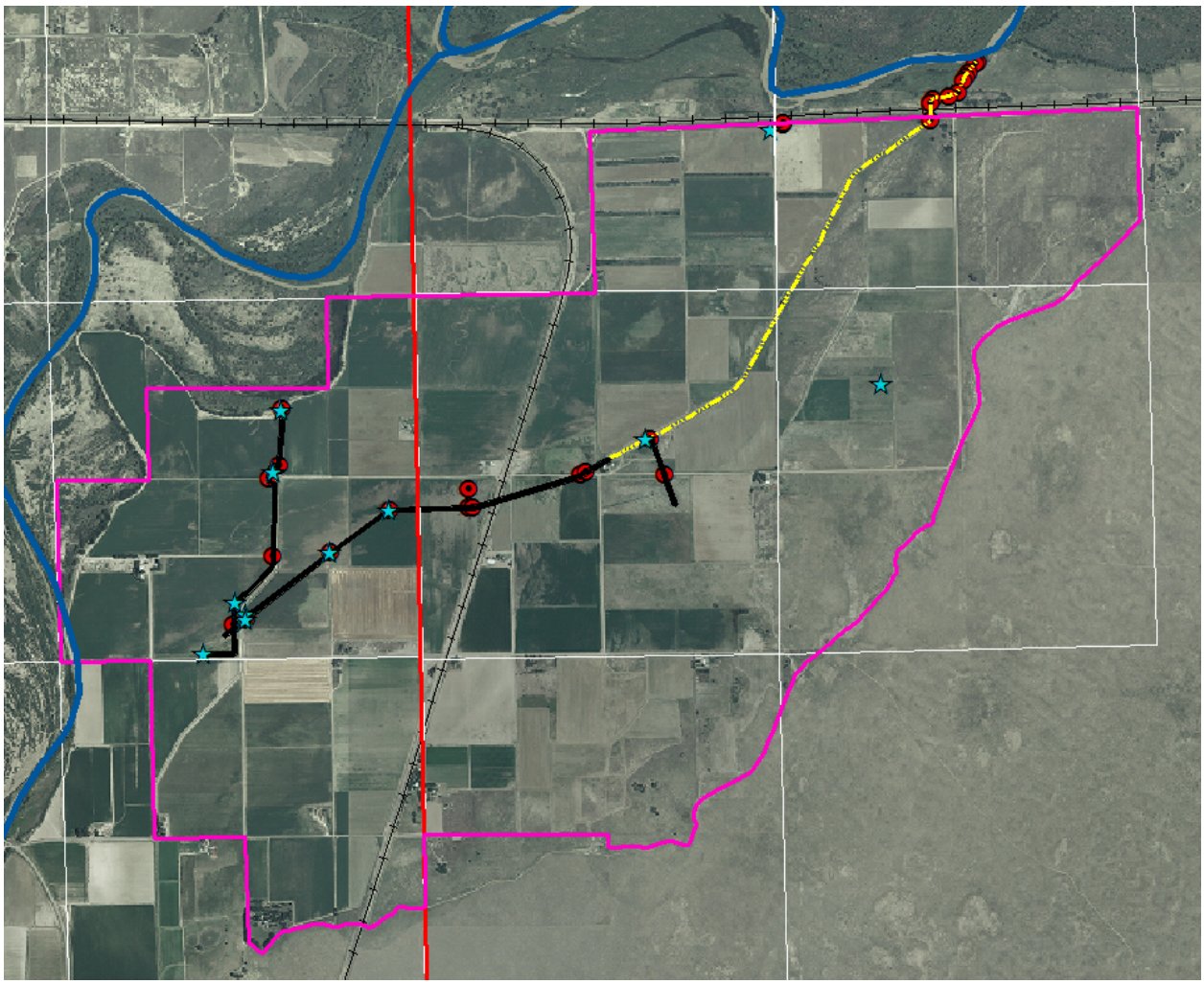
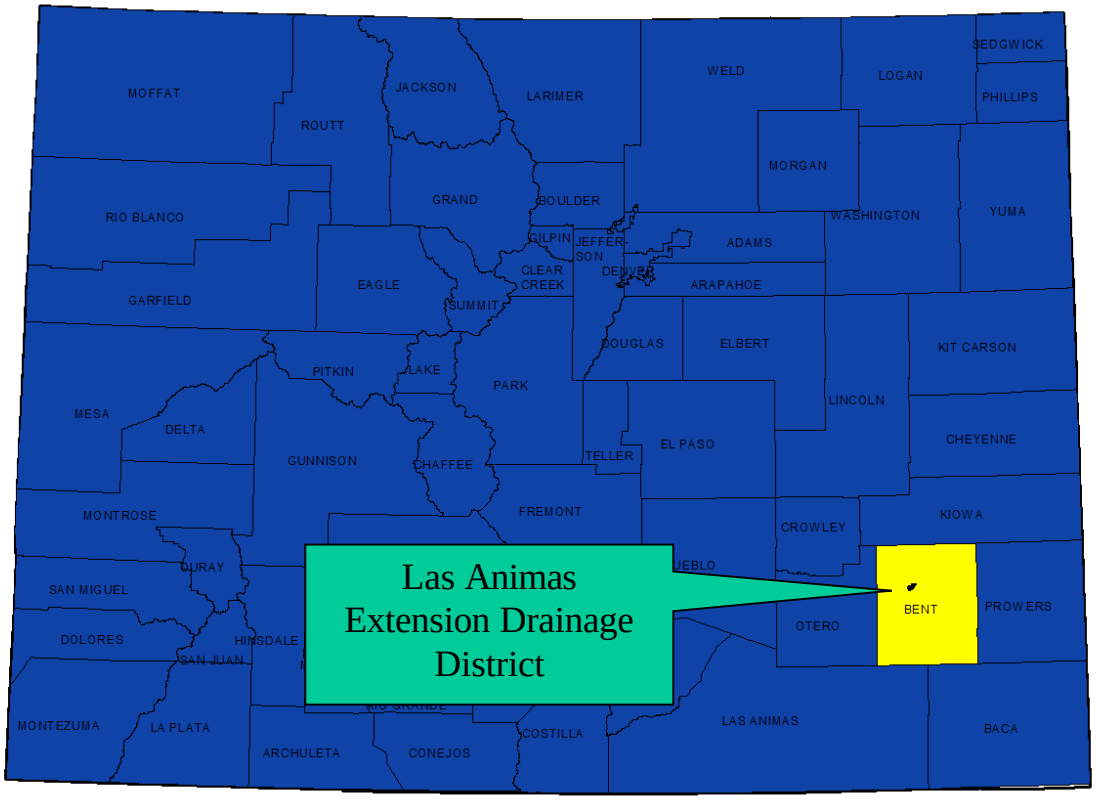
Las Animas Extension Drainage District
Drainage System Inventory

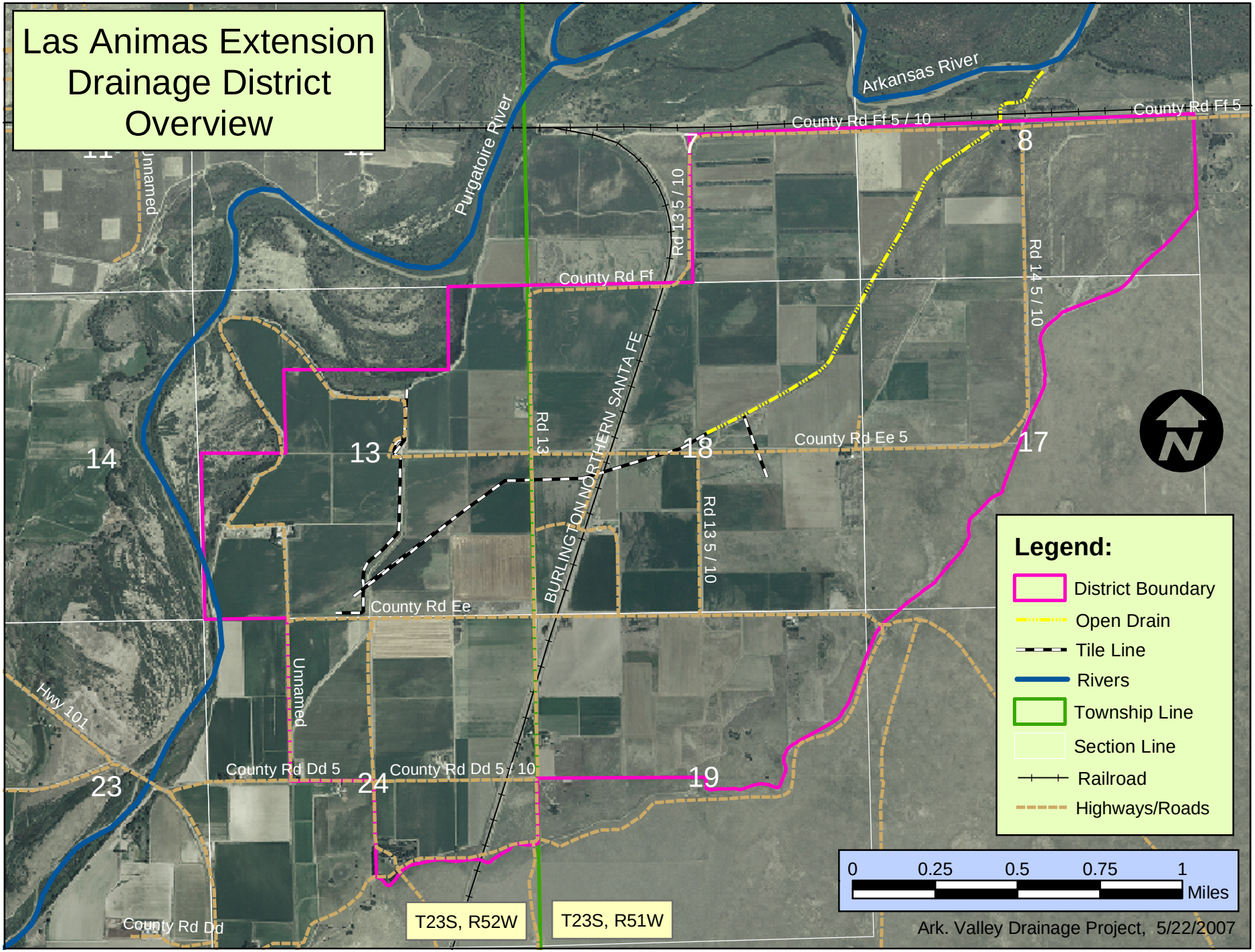


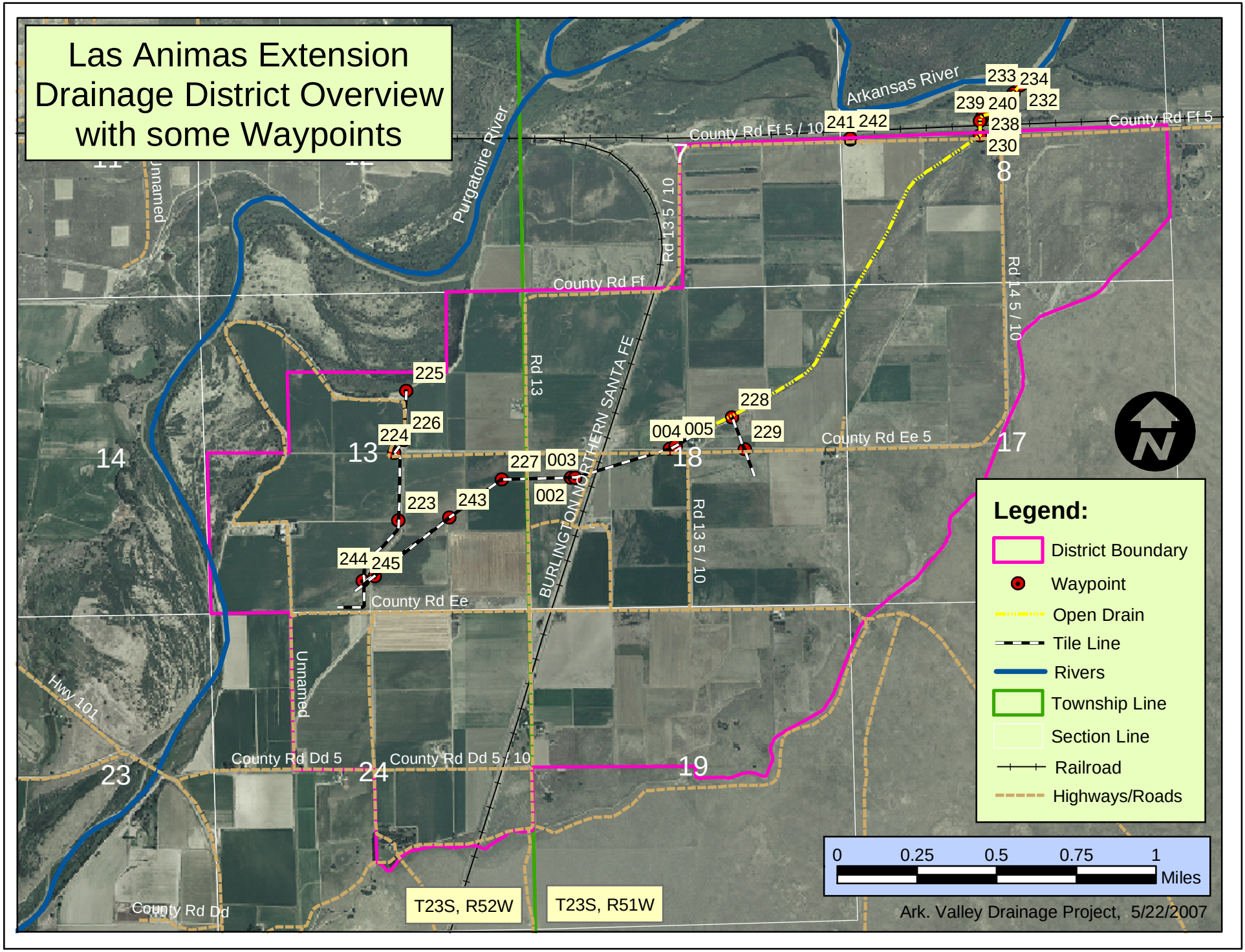
March 22, 2005, Rev. 7/24/07

Prepared by: Loyde Gardner, Walter Epley
The Lower Arkansas Valley Drainage System Rehabilitation Study
Colorado State Univ., Dr. John Wilkins-Wells, Sociology Water Lab
Clark Building B258, Fort Collins, CO 80523 Ph: 970-491-5635

Location of Las Animas Extension Drainage District In Colorado And Bent County




Las Animas Extension Drainage District Overview
Arkansas River
Purgatoire River
County Rd Ff 5 / 10
County Rd Ff 5
County Rd Ff
Rd 13 5 / 10
Rd 14 5 / 10
Rd 13
BURLINGTON NORTHERN SANTA FE
County Rd Ee 5
County Rd Ee
Rd 13 5 / 10
Unnamed
Unnamed
Hwy 101
County Rd Dd 5
County Rd Dd 5 / 10
County Rd Dd
7
8
14
13
18
17
23
24
19
T23S, R52W
T23S, R51W
Legend:
District Boundary
Open Drain
Tile Line
Rivers
Township Line
Section Line
Railroad
Highways/Roads
0
0.25
0.5
0.75
1
Miles
Ark. Valley Drainage Project, 5/22/2007


Las Animas Extension
Drainage District Overview
with some Waypoints
Arkansas River
Purgatoire River
Unnamed
County Rd Ff 5 / 10
County Rd Ff 5
County Rd Ff
Rd 13 5 / 10
Rd 14 5 / 10
Rd 13
BURLINGTON NORTHERN SANTA FE
Rd 13 5 / 10
County Rd Ee 5
County Rd Ee
Unnamed
Hwy 101
County Rd Dd 5
County Rd Dd 5 / 10
County Rd Dd
T23S, R52W
T23S, R51W
7
8
11
12
13
14
17
18
19
23
24
225
226
224
223
244
245
243
227
003
002
004
005
228
229
233
234
232
239
240
238
241
242
230
Legend:
District Boundary
Waypoint
Open Drain
Tile Line
Rivers
Township Line
Section Line
Railroad
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0
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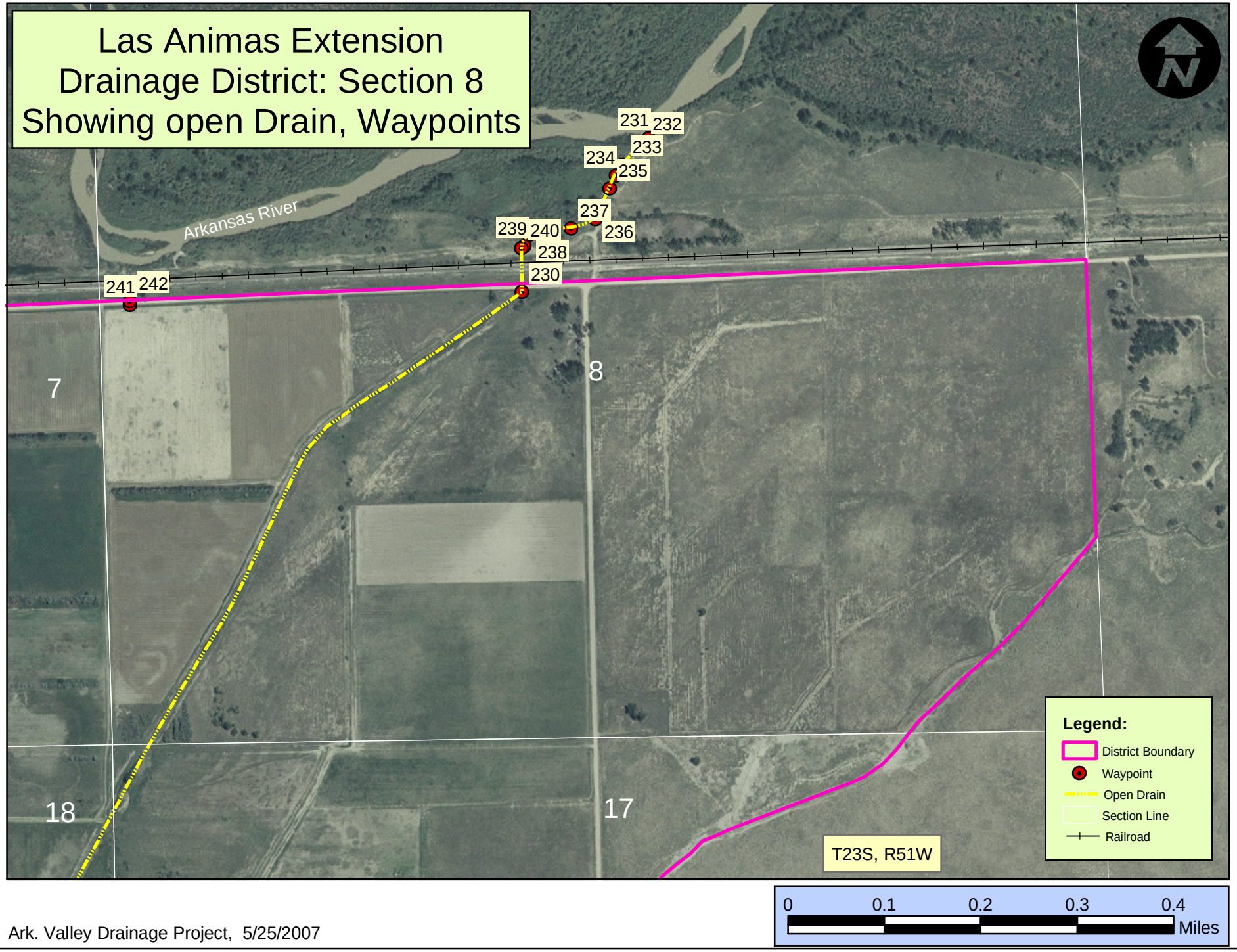
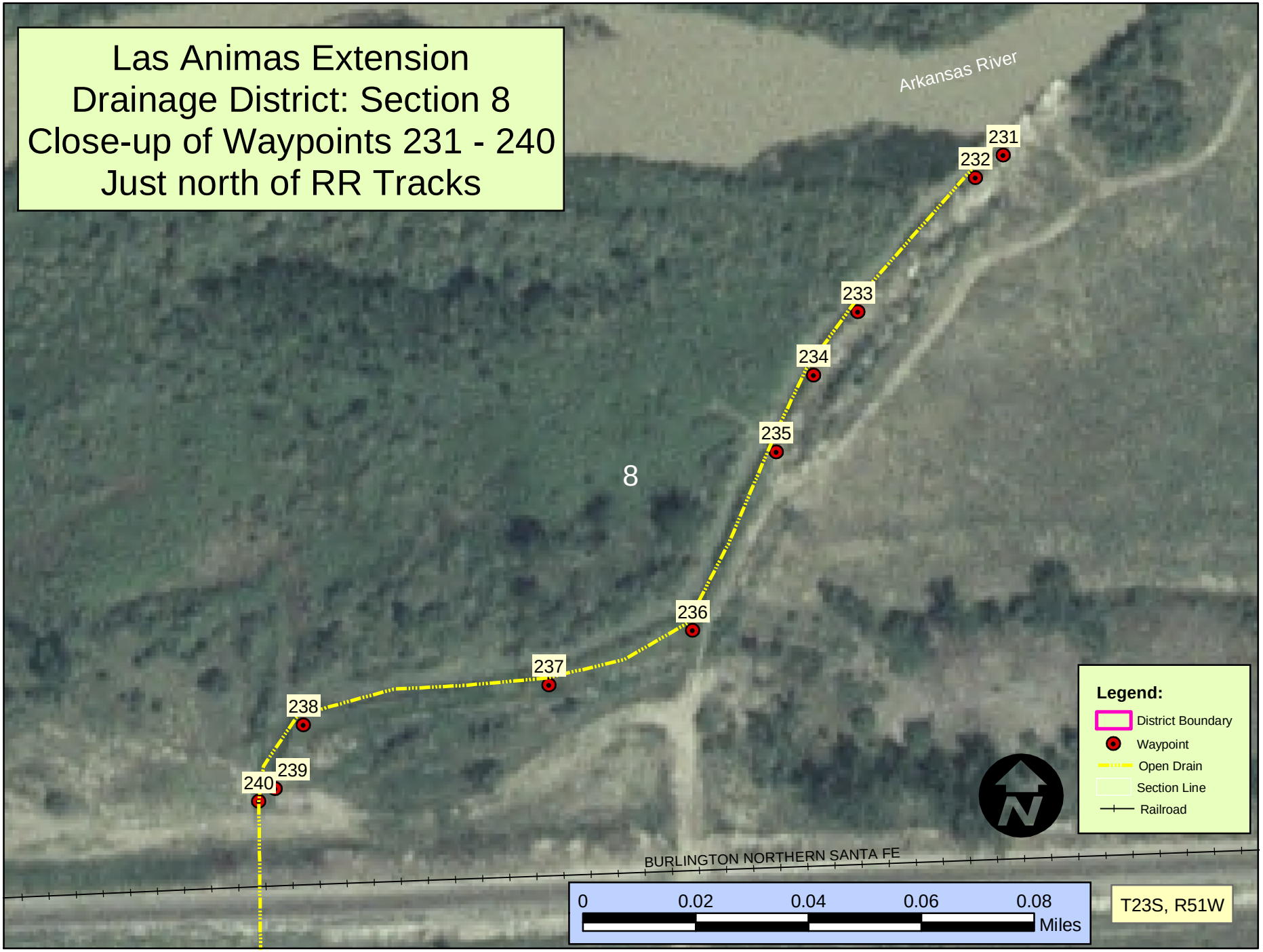
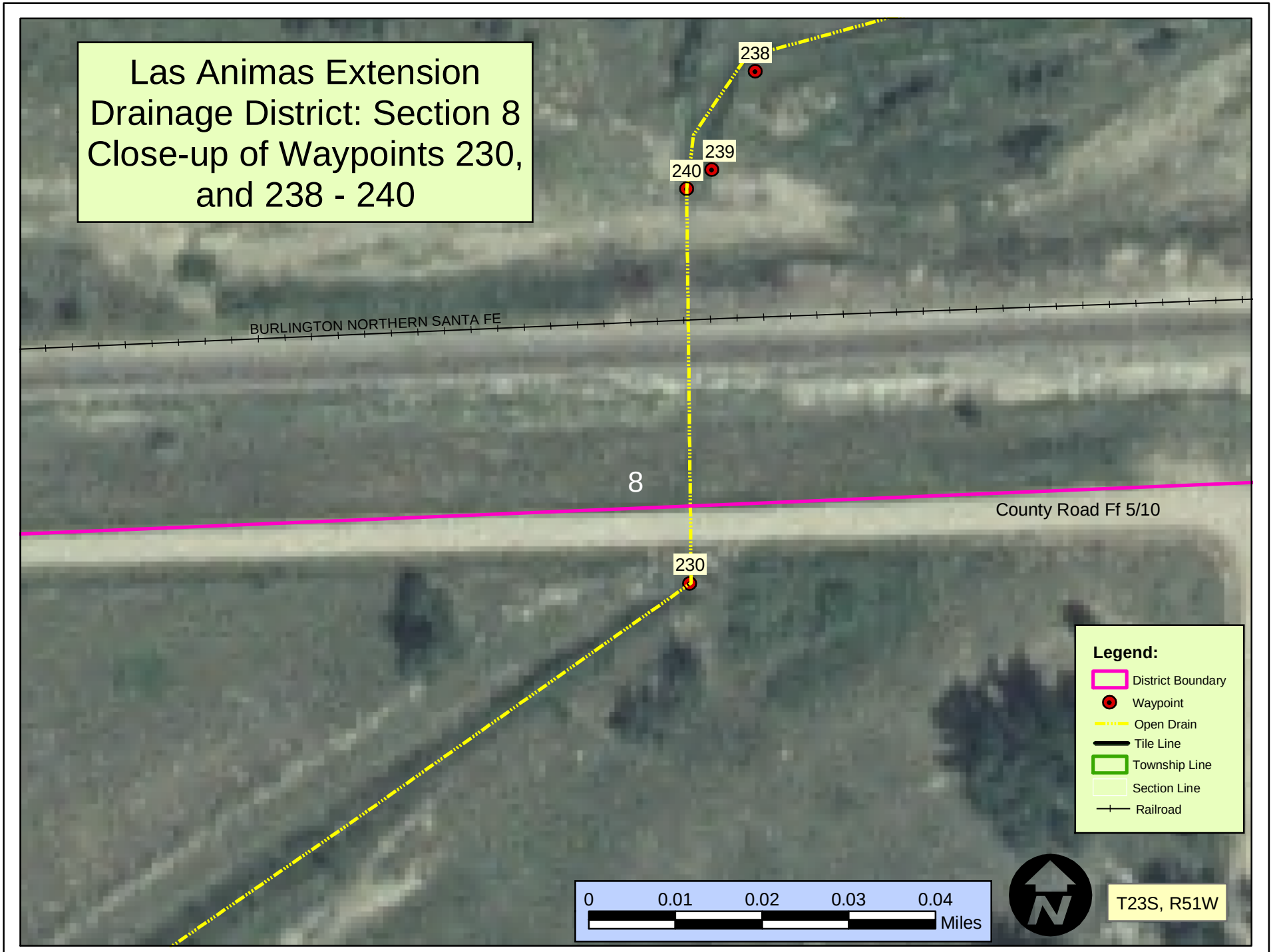
Ark. Valley Drainage Project, 5/22/2007



Ark. Valley Drainage Project, 5/25/2007

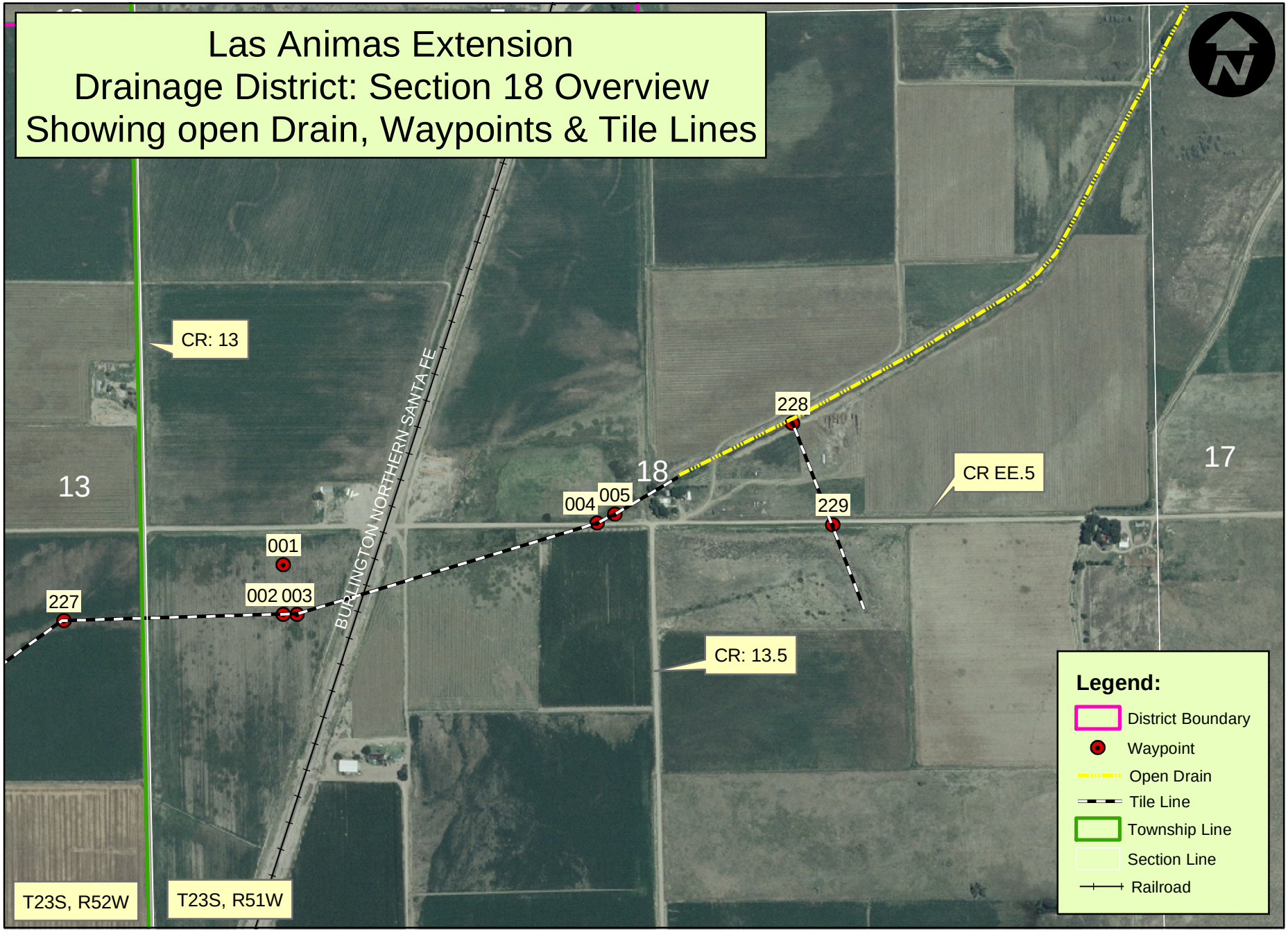


Ark. Valley Drainage Project, 5/25/2007

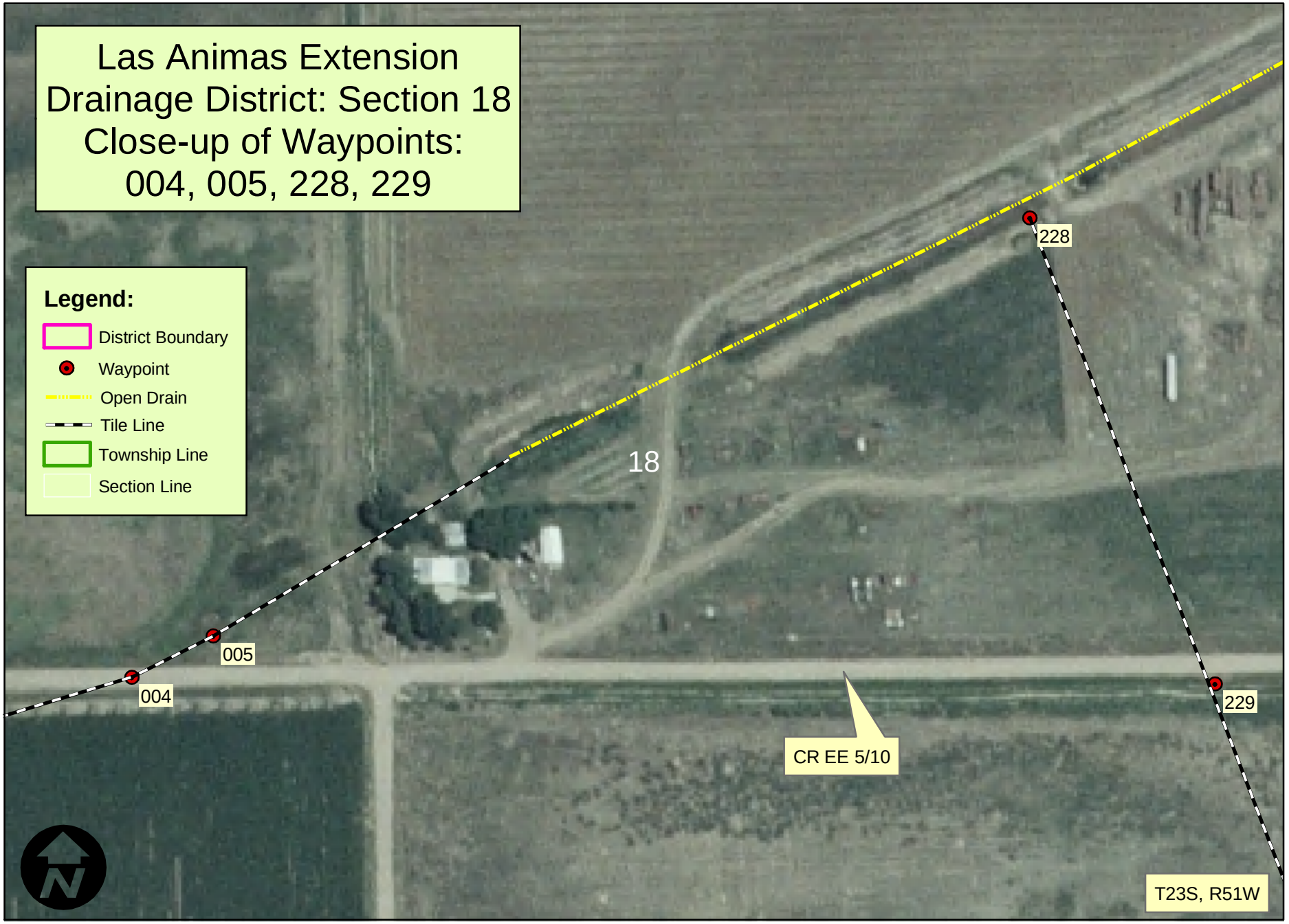


Ark. Valley Drainage Project, 5/25/2007

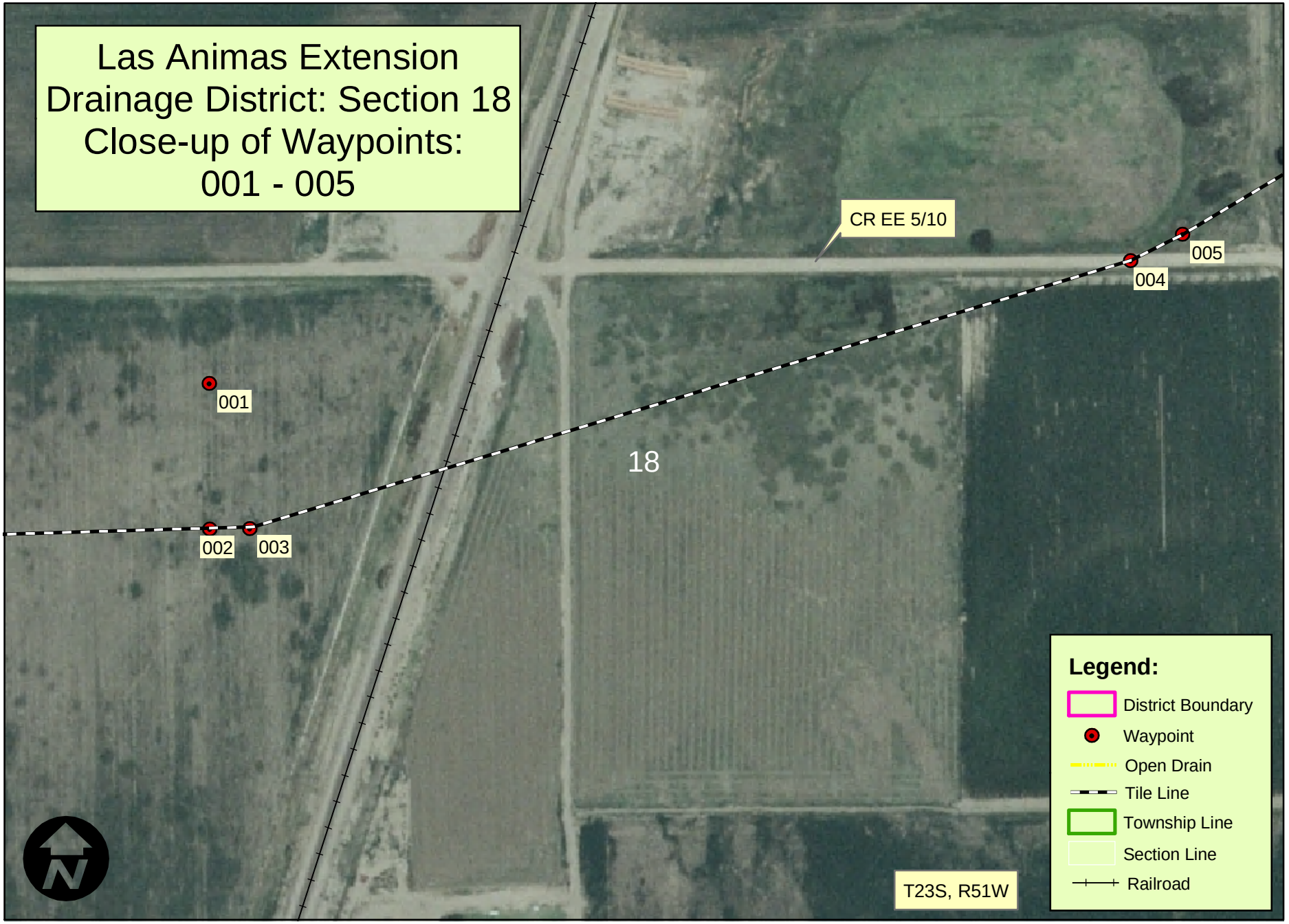
Ark. Valley Drainage Project, 5/25/2007



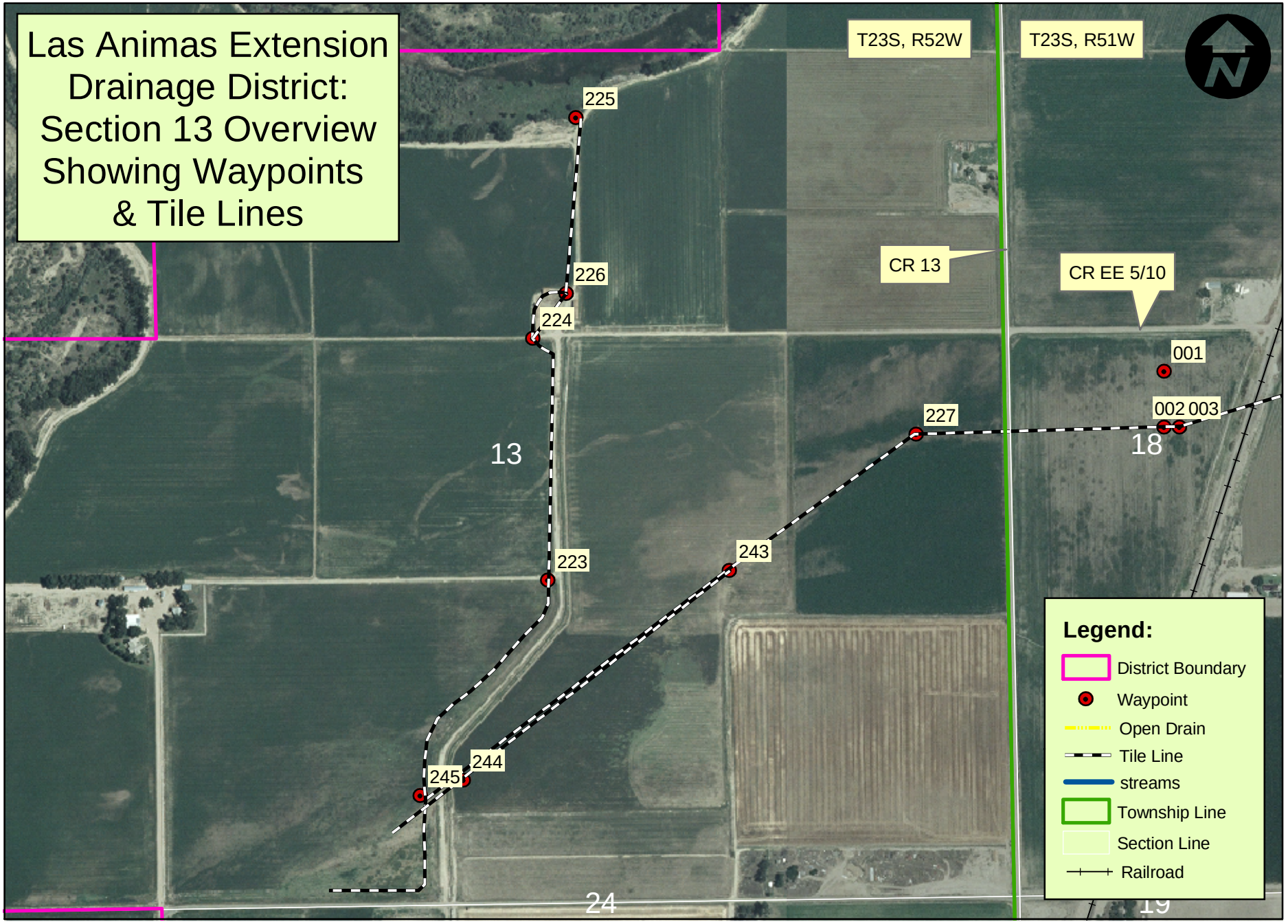
Ark. Valley Drainage Project, 5/25/2007



Ark. Valley Drainage Project, 5/25/2007

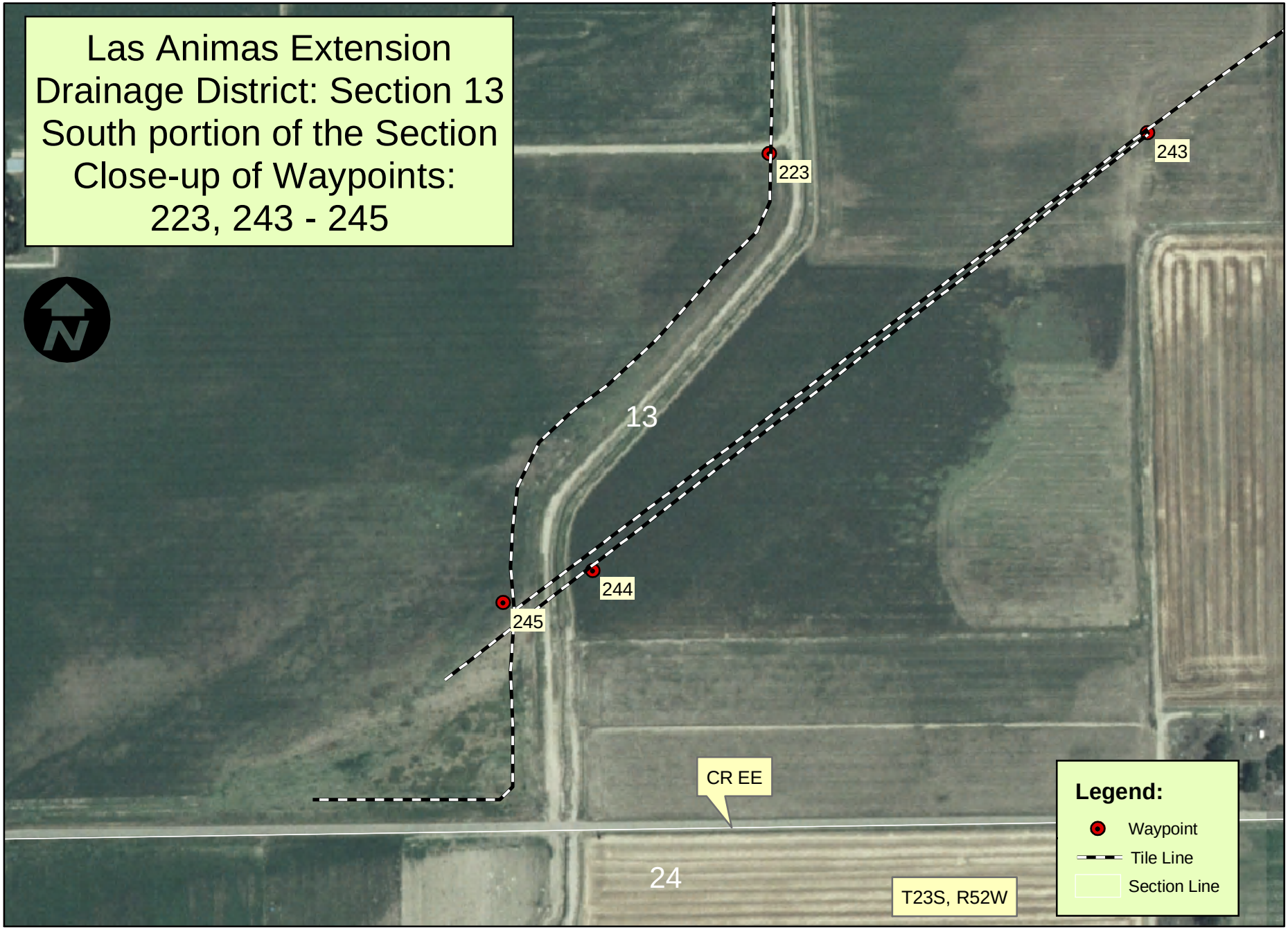


Ark. Valley Drainage Project, 5/25/2007



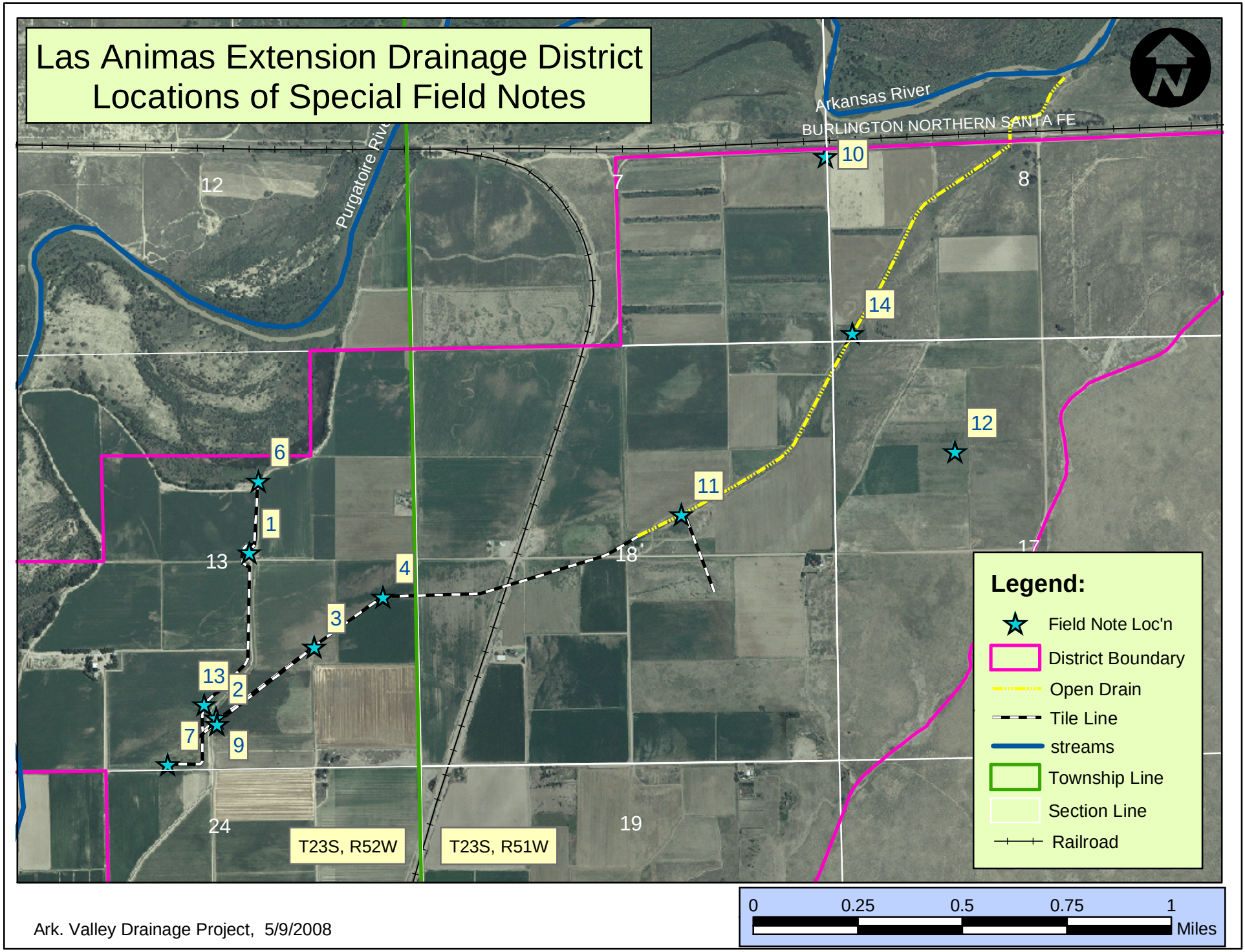
Ark. Valley Drainage Project, 5/25/2007

Ark. Valley Drainage Project, 5/25/2007

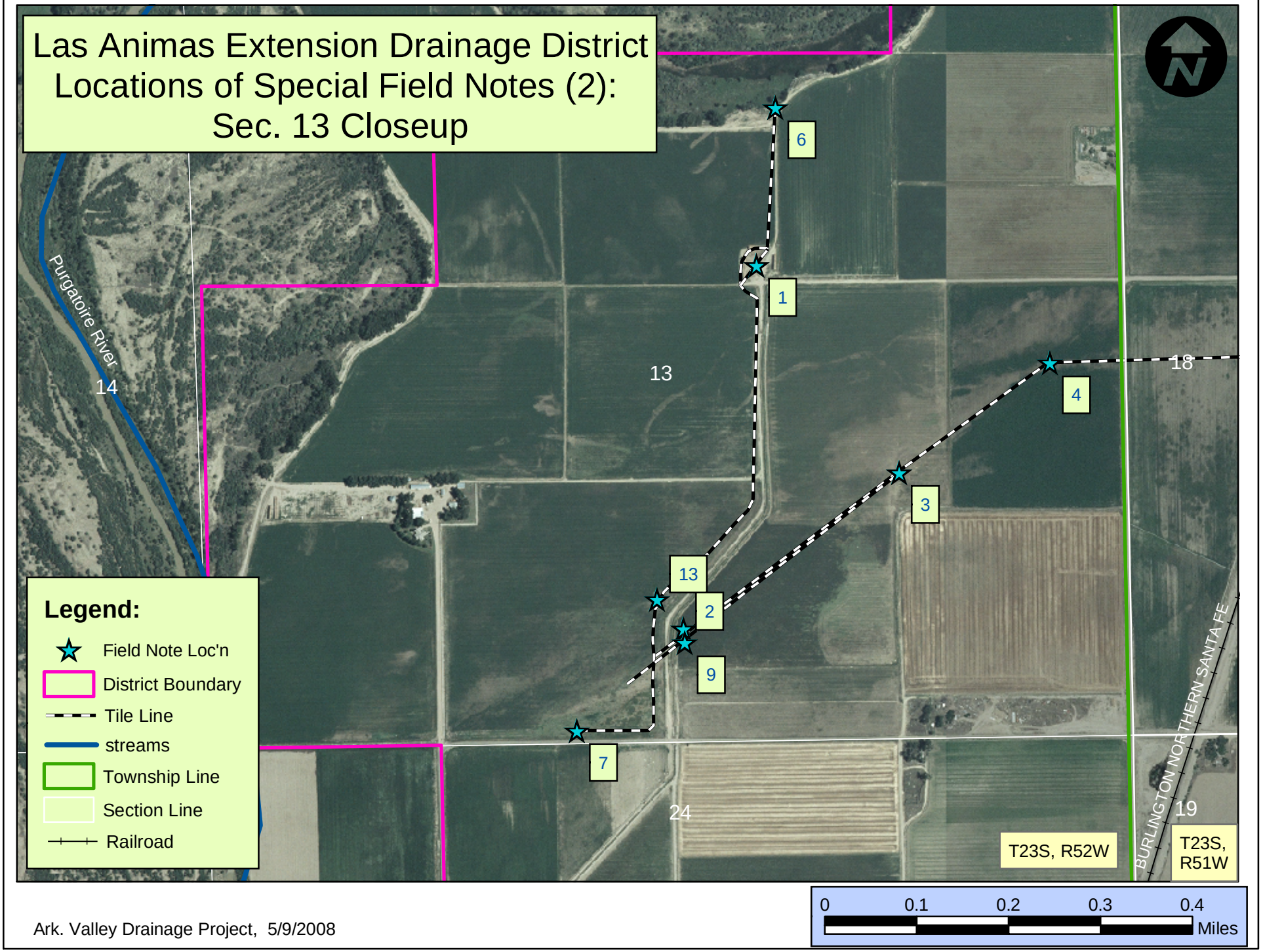


Ark. Valley Drainage Project, 5/25/2007

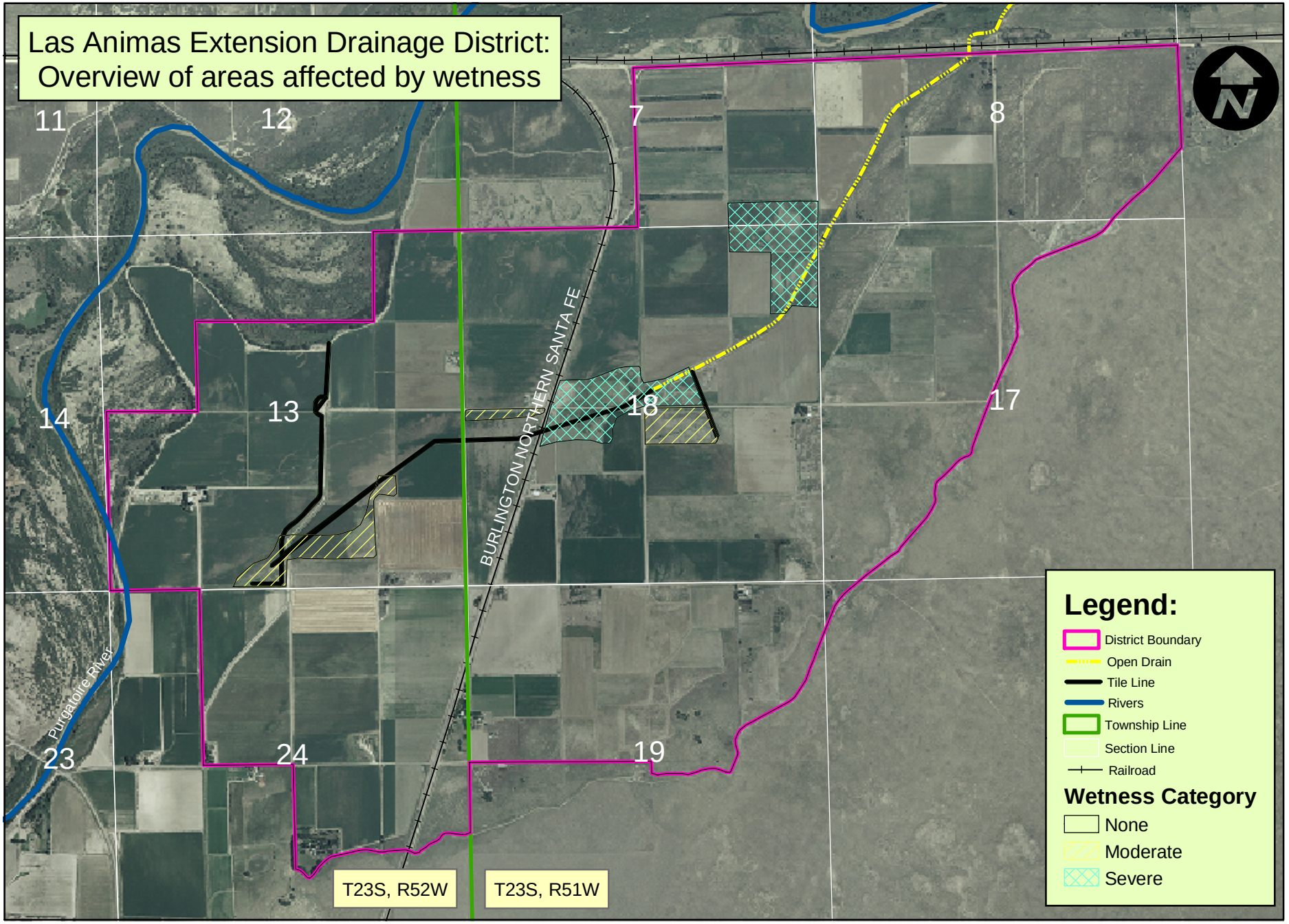
Ark. Valley Drainage Project, 5/25/2007



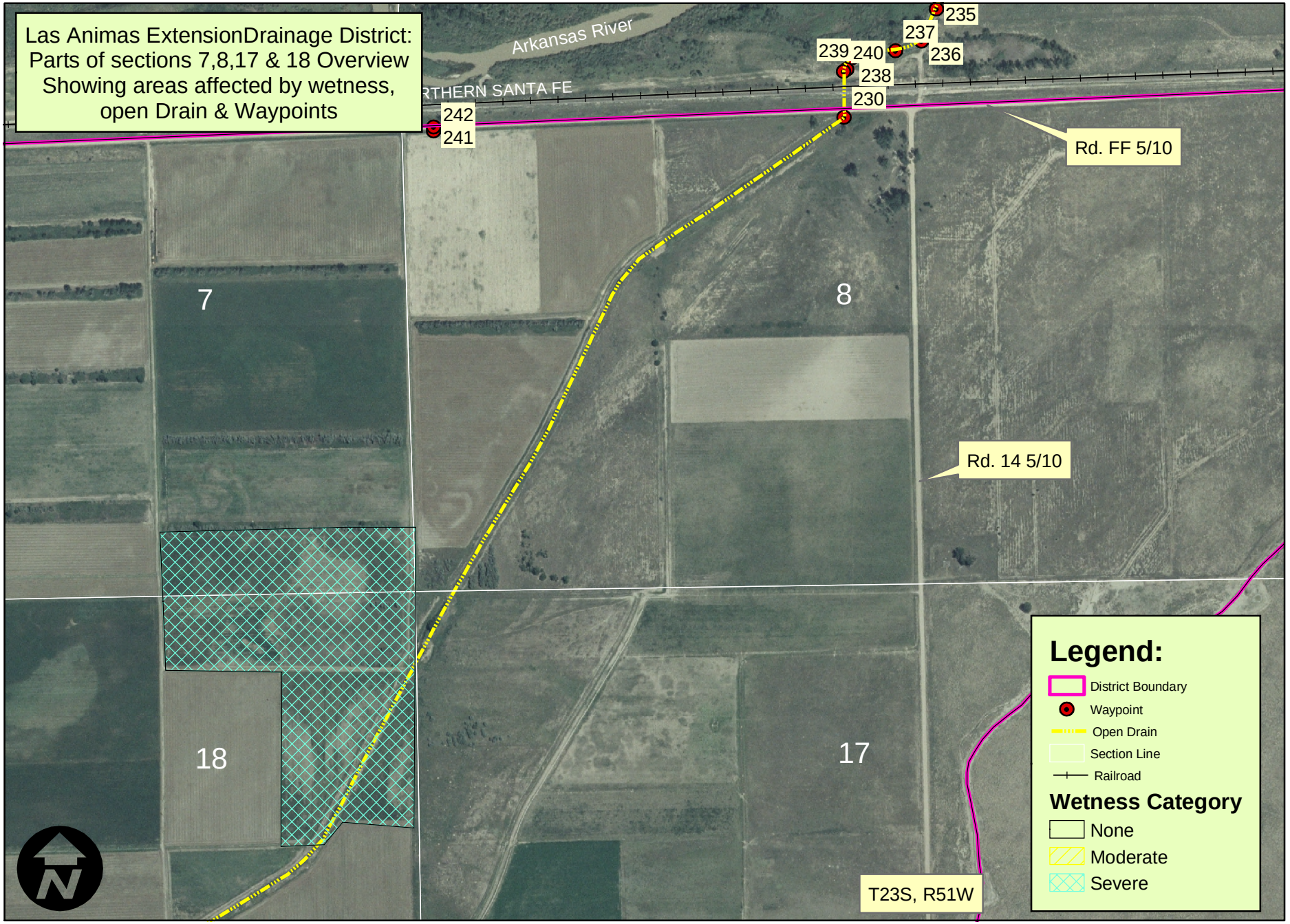
Ark. Valley Drainage Project, 5/9/2008



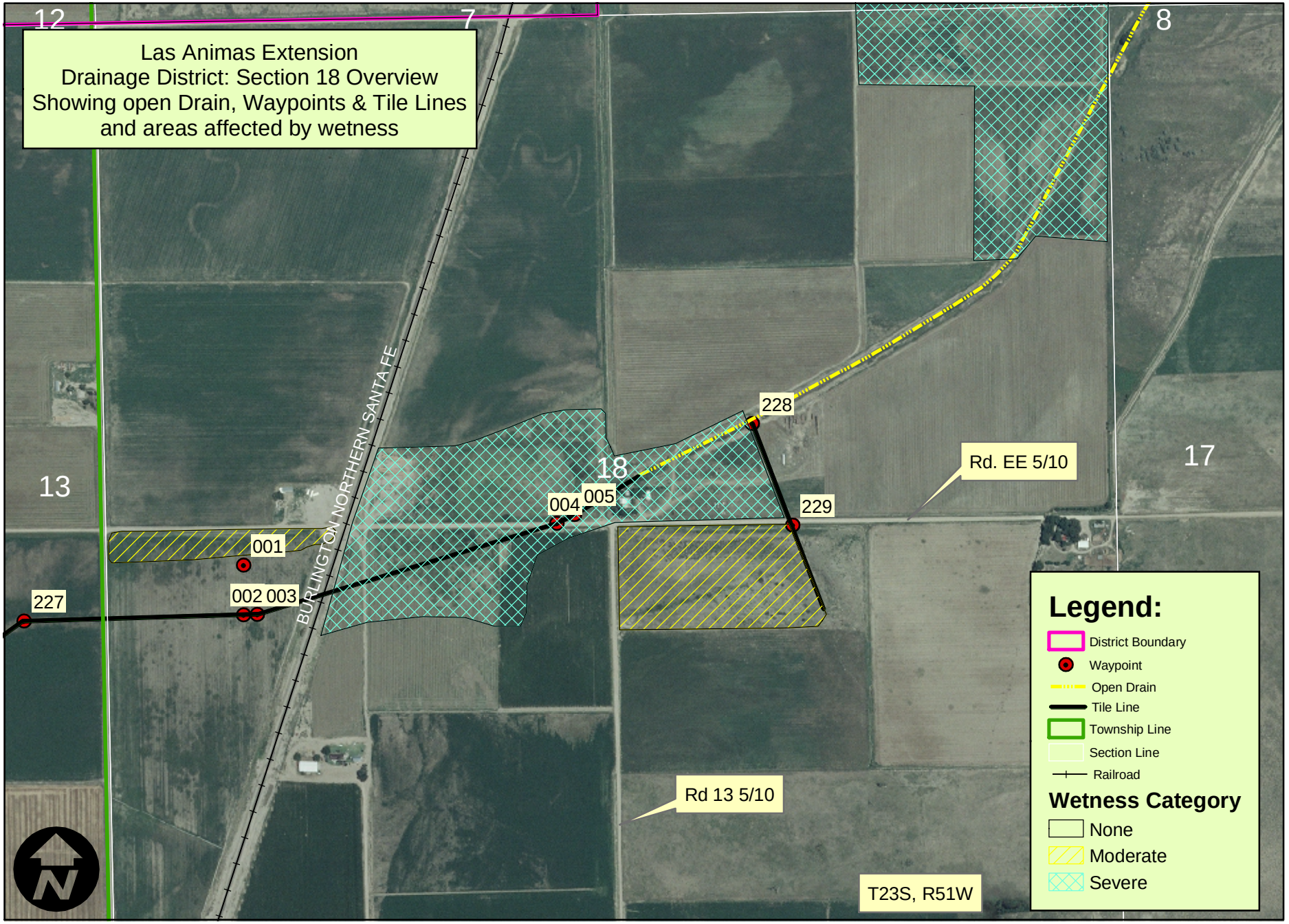
Ark. Valley Drainage Project, 5/9/2008



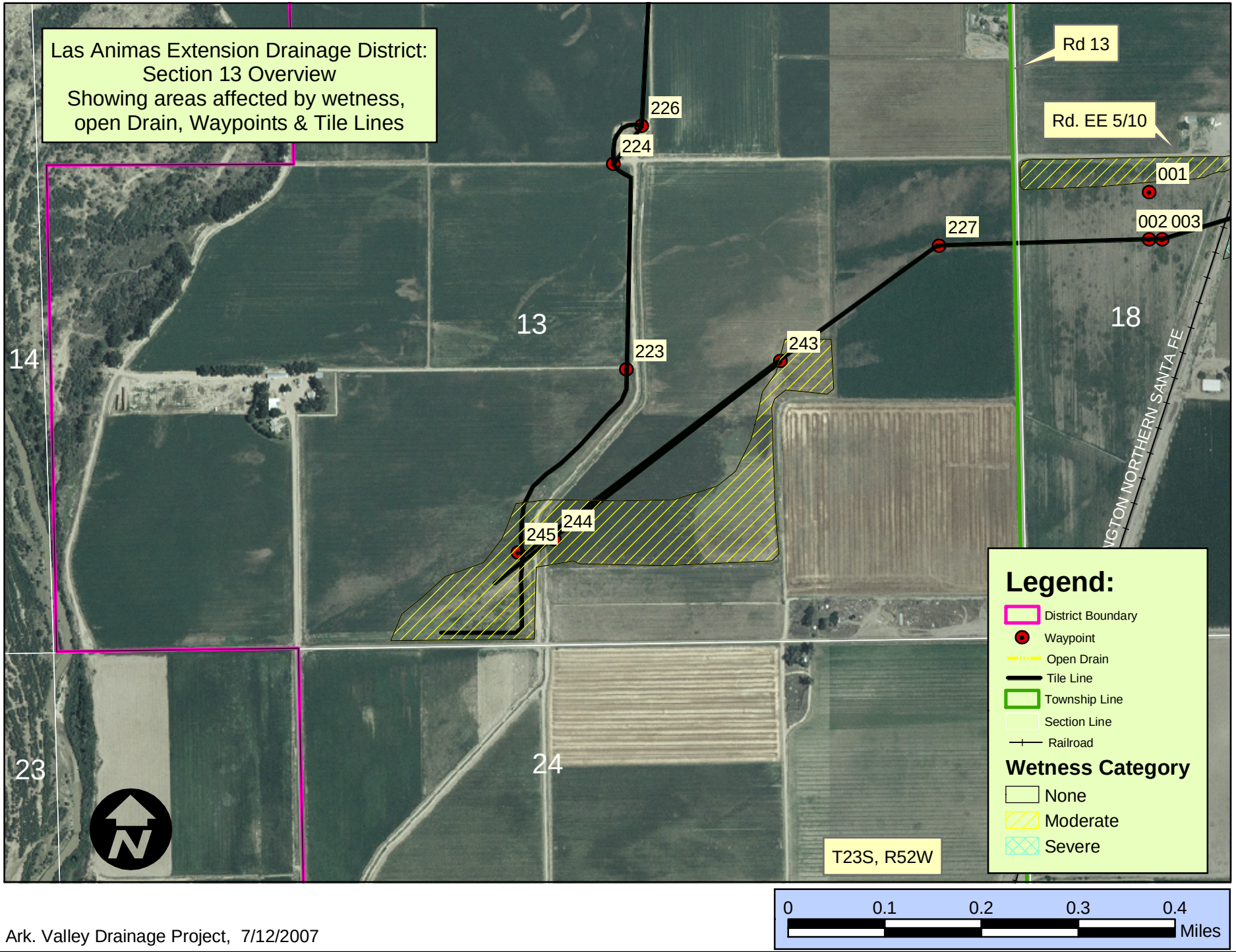
Ark. Valley Drainage Project, 7/12/2007



Ark. Valley Drainage Project, 7/12/2007



Ark. Valley Drainage Project, 7/12/2007



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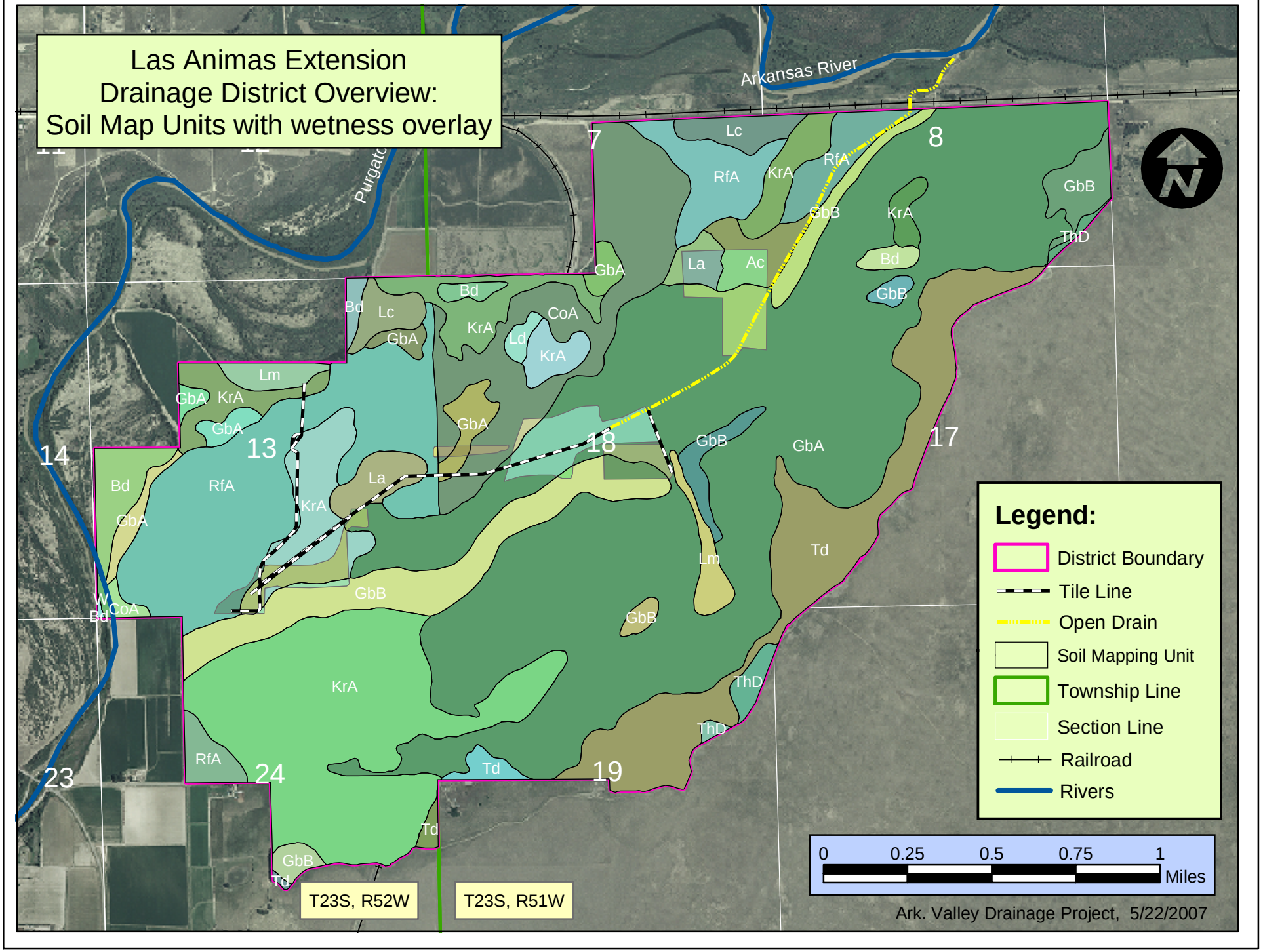
Las Animas Extension
Drainage District Overview:
Soil Map Units with wetness overlay
Arkansas River
Purgatoire
7
8
13
14
18
17
19
23
24
Lc
RfA
KrA
GbB
ThD
Bd
La
Ac
GbA
CoA
Lm
Td
Legend:
District Boundary
Tile Line
Open Drain
Soil Mapping Unit
Township Line
Section Line
Railroad
Rivers
0
0.25
0.5
0.75
1
Miles
T23S, R52W
T23S, R51W
Ark. Valley Drainage Project, 5/22/2007

Drainage District Infrastructure notes on the Las Animas Extension Drainage District located in Bent County, Colorado. This district includes all or parts of Sections 7, 8, 17, 18, 19, and 20 of T23S, R51W, and all or parts of Sections 13 and 24 of T23S, R52W.

Waypoints and notes were taken on February 10, 2005 and March 9, 2005, with the assistance of Loyde Gardner. We used the Garmin GPSmap76 handheld unit with a backpack differential correction unit for the waypoints. Additional notes on district operations were provided by Mr. Gardner, as well as help with the verification of the detail of district drain maps.

General Notes:
1. The Las Animas Extension Drainage District, is situated southeast of Las Animas, Colorado and the point at which the Purgatory River enters the Arkansas River. It lies on the floodplain of the Arkansas River, maintains open drains and tile lines designed to drain irrigated lands served by the Consolidated Extension Canal Company. On the southeast side, the district border is contiguous with the Consolidated Extension ditch. The district collects assessments for its operations through the Bent County Assessor.
2. For this report, we have located and identified the open drains and tile lines that are functioning as district drains based on visual inspection with the help of Mr. Loyde Gardner. In addition, we have used information from several sources including aerial photo interpretation. Archive files from the NRCS office in Las Animas were also used to assist in locating the elements of the drainage infrastructure. Black and white aerial photos from the NRCS, and color photos for the year 2005 were used to assist in the location of the open drains and tile lines.
3. Maintenance on the single main open drain in Sections 18 and 8 and the tile lines has been ongoing. Mr. Gardner indicates that the main drain needs cleaning every 3 years. Some black plastic tile has been added to the system with little success. The removal of beaver dams is a constant necessity in order to continue the movement water out of the district. An issue which looms ever larger is the silting in of the Arkansas riverbed, which, according to some sources, has raised approximately 8 feet. All land within the district is assessed at the same rate.
3. The spreadsheet included at the end of these notes includes the recorded waypoint number (ident), latitude, longitude, and date and time of reading.

First set of waypoints: 2/10/05 11:30 to 12:45 PM.
Loyde Gardner and Walter Epley using the Garmin GPS 76 handheld unit, took waypoints. Differential correction was accessed. The day was clear, with maybe a few clouds.

Waypoint 001:
Piece of tile in the field. It is said that these are “all over the place”.

Waypoint 002:
Manhole – there’s two here – on the west side of the two. SW ¼ of Sec. 18.

Waypoint 003:
Manhole – on the east side of the two: SW ¼ of Sec. 18, T23S, R51W.

Waypoint 004:
Manhole by the road – north side of road EE.5 (probably). NW ¼ Sec. 18. A nearby section of the "old" tile is 15 inch inside diameter clay tile with bell ends. In this general area and above it, irrigation water has recently been applied, and on this date it is running a lot of water, perhaps ¾ full.

Waypoint 005:
Hole – repair hole – broken tile in bottom. It was repaired and left open. Water in the bottom. Very near to Waypoint 4. The tile size here is an estimated 10 inch diameter.

Waypoints 006 – 222 (Unused)

Following is a second set of waypointstaken on 3/9/05: late morning into the early afternoon. Loyde Gardner and Walter Epley using the Garmin GPS 76 handheld unit, took waypoints. Differential correction was accessed. The day was clear.

Waypoint 223:
An 8" black plastic line that was chiseled in. Line goes north-south at this point. Crosses under field road at this point. Point taken at south side of field road. This is in the SE ¼ of Section 13, T23S, R52W.

Waypoint 224:
Located on an upright pipe, an observation point, overlying an 8" black plastic line that connects to line coming north from Waypoint 223. It angles to the southeast from Waypoint 224 to the field road and then south – see map. The tile line from here straight northeast to 226 is a white non –perforated 80# plastic. This is thicker then regular. This section was put in later, as the "loop" around the old farmplace plugged up with tree roots after being in place only a year. An original black plastic line goes around the old farmstead in a "loop". Loyde had to replace it with the white line in this area.

Waypoint 225:
Black tile dumps into ditch at this point. This would be in the NE ¼ of section 13, same TWP as above. From here to the bend just before waypoint 245 the tile line is a recent one put in by Loyde. It is black plastic 6 inch or perhaps 8 inch and it is non-perforated.

Waypoint 226:
The black plastic line is directly south of Waypoint 225, and makes a "Y" at this point. NE ¼ Sec. 13.

Waypoint 227:
Location of a manhole which has been covered over. At this point, several years ago, a cow fell into the hole left by the sink. Loyde and daughter pulled it out with the tractor, as it couldn't get out by itself. When it was let loose, it ran right back into the hole. This is on the eastern edge of Section 13, at about the middle of the section. There is old clay tile at this location, but it is not known how functional it is. Loyde put in 15-inch non-belled clay tile between here and the railroad to the east of this point. When we returned on 3/29/05, we could

speculate that this section might be working as the tile at Waypoint 004 – the manhole on the north side of the road to the east of here – was running rapidly and quite full if not totally full after an irrigation. From the railroad, extending eastward, a 12 inch clay tile was installed by Mr. Gardner.

Waypoint 228:
Outlet of a 6-inch old clay tile line draining from the southeast toward this location, into the main open ditch of the district.

Waypoint 229:
Located at an observation point, consisting of a 12" vertical metal corrugated pipe directly above a 6-inch clay tile line. This is on the south side of the road – just at the edge of it, maybe 5 ft or so off the side of the road. It has a triangular mesh screen on top of the ground surrounding the 10 or 12-inch corrugated pipe, which goes down to the tile. There is water at the bottom, which is 5 to 7 feet down. I took 2 photos at this point. Returned to this location on 3/29/05. Water was present at the bottom of the observation point, but was not "visibly" running.

Waypoint 230:
The main ditch temporarily ends at this point, going into a pipe under County Road Ff 5/10, and the RR tracks. Ditch at this waypoint lies in a northeastward – southwestward orientation. It is probably 6-9 ft deep with water at the bottom, maybe 3 feet or more. The ditch is at least 20 ft wide at the top. From this waypoint, it travels in the underground pipe straight north to a point on the north side of the railroad tracks, where the ditch is open again. This point is directly north of the opening under the tracks on the south side.The end of the tile is directly opposite a RR tie which is upright in the bank. The open ditch continues onward in an easterly direction toward the Arkansas River, and angles to the northeast where it dumps into the river.

There is constant problem with beavers at this location, and southwestward to the southwest corner of section 8. The stick dams they build block the water and prevent drainage from the district system.

Waypoint 231:
Standing on the southeast bank, this is the point at which the open ditch dumps into the Arkansas River. A beaver dam just above this to the south, holds back water maybe a foot high or so.

Waypoint 232:
This waypoint is taken next to a beaver dam on the southeast side of the river, and on the bank of the open ditch.

Waypoint 233:
Ditch runs from the southwest at this point, toward the northeast. This point is on the east bank of the open ditch, which is 10 to 12 ft. wide at this point, and 1 – 2 foot deep.

Waypoint 234:
We are going "up-ditch" here a bit toward the southwest

Waypoint 235:
The first big beaver dam south of the river with sticks and mud holding back the water. It holds back the water at least 2 ft of height. At this point, the ditch widens considerably, widening back westerly into the "swamp". Mr. Gardner reports that this beaver dam was dug out with a backhoe on the 15th of March, 2005, and on the 29th of March, the beaver had put back in/replaced a dam that was about 1 foot high.

Waypoint 236:
Bend in the open ditch from the river toward a west-southwesterly orientation. It appears that the water may be deep here, 6 or 7 ft or more, and 18 ft wide at the top.

Waypoint 237:
Slight bend in the open ditch, to an east-westerly orientation.

Waypoint 238:
Location of a bend to a north-south orientation, as open ditch goes under the RR tracks. The tip of the culvert underneath the railroad track bank extends maybe 8 ft. into the open ditch. At this point, it is covered with water – at least 2 ft of water.

Waypoint 239:
On the east bank of the open ditch, "even" with the tip of the culvert in a North-south way.

Waypoint 240:
End of the open ditch just north of the RR track. I'm at the top of the bank (ditch bank) at the centerline of the ditch. It goes from here straight south under the RR track, which runs straight east west. The culvert is at least 18 inches in diameter.

Waypoint 241:
South side of the east-west county road "FF.5", running parallel with and on the south side of the tracks. This location is at south end of culvert running under the road. Mr. Gardner indicates that the tile originally dumped into this culvert at this point. At this time, there is no water running at this location.

Waypoint 242:
This is at the north edge of the road directly above the culvert, which goes under the road, which used to receive water from the old tile line. There is no evidence of water running through it today. It appears that it has been like this for a long time.

Waypoint 243:
This waypoint is located directly over an old line going southwest. There are two lines here, side-by-side. Mr. Gardner installed one a while ago, right beside the old one, perhaps 6 ft or so apart. The two lines run parallel to each other, with the newer line being black plastic.

Waypoint 244:
Black plastic drainage tube ends at this location.

Waypoint 245:
This is a rough estimate – within 50 ft or so – of the location of the upper end of the clay tile – the original tile ends here. The area near this point is wet. Mr. Gardner indicates that the old clay tile just "falls apart" sometimes when you dig it up. He says he put in black plastic, but that it plugged up after a year of operation or so. It is not thought that "rooting out", or attempting to clean out the old tiles will work. He is more inclined to put in new clay tile. In the notes we have outlined several "salty" or wet areas.

Special Field Note Points: (The ArcView shapefile database shows the point numbers under "ID" for this shapefile. These are distinct and separate points from the "waypoints" taken by the GPS unit above. These points are for noting things about particular locations on the map.)

Point 1. Black plastic – 8 inch – with perforated holes. This line only worked about a year. It gradually slowed. The outlet to this line is Waypoint 225. Chiseled this in with "Big Bud". It didn't work. The upper end is packed with gravel. The holes are "slits".
Points 2, 3: There are two lines here, between these points. The old clay is on the south side. The 8 inch black plastic is on the north side. They are about 4 ft apart.
Point 4: Is the same as Waypoint 227. This is where the cow fell into the hole a number of years ago. This is an old manhole. The tile was broken here, but was repaired. There was still a hole left, which cattle got in. One got in and couldn't get out. See the story above. This had been covered over sometime in the past. Loyde says that from here to the railroad, he put in 15 inch non-belled clay tile.
Point 6: This is the same as waypoint 225, where the 8 inch black plastic line dumps into a ditch. At another point in time, Loyde says this is a 6 inch line.
Point 5: (point not enumerated or shown)
Point 7: From points 6 to 7, the 8 inch black plastic line was chiseled in by Big Bud – Caldwell Pipe Shop north of Rocky Ford on Highway 71 to Limon.
Point 9: (put point on map out of memory, not when we were in the field). This is the point where the old line ends.
Points 10, 11: The old line between these points – an old clay tile – 12 inch – sanded up. The elevation was too low.
Point 12: The old lines – angled in two places – see archive map – between points 10 and 12 – Loyde says were never in place.
Point 13: The location where the installed tile line changes from black plastic non-perforated to perforated/serrated black plastic. From this point to Waypoint 225 the black plastic line is non-perforated.
Point 13 to Point 7: newer tile line is perforated and packed with gravel. From point 13, to Point 6 the tile was non-perforated because tree roots would get in and would plug it up. Loyde says the tree roots can get in the smallest hole and completely fill up or plug up a tile line, even in a year or so.

Point 14 to the river: This area is heavily affected by the activities of beaver. The constant dam-building activity of the beavers causes drain water backup which must be cleaned out frequently, oftentimes as frequent as every month or so.

There are areas that are too wet to farm. See the “wet/salty” areas shapefile, or map. They are put in grass because they are too wet to farm.
Mr. Gardner, reflecting on his experience with tile lines, recalls that engineers say that "if you put in 12 inch tile, you’ve got a problem. If you put in 15inch tile, you’ve got a “REAL” problem". There’s something about the size, and the surface area and the flow dynamics that cause trouble with the larger tile sizes.
3/29/05: Survey report shows the outlet area to be the lowest one within a mile on either side of the outlet under the railroad. There is a deep sense that the damming of the Arkansas River has caused the silting up of the riverbed, and thus the loss of “fall” between the District outlet and the river. This has created damaging problems in that the drainage water will not exit the area.
Summary:
It is Mr. Gardner's opinion that cleaning the lines won't work. He feels it is better to put in new clay tile. Black plastic, he says, "works for only about a year, then slows down and stops". There are several areas that are too wet because of water and salt that need to be drained. The beavers are hampering the drainage in the spring, but their dams will be removed.

Notes on the Drainage Infrastructure:
Total Acreage in District: 2,477.10 acres
Not affected by wetness: 2,367.53 acres
Areas of Moderate effect: 38.37 acres
Areas of Severe effect: 71.20 acres

Length of tile lines installed: 13,870.1 feet
Length of open drains: 8.311.8 feet

Possibilities for maintenance and repairs:
Cleaning all the tile lines: 13,870 feet.

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Phone Off: 970-491-5635
Cell: 303-842-0265

Las Animas Extension
Drainage District
Waypoint Database

	A	B	C	D	E	F	G
1	Ident	Type	Descript	TileSiz_in	TileType	Townshp	Range
2	1	Location	Piece of Tile found on surface in Field	0	None	23	51
3	2	Manhole	Manhole - Wooden (Loyde thinks it is 10 inch, but not sure).	10	Clay Tile	23	51
4	3	Manhole	Manhole - Wooden	0	Clay Tile	23	51
5	4	Manhole	Manhole - wooden	0	Clay Tile	23	51
6	5	Open hole	Hole - Tile exposed (don't know the tile size here).	0	Clay Tile	23	51
7	223	Tile Line	North-South Line crosses under field road	8	Black Plastic	23	52
8	224	Observation Point	Connects to south to 223 angling to se to field road	8	Black Plastic	23	52
9	225	Outlet	Black Plastic line dumps into open ditch	8	Black Plastic	23	52
10	226	Tile LIne	Line makes a "Y" going south from 225	8	Black Plastic	23	52
11	227	Buried Manhole	Repair spot where manhole used to be	10	Clay Tile	23	52
12	228	Outlet	Outlet of clay tile line into main ditch from southeast	6	Clay Tile	23	51
13	229	Observation Point	12 inch corrugated pipe sticking up a foot w/ protective screen	6	Clay Tile	23	51
14	230	Open Ditch	End of open main ditch: goes under RR track	0	none	23	51
15	231	Open Ditch	Open ditch dumps into Arkansas River	0	none	23	51
16	232	Location	beaver dam on open ditch next to river	0	none	23	51
17	233	Open Ditch	Upstream on open ditch	0	none	23	51
18	234	Open Ditch	Upstream on open ditch	0	none	23	51
19	235	Location	Large beaver dam on open ditch	0	none	23	51
20	236	Open Ditch	Bend of open ditch to southwest	0	none	23	51
21	237	Open Ditch	Slight bend in open ditch	0	none	23	51
22	238	Open Ditch	Open ditch bends due south to RR tracks	0	none	23	51
23	239	Open Ditch	East bank of open ditch even with tip of culvert under RR track	0	none	23	51
24	240	Open Ditch	End of open ditch just north of RR track	0	none	23	51
25	241	Buried Outlet	Outlet of old clay line is buried here in ditch(don’t' know size).	0	Clay Tile	23	51
26	242	Location	North edge of road above culvert across from 241	0	none	23	51
27	243	Tile Line	On top of old clay tile line heading southwest upstream	8	Clay Tile	23	52
28	244	Tile Line	End of black plastic drainpipe line	8	Black Plastic	23	52
29	245	Tile LIne	Original clay tile line ends at this point	0	Clay Tile	23	52

Las Animas Extension
Drainage District
Waypoint Database

	A	B	H	I	J	K	L	M	N
1	Ident	Type	Section	SecLocn	OthDescr	Certitude	Lat	Long	Comment
2	1	Location	18	SW 1/4		VIS ID	38.0477	-103.177	2/10/2005 11:42
3	2	Manhole	18	SW 1/4	west side of this set of two manholes	VIS ID	38.04699	-103.177	2/10/2005 11:45
4	3	Manhole	18	SW 1/4	east side of this set of two manholes	Vis ID	38.04699	-103.177	2/10/2005 11:46
5	4	Manhole	18	NW 1/4	by road on n side in the shallow ditch	Vis ID	38.04821	-103.171	2/10/2005 11:54
6	5	Open hole	18	NW 1/4	near by pt. 4 just to east out in field about 50 ft.	Vis ID	38.04834	-103.171	2/10/2005 11:57
7	223	Tile Line	13	SE 1/4	South side of field road	Recall	38.0452	-103.187	3/9/2005 11:20
8	224	Observation Point	13	NE 1/4	on field boundary_it is a pipe sticking up 4'	Vis ID	38.04828	-103.187	3/9/2005 11:26
9	225	Outlet	13	NE 1/4	flow is northward at this point	Vis ID	38.05107	-103.186	3/9/2005 11:31
10	226	Tile LIne	13	NE 1/4		Recall	38.04884	-103.186	3/9/2005 11:35
11	227	Buried Manhole	13	SE 1/4	Not sure of tile size: Cow fell into sinkhole here	Recall	38.04696	-103.181	3/9/2005 11:42
12	228	Outlet	18	NE 1/4		Vis ID	38.0496	-103.167	3/9/2005 11:51
13	229	Observation Point	18	SE 1/4	In shallow roadside ditch next to the road	Vis ID	38.04813	-103.167	3/9/2005 11:58
14	230	Open Ditch	8	SW 1/4		Vis ID	38.06219	-103.153	3/9/2005 12:06
15	231	Open Ditch	8	NE 1/4		Vis ID	38.06447	-103.15	3/9/2005 12:25
16	232	Location	8	NE 1/4		Vis ID	38.06442	-103.15	3/9/2005 12:27
17	233	Open Ditch	8	NE 1/4		Vis ID	38.06408	-103.151	3/9/2005 12:28
18	234	Open Ditch	8	NE 1/4		Vis ID	38.06392	-103.151	3/9/2005 12:30
19	235	Location	8	NE 1/4		Vis ID	38.06372	-103.151	3/9/2005 12:31
20	236	Open Ditch	8	NE 1/4		Vis ID	38.06327	-103.151	3/9/2005 12:33
21	237	Open Ditch	8	NW 1/4		Vis ID	38.06313	-103.152	3/9/2005 12:35
22	238	Open Ditch	8	NW 1/4		Vis ID	38.06304	-103.153	3/9/2005 12:37
23	239	Open Ditch	8	NW 1/4		Vis ID	38.06288	-103.153	3/9/2005 12:39
24	240	Open Ditch	8	NW 1/4		Vis ID	38.06285	-103.153	3/9/2005 12:40
25	241	Buried Outlet	8	SW 1/4	South side of road in ditch. Not visible.	Recall	38.06211	-103.16	3/9/2005 12:48
26	242	Location	8	SW 1/4		Vis ID	38.06217	-103.16	3/9/2005 12:49
27	243	Tile Line	13	SE 1/4		Recall	38.04528	-103.184	3/9/2005 12:57
28	244	Tile Line	13	SE 1/4		Recall	38.04267	-103.188	3/9/2005 13:02
29	245	Tile LIne	13	SW 1/4		Estimate	38.04248	-103.189	3/9/2005 13:09

Las Animas Extension
Drainage District
Soil Mapping Unit areas
by Wetness Category
Breakdown

OrigID	WETNCATEG	MUSYM	MUKEY	AREA_AC
1	Moderate	KrA	94248	14.89
1	Moderate	GbA	94243	1.96
1	Moderate	RfA	94276	3.41
1	Moderate	La	94250	0.12
1	Moderate	GbB	94244	1.90
2	Moderate	CoA	94237	2.47
2	Moderate	RfA	94276	0.24
2	Moderate	GbA	94243	0.96
5	Moderate	GbA	94243	6.50
5	Moderate	GbB	94244	5.93
6	None	KrA	94248	46.97
6	None	GbB	94244	14.33
6	None	KrA	94248	277.76
6	None	W	94294	1.98
6	None	GbA	94243	893.43
6	None	Lc	94251	18.00
6	None	RfA	94276	44.94
6	None	CoA	94237	153.30
6	None	GbB	94244	19.66
6	None	RfA	94276	29.30
6	None	KrA	94248	23.46
6	None	Bd	94234	6.83
6	None	Bd	94234	0.49
6	None	CoA	94237	4.34
6	None	GbB	94244	5.01
6	None	GbB	94244	7.55
6	None	KrA	94248	35.14
6	None	ThD	94287	2.12
6	None	ThD	94287	9.07
6	None	ThD	94287	2.50
6	None	GbB	94244	22.46
6	None	Bd	94234	5.18
6	None	KrA	94248	8.73
6	None	Lm	94254	13.18
6	None	GbA	94243	3.70
6	None	RfA	94276	218.32
6	None	RfA	94276	14.98
6	None	KrA	94248	25.14
6	None	GbA	94243	5.89
6	None	Lm	94254	15.13
6	None	La	94250	5.23
6	None	Bd	94234	5.66
6	None	Ac	94229	15.40
6	None	Bd	94234	26.42
6	None	GbA	94243	7.39
6	None	GbA	94243	9.67
6	None	La	94250	19.95
6	None	GbB	94244	94.27

Las Animas Extension
Drainage District
Soil Mapping Unit areas
by Wetness Category
Breakdown

OrigID	WETNCATEG	MUSYM	MUKEY	AREA_AC
6	None	GbA	94243	7.45
6	None	Lc	94251	16.34
6	None	Td	94286	178.35
6	None	Td	94286	0.80
6	None	Td	94286	3.80
6	None	Td	94286	7.95
6	None	GbB	94244	5.02
6	None	Ld	94252	5.38
6	None	KrA	94248	15.18
6	None	GbA	94243	13.96
3	Severe	GbA	94243	32.76
3	Severe	CoA	94237	1.78
3	Severe	GbB	94244	0.59
4	Severe	GbA	94243	18.71
4	Severe	La	94250	7.57
4	Severe	Ac	94229	9.79
Total:				2476.69

D-100 SUMMARY OF DRAINAGE DISTRICTS

STATE Colorado

WATER DISTRICT OR AREA No. 17

220

SUMMARY OF DATA ON LAS ANIMAS EXTENSION DRAINAGE D. DATE October 1942

Irrigated by Consolidated Extension Canal Co.

GENERAL

LOCATION: STATE Colorado COUNTY Bent NEAR Las Animas

ACRES: GROSS 2351 ASSESSED 2351 SUSTAINING 1500

UNIT OF ASSESSMENT (1) Dollar of assessed benefits

TOTAL UNITS: ORIGINAL $60,606 SUSTAINING $40,000

UNITS OF ASSESSMENT PER ACRE: AVERAGE $ 24 MAXIMUM $ 63 MINIMUM $ 1

LIABILITY FOR DISTRICT OBLIGATIONS Liable to last faithful acre under R.F.C. contract

LOCATION OF ASSESSMENT RECORDS Angus McIntosh, Sec'y., Las Animas

LAND: BAD ALKALI 2 %; SLIGHT ALKALI 15 %; HIGH WATER TABLE 2 %; TREND stable in past - probable slight increase in future due to Caddoa operations

ELEVATION 3900 FT. AVERAGE GROWING SEASON 165 DAYS April 28 TO October 11

PRECIPITATION IN INCHES: ANNUAL AVERAGE 13.46; CHARACTERISTICS OF RAINFALL 79% from 4/1 to 10/1 Erratic-maximum 21.4";minimum 2.8"; maximum daily 3.4". Intense storms in summer

ECONOMIC & FINANCIAL CONDITIONS

GENERAL TAXES ON LAND AND IMPROVEMENTS: AVERAGE $1.25 PER ACRE

CAPITAL DEBT AS OF August 1 1942; BONDS $ 12,000 @ 4 % PAYABLE 1943-68 R.F.C.

WARRANTS $ @ % PAYABLE 19 ; OTHER DEBTS $ @ % PAYABLE 19

NET CAPITAL DEBT: $ 11,546 , ADJUSTED TO AN EQUIVALENT 6% BASIS $ 9413

OR $0.2353 PER SUSTAINING (1) Dollar of assessed benefits

B. & I. ASSESSMENTS FOR PERIOD 1936-41 AVERAGED $ 0.0203 PER (1) $1 of ass'd benefits

O. & M. ASSESSMENTS FOR PERIOD 1936-41 AVERAGED $ 0.0098 PER (1) $1 " " "

ESTIMATED FUTURE ANNUAL ASSESSMENTS PER SUSTAINING (1) dollar of assessed benefits

B. & I. $ 0.0181 O. & M. $ (1) 0.0075

HISTORY AND TREND OF DEBT AND ASSESSMENTS District issued $30,000 of 7½% bonds in 1920, payable 1931-1940. Indebtedness of $31,751 refinanced by R.F.C. in 1935 for $16,000 payable 1938-67. Payments ahead of schedule since that time. B&I assessments slightly below average of last 6 years anticipated in future, after reserve fund has been accumulated. Somewhat lower O&M assessments also anticipated.

THESE LANDS ARE all SUBJECT TO OTHER ASSESSMENTS BY Consolidated Extension Canal Co.

PHYSICAL CONDITIONS

EFFECTIVENESS OF SYSTEM AND ADEQUACY OF PAST MAINTENANCE System has been almost completely effective in past and maintenance has been adequate. Trouble with settlement of tile lines resulted in overhaul of system in 1939 and 1940, through the aid of a W.P.A. project. System now functioning satisfactorily and in good condition

AREA HAS not BEEN ZONED. (SEE ZONE DESCRIPTIONS IF IT HAS BEEN ZONED)

EXPECTED FUTURE ADEQUACY OF MAINTENANCE

Satisfactory and adequate maintenance may be expected in immediate future, but adequacy of system may be subject to impairment after Caddoa Reservoir commences flood operations. See reverse side.

CHARACTER OF FLOODS (2) No flood overflow. Erosion hazard at west end of area on small acreage abutting Purgatoire River.

RECOMMENDATIONS: APPRAISAL FACTORS IN (3) Percent of assessed benefits.

TOTAL DEDUCTION $ 23.53% UNTIL 19 December 1 1943

ANNUAL B. & I. $ 1.81% ANNUAL O. & M. 0.75%

(1) Dollar of assessed benefits, or dollar of assessed valuation, or acre- district's method of assessment

(2) Supplement by attaching gage record tables where available

(3) % of assessed benefits, or % of assessed valuation, or dollars per acre

(SEE REVERSE SIDE FOR ADDITIONAL INFORMATION)

over

FORM D-101 DRAINAGE DISTRICTS

STATE Colorado
WATER DISTRICT OR AREA No. 17

NAME OF DISTRICT LAS ANIMAS EXTENSION DR. DIST. DATE OF INSPECTION October 1942
Irrigated by Consolidated Extension Canal Co.
LAND LOCATION 3 MILES SE OF Las Animas
IN Bent COUNTY. TOWNSHIP 23S RANGE 51 & 52 W

ORGANIZATION

DATE OF ORGANIZATION September 18, 1919 UNDER LAW OF 1911 and 1919
AMENDMENTS TO ORIGINAL ORGANIZATION
ACRES: GROSS 2351 , ASSESSED 2351 , SUSTAINING 1500
UNIT OF ASSESSMENT (1) Dollar of assessed benefits
TOTAL UNITS: ORIGINAL 60,606 SUSTAINING 40,000
UNITS OF ASSESSMENT PER ACRE: AVERAGE $ 24 , MAXIMUM $ 63 , MINIMUM $ 1
LIABILITY FOR DISTRICT OBLIGATIONS Liable to last faithful acre under R.F.C. contract
NAME AND ADDRESS OF SECRETARY Angus McIntosh, Las Animas
LOCATION OF ASSESSMENT RECORDS " " " "

TYPE OF LAND

GENERAL Rectangular shaped area of bench land on east side of Purgatoire River. U.S.B.R. Classification: Class 1 - 73%;Cl. 2 - 25%;Cl.5 & 6 - 2%. 1800 a. cult.
TOPOGRAPHY
Undulating to gently sloping.
SOILS: PREDOMINANT TYPES Las Animas fine sandy loam 60%; Rocky Ford fine sandy loam 40%; underlain with clay loam at shallow depths.
PER CENT OF AREA: BAD ALKALI 2 %, SLIGHT ALKALI 15 %, HIGH WATER TABLE 2 %
TREND stable in past - probable slight increase in future.

CLIMATE

ELEVATION 3900 FT., AVERAGE GROWING SEASON 165 DAYS April 28 TO October 11
RAINFALL AT Las Animas STATION 4 MILES FROM DISTRICT - 13.46 inches
LENGTH OF RECORD 75 YEARS 1867 TO 1941 , ACCURACY good
CHARACTERISTICS OF RAINFALL 79% from 4/1 to 10/1. Erratic-maximum 21.4";minimum 2.8"; maximum daily 3.4". Intense storms of short duration in summer.

CROPS

CROPS	% OF AREA	CROPS	% OF AREA	CROPS	% OF AREA
ALFALFA		POTATOES			
CLOVER	23	SUGAR BEETS	7		
OTHER HAY		beans	6		
PASTURE	23	melons	5		
CEREALS	15	garden & truck	2		
CORN	8				
SORGHUMS	11				

SOURCE OF INFORMATION U.S.B.R. survey & W.C. reports ACCURACY fair
YIELDS AND TRENDS Fair to moderately good yields consistently obtained. No particular trend in production or type of crops.
DISPOSITION OF CROPS About 50% sold for cash. Remainder fed to livestock on farms.

ECONOMIC CONDITIONS

NO. OF FARMS 25 . TENANCY APPROX. 60 %. CONDITION OF FARM IMPROVEMENTS - small and inexpensive - generally in good condition.
GENERAL CHARACTER OF FARMS AND FARMERS Farms generally good - good class of American farmers

GENERAL TAXES ON LAND AND IMPROVEMENTS: AVERAGE $ 1.25 PER ACRE
TRANSPORTATION FACILITIES Area borders A.T. & S.F. Ry. and U.S. Highway No. 50 at Las Animas - 6 mi. maximum distance. Fair graveled roads intersect area.
MARKETING FACILITIES Beet dump and stockyards at siding in district. Alfalfa mill, packing sheds and feed lots at Las Animas. Cream route through project.

(1) Dollar of assessed benefits, or dollar of assessed valuation, or acre - district's method of assessmen

DRAINAGE DISTRICTS - FINANCIAL CONDITION

LAS ANIMAS EXTENSION

OPERATION AND MAINTENANCE ACCOUNT AS OF August 1 19 42

ASSETS		LIABILITIES	
CASH ON HAND	$ 222.33	WARRANTS OUTSTANDING	$
ASSESSMENTS RECEIVABLE		OTHER	
MISCELLANEOUS RECEIVABLE			
TOTAL	$ 222.33	TOTAL	$ none

CAPITAL DEBT SCHEDULE Refinanced 1935

INDEBTEDNESS	AMOUNT	INT. RATE	AMOUNT PER UNIT	REPAYMENT PERIOD
BONDS	$ 12,000	4 %	$ 0.20 PER	$1 of ass'd B.1943 R.F.C.
BONDS		%	PER	
BONDS		%	PER	
WARRANTS		%	PER	
OTHER			PER	
TOTAL	$	%	PER	

NOTE: IF ANNUAL PAYMENTS ARE VARIABLE ATTACH DETAILED REPAYMENT SCHEDULES

CAPITAL DEBT ACCOUNT AS OF August 1 19 42

ASSETS		LIABILITIES	
CASH ON HAND	$ 776.14	WARRANTS OUTSTANDING	$
CURRENT ASSESSMENTS RECEIVABLE		BOND PRINCIPAL UNMATURED	12,000
DELINQUENT ASSESSMENTS RECEIVABLE		BOND PRINCIPAL DELINQUENT	
MISCELLANEOUS RECEIVABLE		INTEREST DELINQUENT	
		Int. to 12/1/42	240
TOTAL	$ 776.14	TOTAL	$ 12,240

CAPITAL DEBT IF ALL ASSESSMENTS ARE COLLECTED..... $

ESTIMATED CURRENT AND DELINQUENT ASSESSMENTS COLLECTIBLE.....

NET CAPITAL DEBT..... 11,564

NET DEBT ADJUSTED TO AN EQUIVALENT 6% BASIS. 26 years - 81.4%..... 9,413

NET ADJUSTED DEBT PER SUSTAINING (1) $1 of assessed benefits..... 0.2353

PAST ANNUAL ASSESSMENTS IN DOLLARS PER dollar of assessed benefits

ITEM:	1936	1937	1938	1939	1940	1941	19	19	19	19	AVE.
A											
B	.0176	.0176	.0224	.0224	.0202	.0219					.0203
SUB-											
TOTAL											
C	.01	.01	.0093	.0093	.01	.01					.0098
TOTAL:	.276	.0276	.0317	.0317	.0302	.0319					.0301

A - WARRANTS. B - BONDS & INTEREST. C - O. & M.

ESTIMATED FUTURE ANNUAL ASSESSMENTS PER SUSTAINING (1) Dollar of assessed benefits

ANNUAL B. & I. $ .0181 ANNUAL O. & M. $ .0075

HISTORY AND TREND OF DEBT AND ASSESSMENTS District issued $30,000 of 7½% serial bonds in 1920, payable 1931-40. Delinquencies resulted and in 1935 R.F.C. refinanced $31,731 of indebtedness for $16,000. Reduced to net debt of approximately $11,500 by 8/1/42 through collections and payments of full drainage debt on lands purchased by Government for Caddoa Reservoir. Slightly reduced B&I assessments may be expected in future. High O&M in last 6 years for rehabilitation of drainage system. Somewhat reduced costs anticipated in future. R.F.C. bonds not yet issued.

THESE LANDS ARE all SUBJECT TO OTHER ASSESSMENTS BY Consolidated Extension Canal Co.

(1) Dollar of assessed benefits, or dollar of assessed valuation, or acre - district's method of assessment

LAS ANIMAS EXTENSION

CONSTRUCTION

COST OF CONSTRUCTION: ORIGINAL $ 30,000 PRESENT UNPAID $ 12,000 refinanced

OUTLET OF SYSTEM: STREAM Arkansas River SEC. 8 TWP. 23S R. 51W

EFFECT OF BACKWATER None in past. Some hazard in future due to Caddoa Reservoir.

LENGTH OF MAIN DRAIN 3 MILES; LATERALS 2 MILES. TOTAL LENGTH 5 MILES

ADEQUACY OF SYSTEM

System has proven adequate in past for substantially the entire area. Non-irrigated lands in district are sandy lands at southeast corner which have been found impractical to irrigate, and are not poorly drained lands.

PROBABLE NEW CONSTRUCTION None anticipated.

GENERAL EFFECTIVENESS OF SYSTEM AND ADEQUACY OF PAST MAINTENANCE

System has been generally effective in past. There has been considerable settlement of tile, however, and in 1939 and 1940 much of it was removed and relaid on cradles, with the aid of a W.P.A. project. Manholes were also rebuilt and system is now functioning satisfactorily and appears to be in good condition.

FUTURE MAINTENANCE: ANNUAL COST (1) $ .0075 per dollar of assessed benefits

EXPECTED FUTURE ADEQUACY The maximum high water line of Caddoa Reservoir extends about one-half mile into the north end of this district, up the draw in which the outlet drain flows. Lands included in this area and immediately adjacent thereto have been purchased by the Government. Backwater from the reservoir and the accumulation of silt in the Arkansas River channel will ultimately cause a condition which will be detrimental to the free operation of the district's drainage system, and may require a different means of outlet. This would result in probable damage to low lying lands through reduced adequacy of drainage. The period of time that will elapse before the results of Caddoa operations will be felt at this point is difficult to predict but the condition represents a hazard which cannot be disregarded in the making of long term loans in this area.

Estimated annual maintenance expense of the drainage system is $300 per year.

(1) Dollar of assessed benefits, or dollar of assessed valuation, or acre-district's method of assessme-