CITY COUNCIL AGENDA ITEM COVER MEMO

Agenda Item Number_____

Meeting Type: Regular

Meeting Date: 3/8/2012

Action Requested By:
Engineering

Agenda Item Type
Resolution

Subject Matter:

Cooperative Maintenance of Public Right-of-Way Agreement

Exact Wording for the Agenda:

Resolution authorizing the Mayor to enter into an Agreement with the Alabama Department of Transportation for a Cooperative Maintenance of Public Right-of-Way for the existing drainage ditch and road culvert along U. S. Highway 72 from Milepost 89.83 to Milepost 89.85, Project No. 65-12-SP13

Note: If amendment, please state title and number of the original

Item to be considered for: Action

Unanimous Consent Required: No

Briefly state why the action is required; why it is recommended; what Council action will provide, allow
and accomplish and; any other information that might be helpful.

Agreement is for the City to maintain the existing drainage ditch and road culvert in the public right-of-way along U. S. Highway 72 from Milepost 89.83 to Milepost 89.85. No city funds involved.

Associated Cost:

Budgeted Item: Select...

MAYOR RECOMMENDS OR CONCURS: Select...

Department Head: _____

Date: 2/14/12

revised 4/13/2011

ROUTING SLIP
CONTRACTS AND AGREEMENTS

Originating Department: **Engineering** Council Meeting Date: **3/8/2012**

Department Contact: **Lynn Majors** Phone # **256-427-5201**

Contract or Agreement: **Cooperative Maintenance Agreement**

Document Name: **ALDOT-US Hwy 72 Project No. 65-12-SP13**

City Obligation Amount: **0**

Total Project Budget: **0**

Uncommitted Account Balance: **0**

Account Number: **N/A**

Procurement Agreements

Not Applicable	**Not Applicable**

Grant-Funded Agreements

Not Applicable	**Grant Name:**

Department	Signature	Date
1) Originating		2/14/12
2) Legal	Mary C. Gates	2/28/12
3) Finance		2/28/12
4) Originating		
5) Copy Distribution		
a. Mayor's office (2 copies)		
b. Clerk-Treasurer (Original & 2 copies)		
c. Legal (1 copy)		

RESOLUTION NO. 12-_____

BE IT RESOLVED by the City Council of the City of Huntsville, Alabama, that the Mayor be, and is hereby authorized, to enter into an agreement with the State of Alabama Department of Transportation for a Cooperative Maintenance of Public Right-of-Way for the existing drainage ditch along U. S. Highway 72 from Milepost 89.83 to Milepost 89.85, Project No. 65-12-SP13, in Huntsville, Alabama, on behalf of the City of Huntsville, a municipal corporation in the State of Alabama, which said agreement is substantially in words and figures similar to that document attached hereto and identified as "Agreement with the State of Alabama Department of Transportation for a Cooperative Maintenance of Public Right-of-Way for the existing drainage ditch and road culvert along U. S. Highway 72 from Milepost 89.83 to Milepost 89.85, Project No. 65-12-SP13" consisting of a total of three (3) pages, plus nineteen (19) additional pages consisting of Attachment "A" and the date of March 8, 2012 appearing on the margin of the first page, together with the signature of the President or President Pro Tem of the City Council, and an executed copy of said document being permanently kept on file in the Office of the City Clerk of the City of Huntsville, Alabama.

ADOPTED this the 8th day of March, 2012.

_____
President of the City Council of the City of Huntsville, Alabama

APPROVED this the 8th day of March, 2012.

_____
Mayor of the City of Huntsville, Alabama

ALABAMA DEPARTMENT OF TRANSPORTATION
AGREEMENT FOR THE COOPERATIVE MAINTENANCE
OF PUBLIC RIGHT OF WAY

Permit No._____

DIVISION _____ DISTRICT _____

THIS AGREEMENT, entered into this the 8th day of March, 2012, by and between the Alabama Department of Transportation acting by and through its Transportation Director hereinafter referred to as the STATE and City of Huntsville, in an effort to secure a more efficient and safe traffic flow within the city limits of Huntsville along Route US Highway 72 / Alabama Hwy 02, the City of Huntsville agrees to maintain the existing drainage ditch and road culvert in the state right-of-way from milepost 89.83 to 89.85, including but not limited to, pavement structures, ditches, drainage structures, signing, striping, pavement markings, and lighting. All maintenance shall conform to standards and specifications of the Alabama Department of Transportation and the Manual on Uniform Traffic Control Devices. Construction of service roads, and subsequent access turnouts, shall be requested by permit and be subject to approval by the Alabama Department of Transportation. It is furthermore understood by the parties that the map attached hereto describes the current situation as to the existing service road. The parties understand that this agreement and the map attached hereto may be amended by the mutual agreement of the parties.

In accepting the above, the Department of Transportation and club, group, business, or municipality agree to do the following:

1. Adequate sight distances must be maintained for maximum public safety; otherwise the Department of Transportation reserves the right to remedy this situation in the most expedient manner.

2. The Department of Transportation is not responsible for the safety of the individual involved or taking part in this work during maintenance operations.

_____
President of the City Council of the City of Huntsville, AL
Date: March 8, 2012

3. If Department of Transportation construction (repair of drainage and traffic structures, crossovers and other minor construction) is done in the subject area, it will be the responsibility of the Department of Transportation to establish a stand of vegetative cover if deemed necessary by the Department of Transportation and then the groups', clubs', business', or municipalities' responsibility to maintain the vegetative cover as stipulated herein. In the event of major construction in the subject area, this Agreement shall be voided at a time designated by the Department of Transportation.

4. All work shall be subject to the inspection and approval of the Alabama Department of Transportation. Description of the proposed work must accompany this and any associated proposal. If the maintenance is not conducted as specified herein, the Department of Transportation shall assume maintenance and this Agreement will be invalid. A copy of this Agreement must be kept by all parties that sign the Agreement. The State of Alabama does not grant applicant any right, title, or claim on any highway right-of-way.

5. The club, group, business, or municipality agrees to store no equipment, materials, or debris of any kind on the shoulders of pavement and in the case of multi-lane highways, in the median strips. The pavement will be kept free from waste and equipment.

6. The APPLICANT shall be solely responsible for and hold harmless the Alabama Department of Transportation for any claim for damage done to existing private property, public utility, or the traveling public.

7. To the fullest extent permitted by law, the APPLICANT shall defend, indemnify, and hold harmless the State of Alabama, the Alabama Department of Transportation, and its agents, servants, employees and/or facilities from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of the APPLICANT, anyone directly or indirectly employed by the APPLICANT or anyone for whose acts APPLICANT may be liable.

The term "hold harmless" includes the obligation of the APPLICANT to pay damages awarded against and legally recoverable from the State of Alabama, or the Alabama Department of Transportation, or its officers, agents, servants, and/or employees in both individual and official capacities whose acts or omissions that were the basis of the liability were performed within the course and scope of their employment.

8. This Agreement is executed with the understanding that it is not valid until the club, group, business or municipality has complied with all existing ordinances, laws and zoning boards that have jurisdiction in the county, city or municipality.

9. Failure of the club, group, business or municipality to conform to the provisions of this Agreement will be cause to terminate this Agreement. Notification prior to termination will be made by the Department of Transportation.

The above conditions are agreed upon:

Name of Club, Group, Business or Municipality:
City of Huntsville, Alabama

BY_____ _____
Name and Title Date
Tommy Battle, Mayor

BY_____ _____
Name and Title Date

BY_____ _____
Name and Title Date

(256) 427-5000
Telephone Number

Reviewed as to Form

_____
Counsel – State of Alabama
Department of Transportation

For the Alabama Department of
Transportation :

_____ _____
District Manager Date

_____ _____
Division Engineer Date

_____ _____
Maintenance Engineer Date

ATTACHMENT "A"

DRAINAGE DESIGN REPORT

HIGHWAY 72 LEFT TURN LANE

HUNTSVILLE, ALABAMA

January 19, 2012

GW JONES
& Sons Consulting Engineers, Inc.
Established 1886

Drainage Summary – Highway 72 Left Turn Lane

This project consists of a left turn lane from Highway 72 East onto Christopher Drive and includes a concrete median between the east and west bound lanes. Slotted drains will be installed on both sides of the concrete median along the entire length. The proposed turn lane and stormwater drainage will provide no adverse effects to the ALDOT right-of-way. The proposed drainage along with existing drainage from the east and west medians will be connected to an existing 36" x 24" RCB and 36" RCP draining to the north under Highway 72 West. **It has been determined that the existing 36" x 24" RCB and 36" RCP are undersized. See the HY8 analysis spreadsheet on page 11 of this report. The City of Huntsville and ALDOT have agreed to perform maintenance to the culvert but no capacity improvements will be made at this time.**

All drainage design calculations are based on the Alabama Department of Transportation Hydraulic Manual. Below is a summary of the design criteria.

1. Huntsville, Alabama rainfall intensity curves were used.
2. Weighted runoff coefficients were used where applicable.
3. Minimum time of concentration was 5.0 minutes.
4. Stormwater design was based on a 50-year design year using the StormCad software.

Included in this report are the following.

- Stormwater Summary Tables – Pre and Post (Results using the original calculated time of concentration (TR-55 Method) and results using the calculated time of concentration from Nomograph)
- Comparison of the TR-55 and Nomograph methods for calculating time of concentration
- WinHydro version 3 results for the two larger areas, Areas A and C
- Drainage Area Maps

Stormwater Summary Tables – Original Time of Concentrations

PRE DEVELOPMENT - STRUCTURE SUMMARY

Label	STRUCTURE TYPE	Ground Elevation (ft)	Sump Elevation (ft)	Inlet Area (acres)	Inlet C	Tc (min)	10-Year Storm				25-Year Storm				50-Year Storm			
							Intensity (in/hr)	Flow (cfs)	Spread (ft)	Capture Efficiency (%)	Intensity (in/hr)	Flow (cfs)	Spread (ft)	Capture Efficiency (%)	Intensity (in/hr)	Flow (cfs)	Spread (ft)	Capture Efficiency (%)
ST-1	Junction Box, Type 1 and 12" Slotted Drain	754.90	753.20	0.17	0.95	5	7.30	1.19	1.18	100	8.33	1.36	1.28	100	9.14	1.49	1.37	100
ST-2	Type B Inlet	754.90	751.92	0.08	0.95	5	7.30	0.56	6.99	100	8.33	0.64	7.50	100	9.14	0.70	7.90	100
ST-3	Junction Box, Type 1 and 12" Slotted Drain	754.90	753.20	0.14	0.67	5	7.30	0.70	0.82	100	8.33	0.79	0.90	100	9.14	0.87	0.95	100
ST-4	Junction Box, Type 1 and 15" Slotted Drain	754.87	752.80	0.25	0.95	5	7.30	1.75	1.33	100	8.33	1.99	1.45	100	9.14	2.19	1.55	100
ST-5	Type B Inlet	754.90	753.07	0.08	0.95	5	7.30	0.56	6.99	100	8.33	0.64	7.50	100	9.14	0.70	7.90	100
ST-6	Junction Box, Type 1 and 12" Slotted Drain	754.38	752.50	0.14	0.67	5	7.30	0.70	0.72	100	8.33	0.79	0.79	100	9.14	0.87	0.84	100
ST-7	Junction Box, Type 1	754.95	749.21															
EX-A	Existing Headwall	755.00	752.03	1.45	0.67	10	6.18	6.01	0.00	100	7.07	6.88	0.00	100	7.78	7.56	0.00	100
EX-B	Existing Headwall	755.00	753.38	0.72	0.76	5	7.30	4.02	0.00	100	8.33	4.59	0.00	100	9.14	5.03	0.00	100
EX-C	Existing Headwall	754.00	749.87	20.15	0.5	30	3.66	37.17	0.00	100	4.27	43.36	0.00	100	4.74	48.14	0.00	100
EX-E	Existing Headwall	755.00	748.63															

POST DEVELOPMENT - STRUCTURE SUMMARY

Label	STRUCTURE TYPE	Ground Elevation (ft)	Sump Elevation (ft)	Inlet Area (acres)	Inlet C	Tc (min)	10-Year Storm				25-Year Storm				50-Year Storm			
							Intensity (in/hr)	Flow (cfs)	Spread (ft)	Capture Efficiency (%)	Intensity (in/hr)	Flow (cfs)	Spread (ft)	Capture Efficiency (%)	Intensity (in/hr)	Flow (cfs)	Spread (ft)	Capture Efficiency (%)
ST-1	Junction Box, Type 1 and 12" Slotted Drain	754.90	753.20	0.17	0.95	5	7.3	1.19	1.18	100	8.33	1.36	1.28	100	9.14	1.49	1.37	100
ST-2	Type B Inlet	754.90	751.92	0.08	0.95	5	7.3	0.56	6.99	100	8.33	0.64	7.5	100	9.14	0.7	7.9	100
ST-3	Junction Box, Type 1 and 12" Slotted Drain	754.90	753.20	0.14	0.95	5	7.3	0.98	1.03	100	8.33	1.12	1.13	100	9.14	1.23	1.2	100
ST-4	Junction Box, Type 1 and 15" Slotted Drain	754.87	752.80	0.25	0.95	5	7.3	1.75	1.33	100	8.33	1.99	1.45	100	9.14	2.19	1.55	100
ST-5	Type B Inlet	754.90	753.07	0.08	0.95	5	7.3	0.56	6.99	100	8.33	0.64	7.5	100	9.14	0.7	7.9	100
ST-6	Junction Box, Type 1 and 12" Slotted Drain	754.38	752.50	0.14	0.95	5	7.3	0.98	0.91	100	8.33	1.12	0.99	100	9.14	1.23	1.05	100
ST-7	Junction Box, Type 1	754.95	749.21															
EX-A	Existing Headwall	755.00	752.03	1.45	0.67	10	6.18	6.01	0	100	7.07	6.88	0	100	7.78	7.56	0	100
EX-B	Existing Headwall	755.00	753.38	0.72	0.76	5	7.3	4.02	0	100	8.33	4.59	0	100	9.14	5.03	0	100
EX-C	Existing Headwall	754.00	749.87	20.15	0.5	30	3.66	37.17	0	100	4.27	43.36	0	100	4.74	48.14	0	100
EX-E	Existing Headwall	755.00	748.63															

Notes:

1. In previous reports, ST-2 and ST-5 were listed as slotted drain inlets. These structures are actually Type B inlets. The current report reflects this change.
2. In previous reports, ST-1 and ST-4 had areas of 0.21 acres and 0.21 acres, respectively. The areas are 0.17 acres and 0.25 acres, respectively. Although the previous report had incorrect areas for these inlets, the stormwater model had the correct information.
3. All structures had been correctly labeled.
4. The latest results reflect a 20% clogging factor for inlets.
5. These results consider the original time of concentrations calculated for the larger areas.

Stormwater Summary Tables – Original Time of Concentrations

PRE DEVELOPMENT - PIPE SUMMARY

Label	Up. Node	Up. Gr Elev. (ft)	Up. Invert (ft)	Dn. Node	Dn. Gr. Elev. (ft)	Dn. Invert (ft)	L (ft)	Size	S (ft/ft)	10-Year Storm			25-Year Storm			50-Year Storm		
										Up. HGL (ft)	Dn. HGL (ft)	Flow / Full Capacity (%)	Up. HGL (ft)	Dn. HGL (ft)	Flow / Full Capacity (%)	Up. HGL (ft)	Dn. HGL (ft)	Flow / Full Capacity (%)
P-1	ST-1	754.90	753.20	ST-7	754.95	751.50	165	12" CMP	1.03%	753.76	752.45	60.7	753.81	752.80	69.2	754.02	753.07	76.0
P-2	ST-2	754.90	751.92	ST-7	754.95	749.71	182	18" RCP	1.21%	752.90	752.45	51.1	753.56	752.80	58.6	753.99	753.07	64.5
P-3	ST-3	754.90	753.20	ST-7	754.95	752.35	165	12" CMP	0.52%	753.70	752.45	50.2	753.74	752.80	57.3	753.77	753.07	62.9
P-4	ST-4	754.87	752.80	ST-7	754.95	751.25	202	15" CMP	0.77%	753.48	752.45	57.0	753.55	752.80	65.1	753.83	753.07	71.4
P-5	ST-5	754.90	753.07	ST-7	754.95	749.71	219	18" RCP	1.53%	753.89	752.45	32.3	753.95	752.80	36.9	753.99	753.07	40.5
P-6	ST-6	754.38	752.50	ST-7	754.95	751.25	202	12" CMP	0.62%	752.98	752.45	45.8	753.14	752.80	52.3	753.48	753.07	57.4
P-A	EX-A	755.00	752.03	ST-2	754.90	751.92	58	EX 18" RCP	0.19%	753.30	753.11	121.2	753.90	753.69	138.8	754.41	754.15	152.6
P-B	EX-B	755.00	753.38	ST-5	754.90	753.07	48	EX 18" RCP	0.65%	754.15	754.06	44.0	754.20	754.13	50.2	754.24	754.19	55.1
P-C	EX-C	754.00	749.87	ST-7	754.95	749.21	41	EX 24" x 38" RCP	1.61%	752.69	752.45	60.4	753.12	752.80	70.4	753.47	753.07	78.2
P-D	ST-7	754.95	749.21	EX-E	755.00	748.63	62	EX 36" RCP	0.94%	751.41	748.63	65.0	751.58	748.63	75.9	751.69	748.63	84.2

POST DEVELOPMENT - PIPE SUMMARY

Label	Up. Node	Up. Gr Elev. (ft)	Up. Invert (ft)	Dn. Node	Dn. Gr. Elev. (ft)	Dn. Invert (ft)	L (ft)	Size	S (ft/ft)	10-Year Storm			25-Year Storm			50-Year Storm		
										Up. HGL (ft)	Dn. HGL (ft)	Flow / Full Capacity (%)	Up. HGL (ft)	Dn. HGL (ft)	Flow / Full Capacity (%)	Up. HGL (ft)	Dn. HGL (ft)	Flow / Full Capacity (%)
P-1	ST-1	754.90	753.20	ST-7	754.95	751.50	165	12" CMP	1.03%	753.76	752.46	60.7	753.81	752.81	69.2	754.04	753.09	76.0
P-2	ST-2	754.90	751.92	ST-7	754.95	749.71	182	18" RCP	1.21%	752.90	752.46	51.1	753.57	752.81	58.6	754.01	753.09	64.5
P-3	ST-3	754.90	753.20	ST-7	754.95	752.35	165	12" CMP	0.52%	753.82	752.46	70.7	753.88	752.81	80.6	753.93	753.09	88.5
P-4	ST-4	754.87	752.80	ST-7	754.95	751.25	202	15" CMP	0.77%	753.48	752.46	57.0	753.55	752.81	65.1	753.85	753.09	71.4
P-5	ST-5	754.90	753.07	ST-7	754.95	749.71	219	18" RCP	1.53%	753.89	752.46	32.3	753.95	752.81	36.9	753.99	753.09	40.5
P-6	ST-6	754.38	752.50	ST-7	754.95	751.25	202	12" CMP	0.62%	753.09	752.46	64.5	753.49	752.81	73.6	753.90	753.09	80.7
P-A	EX-A	755.00	752.03	ST-2	754.90	751.92	58	EX 18" RCP	0.19%	753.30	753.11	121.2	753.92	753.71	138.8	754.43	754.17	152.6
P-B	EX-B	755.00	753.38	ST-5	754.90	753.07	48	EX 18" RCP	0.65%	754.15	754.06	44.0	754.20	754.13	50.2	754.24	754.19	55.1
P-C	EX-C	754.00	749.87	ST-7	754.95	749.21	41	EX 24" x 38" RCP	1.61%	752.70	752.46	60.4	753.14	752.81	70.4	753.49	753.09	78.2
P-D	ST-7	754.95	749.21	EX-E	755.00	748.63	62	EX 36" RCP	0.94%	751.41	748.63	65.4	751.58	748.63	76.3	751.70	748.63	84.7

Stormwater Summary Tables – ALDOT Nomogrpah Time of Concentrations

PRE DEVELOPMENT - STRUCTURE SUMMARY

Label	STRUCTURE TYPE	Ground Elevation (ft)	Sump Elevation (ft)	Inlet Area (acres)	Inlet C	Tc (min)	10-Year Storm				25-Year Storm				50-Year Storm			
							Intensity (in/hr)	Flow (cfs)	Spread (ft)	Capture Efficiency (%)	Intensity (in/hr)	Flow (cfs)	Spread (ft)	Capture Efficiency (%)	Intensity (in/hr)	Flow (cfs)	Spread (ft)	Capture Efficiency (%)
ST-1	Junction Box, Type 1 and 12" Slotted Drain	754.90	753.20	0.17	0.95	5	7.30	1.19	1.18	100	8.33	1.36	1.28	100	9.14	1.49	1.37	100
ST-2	Type B Inlet	754.90	751.92	0.08	0.95	5	7.30	0.56	6.99	100	8.33	0.64	7.50	100	9.14	0.70	7.90	100
ST-3	Junction Box, Type 1 and 12" Slotted Drain	754.90	753.20	0.14	0.67	5	7.30	0.70	0.82	100	8.33	0.79	0.90	100	9.14	0.87	0.95	100
ST-4	Junction Box, Type 1 and 15" Slotted Drain	754.87	752.80	0.25	0.95	5	7.30	1.75	1.33	100	8.33	1.99	1.45	100	9.14	2.19	1.55	100
ST-5	Type B Inlet	754.90	753.07	0.08	0.95	5	7.30	0.56	6.99	100	8.33	0.64	7.50	100	9.14	0.70	7.90	100
ST-6	Junction Box, Type 1 and 12" Slotted Drain	754.38	752.50	0.14	0.67	5	7.30	0.70	0.72	100	8.33	0.79	0.79	100	9.14	0.87	0.84	100
ST-7	Junction Box, Type 1	754.95	749.21															
EX-A	Existing Headwall	755.00	752.03	1.45	0.67	9.8	6.22	6.05		100	7.12	6.93		100	7.83	7.62		100
EX-B	Existing Headwall	755.00	753.38	0.72	0.76	5	7.30	4.02		100	8.33	4.59		100	9.14	5.03		100
EX-C	Existing Headwall	754.00	749.87	20.15	0.5	12.2	5.68	57.68		100	6.52	66.17		100	7.17	72.86		100
EX-E	Existing Headwall	755.00	748.63															

POST DEVELOPMENT - STRUCTURE SUMMARY

Label	STRUCTURE TYPE	Ground Elevation (ft)	Sump Elevation (ft)	Inlet Area (acres)	Inlet C	Tc (min)	10-Year Storm				25-Year Storm				50-Year Storm			
							Intensity (in/hr)	Flow (cfs)	Spread (ft)	Capture Efficiency (%)	Intensity (in/hr)	Flow (cfs)	Spread (ft)	Capture Efficiency (%)	Intensity (in/hr)	Flow (cfs)	Spread (ft)	Capture Efficiency (%)
ST-1	Junction Box, Type 1 and 12" Slotted Drain	754.90	753.20	0.17	0.95	5	7.3	1.19	1.18	100	8.33	1.36	1.28	100	9.14	1.49	1.37	100
ST-2	Type B Inlet	754.90	751.92	0.08	0.95	5	7.3	0.56	6.99	100	8.33	0.64	7.50	100	9.14	0.70	7.90	100
ST-3	Junction Box, Type 1 and 12" Slotted Drain	754.90	753.20	0.14	0.95	5	7.3	0.98	1.03	100	8.33	1.12	1.13	100	9.14	1.23	1.20	100
ST-4	Junction Box, Type 1 and 15" Slotted Drain	754.87	752.80	0.25	0.95	5	7.3	1.75	1.33	100	8.33	1.99	1.45	100	9.14	2.19	1.55	100
ST-5	Type B Inlet	754.90	753.07	0.08	0.95	5	7.3	0.56	6.99	100	8.33	0.64	7.50	100	9.14	0.70	7.90	100
ST-6	Junction Box, Type 1 and 12" Slotted Drain	754.38	752.50	0.14	0.95	5	7.3	0.98	0.91	100	8.33	1.12	0.99	100	9.14	1.23	1.05	100
ST-7	Junction Box, Type 1	754.95	749.21															
EX-A	Existing Headwall	755.00	752.03	1.45	0.67	9.8	6.22	6.05		100	7.12	6.93		100	7.83	7.62		100
EX-B	Existing Headwall	755.00	753.38	0.72	0.76	5	7.3	4.02		100	8.33	4.59		100	9.14	5.03		100
EX-C	Existing Headwall	754.00	749.87	20.15	0.5	12.2	5.68	57.68		100	6.52	66.17		100	7.17	72.86		100
EX-E	Existing Headwall	755.00	748.63															

Notes:

1. In previous reports, ST-2 and ST-5 were listed as slotted drain inlets. These structures are actually Type B inlets. The current report reflects this change.
2. In previous reports, ST-1 and ST-4 had areas of 0.21 acres and 0.21 acres, respectively. The areas are 0.17 acres and 0.25 acres, respectively. Although the previous report had incorrect areas for these inlets, the stormwater model had the correct information.
3. All structures had been correctly labeled.
4. The latest results reflect a 20% clogging factor for inlets.
5. These results consider the time of concentration calculated from the Figure 4-13, Time of Concentration Nomograph in the ALDOT Hydraulic Manual.

Stormwater Summary Tables – ALDOT Nomogrpah Time of Concentrations

PRE DEVELOPMENT - PIPE SUMMARY

Label	Up. Node	Up. Gr Elev. (ft)	Up. Invert (ft)	Dn. Node	Dn. Gr. Elev. (ft)	Dn. Invert (ft)	L (ft)	Size	S (ft/ft)	10-Year Storm			25-Year Storm			50-Year Storm		
										Up. HGL (ft)	Dn. HGL (ft)	Flow / Full Capacity (%)	Up. HGL (ft)	Dn. HGL (ft)	Flow / Full Capacity (%)	Up. HGL (ft)	Dn. HGL (ft)	Flow / Full Capacity (%)
P-1	ST-1	754.90	753.20	ST-7	754.95	751.50	165	12" CMP	1.03%	754.25	753.62	60.70	754.90	754.31	69.20	754.90	754.96	76.00
P-2	ST-2	754.90	751.92	ST-7	754.95	749.71	182	18" RCP	1.21%	754.21	753.62	51.50	754.90	754.31	59.10	754.90	754.96	65.00
P-3	ST-3	754.90	753.20	ST-7	754.95	752.35	165	12" CMP	0.52%	753.84	753.62	50.20	754.59	754.31	57.30	754.90	754.96	62.90
P-4	ST-4	754.87	752.80	ST-7	754.95	751.25	202	15" CMP	0.77%	754.13	753.62	57.00	754.87	754.31	65.10	754.87	754.96	71.40
P-5	ST-5	754.90	753.07	ST-7	754.95	749.71	219	18" RCP	1.53%	753.89	753.62	32.30	754.76	754.31	36.70	754.90	754.96	40.30
P-6	ST-6	754.38	752.50	ST-7	754.95	751.25	202	12" CMP	0.62%	753.89	753.62	45.80	754.38	754.31	52.30	754.38	754.96	57.40
P-A	EX-A	755.00	752.03	ST-2	754.90	751.92	58	EX 18" RCP	0.19%	754.48	754.31	122.10	755.00	755.04	139.80	755.00	755.07	153.70
P-B	EX-B	755.00	753.38	ST-5	754.90	753.07	48	EX 18" RCP	0.65%	754.15	754.06	44.00	754.90	754.83	50.20	754.99	754.98	55.10
P-C	EX-C	754.00	749.87	ST-7	754.95	749.21	41	EX 24" x 38" RCP	1.61%	754.00	753.62	93.70	754.00	754.31	107.40	754.00	754.96	118.30
P-D	ST-7	754.95	749.21	EX-E	755.00	748.63	62	EX 36" RCP	0.94%	751.87	748.63	100.70	752.28	748.63	115.60	752.50	748.63	127.30

POST DEVELOPMENT - PIPE SUMMARY

Label	Up. Node	Up. Gr Elev. (ft)	Up. Invert (ft)	Dn. Node	Dn. Gr. Elev. (ft)	Dn. Invert (ft)	L (ft)	Size	S (ft/ft)	10-Year Storm			25-Year Storm			50-Year Storm		
										Up. HGL (ft)	Dn. HGL (ft)	Flow / Full Capacity (%)	Up. HGL (ft)	Dn. HGL (ft)	Flow / Full Capacity (%)	Up. HGL (ft)	Dn. HGL (ft)	Flow / Full Capacity (%)
P-1	ST-1	754.90	753.20	ST-7	754.95	751.50	165	12" CMP	1.03%	754.270	753.650	60.700	754.90	754.35	69.20	754.90	755.01	76.00
P-2	ST-2	754.90	751.92	ST-7	754.95	749.71	182	18" RCP	1.21%	754.230	753.650	51.500	754.90	754.35	59.10	754.90	755.01	65.00
P-3	ST-3	754.90	753.20	ST-7	754.95	752.35	165	12" CMP	0.52%	754.060	753.650	70.700	754.90	754.35	80.60	754.90	755.01	88.50
P-4	ST-4	754.87	752.80	ST-7	754.95	751.25	202	15" CMP	0.77%	754.150	753.650	57.000	754.87	754.35	65.10	754.87	755.01	71.40
P-5	ST-5	754.90	753.07	ST-7	754.95	749.71	219	18" RCP	1.53%	753.890	753.650	32.300	754.80	754.35	36.70	754.90	755.01	40.30
P-6	ST-6	754.38	752.50	ST-7	754.95	751.25	202	12" CMP	0.62%	754.170	753.650	64.500	754.38	754.35	73.60	754.38	755.01	80.70
P-A	EX-A	755.00	752.03	ST-2	754.90	751.92	58	EX 18" RCP	0.19%	754.500	754.340	122.100	755.00	755.04	139.80	755.00	755.07	153.70
P-B	EX-B	755.00	753.38	ST-5	754.90	753.07	48	EX 18" RCP	0.65%	754.150	754.060	44.000	754.95	754.87	50.20	754.99	754.98	55.10
P-C	EX-C	754.00	749.87	ST-7	754.95	749.21	41	EX 24" x 38" RCP	1.61%	754.000	753.650	93.700	754.00	754.35	107.40	754.00	755.01	118.30
P-D	ST-7	754.95	749.21	EX-E	755.00	748.63	62	EX 36" RCP	0.94%	751.880	748.630	101.400	752.29	748.63	116.30	752.51	748.63	128.10

Time of Concentration Calculations using TR-55 Method

```
Type.... Tc Calcs                                                    Page 1.01
Name.... EXISTING A

File.... C:\Highway 72 Turn Lane\TURN LANE.PPW

 ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
 TIME OF CONCENTRATION CALCULATOR
 ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


 ---------------------------------------------------------------------------


 Segment #1:  Tc: TR-55 Sheet

 Mannings n           .0120
 Hydraulic Length    50.00 ft
 2yr, 24hr P        3.7800 in
 Slope             .020800 ft/ft

 Avg.Velocity         1.23 ft/sec

                                          Segment #1 Time:     .0113 hrs
 ---------------------------------------------------------------------------

 Segment #2:  Tc: TR-55 Channel

 Flow Area          3.0000 sq.ft
 Wetted Perimeter     7.14 ft
 Hydraulic Radius      .42 ft
 Slope             .011700 ft/ft
 Mannings n          .0450
 Hydraulic Length  1116.00 ft

 Avg.Velocity         2.01 ft/sec

                                          Segment #2 Time:     .1543 hrs
 ---------------------------------------------------------------------------

                                                  ========================
                                                   Total Tc:     .1656 hrs
```

Time of Concentration Calculations using TR-55 Method

```
Type.... Tc Calcs                                                    Page 1.01
Name.... EXISTING C

File.... C:\Highway 72 Turn Lane\TURN LANE.PPW

 ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
 TIME OF CONCENTRATION CALCULATOR
 ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


 ----------------------------------------------------------------------------


 Segment #1:  Tc: TR-55 Sheet

 Mannings n          .4100
 Hydraulic Length   140.00 ft
 2yr, 24hr P        3.7800 in
 Slope             .023100 ft/ft

 Avg.Velocity          .09 ft/sec

                                          Segment #1 Time:     .4150 hrs
 ----------------------------------------------------------------------------

 Segment #2:  Tc: TR-55 Shallow

 Hydraulic Length   732.00 ft
 Slope             .023100 ft/ft
 Unpaved

 Avg.Velocity         2.45 ft/sec

                                          Segment #2 Time:     .0829 hrs
 ----------------------------------------------------------------------------

                                                 ========================
                                                  Total Tc:     .4979 hrs
                                                 ========================
```

Time of Concentration Comparisons

Area	Time of Concentration Calculations using TR-55 Method								Time of Concentration Calculations using Figure 4-13: Time of Concentration Nomograph (From Equation Developed By Z. P. Kirpich) located in ALDOT Hydraulic Manual			
	Sheet Flow Segment T_c (hrs)		Shallow Conc. Segment T_c (hrs)		Channel Flow Segment T_c (hrs)		Total T_c (hrs)	Total T_c (min)		T_c (min)	T_c (min)	Total T_c (min)
A	Sheet Flow	0.0113	Shallow Conc.	0	Channel Flow	0.1543	0.1656	9.94		1.04	9.5	10.54
	manning's n	0.012	Hydraulic Length (ft)	0	Flow Area (ft^2)	3.0			Height (ft)	1.04	13.06	
	Hydraulic Length (ft)	50	Slope (ft/ft)	0	Wetted Perimeter (ft)	7.14			Length of Travel (ft)	50	1116	
	2 yr, 24 hr., P (inches)	3.78	Paved??	0	Slope (ft/ft)	0.0117			Type Flow	Overland Flow, asphalt, multiply Tc by 0.4	Mowed grass roadside channels, Tc from chart	
	Slope (ft/ft)	0.0208			manning's n	0.045			Nomograph	2.6	9.5	
					Hydraulic Length (ft)	1116						
C	Sheet Flow	0.415	Shallow Conc.	0.0829	Channel Flow	0	0.4979	29.87		T_c (min)	T_c (min)	Total T_c (min)
	manning's n	0.41	Hydraulic Length (ft)	732	Flow Area (ft^2)	0				2	11	13
	Hydraulic Length (ft)	140	Slope (ft/ft)	0.0231	Wetted Perimeter (ft)	0			Height (ft)	3.23	16.9	
	2 yr, 24 hr., P (inches)	3.78	Paved??	no	Slope (ft/ft)	0			Length of Travel (ft)	140	732	
	Slope (ft/ft)	0.0231			manning's n	0			Type Flow	Overland Flow, grass, multiply Tc by 2	Overland Flow, grass, multiply Tc by 2	
					Hydraulic Length (ft)	0			Nomograph	1	5.5	

WinHydro Summary

Area	Input Data				ALDOT WinHydro Version 3 Calculated Flows				
	Area (acres)	C	Change in Elevation (ft)	Length of Travel (ft)	Time of Concentration (min)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)
A	1.45	0.67	14.1	1166	9.8	5.81	6.72	7.40	8.07
C	20.15	0.5	20.13	872	12.2	55.45	64.13	70.67	77.17

HY8 Analysis Summary

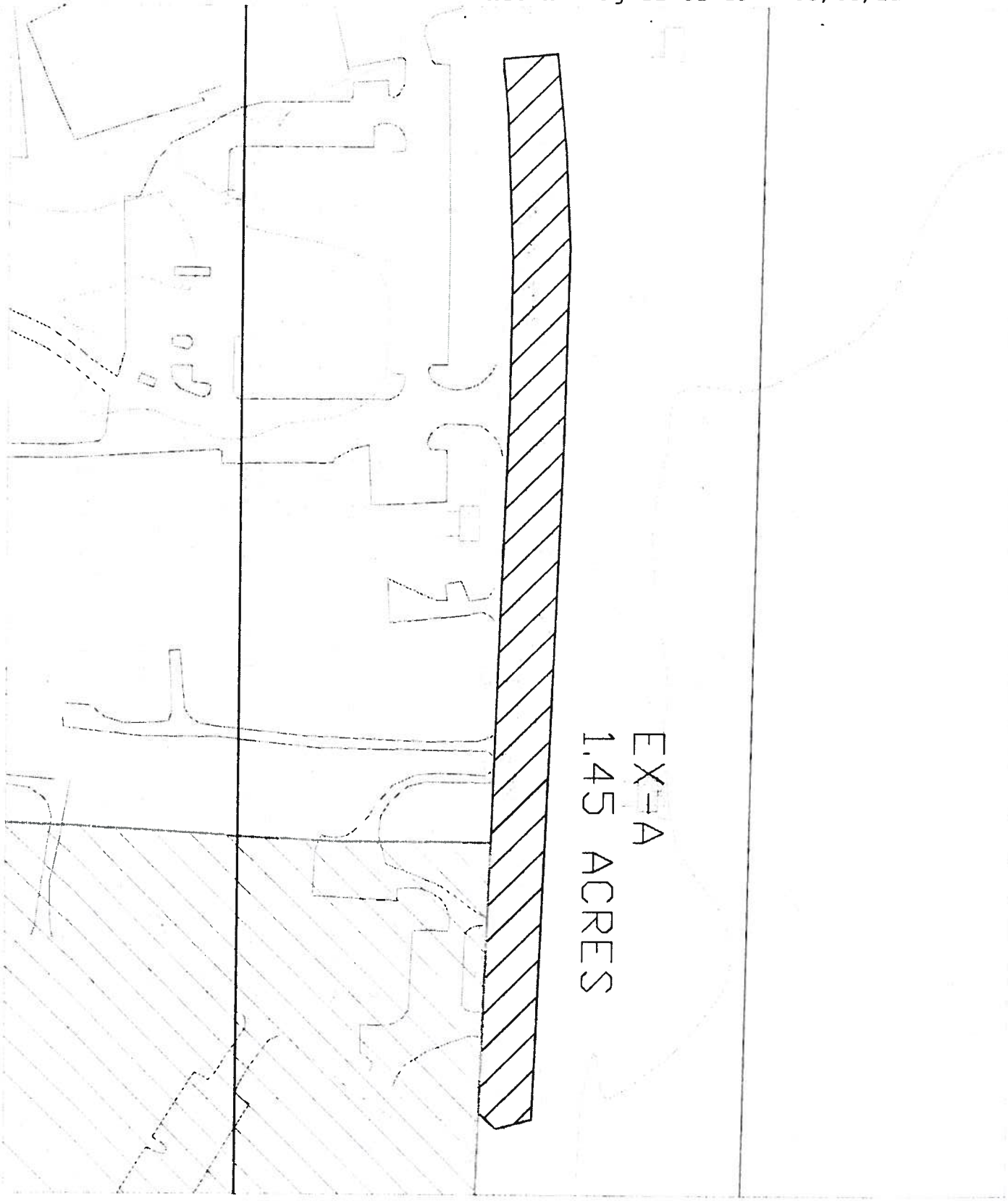
ALDOT WinHydro Flows

Index No.	Existing Structure Size	Area (acres)	C	T_c (minutes	Q_{50} (cfs)	HW_{50} (ft)	Q_{100} (cfs)	HW_{100} (ft)	Shoulder Elevation (ft)	Maximum Allowable Headwater	Remarks
A	18" RCP	1.45	0.67	9.8	7.40	753.87	8.07	754.00	755.00	753.50	Does not meet design storm criteria but does not overtop the roadway.
C	36" x 24" RCB	20.15	0.50	12.2	70.67	754.58	77.17	754.62	754.45	752.95	Overtops the roadway for the design storm and the 100 year design storm.

Rational Method Flows

Index No.	Existing Structure Size	Area (acres)	C	T_c (minutes	Q_{50} (cfs)	HW_{50} (ft)	Q_{100} (cfs)	HW_{100} (ft)	Shoulder Elevation (ft)	Maximum Allowable Headwater	Remarks
A	18" RCP	1.45	0.67	10	7.56	753.89	8.24	754.06	755.00	753.50	Does not meet design storm criteria but does not overtop the roadway.
C	36" x 24" RCB	20.15	0.50	30	48.14	753.64	53.01	754.16	754.45	752.95	Does not meet design storm criteria but does not overtop the roadway.

HY8 analysis was based on a 50-year design storm. The design storm headwater has to be less than 1.5 feet below the shoulder of the roadway. The 100 year design storm can overtop the roadway but can not exceed 1.0 foot above the elevation of the roadway.



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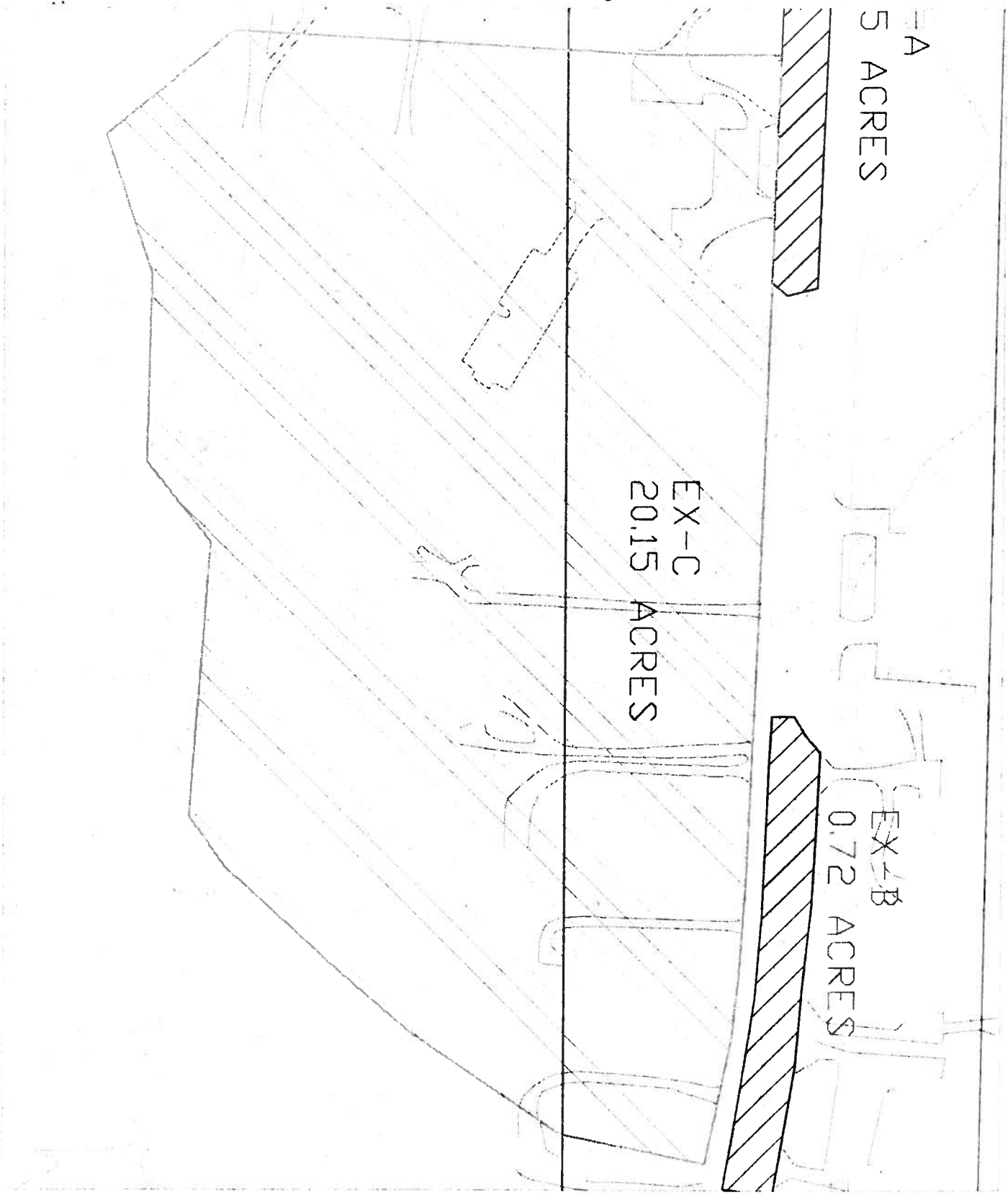
& Sons Consulting Engineers, Inc.
Established 1886

DRAINAGE AREA MAP – OFFSITE
HIGHWAY 72 LEFT TURN LANE
PAGE 1 (NTS

DATE: JULY 2011
LOCATION: HUNTSVILLE, ALABAMA



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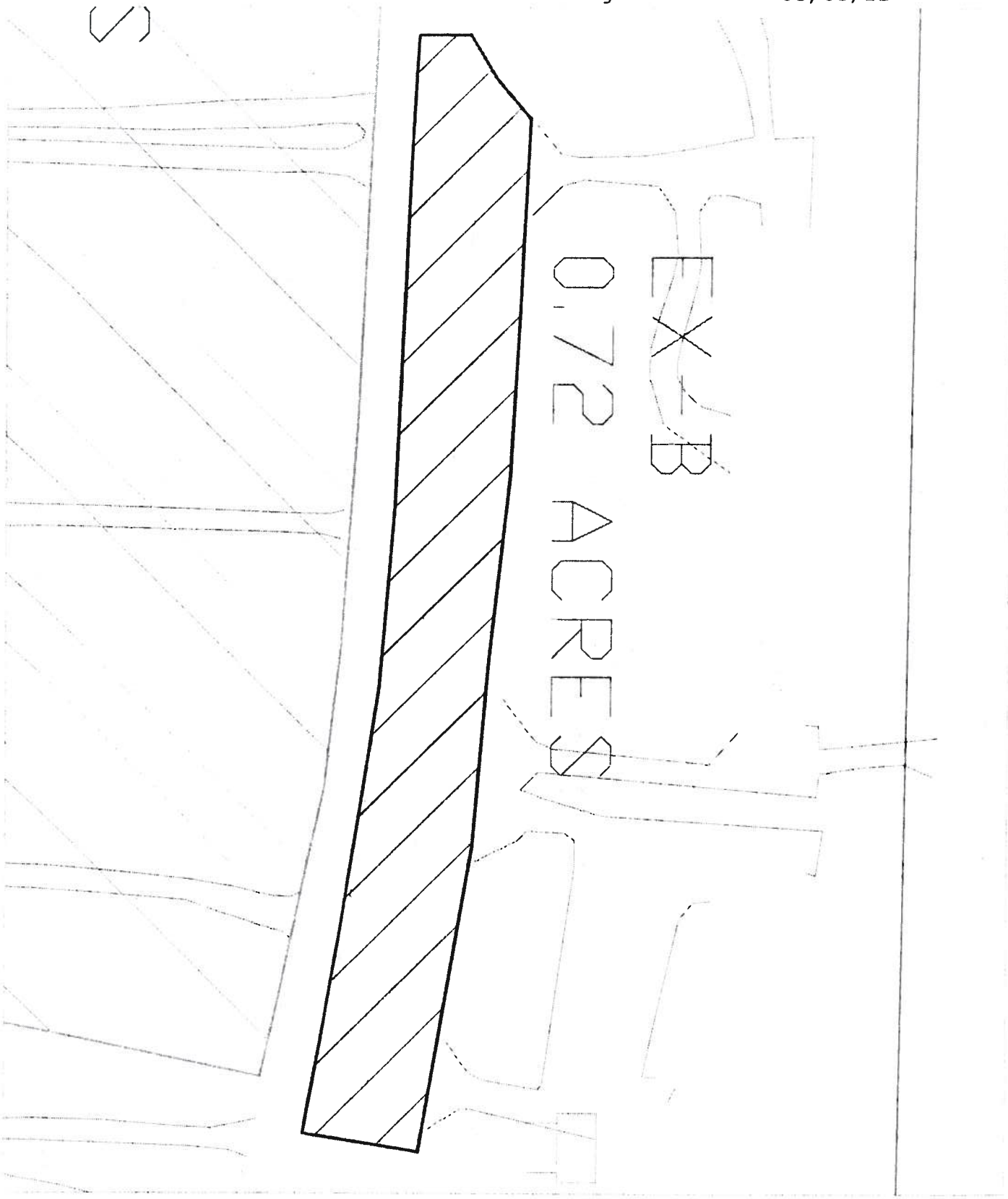
DRAINAGE AREA MAP – OFFSITE
HIGHWAY 72 LEFT TURN LANE
PAGE 2 (NTS)

DATE: JULY 2011
LOCATION: HUNTSVILLE, ALABAMA



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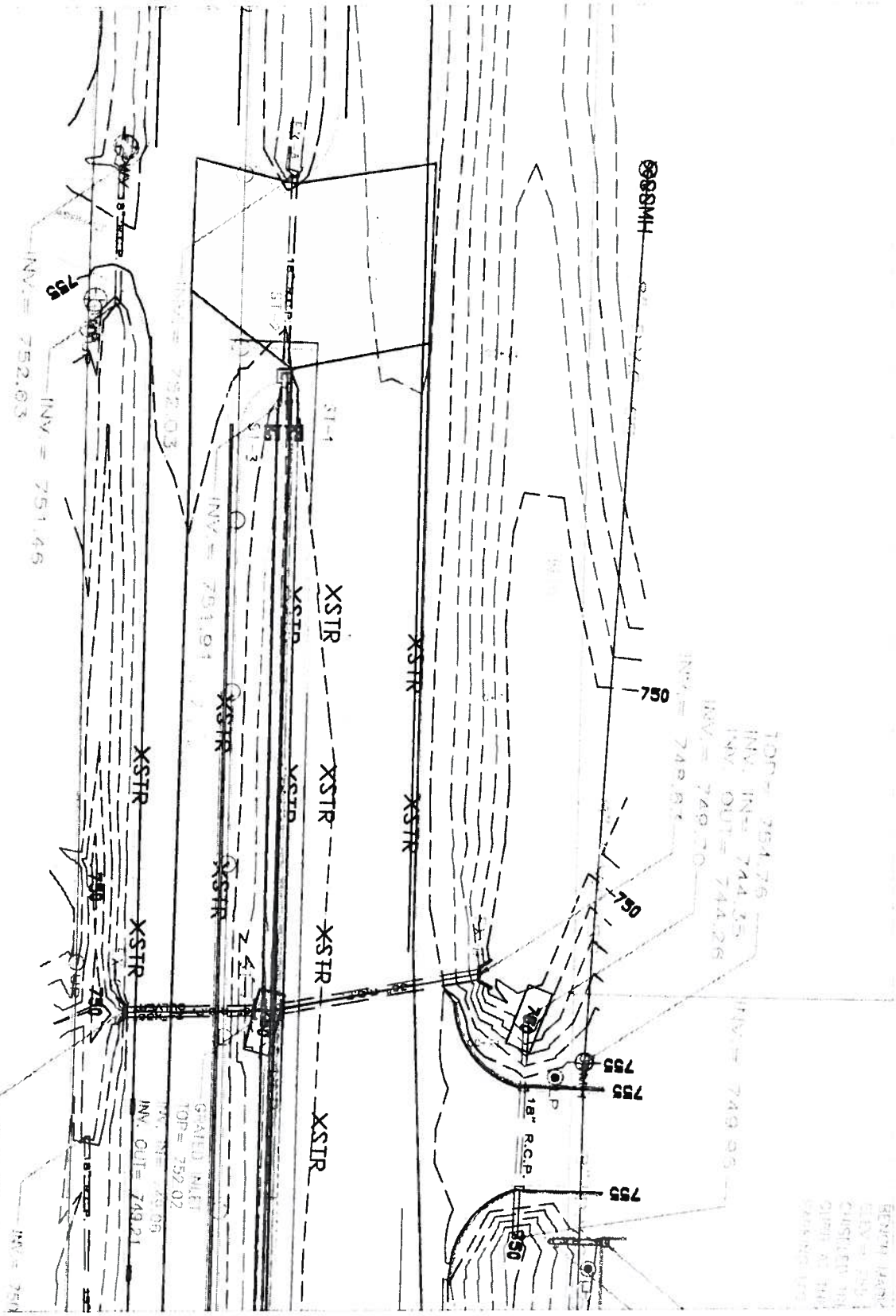
DRAINAGE AREA MAP – OFFSITE
HIGHWAY 72 LEFT TURN LANE
PAGE 3 (NTS)

DATE: JULY 2011
LOCATION: HUNTSVILLE, ALABAMA



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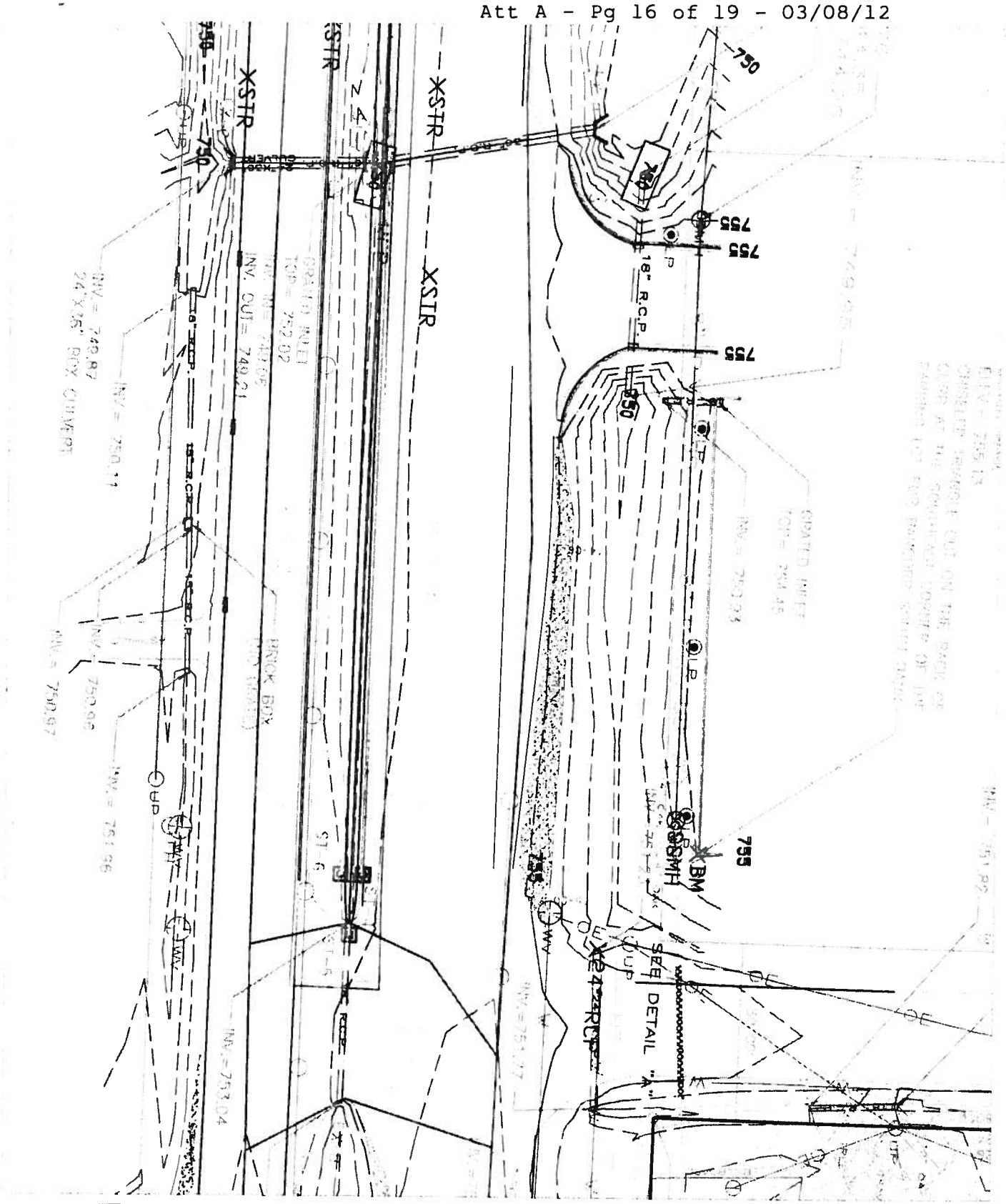
DRAINAGE AREA MAP – MEDIAN DRAINAGE
HIGHWAY 72 LEFT TURN LANE
PAGE 4 (NTS)

DATE: JULY 2011
LOCATION: HUNTSVILLE, ALABAMA


750
755
755
755
755
750
750
750
755
BM
SSSMH
SEE DETAIL "A"
18" R.C.P.
24" R.C.P.
XSTR
XSTR
XSTR
XSTR
BRICK BOX
INV. OUT = 746.21
INV. OUT = 752.02
24"X35" BOX CULVERT
INV = 746.87
INV = 750.11
INV = 750.95
INV = 751.96
INV = 753.04
INV = 755.77
INV = 756.97
INV = 757.95
INV = 758.34
INV = 759.13
INV = 759.34
INV = 759.46
INV = 759.54
INV = 759.62
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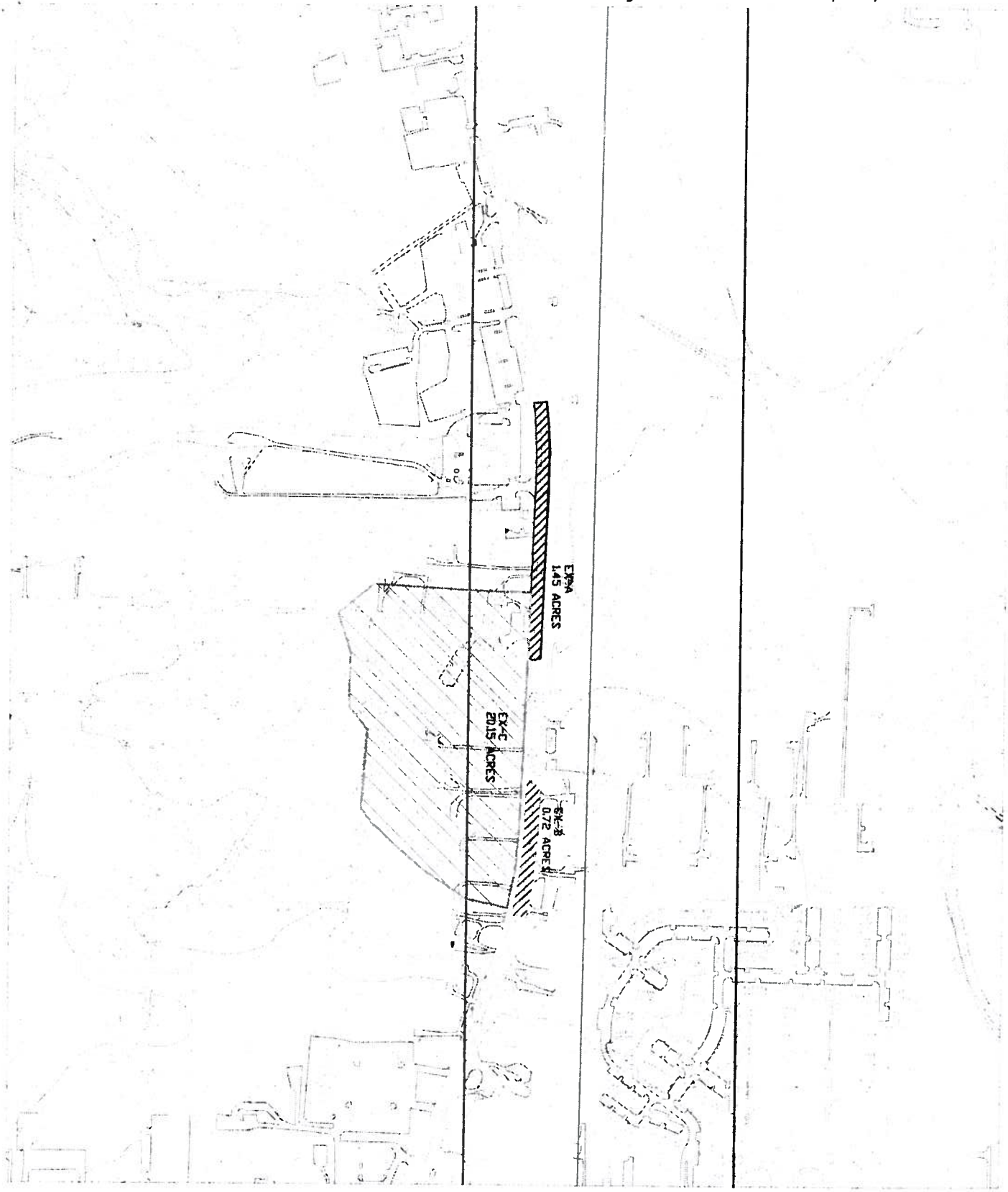

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DRAINAGE AREA MAP – MEDIAN DRAINAGE
HIGHWAY 72 LEFT TURN LANE
PAGE 6 (NTS)

DATE: JULY 2011
LOCATION: HUNTSVILLE, ALABAMA

PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
x	x	1	16

ALABAMA
DEPARTMENT OF TRANSPORTATION
PLANS OF PROPOSED PROJECT

U S HWY 72 LEFT TURN LANE at CHRISTOPHER DRIVE
GRADE, DRAIN, BASE, AND PAVE
MADISON COUNTY

PRELIMINARY PROJECT NO.

CODE NO.

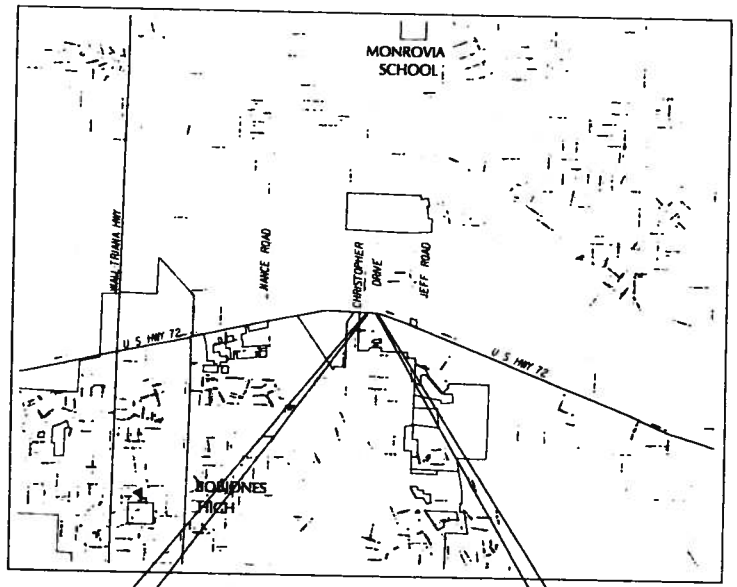
DESIGN DESIGNATION	
ADT (—)	—
ADT (—)	—
K	—
D	—
TDHV	—
TADT	—
V (DESIGN SPEED)	—
MIN. STOPPING SIGHT DIST. (ft)	—

NOTE:
THESE PLANS HAVE BEEN PREPARED TO CONFORM WITH ALABAMA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION 2000 EDITION.

REQUIRED BRIDGE
NONE

IN-PLACE BRIDGE (REMOVE)
NONE

EQUATIONS & EXCEPTIONS
NONE



VICINITY MAP

BEGIN WORK STA 10+00.00

BEGIN PROJECT STA 11+00.00

END WORK STA 15+00.00

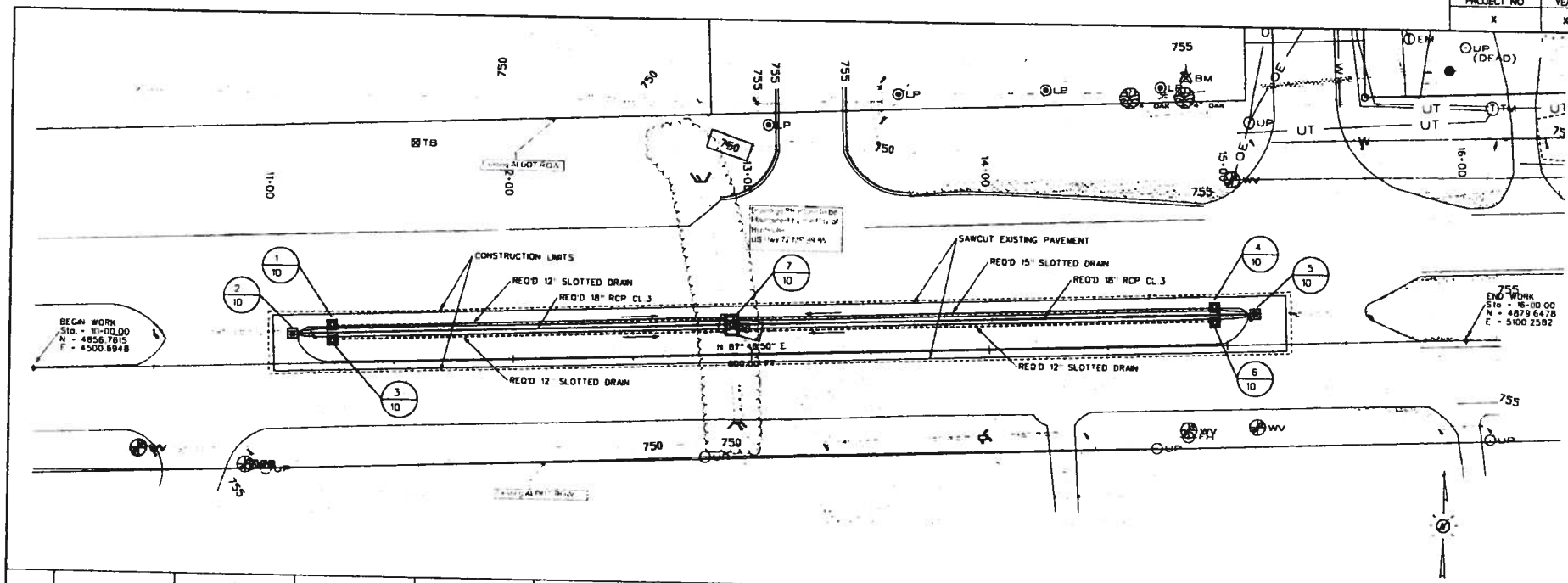
END PROJECT STA 15+25.00

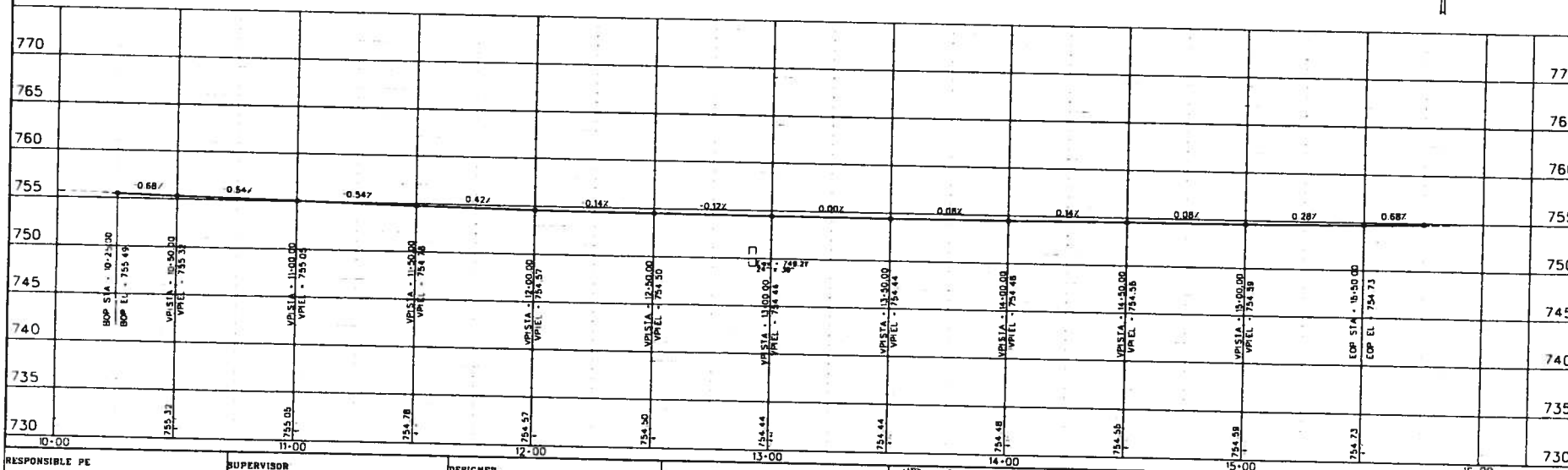
ALABAMA DEPARTMENT OF TRANSPORTATION
SUBMITTED FOR APPROVAL
DIVISION ENGINEER
CHIEF ENGINEER
APPROVED
TRANSPORTATION DIRECTOR

TOTAL STATIONING OF PROJECT	425.00 FT.
EQUATIONS AND EXCEPTIONS	0.00 FT.
NET LENGTH OF PROJECT	425.00 FT. = 0.080 MILES
NET LENGTH OF BRIDGES	0.00 FT. = 0.00 MILES
NET LENGTH OF ROADWAYS	425.00 FT. = 0.080 MILES

GWJONES

REFERENCE PROJECT NO	FISCAL YEAR	SHEET NO
X	X	4





RESPONSIBLE PE	SUPERVISOR	DESIGNER	PLAN SUBMITTAL
DATE	DATE	DATE	

ALABAMA DEPARTMENT OF TRANSPORTATION
G. W. JONES & SONS

HORIZ 20 0 20 — VERT 5 0 5
SCALE (FEET)

SHEET TITLE	ROUTE
LEFT TURN LANE PLAN & PROFILE	US HWY 72