

**IOWA DEPARTMENT OF TRANSPORTATION**

**To:** District 3 Office **Date:** October 31, 2017  
**Attention:** Shane Tymkowicz **Project:** Woodbury/Ida/Cherokee County  
**From:** Todd Huju STPN-031-1(43)--2J-97  
**Office:** District 3 Design PIN: 17-97-031-010  
PW: 9703101017  
**Subject:** 2019 3R Project Concept - **Advancement Candidate** - Final

**Date of Review:** 5/25/2017

**Participants:**

District 3: Tony Lazarowicz, Shane Tymkowicz, Darwin Bishop, Mark Wright, Mike Malchow, Mike Thayer, Todd Huju

**PROJECT DATA**

ROUTE: IOWA 31 from US 20 in Correctionville to C66 in Washta (MP 20.84 - 29.04).

LENGTH: 8.20; PLANNING CLASSIFICATION: 4 Access Route;

MAINTENANCE SERVICE LEVEL: C; NHS: No

TRAFFIC: Current (2019) - 1100 ADT w/ 19% trucks.

Future (2039) - 1200 ADT w/ 20% trucks

Estimated ESALS<sub>20</sub>: 635,100

PRESENT PAVEMENT SURFACE/WIDTH: HMA 24 ft. wide.

PRESENT SHOULDER TYPE / WIDTH: 5 ft. wide granular.

PRESENT ROADWAY TOP WIDTH: 34'

2017 PMIS Data MP to MP	Dir.	Pav't. Type	Ave. Str. No.	80% Str. No.	PCI (2015)	IRI (2015)	K Value	(F)ault (R)ut (2015)
20.84 to 25.02	1	HMA	5.68	4.06	77	90	138	0.17
25.02 to 27.71	1	HMA	5.64	4.59	73	107	106	0.13
27.71 to 29.04	1	HMA	5.24	4.21	74	106	106	0.15

**PAVEMENT HISTORY**

**MP 20.84 to 25.02 Desc:** US 20 to Woodbury/Ida Co. Line

**ORIGINAL PAVEMENT:** 1955 - 3" AAC on 6" BTB on 6" SAS ; COARSE AGG.:

Unknown;



**YEARS RESURFACED:** 1967 - 2.5" TBB and 1" BAC resurfacing (C.LST. - Ft. Dodge Mine); 1986 - Bit. Seal Coat; 1997 - 3.0" BAC and 1.5" AAC Resurfacing (Gravel - Correctionville)

**YEARS RECONSTRUCTED:**

**MP WORK:**

**MP 25.02 to 27.71 Desc:** Woodbury/Ida Co. Line to Ida/Cherokee Co. Line

**ORIGINAL PAVEMENT:** 1955 - 3" AAC on 6" TBB on 6" SAS ; COARSE AGG.:

Unknown;

**YEARS RESURFACED:** 1967 - 2.5" TBB and 1" BAC resurfacing (Gravel - Quimby); 1986 - Bit. Seal Coat; 1997 - 2" BAC and 1.5" AAC Resurfacing (Gravel - Correctionville)

**YEARS RECONSTRUCTED:**

**MP WORK:**

**MP 27.71 to 29.04 Desc:** Ida/Cherokee Co. Line to Washta

**ORIGINAL PAVEMENT:** 1951 - 1" BAC on 4" TBB ; COARSE AGG.: Unknown;

**YEARS RESURFACED:** 1967 - Bit. Seal Coat on 8" SAS; 1986 - Bit. Seal Coat; 1997 - 3.0" BAC and 1.5" AAC Resurfacing (Gravel - Correctionville)

**YEARS RECONSTRUCTED:**

**MP WORK:**

**EXISTING CONDITIONS AND CAUSES OF DISTRESS:**

The existing HMA surface has been milled several times by maintenance forces due to severe rutting and trapping water in the wheel paths. Existing surface has moderate rutting again in several locations. The transverse slope has been flattened and is near 1% to 1.5 % crown. Several areas along centerline, center of lanes, and edgeline have been milled through the surface lift of the previous overlay. Rutting issues appear to be due to unstable HMA mix. Transverse cracks are well sealed and maintained.

Cores were taken by District 3 materials personnel to determine thickness and to try to determine if there is a particular layer in which the rutting is occurring. The cores were taken at 5 locations across the roadway (near the edgeline, in the outer wheel path, at the quarter point of roadway, in the inner wheel path, and near centerline) at 5 different stations along the roadway. The cores indicate that the surface and intermediate HMA placed in 1997 is in generally good condition and that the rutting issue is in the deeper layers, probably the SAS layer.

There was 3' x 8" thick HMA widening placed on the low side of several superelevated curves with the 1997 resurfacing project which are in good condition. There were subdrains placed with the 1997 resurfacing project which cover 46% of the length in Woodbury Co., 72 % of the length in Ida Co., and 17% of the length in Cherokee Co. This project will place subdrains where it is feasible to do so with a goal of nearly 100% coverage.

### **Safety Considerations:**

There have been 25 crashes within the project limits from 2012 to 2016. 18 are animal related, 2 ran off road, 2 distracted drivers, 1 ran a STOP sign, 1 following too close, and 1 unknown. There were 2 minor injury accidents, the rest are PDO. The crash rate = 41.9 crashes /HMVMT, is much lower than the statewide average of 88 crashes/HMVMT. There is a high number of animal related crashes clustered near from MP23.5 to MP25 and from MP26.5 to 28. This could be due to the proximity of the Little Sioux River and vegetation near the roadway. Clearing and grubbing for better visibility may help reduce the animal crashes. There is not any other significant cluster of accidents. To mitigate the run off the road crashes, rumble strips will be added on the shoulders and centerline of this roadway.

There are 41 vertical curves within the project limits. None of the vertical curves are below the 35 mph stopping sight distance criteria. There is one sag curve that has a K value that corresponds with a 50 mph stopping sight distance. There is one crest curve that has a K value that corresponds with a 50 mph stopping sight distance which is in the 45 MPH speed zone at Correctionville. There is one crest curve that has a K value that corresponds with a 45 mph stopping sight distance which is in the 45 MPH speed zone in Washta. The remaining 38 vertical curves are at or above the 55 mph stopping sight distance criteria. This project will UAC the vertical alignment.

There are fourteen horizontal curves within the project limits with six of them having a Degree of Curvature (D) between 3° and 6°. These curves will be evaluated to obtain proper superelevation and warning signs. Any changes to existing signs will be completed by local maintenance forces. This project will UAC the horizontal alignment.

The constructed foreslopes were 3:1 when fills were less than 10' but 2.5:1 when fills were over 10'. There are no foreslopes protected by cable guardrail.

The current pavement is 24' wide and the project will construct 2' paved shoulders with a safety edge on each side to meet criteria per the Iowa DOT Manual Section 3C-4 (Paved Shoulders) and 7D-8 (Pavement Widening on Resurfacing Projects for Non-NHS Highways).

There are 40 side roads, entrances, and dikes that appear to have transverse slopes steeper than 6%. The estimated cost to flatten these slopes is \$120,000.

There are 8 T-intersections without a safety dike in the project limits as listed below.

Station	Street	Discussion
Rt.	Hackberry St.	Short distance from and low speed from previous Stop or turn intersection. No construction recommended
Lt.	145 <sup>th</sup> St.	Short distance without connection to other road system and requires ROW to construct. No construction recommended.
Rt.	130 <sup>th</sup> St.	Sharp curves just prior to IA 31 and would require ROW to construct. No construction recommended.
Lt.	125 <sup>th</sup> St.	Slight offset from D15. Would require ROW to widen for Safety Ramp. Road is 1/2 mile long. No construction

		recommended.
Rt.	125 <sup>th</sup> St./D15	Slight offset from 125 <sup>th</sup> St. Would require ROW, relocation of utilities, and relocation of drainage across IA 31 to widen for Safety Ramp. No construction recommended.
Rt.	State Ave.	Sharp curves just prior to IA 31 and would require ROW to construct. No construction recommended.
Rt.	115 <sup>th</sup> St.	Sharp curve just prior to IA 31 and would require ROW to construct. No construction recommended.
Rt.	Story Ave.	Extreme skew and requires ROW to construct. No construction recommended.

There are two bridge length structures located within the project limits.

Br. No. 4725.6S031, FHWA No. 29171, a 44' x 113' continuous concrete slab bridge, over Bitter Creek 5.3 miles N. of Jct. US 20. The Bridge was constructed in 1974 and had a deck overlay in 2016. The guard rail, approaches and shoulders were upgraded with the deck overlay. The bridge has a sufficiency rating of 87. No work is proposed at this bridge as a part of this project.

Br. No. 4726.1S031, FHWA No. 29181, a 44' x 133' continuous concrete slab bridge over Ashton Creek located 1.0 miles N. of the Co. Rd. D15. The bridge was constructed in 1974. The bridge has a sufficiency rating of 99. The guardrail attachment and terminals do not meet current standards. The approach panels are dropped at the end of the bridge, and it is expected that the 8" paving notch has failed. The first 20' panel of the approach and the paving notches will be replaced and the guard rail and paved shoulders will be upgraded with this project.

There are 9 large culverts (equal to or greater than 72" span or diameter) on this project that are marked with Type 2 Object Markers and/or have headwalls within the clear zone as listed below. These will all require survey to determine the length needed to move the headwall outside of the clear zone. After obtaining survey these structures will be reviewed with the Preliminary Bridge Engineer and Office of Design Methods section to determine the best course of action to mitigate these objects within the clear zone. For concept purposes it is expected these will be extended to the clear zone (24' w/ 4:1 slopes or 18' w/ 6:1 slopes) at an average cost of \$30,000 per end (\$540,000 total).

Sta.	Rt/Lt/Both	Size
84+75	B	6'x6' RCB
115+44	B	10'x12' RCB
150+92	B	Twin 6'x8.8' RCB
160+16.9	B	6'x4' RCB
182+87	B	Twin 4'x3' RCB
221+42.3	B	12'x10' RCB

294+13.5	B	6'x5' RCB w/ 72" x 6' + Apron Ext. Rt.
327+21	B	8'x8' RCB
383+94	B	6'x6' RCB

There are 15 small culverts on this project which will be extended and/or have culvert sections removed and replaced due to separated joints as listed below:

Sta.	Rt/Lt/Both	Size	Removals	Install
44+00	R	4'x5.5' RCB Stock Pass	Headwalls	10' + Apron
44+00	L	4'x5.5' RCB Stock Pass	Headwalls	6' + Apron
93+16.8	B	3'x3' RCB	Headwalls	6' + Aprons
106+31.7	B	4'x5' RCB	Need survey to determine length	
141+60.5	R	30" RCP	1 Section	12' + Apron
141+60.5	L	30" RCP	1 Section	6' + Apron
175+06	B	3'x3' RCB	Need survey to determine length	
202+39	B	5'x5' RCB	Need survey to determine length	
217+50	L	36" RCP	3 Sections	12' + Apron
229+86.5	B	4'x3' RCB	Need survey to determine length	
332+69	R	30" RCP	1Section&Apron	12' + Apron
342+97	R	36" RCP	Headwall	6' + Apron
376+17.7	R	4'x3' RCB	Headwall	12' + Apron
411+95.5	B	4'x5' RCB	Headwalls	6' + Aprons
422+90	B	5'x3' RCB	Headwalls	6' + Aprons
432+49	B	4'x3' RCB	Headwalls	6' + Aprons
434+31	B	5'x3' RCB	Headwalls	6' + Aprons

The intersection with County Rd C66/MainSt in Washta has an existing minor right turn lane for SB IA 31. The turn lane is warranted and will be UAC with resurfacing on this project. No other turn lanes are warranted within the limits of this project.

Woodbury, Ida, and Cherokee Counties have been contacted to discuss whether they would want to have unpaved side roads paved to the radii returns, at county expense, with this project. The counties have responded that they do not want the approaches paved with this project.

There are pedestrian crossings at the intersection with C66/Main St in Washta. It is expected these crossings will need minor adjustment for ADA due to the profile grade raise which will be completed with project # STPN-031-3(11)--2J-18.

### **Feasible Alternatives:**

The Assistant Pavement Engineer in the Office of Construction and Materials indicated that there is pavement need of 1" of HMA for this roadway segments in Woodbury and Cherokee counties and no additional structure needed in Ida County. Three alternatives were chosen for further development during the concept review: 2" milling with widening and 4" HMA resurfacing; 4" Cold in Place Recycling, widen, and 4" HMA resurfacing; and 3" milling with 6" PCC overlay

and widening. Each alternative would have 4' wide granular shoulders placed outside of the paved surface.

There are 12,600 LF of existing subdrains on at least one side of the roadway. This project will install subdrains prior to widening where suitable outlets can be installed. Expected coverage will be near 100% on one side of the roadway in rural areas, approximately 30,600 LF installed w/ this project, at a cost of \$215,000.

Possible alternatives are based on HMA resurfacing prices at \$40/ton for mix and \$400/ton for PG 58-28S asphalt binder. Milling is estimated at \$17/ton. PCC Overlay estimated at \$15/SY (\$5/SY Placement & \$75/CY Furnish). Repair patching needs are estimated at twenty 6' x 12' patches per lane per mile.

**Alternate 1** – Mill 2", place 2' x 5" HMA shoulder widening, resurface entire widened pavement with 4" of HMA resurfacing, place 4' granular shoulder outside of HMA. Install centerline and shoulder rumble strips. Traffic would be maintained on IA 31 throughout construction.

MAJOR WORK ITEMS

Full depth patching	\$214,500
Pavement Scarification W=24', T=2"	\$213,500
Class 13 Excavation W=2', T=5"	\$53,500
HMA for Widening W=2', T=5"	\$335,000
HMA Resurfacing W=28', T=4"	\$1,989,200
Granular Shoulders W=4', T=3"	\$151,600
	=====
Total for Alternative 1	\$2,957,300

**Alternate 2** – Cold in Place Recycle 4", place 2' x 5" shoulder widening as part of the CIPR process, resurface entire widened pavement with 4" of HMA resurfacing, place 4' granular shoulder outside of HMA. Install centerline and shoulder rumble strips. Traffic would be maintained on IA 31 throughout construction.

MAJOR WORK ITEMS

Full depth patching	\$214,500
Cold In Place Recycling	\$459,500
Class 13 Excavation W=2', T=7"	\$74,900
HMA Resurfacing W=28', T=4"	\$1,989,200
Granular Shoulders W=4', T=4"	\$202,100
	=====
Total for Alternative 2	\$2,940,200

**Alternative 3** – Mill 3", place 2' PCC shoulder widening as part of the PCC Overlay process, place 6" PCC Overlay, place 4' granular shoulder outside of PCC. Install centerline and shoulder rumble strips. Traffic would be detoured on L36 to C66 during the milling and PCC overlay operations for this alternative.

### MAJOR WORK ITEMS

Full depth patching	\$214,500
Pavement Scarification W=24', T=3"	\$320,200
Class 13 Excavation W=2', T=3"	\$32,100
PCC Overlay W=28', T=6"	\$2,748,100
Granular Shoulders W=4', T=4"	\$202,100
	=====
Total for Alternative 3	\$3,517,000

### Recommendations:

Although Alternatives 1 and 2 are lower cost than Alternative 3 it is felt that they will not provide the strength/rigidity needed to spread the load enough to halt the rutting that has been reoccurring on this roadway. The recommended method of rehabilitation for this project is Alternate 3 (3" Mill and 6" PCC overlay).

Traffic would be detoured on L36 to C66 during the milling and PCC overlay operations. Traffic may be maintained on IA 31 during other work on this project.

Waterborne pavement markings will be placed throughout the project.

### Estimated Project Cost:

Alternative 3	\$3,517,000
Slope Flattening	\$120,000
Bridge Paving Notch	\$10,000
Guardrail Update	\$35,000
Large Culvert Extensions	\$540,000
Small Culvert Extensions	\$130,000
Clearing and Grubbing	\$100,000
Subdrains	\$215,000
Milled rumble strips	\$28,500
	=====
Subtotal	\$4,695,500
Miscellaneous and Traffic Control (20%)	\$939,100
	=====
PROJECT TOTAL	\$5,634,600

### Safety Costs in this Project:

Slope Flattening	\$120,000
Large Culvert Extensions	\$240,000
Small Culvert Extensions	\$150,000
Clearing and Grubbing	\$100,000
Milled rumble strips	\$35,000
PCC Widening (2 ft. wide)	\$248,600
	=====
TOTAL SAFETY COSTS	\$893,600

**Funds Programmed:**

3R Advancement Candidate for 2019, **\$5,634,600;**

**Project Agreements:**

Right of Way acquisition may be needed for culvert extensions on this project. OLE has advised that archaeological survey will likely be needed at the culvert extension areas.

A city agreement with the City of Washta will be required for temporary closure of side streets. County agreements with Woodbury, Ida and Cherokee Counties will be needed for temporary closure of side roads as well as detour agreements with Woodbury and Cherokee Counties. Railroad agreements are not anticipated on this project.

**Project Schedule:**

The following schedule is based on the potential advancement of this project to FY 2019. If the project is not advanced, a shedule based on an FY 2020 letting will be developed.

D0(Concept) - 10/13/17  
D2(Field Exam) -02/16/2018  
D7(Final Plans) - 9/4/2018  
L2(Letting) - 11/20/2018

cc:

M. J. Kennerly	S. P. Anderson	K. D. Nicholson	J. S. Nelson
M. J. Sankey	D. R. Claman	K. K. Patel	S. J. Gent
G. A. Novey	D. R. Tebben	D.E Sprengeler	T. D. Crouch
C. B. Brakke	E. C. Wright	B. J. Dolan	B. Hofer
M. A. Swenson	F. W. Todey	M. J. Carlson	J. N. Garton
D. A. Popp	M. K. Solberg	K. M. Brink	V. A. Brewer
S. Megivern	J. W. Laaser-Webb	M. Hobbs	W. A. Sorenson
J. McCollough	P. C. Keen	J. R. Schoenrock	N. L. Cuva
W. N. Cameron	E. Engle	T. Nicholson	B. R. Smith
E. D. Gansen	T. Hanson	M. Ross	B. S. Bradley
T. G. Lazarowicz	D. L. Bishop	J. M. Klemme	M. L. Wright
D. S. Schultz	M. R. Thayer	M. R. Malchow	D. E. Manley
J. Jepsen	R. R. Seward	R. D. Wortman	W. L. Dotzler
T. Clouse	D.F. Herbst		

WOODBURY/IDA/CHEROKEE CO.  
PCC OVERLAY - UNBONDED  
STP-031-1(43)--2C-97  
LETTING DATE



Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM

# WOODBURY/IDA/CHEROKEE COUNTY

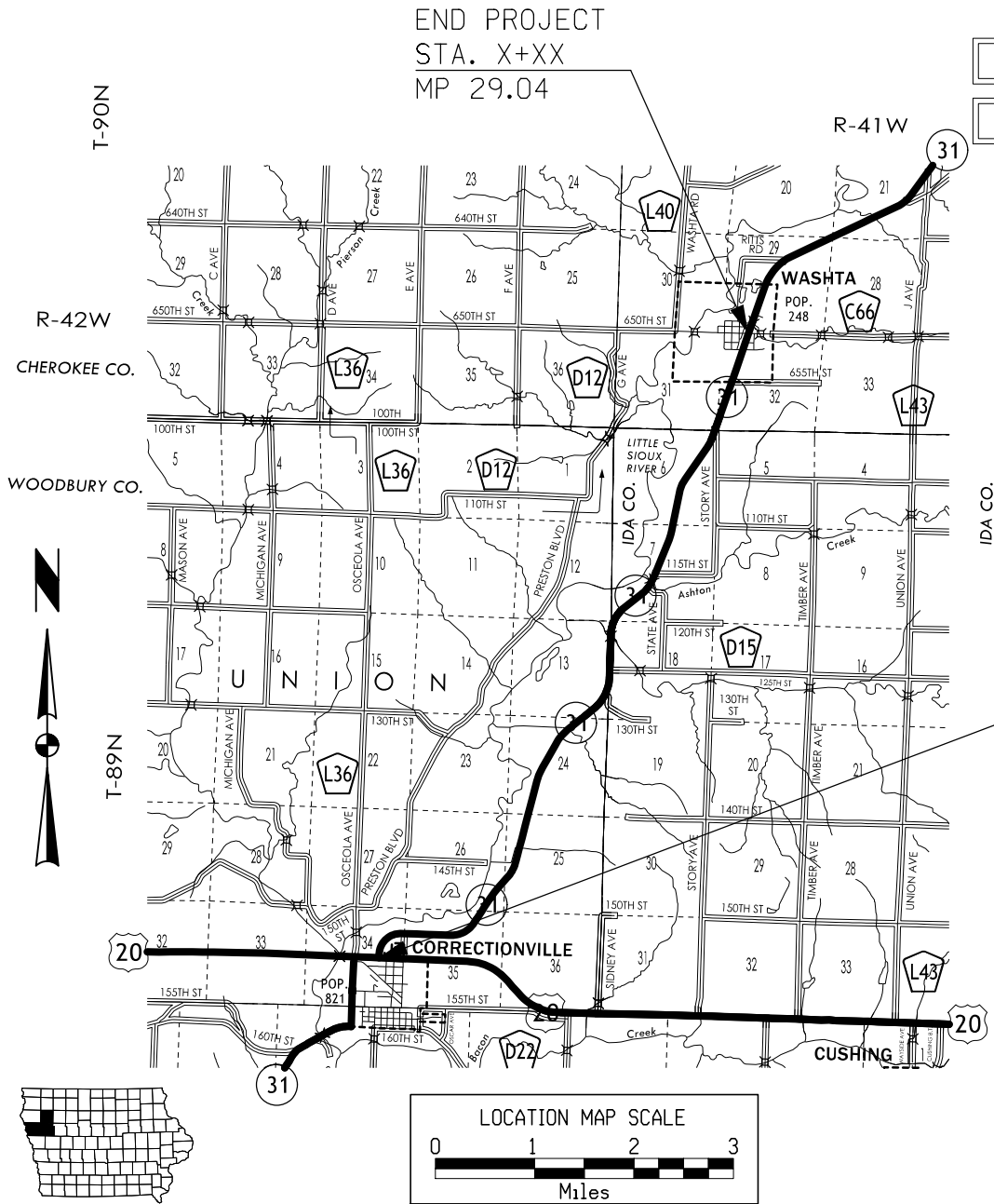
PCC OVERLAY - UNBONDED

E Jct US 20 to Co Rd C66 in Washta

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

Value Engineering Saves. Refer to Article 1105.14 of the Specifications.



BEGIN PROJECT  
STA. X+XX  
MP 20.84

END PROJECT  
STA. X+XX  
MP 29.04

## DESIGN DATA RURAL

2018	AADT	1100	V.P.D.
2038	AADT	1200	V.P.D.
2038	DHV	--	V.P.H.
	TRUCKS	19	%
Total			
Design ESALs		635,100	

## INDEX OF SEALS

SHEET NO.	NAME	TYPE
A.1	Todd E. Huju	Primary Signature Block

REVISIONS

TOTAL

PROJECT IDENTIFICATION NUMBER

17-97-031-010

PROJECT NUMBER

STP-031-1(43)--2C-97

R.O.W. PROJECT NUMBER

STPN-031-1(47)--2J-97

STPN-031-2(5)--2J-47

## INDEX OF SHEETS

105-3

10-18-05

No.	Description
A.1 ROW1-ROW7	TITLE SHEET & LOCATION MAP Proposed ROW

# PRELIMINARY PLANS

Subject to change by final design.

D5 PLAN - Date: 3/28/2019

FILE NO.

ENGLISH

DESIGN TEAM

District 3

WOODBURY/IDA/CHEROKEE COUNTY

PROJECT NUMBER

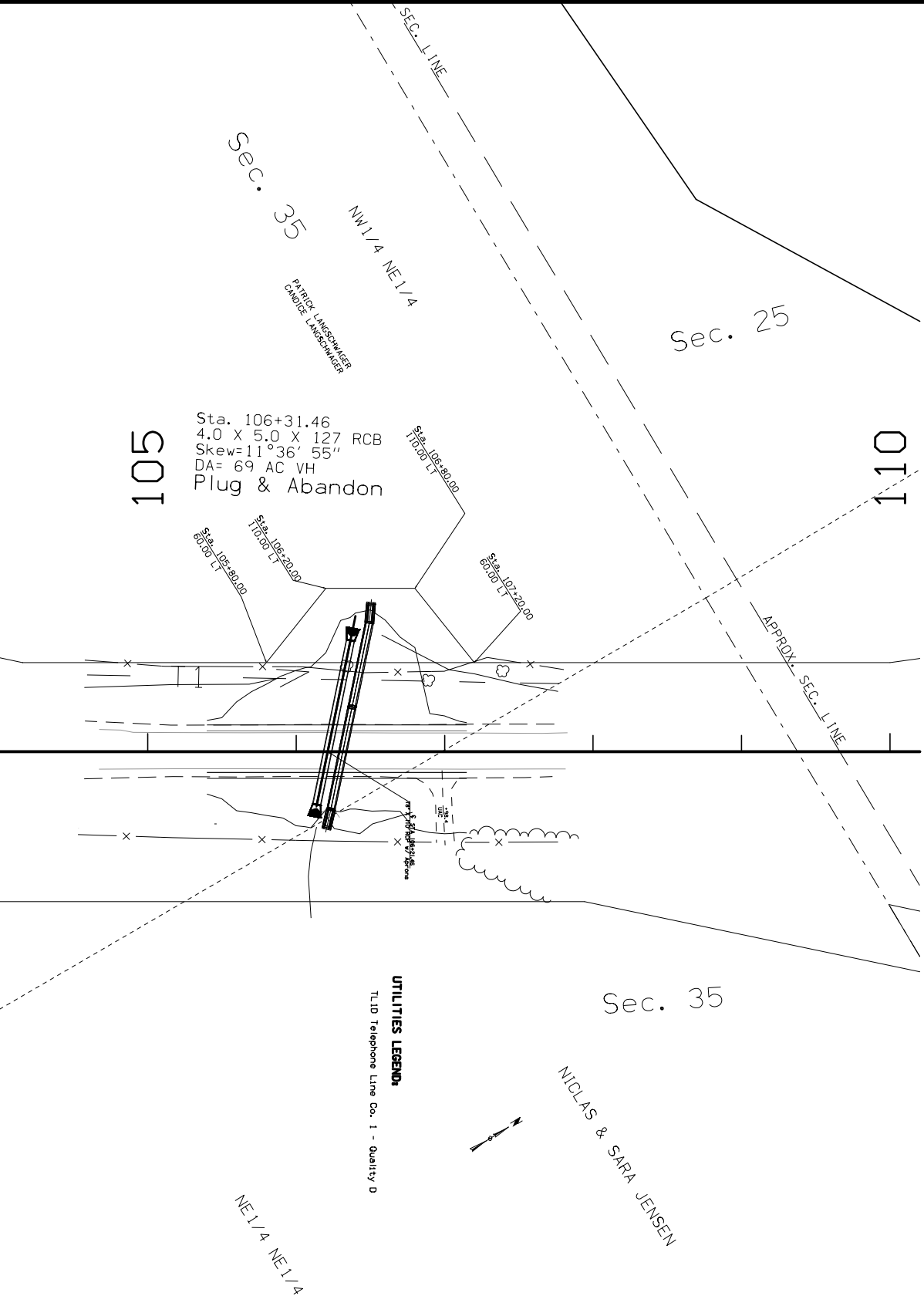
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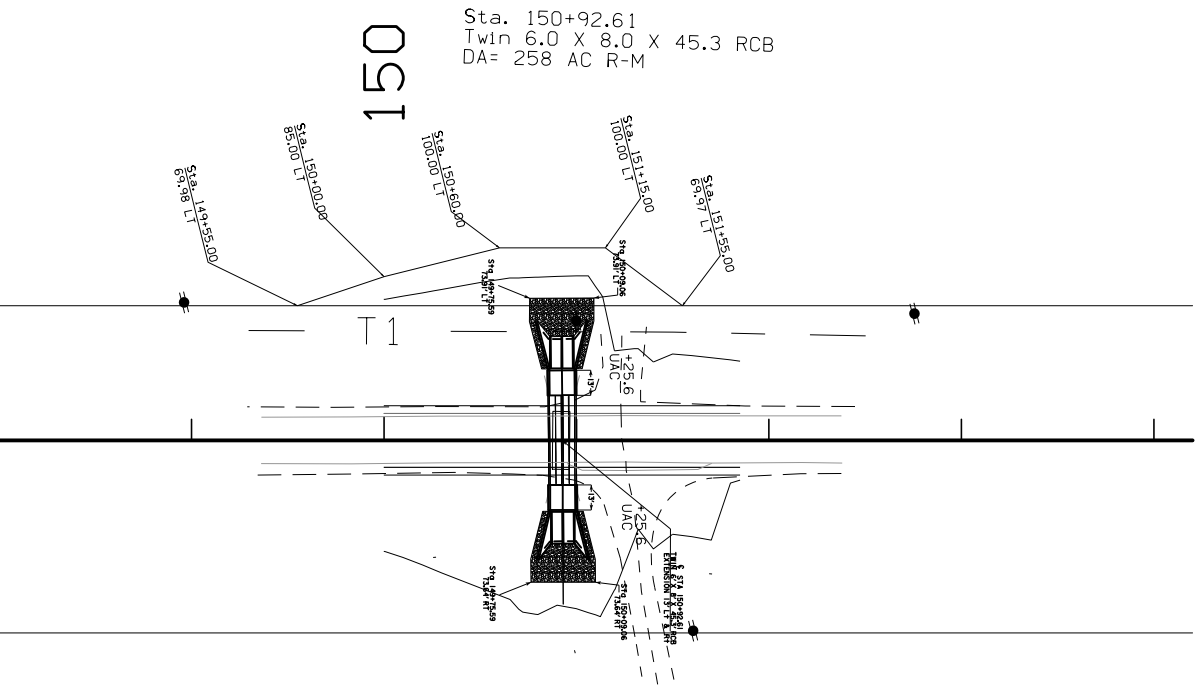
A.1



Preliminary  
D5



Preliminary  
D5

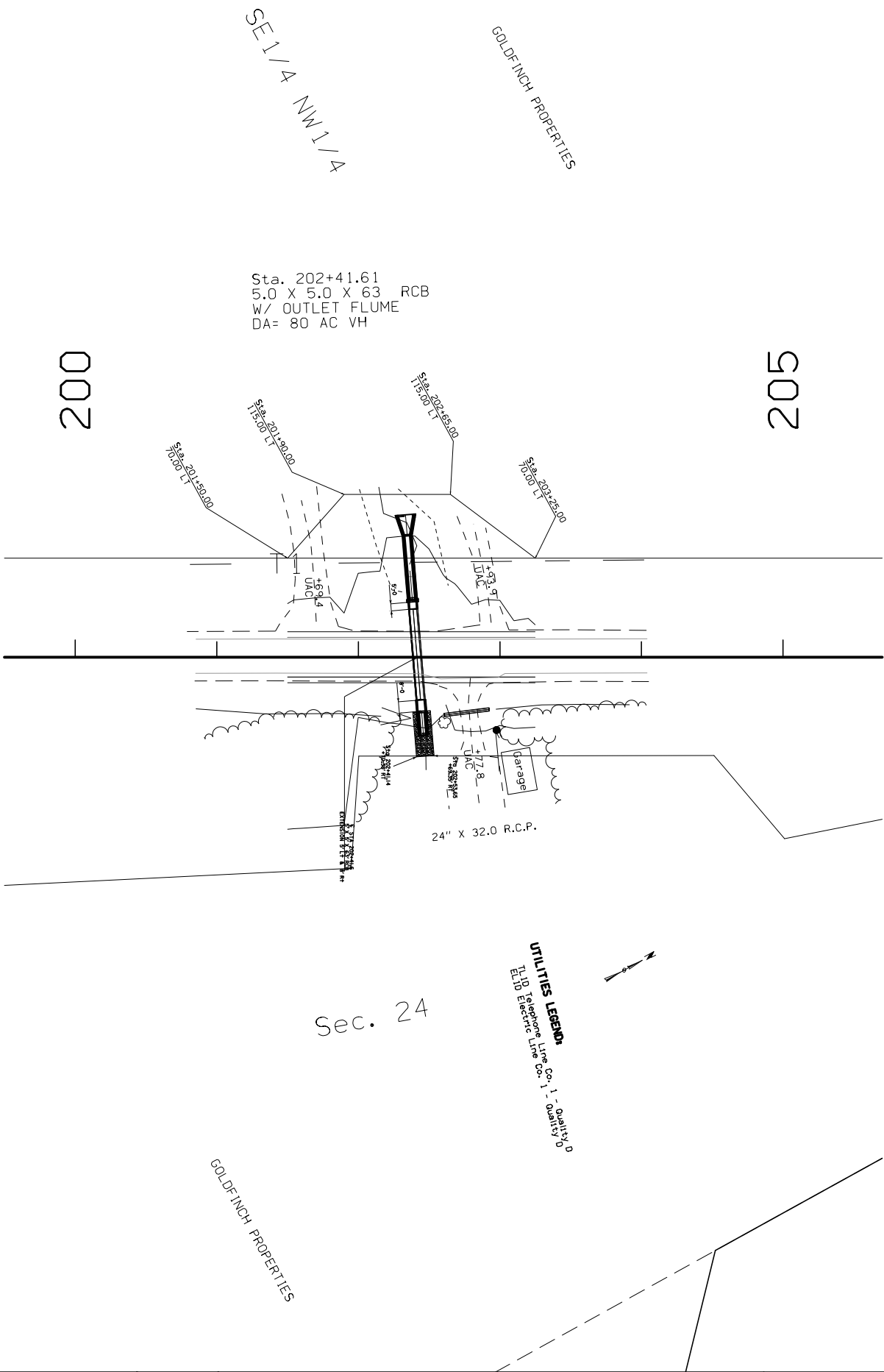


Sec. 25

UTILITIES LEGEND:  
TLD Telephone Line Co. 1 - Quality D  
PPA Power Pole Co. 1

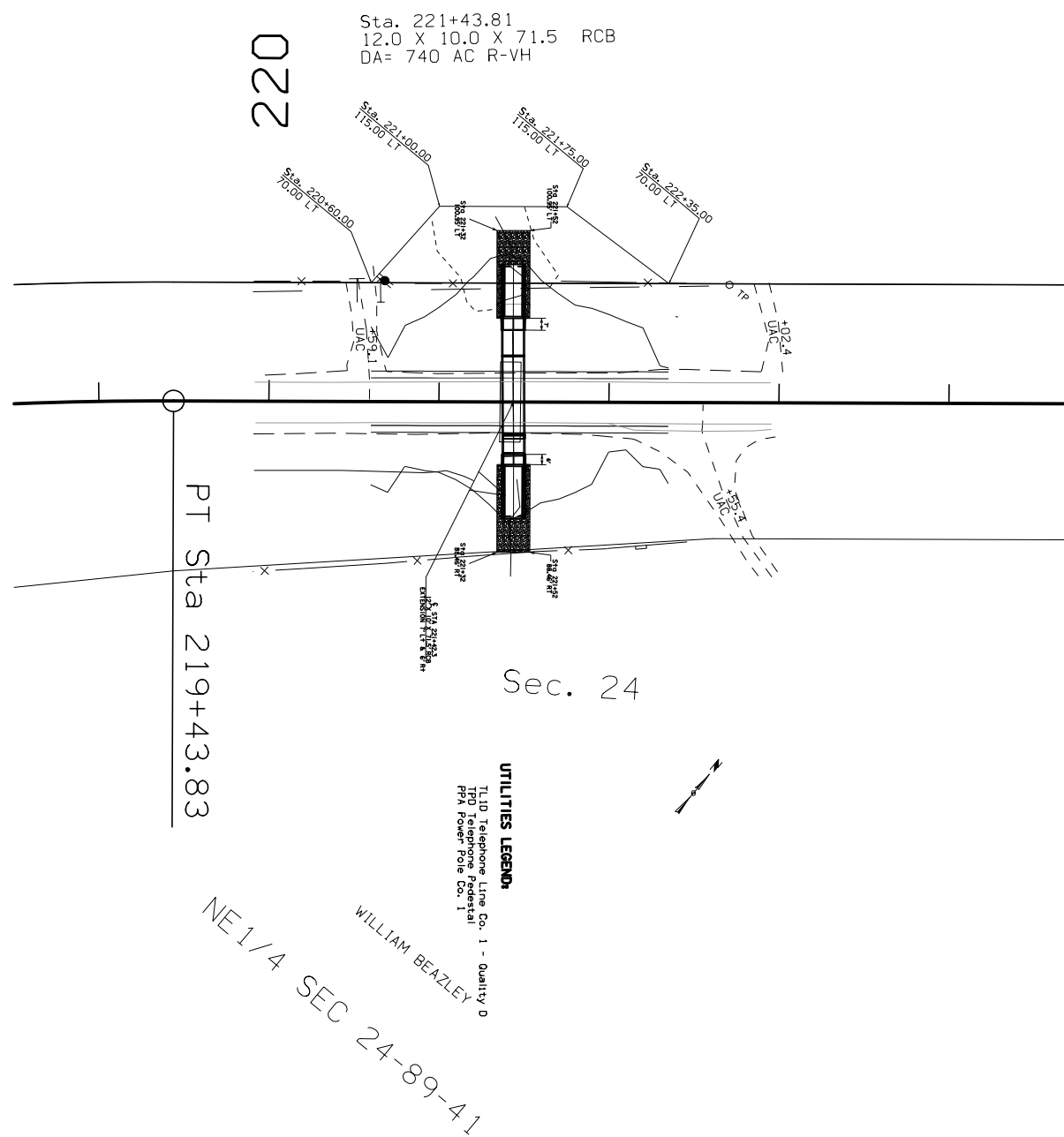
ALAN & CAROL SOBIESKI

Preliminary  
D5



# Preliminary

## D5

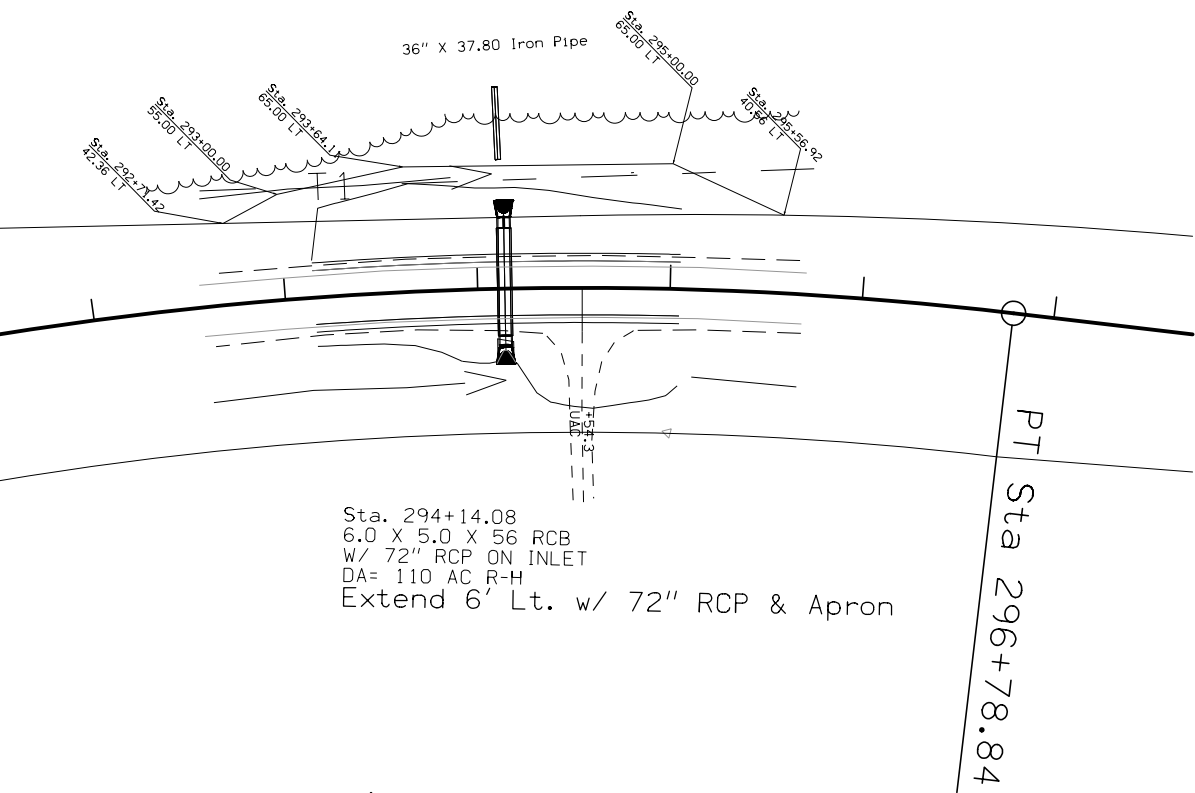


Preliminary  
D5

Douglas Twp.  
T-89N R-41W  
Sec. 7

ROBERT MOHR TRUST SUSAN MOHR TRUST

295



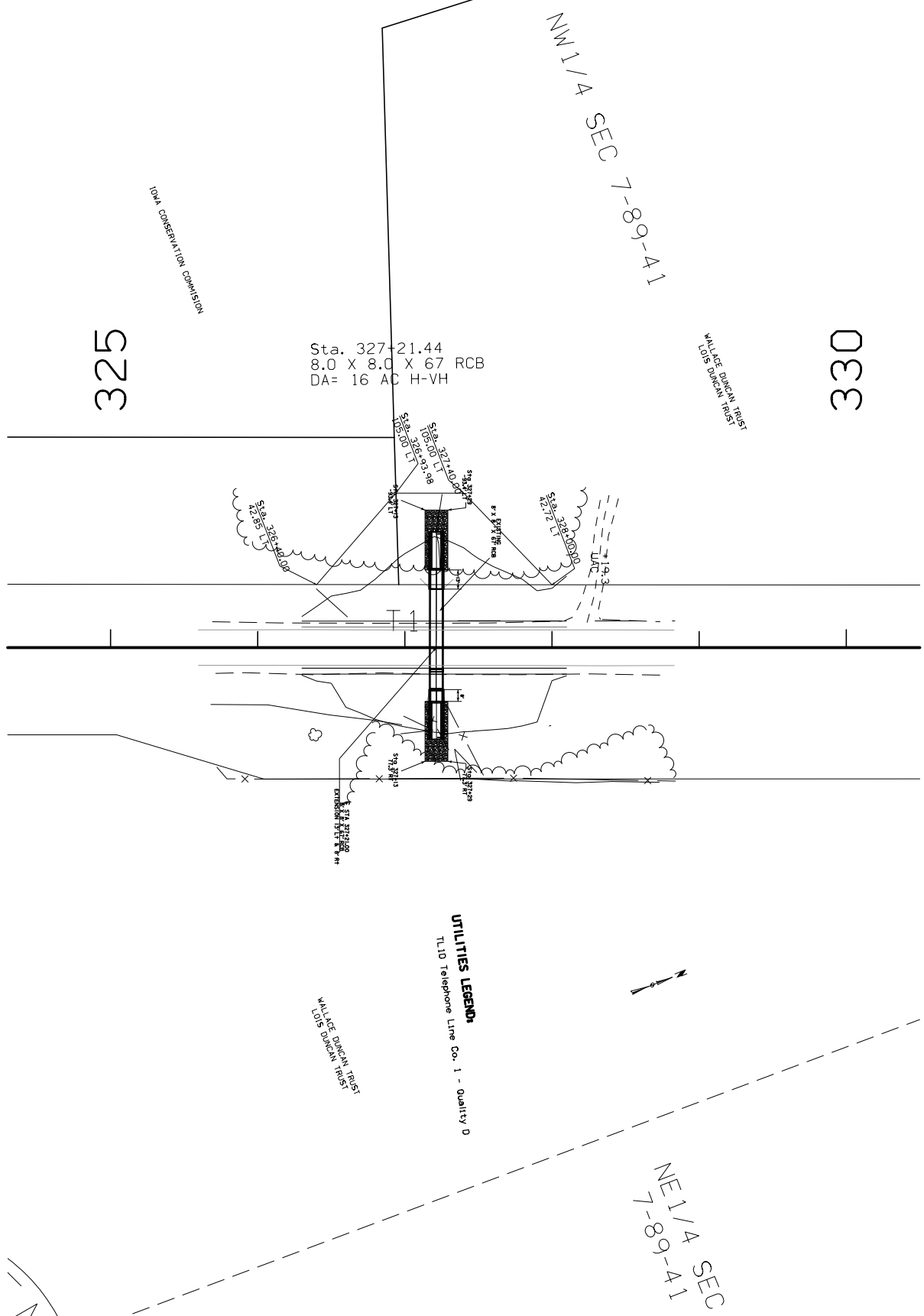
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6.0 X 5.0 X 56 RCB  
W/ 72\"/>

ROBERT MOHR TRUST SUSAN MOHR TRUST

UTILITIES LEGEND  
TL10 Telephone Line Co. 1 - Quality D



Preliminary  
D5



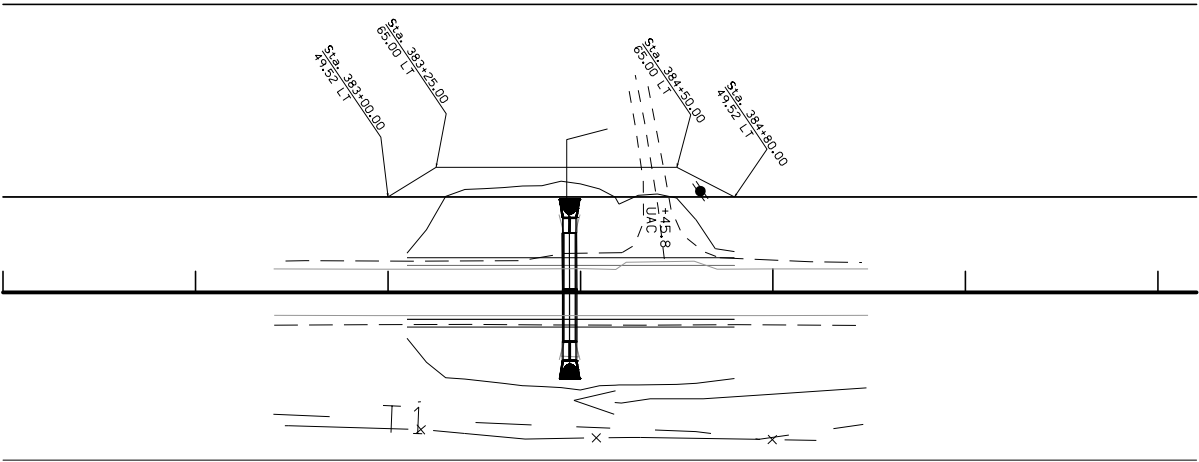
Preliminary  
D5

NE 1/4 SEC 6-89-41

CUSHING ELEVATOR CORP.

Sec. 6

385



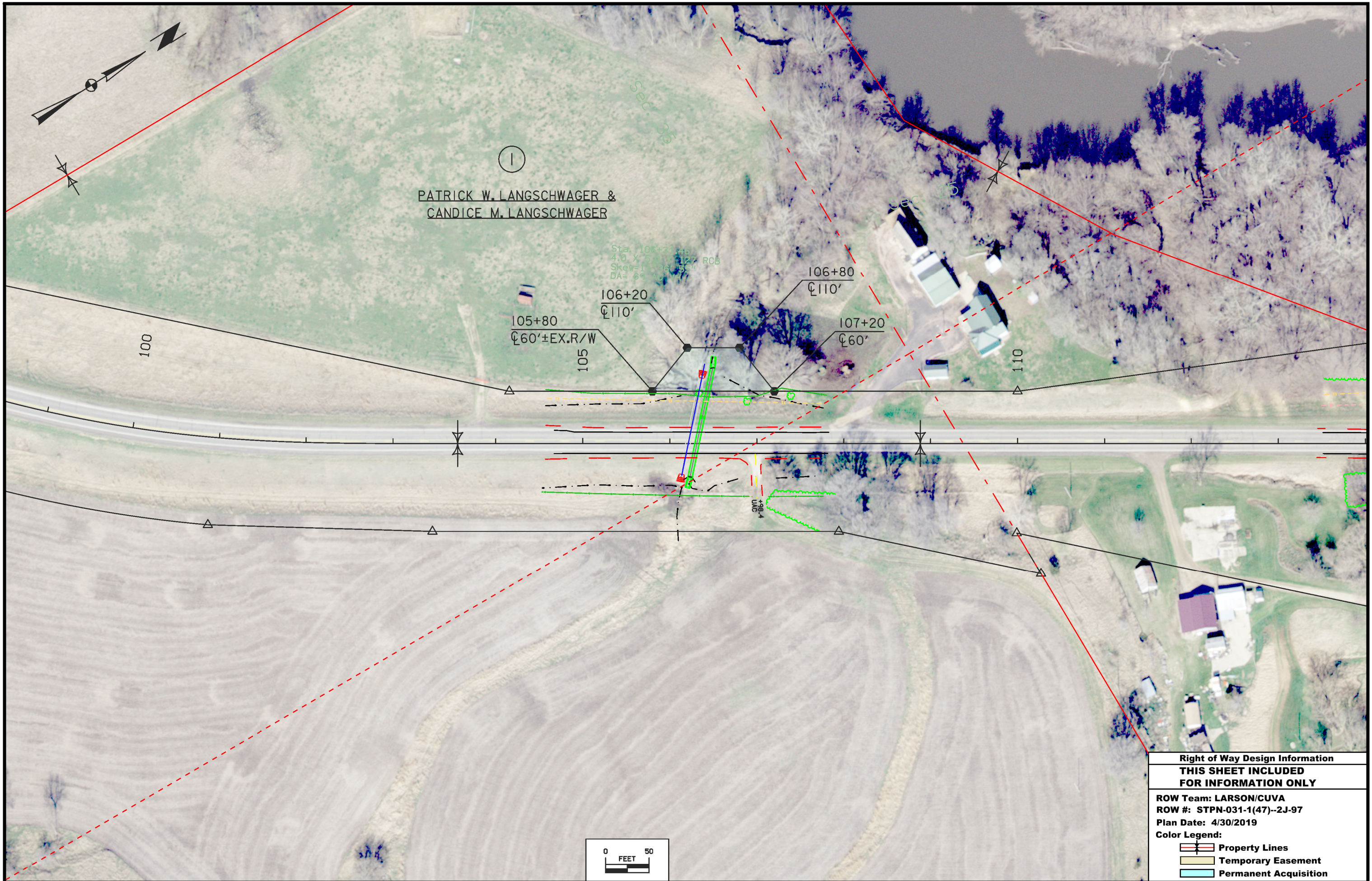
Sta. 383+94.38  
6.0 X 6.0 X 55 RCB  
DA= 122 AC YH  
Extend 8' Lt. & 10' Rt.  
w/ 78" RCP and Aprons




JAMES & MARCIA GRAY



NO ACCESS RIGHTS ARE TO BE ACQUIRED ON THIS PROJECT.





Right of Way Design Information	
THIS SHEET INCLUDED FOR INFORMATION ONLY	
ROW Team: LARSON/CUVA	
ROW #: STPN-031-1(47)--2J-97	
Plan Date: 4/30/2019	
Color Legend:	
	Property Lines
	Temporary Easement
	Permanent Acquisition





2

ALLEN R. & CAROL M. SOBIESKI

Sta. 150+92.61  
Twin 6.0 X 8.0 X 45.3 RCB  
DA= 258 AC R-M

149+55  
CL 70'±EX.R/W

150+60  
CL 100'

150

151+15  
CL 100'

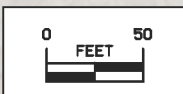
151+55  
CL 70'±EX.R/W

145

155

Sec. 25

ALLEN R. & CAROL M. SOBIESKI

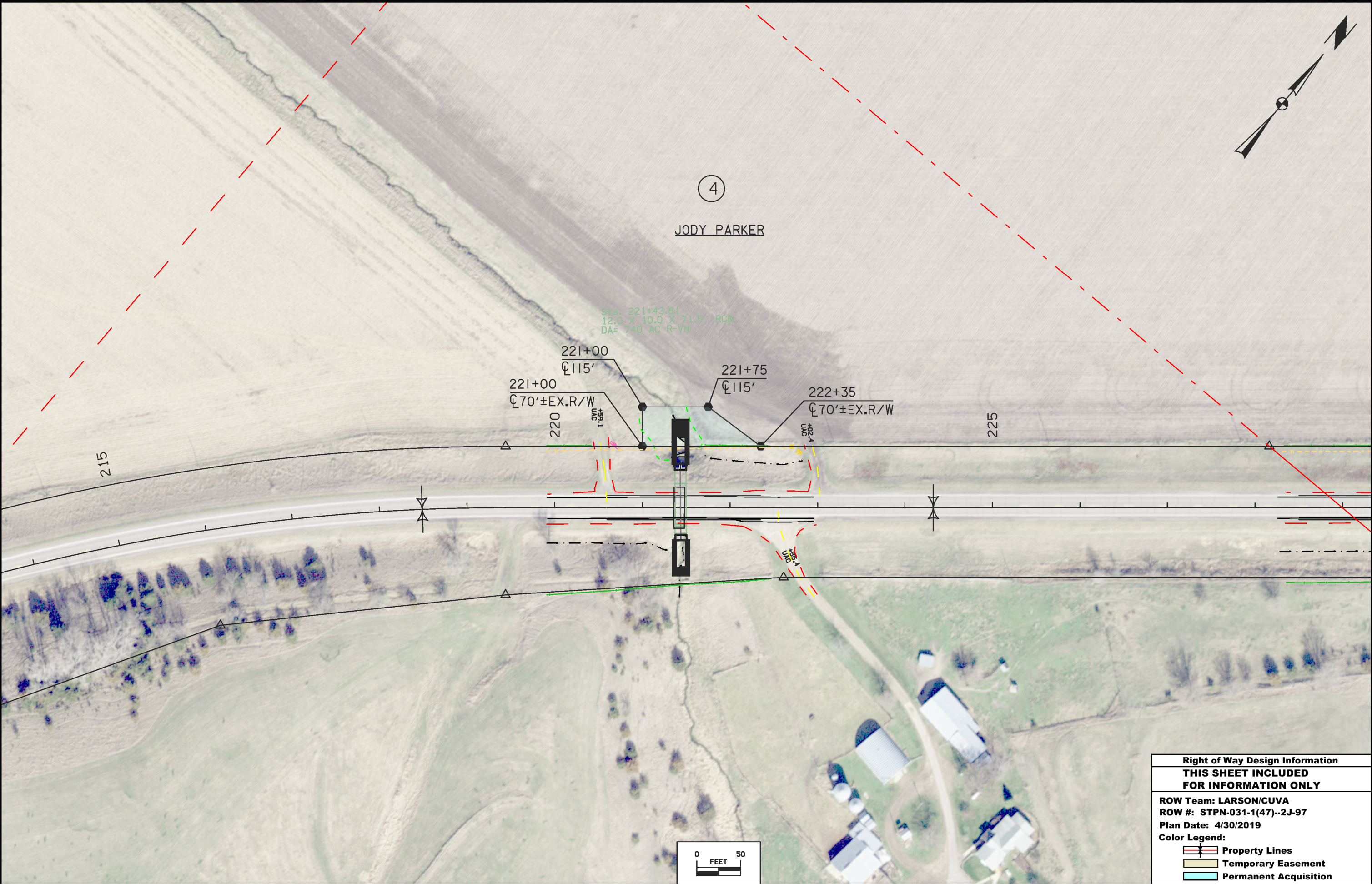


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ROW Team: LARSON/CUVA	
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Plan Date: 4/30/2019	
Color Legend:	
	Property Lines
	Temporary Easement
	Permanent Acquisition



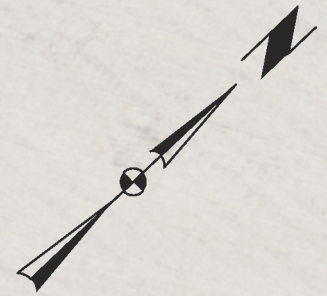






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	Permanent Acquisition





Douglas Twp.  
T-89N R-41W  
Sec. 7

5

ROBERT R. MOHR REV. TRUST  
SUSAN J. MOHR REV. TRUST

293+45  
CL 65'

292+71.42  
CL 42'±EX.R/W

36" X 37.80 Iron Pipe

295+00  
CL 65'

295+56.92  
CL 41'±EX.R/W

300

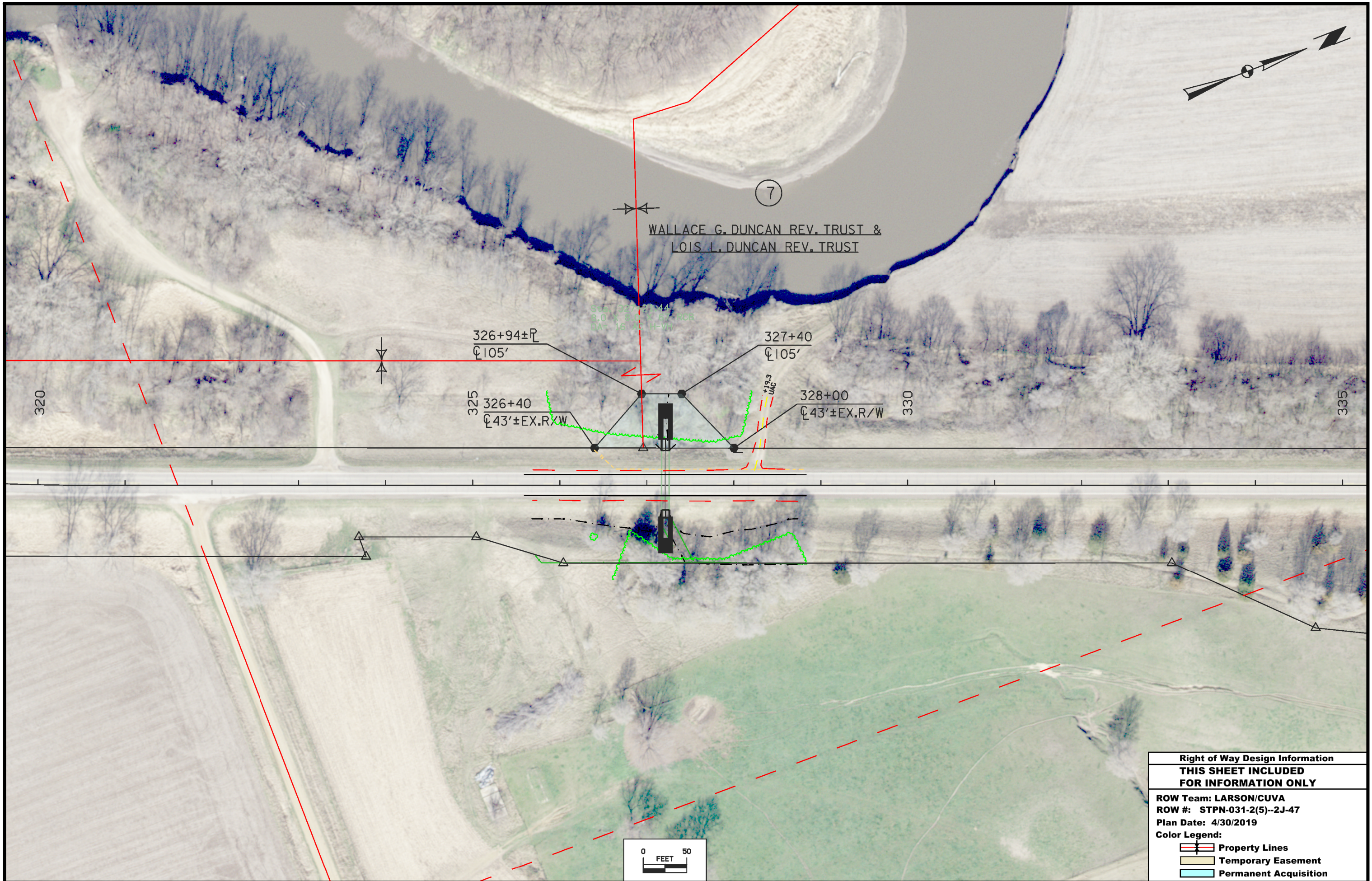
Sta. 294+14.08  
6.0 X 5.0 X 56 RCB  
W/ 72" RCP ON INLET  
DA= 110 AC R-H

ROBERT R. MOHR REV. TRUST  
SUSAN J. MOHR REV. TRUST



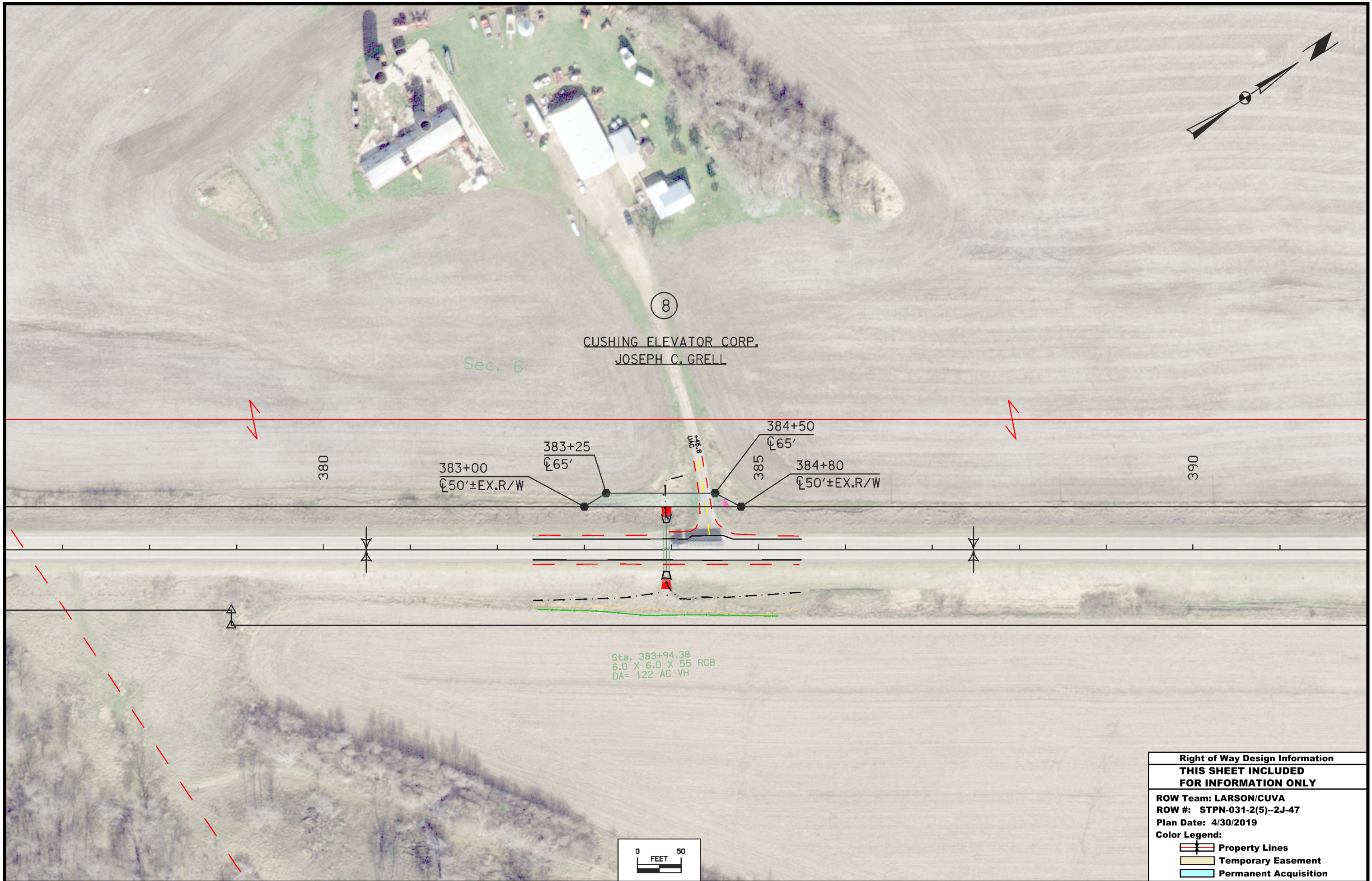
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THIS SHEET INCLUDED FOR INFORMATION ONLY	
ROW Team: LARSON/CUVA	
ROW #: STPN-031-2(5)--2J-47	
Plan Date: 4/30/2019	
Color Legend:	
	Property Lines
	Temporary Easement
	Permanent Acquisition