CENTRAL REGION GRMP
SITE INSPECTION FORM

SITE NUMBER AND NAME: **C017-I, -II, and -III Truckstop Slide**	HIGHWAY & KM: 575:04, 26.631 to 26.050	PREVIOUS INSPECTION DATE: June 23, 2021	INSPECTION DATE: **May 30, 2022**
LEGAL DESCRIPTION: **C017-I** 04-26-29-21 W4M **C017-II** 01-27-29-21 W4M **C017-III** 01-27-29-21 W4M	NAD 83 COORDINATES: UTM Northing Easting 12 5707574 370869 12 5707733 370415 12 5707738 370340	RISK ASSESSMENT: **C017-I** PF: 4 CF: 3 TOTAL: 12 **C017-II** PF: 7 CF: 4 TOTAL: 28 **C017-III** PF: 10 CF: 4 TOTAL: 40	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 870 (east) and 930 (west) (Ref No. 105240 & 106230)		CONTRACT MAINTENANCE AREA (CMA): 517	

SUMMARY OF SITE INSTRUMENTATION: One slope inclinometer (SI) and two vibrating wire piezometers (VWPs) were installed in fall 2020 at C017-III. LAST READING DATE: June 24, 2022	INSPECTED BY: Chris Gräpel (KCB) James Lyons (KCB) Tony Penney (AT) Rocky Wang (AT) Carson Elliot (AT)
PRIMARY SITE ISSUE: C017 – I: a shallow embankment slope failure on the north side (eastbound lane) of Hwy 575; C017 – II: an erosion gully that has formed downslope of a culvert outlet on the north side of Hwy 575; and C017 – IIII: a moderately deep-seated slide (5 to 6 m deep based on an SI installed in 2019) on the north side of Hwy 575 where the highway crosses a creek and enters a cut section in the valley wall	
APPROXIMATE DIMENSIONS: The slides at C017 – I and III are approximately 20 m and 40 m wide, respectively. The zone of sliding onto Hwy 837 was approximately 100 m long (total) in various locations on June 13, 2017.	
DATE OF ANY REMEDIAL ACTION: Unknown.	

ITEM	**CONDITION EXISTS**		**DESCRIPTION AND LOCATION**	**NOTICABLE CHANGE FROM LAST INSPECTION**	
	YES	NO		YES	NO
Pavement Distress	X		C017-I, and -III: Pavement cracked in both lanes of Hwy 575.		X
Slope Movement	X		C017-I: Little to no change. C017-III: Minor retrogression towards Hwy 575.	X	
Erosion	X		C017-II: Erosion gully retrogressing towards Hwy 575 guardrail. Ditch erosion in south ditch with gullies up to 1.2 m deep.	X	
Seepage		X	N/A – none observed		X
Culvert Distress		X	C017-II: Culvert inlet buried; and outlet undermined, hanging, and detached		X

COMMENTS

At C017-I:

- Slide shows little to no change since 2021 inspection. No new cracks or deformations observed in road surface and the lateral extent of the slide has not changed (Photo 7).

At C017-II:

- The erosion gully downstream of the CSP culvert (inoperable) is similar in size as during the 2021 inspection (Photo 1 and 5). The gully was partially backfilled in fall 2020 to allow access for the excavator completing test pits at the C017-III site (monitored by KCB) has been partially eroded since the 2021 inspection.

- The CSP culvert inlet on the south side of the highway is almost completely buried (top of the culvert inlet visible during the 2022 inspection) with eroded materials deposited over the inlet. Flow through the culvert towards the C017-II erosion gully could be re-established in the culvert during a heavy rainfall event leading to increased erosion in the gully.
- The ditch erosion in the south (eastbound) ditch does not appear to have changed significantly since the 2021 inspection (Photo 5 and 6). The erosion gullies are 0.5 m to 1.0 m deep and 1 m to 2 m wide.

At C017-III:

- Slide expansion was observed in 2022, near the northwest end of the backscarp.
- An erosion gully near the northwest end of the slide formed between the 2021 and 2021 inspections (approximately 2.0 m wide and 1.5 m deep) and does not appear to have changed significantly between 2021 and 2022 (Photos 2 through 4).
- A longitudinal crack was observed between the backscarp and the shoulder of Hwy 575 since the 2021 inspection. Longitudinal cracking in the westbound lane could indicate potential retrogression of the backscarp onto the highway.
- The north ditch is conveying surface water flow over the slide area.
- Ditch erosion in the south (eastbound) ditch between C017-II and C017-III continues to worsen, with gullies up to 1 m in depth (Photo 1). The fill placed between the 2020 and 2021 inspections (removed from the C018 geohazard site) is beginning to erode and is progressing northwards.
- An additional borehole was drilled in April 2022 in the westbound lane to assess the ground conditions for a soil nail repair.

In October 2021, KCB submitted a proposal for preliminary engineering, final design, tendering, contract administration, and post-construction services for slope and ditch repairs at the C017 site. The design work is ongoing, and the Preliminary Engineering Report (PER), final design, and tender will be issued to AT in fall 2022

Maintenance/Repair/Monitoring Recommendations:

C017-I:

- In 2022, KCB completed a design to reinforcement the head scarp of the slide with 84 soil nails. The soil nails will be installed in three rows (1.5 m vertical spacing, 2 m horizontal spacing, and 14 m deep) through the upper half of the slide.

C017-II:

- In 2022, KCB completed a design to decommission and permanently block the 600-mm-diameter CSP culvert underlying Hwy 575 (oriented northeast-southwest) and repair the ditch erosion in the south (eastbound) ditch. The ditch repair will include backfilling the erosion gullies, grading the ditch into a channel shape, lining the base of the ditch with non-woven geotextile, and armouring the ditch with a Turf Reinforced Mat (TRM) product. Check trenches (0.5 m deep and 1.0 m wide) will be installed at 10 m spacing along the ditch bottom to reduce the likelihood of undermining the TRM and non-woven geotextile.

C017-III:

- Surface water flows from the ditch north of the slide should be re-routed to the south ditch by building a ditch block in the north ditch (upstream of the C017-III site) and diverting flows to the south ditch by installing a CSP culvert under Hwy 575.
- In 2022, KCB completed a repair design to improve drainage and stabilize the slide. The drainage improvements include building a ditch block upstream (west) of the slide and diverting ditch flows into the south (eastbound) ditch via CSP culvert underlying the highway (oriented north-south). Stabilizing the slide includes the installation of 116 soil nails installed in four rows (1.5 m vertical spacing, 2 m horizontal spacing, and 14 m deep) in the upper portion of the north slope.

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(i) The report is to be read in full, with sections or parts of the report relied upon in the context of the whole report.

(ii) The observations, findings and conclusions in this report are based on observed factual data and conditions that existed at the time of the work and should not be relied upon to precisely represent conditions at any other time.

(iii) The report is based on information provided to KCB by the Client or by other parties on behalf of the client (Client-supplied information). KCB has not verified the correctness or accuracy of such information and makes no representations regarding its correctness or accuracy. KCB shall not be responsible to the Client for the consequences of any error or omission contained in Client-supplied information.

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October 7 2022
I.D. # 58463

Chris Gräpel, M.Eng., P.Eng.
Senior Civil Engineer, Associate

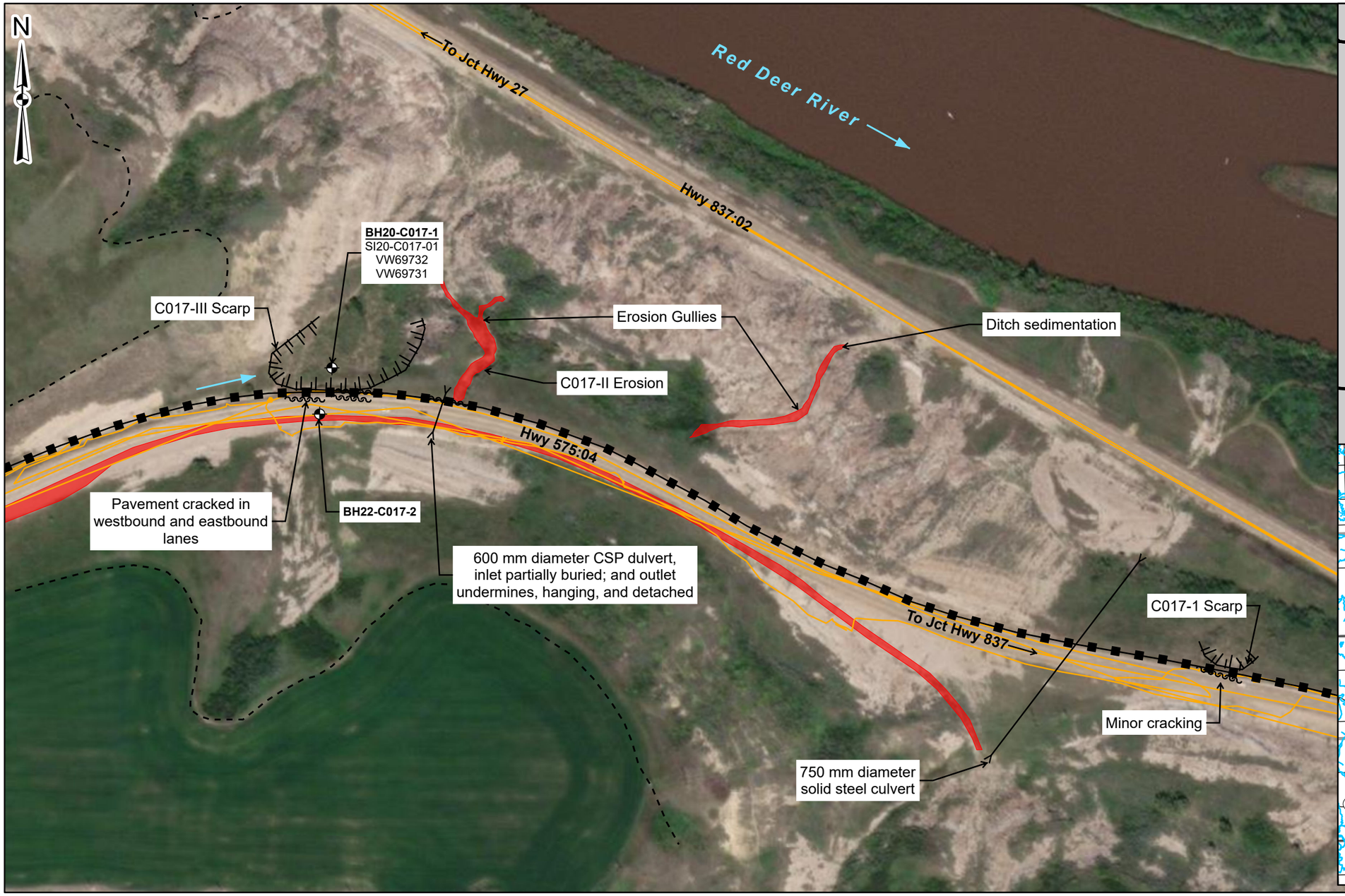
PERMIT TO PRACTICE
KLOHN CRIPPEN BERGER LTD.

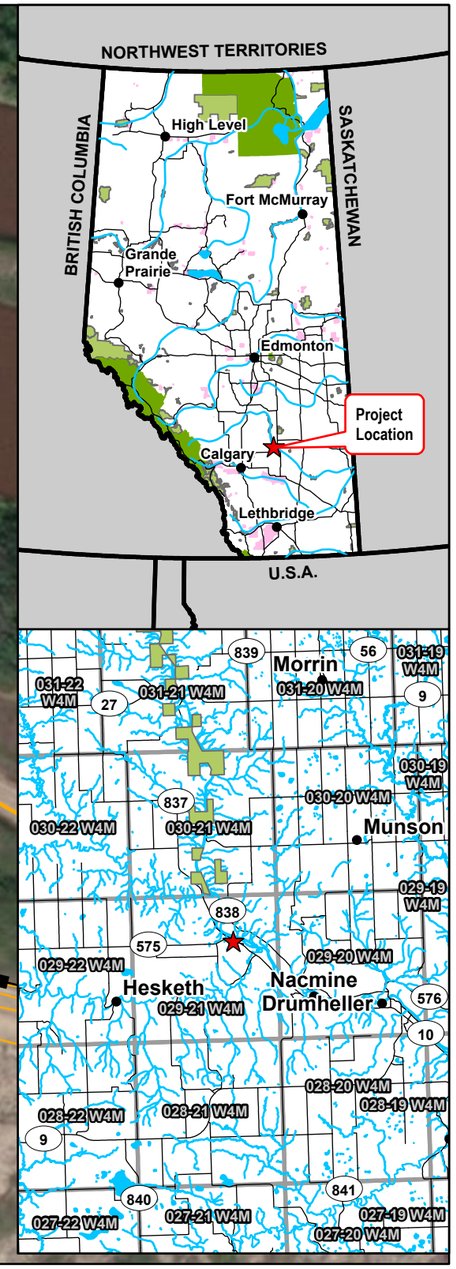
RM SIGNATURE: _____

RM APEGA ID #: 187607

DATE: 7 Oct. 2022

PERMIT NUMBER: P009196
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)





Legend

- Borehole
- GPS Track (May 30, 2022)
- Flow Direction
- Top of Bank
- Scarp
- Guardrail
- Culvert
- Crack
- Erosion

0 125 Metres

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 12N
3. IMAGE SOURCE: 2022 MICROSOFT CORPORATION, 2022 MAXAR CNES, DISTRIBUTION AIRBUS DS

CLIENT: Alberta

Klohn Crippen Berger

PROJECT: CENTRAL REGION GEOHAZARD RISK MANAGEMENT PROGRAM

TITLE: Site Plan
C017-I, -II, and -III Truckstop Slide
Hwy 575:04, km 26.631

SCALE	PROJECT No.	FIG No.
1:2,500	A05116A02	1

File: Z:\AE\DM\A05116A02 ABT Central Region GRMP\400 Drawings\GIS\MXD\2022\C017_220617.aprx Date: Time: Creator: : aharrison

Inspection Photographs

Photo 1 **Aerial photo of the C017-II and -III sites. Ditch erosion along the C017-II site (indicated by red arrow), gullying downstream of an old CSP culvert (indicated be red shading), and the C017-III head scarp (indicated be red dashed line) are presented on the aerial photo. Photo taken May 30, 2022, facing west.**

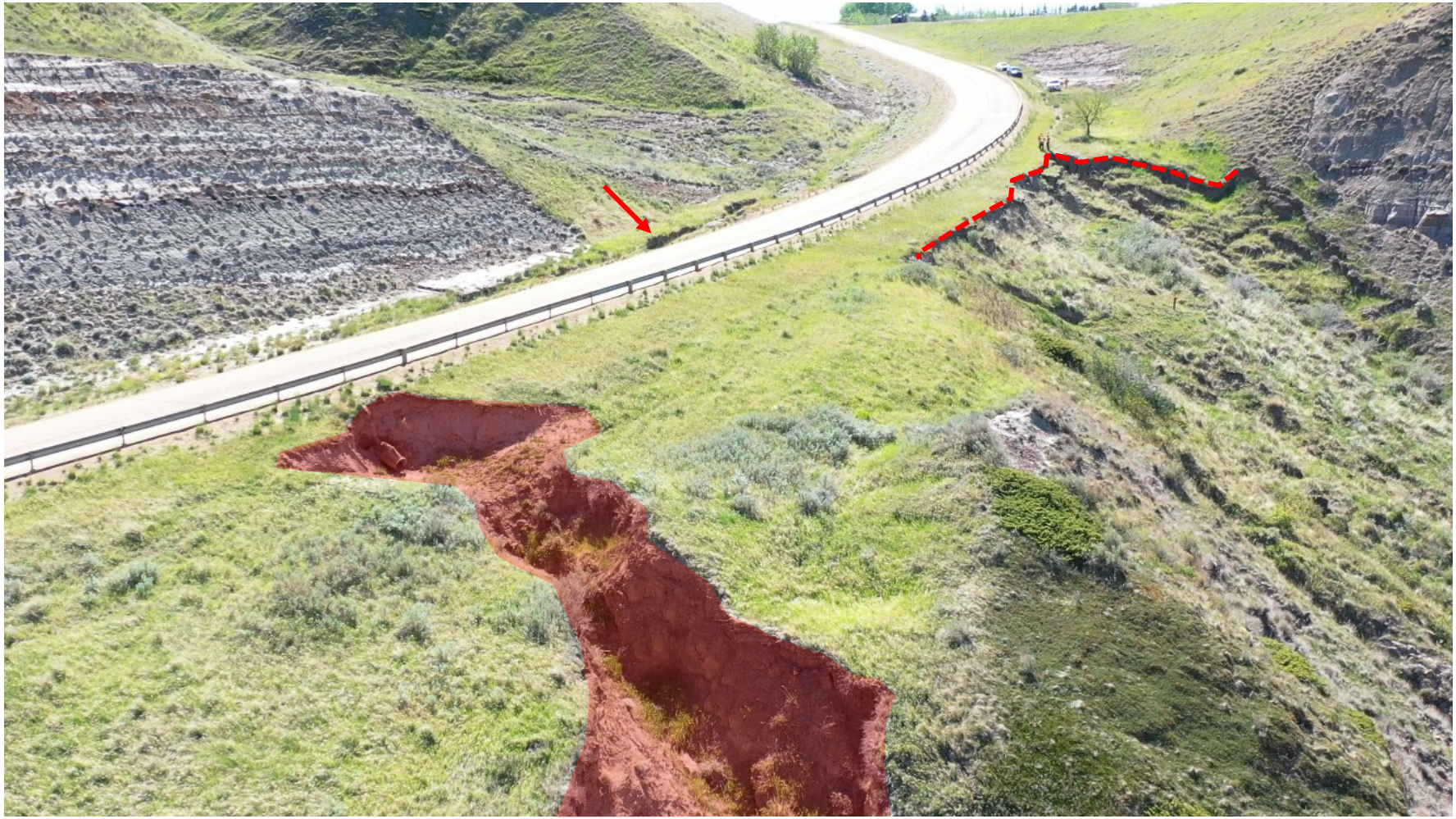


Photo 2 **Aerial photo of the C017-III site, highlighting the upper portion of the slide. Ground cracking, erosion, and the 2020 instrumentation are highlighted by the red arrow, shading, and circle, respectively. Photo taken May 30, 2022, facing southwest.**

Photo 3 **Aerial photo of the northwest portion of the C017-III slide, highlighting the recent movement since the 2021 inspection and erosion gully forming through the failed material. The erosion is most likely attributed to surface runoff from the north (westbound ditch). Photo taken May 30, 2022, facing southwest.**

Photo 4 **The headscarp at the C017-III slide is retrogression towards the highway and has worsened since the 2021 inspection. Material is failing into the slide area and ground cracking was observed between the edge of pavement and headscarp. Photo taken May 30, 2022, facing northwest.**

Photo 5 **Aerial photo of the C017-II site, including the ditch erosion in the south (eastbound) ditch (indicated by red arrow) and the erosion gully downstream of the CSP culvert outlet (indicated by red ellipse). Photo taken May 30, 2022, facing northwest.**

Photo 6 **The ditch erosion along the C017-II site does not appear to have changed significantly since the 2021 inspection. The survey stake near the base of the ditch is for a high-pressure water line (owned and operated by Aqua 7 Water Commission) below the south (eastbound) ditch. Photo taken May 30, 2022, facing west.**

Photo 7 **Headscarp of the C017-I slide. The slide does not appear to have changed significantly since the 2021 inspection. Photo taken May 30, 2022, facing west-northwest.**