

December 18, 2019

Fred Anderson
Geologist
North Dakota Geological Survey
600 East Boulevard
Bismarck, ND 58505

RE: ONEOK Bakken Pipeline, L.L.C. – Tioga Lateral Pipeline Project
Additional Information Regarding Locations of Concern/Landslide Areas

Dear Mr. Anderson,

ONEOK Bakken Pipeline, L.L.C. (ONEOK) proposes to construct the Tioga Lateral Pipeline Project (Project) consisting of approximately 75 miles of new 16-inch-diameter new steel pipeline to transport natural gas liquids. The Project will be located entirely within Williams County, North Dakota (see enclosed Project overview map). As you may recall, we submitted a Project notification letter and consultation request on October 10, 2016 and received a response from your office on October 16, 2019 (enclosed).

In your response, you identified five locations of concern along the Project route and recommended careful examination of these areas along with applicable engineering evaluations and adherence to appropriate construction practices should be continued. You provided a list of these areas with coordinates for each location. Since ONEOK submitted its original consultation letter to your office and as part of its routing process, ONEOK has continued to analyze these areas and incorporated modifications to avoid or minimize the potential to affect these areas.

With this submittal, ONEOK is providing additional information about these areas and detailed mapsets that show the centerline and proposed workspaces with respect to the locations of concern. LIDAR contours are also included on the maps to assist in your review. An updated shapefile displaying the centerline and workspaces in these areas will also be provided electronically.

Table 1 includes a summary of the locations of concern and measures ONEOK has incorporated to avoid or minimize impacts to these areas. Please refer to the enclosed mapsets for further information.

Table 1 NDGS Identified Locations of Concern				
Milepost	Longitude	Latitude	Description	Avoidance Measure(s)
0.9	-102.897442	48.399190	Creek crossing, south facing slope	ONEOK has adjusted the route and corresponding workspace approximately 50 feet to west to avoid the feature.
1.1	-102.896822	48.397019	Northeast of route along creek slope	Feature is associated with the northern bank of an Unnamed Creek. ONEOK plans to cross the area of concern and creek via the horizontal direction drill (HDD) method which will avoid surface disturbance in the area. HDD entry and exit points are displayed on the enclosed maps.
38.3	-103.409227	48.243477	Next to south-facing slope area	ONEOK plans to cross the area of concern and creek via the horizontal direction drill (HDD) method which will avoid surface disturbance in the area. HDD entry and exit points are displayed on the enclosed maps.

ONEOK, Inc.
100 West Fifth Street
Tulsa, OK 74103
www.oneok.com

December 18, 2019
Mr. Fred Anderson

Table 1 NDGS Identified Locations of Concern				
Milepost	Longitude	Latitude	Description	Avoidance Measure(s)
56.1	-103.646623	48.299920	Crossing Cow Creek, southwest facing slope	Feature is associated with the northeastern bank of Cow Creek. ONEOK plans to cross the area of concern and creek via HDD method which will avoid surface disturbance in the area. HDD entry and exit points are displayed on the enclosed maps.
56.4 ¹	-103.647811	48.295078	None ¹	Field review to confirm location; appears to be 150 feet east of centerline/workspace
¹ The NDGS cover letter did not specifically call out this location; however, it was noted in Attachment 1 of the NDGS response as "Evaluate."				

By implementing these measures, we feel that the Project will not affect or cause further instability in any of the 5 areas identified in Table 1 above. With this additional information, we are requesting comments from your office and are seeking your concurrence with our assessment. The Project is under the jurisdiction of the North Dakota Public Service Commission (NDPSC) and ONEOK filed its application for a Certificate of Corridor and Route Permit on November 25, 2019. Any future correspondence we received from your office will be filed with the NDPSC as a supplement to our application.

Merjent, Inc. (Merjent) has been contracted by ONEOK to assist with the environmental review of the Project areas, completion of regulatory applications, and consultations with other agencies. We appreciate your assistance with this request and look forward to your timely review and comments on this Project. Should you have any questions or require additional information, please contact Paul Hartzheim of Merjent at 612-746-1618 or paul.hartzheim@merjent.com, or myself at 918-588-7257 or Beth.Ludwig@oneok.com.

Sincerely,



Environmental Project Manager
ONEOK, Inc.

Enclosures: NDGS - October 16, 2019 Consultation Response
Project Overview Map
Locations of Concern Overview Maps (with 5-foot LIDAR contours)
Locations of Concern Detailed Maps (with 1-foot LIDAR contours)
Project shapefiles (provided electronically)

Cc: Fred Anderson (via email at fjanderson@nd.gov)
Lynn Helms, NDGS (via email at lhelms@nd.gov)
Maddy Krumwiede and Paul Hartzheim, Merjent
Matt Nelson, ONEOK

NDGS - October 16, 2019 Consultation Response



October 16, 2019

Beth Ludwig
 ONEOK, Inc.
 100 West Fifth Street
 Tulsa, OK 74103

Re: ONEOK Bakken Pipeline, LLC – Tioga Lateral Pipeline Project – Pipeline Corridor Review Comments

The North Dakota Geological Survey appreciates the notification and opportunity to review and provide comment on the proposed oil and gas energy infrastructure development project. The review of the proposed route detailed in the letter request of October 10, 2019 was completed by our office on October 16, 2019. We dropped in the alignment of the proposed pipeline route and evaluation corridor on our landslide base maps and compared it to the locations of landslides that have been identified by detailed mapping work previously completed by our office. Additionally, the entire proposed pipeline route and corridor was evaluated by reviewing contemporary National Agriculture Imagery Program (NAIP) aerial imagery from 2016 for the identification of any additional recent landslide areas.

During the route evaluation we noted that the proposed pipeline route generally passes along areas that are generally topographically flat with little relief and consequently are generally free of landslides. However, four locations of concern, three that would be considered to be direct crossings through identified landslide areas, were noted. The locations of these areas are listed below:

Locations of Concern along Pipeline Route

Map Book Page	Near Milepost	Description	Longitude	Latitude
1-8	1	Creek crossing, south facing slope	-102.896822	48.397019
1-8	1	Northeast of route along creek slope	-102.897442	48.399190
5-8	38	Next to south-facing slope area	-103.409227	48.243477
6-8	56	Crossing Cow Creek, southwest facing slope	-103.646623	48.299920

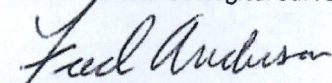
Several (25) other landslide areas were identified within the project evaluation corridor, both from existing mapping and new identification during this review, but are of nominal concern with respect to the location of the proposed pipeline route. A list of these locations is included as Attachment 1.

Landslide maps and data, along with LiDAR elevation data sets and mapping products for the project area are available on our website at: <https://www.dmr.nd.gov/ndgs/lidar/>

Careful examination of existing and proposed pipeline routes in North Dakota, along with applicable engineering evaluations of locations of concern and adherence to appropriate construction practices should be continued. You may also contact our offices directly, with any additional questions or comments, at (701) 328-8000.

Sincerely,

North Dakota Geological Survey:


 Fred Anderson, Geologist
fjanderson@nd.gov

FJA\Attachment

Attachment 1 - Locations of Identified Landslide Areas

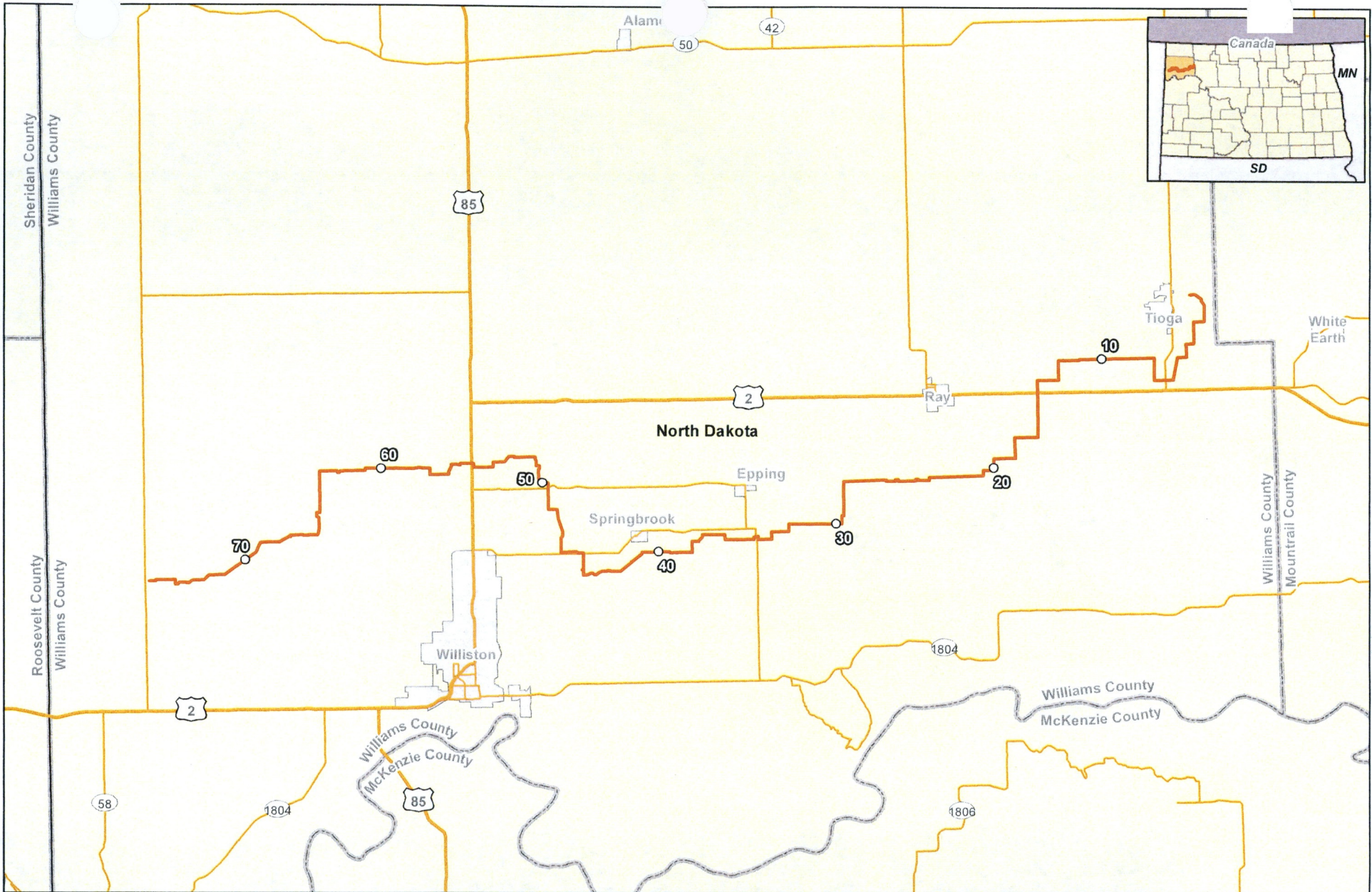
No.	Longitude	Latitude	24K Quadrangle	Status
1	-102.896822	48.397019	Tioga Quadrangle	Evaluate
2	-102.897442	48.399190	Tioga Quadrangle	Evaluate
3	-102.893346	48.398754	Tioga Quadrangle	No Concern
4	-102.889463	48.400466	Tioga Quadrangle	No Concern
5	-102.887304	48.399508	Tioga Quadrangle	No Concern
6	-103.380154	48.244236	Stockyard Creek Quadrangle	No Concern
7	-103.383006	48.246604	Stockyard Creek Quadrangle	No Concern
8	-103.395134	48.246442	Stockyard Creek Quadrangle	No Concern
9	-103.406854	48.243979	Stockyard Creek Quadrangle	No Concern
10	-103.409227	48.243477	Stockyard Creek Quadrangle	Evaluate
11	-103.398554	48.259468	Springbrook Quadrangle	No Concern
12	-103.471986	48.229386	Stockyard Creek Quadrangle	No Concern
13	-103.475091	48.224993	Stockyard Creek Quadrangle	No Concern
14	-103.480810	48.226351	Stockyard Creek Quadrangle	No Concern
15	-103.479961	48.221641	Stockyard Creek Quadrangle	No Concern
16	-103.605241	48.292774	Blacktail Lake SE Quadrangle	No Concern
17	-103.645858	48.294715	Otter Tail Creek Quadrangle	No Concern
18	-103.647811	48.295078	Otter Tail Creek Quadrangle	Evaluate
19	-103.658345	48.297165	Otter Tail Creek Quadrangle	No Concern
20	-103.659055	48.290552	Otter Tail Creek Quadrangle	No Concern
21	-103.675646	48.302067	Otter Tail Creek Quadrangle	No Concern
22	-103.678738	48.304272	Otter Tail Creek Quadrangle	No Concern
23	-103.697762	48.306945	Otter Tail Creek Quadrangle	No Concern
24	-103.707641	48.306078	Otter Tail Creek Quadrangle	No Concern
25	-103.670520	48.300832	Otter Tail Creek Quadrangle	New-No Concern
26	-103.646623	48.299920	Otter Tail Creek Quadrangle	New-Evaluate
27	-103.499131	48.227191	Stockyard Creek Quadrangle	New-No Concern
28	-103.452041	48.246339	Stockyard Creek Quadrangle	New-No Concern
29	-103.452968	48.248862	Stockyard Creek Quadrangle	New-No Concern

Maps

Project Overview Map

Locations of Concern Overview Maps
(with 5-foot LIDAR contours)

Locations of Concern Detailed Maps
(with 1-foot LIDAR contours)



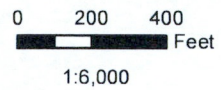
0 3 6 Miles
1 inch = 6 miles

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**ONEOK Bakken Pipeline, L.L.C.
Tioga Lateral Pipeline Project
Project Overview**

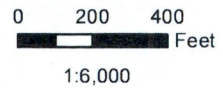
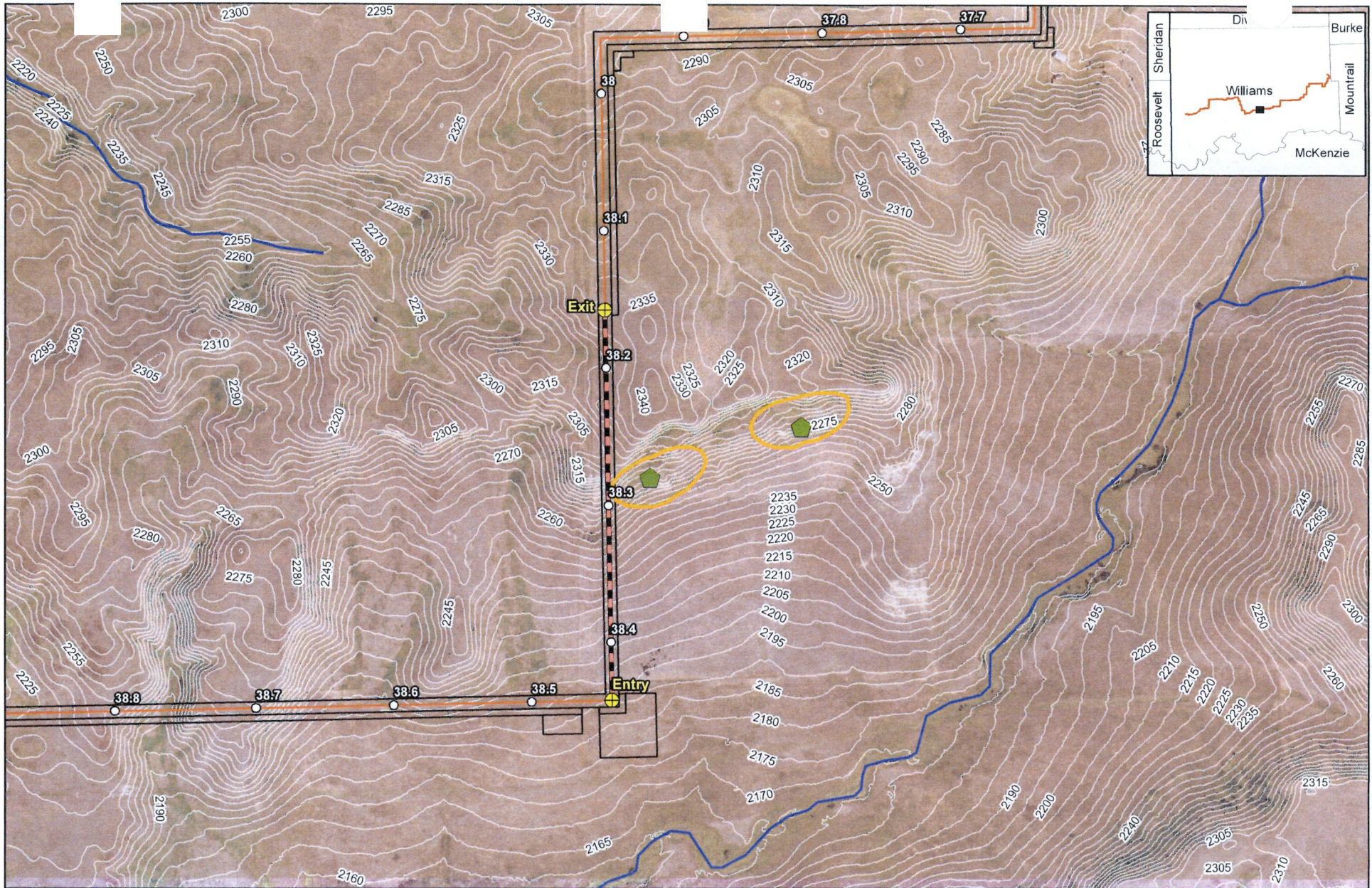
○ Milepost
— Proposed Route

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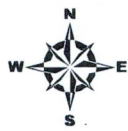
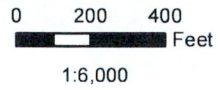
ONEOK Bakken Pipeline, L.L.C.
Tioga Lateral Pipeline Project
NDGS Identified Landslide Areas Near Route
 Page 1 of 3

- Milepost
- ⬠ Geologically Unstable Area (NDGS)
- ⊕ HDD Entry/Exit
- 5' Contours
- Proposed Route
- ⊔ HDD Segment
- NHD Waterbody
- ⬠ Landslide Deposit
- ⬠ Workspace



ONEOK Bakken Pipeline, L.L.C.
Tioga Lateral Pipeline Project
 NDGS Identified Landslide Areas Near Route
 Page 2 of 3

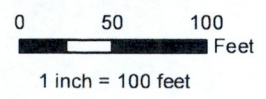
- Milepost
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ONEOK Bakken Pipeline, L.L.C.
Tioga Lateral Pipeline Project
NDGS Identified Landslide Areas Near Route
 Page 3 of 3

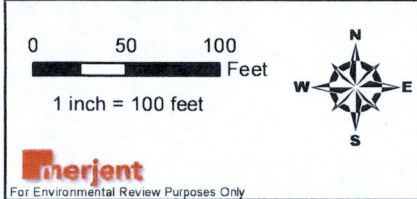
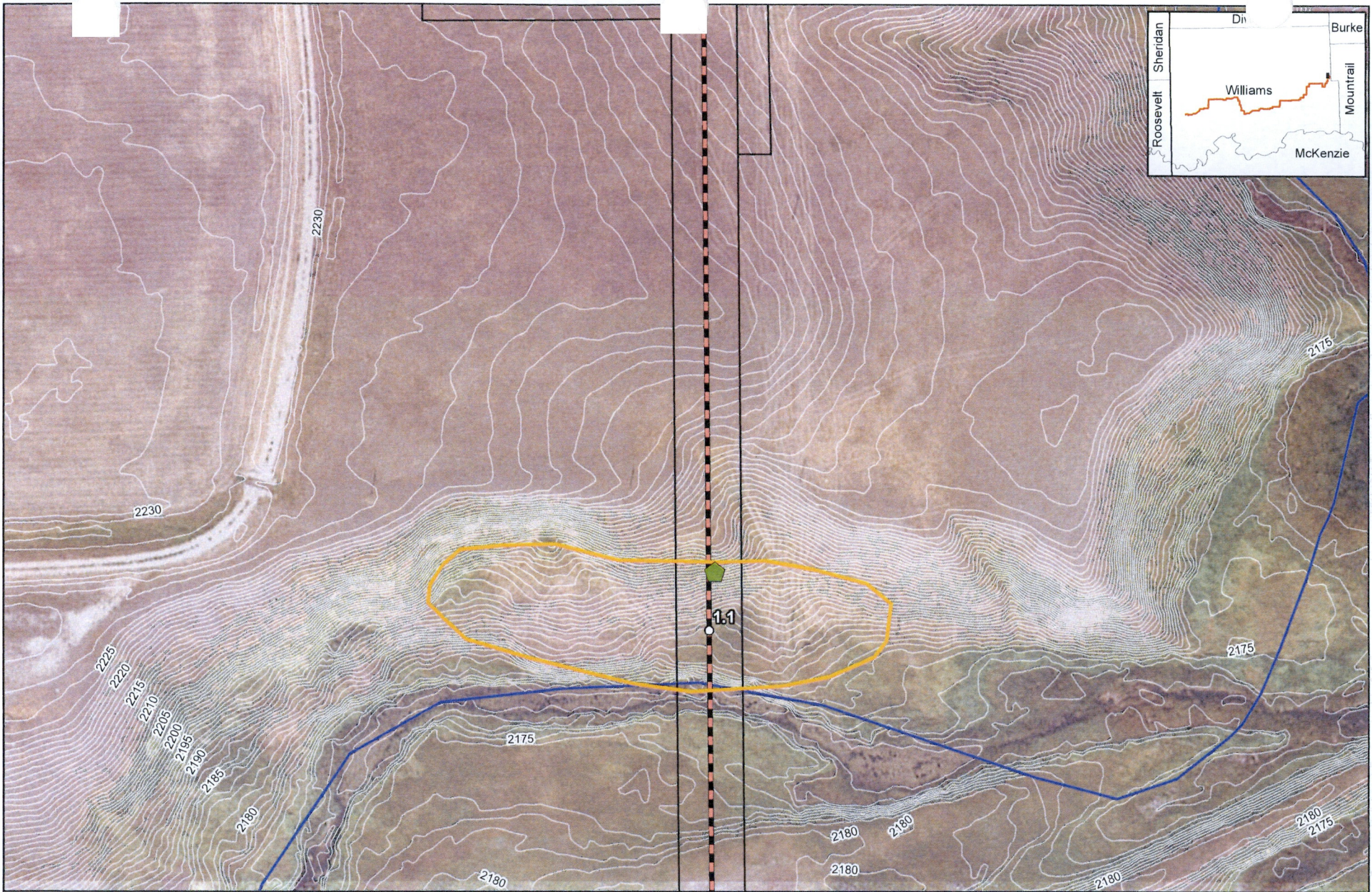
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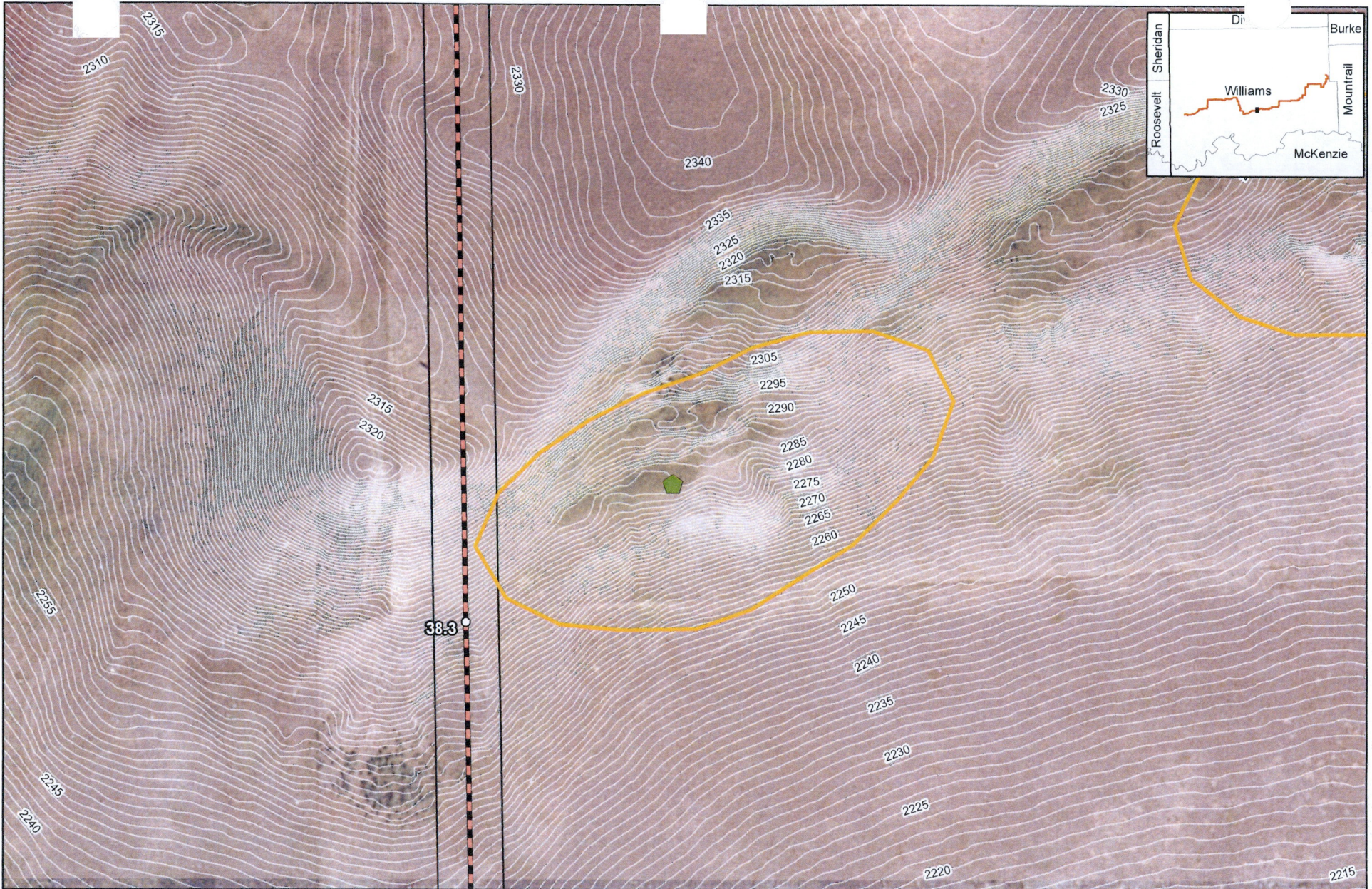
ONEOK Bakken Pipeline, L.L.C.
Tioga Lateral Pipeline Project
NDGS Identified Landslide Areas Near Route
 Page 1 of 5

- Milepost
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- ⬠ Landslide Deposit
- ⬠ Workspace



ONEOK Bakken Pipeline, L.L.C.
Tioga Lateral Pipeline Project
NDGS Identified Landslide Areas Near Route
 Page 2 of 5

- Milepost
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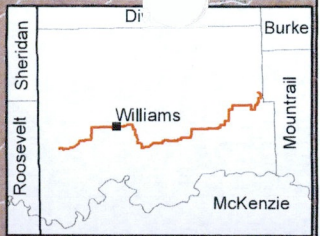


0 50 100 Feet
1 inch = 100 feet

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ONEOK Bakken Pipeline, L.L.C.
Tioga Lateral Pipeline Project
NDGS Identified Landslide Areas Near Route
 Page 3 of 5

- | | |
|-------------------------------------|---------------------|
| ○ Milepost | — Proposed Route |
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| ⊕ HDD Entry/Exit | — NHD Waterbody |
| 1' Contours | ⬡ Landslide Deposit |
| | ⬡ Workspace |



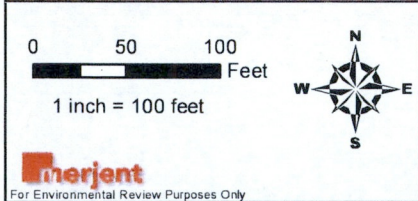
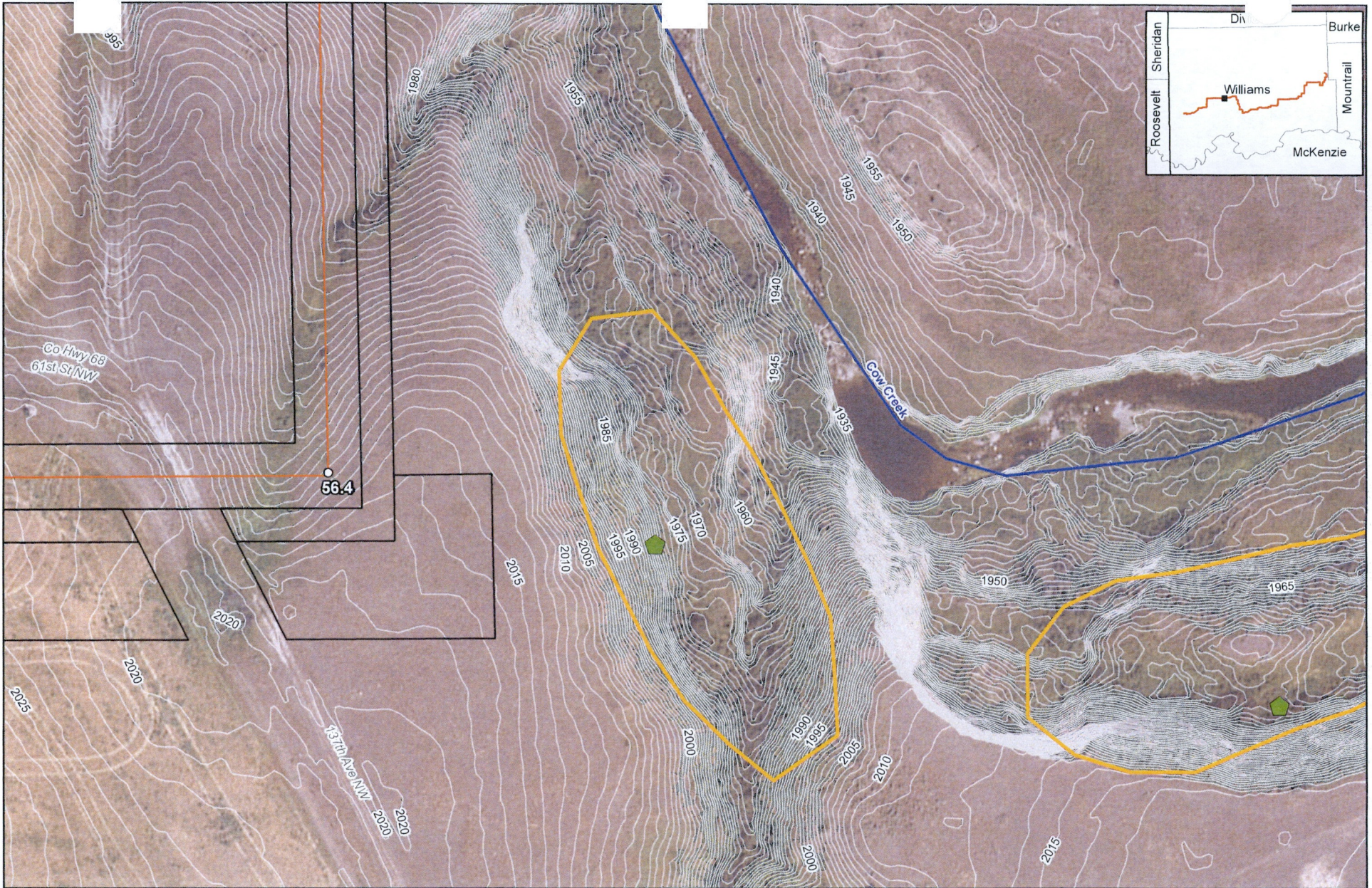
0 50 100 Feet

1 inch = 100 feet



ONEOK Bakken Pipeline, L.L.C.
Tioga Lateral Pipeline Project
NDGS Identified Landslide Areas Near Route
 Page 4 of 5

- Milepost
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ONEOK Bakken Pipeline, L.L.C.
Tioga Lateral Pipeline Project
NDGS Identified Landslide Areas Near Route
 Page 5 of 5

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- NHD Waterbody
- ▭ Landslide Deposit
- ▭ Workspace

Project shapefiles (provided electronically)



December 20, 2019

Beth Ludwig
ONEOK, Inc.
100 West Fifth Street
Tulsa, OK 74103

Re: ONEOK Bakken Pipeline, LLC – Tioga Lateral Pipeline Route Modification Review

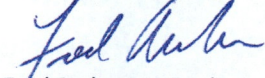
We have reviewed your letter and attachments of December 18, 2019 detailing the planned pipeline route modifications in response to the areas of concern identified by our office.

We have examined the revised alignments and the segments planned for horizontal directional drilling (HDD) in order to avoid the identified areas of concern and do not note any additional concerns with these planned modifications.

If there are additional comments, questions, or concerns regarding this review, please feel free to contact us at (701) 328-8000.

Sincerely,

North Dakota Geological Survey:


Fred Anderson, *Geologist*
fjanderson@nd.gov

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