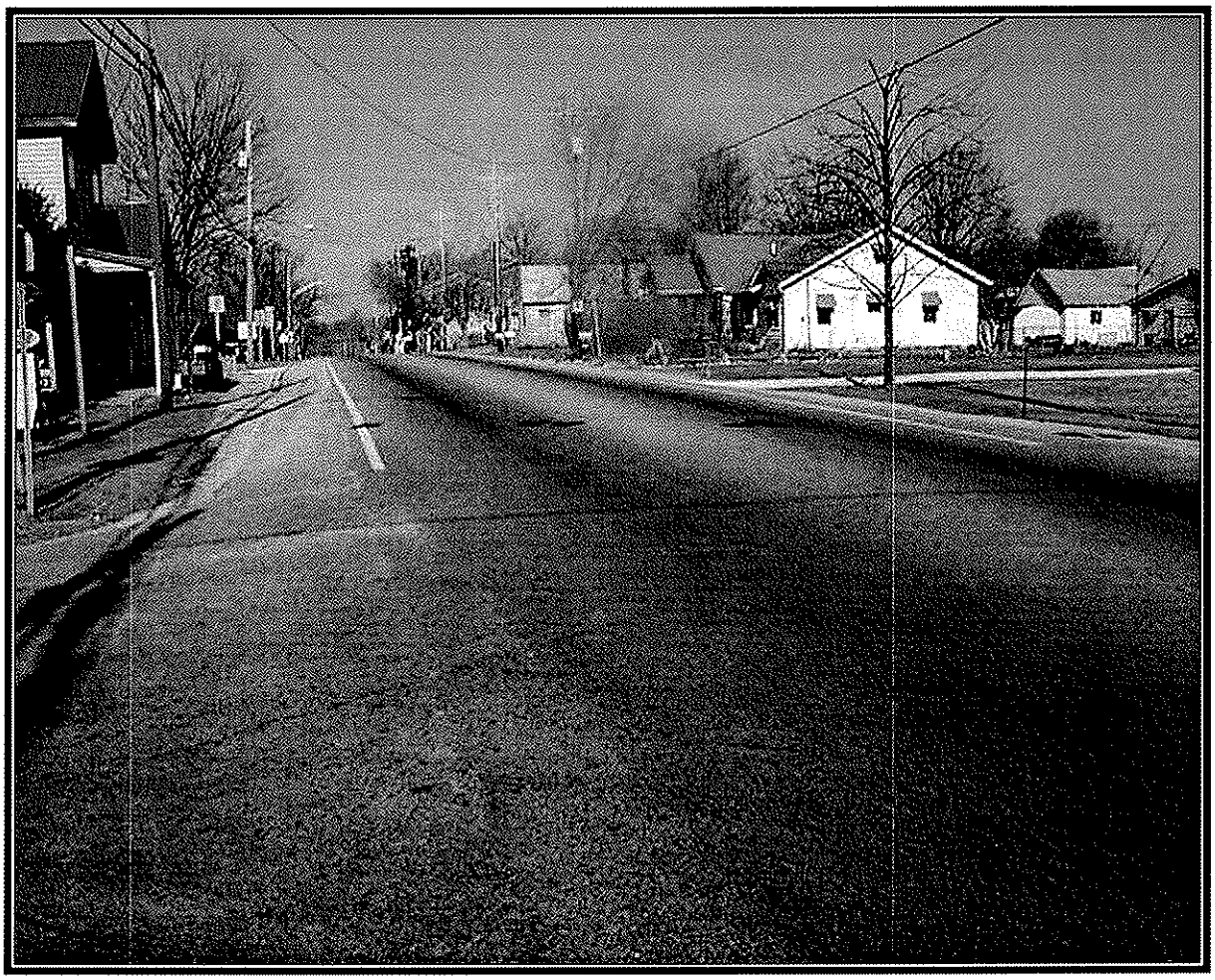
ENGINEER'S REPORT

US 150 Road Rehabilitation



From 1.73 Miles West of SR 335 (County Line) to
3.80 Miles West of I-64
Floyd County
Des. No.: 0012570
Project No.: STP-030-3( ), P.E., R/W & C.N.

Prepared By:

USI CONSULTANTS, INC.
Engineers • Surveyors

Prepared For:

Engineering Assessment Section
Division of Environment, Planning and Engineering
Indiana Department of Transportation

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APPENDIX

March 24, 2003

MEMORANDUM

To: Brad L. Steckler, P.E., Manager
Engineering Assessment Section
Division of Environment, Planning and Engineering

Attn: Tarlochan S. Bansi, Supervisor, P.E.
Engineering Assessment Section

Thru: Ross E. Snider, P.E., Vice-President
USI Consultants, Inc.

From: Gregory R. Wendling, P.E.
USI Consultants, Inc.

Subject: **Engineer's Report**
Des. No. 0012570
Project No. STP – 030-3 ( )
US 150 Road Reconstruction
From 1.73 Miles West of SR 335 (County Line) to 3.80 Miles West of I-64
Floyd County

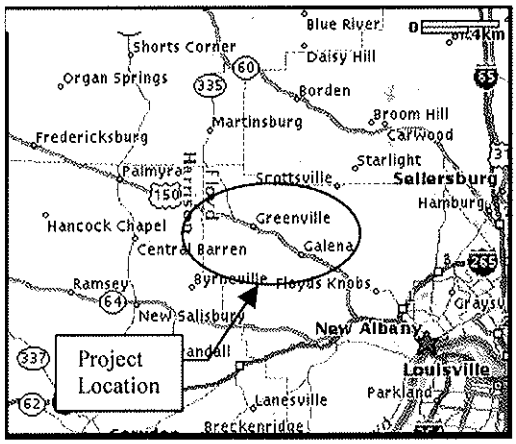
A. PURPOSE OF REPORT:

This Engineer's Report documents the engineering assessment phase, including an outline of the proposal (scope-of-work) improvements to US 150. This report includes the relevant background data and provides conclusions and recommendations that will guide the ongoing environmental and ensuing survey and design phases. (This Engineer's Report is a pre-decisional document, pending completion of the environmental study.)

B. PROJECT LOCATION:

This project begins at the Harrison/Floyd county line, RP 161+49 and proceeds southeast 6.74 miles to the 4 lane divided section, RP 168+23, in the Seymour District. This project goes through the towns of Greenville and Galena.

The adjacent map and location maps of Appendices A-1 and A-2 depict the project location.



C. PROJECT'S NEED AND PURPOSE:

Need for the improvement is based on the facility's substandard intersection sight distance (ISD), stopping sight distance (SSD), narrow shoulder widths; and crash history.

The purpose of this project is to improve the operation and safety of US 150 by improving geometrics along the corridor.

D. EXISTING CONDITIONS:

See the ground level photographs, pages A-3 through A-16 of the Appendix and the aerial photographs in Appendix A-17 to A-30 for existing conditions throughout the project area.

US 150 within the project limits is classified as a *Rural Minor Arterial.* US 150 is not part of the National Highway System (NHS), however it is included on the National Truck Network. It lies on Indiana's 3R Road Network.

Cross Section:

The prevailing rural cross section along US 150 consists of two 12' lanes bordered by 1' gravel shoulders. Prevailing right-of-way through the corridor (rural sections) is 40' (half-width). Roadside drainage ditches are intermittent, and generally non-existent (ditches are "V" ditches of varying depth and slopes).

Within Greensville the typical roadway section consists of 12' travel lanes bordered by 4'-11' paved shoulders (full usable width). Drainage ditches are not apparent. Apparent existing right-of-way is 25' (half-width).

Within Galena the typical roadway section consists of 12' lanes bordered by 5' shoulders (full usable width). Drainage ditches are not apparent. Apparent existing right-of-way is 25' (half-width).

Road History:

1929	16' bituminous macadam, County Road
1932	Widen to 20', rock asphalt on non rigid base
1945	Widen to 22' and resurface with rock asphalt
1949 & 1960	Resurface with hot asphalt concrete
1975	Widen to 26' and resurface with bituminous concrete
1985	Resurface with bituminous concrete
1998	Asphalt resurface

Existing road plans for the 1932 project, FA Proj No. 215 (Greenville to Galena), are available at the central office. Road construction plans for the 3 projects exception areas (Des. No. 9302640 (Intersection Improvement, US 150 at Kiesler Road), Des. No. 8351600 (Intersection Improvement, US 150 at Stiller Road), and Des. No. 9302660 (Intersection Improvement, US 150 at Buck Creek Road) are also available at the central office. Bridge plans for the 4 bridges within the project limits are available at the central office (Project # ST-030-3)

Pavement Condition:

The last resurface took place in 1998 under contract RS-23790. The INDOT's 2001 Pavement Surface Report indicates that this section of roadway has a Pavement Condition Rating (PCR) of 98 (excellent condition), average rut depth of 0.09 inch and a International Roughness Index (IRI) of 62 (excellent condition).

Horizontal and Vertical Alignments:

The posted speed is 55 mph in the rural sections and 40 mph in the towns of Greenville and Galena.

The US 150 corridor runs generally in a northwesterly to southeasterly direction. The horizontal alignment can be seen in the aerial photographs, page A-17 to A-30 of the Appendix. Assuming suitable superelevation is in place, there is one curve that does not satisfy current standards of minimum radius for 55 mph (approx PI = 435+00, R = 955', CEDS = 53 mph).

The prevailing vertical terrain along the US 150 corridor is considered rolling, with the vertical grades ranging from –6.0% to +6.0%. There are numerous locations with vertical curvature for SSD substandard with respect to 3R minimum K-values (+/- 10% of the project consists of areas of substandard vertical alignment).

Intersecting Roadways:

The intersection of US 150 and Navilleton Road is the only signal controlled intersection within the project. All of the other intersecting roadways with US 150 are stop controlled for the minor approach. Intersecting roadways within the project limits are summarized in the following table:

Intersecting Roadway	RP (Sta.)	Intersecting Angle	Intersection Sight Distance (ISD)	ISD CEDS (4R)	Leg Width	Posted Speed Limit
Reisert Rd. (Lt.)	RP 161+42 (Sta. 168+33)	Not within project (part of Des. No. 9902560)				
Corn Creek Trace (Rt.)	RP 161+99 (Sta. 201+58)	84 °	> 870'	>60 mph	18'	Not Posted
Saddleback Rd. (Lt.)	RP 162+02 (Sta. 217+15)	92 °	675' East 590'. West	51 mph 49 mph	20'	20 mph
Kiesler Rd/ Settler's Run	RP 162+55 (Sta. 230+25)	Project Exception (Des. No. 9302640)				
SR 335 (Lt.)	RP 163+22 (Sta. 264+98)	123 °	> 870' East 835' West	> 60 mph	20'	45 mph
Wind Dance Farm (Lt.)	RP 163+24 (Sta. 272+28)	94 °	> 870' East 600' West	> 60 mph 49 mph	35'	Not Posted
Voyles Rd. (Lt.)	RP 163+69 (Sta. 290+79)	111 °	565' East > 870' West	47 mph > 60 mph	18'	50 mph
W. 2nd St. (Rt.)	RP 163+80 (Sta. 296+52)	90 °	>410'	>40 mph	18'	Not Posted
W. 1st St. (Rt.)	RP 163+85 (Sta. 299+28)	90 °	>410'	>40 mph	10'	Not Posted
Cross St. (Lt.)	RP 163+90 (Sta. 302+12)	90 °	>410'	>40 mph	24'	Not Posted
Georgetown-Greenville Rd. (Rt.)	RP 163+90 (Sta. 302+14)	90 °	>410'	>40 mph	18'	Not Posted

Intersecting Roadway	RP (Sta.)	Intersecting Angle	Intersection Sight Distance (ISD)	ISD CEDS (4R)	Leg Width	Posted Speed Limit
E. 1st St. (Lt.)	RP 164+00 (Sta. 305+17)	90 °	>410'	>40 mph	20'	Not Posted
E. 2nd St.	RP 164+05 (Sta. 307+76)	90 °	>410'	>40 mph	10'	Not Posted
E. 3rd St. (Rt.)	RP 164+08 (Sta. 311+20)	90 °	>410'	>40 mph	8'	Not Posted
Pekin St. (Lt.)	RP 164+21 (Sta. 316+51)	90 °	>410'	>40 mph	22'	30 mph
E. 5th St.	RP 164+27 (Sta. 319+59)	90°	>410'	>40 mph	8'	Not Posted
Buttontown Rd. (Rt.)	RP 164+44 (Sta. 246+74)	83 °	>410' East 300' West	>40 mph 25 mph	22'	30 mph
Schuler Rd. (Rt.)	RP 164+95 (Sta. 356+32)	169 °	> 870'	> 60 mph	18'	30 mph
Maple Dr. (Lt.)	RP 165+ (Sta. 385+50)	90°	660' East >870' West	51 mph > 60 mph	18'	Not Posted
Beechwood Dr. (Lt.)	RP 165+45 (Sta. 385+79)	93 °	530' East >870' West	45 mph > 60 mph	18'	Not Posted
Schuler Rd. (Rt.)	RP 165+60 (Sta. 396+00)	31 °	>870' East 495' West	> 60 mph 44 mph	18'	Not Posted
Borden Rd. (Lt.)	RP 165+70 (Sta. 403+50)	91 °	> 870'	> 60 mph	20'	30 mph
Highlander Ct. (Lt.)	RP 166+67 (Sta. 444+71)	90 °	>870' East 800' West	>60 mph > 59 mph	12'	Not Posted
Clover Creek Dr. (Rt.)	RP 166+69 (Sta. 453+18)	102 °	650' East 700' West	51 mph 52 mph	28'	Not Posted
Highlander Rd. (Lt.)	RP 166+69 (Sta. 455+57)	90 °	650 Ft. East 810 Ft. West	51 mph 59 mph	20'	Not Posted
Featheringill Rd.	RP 167+12 (Sta. 480+82)	92 °	> 410'	> 40 mph	18'	30 mph
First Cross St.	RP 167+18 (Sta. 483+89)	92 °	> 410'	> 40 mph	24'	Not Posted

Intersecting Roadway	RP (Sta.)	Intersecting Angle	Intersection Sight Distance (ISD)	ISD CEDS (4R)	Leg Width	Posted Speed Limit
Edwardville-Galena Rd.	RP 167+19 (Sta. 490+89)	95 °	> 410'	> 40 mph	35'	30 mph
Navilleton Rd. (Lt.)	RP 167+64 (Sta. 510+63)	99 °	> 870'	>60mph	20'	30 mph
May St. (Lt.)	RP 167+68 (Sta. 512+77)	100 °	> 870'	>60mph	20'	Not Posted
Everett Ave. (Rt.)	RP 167+68 (Sta. 513+05)	92 °	> 870'	>60mph	36'	20 mph
Barry Ln. (Rt.)	RP 167+88 (Sta. 524+00)	127 °	500' East >870' West	44 mph >60 mph	36'	20 mph

Drainage Structures:

The INDOT Preliminary Hydraulic Review (pages C-4 to C-8 of the appendix) identifies nine major cross culverts that range in size from 3' rise x 3' span to 6.0' rise x 8.5' span. All of the structures are hydraulically inadequate to handle the 100 year flood event. Approximate cross culvert locations are shown on the aerial plan sheets (A-17 to A-30).

BRIDGE STRUCTURES

There are 4 bridge structures within the project limits. The following table summarizes their type, age, clear roadway, and whether or not the structure will be a part of this project. No modifications to the structures are anticipated.

Structure #	Description	Condition Ratings (deck, superstructure, substructure)	Size & Type	Clear Roadway	Year Constructed/ Last Repaired	Included in Project ?
150-22-06760	US 150 over Corn Creek	6,7,7	Concrete Slab: 21.5', 28.6', 21.5'	44.0'	1985	New barrier railing and guardrail
150-22-06761	US 150 over Richland Creek	7, 7, 7	Concrete Slab: 21.5', 30', 21.5'	44.0'	1985	New barrier railing and guardrail
150-22-07331	US 150 over Jersey Park Creek	7, 8, 8	Concrete Slab: 36',44',36'	52.0'	1998	Widening required for eastbound passing blister. New barrier railing and guardrail
150-22-06700	US 150 over Indian Creek	7, 7, 7	Concrete I-Beam: 46.5', 47.2', 46.5'	44.0'	1986	New barrier railing and guardrail

Utilities:

Various utilities are located within the study limits of this project. Overhead power, cable and telephone lines are located along US 150 on both sides of the road (intermittently). Underground gas, water, sanitary sewer and telephone lines exist at certain locations throughout the project.

E. TRAFFIC DATA and CAPACITY ANALYSIS:

An outside consultant for the Traffic Statistics Unit prepared traffic forecasts for this project. The reports show traffic forecasts (full intersection movements), given no capactity constraints, for the following major intersections, for the years 2002, 2007, 2012, 2022, and 2027.

1. US 150 at SR 335
2. US 150 at Georgetown-Greenville Road
3. US 150 at Greenville-Borden Road
4. US 150 at Edwardsville-Galena Road

Forecast summaries were provided for each of the intersections for both the AM and PM peak hours. A copy of the summaries is located in Appendix B-1 to B-8. The District provided a 12-hour turning movement count for the signalized intersection of US 150 at Navilleton Road (see B-9 of the appendix).

Projected Average Annual Daily Traffic (AADT) is summarized in the adjacent table. Capacity analysis on the two-lane highway section from west of SR 335 to east of Edwardsville-Galena Road was performed for the construction year (2007) and the design year (2027), and is summarized in the adjacent table.

Under 4R standards the desirable LOS is B and the minimum is C; for 3R standards, the desirable LOS is B and the minimum is D. As can been seen in the adjacent table, existing US 150 LOS falls below acceptable levels.

Existing Configuration

Roadway Segment	AADT		2007 LOS		2027 LOS	
	2007	2027	AM	PM	AM	PM
West of SR 335	8580	11590	C	C	C	C
East of SR 335	9710	13130	C	C	C	D
West of Georgetown-Greenville Rd	15740	21260	D	D	E	E
East of Georgetown-Greenville Rd	16810	22710	D	D	F	E
West of Greenville-Borden Rd	15030	20310	D	D	E	E
East of Greenville-Borden Rd	16160	21830	D	D	E	E
West of Edwardsville-Galena Rd	17880	24160	E	D	F	E
East of Edwardsville-Galena Rd	18830	25430	D	D	E	E

Intersection LOS:

A capacity analysis was performed at the four intersections along US 150 that had traffic counts performed, pursuant to the Highway Capacity Manual's (year 2000) methodology for intersections to determine level of service (LOS) and delay during the construction year (2007) and the design year (2027). The following table summarizes the findings.

INTERSECTION LOS SUMMARY					
US 150 @	Existing Configuration				
	2007		2027		
	AM	PM	AM	PM	LOS Display Format
SR 335	C (16)/A	C (18)/A	C (24)/A	D (28)/B	SB LOS (delay in seconds)/ EB LT LOS
Georgetown-Greenville Rd	F,F / A,B	E (36),F / B,A	F,F / A,B	F,F /B,A	NB (s),SB (s) / EB LT, WB LT
Greenville-Borden Road	E (45) / A	E (42) / B	F / A	F / B	SB (s) / EB LT
Edwardsville-Galena Road	E (43) / B	D (26) / A	F / C	F / A	NB (s) / WB LT

Since the LOS as a stop controlled intersection failed (LOS = F) for 4 of the 5 intersections, signalized intersection control was analyzed. The adjacent table summarizes the results. The designer is instructed to contact the District Traffic Engineer prior to the Preliminary Field Check to determine if signals are warranted at any of these intersections.

Further discussion of LOS and intersection improvements are in the "Project Alternates and Recommendations" section of this report.

SIGNAL CONTROLLED INTERSECTIONS (Existing Configuration)		
Intersection	2007 LOS (AM / PM)	2027 LOS (AM / PM)
Georgetown-Greenville Rd	B(15) / B(10)	E(79) / E(59)
Greenville-Borden Road	A(9) / A(5)	C(31) / B(11)
Edwardsville-Galena Road	A(5) / A(6)	B(12) / A(9)
Navilleton Road	A(7) / A(5)*	C(21) / B(11)**
Notes: * Growth Factor of 1.37 applied to 1991 count ** Growth Factor of 2.04 applied to 1991 count		

F. CRASH DATA:

The INDOT database shows 232 recorded crashes (accidents) from east of Riesert Road to the start of the 4 lane divided section (east of Buck Creek Road) during the 3 year period from January 1997 to December 1999. The following table describes the distribution of crash events by intersection, with the number of crashes shown, followed by the number of crashes resulting in personal injury in parentheses.

Location	Type of Crash									Totals
	Rear end	Head On	Sideswipe	Right Angle	Off Road	Left Turn	Right Turn	Animal	Undetermined	
Corn Creek Trace (Rt.)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	1 (0)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Saddleback Rd (Lt.)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Kiesler Rd. (Rt.)	0 (0)	0 (0)	1 (0)	1 (1)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (1)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0)	0 (0)	2 (0)
SR 335 (Lt.)	0 (0)	0 (0)	2 (1)	1 (1)	0 (0)	0 (0)	0 (0)	2 (0)	0 (0)	5 (1)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Location	Type of Crash									Totals
	Rear end	Head On	Sideswipe	Right Angle	Off Road	Left Turn	Right Turn	Animal	Undetermined	
Wind Dance Farm (Lt.)	0 (0)	1 (0)	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Voyles Road (Lt.)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	1 (0)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
W. 3rd St. (Lt.)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
W. 2nd St.	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
W 1st St.	1 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (1)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Georgetown – Greenville Road / Cross St.	1 (0)	1 (1)	0 (0)	2 (0)	1 (0)	1 (1)	0 (0)	0 (0)	0 (0)	6 (2)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
E 1st St. (Lt.)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
E. 2nd St. (Rt.)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
E. 3rd St. (Rt.)	3 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	4 (1)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pekin St. (Lt.)	2 (0)	0 (0)	2 (1)	2 (1)	3 (3)	3 (0)	0 (0)	0 (0)	0 (0)	12 (5)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
5th Street	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
6th Street	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Buttontown Road (Rt.)	5 (2)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	6 (3)
Mid-block	5 (1)	1 (1)	0 (0)	0 (0)	10 (6)	1 (0)	0 (0)	0 (0)	0 (0)	17 (8)
Schuler Road (Rt.)	3 (3)	0 (0)	0 (0)	0 (0)	3 (1)	0 (0)	0 (0)	0 (0)	0 (0)	6 (4)
Mid-block	1 (1)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)	1 (0)	0 (0)	3 (1)
Maple Drive (Lt.)	5 (4)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	6 (4)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Beechwood Drive (Lt.)	1 (1)	0 (0)	0 (0)	0 (0)	1 (0)	2 (0)	0 (0)	0 (0)	0 (0)	4 (1)
Mid-block	1 (1)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)	2 (0)	0 (0)	4 (1)
Borden Road (Lt.)	6 (3)	0 (0)	2 (1)	0 (0)	0 (0)	2 (0)	0 (0)	3 (0)	0 (0)	13 (4)
Mid-block	5 (1)	1 (0)	1 (0)	0 (0)	7 (1)	0 (0)	0 (0)	1 (0)	0 (0)	15 (2)
Highlander Court (Lt.)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	2 (0)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	1 (1))	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)
Clover Creek Drive (Rt.)	2 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Highlander Road (Lt.)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	4 (1)	0 (0)	0 (0)	0 (0)	0 (0)	4 (1)
Featheringill Road	3 (2)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)	1 (0)	1 (0)	0 (0)	6 (2)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
1st Cross St.	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	2 (1)

Location	Type of Crash									Totals
	Rear end	Head On	Sideswipe	Right Angle	Off Road	Left Turn	Right Turn	Animal	Undetermined	
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Edwardville / Galena Road (Rt.)	1 (0)	0 (0)	0 (0)	0 (0)	3 (1)	0 (0)	0 (0)	0 (0)	0 (0)	4 (1)
Mid-block	2 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (1)
Navilleton Road (Lt.)	2 (0)	0 (0)	0 (0)	0 (0)	0 (0)	5 (3)	0 (0)	0 (0)	0 (0)	7 (3)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Everett Avenue (Rt.) / May St. (Lt.)	8 (2)	1 (1)	0 (0)	0 (0)	0 (0)	4 (1)	0 (0)	0 (0)	0 (0)	13 (4)
Mid-block	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)
Barry Lane (Rt.)	4 (3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	4 (3)
Mid-block	4 (1)	0 (0)	1 (0)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	6 (1)
Stiller Road (Lt.)	3 (1)	0 (0)	0 (0)	0 (0)	1 (0)	1 (1)	1 (0)	0 (0)	0 (0)	6 (2)
Mid-block	3 (1)	0 (0)	1 (1)	0 (0)	1 (0)	0 (0)	0 (0)	1 (0)	0 (0)	6 (2)
Buck Creek Road (Lt.)	36 (8)	0 (0)	1 (0)	1 (1)	3 (1)	1 (0)	0 (0)	4 (0)	0 (0)	46 (10)
Mid-block	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Totals	113 (39)	5 (3)	12 (4)	8 (5)	47 (17)	23 (6)	4 (0)	20 (0)	0 (0)	232 (74)

# of crashes (# of crashes resulting in personal injury)

113 of the crashes were classified as rear-end crashes. Substandard vertical alignment and lack of refuge for turning vehicles at the intersections, likely are contributing factors in the number of rear-end crashes. 47 crashes were classified as off-road crashes. Narrow shoulders and substandard horizontal and vertical alignments, likely are contributing factors in the number of this type of crash.

Alignment improvements, intersection improvements and an overall update of the cross section is expected to significantly reduce the risk of crashes along US 150.

G. PROJECT ALTERNATES AND RECOMMENDATIONS:

Three alternates were considered for this project, they are as follows:

Alternate A Rehabilitate US 150 as a 2-lane rural roadway with 12' travel lanes and 8' paved shoulders, utilizing 3R standards, resurfacing as much as possible. A cost/benefit analysis, as discussed in chapter 55 of the IDM would be used to determine if design elements would be improved or left in place (i.e. horizontal and vertical alignment improvements). A reduced shoulder width, or curb and gutter, would be utilized in the towns of Greenville and Galena.

Alternate B Same as Alternate A, except within the towns of Greenville and Galena, a 3-lane curb and gutter section would be constructed (one lane each direction with a 2-way left-turn lane in the middle).

Alternate C No Build. This alternate does not satisfy the need and purpose of this project, as detailed in the section Project's Need and Purpose. This alternate is not preferred, and will not be developed any further.

Even though portions of the roadway have design year AADT above 20,000 vpd, construction of a 4-lane divided highway from west of Greenville to the existing 4-lane divided section was not developed in this report. Additional through travel lanes was viewed as beyond the scope of this project.

Alternates A, and B will be further developed in this report.

The following items are considered necessary and are to be included in the final design.

Design Criteria	
Functional Classification:	Rural Minor Arterial
Design Class Rural Sections: Within Greenville and Galena:	 Rural Arterial, 2-lane, AADT > 5000 (Table 55-A) Two-Lane Urban Arterial (Intermediate), (Table 55-F)
Terrain	Rolling
Design Speed	Rural: 55 mph Urban: 40 mph
Access Control	None
FHWA Oversight	Not Required for design or construction

Pavement Recommendation:

The INDOT pavement recommendation (see pages C-9 and C-10 of the appendix) is to retain as much of the existing pavement as possible. For cost estimating purposes, it is assumed that approximately 15% of the project will require new pavement, primarily due to vertical grade issues.

Horizontal and Vertical Alignments:

(See Plan & Profile Sheets (A-17 to A-30)

The one horizontal curve within the project that has a radius with a CEDS below 55 mph (approx PI = 435+00, R = 955', CEDS = 53 mph) should be retained. Accidents at this location are minimal, and improvements to the cross section (i.e. wider shoulders and a larger recovery area) will help reduce the risk of crashes.

The vertical alignment corrects several substandard vertical curves along the corridor. As shown in the profile the new vertical alignment will meet 3R standards for stopping sight distance (comfort criteria for sag curves) and ISD. (Note: The designer is instructed to make suitable refinements to these conceptual horizontal and vertical alignments.)

Hydraulic Recommendations:

The INDOT Hydraulics Unit, has provided a preliminary structure sizes for all major cross culverts within the project limits (9 crossings have been identified). This information is included in the appendix, sheets C-4 to C-8. The preliminary hydraulic review indicates that the existing structures are not hydraulically adequate. Replacement of all cross culverts will be required

A new storm sewer system within Greenville and Galena will be required.

Intersection Treatment:

Type "B" Public Road Approaches should be constructed at all of the rural intersections. Passing blisters will be constructed at all of the "major" rural intersections (as shown in the adjacent table).

Proposed Passing Blisters
SR 335, Maple St., Beechwood Dr., Borden Road, Clover Creek Dr., Highlander Rd., Everett Ave., Barry Lane

Within the towns of Greenville and Galena, street approaches should be designed to accommodate turning vehicles, without severely impacting the adjacent properties.

Survey Requirements:

The mainline survey should extend from Reisert Road (station 168+00) to 900' west of Stiller Road (station 545+00). Length of mainline survey: 7.1 miles. The survey should extend a minimum distance of 100 feet north and south of the centerline in the rural sections. In the urban sections (within Greenville and Galena) the design survey should be wide enough to pickup the front of all buildings along US 150. Design survey along the S-lines should extend 300' from the centerline of US 150 within the rural sections and 150' from the centerline of US 150 in the urban areas.

Traffic Maintenance:

Construction will need to be phased in order to maintain access to all property owners along the corridor. Through traffic will be detoured. The cost of temporary widening, running the length of the job, is prohibitive. The anticipated official state detour would utilize SR 135 and I-64. The total detour length is approximately 26.4 miles, however the length of additional travel is approximately 11.4 miles. Assuming a 50 percent split of local and state traffic, road closure for 330 days and $0.25 per mile, the estimated cost of a state detour is approximately $3,800,000. The traffic maintenance plan will be refined during the design phase.

Right-of-Way Summary:

Within the rural sections of the project, the predominant existing apparent right-of-way along US 150 is 40' each side of centerline. Within the urban sections of the project the apparent existing right-of-way varies from 40' to 50', total width. The widening of US 150 will require continuous (more or less) "strip" right-of-way acquisition. For the curb and gutter sections, consideration should be given to include the side slope grading in temporary right-of-way. For the purposes of this report (i.e. displays, quantities and costs) the grading for side slopes is included in the temporary right-of-way. The proposed right-of-way will vary from a minimum of 30' to a maximum of 80' on each side. The prevailing right-of-way will be 60' in half-width. The following table summarizes the amount and type of right-of-way required. Temporary right-of-way will be required for construction of some driveways. Exact location of temporary right-of-way requirements will be determined during the design phase.

Right-of-Way Summary				
	Alternate A		Alternate B	
	Perm.	Temp.	Perm.	Temp.
Residential	3.6 (40)	1.6 (33)	4.3 (72)	1.6 (33)
Commercial	0.1(4)	1.1 (26)	0.6 (29)	1.1 (26)
Agricultural/Wooded	10.8 (55)	0	10.8 (55)	0
Totals	**14.5 (99)**	**2.7 (59)**	**15.7 (156)**	**2.7 (59)**
	Note: Table shows Total Acres (# of Parcels)			

Two relocations are possible (Sta. 206+50 (residence), and Sta. 500+50 (commercial bldg, Notable historic significance)). The designer should consider at select sites, the use of ditch enclosure, small retaining walls and other reasonable methods in an effort to minimize the right-of-way impacts and the number of relocations.

Estimated Costs (Year 2003):

Item Description	Alternate A	Alternate B
Road Rehabilitation:	$6,800,000	$7,400,000
Storm Sewer:	$800,000	$850,000
Traffic Maintenance:	$500,000	$500,000
CONSTRUCTION TOTAL	$8,100,000	$8,750,000
Right-of-Way Services	$700,000	$780,000
Right-of-Way	$400,000	$620,000
Right-of-Way Total	$1,100,000	$1,400,000
Engineering (Includes Survey):	$500,000	$550,000
PROJECT TOTAL	$9,700,000	$10,700,000

PROJECT RECOMMENDATIONS

It is recommended to proceed with development of Alternate B. Alternate B provides additional safety and capacity (over Alternate A), by providing a continuous left turn auxiliary lane through the towns of Greenville and Galena, where left turn movements are prevalent.

H. ENVIRONMENTAL ISSUES:

The primary environmental considerations on this project involve the additional right-of-way requirement, relocations, old automotive service stations, and potentially historic properties. Several historic properties are identified in the towns of Greenville and Galena. The INDOT Environmental Assessment Section is preparing the project's environmental document. The designer shall continually confer with the environmental scientist in the Environmental Assessment Section as the project advances, particularly regarding impacts to any sensitive sites. It could become necessary to shift slightly the position of US 150 horizontally or to construct modest retaining structures to avoid impact to critical sites.

I. RELATED PROJECTS, CONSISTENCY:

The subject project is scheduled as ready for contracts (RFC) in December 2006 though the scale of work may delay the schedule. According to the *2002 Directory of INDOT Highway Projects* and the INDOT Project Database (as of 01/31/02), there are several future projects scheduled which may affect this subject project. The projects are as follows:

Des. Number	Project Description	Comments
8351600	Intersection Improvement, US 150 at Stiller Road, RP 168+42, Floyd County	RFC Date: 8/01. This project was completed in the 2002 construction season. The subject project should consider this project area as an exception.
9302640	Intersection Improvement, US 150 at Kiesler Road, RP 162+55, Floyd County	RFC Date: 4/01. This project was completed in the 2002 construction season. The subject project should consider this project area as an exception.
9302660	Intersection Improvement, US 150 at Buck Creek Road, RP 168+78, Floyd County	RFC Date: 8/01. This project was completed in the 2002 construction season. The subject project should consider this project area as an exception.
9902560	Road Reconstruction, US 150 from SR 135 to Harrison/ Floyd County Line	RFC date: 3/05. This project abuts the subject project. Coordinate to ensure traffic maintenance and project compatibility.
0012560	US 150 Road Rehabilitation From SR 66 to SR 135, RP 148+09 to RP 157+01, Washington and Harrison counties	RFC date: 12/06. Project is 6 miles west of subject project. Coordinate to ensure traffic maintenance and project compatibility.

The designer shall check for any new projects posted after this date prior to final plan submittal for compatibility with the proposed work.

J. COORDINATION, MEETINGS, CONCURRENCE:

This project has involved coordination with the following individuals:

David Dye	INDOT, Seymour District, Program Development Engineer
Jose Garcia	INDOT, Seymour District, Traffic
Chad Mills	Burgess & Niple (B & N), INDOT Design Representative
Eduardo Calderin	B & N, INDOT Design Representative

All of these individuals attended the field check meeting held on March 07, 2002 and provided their input into this project. The major issues relative to the field investigation are detailed in the Field Check Minutes, located in Appendix C-1 through C-3. Photographs of the project site are located in Appendix A-3 through A-16.

Draft copies were sent to David Dye and Eduardo Calderin for their review and comments.

Additional coordination has taken place with Brad Steckler and Tarlochan Bansi from INDOT's Engineering Assessment Section.

K. SCOPE OF WORK CHANGES

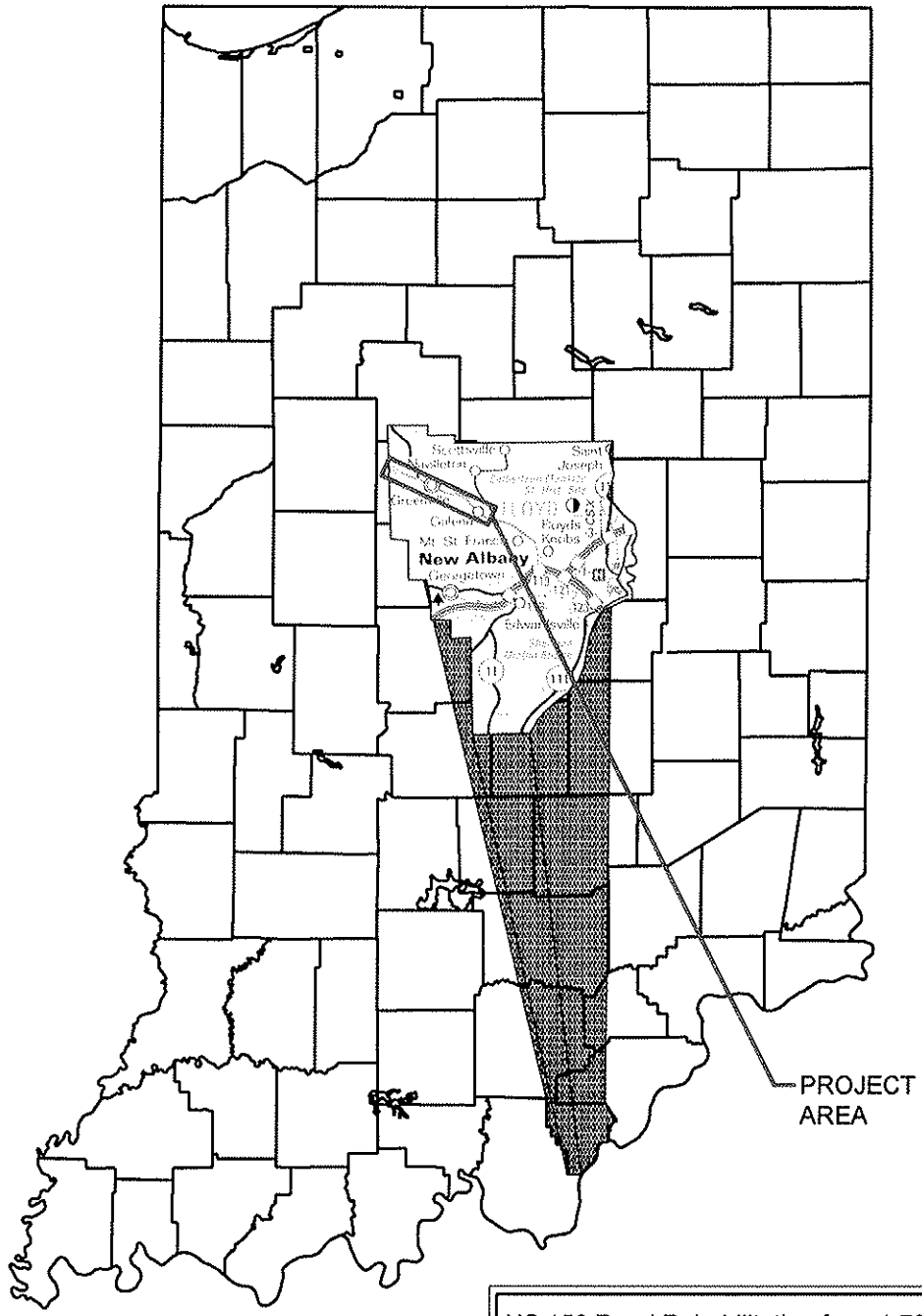
The Engineering Assessment Section shall be consulted if deviation from the proposal (scope of work) is determined to be necessary during a later phase of project development. The person initiating the change should send a memo to the Engineering Assessment Section Manager for concurrence. The designer should route the memo through the Design Division Section Manager. The memo should include justification for the change and the estimated cost difference.

CONCUR: _____ **DATE:** _____

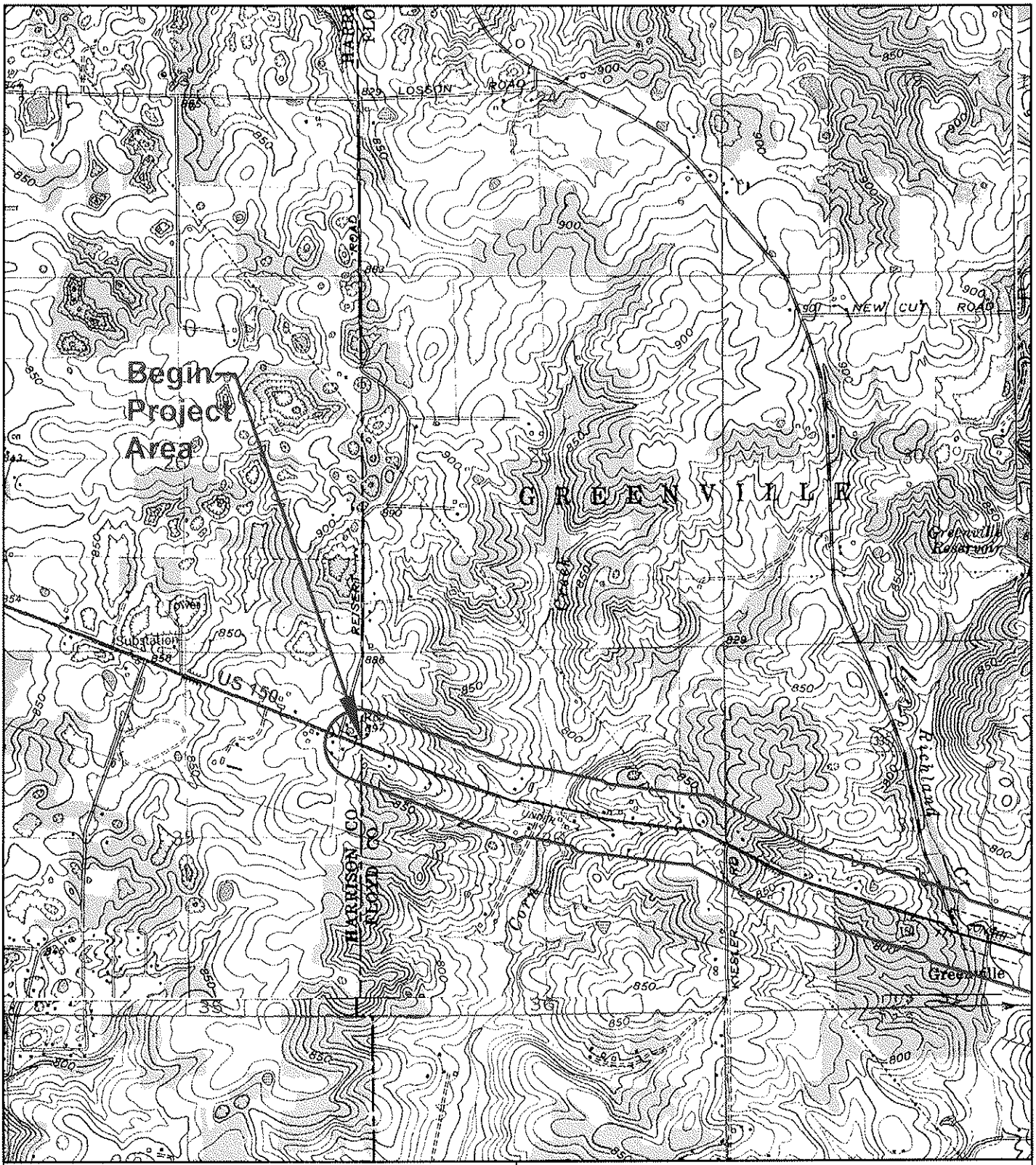
Brad L. Steckler, Manager
Engineering Assessment Section

cc:

Hollie Pratt (3), INDOT Project Coordinator
Gary Mroczka (2), INDOT, Design, Specialty Group
Matt Thomas, INDOT, Design, Utilities Engineer
William Schmidt, INDOT Design-Location Survey Section
Jim Juricic, INDOT Environmental Assessment Section
Athar Khan, INDOT Materials & Test, Design
Roberta Johnson, INDOT, Land Acquisition
Jim Ude, INDOT, Seymour, Development
B. Steckler/T. Bansi/Engineering Assessment Section File
USI File 2002-924



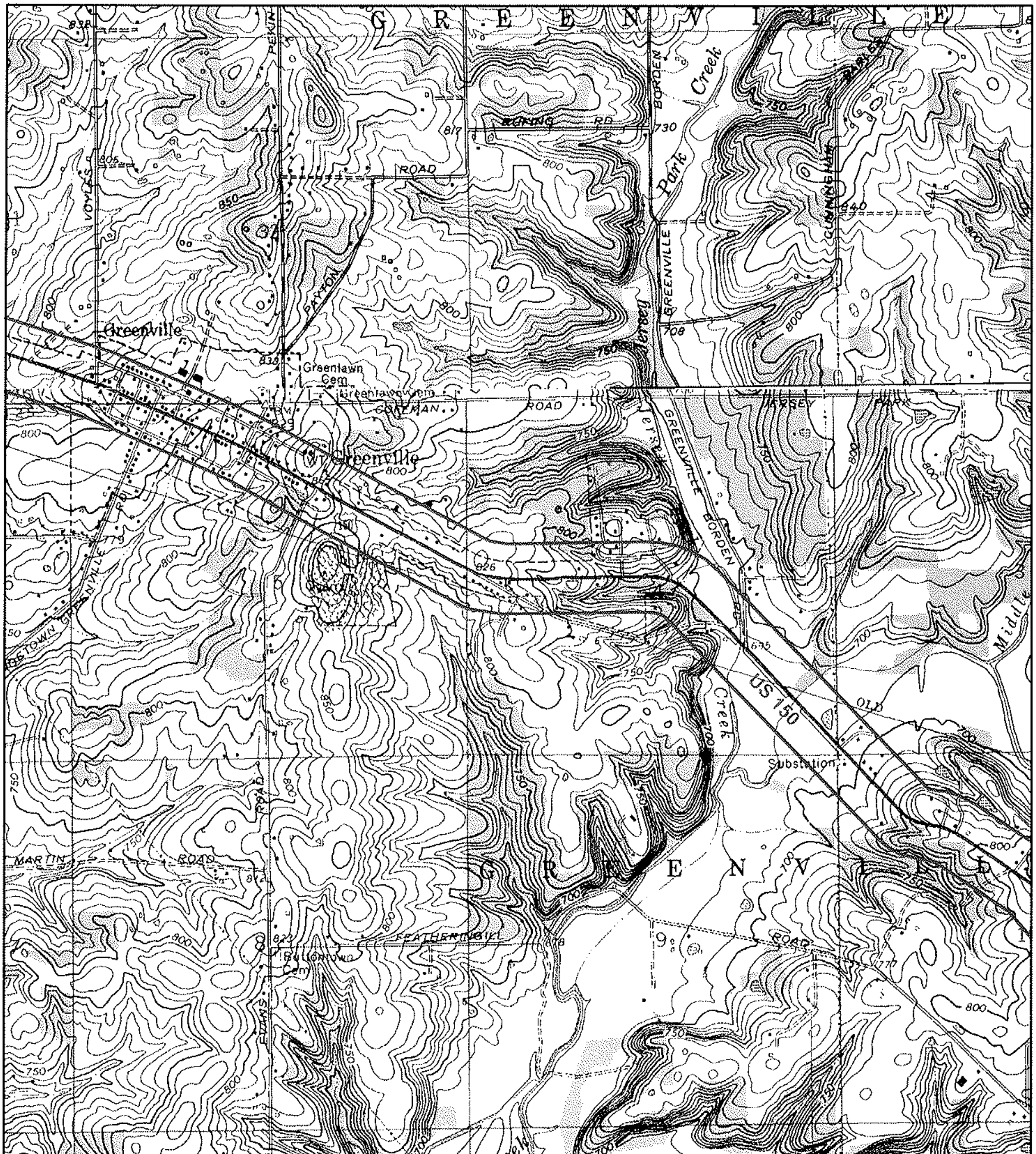
US 150 Road Rehabilitation from 1.73 Mi. West of SR 335 (Count Line) to 3.80 Mi. West of I-64
Des. No. 0012570
Project No. STP-030-3( )
Floyd County



Crandall, Borden, Palmyra
& Georgetown, IN Quadrangles
Scale = 1" = 2000'

US 150 Road Rehabilitation from
1.73 Mi. West of SR 335 (County Line)
to 3.80 Mi. West of I-64
Des. No. 0012570
Project No. STP-030-3( )
Floyd County

A-2a



Crandall, Borden, Palmyra
& Georgetown, IN Quadrangles
Scale = 1" = 2000'

US 150 Road Rehabilitation from
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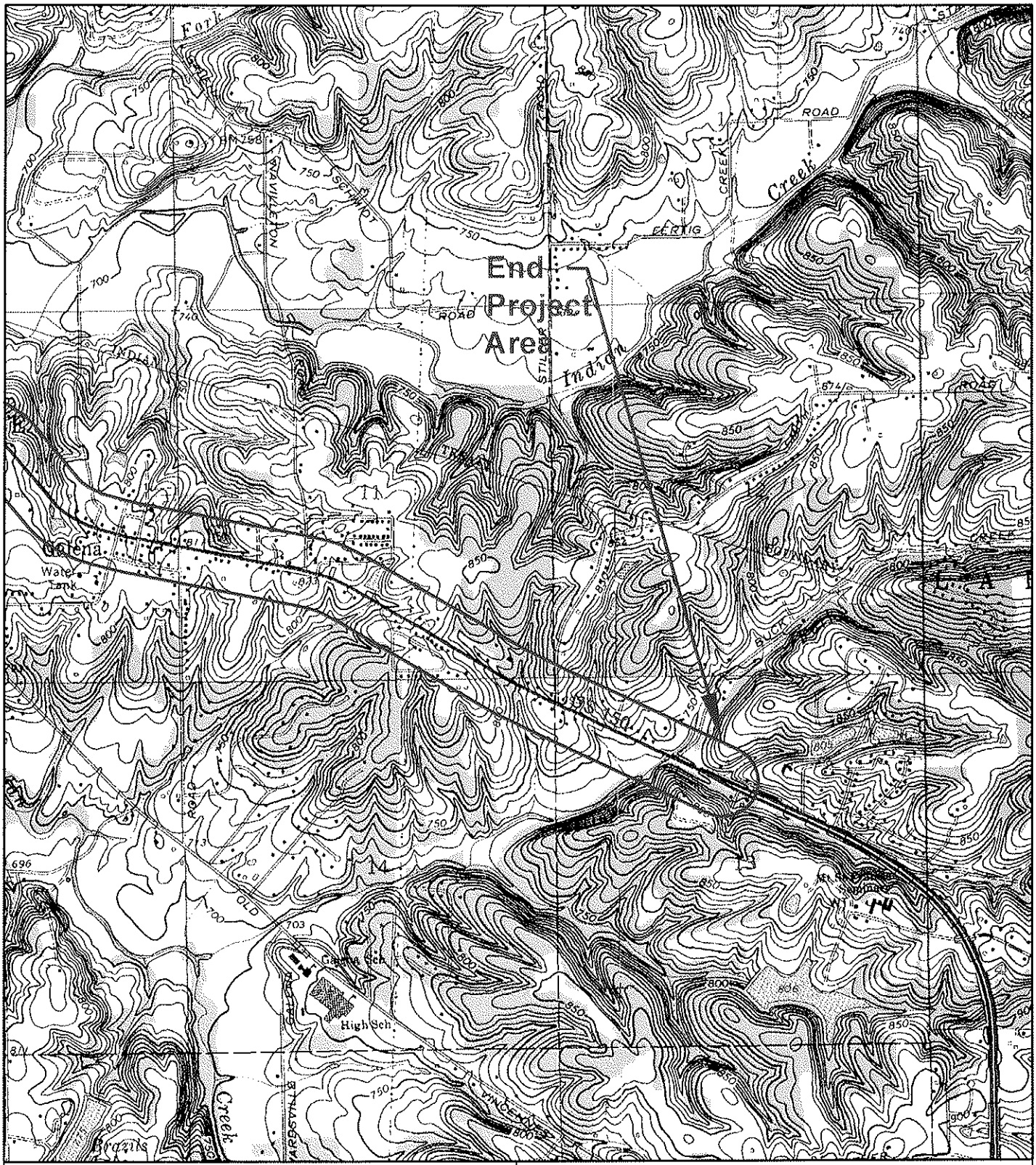
Des. No. 0012570
Project No. STP-030-3( )
Floyd County

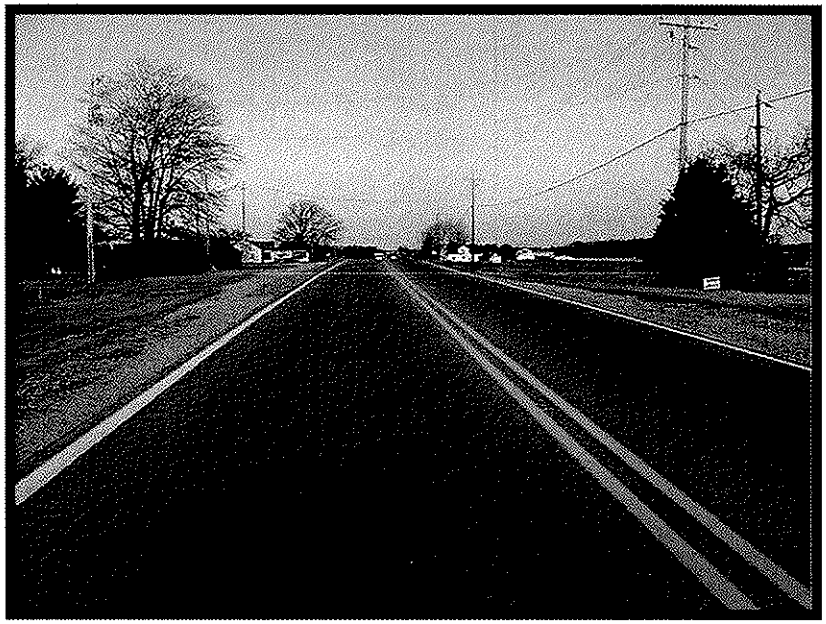
A-2b



Crandall, Borden, Palmyra
& Georgetown, IN Quadrangles
Scale = 1" = 2000'

US 150 Road Rehabilitation from
1.73 Mi. West of SR 335 (County Line)
to 3.80 Mi. West of I-64
Des. No. 0012570
Project No. STP-030-3( )
Floyd County

A-2c



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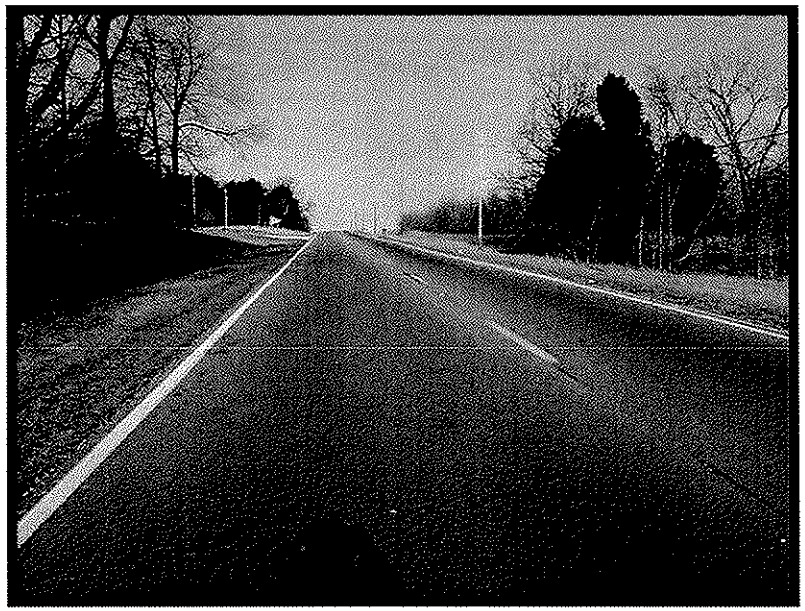
FACING EAST ALONG US 150 AT STA. 175+00



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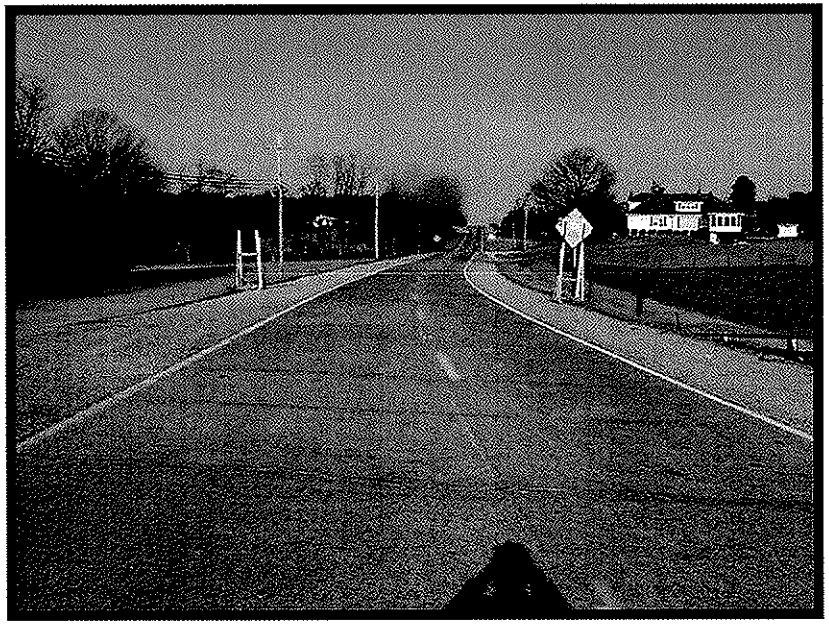
US 150 Road Reconstruction



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FACING EAST ALONG US 150 AT CORN CREEK TRACE

FACING WEST ALONG US 150 AT SADDLEBACK RD.
(STA. 218+00)

FACING EAST ALONG US 150 AT SADDLEBACK RD.
(STA. 218+00)

US 150 Road Reconstruction

FACING WEST ALONG US 150 AT STA. 241+00

FACING EAST ALONG US 150 AT STA. 241+00

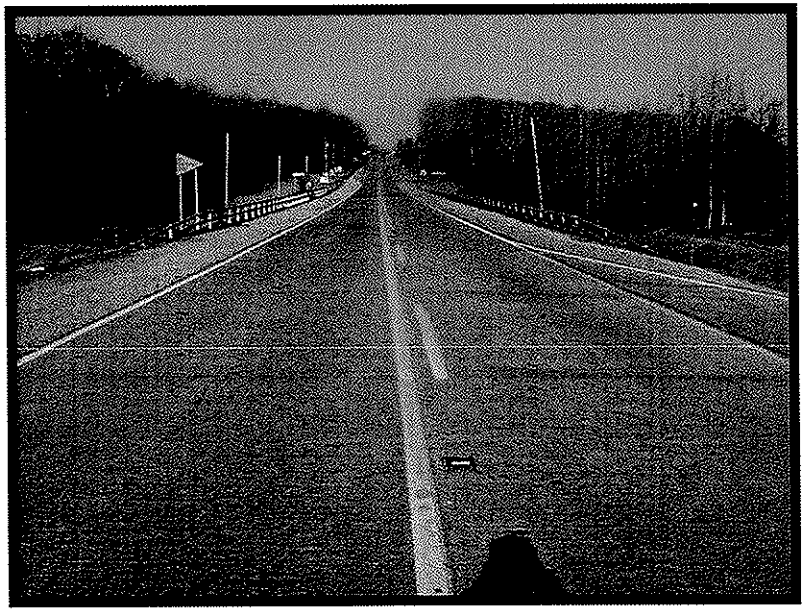
FACING WEST ALONG US 150 AT STA. 253+00

FACING EAST ALONG US 150 STA. 253+00

US 150 Road Reconstruction

FACING WEST ALONG US 150 AT SR 335

FACING EAST ALONG US 150 AT SR 335



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(STA. 271+00)

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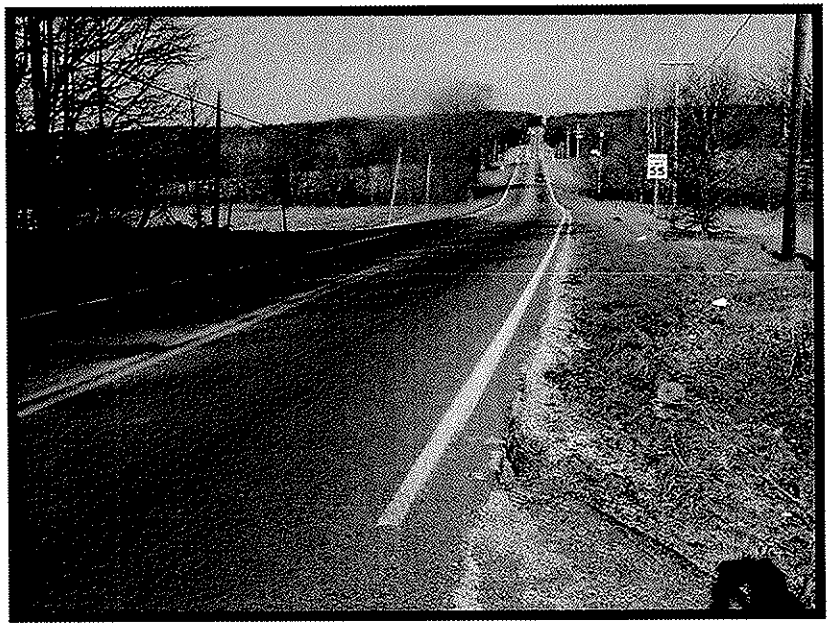
(STA. 271+00)

US 150 Road Reconstruction



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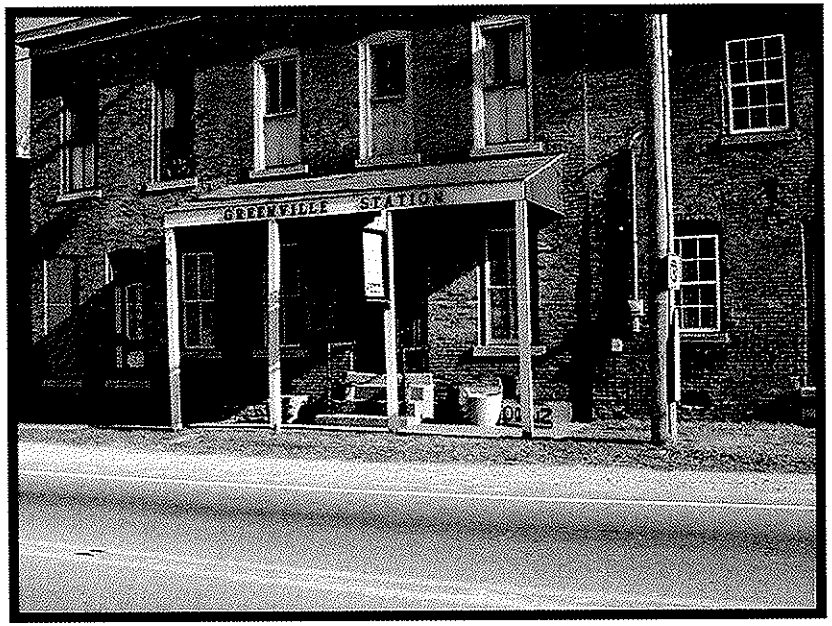
FACING EAST ALONG US 150 AT VOYLES RD. (STA. 290+50)

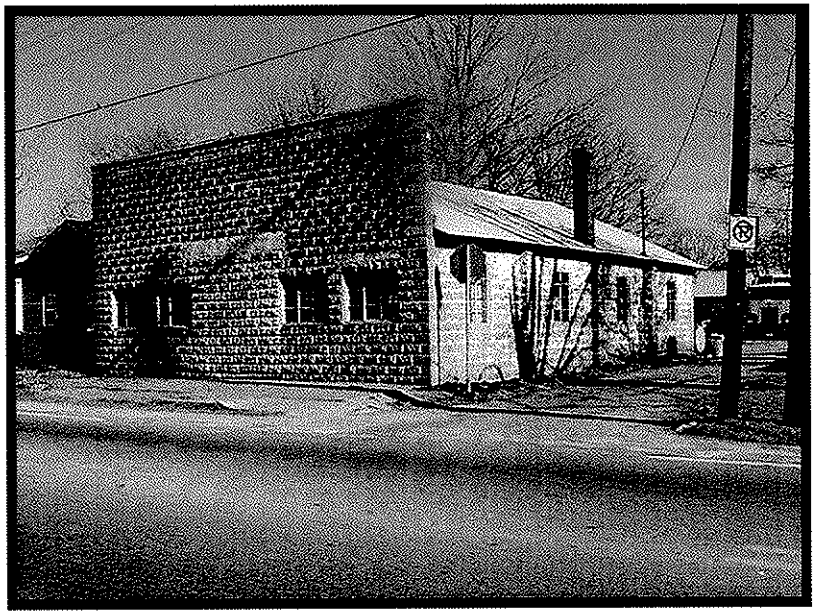
FACING WEST ALONG US 150 AT STA. 296+00

FACING EAST ALONG US 150 AT W. 2ND ST. (STA. 296+00)

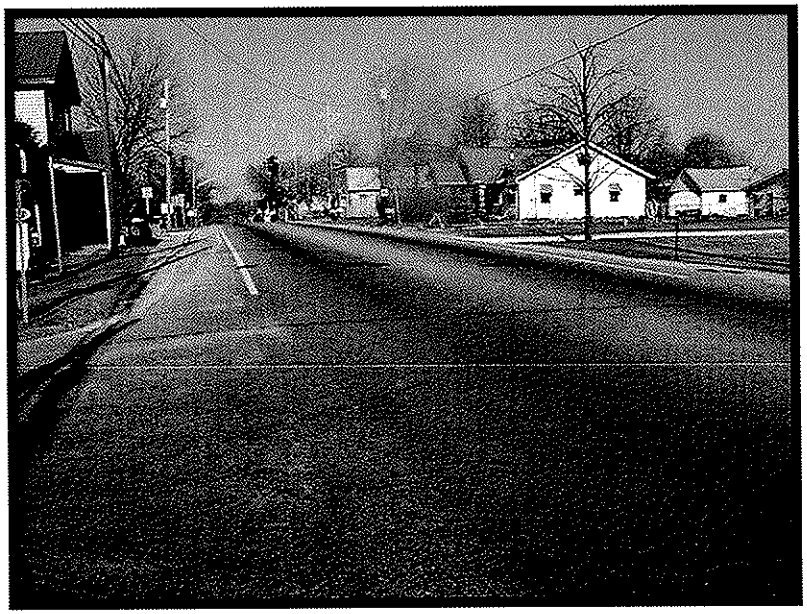
US 150 Road Reconstruction



GREENVILLE STATION ON W. 2ND ST. FROM NORTHSIDE OF U 150 (STA. 296+00)



AUTO SHOP ON NORTHWEST CORNER OF US 150 & 1ST ST. (STA. 298+50)



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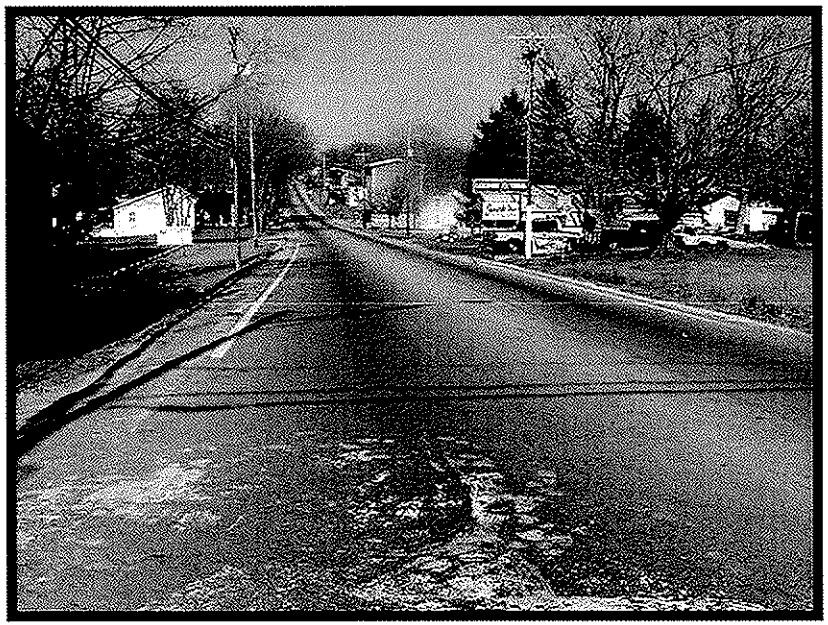

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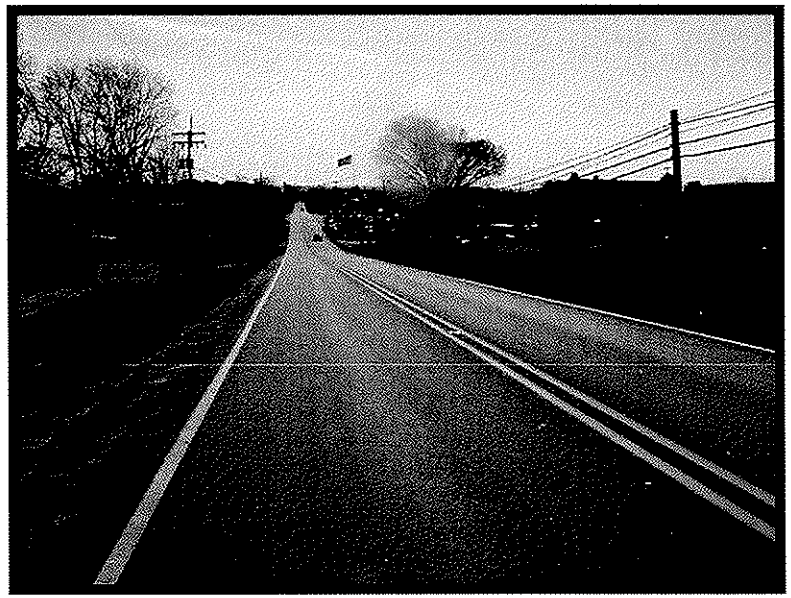
FACING EAST ALONG US 150 AT PEKIN RD. (STA. 316+00)

FACING WEST ALONG US 150 AT BUTTONDOWN AVE. (STA. 327+50)



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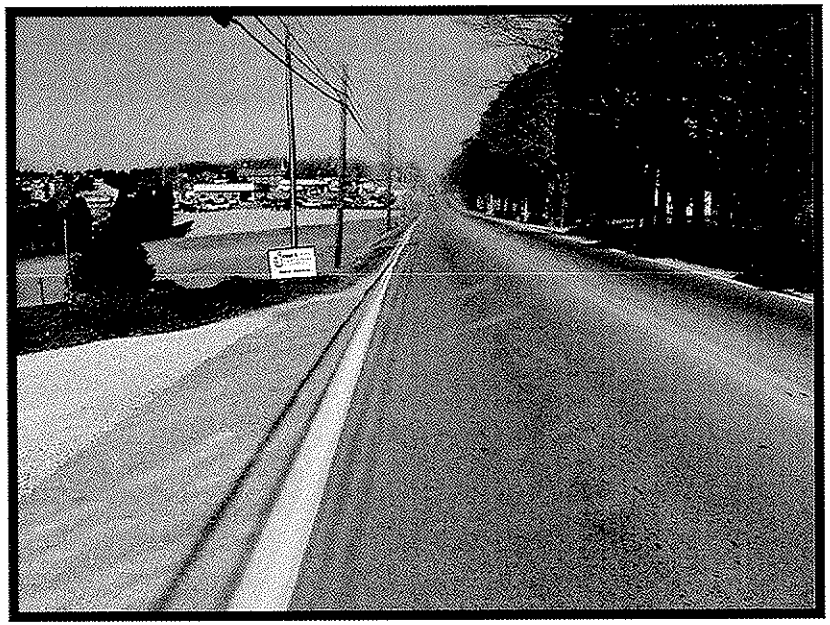

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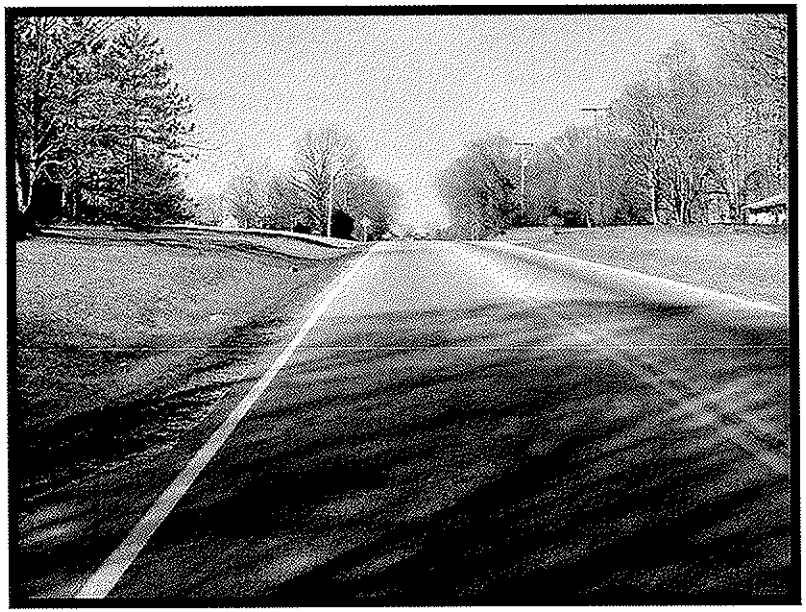

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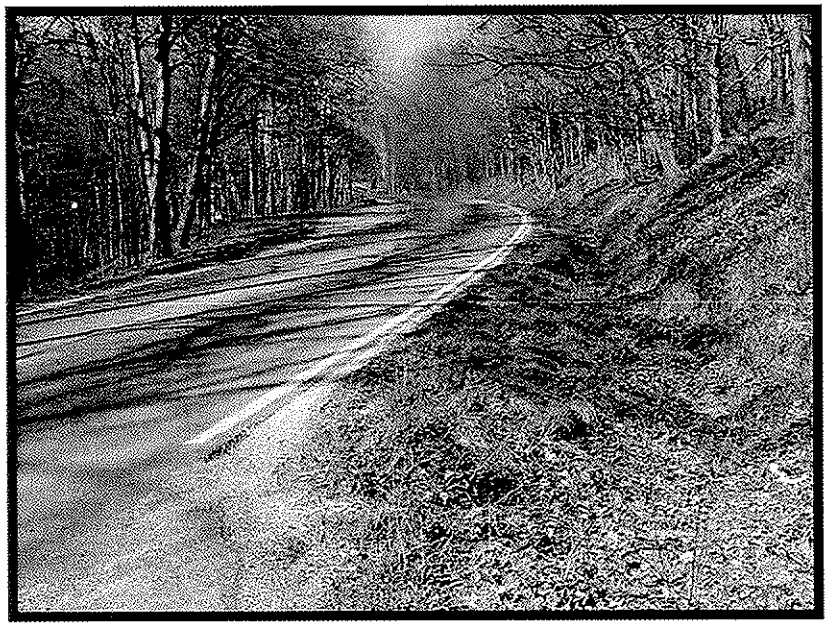
US 150 Road Reconstruction



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BEECHWOOD AVE. (STA. 386+00)

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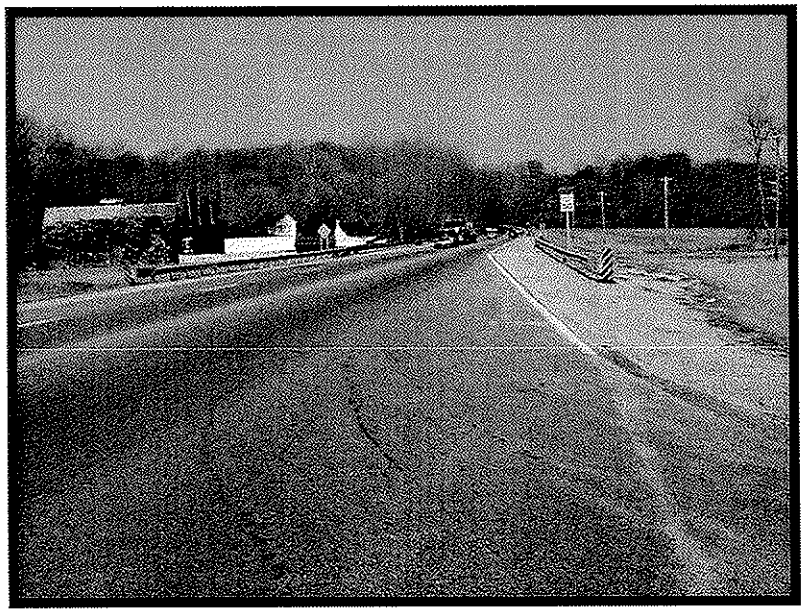
BEECHWOOD AVE. (STA. 386+00)



FACING WEST ALONG US 150 AT
BORDEN RD. (STA. 403+00)

FACING EAST ALONG US 150 AT
BORDEN RD. (STA. 403+00)

US 150 Road Reconstruction

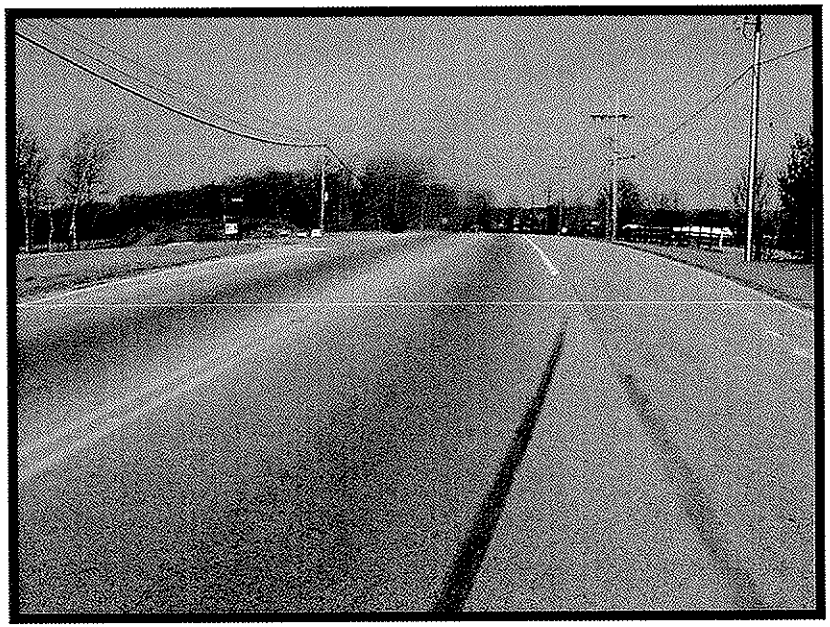
FACING WEST ALONG US 150 AT STA. 429+00

FACING EAST ALONG US 150 AT STA. 429+00

FACING WEST ALONG US 150 AT STA. 445+00

FACING EAST ALONG US 150 AT STA. 445+00

US 150 Road Reconstruction



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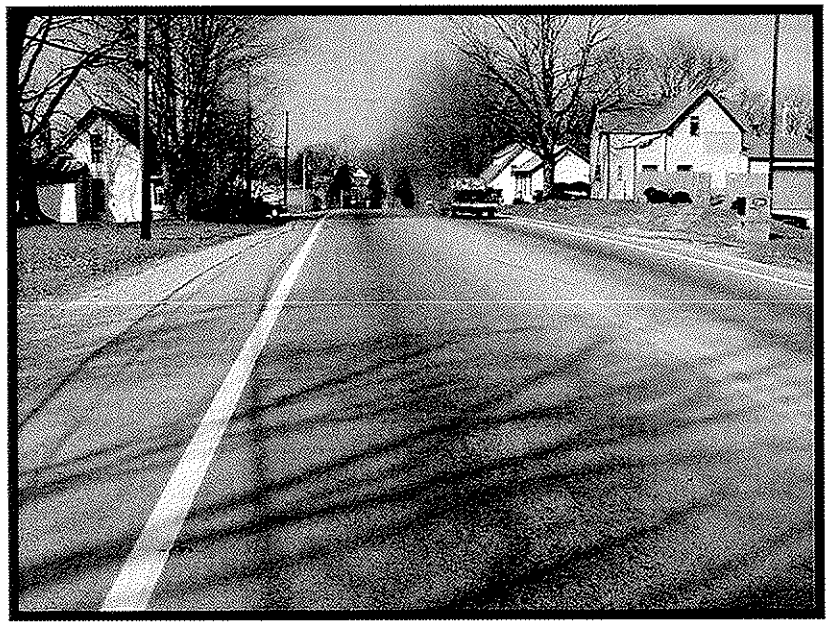
FACING WEST ALONG US 150 AT STA. 470+00

FACING EAST ALONG US 150 AT STA. 470+00



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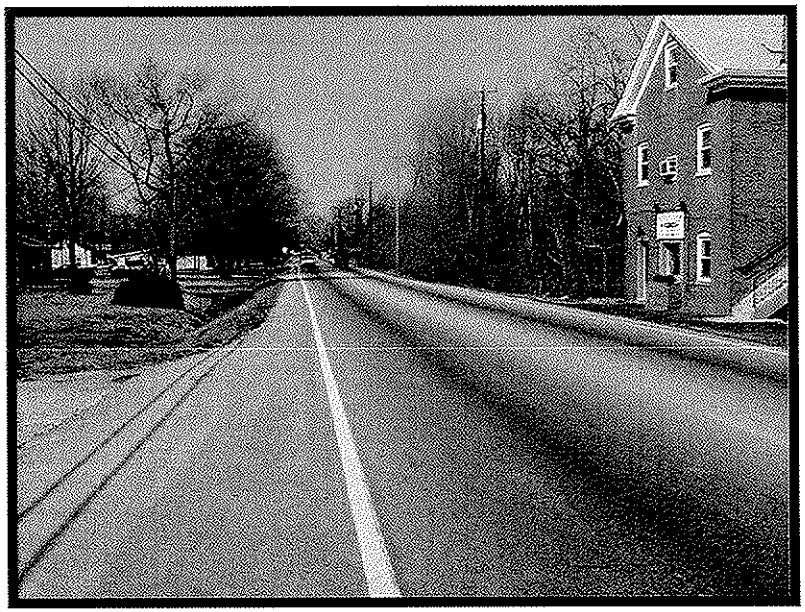

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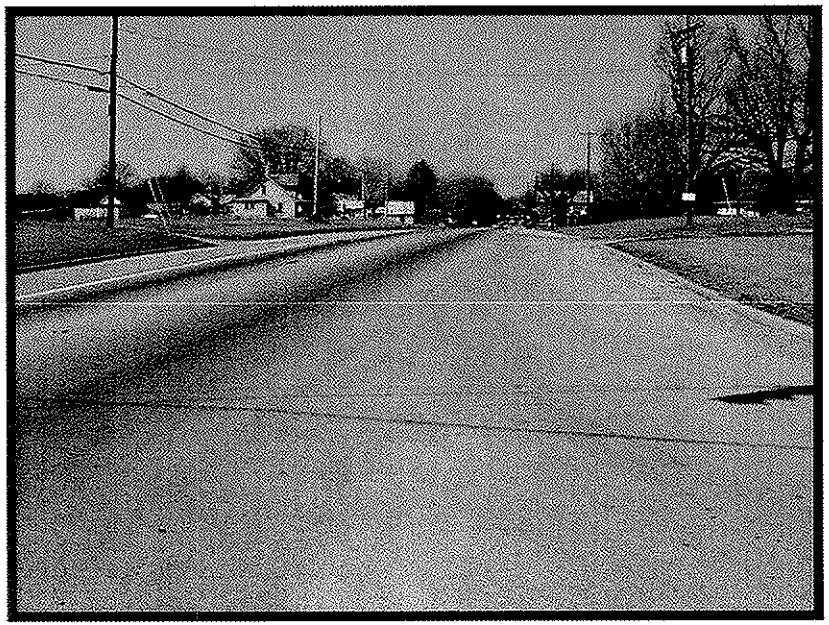
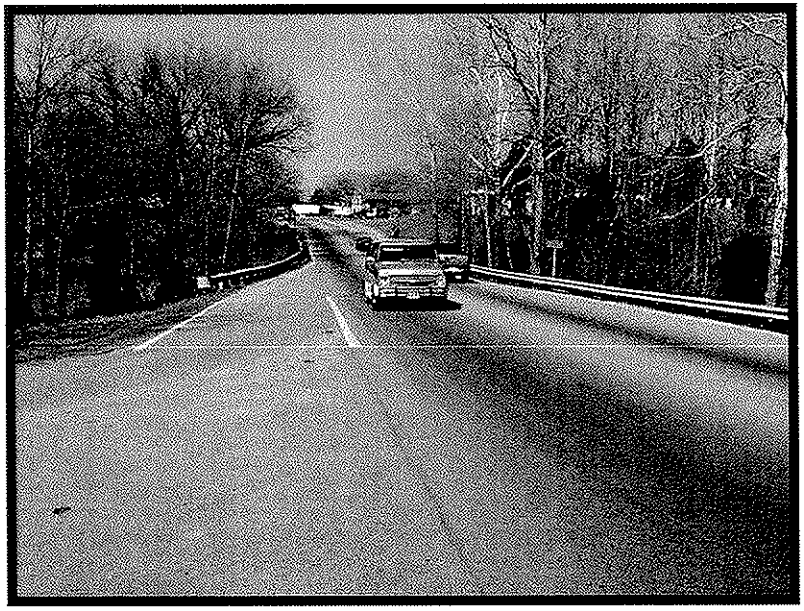
FACING EAST ALONG US 150 AT STA. 501+50

US 150 Road Reconstruction

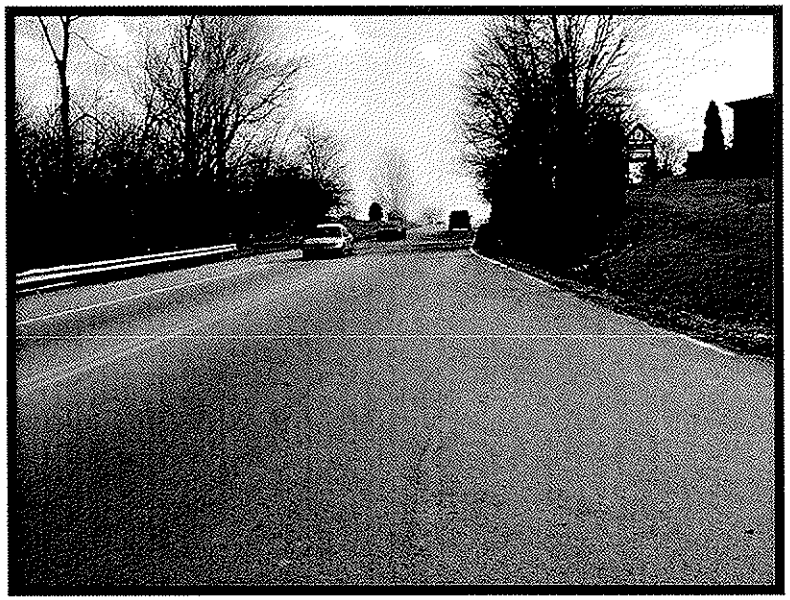


FACING WEST ALONG US 150 AT
NAVILLETON RD. (STA. 510+00)

FACING EAST ALONG US 150 AT
NAVILLETON RD. (STA. 510+00)

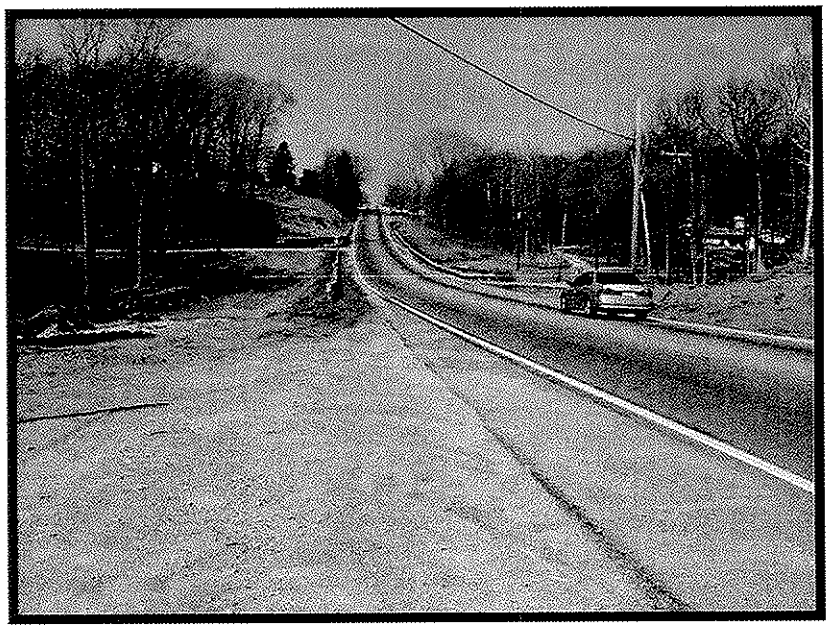


FACING WEST ALONG US 150 AT
BARRY LANE (STA. 523+00)



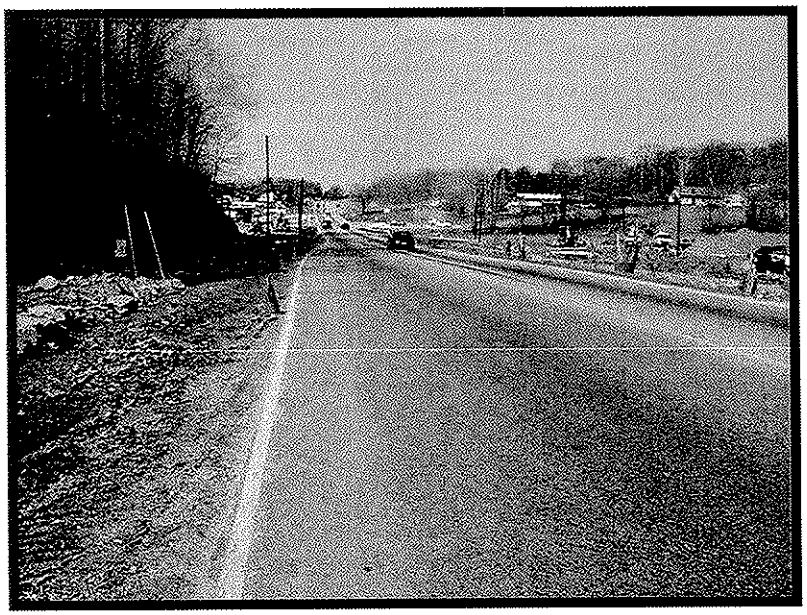
FACING EAST ALONG US 150 AT
BARRY LANE (STA. 523+00)

US 150 Road Reconstruction

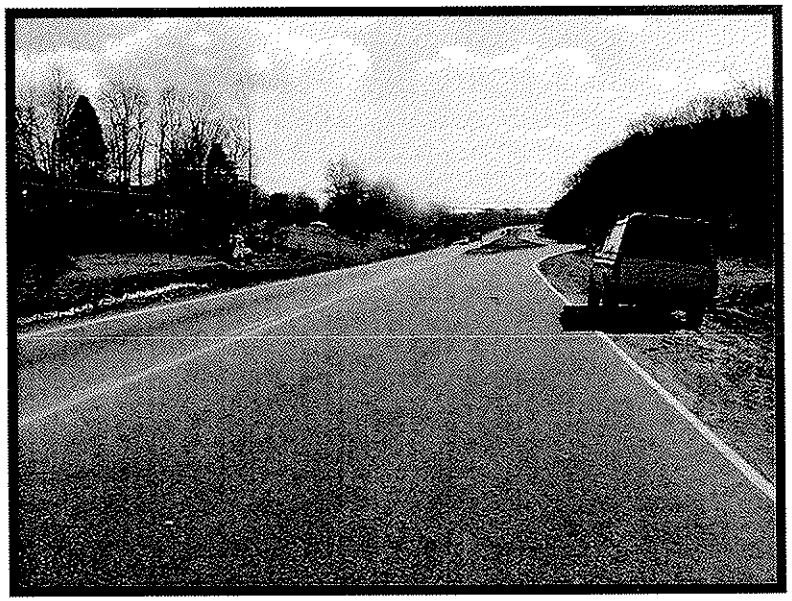


FACING WEST ALONG US 150 AT STA. 545+50

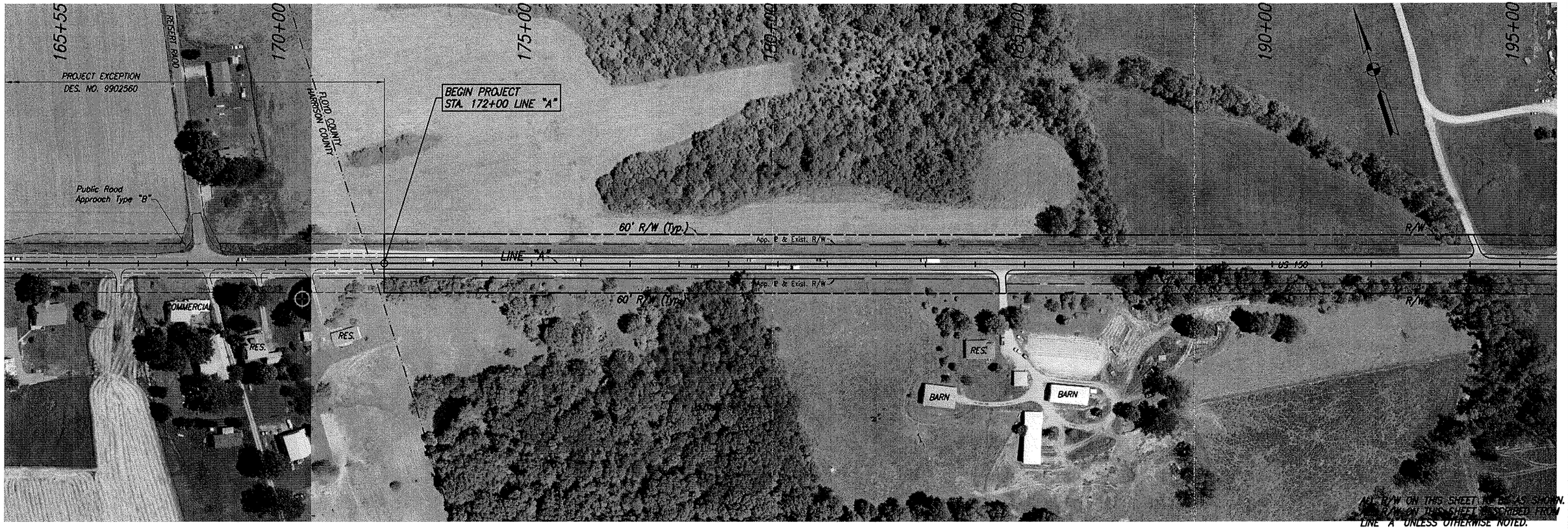
FACING EAST ALONG US 150 AT STA. 545+50

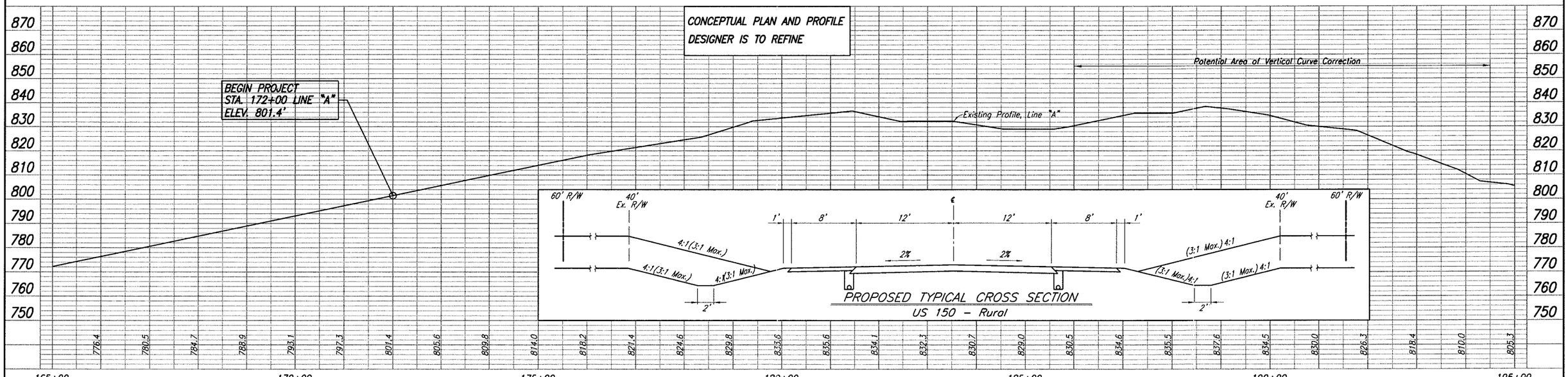


FACING WEST ALONG US 150 AT STA. 576+00



FACING EAST ALONG US 150 AT STA. 576+00





INDIANA
DEPARTMENT OF TRANSPORTATION

PLAN AND PROFILE
LINE "A"

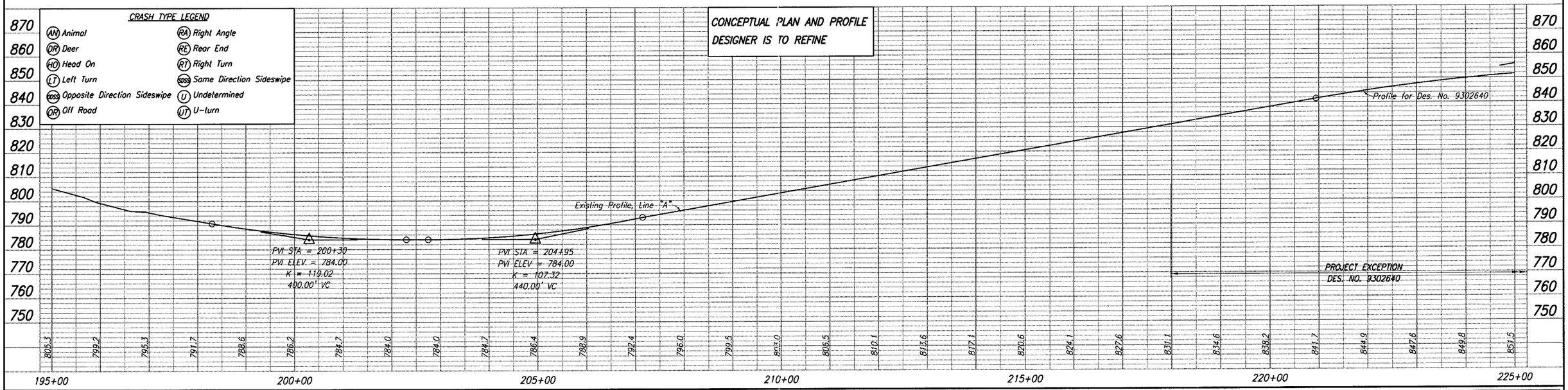
DESIGNED: GRW	DRAWN: NLC
CHECKED: DPF	CHECKED: GRW

HORIZONTAL SCALE	BRIDGE FILE
1" = 200'	
VERTICAL SCALE	DESIGNATION
1" = 40'	0012570
SURVEY BOOK	SHEETS
ELECTRONIC	A-17 of
CONTRACT	PROJECT
	STP-030-3( )

CRASH TYPE LEGEND

(AN) Animal	(RA) Right Angle
(DR) Deer	(RE) Rear End
(HO) Head On	(RT) Right Turn
(LT) Left Turn	(SDSS) Same Direction Sideswipe
(ODSS) Opposite Direction Sideswipe	(U) Undetermined
(OR) Off Road	(UT) U-turn

CONCEPTUAL PLAN AND PROFILE
DESIGNER IS TO REFINE



DESIGNED: GRW	DRAWN: NLC
CHECKED: DPF	CHECKED: GRW

INDIANA
DEPARTMENT OF TRANSPORTATION

PLAN AND PROFILE
LINE "A"

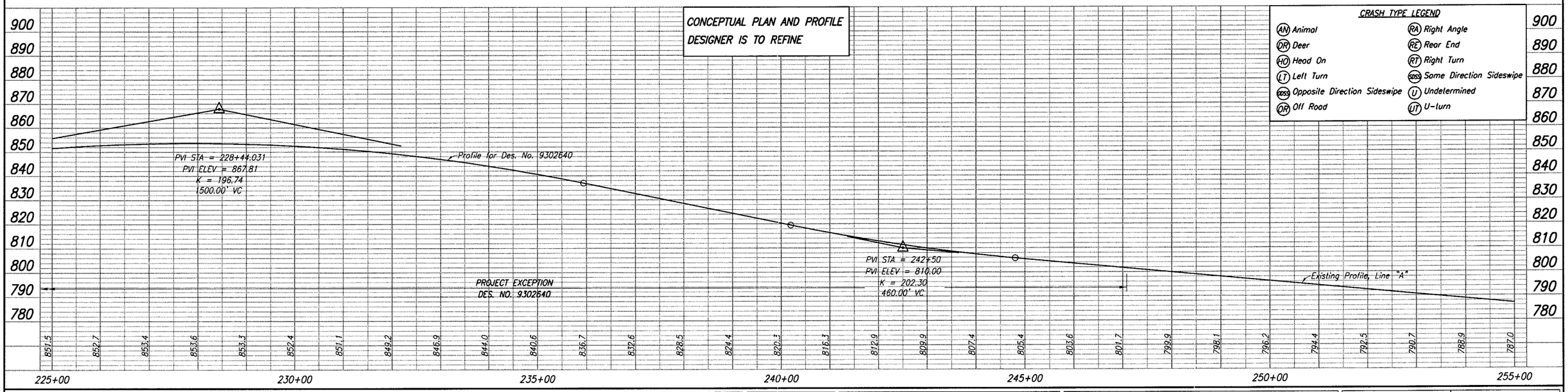
HORIZONTAL SCALE	BRIDGE FILE
1" = 200'	
VERTICAL SCALE	DESIGNATION
1" = 40'	0012570
SURVEY BOOK	SHEETS
ELECTRONIC	A-18 of
CONTRACT	PROJECT
	STP-030-3( )

LINE "A" UNLESS OTHERWISE NOTED.

CONCEPTUAL PLAN AND PROFILE
DESIGNER IS TO REFINE

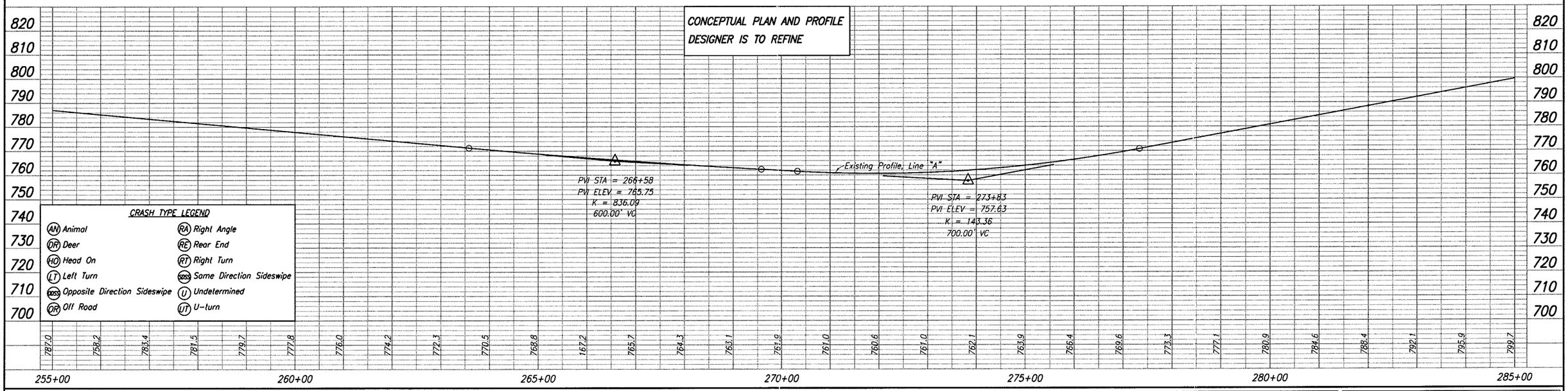
CRASH TYPE LEGEND

(AN) Animal	(RA) Right Angle
(DR) Deer	(RE) Rear End
(HO) Head On	(RT) Right Turn
(LT) Left Turn	(SDSS) Same Direction Sideswipe
(ODSS) Opposite Direction Sideswipe	(U) Undetermined
(OR) Off Road	(UT) U-turn



DESIGNED: GRW	DRAWN: NLC	INDIANA DEPARTMENT OF TRANSPORTATION	HORIZONTAL SCALE 1" = 200' / BRIDGE FILE
CHECKED: DPF	CHECKED: GRW	PLAN AND PROFILE LINE "A"	VERTICAL SCALE 1" = 40' / DESIGNATION 0012570
			SURVEY BOOK ELECTRONIC / SHEETS A-19 of
			CONTRACT / PROJECT STP-030-3( )

CONCEPTUAL PLAN AND PROFILE
DESIGNER IS TO REFINE



CRASH TYPE LEGEND

(AN) Animal	(RA) Right Angle
(DR) Deer	(RE) Rear End
(HO) Head On	(RT) Right Turn
(LT) Left Turn	(SDSS) Same Direction Sideswipe
(ODSS) Opposite Direction Sideswipe	(U) Undetermined
(OR) Off Road	(UT) U-turn

DESIGNED: GRW | DRAWN: NLC
CHECKED: DPF | CHECKED: GRW

INDIANA
DEPARTMENT OF TRANSPORTATION

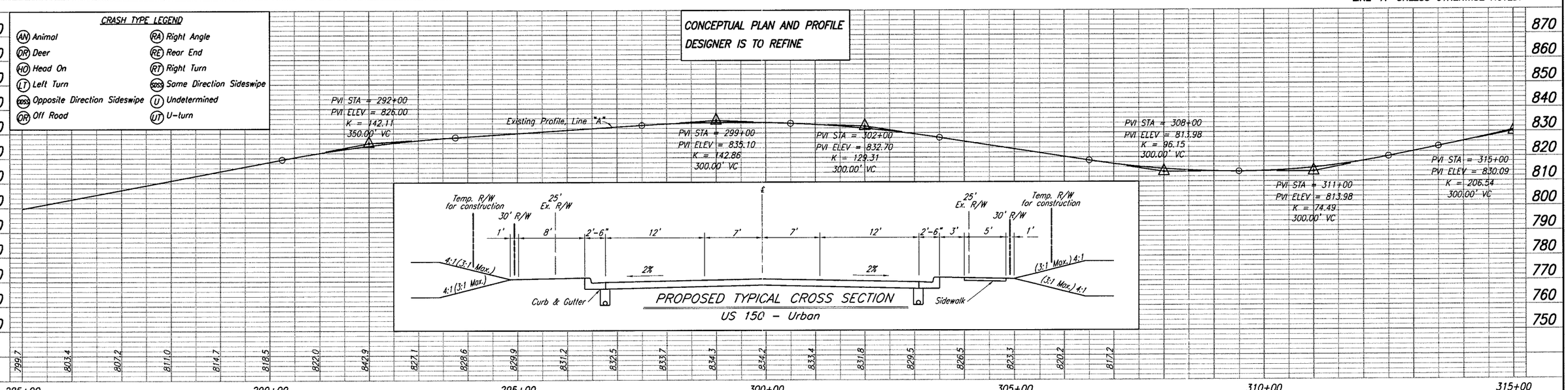
PLAN AND PROFILE
LINE "A"

HORIZONTAL SCALE	BRIDGE FILE
1" = 200'	
VERTICAL SCALE	DESIGNATION
1" = 40'	0012570
SURVEY BOOK	SHEETS
ELECTRONIC	A-20 of
CONTRACT	PROJECT
	STP-030-3( )

CRASH TYPE LEGEND

(AN) Animal	(RA) Right Angle
(DR) Deer	(RE) Rear End
(HO) Head On	(RT) Right Turn
(LT) Left Turn	(SSSS) Same Direction Sideswipe
(OSS) Opposite Direction Sideswipe	(U) Undetermined
(OR) Off Road	(UT) U-turn

CONCEPTUAL PLAN AND PROFILE
DESIGNER IS TO REFINE

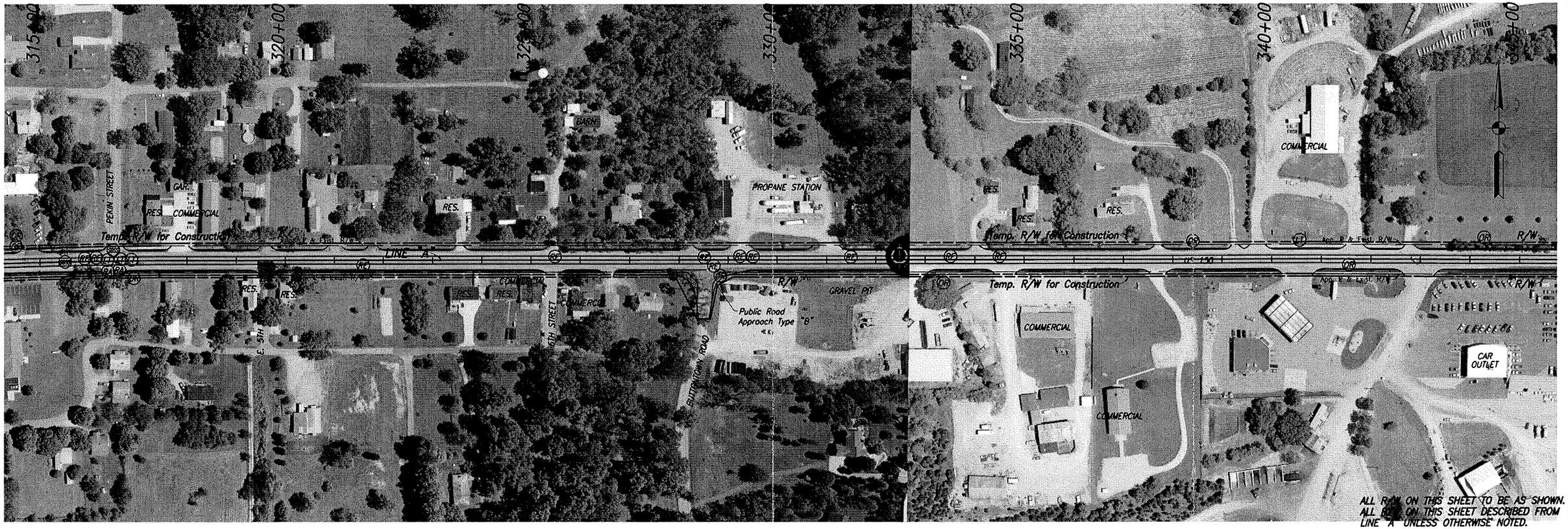


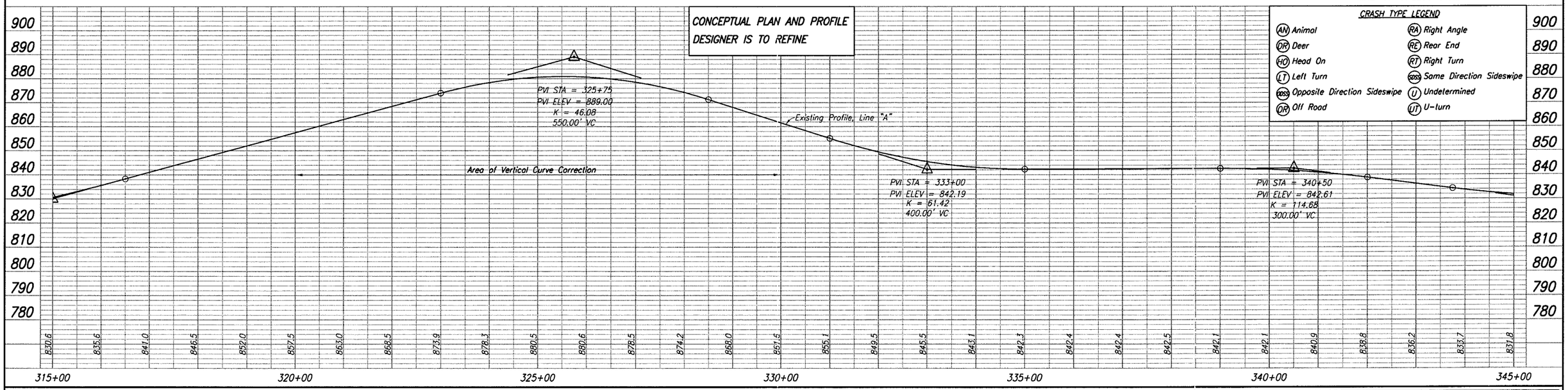
INDIANA DEPARTMENT OF TRANSPORTATION

PLAN AND PROFILE
LINE "A"

DESIGNED: GRW | DRAWN: NLC
CHECKED: DPF | CHECKED: GRW

HORIZONTAL SCALE	BRIDGE FILE
1" = 200'	
VERTICAL SCALE	DESIGNATION
1" = 40'	0012570
SURVEY BOOK	SHEETS
ELECTRONIC	A-21 of
CONTRACT	PROJECT
	STP-030-3( )





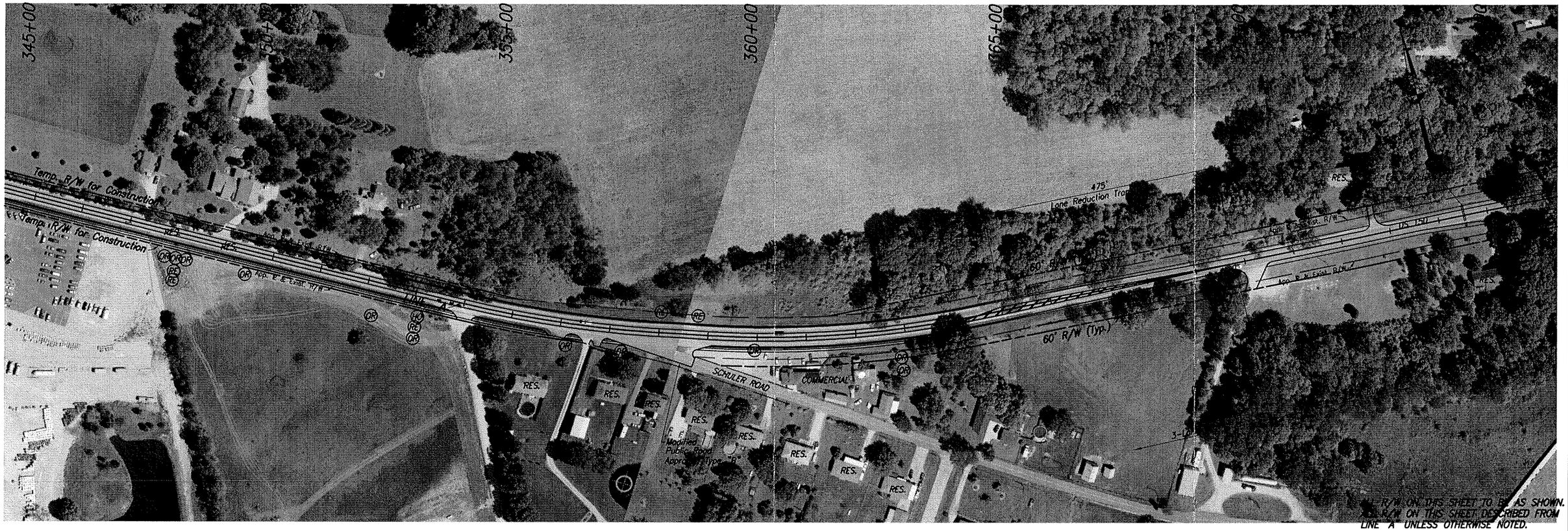
DESIGNED: GRW | DRAWN: NLC

CHECKED: DPF | CHECKED: GRW

INDIANA
DEPARTMENT OF TRANSPORTATION

PLAN AND PROFILE
LINE "A"

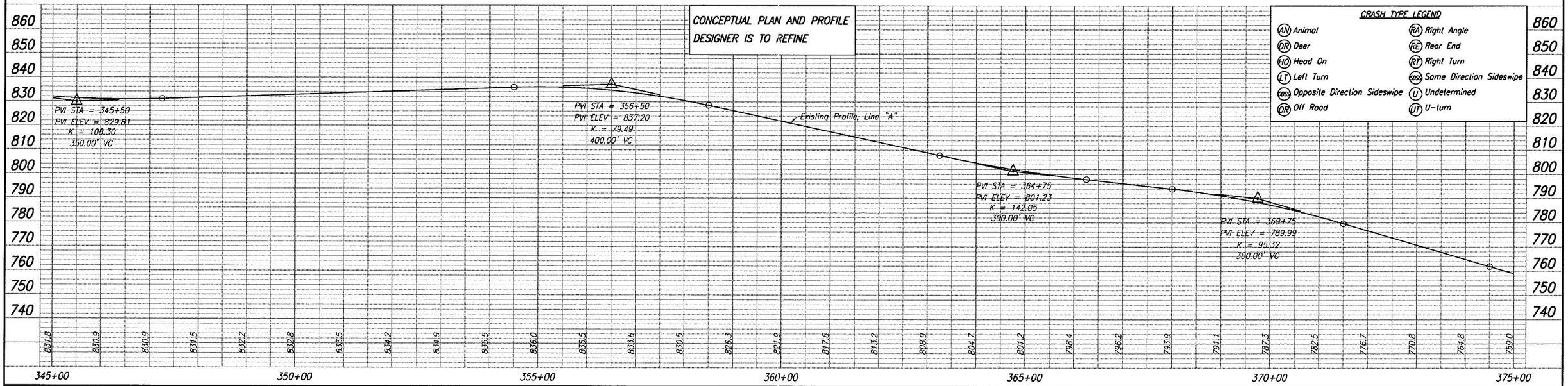
HORIZONTAL SCALE	BRIDGE FILE
1" = 200'	
VERTICAL SCALE	DESIGNATION
1" = 40'	0012570
SURVEY BOOK	SHEETS
ELECTRONIC	A-22 of
CONTRACT	PROJECT
	STP-030-3( )



CONCEPTUAL PLAN AND PROFILE
DESIGNER IS TO REFINE

CRASH TYPE LEGEND

(AN) Animal	(RA) Right Angle
(DR) Deer	(RE) Rear End
(HO) Head On	(RT) Right Turn
(LT) Left Turn	(SDSS) Same Direction Sideswipe
(ODSS) Opposite Direction Sideswipe	(U) Undetermined
(OR) Off Road	(UT) U-turn

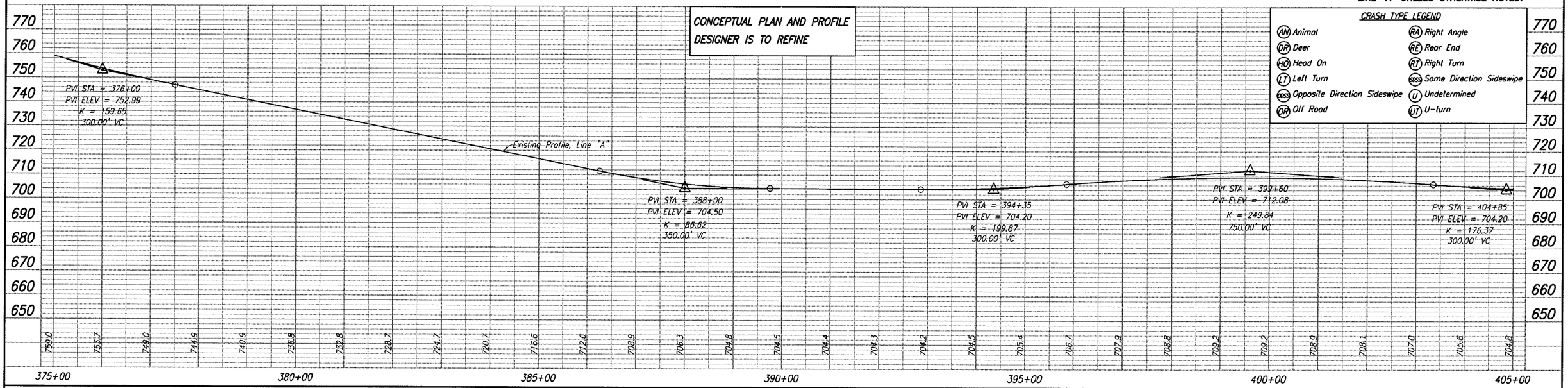


DESIGNED: GRW | DRAWN: NLC
CHECKED: DPF | CHECKED: GRW

INDIANA
DEPARTMENT OF TRANSPORTATION

PLAN AND PROFILE
LINE "A"

HORIZONTAL SCALE	BRIDGE FILE
1" = 200'	
VERTICAL SCALE	DESIGNATION
1" = 40'	0012570
SURVEY BOOK	SHEETS
ELECTRONIC	A-23 of
CONTRACT	PROJECT
	STP-030-3( )

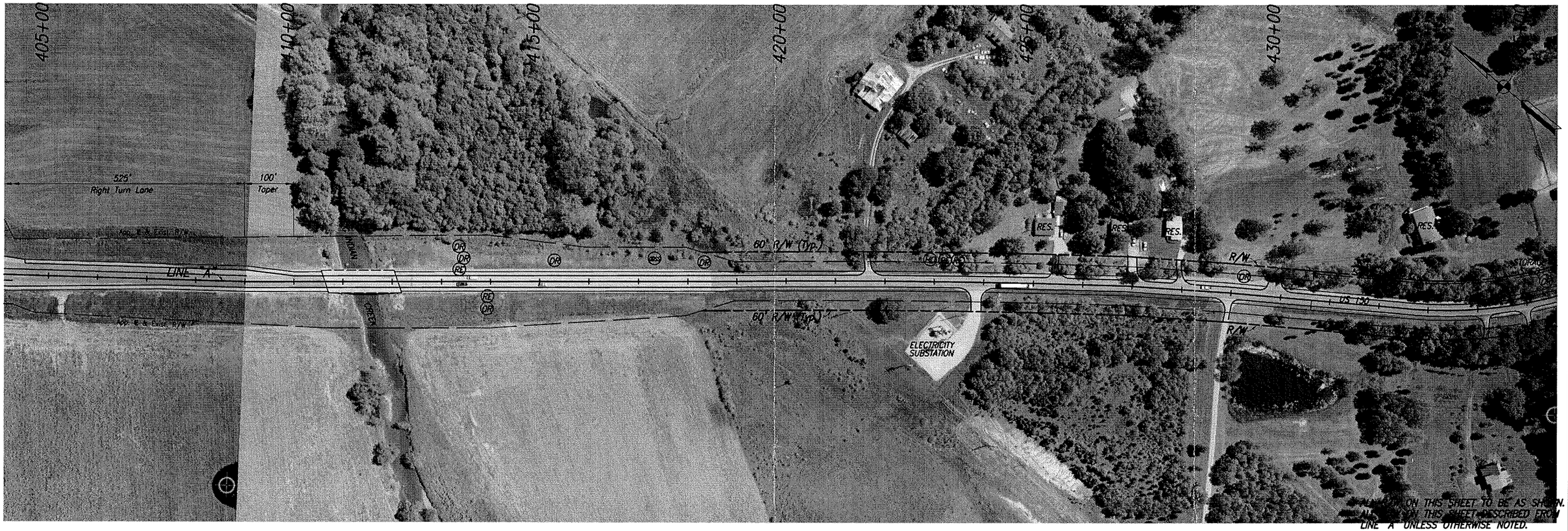


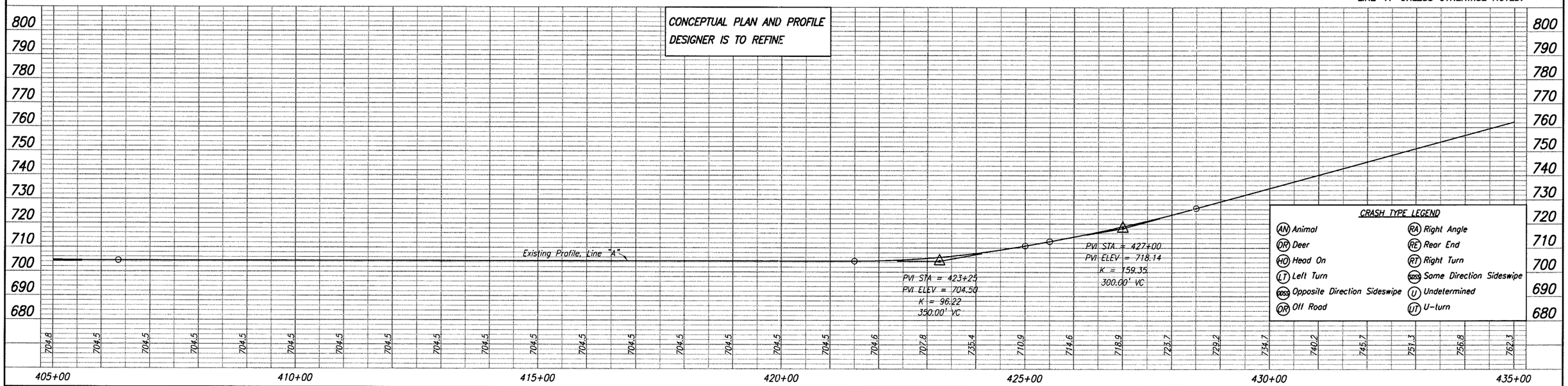
DESIGNED: GRW | DRAWN: NLC
CHECKED: DPF | CHECKED: GRW

INDIANA DEPARTMENT OF TRANSPORTATION

PLAN AND PROFILE
LINE "A"

HORIZONTAL SCALE	BRIDGE FILE
1" = 200'	
VERTICAL SCALE	DESIGNATION
1" = 40'	0012570
SURVEY BOOK	SHEETS
ELECTRONIC	A-24 of
CONTRACT	PROJECT
	STP-030-3( )



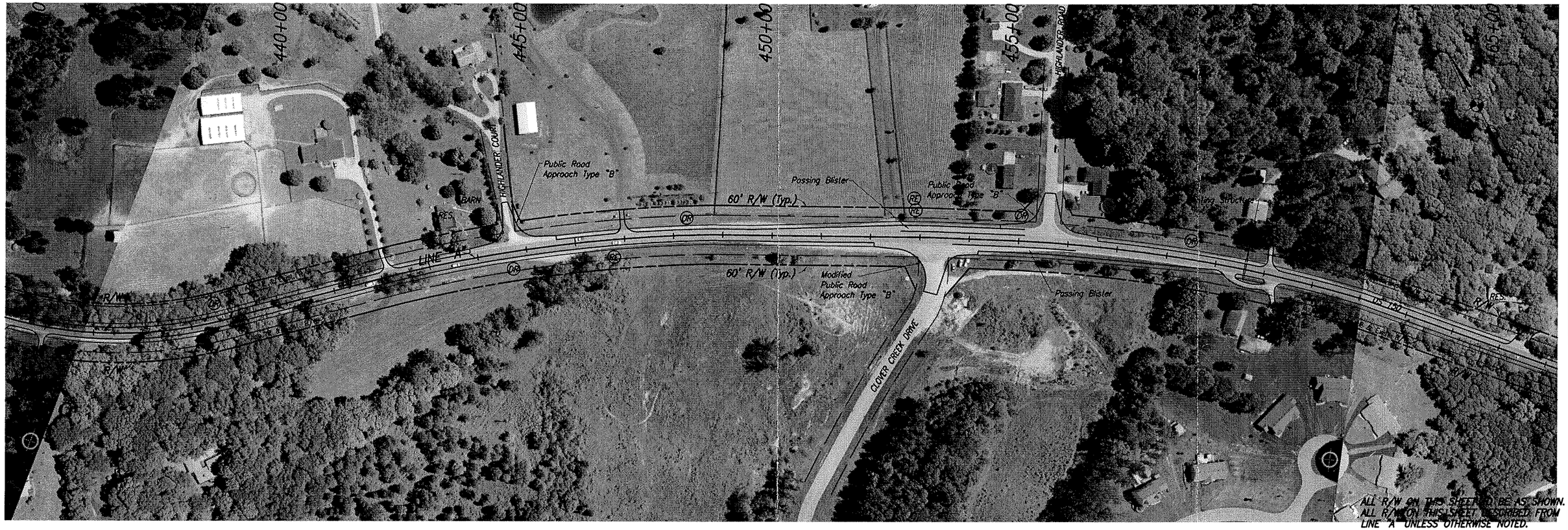


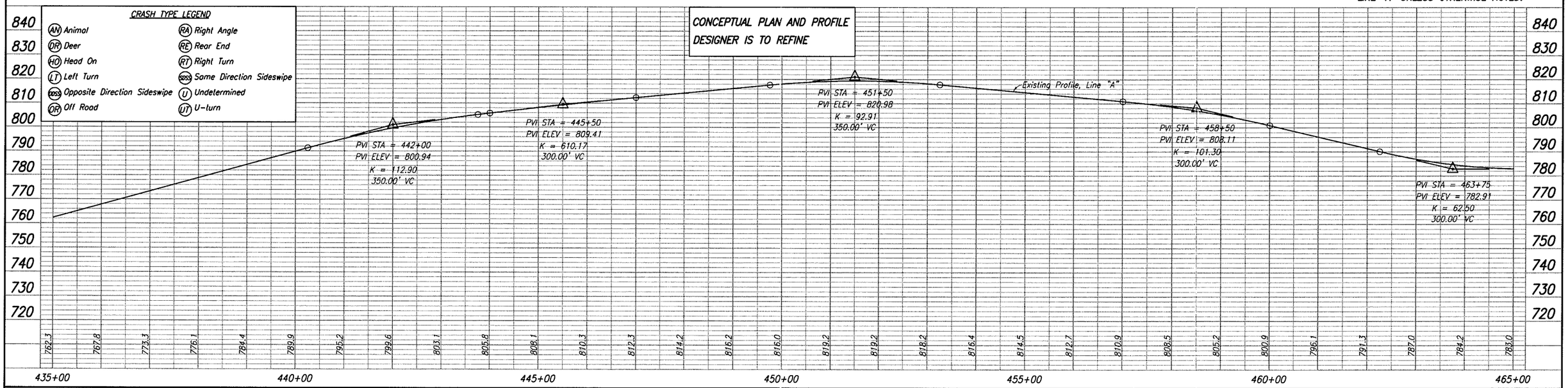
DESIGNED: GRW	DRAWN: NLC
CHECKED: DPF	CHECKED: GRW

INDIANA
DEPARTMENT OF TRANSPORTATION

PLAN AND PROFILE
LINE "A"

HORIZONTAL SCALE	BRIDGE FILE
1" = 200'	
VERTICAL SCALE	DESIGNATION
1" = 40'	0012570
SURVEY BOOK	SHEETS
ELECTRONIC	A-25 of
CONTRACT	PROJECT
	STP-030-3( )





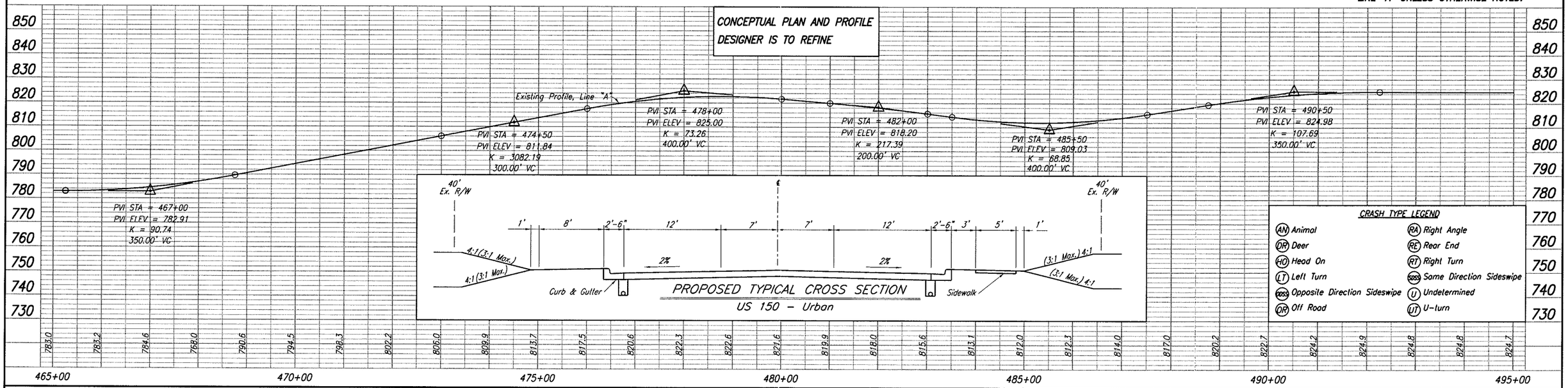
DESIGNED: GRW | DRAWN: NLC
CHECKED: DPF | CHECKED: GRW

INDIANA
DEPARTMENT OF TRANSPORTATION

PLAN AND PROFILE
LINE "A"

HORIZONTAL SCALE	BRIDGE FILE
1" = 200'	
VERTICAL SCALE	DESIGNATION
1" = 40'	0012570
SURVEY BOOK	SHEETS
ELECTRONIC	A-26 of
CONTRACT	PROJECT
	STP-030-3( )

CONCEPTUAL PLAN AND PROFILE
DESIGNER IS TO REFINE



CRASH TYPE LEGEND

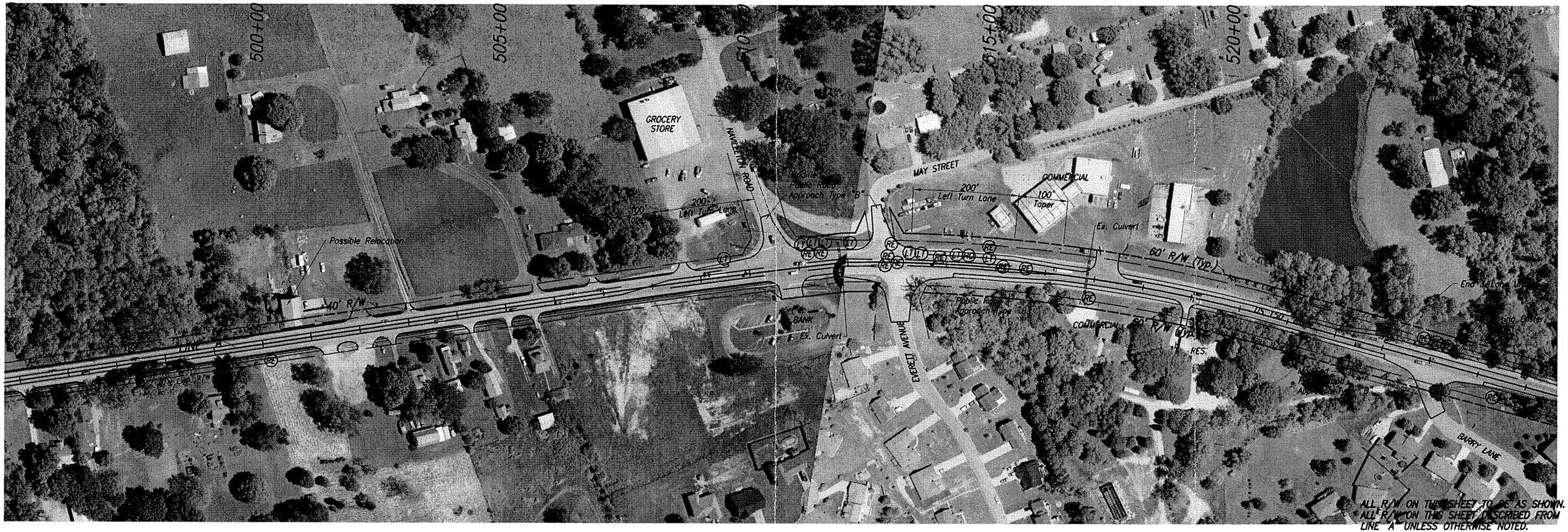
(AN) Animal	(RA) Right Angle
(DR) Deer	(RE) Rear End
(HO) Head On	(RT) Right Turn
(LT) Left Turn	(SDSS) Same Direction Sideswipe
(ODSS) Opposite Direction Sideswipe	(U) Undetermined
(OR) Off Road	(UT) U-turn

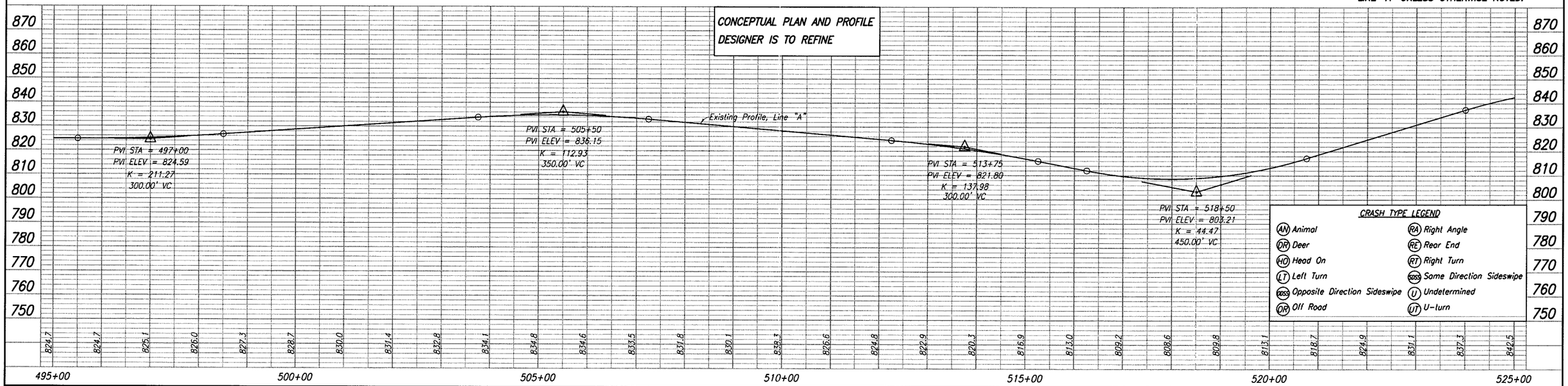
INDIANA
DEPARTMENT OF TRANSPORTATION

PLAN AND PROFILE
LINE "A"

DESIGNED: GRW	DRAWN: NLC
CHECKED: DPF	CHECKED: GRW

HORIZONTAL SCALE	BRIDGE FILE
1" = 200'	
VERTICAL SCALE	DESIGNATION
1" = 40'	0012570
SURVEY BOOK	SHEETS
ELECTRONIC	A-27 of
CONTRACT	PROJECT
	STP-030-3( )





DESIGNED: GRW	DRAWN: NLC
CHECKED: DPF	CHECKED: GRW

INDIANA DEPARTMENT OF TRANSPORTATION

PLAN AND PROFILE
LINE "A"

HORIZONTAL SCALE	BRIDGE FILE
1" = 200'	
VERTICAL SCALE	DESIGNATION
1" = 40'	0012570
SURVEY BOOK	SHEETS
ELECTRONIC	A-28 of
CONTRACT	PROJECT
	STP-030-3( )

ALL R/W ON THIS SHEET TO BE AS SHOWN.
ALL R/W ON THIS SHEET DESCRIBED FROM LINE "A" UNLESS OTHERWISE NOTED.

CONCEPTUAL PLAN AND PROFILE
DESIGNER IS TO REFINE

PVI STA = 526+50
PVI ELEV = 852.85
K = 50.33
500.00' VC

PVI STA = 533+00
PVI ELEV = 828.61
K = 299.61
300.00' VC

Existing Profile, Line "A"

END PROJECT
STA. 542+50 LINE "A"
ELEV. 789.77'

PVI STA = 542+50
PVI ELEV = 783.67
K = 51.39
500.00' VC

PVI STA = 548+50
PVI ELEV = 813.75
K = 60.16
550.00' VC

Profile for Des. No. 8351600

PROJECT EXCEPTION
DES. NO. 8351600

CRASH TYPE LEGEND

(AN) Animal	(RA) Right Angle
(DR) Deer	(RE) Rear End
(HO) Head On	(RT) Right Turn
(LT) Left Turn	(SDSS) Same Direction Sideswipe
(ODSS) Opposite Direction Sideswipe	(U) Undetermined
(OR) Off Road	(UT) U-turn

60' R/W
40' Ex. R/W
1' 8' 12' 12' 8' 1'
4:1(3:1 Max.)
2%
2'

PROPOSED TYPICAL CROSS SECTION
US 150 - Rural

842.5 846.8 847.0 846.3 843.5 839.8 836.1 832.3 828.2 823.8 819.1 814.4 809.7 805.0 800.2 795.5 791.7 789.9 790.1 792.2 796.2 801.2 804.9 807.0 807.5 806.3 803.4 799.3 795.2 791.0 786.9

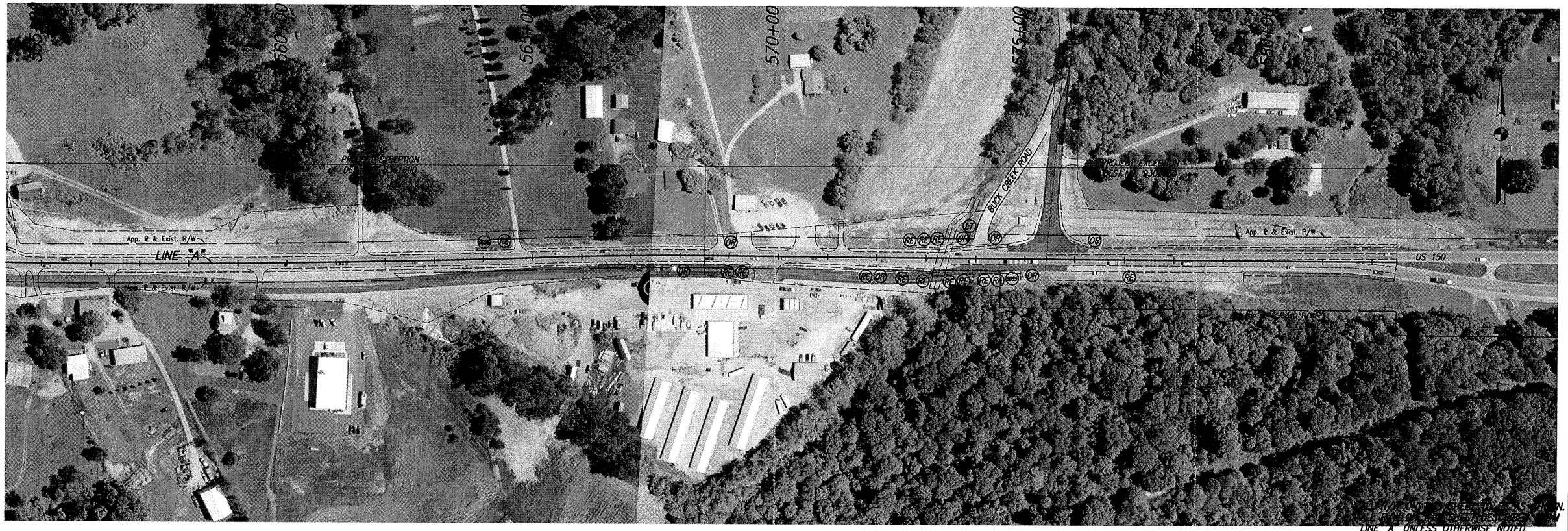
525+00 530+00 535+00 540+00 545+00 550+00 555+00

DESIGNED: GRW DRAWN: NLC
CHECKED: DPF CHECKED: GRW

INDIANA
DEPARTMENT OF TRANSPORTATION

PLAN AND PROFILE
LINE "A"

HORIZONTAL SCALE	BRIDGE FILE
1" = 200'	
VERTICAL SCALE	DESIGNATION
1" = 40'	0012570
SURVEY BOOK	SHEETS
ELECTRONIC	A-29 of
CONTRACT	PROJECT
	STP-030-3( )

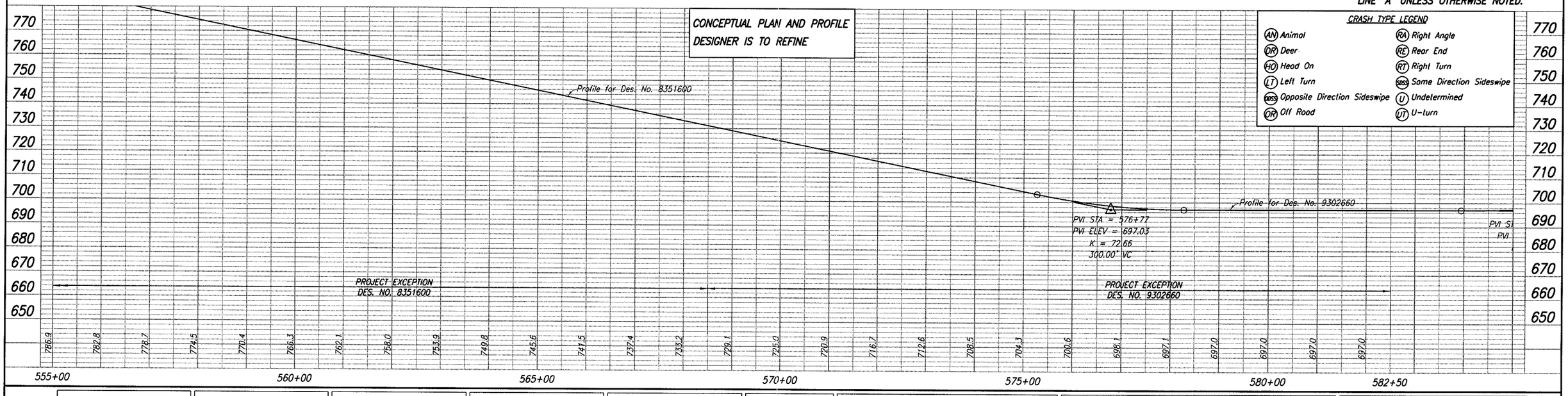


LINE "A" UNLESS OTHERWISE NOTED.

CONCEPTUAL PLAN AND PROFILE
DESIGNER IS TO REFINE

CRASH TYPE LEGEND

(AN) Animal	(RA) Right Angle
(DR) Deer	(RE) Rear End
(HO) Head On	(RT) Right Turn
(LT) Left Turn	(SDSS) Same Direction Sideswipe
(ODSS) Opposite Direction Sideswipe	(U) Undetermined
(OR) Off Road	(UT) U-turn



INDIANA
DEPARTMENT OF TRANSPORTATION

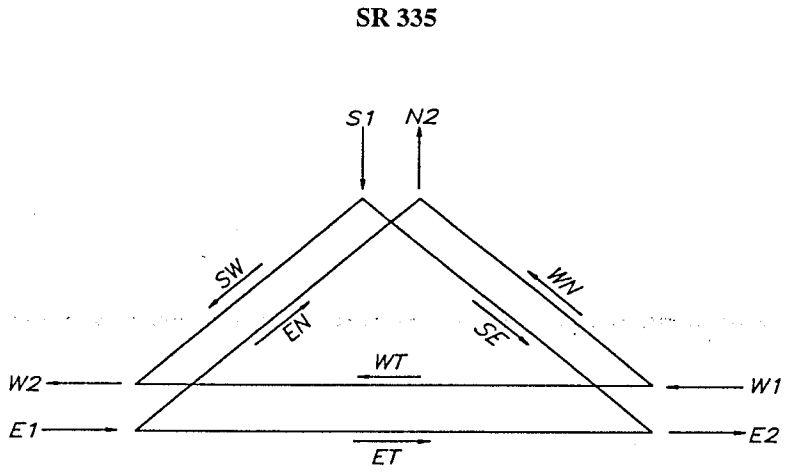
PLAN AND PROFILE
LINE "A"

DESIGNED: GRW | DRAWN: NLC
CHECKED: DPF | CHECKED: GRW

HORIZONTAL SCALE	BRIDGE FILE
1" = 200'	
VERTICAL SCALE	DESIGNATION
1" = 40'	0012570
SURVEY BOOK	SHEETS
ELECTRONIC	A-30 of
CONTRACT	PROJECT
	STP-030-3( )

TRAFFIC VOLUME FORECAST FOR INTERSECTIONS

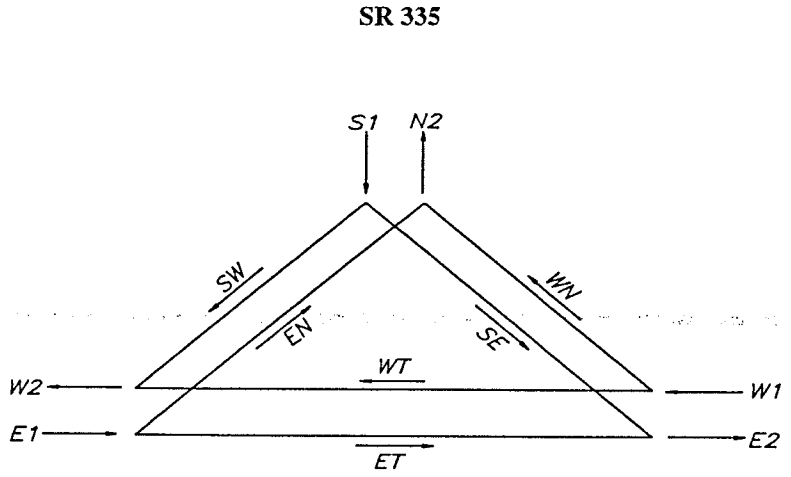
Date: January 2003 (Revised)
Project: Des. No. 0012570
Route: US Route 150 at State Road 335
County: Floyd County
Other Info: AM-DHV



Turning Movements	AADT					DHV %	COMMERCIAL VEHICLES	
	2002	2007	2012	2022	2027		% AADT	% DHV
NE								
NW								
NT								
SE	540	590	640	750	800	12	4	3
SW	30	30	40	40	40	3	3	2
ST								
ES								
EN	30	30	40	40	40	3	3	2
ET	3950	4330	4710	5470	5850	11	6	3
WN	550	600	660	760	820	2	3	2
WS								
WT	3820	4190	4560	5290	5660	3	7	7
N1								
S2								
S1	570	620	680	790	840	11	4	3
N2	580	630	700	800	860	2	3	2
E1	3980	4360	4750	5510	5890	11	6	3
W2	3850	4220	4600	5330	5700	3	7	7
W1	4370	4790	5220	6050	6480	2	6	6
E2	4490	4920	5350	6220	6650	11	6	3

TRAFFIC VOLUME FORECAST FOR INTERSECTIONS

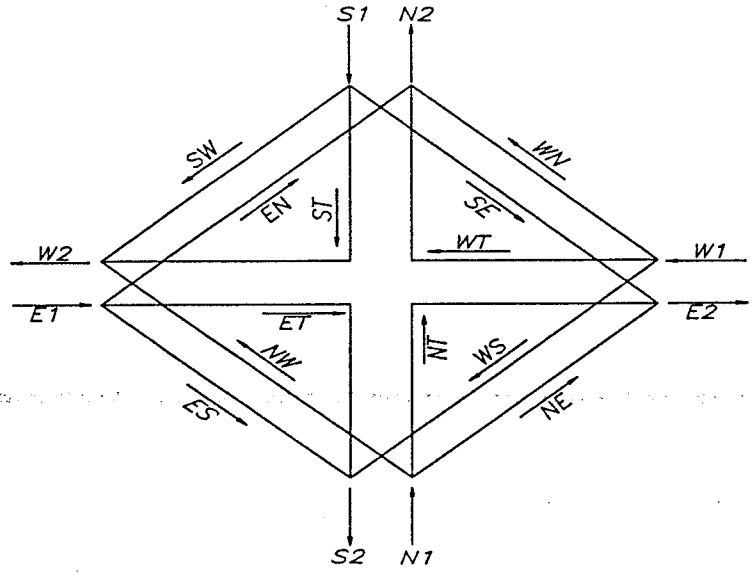
Date: January 2003 (Revised)
Project: Des. No. 0012570
Route: US Route 150 at State Road 335
County: Floyd County
Other Info: PM-DHV



Turning Movements	AADT					DHV %	COMMERCIAL VEHICLES	
	2002	2007	2012	2022	2027		% AADT	% DHV
NE								
NW								
NT								
SE	540	590	640	750	800	4	4	4
SW	30	30	40	40	40	3	3	3
ST								
ES								
EN	30	30	40	40	40	7	3	3
ET	3950	4330	4710	5470	5850	5	6	4
WN	550	600	660	760	820	16	3	3
WS								
WT	3820	4190	4560	5290	5660	13	7	2
N1								
S2								
S1	570	620	680	790	840	4	4	4
N2	580	630	700	800	860	16	3	3
E1	3980	4360	4750	5510	5890	5	6	4
W2	3850	4220	4600	5330	5700	13	7	2
W1	4370	4790	5220	6050	6480	13	6	2
E2	4490	4920	5350	6220	6650	5	6	4

TRAFFIC VOLUME FORECAST FOR INTERSECTIONS

Date: January 2003 (Revised)
Project: Des. No. 0012570
Route: US Route 150 at Georgetown - Greenville Road
County: Floyd County
Other Info: AM-DHV



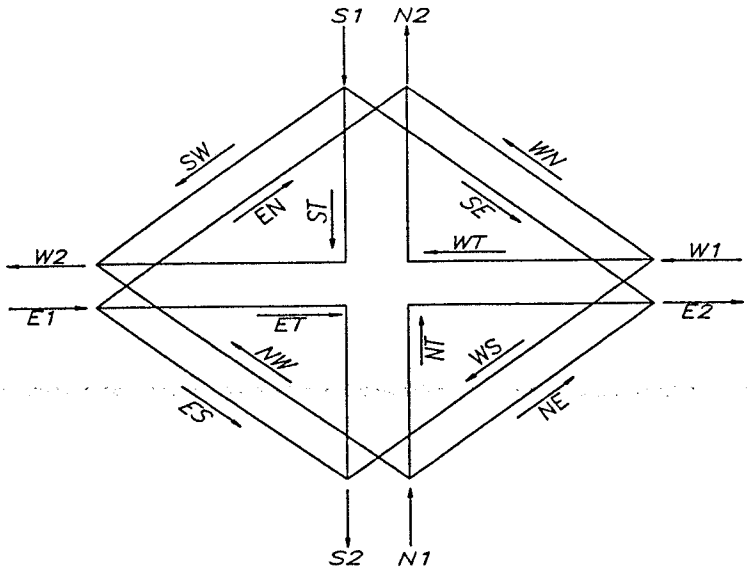
US Route 150

Georgetown - Greenville Road

Turning Movements	AADT 2002	2007	2012	2022	2027	DHV %	COMMERCIAL VEHICLES % AADT	% DHV
NE	850	930	1010	1180	1260	14	6	5
NW	260	290	310	360	390	6	6	5
NT	50	50	60	70	70	6	5	4
SE	230	250	270	320	340	5	6	5
SW	90	100	110	120	130	3	6	5
ST	80	90	100	110	120	3	5	4
ES	330	360	390	460	490	2	6	5
EN	50	50	60	70	70	6	6	5
ET	7180	7880	8570	9950	10640	13	6	3
WN	110	120	130	150	160	6	6	5
WS	520	570	620	720	770	3	6	5
WT	6440	7060	7680	8930	9540	4	6	5
N1	1160	1270	1380	1610	1720	12	6	5
S2	930	1020	1110	1290	1380	2	6	5
S1	400	440	480	550	590	4	6	5
N2	210	220	250	290	300	6	6	5
E1	7560	8290	9020	10480	11200	12	6	3
W2	6790	7450	8100	9410	10060	4	6	5
W1	7070	7750	8430	9800	10470	4	6	5
E2	8260	9060	9850	11450	12240	13	6	3

TRAFFIC VOLUME FORECAST FOR INTERSECTIONS

Date: January 2003 (Revised)
Project: Des. No. 0012570
Route: US Route 150 at Georgetown - Greenville Road
County: Floyd County
Other Info: PM-DHV



US Route 150

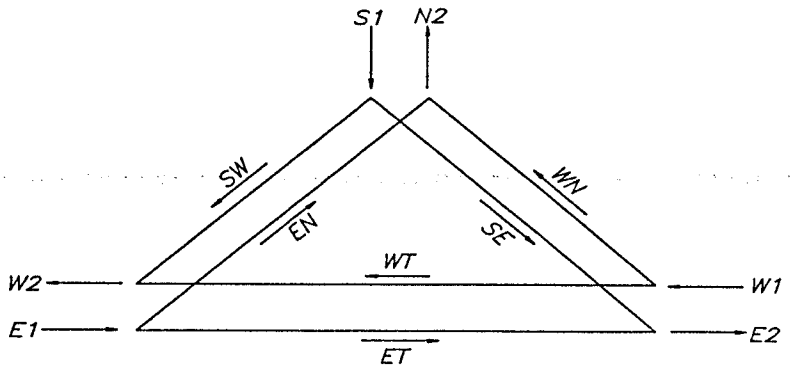
Georgetown - Greenville Road

Turning Movements	AADT					DHV %	COMMERCIAL VEHICLES	
	2002	2007	2012	2022	2027		% AADT	% DHV
NE	850	930	1010	1180	1260	6	6	6
NW	260	290	310	360	390	5	6	6
NT	50	50	60	70	70	4	5	5
SE	230	250	270	320	340	6	6	6
SW	90	100	110	120	130	3	6	6
ST	80	90	100	110	120	5	5	5
ES	330	360	390	460	490	6	6	6
EN	50	50	60	70	70	4	6	6
ET	7180	7880	8570	9950	10640	5	6	4
WN	110	120	130	150	160	5	6	6
WS	520	570	620	720	770	15	6	6
WT	6440	7060	7680	8930	9540	13	6	2
N1	1160	1270	1380	1610	1720	6	6	6
S2	930	1020	1110	1290	1380	11	6	6
S1	400	440	480	550	590	5	6	6
N2	210	220	250	290	300	5	6	6
E1	7560	8290	9020	10480	11200	5	6	4
W2	6790	7450	8100	9410	10060	12	6	2
W1	7070	7750	8430	9800	10470	13	6	2
E2	8260	9060	9850	11450	12240	5	6	4

TRAFFIC VOLUME FORECAST FOR INTERSECTIONS

Date: January 2003 (Revised)
Project: Des. No. 0012570
Route: US Route 150 at Greenville - Borden Road
County: Floyd County
Other Info: AM-DHV

Greenville - Borden Road



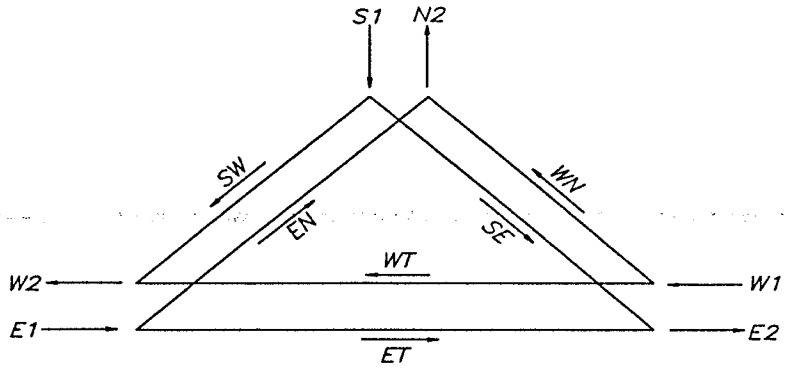
US Route 150

Turning Movements	AADT					DHV %	COMMERCIAL VEHICLES	
	2002	2007	2012	2022	2027		% AADT	% DHV
NE								
NW								
NT								
SE	540	590	640	750	800	15	5	4
SW	50	50	60	70	70	2	4	3
ST								
ES								
EN	50	50	60	70	70	2	5	4
ET	6920	7590	8260	9590	10260	13	5	2
WN	580	640	690	800	860	3	5	4
WS								
WT	6690	7340	7980	9270	9910	2	5	5
N1								
S2								
S1	590	640	700	820	870	14	5	4
N2	630	690	750	870	930	3	5	4
E1	6970	7640	8320	9660	10330	13	5	2
W2	6740	7390	8040	9340	9980	2	5	5
W1	7270	7980	8670	10070	10770	2	5	5
E2	7460	8180	8900	10340	11060	13	5	2

TRAFFIC VOLUME FORECAST FOR INTERSECTIONS

Date: January 2003 (Revised)
Project: Des. No. 0012570
Route: US Route 150 at Greenville - Borden Road
County: Floyd County
Other Info: PM-DHV

Greenville - Borden Road

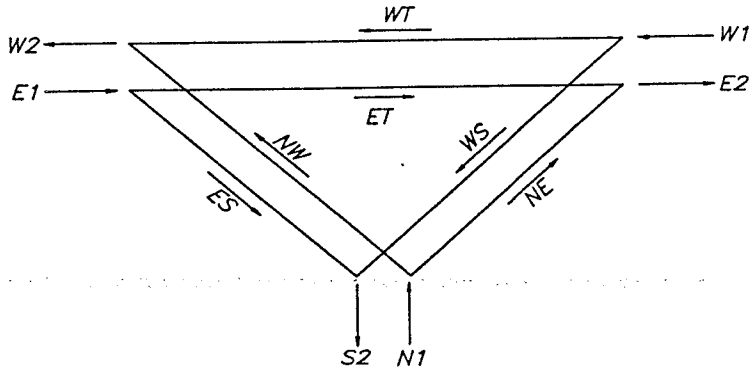


US Route 150

Turning Movements	AADT					DHV %	COMMERCIAL VEHICLES	
	2002	2007	2012	2022	2027		% AADT	% DHV
NE								
NW								
NT								
SE	540	590	640	750	800	6	5	5
SW	50	50	60	70	70	8	4	4
ST								
ES								
EN	50	50	60	70	70	6	5	5
ET	6920	7590	8260	9590	10260	5	5	2
WN	580	640	690	800	860	10	5	5
WS								
WT	6690	7340	7980	9270	9910	13	5	2
N1								
S2								
S1	590	640	700	820	870	6	5	5
N2	630	690	750	870	930	10	5	5
E1	6970	7640	8320	9660	10330	5	5	2
W2	6740	7390	8040	9340	9980	13	5	2
W1	7270	7980	8670	10070	10770	13	5	2
E2	7460	8180	8900	10340	11060	5	5	2

TRAFFIC VOLUME FORECAST FOR INTERSECTIONS

Date: January 2003 (Revised)
Project: Des. No. 0012570
Route: US Route 150 at Edwardsville - Galena Road
County: Floyd County
Other Info: AM-DHV



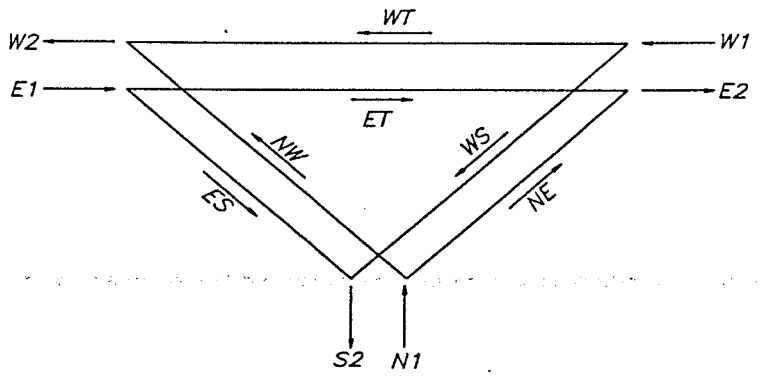
US Route 150

Edwardsville - Galena Road

Turning Movements	AADT					DHV %	COMMERCIAL VEHICLES	
	2002	2007	2012	2022	2027		% AADT	% DHV
NE	800	880	950	1110	1190	5	6	5
NW	390	430	470	540	580	13	5	4
NT								
SE								
SW								
ST								
ES	450	490	540	620	670	37	6	5
EN								
ET	7880	8640	9400	10920	11680	11	5	4
WN								
WS	900	990	1070	1250	1330	4	6	5
WT	7580	8320	9040	10510	11230	4	5	5
N1	1190	1310	1420	1650	1770	7	6	5
S2	1350	1480	1610	1870	2000	15	6	5
S1								
N2								
E1	8330	9130	9940	11540	12350	13	5	4
W2	7970	8750	9510	11050	11810	4	5	5
W1	8480	9310	10110	11760	12560	4	5	5
E2	8680	9520	10350	12030	12870	11	5	4

TRAFFIC VOLUME FORECAST FOR INTERSECTIONS

Date: January 2003 (Revised)
Project: Des. No. 0012570
Route: US Route 150 at Edwardsville - Galena Road
County: Floyd County
Other Info: PM-DHV



US Route 150

Edwardsville - Galena Road

Turning Movements	AADT					DHV %	COMMERCIAL VEHICLES	
	2002	2007	2012	2022	2027		% AADT	% DHV
NE	800	880	950	1110	1190	8	6	6
NW	390	430	470	540	580	14	5	5
NT								
SE								
SW								
ST								
ES	450	490	540	620	670	8	6	6
EN								
ET	7880	8640	9400	10920	11680	5	5	5
WN								
WS	900	990	1070	1250	1330	6	6	6
WT	7580	8320	9040	10510	11230	8	5	2
N1	1190	1310	1420	1650	1770	10	6	6
S2	1350	1480	1610	1870	2000	7	6	6
S1								
N2								
E1	8330	9130	9940	11540	12350	6	5	5
W2	7970	8750	9510	11050	11810	8	5	2
W1	8480	9310	10110	11760	12560	8	5	2
E2	8680	9520	10350	12030	12870	6	5	5

Form T-4 Computer Revision (7/6/89)

INDIANA DEPARTMENT OF TRANSPORTATION
Traffic Count Summary Sheet

Weather: Cloud

Pavement: Dry

Intersection: US-150 & Marilleton Rd.

Other Conditions:

City/County: Galena/Floyd

Counted By: Sue Mischneier Sum By: Jim Deaton Day: Fr.,Mon.,Tues.,Mon.

Date: Nov 22,25,26,Dec 11,1991

Time		Traffic Entering Intersection From: North On Marilleton Road Going				South On Citizens Fidelity Going				East On US-150 Going				West On US-150 Going				Total Traffic Entering From			Total
		W	S	E	Total	E	W	W	Total	E	W	S	Total	S	E	E	Total	E+S	E+W	E+S + E+W	P + T
6-7AM	P	11	0	56	67	4	1	0	5	18	76	1	95	5	763	21	789	72	884	956	
	T	1	0	2	3	0	0	0	0	0	4	0	4	0	3	0	3	3	7	10	966
7-8AM	P	32	0	45	77	5	0	0	5	18	206	2	226	6	656	24	686	82	912	994	
	T	0	0	2	2	0	0	0	0	3	8	0	11	0	8	1	9	2	20	22	1016
8-9AM	P	10		42	52	7	0	0	7	11	126	5	142	7	359	24	390	59	532	591	
	T	0	0	4	4	0	0	0	0	1	5	0	6	0	15	1	16	4	22	26	617
9-10AM	P	10	5	25	40	26	8	8	42	28	134	12	174	25	309	20	354	82	528	610	
	T	2	0	5	7	0	0	0	0	4	15	0	19	0	9	2	11	7	30	37	647
10-11AM	P	7	2	32	41	16	1	5	22	29	171	12	212	14	249	16	279	63	491	554	
	T	0	0	4	4	2	0	0	2	2	18	0	20	0	12	2	14	6	34	40	594
11A-12N	P	15	4	23	42	12	2	2	16	56	173	3	232	10	231	32	273	58	505	563	
	T	0	0	1	1	0	0	0	0	4	14	0	18	0	21	2	23	1	41	42	605
12N-1PM	P	7	2	38	47	18	8	3	29	57	208	11	274	16	239	22	277	76	551	627	
	T	0	0	5	5	0	0	0	0	3	14	0	17	0	16	1	17	5	34	39	666
1-2PM	P	9	4	30	43	13	1	5	19	37	172	7	216	9	231	22	262	62	478	540	
	T	0	0	4	4	0	0	0	0	2	36	0	38	0	18	1	19	4	57	61	601
2-3PM	P	8	0	40	48	9	5	4	18	62	288	5	355	9	285	34	328	64	683	747	
	T	2	0	2	4	0	0	0	0	2	11	0	13	0	16	1	17	4	30	34	781
3-4PM	P	14	4	51	69	12	2	6	20	69	463	8	540	12	251	33	296	89	836	925	
	T	1	0	2	3	0	0	0	0	4	17	0	21		10	4	14	3	35	38	963
4-5PM	P	19	3	38	59	4	5	4	13	114	642	5	761	7	264	39	310	72	1071	1143	
	T	0	0	3	3	1	0	0	1	3	6	0	9	1	8	1	10	4	19	23	1166
5-6PM	P	14	0	33	47	8	2	9	19	136	587	7	730	10	294	40	344	66	1074	1140	
	T	0	0	1	1	0	0	0	0	3	9	0	12	0	16	0	16	1	28	29	1169
6-7PM	P	25	2	49	76	4	0	3	7	106	463	2	571	3	241	37	281	83	852	935	
	T	1	0	1	2	0	0	0	0	10	10	0	20	0	5	1	6	2	26	28	963
7-8PM	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-9PM	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-Totals	P	178	26	502	706	138	35	49	222	741	3707	80	4528	133	4372	364	4869	923	9397	10325	
	T	7	0	36	43	3	0	0	3	41	167	0	209	1	157	17	175	46	383	429	9791
Grand Totals P + T		185	26	538	749	141	35	49	225	782	3874	80	4738	134	4529	381	5044	969	8902	9791	9791

Percent Trucks 4 %

CONSULTANTS, INC.
Engineers • Land Surveyors

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John H. Vamer, PLS
Gregory R. Wendling, PE
Donald R. West, PLS

March 11, 2002

MEMORANDUM

To: Mr. Brad Steckler, PE,
INDOT Engineering Assessment Manager

From: Gregory R. Wendling, PE
Project Engineer
USI Consultants, Inc.

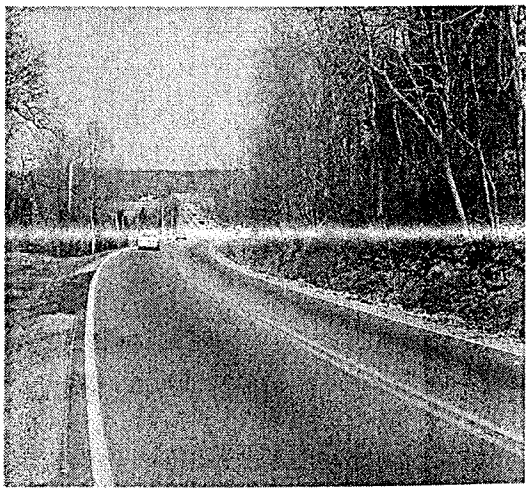
Re: **Minutes of Field Check**
Des. No.: 0012570
Project No.: STP –030-3( )
Route No.: US 150
Location: From Harrison/Floyd County Line to 4-lane section
County: Floyd County
Work Type: Road Reconstruction

This memorandum is a summary of the observations and recommendations made at a field check held at the project on Thursday, March 07, 2002. The field check was held to review the existing conditions and determine the scope of work for this engineering assessment. The following individuals were in attendance:

David Dye	INDOT, Seymour Dist., Development	812-522-5649
Jose Garcia	INDOT, Seymour Dist., Traffic	812-524-3711
Chad Mills	Burgess & Niple (B&N)	317-237-2760
Eduardo Calderin	B&N	317-237-2760
Tom Flanagan	USI Consultants, Inc.	317-544-4996
Greg Wendling	USI Consultants, Inc.	317-544-4996

The following issues were discussed at the field check:

1. This portion of US 150 is a two lane Rural Minor Arterial. It is not on the National Highway System (NHS), however, it is on the National Truck Network. The posted speed limit is 55 mph throughout the rural areas, but is reduced within the small urban areas. The vertical terrain is rolling. The predominant existing typical section (rural) is 2- 12' lanes bordered by 1' gravel shoulders. Side slopes within the corridor vary.



OFFICE
8415 East 56th Street
Indianapolis, Indiana 46216-2200
Phone: 317-544-4996
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E-mail: postoffice@usiconsultants.com

2. There were 235 crashes within the corridor during the 3 year study period (1997 to 1999). 48% of the crashes were classified as rear-end crashes. 69 of the crashes reported an injury, one crash resulted in a fatality. There is also evidence of 4 fatal crashes within the project limits.

3. The proposed cross section will include 12' travel lanes, 8' paved shoulders (9' usable) and improved roadside safety with flatter side slopes and guardrail where required. USI will identify the percentage of the project that will require new pavement due to horizontal and vertical alignment improvements. A preliminary pavement design will be requested.

4. There are four bridge structures within the project limits. The following table summarizes the bridge structures:

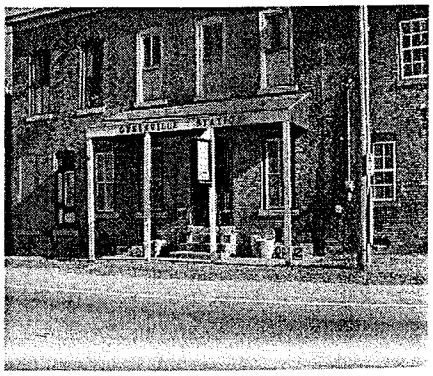
Bridge Summary

Str. No.	Description	Comments
150-22-6760	3 span concrete slab, 44' clear roadway, length 74', built 1985.	Substandard guardrail and barrier rail, deck appears in good condition
150-22-6761	3 span concrete slab, 44' clear roadway, length 76', built 1985.	Substandard guardrail and barrier rail, deck appears in good condition
150-22-7331	3 span concrete slab, 52' clear roadway, length 119', built 1998.	Bridge is in good condition. No apparent substandard features.
150-22-6700	3 span concrete I-beam, 44' clear roadway, length 144', built in 1986.	Substandard guardrail and barrier rail, deck appears in good condition

5. Due to numerous areas with vertical alignment improvements, it is anticipated that an official state detour route will be required. The recommended state detour would utilize SR 135 and I-64.

6. Environmental concerns included potential relocations, old gas stations and potentially historic structures. USI will coordinate with the INDOT Environmental Section regarding these matters.

7. USI will coordinate the project terminus at the county line with Des. No. 9902560.



8. There are two sections of roadway that will require an urban design classification. They are within Greenville and within Galena. Both sections will require a narrower shoulder and enclosed drainage is a possibility.

9. There are three ongoing projects that USI will coordinate with to determine project limits and whether or not these areas will be treated as project exceptions. The three projects are shown in the following table:

Des. No.	Description
9302660	US 150 Intersection Improvement at Buck Creek Rd., RP 168+78, Construction 2002.
8351600	US 150 Intersection Improvement at Stiller Rd., RP 168+42, Construction 2002.
9302640	US 150 Intersection Improvement at Kiesler Rd., RP 162+55, Construction 2002.

10. The following utilities were noted in the area:

    Rural Area: Primarily Overhead electric and telephone

    Urban Area: gas, water, sewer, telephone electric

This completed the items discussed. If there are any questions, additions, or revisions necessary concerning the items listed above, please contact the author.

GRW:gw

cc: Attendees
Jim Juricic
File 2002-924

INDIANA DEPARTMENT OF TRANSPORTATION
INDIANAPOLIS, INDIANA 46204-2249
INTER-DEPARTMENT COMMUNICATION

October 30, 2002

MEMORANDUM

TO: Brad Steckler
Preliminary Engineering

FROM: Gerald R. Swenson, P.E.
Hydraulic Engineer

SUBJECT: PRELIMINARY HYDRAULIC REVIEW
Road: US 150, Harrison/Floyd County Line to Buck Creek Road
Des. #: 0012570
Project: STP-030-3( )

SITE 1:

Location: 5.05 miles east of SR135
Existing Type: 5 foot RCP with projecting ends

The existing 5 ft diameter concrete pipe is not hydraulically adequate to handle the 100-year flood event. The following recommendations are made for the hydraulic design of this structure:

Proposed:

Approximate Drainage Area	=	54.0	acres
Approximate Q100 Discharge	=	108.0	cfs
Approximate Q100 Depth	=	1.67	feet
Approximate Gross Waterway Opening below Q-100	=	N/A	sf
Approximate Grade Raise	=	0.0	feet

Discussion of Structure Sizing:

The proposed structure size, based on field elevation estimates, is a 10.67 foot by 6.92 foot corrugated metal pipe arch. All other alternatives provided excessive discharge velocities and will not be considered. Due to the shape of the proposed pipe, a gross waterway opening below the Q100 water level was not calculated. Class 1 rip-rap will be required.

SITE 2:

Location: 0.32 miles west of Georgetown Greenville Road - Greenville, IN
Existing Type: 8.58 ft by 5.92 ft CMPA with projecting ends

The existing 8.58 ft by 5.92 ft corrugated metal pipe arch is not hydraulically adequate to handle the 100-year flood event. The following recommendations are made for the hydraulic design of this structure:

Proposed:

Approximate Drainage Area	=	114.0	acres
Approximate Q100 Discharge	=	262.0	cfs
Approximate Q100 Depth	=	2.78	feet
Approximate Gross Waterway Opening below Q-100	=	33.4	sf
Approximate Grade Raise	=	0.0	feet

Discussion of Structure Sizing:

The proposed structure size, based on field elevation estimates, is a 12 foot wide by 4 foot high reinforced concrete box with concrete square edge headwall. A second alternative would be a 14 foot wide by 4 foot high three sided precast concrete arch box culvert. Class II rip-rap will be required.

SITE 3:

Location: 0.15 miles east of Georgetown Greenville Road - Greenville, IN
Existing Type: 4 ft wide by 5 ft high RCB with headwall only

The existing 4 ft by 5 ft reinforced concrete box is not hydraulically adequate to handle the 100-year flood event. The following recommendations are made for the hydraulic design of this structure:

Proposed:

Approximate Drainage Area	=	74.0	acres
Approximate Q100 Discharge	=	200.0	cfs
Approximate Q100 Depth	=	1.08	feet
Approximate Gross Waterway Opening below Q-100	=	17.28	sf
Approximate Grade Raise	=	0.0	feet

Discussion of Structure Sizing:

The proposed structure size, based on field elevation estimates, is a 16 foot wide by 4 foot high reinforced concrete box with concrete square edge headwall. A second alternative would be a 16 foot wide by 5 foot high three sided precast concrete arch box culvert. Class II rip-rap will be required.

SITE 4:

Location: 1.36 miles east of Georgetown Greenville Road - Greenville, IN
Existing Type: 3 ft wide by 3 ft high RCB with headwall only

The existing 3 ft by 3 ft reinforced concrete box is not hydraulically adequate to handle the 100-year flood event. The following recommendations are made for the hydraulic design of this structure:

Proposed:

Approximate Drainage Area	=	21.0	acres
Approximate Q100 Discharge	=	45.0	cfs
Approximate Q100 Depth	=	0.9	feet
Approximate Gross Waterway Opening below Q-100	=	N/A	sf
Approximate Grade Raise	=	0.0	feet

Discussion of Structure Sizing:

The proposed structure size, based on field elevation estimates, is a 6.92 foot by 4.75 foot corrugated metal pipe arch. All other alternatives provided excessive discharge velocities and will not be considered. Due to the shape of the proposed pipe, a gross waterway opening below the Q100 water level was not calculated. Class II rip-rap will be required.

SITE 5:

Location: 1.54 miles east of Georgetown Greenville Road - Greenville, IN
Existing Type: 4 ft wide by 5 ft high RCB with wingwalls

The existing 4 ft by 5 ft reinforced concrete box is not hydraulically adequate to handle the 100-year flood event. The following recommendations are made for the hydraulic design of this structure:

Proposed:

Approximate Drainage Area	=	51.0	acres
Approximate Q100 Discharge	=	103.0	cfs
Approximate Q100 Depth	=	1.73	feet
Approximate Gross Waterway Opening below Q-100	=	N/A	sf
Approximate Grade Raise	=	0.0	feet

Discussion of Structure Sizing:

The proposed structure size, based on field elevation estimates, is a 9.33 foot by 6.25 foot corrugated metal pipe arch. All other alternatives provided excessive discharge velocities and will not be considered. Due to the shape of the proposed pipe, a gross waterway opening below the Q100 water level was not calculated. Class II rip-rap will be required.

SITE 6:

Location: 2.98 miles east of Georgetown Greenville Road - Culvert in Galena, IN
Existing Type: 3 ft wide by 3 ft high RCB with wingwalls

The existing 3 ft by 3 ft reinforced concrete box is not hydraulically adequate to handle the 100-year flood event. The following recommendations are made for the hydraulic design of this structure:

Proposed:

Approximate Drainage Area	=	35.0	acres
Approximate Q100 Discharge	=	114.0	cfs
Approximate Q100 Depth	=	1.49	feet
Approximate Gross Waterway Opening below Q-100	=	N/A	sf
Approximate Grade Raise	=	0.0	feet

Discussion of Structure Sizing:

The proposed structure size, based on field elevation estimates, is a 11.83 foot by 7.58 foot corrugated metal pipe arch. All other alternatives provided excessive discharge velocities and will not be considered. Due to the shape of the proposed pipe, a gross waterway opening below the Q100 water level was not calculated. The discharge velocity is very high and is borderline for needing an energy dissipater. It will require final design to determine if an energy dissipater is required.

SITE 7:

Location: 3.3 miles east of Georgetown Greenville Road - Culvert in Galena, IN
Existing Type: UNKNOWN

The existing unknown culvert may not be hydraulically adequate to handle the 100-year flood event. The following recommendations are made for the hydraulic design of this structure:

Proposed:

Approximate Drainage Area	=	14.0	acres
Approximate Q100 Discharge	=	38.0	cfs
Approximate Q100 Depth	=	undet	feet
Approximate Gross Waterway Opening below Q-100	=	undet	sf
Approximate Grade Raise	=	undet	feet

Discussion of Structure Sizing:

The existing structure was buried at the outlet end and local testimony proposes that it is a 3ft by 2ft concrete box that connects to a buried 4ft by 4ft concrete box on private property. The private culvert is reported to make multiple underground bends over a distance of 400 feet. The upstream side of the culvert was heavily overgrown with trees and shrubs at the time of inspection. Coupled with an incredibly deep channel, investigation of both the upstream end of the state culvert, and the downstream of the private culvert was impossible. If the designer has the chance to investigate this site during winter months, the upstream side of the culvert should be checked for size and inlet conditions. The culvert is most likely inlet controlled and could be designed with that data. A replacement size recommendation can not be made at this time.

SITE 8:

Location: 3.77 miles east of Georgetown Greenville Road
Existing Type: 3 ft CMP with projecting ends

The existing 3 ft corrugated metal pipe is not hydraulically adequate to handle the 100-year flood event. The following recommendations are made for the hydraulic design of this structure:

Proposed:

Approximate Drainage Area	=	6.0	acres
Approximate Q100 Discharge	=	22.0	cfs
Approximate Q100 Depth	=	0.98	feet
Approximate Gross Waterway Opening below Q-100	=	N/A	sf
Approximate Grade Raise	=	0.0	feet

Discussion of Structure Sizing:

The proposed structure size, based on field elevation estimates, is a 3.5 foot by 2.42 foot corrugated metal pipe arch. Due to the shape of the proposed pipe, a gross waterway opening below the Q100 water level was not calculated. An acceptable second alternative would be a 3.5 foot corrugated metal pipe. Alternative pipe materials will not be considered due to excessive outlet velocities. Class I rip-rap will be required.

SITE 9:

Location: 3.9 miles east of Georgetown Greenville Road
Existing Type: 3 ft wide by 3 ft high RCB with wingwalls

The existing 3 ft by 3 ft reinforced concrete box is not hydraulically adequate to handle the 100-year flood event. The following recommendations are made for the hydraulic design of this structure:

Proposed:

Approximate Drainage Area	=	33.0	acres
Approximate Q100 Discharge	=	80.0	cfs
Approximate Q100 Depth	=	1.56	feet
Approximate Gross Waterway Opening below Q-100	=	N/A	sf
Approximate Grade Raise	=	0.0	feet

Discussion of Structure Sizing:

The proposed structure size, based on field elevation estimates, is a 6.92 foot by 4.75 foot corrugated metal pipe arch. All other alternatives provided excessive discharge velocities and will not be considered. Due to the shape of the proposed pipe, a gross waterway opening below the Q100 water level was not calculated. Class I rip-rap will be required.

Existing bridges within the project limits are considered too new for replacement. If road widening is required, widening the bridges to match the existing waterway opening should be sufficient. If you have any questions or comments, please contact me at (317) 232-5332.

GRS
cc: File (2)

Indiana Department of Transportation

Materials and Tests Division
120 South Shortridge Road P.O. Box 19389
Indianapolis, Indiana 46219-0389
Phone: (317) 232-5280 Fax: (317) 356-9351

November 18, 2002

MEMORANDUM

TO : Mr. Greg R. Wendling
USI Consultants, Inc.
8415 East 56th Street
Indianapolis, IN 46216

THRU: Mr. David H. Andrewski
Materials Engineer

FROM: Mr. Kumar P. Dave
Pavement Design Engineer

RE : Preliminary Pavement Design
Des No : 0012560 & 0012570
District : Seymour
Route : US 150 from SR 66 to SR 135 & US 150 from Harrison/Floyd County Line to 4 lane divided highway.

You had requested a preliminary pavement design for US 150 through your letter dated July 29, 2002. There are two sections with two Des. Nos.

Des. No. 0012560 from SR 66 to SR 135 (8.9 miles): As described in your letter this section has rolling terrain with numerous substandard vertical curves and 3 to 4 substandard horizontal curves. AADT in this section varies from 5700 near SR 66 to 11,000 near SR 135. This is a well traveled road with fair amount of truck traffic. This section has 2-12 feet lanes bordered by 1 foot gravel shoulders and it is on National Truck Network. There were 99 crashes within the corridor during 3 year study period (1997 to 1999).

The proposed section will have 12 feet lanes with 8 feet paved shoulders. There is approximately 30% of pavement will be replaced due to substandard alignment.
For preliminary pavement design for new pavement use 350 +/- 50 mm thickness. The final pavement type and thickness will be determined after completion and receipt of the geotechnical report and traffic data. For new shoulder use standard section of shoulders as shown in Chapter 52 of Design Manual. The existing pavement within the project limits will be resurfaced with 38 mm of QC/QA HMA material.

Des. No. 0012570 from Co. Line to 4 lane section in Floyd County: This portion of US 150 has 2-12 feet lanes with 1 foot gravel shoulder. There were about 235 crashes within the corridor during the 3 year study period (1997 to 1999).

The proposed section will have 12 feet lanes with 8 feet paved shoulders. There is approximately 25 to 35% of pavement will be replaced due to substandard alignment.

For preliminary pavement design for new pavement use 350 +/- 50 mm thickness. The final pavement type and thickness will be determined after completion and receipt of the geotechnical report and traffic data. For new shoulder use standard section of shoulders as shown in Chapter 52 of Design Manual. The existing pavement within the project limits will be resurfaced with 38 mm of QC/QA HMA material.

KPD
cc: Mr. Klika,
File