



# Water Quality Technical Memorandum

ArDOT JOB NO. CA0602

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I-30 (From I-530/I-440 to I-40) and  
I-40 (From Hwy. 365/MacArthur Dr. to Hwy. 67)  
Pulaski County, Arkansas  
October 2017



U.S. Department  
of Transportation  
**Federal Highway  
Administration**





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## 1.0 INTRODUCTION

Approved by Arkansas voters, the Arkansas Department of Transportation (ArDOT) is implementing an accelerated State Highway Construction and Improvement Program named the Connecting Arkansas Program (CAP).

A major component of the CAP is to implement a project to improve a portion of Interstate 30 (I-30) from Interstate 530 (I-530) and Interstate 440 (I-440) to Interstate 40 (I-40), including the Arkansas River Bridge, and a portion of I-40 from Highway (Hwy.) 365 (MacArthur Drive [Dr.]) to Hwy. 67. This project is CA0602: I-530 - Hwy. 67 (Widening & Reconst.) (I-30 & I-40), commonly known as the 30 Crossing project. **Figure 1** illustrates the proposed 7.3-mile project limits.

### 1.1 Existing Facility

I-30 is one of the critical links of the Central Arkansas Freeway System. It connects communities within the Central Arkansas Region and serves local, regional and national travelers with varied destinations and trip purposes.

The I-30 corridor generally consists of three main lanes in each direction with parallel one-way discontinuous frontage roads on each side of the interstate. In the northern portion of the project limits, the I-40 corridor consists of three to four main lanes in each direction with parallel one-way frontage roads on each side of the interstate between the I-30/I-40 interchange and North Hills Boulevard (Blvd.). Within the 7.3-mile corridor, four system interchanges are located:

- I-30 with I-530 and I-440
- I-30 with I-630
- I-30 with I-40
- I-40 with Highways 67/167

### 1.2 Proposed Alternatives

#### 1.2.1 No-Action Alternative

The No-Action Alternative represents the case in which the proposed project is not constructed, but could include future projects identified through the long range planning process for maintaining a state of good repair as funding becomes available.

#### 1.2.2 Action Alternatives

Two different main lane configurations are under consideration. Both would include the replacement of the Arkansas River Bridge.

- Eight-Lane General Purpose (GP) Alternative would provide four main lanes in each direction with no Collector Distributor (C/D) lanes.
- Six-Lane with C/D Lanes Alternative would reconstruct the existing six-lane (three in each direction) roadway while adding two decision lanes on each side that ultimately feed into a C/D system located at the Arkansas River Bridge.

The current Hwy. 10 (Cantrell Rd.) interchange provides direct access to the downtown business district of Little Rock. Its proximity to the Arkansas River Bridge and the I-30 interchange with I-630 creates a unique level of complexity. In order to balance various project goals, two interchange concepts are being considered for replacement of this interchange:

- An elevated Single Point Urban Interchange (SPUI) constructed in the same location as the current interchange;
- A Split Diamond Interchange (SDI) constructed south of the existing interchange at 4<sup>th</sup> and 9<sup>th</sup> Streets.

Combining the two main lane configurations with the two Hwy 10 (Cantrell Rd.) interchange concepts results in the four Action Alternatives as follows:

- Alternative 1A: 8-Lane GP with SPUI Alternative
- Alternative 1B: 8-Lane GP with SDI Alternative
- Alternative 2A: 6-Lane with C/D Lanes with SPUI Alternative
- Alternative 2B: 6-Lane with C/D Lanes with SDI Alternative

For detailed information on the Action Alternatives, refer to the **30 Crossing Environmental Assessment** (EA) for the proposed project.

## 2.0 GOVERNING REGULATIONS

The following water quality regulatory requirements apply to the project:

- Provisions of the Federal Water Pollution Control Act, later renamed the Clean Water Act (CWA), including Section 401; Water Quality Certification, Section 402; National Pollutant Discharge Elimination System (NPDES), and Section 404; Permits for Dredged or Fill Material.
- Water quality standards established by the Arkansas Pollution Control and Ecology Commission (APC&E) as part of the Arkansas Water Pollution Control Act of 1949.
- Regulations outlined in the ArDOT Statewide Storm Water Management Program (SWMP), Permit No. ARR040000, August 1, 2014 and ArDOT/City of Little Rock NPDES Permit No. ARS00002.

The US Environmental Protection Agency (EPA) has delegated authority for the implementation of the CWA to The Arkansas Department of Environmental Quality (ADEQ). Sections 401 and 402 of the CWA are administered by the ADEQ permit branch. Section 404 of the Clean Water Act is administered by the US Army Corps of Engineers (USACE). Section 404 permitting is discussed in the Water Resources Technical Memorandum. The proposed project will comply with all of the above requirements.

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FIGURE 1: PROJECT LOCATION MAP



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### 3.0 REGULATORY BACKGROUND

ADEQ regulates disturbance to water bodies which may cause an impact to water quality under Section 401 of the CWA. A Short Term Activity Authorization (STAA) may be required to demonstrate compliance with Section 401.

ADEQ regulates storm water discharge to water bodies which may cause an impact to water quality under Section 402. Compliance with the NPDES Construction General Permit and the SWMP must be demonstrated. The SWMP includes best management practices (BMP's), control techniques, and system, design and engineering methods intended to manage the quantity and/or improve the quality of storm water runoff from ArDOT highways, and to prevent degradation of receiving water bodies due to construction of ArDOT highways. BMP's were chosen to reduce the discharge of pollutants to the maximum extent practicable. Although the SWMP is intended to be applicable statewide, it prohibits storm water discharges that have the reasonable potential to contribute to a violation of the water quality standard for the receiving water body. Storm water discharges to impaired water bodies and to those water bodies with established Total Maximum Daily Limits (TMDL's) are permitted only if ArDOT either determines that there are no significant sources of pollutants from highways within the drainage area of the impaired water body or commits to reducing the impact of the storm water discharge.

ADEQ classifies surface waters throughout the state based on their past, present, and future potential uses and values, and sets water quality standards for each class of surface water. The classes of water bodies are Extraordinary Resource Waters, Ecologically Sensitive Waterbody, Natural and Scenic Waterway, Primary Contact Recreation, Secondary Contact Recreation, and Aquatic Life. The water quality standard for each class of water body varies by location throughout the state (ecoregion). There are six ecoregions in Arkansas: Ozark Highlands, Boston Mountains, Arkansas River Valley, Ouachita Mountains, Gulf Coast Plain, and Mississippi Delta.

### 4.0 EXISTING CONDITIONS

The proposed project study area spans four ecoregions: Arkansas River Valley, Ouachita Mountains, Gulf Coastal Plain, and Mississippi Delta (**Figure 2**). There are three water bodies in the project study area: the Arkansas River (Arkansas River Valley and Mississippi Delta), Lakewood Lakes (Ouachita Mountains), and Fourche Creek (Gulf Coastal Plain). The three water bodies are shown in **Figure 3**.

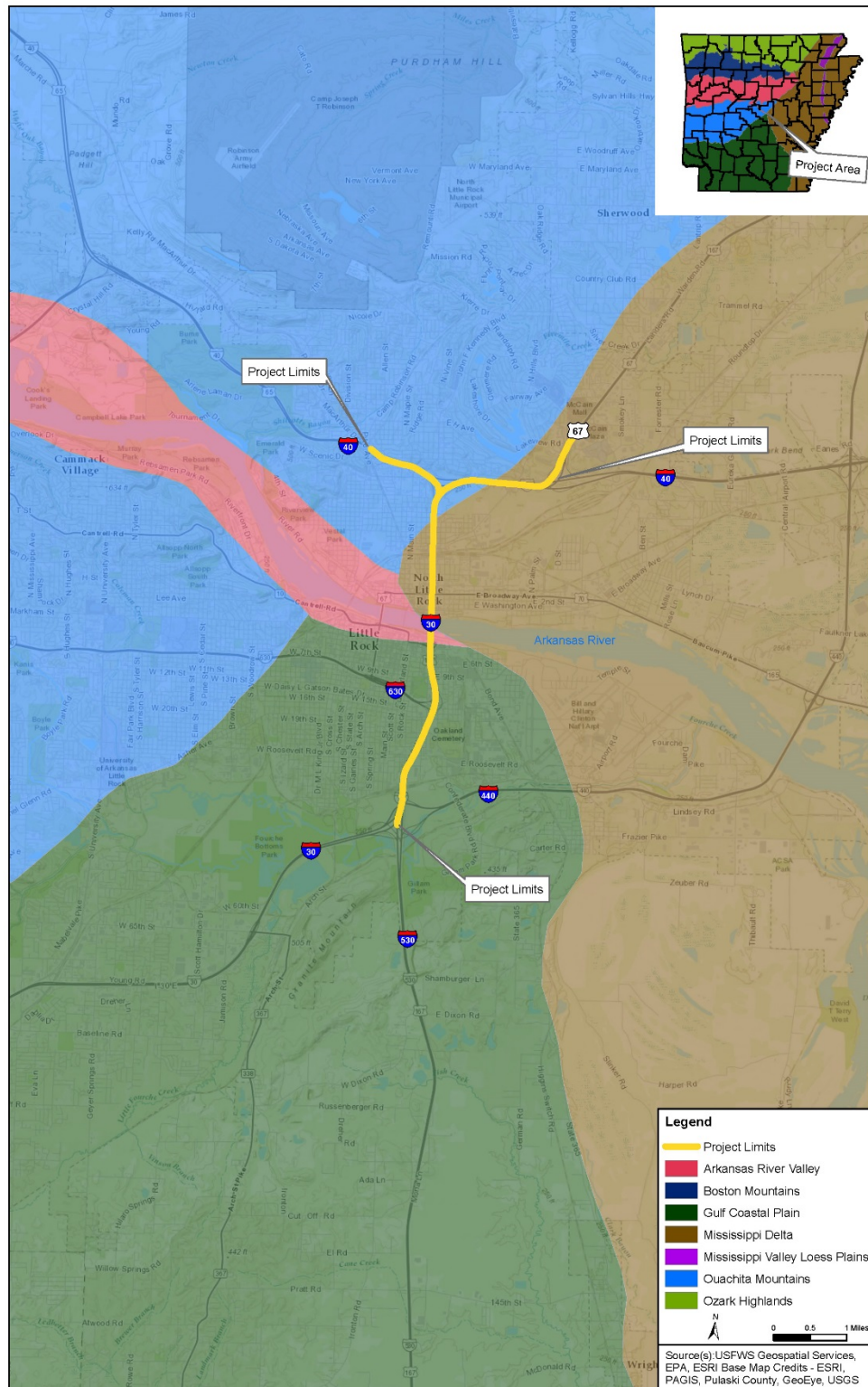
Lakewood Lakes are a series of interconnected impoundments in North Little Rock north of I-40. The southernmost lake, Lake Number One, discharges into the Dark Hollow drainage channel, which flows south, under I-40 and through Dark Hollow, into the Redwood Tunnel to the Arkansas River. Lakewood Lakes are classified as Primary Contact Recreation.

The Arkansas River flows from west to east through the project study area. I-30 crosses the Arkansas River between the Cities of Little Rock and North Little Rock. The Arkansas River is classified as Primary Contact Recreation.



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FIGURE 2: 30 CROSSING ECOREGIONS



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FIGURE 3: WATER BODIES IN THE PROJECT AREA





Fourche Creek flows from west to east through the southern part of the project study area, which is the I-30/ I-530/ I-440 interchange. Fourche Creek through the project area is Reach 22. Reach 22 joins the Arkansas River approximately 4.0 miles downstream of the I-30 Bridge. Fourche Creek is classified as Primary Contact Recreation.

Fourche Creek is on the Draft 2016 Impaired Waterbodies List (303(d)) as a Category 5, Low Priority. Category 5 is classified as, "The waterbody is impaired, or one or more water quality standards may not be attained." Low prioritization means;

- 1) waters currently not attaining one or more water quality standards, but all designated uses are determined to be supported; or
- 2) there is insufficient data to make a scientifically defensible decision concerning designated use attainment; or
- 3) waters ADEQ assessed as unimpaired, but were assessed impaired by EPA.

Fourche Creek is listed as impaired for low dissolved oxygen concentrations, elevated surface erosion and turbidity, and temperature. The greatest threats to the Fourche Creek Watershed are sedimentation, development, and floodplain encroachment.

Water quality standards for the four applicable ecoregions are shown in **Table 1**.

**Table 1: Water Quality Requirements in the Project Area**

Parameters		Ecoregion			
		Arkansas Valley	Mississippi Delta	Ouachita Mountains	Gulf Coast Plain
Temperature (degrees Celsius)		32	32	30	30
Dissolved Oxygen (mg/L)	Primary	5	5	6	5
	Critical	5	5	2	2
pH		6 to 9	6 to 9	6 to 9	6 to 9
Base Flow Turbidity (NTU)		50	50	10	21
Pathogen Indicators: Individual Sample (col/100 mL)	<i>E. Coli</i>	410	410	410	410
	Fecal Coliform	400	400	400	400
Chlorides (mg/L)		250	36	6	14
Sulfates (mg/L)		100	28	15	31
TDS (mg/L)		500	390	128	123
Oil and grease (mg/L): Ave./Max.		10/15	10/15	10/15	10/15
Copper (ppb): Acute and Chronic		0.96	0.96	0.96	0.96
Zinc (ppb)	Acute	0.978	0.978	0.978	0.978
	Chronic	0.986	0.986	0.986	0.986

Source: Arkansas Pollution Control and Ecology Commission 2014. *Regulation No. 2; Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas*

Note: The turbidity standard for lakes and reservoirs in all ecoregions is 25 NTUs.

The *E. coli* Individual Sample standard for lakes and reservoirs in all regions is 298 col/100 mL; the Fecal Coliform standard is 400 col/100 mL.

## 5.0 ENVIRONMENTAL CONSEQUENCES

The 30 Crossing Action Alternatives involve widening and reconstruction of portions of I-30 and I-40 that discharge to the water bodies described above. Potential long-term impacts of the project on water quality include an increase in the type and quantity of pollutants, such as sediment, nutrients, organics, oil and grease, and heavy metals. In addition, the increase in impervious surface can increase the quantity of runoff, which can lead to increases in erosion and sedimentation of receiving water bodies. The provisions of the SWMP are intended to address these potential long-term impacts.

The general categories of structural BMP's intended to address these potential long-term water quality impacts include:

- Infiltration systems;
- Detention systems;
- Retention systems;
- Constructed wetland systems;
- Filtration systems;
- Vegetated systems;
- Minimization of directly connected impervious surface; and
- Miscellaneous and vendor-supplied systems.

In addition, non-structural BMP's including education programs, source control, recycling, and maintenance programs for storm water collection and treatment systems are also included in the SWMP.

During construction, soil disturbance can result in increased erosion and sedimentation, which can result in localized, short-term adverse water quality impacts. Construction impacts to water quality are addressed by means of Storm Water Pollution Prevention Plans (SWPPP's), which are required as part of the SWMP to be developed for each construction project that disturbs an area equal to or greater than one acre.

The No-Action Alternative would not result in new direct impacts to water quality within the study area; however, existing impacts to water quality resulting from lack of structural and non-structural BMP's would not be addressed.

## 6.0 MITIGATION

The Design-Build Contractor for the 30 Crossing project will be required to obtain an STAA under Section 401 of the CWA and to implement a SWPPP as required under the Section 402 of the CWA, the SWMP and the statewide NPDES General Storm Water Permit for Construction Activities. After development and approval of the SWPPP, ArDOT will submit a Notice of Intent to use the NPDES General Storm Water Permit for Construction Activities at the start of construction, and a Notice of Termination at the end of construction.

SWPPP's include, at a minimum:

- Requirements to implement appropriate erosion and sediment control BMP's;
- Requirements to control waste such as demolition materials, truck washouts, chemicals, litter, and sanitary waste;
- Procedures for site plan review which incorporate water quality considerations;
- Procedures for receipt and consideration of information received by the public; and
- Procedures for site inspection and enforcement of control measures.

The SWPPP must contain a detailed description of the construction project; a detailed site map demonstrating drainage, erosion controls, and discharge locations; a description of the erosion controls to be used on site; inspection and maintenance procedures for the erosion controls, documentation for Total Maximum Daily Load (TMDL) and Water Quality Standards compliance; and all required certifications.

The Specific non-structural BMP's likely to be part of the SWPPP for the 30 Crossing project include:

- Establishment of permanent vegetation;
- Preservation of existing vegetation;
- Maintenance of buffer zones along streams;
- Protection of wetlands;
- Personnel training for BMP structural maintenance; and
- Source control such as litter collection and street sweeping.

Specific structural control measures likely to be part of the SWPPP for the 30 Crossing project include:

- Concrete spillways, grouted riprap or other outlet structures;
- Detention/retention ponds;
- Grassed swales;
- Vegetated filter strips;
- Rip rapped or hard surface slopes and channels;
- Inlet grating; and
- Velocity dissipaters.

The intent of the ArDOT SWMP is to remove at least 80% of the total suspended solids from the increase in runoff due to the project. The Design-Build contractor will be required to perform weekly inspections of the project and to document the findings on an NPDES storm water inspection report in order to demonstrate compliance with the NPDES permit.

## 7.0 SUMMARY AND CONCLUSIONS

The provisions of the ArDOT SWMP and the SWPPP prepared for the 30 Crossing project by the Design-Build contractor will prevent any degradation in the water quality standards listed in Table 1 resulting from the project.

## 8.0 REFERENCES

Arkansas Pollution Control and Ecology Commission 2014. *Regulation No. 2; Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas* ([https://www.adeq.state.ar.us/regs/files/reg02\\_final\\_140324.pdf](https://www.adeq.state.ar.us/regs/files/reg02_final_140324.pdf))

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