

Project Summary 2016 Sinkhole Filling Contract AM-720-15



**North Dakota Public Service Commission
Abandoned Mine Lands Division
600 East Boulevard Avenue, Department 408
Bismarck, ND 58505-0480**

December 2016

**North Dakota Public Service Commission
2016 Sinkhole Filling AML Project Summary**

Project Type:	Surface backfilling of dangerous sinkholes caused by subsidence of underground mines and respreading topsoil and seeding areas at a reclaimed surface mine.
Primary Locations:	Sixteen properties near the cities of Velva, Noonan, Dickinson, Haynes, Bowman, Wilton, and Beulah, North Dakota.
Project Dates:	October 17 to December 3, 2016.
Contractor:	Earthworm Excavating of Tolna, ND.
Project Cost:	\$87,893 during this period. This was a two-year project conducted in 2015 and 2016. This report is for the work conducted in 2016.

The Public Service Commission administers the Abandoned Mine Lands (AML) Program on behalf of the State of North Dakota. The AML program is charged with eliminating existing and potential public hazards resulting from abandoned surface and underground coal mines. It is funded by a federal production fee on lignite coal mined in the state.

The 2016 Sinkhole Filling Project was conducted to fill dangerous sinkholes caused by collapse of abandoned underground coal mines in Western North Dakota. Work was also conducted to repair erosion features at a reclaimed surface mine site near Velva. Approximately 138 sinkholes were filled near the cities of Noonan, Dickinson, Haynes, Bowman, Wilton, and Beulah, North Dakota between October 17 and December 3, 2016. Standard requirements for sinkhole filling under this contract were as follows:

1. Remove and stockpile topsoil or suitable plant growth material from around/within sinkhole.
2. Excavate the sinkhole (as directed) with a backhoe or excavator.
3. Backfill the sinkhole with approved fill material, compaction with loader or excavator required between lifts.
4. Grade area to blend with adjacent topography and re-establish drainage.
5. Respread topsoil over disturbed areas and finish-grade.
6. Seed (broadcast spreader allowed) disturbed areas with required mixture.
7. Drag the seeded areas with a spike-tooth harrow or equivalent.

The required seed mixture for native grassland areas consisted of the following species and rates.

<u>Species</u>	<u>Rate/Acre – Lbs. (PLS)</u>
Thickspike Wheatgrass	4
Streambank Wheatgrass	4
Western Wheatgrass	4
Slender Wheatgrass	2
Green Needle Grass	2
Sideoats Grama	2
Switchgrass	4

This AML Project reduced the likelihood of death or injuries to property owners and the public, and minimized the probability of property damage by filling numerous deep and dangerous sinkholes. However, there are many more sinkholes that need to be filled and new sinkholes are reported each year. Sinkhole filling projects such as these have been conducted annually in North Dakota and will likely continue into the foreseeable future.

Cover Photo: *The cover photo shows AML Employees, Jordan Burns and Matt Fischer, inspecting and measuring a sinkhole on property owned by Mike Eslinger, about 1.5 miles north of Beulah. This sinkhole was located within 200 feet of 60th Avenue Southwest. It was about 13 feet in diameter and 11 feet deep. Mike barricaded the sinkhole with gate panels to keep people and livestock from falling into it. It was filled on November 24, 2016.*

2015-16 Sinkhole Project

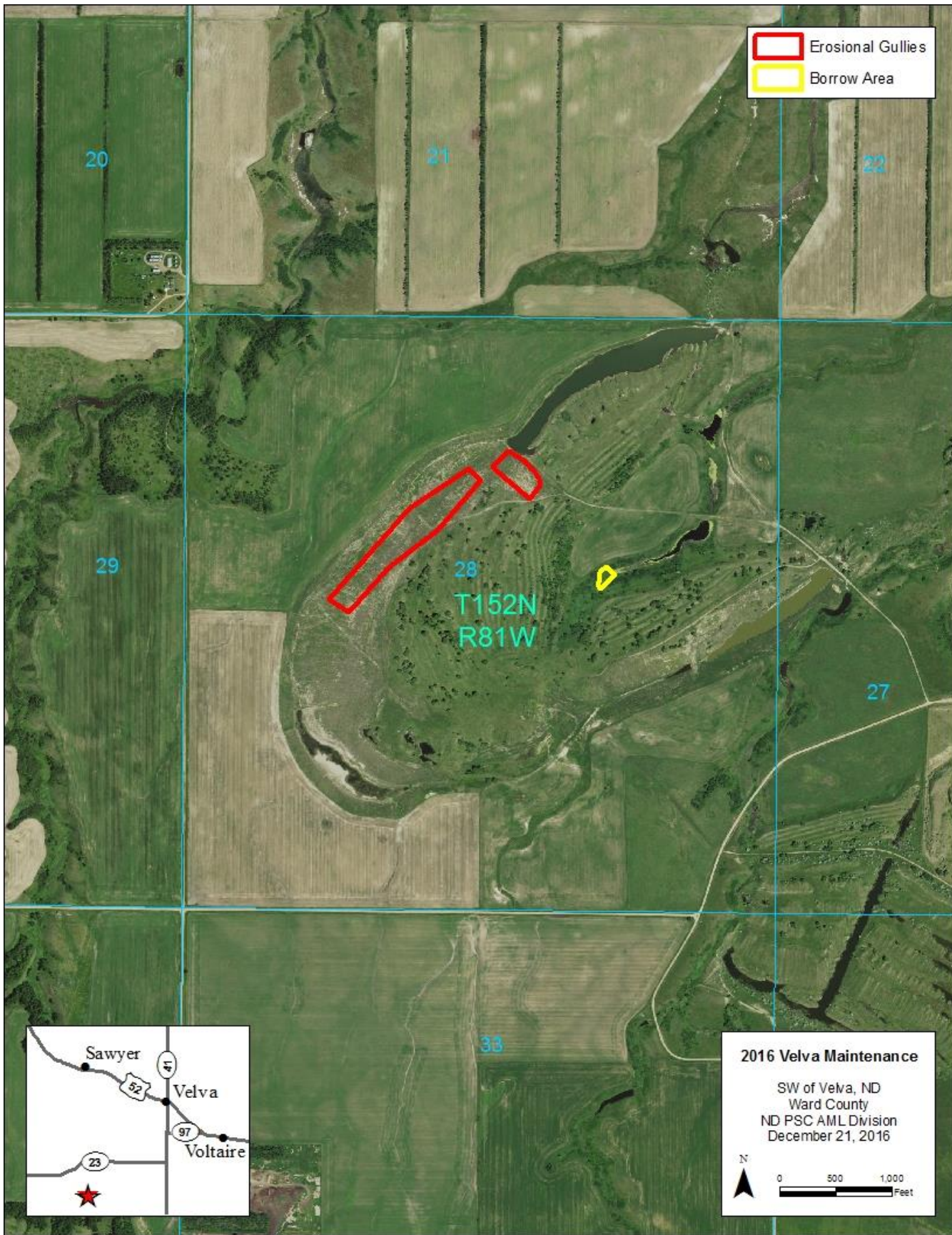
2016 Sites

Data by Site

Project	Site	Owner/Renter	Dates	Twp	Location				Sinkholes	CYD	Cost
					Rg	Sec	Part				
2016 Sinkholes	Velva Maint*	Lindahl	Oct. 17-24	152	81	28	N	N/A	1580	\$16,606.96	
	Noonan	Kimball	Oct. 26-29	162	95	9	NE	8			
		Landfill	Oct. 26-29	162	95	10	NW	51	1468	\$14,832.00	
	Dickinson	Stark Co, (38th St. SW, Binek Drive)	Nov. 1-2	139	95	18	NE	1			
		Marrman, Roughrider, Sebastian	Nov. 1-2	139	95	8	All	7	267	\$3,703.00	
	Haynes	State Lands	Nov. 7-8	129	94	16	NE	8	445	\$5,375.00	
	Bow man	City of Bow man	Nov. 9	132	102	15	SE	1	120	\$2,100.00	
	Wilton	Krzmarzick	Nov. 14-16	143	80	36	SE	1			
		Krzmarzick	Nov. 14-16	142	79	5	All	8			
		McGinnis	Nov. 14-16	142	79	6	All	8			
		Sorch	Nov. 14-16	142	79	15	NW	1			
		Opp	Nov. 14-16	141	79	2	W	4	360	\$4,340.00	
	Beulah	Sailer	Nov 18-Dec 3	144	87	7	SE	4			
		NDGF	Nov 18-Dec 3	144	87	7	NE and SW	32			
		NDGF	Nov 18-Dec 3	144	88	12	SE	2			
		Eslinger	Nov 18-Dec 3	144	88	12	NE	2	4448	\$40,936.00	
	TOTALS							138	8688	\$87,892.96	

* Maintenance work at Velva Site included repairing erosion, topsoiling and erosion control blankets on a reclaimed surface mine.

2016 Sinkhole Filling Approximate Locations of Maintenance Work Near Velva



2016 Sinkhole Filling, Velva Maintenance

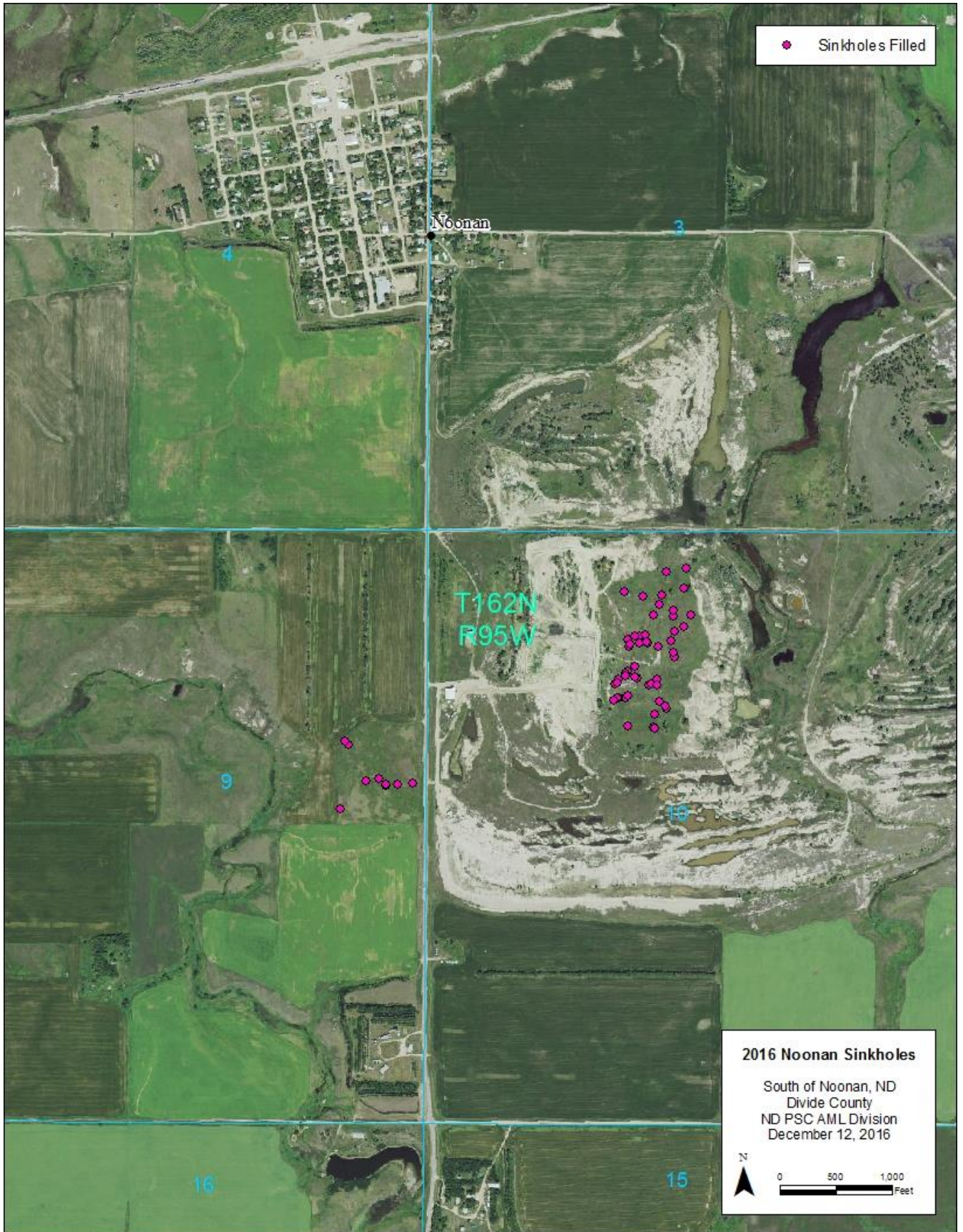


At the request of landowner, Albert Lindahl, work was conducted to fill erosion features at a reclaimed abandoned surface mine near Velva. This photo shows Matt Fischer supervising the respreading of topsoil to fill several erosion features.



Approximately 60 erosion features were filled at this site on October 17-24. Albert Lindahl agreed to till and seed the repaired areas. Extra topsoil, seed and erosion control mats were left for him at the site. The cost for work at the Velva site was \$16,607.

2016 Sinkhole Filling Approximate Locations of Sinkholes at Noonan Sites



2016 Sinkhole Filling, Noonan Sites

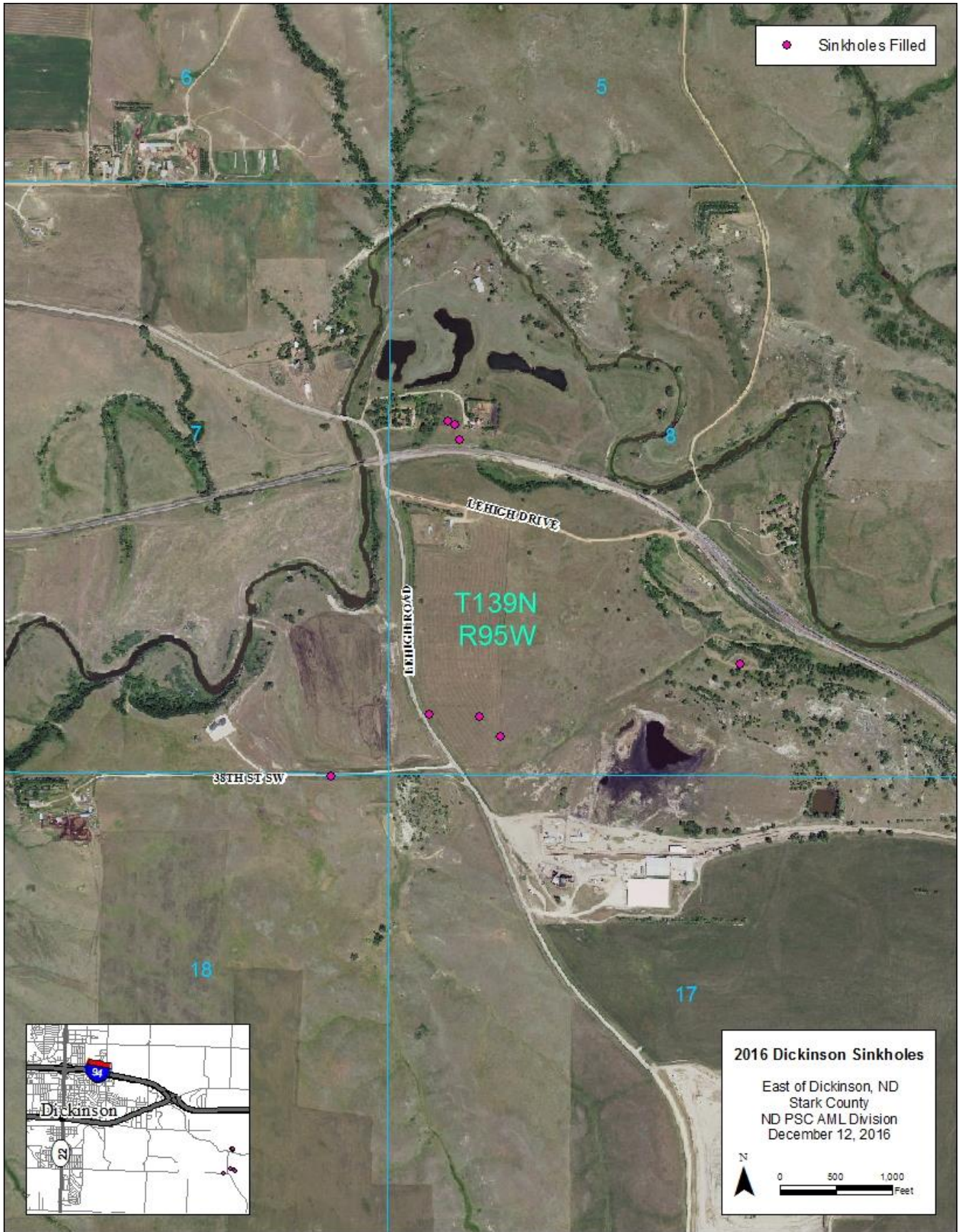


Approximately 59 sinkholes were filled at two sites about a mile south of Noonan on October 26-29. This shows Matt Fisher and Jordan Burns supervising while a truck was being loaded with earthen materials from a nearby spoil pile to fill sinkholes.



About 51 sinkholes were filled at this location, owned by Noonan Landfill, and eight on property owned by James Kimball. The cost for this work was \$14,832. Matt is standing on a partially filled sinkhole.

2016 Sinkhole Filling Approximate Locations of Sinkholes at Dickinson Sites



2016 Sinkhole Filling, Dickinson Sites

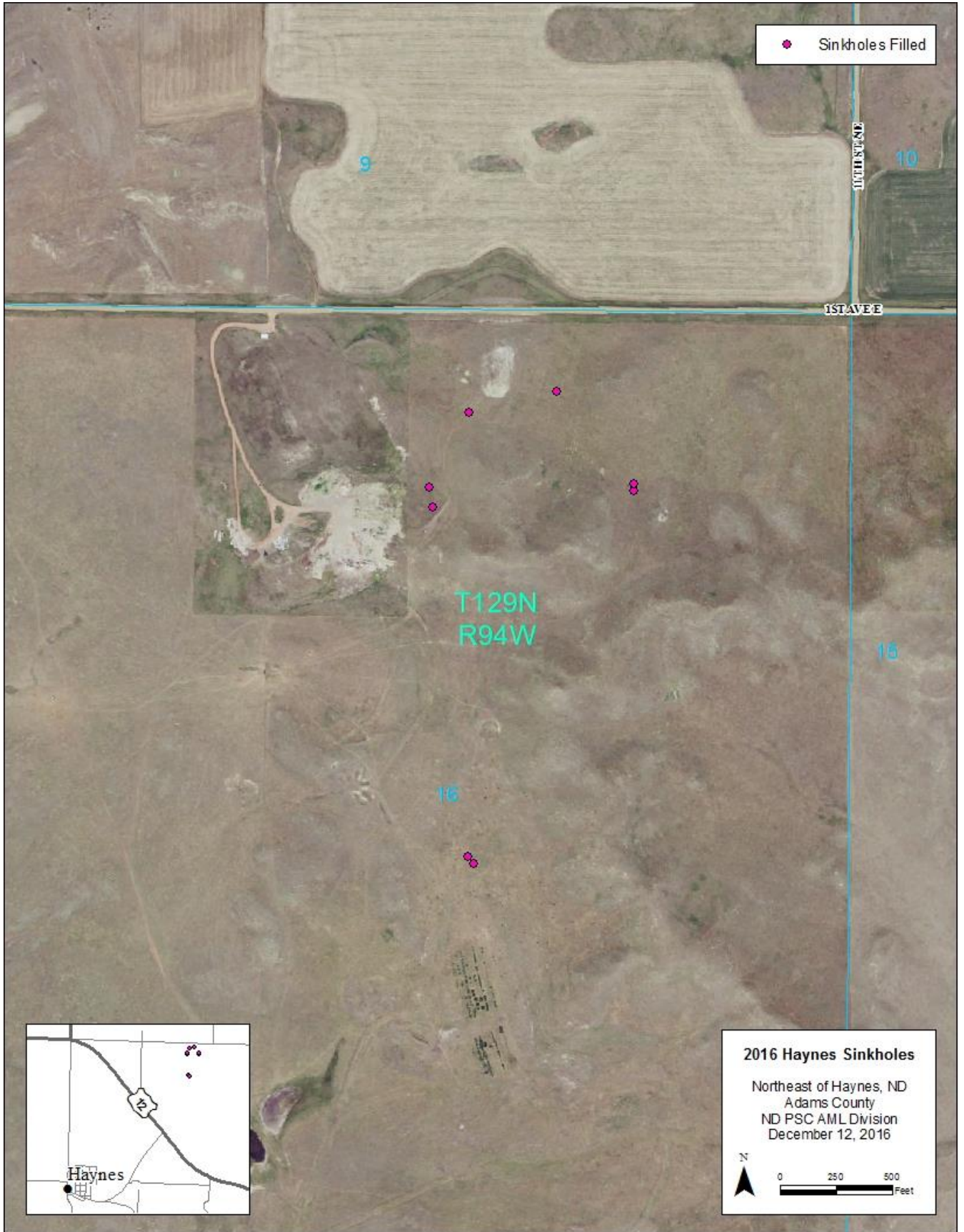


This shows contractor, Ross Smith, standing in a sinkhole on a pasture rented by Lexi Sebastian about two miles east of Dickinson. This sinkhole was approximately 33 feet long, 12 feet wide and more than 7 feet deep.



This shows the same hole when it was nearly full with 17 truckloads of dirt. Lexi's home is in the background. Eight sinkholes were filled at four properties near Dickinson on November 1–2. The cost for this work was \$3703.

2016 Sinkhole Filling Approximate Locations of Sinkholes at Haynes Site



2016 Sinkhole Filling, Haynes Site



This shows two dangerous sinkholes at the Haynes site. The one in the foreground was 13' deep and the one in the background by the excavator was 15' deep. They were reported by the Hettinger Fire Protection District.



Eight sinkholes were filled at the Haynes site on November 7-8 and the cost was \$5375. This shows a sinkhole which was found when the haul truck dropped a wheel into it. It was 25' in diameter, 15' deep and took 15 truckloads of dirt.

**2016 Sinkhole Filling
Approximate Locations of Sinkholes at Bowman Site**



2016 Sinkhole Filling, Bowman Site

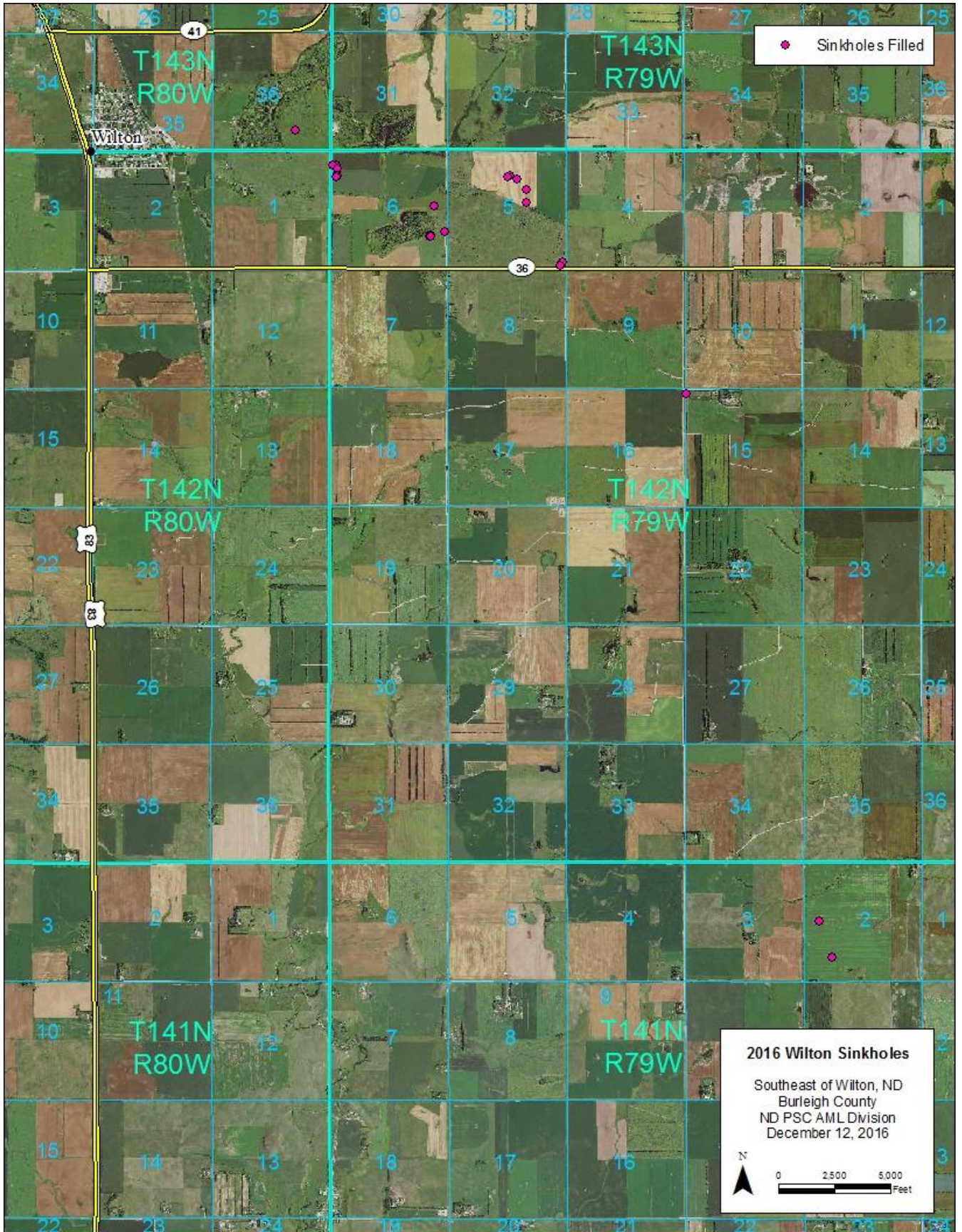


This sinkhole occurred on property owned by the City of Bowman, near the City Landfill. It was about 21 feet in diameter and 12 feet deep. It was located about 200 feet from a public road.



This shows Matt surveying a clay stockpile at the Bowman Landfill. Approximately 120 cubic yards of soil from this pile was used to fill the sinkhole. Work was completed November 9 and the cost was \$2100.

2016 Sinkhole Filling Approximate Locations of Sinkholes at Wilton Sites



2016 Sinkhole Filling, Wilton Sites

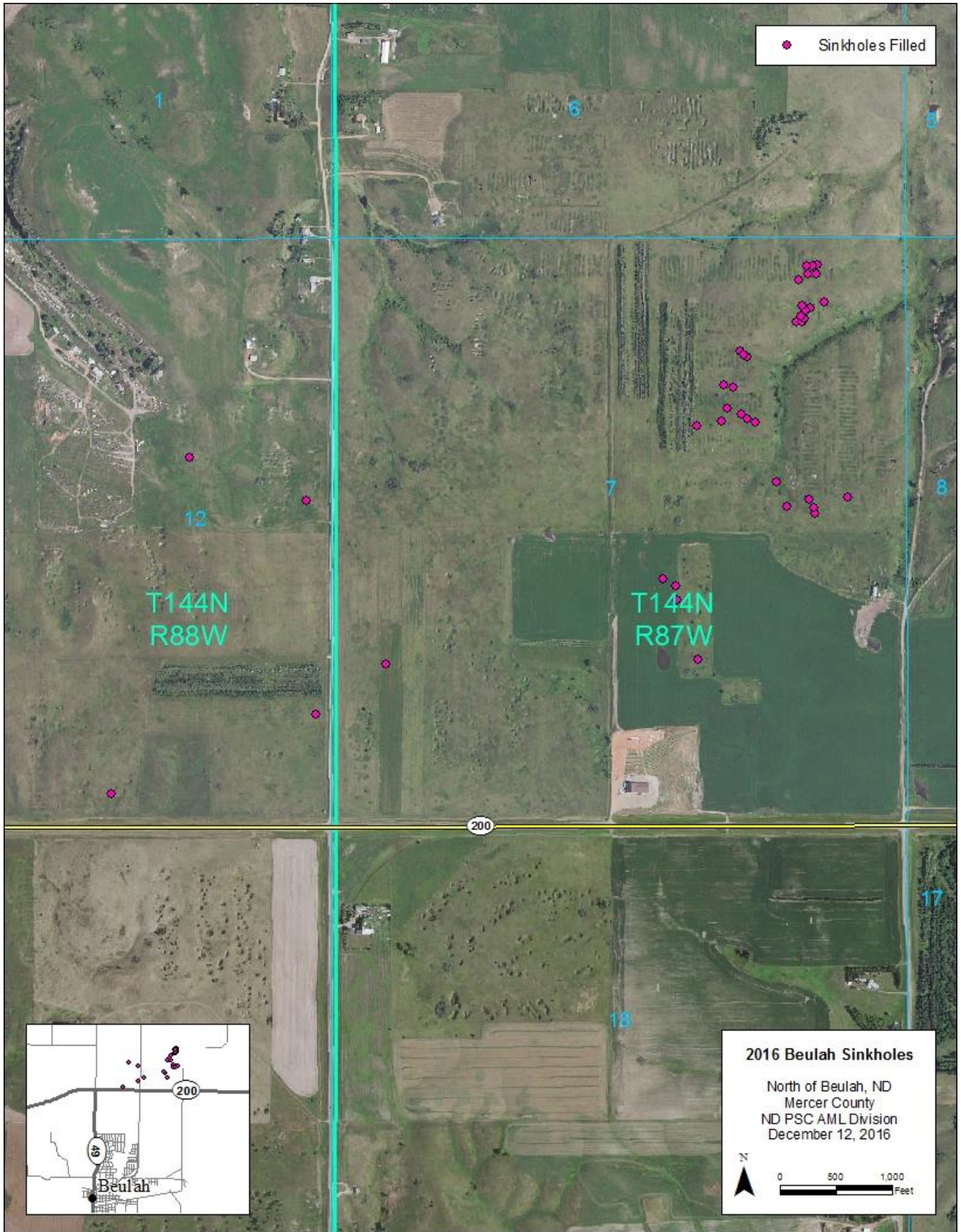


This is a sinkhole that occurred on cropland owned by Donald Sorch, about 5 miles southeast of Wilton. Donald pushed dirt in, it but it was still dangerous. The Wilton Windfarm and 66th Street are in the background.



This photo was taken November 15 after the sinkhole was filled and topsoil was respread. Approximately 22 sinkholes were filled at five properties near Wilton on November 14-16 and the cost was \$4330.

2016 Sinkhole Filling Approximate Locations of Sinkholes at Beulah Sites



2016 Sinkhole Filling, Beulah Sites



This shows Matt standing by a sinkhole on Garner Sailer's property north of Beulah. It was about 15 feet in diameter and 8 feet deep. Four sinkholes were filled on Garner's property, two on Mike Eslinger's property and 34 on ND Game & Fish property.



This sinkhole on ND Game & Fish property was 45' long, 18' wide and 16' deep. Ramps were constructed on two sides and it was filled by scrapers. Many dangerous sinkholes remain on this property, and they will need to be filled in the future.