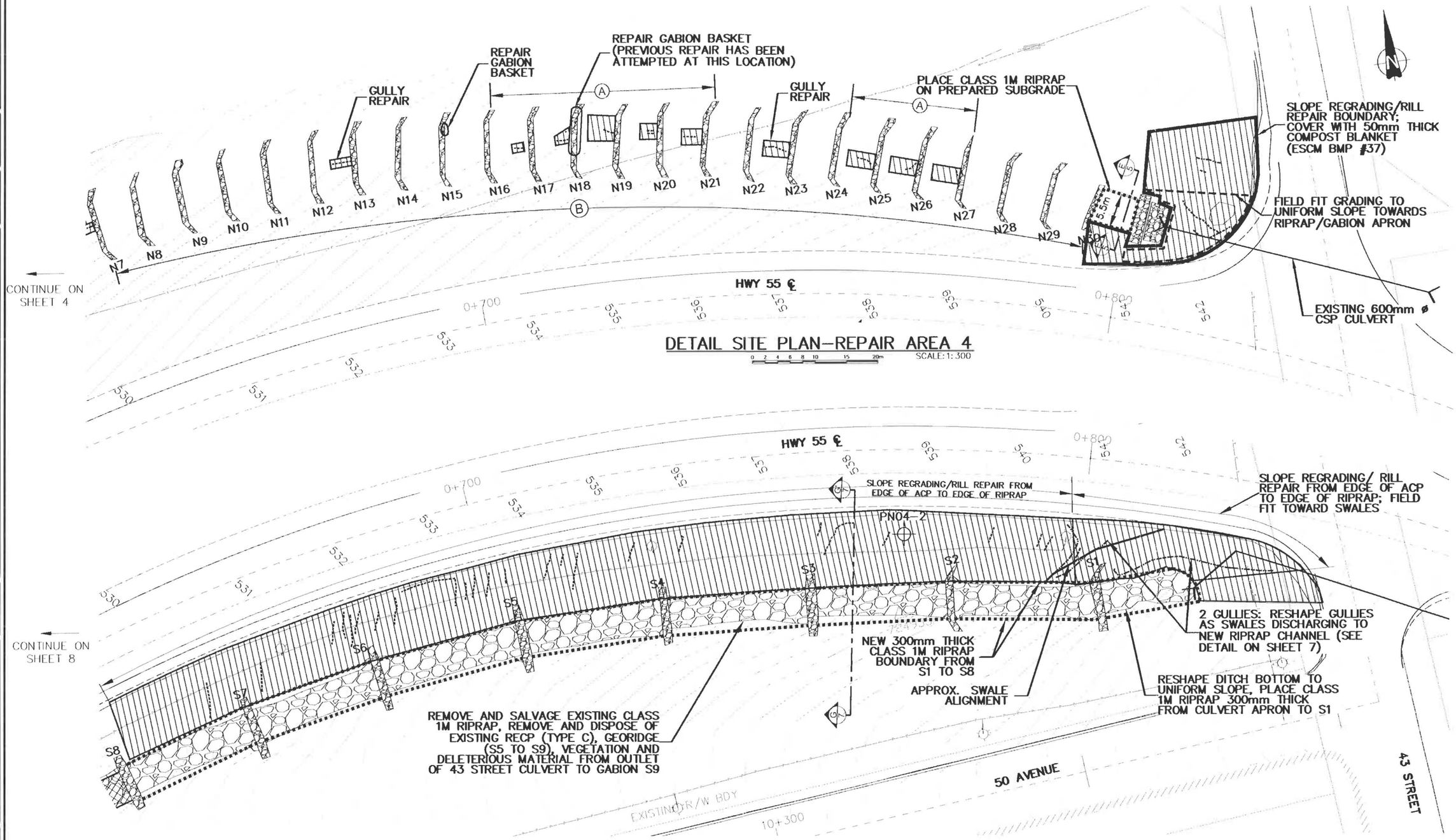
0	2017-04-04	ISSUED FOR CONSTRUCTION	

Alberta Transportation

HWY 55:10 AND HWY 813:02 INTERSECTION IN ATHABASCA
DETAIL SITE PLAN-REPAIR AREA 2

DATE	LOCATION	SITE	CONTRACT	HIGHWAY	SHEET	DRAWING
2017-04-04	ATHABASCA	NC004	18901	55:10 813:02	4 OF 11	RD-20775-P



DETAIL SITE PLAN-REPAIR AREA 4

SCALE: 1:300

DETAIL SITE PLAN-REPAIR AREA 5

SCALE: 1:300

LEGEND

- COMPOST BLANKET (50mm THICKNESS) (NEW)
- TYPE C TRM (NEW)
- FLEXAMAT (NEW)
- RIPRAP BOUNDARY (NEW)
- RIPRAP (EXISTING)
- GULLY
- EROSION RILL
- LIGHT POLE
- UNDERGROUND POWER FOR STREET LIGHTS
- TELUS (UNDERGROUND)
- FORTIS (UNDERGROUND)
- STORM SEWER

521 GROUND SURFACE CONTOUR IN METRES

(A) GULLY REPAIR ALONG DITCH BOTTOM

(B) TYPE C TRM TO BE PLACED CENTERED IN DITCH, 2 ROLLS (MIN 4m TOTAL WIDTH)

S#/N#/NE# EXISTING GABION BASKET NUMBER

TEST HOLE LOCATION

NOTES:
EXISTING CLASS 1M RIPRAP APPROXIMATE 200mm THICK BETWEEN CULVERT OUTLET AND S4 AND 150mm THICK BETWEEN S4 AND S9.

CONSULTANT: THURBER ENGINEERING LTD.
PROJECT NO. 14382

PERMIT TO PRACTICE
Thurber Engineering Ltd.
PERMIT NUMBER: P 5186
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

DESIGNER: PROFESSIONAL ENGINEER ALBERTA ORIGINAL STAMPED AND SIGNED BY R. TROESE ON JUNE 2, 2017
P.ENG. DATE

CHECKER: PROFESSIONAL ENGINEER ALBERTA ORIGINAL STAMPED AND SIGNED BY L.MICHALUTZ ON JUNE 2, 2017
P.ENG. DATE

REV	DATE	REVISION	BY
5			
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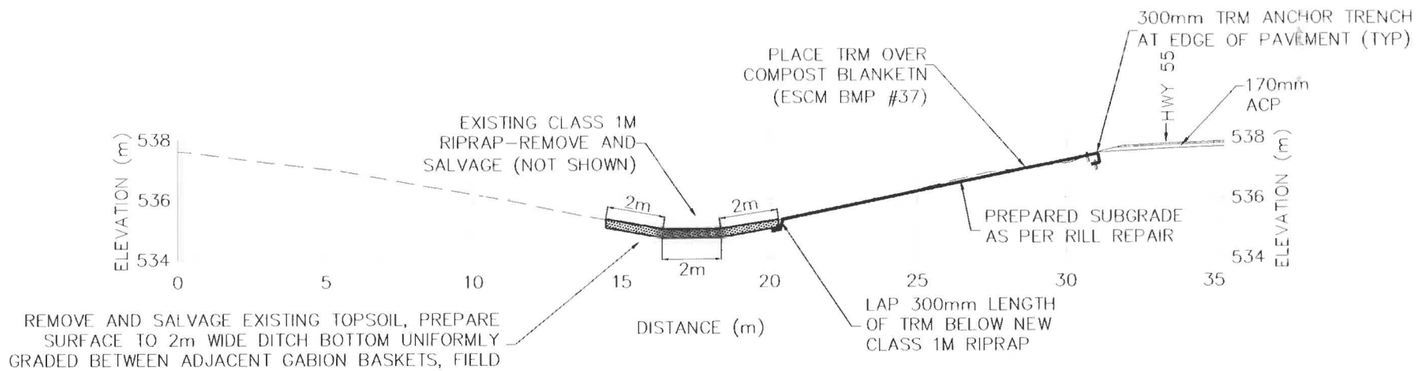
Alberta Transportation

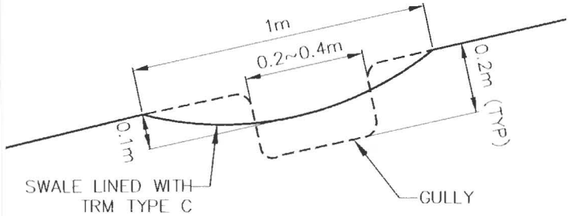
HWY 55:10 AND HWY 813:02 INTERSECTION IN ATHABASCA
DETAIL SITE PLANS-REPAIR AREAS 4 AND 5

DATE	LOCATION	SITE	CONTRACT	HIGHWAY	SHEET	DRAWING
2017-04-04	ATHABASCA	NC004	18901	55:10 813:02	6 OF 11	RD-20777-P

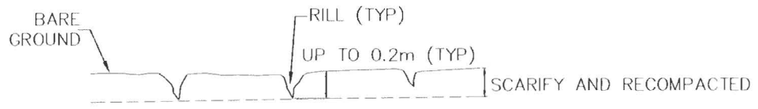


NOTES
1. SPIKES SHALL BE SUPPLIED AND INSTALLED AS PER MANUFACTURER'S SPECIFICATIONS AND SHALL BE A MINIMUM OF 450mm IN LENGTH AND INCORPORATE A WASHER OF MIN 38mm DIAMETER.
2. TRM TO BE INSTALLED AS PER ESCM BMP #13 EXCEPT THAT SPIKES (EXCLUDING ANCHOR TRENCHES) SHALL BE INSTALLED IN A REGULAR TRIANGULAR PATTERN WITH COVERAGE NOT LESS THAN 1.8 ANCHORS/m^2.

G6 CROSS-SECTION-TYPICAL RIPRAP WIDENING (S8 TO CULVERT OUTLET)
SCALE: 1:100

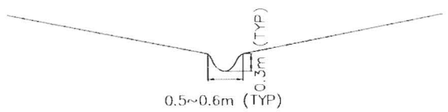


SWALE DETAIL
SCALE: 1:10



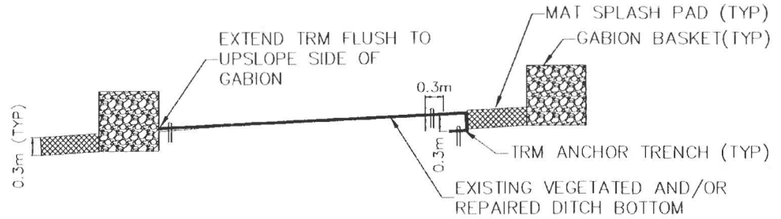
RILL REPAIR
1. REMOVE AND DISPOSE OF SAND ACCUMULATION WITHIN THE TREATMENT AREA SHOWN ON THE DRAWINGS, IF PRESENT.
2. REMOVE AND DISPOSE OF NON-WOVEN GEOTEXTILE, VEGETATION, AND DELETERIOUS MATERIALS THAT MAY BE PRESENT.
3. REMOVE AND SALVAGE TOPSOIL, IF PRESENT.
4. SCARIFY RILLED SLOPE SURFACE AND REWORK TO EVEN SURFACE. DEPTH OF SCARIFYING SHALL BE THE GREATER OF DEEPEST RILL OR 150mm.
5. COMPACT REWORKED SURFACE BY TRACK-PACKING WITH A DOZER WORKING IN A DIRECTION PERPENDICULAR TO FLOW DIRECTION (UP AND DOWN THE SLOPE). SEE ALBERTA TRANSPORTATION ESCM BMP#34.

SLOPE EROSION RILL REPAIR DETAIL
SCALE: 1:25



GULLY REPAIR
1. REMOVE AND SALVAGE TOPSOIL, IF PRESENT.
2. EXCAVATE LOOSE AND OVERHANGING MATERIAL FROM ERODED SURFACE AND SHAPE.
3. PLACE COMPACTED IMPORTED CLAY IN 150mm LIFTS TO MATCH ADJACENT GRADE AND AS DIRECTED BY THE CONSULTANT.
4. COVER FILL WITH SURFACE TREATMENT SPECIFIED ON DETAIL SITE PLAN DRAWINGS.

GULLY REPAIR DETAIL
SCALE: 1:50



NOTES
1. SPIKES SHALL BE SUPPLIED AND INSTALLED AS PER MANUFACTURER'S SPECIFICATIONS AND SHALL BE A MINIMUM OF 450mm IN LENGTH AND INCORPORATE A WASHER OF MIN 38mm DIAMETER.
2. TRM TO BE INSTALLED AS PER ESCM BMP #13 EXCEPT THAT SPIKES (EXCLUDING THOSE IN THE ANCHOR TRENCHES) SHALL BE INSTALLED IN A REGULAR TRIANGULAR PATTERN WITH COVERAGE NOT LESS THAN 1.2 ANCHORS/m^2.
3. EXISTING VEGETATION (WHERE PRESENT) SHALL NOT BE DISTURBED AND THE TRM INSTALLED DIRECTLY OVER TOP OR OVER COMPOST BLANKET AT SPECIFIED LOCATION ON THE DRAWINGS.
4. ANCHOR TRENCH TO BE BACKFILLED WITH COMPACTED EXCAVATION SOIL. BROADCAST SEED OVER TOP OF BACKFILL.

TYPE C TRM DITCH COVER DETAIL
SCALE: 1:50

CONSULTANT: THURBER ENGINEERING LTD.
PROJECT NO. 14382

PERMIT TO PRACTICE
Thurber Engineering Ltd.
PERMIT NUMBER: P 5186
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

DESIGNER: ORIGINAL STAMPED AND SIGNED BY: K. FROESE ON: JUNE 2, 2017 — P.ENG. DATE
CHECKER: ORIGINAL STAMPED AND SIGNED BY: L.ABDELAZIZ ON: JUNE 2, 2017 — P.ENG. DATE

REV.	DATE	REVISION	BY
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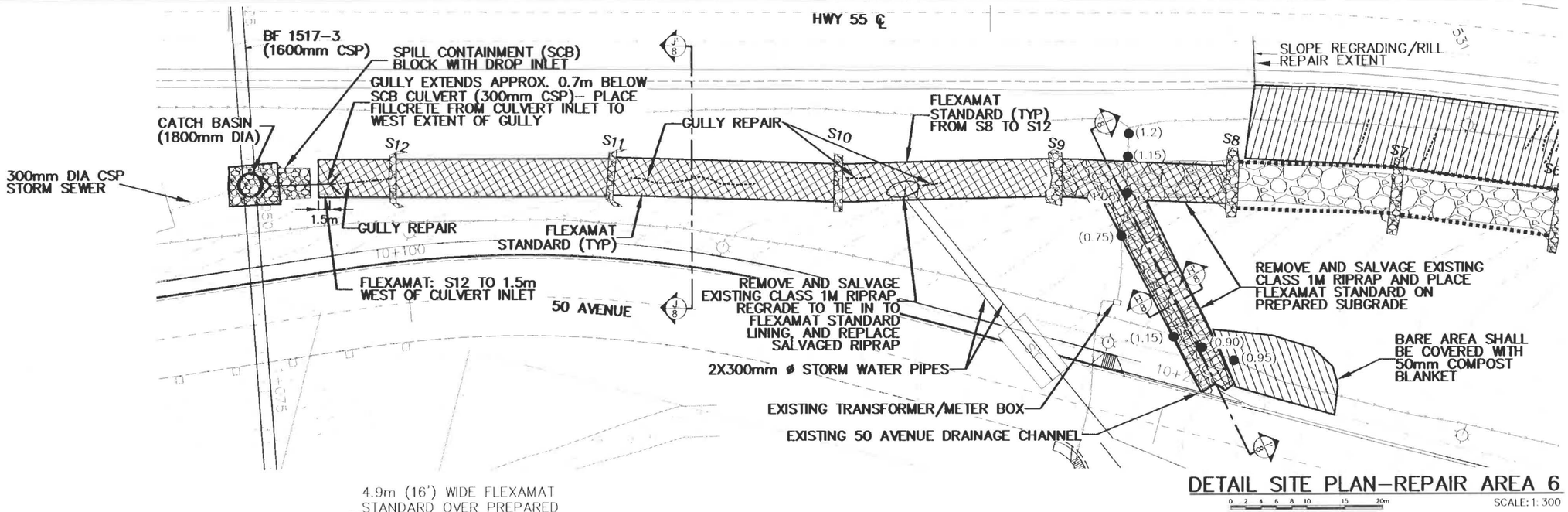
Alberta Transportation

HWY 55:10 AND HWY 813:02 INTERSECTION IN ATHABASCA
CROSS-SECTIONS AND OTHER DETAILS

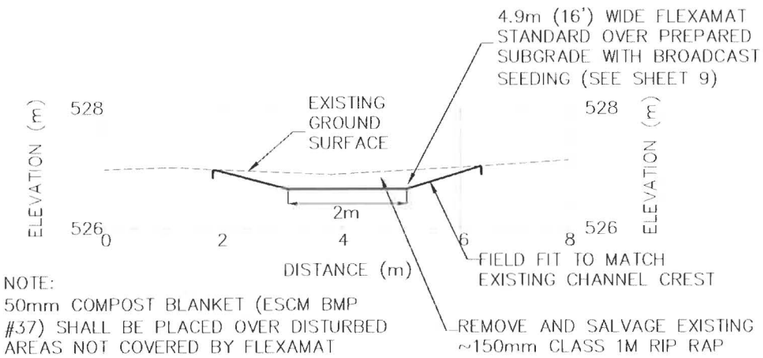
DATE	LOCATION	SITE	CONTRACT	HIGHWAY	SHEET	DRAWING
2017-04-04	ATHABASCA	NC004	18901	55:10 813:02	7 OF 11	RD-20778-P

DESCRIPTION: HWY 55:10, HWY 813:02 & HWY 2:42 AT ATHABASCA-CROSS-SECTIONS AND OTHER DETAILS
CONTRACT: 18901
HIGHWAY: 55:10 813:02
DRAWING: RD-20778-P
PHOTO | DATE | BY | SURVEYED | DEPARTMENT BAR CODE



DETAIL SITE PLAN–REPAIR AREA 6

SCALE: 1: 300

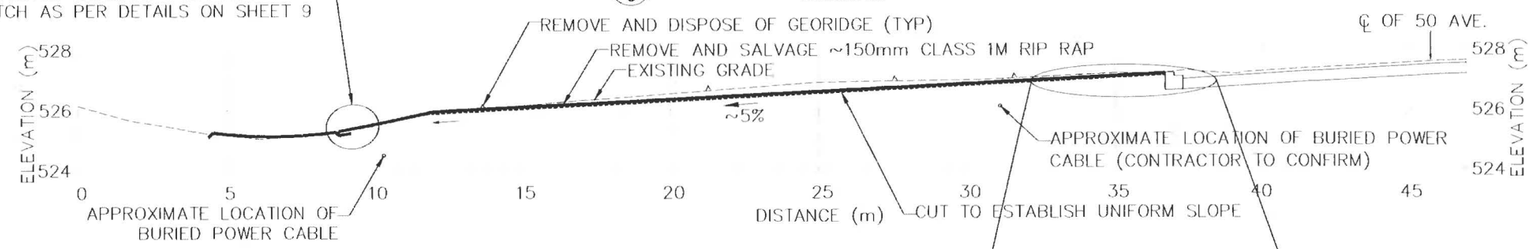


NOTE:
50mm COMPOST BLANKET (ESCM BMP #37) SHALL BE PLACED OVER DISTURBED AREAS NOT COVERED BY FLEXAMAT STANDARD.

OVERLAP FLEXAMAT STANDARD FROM 50 AVENUE CHANNEL OVER FLEXAMAT IN DITCH AS PER DETAILS ON SHEET 9

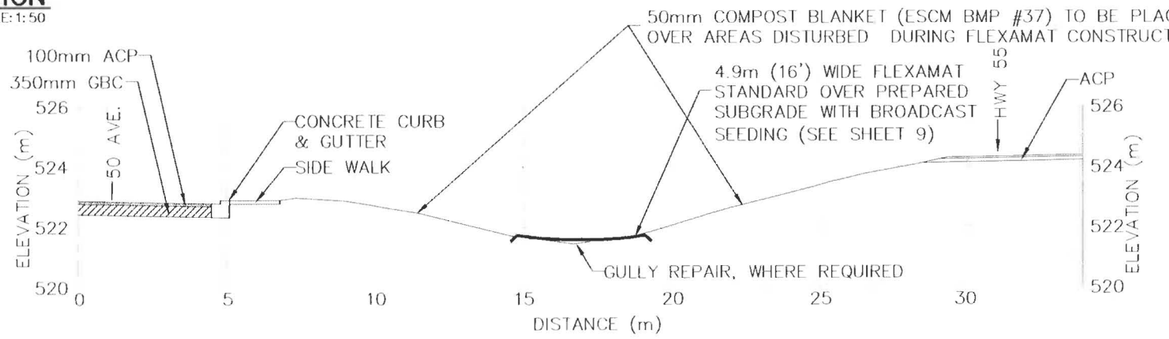
(I/8) CROSS–SECTION

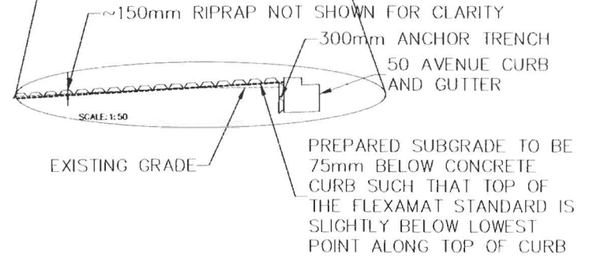
SCALE: 1: 100



(H/8) CROSS–SECTION

SCALE: 1: 50





(J/8) CROSS–SECTION–FLEXAMANT CHANNEL INSTALLATION FROM S8 TO SCB

SCALE: 1: 100

LEGEND

- COMPOST BLANKET (50mm THICKNESS) (NEW)
- FLEXAMAT (NEW)
- RIPRAP BOUNDARY (NEW)
- RIPRAP (EXISTING)
- GULLY
- EROSION RILL
- LIGHT POLE
- UNDERGROUND POWER FOR STREET LIGHTS
- TELUS (UNDERGROUND)
- FORTIS (UNDERGROUND)
- STORM SEWER

521 GROUND SURFACE CONTOUR IN METRES

S#/N#/NE# EXISTING GABION BASKET NUMBER

INSTRUMENT LOCATION

(1.2) ● APPROXIMATE HYDROVAC LOCATION AND DEPTH IN METRES (DEPTH MEASURED BELOW GROUND SURFACE)

CONSULTANT: THURBER ENGINEERING LTD.
PROJECT NO. 14382

PERMIT TO PRACTICE
Thurber Engineering Ltd.
PERMIT NUMBER: P 5186
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

DESIGNER: PROFESSIONAL ENGINEER ALBERTA — ORIGINAL STAMPED AND SIGNED BY: K. FROESE ON: JUNE 2, 2017
P.ENG.
DATE:

CHECKER: PROFESSIONAL ENGINEER ALBERTA — ORIGINAL STAMPED AND SIGNED BY: T.ARDELAN ON: JUNE 2, 2017
P.ENG.
DATE:

REV	DATE	REVISION	BY
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Alberta Transportation

HWY 55:10 AND HWY 813:02 INTERSECTION IN ATHABASCA
DETAIL SITE PLAN–REPAIR AREA 6

DATE	LOCATION	SITE	CONTRACT	HIGHWAY	SHEET	DRAWING
2017-04-04	ATHABASCA	NC004	18901	55:10 813:02	8 OF 11	RD–20779–P

DRAWING RD–20779–P
HIGHWAY 55:10 813:02
CONTRACT 18901
DESCRIPTION HWY 55:10 AND HWY 813:02 INTERSECTION IN ATHABASCA–DETAIL SITE PLAN–REPAIR AREA 6
PHOTO
DATE
BY
SURVEYED
DEPARTMENT BAR CODE

DRAWING RD-20780-P

HIGHWAY 55:10 813:02

CONTRACT 18901

DESCRIPTION
HWY 55:10 AND HWY 813:02 INTERSECTION IN ATHABASCA
FLEXAMAT INSTALLATION DETAILS

PHOTO

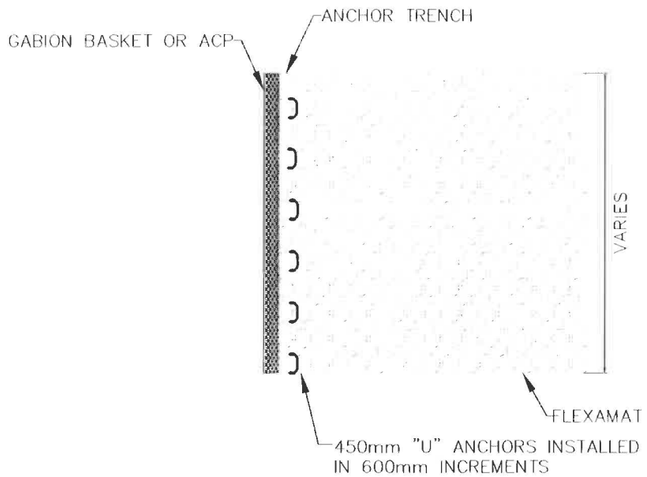
DATE

BY

SURVEYED

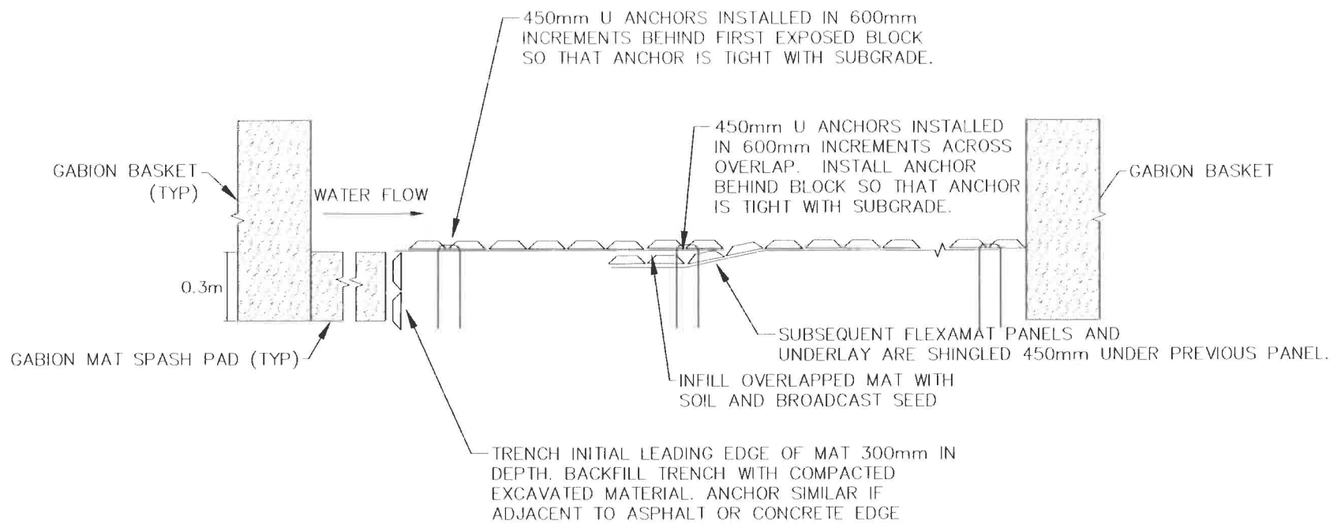
DEPARTMENT BAR CODE

PLAN VIEW

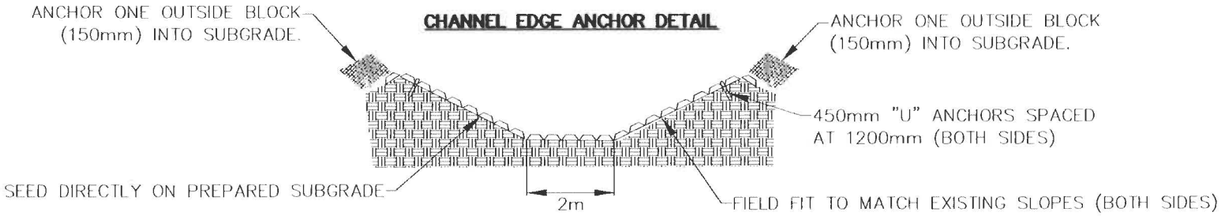


PROFILE VIEW

ANCHOR ADJACENT TO GABION BASKET OR ACP AND TYPICAL OVERLAP DETAIL



CHANNEL EDGE ANCHOR DETAIL



CONSTRUCTION NOTES:

1. INSTALLATION DETAILS ARE SAME FOR BOTH FLEXAMAT STANDARD AND FLEXAMAT PLUS.
2. REMOVE AND SALVAGE TOPSOIL, WHERE PRESENT, AS DIRECTED BY THE CONSULTANT.
3. PREPARED SUBGRADE SURFACE FOR FLEXAMAT SHALL BE SMOOTH AND FREE OF PROTRUSIONS AND DEBRIS OF ANY KIND. WHERE REQUIRED, RILL REPAIR AND GULLY REPAIR SHALL BE UNDERTAKEN AS SHOWN ON THE DRAWINGS.
4. DISTRIBUTE SALVAGED TOPSOIL AND BROADCAST SEED ON PREPARED SUBGRADE PRIOR TO FLEXAMAT INSTALLATION. USE SEED PER PROJECT SPECIFICATIONS.
5. INSTALL FLEXAMAT ROLLS. WHERE MATS ARE PLACED ADJACENT FOR ADDITIONAL WIDTH, THE EDGE SHALL BE FLUSH WITHOUT GAPS OR OVERLAPS. WHERE SUCH A SEAM IS LOCATION PARALLEL TO THE WATER FLOW DIRECTION, A 1.2m WIDE TEMPORARY RECP SHALL BE PLACED BELOW THE SEAM.SECURE THE SEAM BY INSTALLING "U" ANCHORS IN 1m INCREMENTS ACROSS THE JOINT.
6. CUT MATS, AS REQUIRED, FOR EXACT FIT SUCH AS AROUND CULVERTS, AGAINST 50 AVENUE CONCRETE CURB, AND AROUND STREET LIGHT POLES.
7. ANCHOR TRENCHES SHALL BE FILLED AND COMPACTED WITH EXCAVATED MATERIAL.
8. FOR ADDITIONAL SECTIONS OF MAT, OVERLAP THE DOWNSTREAM SECTION 450mm (MIN) WITH UPSTREAM SECTION OF MAT. PRIOR TO INSTALLING OVERLAP, FLIP UPSTREAM MAT BACK 600mm. EXCAVATE 55mm OF SOIL 450mm FROM END OF UPSTREAM MAT. DOWNSTREAM SECTION IS LAID IN THE SHALLOW TRENCH. LIGHTLY SPREAD EXCAVATED SOIL OVER INITIAL EDGE AND BROADCAST SEED. FLIP END OF UPSTREAM MAT OVER THE SOIL COVERED INITIAL LEADING EDGE OF DOWNSTREAM MAT.
9. INSTALL 450mm "U" ANCHORS IN 600mm INCREMENTS ACROSS THE OVERLAP. INSTALL ANCHORS DIRECTLY BEHIND BLOCKS. "U" ANCHORS CONSIST OF #3 REBAR "U" ANCHOR WITH 450mm LEGS.
10. AT THE END OF SECTION OF DITCH CHANNEL, CUT THE FLEXAMAT FLUSH AGAINST THE GABION BASKET SUCH THAT THE MAT LIES FLUSH WITH THE GROUND SURFACE AND SECURE THE END WITH 450mm "U" ANCHORS SPACED AT 600mm.

FLEXAMAT INSTALLATION DETAILS

N. T. S.

CONSULTANT
THURBER ENGINEERING LTD.
PROJECT NO. 14382

PERMIT TO PRACTICE
Thurber Engineering Ltd.
PERMIT NUMBER: P 5186
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

DESIGNER
PROFESSIONAL ENGINEER ALBERTA ORIGINAL STAMPED AND SIGNED BY: K. FROESE ON: JUNE 2, 2017
P.ENG.
DATE

CHECKER
PROFESSIONAL ENGINEER ALBERTA ORIGINAL STAMPED AND SIGNED BY: T. ABDELAZIZ ON: JUNE 2, 2017
P.ENG.
DATE

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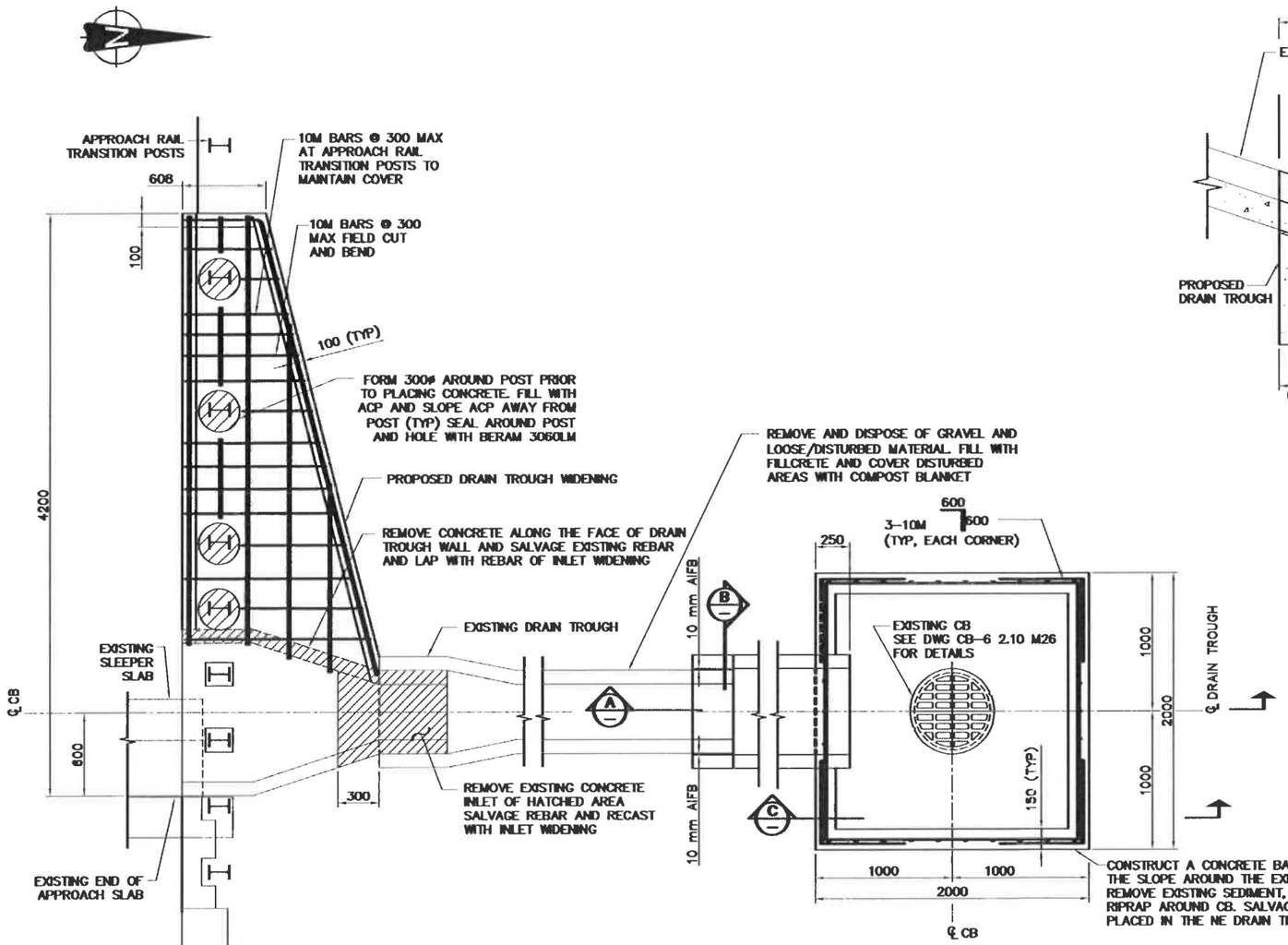
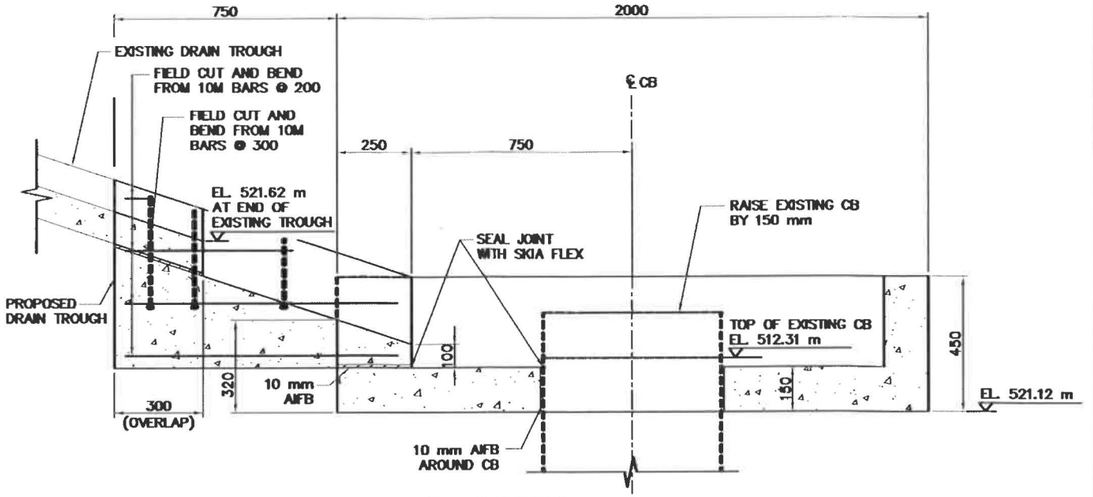
Alberta Transportation

HWY 55:10 AND HWY 813:02 INTERSECTION IN ATHABASCA
FLEXAMAT INSTALLATION DETAILS

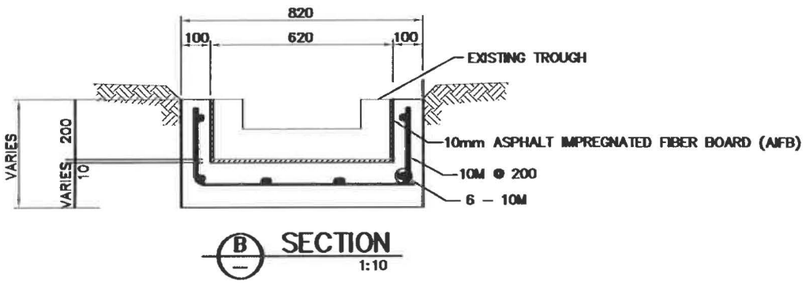
DATE	LOCATION	SITE	CONTRACT	HIGHWAY	SHEET	DRAWING
2017-04-04	ATHABASCA	NC004	18901	55:10 813:02	9 OF 11	RD-20780-P



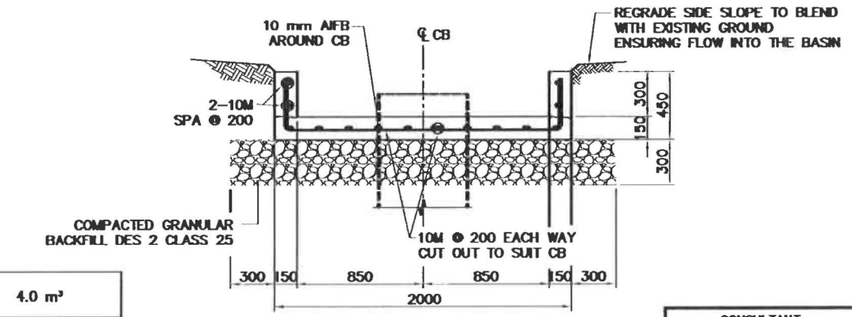
PLAN VIEW – DRAIN TROUGH
1:20



A SECTION
1:10



B SECTION
1:10



C SECTION
1:20

CONCRETE CLASS C	4.0 m³
REINFORCING STEEL, PLAIN	240 Kg
DES 2 CLASS 25 GRANULAR BACKFILL	2.0 m³
QUANTITY ESTIMATE: TWO DRAIN TROUGHS	

GENERAL NOTES

1. ALL CONCRETE SHALL BE CLASS C
2. ALL CORNERS SHALL HAVE A 20 mm CHAMFER OR FILLET
3. ALL DIMENSIONS ARE IN MILLIMETERS
4. REFER TO STANDARD SPECIFICATION FOR BRIDGE CONSTRUCTION FOR MORE DETAILS
5. SUBMIT STEEL REINFORCEMENT SHOP DRAWINGS FOR CONCRETE BASIN TO THE CONSULTANT AND ALLOW ONE WEEK FOR REVIEW

CONSULTANT: GeoMetrix Group Engineering — STRUCTURAL CONSULTING ENGINEERING
JOB No. 17–0090

PERMIT TO PRACTICE
GEOMETRIX GROUP ENGINEERING LTD
Signature
Date July 24, 2017
PERMIT NUMBER: P10423
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

DESIGNER: PROFESSIONAL ENGINEER ALBERTA — ZICHAO WU — July 24, 2017 — DATE
CHECKER: PROFESSIONAL ENGINEER ALBERTA — WAYNE STEVENS — July 24, 2017 — DATE

REV	DATE	REVISION	BY
4			
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0	2017–07–24	ISSUED FOR CONSTRUCTION	ZW

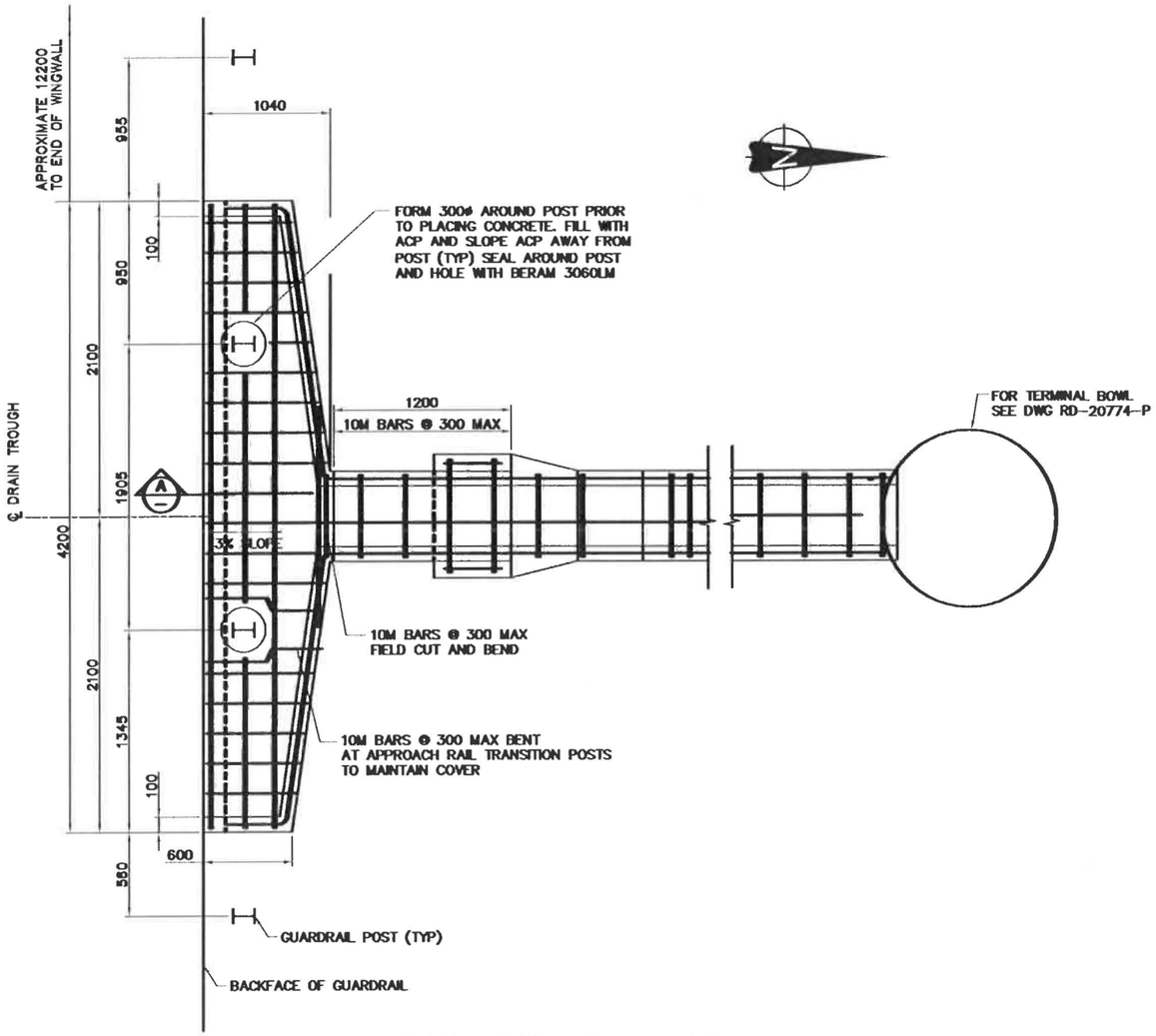
DATE	LOCATION	SITE
2017–07–24	ATHABASCA	1517

Alberta Transportation

HWY 55:10 AND HWY 813:02 INTERSECTION IN ATHABASCA NW DRAIN TROUGH

CONTRACT	HIGHWAY	SHEET	DRAWING
18901	55:10/813:02	10 OF 11	[redacted]–P

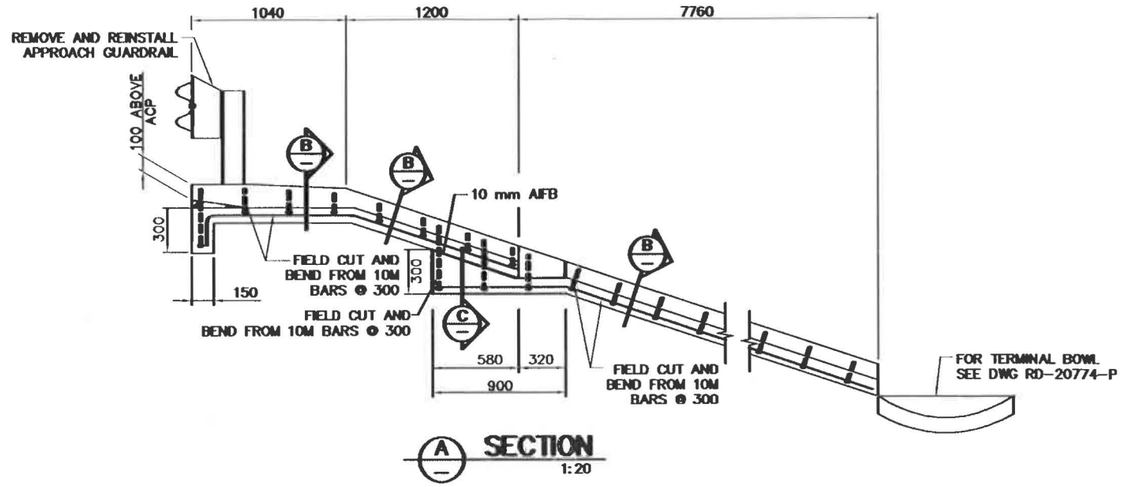
DRAWING | HIGHWAY | CONTRACT | DESCRIPTION | PHOTO | DATE | BY | SURVEYED | DEPARTMENT BAR CODE



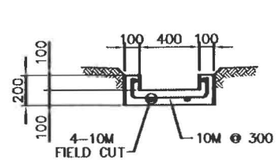
PLAN VIEW – DRAIN TROUGH
1:20

NOTE:

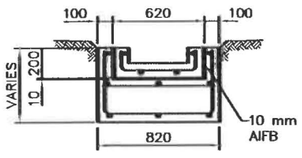
DRAIN TROUGH INLET DIMENSIONS ARE MEASURED ALONG THE CENTERLINE OF GUARDRAIL POSTS.



A SECTION
1:20



B SECTION
1:20



C SECTION
1:20

GENERAL NOTES

1. ALL CONCRETE SHALL BE CLASS C
2. ALL CORNERS SHALL HAVE A 20 mm CHAMFER OR FILLET
3. ALL DIMENSIONS ARE IN MILLIMETERS
4. REFER TO STANDARD SPECIFICATION FOR BRIDGE CONSTRUCTION FOR MORE DETAILS
5. SUBMIT STEEL REINFORCEMENT SHOP DRAWINGS FOR CONCRETE BASIN TO THE CONSULTANT AND ALLOW ONE WEEK FOR REVIEW

DRAWING | HIGHWAY | CONTRACT | DESCRIPTION | PHOTO | DATE | BY | SURVEYED | DEPARTMENT BAR CODE

CONSULTANT: GeoMetrix Group Engineering — STRUCTURAL CONSULTING ENGINEERING
JOB No. 17-0090

PERMIT TO PRACTICE
GEOMETRIX GROUP ENGINEERING LTD
Signature:
Date: July 24, 2017
PERMIT NUMBER: P10423
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

DESIGNER — PROFESSIONAL ENGINEER ALBERTA — July 24, 2017 — DATE
CHECKER — PROFESSIONAL ENGINEER ALBERTA — July 24, 2017 — DATE

REV	DATE	REVISION	BY
4			
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0	2017-07-24	ISSUED FOR CONSTRUCTION	ZW

DATE	LOCATION	SITE
2017-07-24	ATHABASCA	1517

Alberta Transportation

HWY 55:10 AND HWY 813:02 INTERSECTION IN ATHABASCA NE DRAIN TROUGH

CONTRACT	HIGHWAY	SHEET	DRAWING
18901	55:10/813:02	11 OF 11	RD-20782-P

	***Photo #1.*** *Hwy 55 South Ditch. Looking west at existing riprap channel from the east of G1.*
	***Photo #2.*** *Hwy 55 South Ditch: Looking west at the east end of the existing riprap channel. Note the presence of bare side slopes and an erosion gully on the slope surface*

	***Photo #3.*** *Hwy 55 South Ditch: Looking east at the existing riprap channel*
	***Photo #4.*** *Hwy 55 South Ditch: Looking east at riprap between G9 and G8*

	***Photo #5.*** *Looking northwest at the existing Class 1 M Riprap lined swale extending from the end of the concrete curb and gutter along the north edge of 50 Avenue to the south ditch of Hwy 55; swale is not well defined and a few areas are bare of riprap.*
	***Photo #6.*** *Looking southeast at the outlets of the storm water pipes; signs of erosion near the outlets of the pipes*

	***Photo #7.*** *Hwy 55 south ditch: looking east at signs of erosion between G10 and G11*
	***Photo #8.*** *Hwy 55 south ditch: looking east at erosion gully between G 12 and the spill containment ditch block*

	***Photo #9.*** *Looking southeast at a bare sandy slope on the south side slope of Hwy 55*
	***Photo #10.*** *Highway 55 south ditch: Ponding water within a low area to the west of the 1200 mm diameter manhole.*

	***Photo #11.*** *Looking west at the northeast corner of the intersection of Hwy 55 and 813. Bare vegetation and erosion rills in this area*
	***Photo #12.*** *Looking north at deep erosion gullies developed within NE corner of the bridge; erosion gully was backfilled with gravel in 2016*

	***Photo #13.*** *Drain trough on the northwest side of bridge crossing Tawatinaw River. Erosion developed below and on the west facing side the of the drain. Sediment accumulated around catch basin/ dissipation bowl.*
	***Photo #14.*** *Highway 55 north ditch: Looking east at bare side slopes*

Photo #15.
Hwy 55 North Ditch: Looking north from the manhole location at erosion rills and bare slopes

Photo #16.
Hwy 55 North Ditch: Erosion gully between G2 and G3

	***Photo #17.*** *Hwy 55 North Ditch: Erosion gully between G4 and G5*
	***Photo #18.*** *Hwy 55 North Ditch: Erosion gully between G5 and G6; note the gap developed below G6*

Photo #19.
Hwy 55 North Ditch: looking west from the west side slope of 43 Street. Bare ground surface and erosion rills in the side slope