DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101ST EAST AVENUE
TULSA, OKLAHOMA 74128-4609

Application Number SWT-2015-775

JOINT PUBLIC NOTICE
U.S. ARMY CORPS OF ENGINEERS
AND
OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY (ODEQ)
(30-DAY COMMENT PERIOD)

Interested parties are hereby notified that the District Engineer (DE) has received an application for a Department of the Army (DA) permit and water quality certification pursuant to Sections 404 and 401 of the Clean Water Act. The ODEQ hereby incorporates this public notice and procedure as its own public notice and procedure by reference thereto.

The application is for the placement of 65,610 cubic yards (cys) of fill material associated with the construction of South Tulsa/Jenks Low Water Dam (LWD) project and appurtenant features into the Arkansas River to facilitate a new static pool and pedestrian bridge. The proposal would also result in the construction of 7 public access features and 8 site-specific shoreline stabilization projects.

Name of Applicant:
Mr. Tom Rains
Tulsa County
500 S. Denver, 3rd Floor
Tulsa, OK 74103

Name of Agent:
Mr. Gaylon Pinc
Program Management Group
601 S. Boulder, Suite 1200
Tulsa, OK 74119

Location: The proposed project is located in the Arkansas River in Section 29, Township 18 North, Range 13 East, in Tulsa, Tulsa County, Oklahoma. The project site can be found on the Jenks, OK 7.5 Minute USGS Quadrangle map.

Latitude North: 36.0226818 Longitude West: 95.9542272 Decimal Degrees

Purpose:

The basic purpose of this work is to create a static pool at 597 feet (ft) above Mean Sea Level (MSL) within the Arkansas River.

A water dependency determination is not required since the LWD is a water dependent activity.

The overall purpose of this work is to support riverine recreation as a part of the larger Arkansas River Corridor Master Plan, support riverine and riparian ecological functions, and to maintain flood risk management and hydropower generation within the Arkansas River corridor.

Description of Work: The applicant proposes the placement of approximately 65,610 cys of fill material below the ordinary high water mark (OHWM) of the Arkansas River. This proposal would result in the placement, redistribution, and the excavation of riverbed materials within waters of the United States. A total of approximately 27,400 cys of earthen material (after compaction) would be excavated and used to construct the LWD. Additionally, 13,700 cys of excavated rock and 33,904 cys of concrete fill material consisting of stone and gravel, sand, cement, and water would also be used to construct the LWD.

The applicant proposes bank stabilization along the riverbank at eight locations. These locations would be armored by utilizing revetment riprap with launchable stone toe, stone toe wedge, or longitudinal peaked stone toe. A total of approximately 14,973 cys of fill material consisting of 18- to 24-inch riprap/rock boulders and geotextile fabric would be used for bank stabilization to protect 6,441 linear feet (lf) of riverbanks.

The applicant also proposed seven public access features which would result in approximately 12,749 cys of rock and soil/sand fill material placed below the OHWM. The public access features would be placed on both banks of the Arkansas River. Approximately 871 cys of rock fill material would be used to construct the public access areas. Approximately 11,274 cys of sand/soil fill material would be used to construct acess areas to accommodate recreational features. These features would consist of boat docks, ramps, landing areas, water features, playgrounds, splash pads, multi-use trails, climbing walls, overlooks, restrooms, and a 20-foot wide bicycle/pedestrian bridge.

The work associated with construction of the LWD and appurtenant features would be completed using wheeled and tracked excavation equipment (backhoes, track hoes, dozers, dump trucks, and front-end loaders), drilling rigs, concrete trucks, concrete pumping equipment, compactors, and graders.

The table of impacts below depicts the breakdown of excavated materials, fill materials, and quantities by acres and linear impacts.

Table of Impacts:

Location (Arkansas River)	Sand – Excavation cys	Rock – Excavation cys	Sand/ Soil Fill cys	Rock Fill cys	Concrete Fill cys	Acres	Linear feet
LWD	27,400	13,700			33,300	2.03	
Bank Stabilization – Area 1				634			214
Bank Stabilization – Area 2				3,474			1,172
Bank Stabilization – Area 3				625			211
Bank Stabilization – Area 4				587			198
Bank Stabilization – Area 5				744			251
Bank Stabilization – Area 6				1,206			407
Bank Stabilization – Area 7				5,083			1,715

Bank Stabilization – Area 8				2,620			884
Public Access Feature – A			5,346		277	0.14	
Public Access Feature – B			1,054		29	0.03	
Public Access Feature – C				871		0.27	
Public Access Feature – D			489		11	0.02	
Public Access Feature – E			1,936		65	0.08	
Public Access Feature – F			1,481		93	0.11	
Public Access Feature – G			968		129	0.08	
Total	27,400	13,700	11,274	15,488	33,904	2.76	5,052

Dimensions of Dam Structures:

The new dam construction is 1,850 ft in length with a total gate area of 5,880 square (sq) ft or approximately 44 percent of the total dam face area. The full-height gate length is 600 ft, crest gate length is 560 ft, and fixed crest dam length is 690 ft. Gates will be installed to the dam to facilitate flow management and sediment transport. The low water dam has three different cross-sections: a fixed crest section, a 3-ft crest gate section, and a full-height gate section. The full-height gate section is 7 ft high at low water dam. The low water dam geometry is included below. The proposed dam sections will be constructed of mass concrete founded upon the underlying shale bedrock and extending up to the design crest (or sill) elevation at each section to meet crest elevation and sediment management requirements.

Additionally, steps will be installed immediately below the dam to mitigate the dangerous hydraulic roller effect. A hydraulic roller is the hydraulic condition below a dam caused by the vertical drop in water surface that creates dangerous conditions. The geometry of the stepped face is hydraulically determined; however, these steps have relatively low structural demands and could be constructed of mass concrete, grouted riprap, anchored stone blocks, or other material with density similar to concrete.

The dam includes inflatable air bladder operated gates. A specific gate layout was developed for the dam using both full-height and crest gates to provide for the operational level control, allow sediment passage, and address the Federal Emergency Management Agency's (FEMA's) floodway requirements.

The dam will provide support for the 20 ft wide pedestrian bridge structure and aid in the performance of some maintenance functions. The bridge will include several seating, fishing, and overlook areas to enhance recreational opportunities. The dam will incorporate integral columns to support a pedestrian bridge across the river. These columns will be structurally connected to diaphragm walls that separate the various sections at the dam (fixed crest, crest gate, and full-height gate).

South Tulsa/Jenks Dam Elements

Dam Element	Size (L)(ft)	Number	Open Gate Area (sqft) H*L
Full-Height Gate	600	10	4,200 (7*600)
Crest Gate	560	16	1,680 (3*560)
Fixed Crest Dam/Pier	690	n/a	n/a
Total	1,850	-	5,880

Note #1: The applicant has noted that potential waters of the United States identified within the proposed study area included the following below:

a. Vegetated and Non-Vegetated Sandbars (R2UBH/R2USJ) – 457.11 acres
b. Emergent Marsh Wetlands (PEM1F) – 12.37 acres
c. Scrub-Shrub Wetlands (PSS1C) – 0.78 acre
d. Vensel Creek (R2UB1J) – 408 lf
e. Fred Creek [remnant] (R4UBH) – 584 lf

Note #2: The construction of the LWD would establish a static pool at elevation 597 ft above MSL, resulting in a lake depth of 7 ft at the dam. Under low-flow conditions (essentially no releases from Keystone Dam), the new static pool would cover an area of approximately 468 acres and be approximately 3.5 miles (19,000 ft) long and lake depth ranging 0 ft at the end of the pool length to 7 ft at the dam.

Avoidance and Minimization Information: The applicant provided the following statement with regard to how avoidance and minimization of impacts to aquatic resources was incorporated into the project plan:

> The applicant stated that adverse impacts to surface waters and waters of the United States have been avoided and minimized to the greatest extent practicable through site design and associated hydrologic modeling.
>
> The applicant's alternative analysis includes various siting and design alternatives for the dam including location, dam height, fish and egg passage, recreational access, and riparian habitat restoration.
>
> The applicant evaluated two alternative locations for the LWD at River Mile 510.25 and 96th Street and Creek Turnpike Bridge. The applicant also considered four alternative on-site configurations during the preliminary design of the project. The alternatives evaluation was multifaceted and included factors such as site constraints, environmental impacts, avoidance, public safety, economics, site and neighborhood aesthetics, public access, and hydraulic impacts.

Alternative 1: No Action

Alternative 2 (Configuration 1): The LWD project would include a combination of elements including:
• LWD height 8 ft (design to meet “No Rise” condition; no extra channel to mitigate minimum rise)
• Full height gates 50% of length
• Seasonal gate operations for fish and fish egg passage
• Polecat and Vensel Creek restoration
• Bank stabilization limited to dams and areas next to dams
• Wetland and riparian restoration on each pool area
• Fish stocking

Alternative 3 (Configuration 2): The LWD project would include a combination of elements focusing on environmental benefits:
• LWD height 9 ft
• Polecat and Vensel Creek restoration
• Roughened channel passage
• Gates – full height and length of dams
• Seasonal gate operations for fish and fish egg passage
• Addition of least tern habitat/islands in pools and downstream riverine areas
• Enhanced restoration along pools
• Bank biostabilization for protection above 40,000 cfs
• Fish stocking to mitigate fish loss

Alternative 4 (Configuration 3): The LWD project would include a combination of elements focusing of socioeconomic benefits:
• LWD height 9 ft
• Full height gates 50% of length
• Whitewater on one or both sides
• Additional recreational access and amenities
• Polecat and Vensel Creek restoration
• Continuous channel between Zink Dam and Approximately 81st Street.
• Enhance terrace LWD at each location
• Same restoration as the Master Plan
• Enhanced access to pool for fishing and other water-based recreation

Alternative 5 (Configuration 4) [Preferred]: The LWD project would include a combination of elements focusing on a balanced approach:
• LWD height 9 ft above existing river bottom
• Full height gates 50% of length
• Adaptive management of fish/egg passage via roughened channel and gate operation
• Enhanced fish monitoring and/or stocking
• Polecat and Vensel Creek restoration

• Recreation/bank/riparian restoration
• Seasonal gate operations for fish and fish egg passage

Mitigation: The applicant has proposed compensatory mitigation for the unavoidable impacts to aquatic resources expected from the proposed project:

The goal for the development of project-specific mitigation strategies was to fully compensate the unavoidable impacts from the proposed project, while seeking opportunities to provide an overall improvement to the Arkansas River watershed near the project. Compensatory mitigation strategies presented in this plan follow guidance provided in the District's Aquatic Resource Mitigation and Monitoring Guidelines (2004). USACE guidelines define the strategies as follows:

Restoration – the reestablishment of aquatic resource characteristics and functions at a site where they have ceased to exist or exist in a substantially degraded state.

Enhancement – an activity conducted in existing aquatic resources that increases or improves one or more aquatic functions or characteristics.
Creation – the establishment of an aquatic resource where one did not formerly exist.

Preservation – the conservation or dedication of ecologically important existing aquatic resources in perpetuity through the implementation of appropriate legal and physical mechanisms to prevent its destruction or degradation in the future.

The development of mitigation strategies includes specific objectives that serve to ensure that there is "no net loss" of ecological functions of aquatic resources. The following are the objectives:

• The qualification of ecological functions lost at the project site and gained through mitigative activities

• The replacement of lost functions by identification of potential onsite and in-kind mitigation opportunities prior to seeking offsite and/or out-of-kind opportunities

• The development of mitigation strategies that are easily implementable and sustainable

• The establishment of a monitoring program that includes specific success criteria, ensuring that mitigation strategies are effective

• The establishment of legal instruments to provide permanent protection of mitigation activities

The tables below was submitted with the applicant's conceptual mitigation plan for the LWD project.

LWD Project Mitigation Strategies: Direct Impacts

	Proposed Impacts	Proposed Mitigation Ration	Mitigation Needed	
	Riverine Sandbar (acres)		Riverine Sandbar (acres)	Least Tern Nesting Island (acres)
Low Water Dam	2.03	1:1.5	3.05	
Public Access Features	0.73	1:1.5	1.10	
Reservoir Pool	0*			5
Bank Stabilization		1:1		
Total	2.76#		4.15	5
*Loss of interior least tern habitat will be mitigated through the creation of permanent nesting island habitat. # Proposed impacts for Reservoir Pool are not included in total impacts.				

LWD Project Mitigation Strategies: Indirect Impacts

	Potential Impact (acres)	Proposed Mitigation Ratio	Mitigation Needed (acres)
Upland Forested Riparian Buffer	1.64	1:1	1.64

The total of riverine sandbar mitigation needed from application of the factored ratios is 4.15 acres from the placement of fill material from the construction of the LWD and public access features. Since the placement of fill material results in a permanent loss of this habitat, and mitigation for this loss is to be "in-kind" and "on-site," the minimum USACE Tulsa District's guideline of 1:1.5 was employed. No mitigation is proposed from the conversion of riverine sand bar habitat to open water habitat. Both the existing and post-project aquatic habitats are intermittent in nature and the former provides increased ecological values compared to existing conditions. The conversion of riverine sandbar habitat to open water habitat will constitute the loss of interior least tern nesting habitat. The compensation for the loss of least tern nesting habitat and the permanent loss of riverine sandbars from construction of the LWD, will be through the creation of the least tern nesting island as previously described. In addition, preservation of riverine sandbar habitats within the vicinity of the project will further protect the ecological functions they provide.

The stabilization of Arkansas River banks using cobble riprap and vegetated plantings to arrest existing degraded and eroded banks will occur along approximately 5,052 lf. The areas of proposed bank stabilization are concentrated in bank areas that have been evaluated to be moderately unstable to unstable, or the most critical areas of bank instability. Without bank stabilization with riparian plantings of live stakes and whips as proposed for these areas, the banks will continue to erode and their ecological function will continue to degrade. The proposed bank stabilization methods include the use of native stone for toe protection and slope stabilization and will incorporate native plantings of live stakes and whips to restore and maintain the lost ecological function. The placement of riprap below the jurisdictional historic high bank is considered fill. However, the newly stabilized banks will provide increased ecological benefits for the Arkansas River in the project vicinity, the application of bank stabilization treatments are considered self-mitigating and no additional mitigation would be required for the placement of the stone toe fill.

To compensate for the potential indirect impacts to surrounding Arkansas River upland forested riparian buffers from future development, approximately 1.64 acres of mitigation will be needed if the INCOG development regulations currently being prepared are not implemented. The potential location of upland buffers to be restored or preserved will be coordinated with INCOG which is currently in the process of creating development guidelines for the river corridor. The primary mitigation strategy will be the preservation of existing forested upland riparian buffers within the vicinity of the project or within the Arkansas River corridor. If needed, restoration of the Arkansas River riparian buffer at selected locations will also contribute to the overall lift of ecological functions of the river corridor and within the project vicinity. This restoration strategy will include the stabilization of eroding riverbanks and plantings of upland riparian areas.

The Corps has made no determination at this time with regard to the adequacy of the proposed mitigation relative to the federal mitigation rules and guidance, including Tulsa District's Mitigation and Monitoring Guidelines. The Corps is accepting comments on the need for and nature of the proposed mitigation, in addition to comments on the applicant's primary proposal. The Corps bears the final decision on the need for and extent of mitigation required, if the project proposed herein is authorized.

Project Setting: This project is located within the city limits of Tulsa and Jenks, in the Oklahoma ecoregion of Osage Cuestas, which is part of the Central Irregular Plains geomorphic province. The transition is characterized by a series of tall grass prairie and oak-hickory forests that are native to eastern areas. The project is located within a sparse riparian corridor that provides shading for a perennial stream channel.

Existing Condition: The project area is on the left and right descending banks including the Arkansas River, which has an eroded river bottom primarily comprised of rock, sand, and silts; which is surrounded by the Tulsa/Jenks metropolitan areas.

Plans and Data: Plans showing the location of the proposed activity and other data are enclosed with this notice (Enclosures 1 through 16). If additional information is desired, it may be obtained from Mr. Michael Ware, U.S. Army Corps of Engineers, Tulsa District, ATTN: Regulatory Office, 1645 South 101st East Avenue, Tulsa, OK 74128-4609, or telephone 918-669-7619.

Cultural Resources: The DE has consulted the National Register of Historic Places and has determined that there are no properties currently listed in the National Register which would be directly affected by the proposed work. The DE has also consulted the listing of Eligibility Determinations for Oklahoma and determined that the proposed project is not in the vicinity of properties eligible for listing. The applicant conducted a cultural resources investigation and reported negative findings that we will need to coordinate with the State Historic Preservation Officer (SHPO) and Native American Tribal governments. This public notice is also being sent to the SHPO and to Native American Tribal governments to reveal if other known historic or archeological resources that might be eligible for listing in the National Register exist in the project area and which could be directly affected by the proposed work. This coordination is being done to fulfill our requirements under the National Historic Preservation Act of 1966 and associated historic preservation laws. If we are made aware, as a result of comments received in response to this notice, or by other means, of specific archeological or other historic properties which might be affected by the proposed work, the DE would immediately take the appropriate action necessary pursuant to the National Historic Preservation Act of 1966 (Public Law 89-665), as amended, and 36 CFR Part 800, in accordance with implementing regulations 33 CFR Part 325, Appendix C.

Threatened and Endangered Species: The following federally listed species are known to occur in the vicinity or are listed for the county in which the proposed action is located: American burying beetle (*Nicrophorus americanus*), interior least tern (*Sterna antillarum*), red knot (*Calidris canutus rufa*), Northern long-eared bat (*Myotis septentrionalis*), and piping plover (*Charadrius melodus*). A copy of this notice is being furnished to the U.S. Fish and Wildlife Service and appropriate state agencies. This notice constitutes a request to those agencies for information on whether any other listed or proposed-to-be-listed endangered or threatened species may be present in the area which would be affected by the proposed activity.

Our preliminary determination is that the proposed activity would not would cause a negative effect to existing least tern islands or affect listed threatened or endangered species or their critical habitat, if the work in the river is completed outside of the nesting season of the interior least tern. The IPAC Consultation Tracking Number is 02EKOK00-2016-SLI-0552. The proposed project would require Section 7 consultation if the work is performed during the nesting season of the interior least tern.

Environmental Considerations: The decision whether to issue a permit would be based on an evaluation of the probable impact, including cumulative impacts of the proposed activity and its intended use on the public interest. That decision would reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal would be considered, including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownerships, and, in general, the needs and welfare of the people. A permit would be denied if the discharge does not comply with the Environmental Protection Agency's 404(b)(1) guidelines. Subject to the 404(b)(1) guidelines and any other applicable guidelines or criteria, a permit would be granted unless the DE determines that it would be contrary to the public interest.

Comments: The Corps is soliciting comments from the public; federal, state, and local agencies and officials; Indian tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Comments concerning the issuance of this permit should be received by the DE no later than 30 days from the date of this public notice. Any comments received would be considered by the Corps to determine whether to issue, modify, condition, or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity. Any person may request in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing.

At the request of the Oklahoma Water Resources Board's National Flood Insurance Program State Coordinator, we are sending a copy of this notice to the local floodplain administrator to apprise the administrator of proposed development within their jurisdiction. In accordance with 44 CFR Part 60 (Criteria for Land Management and Use), participating communities are required to review all proposed development to determine if a floodplain development permit is required. The local floodplain administrator is required to perform this review for all proposed development and maintain records of such review.

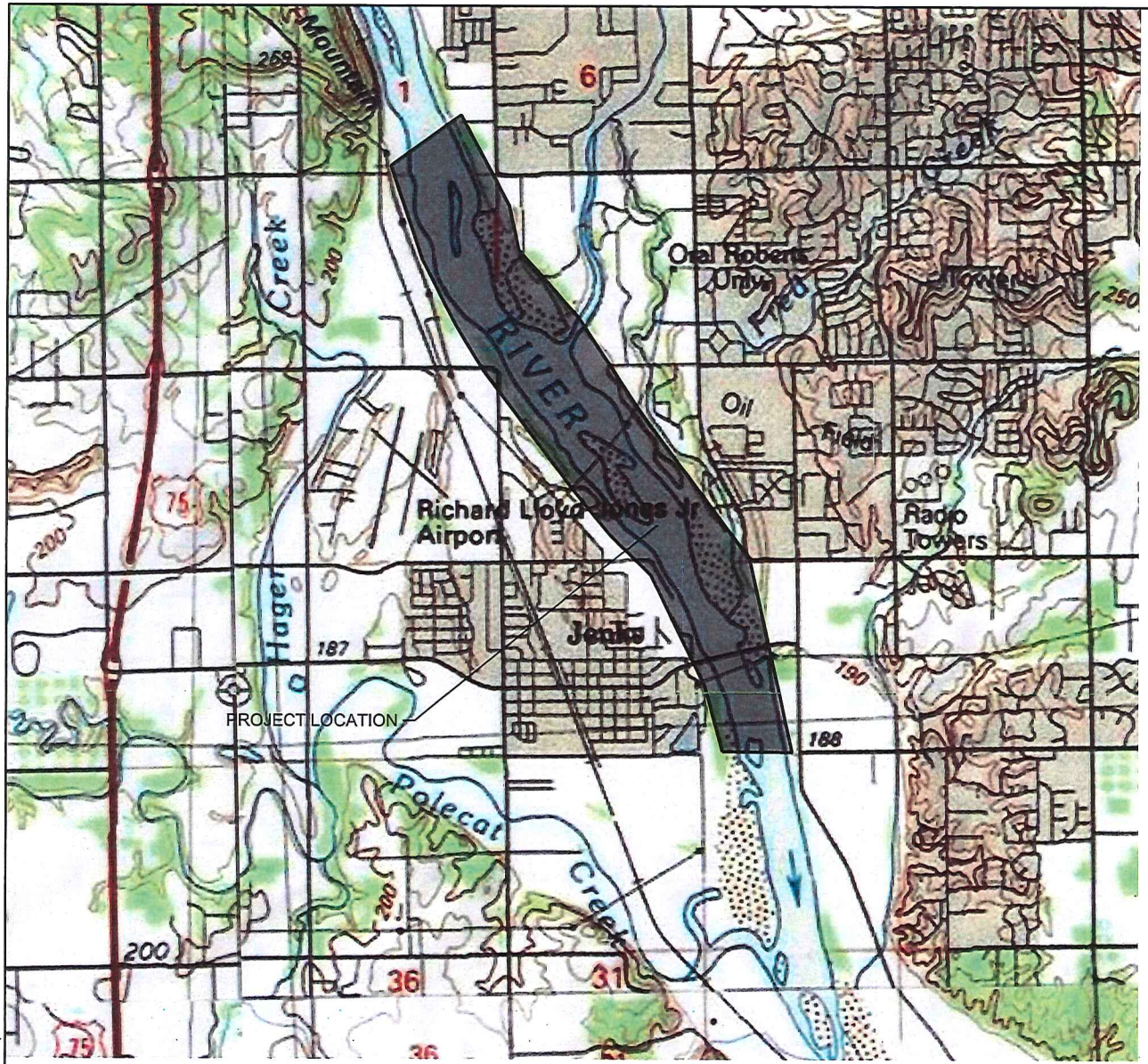
Comments concerning water quality impacts would be forwarded to the Oklahoma Department of Environmental Quality for consideration in issuing a Section 401 Water

Quality Certification for the proposed project. Work may **not** commence until decisions have been made on both Sections 401 and 404.

Andrew R. Commer
Chief, Regulatory Office

Enclosures

SWT-2015-775
Tulsa County
South Tulsa/Jenks Low Water Dam
Arkansas River
Enclosure 1 of 16



VICINITY MAP

LOCATION MAP

Figure 1
Location Map
South Tulsa / Jenks
Low Water Dam

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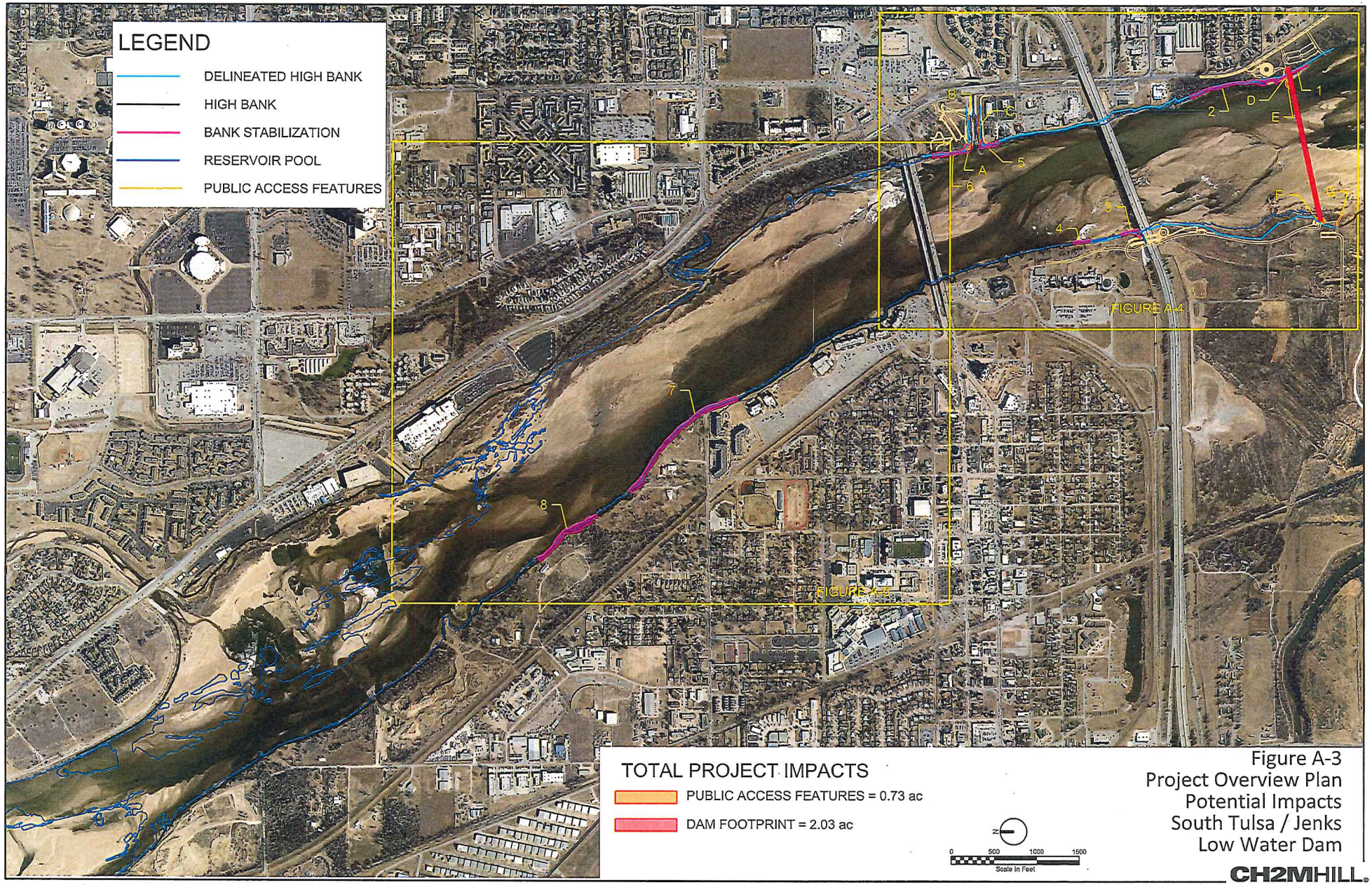
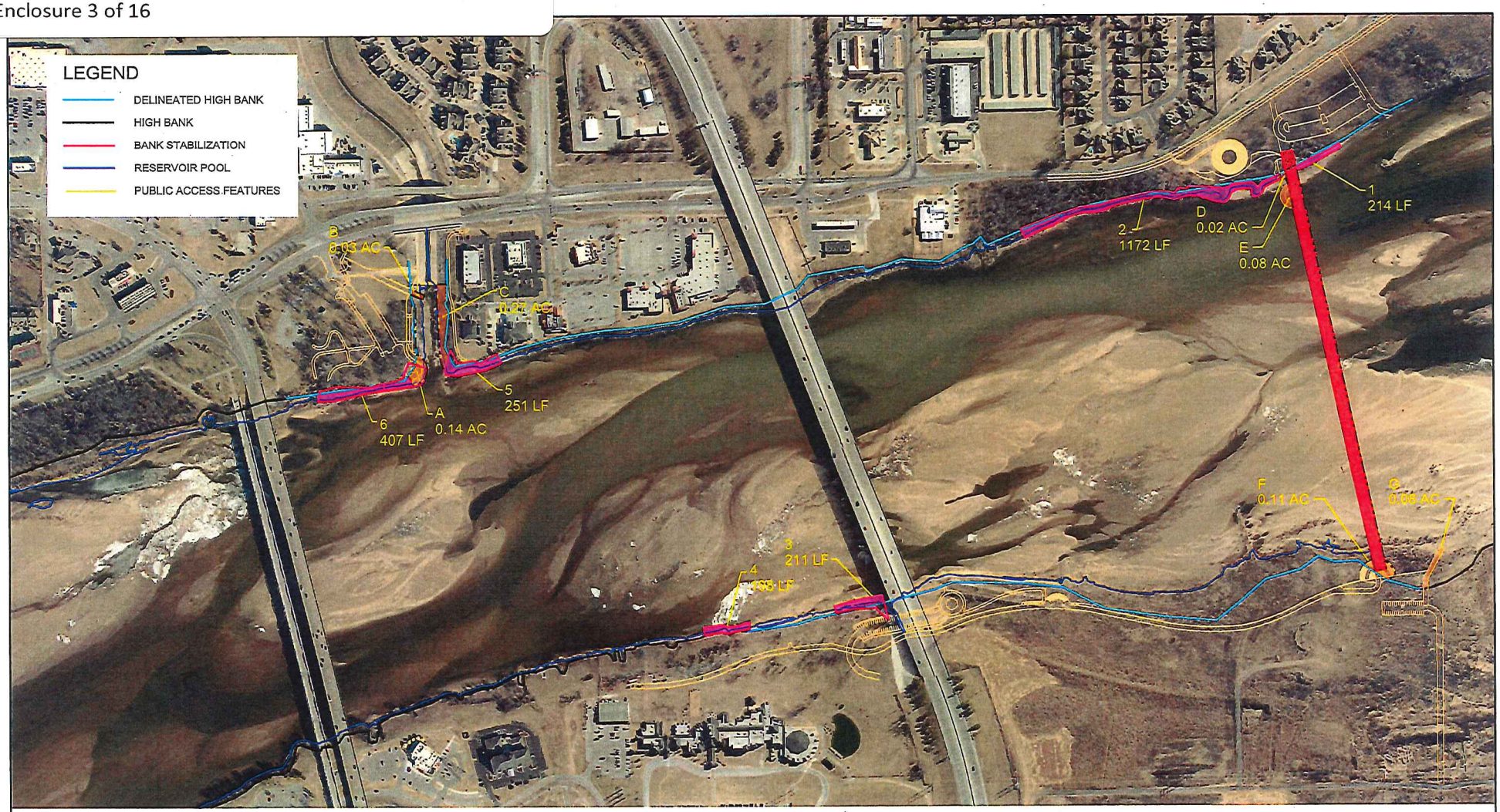


SWT-2015-775
Tulsa County
South Tulsa/Jenks Low Water Dam
Arkansas River
Enclosure 2 of 16

SWT-2015-775
Tulsa County
South Tulsa/Jenks Low Water Dam
Arkansas River
Enclosure 3 of 16



TOTAL PROJECT IMPACTS

- BANK STABILIZATION = 6,600 lf
- PUBLIC ACCESS FEATURES = 0.73 ac
- DAM FOOTPRINT = 2.03 ac

N

0 200 400 600
Scale In Feet

Figure A-4
Project Area Southern Extent
Potential Impacts
South Tulsa / Jenks
Low Water Dam

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SWT-2015-775
Tulsa County
South Tulsa/Jenks Low Water Dam
Arkansas River
Enclosure 4 of 16

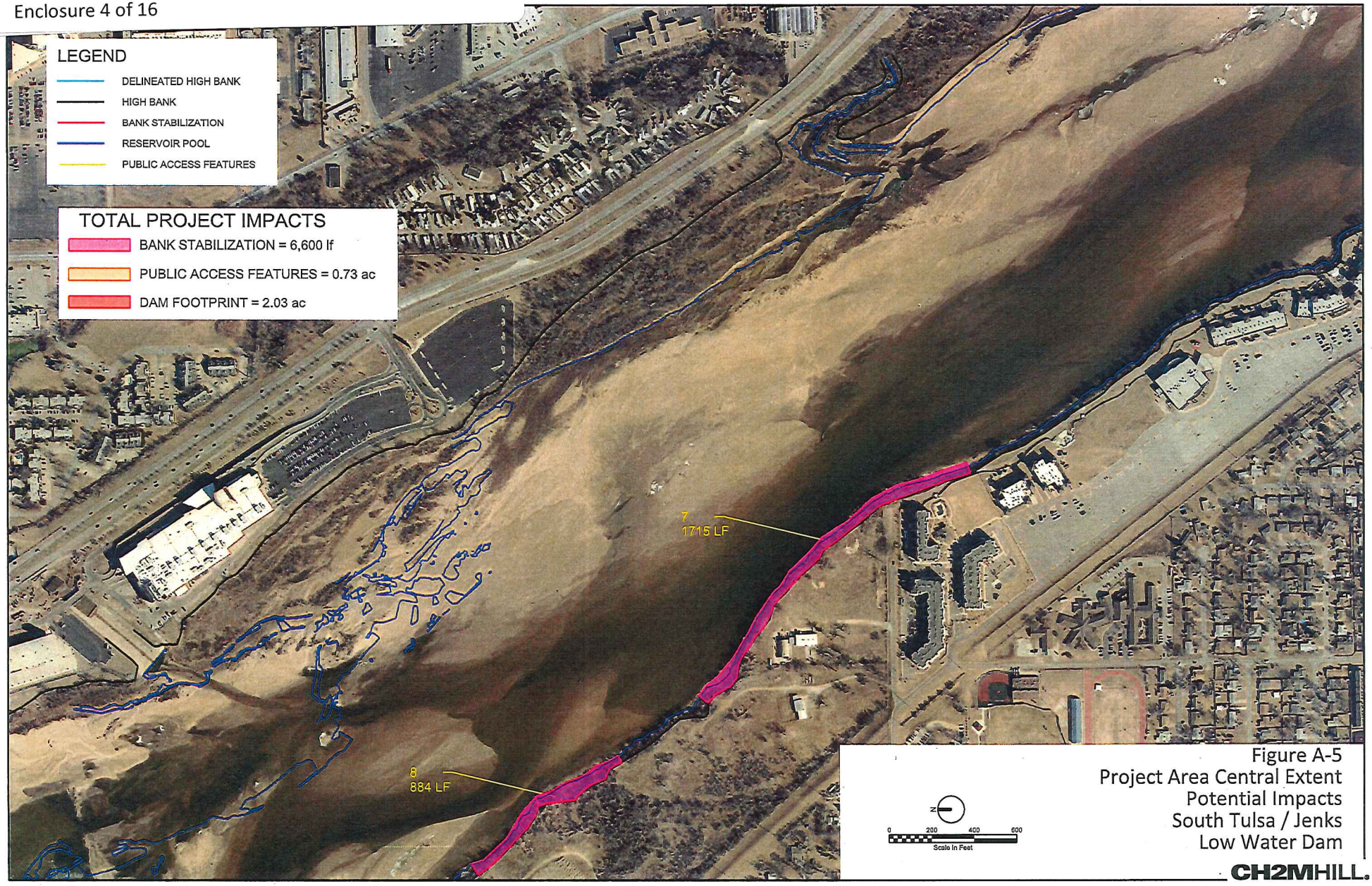

Figure A-5
Project Area Central Extent
Potential Impacts
South Tulsa / Jenks
Low Water Dam

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SWT-2015-775
Tulsa County
South Tulsa/Jenks Low Water Dam
Arkansas River
Enclosure 5 of 16

Figure A-8
Proposed Construction Staging Areas
Plan View
South Tulsa / Jenks
Low Water Dam

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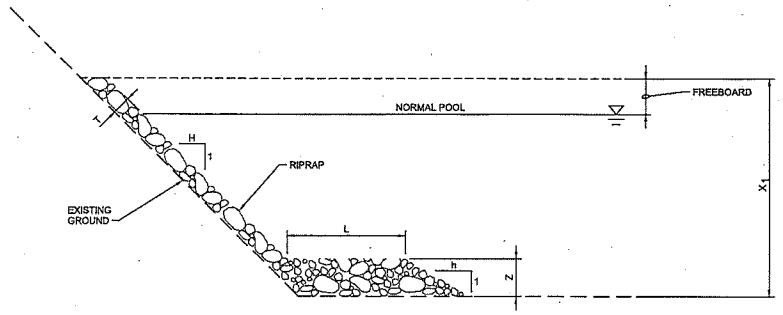
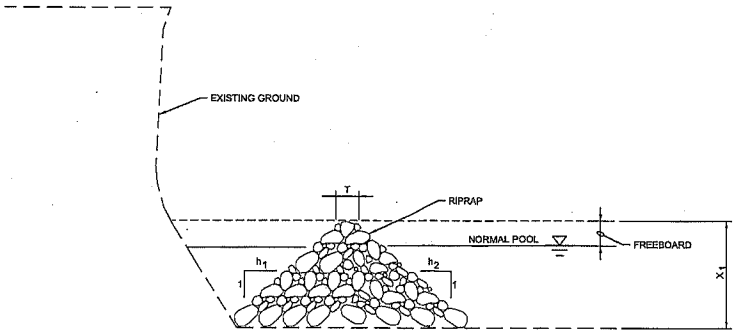
SWT-2015-775
Tulsa County
South Tulsa/Jenks Low Water Dam
Arkansas River
Enclosure 6 of 16



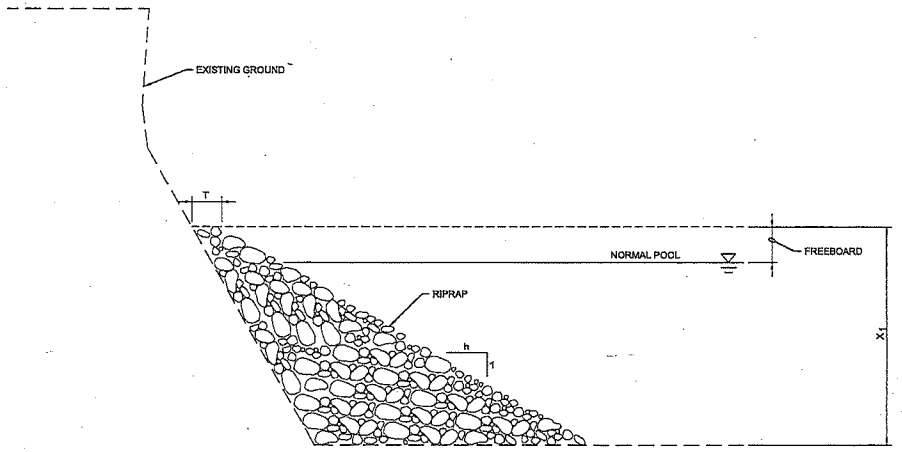
REVETMENT RIPRAP WITH LAUNCHABLE STONE TOE

1 TREATMENT
NTS



LONGITUDINAL PEAKED STONE TOE

3 TREATMENT
NTS



STONE TOE WEDGE

2 TREATMENT
NTS

NOTES:

1. ALL TRASH AND WOODY DEBRIS SHOULD BE REMOVED FROM BANK FACE AND TOE WITHIN THE RANGE OF X1 AND THE FOOTPRINT OF TREATMENT PRIOR TO INSTALLING RIPRAP.
2. REFER TO TABLE __ FOR DIMENSIONS, ANGLES, SLOPES, AND RIPRAP SIZE.
3. REFER TO SPECIFICATION _____ FOR RIPRAP PROPERTIES.
4. VEGETATION COMPONENTS CAN BE ADDED TO EACH BANK STABILIZATION TREATMENT FOR MITIGATION CREDIT.

FIGURE A-7
BANK STABILIZATION TREATMENTS
South Tulsa/Jenks Low Water Dam

XXXXXXXX

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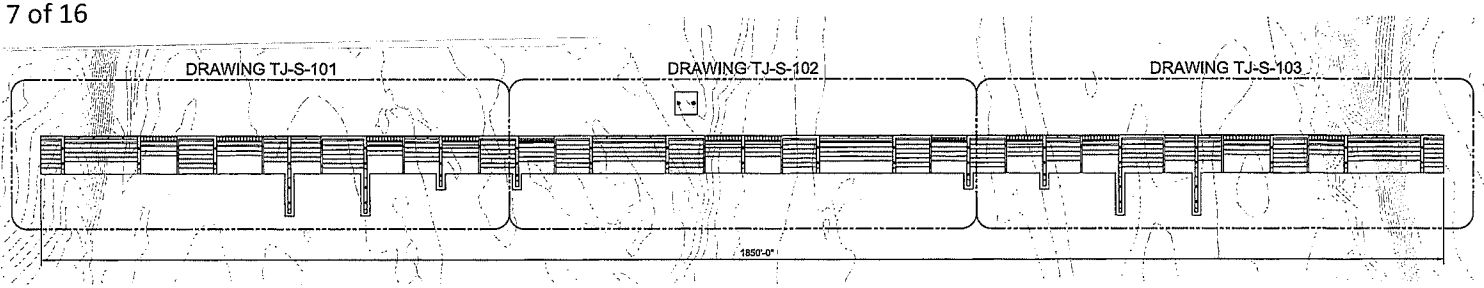
Tulsa County
South Tulsa/Jenks Low Water Dam
Arkansas River
Enclosure 7 of 16



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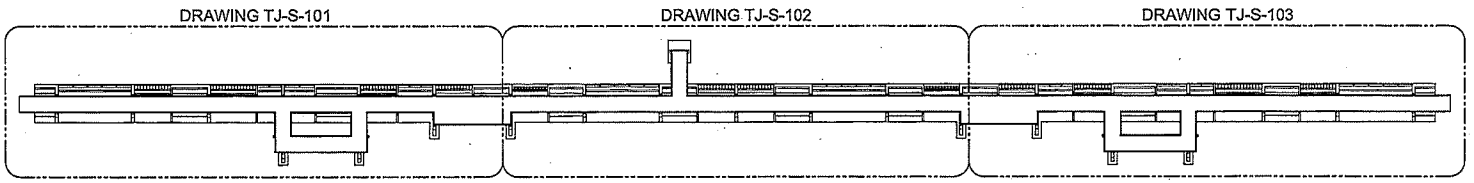
DAM PLAN - OVERALL
1"=80'



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BRIDGE PLAN - OVERALL
1"=80'

NO.	DATE	DSGN	DR	CHK	APVD	REVISION	BY	APVD
		K WHITTIER	CHENLIN					

ARKANSAS RIVER LOW WATER DAMS
TULSA COUNTY
OKLAHOMA

ch2m:

SOUTH TULSA JENKS DAM
STRUCTURAL
PLAN - OVERALL

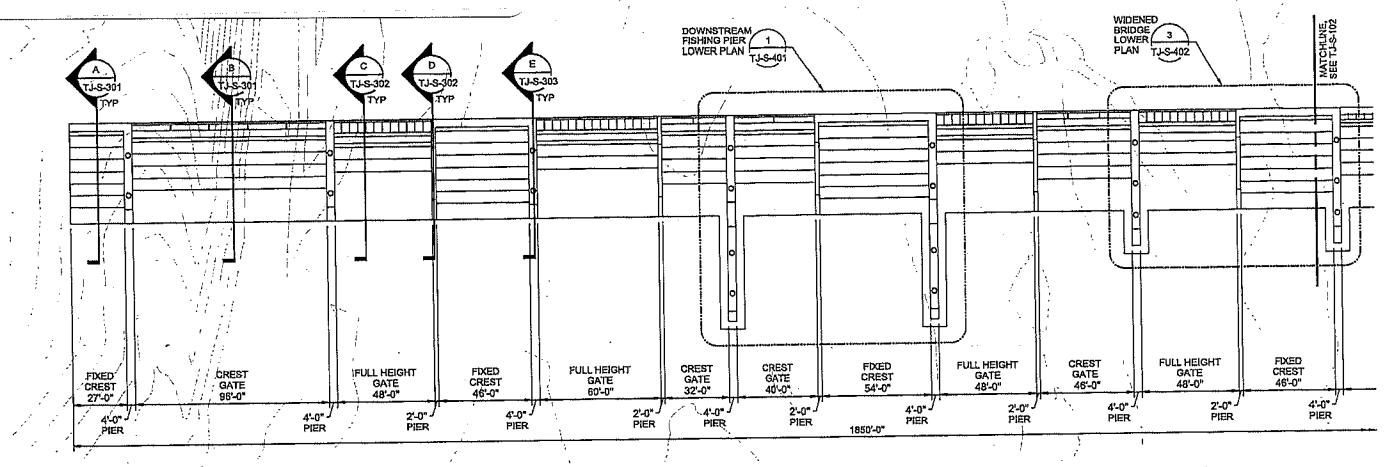
SCHEMATIC DESIGN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE
PROJ
DWG TJ-S-100
SHEET of

$PWURL pw://projectwise.ch2m.com:DEN001/Documents/657971&space;-&space;Arkansas&space;River&space;LWD&space;Schematic/DESIGN/South&space;Tulsa&space;Jenks&space;Dam/ST/Div/TJ-S-100_657971.FILENAME: TJ-S-100_657971.dgn PLOT DATE: 4/22/2015 PLOT TIME: 6:16:34 PM

SWT-2015-775
Tulsa County
South Tulsa/Jenks Low Water Dam
Arkansas River
Enclosure 8 of 16



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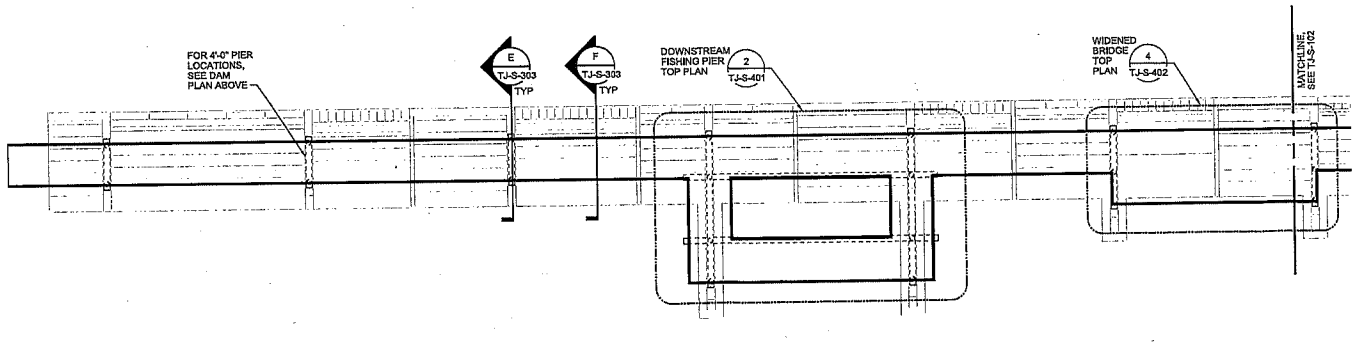
DAM PLAN - WEST
1"=30'



NOTE:
DAM BELOW SCREENED FOR CLARITY.

N

BRIDGE PLAN - WEST
1"=30'

NO.	DATE	DR	REVISION	CHK	APVD
DSGN	K WHITTIER	C HEWI BY		BY	APVD

ch2m:

ARKANSAS RIVER LOW WATER DAMS
TULSA COUNTY
OKLAHOMA

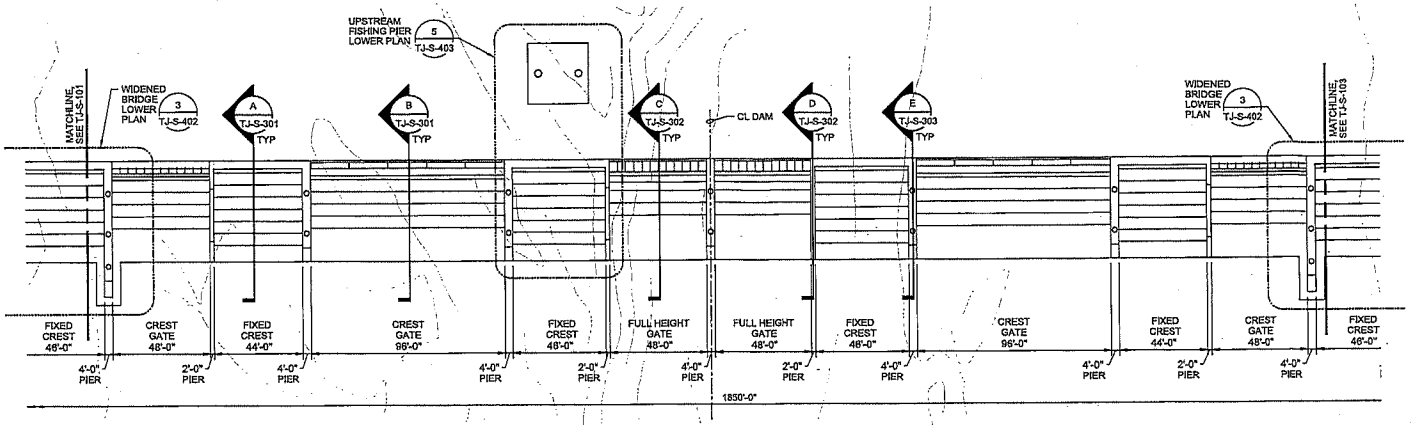
SOUTH TULSA JENKS DAM
STRUCTURAL
PLAN - WEST

SCHEMATIC DESIGN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	
PROJ	
DWG	TJ-S-101
SHEET	of

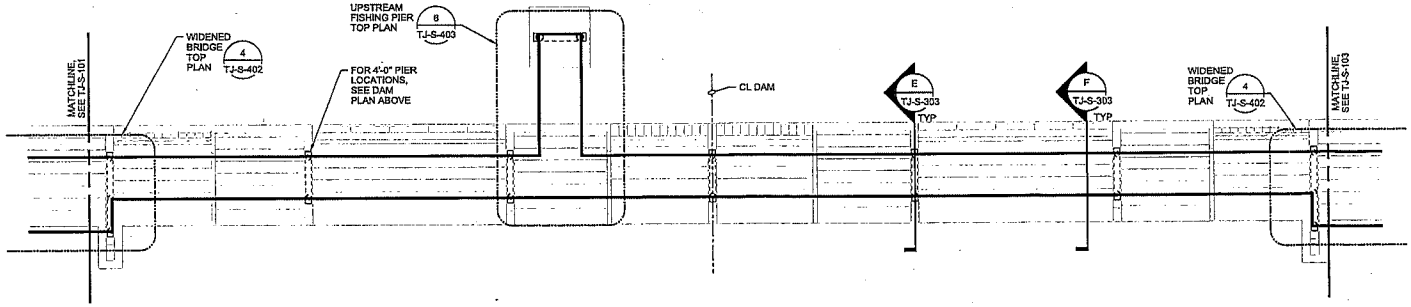
$PWURL
pw://projectwise.ch2m.com:DEN001/Documents/657971&space;-&space;Arkansas&space;River&space;LWD&space;Schematic/DESIGN/South&space;Tulsa&space;Jenks&space;Dam/ST/Dlr/TJ-S-101_657971.dgn
PLOT DATE: 4/22/2015
PLOT TIME: 6:15:50 PM



N

DAM PLAN - MIDDLE

1"=30'



NOTE:
DAM BELOW SCREENED FOR CLARITY.

N

BRIDGE PLAN - MIDDLE

1"=30'

NO.	DATE	BY	APVD
DSGN	K WHITTIER		
DR			
CHK	C NEVLIN		

REVISION

ch2m:

ARKANSAS RIVER LOW WATER DAMS
TULSA COUNTY
OKLAHOMA

SOUTH TULSA-JENKS DAM
STRUCTURAL
PLAN - MIDDLE

SCHEMATIC DESIGN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	
PROJ	
DWG	TJ-S-102
SHEET	of

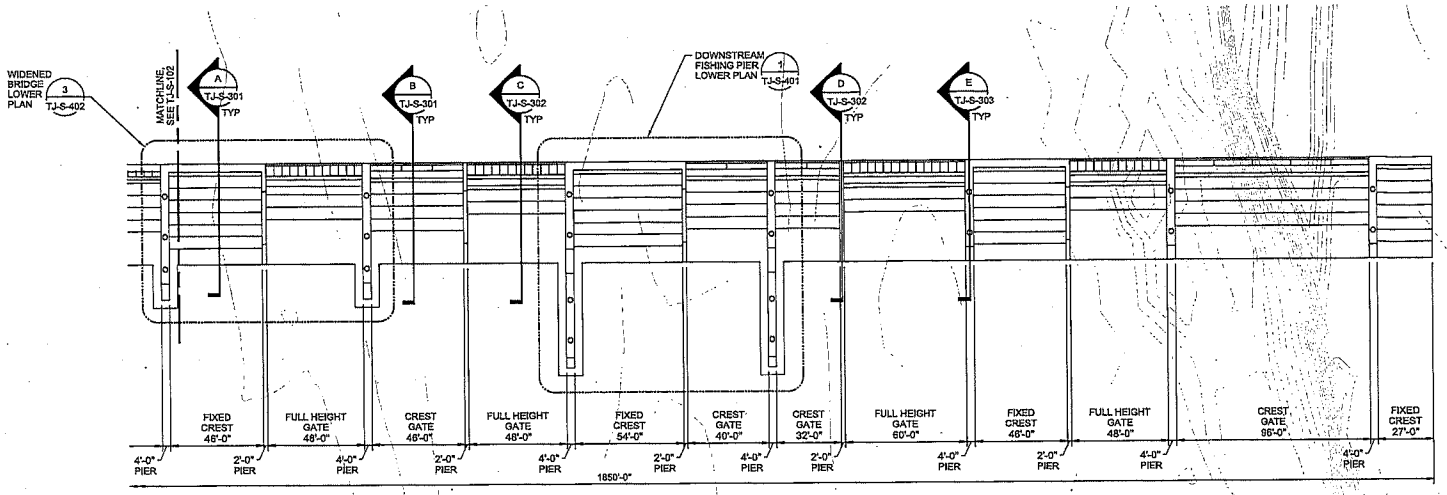
$PWURL

pw://projectwise.ch2m.com:DEN001/Documents/657971&space;-&space;Arkansas&space;River&space;LWD&space;Schematic/DESIGN/South&space;Tulsa&space;Jenks&space;Dam/ST/Dlr/TJ-S-102_657971FILENAME: 657971TJ-S-102.dgn

PLOT DATE: 4/22/2015

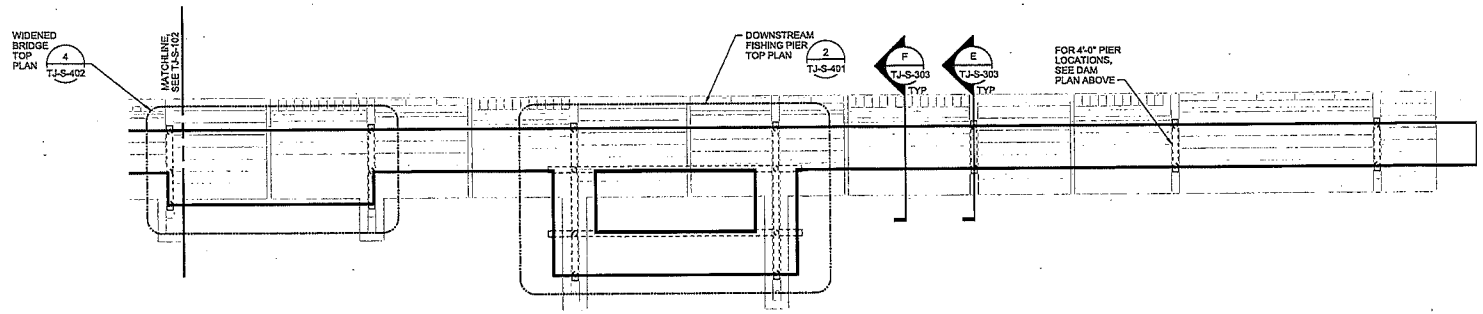
PLOT TIME: 6:15:50 PM

SWT-2015-775
Tulsa County
South Tulsa/Jenks Low Water Dam
Arkansas River
Enclosure 9 of 16



N

DAM PLAN - EAST
1"=30'



NOTE:
DAM BELOW SCREENED FOR CLARITY.

N

BRIDGE PLAN - EAST
1"=30'

ch2m:

SOUTH TULSA JENKS DAM
STRUCTURAL
PLAN - EAST

ARKANSAS RIVER LOW WATER DAMS
TULSA COUNTY
OKLAHOMA

NO.	DATE	REVISION	BY	APVD
DSGN	K WHITTIER	CHK	C NEYLIN	APVD
DR				

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

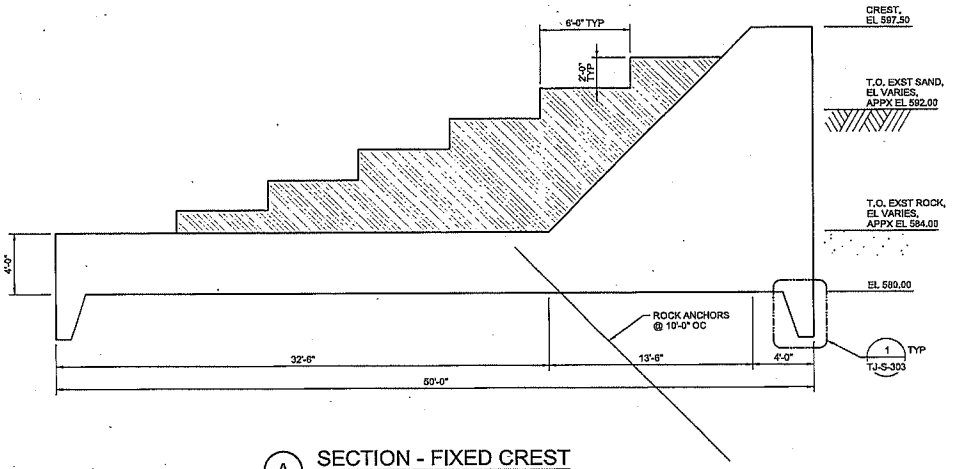
DATE
PROJ
DWG TJ-S-103
SHEET of

SCHEMATIC DESIGN

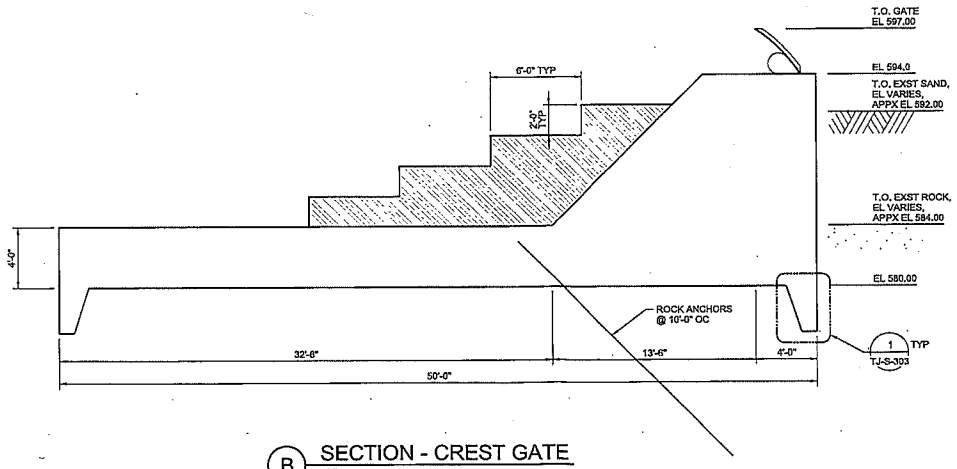
SPWURL
pw://projectwise.ch2m.com:DEN001/Documents/657971&space;-&space;Arkansas&space;River&space;LWD&space;Schematic/DESIGN/South&space;Tulsa&space;Jenks&space;Dam/ST/Dlw/TJ-S-103_657971.dgn
PLOT DATE: 4/22/2015
PLOT TIME: 6:16:00 PM

SWT-2015-775
Tulsa County
South Tulsa/Jenks Low Water Dam
Arkansas River
Enclosure 10 of 16

NOTE:
BRIDGE ABOVE NOT SHOWN,
SEE DRAWING TJ-S-303.



A SECTION - FIXED CREST
1/4"=1'-0"
TJ-S-101



B SECTION - CREST GATE
1/4"=1'-0"
TJ-S-101

NO.	DATE	REVISION	BY	APVD
DSGN	K WHITTIER	DR	C NEVILLE	CHK

ch2m:

ARKANSAS RIVER LOW WATER DAMS
TULSA COUNTY
OKLAHOMA

SOUTH TULSA JENKS DAM
STRUCTURAL SECTIONS

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

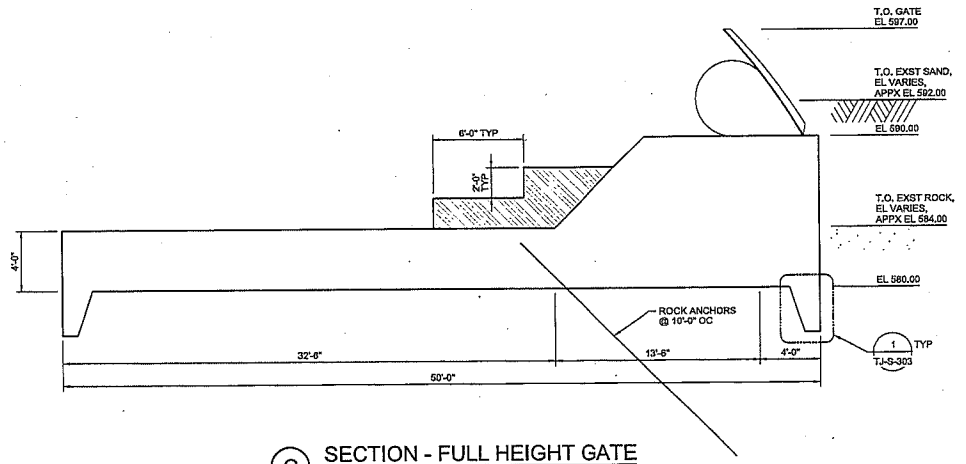
DATE	
PROJ	
DWG	TJ-S-301
SHEET	of

SCHEMATIC DESIGN

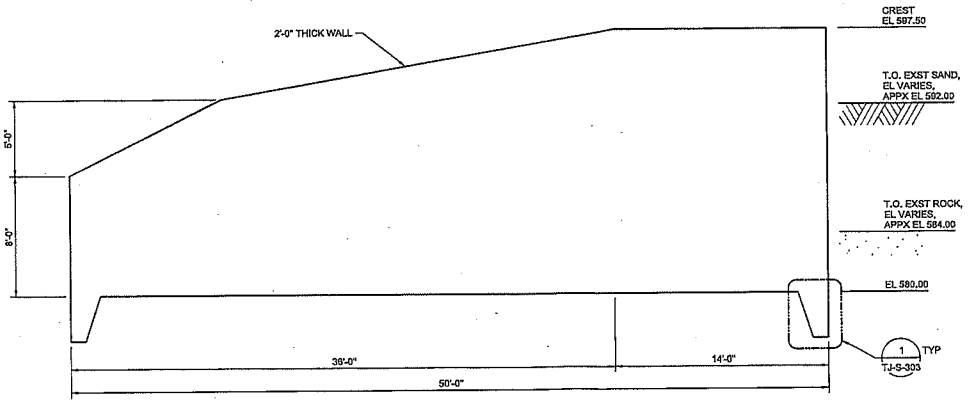
$PWURL
pw://projectwise.ch2m.com:DEN001/Documents/657971&space;-&space;Arkansas&space;River&space;LWD&space;Schematic/DESIGN/South&space;Tulsa&space;Jenks&space;Dam/ST/Div/TJ-S-301_657971.dgn FILENAME: 657971_TJS301.dgn
PLOT DATE: 4/22/2015
PLOT TIME: 6:15:15 PM

SWT-2015-775
Tulsa County
South Tulsa/Jenks Low Water Dam
Arkansas River
Enclosure 11 of 16

NOTE:
BRIDGE ABOVE NOT SHOWN,
SEE DRAWING TJ-S-303.



C SECTION - FULL HEIGHT GATE
1/4"=1'-0"
TJ-S-101



D SECTION - 2'-0" PIER
1/4"=1'-0"
TJ-S-101

NO.	DATE	REVISION	BY	APVD
DSGN	K WHITTIER	DR	CHK	C NEWLIN

ch2m:

ARKANSAS RIVER LOW WATER DAMS
TULSA COUNTY
OKLAHOMA

SOUTH TULSA JENKS DAM
STRUCTURAL SECTIONS

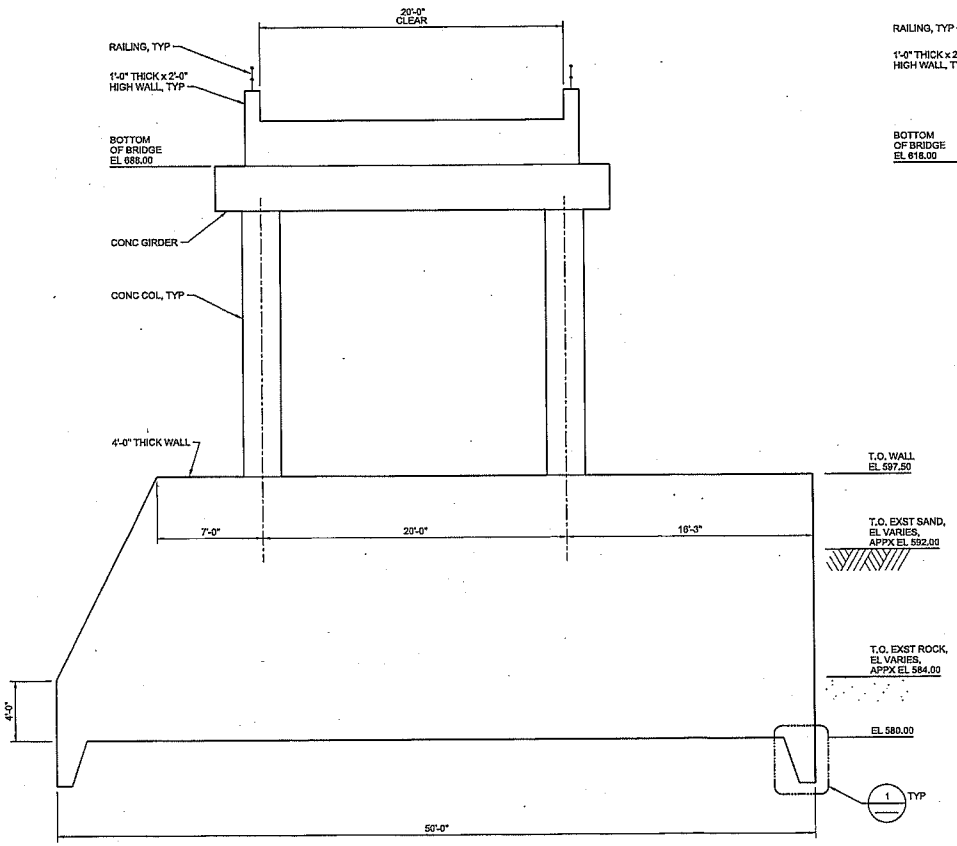
SCHEMATIC DESIGN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

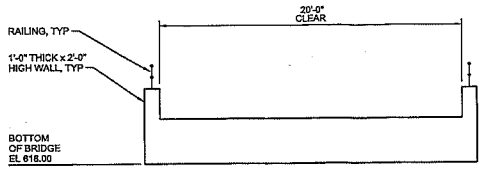
DATE
PROJ
DWG TJ-S-302
SHEET of

$PWURL pw://projectwise.ch2m.com:DEN001/Documents/657971&space;-&space;Arkansas&space;River&space;LWD&space;Schematic/DESIGN/South&space;Tulsa&space;Jenks&space;Dam/ST/Dlr/TJ-S-302_657971FILENAME: TJ-S-302_657971.dgn PLOT DATE: 4/22/2015 PLOT TIME: 6:15:21 PM

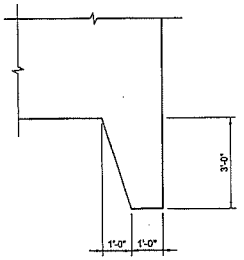
SWT-2015-775
Tulsa County
South Tulsa/Jenks Low Water Dam
Arkansas River
Enclosure 12 of 16



E SECTION - 4'-0" PIER
1/4"=1'-0"
TJ-S-101



F SECTION - TYPICAL BRIDGE
1/4"=1'-0"
TJ-S-101



1 KEYED EDGE
1/2"=1'-0"
TJ-S-301

NO.	DATE	DSGN	DR	CHK	APVD
		K WHITTIER		C NEVILLE	

REVISION BY APVD

ch2m:

ARKANSAS RIVER LOW WATER DAMS
TULSA COUNTY
OKLAHOMA

SOUTH TULSA JENKS DAM
STRUCTURAL SECTIONS

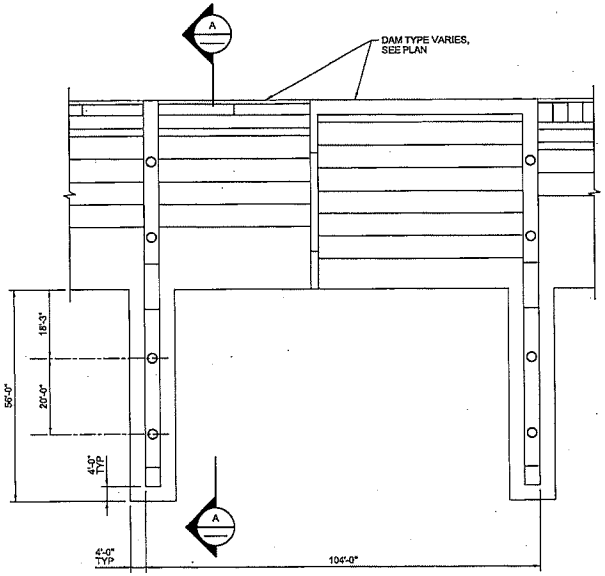
SCHEMATIC DESIGN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

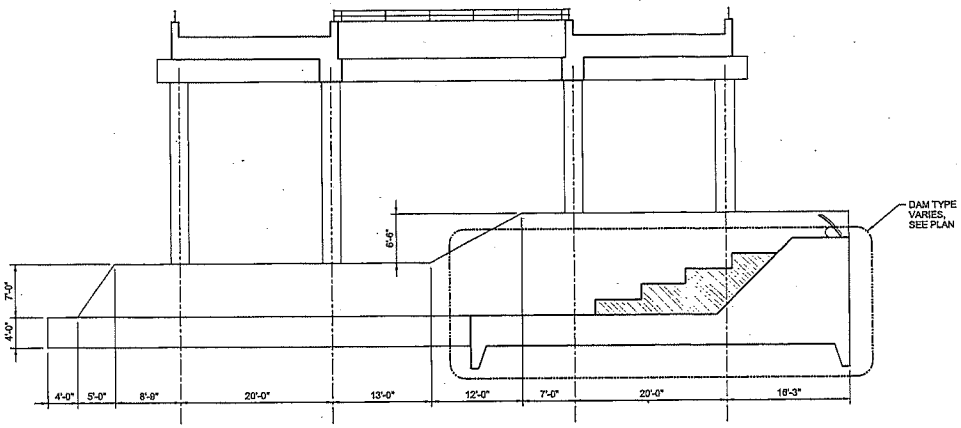
DATE	
PROJ	
DWG	TJ-S-303
SHEET	of

$PWURL pw://projectwise.ch2m.com:DEN001/Documents/657971&space;-&space;Arkansas&space;River&space;LWD&space;Schematic/DESIGN/South&space;Tulsa&space;Jenks&space;Dam/ST/Div/TJ-S-303_657971 FILENAME: TJ-S-303_657971.dgn PLOT DATE: 4/22/2015 PLOT TIME: 6:15:59 PM

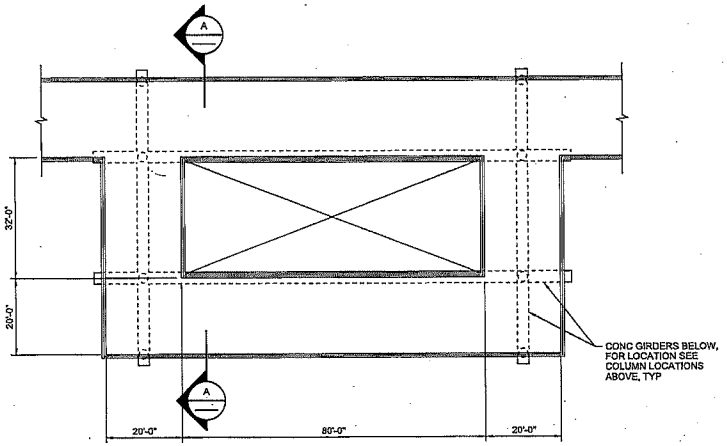
SWT-2015-775
Tulsa County
South Tulsa/Jenks Low Water Dam
Arkansas River
Enclosure 13 of 16



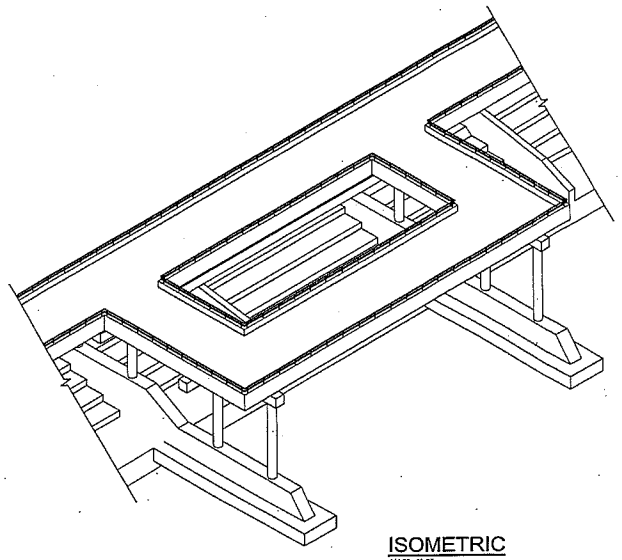
1 ENLARGED LOWER PLAN
1/16"=1'-0"
TJ-S-101



A SECTION
1/8"=1'-0"



2 ENLARGED TOP PLAN
1/16"=1'-0"
TJ-S-101



ISOMETRIC
1/16"=1'-0"

ch2m:

SOUTH TULSA JENKS DAM
STRUCTURAL
ENLARGED PLANS

ARKANSAS RIVER LOW WATER DAMS
TULSA COUNTY
OKLAHOMA

SCHEMATIC DESIGN

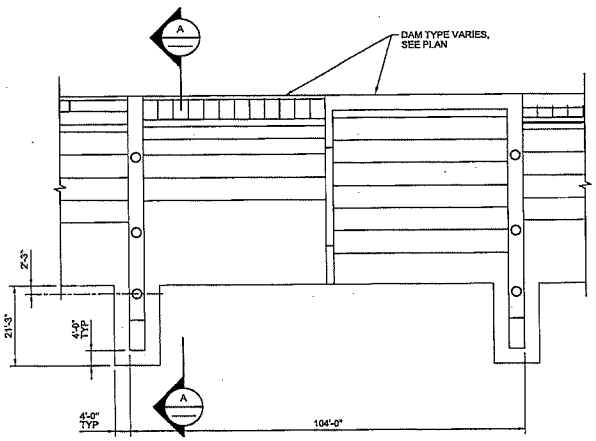
NO.	DATE	REVISION	BY	APVD
DSGN	K WHITTIER	CHK	C NEVLIN	APVD
DR				

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

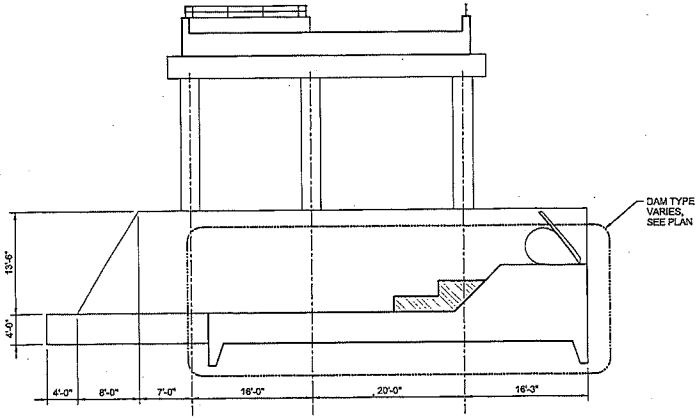
DATE
PROJ
DWG TJ-S-401
SHEET of

SPWURL
pw://projectwise.ch2m.com:DEN001/Documents/657971&space;-&space;Arkansas&space;River&space;LWD&space;Schematic/DESIGN/South&space;Tulsa&space;Jenks&space;Dam/ST/Div/TJ-S-401_657971.dgn
FILENAME: [illegible]
PLOT DATE: 4/22/2015
PLOT TIME: 6:14:44 PM

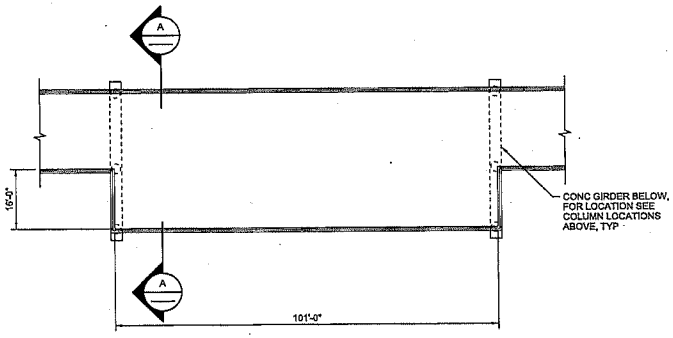
SWT-2015-775
Tulsa County
South Tulsa/Jenks Low Water Dam
Arkansas River
Enclosure 14 of 16



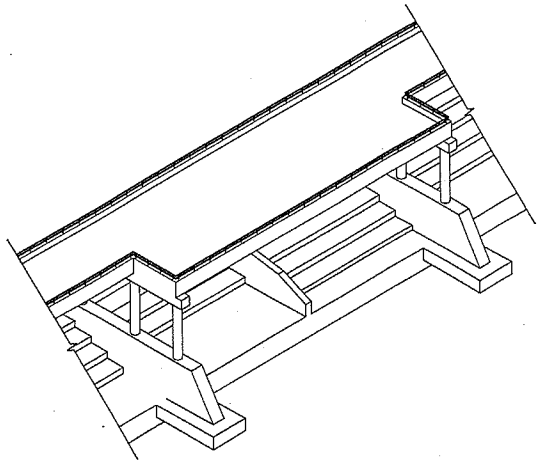
3 ENLARGED LOWER PLAN
1/16"=1'-0"
TJ-S-101



A SECTION
1/8"=1'-0"



4 ENLARGED TOP PLAN
1/16"=1'-0"
TJ-S-101



ISOMETRIC
1/18"=1'-0"

NO.	DATE	REVISION	BY	APVD
DSGN	K WHITTIER	C NEVLIN		
DR		CHK		

ch2m:

ARKANSAS RIVER LOW WATER DAMS
TULSA COUNTY
OKLAHOMA

SOUTH TULSA JENKS DAM
STRUCTURAL
ENLARGED PLANS

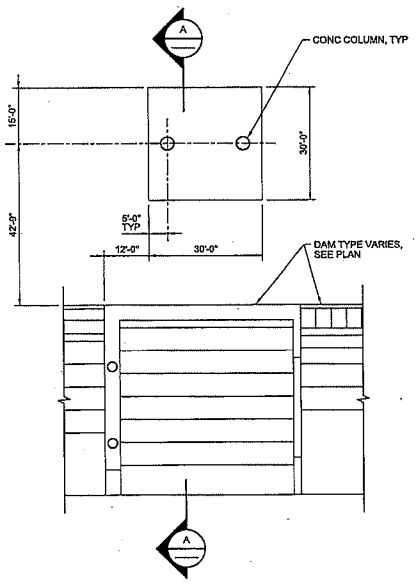
SCHEMATIC DESIGN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

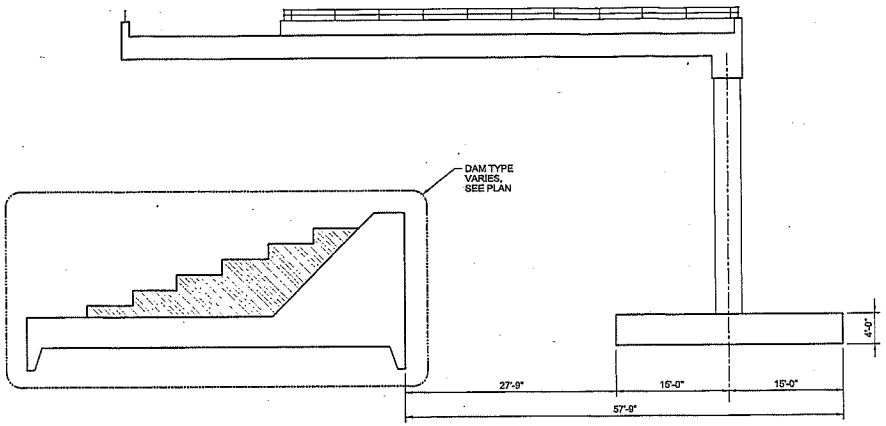
DATE
PROJ
DWG TJ-S-402
SHEET of

$PWURL
pw://projectwise.ch2m.com:DEN001/Documents/657971&space;-&space;Arkansas&space;River&space;LWD&space;Schematic/DESIGN/South&space;Tulsa&space;Jenks&space;Dam/ST/Dlw/TJ-S-402_657971FILENAME: TJ-S-402_657971.dgn
PLOT DATE: 4/22/2015
PLOT TIME: 6:15:11 PM

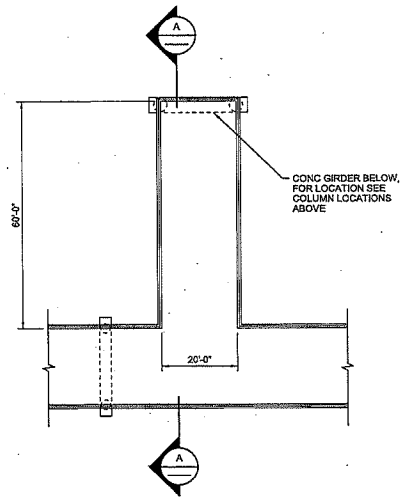
SWT-2015-775
Tulsa County
South Tulsa/Jenks Low Water Dam
Arkansas River
Enclosure 15 of 16



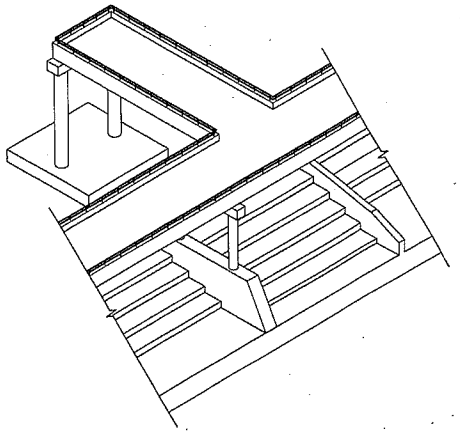
5 ENLARGED LOWER PLAN
1/16"=1'-0"
TJ-S-101



A SECTION
1/8"=1'-0"



6 ENLARGED TOP PLAN
1/16"=1'-0"
TJ-S-101



ISOMETRIC
1/16"=1'-0"

NO.	DATE	REVISION	BY	APVD
DSGN	K WHITTIER	DR	CHK	C NEVLIN

ch2m

ARKANSAS RIVER LOW WATER DAMS
TULSA COUNTY
OKLAHOMA

SOUTH TULSA JENKS DAM
STRUCTURAL
ENLARGED PLANS

SCHEMATIC DESIGN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE
PROJ
DWG TJ-S-403
SHEET of

$PWURL pw://projectwise.ch2m.com:DEN001/Documents/657971&space;-&space;Arkansas&space;River&space;LWD&space;Schematic/DESIGN/South&space;Tulsa&space;Jenks&space;Dam/ST/Dlr/TJ-S-403_657971LENAME: TJ-S-403_657971.dgn PLOT DATE: 4/22/2015 PLOT TIME: 6:14:42 PM

SWT-2015-775
Tulsa County
South Tulsa/Jenks Low Water Dam
Arkansas River
Enclosure 16 of 16