Conclusions and Recommendations

As stated previously in this report, the goal was to determine if the concept of building a dam/reservoir in Central Indiana near Anderson was feasible and achievable through the findings of a preliminary study phase. There are many potential items and issues to consider in order to bring the dam to fruition. The following is a compilation of the summaries and next steps for the continuance of the project.

At this stage of the investigations there appears to be no issues that should prevent this project from continuing on to the next phase. However, many areas of concern still exist, most notably the environmental stakeholders, and potential impacts to the Native American Mounds area. Another area of concern exists with regard to the soils at the dam site itself. However, these issues can be resolved with structural measures and the upgrading of the type of spillway that would be constructed. These resolutions will add additional cost to the project. The size of the dam spillway will range from 700 to 1,100 feet long, for pool elevations of 870 and 875 respectively. The potential water yield from the reservoir is about 50 MGD during severe drought conditions. Flood control is a possibility with controlled gates on the dam, however a flood study of this magnitude would need to be completed only when an exact number of gates (if any are to be used) has been determined. It appears likely that one to three bridges would be removed (a traffic study in a further phase would confirm the number) while one to three others would require full reconstruction or raising of the deck.

In order to address the above issues and concerns, the Next Steps for the project would include the completion of an Environmental Impact Statement (EIS) to obtain NEPA Clearance, and coordination with all relevant agencies and stakeholders to verify the initial findings and confirm permitting and other regulatory issues that might be an issue. Further, the expansion of the geotechnical information would be required through the completion of site specific borings. These borings and laboratory tests will assist with the development of more detailed information on the subsurface strata and the soil engineering parameters. Verification of the condition/location of the limestone bedrock is also important, especially in the right abutment where the bedrock is relatively shallow. This would confirm the level of structural support required for the dam's foundation.

The refinement of the potential potable water yield is also a critical Next Step in the sizing of the dam. This factor will provide valuable drought-year information to potential water-sale customers. The determination of the need for a gated structure is a cost/benefit issue as well. Also, a traffic study should be completed to determine if one or more bridges can be removed with no replacement necessary (i.e., traffic volumes are low enough that bridge replacement(s) is not warranted). The bridges that could possibly be raised (at substantially lower costs) should be investigated by a bridge structural engineer. All transportation agencies will require input and coordination on the signoff of any removal or replacement.

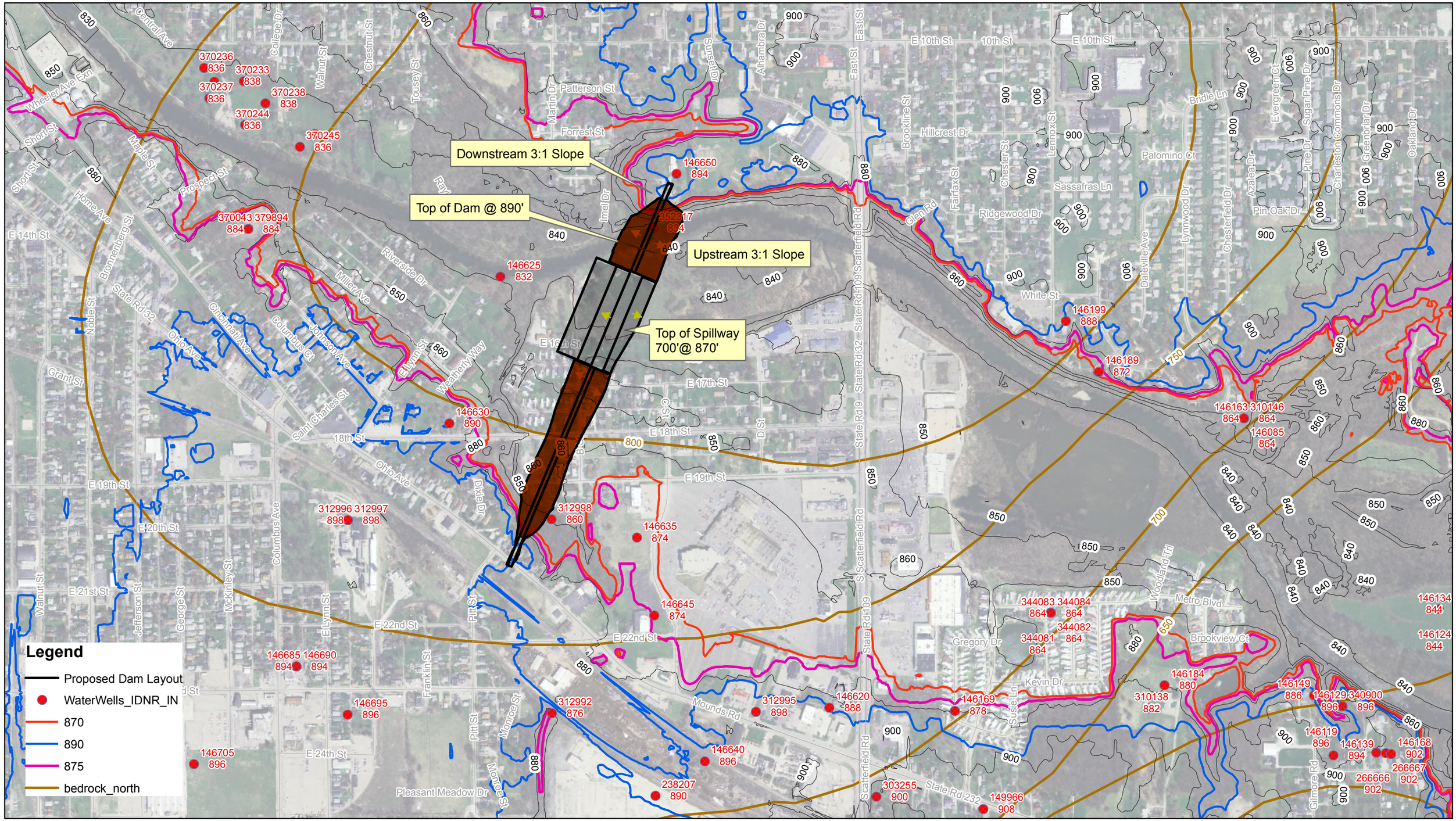
The estimated hard costs for the construction of these three options falls in the $175M to $200M range with additional land prep/permitting/mitigation costs ranging from $125M to $150M. Therefore, as a planning level tool, the total costs for the project are believed to lie in the $300M to $350M range.

The information investigated in this report did not find any "fatal flaws" that would stop the project at this phase. Therefore, the next phase of study appears to be warranted.

Appendix A

Environmental

Appendix A: Proposed Dam Layout



ANDERSON PROPOSED DAM LAYOUT

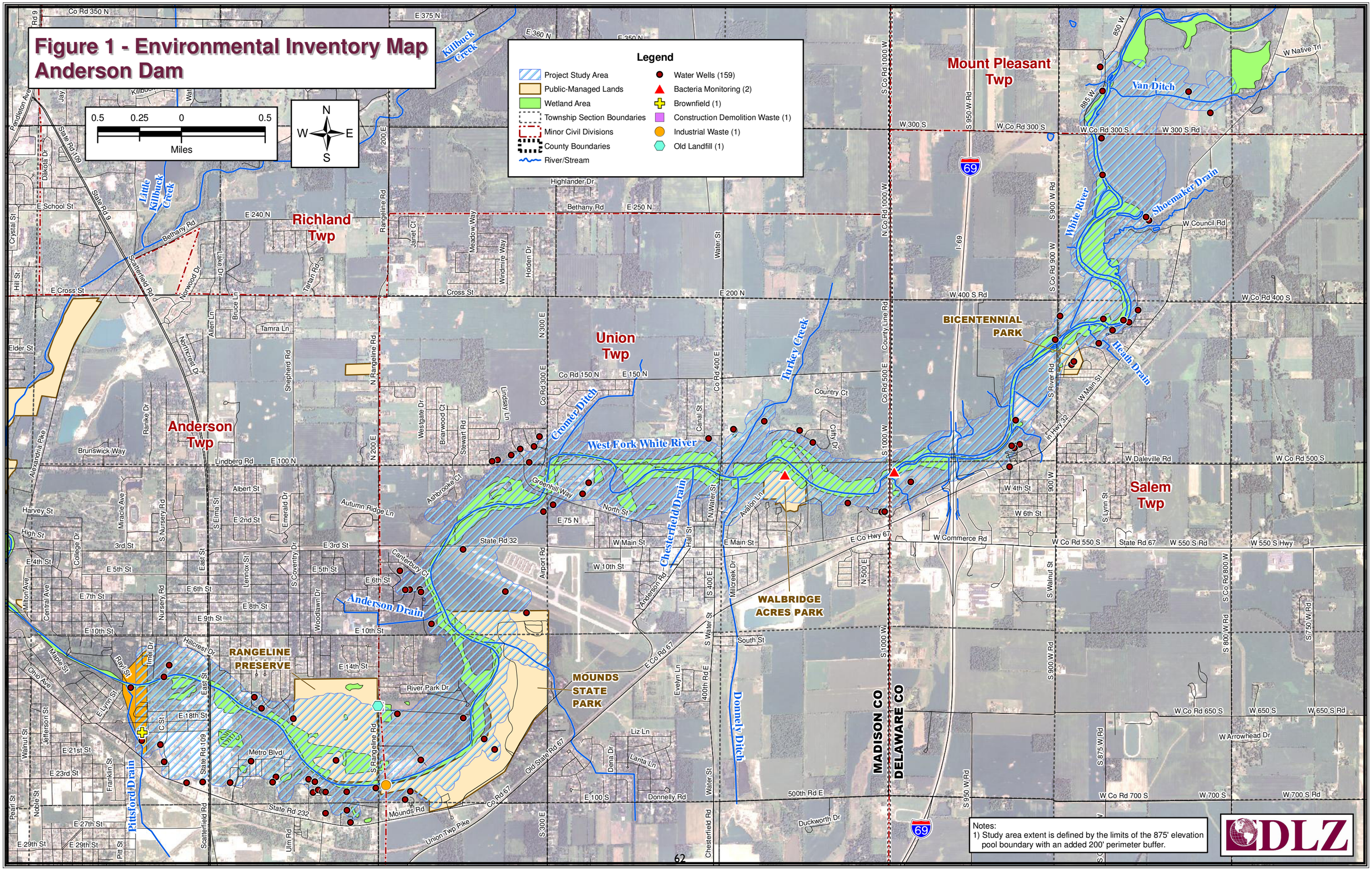
N

0 300 600 Feet

\\COLS1\Proj\proj\1163\0791.90 Anderson Dam\GIS\dam_layout.mxd

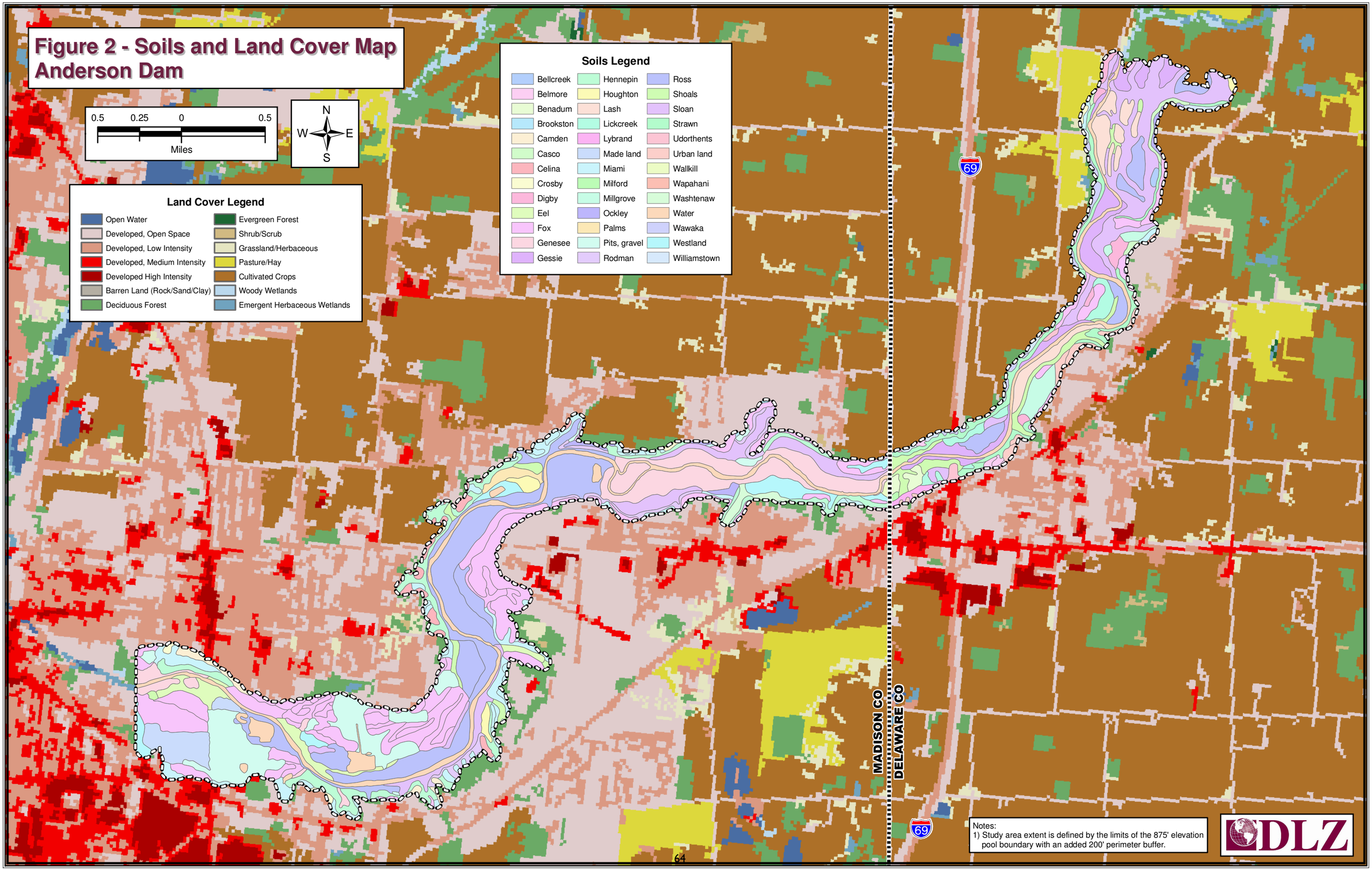
Appendix A: Environmental Inventory Map

Figure 1 - Environmental Inventory Map
Anderson Dam



Appendix A: Soils and Land Cover Map

Figure 2 - Soils and Land Cover Map
Anderson Dam



Appendix A: DNR Endangered Species Request for Information

Indiana Department of Natural Resources

Mitchell E. Daniels, Jr., Governor
Robert E. Carter, Jr., Director

Division of Nature Preserves
402 W. Washington St., Rm W267
Indianapolis, IN 46204-2739

October 17, 2011

Natalie Dingledine
DLZ
1425 Keystone Avenue
Lansing, MI 48911

Dear Natalie Dingledine:

I am responding to your request for information on the endangered, threatened, or rare (ETR) species, high quality natural communities, and natural areas documented from a project area along the White River, Madison County, Indiana. The Indiana Natural Heritage Data Center has been checked and following you will find information on the ETR species documented within the project area.

For more information on the animal species mentioned, please contact Christie Stanifer, Environmental Coordinator, Division of Fish and Wildlife, 402 W. Washington Room W273, Indianapolis, Indiana 46204, (317)232-4080.

The information I am providing does not preclude the requirement for further consultation with the U.S. Fish and Wildlife Service as required under Section 7 of the Endangered Species Act of 1973. If you have concerns about potential Endangered Species Act issues you should contact the Service at their Bloomington, Indiana office.

U.S. Fish and Wildlife Service
620 South Walker St.
Bloomington, Indiana 47403-2121
812-334-4261

At some point, you may need to contact the Department of Natural Resources' Environmental Review Coordinator so that other divisions within the department have the opportunity to review your proposal.

An Equal Opportunity Employer

For more information, please contact:

Department of Natural Resources
attn: Christie Stanifer
Environmental Coordinator
Division of Fish and Wildlife
402 W. Washington Street, Room W273
Indianapolis, IN 46204
(317)232-4080

Please note that the Indiana Natural Heritage Data Center relies on the observations of many individuals for our data. In most cases, the information is not the result of comprehensive field surveys conducted at particular sites. Therefore, our statement that there are no documented significant natural features at a site should not be interpreted to mean that the site does not support special plants or animals.

Due to the dynamic nature and sensitivity of the data, this information should not be used for any project other than that for which it was originally intended. It may be necessary for you to request updated material from us in order to base your planning decisions on the most current information.

Thank you for contacting the Indiana Natural Heritage Data Center. You may reach me at (317)232-8059 if you have any questions or need additional information.

Sincerely,

Ronald P. Hellmich

Ronald P. Hellmich
Indiana Natural Heritage Data Center

Enclosure: invoice
Data sheets

Appendix A: White River Endangered Species Search Results

Endangered, Threatened and Rare Species and Significant Areas Documented Within a Project Area Along the White River, Madison County, Indiana

Type	Species Name	Common Name	Fed	State	Town Range	Date	Comments
Bird	Lanius ludovicianus	Loggerhead Shrike		SE	019N007E 13	1924-05-17	
Mollusk	Pleurobema clava	Clubshell	LE	SE	019N008E 16	2002-08-28	WEATHERED DEAD
Mollusk	Ptychobranchus fasciolaris	Kidneyshell		SSC	019N008E 9	2000-08-28	WEATHERED DEAD
Vascular Plant	Hypericum pyramidatum	Great St. John's-wort		ST	019N008E 09 NEQ NEQ	1996-07-21	
Vascular Plant	Onosmodium hispidissimum	Shaggy False-gromwell		SE	019N008E 09	1907-08-11	
Vascular Plant	Trichostema dichotomum	Forked Bluecurl		SR	019N008E 12 NWQ	1949-08-30	
MOUNDS FEN NATURE PRESERVE							
High Quality Natural Community	Wetland - fen	Fen		SG	019N008E 16 NWQ SEQ	1990-10	
Insect Odonata	Somatochlora tenebrosa	Clamp-tipped Emerald		SR	019N008E 16	1996-07-31	
Insect Odonata	Tachopteryx thoreyi	Gray Petaltail		SR	019N008E 16	1996-07-05	
Vascular Plant	Deschampsia cespitosa	Tufted Hairgrass		SR	019N008E 16 NWQ SEQ	1990-10	
Vascular Plant	Juglans cinerea	Butternut		WL	019N008E 09	1982	
Vascular Plant	Selaginella apoda	Meadow Spike-moss		WL	019N008E 16 NWQ SEQ	1992	
Vascular Plant	Spiranthes lucida	Shining Ladies'-tresses		SR	019N008E 16 NWQ SEQ	1992	

Fed: LE = listed federal endangered; C = federal candidate species

State: SE = state endangered; ST = state threatened; SR = state rare; SSC = state species of special concern; SG = state significant; WL = Watch List; no rank - not ranked but tracked to monitor status

Type	Species Name	Common Name	Fed	State	Town Range	Date	Comments
MOUNDS STATE PARK							
High Quality Natural Community	Forest - upland mesic	Mesic Upland Forest		SG	019N008E 16 SH	1990-10	
Insect Odonata	Cordulegaster bilineata	Brown Spiketail		SE	019N008E 09	1998-06-18	
Mollusk	Epioblasma torulosa rangiana	Northern Riffleshell	LE	SE	019N008E 16	2000-08-28	WEATHERED DEAD
Mollusk	Lampsilis fasciola	Wavyrayed Lampmussel		SSC	019N008E 9	2000-08-28	WEATHERED DEAD
Mollusk	Toxolasma lividus	Purple Lilliput		SSC	019N008E 9	2004-10-04	WEATHERED DEAD

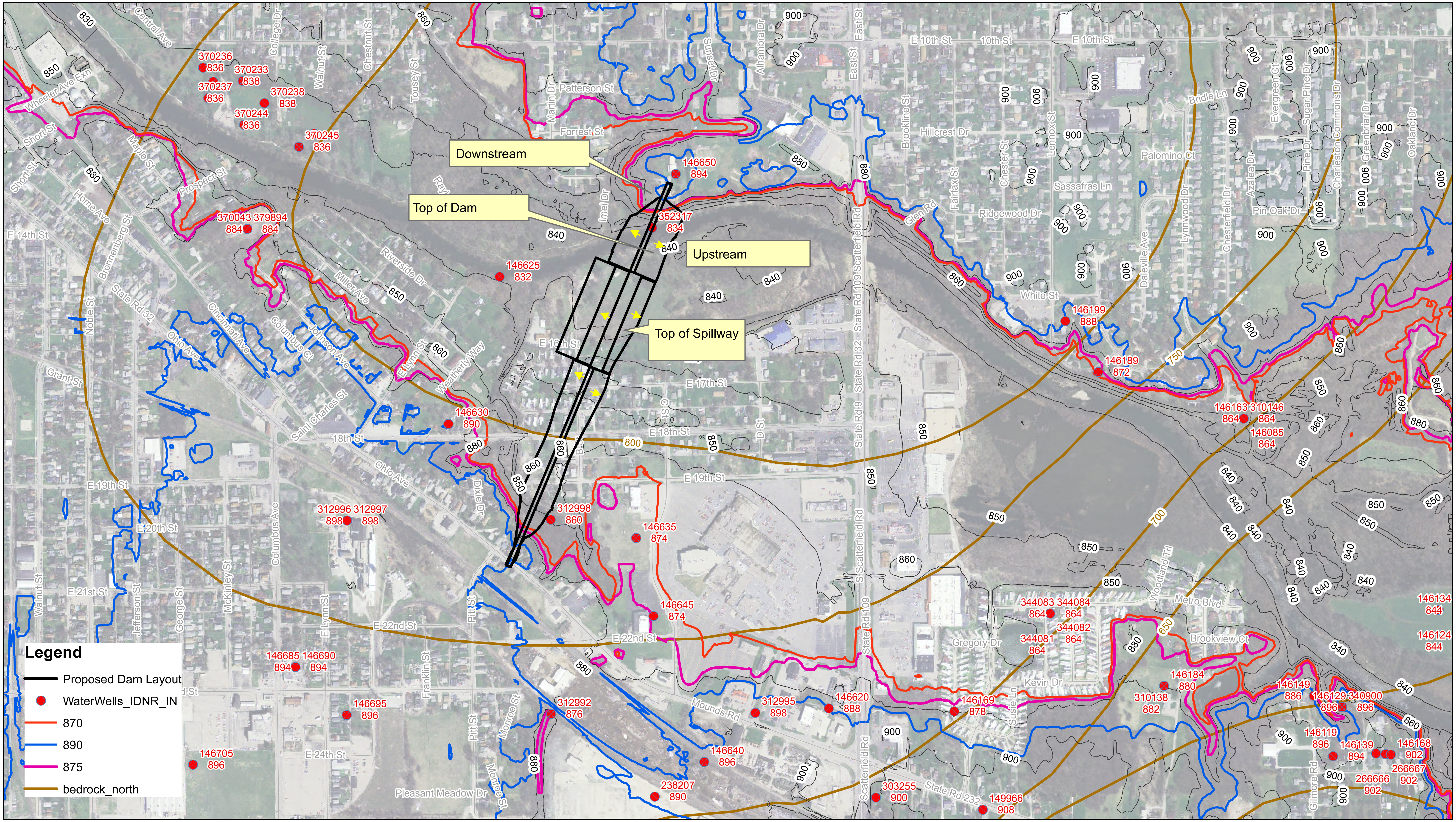
Fed: LE = listed federal endangered; C = federal candidate species

State: SE = state endangered; ST = state threatened; SR = state rare; SSC = state species of special concern; SG = state significant; WL = Watch List; no rank - not ranked but tracked to monitor status

Appendix B

Geotechnical

Appendix B: Well Location Map



WELL LOG LOCATIONS

N

0 300 600
Feet

\\COLS1\Proj\proj\11631\0791.90 Anderson Dam\GIS\dam_layout.mxd

Appendix B: Well Logs

Record of Water Well

Indiana Department of Natural Resources

Reference Number **144835**

Driving directions to well

Date completed

Owner-Contractor	**Name**	**Address**	**Telephone**
Owner	L B KERR HOSPITAL		
Driller	C M BUSBY		

Construction Details

Well	**Use:**	**Drilling method:**	**Pump type:**
	Depth: 120.0	**Pump setting depth:**	**Water quality:**
Casing	**Length:**	**Material:**	**Diameter:**
Screen	**Length:**	**Material:**	**Diameter: Slot size:**

Well Capacity Test

Type of test: **Test rate:** gpm for hrs. **BailTest rate:** gpm for hrs.

Drawdown: ft. **Static water level:** ft. **Bailer Drawdown** ft.

Grouting Information

Material: **Depth:** from to

Installation Method: **Number of bags used:**

Well Abandonment

Sealing material: **Depth:** from to

Installation Method: **Number of bags used:**

Administrative

County: MADISON **Township:** 19N **Range:** 8E

Section: SW of the SE of the SW of Section 9 **Topo map:** ANDERSON SOUTH

Grant Number:

Field located by: **on:**

Courthouse location by: **on:**

Location accepted w/o verification by: **on:**

Subdivision name: **Lot number:**

Ft W of EL: **Ft N of SL:** **Ft E of WL:** **Ft S of NL:**

Ground elevation: 900.0 **Depth to bedrock:** 317.0 **Bedrock elevation:** 583.0 **Aquifer elevation:**

UTM Easting: **UTM Northing:**

Well Log

Top	Bottom	Formation
0.0	225.0	CLAY
225.0	235.0	SAND
235.0	253.0	CLAY
253.0	256.0	SAND
256.0	317.0	CLAY
317.0	375.0	SH

Comments TEST HOLE INFO IN ORIGINAL;

Record of Water Well

Indiana Department of Natural Resources

Reference Number	**Driving directions to well**	**Date completed**
146124	.75 MILE EAST OF 109 BYPASS AND S.R. 232, ON 232 TO GILMORE RD. NORTH 2 BLOCKS TO 227.	Sep 21, 1965

Owner-Contractor	**Name**	**Address**	**Telephone**
Owner	DUANE DYSON	225 GILMORE RD	
Driller	JAMES CURTIS	3020 HELMS RD, ANDERSON IN	
Operator	JAMES CURTIS	License: null	

Construction Details

Well	**Use:** Home	**Drilling method:** Cable Tool	**Pump type:**
	Depth: 43.0	**Pump setting depth:**	**Water quality:**
Casing	**Length:** 43.0	**Material:**	**Diameter:** 4.5
Screen	**Length:**	**Material:**	**Diameter: Slot size:**

Well Capacity Test

Type of test: Pumping **Test rate:** 10.0 gpm for 1.0 hrs. **BailTest rate:** gpm for hrs.
Drawdown: 2.0 ft. **Static water level:** 29.0 ft. **Bailer Drawdown** ft.

Grouting Information

Material: **Depth:** from to
Installation Method: **Number of bags used:**

Well Abandonment

Sealing material: **Depth:** from to
Installation Method: **Number of bags used:**

Administrative

County: MADISON **Township:** 19N **Range:** 8E
Section: SE of Section 17 **Topo map:** ANDERSON SOUTH
Grant Number:
Field located by: **on:**
Courthouse location by: **on:**
Location accepted w/o verification by: **on:**
Subdivision name: **Lot number:**
Ft W of EL: **Ft N of SL:** **Ft E of WL:** **Ft S of NL:**
Ground elevation: **Depth to bedrock:** **Bedrock elevation:** **Aquifer elevation:**
UTM Easting: **UTM Northing:**

Well Log

Top	Bottom	Formation
0.0	41.0	RED CLAY AND GRAV
41.0	43.0	GRAV

Comments

Record of Water Well

Indiana Department of Natural Resources

Reference Number	**Driving directions to well**	**Date completed**
146134	SEE ATTACHED MAP	Aug 26, 1968

Owner-Contractor	**Name**	**Address**	**Telephone**
Owner	THOMAS SANFORD	RR 1 BOX 34, ANDERSON IN	
Driller	ELWOOD NORRIS WELL DRLG	7044 S MAIN ST, ANDERSON IN	
Operator	ELWOOD NORRIS	License: null	

Construction Details

Well	**Use:** Home	**Drilling method:** Rotary	**Pump type:**
	Depth: 295.0	**Pump setting depth:**	**Water quality:**
Casing	**Length:**	**Material:**	**Diameter:**
Screen	**Length:**	**Material:**	**Diameter: Slot size:**

Well Capacity Test

Type of test: Pumping **Test rate:** 25.0 gpm for 1.0 hrs. **BailTest rate:** gpm for hrs.
Drawdown: 85.0 ft. **Static water level:** 15.0 ft. **Bailer Drawdown** ft.

Grouting Information

Material: **Depth:** from to
Installation Method: **Number of bags used:**

Well Abandonment

Sealing material: **Depth:** from to
Installation Method: **Number of bags used:**

Administrative

County: MADISON **Township:** 19N **Range:** 8E
Section: SE of Section 17 **Topo map:** ANDERSON SOUTH
Grant Number:
Field located by: **on:**
Courthouse location by: **on:**
Location accepted w/o verification by: **on:**
Subdivision name: **Lot number:**
Ft W of EL: **Ft N of SL:** **Ft E of WL:** **Ft S of NL:**
Ground elevation: **Depth to bedrock:** **Bedrock elevation:** **Aquifer elevation:**
UTM Easting: **UTM Northing:**

Well Log

Top	Bottom	Formation
0.0	2.0	TOP SOIL
2.0	41.0	BLUE CLAY
41.0	81.0	BLUE SAND
81.0	110.0	RED CLAY

110.0	122.0	BLUE SAND
122.0	235.0	GRAY CLAY
235.0	252.0	RED CLAY
252.0	282.0	SOFT GRAY LS
282.0	295.0	MD BLUE LIME AND WATER

Comments SEE MAP;

Record of Water Well

Indiana Department of Natural Resources

Reference Number	**Driving directions to well**	**Date completed**
146153		Apr 29, 1964

Owner-Contractor	**Name**	**Address**	**Telephone**
Owner	MADISON CO ORPHANS HOME	3420 MOUNDS RD CITY	
Driller	BUSBY DRLG CO	RR 6 BOX 345, ANDERSON IN	
Operator	LENARD HALL	License: null	

Construction Details

Well	**Use:** Public Supply	**Drilling method:** Cable Tool	**Pump type:**
	Depth: 82.0	**Pump setting depth:**	**Water quality:**
Casing	**Length:** 79.0	**Material:**	**Diameter:** 4.0
Screen	**Length:** 5.4	**Material:**	**Diameter:** 4.0 **Slot size:** 6

Well Capacity Test

Type of test: Pumping **Test rate:** 15.0 gpm for 2.0 hrs. **BailTest rate:** gpm for hrs.
Drawdown: 0.0 ft. **Static water level:** 20.0 ft. **Bailer Drawdown** ft.

Grouting Information

Material: **Depth:** from to
Installation Method: **Number of bags used:**

Well Abandonment

Sealing material: **Depth:** from to
Installation Method: **Number of bags used:**

Administrative

County: MADISON **Township:** 19N **Range:** 8E
Section: SE of the SW of the SW of Section 16 **Topo map:** ANDERSON SOUTH
Grant Number:
Field located by: CES **on:** Sep 01, 1966
Courthouse location by: **on:**
Location accepted w/o verification by: **on:**
Subdivision name: **Lot number:**
Ft W of EL: **Ft N of SL:** **Ft E of WL:** **Ft S of NL:**
Ground elevation: 910.0 **Depth to bedrock:** **Bedrock elevation:** **Aquifer elevation:** 830.0
UTM Easting: 616735.97369 **UTM Northing:** 4438619.4638

Well Log

Top	Bottom	Formation
0.0	20.0	SAND
20.0	78.0	HARDPAN
78.0	82.0	GRAV

Comments MC 830;

Record of Water Well

Indiana Department of Natural Resources

Reference Number	Driving directions to well	Date completed
146158	200E 75S ON E SIDE OF RD	Jun 26, 1978

Owner-Contractor	Name	Address	Telephone
Owner	USGS	1819 N MERIDIAN ST, INDPLS IN	
Driller	ORTMAN DRLG INC	717 S MALFALFA RD, KOKOMO IN	
Operator	RICK O, FRANK G, LOWELL C, JIM	License: null	

Construction Details

Well	**Use:**	**Drilling method:** Rotary	**Pump type:**
	Depth: 280.0	**Pump setting depth:**	**Water quality:**
Casing	**Length:** 221.0	**Material:**	**Diameter:** 2.0
Screen	**Length:** 3.0	**Material:**	**Diameter:** 2.0 **Slot size:** .040

Well Capacity Test

Type of test: Air **Test rate:** 25.0 gpm for hrs. **BailTest rate:** gpm for hrs.
Drawdown: ft. **Static water level:** 13.0 ft. **Bailer Drawdown** ft.

Grouting Information

Material: **Depth:** from to
Installation Method: **Number of bags used:**

Well Abandonment

Sealing material: **Depth:** from to
Installation Method: **Number of bags used:**

Administrative

County: MADISON **Township:** 19N **Range:** 8E
Section: SW of the SW of the NW of Section 16 **Topo map:** ANDERSON SOUTH
Grant Number:
Field located by: **on:**
Courthouse location by: **on:**
Location accepted w/o verification by: **on:**
Subdivision name: **Lot number:**
Ft W of EL: **Ft N of SL:** 2650.0 **Ft E of WL:** 50.0 **Ft S of NL:**
Ground elevation: 880.0 **Depth to bedrock:** 278.0 **Bedrock elevation:** 602.0 **Aquifer elevation:**
UTM Easting: 616648.81211 **UTM Northing:** 4439440.2831

Well Log

Top	Bottom	Formation
0.0	13.0	BR CLAY
13.0	19.0	SANDY FN TO MD DRY S AND G
19.0	39.0	MD TO CRS S AND DRY G

39.0	40.0	REDDISH BR CLAY
40.0	53.0	GRAY CLAY
53.0	55.0	S AND G
55.0	65.0	GRAY CLAY
65.0	75.0	FINE SAND
75.0	108.0	GRAY CLAY W/ SOME SAND
108.0	114.0	FN TO MD S AND G LOOSE
114.0	116.0	CLAY
116.0	128.0	LOOSE FN TO MD S AND G, CRS
128.0	144.0	REDDISH BR CLAY
144.0	145.0	SAND
145.0	147.0	REDDISH BR CLAY
147.0	148.0	SAND
148.0	151.0	REDDISH BR CLAY
151.0	158.0	FN SAND W/ SOME GRAV
158.0	181.0	STICKY REDDISH BR CLAY
181.0	190.0	VERY FINE SAND
190.0	218.0	SMOOTH REDDISH BR CLAY
218.0	227.0	FN TO MD BROKEN STONE & GRAV
227.0	234.0	CEMENTED S AND G
234.0	270.0	GRAY CLAY
270.0	277.0	GRITTY GRAY CLAY
277.0	278.0	BROKEN STONE
278.0	280.0	GRAY STONE

Comments

Record of Water Well

Indiana Department of Natural Resources

Reference Number	**Driving directions to well**	**Date completed**
146163	1 1/2 MI E OF ANDERSON CITY LIMITS ON SR 32	Dec 09, 1959

Owner-Contractor	**Name**	**Address**	**Telephone**
Owner	R O HOCKENBERRY	3012 MOUNDS RD, ANDERSON	
Driller	JAMES CURTIS	3020 HELMS RD, ANDERSON IN	
Operator	JAMES CURTIS	License: null	

Construction Details

Well	**Use:** Home	**Drilling method:** Cable Tool	**Pump type:**
	Depth: 71.0	**Pump setting depth:**	**Water quality:**
Casing	**Length:** 68.0	**Material:**	**Diameter:** 4.5
Screen	**Length:** 5.0	**Material:**	**Diameter:** 3.0 **Slot size:** 4

Well Capacity Test	**Type of test:** Pumping	**Test rate:** 10.0 gpm for 1.0 hrs.	**BailTest rate:** gpm for hrs.
	Drawdown: 7.0 ft.	**Static water level:** ft.	**Bailer Drawdown** ft.

Grouting Information	**Material:**	**Depth:** from to
	Installation Method:	**Number of bags used:**

Well Abandonment	**Sealing material:**	**Depth:** from to
	Installation Method:	**Number of bags used:**

Administrative

County: MADISON **Township:** 19N **Range:** 8E

Section: of Section 17 **Topo map:** ANDERSON SOUTH

Grant Number:

Field located by: **on:**

Courthouse location by: **on:**

Location accepted w/o verification by: **on:**

Subdivision name: **Lot number:**

Ft W of EL: **Ft N of SL:** **Ft E of WL:** **Ft S of NL:**

Ground elevation: **Depth to bedrock:** **Bedrock elevation:** **Aquifer elevation:**

UTM Easting: **UTM Northing:**

Well Log

Top	Bottom	Formation
0.0	53.0	BLUE CLAY
53.0	69.0	SAND
69.0	71.0	GRAV

Comments

Record of Water Well

Indiana Department of Natural Resources

Reference Number	**Driving directions to well**	**Date completed**
146169	2ND HOUSE E OF 109 BYPASS ON MOUND RD, NORTH SIDE OF ST.	Aug 11, 1965

Owner-Contractor	**Name**	**Address**	**Telephone**
Owner	JAN KIMMERLING	2312 MOUNDS RD	
Driller	BUSBY DRLG CO	RR 6 BOX 345, ANDERSON IN	
Operator	CHARLES DUCKWORTH	License: null	

Construction Details

Well	**Use:** Home	**Drilling method:** Rotary	**Pump type:**
	Depth: 62.0	**Pump setting depth:**	**Water quality:**
Casing	**Length:** 58.0	**Material:**	**Diameter:** 5.0
Screen	**Length:** 5.0	**Material:**	**Diameter:** 5.0 **Slot size:** 8

Well Capacity Test

Type of test: Pumping **Test rate:** 30.0 gpm for 1.0 hrs. **BailTest rate:** gpm for hrs.
Drawdown: 10.0 ft. **Static water level:** 40.0 ft. **Bailer Drawdown** ft.

Grouting Information

Material: **Depth:** from to
Installation Method: **Number of bags used:**

Well Abandonment

Sealing material: **Depth:** from to
Installation Method: **Number of bags used:**

Administrative

County: MADISON **Township:** 19N **Range:** 8E
Section: SW of the SW of Section 17 **Topo map:** ANDERSON SOUTH
Grant Number:
Field located by: **on:**
Courthouse location by: **on:**
Location accepted w/o verification by: **on:**
Subdivision name: **Lot number:**
Ft W of EL: **Ft N of SL:** **Ft E of WL:** **Ft S of NL:**
Ground elevation: **Depth to bedrock:** **Bedrock elevation:** **Aquifer elevation:**
UTM Easting: **UTM Northing:**

Well Log

Top	Bottom	Formation
0.0	20.0	RED CLAY
20.0	62.0	GRAV

Comments

Record of Water Well

Indiana Department of Natural Resources

Reference Number	**Driving directions to well**	**Date completed**
146189	BRONNENBERG PROPERTY, 200 FT E OF LENNOX ST AND 180 FT N OF WHITE RIVER, USE # 21 TEST	Nov 09, 1951

Owner-Contractor	**Name**	**Address**	**Telephone**
Owner	CITY OF ANDERSON		
Driller	LAYNE NORTHERN CO		

Construction Details

Well	**Use:**	**Drilling method:**	**Pump type:**
	Depth:	**Pump setting depth:**	**Water quality:**
Casing	**Length:**	**Material:**	**Diameter:**
Screen	**Length:**	**Material:**	**Diameter: Slot size:**

Well Capacity Test

Type of test: **Test rate:** gpm for hrs. **BailTest rate:** gpm for hrs.
Drawdown: ft. **Static water level:** ft. **Bailer Drawdown** ft.

Grouting Information

Material: **Depth:** from to
Installation Method: **Number of bags used:**

Well Abandonment

Sealing material: **Depth:** from to
Installation Method: **Number of bags used:**

Administrative

County: MADISON **Township:** 19N **Range:** 8E
Section: SW of the SE of the NW of Section 17 **Topo map:** ANDERSON SOUTH
Grant Number:
Field located by: **on:**
Courthouse location by: **on:**
Location accepted w/o verification by: **on:**
Subdivision name: **Lot number:**
Ft W of EL: **Ft N of SL:** **Ft E of WL:** **Ft S of NL:**
Ground elevation: **Depth to bedrock:** **Bedrock elevation:** **Aquifer elevation:**
UTM Easting: **UTM Northing:**

Well Log

Top	Bottom	Formation
0.0	2.0	SOIL, TOP
2.0	10.0	HARD GRITTY CLAY
10.0	26.5	SOFT SANDY CLAY
26.5	28.5	LS

Comments

Record of Water Well

Indiana Department of Natural Resources

Reference Number	**Driving directions to well**	**Date completed**
146199		Sep 28, 1983

Owner-Contractor	**Name**	**Address**	**Telephone**
Owner	RAY DANIELS	1528 LENNOX ST, ANDERSON	
Driller	PERRY WELL DRLG	ANDERSON	
Operator	JIM PERRY	License: null	

Construction Details

Well	**Use:** Home	**Drilling method:** Rotary	**Pump type:**
	Depth: 94.0	**Pump setting depth:**	**Water quality:**
Casing	**Length:** 90.0	**Material:**	**Diameter:** 5.0
Screen	**Length:** 4.0	**Material:**	**Diameter:** 5.0 **Slot size:** 60

Well Capacity Test

Type of test: Pumping **Test rate:** 25.0 gpm for 1.0 hrs. **BailTest rate:** gpm for hrs.
Drawdown: 0.0 ft. **Static water level:** 62.0 ft. **Bailer Drawdown** ft.

Grouting Information

Material: **Depth:** from to
Installation Method: **Number of bags used:**

Well Abandonment

Sealing material: **Depth:** from to
Installation Method: **Number of bags used:**

Administrative

County: MADISON **Township:** 19N **Range:** 8E
Section: NE of the SW of the NW of Section 17 **Topo map:** ANDERSON SOUTH
Grant Number:
Field located by: TFA **on:** Jul 16, 1987
Courthouse location by: **on:**
Location accepted w/o verification by: **on:**
Subdivision name: **Lot number:**
Ft W of EL: **Ft N of SL:** **Ft E of WL:** 1400.0 **Ft S of NL:** 1900.0
Ground elevation: 850.0 **Depth to bedrock:** **Bedrock elevation:** **Aquifer elevation:** 760.0
UTM Easting: 615273.43397 **UTM Northing:** 4439578.1536

Well Log

Top	Bottom	Formation
0.0	12.0	YEL CLAY
12.0	64.0	YEL MUDDY GRAV
64.0	76.0	GRAY CLAY
76.0	90.0	GRAV AND SOME SAND

Comments

Record of Water Well

Indiana Department of Natural Resources

Reference Number	**Driving directions to well**	**Date completed**
344081	2225 MOUNDS RD	Aug 28, 2000

Owner-Contractor	**Name**	**Address**	**Telephone**
Owner		2225 MOUNDS RD ANDERSON IN	
Driller	ORTMAN DRILLING INC	241N 300W KOKOMO IN	(765) 459-4125
Operator	LEONARD F CHRIS H	License: 1035	
Company	CONESTOGA-ROVERS & ASSOC	2055 NIAGARA FALLS BLVD NIAGARA FALLS NY	(716) 297-6150

Construction Details

Well	**Use:** Home	**Drilling method:**	**Pump type:**
	Depth: 55.0	**Pump setting depth:**	**Water quality:**
Casing	**Length:**	**Material:** STEEL	**Diameter:** 4.0
Screen	**Length:**	**Material:**	**Diameter: Slot size:**

Well Capacity Test

Type of test: **Test rate:** gpm for hrs. **BailTest rate:** gpm for hrs.
Drawdown: ft. **Static water level:** ft. **Bailer Drawdown** ft.

Grouting Information

Material: **Depth:** from to
Installation Method: **Number of bags used:**

Well Abandonment

Sealing material: HOLE PLUG **Depth:** from 55 to 1
Installation Method: **Number of bags used:** 5.0

Administrative

County: MADISON **Township:** 19N **Range:** 8E
Section: SW of Section 17 **Topo map:** ANDERSON SOUTH
Grant Number:
Field located by: **on:**
Courthouse location by: **on:**
Location accepted w/o verification by: **on:**
Subdivision name: **Lot number:**
Ft W of EL: **Ft N of SL:** **Ft E of WL:** **Ft S of NL:**
Ground elevation: **Depth to bedrock:** **Bedrock elevation:** **Aquifer elevation:**
UTM Easting: **UTM Northing:**

Well Log

Top	Bottom	Formation

Comments PLUGGED OLD 4" WELL CHLORINE 1 QT LIQUID CEMENT 1/4 SACK 1-0

Record of Water Well

Indiana Department of Natural Resources

Reference Number	**Driving directions to well**	**Date completed**
344082	2712 MOUNDS RD	Aug 28, 2000

Owner-Contractor	**Name**	**Address**	**Telephone**
Owner		2712 MOUNDS RD ANDERSON IN	
Driller	ORTMAN DRILLING INC	241N 300W KOKOMO IN	(765) 459-4125
Operator	LEONARD F CHRIS H	License: 1035	
Company	CONESTOGA-ROVERS & ASSOC	2055 NIAGARA FALLS BLVD SUITE 3 NIAGARA FALLS N	(716) 297-6150

Construction Details

Well	**Use:** Home	**Drilling method:**	**Pump type:**
	Depth: 38.8	**Pump setting depth:**	**Water quality:**
Casing	**Length:**	**Material:** SS	**Diameter:** 4.0
Screen	**Length:**	**Material:**	**Diameter: Slot size:**

Well Capacity Test	**Type of test:**	**Test rate:** gpm for hrs.	**BailTest rate:** gpm for hrs.
	Drawdown: ft.	**Static water level:** ft.	**Bailer Drawdown** ft.

Grouting Information	**Material:**	**Depth:** from to
	Installation Method:	**Number of bags used:**

Well Abandonment	**Sealing material:** HOLE PLUG	**Depth:** from 38.8 to 1
	Installation Method:	**Number of bags used:** 5.0

Administrative

County: MADISON **Township:** 19N **Range:** 8E

Section: SW of Section 17 **Topo map:** ANDERSON SOUTH

Grant Number:

Field located by: **on:**

Courthouse location by: **on:**

Location accepted w/o verification by: **on:**

Subdivision name: **Lot number:**

Ft W of EL: **Ft N of SL:** **Ft E of WL:** **Ft S of NL:**

Ground elevation: **Depth to bedrock:** **Bedrock elevation:** **Aquifer elevation:**

UTM Easting: **UTM Northing:**

Well Log

Top	Bottom	Formation

Comments PLUGGED OLD 4" WELL CHLORINE 1 QT LIQUID CEMENT 1/4 SACK 1-0

Record of Water Well

Indiana Department of Natural Resources

Reference Number	**Driving directions to well**	**Date completed**
310147	E OF ANDERSON NEAR MOUNDS PARKS	

Owner-Contractor	**Name**	**Address**	**Telephone**
Owner	ORPHANS HOME		
Driller	CLIFF BUSBY	RR ANDERSON	

Construction Details

Well	**Use:**	**Drilling method:**	**Pump type:**
	Depth: 310.0	**Pump setting depth:**	**Water quality:**
Casing	**Length:** 192.3	**Material:**	**Diameter:** 4.0
Screen	**Length:**	**Material:**	**Diameter: Slot size:**

Well Capacity Test **Type of test:** **Test rate:** gpm for hrs. **BailTest rate:** gpm for hrs.
Drawdown: ft. **Static water level:** ft. **Bailer Drawdown** ft.

Grouting Information **Material:** **Depth:** from to
Installation Method: **Number of bags used:**

Well Abandonment **Sealing material:** **Depth:** from to
Installation Method: **Number of bags used:**

Administrative

County: MADISON **Township:** 19N **Range:** 8E
Section: SE of the SW of the SW of Section 16 **Topo map:** ANDERSON SOUTH
Grant Number:
Field located by: **on:**
Courthouse location by: **on:**
Location accepted w/o verification by: LES **on:** Aug 01, 1966
Subdivision name: **Lot number:**
Ft W of EL: **Ft N of SL:** **Ft E of WL:** **Ft S of NL:**
Ground elevation: 910.0 **Depth to bedrock:** 190.0 **Bedrock elevation:** 720.0 **Aquifer elevation:**
UTM Easting: **UTM Northing:**

Well Log

Top	Bottom	Formation

Comments

Record of Water Well

Indiana Department of Natural Resources

Reference Number	**Driving directions to well**	**Date completed**
334083	ON CR600S .75 MI E OF COUNTY LINE ON S SD OF RD	Oct 14, 1999

Owner-Contractor	**Name**	**Address**	**Telephone**
Driller	C&L WELL DRILLING	11431 CR10 MIDDLEBURY, IN	(219) 825-9262
Operator	ROBERT PLETCHER	License: 1430	
Company	JDL CONST.	0770 W 200 N LAGRANGE, IN	(219) 463-6720

Construction Details

Well	**Use:** Home	**Drilling method:** Rotary	**Pump type:** Submersible
	Depth: 66.0	**Pump setting depth:**	**Water quality:** CLEAR
Casing	**Length:** 59.0	**Material:** PVC	**Diameter:** 4.0
Screen	**Length:** 7.0	**Material:** PVC	**Diameter:** 4.0 **Slot size:** 0.012

Well Capacity Test

Type of test: Air **Test rate:** 80.0 gpm for 1.0 hrs. **BailTest rate:** gpm for hrs.
Drawdown: ft. **Static water level:** 30.0 ft. **Bailer Drawdown** ft.

Grouting Information

Material: BNSL **Depth:** from 0.0 to 45.0
Installation Method: PRESS **Number of bags used:** 3.0

Well Abandonment

Sealing material: **Depth:** from to
Installation Method: **Number of bags used:**

Administrative

County: LAGRANGE **Township:** 36N **Range:** 8E
Section: NE of Section 30 **Topo map:** MILLERSBURG
Grant Number:
Field located by: **on:**
Courthouse location by: **on:**
Location accepted w/o verification by: **on:**
Subdivision name: **Lot number:**
Ft W of EL: **Ft N of SL:** **Ft E of WL:** **Ft S of NL:**
Ground elevation: **Depth to bedrock:** **Bedrock elevation:** **Aquifer elevation:**
UTM Easting: **UTM Northing:**

Well Log

Top	Bottom	Formation
0.0	48.0	CLAY
48.0	66.0	VEIN CRS GRAV

Comments

Record of Water Well

Indiana Department of Natural Resources

Reference Number	**Driving directions to well**	**Date completed**
334084	.3 MI N OF CR600S ON THE E SD OF CR1125W	Dec 30, 1999

Owner-Contractor	**Name**	**Address**	**Telephone**
Owner	RICHARD SHELEY	1125 W 5645 S MILLERSBURG, IN	
Driller	GRABER'S WELL DRLNG INC.	7875 W 075 N SHIPSHEWANA, IN	(219) 768-4668
Operator	DARRYL GRABER	License: 247	

Construction Details

Well	**Use:** Home	**Drilling method:** Rotary	**Pump type:** Submersible
	Depth: 90.0	**Pump setting depth:**	**Water quality:** 1.5 PPM IRON
Casing	**Length:** 80.0	**Material:** PVC	**Diameter:** 4.0
Screen	**Length:** 10.0	**Material:** PVC	**Diameter:** 4.0 **Slot size:** .012

Well Capacity Test

Type of test: Air **Test rate:** 100.0 gpm for 1.0 hrs. **BailTest rate:** gpm for hrs.
Drawdown: ft. **Static water level:** 40.0 ft. **Bailer Drawdown** ft.

Grouting Information

Material: BENT **Depth:** from 0.0 to 70.0
Installation Method: PRESS **Number of bags used:** 5.0

Well Abandonment

Sealing material: **Depth:** from to
Installation Method: **Number of bags used:**

Administrative

County: LAGRANGE **Township:** 36N **Range:** 8E
Section: SE of Section 19 **Topo map:** MILLERSBURG
Grant Number:
Field located by: **on:**
Courthouse location by: **on:**
Location accepted w/o verification by: **on:**
Subdivision name: **Lot number:**
Ft W of EL: **Ft N of SL:** **Ft E of WL:** **Ft S of NL:**
Ground elevation: **Depth to bedrock:** **Bedrock elevation:** **Aquifer elevation:**
UTM Easting: **UTM Northing:**

Well Log

Top	Bottom	Formation
0.0	20.0	BRN CLAY
20.0	58.0	GRAY CLAY
58.0	95.0	S&G

Record of Water Well

Indiana Department of Natural Resources

Reference Number	**Driving directions to well**	**Date completed**
146124	.75 MILE EAST OF 109 BYPASS AND S.R. 232, ON 232 TO GILMORE RD. NORTH 2 BLOCKS TO 227.	Sep 21, 1965

Owner-Contractor	**Name**	**Address**	**Telephone**
Owner	DUANE DYSON	225 GILMORE RD	
Driller	JAMES CURTIS	3020 HELMS RD, ANDERSON IN	
Operator	JAMES CURTIS	License: null	

Construction Details

Well	**Use:** Home	**Drilling method:** Cable Tool	**Pump type:**
	Depth: 43.0	**Pump setting depth:**	**Water quality:**
Casing	**Length:** 43.0	**Material:**	**Diameter:** 4.5
Screen	**Length:**	**Material:**	**Diameter: Slot size:**

Well Capacity Test

Type of test: Pumping **Test rate:** 10.0 gpm for 1.0 hrs. **BailTest rate:** gpm for hrs.
Drawdown: 2.0 ft. **Static water level:** 29.0 ft. **Bailer Drawdown** ft.

Grouting Information

Material: **Depth:** from to
Installation Method: **Number of bags used:**

Well Abandonment

Sealing material: **Depth:** from to
Installation Method: **Number of bags used:**

Administrative

County: MADISON **Township:** 19N **Range:** 8E
Section: SE of Section 17 **Topo map:** ANDERSON SOUTH
Grant Number:
Field located by: **on:**
Courthouse location by: **on:**
Location accepted w/o verification by: **on:**
Subdivision name: **Lot number:**
Ft W of EL: **Ft N of SL:** **Ft E of WL:** **Ft S of NL:**
Ground elevation: **Depth to bedrock:** **Bedrock elevation:** **Aquifer elevation:**
UTM Easting: **UTM Northing:**

Well Log

Top	Bottom	Formation
0.0	41.0	RED CLAY AND GRAV
41.0	43.0	GRAV

Comments

Record of Water Well

Indiana Department of Natural Resources

Reference Number	**Driving directions to well**	**Date completed**
146134	SEE ATTACHED MAP	Aug 26, 1968

Owner-Contractor	**Name**	**Address**	**Telephone**
Owner	THOMAS SANFORD	RR 1 BOX 34, ANDERSON IN	
Driller	ELWOOD NORRIS WELL DRLG	7044 S MAIN ST, ANDERSON IN	
Operator	ELWOOD NORRIS	License: null	

Construction Details

Well	**Use:** Home	**Drilling method:** Rotary	**Pump type:**
	Depth: 295.0	**Pump setting depth:**	**Water quality:**
Casing	**Length:**	**Material:**	**Diameter:**
Screen	**Length:**	**Material:**	**Diameter: Slot size:**

Well Capacity Test

Type of test: Pumping **Test rate:** 25.0 gpm for 1.0 hrs. **BailTest rate:** gpm for hrs.
Drawdown: 85.0 ft. **Static water level:** 15.0 ft. **Bailer Drawdown** ft.

Grouting Information

Material: **Depth:** from to
Installation Method: **Number of bags used:**

Well Abandonment

Sealing material: **Depth:** from to
Installation Method: **Number of bags used:**

Administrative

County: MADISON **Township:** 19N **Range:** 8E
Section: SE of Section 17 **Topo map:** ANDERSON SOUTH
Grant Number:
Field located by: **on:**
Courthouse location by: **on:**
Location accepted w/o verification by: **on:**
Subdivision name: **Lot number:**
Ft W of EL: **Ft N of SL:** **Ft E of WL:** **Ft S of NL:**
Ground elevation: **Depth to bedrock:** **Bedrock elevation:** **Aquifer elevation:**
UTM Easting: **UTM Northing:**

Well Log

Top	Bottom	Formation
0.0	2.0	TOP SOIL
2.0	41.0	BLUE CLAY
41.0	81.0	BLUE SAND
81.0	110.0	RED CLAY

110.0	122.0	BLUE SAND
122.0	235.0	GRAY CLAY
235.0	252.0	RED CLAY
252.0	282.0	SOFT GRAY LS
282.0	295.0	MD BLUE LIME AND WATER

Comments SEE MAP;

Record of Water Well

Indiana Department of Natural Resources

Reference Number	**Driving directions to well**	**Date completed**
146163	1 1/2 MI E OF ANDERSON CITY LIMITS ON SR 32	Dec 09, 1959

Owner-Contractor	**Name**	**Address**	**Telephone**
Owner	R O HOCKENBERRY	3012 MOUNDS RD, ANDERSON	
Driller	JAMES CURTIS	3020 HELMS RD, ANDERSON IN	
Operator	JAMES CURTIS	License: null	

Construction Details

Well	**Use:** Home	**Drilling method:** Cable Tool	**Pump type:**
	Depth: 71.0	**Pump setting depth:**	**Water quality:**
Casing	**Length:** 68.0	**Material:**	**Diameter:** 4.5
Screen	**Length:** 5.0	**Material:**	**Diameter:** 3.0 **Slot size:** 4

Well Capacity Test

Type of test: Pumping **Test rate:** 10.0 gpm for 1.0 hrs. **BailTest rate:** gpm for hrs.
Drawdown: 7.0 ft. **Static water level:** ft. **Bailer Drawdown** ft.

Grouting Information

Material: **Depth:** from to
Installation Method: **Number of bags used:**

Well Abandonment

Sealing material: **Depth:** from to
Installation Method: **Number of bags used:**

Administrative

County: MADISON **Township:** 19N **Range:** 8E
Section: of Section 17 **Topo map:** ANDERSON SOUTH
Grant Number:
Field located by: **on:**
Courthouse location by: **on:**
Location accepted w/o verification by: **on:**
Subdivision name: **Lot number:**
Ft W of EL: **Ft N of SL:** **Ft E of WL:** **Ft S of NL:**
Ground elevation: **Depth to bedrock:** **Bedrock elevation:** **Aquifer elevation:**
UTM Easting: **UTM Northing:**

Well Log

Top	Bottom	Formation
0.0	53.0	BLUE CLAY
53.0	69.0	SAND
69.0	71.0	GRAV

Comments

Record of Water Well

Indiana Department of Natural Resources

Reference Number	**Driving directions to well**	**Date completed**
310138	MOUNTD RD (MOUNDS RD)?	

Owner-Contractor	**Name**	**Address**	**Telephone**
Owner	CHARLIE STILL		
Driller	SCOTT		

Construction Details

Well	**Use:**	**Drilling method:**	**Pump type:**
	Depth: 131.0	**Pump setting depth:**	**Water quality:**
Casing	**Length:**	**Material:**	**Diameter:**
Screen	**Length:**	**Material:**	**Diameter: Slot size:**

Well Capacity Test

Type of test: **Test rate:** gpm for hrs. **BailTest rate:** gpm for hrs.
Drawdown: ft. **Static water level:** ft. **Bailer Drawdown** ft.

Grouting Information

Material: **Depth:** from to
Installation Method: **Number of bags used:**

Well Abandonment

Sealing material: **Depth:** from to
Installation Method: **Number of bags used:**

Administrative

County: MADISON **Township:** 19N **Range:** 8E
Section: SE of the SW of Section 17 **Topo map:** ANDERSON SOUTH
Grant Number:
Field located by: **on:**
Courthouse location by: **on:**
Location accepted w/o verification by: **on:**
Subdivision name: **Lot number:**
Ft W of EL: **Ft N of SL:** **Ft E of WL:** **Ft S of NL:**
Ground elevation: **Depth to bedrock:** **Bedrock elevation:** **Aquifer elevation:**
UTM Easting: **UTM Northing:**

Well Log

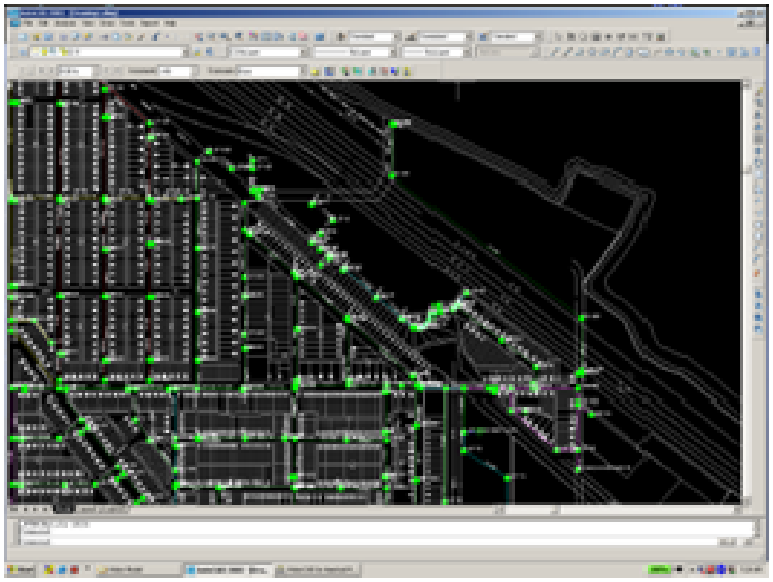
Top	Bottom	Formation
0.0	131.0	BLANK
131.0		GRAVEL

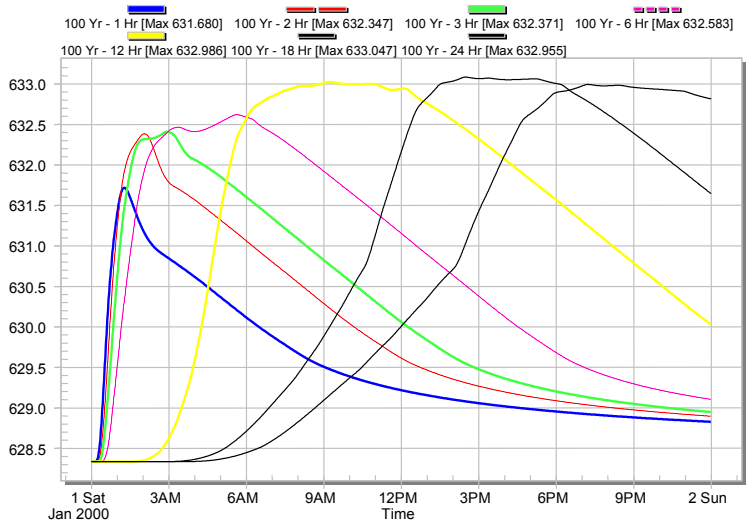
Comments SECOND WELL - SAME PLACE 72' GRAVEL

Appendix C

Hydrology and Hydraulics

Appendix C: Corps of Engineer′ s Unit Hydrograph Development

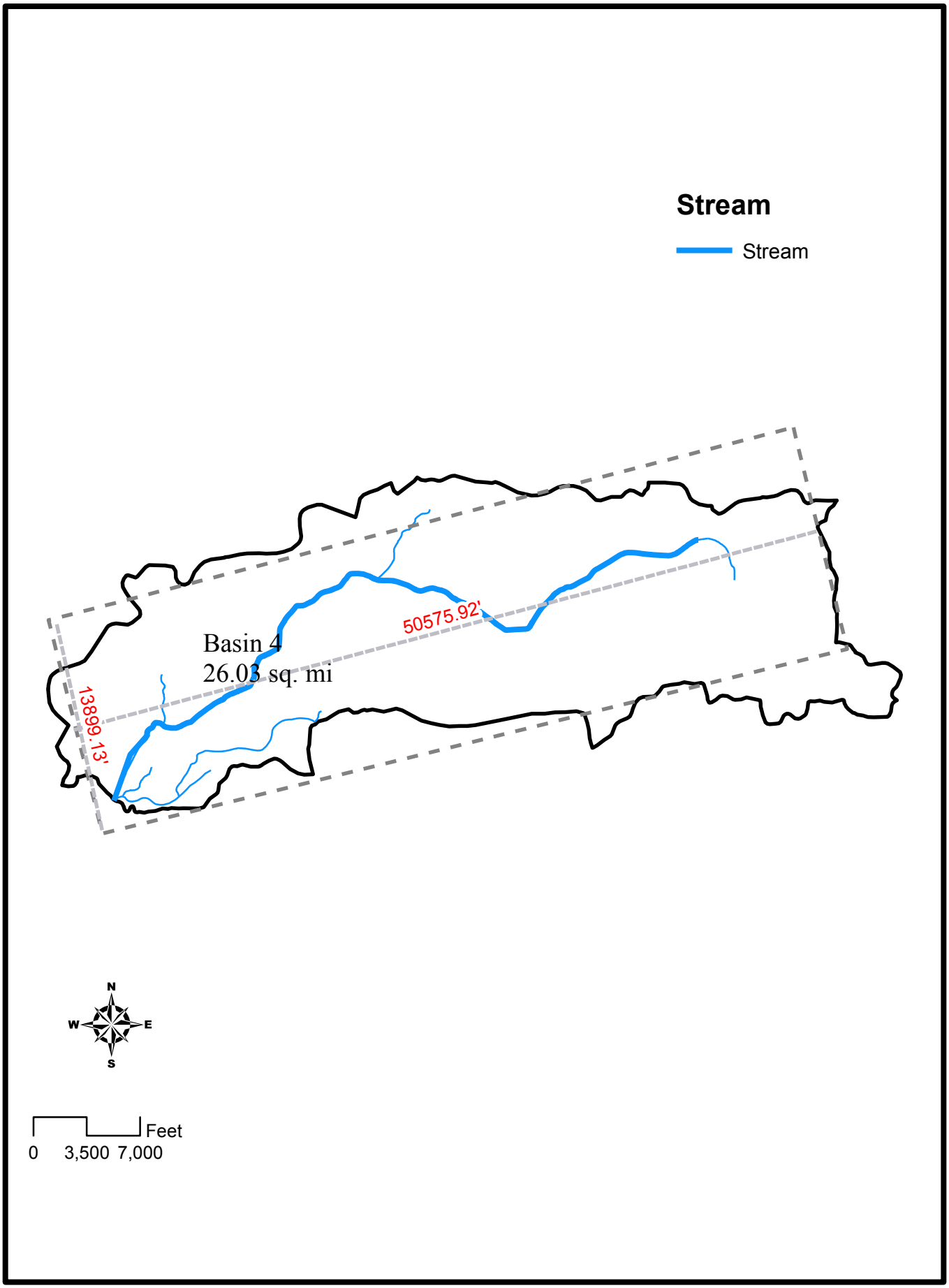




Six Hour UG parameters

Basin	DA	Stream Length	0.7L	w/l	S	pk	Wpk	Tp	CN
Units	sq. mile	mi	mi	-	ft/mi	cfs	hr	hr	-
basin4	26.03	9.48	6.64	0.27	5.19	763.89	18.54	18.89	77.71
basin5	16.96	5.95	4.17	0.78	4.56	416.70	22.21	19.21	72.52
basin6	21.75	9.02	6.32	1.26	10.76	647.45	18.33	14.05	79.17
basin7	18.43	10.04	7.03	0.46	3.30	339.03	29.51	26.74	74.86
basin8	13.44	5.76	4.03	0.63	5.84	378.04	19.50	17.42	79.41
basin9	18.41	9.16	6.41	0.47	10.11	633.21	15.93	14.55	78.57
basin10	24.60	12.46	8.72	0.35	3.60	484.48	27.49	25.89	80.89
basin11	25.90	13.12	9.18	0.50	10.34	808.06	17.46	15.41	83.37
basin12	22.83	11.44	8.00	0.45	9.56	726.54	17.15	15.56	85.01
basin13	29.33	13.00	9.10	0.30	7.67	910.61	17.51	17.09	81.98
basin14	17.73	11.52	8.07	0.24	13.36	727.94	13.39	13.54	82.99
basin15	26.89	12.08	8.45	0.61	8.65	766.62	19.07	16.36	81.78
basin16	31.60	15.17	10.62	0.20	5.52	850.70	20.14	20.83	80.51
basin17	23.89	6.63	4.64	0.28	14.70	1414.83	9.29	9.82	79.90
basin18	21.03	9.18	6.43	0.46	9.45	724.23	15.88	14.64	81.92
basin19	20.50	4.92	3.45	0.78	16.74	1144.04	9.87	8.81	80.26
basin20	29.69	7.27	5.09	0.49	18.44	1749.55	9.31	8.85	80.78
basin21	17.79	10.30	7.21	0.23	14.95	827.20	11.84	12.21	82.10

BASIN 4



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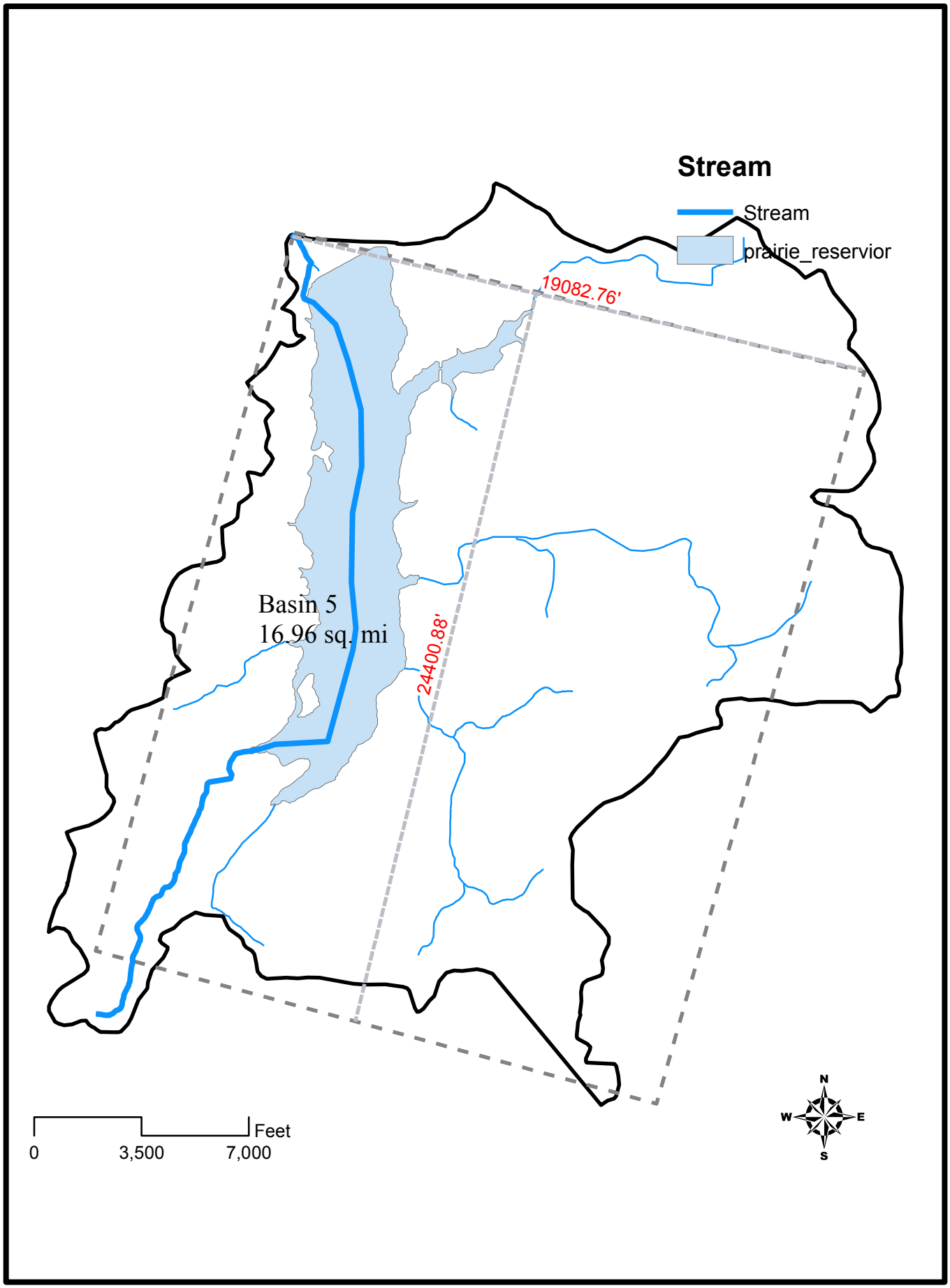
BASIN 5



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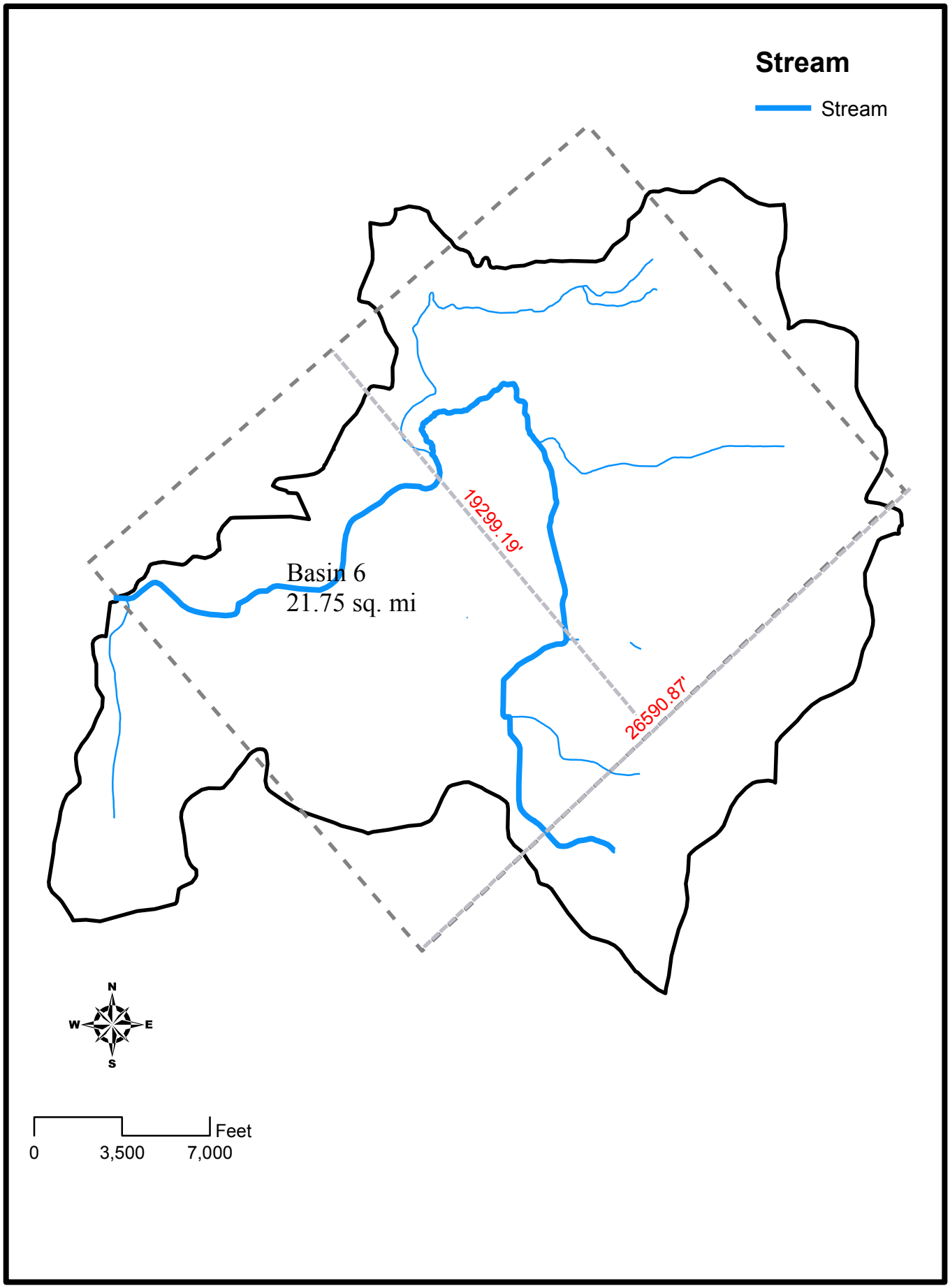

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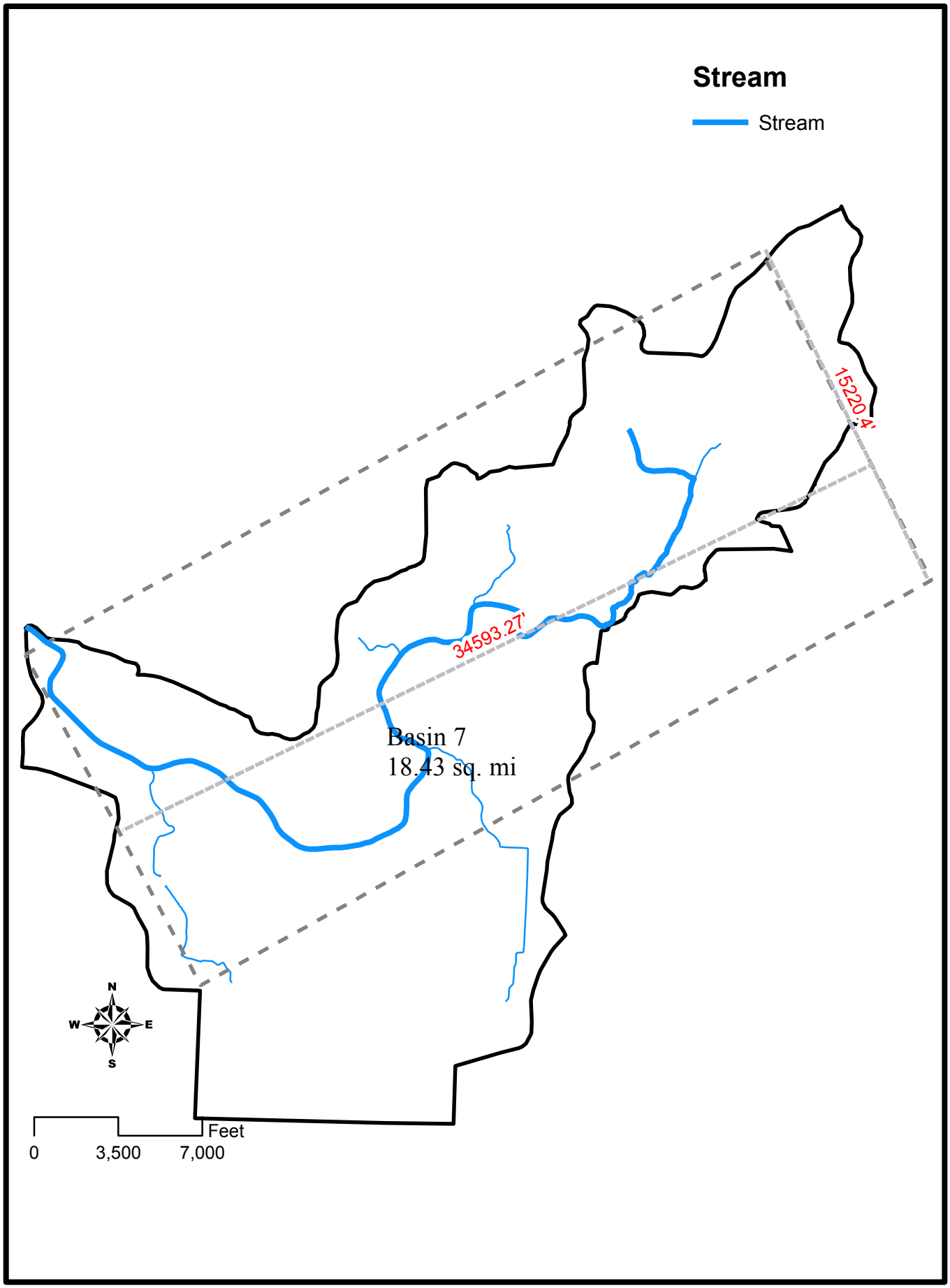
BASIN 7



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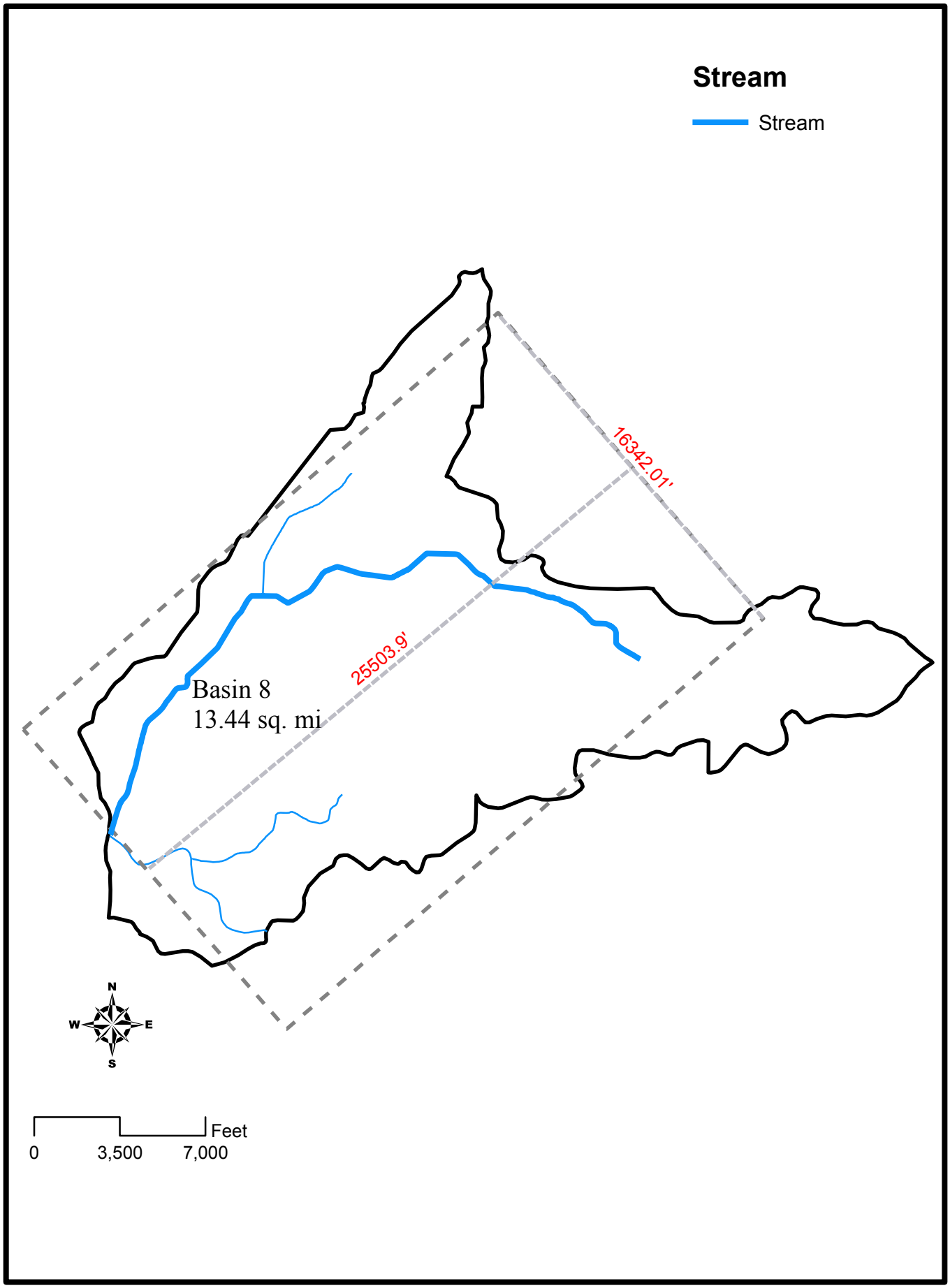
BASIN 8



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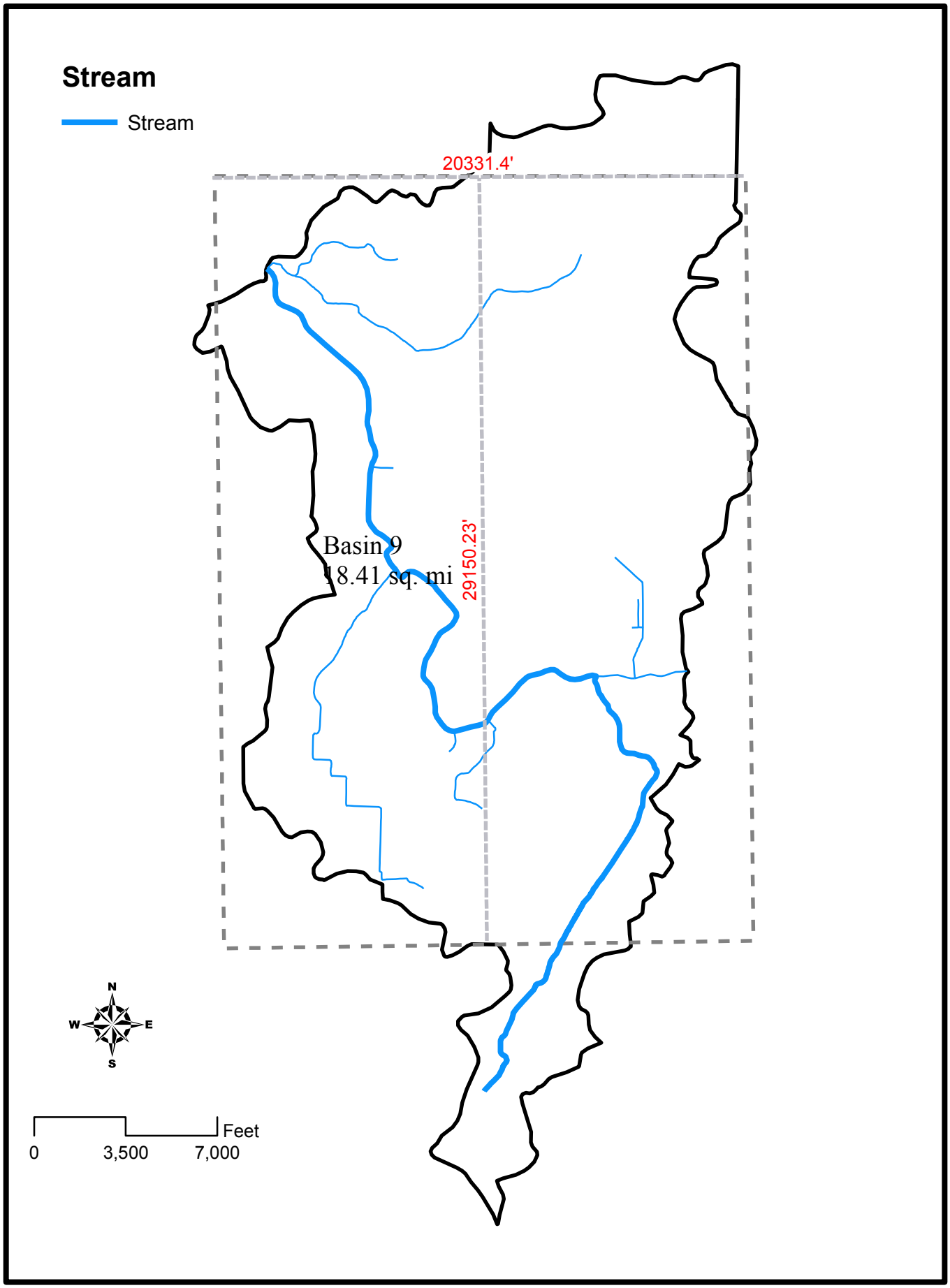
BASIN 9



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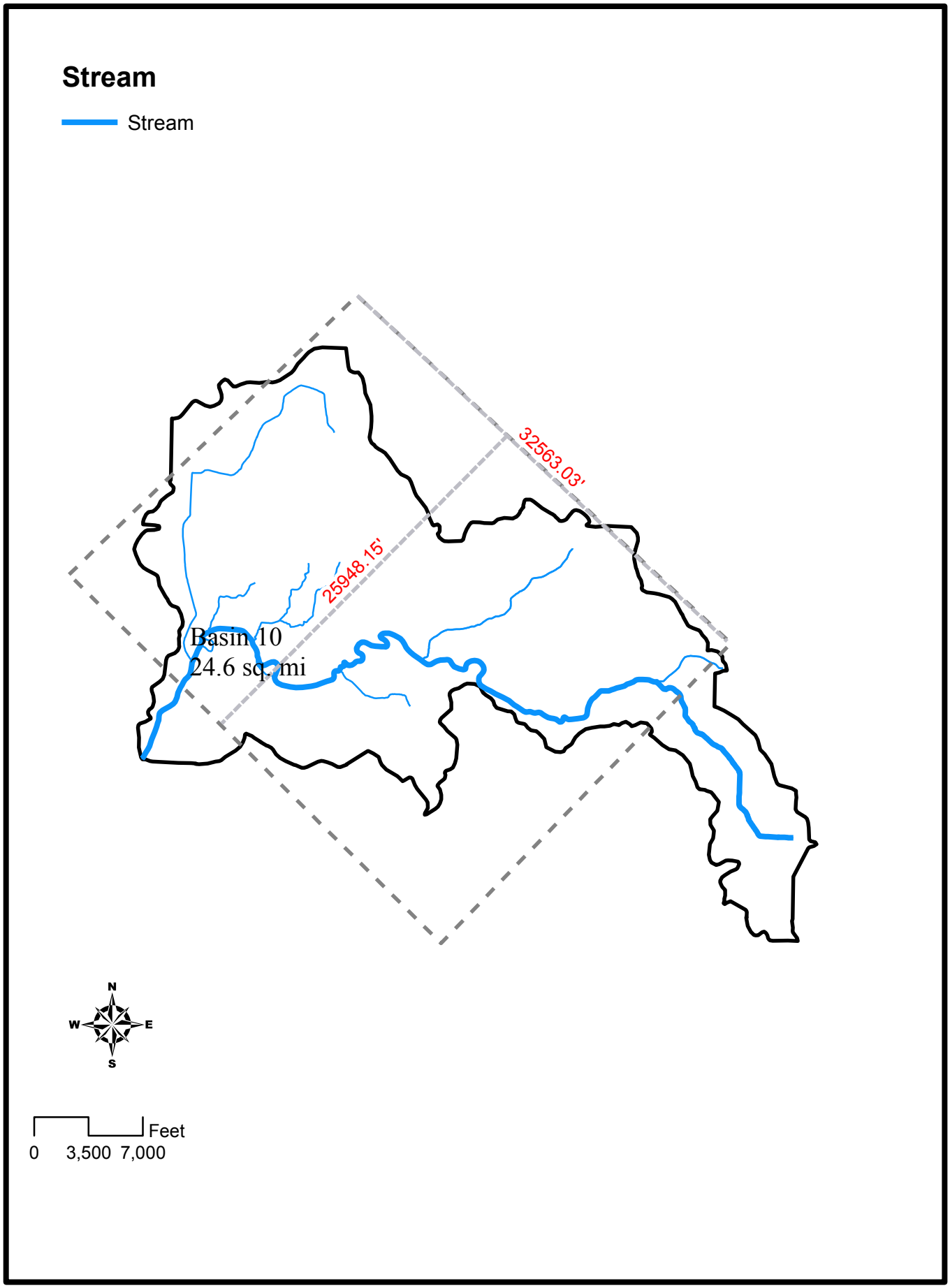
BASIN 10



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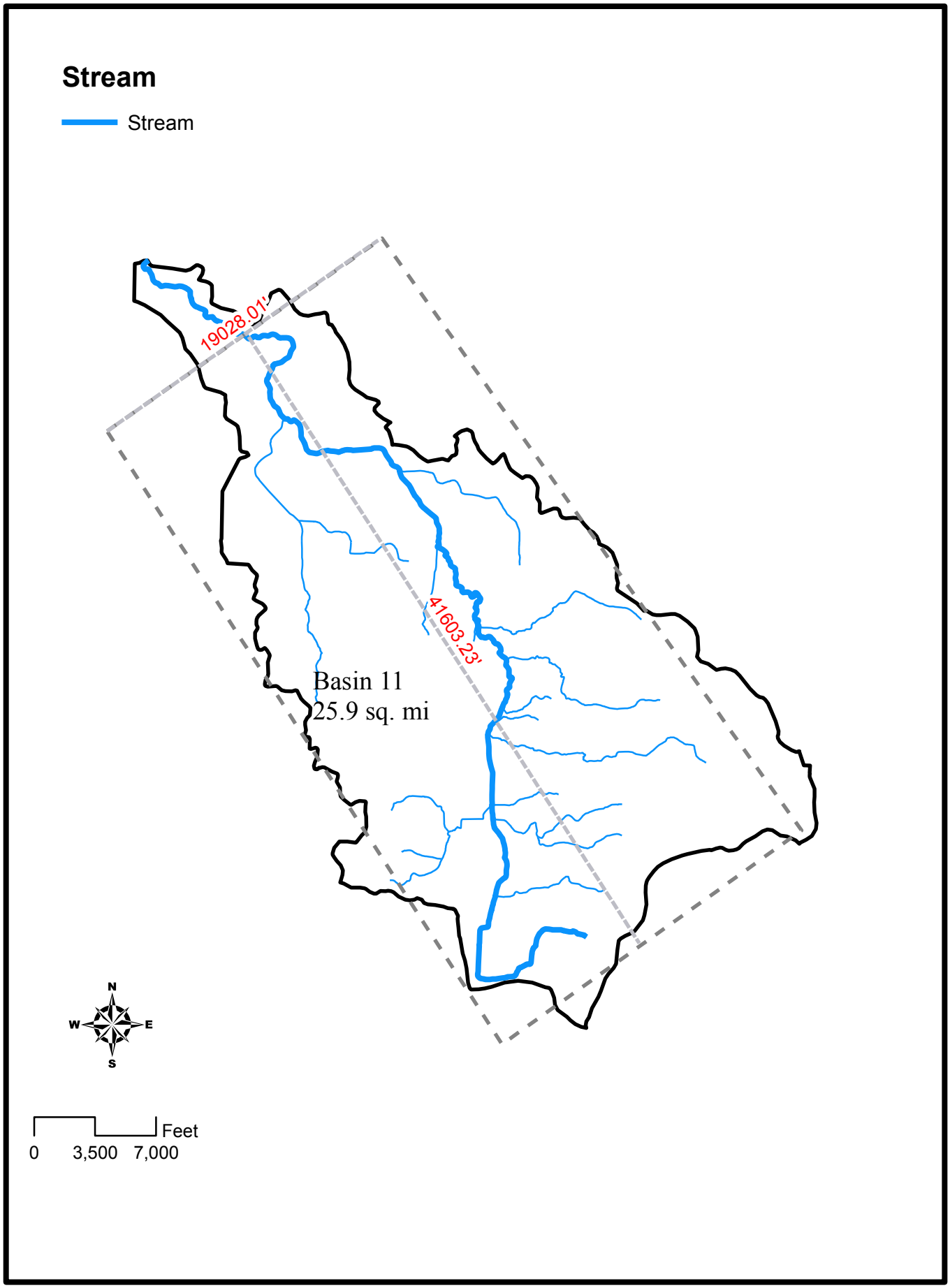
BASIN 11



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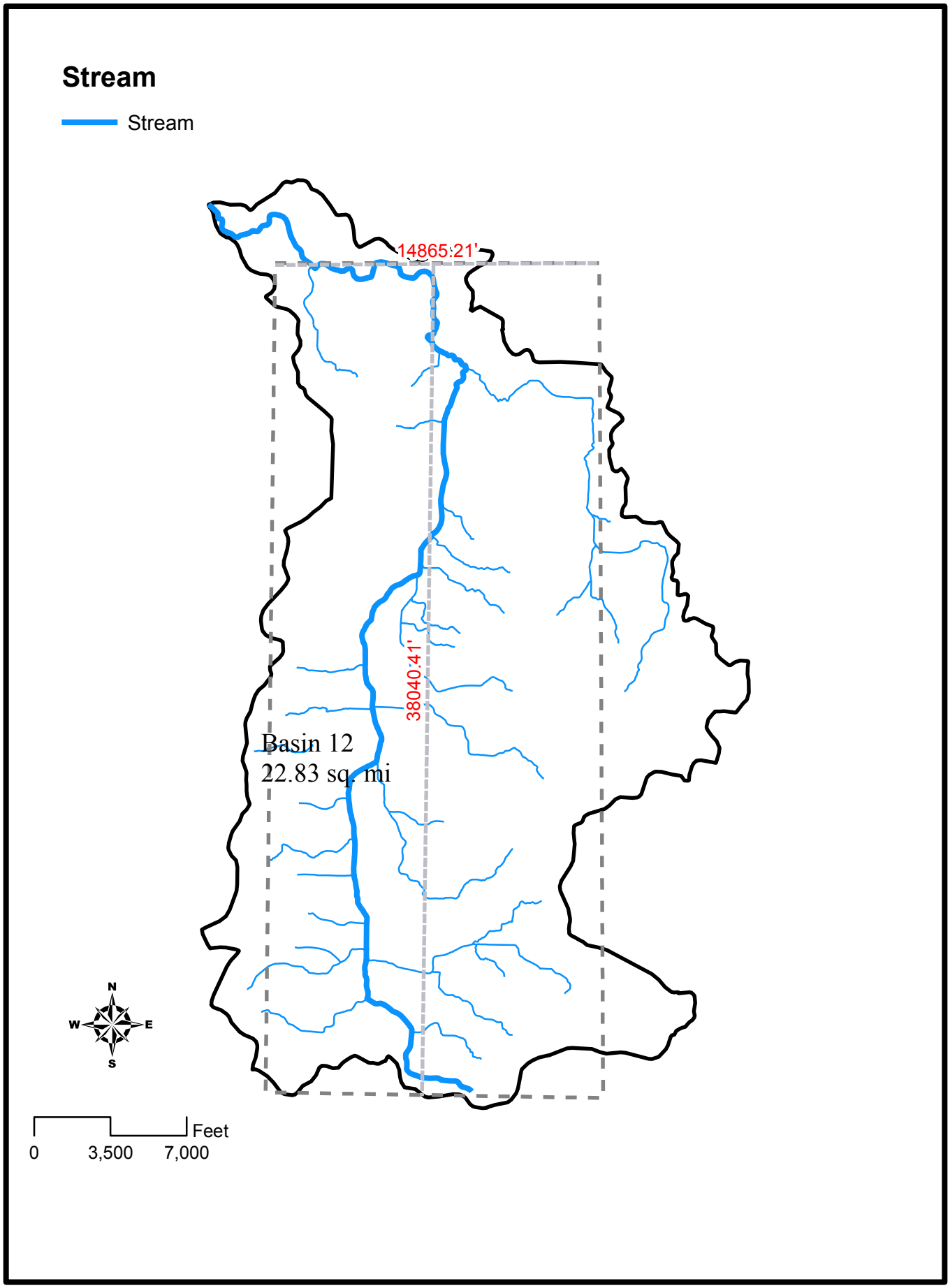
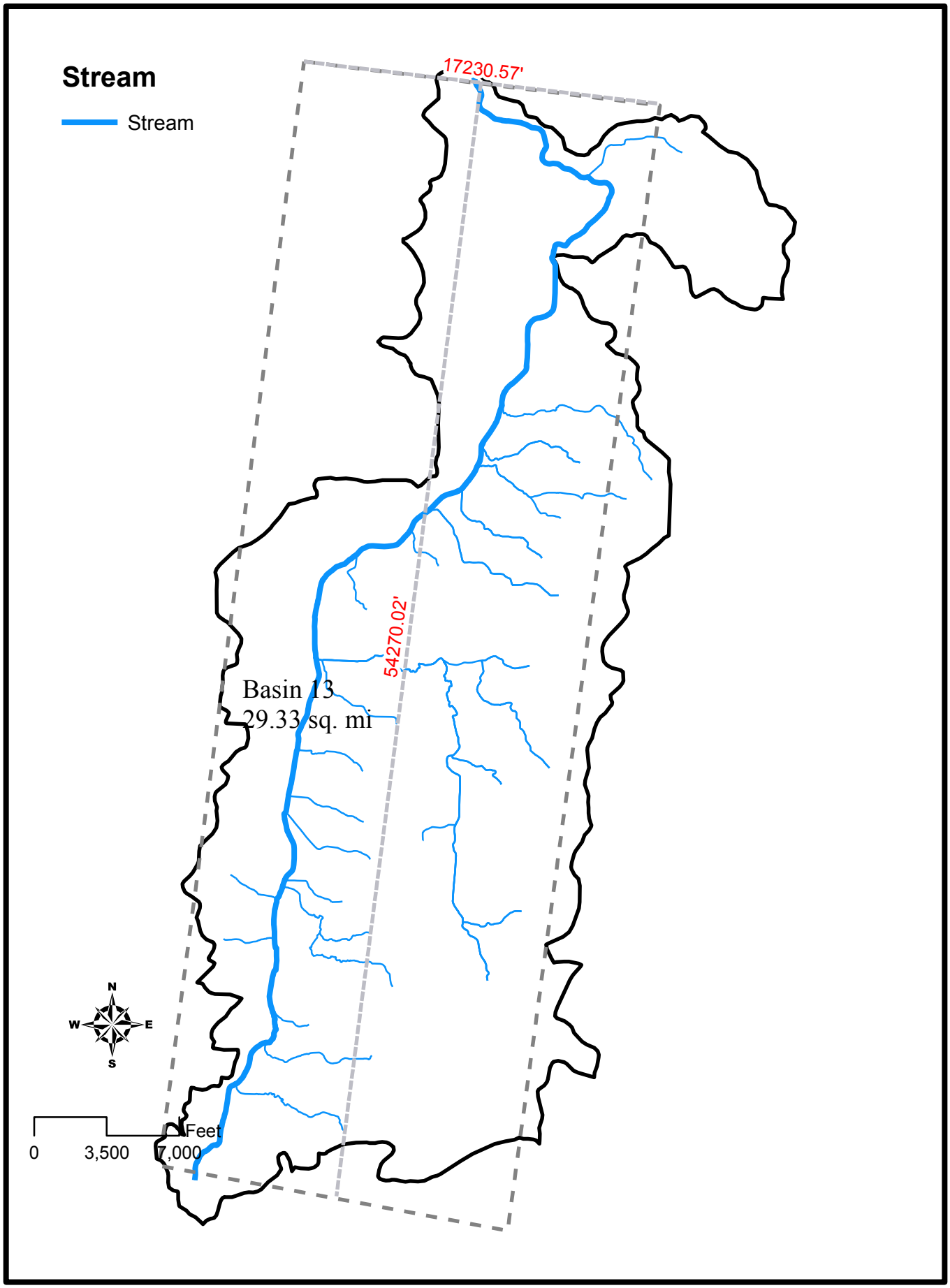
BASIN 12



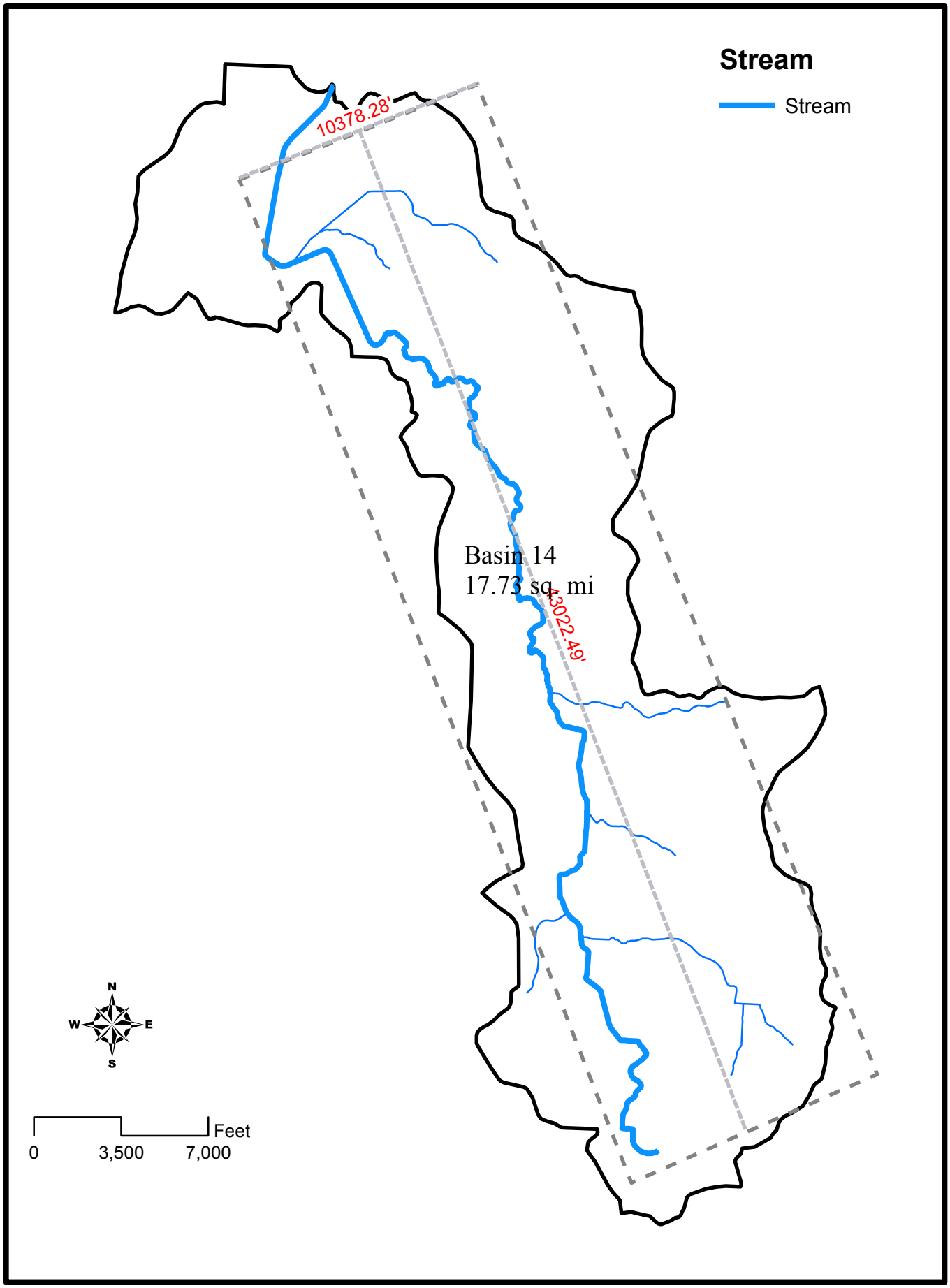
M:\proj\1163\0791.90 Anderson Dam\GIS\ex_six_hour_basins_calcs_basin12.mxd

BASIN 13



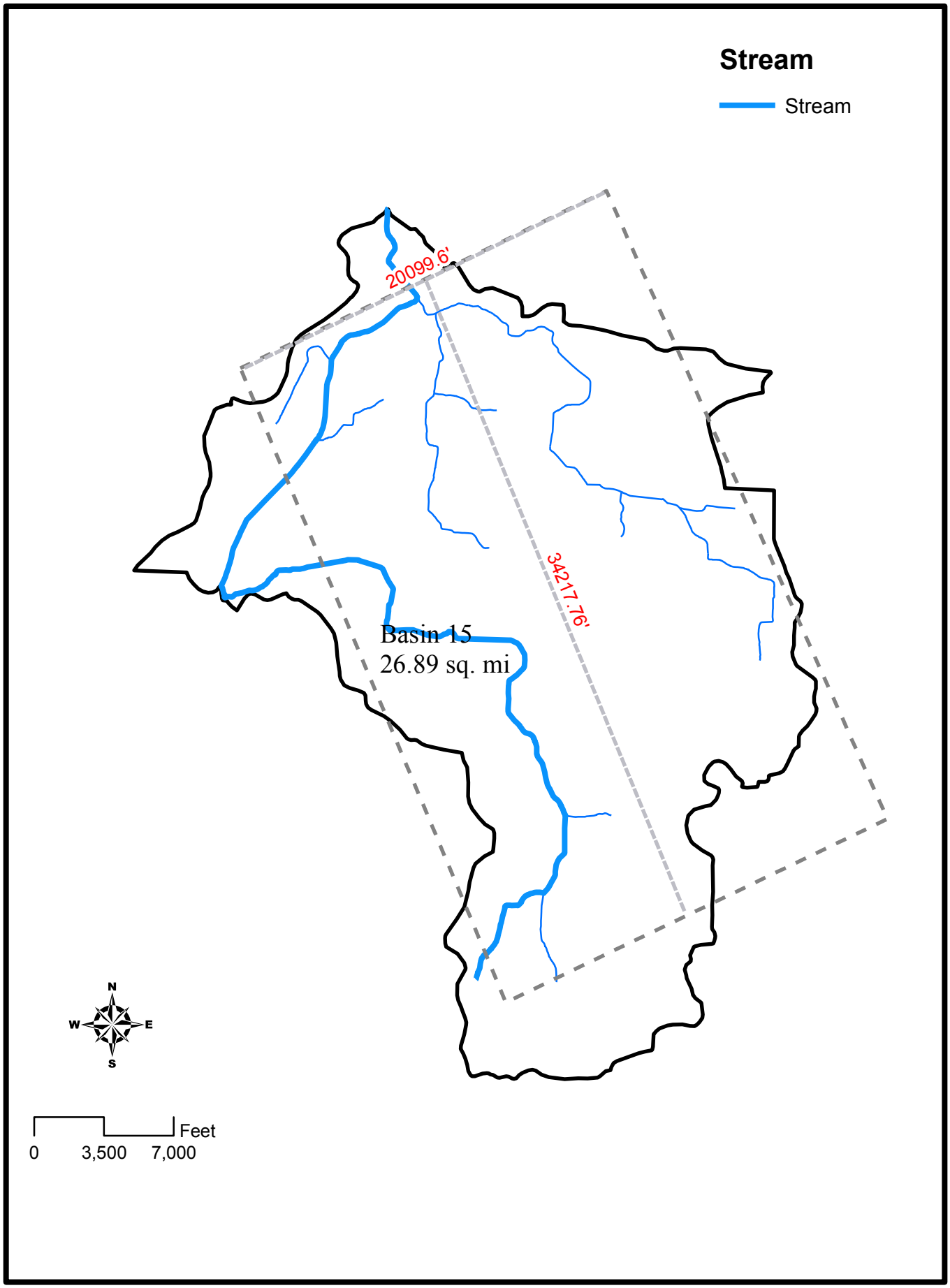
M:\proj\1163\0791.90 Anderson Dam\GIS\ex_six_hour_basins_calcs_basin13.mxd

BASIN 14



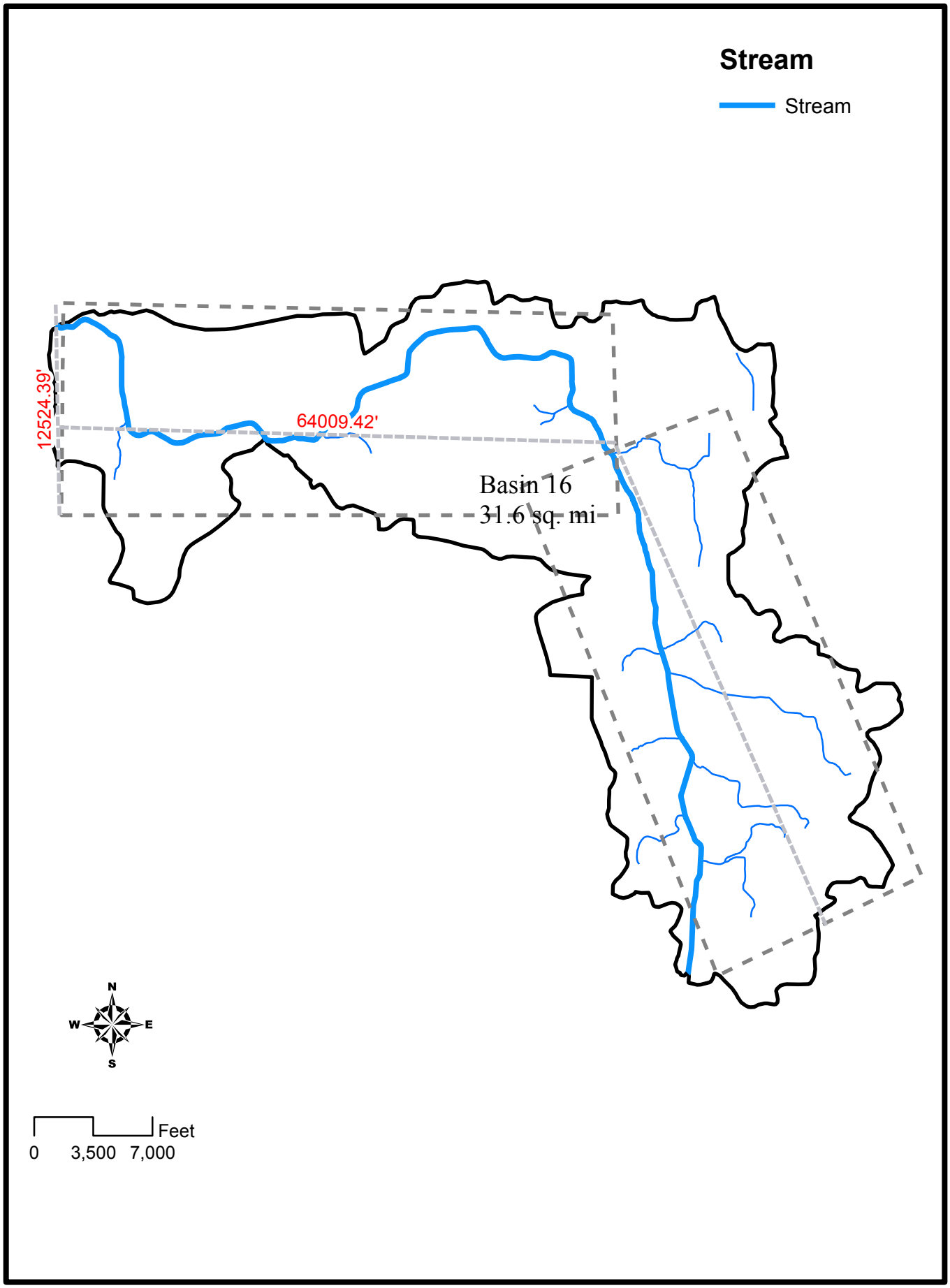
M:\proj\1163\0791.90 Anderson Dam\GIS\ex_six_hour_basins_calcs_basin14.mxd

BASIN 15



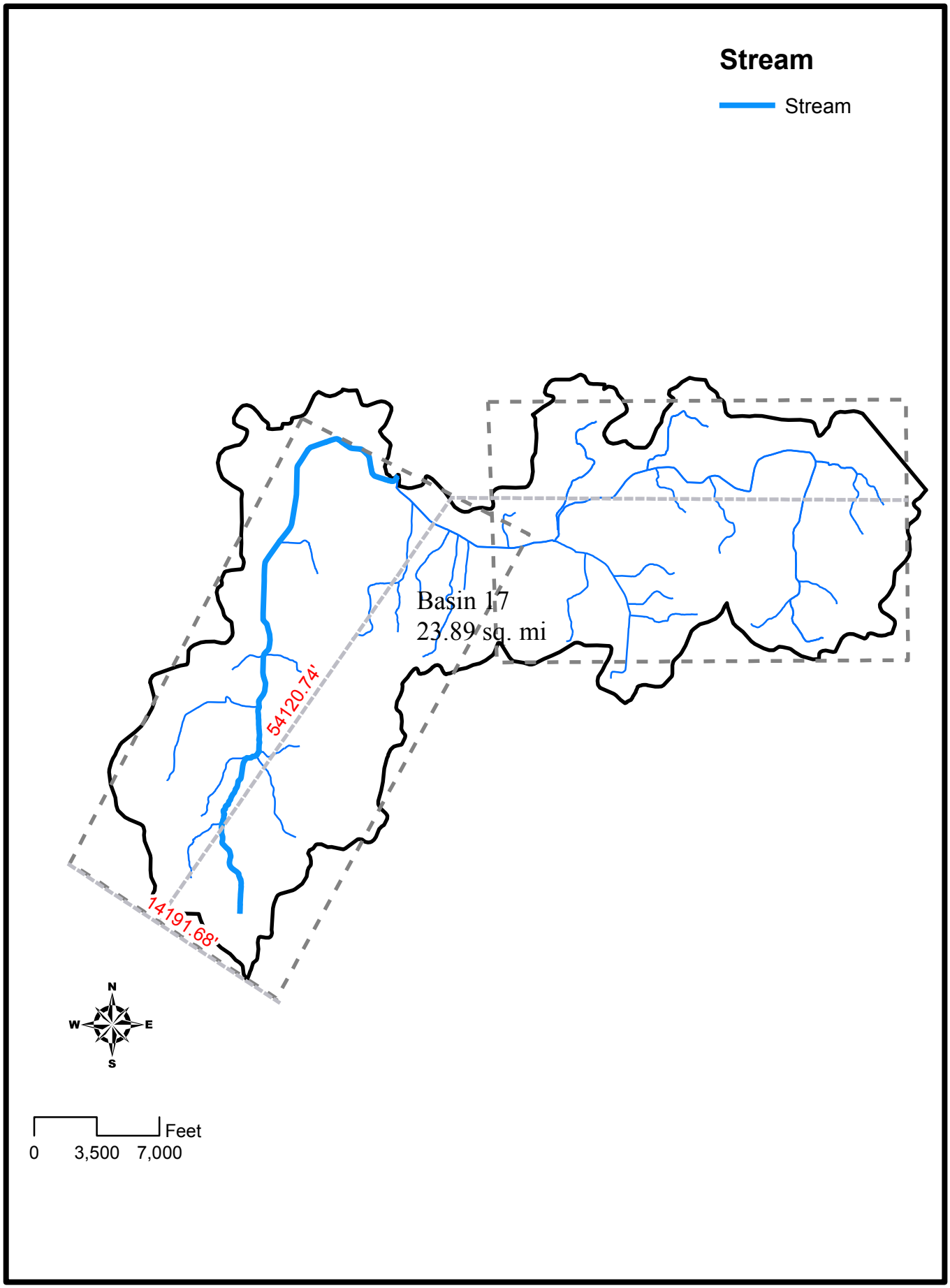
M:\proj\1163\0791.90 Anderson Dam\GIS\ex_six_hour_basins_calcs_basin15.mxd

BASIN 16



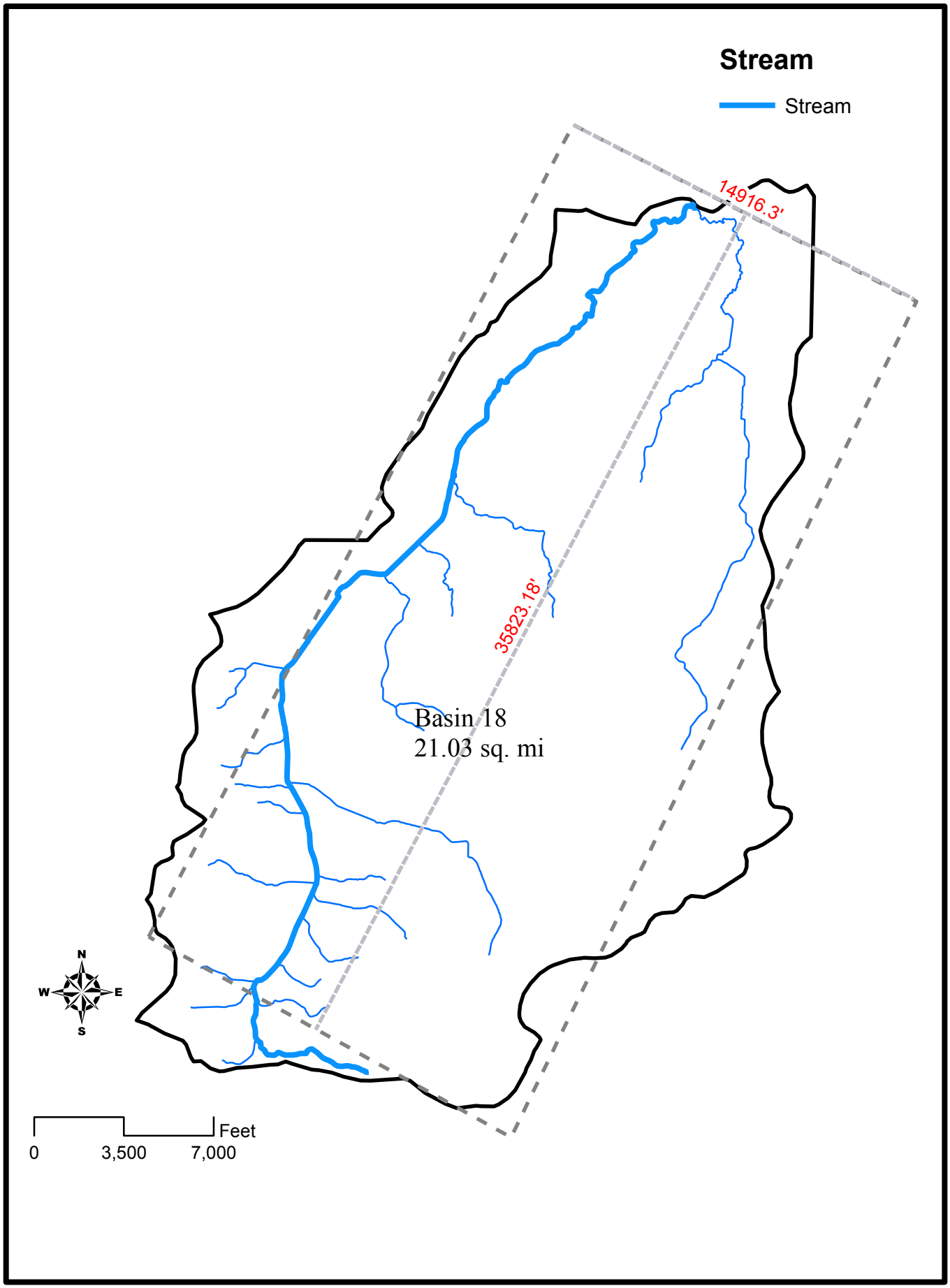
M:\proj\1163\0791.90 Anderson Dam\GIS\ex_six_hour_basins_calcs_basin16.mxd

BASIN 17



M:\proj\1163\0791.90 Anderson Dam\GIS\ex_six_hour_basins_calcs_basin17.mxd

BASIN 18



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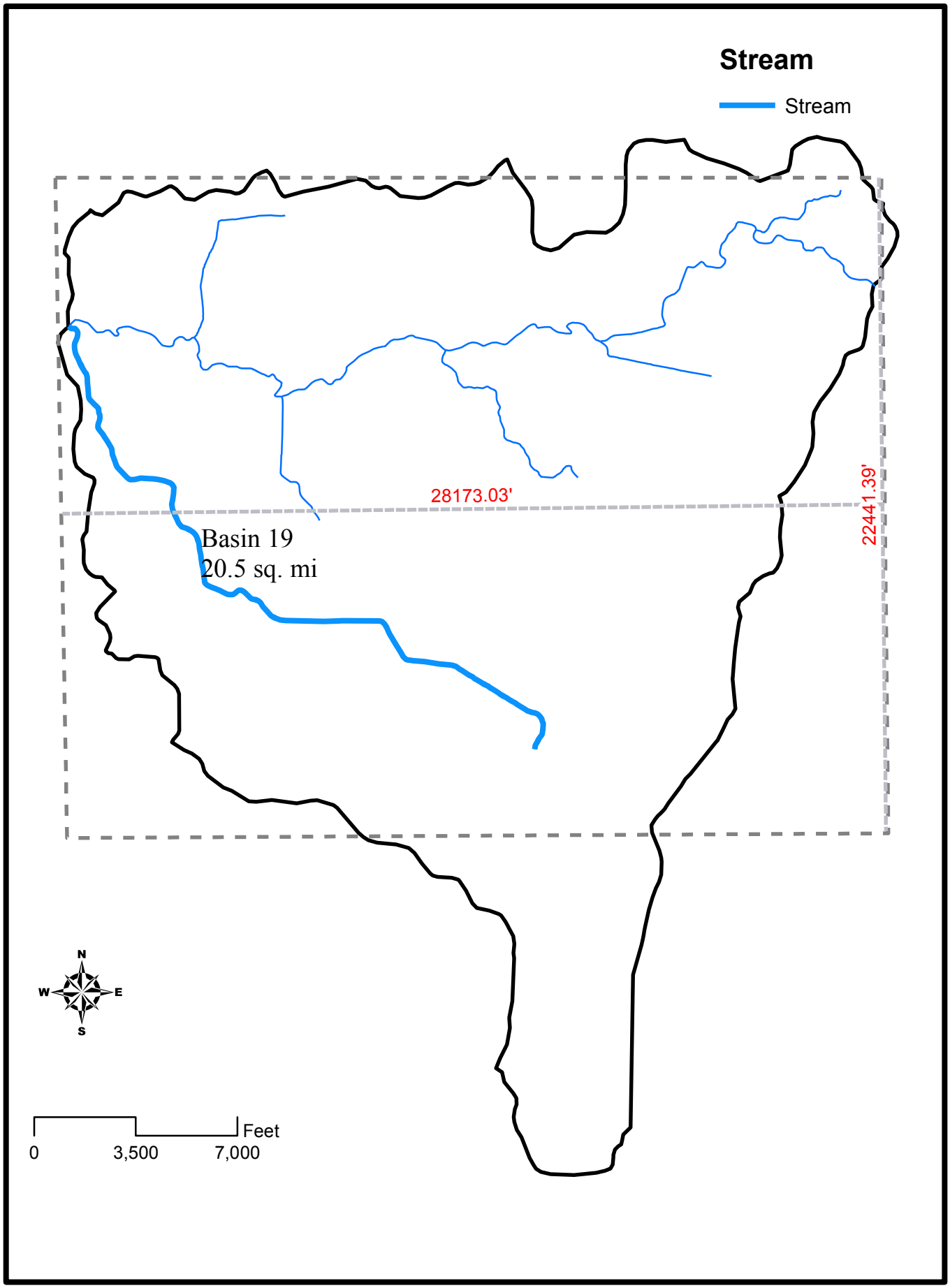
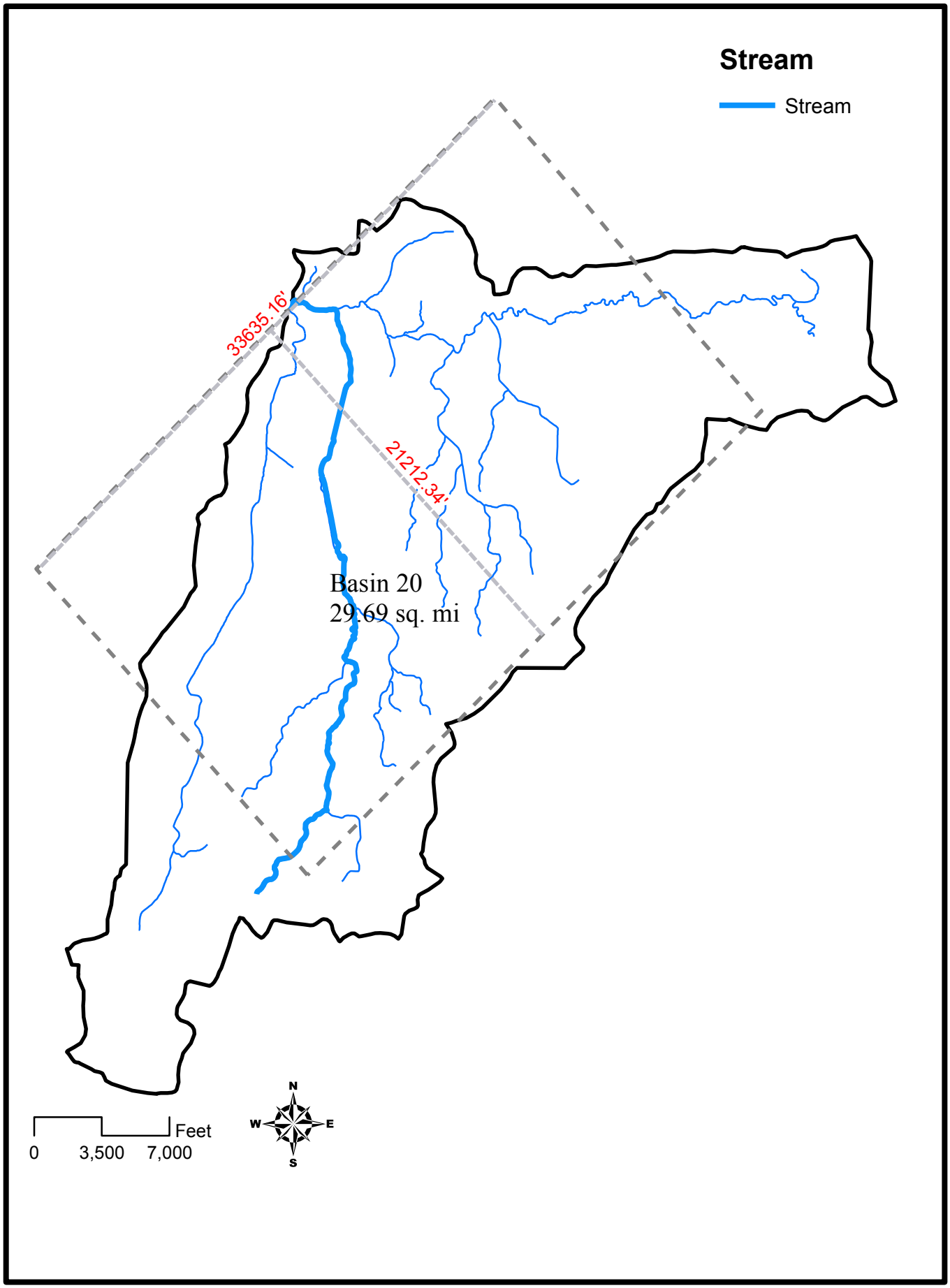
BASIN 19



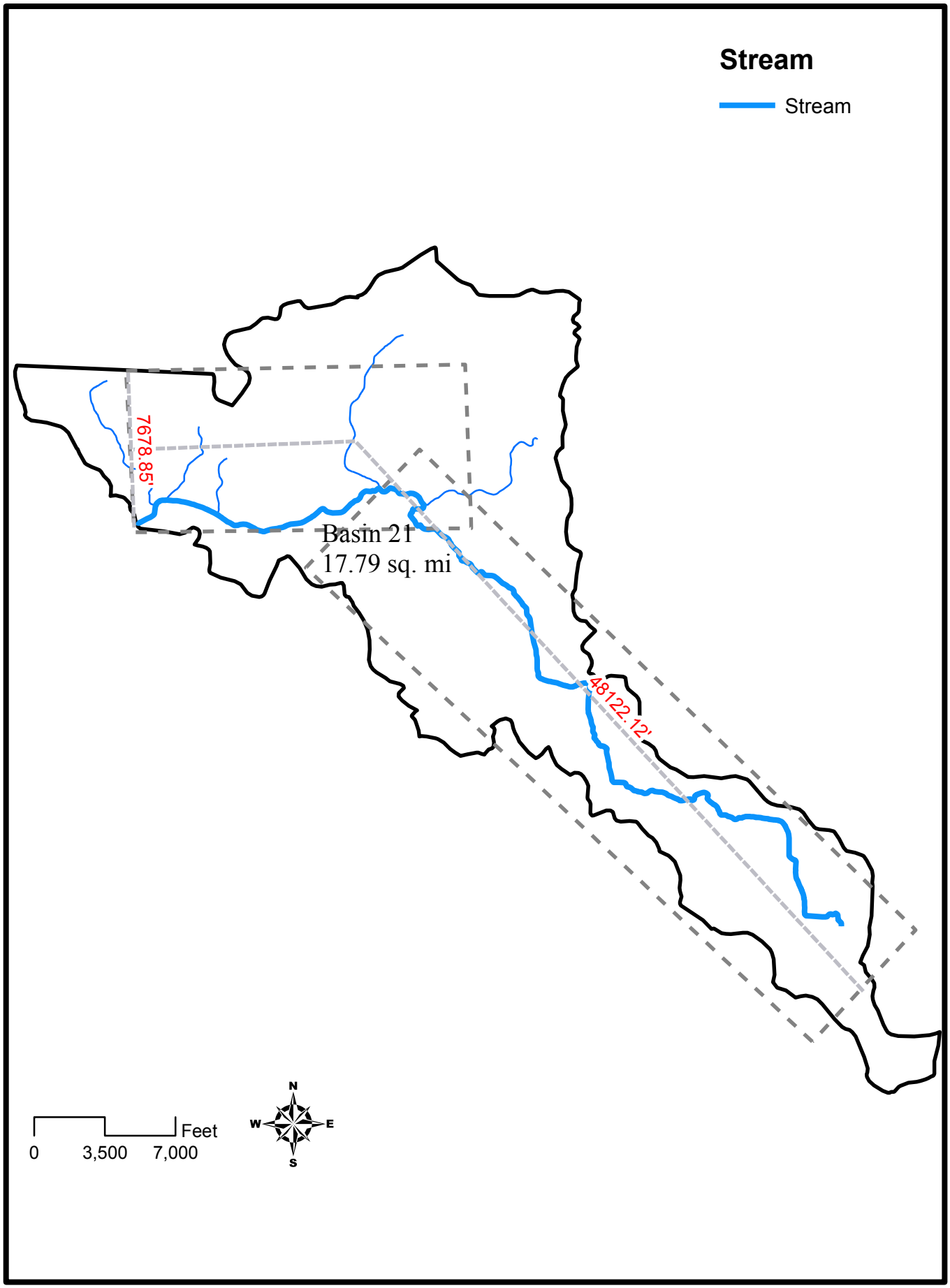
M:\proj\1163\0791.90 Anderson Dam\GIS\ex_six_hour_basins_calcs_basin19.mxd

BASIN 20



M:\proj\1163\0791.90 Anderson Dam\GIS\ex_six_hour_basins_calcs_basin20.mxd

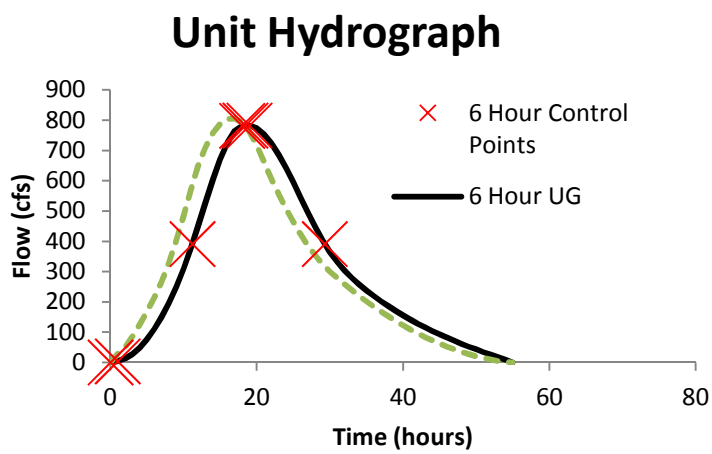
BASIN 21

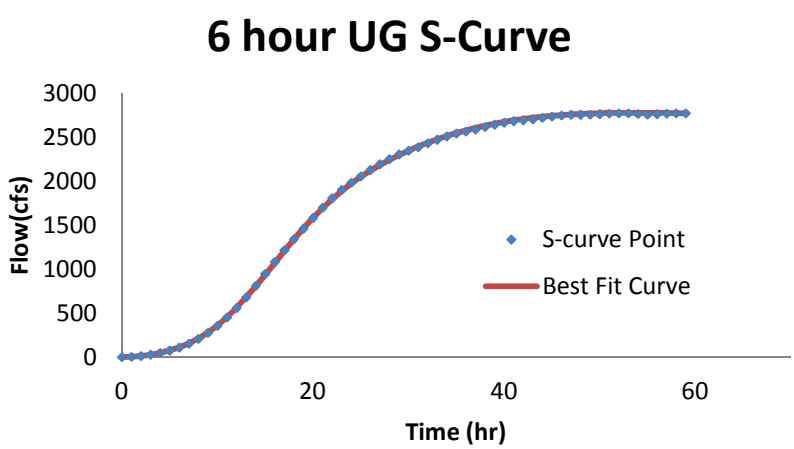


M:\proj\1163\0791.90 Anderson Dam\GIS\ex_six_hour_basins_calcs_basin21.mxd

Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	4.00	28.90
2	12.93	48.66
3	27.86	85.13
4	48.90	126.04
5	76.17	168.32
6	109.79	213.34
7	149.86	266.63
8	196.50	329.55
9	249.82	402.11
10	309.93	484.31
11	376.95	572.02
12	450.56	648.74
13	527.23	710.36
14	601.96	756.86
15	669.79	788.26
16	725.73	804.55
17	764.80	805.72
18	782.00	791.79
19	782.50	762.75
20	774.05	718.59
21	753.90	662.49
22	723.99	607.03
23	686.24	555.38
24	642.59	507.54
25	594.97	463.51
26	545.32	423.29
27	495.57	386.87
28	447.65	354.26
29	403.50	325.46
30	364.88	300.47
31	331.90	278.77
32	303.63	258.35
33	279.17	238.68
34	257.60	219.76
35	238.00	201.61
36	219.60	184.21
37	202.19	167.58
38	185.74	151.70
39	170.18	136.58
40	155.46	122.21
41	141.53	108.61
42	128.34	95.76
43	115.84	83.67
44	103.96	72.34

Basin	4
Da-mi 2	26.03
w	13899.13
l	50575.92
L-mi	9.48
S-ft/mi	5.44
w/l	0.27
pk	782.87
wpk	18.10
tp	18.44

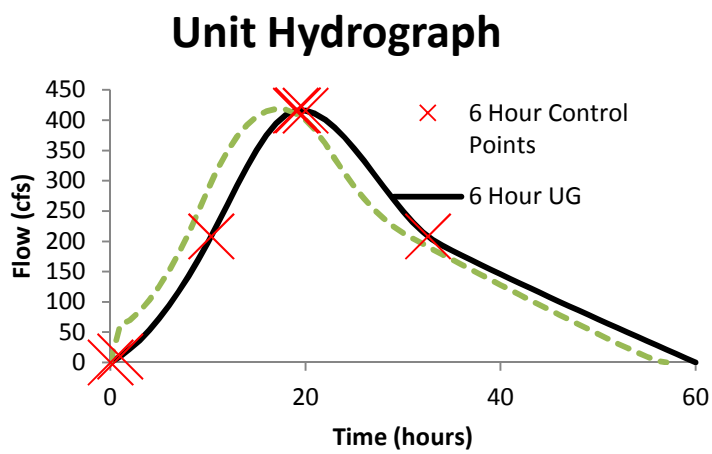


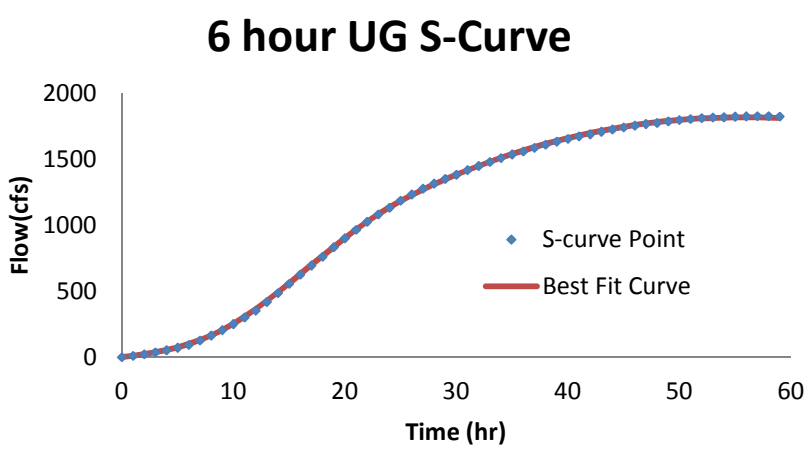


45	92.67	61.77
46	81.90	51.95
47	71.61	42.90
48	61.73	34.60
49	52.23	27.06
50	43.04	20.28
51	34.12	14.25
52	25.40	8.99
53	16.85	4.48
54	8.40	0.73
55	0.00	0.00

Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	10.00	62.37
2	22.05	69.95
3	36.51	84.42
4	53.29	103.02
5	72.30	125.06
6	93.49	150.54
7	116.75	179.47
8	142.02	211.83
9	169.21	247.64
10	198.25	285.47
11	229.00	319.66
12	260.73	348.80
13	292.32	372.87
14	322.65	391.89
15	350.59	405.85
16	375.02	414.76
17	394.82	418.60
18	408.85	417.39
19	416.00	411.13
20	416.00	399.80
21	410.72	383.42
22	401.10	361.98
23	387.83	336.70
24	371.58	312.43
25	353.02	290.38
26	332.84	270.56
27	311.72	252.97
28	290.33	237.60
29	269.35	224.46
30	249.46	213.54
31	231.3336	204.4788
32	215.6547	195.8255
33	203.0682	187.2122
34	193.2968	178.639
35	185	170.1058
36	177.011	161.6126
37	169.0941	153.1594
38	161.2464	144.7463
39	153.4647	136.3732
40	145.7462	128.0402
41	138.0878	119.7472
42	130.4864	111.4942
43	122.9392	103.2813
44	115.443	95.10834

Basin	5
Da-mi 2	16.96
w	42.00
l	54.00
L-mi	5.95
S-ft/mi	4.56
w/l	0.78
pk	416.55
wpk	22.22
tp	19.22

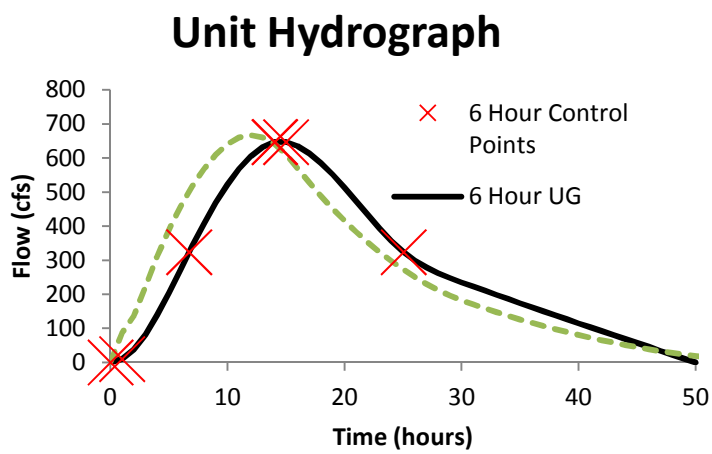


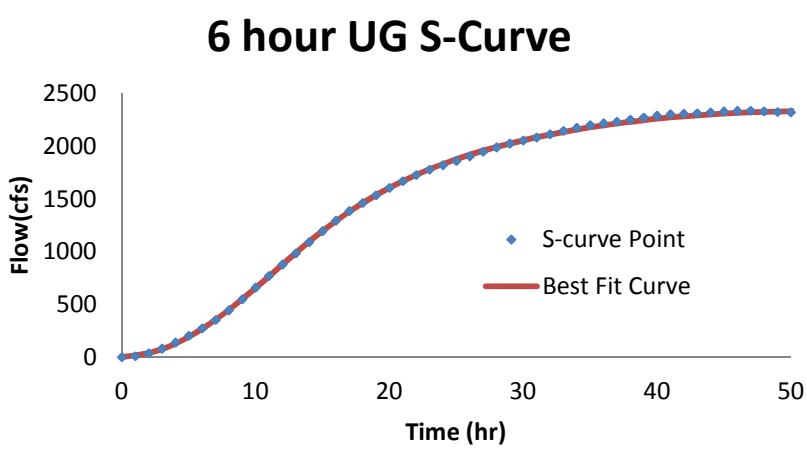


45	107.9949	86.97546
46	100.5919	78.88262
47	93.231	70.82981
48	85.90913	62.81703
49	78.62332	54.84429
50	71.37057	46.91158
51	64.14787	39.04511
52	56.95222	31.34975
53	49.7806	23.85171
54	42.63002	16.55099
55	35.49747	9.447576
56	28.38	2.54
57	21.27	0.00
58	14.18	
59	7.09	
60	0.00	

Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	10.00	87.31
2	37.18	135.76
3	81.48	223.02
4	138.53	310.63
5	203.98	388.96
6	273.45	458.01
7	342.59	517.78
8	408.07	568.27
9	468.39	609.49
10	522.25	640.87
11	568.34	660.17
12	605.37	666.84
13	632.02	660.86
14	647.00	642.25
15	647.00	611.00
16	634.81	569.59
17	613.65	527.90
18	585.21	488.40
19	551.19	451.10
20	513.30	416.00
21	473.23	383.09
22	432.68	352.37
23	393.36	323.83
24	356.95	297.39
25	325.17	273.01
26	299.29	250.71
27	278.60	230.48
28	261.84	212.32
29	247.73	196.24
30	235.00	182.22
31	222.5895	169.9997
32	210.2805	158.4549
33	198.0679	147.3083
34	185.9462	136.5597
35	173.91	126.2092
36	161.9541	116.2569
37	150.0731	106.7026
38	138.2615	97.5464
39	126.5142	88.78831
40	114.8257	80.42831
41	103.1907	72.46641
42	91.60385	64.9026
43	80.05977	57.73689
44	68.55313	50.96927

Basin	6
Da-mi 2	21.75
w	48.00
l	38.00
L-mi	9.02
S-ft/mi	10.76
w/l	1.26
pk	647.45
wpk	18.33
tp	14.05

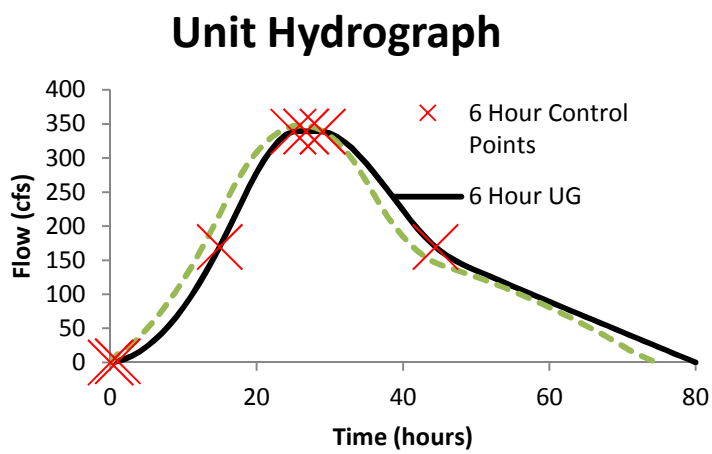


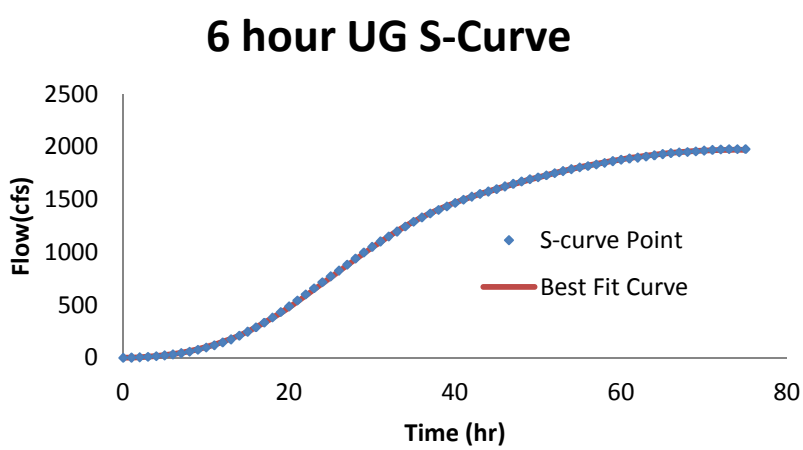


45	57.07858	44.59975
46	45.63077	38.62832
47	34.20436	33.05499
48	22.79399	27.87976
49	11.39432	23.10262
50	0	18.72357
51		14.74262
52		11.15976
53		7.975002
54		5.188336
55		2.799766
56		0.81
57		0.00

Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	2.00	12.00
2	5.21	18.51
3	9.85	27.38
4	15.92	37.60
5	23.38	49.10
6	32.22	61.64
7	42.43	75.16
8	53.99	89.66
9	66.87	105.13
10	81.07	121.59
11	96.56	139.03
12	113.32	157.44
13	131.34	176.84
14	150.60	197.21
15	171.08	218.57
16	192.65	240.39
17	214.77	260.62
18	236.84	278.76
19	258.25	294.79
20	278.40	308.73
21	296.68	320.57
22	312.48	330.31
23	325.2112	337.95
24	334.2517	343.4911
25	339	346.9332
26	339.5896	348.2761
27	339.0919	347.52
28	339.4188	344.6647
29	339	339.7103
30	336.2632	332.6569
31	331.1198	323.5043
32	323.8521	312.2526
33	314.7426	298.9018
34	304.0736	283.4519
35	292.1275	265.9029
36	279.1866	246.8769
37	265.5332	228.8624
38	251.4498	212.4814
39	237.2186	197.734
40	223.1221	184.6201
41	209.4427	173.1399
42	196.4625	163.2931
43	184.4641	155.08
44	173.7298	148.5003

Basin	7
Da-mi 2	18.43
w	17670.00
l	29077.00
L-mi	2.59
S-ft/mi	19.97
w/l	0.61
pk	1604.12
wpk	6.38
tp	6.36

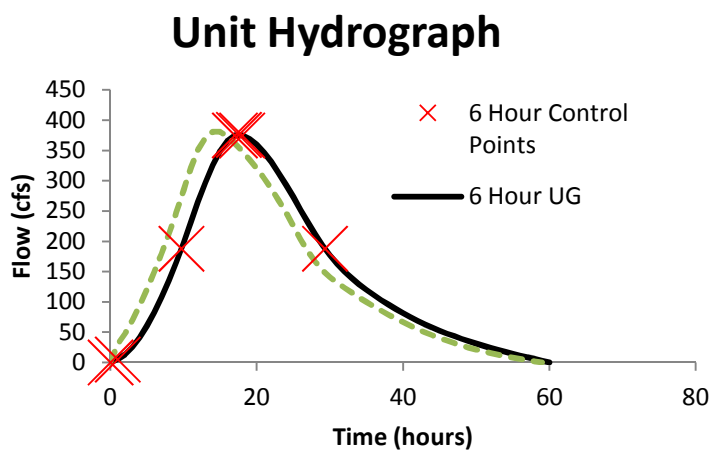


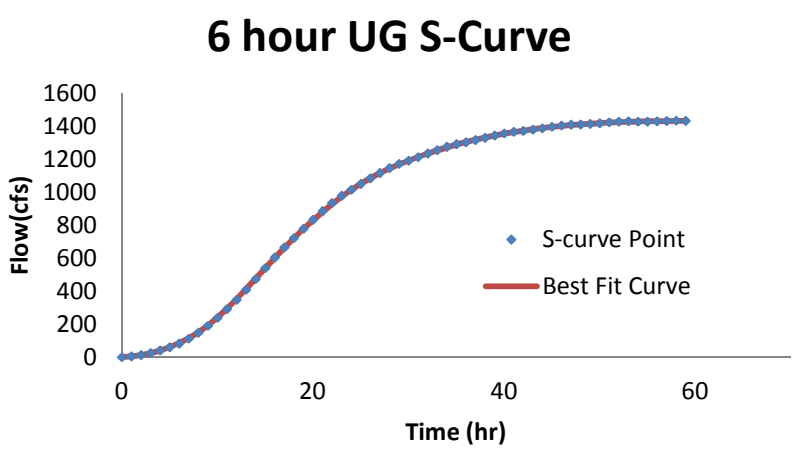


45	164.5242	143.5543
46	156.8098	139.9494
47	150.2974	136.5163
48	144.6897	132.9624
49	139.6896	129.2879
50	135	125.4926
51	130.3732	121.5767
52	125.7593	117.5401
53	121.1578	113.3828
54	116.5684	109.1048
55	111.9905	104.7062
56	107.42	100.19
57	102.87	95.55
58	98.32	90.79
59	93.79	85.90
60	89.26	80.90
61	84.74	75.78
62	80.23	70.54
63	75.73	65.17
64	71.24	59.69
65	66.75	54.08
66	62.27	48.36
67	57.80	42.51
68	53.33	36.54
69	48.86	30.45
70	44.41	24.24
71	39.95	18.04
72	35.50	12.34
73	31.06	7.28
74	26.62	2.85
75	22.18	0.00
76	17.74	
77	13.30	
78	8.87	
79	4.43	
80	0.00	

Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	5.00	30.00
2	13.35	47.44
3	25.52	69.92
4	41.29	94.34
5	60.40	120.69
6	82.62	149.02
7	107.72	179.54
8	135.46	212.29
9	165.59	247.26
10	197.88	284.46
11	231.59	321.88
12	265.19	351.47
13	297.07	371.21
14	325.61	381.11
15	349.19	381.16
16	366.19	372.79
17	375.00	361.68
18	375.00	349.27
19	369.46	335.56
20	359.88	320.53
21	346.89	304.20
22	331.08	286.57
23	313.09	267.62
24	293.50	247.37
25	272.95	225.81
26	252.03	203.63
27	231.36	183.61
28	211.56	166.42
29	193.23	152.08
30	176.93	140.58
31	162.69	131.49
32	150.19	123.12
33	139.11	115.03
34	129.16	107.23
35	120.00	99.71
36	111.38	92.47
37	103.23	85.53
38	95.52	78.87
39	88.25	72.49
40	81.38	66.40
41	74.91	60.59
42	68.80	55.07
43	63.05	49.84
44	57.62	44.89

Basin	8
Da-mi 2	13.44
w	
l	
L-mi	5.76
S-ft/mi	5.76
w/l	0.63
pk	375.93
wpk	19.61
tp	17.54

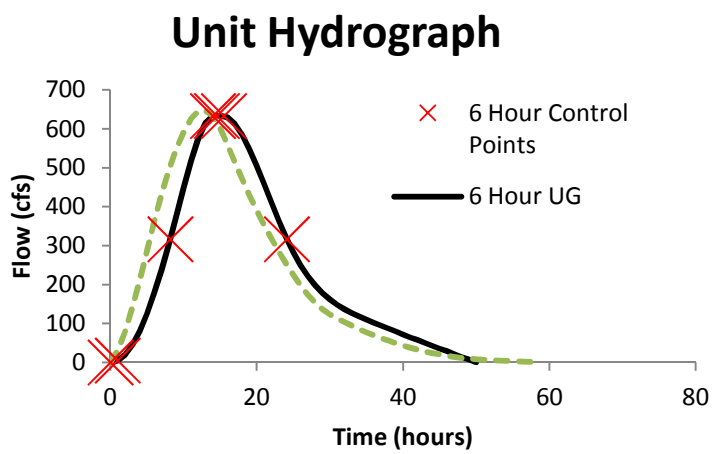


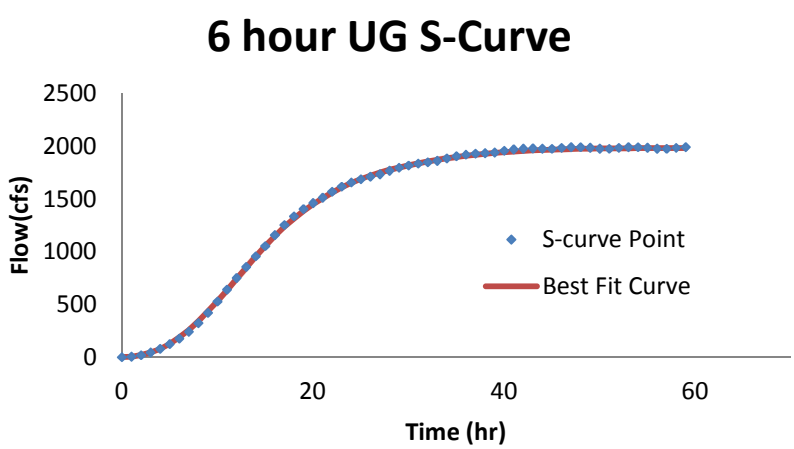


45	52.51	40.23
46	47.69	35.85
47	43.15	31.76
48	38.85	27.95
49	34.79	24.43
50	30.95	21.19
51	27.30	18.22
52	23.82	15.42
53	20.50	12.76
54	17.32	10.25
55	14.26	7.89
56	11.29	5.68
57	8.40	3.61
58	5.57	1.70
59	2.77	0.00
60	0.00	

Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	5.00	30.00
2	19.54	79.05
3	44.85	142.24
4	80.12	210.83
5	124.49	284.84
6	177.15	361.88
7	237.25	432.48
8	303.97	494.27
9	376.01	547.24
10	448.92	591.41
11	516.89	625.49
12	574.10	644.41
13	614.74	646.89
14	633.00	632.94
15	633.55	602.55
16	629.37	558.79
17	612.46	513.91
18	584.64	470.98
19	548.28	429.98
20	505.73	390.93
21	459.38	353.83
22	411.57	318.66
23	364.67	285.44
24	321.06	254.17
25	282.74	224.83
26	249.83	197.70
27	221.82	173.80
28	198.17	153.40
29	178.34	136.50
30	161.81	123.09
31	148.05	112.67
32	136.51	103.20
33	126.68	94.17
34	118.02	85.58
35	110.00	77.43
36	102.18	69.72
37	94.45	62.45
38	86.82	55.62
39	79.28	49.23
40	71.82	43.28
41	64.43	37.77
42	57.11	32.70
43	49.84	28.07
44	42.63	23.88

Basin	9
Da-mi 2	18.41
w	80.00
l	170.00
L-mi	9.16
S-ft/mi	10.11
w/l	0.47
pk	633.36
wpk	15.93
tp	14.55

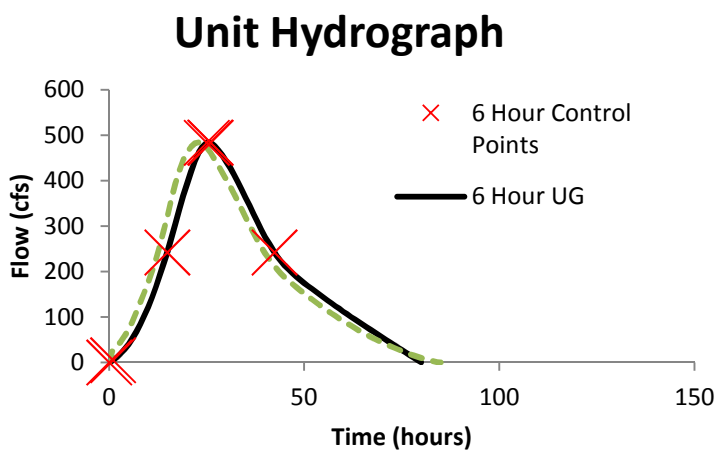


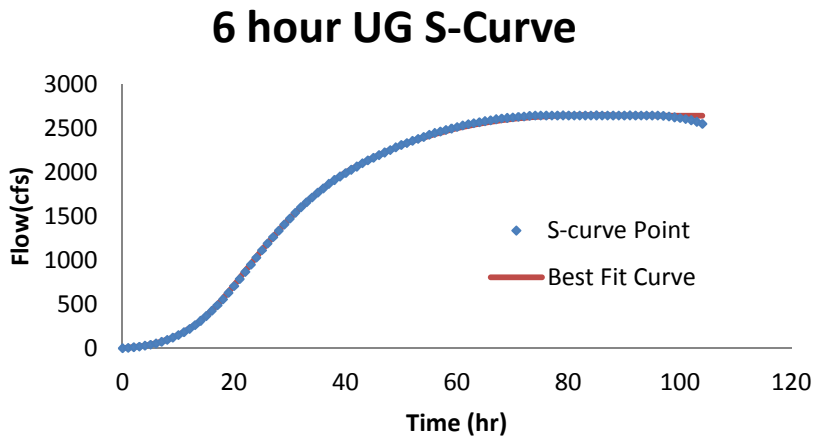


45	35.46	20.13
46	28.32	16.83
47	21.22	13.96
48	14.13	11.53
49	7.06	9.55
50	0.00	8.00
51		6.83
52		5.78
53		4.78
54		3.84
55		2.96
56		2.13
57		1.35
58		0.64
59		0.00

Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.0
1	5.00	30.0
2	11.36	35.8
3	19.34	45.2
4	28.97	57.6
5	40.25	73.0
6	53.19	91.2
7	67.80	110.7
8	84.08	131.4
9	102.04	153.2
10	121.70	176.1
11	143.05	200.3
12	166.12	227.1
13	190.90	256.8
14	217.41	289.3
15	245.65	324.6
16	275.44	361.4
17	306.07	394.4
18	336.73	422.3
19	366.61	445.1
20	394.89	462.7
21	420.76	475.1
22	443.42	482.5
23	462.06	484.7
24	475.85	481.7
25	484.00	473.7
26	484.00	461.2
27	476.80	447.5
28	467.47	433.3
29	456.26	418.6
30	443.39	403.4
31	429.12	387.8
32	413.67	371.6
33	397.29	354.9
34	380.20	337.8
35	362.67	320.2
36	344.91	302.3
37	327.17	285.3
38	309.69	269.3
39	292.71	254.4
40	276.46	240.6
41	261.18	227.8
42	247.12	216.2
43	234.49	205.6
44	223.26	196.1

Basin	10
Da-mi 2	24.60
w	88.00
l	250.00
L-mi	12.46
S-ft/mi	3.60
w/l	0.35
pk	484.69
wpk	27.48
tp	25.88

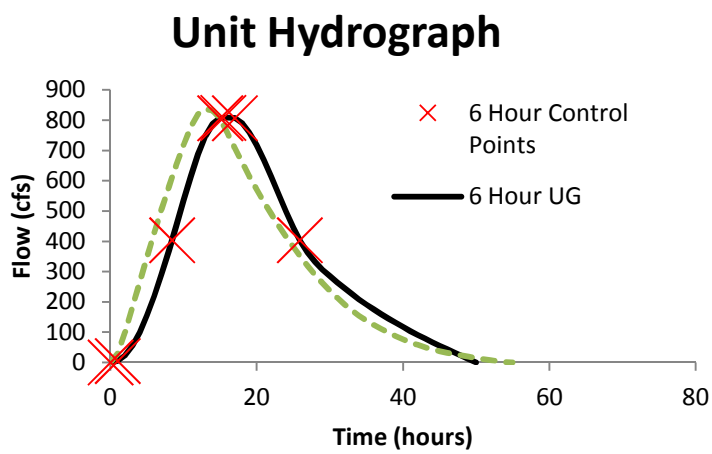


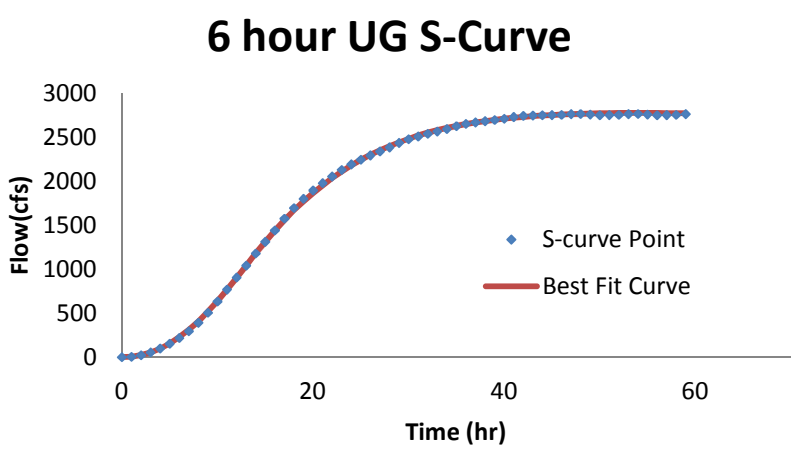


45	213.27	187.6
46	204.31	180.1
47	196.19	172.9
48	188.73	165.8
49	181.73	158.8
50	175.00	152.0
51	168.39	145.3
52	161.85	138.8
53	155.39	132.4
54	149.01	126.1
55	142.70	119.9
56	136.45	113.9
57	130.27	108.0
58	124.16	102.3
59	118.10	96.7
60	112.10	91.2
61	106.16	85.8
62	100.27	80.6
63	94.43	75.6
64	88.63	70.6
65	82.88	65.8
66	77.17	61.1
67	71.50	56.6
68	65.86	52.2
69	60.26	47.9
70	54.68	43.8
71	49.14	39.8
72	43.61	35.9
73	38.12	32.2
74	32.63	28.6
75	27.17	25.1
76	21.72	21.8
77	16.28	18.6
78	10.85	15.5
79	5.42	12.6
80	0.00	9.8

Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	5.00	30.00
2	22.75	99.42
3	54.53	182.36
4	98.78	264.85
5	153.92	346.88
6	218.37	427.93
7	290.56	505.93
8	368.92	580.34
9	451.77	651.18
10	535.78	718.44
11	616.21	778.90
12	688.31	819.64
13	747.32	837.44
14	788.47	832.30
15	807.00	804.22
16	809.03	757.33
17	807.00	708.15
18	790.59	660.81
19	759.92	615.32
20	718.01	571.67
21	667.88	529.86
22	612.53	489.89
23	554.99	451.77
24	498.26	415.49
25	445.36	381.05
26	399.31	348.46
27	361.96	317.71
28	331.84	288.80
29	306.88	261.74
30	285.00	236.51
31	264.48	213.13
32	244.92	191.59
33	226.27	171.90
34	208.49	154.05
35	191.52	138.04
36	175.32	123.72
37	159.82	110.46
38	144.99	98.12
39	130.77	86.69
40	117.10	76.18
41	103.94	66.57
42	91.24	57.88
43	78.95	50.10
44	67.01	43.24

Basin	11
Da-mi 2	25.90
w	
l	
L-mi	13.12
S-ft/mi	10.34
w/l	0.50
pk	807.92
wpk	17.46
tp	15.41

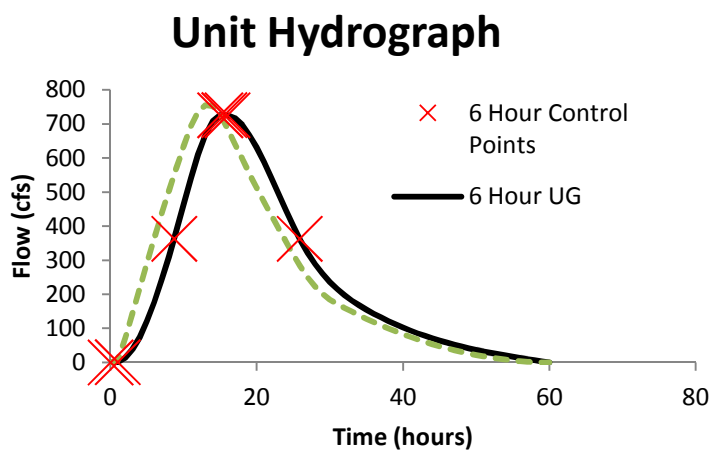


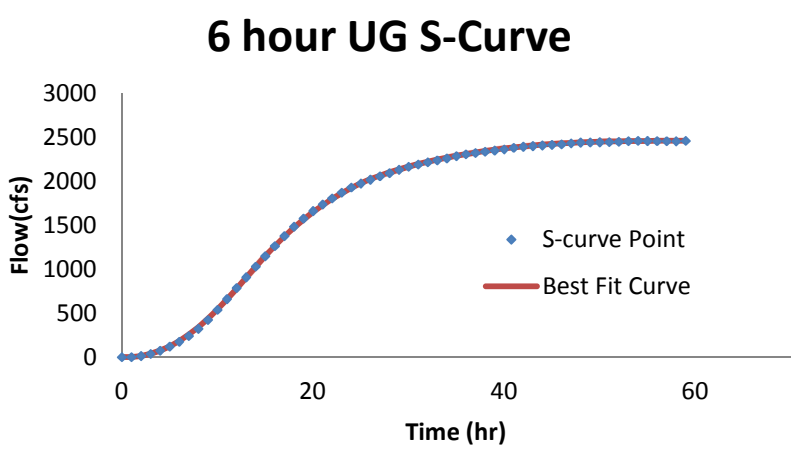


45	55.37	37.28
46	43.99	32.13
47	32.82	27.36
48	21.79	22.85
49	10.87	18.60
50	0.00	14.62
51		10.90
52		7.45
53		4.26
54		1.34
55		0.00

Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	1.00	6.00
2	13.30	68.71
3	38.22	143.45
4	74.56	217.57
5	121.13	291.05
6	176.74	363.68
7	240.20	434.53
8	310.32	503.38
9	385.90	570.22
10	464.38	635.06
11	540.92	694.61
12	610.43	735.73
13	667.83	755.13
14	708.05	752.82
15	726.00	728.79
16	726.00	686.82
17	717.48	642.00
18	697.60	598.11
19	668.25	555.13
20	631.33	513.09
21	588.76	471.96
22	542.42	431.77
23	494.23	392.49
24	446.08	354.14
25	399.88	316.71
26	357.52	280.88
27	320.32	249.31
28	288.01	222.67
29	260.07	200.96
30	235.98	184.18
31	215.21	171.57
32	197.25	160.11
33	181.58	149.05
34	167.67	138.39
35	155.00	128.12
36	143.14	118.24
37	131.97	108.77
38	121.46	99.68
39	111.59	91.00
40	102.33	82.70
41	93.65	74.81
42	85.51	67.31
43	77.90	60.20
44	70.77	53.49

Basin	12
Da-mi 2	22.83
w	2.80
l	6.20
L-mi	11.44
S-ft/mi	9.56
w/l	0.45
pk	726.33
wpk	17.15
tp	15.57

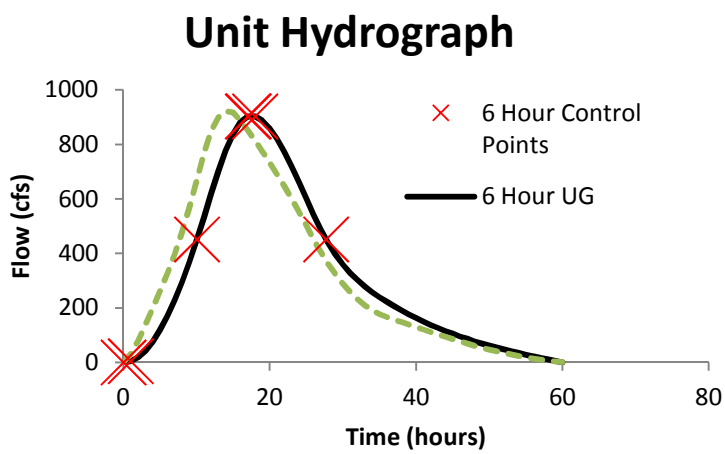


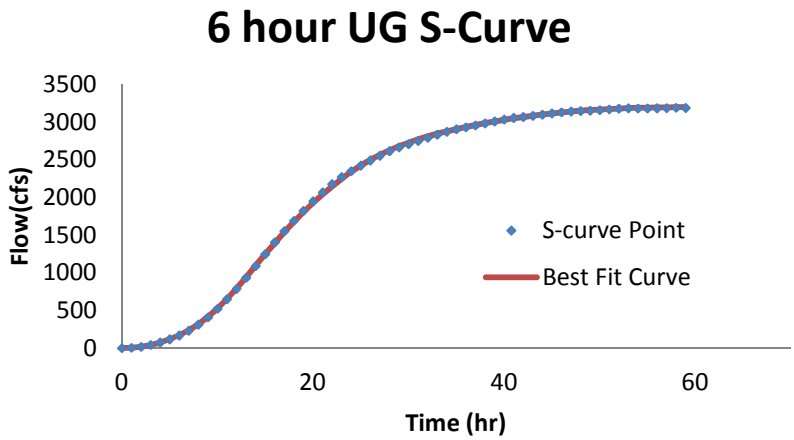


45	64.11	47.17
46	57.88	41.26
47	52.06	35.73
48	46.61	30.60
49	41.50	25.87
50	36.72	21.53
51	32.22	17.59
52	27.99	14.04
53	23.98	10.89
54	20.18	8.13
55	16.55	5.77
56	13.07	3.81
57	9.70	2.24
58	6.42	1.06
59	3.20	0.28
60	0.00	0.00

Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	5.00	30.00
2	18.70	79.10
3	42.42	138.74
4	75.68	199.27
5	117.97	260.70
6	168.78	324.41
7	227.61	395.95
8	293.96	476.70
9	367.33	566.67
10	447.22	665.86
11	532.50	767.97
12	619.17	847.89
13	702.37	899.32
14	777.21	922.28
15	838.85	916.76
16	882.40	887.21
17	903.00	851.46
18	903.00	813.97
19	888.19	774.74
20	859.95	733.76
21	820.69	691.04
22	772.78	646.58
23	718.63	600.37
24	660.62	552.42
25	601.15	502.73
26	542.60	452.28
27	487.37	405.03
28	437.83	361.96
29	395.23	323.06
30	358.87	288.35
31	327.88	257.82
32	301.38	231.47
33	278.48	209.30
34	258.32	191.31
35	240.00	177.51
36	222.79	167.20
37	206.52	157.69
38	191.14	148.29
39	176.61	139.01
40	162.89	129.84
41	149.95	120.78
42	137.75	111.84
43	126.25	103.01
44	115.41	94.30

Basin	13
Da-mi 2	29.33
w	
l	
L-mi	13.00
S-ft/mi	7.67
w/l	0.31
pk	903.71
wpk	17.65
tp	17.11

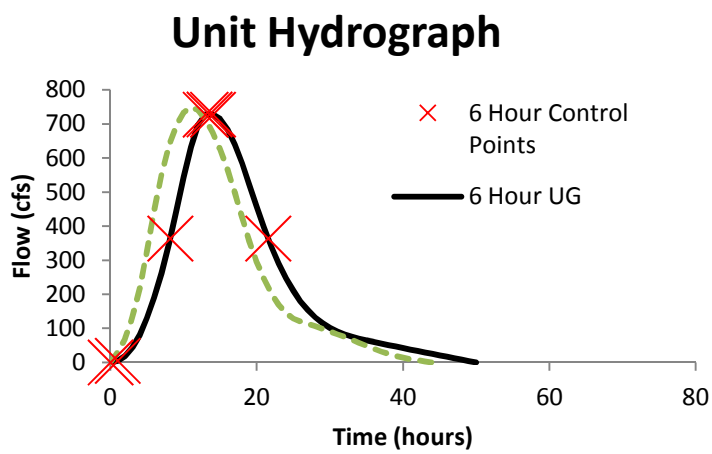


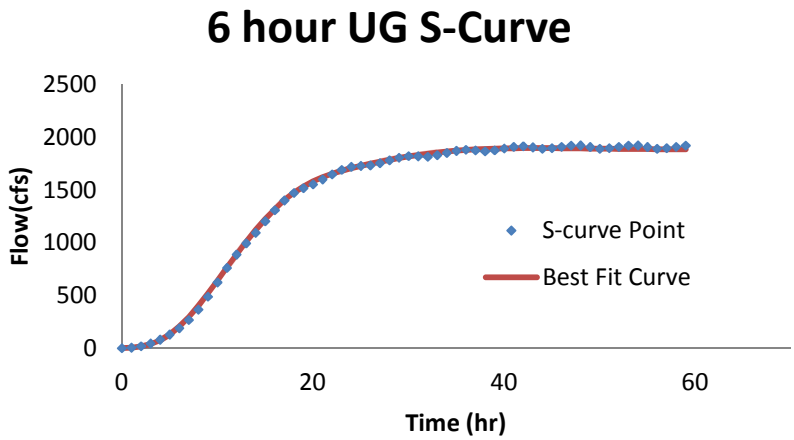


45	105.19	85.70
46	95.55	77.26
47	86.46	69.17
48	77.86	61.49
49	69.74	54.20
50	62.04	47.32
51	54.73	40.84
52	47.77	34.76
53	41.12	29.08
54	34.74	23.79
55	28.59	18.91
56	22.64	14.43
57	16.85	10.36
58	11.17	6.68
59	5.56	3.40
60	0.00	0.52
61		0.00

Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	5.00	30.00
2	19.08	69.00
3	44.28	132.95
4	80.90	218.33
5	129.24	325.14
6	189.58	446.05
7	262.22	551.73
8	347.44	634.84
9	444.35	695.39
10	543.66	733.37
11	632.58	748.79
12	698.29	741.64
13	728.00	714.08
14	728.00	674.77
15	715.28	625.87
16	684.51	567.37
17	639.62	499.28
18	584.51	424.66
19	523.09	355.83
20	459.27	295.85
21	396.96	244.72
22	340.01	202.45
23	290.30	169.03
24	247.40	144.46
25	210.76	128.75
26	179.81	120.38
27	153.99	113.30
28	132.75	106.00
29	115.51	98.49
30	101.73	90.76
31	90.84	82.81
32	82.29	74.64
33	75.50	66.25
34	69.92	57.65
35	65.00	48.83
36	60.26	39.99
37	55.60	31.95
38	51.02	24.90
39	46.52	18.85
40	42.08	13.80
41	37.70	9.66
42	33.37	6.05
43	29.09	2.88
44	24.86	0.17

Basin	14
Da-mi 2	17.73
w	51.00
l	213.00
L-mi	11.52
S-ft/mi	13.36
w/l	0.24
pk	728.13
wpk	13.38
tp	13.53

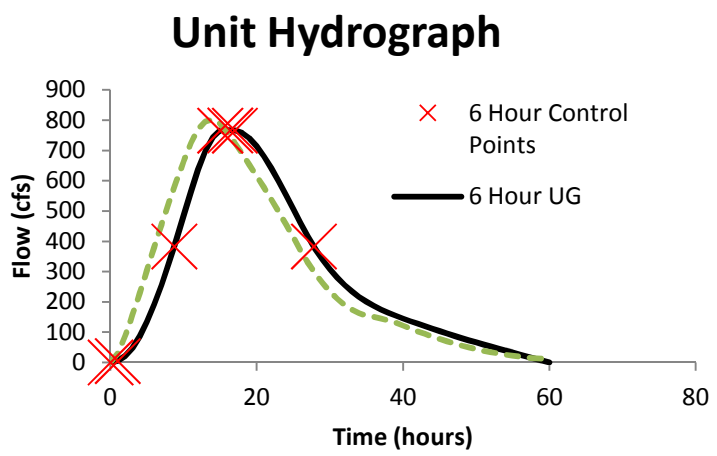


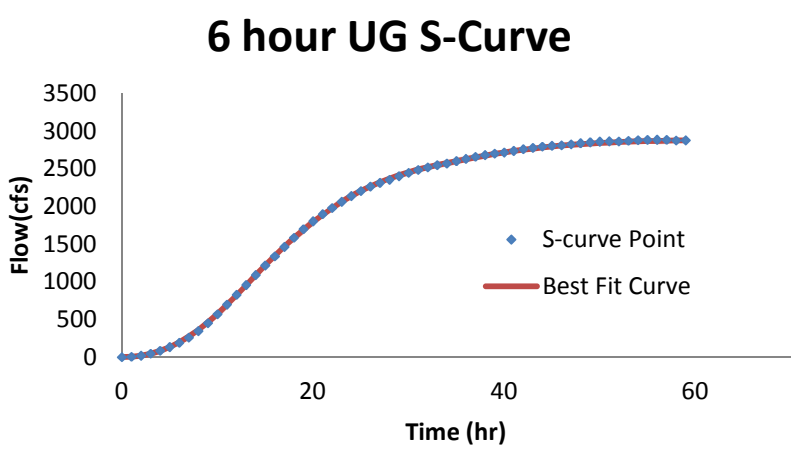


45	20.66	0.00
46	16.49	
47	12.35	
48	8.22	
49	4.11	
50	0.00	

Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	5.00	30.00
2	20.56	86.61
3	47.97	156.52
4	86.22	228.90
5	134.30	303.76
6	191.19	380.24
7	255.89	455.00
8	327.37	527.18
9	404.61	596.80
10	485.26	663.84
11	564.50	725.49
12	637.26	770.48
13	698.48	796.00
14	743.08	802.04
15	766.00	788.61
16	767.42	758.76
17	766.00	724.74
18	758.22	689.63
19	740.37	653.42
20	713.96	616.11
21	680.50	577.70
22	641.51	538.19
23	598.48	497.58
24	552.92	455.87
25	506.36	413.06
26	460.28	370.00
27	416.21	330.08
28	375.65	294.16
29	339.59	262.22
30	307.80	234.28
31	279.94	210.32
32	255.63	190.36
33	234.50	174.39
34	216.20	162.41
35	200.34	154.42
36	186.57	149.56
37	174.52	144.39
38	163.82	138.05
39	154.10	130.52
40	145.00	121.83
41	136.21	112.23
42	127.65	102.81
43	119.32	93.85
44	111.20	85.34

Basin	15.00
Da-mi 2	26.89
w	105.00
l	171.00
L-mi	12.08
S-ft/mi	8.65
w/l	0.61
pk	766.49
wpk	19.07
tp	16.36

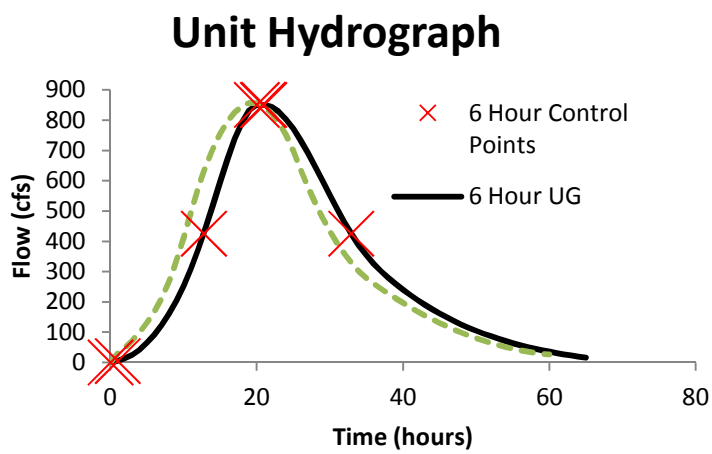


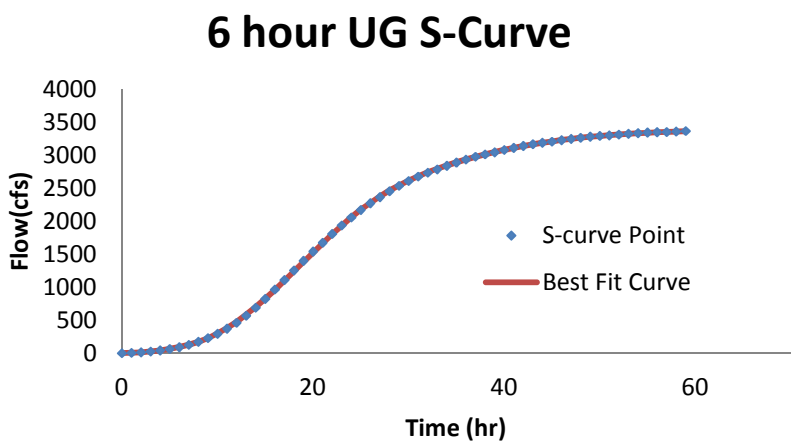


45	103.29	77.29
46	95.56	69.69
47	88.00	62.54
48	80.61	55.85
49	73.36	49.62
50	66.26	43.83
51	59.27	38.50
52	52.41	33.63
53	45.64	29.21
54	38.95	25.24
55	32.35	21.73
56	25.80	18.67
57	19.31	16.07
58	12.85	13.92
59	6.42	12.22
60	0.00	10.98
61		10.12
62		9.35
63		8.60
64		7.87
65		7.16
66		6.47
67		5.80
68		5.15
69		4.52
70		3.91
71		3.32
72		2.75
73		2.20
74		1.66
75		1.15
76		0.66
77		0.19
78		0.00

Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	5.00	30.00
2	13.25	48.51
3	25.63	73.14
4	42.44	100.79
5	63.98	131.46
6	90.55	166.47
7	122.44	211.14
8	159.96	266.80
9	203.39	333.45
10	253.04	411.09
11	309.20	496.29
12	372.17	575.38
13	442.24	644.93
14	518.23	704.94
15	595.95	755.41
16	670.85	796.21
17	738.37	826.79
18	793.93	847.03
19	833.00	856.92
20	851.00	856.46
21	851.00	845.65
22	844.55	824.49
23	828.29	792.98
24	803.56	751.13
25	771.72	698.93
26	734.10	638.85
27	692.03	580.80
28	646.88	527.25
29	599.97	478.20
30	552.65	433.65
31	506.27	393.60
32	462.15	358.06
33	421.66	327.01
34	385.70	300.46
35	353.98	278.42
36	325.95	260.23
37	301.07	243.30
38	278.81	226.99
39	258.64	211.30
40	240.00	196.23
41	222.45	181.78
42	205.88	167.96
43	190.24	154.76
44	175.50	142.19

Basin	16.00
Da-mi 2	31.60
w	65.00
l	320.00
L-mi	15.17
S-ft/mi	5.52
w/l	0.20
pk	851.13
wpk	20.13
tp	20.82

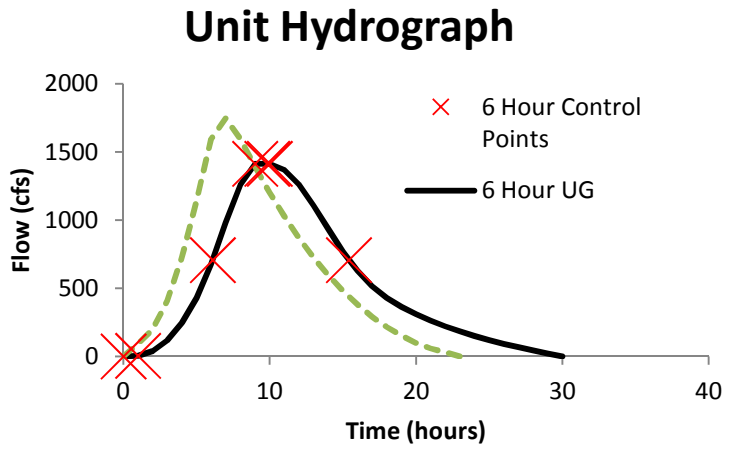


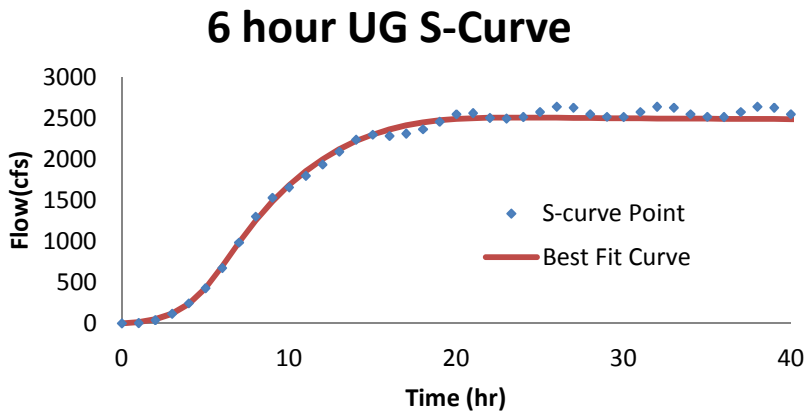


45	161.64	130.25
46	148.61	118.93
47	136.38	108.25
48	124.93	98.19
49	114.21	88.75
50	104.20	79.95
51	94.85	71.77
52	86.14	64.22
53	78.04	57.30
54	70.50	51.01
55	63.50	45.34
56	57.00	40.30
57	50.97	35.89
58	45.38	32.10
59	40.18	28.95
60	35.36	26.42
61	30.87	24.42
62	26.68	22.56
63	22.76	20.76
64	19.07	19.00
65	15.59	17.28
66	12.27	15.62
67	9.08	14.00
68	6.00	12.43
69	2.98	10.91
70	0.00	9.44
71		8.01
72		6.63
73		5.30
74		4.02
75		2.78
76		1.59
77		0.45
78		0.00

Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	5.00	93.62
2	40.48	198.94
3	118.24	409.58
4	245.40	725.54
5	429.09	1146.82
6	676.42	1593.82
7	981.08	1748.14
8	1262.37	1594.69
9	1414.00	1391.46
10	1414.00	1202.94
11	1370.14	1029.14
12	1260.66	870.05
13	1108.61	725.68
14	937.05	596.03
15	769.02	481.09
16	626.55	380.42
17	515.79	292.21
18	430.49	216.01
19	364.09	151.82
20	310.00	99.64
21	262.65	59.47
22	220.46	31.31
23	182.86	0.00
24	149.28	
25	119.14	
26	91.87	
27	66.89	
28	43.64	
29	21.53	
30	0.00	

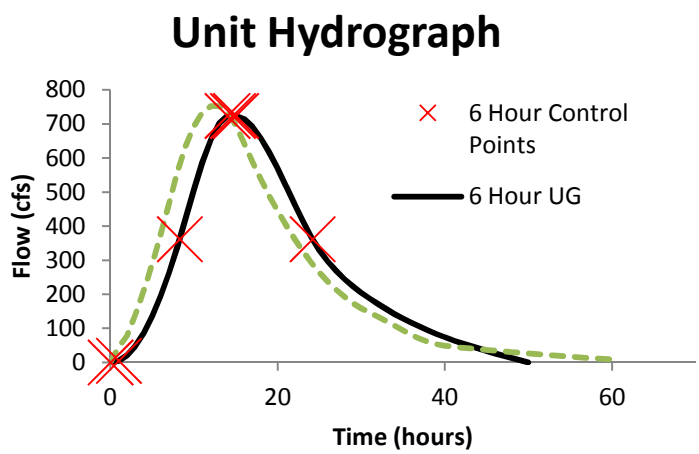
Basin	17.00
Da-mi 2	23.89
w	74.00
l	268.00
L-mi	6.63
S-ft/mi	14.70
w/l	0.28
pk	1414.20
wpk	9.30
tp	9.83

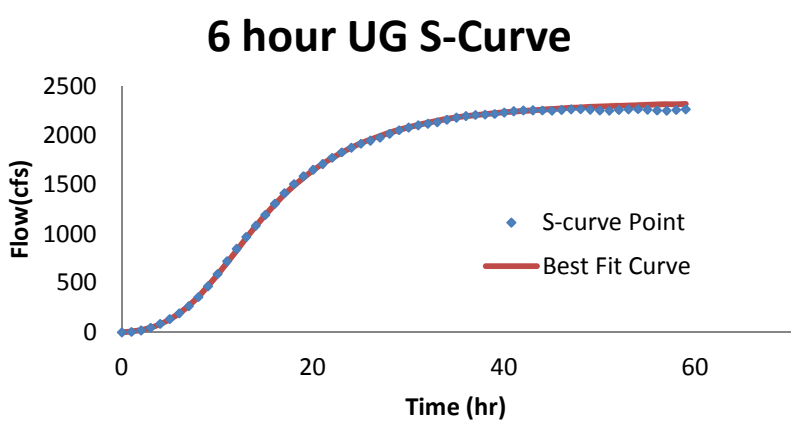




Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	5.00	44.98
2	20.51	78.06
3	48.01	139.72
4	86.73	211.97
5	135.90	290.33
6	194.76	374.79
7	262.53	465.36
8	338.45	557.81
9	421.36	635.26
10	506.33	693.49
11	586.23	732.51
12	653.91	752.32
13	702.22	752.90
14	724.00	734.27
15	724.00	696.43
16	714.92	643.07
17	692.39	589.00
18	658.92	537.93
19	617.03	489.86
20	569.25	444.79
21	518.10	402.71
22	466.09	363.64
23	415.76	327.56
24	369.61	294.48
25	329.86	264.39
26	296.41	237.31
27	268.23	213.22
28	244.29	192.13
29	223.56	174.04
30	205.00	158.94
31	187.74	146.29
32	171.55	133.83
33	156.39	121.01
34	142.20	107.84
35	128.91	94.30
36	116.47	80.85
37	104.83	69.27
38	93.93	59.99
39	83.71	53.03
40	74.11	48.38
41	65.08	45.66
42	56.56	43.36
43	48.50	41.09
44	40.83	38.87

Basin	18.00
Da-mi 2	21.03
w	82.00
l	178.00
L-mi	9.18
S-ft/mi	9.45
w/l	0.46
pk	724.12
wpk	15.89
tp	14.65

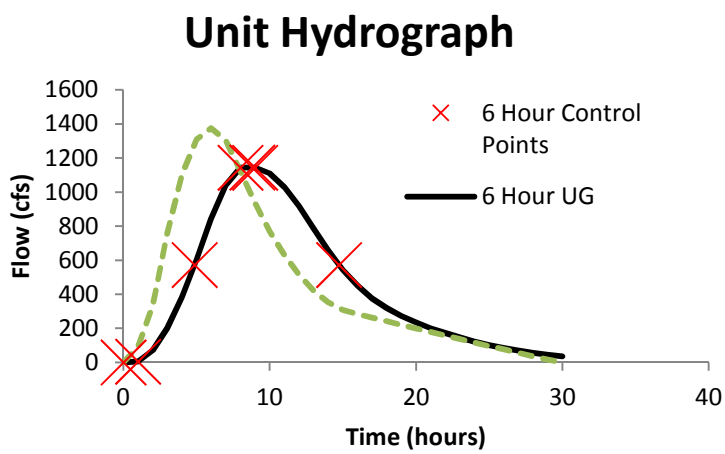


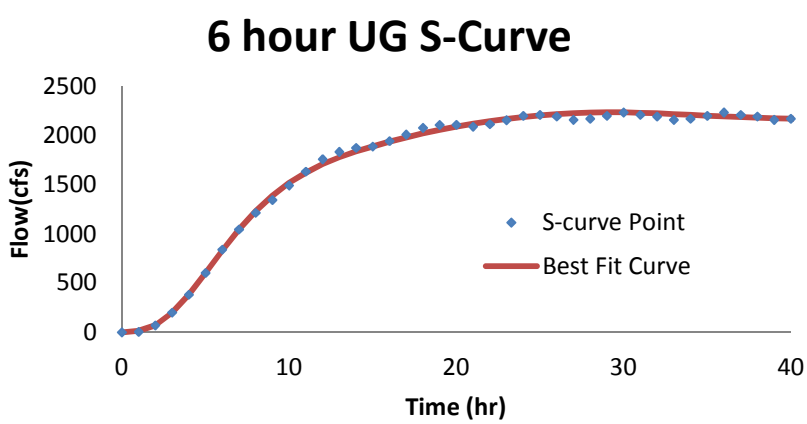


45	33.51	36.68
46	26.46	34.54
47	19.65	32.43
48	13.01	30.36
49	6.47	28.33
50	0.00	26.34
51		24.39
52		22.48
53		20.61
54		18.77
55		16.98
56		15.22
57		13.51
58		11.83
59		10.19
60		8.59
61		7.03
62		5.51
63		4.03
64		2.58
65		1.18
66		0.00

Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	5.00	92.69
2	71.30	335.11
3	201.42	756.38
4	383.19	1102.12
5	604.40	1308.75
6	841.57	1376.26
7	1041.00	1304.66
8	1144.00	1121.08
9	1144.00	934.04
10	1110.03	770.67
11	1029.49	630.98
12	917.47	514.97
13	789.08	422.63
14	659.40	353.97
15	543.46	308.98
16	450.07	283.74
17	376.50	262.53
18	318.79	241.43
19	272.94	220.43
20	235.00	199.53
21	201.61	178.73
22	171.88	158.03
23	145.56	137.44
24	122.38	116.95
25	102.09	96.57
26	84.41	76.28
27	69.10	56.10
28	55.88	36.02
29	44.49	16.05
30	34.67	0.00

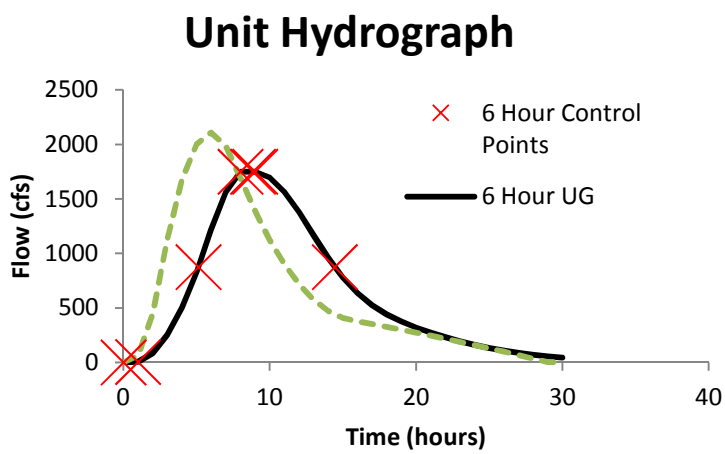
Basin	19.00
Da-mi 2	20.50
w	111.00
l	142.00
L-mi	4.92
S-ft/mi	16.74
w/l	0.78
pk	1144.67
wpk	9.87
tp	8.81

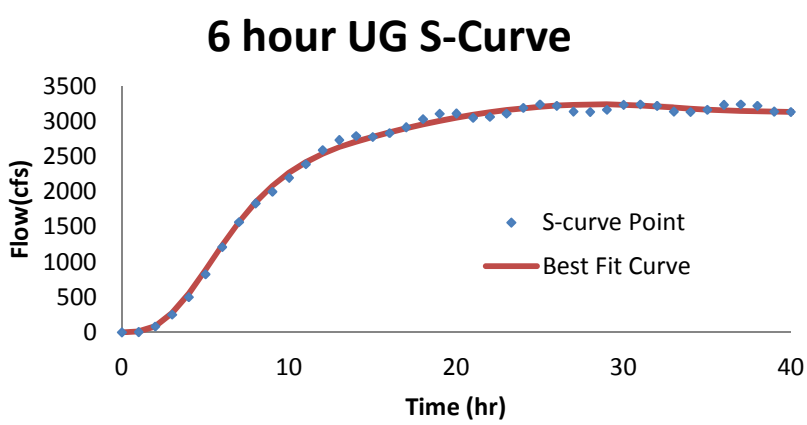




Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	5.00	61.97
2	85.27	449.64
3	252.21	1123.10
4	501.26	1674.88
5	827.85	2003.12
6	1214.07	2107.83
7	1563.25	1988.99
8	1750.00	1690.49
9	1750.00	1387.87
10	1697.68	1125.01
11	1564.84	901.90
12	1379.06	718.55
13	1167.91	574.96
14	958.99	471.12
15	778.87	407.04
16	636.55	375.99
17	525.99	351.05
18	440.72	325.48
19	374.22	299.30
20	320.00	272.49
21	272.58	245.06
22	230.56	217.01
23	193.55	188.34
24	161.17	159.05
25	133.03	129.13
26	108.74	98.60
27	87.92	67.44
28	70.18	35.66
29	55.15	3.26
30	42.42	0.00

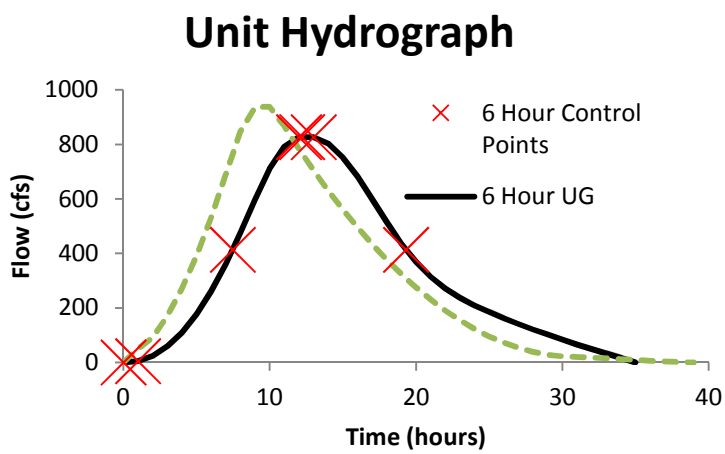
Basin	20.00
Da-mi 2	29.69
w	100.00
l	205.00
L-mi	7.27
S-ft/mi	18.44
w/l	0.49
pk	1750.10
wpk	9.31
tp	8.85

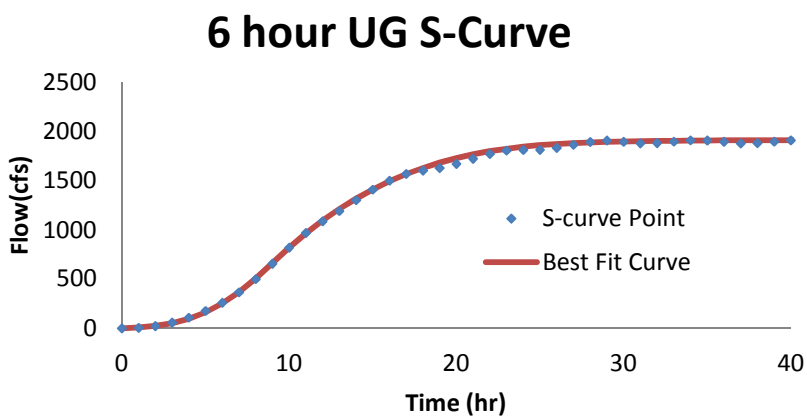




Time	6 Hour UG	1 Hour UG
hr	cfs	cfs
0	0.00	0.00
1	5.00	50.15
2	23.60	91.44
3	58.51	170.28
4	109.71	271.70
5	177.19	391.97
6	260.94	531.09
7	360.95	689.05
8	476.75	848.07
9	599.00	936.96
10	710.07	937.94
11	792.04	866.36
12	827.00	783.68
13	827.00	705.24
14	803.08	631.06
15	752.04	561.12
16	681.86	495.44
17	600.51	434.01
18	515.96	376.83
19	436.19	323.90
20	368.60	275.22
21	314.51	230.79
22	271.54	190.62
23	237.25	154.70
24	209.22	123.02
25	185.00	95.60
26	162.55	72.43
27	141.35	53.51
28	121.25	38.85
29	102.13	28.43
30	83.84	22.27
31	66.23924	19.59464
32	49.19439	17.39024
33	32.56528	14.89508
34	16.21335	12.10917
35	0	9.032498
36		5.827294
37		3.142433
38		1.140135
39		0

Basin	21.00
Da-mi 2	17.79
w	50.00
l	217.00
L-mi	10.30
S-ft/mi	14.95
w/l	0.23
pk	827.31
wpk	11.84
tp	12.21





Appendix D

Bridge

Appendix D: Bridge Location Map

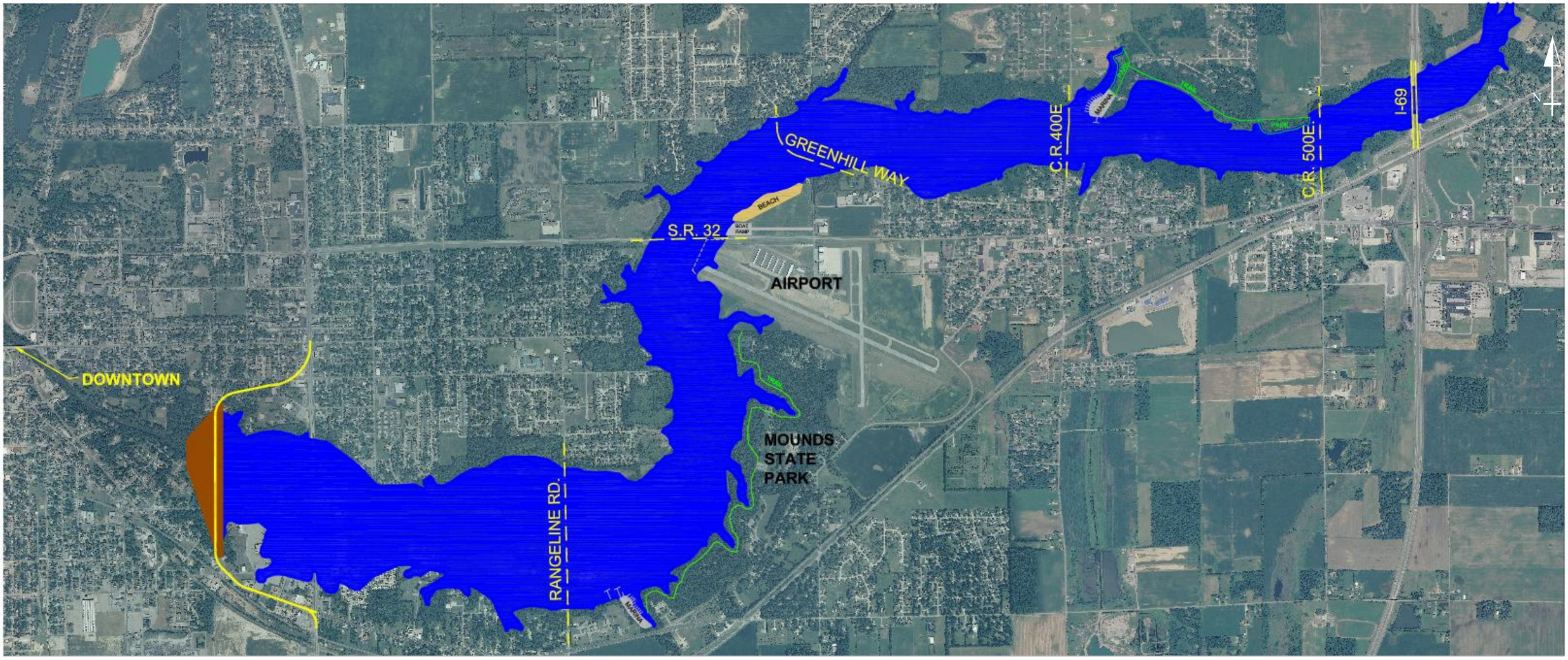


Figure 4.1 Bridge Location Map

Appendix D: Bridge Summary Table

Bridge No.	Road Name	Existing Length	Existing Clear Roadway Width	Existing O-O Width	Est. Low Chord elev.	Skew	Functional Classification	ADT	Proposed Length	Proposed Clear Roadway Width	Proposed Width	Bridge Removal - $65/sft	Bridge Replacement - $225/sft	Approach Roadway Costs	Total Cost to Replace
Bridge 105	Greenhill Road	342	32	35	870	0	Urban Collector	1762	381.5	36	39	$765,814	$3,347,663	$1,673,831	$5,787,308
Bridge 107	Rangeline Road	364	28	32	855	0	Urban Minor Arterial	10400	404	40	43	$753,098	$3,908,700	$1,954,350	$6,616,148
Bridge 109	C. R. 500	302	26	29	873	40	Rural Local	897	360	28	31	$559,640	$2,511,000	$1,255,500	$4,326,140
Bridge 115	C.R. 400	382	26	30	869	0	Rural Local	1762	422	34	37	$740,679	$3,513,150	$1,756,575	$6,010,404
Bridge on SR 32	S.R. 32	420	41.3	44	870	30	Urban Other Principal Arterial	14811	470	44	47	$1,210,254	$4,970,250	$2,485,125	$8,665,629
												$4,029,485	$18,250,763	$9,125,381	$31,405,628

Note that SR 9 will be removed and will be rerouted so no direct replacement cost is included (the items are split below showing separate demolition and reconstruction costs)

SR 9 removal	SR 9	440		47	860							$1,344,200			
SR 9 rerouted on dam	SR 9						Urban Other Principal Arterial		700	44	47	$0	$7,402,500	$3,701,250	$11,103,750
													$25,653,263	$12,826,631	$42,509,378

Grand Total

Note that the low chord of the I-69 bridge is 877.2 at the center span of the bridge.

Note that the C.R 900 West bridge in Delaware County had no available bridge plans but the deck is at or above elevation 880 based on contour data.

Table 4.1 Anderson Reservoir Bridge Summary

Appendix D: CR 400 Bridge Plans

BRIDGE CONTRACT No. 5707

PUBLIC HWY. REGION NO.		P.I.		J.	TOTAL SHEETS
4	IND.	S783(1)		1	40

INDEX

PROJECT	STRUCTURE	TYPE	SPAN	OVER	STATION	CONTRACT NO.
S-783 (1)	MADISON 9398	PRESTRESSED CONCRETE I-BEAM	5 at 73'-0" NO SKEW	WEST FORK OF WHITE RIVER	20+50.00 ℄ SPAN "C"	5707

SHEET NO.	SHEET DESIGNATION	SUBJECT	B.P.R. APPROVAL
1		TITLE SHEET	
2		ROAD PLAN AND PROFILE	
3		LAYOUT	
4		CHANNEL CHANGE LAYOUT	
5		GENERAL PLAN	
6		BENT NOS. 1 & 6 DETAILS	
7		PIERS 2,3,4, & 5 DETAILS	
8		BEAM ERECTION DIAGRAM	
9		SUPERSTRUCTURE DETAILS	
10		SCREED ELEVATIONS	
11		SUMMARY	
12-19		ROADWAY CROSS SECTIONS	
20-24		WATERWAY CROSS SECTIONS	

STATE OF INDIANA

INDIANA STATE HIGHWAY COMMISSION

BRIDGE PLANS

FOR SPANS OVER 20 FEET

#115 — 1973 BRIDGE SURVEY

MADISON COUNTY

FEDERAL AID SECONDARY PROJECT NO. S-783(1)

F.A.S. ROUTE NO. S-1337

BEGINNING AT THE INTERSECTION OF STATE ROAD 32 AND F.A.S. ROUTE S-1337 AND PROCEEDING IN A NORTHERLY DIRECTION ALONG F.A.S. ROUTE S-1337 APPROXIMATELY 1500 FEET TO THE POINT OF BEGINNING OF PROJECT; THENCE NORTHERLY APPROXIMATELY 2017 FEET TO A POINT ON THE CENTERLINE OF F.A.S. ROUTE S-1337, SUCH POINT BEING THE END OF PROJECT, ALL CONSTRUCTION BEING IN SECTIONS 2, 3, 10 AND 11, T19N, R8E, IN UNION TOWNSHIP, MADISON COUNTY, INDIANA.

MADISON COUNTY

SCALE 1" = 1 MILE

PROJECT LOCATION

N

APPROACH LENGTH = 0.310 Mi.

BRIDGE LENGTH = 0.072

PROJECT LENGTH = 0.382 Mi.

MAXIMUM GRADE = 6.32 %

F.A.S. PROJECT NO. S-783(1)
STRUCTURE NO. MADISON 9398
PRESTRESSED CONC. I-BEAMS
5 SPANS at 73'-0"
℄ STRUCTURE 20+50.00
BEGINNING OF PROJECT STA 10+00
END OF PROJECT STA 30+17

INDEX CONTINUED
STANDARD DRAWINGS

SHEET NO.	SHEET DESIGNATION	SUBJECT	B.P.R. APPROVAL	ADOPTED "A" REVISION "R"
25	BRIDGE STD. C1	STANDARD MISCELLANEOUS DETAILS	1-12-60	R-12-2-58
	BRIDGE STD. C2	STANDARD MISCELLANEOUS DETAILS		
26	BRIDGE STD. D	CASTING DETAILS ROADWAY DRAINS	1-12-60	A-1-3-50
	BRIDGE STD. F	ROADWAY DRAIN OUTLET DETAILS		
	BRIDGE STD. GRA	TYPICAL BEAM GUARD RAIL DETAILS		
	BRIDGE STD. H	TYP. DETAILS OF THICK. PAVEMENT & LOC. TOE OF SL. AROUND END BENTS		
	BRIDGE STD. H	TYP. DETAILS OF THICK. PAVEMENT & LOCATING TOE OF SLOPE		
	BRIDGE STD. HS	CONT. STEEL BEAM—TYP. APPROACH DETAILS—TWIN STRUCTURES		
	BRIDGE STD. HS	ST. BEAM & R.C. GIRDER—TYP. APPROACH DETAILS—TWO-LANE STRUCTURES		
	BRIDGE STD. HS21	CONT. STEEL BEAM—TYP. APPROACH DETAILS		
27	BRIDGE STD. M1	MISCELLANEOUS APPROACH DETAILS	11-23-60	R-8-25-60
	BRIDGE STD. M2	MISCELLANEOUS APPROACH DETAILS		
28	BRIDGE STD. M3	MISCELLANEOUS APPROACH DETAILS	9-28-61	R-3-15-61
29	BRIDGE STD. M4	R.C. BRIDGE APPROACH TURNOUT DETAILS—12'-6" SHOULDERS	PENDING	R-1-13-61
30	BRIDGE STD. M5	SLOPE WALL DETAILS	8-10-61	A-4-25-61
	BRIDGE STD. P2	STANDARD CONCRETE PILE DETAILS		
31	BRIDGE STD. PB 3	PRESTRESSED CONCRETE TYPE 3 I-BEAMS	4-16-62	A-1-16-62
	BRIDGE STD. PB	PRESTRESSED COMPOSITE BOX BEAMS WIDE		
	BRIDGE STD. R1	ALUMINUM RAILING DETAILS		
	BRIDGE STD. R2	BRIDGE LIGHTING DETAILS		
32	BRIDGE STD. S1	TYPICAL DETAILS FOR PLACING SPECIAL FILLING MATERIAL	10-10-61	R-6-1-61
	BRIDGE STD. S2	TYPICAL DETAILS FOR PLACING SPECIAL FILLING MATERIAL		
	BRIDGE STD. T SHEET A	STANDARD TEMPORARY BRIDGE		
	BRIDGE STD. T SHEET B	STANDARD TEMPORARY BRIDGE		
	ROAD STD. SHEET A	STANDARD PAVEMENT JOINTS		
33	ROAD STD. SHEET MA	MISCELLANEOUS STANDARDS	3-9-61	R-7-11-60
	ROAD STD. SHEET MB	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET MC	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET MC1	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET MD	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET MD1	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET ME	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET MF	MISCELLANEOUS STRUCTURE STANDARDS		
	ROAD STD. SHEET MG	MISCELLANEOUS STRUCTURE STANDARDS		
	ROAD STD. SHEET MH	MISCELLANEOUS PRIVATE DRIVE STANDARDS		
34	ROAD STD. SHEET MI	MISCELLANEOUS STANDARDS	4-20-61	R-3-30-61
	ROAD STD. SHEET MJ	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET K	MISCELLANEOUS STANDARDS	5-9-61	R-4-11-61
35	ROAD STD. SHEET MN	MISCELLANEOUS STANDARDS	6-5-62	R-5-25-62
36	ROAD STD. SHEET MP	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET MQ	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET MR	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET S	MISCELLANEOUS STANDARDS CENTER DITCH INLETS		
	ROAD STD. SHEET S1	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET MT	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD.	STANDARD STRUCTURE CONNECTIONS FOR EXTENSION		
	ROAD STD.	STANDARD REINF. CONC. BOX CULVERTS		
	ROAD STD.	STANDARD REINF. CONC. BOX CULVERTS—SK. END & WING DETAILS		
	ROAD STD.	STANDARD REINF. CONC. CULVERTS—SLAB TOP TYPE (W.F.)		
	ROAD STD.	STANDARD REINF. CONC. CULVERTS—SLAB TOP TYPE (U.F.)		
	ROAD STD. SHEET GR	STANDARD GUARD RAIL	6-6-61	R-5-25-61
37	ROAD STD. SHEET GR1	BEAM GUARD RAIL		
	ROAD STD.	STANDARD REINF. CONCRETE ARCH—12' SPAN		
	ROAD STD.	STANDARD HEADWALLS		
	ROAD STD.	STANDARD STRUCTURAL PLATE ARCH		
	ROAD STD.	CONCRETE WINGS FOR STD. STRUCTURAL PLATE ARCHES		
	ROAD STD.	STANDARDS FOR SUPER-ELEVATION & WIDENING OF CURVES		
38	ROAD STD. SHEET 1 DETOURS	STANDARD DETOUR SIGNS	1-26-62	A-12-61
39	ROAD STD. SHEET 2 DETOURS	STANDARD DETOUR SIGNS	1-26-62	A-12-61
	ROAD STD. SHEET 3 DETOURS	STANDARD DETOUR SIGNS		
40	ROAD STD. SHEET 4 DETOURS	STANDARD DETOUR SIGNS	1-26-62	R 12-1-61

TRAFFIC DATA		
A.D.T. (1962)	200	V.P.D.
A.D.T. (1982 PROJECTED)	325	V.P.D.
TRUCKS	10	%
DESIGN SPEED	40	M.P.H.
ACCESS CONTROL	NONE	

PLANS PREPARED BY

BUTLER, FAIRMAN AND SEUFERT

INCORPORATED

CONSULTING ENGINEERS

INDIANAPOLIS

CERTIFIED BY: Cliff E. Lyle DATE 7-9-62

APPROVED DATE

Harold Foust

Jesse S. Blackwell

Ralph E. McCord

BOARD OF MADISON COUNTY COMMISSIONERS

ATTEST

AUDITOR MADISON COUNTY

RECOMMENDED FOR APPROVAL 7-17-62

C. R. Ruminer

ENGINEER OF BRIDGE DESIGN, INDIANA STATE HIGHWAY COMMISSION

APPROVED 7-18-62

Theo. E. Hoodwin

CHIEF ENGINEER—INDIANA STATE HIGHWAY COMMISSION

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS

APPROVED:-

[redacted] DIVISION ENGINEER [redacted] DATE

BRIDGE FILE:- MADISON 9398

REVISIONS	
DATE	SHEET NO.

STATE HIGHWAY DEPARTMENT OF INDIANA.
STANDARD SPECIFICATIONS DATED 1960
TO BE USED WITH THESE PLANS.

#115

STATE HIGHWAY
DEPARTMENT OF INDIANA

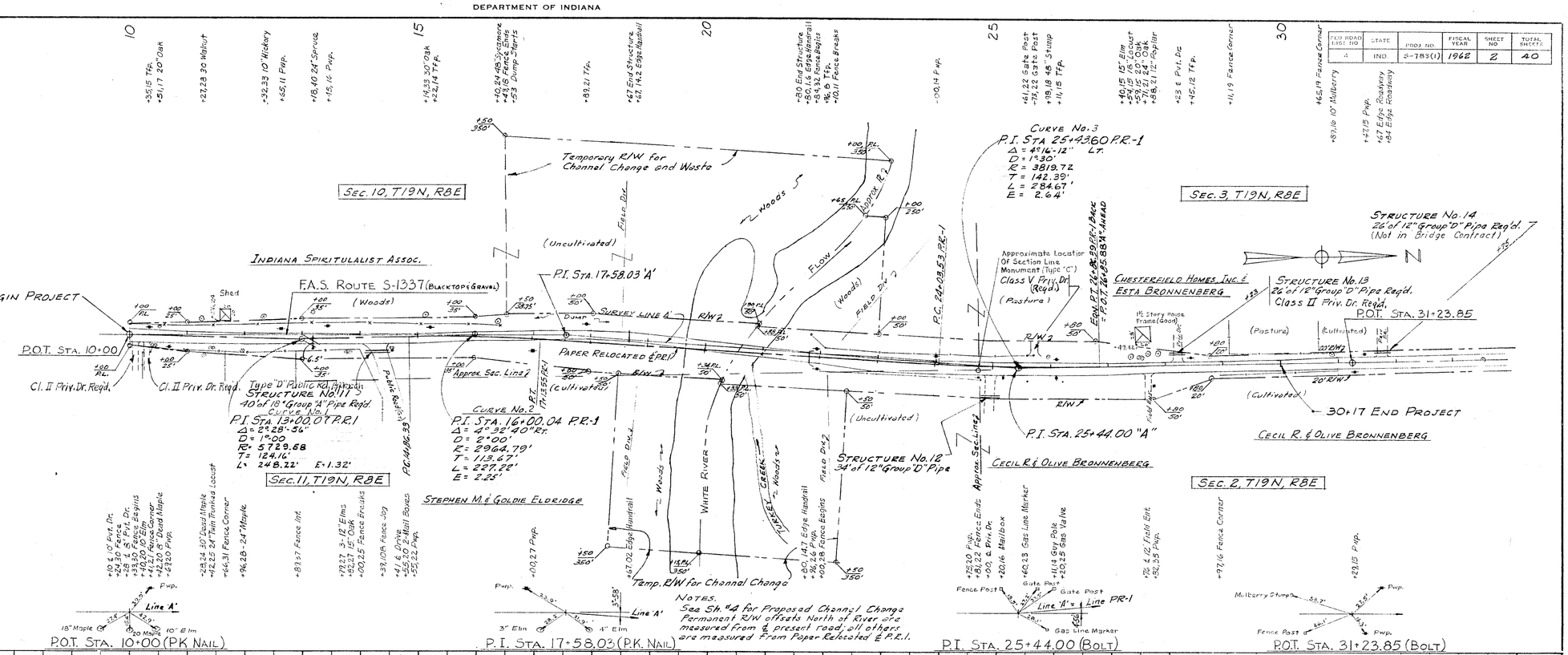
FED ROAD LIST NO	STATE	PROJ NO	FISCAL YEAR	SHEET NO	TOTAL SHEETS
4	IND.	S-783(1)	1962	2	40

UTILITIES

Indiana And Michigan Electric Co. - Anderson, Indiana.
Indiana Bell Telephone Co. - Anderson, Indiana.
Central Indiana Gas Co. - Muncie, Indiana.

APPROACH TABLE

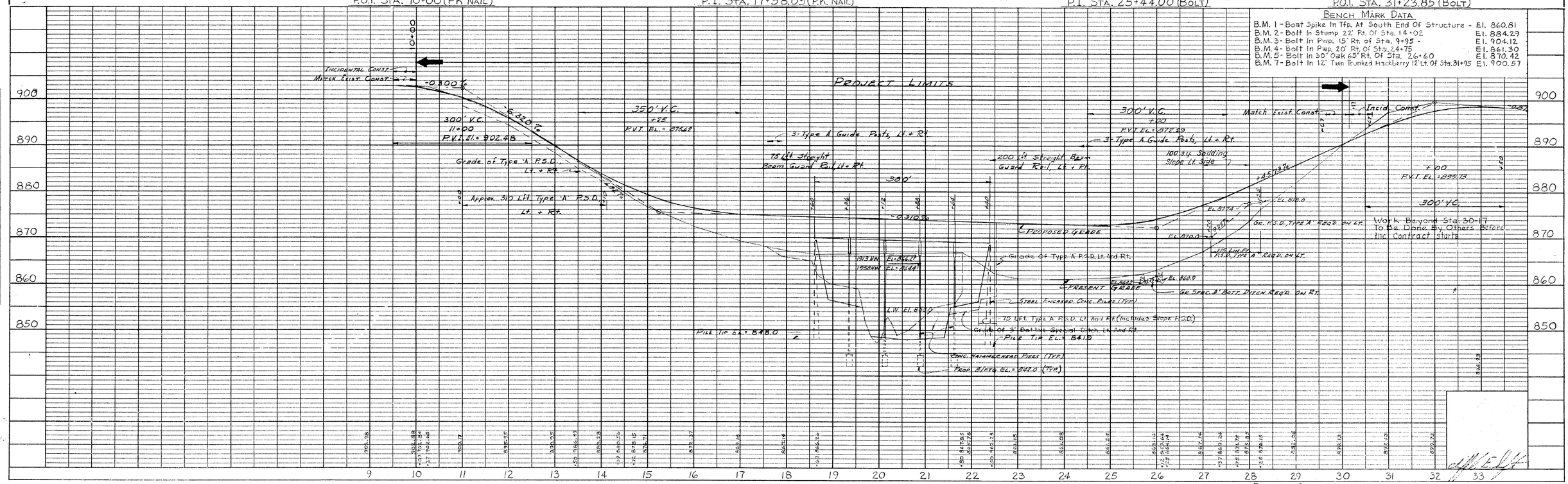
10+10 Rt.	CLASS II PRIVATE DRIVE
10+28 Rt.	CLASS II PRIVATE DRIVE
14+30 Rt.	TYPE D PUBLIC ROAD APPROACH
25+00 Rt.	CLASS II PRIVATE DRIVE
27+76 Rt.	CLASS V FIELD ENTRANCE
28+23 Lt.	CLASS II PRIVATE DRIVE
25+67 Lt.	CLASS V FIELD ENTRANCE



NOTES.
See Sh. #4 for Proposed Channel Change
Permanent R/W offsets North of River are measured from ℄ present road; all others are measured from Paper Relocated ℄ P.R.I.

BENCH MARK DATA

B.M. 1 - Boat Spike In Tfp. At South End Of Structure -	El. 860.81
B.M. 2 - Bolt In Stump 22' Rt. Of Sta. 14+02	El. 884.29
B.M. 3 - Bolt In Pwp. 15' Rt. Of Sta. 9+95 -	El. 904.12
B.M. 4 - Bolt In Pwp. 20' Rt. Of Sta. 24+75	El. 861.30
B.M. 5 - Bolt In 30" Oak 65' Rt. Of Sta. 26+60	El. 870.42
B.M. 7 - Bolt In 12" Twin Trunked Hackberry 12' Lt. Of Sta. 31+95	El. 900.57



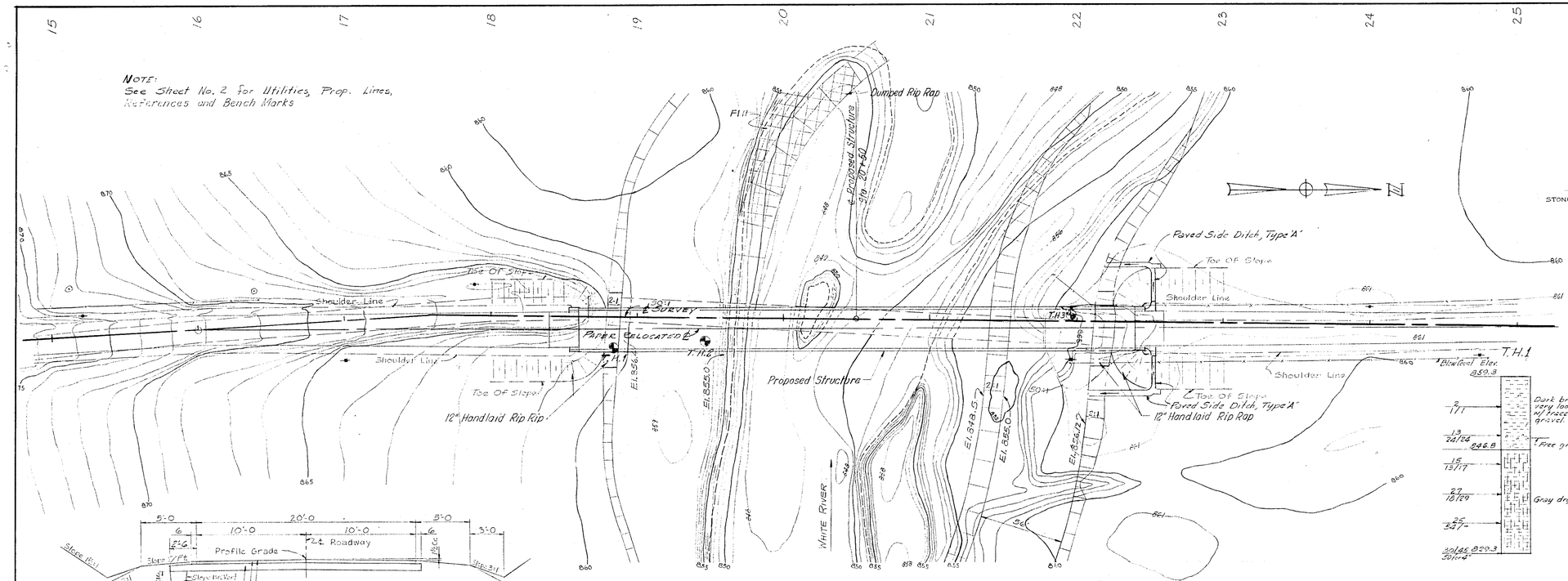
BRIDGE CONTRACT: 5707
BRIDGE FILE: MADISON 9398

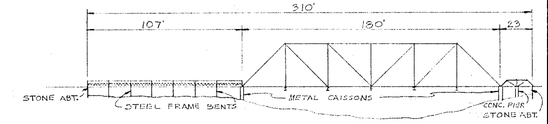
PROJ	LINE	SHEET	FILE
S-783(1)	REC	2	110

PLATE 1 - PLAN - PROFILE B. R. R. STANDARD
INDIANAPOLIS 1959 PRINT AND LITHOGRAPH COMPANY

BRIDGES OVER 20' SPAN					
FEDERAL ROAD REGION NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
4	IND.	S-783(1)	1962	3	40

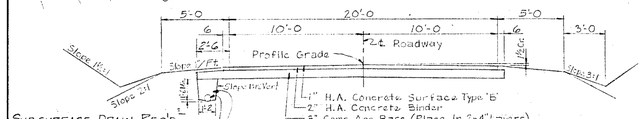
NOTE:
See Sheet No. 2 for Utilities, Prop. Lines, References and Bench Marks





Structure Deck: Wood on Steel Stringers.
Approximate Structural Steel Weight = 63.5 Tons.

ELEVATION OF EXISTING STRUCTURE
Scale: 1" = 50'



SUBSURFACE DRAIN REQ'D.
STA 10+00 to 14+00 on LEFT
STA 10+00 to 14+10 on RIGHT

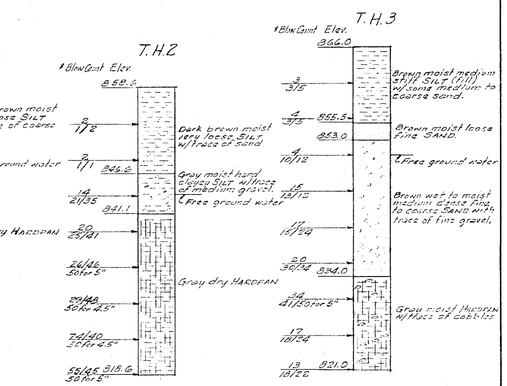
TYPICAL APPROACH SECTION
Scale: 3/16" = 1'-0

INDIANA FLOOD CONTROL AND WATER RESOURCES COMMISSION'S RECOMMENDATIONS

DRAINAGE AREA = 580 Sq. Mi.
WATERWAY OPENING = 4700 Sq. Ft. BELOW 1913 H.W.
" " = 3500 Sq. Ft. BELOW 1959 H.W.

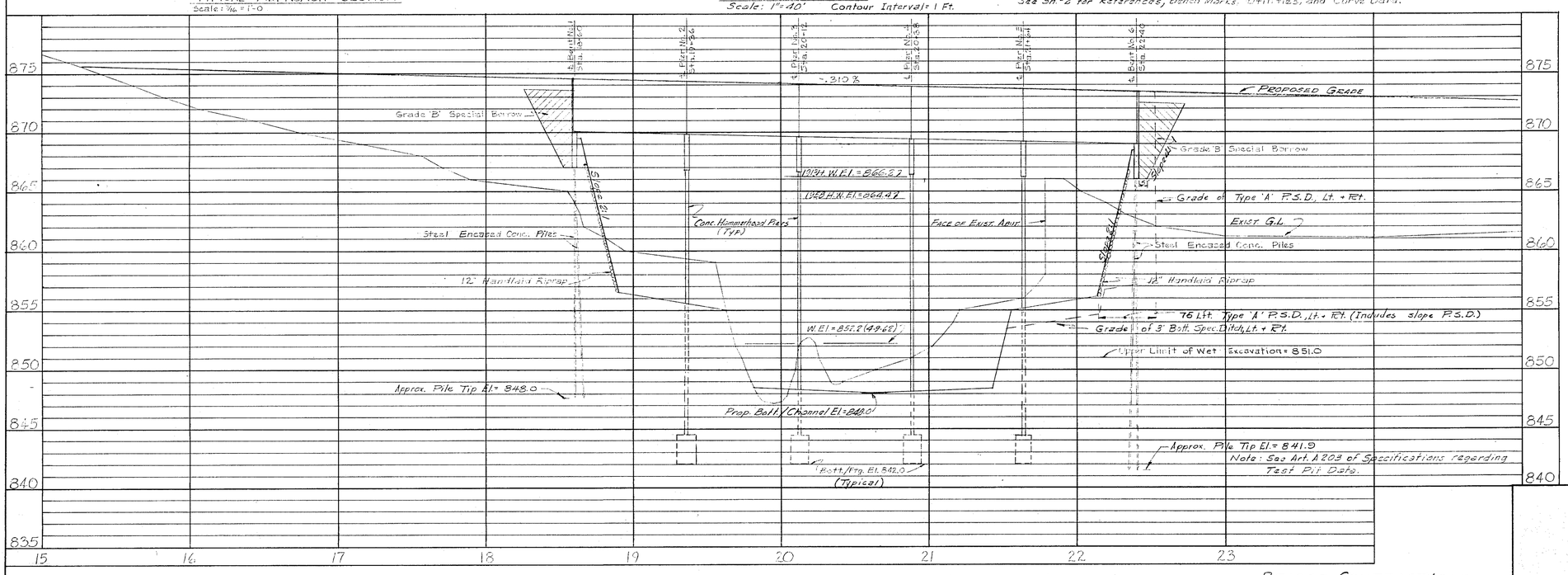
SITUATION PLAN
Scale: 1" = 40' Contour Interval = 1 Ft.

Note: See Sh. #4 for Channel Change.
See Sh. #2 for References, Bench Marks, Utilities, and Curve Data.



* Standard Penetration Test - Driving 2" O.D. Sampler 1' with Hammer Falling 30"; Blow Count Made at 6" Intervals. First 6" Count for Setting Sampler.

SOIL BORING LOGS
Scale: 1" = 10' Vertical.



PROFILE
Vert. 1" = 5'
Horiz. 1" = 40'

EARTHWORK

Fill + 20%	=	18015	Cu. Yds.
* Waterway Excavation	=	3075	Cu. Yds.
Common Excavation	=	2050	Cu. Yds.
Special Borrow	=	12890	Cu. Yds.
Total Waterway Excavation	=	16015	Cu. Yds.
* Useable in Fill	=	3075	Cu. Yds.
Waste (Unsuitable Material)	=	12940	Cu. Yds.
12" Handlaid Riprap	=	550	Sq. Yds.
Dumped Riprap	=	775	Tons.
Wet Excavations (Piers)	=	420	Cu. Yds.
Rubbish Disposal (Included in Common Ex.)			
Sodding	=	500	Sq. Yds.
Mulched Seeding	=	8110	Sq. Yds.

LAYOUT
PRESTRESSED CONC. I-BEAM BRIDGE
5 SPANS @ 73'-0 CL. NO SKEW
2-1'-0 CURBS 26'-0 CLEAR RDWY.
ON F.A.S. ROUTE S-1337 OVER W. FORK WHITE RIVER

BRIDGE CONTRACT: 5707
BRIDGE FILE: MADISON 9398

BRONNENBERG BRIDGE
MADISON COUNTY

BUTLER, FAIRMAN AND SEUFERT
INCORPORATED
1101 E. 46TH. ST. ENGINEERS INDIANAPOLIS
DWG. BY RFB CK. BY CES DATE 5-10-63

SHEET 3 OF 40

Appendix D: CR 500 Bridge Plans

CONTRACT No. B-16472

BRIDGES OVER 20' SPAN					
FEDERAL REGION NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	IND.		198	1	52

INDIANA DEPARTMENT OF HIGHWAYS

BRIDGE PLANS

FOR SPANS OVER 20 FEET

MADISON COUNTY

FEDERAL AID BRIDGE REPLACEMENT PROJECT. MABRZ-9948(15)

BEGINNING AT A POINT ON THE CENTERLINE OF COUNTY ROAD 500 EAST, SAID POINT BEING SOUTHERLY APPROX. 566 FEET ALONG LINE "PR-1" FROM THE INTERSECTION OF SAID ROAD AND THE CENTERLINE OF WHITE RIVER, THENCE NORTHERLY APPROX. 1125 FEET ALONG LINE "PR-1" AND TERMINATING ON THE CENTERLINE OF SAID ROAD. THE PROJECT BEING LOCATED ON THE LINE COMMON TO SECTION 11, MADISON COUNTY AND SECTION 12, DELAWARE COUNTY, T.19N., R.8E., UNION TOWNSHIP, INDIANA.

BRIDGE	LENGTH:	0.057 MI.
ROADWAY	LENGTH:	0.156 MI.
TOTAL	LENGTH:	0.213 MI.
MAX.	GRADE :	+5.36 %

INDEX

PROJECT	STRUCTURE	TYPE	SPAN	OVER	STATION
MABRZ-9948(15)	MADISON 10442	PRESTRESSED CONCRETE I-BEAM BRIDGE	3 SPANS AT 97'-6, 101'-0 & 97'-6 SKEW 40° LT.	WHITE RIVER	℄ 21+18 LINE "PR-1"

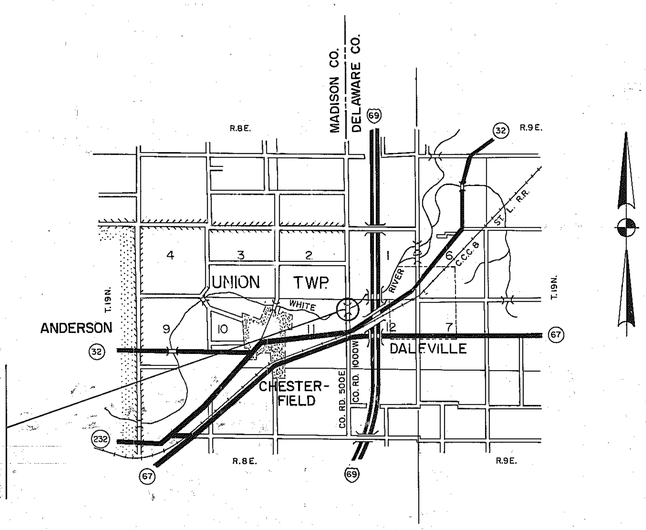
SHEET NO.	SHEET DESIGNATION	SUBJECT	F.H.W.A. APPROVAL
1		TITLE AND INDEX	
2-3		ROAD PLAN AND PROFILE	
4		SOIL BORINGS	
5		LAYOUT	
6-8		GENERAL PLAN	
9-10		BENTS NO.1 AND NO.4 DETAILS	
11		PIERS NO. 2 AND NO.3 DETAILS	
12-13		BEAM ERECTION PLAN AND DETAILS	
14		EXPANSION JOINTS CLASS S-S	
15		EXPANSION JOINTS CLASS T-S	
16		OPTIONAL PRECAST CONCRETE DECK PANELS	
17-19		FLOOR DETAILS	
20		BRIDGE SUMMARY	
21		BRIDGE ESTIMATE OF QUANTITIES	
22-28		CROSS SECTIONS	
5A		EROSION CONTROL	

INDEX CONTINUED

STANDARD DRAWINGS

SHEET NO.	SHEET DESIGNATION	SUBJECT	F.H.W.A. APPROVAL	ADOPTED "A" REVISION "R"
29	BRIDGE STD. BR1	ALUMINUM BRIDGE RAILING		R10-23-84
30	BRIDGE STD. BR2	ALUMINUM BRIDGE RAILING DETAILS		R10-23-84
31	BRIDGE STD. BR3	STEEL BRIDGE RAILING	12-16-80	R11-3-80
32	BRIDGE STD. BR4	STEEL BRIDGE RAILING DETAILS	5-10-79	R12-1-78
	BRIDGE STD. BR5	RAILING CONNECTION DETAILS		
	BRIDGE STD. BR6	RAILING CONNECTION DETAILS		
33	BRIDGE STD. C1	MISCELLANEOUS DETAILS	12-21-81	R12-7-81
	BRIDGE STD. C2	MISCELLANEOUS DETAILS		
34	BRIDGE STD. C3	MISCELLANEOUS DETAILS	12-21-81	R12-7-81
	BRIDGE STD. C4	MISCELLANEOUS DETAILS		
	BRIDGE STD. D	CASTING DETAILS ROADWAY DRAINS		
	BRIDGE STD. D1	ADJUSTING FRAME DETAILS FOR ROADWAY DRAINS		
	BRIDGE STD.			
35	BRIDGE STD. PB4	PRESTRESSED CONCRETE TYPE IV I-BEAMS	4-16-62	A JAN. 1962
	BRIDGE STD. PB	PRESTRESSED CONCRETE TYPE I-BEAMS		
	BRIDGE STD. PB6	PRESTRESSED BOX BEAMS		
	BRIDGE STD. PB	PRESTRESSED COMPOSITE BOX BEAMS WIDE		
	BRIDGE STD. PB	PRESTRESSED COMPOSITE BOX BEAMS WIDE		
36	BRIDGE STD. PB10	TOLERANCES FOR FABRICATION OF PRESTRESSED BEAMS	8-14-63	A NOV. 1962
37	BRIDGE STD. PB11	ELASTOMERIC BEARING PAD DETAILS	10-19-83	R9-9-83
	BRIDGE STD.			
	BRIDGE STD.			
	BRIDGE STD. R2A	BRIDGE LIGHTING DETAILS		
	BRIDGE STD. R2B	BRIDGE LIGHTING DETAILS		
38	BRIDGE STD. S1	MISCELLANEOUS DETAILS	1-17-72	R8-2-71
	BRIDGE STD. SH1	STEEL SHOE DETAILS		
	BRIDGE STD. T SHEET A	STANDARD TEMPORARY BRIDGE		
	BRIDGE STD. T SHEET B	STANDARD TEMPORARY BRIDGE		
	BRIDGE STD.			
	BRIDGE STD.			
	BRIDGE STD.			
	BRIDGE STD.			
	BRIDGE STD.			
	ROAD STD. SHEET A	STANDARD PAVEMENT JOINTS		
	ROAD STD. SHEET B	STANDARD PAVEMENT JOINTS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
39	ROAD STD. SHEET MA	MISCELLANEOUS STANDARDS		R9-4-84
40	ROAD STD. SHEET MHI	MISCELLANEOUS STANDARDS		R-6-3-85
41	ROAD STD. SHEET MT3	MISCELLANEOUS STANDARDS	8-30-82	A JUL. 1982
42	ROAD STD. SHEET MT4	MISCELLANEOUS STANDARDS	12-27-82	R10-1-82
43	ROAD STD. SHEET MP	MISCELLANEOUS STANDARDS		R-6-3-85
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET GR	GUARD RAIL CLASS		
44	ROAD STD. SHEET GR4	GUARD RAIL CLASS "GA or GST"		R4-2-84
44A	ROAD STD. SHEET GR2	GUARD RAIL CLASS "BS"	6-4-84	R-4-2-84
44B	ROAD STD. SHEET GR3	GUARD RAIL CLASS "BA or BST"	6-4-84	R-4-2-84
45	ROAD STD. SHEET GR5	ALUMINUM GUARD RAIL DETAILS	5-21-82	R4-1-82
46	ROAD STD. SHEET GR6	STEEL TUBE GUARD RAIL DETAILS	5-21-82	R4-1-82
	ROAD STD. SHEET GR7	GUARD RAIL PIER CONNECTION DETAILS		
	ROAD STD. SHEET GR8	STEEL BEAM GUARD RAIL		
	ROAD STD. SHEET GR9	ALUMINUM BEAM GUARD RAIL		
47	ROAD STD. SHEET GR10	GUARD RAIL BURIED ENDS		R2-1-85
	ROAD STD. SHEET GR10A	GUARD RAIL BREAKAWAY CABLE TERM.		
	ROAD STD.			
48	ROAD STD. SHEET CB2	TEMPORARY CONCRETE BARRIER		R6-1-84
	TRAFFIC STD. SHEET 9	TRAFFIC SIGN DETAILS		
	ROAD STD. SHEET 1 DETOURS	STANDARD DETOUR SIGNS		
	ROAD STD. SHEET 1A DETOURS	STANDARD DETOUR SIGNS		
	ROAD STD. SHEET 1B DETOURS	STANDARD DETOUR SIGNS		
48A	ROAD STD. SHEET 2 DETOURS	STANDARD DETOUR SIGNS	4-1-85	R-2-1-85
49	ROAD STD. SHEET 2A DETOURS	STANDARD DETOUR SIGNS	4-1-85	R2-1-85
50	ROAD STD. SHEET 3 DETOURS	STANDARD DETOUR SIGNS	4-10-84	R2-1-84
51	ROAD STD. SHEET 3A DETOURS	STANDARD DETOUR SIGNS	12-8-83	R10-3-83
52	ROAD STD. SHEET 4 DETOURS	STANDARD DETOUR SIGNS	12-8-83	R10-3-83
52A	ROAD STD. SHEET 5 DETOURS	STANDARD DETOUR SIGNS	4-10-84	R-2-1-84
	ROAD STD. SHEET 5A DETOURS	STANDARD DETOUR SIGNS		

TRAFFIC DATA	
A.D.T. (1985)	325 V.P.D.
A.D.T. (2005 PROJECTED)	530 V.P.D.
TRUCKS	7 %
DESIGN SPEED	40 M.P.H.
ACCESS CONTROL	NONE



MADISON COUNTY

SCALE: 1" = 1 MILE

BUTLER, FAIRMAN & SEUFERT, INC.

ENGINEERS

CARMEL, INDIANA

APPROVED DATE 7-11-86

Clayton B. Garland

Jamie A. Dowden

Raymond H. Price

BOARD OF MADISON COUNTY COMMISSIONERS

ATTEST Sondra S. Huntzinger

AUDITOR OF MADISON COUNTY

BRIDGE FILE: MADISON 10442
CONTINUOUS PRESTRESSED
CONCRETE I-BEAM BRIDGE
3 SPANS AT 97'-6, 101'-0 & 97'-6
26' O CLEAR RDWY., SKEW 40° LT.
BEGIN PROJECT: STA. 15+50 "PR-1"
END PROJECT: STA. 26+75 "PR-1"

NOTE:—
WHENEVER BRZ-9948( ) APPEARS IN THESE PLANS OR CONTRACT DOCUMENTS IT SHALL BE INTERPRETED AS
MABRZ-9948(15)

CERTIFIED BY: Stephen F. Weintraut

DATE: 7-10-86

STEPHEN F. WEINTRAUT REGISTERED NO. 16222 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL 8-1-86

Gregory L. Hermele

DESIGN CONSULTANT SERVICES MANAGER INDIANA DEPARTMENT OF HIGHWAYS

GREGORY L. HERMELE REGISTERED No. 18318 STATE OF INDIANA PROFESSIONAL ENGINEER

#109

APPROVED 8-12-86

CHIEF, DIVISION OF DESIGN

FEDERAL HIGHWAY ADMINISTRATION
DEPARTMENT OF TRANSPORTATION

APPROVED:-

DIVISION ADMINISTRATOR DATE

BRIDGE FILE:- MADISON 10442

REVISIONS	
DATE	SHEET NO.

REVISIONS	
DATE	SHEET NO.

INDIANA DEPARTMENT OF HIGHWAYS
STANDARD SPECIFICATIONS DATED 1985
TO BE USED WITH THESE PLANS.

1479

#109

SIGN LEGEND

KEY	DESCRIPTION	DESIGNATION	TYPE
A	Road Closed ___ Miles Ahead Local Traffic Only & Detour	R11-4 & XM4-10L	A
B	Road Closed ___ Miles Ahead Local Traffic Only & Detour	R11-4 & XM4-10R	A
C	Road Closed 1000 Feet	W20-3	A
D	Road Closed 500 Feet	W20-3	A
E	Detour	XM4-10L	B
F	Standard Barricade, Type III-A		

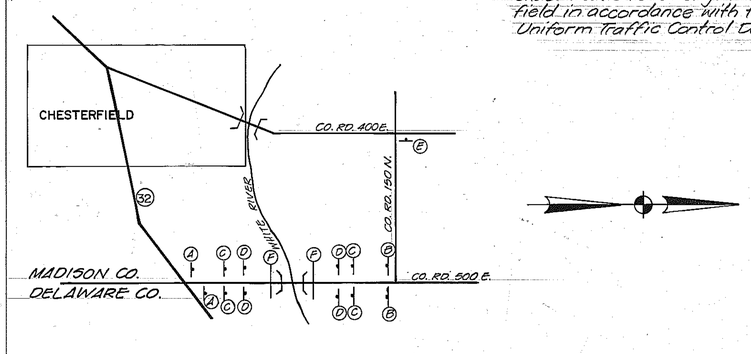
SHEET SIGN SUMMARY

SIGN CODE	SIGN DESCRIPTION	NO. OF SIGNS	SHEETING TYPE	THICKNESS (INCHES)	TOT. AREA (SQ. FT.)
W3-1-A	STOP AHEAD	1	II	0.100	9.0
R4-1	DO NOT PASS	1	I	0.080	5.0
W14-3	NO PASSING ZONE	1	II	0.100	5.6
		TOTAL	I	0.080	5.0
		TOTAL	II	0.100	14.6

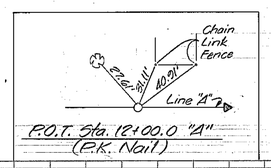
* SIGN POST SUMMARY

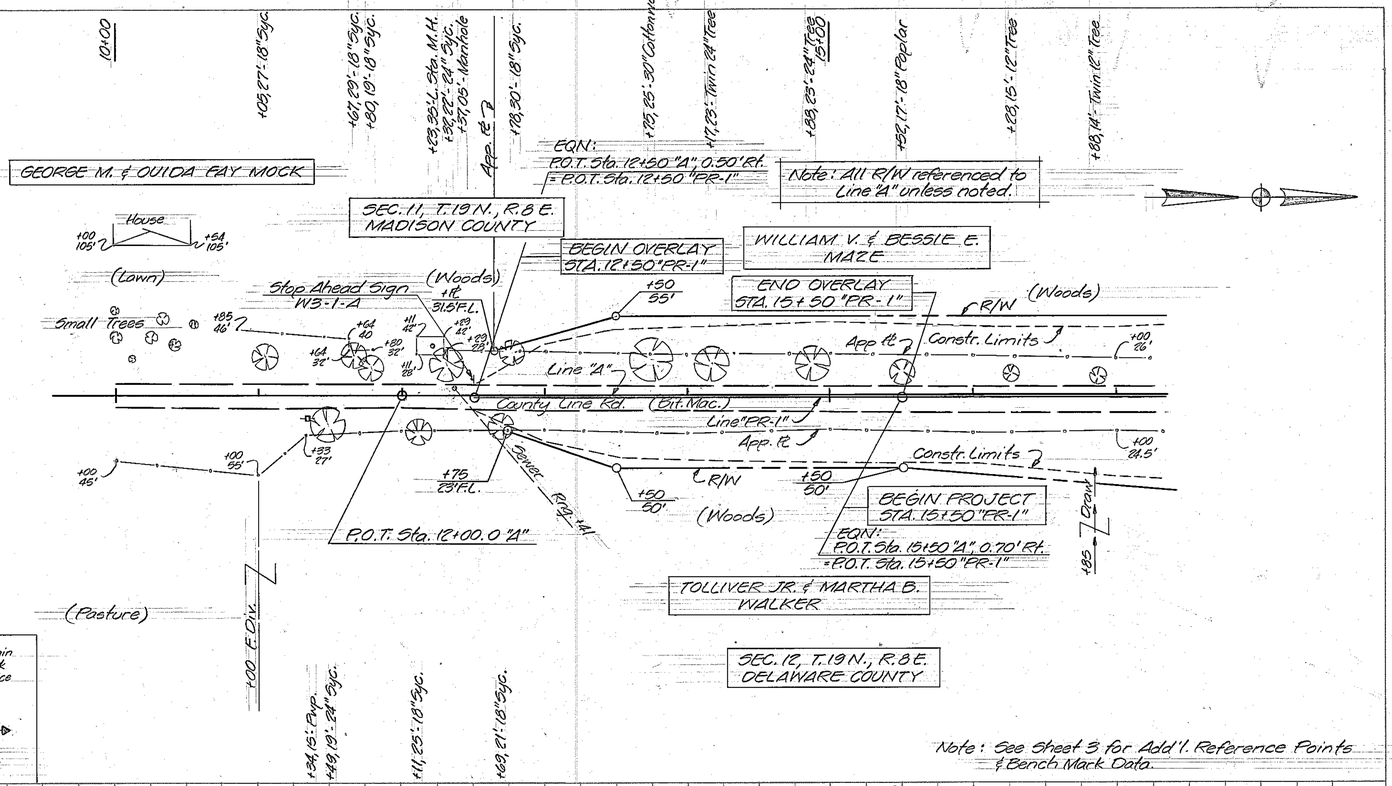
SIGN CODE	LOCATION STATION AND LINE	LT./RT.	NO. OF POSTS	POST TYPE	TOT. LEN. (LFT.)
W3-1-A	12+50 "A"	LT.	2	A	28
R4-1	23+75 "PR-1"	RT.	1	A	14
W14-3	23+75 "PR-1"	LT.	2	A	28
			TOTAL	A	70

* Note: Sign location and post lengths are approximate. Exact location and length to be determined in the field in accordance with the Indiana Manual on Uniform Traffic Control Devices.

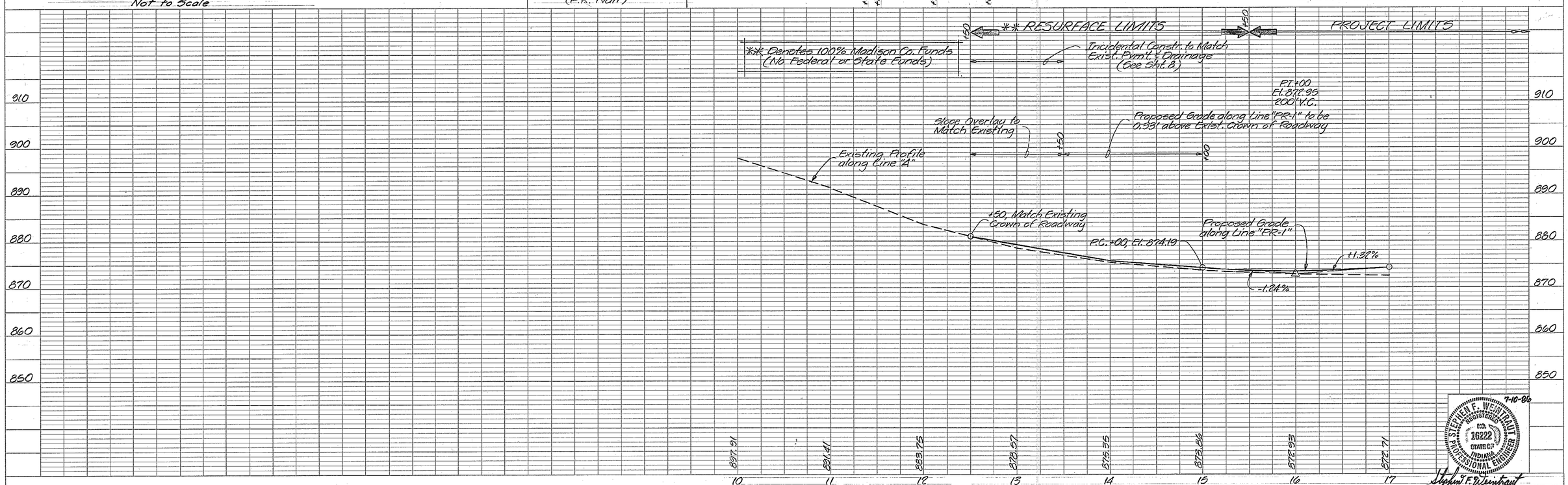


TRAFFIC CONTROL PLAN
Not to Scale





Note: See Sheet 3 for Add'l. Reference Points & Bench Mark Data.



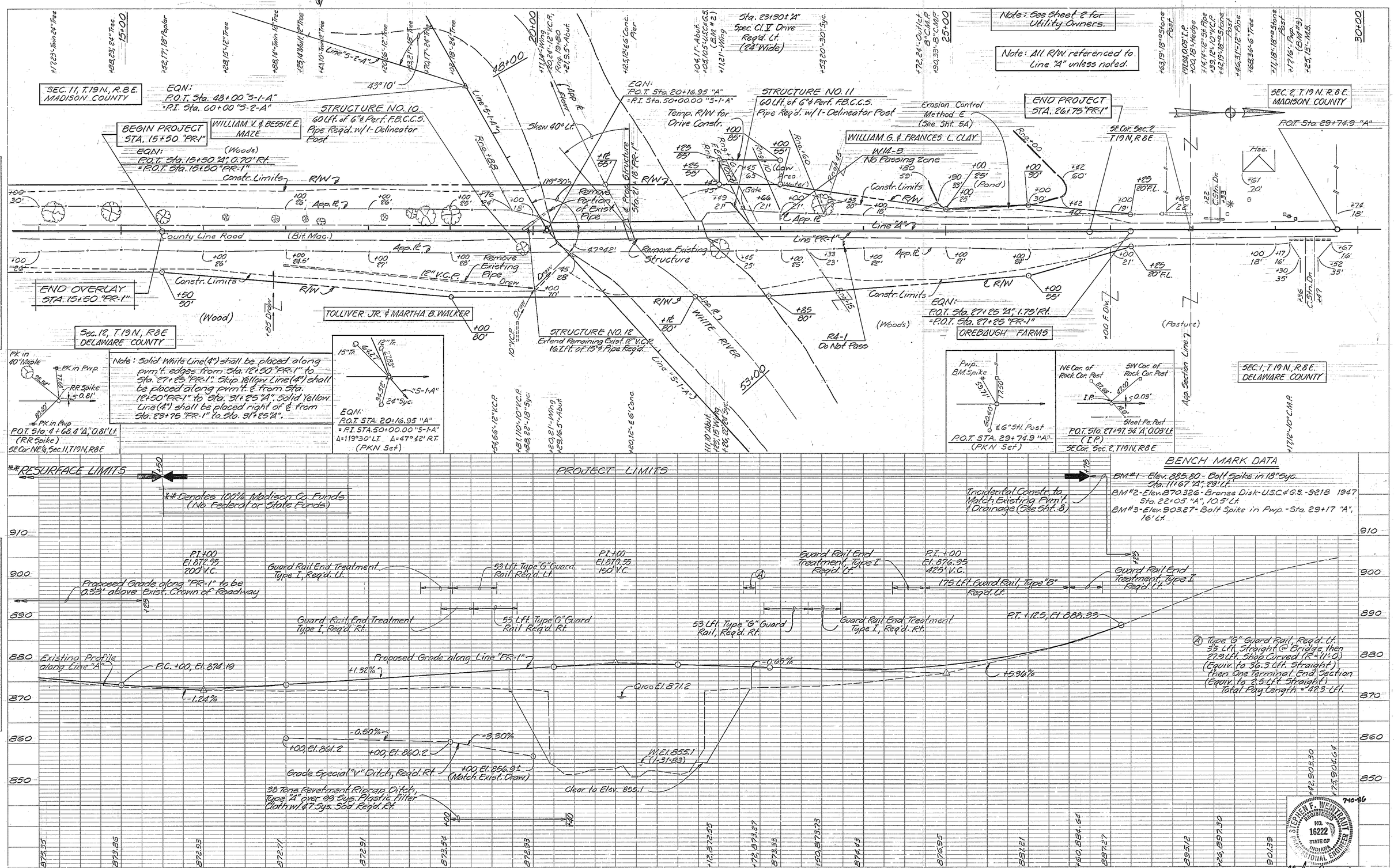
PLAN — SURVEYED: ; DRAWN: ; NOTE BOOK: ; No. 128 — BY B.C.F.S. T. Carlson — DATE 2-9-83 2-9-83 — ALIGNMENT CHECKED: ; R/W OF WAY CHECKED:

PROFILE — SURVEYED: ; DRAWN: ; NOTE BOOK: ; No. 128 — BY B.C.F.S. T. Carlson — DATE 2-9-83 2-9-83 — GRADES CHECKED: ; B. M.'S NOTED: ; STRUCTURE NOTATIONS CHECKED:

7-10-86
STEPHEN F. WEINTRAUT REGISTERED NO. 36222 STATE OF INDIANA PROFESSIONAL ENGINEER
Stephen F. Weintraut

BRIDGE CONTRACT: B-16472
BRIDGE FILE: MADISON 10442

PROJECT NO.	LINE	SHEET NO.	TOTAL SHEETS	FILE
BRZ-9942( )	"A"	2	56	1479


Note: See Sheet 2 for Utility Owners.
Note: All R/W referenced to Line "A" unless noted.
SEC. 11, T.19 N., R.8 E. MADISON COUNTY
EQN: P.O.T. Sta. 48+00 "S-1-A" = P.I. Sta. 60+00 "S-2-A"
STRUCTURE NO. 10
60 Lft. of 6" ϕ Perf. F.B.C.C.S. Pipe Req'd. w/1-Delineator Post
BEGIN PROJECT STA. 15+50 "PR-1"
WILLIAM V. & BESSIE E. MAZE
EQN: P.O.T. Sta. 15+50 "A", 0.70' Rt. = P.O.T. Sta. 15+50 "PR-1"
Constr. Limits
R/W
County Line Road
(Bit. Mac.)
App. ℄
END OVERLAY STA. 15+50 "PR-1"
Sec. 12, T.19 N., R.8 E. DELAWARE COUNTY
TOLLIVER JR. & MARTHA B. WALKER
(Wood)
Skew 40° Lt.
Remove Portion of Exist. Pipe
Remove Existing Pipe
Remove Existing Structure
Drain
STRUCTURE NO. 12
Extend Remaining Exist. 12" V.C.P. 16 Lft. of 15" ϕ Pipe Req'd.
EQN: P.O.T. Sta. 20+16.95 "A" = P.I. Sta. 50+00.00 "S-1-A"
STRUCTURE NO. 11
60 Lft. of 6" ϕ Perf. F.B.C.C.S. Pipe Req'd. w/1-Delineator Post
Temp. R/W for Drive Constr.
Sta. 23+30 ± "A" Spec. Cl. V Drive Req'd. Lt. (24' Wide)
Erosion Control Method "E" (See Sht. 5A)
WILLIAM G. & FRANCES L. CLAY
WM-3 No Passing Zone
Constr. Limits
(Low Area Water)
Gate
Line "PR-1"
Line "A"
Line "S-1-A"
WHITE RIVER
R4-1 Do Not Pass
EQN: P.O.T. Sta. 27+25 "A", 1.75' Rt. = P.O.T. Sta. 27+25 "PR-1"
OREBAUGH FARMS
(Woods)
(Pasture)
END PROJECT STA. 26+75 "PR-1"
SE Cor. Sec. 2, T.19 N., R.8 E.
SEC. 2, T.19 N., R.8 E. MADISON COUNTY
P.O.T. Sta. 29+74.9 "A"
App. Section Line
SEC. 1, T.19 N., R.8 E. DELAWARE COUNTY
P.O.T. Sta. 4+68.4 "A", 0.81' Lt. (RR Spike)
SE Cor. NE¼, Sec. 11, T.19 N., R.8 E.
P.O.T. STA. 20+16.95 "A" = P.I. STA. 50+00.00 "S-1-A" Δ=119°30' Lt. Δ=47°42' Rt. (PKN Set)
P.O.T. STA. 29+74.9 "A" (PKN Set)
P.O.T. Sta. 27+97.34 "A", 0.03' Lt. (I.P.)
SE Cor. Sec. 2, T.19 N., R.8 E.
NE Cor. of Rock Cor. Post
SW Cor. of Rock Cor. Post
Steel Fe. Post
BENCH MARK DATA
BM #1 - Elev. 885.80 - Bolt Spike in 18" Syc. Sta. 11+67 "A", 29' Lt.
BM #2 - Elev. 870.326 - Bronze Disk - U.S.C. & G.S. - S218 1947 Sta. 22+05 "A", 10.5' Lt.
BM #3 - Elev. 903.27 - Bolt Spike in Pwp. - Sta. 29+17 "A", 16' Lt.
** RESURFACE LIMITS
PROJECT LIMITS
** Denotes 100% Madison Co. Funds (No Federal or State Funds)
Incidental Constr. to Match Existing Pvmt. & Drainage (See Sht. 8)
Existing Profile along Line "A"
Proposed Grade along "PR-1" to be 0.33' above Exist. Crown of Roadway
Proposed Grade along Line "PR-1"
P.C. +00, El. 874.19
-1.24%
+1.32%
-0.65%
+5.36%
Q100 El. 871.2
Guard Rail End Treatment Type I, Req'd. Lt.
53 Lft. Type "G" Guard Rail, Req'd. Lt.
175 Lft. Guard Rail, Type "B" Req'd. Lt.
P.T. +12.5, El. 888.33
Ⓐ Type "G" Guard Rail, Req'd. Lt. 38 Lft. Straight @ Bridge then 22.9 Lft. Stop Curved (R=115.0) (Equiv. to 36.5 Lft. Straight) Then One Terminal End Section (Equiv. to 2.5 Lft. Straight) Total Pay Length = 42.5 Lft.
+00, El. 861.2
+00, El. 860.2
-0.50%
-3.30%
+00, El. 856.9 ± (Match Exist. Drain)
Grade Special "V" Ditch, Req'd. Rt.
38 Tons Revetment Riprap Ditch, Type "A" over 99 Sys. Plastic Filter Cloth w/ 47.5 Sys. Sod Req'd. Rt.
Clear to Elev. 855.1
PLATE 1 - PLAN - PROFILE B. R. R. STANDARD
1975
BRIDGE CONTRACT: B-16472
BRIDGE FILE: MADISON 10442
PROJECT NO. BRZ-9948( ) "A"
SHEET NO. 3
TOTAL SHEETS 32
FILE 1479
STEPHEN F. WEINTRAUT REGISTERED NO. 16222 STATE OF INDIANA PROFESSIONAL ENGINEER
7-10-86

TP114

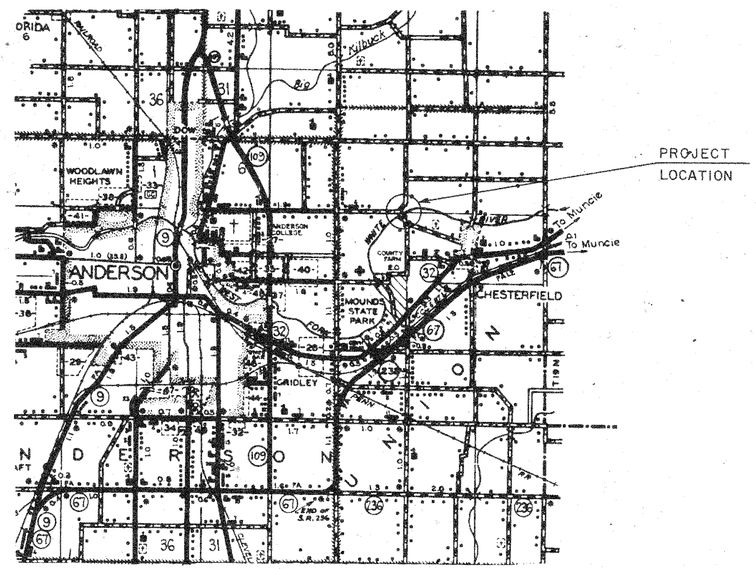
Appendix D: Greenhill Bridge Plans

SHEET	SUBJECT
1	TITLE AND SUMMARY
2-3	ROAD PLAN AND PROFILE
4	LAYOUT
5	CHANNEL CHANGE LAYOUT
6	GENERAL PLAN
7	BENTS NO. 1 & NO.6 DETAILS
8	PIERS NO. 2 & NO.3 DETAILS
9	PIERS NO. 4 & NO.5 DETAILS
10	BEAM ERECTON PLAN
11	STRUCTURE DETAILS – SPANS "A" "B" & "C"
12	STRUCTURE DETAILS – SPANS "D" & "E"
13	BOX CULVERT DETAILS
14	STANDARDS
15-23	CROSS SECTIONS

MADISON COUNTY BRIDGE PLANS

APPROACH LENGTH	0.276 MILES
BRIDGE LENGTH	0.065 MILES
PROJECT LENGTH	0.341 MILES
DESIGN SPEED	40 M.P.H.

N



MADISON COUNTY
scale 1" = 1 mile
PROJECT LOCATION

SUMMARY

ITEM	DESCRIPTION	UNIT	AMOUNT
1	CONCRETE, CLASS "A" IN SUPERSTRUCTURE	C.Y.	331.2
2	CONCRETE, CLASS "A" IN SUBSTRUCTURE	C.Y.	128.7
3	CONCRETE, CLASS "B" ABOVE FTG.	C.Y.	118.0
4	CONCRETE, CLASS "B" IN FTG.	C.Y.	71.2
5	CONCRETE RAILING	C.Y.	3.0
6	REINFORCING STEEL	LBS.	147,892
7	CONCRETE STRUCTURAL MEMBERS	L.S.	1
8	RAILING, TYPE 6 (ALUMINUM)	LIN. FT.	658
9	PILE SHELLS FURNISHED & DRIVEN (12"Ø)	LIN. FT.	560
10	FURNISHING EQUIPMENT FOR DRIVING PILES	L.S.	1
11	WET EXCAVATION	C.Y.	560
12	WATERWAY EXCAVATION	C.Y.	11,160
13	COMMON EXCAVATION	C.Y.	1215
14	BORROW	C.Y.	54,345
15	"B" BORROW	C.Y.	85
16	TYPE "P", COMPACTED AGG. FOR BASE	TON	2200
17	TYPICAL SIGN STANDARDS	EA.	8
18	STANDARD BARRICADES, TYPE "B"	EA.	4
19	CONCRETE, CLASS "A" IN STRUCTURES	C.Y.	21.4
20	SODDING	S.Y.	900
21	MULCHED SEEDING	S.Y.	13,660
22	HOT ASPHALTIC CONCRETE SURFACE, TYPE "B"	TON	255
23	HOT ASPHALTIC CONCRETE BASE	TON	525
24	AGGREGATE FOR SHOULDER DRAINS	TON	10
25	PAVED SIDE DITCH, TYPE "A"	L.F.	1005
26	PAVED SIDE DITCH, TYPE "G"	L.F.	280
27	REVETMENT RIPRAP	TON	1245
28	GUARD RAIL, TYPE "GA"	L.F.	2242
29	6" PERFORATED C.S. PIPE (18 Ga.)	L.F.	102
30	12" C.S. PIPE (16 Ga.)	L.F.	112
31	24" C.S. PIPE (16 Ga.)	L.F.	102
32	CONCRETE PAVEMENT, REINFORCED CEMENT (9")	S.Y.	146.2
33	EPOXY SEAL FOR BRIDGE DECK	S.Y.	1309
34	CASTING, TYPE 7	EA	1
35	ALUMINUM PLAQUE	EA	1

#105

APPROVED DATE 4-5-71

George W. Baker
Clifton Taddock
Murray J. Alford
BOARD OF MADISON COUNTY COMMISSIONERS

ATTEST
Carlton F. Davison
MADISON COUNTY AUDITOR

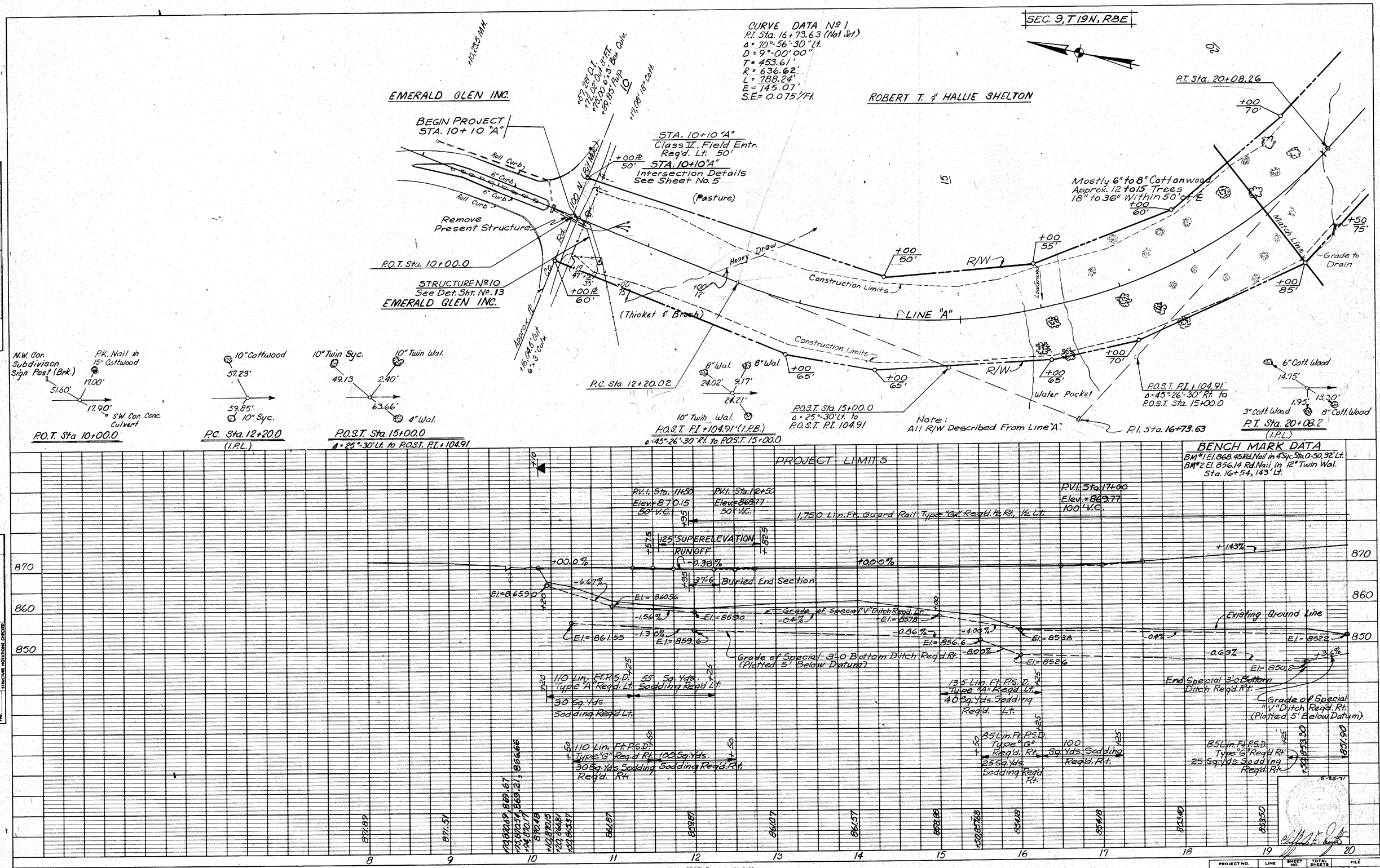
INDIANA STATE HIGHWAY COMMISSION
STANDARD SPECIFICATIONS DATED 1969
TO BE USED WITH THESE PLANS.

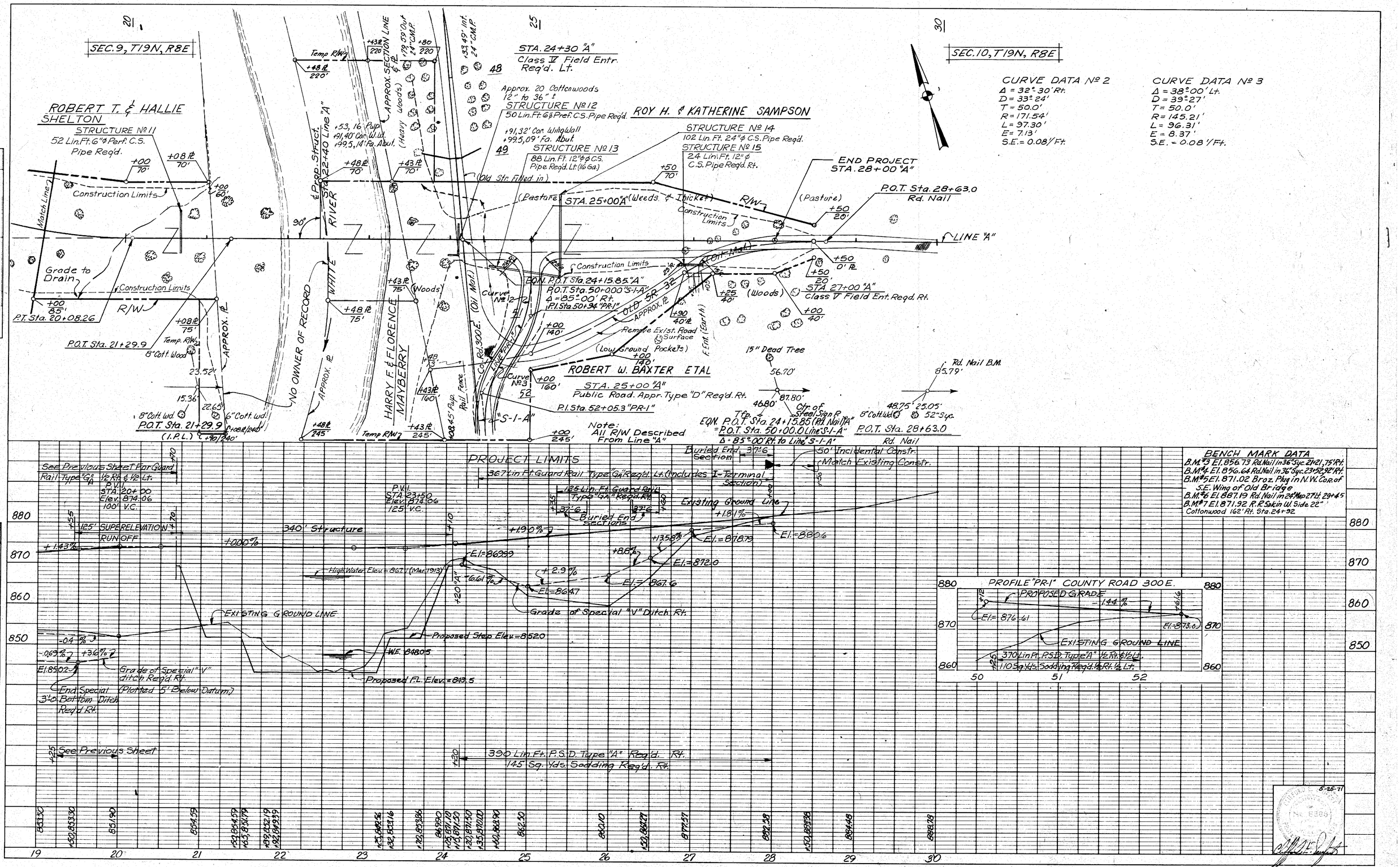
5-25-71

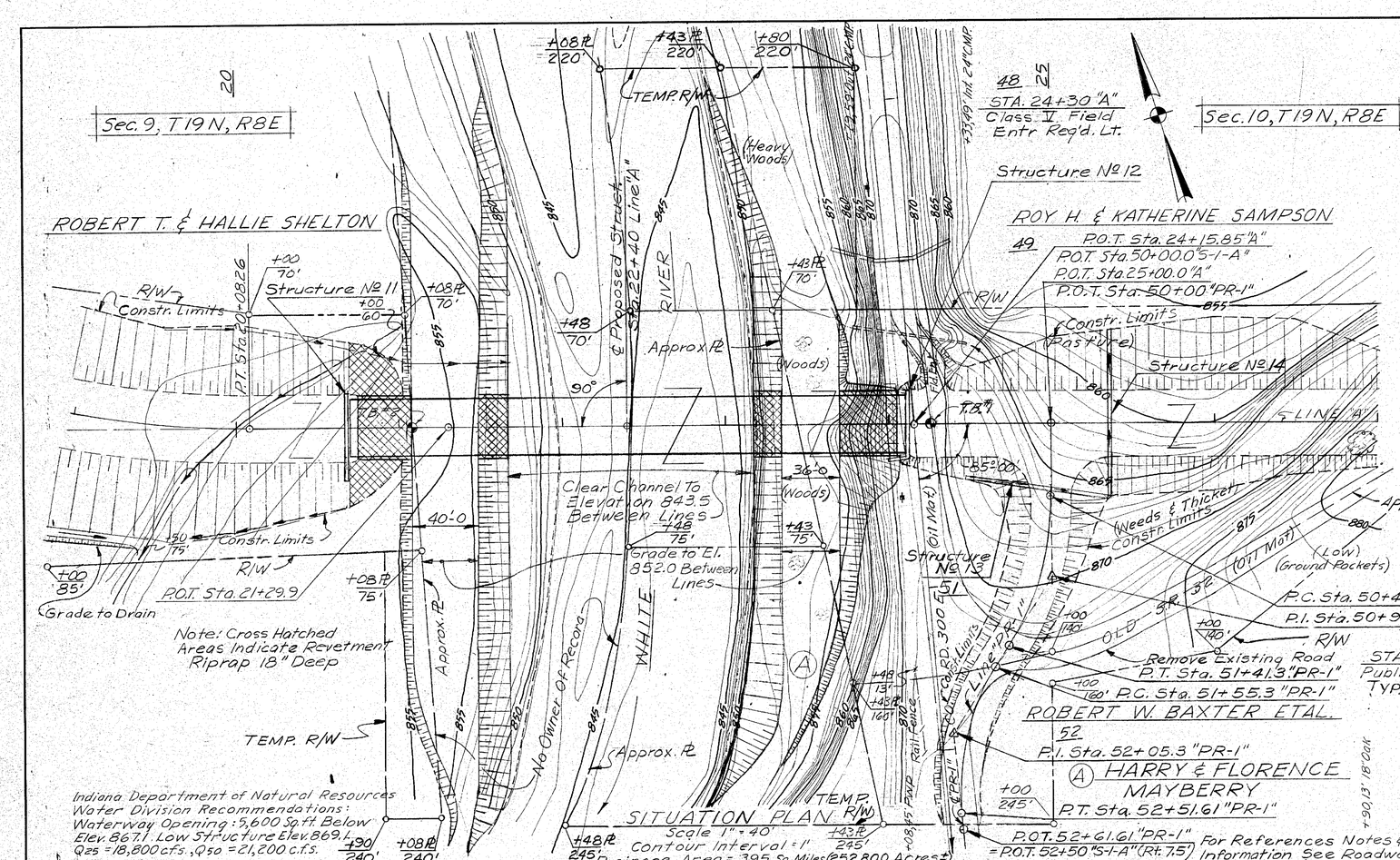
COUNTY ROAD 75 N. over WHITE RIVER
MADISON COUNTY

BUTLER, FAIRMAN AND SEUFERT
INCORPORATED
INDIANAPOLIS ENGINEERS INDIANA
DWG. BY CK. BY CEL DATE 2/22/71

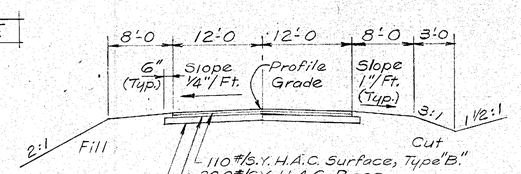
SHEET 1 OF 23
560


SEC. 9, T19N, R8E
CURVE DATA Nº 1
P.I. Sta. 16+73.63 (Not Set)
Δ = 70°-56'-30" Lt.
D = 9°-00'00"
T = 453.61'
R = 636.62'
L = 788.24'
E = 145.07'
S.E. = 0.075'/Ft.
EMERALD GLEN INC.
ROBERT T. & HALLIE SHELTON
BEGIN PROJECT STA. 10+10 "A"
STA. 10+10 "A"
Class V. Field Entr. Req'd. Lt. 50'
STA. 10+10 "A"
Intersection Details See Sheet No. 5
(Pasture)
Roll Curb
6" Curb
Remove Present Structure
P.O.T. Sta. 10+00.0
STRUCTURE Nº 10
See Det. Sht. Nº 13
EMERALD GLEN INC.
Approx. R/W
Heavy Draw
(Thicket & Brush)
Construction Limits
LINE "A"
R/W
Mostly 6" to 8" Cottonwood
Approx. 12 to 15 Trees
18" to 36" Within 50' of ℄
P.T. Sta. 20+08.26
Match Line
Grade to Drain
Water Pocket
P.O.S.T. P.I. +104.91
Δ = 45°-26'-30" Rt. to P.O.S.T. Sta. 15+00.0
P.I. Sta. 16+73.63
P.T. Sta. 20+08.2 (I.P.L.)
P.C. Sta. 12+20.02
P.O.S.T. Sta. 15+00.0
Δ = 25°-30' Lt. to P.O.S.T. P.I. 104.91
Note: All R/W Described From Line "A".
N.W. Cor. Subdivison Sign Post (Brk.)
Pk. Nail in 15" Cottwood
S.W. Cor. Conc. Culvert
P.O.T. Sta 10+00.0
P.C. Sta. 12+20.0 (I.P.L.)
P.O.S.T. Sta. 15+00.0
Δ = 25°-30' Lt. to P.O.S.T. P.I. +104.91
P.O.S.T. P.I. +104.91 (I.P.L.)
Δ = 45°-26'-30" Rt. to P.O.S.T. 15+00.0
BENCH MARK DATA
BM #1 El. 868.45 Rd. Nail in 4" Syc. Sta. 0+50.92' Lt.
BM #2 El. 856.14 Rd. Nail in 12" Twin Wal. Sta. 16+54.143' Lt.
PROJECT LIMITS
P.V.I. Sta. 11+50 Elev. = 870.15 50' V.C.
P.V.I. Sta. 12+50 Elev. = 869.77 50' V.C.
P.V.I. Sta. 17+00 Elev. = 863.77 100' V.C.
1,750 Lin. Ft. Guard Rail Type "G" Req'd. ½ Rt., ½ Lt.
125' SUPERELEVATION RUNOFF
Buried End Section
Grade of Special "V" Ditch Req'd. Rt.
Existing Ground Line
Grade of Special 3'-0 Bottom Ditch Req'd. Rt. (Plotted 5' Below Datum)
End Special 3'-0 Bottom Ditch Req'd. Rt.
Grade of Special "V" Ditch Req'd. Rt. (Plotted 5' Below Datum)
110 Lin. Ft. P.S.D. Type "A" Req'd. Lt.
55 Sq. Yds. Sodding Req'd. Lt.
30 Sq. Yds. Sodding Req'd. Lt.
110 Lin. Ft. P.S.D. Type "G" Req'd. Rt.
100 Sq. Yds. Sodding Req'd. Rt.
30 Sq. Yds. Sodding Req'd. Rt.
135 Lin. Ft. P.S.D. Type "A" Req'd. Lt.
40 Sq. Yds. Sodding Req'd. Lt.
85 Lin. Ft. P.S.D. Type "G" Req'd. Rt.
100 Sq. Yds. Sodding Req'd. Rt.
25 Sq. Yds. Sodding Req'd. Rt.
85 Lin. Ft. P.S.D. Type "G" Req'd. Rt.
25 Sq. Yds. Sodding Req'd. Rt.
PLAN
PROFILE
NOTE BOOK
No.
PLATE 1 - PLAN - PROFILE B. R. R. STANDARD
November 6, 1961
PROJECT NO.
LINE "A"
SHEET NO. 2
TOTAL SHEETS 23
FILE 560

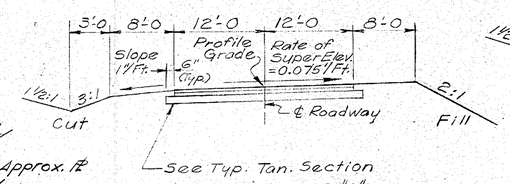

SEC. 9, T19N, R8E
SEC. 10, T19N, R8E
ROBERT T. & HALLIE SHELTON
STRUCTURE Nº 11
52 Lin. Ft. 6" ϕ Perf. C.S. Pipe Req'd.
STA. 24+30 "A"
Class V Field Entr. Req'd. Lt.
Approx. 20 Cottonwoods 12" to 36" ϕ
STRUCTURE Nº 12
50 Lin. Ft. 6" ϕ Perf. C.S. Pipe Req'd.
ROY H. & KATHERINE SAMPSON
STRUCTURE Nº 13
88 Lin. Ft. 12" ϕ C.S. Pipe Req'd. Lt. (16 Ga.)
STRUCTURE Nº 14
102 Lin. Ft. 24" ϕ C.S. Pipe Req'd.
STRUCTURE Nº 15
24 Lin. Ft. 12" ϕ C.S. Pipe Req'd. Rt.
END PROJECT STA. 28+00 "A"
P.O.T. Sta. 28+63.0 Rd. Nail
LINE "A"
STA. 25+00 "A"
STA. 27+00 "A"
Class V Field Ent. Req'd. Rt.
Construction Limits
Grade to Drain
P.T. Sta. 20+08.26
P.O.T. Sta. 21+29.9
Temp. R/W
8" Cott. Wood
NO OWNER OF RECORD
HARRY F. & FLORENCE MAYBERRY
ROBERT W. BAXTER ETAL
STA. 25+00 "A"
Public Road. Appr. Type "D" Req'd. Rt.
P.I. Sta. 52+05.3 "PR-1"
"S-1-A"
Note: All R/W Described From Line "A"
EQN. P.O.T. Sta. 24+15.85 (Rd. Nail) "A" = P.O.T. Sta. 50+00.0 Line "S-1-A"
Δ = 85°-00' Rt. to Line "S-1-A"
P.O.T. Sta. 28+63.0 Rd. Nail
Rd. Nail B.M.
15" Dead Tree
Ctr. of Steel Sign P.
Tip of
Old Sta. Filled in
Remove Exist. Road Surface
(Low Ground Pockets)
Approx. R/W
Rail Fence
Co. Rd. 300 E.
Curve Nº 12
Curve Nº 3
CURVE DATA Nº 2
Δ = 32°-30' Rt.
D = 33°-24'
T = 50.0'
R = 171.54'
L = 97.30'
E = 7.13'
S.E. = 0.08'/Ft.
CURVE DATA Nº 3
Δ = 38°-00' Lt.
D = 39°-27'
T = 50.0'
R = 145.21'
L = 96.31'
E = 8.37'
S.E. = 0.08'/Ft.
PROJECT LIMITS
367 Lin. Ft. Guard Rail Type "GA" Req'd. Lt. (Includes I-Terminal Section)
125 Lin. Ft. Guard Rail Type "GA" Req'd. Rt.
Buried End Sections
50' Incidental Constr. (Match Existing Constr.)
See Previous Sheet For Guard Rail Type "GA" ½ Rt. & ½ Lt.
P.V.I. STA. 20+00 Elev. 874.06 100' V.C.
P.V.I. STA. 23+50 Elev. 874.06 125' V.C.
125' SUPERELEVATION RUNOFF
340' Structure
Existing Ground Line
High Water Elev. = 867.1 (Mar. 1913)
Grade of Special "V" Ditch Rt.
Proposed Step Elev. = 850
W.E. 848.05
Proposed F.L. Elev. = 848.5
Grade of Special "V" ditch Req'd. Rt.
End Special (Plotted 5' Below Datum) 3' ϕ Bottom Ditch Req'd. Rt.
See Previous Sheet
390 Lin. Ft. P.S.D. Type "A" Req'd. Rt.
145 Sq. Yds. Sodding Req'd. Rt.
PROFILE "PR-1" COUNTY ROAD 300 E.
PROPOSED GRADE
EXISTING GROUND LINE
370 Lin. Ft. P.S.D. Type "A" ½ Rt. & ½ Lt.
110 Sq. Yds. Sodding Req'd. ½ Rt. & ½ Lt.
BENCH MARK DATA
B.M. #3 El. 856.73 Rd. Nail in 36" Syc. 21+21, 75' Rt.
B.M. #4 El. 856.64 Rd. Nail in 36" Syc. 23+52, 92' Rt.
B.M. #5 El. 871.02 Broz. Plug in N.W. Cor. of S.E. Wing of Old Bridge
B.M. #6 El. 887.19 Rd. Nail in 24" Mp. 27' Lt. 29+45
B.M. #7 El. 871.92 R.R. Spikin W. Side 22" Cottonwood 162' Rt. Sta. 24+92
PLAN
PROFILE
PLATE 1 - PLAN - PROFILE & R R STANDARD
November 6, 1961
PROJECT NO.
LINE "A"
SHEET NO. 3
TOTAL SHEETS 23
FILE 560



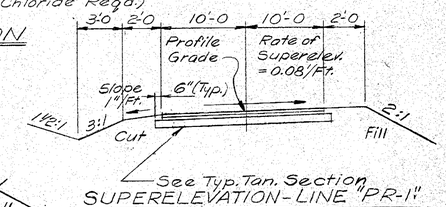
SITUATION PLAN
Scale 1" = 40'
Contour Interval = 1'



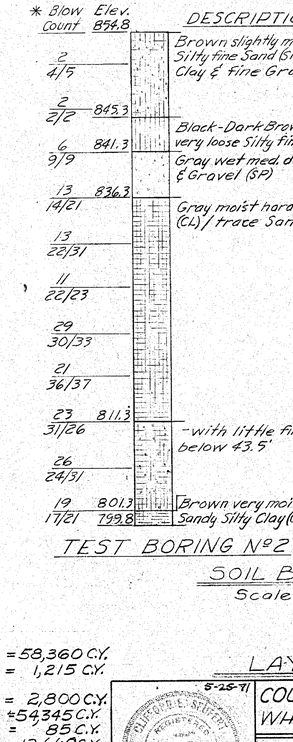
TYPICAL APPROACH SECTION ON TANGENT
Not to Scale



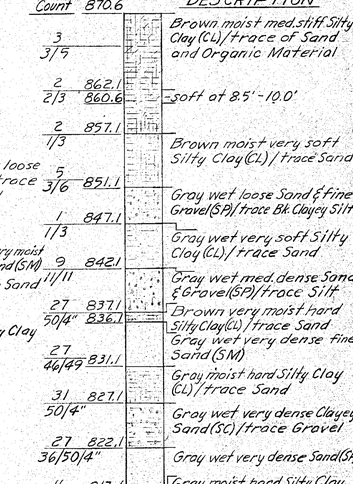
SUPERELEVATION-LINE "A"
CURVE No 1
Not to Scale



SUPERELEVATION-LINE "PR-1"
CURVES No 2 & 3
Not to Scale



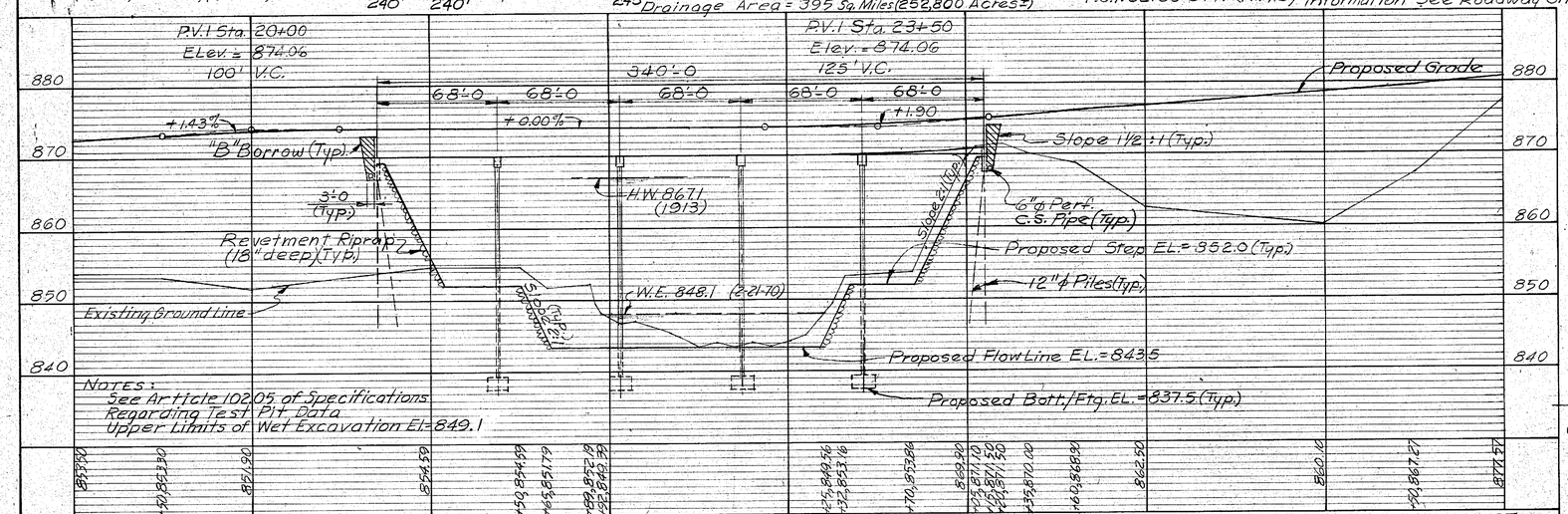
TEST BORING No 2



TEST BORING No 1

*Standard Penetration Test - Driving 2" O.D. Sampler 1'-0 with 140#. hammer falling 30". Count made at 6" intervals. First 6" Count for Setting Sampler.

SOIL BORING LOG
Scale 1" = 8'-0



PROFILE
Scale: 1" = 40'-0 Horz.
1" = 10'-0 Vert.

NOTES:
See Article 102.05 of Specifications Regarding Test Pit Data
Upper Limits of Wet Excavation El. = 849.1

EARTHWORK

Fill + 20%	= 58,360 C.Y.
Common Excavation	= 1,215 C.Y.
Usable Waterway Excavation	= 2,800 C.Y.
Borrow	= 54,345 C.Y.
"B" Borrow	= 85 C.Y.
Mulched Seeding	= 13,660 S.Y.
*Sodding	= 900 S.Y.
Waterway Excavation	= 11,160 C.Y.

* Includes 115 Sq. Yds. Sodding Reqd. @ Bridge

LAYOUT

COUNTY ROAD 75 N. OVER WHITE RIVER, MADISON COUNTY

BUTLER, FAIRMAN AND SEUFERT INCORPORATED
ENGINEERS
INDIANAPOLIS INDIANA

DWG. BY RMF CK. BY CEL DATE 3-28-70

SHEET 4 OF 23

560

Appendix D: I-69 Bridge Plans

BRIDGE CONTRACT NO. 5846

INDEX

PROJECT	STRUCTURE	TYPE	SPAN	OVER	STATION	CONTRACT NO.
I-69-2(21)32	I-69-32-4741 & 4741J	CONT. STEEL BEAM BR. (TWO. STRUCT.)	70'-9", 84'-6", 84'-6", 84'-6" & 70'-9" SKEW 6°-00'	WHITE RIVER	POT 892+50.0 LINE "A"	5846

SHEET NO.	SHEET DESIGNATION	SUBJECT
1	ONE SHEET	TITLE SHEET
2	ROAD STANDARD	STD. DIV. LANE SECTIONS FOR FEDERAL AID INTERSTATE PROJ. (R-7-3-61)(B.P.R.A. 8-29-61)
3	ONE SHEET	TYPICAL GRADING SECTIONS
4	ROAD SHEET Nº 15	ROAD PLAN AND PROFILE - ROAD PROJECT I-69-2(16)30 LINE "A"
5	ROAD SHEET Nº 16	ROAD PLAN AND PROFILE - ROAD PROJECT I-69-2(16)30 LINE "A"
6	ROAD SHEET Nº 36	LINE DATA SHEET - ROAD PROJECT I-69-2(16)30 LINE "A"
7	ONE SHEET	CHANNEL CLEARING
8	ONE SHEET	TURNOUT DETAILS - NORTHBOUND & SOUTHBOUND LANES
9	ONE SHEET	TEST BORING
10	S1 STR. I-69-32-4741	LAYOUT
11	S2	GENERAL PLAN
12	S3	BENT NO.1 SOUTHBOUND LANE - DETAILS
13	S4	BENT NO.1 SOUTHBOUND LANE - DETAILS & BILL OF MATERIALS
14	S5	BENT NO.1 NORTHBOUND LANE - DETAILS
15	S6	BENT NO.1 NORTHBOUND LANE - DETAILS & BILL OF MATERIALS
16	S7	PIER NO.2 SOUTHBOUND LANE - DETAILS & BILL OF MATERIALS
17	S8	PIER NO.2 NORTHBOUND LANE - DETAILS & BILL OF MATERIALS
18	S9	PIER NO.3 SOUTHBOUND LANE - DETAILS & BILL OF MATERIALS
19	S10	PIER NO.3 NORTHBOUND LANE - DETAILS & BILL OF MATERIALS
20	S11	PIER NO.4&5 SOUTHBOUND LANE - DETAILS
21	S12	PIER NO.4&5 SOUTHBOUND LANE - BILL OF MATERIALS
22	S13	PIER NO.4 NORTHBOUND LANE - DETAILS & BILL OF MATERIALS
23	S14	PIER NO.5 NORTHBOUND LANE - DETAILS & BILL OF MATERIALS
24	S15	BENT NO.6 SOUTHBOUND & NORTHBOUND - DETAILS
25	S16	BENT NO.6 SOUTHBOUND & NORTHBOUND - DETAILS
26	S17	BENT NO.6 SOUTHBOUND & NORTHBOUND - DETAILS & BILL OF MATERIALS
27	S18	FRAMING PLAN - SOUTHBOUND LANE
28	S19	FRAMING PLAN - NORTHBOUND LANE
29	S20	BEAM SPLICE DETAILS - SOUTHBOUND LANE
30	S21	BEAM SPLICE DETAILS - SOUTHBOUND LANE
31	S22	BEAM SPLICE DETAILS - NORTHBOUND LANE
32	S23	BEAM SPLICE DETAILS - NORTHBOUND LANE
33	S24	BEAM SPLICE DETAILS - SOUTHBOUND & NORTHBOUND LANES
34	S25	SHOE DETAILS - SOUTHBOUND LANE
35	S26	SHOE DETAILS - NORTHBOUND LANE
36	S27	TOOTHED EXPANSION JOINT SOUTHBOUND & NORTHBOUND LANES
37	S28	TOOTHED EXPANSION JOINT SOUTHBOUND & NORTHBOUND LANES
38	S29	SUPERSTRUCTURE - SOUTHBOUND LANE
39	S30	SUPERSTRUCTURE - SOUTHBOUND LANE
40	S31	SUPERSTRUCTURE BILL OF MATERIALS - SOUTHBOUND LANE
41	S32	SUPERSTRUCTURE - NORTHBOUND LANE
42	S33	SUPERSTRUCTURE - NORTHBOUND LANE
43	S34	SUPERSTRUCTURE BILL OF MATERIALS - NORTHBOUND LANE
44	S35	SUPERSTRUCTURE DETAILS - SOUTHBOUND & NORTHBOUND LANES
45	S36	SCREEDS - SOUTHBOUND LANE
46	S37	SCREEDS - NORTHBOUND LANE

STATE OF INDIANA
STATE HIGHWAY DEPARTMENT

BRIDGE PLANS

FOR SPANS OVER 20 FEET ON INTERSTATE ROUTE NO. 69 SECTION 2

PROJECT I-69-2(21)32

BEGINNING AT A POINT ON THE ℄ OF PROPOSED I-69 AT THE INTERSECTION OF SAID ℄ AND THE EAST-WEST SECTION LINE BETWEEN SECTIONS 1/12, T19N, R8E, THENCE NORTH ON AND ALONG SAID ℄ 25.0 FEET TO A POINT, THE SOUTH PROJECT LIMITS, THENCE NORTH ON AND ALONG THE THE SAID ℄ 450.0 FEET TO A POINT, THE NORTH PROJECT LIMITS, ALL IN SECTION 1, T19N, R8E IN SALEM TOWNSHIP, DELAWARE COUNTY, INDIANA.

BRIDGES OVER 20' SPAN

PUB. ROAD DIV. NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
4	IND.	I-69-2(21)32	1962	1	72

INDEX CONTINUED
STANDARD DRAWINGS

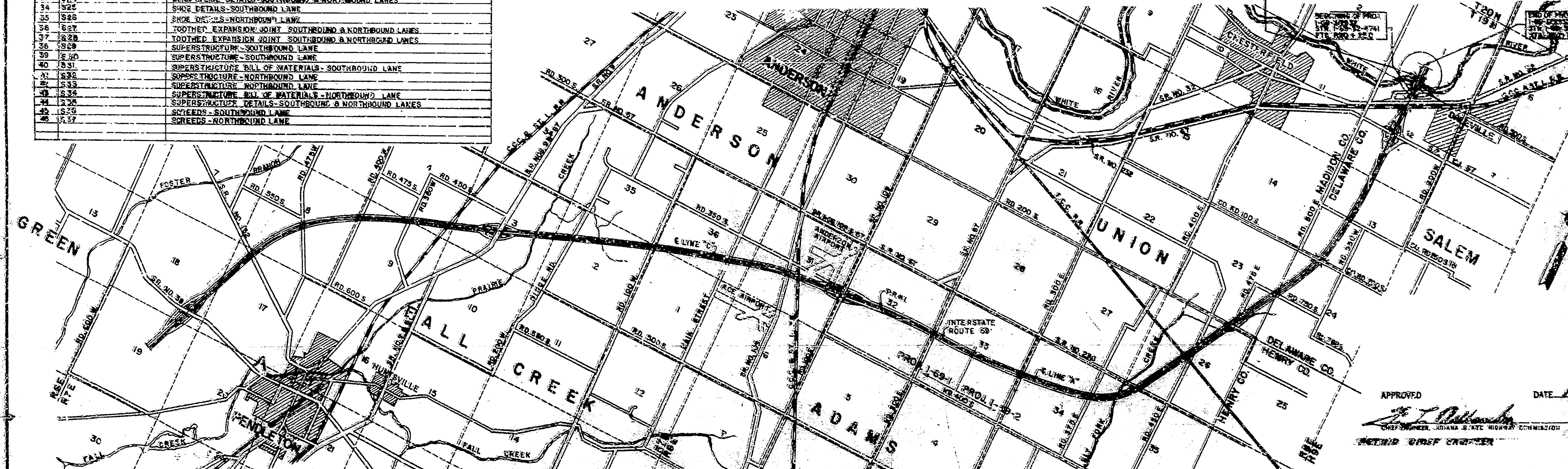
SHEET NO.	SHEET DESIGNATION	SUBJECT	B.P.R. APPROVAL	REVISIONS
47	ONE SHEET	SUMMARY		
48-56		CROSS SECTIONS - LINE "A"		
57-62		CROSS SECTIONS - CHANNEL CHANGE		
64	BRIDGE STANDARD S1	STANDARD MISCELLANEOUS DETAILS	1-12-60	R-12-2-59
65	BRIDGE STANDARD R2A	TYPICAL BEAM GUARD RAIL DETAILS	11-3-61	R-5-26-61
66	BRIDGE STANDARD MS	TYPICAL APPROACH DETAILS	2-7-61	A-10-30-60
67	BRIDGE STANDARD M3	MISCELLANEOUS APPROACH DETAILS	9-28-61	R-5-15-61
68	BRIDGE STANDARD MS	SLOPE WALL DETAILS		R-10-3-62
69	BRIDGE STANDARD R1-A	ALUMINUM RAILING DETAILS		R-1-22-60
69A	BRIDGE STANDARD S1	TYP. DETAILS FOR PL. ACCESS SPEC. FILL MAT.		R-3-18-63
69B	BRIDGE STANDARD R-5	STEEL RAILING DETAILS		R-1-15-62
70	ROAD STD. SHEET MA	MISCELLANEOUS STANDARDS	3-9-61	R 7-11-60
71	ROAD STD. SHEET ME	MISCELLANEOUS STANDARDS	6-9-61	R 10-14-60
72	ROAD STD. SHEET MP	MISCELLANEOUS STANDARDS	6-5-62	R 5-25-62
72A	SHEET 4 DETOURS	STANDARD DETOUR SIGNS	1-26-62	R 12-1-61

ROADWAY LENGTH 0.010 MI.
BRIDGE LENGTH 0.075 MI.
TOTAL LENGTH 0.085 MI.

MAX. GRADE 2.484%

STRUCTURE I-69-32-4741-4741J
TWO STRUCTURES
5 SPANS 70'-9", 84'-6", 84'-6", 84'-6", 70'-9"
SKEW 6°00'
CONT. STEEL BEAM BRIDGE
℄ STA. 892+50.0, LINE "A"

TRAFFIC DATA	
A.D.T. (1959)	7642 V.P.D.
A.D.T. (1975 PROJECTED)	17405 V.P.D.
TRUCKS	5%
DESIGN SPEED	70 M.P.H.
ACCESS CONTROL	NONE



APPROVED DATE

CHIEF ENGINEER, INDIANA STATE HIGHWAY COMMISSION
ACTING CHIEF ENGINEER

Rev. 1-23-63 Sheets Nº 1,10,11,38,40,41,43,47,69,69B Added.
Rev. 2-26-63 Sheets Nº 11,12,13,14,15,26
Rev. 3-13-63 Sheet Nº 11
Rev. 3-30-63 Sheet Nº 30 & 69A
Rev. R1 4-10-63 Sheet Nº 39, 42

STATE HIGHWAY DEPARTMENT OF INDIANA
1960 STANDARD ROAD AND BRIDGE SPECIFICATIONS
TO BE USED WITH THESE PLANS

THESE PLANS PREPARED BY
CLYDE E. WILLIAMS & ASSOCIATES
PROFESSIONAL ENGINEERS
SOUTH BEND - CHICAGO - INDIANAPOLIS
CERTIFIED [signature] DATE 11-27-62

CHARLES R. GASKINS REGISTERED NO. 4153 STATE OF INDIANA PROFESSIONAL ENGINEER

SUBMITTED FOR APPROVAL DATE 1-2-63

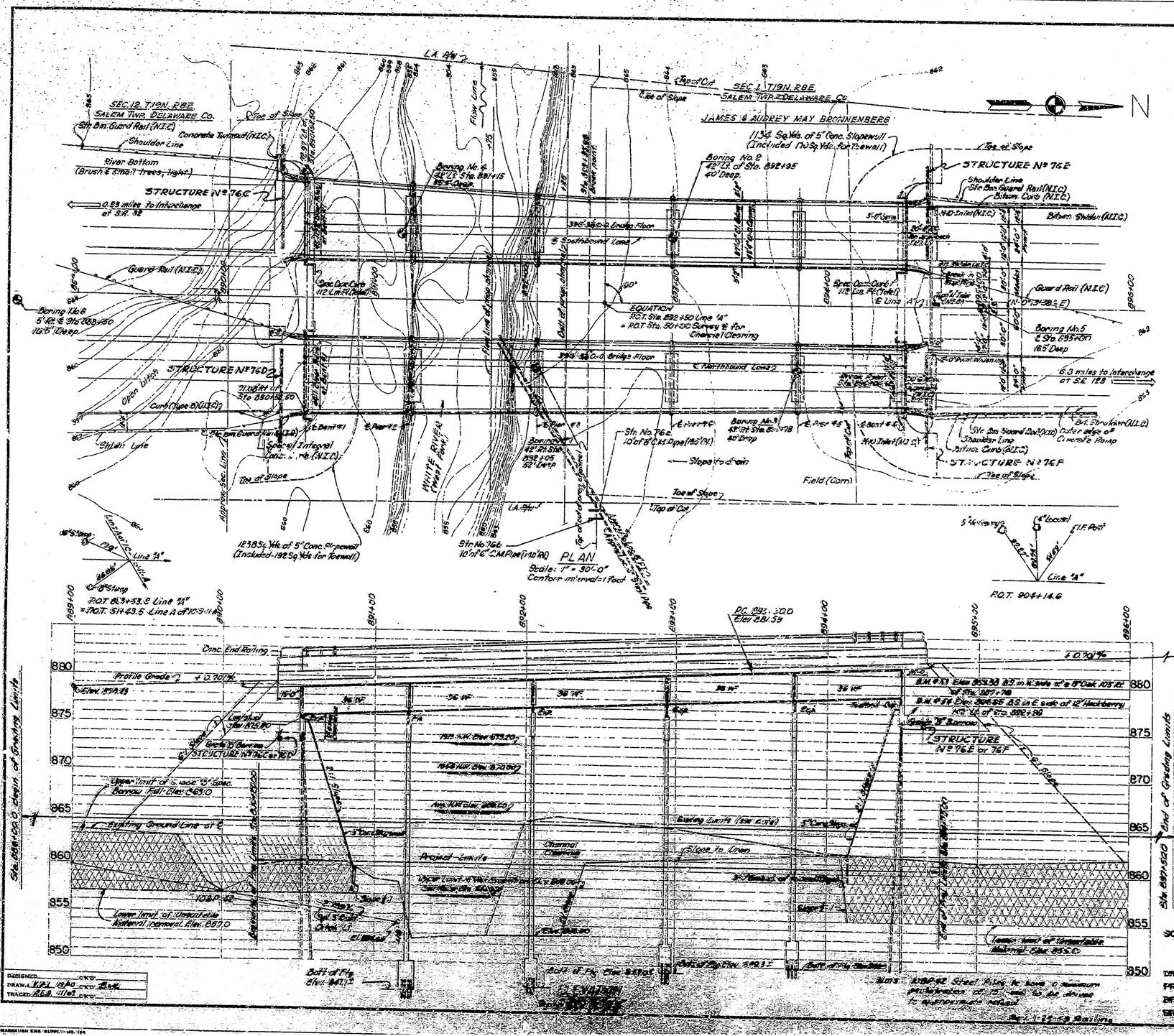
ENGINEER OF BRIDGE DESIGN, INDIANA STATE HIGHWAY COMMISSION

CHARLES R. RUMMER REGISTERED NO. 2275 STATE OF INDIANA PROFESSIONAL ENGINEER

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS
APPROVED:
[redacted]
DISTRICT ENGINEER DATE

BRIDGE FILE I-69-32-4741 & 4741J

BRIDGES OVER 20' SPAN					
FED. ROAD REQ. NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
4	IND.	I-69-2(20)32	1962	10	72



PRESENT STRUCTURE

None

NOTES

See Article A-203 of the Specifications regarding Test Pit Data.
Field Notes from Books 8373 L, 8374 T, & Bk. 1816-1
For Test Boring Logs, see Sheet #9
For Plan of Waterway Cleaning and Stream Profile, see Sheet #7
This Bridge is Structure No 5 on Road Project I-69-2(18)30
For approach items and R/W see Road Plan and Profile Sheets No. 4&5
See Summary Sheet for approach Structures - Sheet No. 47
The drainage area consists of approximately 250,000 acres (390 sq. mi.) of slightly rolling terrain.
For additional information and levels of Unsuitable Material Removal and Grade "B" Special Borrow Fill see Rd. Plan & Profile Sheet No. 6
Grading Limits from Sta. 886+00 to 889+27 (end of bridge cone backslope) to consist of removal of unsuitable material and backfilling with Grade "B" Spec. Borrow to Elev. 863.0, and from Sta. 895+97 (end of bridge cone backslope) to Sta. 897+50 to consist of removal of unsuitable material and backfilling with Grade "B" Spec. Borrow to existing ground line. See Rd. Plan & Profile Sheets and Cross-Sections.
For location of Dumped Rip-Rap in Channel, see Channel Cleaning Sheet #7
For drainage structures south of proposed bridge, see Plan & Profile sheet #4.

EARTHWORK TABULATION

Item	Usable Cu. Yds.	Unusable Cu. Yds.	Total Cu. Yds.
Fill + 20% (Conc. & Diers.)	—	—	28,350
Surplus Excavation (Channel Cleaning)	—	57,665	57,665
" (Dry)	—	185	185
Wet Excavation	—	1081	1081
Common Excavation	12,427	38,383	50,810
* Waste	—	77,225	77,225
Special Borrow (Fill 28,350 Cu. yds. - Usable 12,427)	—	—	16,310
Grade "B" Special Borrow	—	—	35,710

*Unsuitable material to be placed as follows:
31,045 Cu. Yds. to be placed in Southeast Quadrant
46,230 Cu. Yds. to be placed in Northwest Quadrant

LEGEND

Unsuitable Material Removal
Grade "B" Special Borrow Fill

LAYOUT
CONT. STEEL BEAM BRIDGE
TWO STRUCTURES
5 SPANS 70'-9", 84'-6", 84'-6", 84'-6" & 70'-9" SKEW 0°-00'
ROADWAY WIDTH VARIES, 2'-2'-0" WALKS ON PROJ. I-69 OVER
WHITE RIVER

STATE HIGHWAY DEPARTMENT OF INDIANA

DELAWARE COUNTY

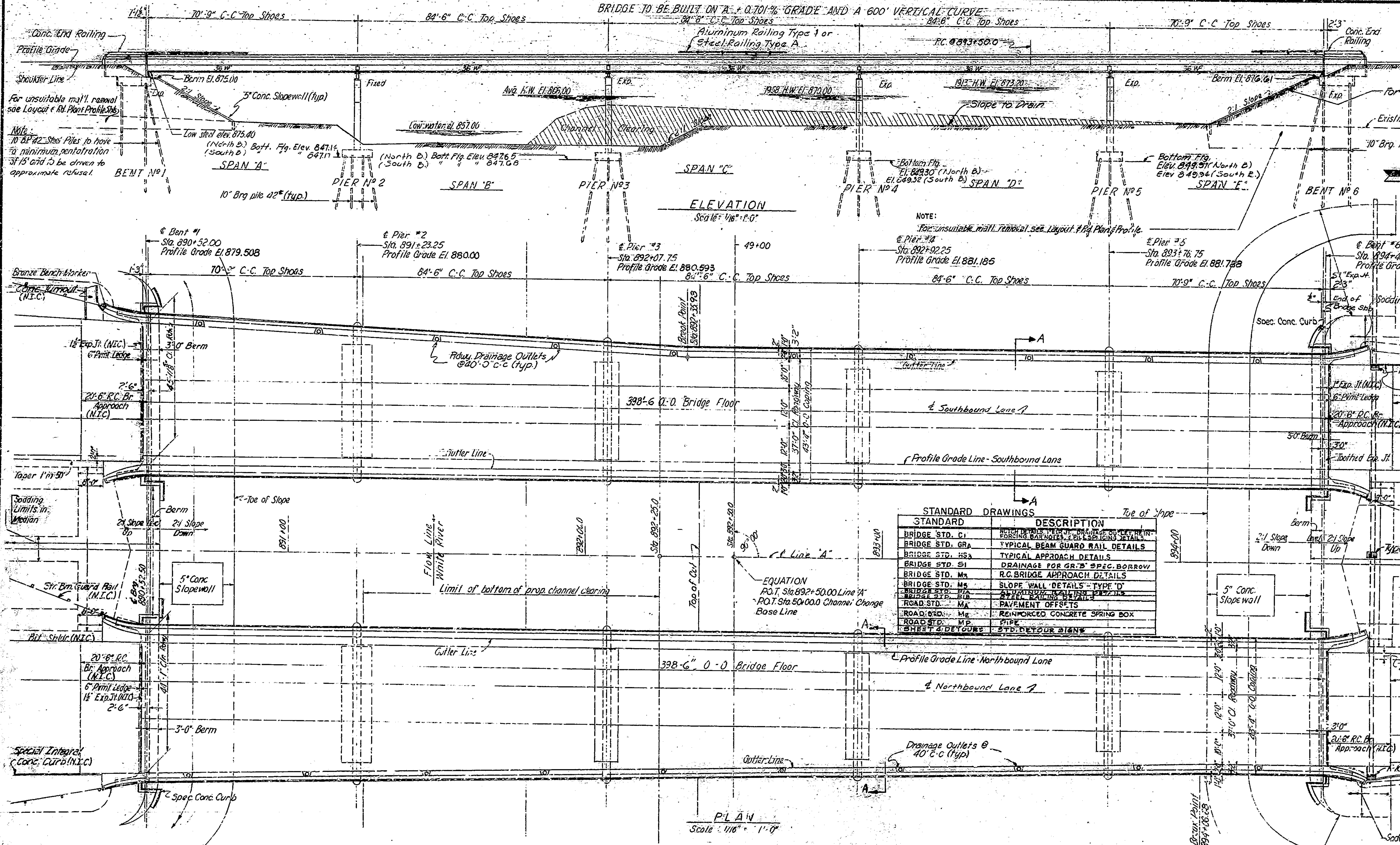
SCALE:- AS NOTED DECEMBER 5, 1962

Bruce R. Robertson Jr.

DRAWING:- 31 OF 937 ℄ STA. 892+50.0
PROJECT:- I-69-2(20)32
BRIDGE CONTRACT NO. 5846
BRIDGE FILE:- I-69-32-4741, & 4741 J

DESIGNED
DRAWN
TRACED
CHECKED

BRIDGES OVER 20' SPAN					
PUB. ROAD REG. NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
4	IND.	I-69-2(21)32	1962	11	72



DESIGN DATA

Designed for H20-S16-44 loading in accordance with 1957 A.A.S.H.O. Specifications, Rev. 1961
Main carring members checked for military loading.
Use A-36 steel - allow fs = 20,000 psi.

JOINT LEGEND

1½" Exp. Jt & 1" Exp. Jt - See Br. Standard C1

STANDARD DRAWINGS

STANDARD	DESCRIPTION
BRIDGE STD. C1	NOTCH DETAILS, 1" EXP. JT., DRAINAGE OUTLET, REINFORCING BAR NOTES, & PILE SPLICING DETAILS
BRIDGE STD. GRA	TYPICAL BEAM GUARD RAIL DETAILS
BRIDGE STD. HS3	TYPICAL APPROACH DETAILS
BRIDGE STD. S1	DRAINAGE FOR GR. "B" SPEC. BORROW
BRIDGE STD. M3	R.C. BRIDGE APPROACH DETAILS
BRIDGE STD. M5	SLOPE WALL DETAILS - TYPE "D"
BRIDGE STD. P1A	ALUMINUM RAILING DETAILS
BRIDGE STD. P1B	STEEL RAILING DETAILS
ROAD STD. MA	PAVEMENT OFFSETS
ROAD STD. ME	REINFORCED CONCRETE SPRING BOX
ROAD STD. MP	PIPE
SHEET 4 DETOURS	STD. DETOUR SIGNS

GENERAL NOTES

No present structure at proposed bridge site.
Depth of footings to be extended if found necessary. See Art. B403.2(a) of the Specifications.
Steel bearing piles shall have minimum bearing value on detail drawings. Determine pile lengths by Art. E103 and E203 of the specifications.
Reinforcing steel covering shall be 1½ inches in top and 1 inch min. in bottom of floor slabs, 3 inches in footings, except bottom steel which shall be 4 inches, and 2 inches in all other parts unless noted.
Dumped Rip Rap to be placed on South Bank of River as shown on Channel Clearing Sheet.
Concrete in footings and pier stems to bottom of coping to be class "E".
Concrete in Superstructure, including railing, bent caps, top of piers above bottom of coping to be Class "F".
Concrete in structure not noted above, concrete slopewall and headwalls to be Class "D".
Continuous concrete pours shall be required between construction joints as shown on detail plans.
Bevel forms ¾" under copings, and chamfer exposed edges 1" unless noted.
20 roadway drainage outlets to be placed as shown on this drawing.
Construct 5" concrete slopewall at locations as shown on Layout.
Tolerance in position of pile head maximum 2 inches.
All railings posts to be constructed perpendicular to grade.
See special provisions for items included in this contract. (See Layout for additional notes, etc.)
Waterproof endwalls & construction joints in accordance with the specifications.
Three 1 inch Exp. Joints with Load Transfer to be placed in the Approach Pavement. (See Bridge Standard "AS")

DESIGNED ____ CK'D ____
DRAWN M.E.B. CK'D B.A.R.
TRACED ____ CK'D ____

GENERAL PLAN
CONT. STEEL BEAM BRIDGE (TWO STRUCTURES)
5 SPANS 70'-9", 84'-6", 84'-6", 84'-6" & 70'-9" SKEW 0° 00'
ROADWAY WIDTH VARIES 2-2'-0" WALKS
OVER WEST FORK OF WHITE RIVER ON PROPOSED I-69

STATE HIGHWAY DEPARTMENT OF INDIANA

DELAWARE COUNTY

SCALE:- AS NOTED

DECEMBER 5, 1962

Ben A. Richardson Jr.

℄ STA. 892+50.00
LINE "A"

DRAWING:- S2 OF S37
PROJECT:- I-69-2(21)32
BRIDGE CONTRACT NO. 5846
BRIDGE FILE:- I-69-32-4741 & 4741 J

MASBAUGH ENG. SUPPLY-NO. 166

Appendix D: Rangeline Road Bridge Plans

BRIDGE CONTRACT No. 6383

No. 107 - Madison
Cat. Bridge Survey
1973

INDEX

PROJECT	STRUCTURE	TYPE	SPAN	OVER	STATION	CONTRACT NO.
S-827(I)	D-8 MADISON 9448	PRESTRESSED CONC. I BEAMS	5 @ 69'-4¾" CL. NO SKEW	WHITE RIVER	℄ 22+79.50	6383

SHEET NO.	SHEET DESIGNATION	SUBJECT	B.P.R. APPROVAL
1		TITLE SHEET	
2-3		ROAD PLAN & PROFILE	
4		LAYOUT	
5		CHANNEL CHANGE LAYOUT	
6		GENERAL PLAN	
7		BENTS NO. 1 & NO. 6 DETAILS	
8		PIERS NO. 2 & NO. 3 DETAILS	
9		PIERS NO. 4 & NO. 5 DETAILS	
10		ERECTION DIAGRAM AND DETAILS	
11		SUPERSTRUCTURE DETAILS	
12		SCREED ELEVATIONS	
13		SUMMARY	
14-19		CROSS SECTIONS	

STATE OF INDIANA

INDIANA STATE HIGHWAY COMMISSION

BRIDGE PLANS

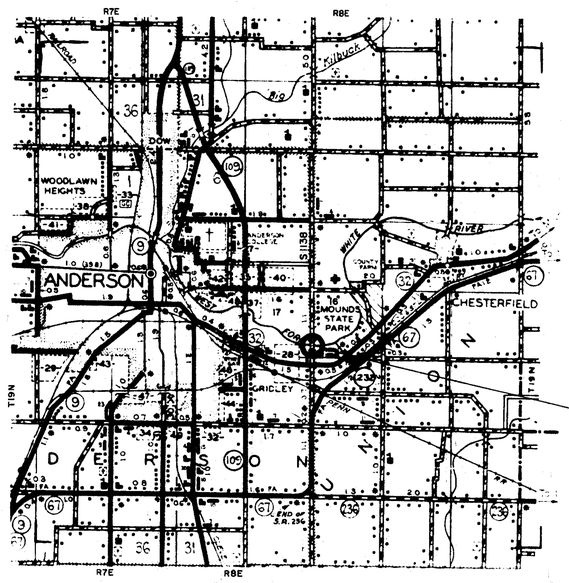
FOR SPANS OVER 20 FEET

MADISON COUNTY

FEDERAL AID SECONDARY PROJECT NO. S-827(I)

F.A.S. ROUTE NO. S-1138

BEGINNING AT A POINT ON THE NORTH EDGE OF PAVEMENT OF S. R. 32 10 FEET EAST OF THE PRESENT ℄ OF F.A.S. ROUTE S-1138; THENCE RUNNING NORTHERLY AND NORTHWESTERLY APPROXIMATELY 1789.4 FEET TO A POINT IN THE ℄ OF F.A.S. ROUTE S-1138 ALL IN SECTIONS 20, 21, 16 & 17, T19N, R8E, MADISON COUNTY INDIANA



N

APPROACH LENGTH = 0.270 Mi.
BRIDGE LENGTH = 0.069 Mi.

PROJECT LENGTH = 0.339 Mi.

MAXIMUM GRADE = 6.00%

F.A.S. PROJECT S-827(I)
BRIDGE FILE: MADISON 9448
PRESTRESSED CONC. I BEAM BRIDGE
5 SPANS @ 69'-4¾" CLEAR NO SKEW
℄ STRUCTURE STA. 22+79.50
BEGIN PROJECT STA 10+10.98 P.R. 1
EQUATION P.T. STA. 27+89.03 P.R. 1 BACK = P.O.T STA 27+88.55 "A" AHEAD
END PROJECT STA 28+00 "A"

MADISON COUNTY

SCALE 1" = 1 MILE

PROJECT LOCATION

BRIDGES OVER 20' SPAN					
PUBLIC ROAD REGION NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
4	IND.	S-827(I)	1964	1	37

INDEX CONTINUED
STANDARD DRAWINGS

SHEET NO.	SHEET DESIGNATION	SUBJECT	B.P.R. APPROVAL	ADOPTED & REVISION #
20	BRIDGE STD. C1	STANDARD MISCELLANEOUS DETAILS	6-21-63	R 5-1-63
	BRIDGE STD. C2	STANDARD MISCELLANEOUS DETAILS		
21	BRIDGE STD. D	CASTING DETAILS ROADWAY DRAINS	1-12-60	A 1-3-50
	BRIDGE STD. F	ROADWAY DRAIN OUTLET DETAILS		
	BRIDGE STD. GRA	TYPICAL BEAM GUARD RAIL DETAILS		
	BRIDGE STD. H	TYP. DETAILS OF THICK. PAVEMENT & LOC. TOE OF SL. AROUND END BENTS		
	BRIDGE STD. H	TYP. DETAILS OF THICK. PAVEMENT & LOCATING TOE OF SLOPE		
	BRIDGE STD. HS	CONT. STEEL BEAM-TYP. APPROACH DETAILS-TWIN STRUCTURES		
	BRIDGE STD. HS	ST. BEAM & R.C. GIRDER-TYP. APPROACH DETAILS-TWIN STRUCTURES		
	BRIDGE STD. HS21	CONT. STEEL BEAM-TYP. APPROACH DETAILS-TWO LANE STRUCTURES		
22	BRIDGE STD. M1	MISCELLANEOUS APPROACH DETAILS	6-21-63	R 5-14-63
	BRIDGE STD. M2	MISCELLANEOUS APPROACH DETAILS		
23	BRIDGE STD. M3	MISCELLANEOUS APPROACH DETAILS		R 6-27-63
24	BRIDGE STD. M4	R.C. BRIDGE APPROACH TURNOUT DETAILS-12'-6" SHOULDERS	10-4-62	R 6-21-62
25	BRIDGE STD. M5	SLOPE WALL DETAILS	12-4-62	R 10-4-62
26	BRIDGE STD. PB10	TOLERANCES FOR FABRICATION OF PRESTRESSED BEAMS	8-14-63	A 11-9-62
	BRIDGE STD. P2	STANDARD CONCRETE PILE DETAILS		
27	BRIDGE STD. PB3	PRESTRESSED CONCRETE TYPE III I-BEAMS	4-16-62	A 1-16-62
	BRIDGE STD. PB	PRESTRESSED COMPOSITE BOX BEAMS WIDE		
	BRIDGE STD. R1	ALUMINUM RAILING DETAILS		
	BRIDGE STD. R2	BRIDGE LIGHTING DETAILS		
28	BRIDGE STD. S1	TYPICAL DETAILS FOR PLACING GRADE "B" SPECIAL BORROW	3-28-63	R 2-18-63
	BRIDGE STD. S2	TYPICAL DETAILS FOR PLACING SPECIAL FILLING MATERIAL		
	BRIDGE STD. T SHEET A	STANDARD TEMPORARY BRIDGE		
	BRIDGE STD. T SHEET B	STANDARD TEMPORARY BRIDGE		
	ROAD STD. SHEET A	STANDARD PAVEMENT JOINTS		
29	ROAD STD. SHEET MA	MISCELLANEOUS STANDARDS		R 2-1-64
	ROAD STD. SHEET MB	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET MC	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET MC1	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET MD	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET MD1	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET ME	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET MF	MISCELLANEOUS STRUCTURE STANDARDS		
	ROAD STD. SHEET MG	MISCELLANEOUS STRUCTURE STANDARDS		
	ROAD STD. SHEET MH	MISCELLANEOUS PRIVATE DRIVE STANDARDS		
30	ROAD STD. SHEET MI	MISCELLANEOUS STANDARDS	4-20-61	R 3-30-61
	ROAD STD. SHEET MJ	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET K	MISCELLANEOUS STANDARDS		
31	ROAD STD. SHEET MN	MISCELLANEOUS STANDARDS	3-9-61	R 4-11-61
32	ROAD STD. SHEET MP	MISCELLANEOUS STANDARDS		R 11-20-63
	ROAD STD. SHEET MQ	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET MR	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET S	MISCELLANEOUS STANDARDS CENTER DITCH INLETS		
	ROAD STD. SHEET S1	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET MT	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD. SHEET	MISCELLANEOUS STANDARDS		
	ROAD STD.	STANDARD STRUCTURE CONNECTIONS FOR EXTENSION		
	ROAD STD.	STANDARD REINF. CONC. BOX CULVERTS		
	ROAD STD.	STANDARD REINF. CONC. BOX CULVERTS-SK. END & WING DETAILS		
	ROAD STD.	STANDARD REINF. CONC. CULVERTS-SLAB TOP TYPE (W.F.)		
	ROAD STD.	STANDARD REINF. CONC. CULVERTS-SLAB TOP TYPE (U.F.)		
	ROAD STD. SHEET GR	STANDARD GUARD RAIL		
33	ROAD STD. SHEET GR1	BEAM GUARD RAIL	6-6-61	R 5-25-61
	ROAD STD.	STANDARD REINF. CONCRETE ARCH-12' SPAN		
	ROAD STD.	STANDARD HEADWALLS		
	ROAD STD.	STANDARD STRUCTURAL PLATE ARCH		
	ROAD STD.	CONCRETE WINGS FOR STD. STRUCTURAL PLATE ARCHES		
	ROAD STD.	STANDARDS FOR SUPER-ELEVATION & WIDENING OF CURVES		
34	ROAD STD. SHEET 2 DETOURS	STANDARD DETOUR SIGNS	PENDING	R 3-8-63
35	ROAD STD. SHEET 3 DETOURS	STANDARD DETOUR SIGNS	PENDING	R 3-8-63
36	ROAD STD. SHEET 3A DETOURS	STANDARD DETOUR SIGNS	PENDING	R 3-8-63
37	ROAD STD. SHEET 1	CONSTRUCTION IDENTIFICATION SIGNS		A-Feb. 1964

TRAFFIC DATA		
A.D.T. (1963)	500	V.P.D.
A.D.T. (1983 PROJECTED)	800	V.P.D.
TRUCKS	10	%
DESIGN SPEED	40	M.P.H.
ACCESS CONTROL	NONE	

PLANS PREPARED BY

BUTLER, FAIRMAN AND SEUFERT

INCORPORATED

CONSULTING ENGINEERS

INDIANAPOLIS

CERTIFIED BY: Robert F. Butler DATE 11-15-63

APPROVED DATE 11-4-63

James S. Biddle
Ralph D. McCord
Harold Foust

BOARD OF COMMISSIONERS MADISON COUNTY

ATTEST Joseph H. Armington
AUDITOR MADISON COUNTY

RECOMMENDED FOR APPROVAL 1-20-64

C. R. Runner
ENGINEER OF BRIDGE DESIGN, INDIANA STATE HIGHWAY COMMISSION

APPROVED 1-21-64

CHIEF ENGINEER—INDIANA STATE HIGHWAY COMMISSION

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS

APPROVED:

DIVISION ENGINEER DATE

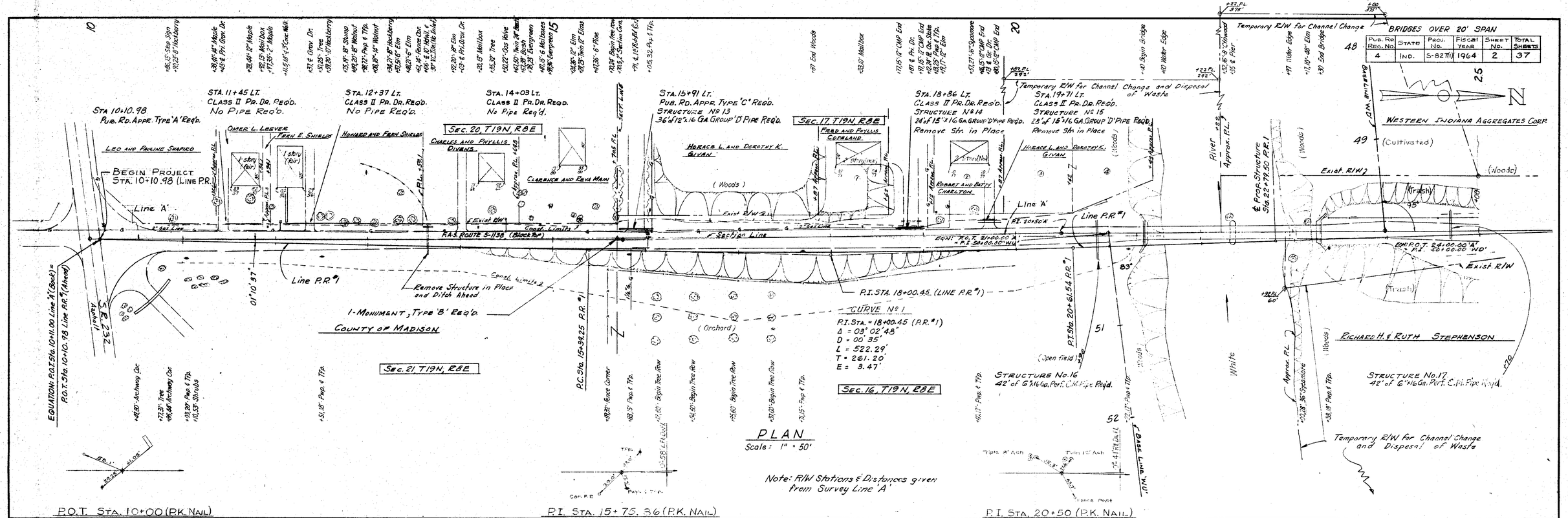
REVISIONS	
DATE	SHEET NO.
3-2-64	1, 6

INDIANA STATE HIGHWAY COMMISSION
STANDARD SPECIFICATIONS DATED 1963
TO BE USED WITH THESE PLANS.

BRIDGE FILE:- MADISON 9448 #107 - 1973 Bridge Survey

D-8
"Rangeline" Br. on 200E.
White River

BRIDGES OVER 20' SPAN					
Pub. Rd. Reg. No.	State	Proj. No.	Fiscal Year	Sheet No.	Total Sheets
4	Ind.	S-8271(1)	1964	2	37

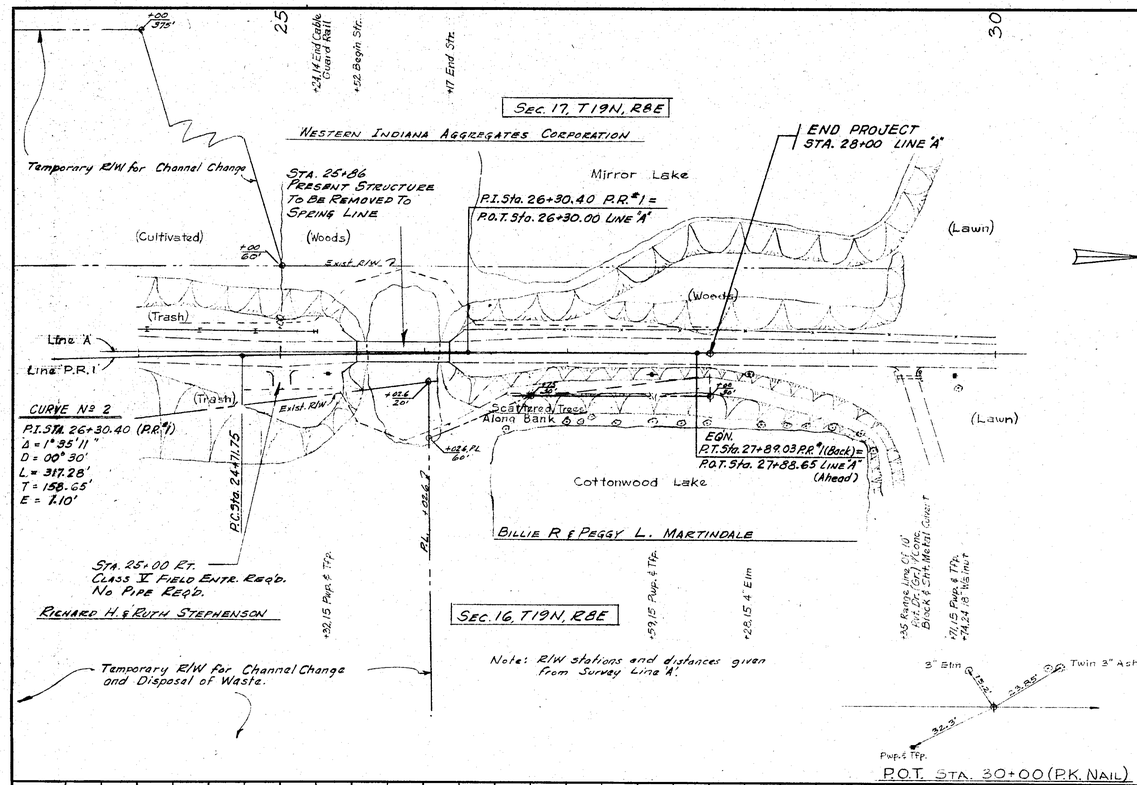


Plan	By	Date
Surveyed		
Computed		
Note Book		
Alignment Checked		
No.	Rt. of Way Checked	

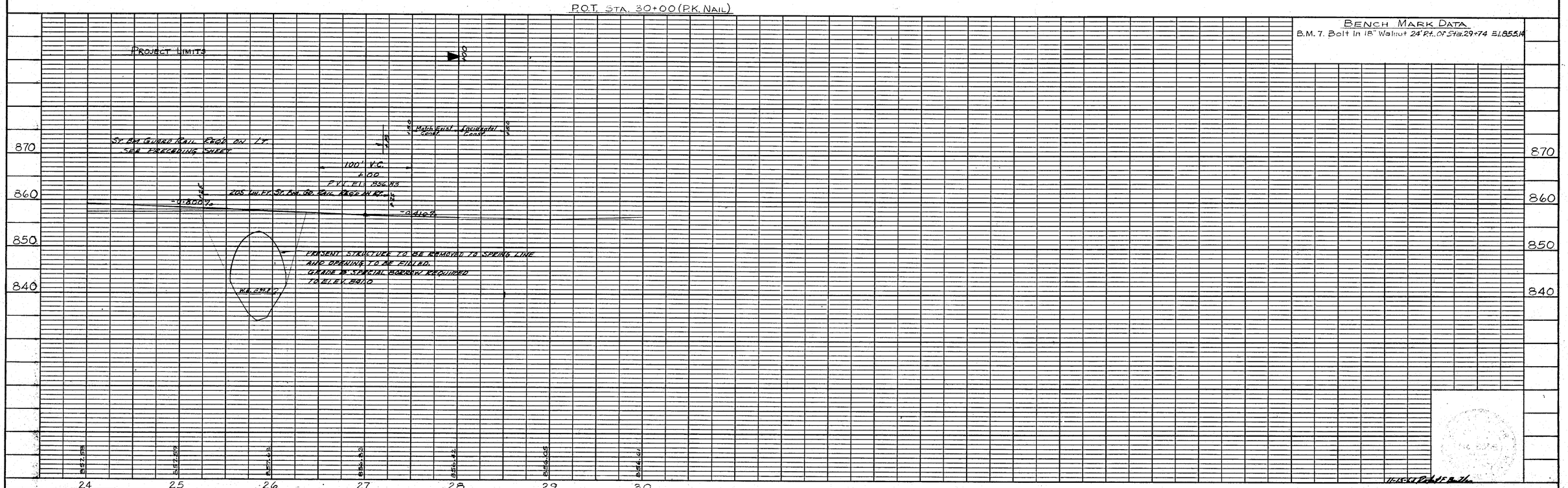
Profile	By	Date
Surveyed		
Computed		
Note Book		
Grades Checked		
No.	B. M. & Noted	
	Structure Notations Ch'kd	

K+E PLATE 1, PLAN-PROFILE
KEUFFEL & ESSER CO.

BRIDGES OVER 20' SPAN					
PUB. RD. REG. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
4	IND.	S-827(1)	1964	5	37



PLAN
SURVEYED
PLOTTED
NOTE BOOK ALIGNMENT CHECKED
RT. OF WAY CHECKED
NO.
BY
DATE



PROFILE
SURVEYED
PLOTTED
NOTE BOOK GRADES CHECKED
St. M.S. NOTED
NO. STRUCTURE NOTATIONS CHK'D
BY
DATE

K+E PLATE 1, PLAN-PROFILE
KEUFFEL & ESSER CO.

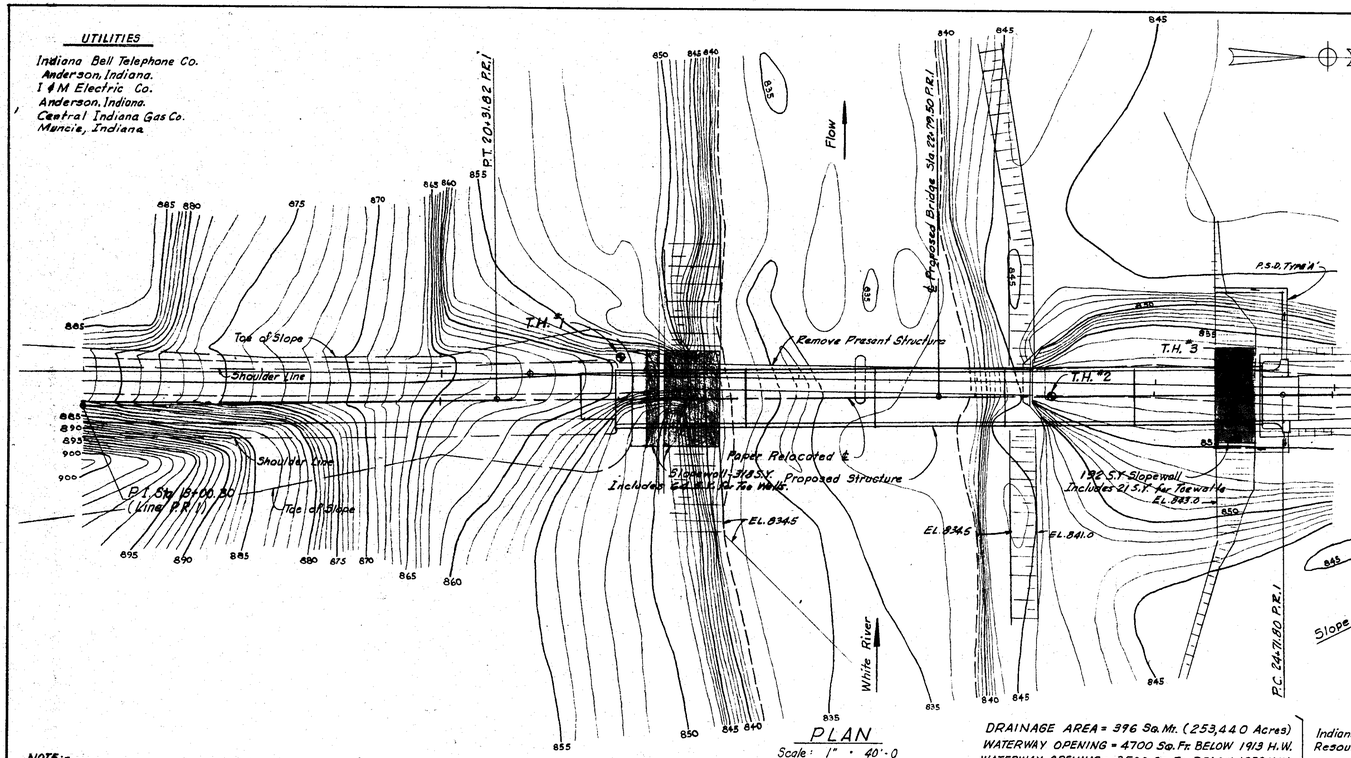
K+E HERCULENE® 09983

BRIDGE CONTRACT: 6383
BRIDGE FILE: MADISON 9448

UTILITIES

Indiana Bell Telephone Co.
Anderson, Indiana.
I & M Electric Co.
Anderson, Indiana.
Central Indiana Gas Co.
Muncie, Indiana

BRIDGES OVER 20' SPAN					
PUBLIC ROAD REGION No.	STATE	PROJ. No.	FISCAL YEAR	SHEET No	TOTAL SHEETS
4	IND.	S-827(1)	1964	4	37

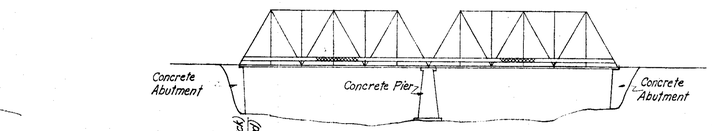


PLAN
Scale: 1" = 40'-0
Contour Interval = 1 ft.

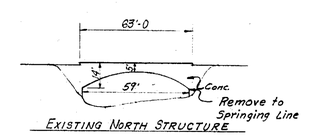
DRAINAGE AREA = 396 Sq. Mi. (253,440 Acres)
WATERWAY OPENING = 4700 Sq. Ft. BELOW 1913 H.W.
WATERWAY OPENING = 3500 Sq. Ft. BELOW 1958 H.W.

Indiana Flood Control and Water Resources Commission's Recommendations.

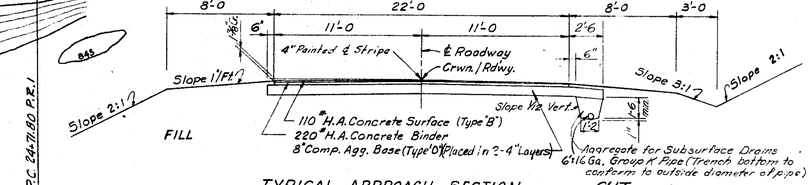
NOTE:-
See Sh. #2 and #3 for References, Bench Mark Data, and Curve Data and Right-of-Way
See Sh. #5 for Channel Change Layout.
See Sh. #2 and #3 for Ditches and Ditches' Grade



EXISTING SOUTH STRUCTURE
No Scale
Approx. Steel weight = 50 tons



EXISTING NORTH STRUCTURE
No Scale



TYPICAL APPROACH SECTION
Scale: 3/16" = 1'-0

SUBSURFACE DRAIN REQ'D
STA. 14+00 To 19+80 Lt. ℄ Rt.

SOIL BORING LOG

T.H. #3

BLOW COUNT*	ELEV.	
	857.3	
5 / 5/4		Brown moist loose silty sand with a trace of gravel
	850.3	
3 / 3/3		Brown moist medium stiff to stiff sandy silty clay
5 / 6/8		
	839.3	
1 / 1/2		Dark gray moist very soft to soft sandy marl
	835.3	
5 / 9/14		Gray moist very stiff silty clay with a trace of sand and gravel
	828.3	
21 / 36/50		Gray moist very dense coarse sand with gravel
11 / 31/47		
	818.3	
7 / 12/19		Gray moist hard silty clay with a trace of sand and gravel
	815.8	

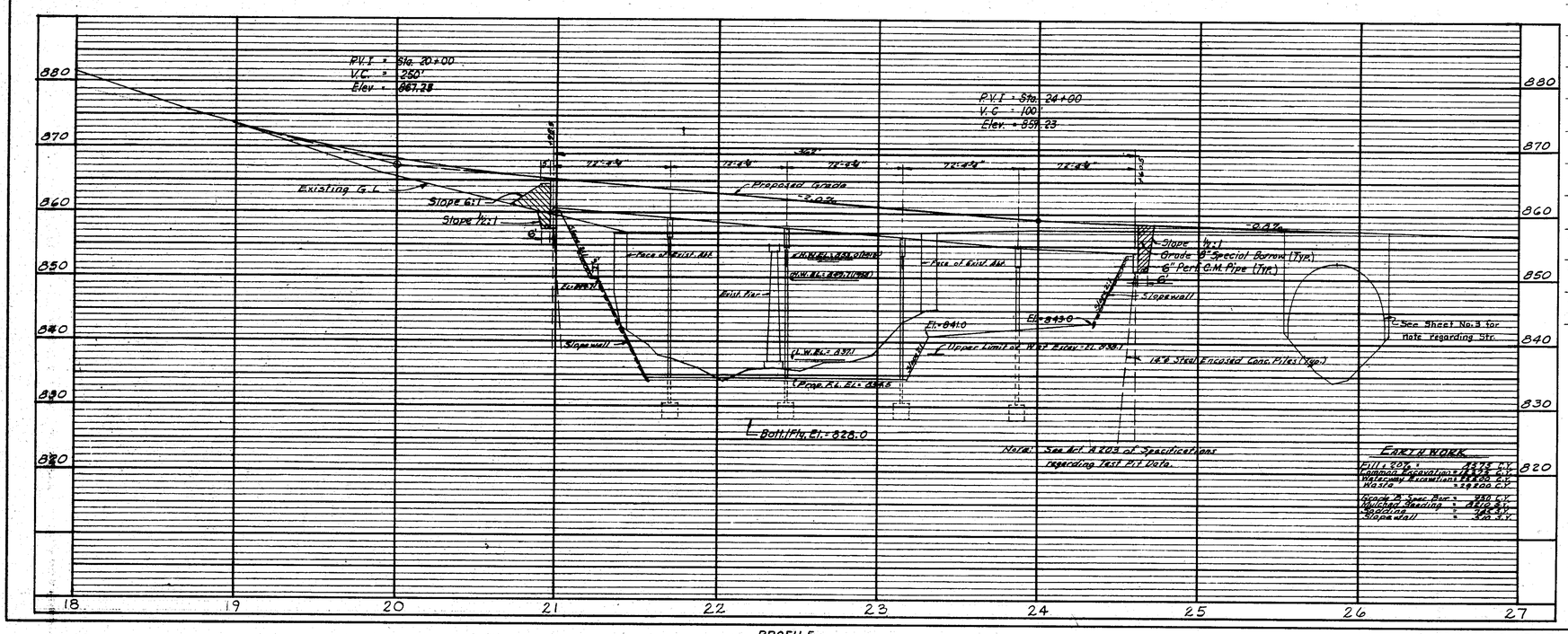
T.H. #2

BLOW COUNT*	ELEV.	
	857.0	
5 / 4/6		Brown moist medium stiff to stiff sandy clay.
4 / 5/7		
6 / 4/5		
	842.0	
9 / 5/4		Brown moist loose sand
	837.0	
9 / 6/11		Brown and black wet loose to medium dense sand and gravel
	831.0	
18 / 21/26		Gray moist very stiff to hard silty clay with a trace of sand gravel
10 / 19/23		
8 / 13/22		
7 / 14/42		
8 / 15/22		
9 / 14/22		
	800.5	

T.H. #1

BLOW COUNT*	ELEV.	
	859.4	
		4" Asphalt
6 / 9/9		Brown moist very stiff sand and gravel
5 / 6/8	849.4	
17 / 34/32		Brown moist stiff sandy clay with a trace of gravel
14 / 23/27	845.4	
30 / 50/60		Brown moist dense to very dense sand and gravel with boulders
	838.4	
57/61		Gray moist to wet hard silty clay loam
16 / 24/25	835.4	
12 / 25/41		Brown wet very dense sand and gravel
20 / 40/87	823.9	
15 / 28/31		Gray moist hard silty clay loam (hardpan)
11 / 21/27	815.4	
	812.4	Gray very fine moist very dense silty sand
	802.9	Gray moist hard silty clay with a trace of gravel

*Standard Penetration Test - Driving 2" O.D. Sampler 1' with 140 lbs. hammer falling 30". Blow count made at 6" intervals. First 6" count for setting sampler.



EARTH WORK

Fill @ 20% =	8378 C.Y.
Common Excavation =	19,175 C.Y.
Waterway Excavation =	8,800 C.Y.
Waste =	28,100 C.Y.
Grade B Spec. Bor. =	950 C.Y.
Notched Grading =	4,600 C.Y.
Seeding =	3.4 Ac.
Slopewall =	320 S.Y.

PROFILE
SCALE:- HORIZ. 1" = 40'-0
VERT. 1" = 5'-0

LAYOUT

PRESTRESSED CONCRETE I-BEAM BRIDGE
5 SPANS @ 69'-4 3/4" CL. NO SKEW 28'-0 ROADWAY 2-1'-0" WALKS
F.A.S. ROUTE S-1198 OVER WHITE RIVER

RANGE LINE ROAD EAST BRIDGE
MADISON COUNTY

SHEET 4 OF 37

BUTLER, FAIRMAN AND SEUFERT
INCORPORATED
INDIANAPOLIS ENGINEERS INDIANA

DWG. BY R.F.B. CHK. BY R.F.B. DATE 11-15-63

BRIDGE CONTRACT: 6383
BRIDGE FILE: MADISON 9448

Appendix D: SR 32 Plans

BRIDGE CONTRACT NO. 4817

INDEX

PROJECT	STRUCTURE	TYPE	SPAN	OVER	STATION	CONTRACT NO.
S-241(4)	32-G9-4513	CONT. ST. BEAM & R.C. GIRDER	24'65'3@78'65'24' SK. 30°R	WHITE RIVER	74+84 LINE "RR" FUTURE & BETWEEN LANES	4817

SHEET NO.	SHEET DESIGNATION	SUBJECT
1		INDEX & TITLE SHEET
2	ONE SHEET	TYPICAL CROSS SECTION
3	ONE SHEET	TEST BORINGS
4	ONE SHEET	WIDENED R.C. BRIDGE APPROACH DETAILS
5	ROAD PLAN SHEET Nº 14	ROAD PLAN & PROFILE-ROAD PROJ. Nº S-241(4) STA. 69+00 TO 85+00
6	S1 (STRUCTURE 32-G9-4513)	LAYOUT
7	S2	GENERAL PLAN
8	S3	BENT Nº 1 & BENT Nº 8 DETAILS
9	S4	PIER Nº 2 DETAILS
10	S5	PIER Nº 3 DETAILS
11	S6	PIER Nº 4 DETAILS
12	S7	PIER Nº 5 DETAILS
13	S8	PIER Nº 6 DETAILS
14	S9	PIER Nº 7 DETAILS
15	S10	SPAN A & G DETAILS
16	S11	SPAN A & G DETAILS
17	S12	FRAMING PLAN-SPANS B,C,D,E & F
18	S13	BEAM-SPLICES & ALUMINUM RAILING DETAILS
19	S14	EXPANSION JOINT DETAILS
20	S15	SHOE DETAILS & DEFLECTIONS
21	S16	FLOOR DETAILS
22	S17	FLOOR DETAILS & BILL OF MATERIALS
23	ONE SHEET	SUMMARY
24-30	SEVEN SHEETS	CROSS SECTIONS
31	BRIDGE STD. C1	STANDARD MISCELLANEOUS DETAILS (REV. 12-2-58)
32	BRIDGE STD. D	CASTING DETAILS ROADWAY DRAINS (JAN. 1950)
33	BRIDGE STD. M1	MISCELLANEOUS APPROACH DETAILS (REV. 5-15-59)
34	BRIDGE STD. M2	MISCELLANEOUS APPROACH DETAILS (REV. 6-8-57)
35	BRIDGE STD. M3	MISCELLANEOUS APPROACH DETAILS (REV. 1-16-59)
36	BRIDGE STD. R1	ALUMINUM RAILING DETAILS (REV. 1-15-59)
37	BRIDGE STD. S2	TYPICAL DETAILS FOR PLACING SPECIAL FILLING MATERIAL (REV. 9-20-57)
38	ROAD STD. SHEET A	STANDARD PAVEMENT JOINTS (APRIL 1957)
39	ROAD STD. SHEET MC	MISCELLANEOUS STANDARDS (REV. 4-1-59)
40	ROAD STD. SHEET MD	MISCELLANEOUS STANDARDS (REV. 5-26-59)
41	ROAD STD. SHEET ME	MISCELLANEOUS STANDARDS (REV. 11-17-58)
42	ROAD STD. SHEET MN	MISCELLANEOUS STANDARDS (REV. 1-23-58)
43	ROAD STD. SHEET MP	MISCELLANEOUS STANDARDS (REV. 3-11-59)
44	ROAD STD. SHEET GR	STEEL BEAM GUARD RAIL (REV. 1-10-57)

STATE OF INDIANA

STATE HIGHWAY DEPARTMENT

BRIDGE PLANS

FOR SPANS OVER 20 FEET ON STATE ROAD NO. 32 SECTION G9

F.A.S. PROJECT NO. S-241(4)

ANDERSON-CHESTERFIELD ROAD

BEGINNING AT A POINT ON PROPOSED S.R. 32 APPROX. 1613.4' EAST OF THE WEST LINE OF SECTION 9 AND EXTENDING EAST A DISTANCE OF APPROX. 780' TO A POINT ON PROPOSED S.R. 32 APPROX. 2393.4' EAST OF THE WEST LINE OF SECTION 9, ALL IN SECTION 9-T.19N.-R.8E., MADISON COUNTY.

ROADWAY LENGTH=0.068 MI.
BRIDGE LENGTH=0.079 MI.
TOTAL LENGTH=0.147 MI.
(LINE "RR" FUTURE & BETW. LANES)

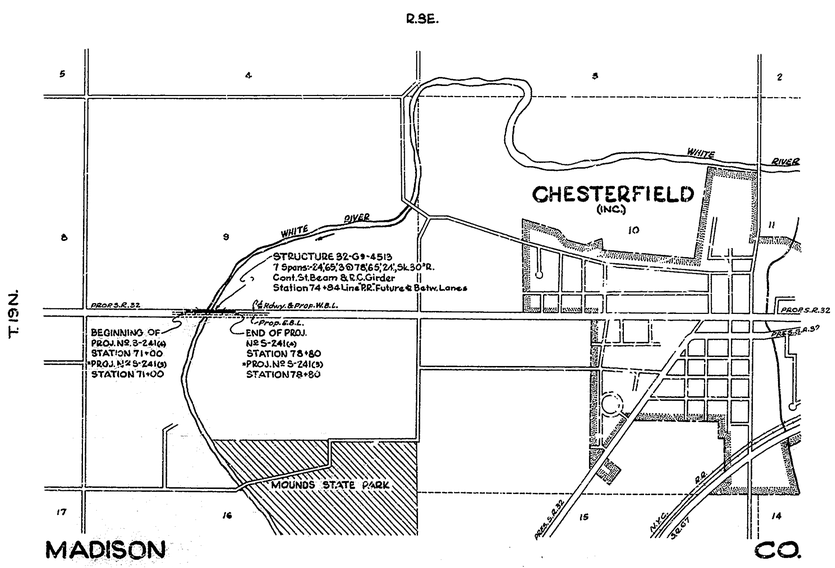
MAX. GRADE:--2.0%

BRIDGES OVER 20' SPAN

FED. ROAD REG. NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
4	IND.	S-241(4)	1959	1	44

TRAFFIC DATA

A.D.T. (1959) ..... 1250 V.P.D.
A.D.T. (1979 PROJECTED) ..... 4000 V.P.D.
TRUCKS 17%
DESIGN SPEED ..... 70 M.P.H.
ACCESS CONTROL ..... PARTIAL



REV. 9-10-59 Sheets Nº 6 & 23
REV. 12-18-59 Sheets Nº 7, 15, 16, 17, 18, 19, 21, 22 & 23

Scale: 1" = 1000'

APPROVED AND ADOPTED BY STATE HIGHWAY DEPARTMENT OF INDIANA DATE 7-13-59

CHAIRMAN, STATE HIGHWAY DEPARTMENT OF INDIANA

APPROVED DATE 7-13-59

Carl E. Vonderscheer
CHIEF ENGINEER, STATE HIGHWAY DEPARTMENT OF INDIANA

RECOMMENDED FOR APPROVAL DATE 7/13/59

C. R. Lenimer
ENGINEER OF BRIDGE DESIGN, STATE HIGHWAY DEPARTMENT OF INDIANA

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS

APPROVED:

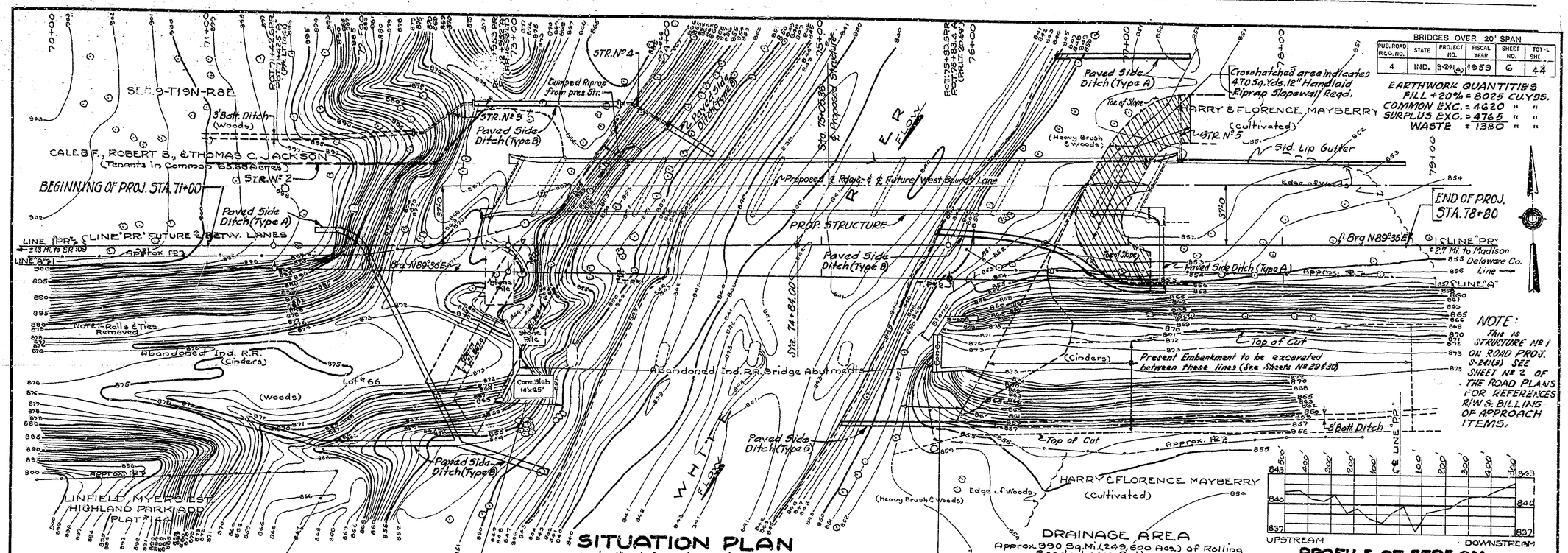
[redacted]
DIVISION ENGINEER DATE

BRIDGE FILE: 32-G9-4513

STATE HIGHWAY DEPARTMENT OF INDIANA
1957 STANDARD ROAD AND BRIDGE SPECIFICATIONS
TO BE USED WITH THESE PLANS

BRIDGES OVER 20' SPAN					
PUB. ROAD REG. NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.	TOT-L SHE
4	IND.	S-241(4)	1959	6	44

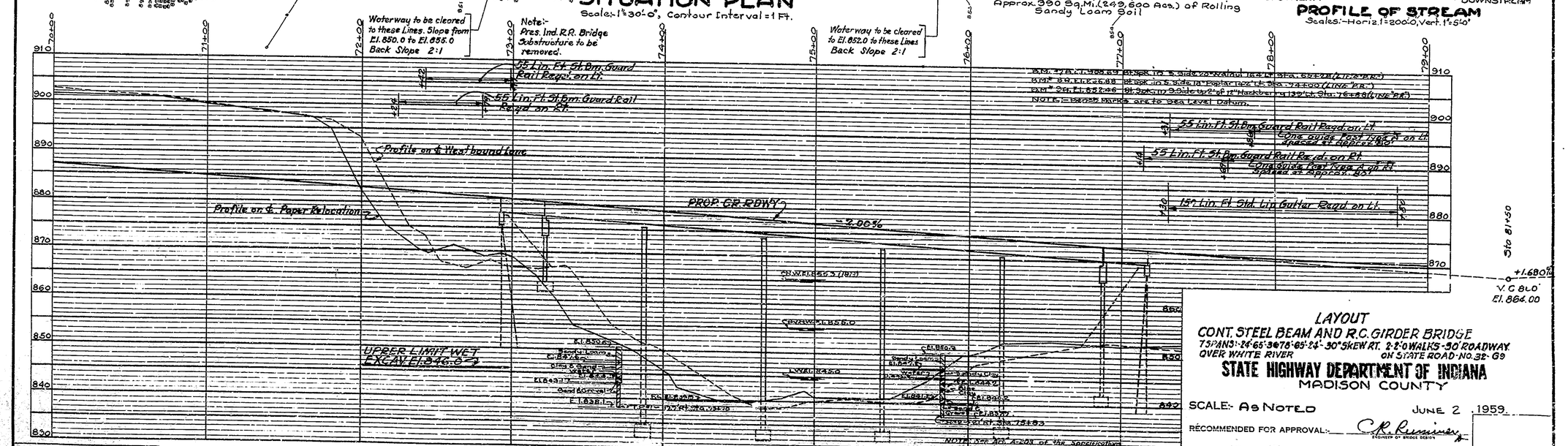
EARTHWORK QUANTITIES
FILL +20% = 8025 CU.YDS.
COMMON EXC. = 4620 " "
SURPLUS EXC. = 4765 " "
WASTE = 1380 " "



SITUATION PLAN
Scale:- 1" = 30'-0", Contour Interval = 1 Ft.

PROFILE OF STREAM
Scales:- Horiz. 1" = 200'-0", Vert. 1" = 5'-0"

NOTE:
This is STRUCTURE No 1 ON ROAD PROJ. S-241(4) SEE SHEET No 2 OF THE ROAD PLANS FOR REFERENCES R/W & BILLING OF APPROACH ITEMS.



PROFILES
Scales:- Horiz. 1" = 30'-0", Vert. 1" = 10'-0"

Rev. 9-10-59. Guard Rail

LAYOUT
CONT. STEEL BEAM AND R.C. GIRDER BRIDGE
7 SPANS - 24'-66'-3@76'-66'-24' - 30° SKEW RT. 2-2'-0 WALKS - 50' ROADWAY
OVER WHITE RIVER ON STATE ROAD NO. 32 - G9

STATE HIGHWAY DEPARTMENT OF INDIANA
MADISON COUNTY

SCALE:- As Noted JUNE 2, 1959

RECOMMENDED FOR APPROVAL:- C. R. Ruminer, Engineer of Bridge Design

DRAWING:- 51 OF 17

PROJECT:- S-241(4) STATION:- 74+84.00 LINE "PR"

BRIDGE CONTRACT NO. 4817 FUTURE & BETWEEN

DESIGNED ____ C'K'D ____
DRAWN A.R. 6-11-58 C'K'D F.G.G. 20-58
TRACED W.F.B. 11-7-58 C'K'D ____

Appendix E

Cost Analysis

Appendix E: Cost Analysis Option 1

ANDERSON DAM
PRELIMINARY CONSTRUCTION COST
OPTION 1 - 700' RCC CORE w/CIP VENEER CRESTED SPILLWAY @ EL 870

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
1	Demolition Activities - Dam footprint plus 500' East and West	1	Each	$2,414,556	$2,414,556
2	Site Preparation - Clear, Strip, Prepare Subgrade, Etc.	1	Each	$862,000	$862,000
3	River Bypass	1	Each	$1,346,000	$1,346,000
4	Earthwork, Cut/Fill, Import	1	Each	$6,547,313	$6,547,313
5	Armoring, Wave Protection	1	Each	$341,045	$341,045
6	Spillway	1	Each	$44,831,876	$44,831,876
7	Base/Underdrain/Filter System	1	Each	$110,027	$110,027
8	Intake Structure	1	Each	$1,133,200	$1,133,200
9	Utilities	1	Each	$750,000	$750,000
10	Site Restoration	1	Each	$144,167	$144,167
	Preliminary Construction Estimate - 2011 Dollars				**$58,480,183**
	Bridge Replacement/Demo/Reconstruction	1	Lump Sum	$26,500,000	$26,500,000
	Real Estate Cost	1	Lump Sum	$86,500,000	$86,500,000

Demolition Activities - Dam footprint plus 500' East and West

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Raze Structures					
	Mobile Homes/Foundations/Misc.	37	Each	$10,000.00	$370,000
	Houses (include Excavate/BF Basements	40	Each	$20,000.00	$800,000
	Other	10	Each	$20,000.00	$200,000
Remove/Dispose/Abandon Infastructure					
	Roadway	16528	sy	$20.00	$330,556
	Underground (Storm/San/Water/Telcom/Gas)	23800	ft	$30.00	$714,000
				Demolition Activities Total	**$2,414,556**

Site Preparation - Clear, Strip, Prepare Subgrade, Etc.

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Clear and Grub					
	Clear and Grub	22	Acres	$10,000.00	$220,000
Strip and Stock (Place) Topsoil					
	Strip and Place/Mound/Waste Topsoil	71333	cy	$6.00	$428,000
	(107,000 sy @ 2' thick average in valley bottom)				
Prepare Subgrade, scarify/compact					
	Prepare Subgrade, Scarify/Compact	107000	sy	$2.00	$214,000
				Site Prep Total	**$862,000**

River Bypass

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Relocate River					
	Install Pinstock	1	Each	$1,000,000.00	$1,000,000
	Dam Existing River	1	Each	$250,000.00	$250,000
	Excavate and Waste River Re-Alignment	12000	cy	$8.00	$96,000
				River Relocation Total	**$1,346,000**

Earthwork, Cut/Fill, Import

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Replace Volume of Strip/Demo/Unsuitable					
	North Dam	13333	CY	$13.96	$186,146
	Spillway	26000	CY	$13.96	$362,984
	South Dam	32000	CY	$13.96	$446,750
Embankment					
	North Dam	166572	CY	$13.96	$2,325,501
	Spillway	0	CY	$13.96	$0
	South Dam	202099	CY	$13.96	$2,821,492
Excavate and Stock (Place) Outfall Material					
	Excavate/Shape/Place/Waste Outfall Cut (50,555 sy @ 3' Average Cut)	50555	cy	$8.00	$404,440
				Earthwork Total	**$6,547,313**

Imported Clay Material

Trucking

Haul Capacity Average	20	ton/load
Round Trip	20	miles
Load Time	10	min
Unload Time	8	min
Average Haul Speed - Rural/City	25	mph
Round Trip Time	66	min
Loads per Hour	0.91	/hour
Estimated Trucking Cost	$75.00	/hour
Estimated Trucking Cost	$82.50	/load
Haul Capacity, Based on Placed Density	11.85	cy/load
Haul Cost, Based on Placed Density	$6.96	/cy

Material

Density, Quarry	125	lb/ft3
	3375	lb/cy
Material Cost, Quarry Measure	1	/cy
Density. Placed	125	lb/ft3

	3375	lb/cy
Material Cost, Based on Placed Volume	$1.00	/cy

Material Loading

Load Material @ Quarry	$2.00	/cy
Load Material @ Quarry	$2.00	/cy

Fill Placement

Spread, Manipulate, and Compact Fill	$4.00	/cy
Spread, Manipulate, and Compact Fill	$4.00	/cy

Armoring, Wave Protection

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Armoring- 24" to 36" Rip-Rap					
	North Dam @ 450' x 30' x 3'	1500	CY	$47.85	$71,774
	South Dam @ 1450' x 30' x 3'	4833	CY	$47.85	$231,271
Filters/Fabrics					
	North Dam @ 450'	1800	SY	$5.00	$9,000
	South Dam @ 1450'	5800	SY	$5.00	$29,000
				Armoring Total	**$341,045**

Imported Rock Material

Trucking

Haul Capacity Average	22	ton/load
Round Trip	20	miles
Load Time	10	min
Unload Time	15	min
Average Haul Speed - Rural/City	25	mph
Round Trip Time	73	min
Loads per Hour	0.82	/hour
Estimated Trucking Cost	$75.00	/hour
Estimated Trucking Cost	$91.25	/load
Haul Capacity, Based on Placed Density	10.86	cy/load
Haul Cost, Based on Placed Density	$8.40	/cy

Material

Density, Placed	150	lb/ft3
	4050	lb/cy
Material Cost	$18.00	/ton
Material Cost, Based on Placed Volume	$36.45	/cy

Placement

Place Rip-Rap	$3.00	/cy
Place Rip-Rap	$3.00	/cy

Base/Underdrain/Filter System

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Drainage or Base Aggregate - Various Gradations					
	Upstream Face @ 8"	0	CY	$42.44	$0
	Crest @ 8"	0	CY	$42.44	$0
	Downstream Face @ 24"'	0	CY	$42.44	$0
	Scour Pad @ 8"	2593	CY	$42.44	$110,027
Filters/Fabrics					
	Upstream Face	0	SY	$5.00	$0
	Crest	0	SY	$5.00	$0
	Downstream Face	0	SY	$5.00	$0
Drain Conduits (assume 50' spacing + 20% for headers)		50	1.2		
	Upstream Face	0	LF	$15.00	$0
	Crest	0	SY	$15.00	$0
	Downstream Face	0	SY	$15.00	$0
				Base/Drain Total	**$110,027**

Imported Rock Material

Trucking

Haul Capacity Average	22	ton/load
Round Trip	20	miles
Load Time	10	min
Unload Time	15	min
Average Haul Speed - Rural/City	25	mph
Round Trip Time	73	min
Loads per Hour	0.82	/hour
Estimated Trucking Cost	$75.00	/hour
Estimated Trucking Cost	$91.25	/load
Haul Capacity, Based on Placed Density	11.24	cy/load
Haul Cost, Based on Placed Density	$8.12	/cy

Material

Density, Placed	145	lb/ft3
	3915	lb/cy
Material Cost	$16.00	/ton
Material Cost, Based on Placed Volume	$31.32	/cy

Placement

Place/Compact Aggregate	$3.00	/cy
Place Rip-Rap	$3.00	/cy

Spillway

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
End Walls					
	North Wall @ 2.5'	1406	CY	$800.00	$1,124,889
	South Wall @ 2.5'	1406	CY	$800.00	$1,124,889
Spillway Core					
	RCC Spillway Core	132243	CY	$250.00	$33,060,750
Faces					
	Upstream Face CIP Veneer @ 1'	2666	CY	$700.00	$1,866,356
	Crest CIP Veneer @ 1'	2333	CY	$700.00	$1,633,333
	Downstream Face CIP Veneer @ 1'	3047	CY	$700.00	$2,132,770
	Scour Pad RCC @ 2'	7778	CY	$500.00	$3,888,889
				Spillway Total	**$44,831,876**

Intake Structure

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Intake Structure					
	Intake Tower - 16'x16'x50' w/2' thick walls	315	CY	$900.00	$283,200
	Gates - 4'x4'	4	EA	$100,000.00	$400,000
	Outlet Pipe - 72"	300	FT	$1,500.00	$450,000
				Intake Structure Total	**$1,133,200**

Utilities

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Utilities					
Electric Service		1	EA	$750,000.00	$750,000
				Utilities Total	**$750,000**

Site Restoration

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Respread Topsoil					
	Re-Spread	8917	cy	$10.00	$89,167
Seed and Mulch					
	Seed and Mulch	11	Acres	$5,000.00	$55,000
				Site Restoration Total	**$144,167**

Appendix E: Cost Analysis Option 2

ANDERSON DAM
PRELIMINARY CONSTRUCTION COST
OPTION 2 - 1100' RCC CORE w/ VENEER CRESTED SPILLWAY @ EL 875

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
1	Demolition Activities - Dam footprint plus 500' East and West	1	Each	$2,414,556	$2,414,556
2	Site Preparation - Clear, Strip, Prepare Subgrade, Etc.	1	Each	$862,000	$862,000
3	River Bypass	1	Each	$1,346,000	$1,346,000
4	Earthwork, Cut/Fill, Import	1	Each	$5,430,101	$5,430,101
5	Armoring, Wave Protection	1	Each	$313,287	$313,287
6	Spillway	1	Each	$63,336,637	$63,336,637
7	Base/Underdrain/Filter System	1	Each	$183,379	$183,379
8	Intake Structure	1	Each	$1,133,200	$1,133,200
9	Utilities	1	Each	$750,000	$750,000
10	Site Restoration	1	Each	$144,167	$144,167
	Preliminary Construction Estimate - 2011 Dollars				**$75,913,326**

Demolition Activities - Dam footprint plus 500' East and West

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Raze Structures					
	Mobile Homes/Foundations/Misc.	37	Each	$10,000.00	$370,000
	Houses (include Excavate/BF Basements	40	Each	$20,000.00	$800,000
	Other	10	Each	$20,000.00	$200,000
Remove/Dispose/Abandon Infastructure					
	Roadway	16528	sy	$20.00	$330,556
	Underground (Storm/San/Water/Telcom/Gas)	23800	ft	$30.00	$714,000
				Demolition Activities Total	**$2,414,556**

Site Preparation - Clear, Strip, Prepare Subgrade, Etc.

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Clear and Grub					
	Clear and Grub	22	Acres	$10,000.00	$220,000
Strip and Stock (Place) Topsoil					
	Strip and Place/Mound/Waste Topsoil	71333	cy	$6.00	$428,000
	(107,000 sy @ 2' thick average in valley bottom)				
Prepare Subgrade, scarify/compact					
	Prepare Subgrade, Scarify/Compact	107000	sy	$2.00	$214,000
				Site Prep Total	**$862,000**

River Bypass

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Relocate River					
	Install Pinstock	1	Each	$1,000,000.00	$1,000,000
	Dam Existing River	1	Each	$250,000.00	$250,000
	Excavate and Waste River Re-Alignment	12000	cy	$8.00	$96,000
				River Relocation Total	**$1,346,000**

Earthwork, Cut/Fill, Import

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Replace Volume of Strip/Demo/Unsuitable					
	North Dam	7407	CY	$13.96	$103,413
	Spillway	40741	CY	$13.96	$568,778
	South Dam	27778	CY	$13.96	$387,807
Embankment					
	North Dam	92500	CY	$13.96	$1,291,387
	Spillway	0	CY	$13.96	$0
	South Dam	175000	CY	$13.96	$2,443,164
Excavate and Stock (Place) Outfall Material					
	Excavate/Shape/Place/Waste Outfall Cut (79,444 sy @ 3' Average Cut)	79444	cy	$8.00	$635,552
				Earthwork Total	**$5,430,101**

Imported Clay Material

Trucking

Haul Capacity Average	20	ton/load
Round Trip	20	miles
Load Time	10	min
Unload Time	8	min
Average Haul Speed - Rural/City	25	mph
Round Trip Time	66	min
Loads per Hour	0.91	/hour
Estimated Trucking Cost	$75.00	/hour
Estimated Trucking Cost	$82.50	/load
Haul Capacity, Based on Placed Density	11.85	cy/load
Haul Cost, Based on Placed Density	$6.96	/cy

Material

Density, Quarry	125	lb/ft3
	3375	lb/cy
Material Cost, Quarry Measure	1	/cy
Density. Placed	125	lb/ft3

	3375	lb/cy
Material Cost, Based on Placed Volume	$1.00	/cy

Material Loading

Load Material @ Quarry	$2.00	/cy
Load Material @ Quarry	$2.00	/cy

Fill Placement

Spread, Manipulate, and Compact Fill	$4.00	/cy
Spread, Manipulate, and Compact Fill	$4.00	/cy

Armoring, Wave Protection

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Armoring- 24" to 36" Rip-Rap					
	North Dam @ 250' x 35' x 3'	972	CY	$47.85	$46,520
	South Dam @ 1250' x 35' x 3'	4861	CY	$47.85	$232,600
Filters/Fabrics					
	North Dam @ 250'	1139	SY	$5.00	$5,694
	South Dam @ 1250'	5694	SY	$5.00	$28,472
				Armoring Total	**$313,287**

Imported Rock Material

Trucking

Haul Capacity Average	22	ton/load
Round Trip	20	miles
Load Time	10	min
Unload Time	15	min
Average Haul Speed - Rural/City	25	mph
Round Trip Time	73	min
Loads per Hour	0.82	/hour
Estimated Trucking Cost	$75.00	/hour
Estimated Trucking Cost	$91.25	/load
Haul Capacity, Based on Placed Density	10.86	cy/load
Haul Cost, Based on Placed Density	$8.40	/cy

Material

Density, Placed	150	lb/ft3
	4050	lb/cy
Material Cost	$18.00	/ton
Material Cost, Based on Placed Volume	$36.45	/cy

Placement

Place Rip-Rap	$3.00	/cy
Place Rip-Rap	$3.00	/cy

Base/Underdrain/Filter System

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Drainage or Base Aggregate - Various Gradations					
	Upstream Face @ 8"	0	CY	$42.44	$0
	Crest @ 8"	0	CY	$42.44	$0
	Downstream Face @ 24"'	0	CY	$42.44	$0
	Scour Pad @ 8"	4321	CY	$42.44	$183,379
Filters/Fabrics					
	Upstream Face	0	SY	$5.00	$0
	Crest	0	SY	$5.00	$0
	Downstream Face	0	SY	$5.00	$0
Drain Conduits (assume 50' spacing + 20% for headers)		50	1.2		
	Upstream Face	0	LF	$15.00	$0
	Crest	0	SY	$15.00	$0
	Downstream Face	0	SY	$15.00	$0
				Base/Drain Total	**$183,379**

Imported Rock Material

Trucking

Haul Capacity Average	22	ton/load
Round Trip	20	miles
Load Time	10	min
Unload Time	15	min
Average Haul Speed - Rural/City	25	mph
Round Trip Time	73	min
Loads per Hour	0.82	/hour
Estimated Trucking Cost	$75.00	/hour
Estimated Trucking Cost	$91.25	/load
Haul Capacity, Based on Placed Density	11.24	cy/load
Haul Cost, Based on Placed Density	$8.12	/cy

Material

Density, Placed	145	lb/ft3
	3915	lb/cy
Material Cost	$16.00	/ton
Material Cost, Based on Placed Volume	$31.32	/cy

Placement

Place/Compact Aggregate	$3.00	/cy
Place Rip-Rap	$3.00	/cy

Spillway

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
End Walls					
	North Wall @ 2.5'	1406	CY	$800.00	$1,124,889
	South Wall @ 2.5'	1406	CY	$800.00	$1,124,889
Spillway Core					
	RCC Spillway Core	183200	CY	$250.00	$45,800,000
Faces					
	Upstream Face CIP Veneer @ 1'	3546	CY	$700.00	$2,482,252
	Crest CIP Veneer @ 1'	4889	CY	$700.00	$3,422,222
	Downstream Face CIP Veneer @ 1'	4144	CY	$700.00	$2,900,904
	Scour Pad RCC @ 2'	12963	CY	$500.00	$6,481,481
				Spillway Total	**$63,336,637**

Intake Structure

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Intake Structure					
	Intake Tower - 16'x16'x50' w/2' thick walls	315	CY	$900.00	$283,200
	Gates - 4'x4'	4	EA	$100,000.00	$400,000
	Outlet Pipe - 72"	300	FT	$1,500.00	$450,000
				Intake Structure Total	**$1,133,200**

Utilities

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Utilities					
	Electric Service	1	EA	$750,000.00	$750,000
				Utilities Total	**$750,000**

Site Restoration

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Respread Topsoil					
	Re-Spread	8917	cy	$10.00	$89,167
Seed and Mulch					
	Seed and Mulch	11	Acres	$5,000.00	$55,000
				Site Restoration Total	**$144,167**

Appendix E: Cost Analysis Option 3

ANDERSON DAM
PRELIMINARY CONSTRUCTION COST
OPTION 3 - 450' OPEN (534' SPAN) RCC CORE W/ VENEER GATED SPILLWAY @ EL 860

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
1	Demolition Activities - Dam footprint plus 500' East and West	1	Each	$2,414,556	$2,414,556
2	Site Preparation - Clear, Strip, Prepare Subgrade, Etc.	1	Each	$862,000	$862,000
3	River Bypass	1	Each	$1,346,000	$1,346,000
4	Earthwork, Cut/Fill, Import	1	Each	$7,017,241	$7,017,241
5	Armoring, Wave Protection	1	Each	$492,159	$492,159
6	Spillway	1	Each	$62,175,104	$62,175,104
7	Base/Underdrain/Filter System	1	Each	$83,935	$83,935
8	Intake Structure	1	Each	$1,133,200	$1,133,200
9	Utilities	1	Each	$750,000	$750,000
10	Site Restoration	1	Each	$144,167	$144,167
	Preliminary Construction Estimate - 2011 Dollars				**$76,418,362**
	Bridge Replacement/Demo/Reconstruction	1	Lump Sum	$26,500,000	$26,500,000
	Real Estate Cost	1	Lump Sum	$86,500,000	$86,500,000

Demolition Activities - Dam footprint plus 500' East and West

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Raze Structures					
	Mobile Homes/Foundations/Misc.	37	Each	$10,000.00	$370,000
	Houses (include Excavate/BF Basements	40	Each	$20,000.00	$800,000
	Other	10	Each	$20,000.00	$200,000
Remove/Dispose/Abandon Infastructure					
	Roadway	16528	sy	$20.00	$330,556
	Underground (Storm/San/Water/Telcom/Gas)	23800	ft	$30.00	$714,000
				Demolition Activities Total	**$2,414,556**

Site Preparation - Clear, Strip, Prepare Subgrade, Etc.

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Clear and Grub					
	Clear and Grub	22	Acres	$10,000.00	$220,000
Strip and Stock (Place) Topsoil					
	Strip and Place/Mound/Waste Topsoil	71333	cy	$6.00	$428,000
	(107,000 sy @ 2' thick average in valley bottom)				
Prepare Subgrade, scarify/compact					
	Prepare Subgrade, Scarify/Compact	107000	sy	$2.00	$214,000
				Site Prep Total	**$862,000**

River Bypass

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Relocate River					
	Install Pinstock	1	Each	$1,000,000.00	$1,000,000
	Dam Existing River	1	Each	$250,000.00	$250,000
	Excavate and Waste River Re-Alignment	12000	cy	$8.00	$96,000
				River Relocation Total	**$1,346,000**

Earthwork, Cut/Fill, Import

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Replace Volume of Strip/Demo/Unsuitable					
	North Dam	15793	CY	$13.96	$220,480
	Spillway	19778	CY	$13.96	$276,119
	South Dam	33133	CY	$13.96	$462,572
Embankment					
	North Dam	197210	CY	$13.96	$2,753,236
	Spillway	0	CY	$13.96	$0
	South Dam	214620	CY	$13.96	$2,996,296
Excavate and Stock (Place) Outfall Material					
	Excavate/Shape/Place/Waste Outfall Cut (38,567 sy @ 3' Average Cut)	38567	cy	$8.00	$308,536
				Earthwork Total	**$7,017,241**

Imported Clay Material

Trucking

Haul Capacity Average	20	ton/load
Round Trip	20	miles
Load Time	10	min
Unload Time	8	min
Average Haul Speed - Rural/City	25	mph
Round Trip Time	66	min
Loads per Hour	0.91	/hour
Estimated Trucking Cost	$75.00	/hour
Estimated Trucking Cost	$82.50	/load
Haul Capacity, Based on Placed Density	11.85	cy/load
Haul Cost, Based on Placed Density	$6.96	/cy

Material

Density, Quarry	125	lb/ft3
	3375	lb/cy
Material Cost, Quarry Measure	1	/cy
Density. Placed	125	lb/ft3

	3375	lb/cy
Material Cost, Based on Placed Volume	$1.00	/cy

Material Loading

Load Material @ Quarry	$2.00	/cy
Load Material @ Quarry	$2.00	/cy

Fill Placement

Spread, Manipulate, and Compact Fill	$4.00	/cy
Spread, Manipulate, and Compact Fill	$4.00	/cy

Armoring, Wave Protection

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Armoring- 24" to 36" Rip-Rap					
	North Dam @ 533' x 40' x 3'	2369	CY	$47.85	$113,349
	South Dam @ 1575' x 40' x 3'	6813	CY	$47.85	$326,012
Filters/Fabrics					
	North Dam @ 533'	2724	SY	$5.00	$13,621
	South Dam @ 1533'	7835	SY	$5.00	$39,177
				Armoring Total	**$492,159**

Imported Rock Material

Trucking

Haul Capacity Average	22	ton/load
Round Trip	20	miles
Load Time	10	min
Unload Time	15	min
Average Haul Speed - Rural/City	25	mph
Round Trip Time	73	min
Loads per Hour	0.82	/hour
Estimated Trucking Cost	$75.00	/hour
Estimated Trucking Cost	$91.25	/load
Haul Capacity, Based on Placed Density	10.86	cy/load
Haul Cost, Based on Placed Density	$8.40	/cy

Material

Density, Placed	150	lb/ft3
	4050	lb/cy
Material Cost	$18.00	/ton
Material Cost, Based on Placed Volume	$36.45	/cy

Placement

Place Rip-Rap	$3.00	/cy
Place Rip-Rap	$3.00	/cy

Base/Underdrain/Filter System

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Drainage or Base Aggregate - Various Gradations					
	Upstream Face @ 8"	0	CY	$42.44	$0
	Crest @ 8"	0	CY	$42.44	$0
	Downstream Face @ 24"'	0	CY	$42.44	$0
	Scour Pad @ 8"	1978	CY	$42.44	$83,935
Filters/Fabrics					
	Upstream Face	0	SY	$5.00	$0
	Crest	0	SY	$5.00	$0
	Downstream Face	0	SY	$5.00	$0
Drain Conduits (assume 50' spacing + 20% for headers)		50	1.2		
	Upstream Face	0	LF	$15.00	$0
	Crest	0	SY	$15.00	$0
	Downstream Face	0	SY	$15.00	$0
				Base/Drain Total	**$83,935**

Imported Rock Material

Trucking

Haul Capacity Average	22	ton/load
Round Trip	20	miles
Load Time	10	min
Unload Time	15	min
Average Haul Speed - Rural/City	25	mph
Round Trip Time	73	min
Loads per Hour	0.82	/hour
Estimated Trucking Cost	$75.00	/hour
Estimated Trucking Cost	$91.25	/load
Haul Capacity, Based on Placed Density	11.24	cy/load
Haul Cost, Based on Placed Density	$8.12	/cy

Material

Density, Placed	145	lb/ft3
	3915	lb/cy
Material Cost	$16.00	/ton
Material Cost, Based on Placed Volume	$31.32	/cy

Placement

Place/Compact Aggregate	$3.00	/cy
Place Rip-Rap	$3.00	/cy

Spillway

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
End Walls					
	North Wall @ 3'	1687	CY	$800.00	$1,349,867
	South Wall @ 3'	1687	CY	$800.00	$1,349,867
Spillway Core					
	RCC Spillway Core	77430	CY	$250.00	$19,357,500
Division Walls/Pillars					
	30' exposed, 10' below, 30' wide top, 210' wide bottom, 6' thick = 800 cy @ 14 Units	11200	CY	$800.00	$8,960,000
Gates					
	30' x 30', Gate Assembly	15	EA	$1,200,000.00	$18,000,000
Crane Bridge/Crane					
	Crane Bridge/Crane	530	FT	$5,000.00	$2,650,000
	Crane	1	EA	$500,000.00	$500,000
Monitoring and Controls					
	Monitoring and Control System	1	EA	$2,000,000.00	$2,000,000
Faces					
	Upstream Face CIP Veneer @ 1'	1358	CY	$700.00	$950,652
	Crest CIP Veneer @ 1'	2500	CY	$700.00	$1,750,000
	Downstream Face CIP Veneer @ 1'	1648	CY	$700.00	$1,153,885
	Scour Pad RCC @ 2'	5933	CY	$700.00	$4,153,333
				Spillway Total	**$62,175,104**

Intake Structure

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Intake Structure					
	Intake Tower - 16'x16'x50' w/2' thick walls	315	CY	$900.00	$283,200
	Gates - 4'x4'	4	EA	$100,000.00	$400,000
	Outlet Pipe - 72"	300	FT	$1,500.00	$450,000
				Intake Structure Total	**$1,133,200**

Utilities

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Utilities					
	Electric Service	1	EA	$750,000.00	$750,000
				Utilities Total	**$750,000**

Site Restoration

ITEM	DESCRIPTION	QTY	UNIT	COST/UNIT	ESTIMATED COST
Respread Topsoil					
	Strip and Place/Mound/Waste Topsoil	8917	cy	$10.00	$89,167
Seed and Mulch					
	Clear and Grub	11	Acres	$5,000.00	$55,000
				Site Restoration Total	**$144,167**