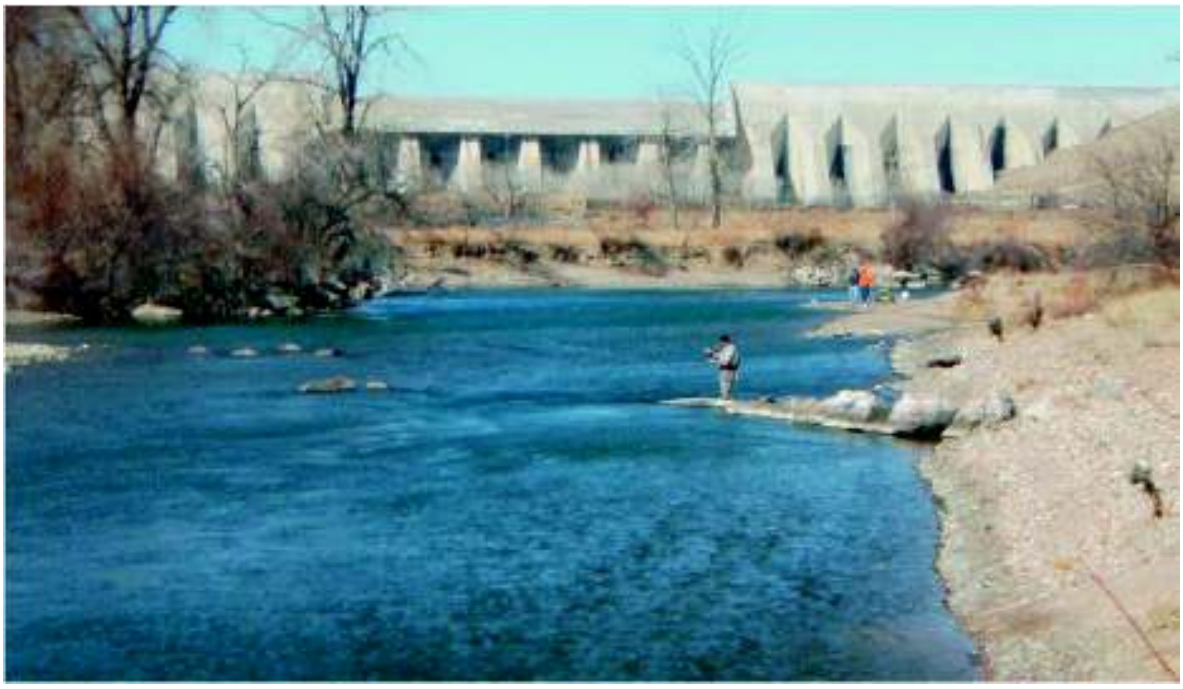
Arkansas River Legacy Habitat Improvement Project

City of Pueblo
&
Colorado Department of Parks & Wildlife

Application for a Regional General Permit for Aquatic Habitat Enhancement (RGP12)



Submitted to:
United States Army Corps of Engineers
Southern Colorado Regulatory Office – Albuquerque District
200 S. Santa Fe Ave., Ste. 301
Pueblo, CO 81003

1(a) - Applicants:

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Project Area – Pueblo Reservoir to Wild Horse Creek

1(d) - Project Location & Ownership:

The project is located along approximately 7 miles of the Arkansas River from the Juniper Rd. bridge immediately downstream of the Pueblo Reservoir Dam downstream to the confluence with Wild Horse Creek. The upstream project boundary location is Lat. 38°16'18", Long. 104°43'03", in SE¼NE¼ sec. 36, T.20 S., R.66 W., in Pueblo County, Colorado. The hydrologic unit (HUC) is11020002. The project area consists of mixed federal, state, and local municipal ownership, including the following entities.

City of Pueblo — Pueblo Conservancy District
Colorado Parks & Wildlife — USDI - Bureau of Reclamation

A map of the project area showing ownership is provided in Exhibit A

1(e) - Easements and Public Access
An easement has been granted by the Pueblo Conservancy District to the City of Pueblo for improvements & public access on PCD lands. Colorado Parks & Wildlife (Pueblo State Park) has granted an easement to the City of Pueblo for improvements & public access between Pueblo Reservoir & Pueblo Blvd. US Dept. of the Interior - Bureau of Reclamation lands are managed by the Colorado Parks & Wildlife (Pueblo State Park), and a special use permit (#03-LM-60-6461) has been granted to City of Pueblo for improvements & public access on USDI BOR lands as well.

2 – Project Drawings
Eleven plan view drawings (Plates 5-15) of the proposed project are provided in Exhibit B. These drawings outline the specific treatments and maintenance to be undertaken in the project. "Red" treatments indicate existing structures that will be maintained or modified. "Green" treatments indicate new structures that will be installed as part of the project. Additionally, plan & profile view schematic drawings are included of proposed new treatments, as well as photos of similar features previously constructed on other rivers. Photos of pre-project existing condition are provided in Exhibit C.

3- Project Purpose & Need
The Arkansas River Legacy Habitat Improvements - Phase II project consist of improving fish habitat structures along approximately 7 miles of the Arkansas River below the Pueblo Reservoir to the Dutch Clark Stadium. 60% of the scope of work will be modifications to existing structures that were installed in 2004 and 2005. The remaining 40% of the scope of work will be the installation of additional rock and log structures (approximately 3,000 additional boulders may be acquired). All aspects of the project are needed to promote insect life and help develop the aquatic habitat.

The original Legacy Habitat Project has resulted in the development of a high-quality trout fishery within the metropolitan area of Pueblo. The quality and accessibility of the fishery has led to its popularity for local anglers and those from across the Front Range, particularly during the period from November through March. Quality fishing regulations on a portion of this reach were enacted in 2011 for purposes of further increasing the size of trout. This fishery has been recognized by Fly Fisherman Magazine as one of the "Top 10" trout fisheries in the U.S. In an angler survey completed by the Colorado Division of Wildlife in 2008, the Arkansas River was listed as the #1 favorite fishing destinations by in-state angler respondents.

However, with this popularity, angler crowding has been increasing. While considering special regulations for this area, one of the overarching requests from anglers was to increase the amount of habitat structures in the river. This was suggested to improve both the trout populations, but also to provide more fishable water in this important stretch of the Arkansas River. This project will significantly increase available fish holding water (i.e., fishable water) within this reach, thereby providing more angling opportunity, less crowding, and greater angler satisfaction.

4- Project Description

Approximately 60% of the project will be maintaining existing rock structures that were previously installed in 2005 & 2006. Maintenance of existing rock structures will primarily consist of adjusting the elevations or moving rock vanes ("J", "V" or "W" structures) and adjusting or moving boulder clusters. The other 40% of the project will consist of adding new "J" hook vanes, cross-vanes, additional boulder clusters; installation of habitat trees; and riparian bank-full benching.

While most of the materials necessary for the work are already present in the project reach, some additional materials may need to be acquired. In particular, we estimate that up to 3,000 additional boulders (4,500 yd^3) may be needed to complete the entire 7.1 mile project reach. Boulders will be imported to the project reach from a quarry located in Canon City, Colorado. This quarry provided boulders for the initial Phase I project, and these new materials should match existing boulders already in place.

Habitat features will include some large cottonwood trees incorporated into the river banks, or as vanes to create scour and cover for resident trout. These features will be anchored into the river substrate using Foresight Products MR-1 and MR-4 dead-man anchors installed in the river bed using a pneumatic hammer.

Geo-textile fabric and erosion control fabric will be required for many of the bank stabilization efforts. Geo-textile fabric will be heavy-duty water permeable woven fabric at least six feet in width. EC matting will include straw / coconut bio-net.

Chaparral Construction of La Veta, CO will provide the heavy equipment and operators necessary to complete the project. The company is experienced in river work, having completed many high-profile projects in the Arkansas & South Platte watersheds over the last 15 years. Project management will be provided by Fin-Up Habitat Consultants, Inc. of Manitou Springs, CO. We anticipate that most of the work under this proposal will be completed utilizing a single 350 series excavator, equipped with a hydraulic thumb, a large front loader, and a 6 wheel articulated dump truck. Construction will begin at the upstream boundary of the project, and work downstream. Short sections will be worked on and completed before moving downstream to the next segment. It is not anticipated that more than 600 ft of channel will be disturbed at any given time.

The project will require two years to complete, with the work limited to the low-flow winter storage months from November through the middle of March. Our timeline for construction is between January and March 15, 2013, and between November 2013 and March 15, 2014. Approximately 3 miles of river habitat improvements will be completed in the first year, starting at the Pueblo Reservoir & extending downstream to the Pueblo Nature Center. The remaining 4 miles of river habitat improvements downstream to Wild Horse Creek will be completed the following year.

5- Existing Conditions

An assessment of the existing structures and habitat features in the project reach was conducted by Fin-Up Habitat Consultants, Inc. and Colorado Dept. of Parks & Wildlife personnel in March 2011. The assessment revealed that many of the structures installed in

2004 and 2005 were functioning at less than their potential. Issues identified during the assessment included problems with structure elevation, placement and alignment. Many structures had been constructed above the bank-full elevation of the channel, and were providing little or no scour or holding cover for resident sport fish. Several of the full-channel cross vanes and W weirs had partially failed as boulders rolled downstream, possibly due to inadequate footer boulder placement. The assessment identified structures that were at risk of failure or that required maintenance to prevent future problems. Additionally, the assessment identified features that had been planned in Phase I, but were not constructed, as well as locations where there was an opportunity for additional enhancement to improve habitat and holding cover.

6- Quantity of Waters / Wetlands Impacted by the Project

The length of river channel affected in the project reach is 37,488 feet. 1,500 linear feet of river bank will be stabilized utilizing bank-full benching consisting of boulder or cottonwood toe slope revetments lined with geo-textile fabric and back-filled with excess river bed spoils generated by the in-channel habitat feature construction. Bank full benching will be vegetated using sod & sedge mats and willow clumps harvested from designated areas adjacent to the river. Approximately 0.2 acres of riparian vegetation will be harvested from areas not located adjacent to the river for the riparian benches. Harvest areas will be leveled and replanted by volunteers following completion of the project. An additional 0.1 acres of stream bank riparian vegetation may be temporarily affected by access routes into the river, which will be kept to a minimum necessary to complete the work. All access routes will be closed and restored following completion of the work. No wetlands are expected to be effected by the work proposed under this project.

7- Monitoring Plan

Project goals and objectives are to enhance the amount and quality of fish habitat by restoring existing structures and providing new habitat structures in the 7 mile reach of the Arkansas River through Pueblo. The project is expected to result in a measurable increase in trout habitat and biomass. Angler fishing opportunity is expected to be improved by increasing quality trout holding habitat, dispersing angler use and enhancing experiences and satisfaction. Angler use is anticipated to increase by 25% in the project reach following completion of the project in 2014.

Post project monitoring of the goals and objectives will consist of repetition of photo-points established in March 2011, measurement of residual pool depth (RPD) in a sub-set of new pools and pocket-water habitats constructed during the project, creel census of fisherman use, and biometric monitoring, consisting of two-pass depletion electro-fishing.

Photo-point monitoring will be used to gauge the effectiveness of river bank stabilization efforts, and to verify that structures have not changed due to high-flows or other causes. RPD, which measures the difference between the maximum depth of a pool or pocket water and the riffle crest depth downstream of the feature, is a useful metric for assessing the effectiveness of scour in structures such as cross vanes and boulder clusters. A creel census will be utilized to monitor angler satisfaction and use, and electro-fishing will be conducted to assess whether or not trout biomass has been increased in the project reach.

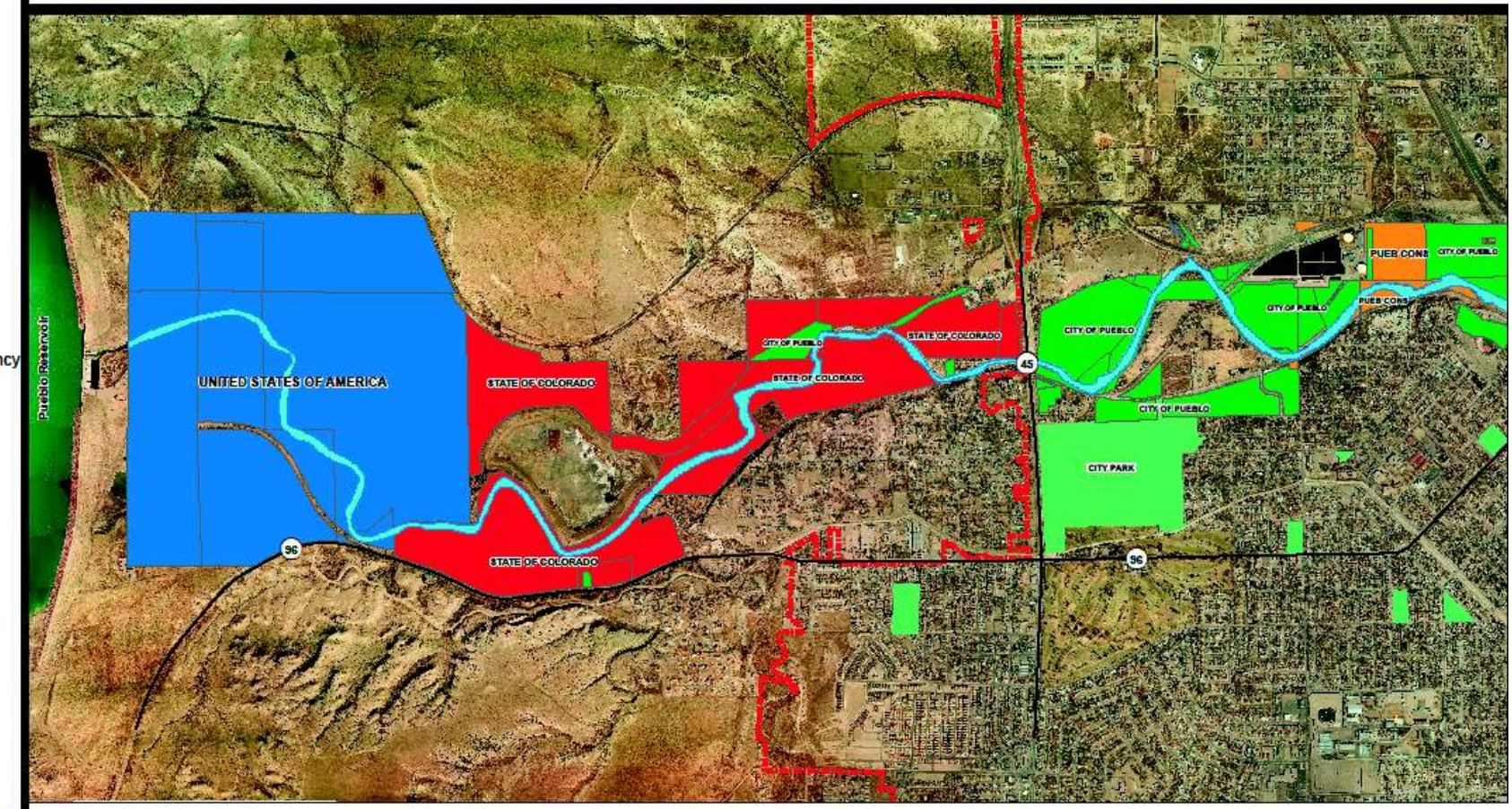
The Colorado Division of Parks & Recreation conducted a creel census in the project area in 2008, and has permanent electro-fishing sampling stations already established in the project reach, providing the baseline conditions on which to measure success of the work.

As-Built plan drawings will be provided to the US Army Corps of Engineers within 90 days (June 15, 2014) following completion of all of the work. Post project monitoring data collection is expected to occur in 2016 & 2017, and a final report will be prepared and submitted by Dec. 31, 2017. The City of Pueblo and the Colorado Division of Parks & Wildlife will be responsible for post project monitoring requirements as outlined in this permit application.

EXHIBIT A

PROJECT AREA MAP
(Including Ownership Parcels)

Arkansas River Legacy Habitat Improvements – Phase II
City of Pueblo
EXHIBIT A - "Project Map"



Legend

Parcels Owners

Owner

- City of Pueblo
- Pueblo Conservancy
- State of CO
- USA
- Highways
- Arkansas River
- City Parks
- City Limits

0 0.25 0.5 1 1.5 Miles

PUEBLO
GIS DIVISION

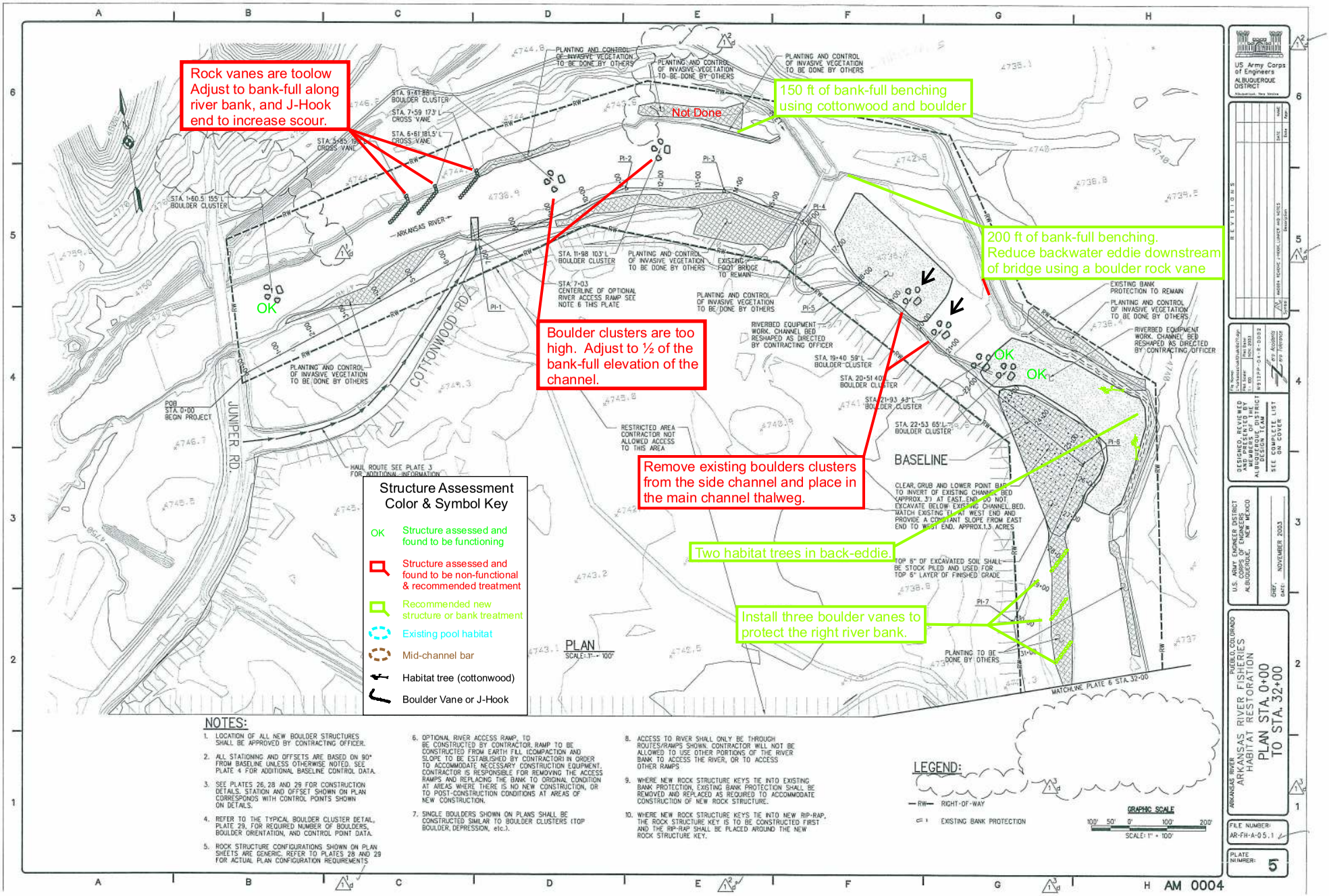
EXHIBIT B

PROJECT PLAN DRAWINGS

Project Structure Assessment & Plan
(Drawing Plates 5 – 15)

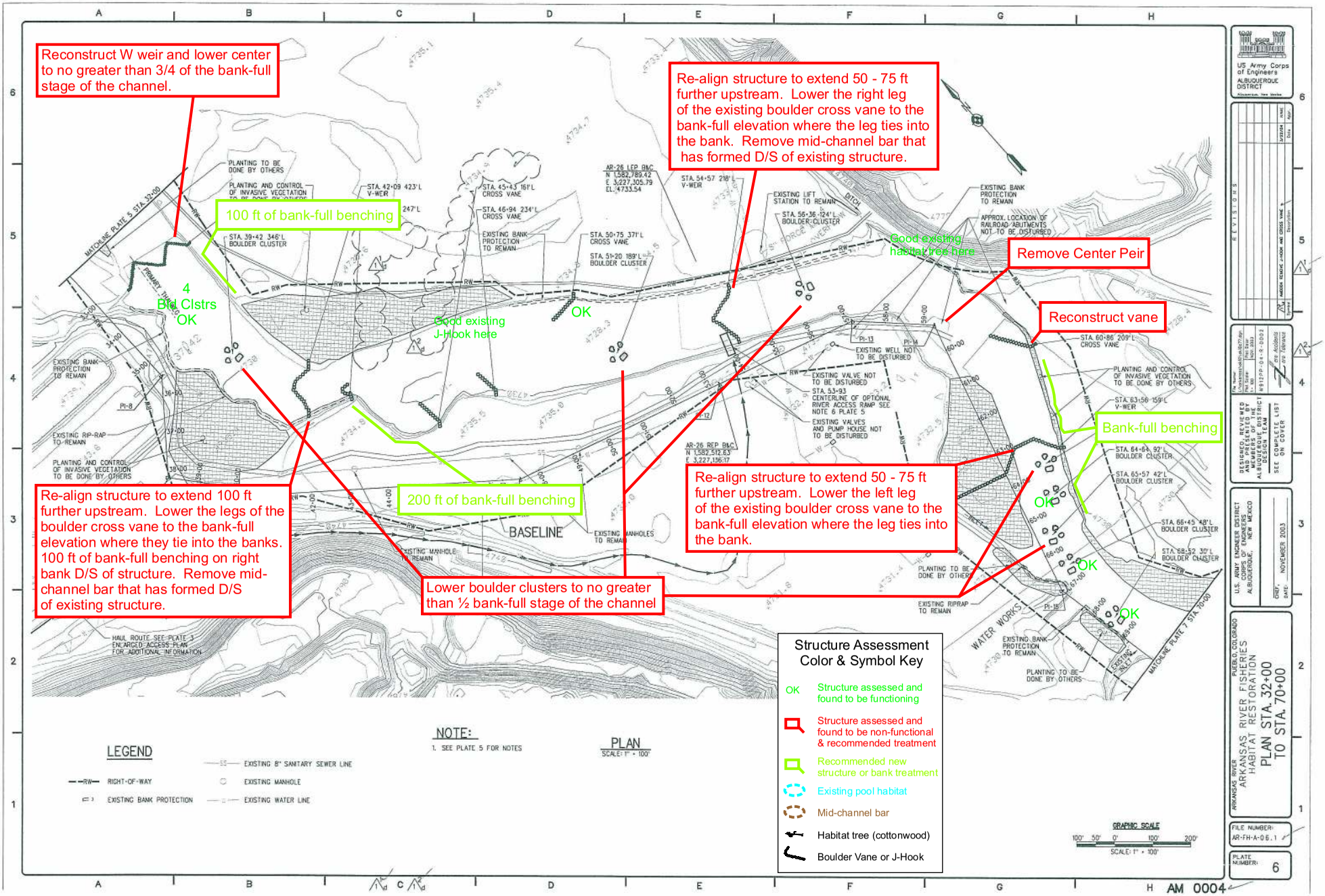
New Structure Plan & Profile Drawings

Pueblo Arkansas River Legacy Project



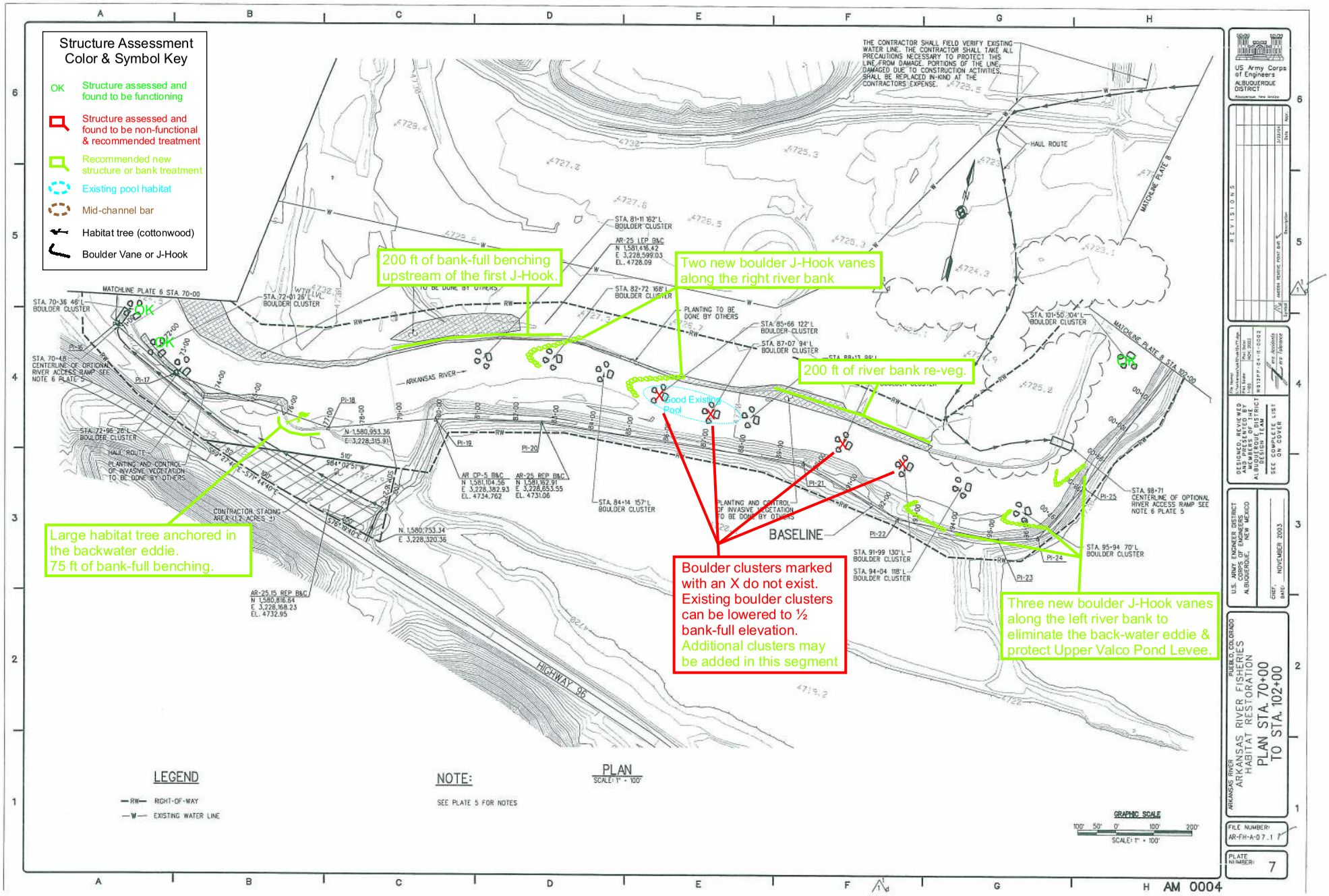
Upper Segment of Reach 3

Pueblo Arkansas River Legacy Project



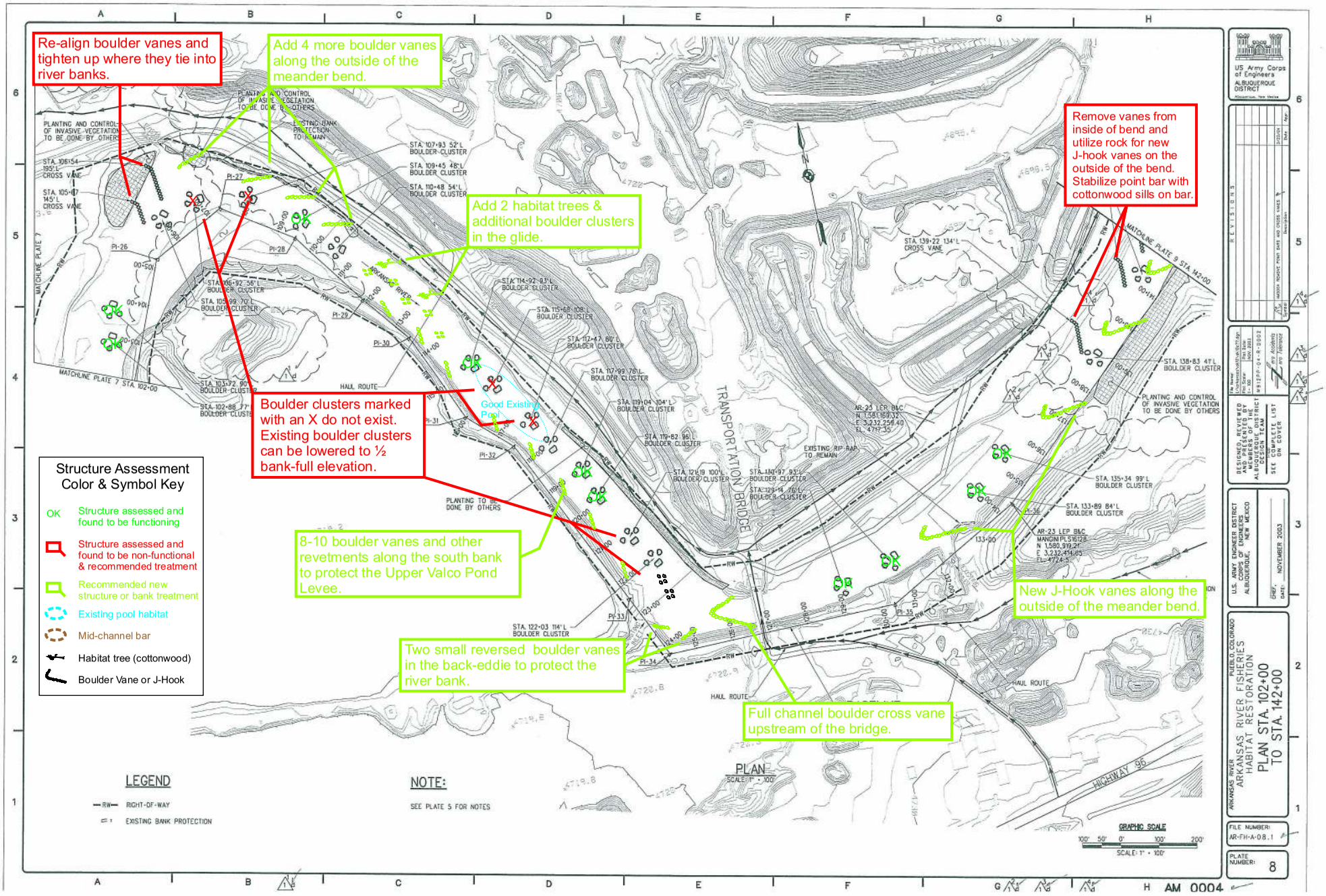
Upper Middle Segment of Reach 3

Pueblo Arkansas River Legacy Project



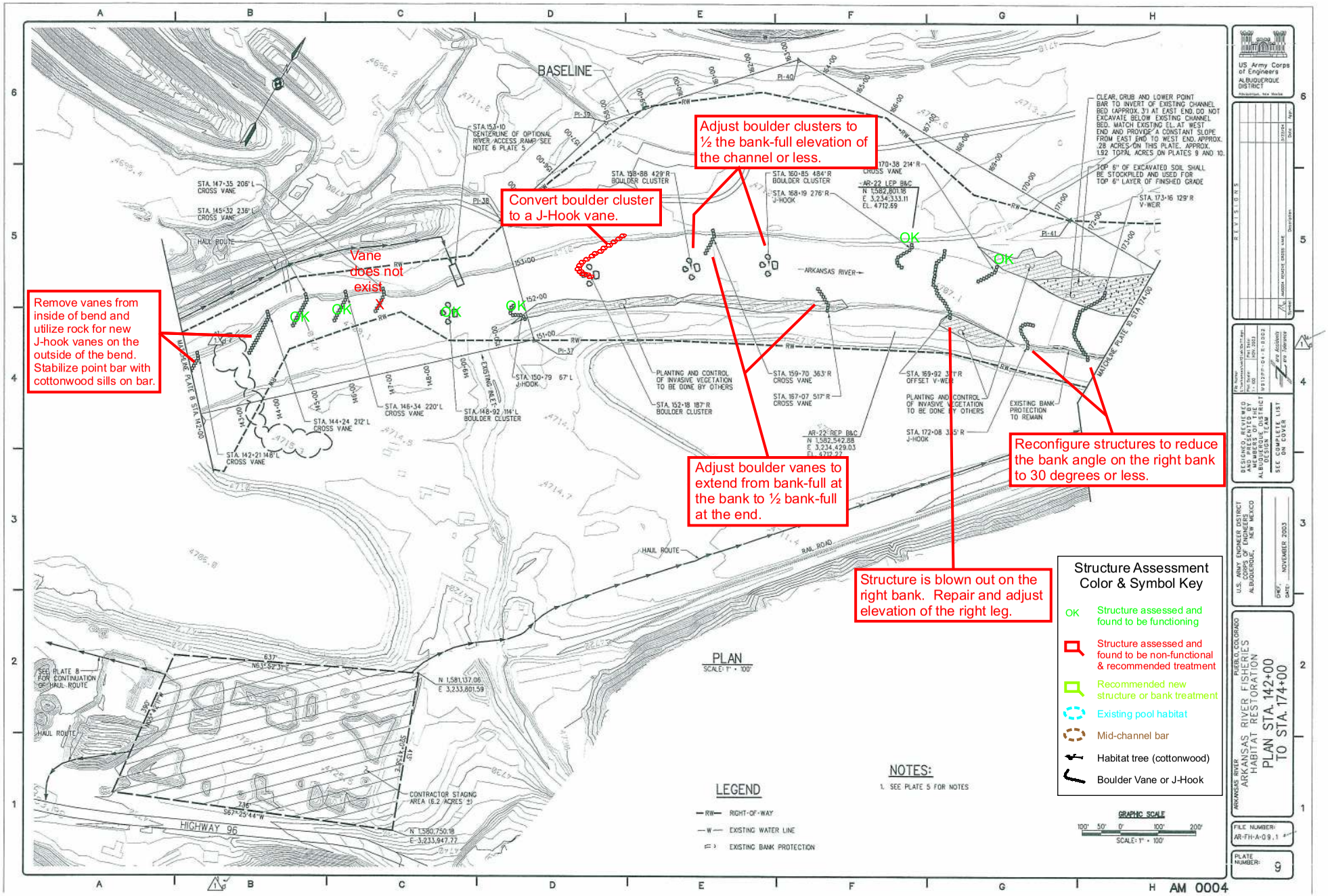
Lower Middle Segment of Reach 3

Pueblo Arkansas River Legacy Project



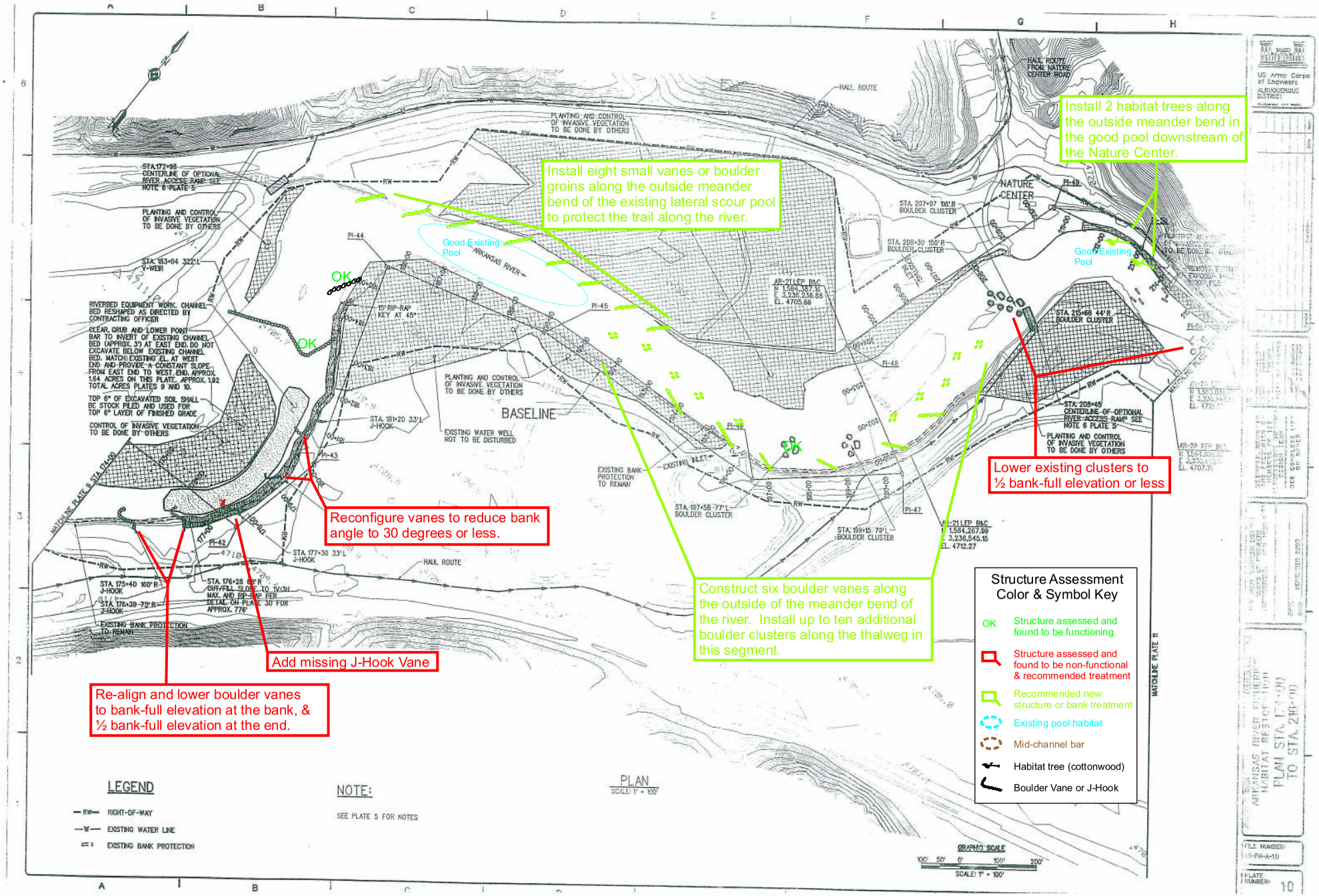
Lower Segment of Reach 3 / Upper Segment of Reach 2

Pueblo Arkansas River Legacy Project



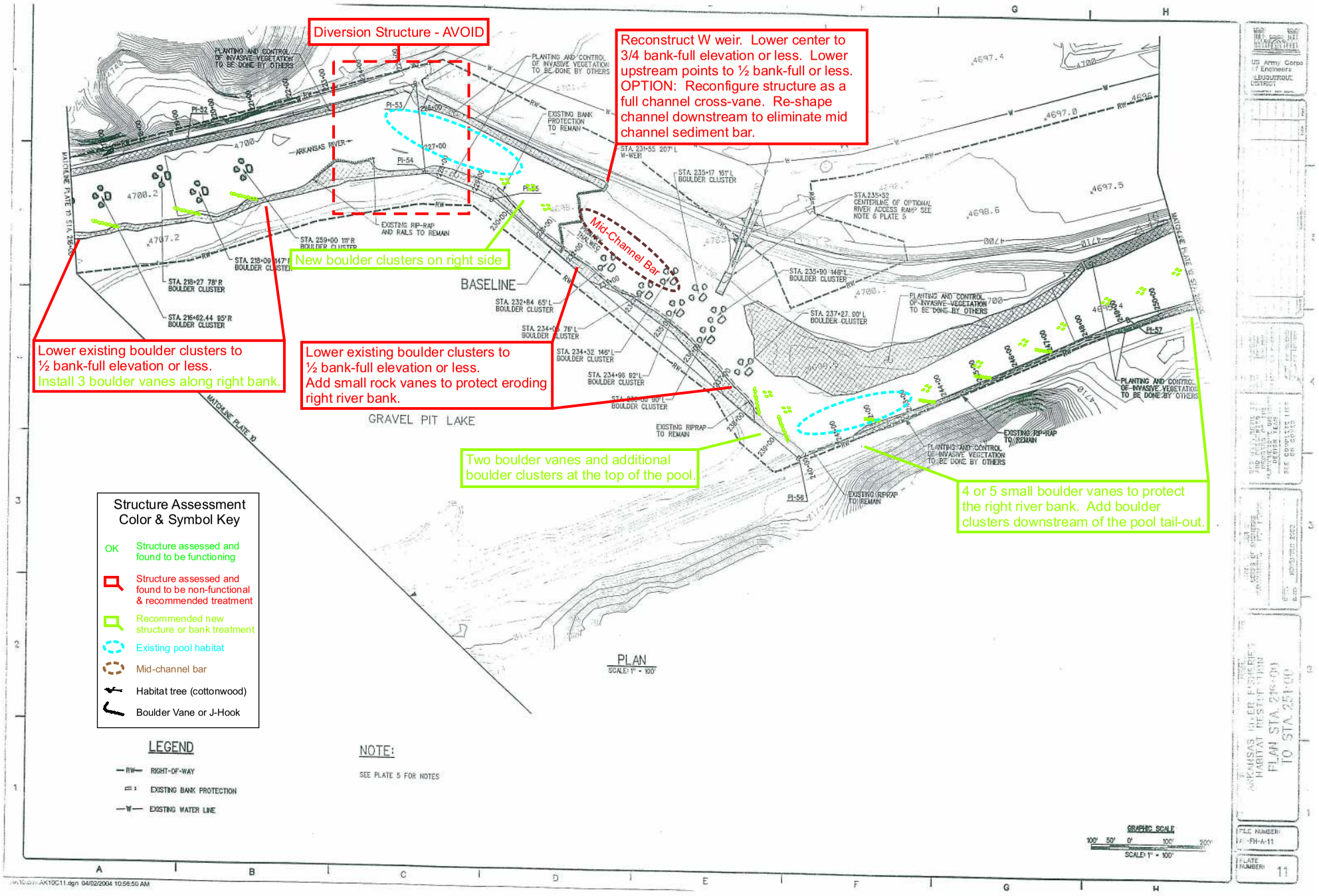
Upper Middle Segment of Reach 2

Pueblo Arkansas River Legacy Project



Lower Middle Segment of Reach 2

Pueblo Arkansas River Legacy Project



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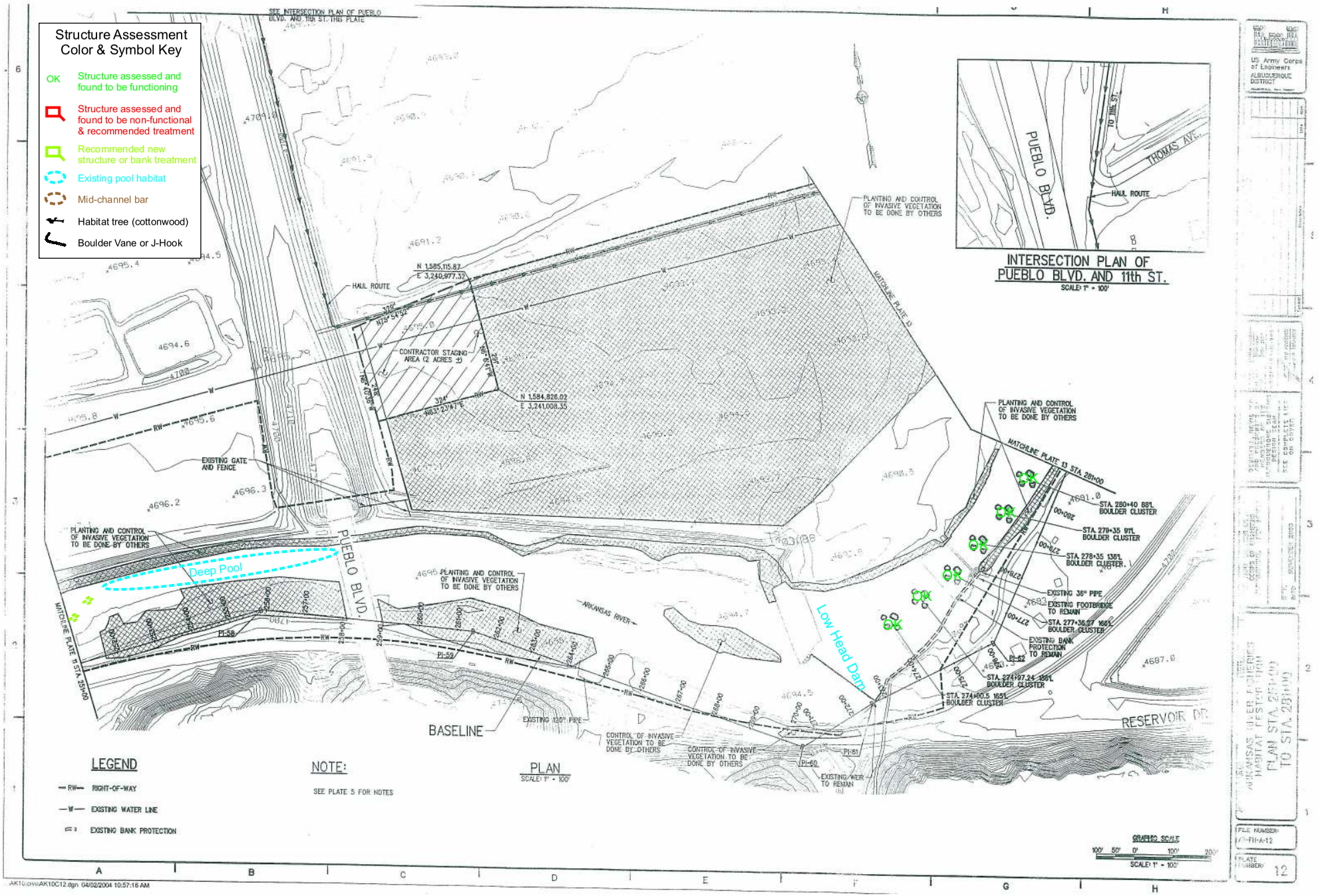
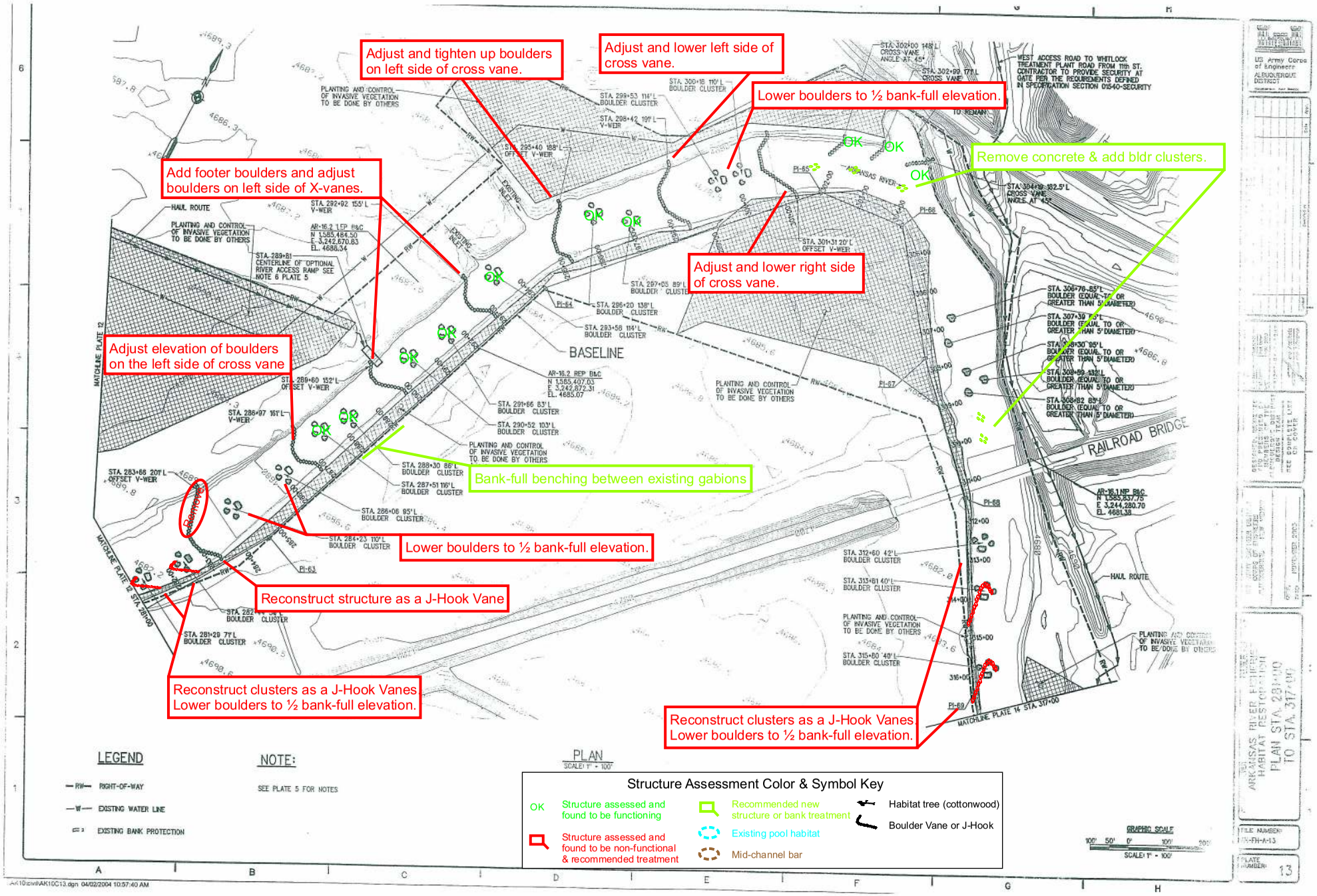
Pueblo Arkansas River Legacy Project



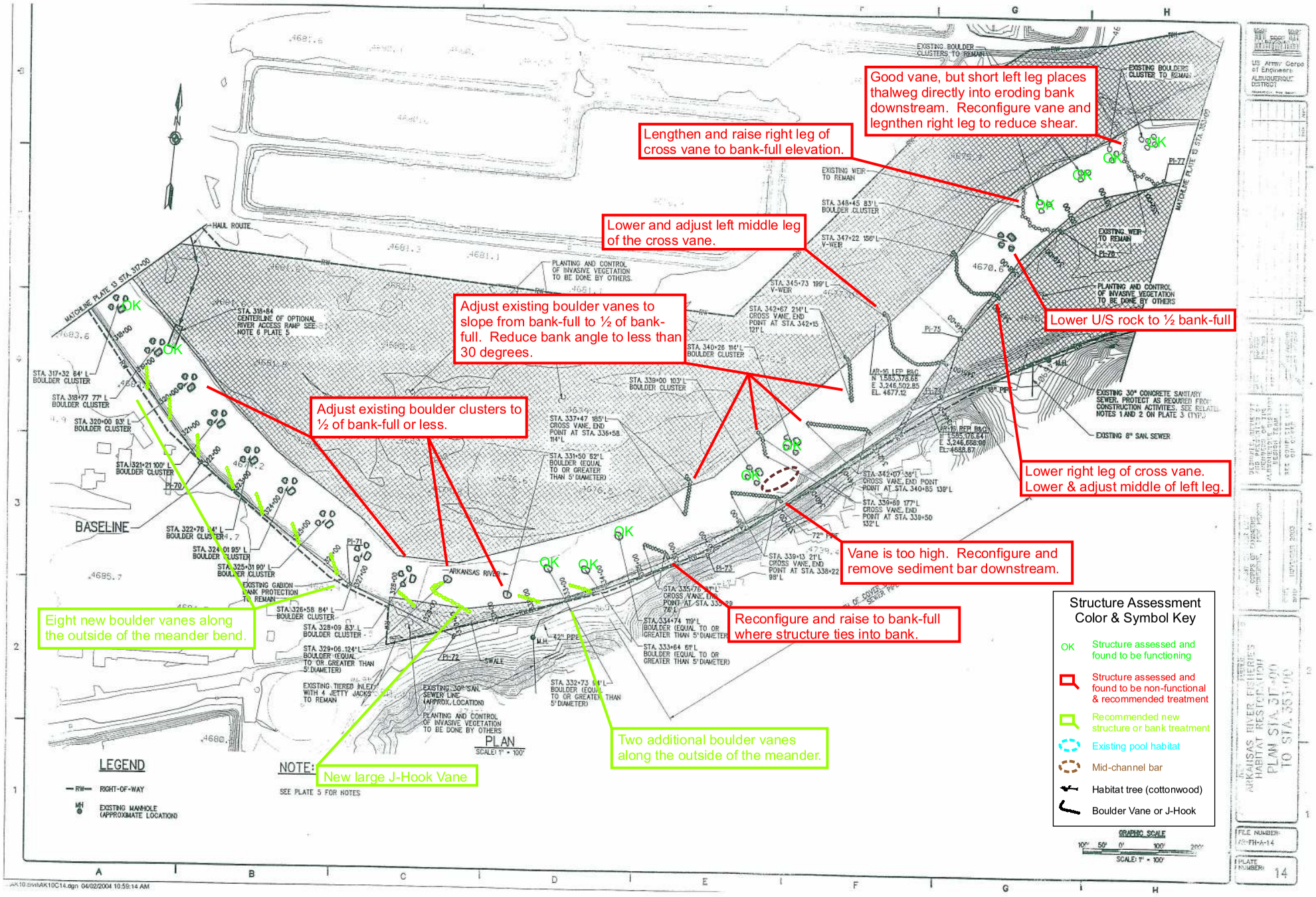
Lower Segment of Reach 2 / Upper Segment of Reach 1

Pueblo Arkansas River Legacy Project



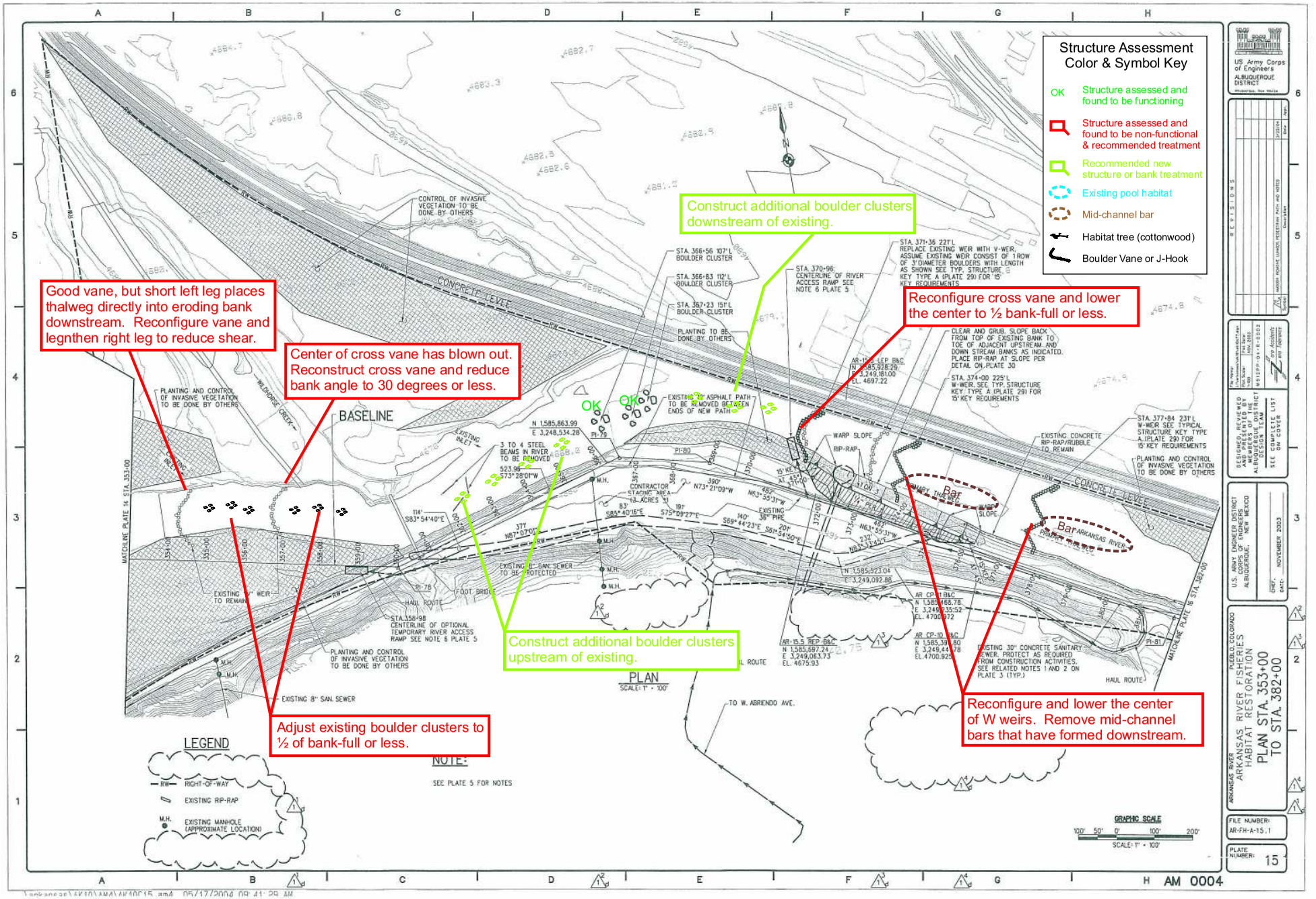
Upper Middle Segment of Reach 1

Pueblo Arkansas River Legacy Project

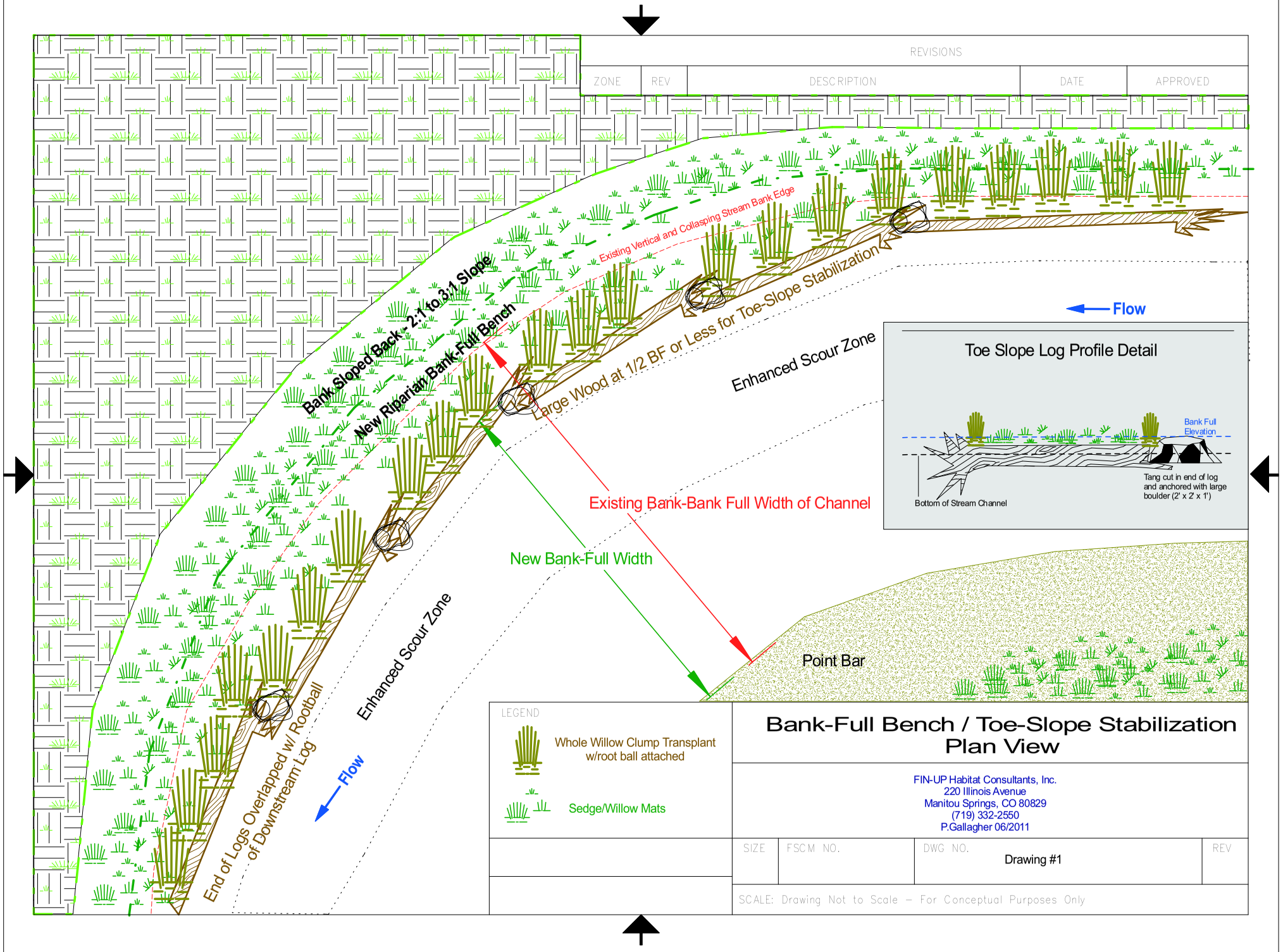


Lower Middle Segment of Reach 1

Pueblo Arkansas River Legacy Project



Lower Segment of Reach 1


REVISIONS
ZONE
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DESCRIPTION
DATE
APPROVED
Existing Vertical and Collapsing Stream Bank Edge
Bank Sloped Back - 2:1 to 3:1 Slope
New Riparian Bank-Full Bench
Large Wood at 1/2 BF or Less for Toe-Slope Stabilization
Flow
Enhanced Scour Zone
Toe Slope Log Profile Detail
Bank Full Elevation
Tang cut in end of log and anchored with large boulder (2' x 2' x 1')
Bottom of Stream Channel
Existing Bank-Bank Full Width of Channel
New Bank-Full Width
Point Bar
Enhanced Scour Zone
End of Logs Overlapped w/ Rootball of Downstream Log
Flow
LEGEND
Whole Willow Clump Transplant w/root ball attached
Sedge/Willow Mats
Bank-Full Bench / Toe-Slope Stabilization
Plan View
FIN-UP Habitat Consultants, Inc.
220 Illinois Avenue
Manitou Springs, CO 80829
(719) 332-2550
P.Gallagher 06/2011
SIZE
FSCM NO.
DWG NO.
Drawing #1
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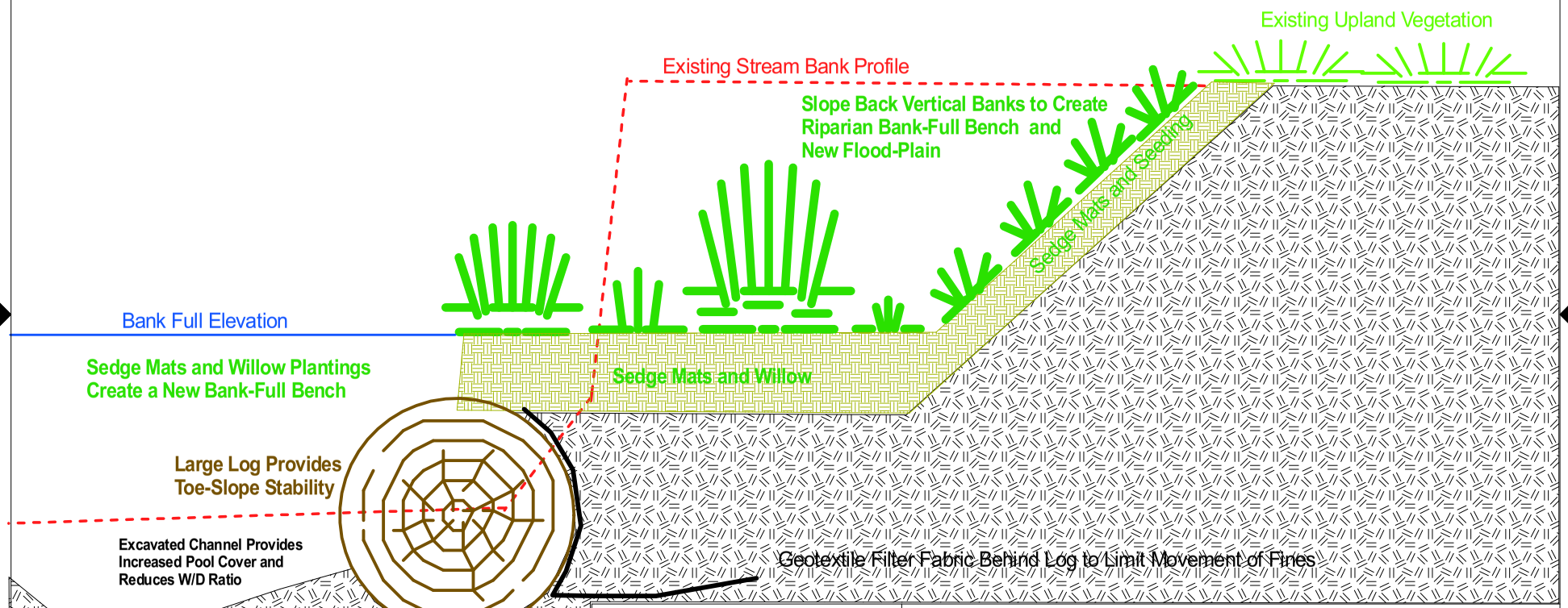

Bank-Full Bench / Toe-Slope Stabilization
Vertical Profile View

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SIZE	FSCM NO.	DWG NO.	REV
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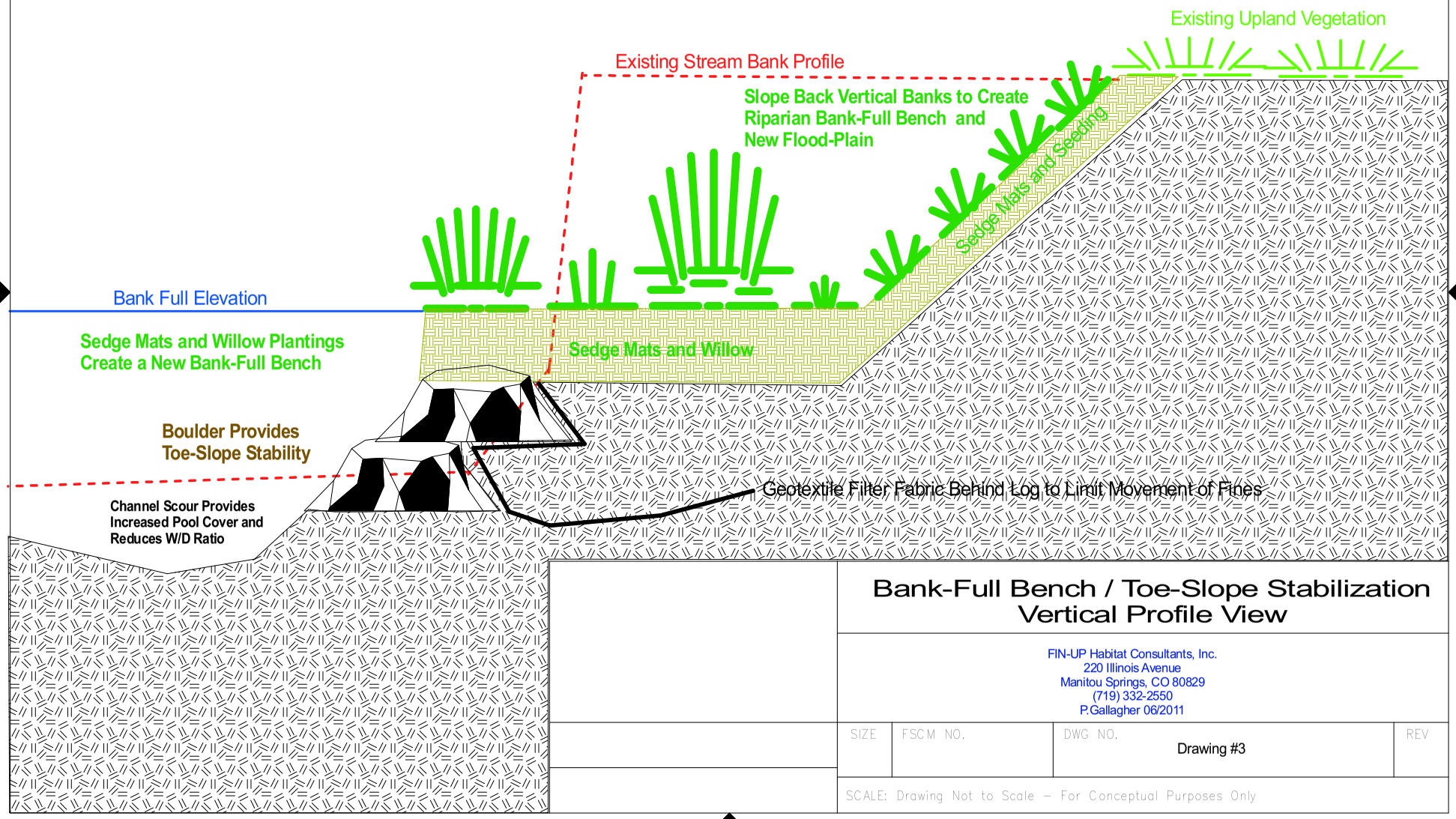

Bank-Full Bench / Toe-Slope Stabilization
Vertical Profile View

FIN-UP Habitat Consultants, Inc.
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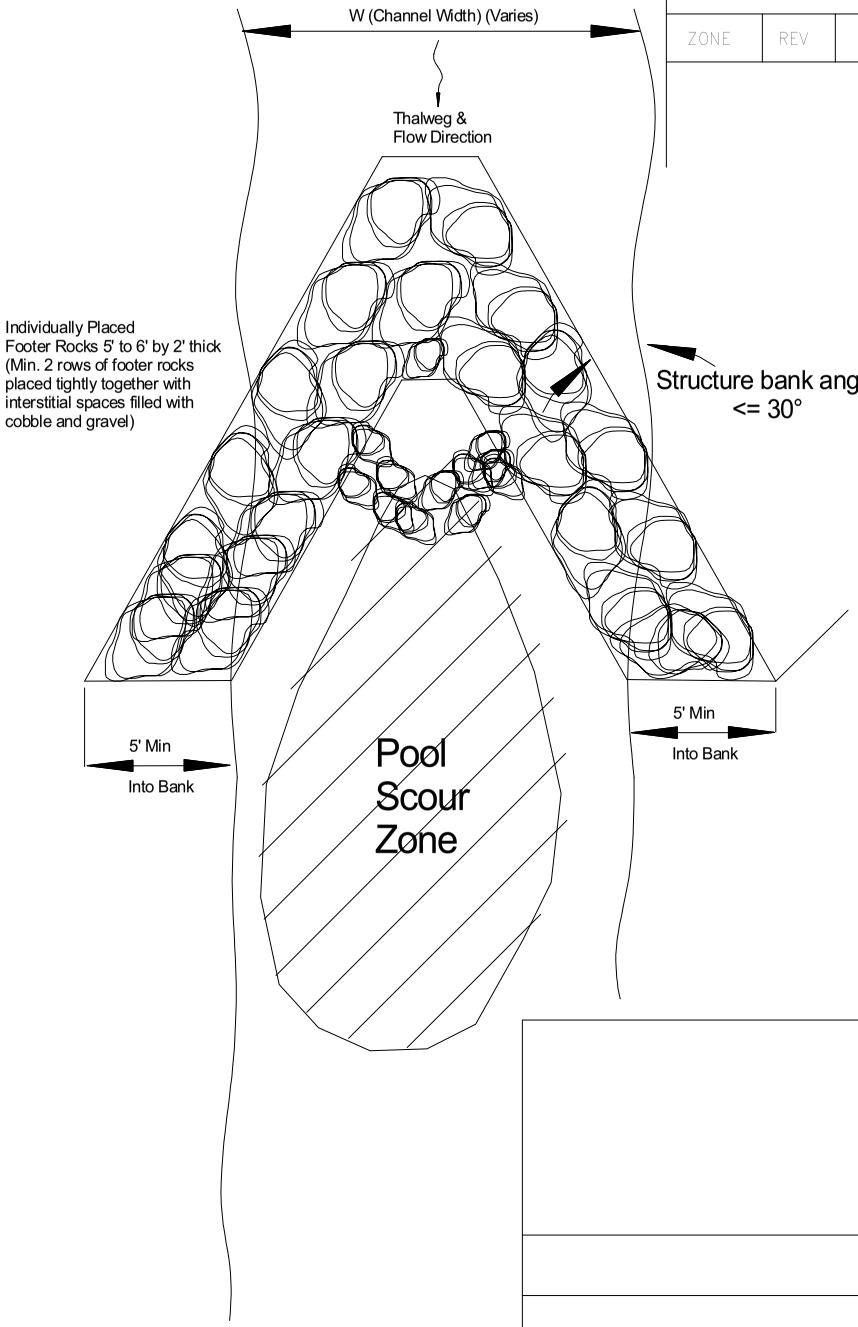

Cross-Vane Plan View

FIN-UP Habitat Consultants, Inc.
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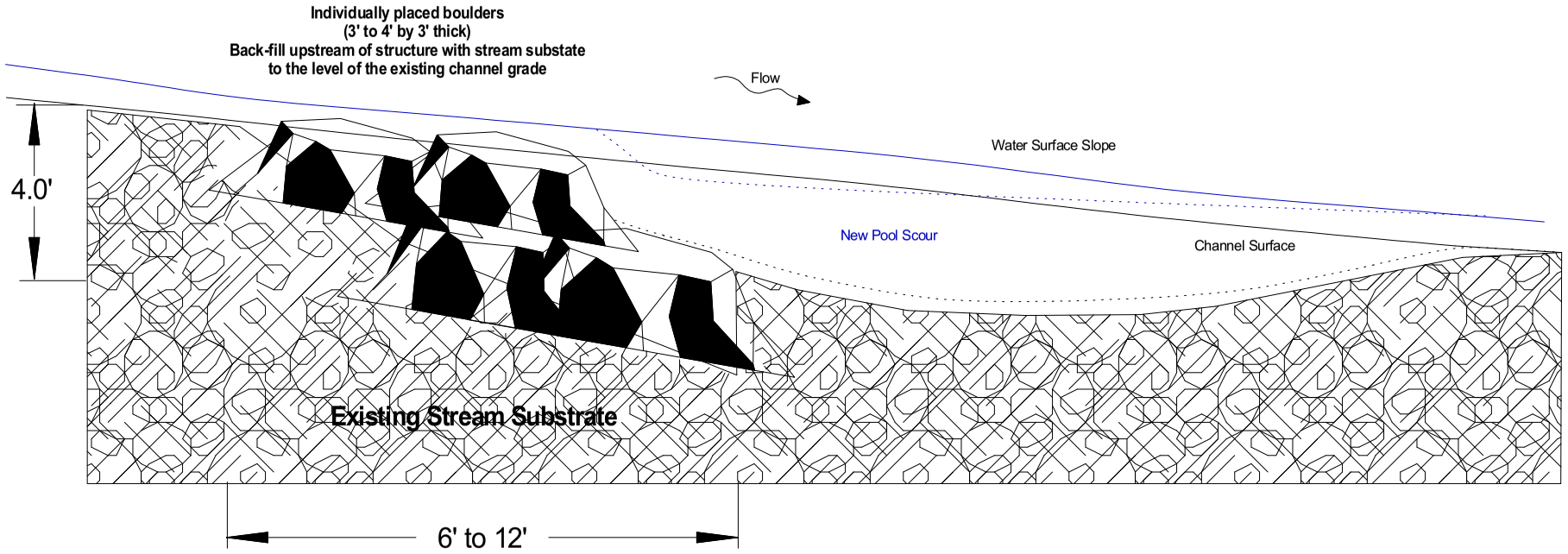
New Water Surface Slope

New Channel Profile



Cross-Vane Vertical Profile (Center of Structure)

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SIZE	FSCM NO.	DWG NO.	REV
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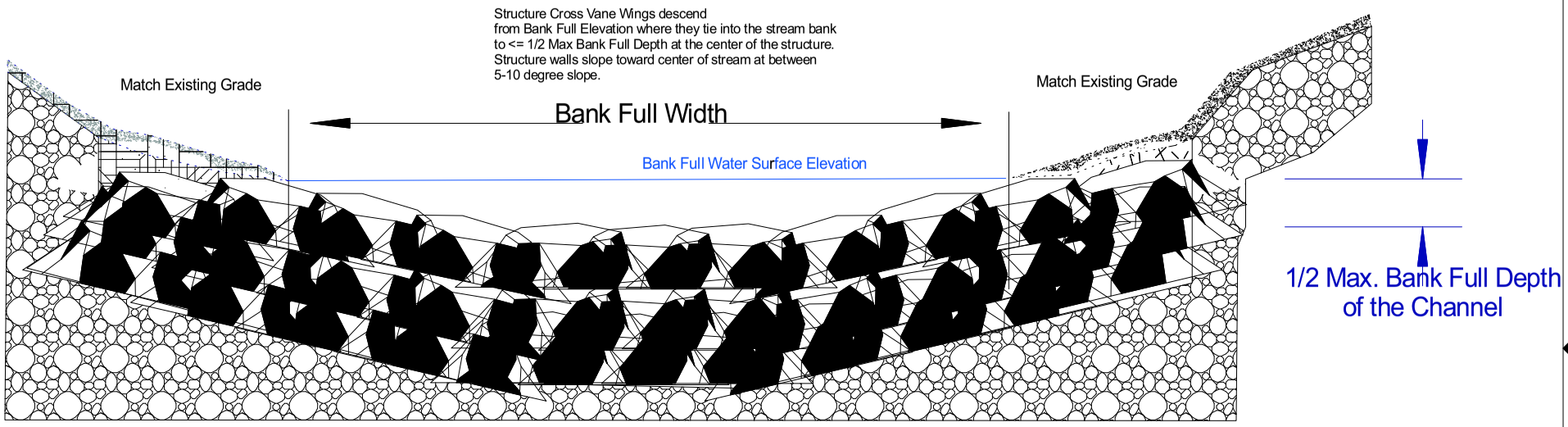

Cross-Vane Vertical Profile
Cross Section Elevations)

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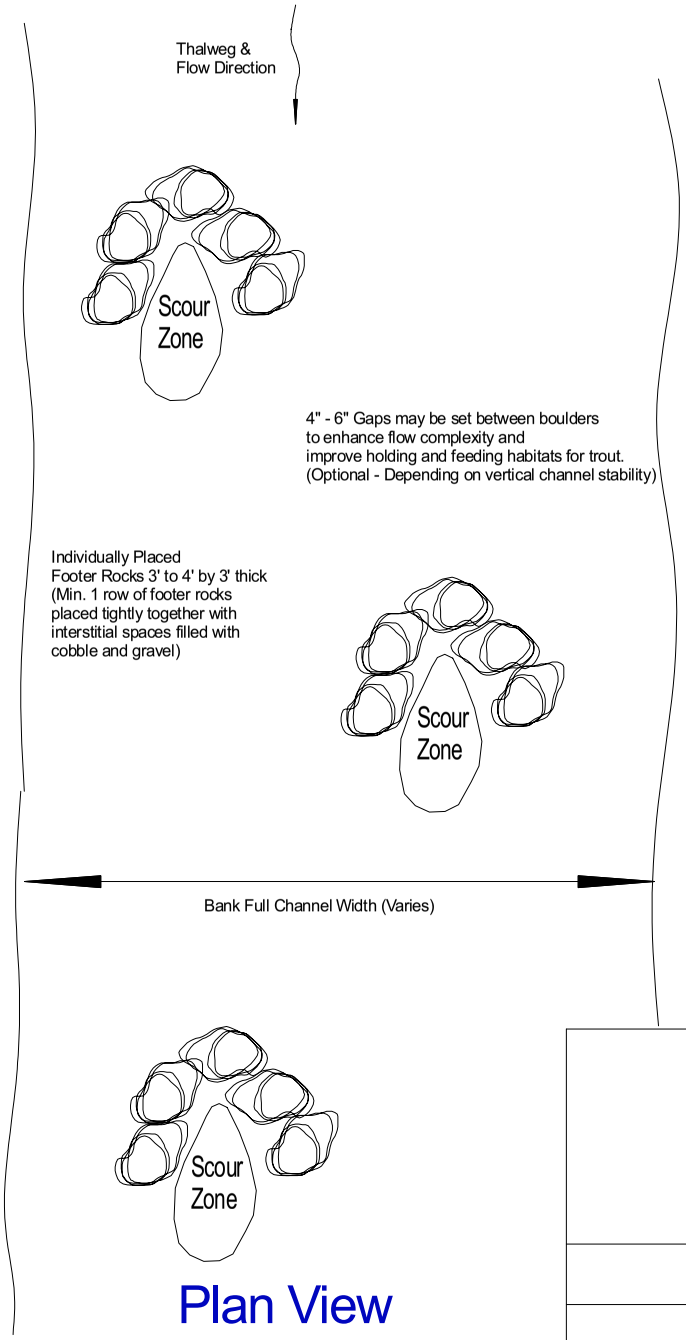
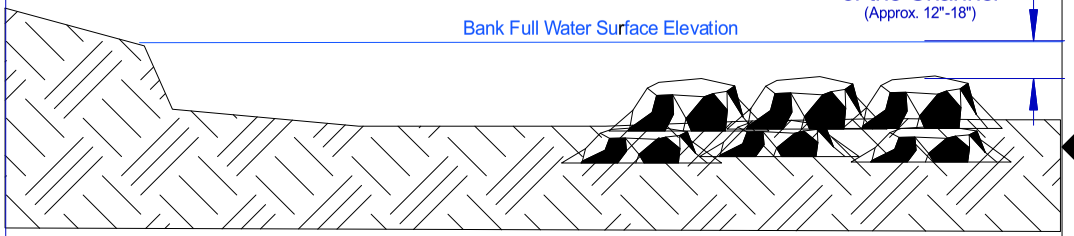


Plan View

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

Profile View



4" to 6" Spacing between boulders
to provides variation in velocity and habitat
complexity. Footer rocks should be placed
tightly together, with interstitial spaces back-
filled with stream substrate

Boulder Cluster Habitat Structure
Plan and Profile View

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SIZE	FSCM NO.	DWG NO.	REV
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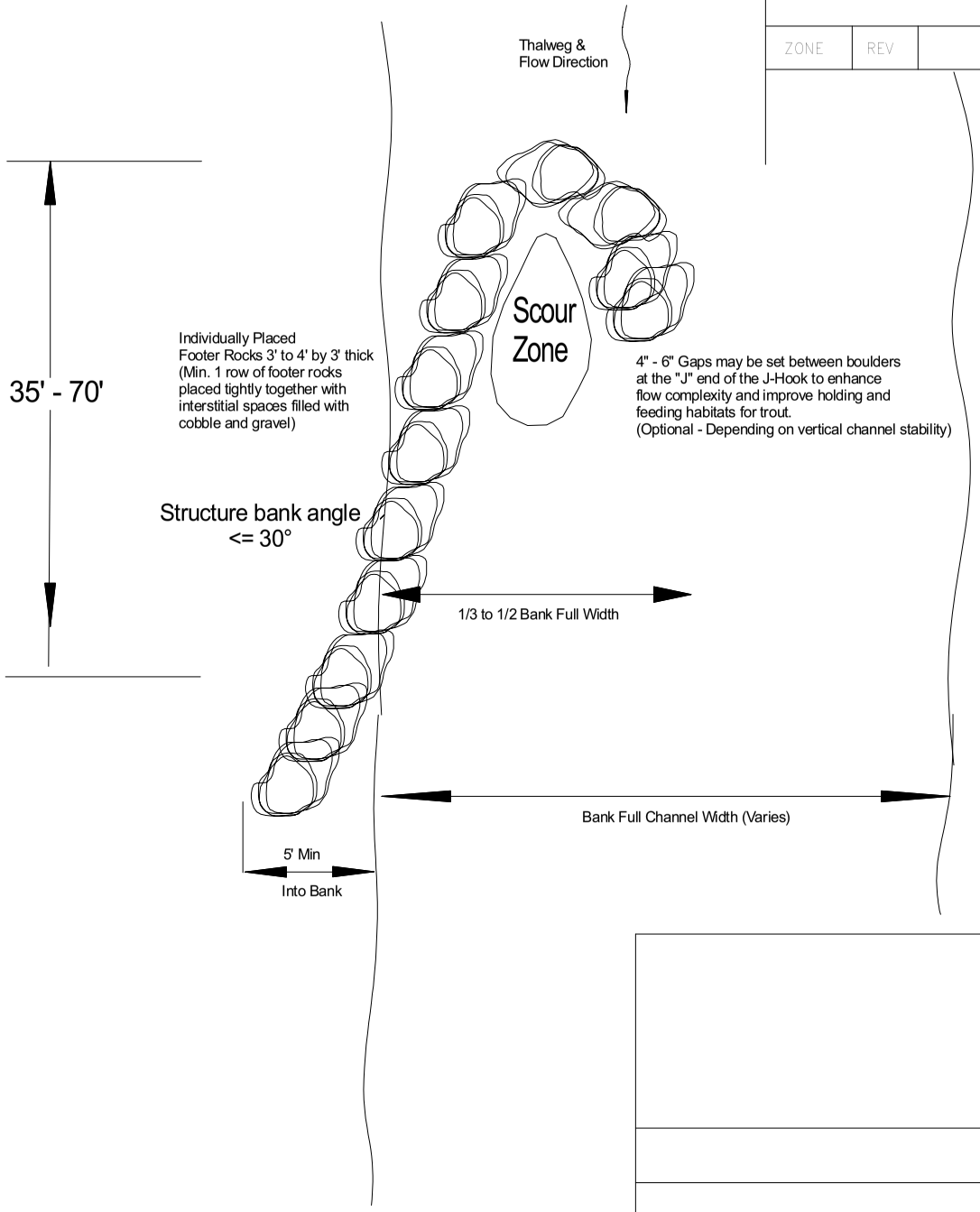
SCALE: Drawing Not to Scale – For Conceptual Purposes Only



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ZONE	REV	DESCRIPTION	DATE	APPROVED

Rock J-Hook Vane - Plan View

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Manitou Springs, CO 80829
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SIZE	FSCM NO.	DWG NO.	REV
		Drawing #8	

SCALE: Drawing Not to Scale – For Conceptual Purposes Only

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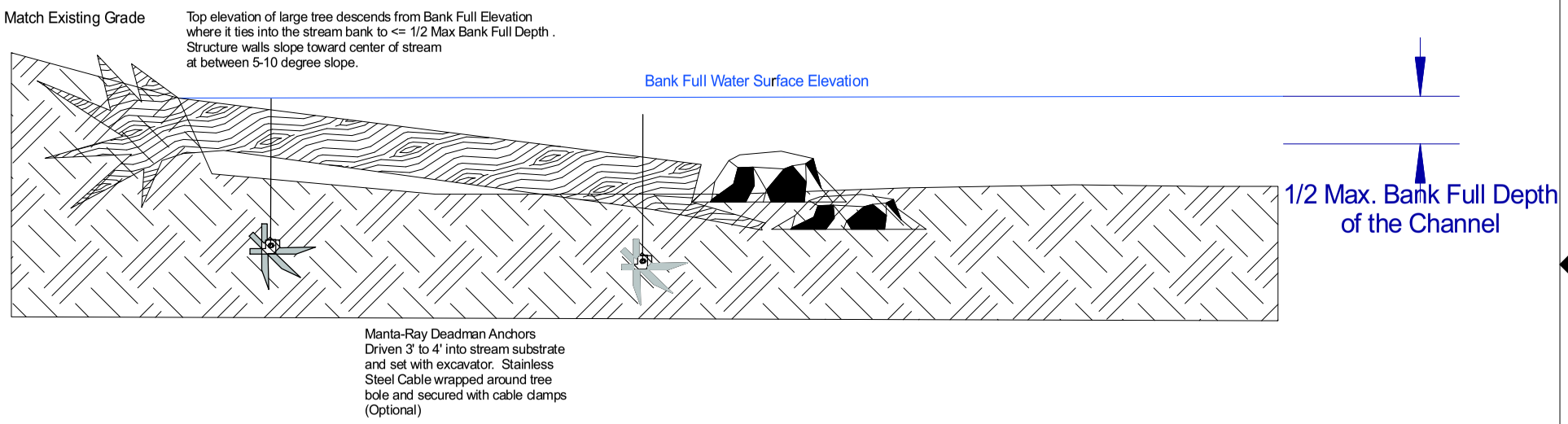

Habitat Tree Anchoring Detail Vertical Profile

FIN-UP Habitat Consultants, Inc.
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Manitou Springs, CO 80829
(719) 332-2550
P.Gallagher 06/2011

SIZE	FSCM NO.	DWG NO.	REV
		Drawing #9	

SCALE: Drawing Not to Scale – For Conceptual Purposes Only

EXHIBIT C

PRE-PROJECT EXISTING CONDITION
&
PHOTO-POINTS

Pedal for Multiple

GO!
EAST!
SHS 93