BLACK RIVER TECHNICAL COLLEGE
POCAHONTAS CAMPUS
FLOOD PROTECTION PROJECT
PRELIMINARY ENGINEERING
REPORT

May 2019

Prepared For:

BLACK RIVER TECHNICAL COLLEGE

Prepared By:

DeCLERK-THROESCH

ENGINEERING - LAND SURVEYING

114 Pyburn Street - P.O. Box 804
Pocahontas, Arkansas 72455
Phone 870-892-9412
Fax 870-892-5975

STATE OF
ARKANSAS
REGISTERED
PROFESSIONAL
ENGINEER
No.8124
BERNARD J. DeCLERK, JR.

May 30, 2019

BLACK RIVER TECHNICAL COLLEGE
POCAHONTAS CAMPUS FLOOD PROTECTION PROJECT
PRELIMINARY ENGINEERING REPORT

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Narrative:

According to the FEMA Flood Insurance Rate Map for the City of Pocahontas, the Black River Technical College (BRTC) Campus is located in Zone X, defined as areas of 0.2% annual chance flood (500 year flood). However, major flooding has occurred on the campus twice in the last eight years causing over seven million dollars in damage. The source of those floods was the Black River, compounded by the Running Water Levee system.

The Running Water Levee was completed in 1938 for the purpose of protecting approximately 65,000 acres of mostly farmland in Randolph and Lawrence Counties from Black River floods (see Figure 1). The levee was not intended to provide protection to the riverside areas that developed after the levee was constructed. The BRTC Pocahontas Campus is one of those developments. The levee contains the Black River at stages that would cause overland flow and flooding at a stage of around 20 to 22 feet on the Pocahontas gauge. As intended, the levee causes a higher river stage than would occur otherwise and forces water over U.S. Highway 67 and State Highway 304N. At a river stage above 27 feet, water begins crossing those highways. Highway 304N is overtopped first in the vicinity of the Randolph County Sherriff's Office and the water flows south and southwest flooding the BRTC Campus and surrounding areas. In the floods of 2011 and 2017, the flooding continued until the levee system breached and provided an outlet for the water.

In 2017 the City of Pocahontas and Randolph County requested the U.S. Army Corps of Engineers, through the 205 federal cost share program, to find a solution to the overall flooding problem in the area that would include the BRTC Campus. The Corps initial review of the hydrology indicated that structural measures such as increased river channel capacity or lowering the levee would not prevent floods from overtopping the highways. They indicated that flood proofing would likely be the best preventative measure. The City and County decided to terminate the 205 program and are considering local solutions.

Purpose:

The purpose of this report is to develop and analyze options to prevent flood damage on the BRTC Pocahontas.

Problem:

As stated, Black River flood water crosses Highway 304N at river stages exceeding approximately 27 feet on the Pocahontas Gauge. See Table 1 for a summary of significant river stages and events. The water flows overland across the campus and has reached depths of up to 18 inches in the lower buildings, As the flood water continues south through the

campus, the water surface decreases. However, the ground surface and most building elevations are lower in the south area causing greater water depths in the buildings. Table 2 summarizes the building elevations and historic flood elevations from 2011 and 2017. It should be noted that most of the 2011 flood elevations were determined by measuring the depth inside the buildings. The 2017 flood elevations were obtained from high water marks outside of the buildings. The outside measurements are much more consistent due to the fact that, with the short duration of floods, the water level does not equalize inside the buildings.

Design Flood:

Although it was approximately 3 feet higher than the FEMA Base Flood Elevation, the Corps of Engineers determined that the 2017 flood was just under a 100 year frequency event. Statistically that level of flooding has approximately a 1% chance of occurring in any given year or, over a long enough time period, would occur, on average, once every 100 years. It could be several years before a damaging flood reoccurs. On the other hand, it has the same probability of occurring every year.

Due to the flat terrain, a greater magnitude flood will not result in a significantly higher water level on the campus. The 2017 river stage was approximately 1 foot higher than in 2011. However, the difference in flood depths on the campus only increased about 0.2 feet. Therefore, a design based on the 2017 flood is appropriate regardless of the frequency.

The plan height of the Running Water Levee is 273.18. 2017 flood high water marks on the campus range from 271.5 to 272.8. Any flood control structures should be built to include freeboard of 12 to 18 inches above the high water marks. That will result in structures with a height of 272.5 to 274.3.

Insurance Issue:

Besides the obvious consequences of another damaging flood, BRTC has been notified that a major change in the flood insurance is likely if no action is taken to prevent future flooding. The Risk Management Division of the Arkansas Insurance Department has notified BRTC that there will likely be limitations in coverage and/or availability of flood insurance for public entity coverage in 2020. The existing flood insurance deductible is $20,000 but could be changed to $500,000 for structures and $500,000 for contents per occurrence unless some form of protection is put in place by July 1, 2020, according to the Arkansas Insurance Department. That would necessitate obtaining insurance through the National Flood Insurance Program (NFIP) at a higher premium cost with limited coverage.

Liability Issue:

Although any alternative that prevents flood water from flowing onto the campus could cause some increase in the flood level for adjacent property, any increase would be very small and difficult to calculate with any degree of accuracy. Attorney Alex Bigger was asked to investigate possible liability to BRTC if a project were constructed. His letter of opinion is included as Attachment 1. According to case law, landowners have the right to protect their

property from surface waters so long as they do not unnecessarily cause damage to their neighbors. There is a distinction between surface waters and waters that flow in a channel or stream. The floods on the BRTC campus were caused by extraordinary surface water. Therefore, liability should be limited so long as any improvements do not "unnecessarily" cause damage to adjacent lands. It would seem that most any attempt at preventing flooding on the campus would meet this requirement.

Alternatives:

The goal of the project is to keep flood water out of the buildings with a system that can be deployed easily and without negatively affecting the aesthetics of the campus. Those goals will have to be achieved without unnecessarily increasing flood levels for the surrounding properties.

One of the more obvious solutions would be to prevent the flood water from crossing Highway 304N. However, that would force more water across Highway 67 and/or increase the water level on the riverside of the levee system. Another solution would be to provide a flood relief in the levee to prevent flood water from reaching the height of Highway 304. That would cause extensive flooding of areas now protected by the levee. These options were investigated by the Corps and found not to be feasible, they are not considered in this report.

Remaining options include temporary individual building flood protection, campus-wide permanent flood protection, or participation in a community flood protection project. These options are discussed in more detail below.

Alternative 1: Individual Building Flood Protection.

Description:

Eight individual buildings were flooded to some degree during the 2017 flood. Depths in the buildings ranged from less than an inch to as much as 18 inches.

Protection can be achieved with temporary barriers (bladders) that would be deployed before a flood event for only the flood prone buildings. Bladders consist of heavy gauge vinyl tubes that are rolled out and filled with water to form a barrier. These would be used in parking and drives, and where permanent walls cannot be placed.

In addition to deploying the bladders, each area protected in this manner will require closure of building entrances (doors) and plugging all utility lines entering the buildings. Each area will also require a sump and pump in order to collect and eliminate seep water and to handle rain events during a flood.

To provide a flood-safe area to store the materials as well as to have an accessible area during floods, the maintenance building should be permanently flood proofed. That can be achieved with a combination of raised curbing and earthen

berms around the building area. Entrances to the facility would be raised and hard surfaced to provide access during a flood event. This firm previously developed preliminary plans and cost estimates for this.

Deploying this system will require moving and placing the bladders, weighing approximately 10 tons, as well as pumps, hoses, and other materials. The bladders will require approximately 525,000 gallons of water to fill.

It is estimated that deploying the system will require three 10 hour days with 10 people or 300 man-hours. Removing and storing the system would require a similar effort.

Each area will require two people to monitor the pumps and patrol the area 24 hours per day during a flood event. Based on previous floods, the flood fighting duration is estimated to be 48 hours. However, if the levee system does not fail, the duration could be considerably longer. By combining some of the buildings, the number of areas can be reduced to six. That would require 12 people per shift. A flood duration of 48 hours would require 576 man-hours.

A general plan of this alternative is shown on Plan Sheet 1 of 3; details are shown on Plan Sheet 3 of 3.

Estimated Cost – Alternative 1:

Flood Proofing Maint. BLDG	L.S.	$100,000
Sump Structures	10 Ea. @ $2,500	$25,000
Sump Pumps & Piping	10 Ea. @ $1,000	$10,000
Sewer/Drain Valves	15 Ea. @ $500	$7,500
Bladder Barriers	5,050 L.F. @ $50	$252,500
Miscellaneous Items	Lump Sum	$10,000
Contingencies	20%	$82,000
Engineering	13%	$63,000
	Total Estimated Cost	$550,000

Advantages:

- Lower initial cost.
- Less visual impact when not flooded.
    - Most of the system would not be visible until deployed.
- Less likely to affect other properties.
    - Will not displace a significant amount of flood water.
- Can be a temporary solution.
    - Could be eliminated if a community project provides campus protection in the future.

Disadvantages:

- Manpower and time required to deploy the system.
    - Will be labor intensive, +/-300 man-hours.

    - Specific components for each building area.
- Personnel required to man the system during floods.
    - Will require at least two individuals per area, or 12 people 24/7.
- Storing and maintaining the components required.
    - Space requirements.
    - Limited shelf life.
- Deciding when to deploy.
    - Will have to rely on river stage forecasts that change daily.
    - Could lead to false deployments or not having time to deploy.

Permit Requirements:

The campus is not located in a regulated flood zone or floodway. Therefore, a City or County Floodplain Development Permit will not be required. No dredge or fill operations within water of the United States are required and a Section 404 permit will not be required.

Alternative 2: Campus-Wide Flood Proofing.

Description:

Campus floods are relatively shallow and historically have been short in duration. A system of earthen berms, permanent walls, sumps, and a relief area could protect the entire main campus area. The earthen berms would range in height from 2 to 5 feet and would be constructed in open areas where space is available. More confined areas would require a masonry wall. The berms can be designed with random curves and varying height to improve aesthetics. Masonry walls can be designed with decorative finishes that would blend in with the campus architecture. Roadways and drives would be left open and require closure during flood events. Existing drainage would require control structures to prevent backflow, and pumping of seep water and rainfall will be required in multiple locations. A relief area, or floodway, could be required in order to pass the floodwater blocked by the berms and walls to prevent increasing damage to neighboring property.

This alternative will require constructing some of the barriers and the floodway on property not owned by BRTC. Easements and/or agreements will be required.

The entrance to the maintenance building off airport road would be permanently raised to allow vehicle access to the campus during floods. The remaining 11 drive and road openings would be closed during floods. The closure would consist of tarps and sandbags over dumped sand or a fabricated structure that could be more easily installed and removed.

As with Alternative 1, pumping will be required to control seep water and stormwater during a flood. This alternative will require fewer but larger pumps. Four sump locations with agricultural type re-lift pumps can service the campus.

A general plan of this alternative is shown on Plan Sheet 2 of 3; details are shown on Plan Sheet 3 of 3.

Estimated Cost – Alternative 2:

Earthen Berms	20,000 C.Y. @ $15	$300,000
Permanent Masonry Wall	800 L.F. @ $150	$120,000
Control structures	10 Ea. @ $20,000	$200,000
Road/Drive Openings	11 Ea. @ $5,000	$55,000
Sump & Pump Units	4 Ea. @ $20,000	$80,000
Floodway Excavation	50,000 C.Y. @ $5	$150,000
Seeding/Landscaping	Lump Sum	$30,000
Maintenance Entrance	Lump Sum	$20,000
Miscellaneous Items	Lump Sum	$20,000
Contingencies	20%	$195,000
Engineering & Hydrology	11.5%	$134,500
	Total Estimated Cost	$1,304,5000

Advantages:

- Manpower and time required to deploy the system.
    - Will be less labor intensive, +/-200 man-hours.
    - Fewer devices to install.
- Personnel required to man the system during floods.
    - Will require six individuals 24/7.
- Few components required to activate the protection.
- A false deployment will be less costly and disruptive.

Disadvantages:

- High initial cost.
- Significant visual impact when not flooded.
    - Most of the system would be visible.
- More likely to affect other properties.
    - Will displace some amount of flood water.

Permit Requirements:

There are no known wetlands on the campus property. However, there are drainage ditches that could be classified as “waters of the United States” that would require a Section 404 permit through the Corps of Engineers. If required, that permit would be routine with no wetlands involved.

Alternative 3: Community Flood Protection Project.

As stated, the City and County chose to terminate the Section 205 program with the Corps of Engineers. Both had allocated funds for the 205 program that were not used and they have indicated that those funds could be used for a local solution. However, no definite plans are in place. Preliminary work by the Corps indicated that structural methods (larger river channel or lowering the levee) would not prevent floodwater from overtopping Highway 304N. The solution suggested by the Corps was flood proofing the vulnerable areas. That could be done for individual structures or groups of structures and could include one of the previous two alternatives for BRTC Pocahontas campus, or a larger area.

It is not possible to estimate the cost of this option at this time. However, if BRTC were grouped with other areas, there could be potential savings.

Advantages:

- Not using funds on a project that might not be necessary in the future.
    - Any future Corps or City/County project should include protecting the BRTC campus.
    - BRTC funds could be used as a local match if a community project develops.
    - Potential cost savings with a larger area.

Disadvantages:

- Unknown implementation schedule.
    - Design, funding, permitting, and construction could take years.
    - Possibility of another flood event before a community project is completed.

Funding Options:

There are several sources available to provide loans to fund a mitigation project. The Federal Emergency Management Administration is the only known source for grant funds. FEMA provides funding for certain mitigation projects that meet specific criteria. According to the regulations and the Randolph County Hazard Mitigation Plan, BRTC qualifies to apply for funding from FEMA independent from the City or County. However, since a specific project for the campus was not specified in the County's approved plan, it may be more difficult to get funded. Funding opportunities begin in mid summer through FEMA. These grants require a 25% match (cash or in-kind) and are awarded near the first of the calendar year.

Summary:

It is impossible to predict the probability of a future flood event on the BRTC Pocahontas Campus. With the past events in 2011 and 2017, it is likely to occur at some point in the future. With two major claims from the previous floods, the insurers are

planning to drastically increase premiums and/or deductibles or not provide coverage if a mitigation project is not completed.

Flood mitigation options include protecting individual buildings susceptible to flooding, protecting the entire campus, or participating in a community-wide project, if one develops.

There are no active projects being developed by the Corps of Engineers, the City of Pocahontas, or Randolph County. That necessitates that BRTC pursue a project to provide flood protection for the campus.

Conclusions and Recommendations:

Of the three options presented in this report, Alternative 2, campus wide-flood proofing is the best project to provide reliable, timely protection for the BRTC Pocahontas Campus. Although more costly initially, it will be easier to deploy and maintain, will be more reliable, and can be in place in a relatively short time..

It is recommended that BRTC pursue funding and begin detailed design for Alternate 2.

Project Schedule:

Following is a general outline of the steps required to institute Alternative 2 with estimated time requirements:

Project Phase	Estimated Duration
Phase - I Preliminary Engineering (this report): • Develop and analyze alternatives for the project	N/A, Completed
Phase II - Detailed Design: • Prepare descriptions of any required rights of way or easements. • Obtain any necessary permits or approvals. • Prepare construction plans. • Prepare bid documents.	6 to 8 Months

Phase III - Construction:
• Advertising, bidding, and awarding contracts.
• Provide construction oversight including:
  o Review and approve submittals.
  o Provide construction observation.
  o Negotiate and prepare change orders, if required.
  o Prepare as-built plans.
  o Prepare an operating manual to include tasks at various river stages.
	8 to 12 Months

Total Duration	Approximately 1½ Years

The project schedule could be greatly influenced by requirements of the funding agency if a grant or loan is obtained. Most state and federal funding sources will require public notices for procurement, environmental review, and other activities. Some of the notices and other time dependent tasks could be concurrent with the design phase. The required construction duration will also be dependent on the time of the year that it is started.

If the design phase where to begin immediately and funding secured, the project could be substantially complete by fall of 2020.

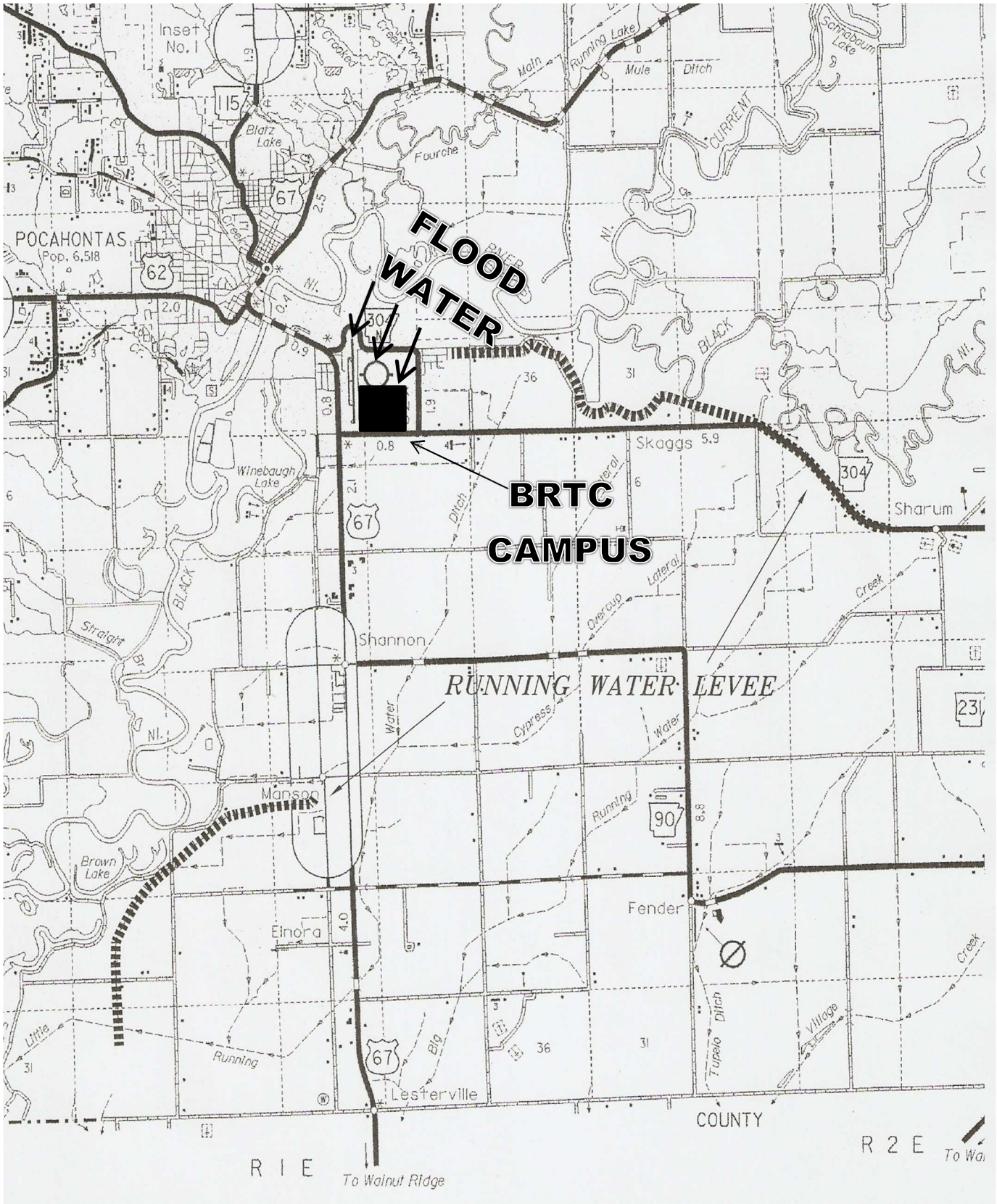


Figure 1- Layout of Levee System & Flood Water Path

TABLE OF SIGNIFICANT BLACK RIVER GAUGE READINGS

Pocahontas Gauge Reading, Feet	Description	Date or Frequency
-0.21	Lowest Recorded Level	August 10, 2012
16	Bank-Full in Most Areas	Annually
17	Flood Stage (Per NWS)	Annually
20	Water at Base of North Levee	40*
22	Without Levee, Hwy 67 is Inundated Near Randolph-Lawrence County Line	26*
25	Approximate Base Flood Elevation (BFE) Upstream of Hwy 67 Water Begins to Enter East Airport (Robil) Addition	5*
27	Water Begins Crossing Hwy 67 Near Old County Road and Hwy 304N Near the Sherriff's Department	2*
27.5	Hwy 67 Closes	2*
28	Water Nears the Top of the Levee	2*
28.5	Levee Overtops	2*
28.95	Highest Recorded Level	May 2, 2017

*Number of times equaled or exceed after the levee was constructed in 1938.

Table 1 - Summary of Significant River Stages and Events

Building No.	Name	Floor Elevation	2011 Flood Depth	2011 Flood Elev.	2017 Flood Depth	2017 Flood Elev.	Lowest Adjacent Grade (LAG)
1	Library	270.89	0.2	271.1	0.6	271.5	269.9
2	Academic Complex	270.94	0.2	271.1	0.6	271.5	269.8
3	Joe R. Martin Bldg	270.58	1.3	271.9	1.3	271.9	269
4	Greenhouse	271.40					270.8
5	Bldg B	273.21	N/A	N/A	N/A	N/A	272.3
6	Admin Bldg A	273.15	N/A	N/A	N/A	N/A	272.2
7	Education Bldg	272.39	N/A	N/A	N/A	N/A	271.4
7A	Lower Level				0.2		271.4
8	Development Center BT	271.34	0.2	271.5	0.5	271.8	269.9
9	RCDC-Lower Level	270.30	1.2	271.5	1.5	271.8	269.9
10	LETA	270.32	N/A	N/A	N/A	N/A	268.3
10A	Lower Level	268.66	1.0	269.7	0.3	269.0	268.3
11	Adult Ed.	272.44	N/A	N/A	N/A	N/A	270.6
11A	Lower Level	271.10	1.3	272.4	1.0	272.1	270.6
12	Eq. Storage	N/A	N/A	N/A	N/A	N/A	270.1
13	Welding	272.49	N/A	N/A	N/A	N/A	271.5
14	Health/Science	273.00	N/A	N/A	N/A	N/A	272.6
15	Physical Plant Maintenance	271.47	0.2	271.7	0.4	271.9	270.5
15A	Storage	271.50					270.9
16	Automotive	272.92	N/A	N/A	N/A	N/A	269.1
17	BRAD Headstart	272.60	N/A	N/A	0.2	272.8	272
	Physical Plant	272.77	N/A	N/A	N/A	N/A	271
	Aviation	272.71	N/A	N/A	0.1	272.8	271.7
	Burn Bldg/Drill Tower	273.00	N/A	N/A	N/A	N/A	272.1
	Tower Basement	265.00					272.1

Building number per online campus map (see Figure 2 on following page).

Plan top of Running Water Levee, North Section is 273.18.

Table 2 - Building Elevations and Flood Levels

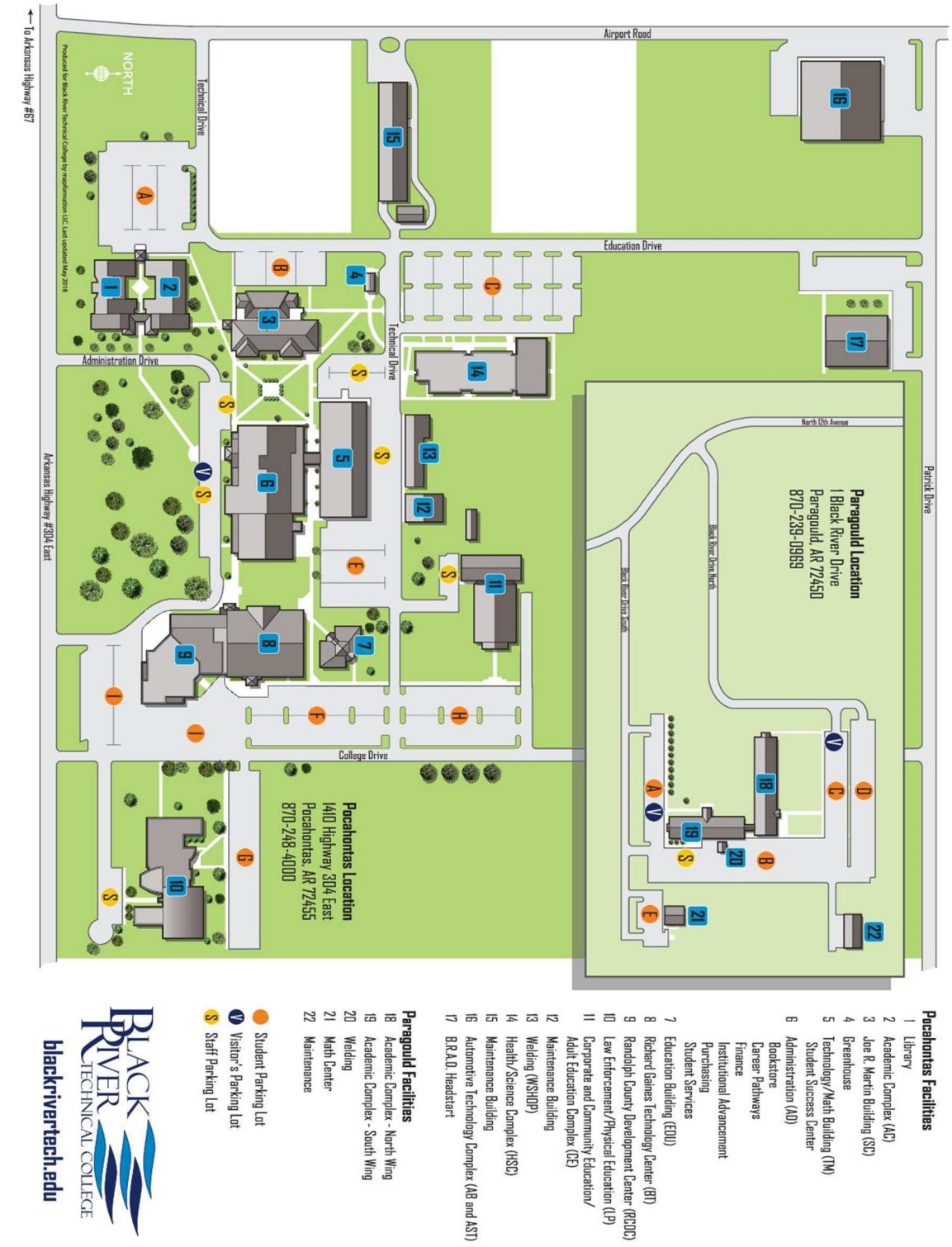
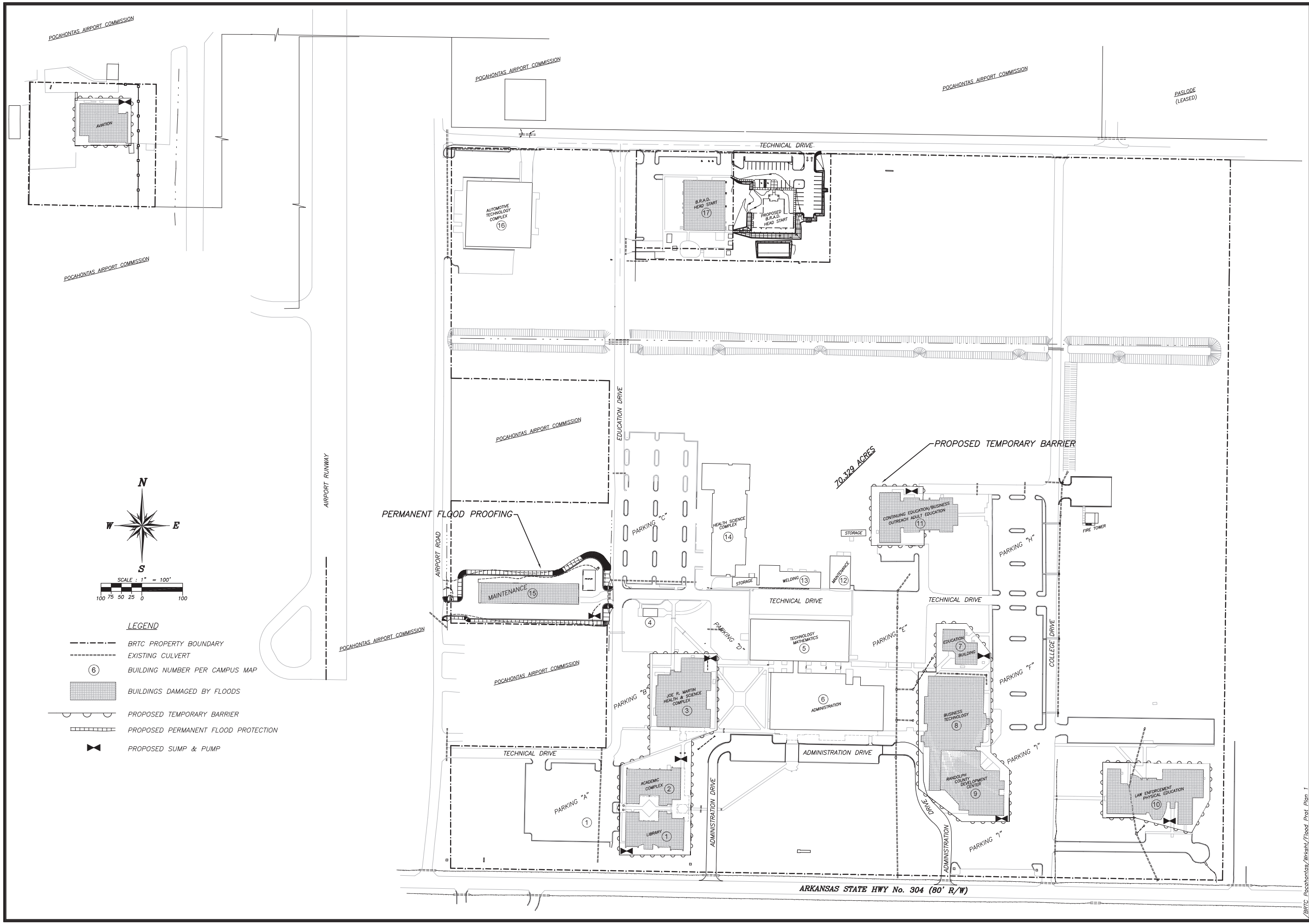


Figure 2 - BRTC Online Campus Map



REGISTERED PROFESSIONAL LAND SURVEYOR
STATE OF ARKANSAS
NO. 1394
SIGNATURE
RICHARD J. DeCLERK, JR.

REVISIONS

No.	DATE	DESCRIPTION

DeCLERK-THROESCH
ENGINEERING – LAND SURVEYING
114 Pelham Street - P.O. Box 804
Pocahontas, Arkansas 72455
Phone: 870-892-4412
Fax 870-892-5975

BLACK RIVER TECHNICAL COLLEGE
PRELIMINARY FLOOD MITIGATION PLAN
POCAHONTAS, ARKANSAS

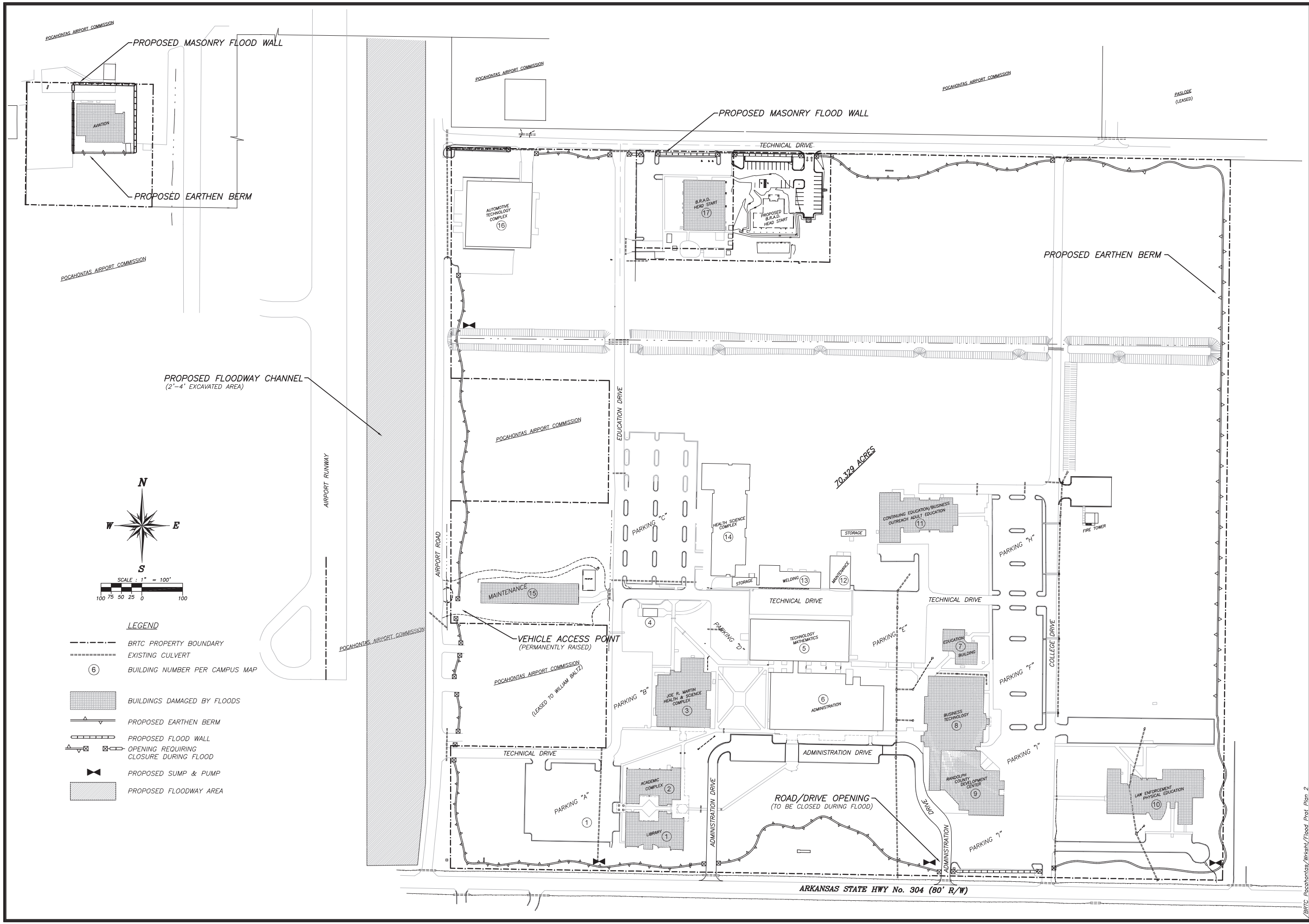
LAYOUT - ALTERNATIVE I

SCALE: 1" = 100'

DATE: May 2019

PLAN SHEET
1 of 3

/BRTC Pocahontas/Wrshl/Flood Prot Plan 1



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SIGNATURE
RICHARD J. DeCLERK, JR.

REVISIONS		
No.	DATE	DESCRIPTION

DeCLERK-THROESCH
ENGINEERING – LAND SURVEYING
114 Pyburn Street - P.O. Box 8104
Pocahontas, Arkansas 72455
Phone: 870-892-4412
Fax: 870-892-5975

BLACK RIVER TECHNICAL COLLEGE
PRELIMINARY FLOOD MITIGATION PLAN
POCAHONTAS, ARKANSAS

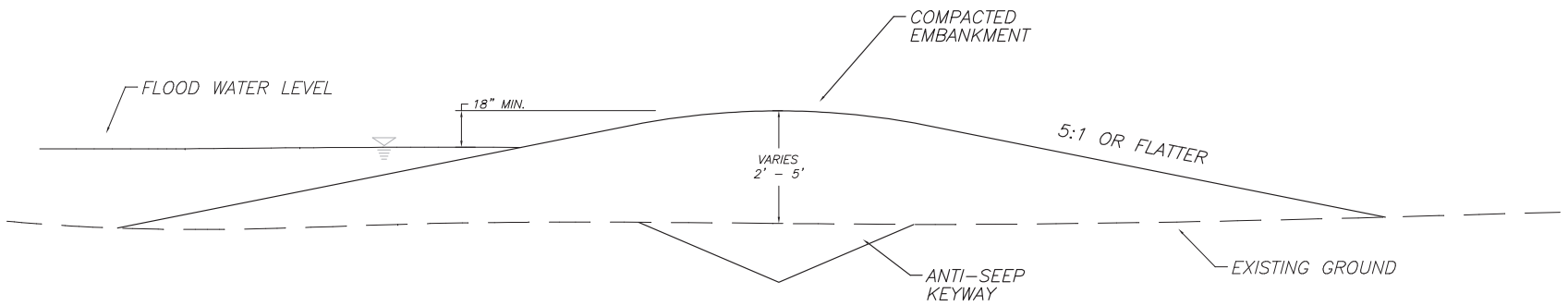
LAYOUT - ALTERNATIVE 2

SCALE: 1" = 100'

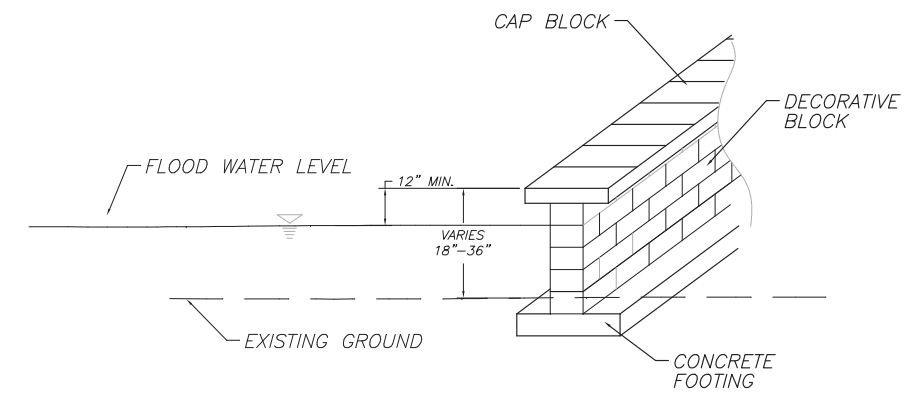
DATE: May 2019

PLAN SHEET
2 of 3

/BRTC Pocahontas/Wright/Flood Prot Plan 2



SECTION VIEW – EARTHEN BERM
NOT TO SCALE
USED IN ALTERNATIVE 2



SECTION VIEW – PERMANENT MASONRY WALL
NOT TO SCALE
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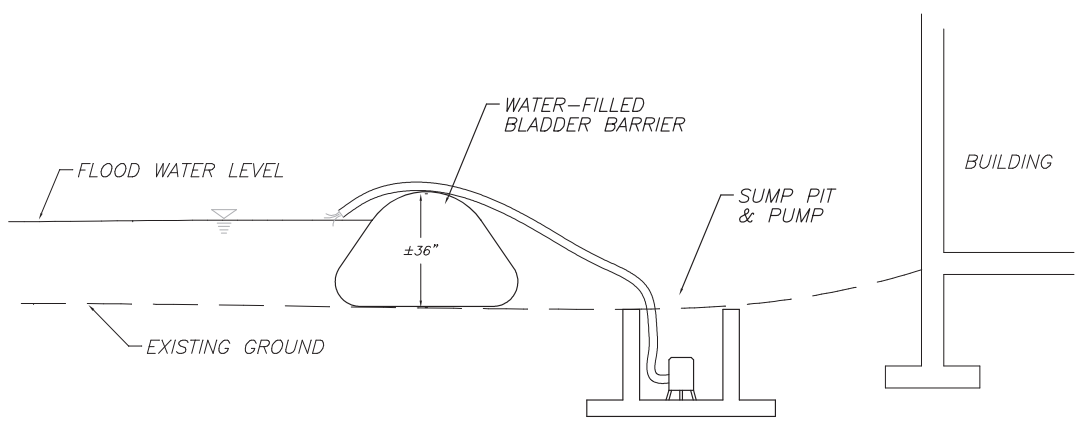
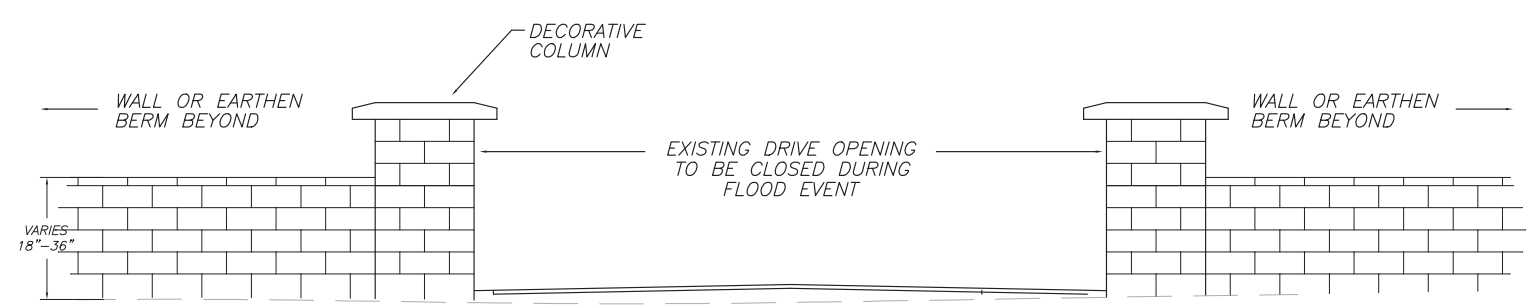


SECTION VIEW – TEMPORARY BLADDER BARRIER & SUMP
NOT TO SCALE
USED IN ALTERNATIVE 1



SECTION VIEW – ROAD/DRIVE OPENING
NOT TO SCALE
USED IN ALTERNATIVE 2

REGISTERED PROFESSIONAL LAND SURVEYOR
STATE OF ARKANSAS
NO. 1394
SIGNATURE
RICHARD J. DeCLERK, JR.

REVISIONS		
No.	DATE	DESCRIPTION

DeCLERK-THROESCH
ENGINEERING – LAND SURVEYING
114 Pybum Street - P.O. Box 804
Pocahontas, Arkansas 72455
Phone: 870-892-4142
Fax: 870-892-5975

BLACK RIVER TECHNICAL COLLEGE
PRELIMINARY FLOOD MITIGATION PLAN
POCAHONTAS, ARKANSAS

DETAILS

SCALE: N/A

DATE: May 2019

PLAN SHEET
3 of 3

/BRTC Pocahontas/Wrsht/Flood Protection Details

Attachment 1

Attorney's Letter of Opinion Regarding Liability (5 Pages)

ALEXANDER S. BIGGER
ATTORNEY AT LAW
202 W. PYBURN STREET
POCAHONTAS, AR 72455
Office: (870) 892-3000 Fax: (501) 421-8984
alex@thebiggerlawfirm.com www.thebiggerlawfirm.com

May 6, 2019

To Mr. Ben DeClerk:

I am writing this letter in connection with our recent discussion of the potential construction of an embankment or levee built to encircle the Black River Technical College ("BRTC") campus in east Pocahontas with the objective to alleviate potential flood damage to the campus and related BRTC facilities.

Based on our discussion, I understand that there are no permits required prior to construction, including, but not limited to state, federal, or any environmental permits.

You have asked me to provide an opinion on the following issue: Would the construction of an embankment or levee to encircle the BRTC campus create potential civil liability for BRTC due to the diversion of flood waters onto adjacent property owners?

I have refined this question to state: Would the construction of an embankment or levee by a landowner create potential civil liability due to the diversion of surface water upon adjacent land owners?

Without going into greater detail, the law makes a distinction between a landowner who alters natural currents, streams, or rivers versus a landowner who protects himself against surface water or flood water. For the purpose of this inquiry, the research conducted only focuses on the law as it concerns surface water.

With regard to surface water that is not contained in marked channels or banks, the doctrine of the common law held that for the purpose of draining, building, or any other useful and proper object, each landowner had the right to elevate the surface of his own land, or to ward off the influx of surface water from his neighbors, <u>without liability</u>. *Railway Co. v. Chapman*, 39 Ark. 463 at 474 (1882).

The principal of Arkansas law, however, diverts slightly from the common law and clothes it with a qualifier. This rule of law is found as early as 1882 in the case of *Railway Co. v. Chapman*, 39 Ark. 463 (1882). In *Chapman* it was held that "the right of a landowner to obstruct the natural drainage or flow of surface waters was not absolute, and that, if such proprietor unnecessarily injures the land of upper proprietors by the erection of an embankment or levee, when, by reasonable care and expense, he might have avoided the injury, he becomes liable for damages thus occasioned." See also *Baker v. Allen*, 66 Ark. 271 (1899). This doctrine is upheld as the rule of law in Arkansas in *Leader v. Mathews*, 192 Ark. 1049, 95 S.W.2d 1138, 1140 (1936).

Several years after the *Chapman* case, this principal of law evolved to what is most readily found in current Arkansas case law, as follows:

> "The flood waters of a river are a common enemy which any landowner may defend against without incurring liability for damages unless injury is unnecessarily inflicted upon another which by reasonable effort and expense could be avoided." *McCoy v. Board of Directors of Plum Bayou Levee Dist*., 95 Ark. 345, 129 S.W. 1097, 29 L.R.A. (N.S.) 396 (1921).
>
> The most current statement of the law is found in *Stacy v. Walker*, however:
>
> "A landowner is justified in defending against such flood waters and can do so without incurring liability, unless he unnecessarily injures or damages another." *Stacy v. Walker*, 222 Ark. 819 (1953).

This rule of law has strong precedential value as it can be found repeated in many long lines of cases through Arkansas law, which was derived from the common law of England. See *Beck v. State ex rel. Attorney General*, 179 Ark. 102, 14 S.W. (2d) 1101; *Leader v. Matthews*, 192 Ark. 1049 (1936); *Baker v. Allen*, 66 Ark. 271 (1899); *Dent v. Alexander*, 218 Ark. 277 (1951).

After my review of this line of cases, I note that the main qualifier to this principal rule of law begins at the word "unless." This rule of law essentially states that a landowner has the right to defend himself against surface waters and flood waters <u>unless</u> injury is <u>unnecessarily</u> inflicted upon another landowner, which by reasonable effort and expense could be avoided. In other words, the right of a landowner to obstruct the natural drainage or flow of surface waters is <u>not absolute</u>, but only in the event if such landowner <u>unnecessarily</u> injures the land of an adjacent landowner by the erection of an embankment or levee. If the embankment or levee constructed causes unnecessary damage to adjacent landowners, then the proprietor might become liable for damages thus sustained, especially if the injury could have been avoided by reasonable care and expense.

With that principle in mind, our investigation shifts to a narrower inquiry: What conduct in this respect is considered "unnecessary" or "unreasonable" which to such extent could that it be avoided by reasonable effort and expense?

This question quite obviously cannot be answered without specific factual findings as declared by a court of law. However, recent Arkansas cases that have factual similarity to the proposed project are *Dent et al. v. Alexander et al.*, 218 Ark. 277 (1951) and *Stacy v. Walker*, 222 Ark. 819 (1953).

The facts of the *Dent* case are as follows:

Dent (Plaintiff) filed suit against Alexander (Defendant) alleging that the Defendant had removed a natural barrier of high ground on Defendant's lands which diverted the overflow of

surface water from the Defendant's lands onto lands owned by the Plaintiff, and that by accelerating the flow of surface water caused it to flow upon the lands of the Plaintiff in a manner that created an unnatural channel to the detriment of the Plaintiff.

Plaintiff stated that the said wrongful diversion of surface water, from its regular, long established, and natural water course onto the lands of Plaintiff, caused continuing overflow, irreparable damage, and a continuing nuisance.

Although no monetary damages were sought, the Plaintiff prayed for equitable injunctive relief and for the indirect discharge of surface water to be ceased by the Defendant.

In this case there was much conflict in testimony from experts and other fact witnesses familiar with the subject properties. One witness, however, whose experience was serving on the local levee board for over 25 years, crucially stated that "the water carried by the [Defendant's] ditches in question would not make any appreciable contribution to the [Plaintiff's] area… I don't think it would be a drop in the bucket."

The Court, after reviewing all testimony, concluded the case by stating, "… when you see water that is accumulated in a ditch three or four feet wide and four or five feet deep, that comes pretty fast and looks muddy, it looks like it is doing lots of damage, but when you spread it out over a good large area, it doesn't amount to anything."

Essentially, the court in the *Dent* case made the finding that since the territory over which the surface water traveled was so spread out and flat, it concluded that there wasn't an appreciable increase in the surface flow of water which warranted equitable intervention by the Court. The Plaintiff's complaint was therefore dismissed.

The *Dent* case was appealed and on review the Supreme Court of Arkansas made the following observations and ruling:

The Supreme Court reiterated the standard of law in this context by stating: "A well-established rule is that as against overflow or surface waters, 'a landowner has the right to defend himself as against a common enemy, without rendering himself liable for damages, unless he unnecessarily injures or damages another for his own protection', *Leader v. Mathews*, 192 Ark. 1049, 95 S.W.2d 1138, 1140, or as expressed in *Bohn v. Salt Lake City*, 79 Utah 121, 8 P.2d 591, 81 A.L.R. 256: 'A landowner is under no duty to receive upon his land surface water from the adjacent property, but in the use or improvement of it he may repel such water at his boundary. * * * A landowner incurs no liability by reason of the fact that surface water falling or running onto his land flows thence to the property of others in its natural manner. But he may not use or improve his land in such a way as to increase the total volume of surface water which flows from it to adjacent property, or as to discharge it or any part of it upon such property in a manner different in volume or course from its natural flow, to the substantial damage of the owner of that property.'"

The Supreme Court concluded by stating:

"In the present case, no damages have been sought, and the preponderance of the testimony shows, as the trial court found, that appellants have not been substantially or unnecessarily damaged or injured by any accelerated flow of the surface waters, in the circumstances here. The test, as just quoted, is not whether the flow of the waters has been accelerated, but whether such acceleration injured or damaged the lands of appellants."

In the *Walker* case, the Defendant, Stacy, had constructed a levee of varying height from 18 inches to less than three feet for a distance of 190 feet along a fencerow dividing the line between land owned by Stacy and Walker. Several acres of Walker's land were adversely affected following heavy rains water accumulated against Stacy's dam and gradually spread over an area regarded by Walker as his best cotton land. Walker sued for damages to his 1951 cotton crop amounting to $1,600 and for a mandatory order directing Stacy to breach the levee. After the lower court ordered a $50 judgment for nominal damages and a decree for elimination of the levee, Stacy then appealed to the Supreme Court of Arkansas.

The Supreme Court in *Walker* determined that since there was no constant stream or natural watercourse that was altered other than slight depressions on Walker's land which were filled by rainfall, that Stacy had a right to defend himself and his lands against surface water and rain water.

The Court reiterated the standard of law previously mentioned in this letter and espoused that a landowner is under no duty to receive upon his land surface water from the adjacent property and that, in the use or improvement of his land, a landowner may repel such water at his boundary. This statement was, of course, subject to the modification that unnecessary harm must not be inflicted. *Stacy v. Walker*, 222 Ark. at 890-891. The Court then found in favor of Stacy on every issue and reversed the lower court with directions to dismiss the Plaintiff's complaint.

Alternatively, the *Chapman* case, as previously mentioned, is an example case in which the Arkansas Supreme Court found that the landowner acted unreasonably in its construction of an embankment to defend itself against surface water drainage. The Court held against the Defendant in *Chapman* because it erected and maintained an embankment on its right of way through which the accumulation of waters from the surrounding country passed off onto the lands of Plaintiff and thereby caused substantial damages to a horse stable and garden.

In construction of the embankment, the Defendant had failed to place sufficient culverts or drain-pipes in said embankment which resulted in an obstruction of the usual flow of water across the grounds occupied by this Defendant and caused it to flow back and accumulate on the Plaintiff's land. The Court found that by the use of ordinary care and caution in the construction of such embankment with a proper culvert, the damage to Plaintiff's land might have been avoided, and that, by reason of the overflow caused by said embankment, the Plaintiff had suffered damage.

While no guarantees can be made as to the potential likelihood of experiencing adverse litigation, the *Dent* case and *Walker* case holdings appear favorable to the proposed embankment construction at BRTC. There are similarities in this project in comparison to the surface water defenses litigated in the *Walker* and *Dent* cases, such as the geographical area surrounding the campus being relatively flat which should permit surface water to disperse over a large surface area and territory. Furthermore, the proposed embankment construction doesn't involve the rerouting or obstruction of any natural channels or water courses, and would not seem to discharge water in a manner different in course from its natural flow. It appears unquestionable with the guiding case law that there is a right to protect oneself from surface water and, in so doing, there is no infringement of property rights of others as long as surface water diversion is not done unnecessarily.

This opinion is limited to the laws of the state of Arkansas now in existence.

Sincerely,

Alexander S. Bigger