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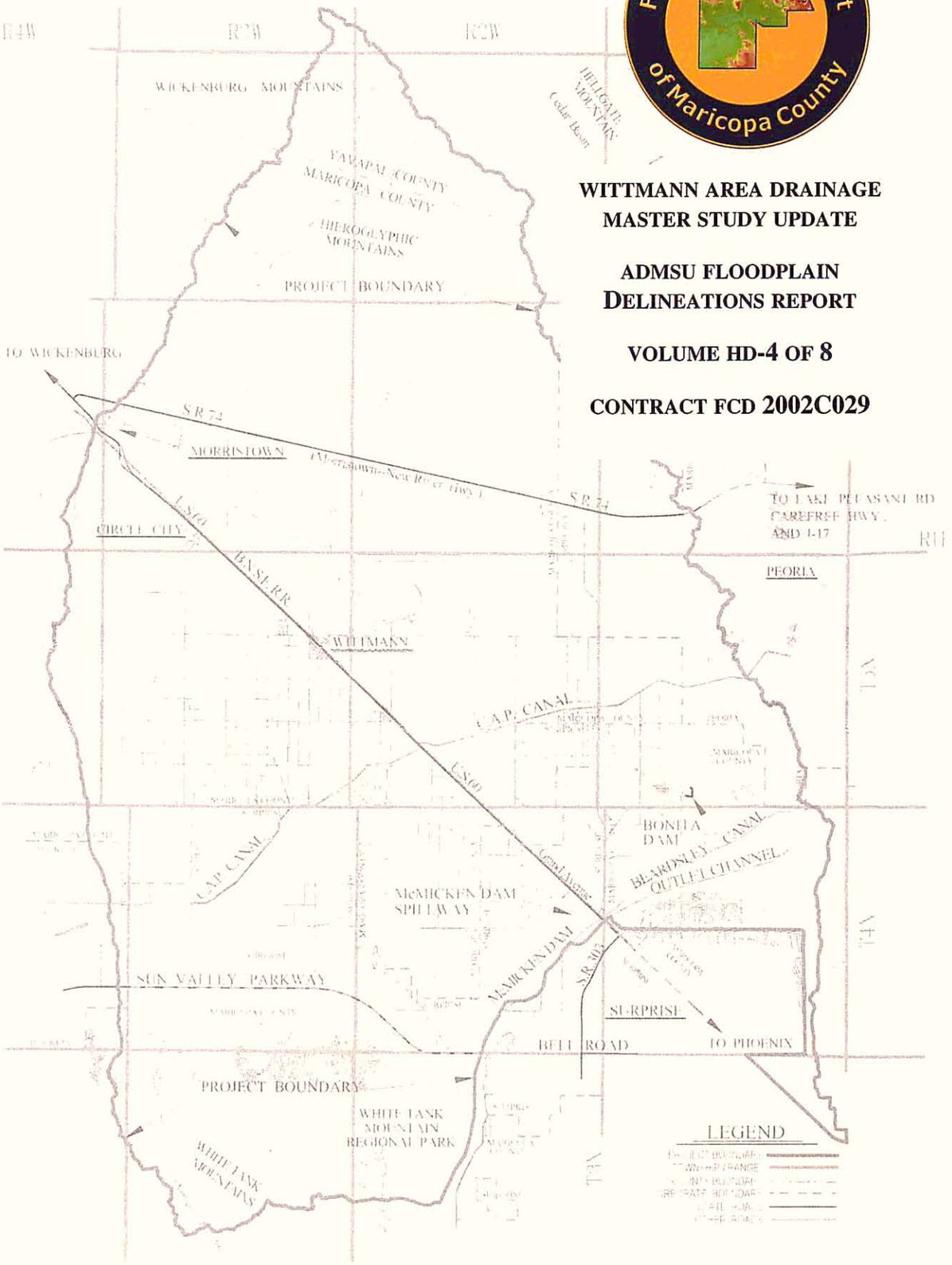
Flood Control District of Maricopa County

WITTMANN AREA DRAINAGE MASTER STUDY UPDATE

ADMSU FLOODPLAIN DELINEATIONS REPORT

VOLUME HD-4 OF 8

CONTRACT FCD 2002C029



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CONTRACT FCD 2002C029

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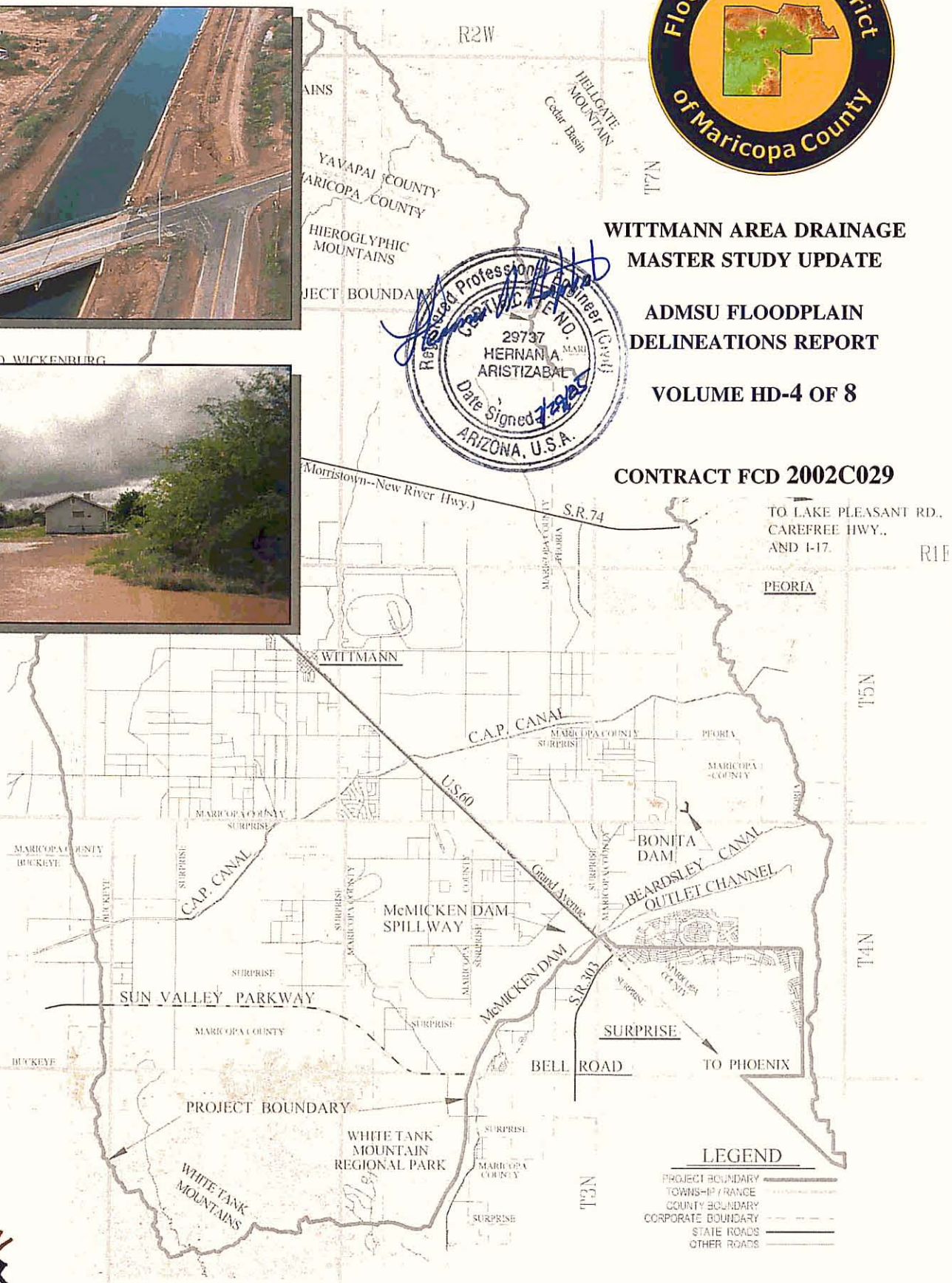

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VOLUME NAME	VOLUME ID
EXISTING CONDITIONS ANALYSIS (PART I)	EC
ADMSU HYDROLOGY	HY
GEOMORPHOLOGY REPORT	GR
SUBSIDENCE REPORT	SU
ALTERNATIVES IDENTIFICATION (PART II)	AI
RULES OF DEVELOPMENT (PART III)	RD
ALTERNATIVE ANALYSIS MCMICKEN DAM	MA
MCMICKEN DAM HYDROLOGY	MD
MCMICKEN DAM FINAL LANDSCAPE CHARACTER COMPATABILITY ANALYSIS REPORT	LA
FLOODPLAIN DELINEATION	HD
REPORT OF SURVEY	SR
SUN VALLEY PARKWAY CULVERT EVALUATION	SV
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Note: Volume ID will be used for Section, Plate, Figure, and Table Identifiers.

WITTMANN AREA DRAINAGE MASTER STUDY UPDATE

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E.1.1 Roughness Coefficient Reference Materials

Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona

By B.W. Thomsen and H.W. Hjalmarson

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April 1991

estimates should not be used as verified values of roughness coefficients. The Flood Control District of Maricopa County furnished maps and channel data and was the cooperator in the study.

The total *n* value is determined by using a base *n* for the channel or flood plain and applying adjustments for various roughness components such as vegetation and obstructions to flow. Where there are distinct segments of different channel roughness in a channel section or subsection, the *n* values for the segments are weighted by area or wetted perimeter to determine the total *n* value. Where there is an unequal distribution of velocity across a channel, the channel cross section was subdivided into sections of more uniform velocity distribution on the basis of changes in channel geometry and roughness.

MANNING EQUATION

The Manning equation in the following form is commonly used to compute discharge in natural channels:

$$Q = \frac{1.486}{n} A R^{2/3} S_e^{1/2}, \tag{1}$$

where

Q = discharge, in cubic feet per second,

A = cross-section area of channel, in square feet,

R = hydraulic radius, A/P (P, wetted perimeter, in feet), in feet,

S_e = energy gradient, and

n = roughness coefficient.

The equation was developed for conditions of uniform flow in which the water-surface profile and energy gradient are parallel to the streambed and the area, depth, and velocity are constant throughout the reach. The equation was assumed to be valid for nonuniform reaches if the energy gradient is modified to reflect only the losses resulting from boundary friction (Barnes, 1967). The modified energy gradient is called the friction slope. Use of the Manning equation in discharge computations generally involves the concept of channel conveyance. Conveyance, K, is defined as

$$K = \frac{1.486}{n} A R^{2/3} \tag{2}$$

and is a measure of the carrying capacity of the channel. Where the conveyance concept is used, Manning's equation is reduced to

$$Q = KS^{1/2}, \tag{3}$$

where S is the friction slope. The friction slope for a reach of nonuniform channel can be expressed as

$$S = \frac{h_f}{L}, \tag{4}$$

where

h_f = energy loss resulting from boundary friction in the reach and

L = length of the reach.

The main components of h_f are the difference in water-surface elevation and the difference in velocity head at the ends of the reach.

Velocity-Head Coefficient

The velocity-head coefficient is not directly used for the estimate of channel roughness in this report. Several of the cross sections, however, are subdivided on the basis of velocity-head considerations, and a Manning's roughness coefficient is estimated for each of the subsections. A basic understanding of the velocity-head coefficient, therefore, is necessary for the estimation of channel roughness coefficients for channels with irregularly shaped cross sections and varying distribution of vegetation across the channels.

Roughness factors and nonuniformities in channel geometry cause the velocity in a given cross section of channel to vary from point to point. As a result of nonuniform distribution of velocities, the true velocity head (h_v) generally is greater than the value computed from the expression

$$h_v = \frac{V^2}{2g}, \tag{5}$$

where

V = mean velocity in the cross section and

g = acceleration of gravity.

The ratios of the true velocity head to the velocity head computed on the basis of the mean velocity is the velocity-head coefficient, alpha. For a reasonably straight channel with uniformly shaped cross section, the effect of nonuniform velocity distribution on the computed velocity head is small

and, for convenience in the absence of a more suitable method, the coefficient is assumed to be unity (Chow, 1959). A detailed study of the velocity-head coefficient, alpha, in natural channels showed a significant correlation between alpha and channel roughness for channels without overbank flow. Variation in the horizontal distribution of velocity had a greater effect on the value of alpha than variation in the vertical. Computed values of alpha at 894 sites in a variety of settings ranged from 1.03 to 4.70, and the median value for trapezoidal channels was 1.40 (Hulsing and others, 1966). In the computation of water-surface profiles in open channels, the value of alpha is assumed to be 1.0 if the section is not subdivided (Davidian, 1984). In subdivided channel cross sections, the value of alpha is computed as

$$\alpha = \frac{\Sigma(k_i^3/a_i^2)}{K_T^3/A_T^2}, \tag{6}$$

where

k_i = conveyance of individual subsections,

a_i = area of individual subsections,

K_T = conveyance of entire cross section, and

A_T = area of entire cross section.

Channel n Values

The Manning roughness coefficient, *n*, is a measure of the flow resistance or relative roughness of a channel or overflow area. The flow resistance is affected by many factors including bed material, cross-section irregularities, depth of flow, vegetation, channel alignment, channel shape, obstructions, suspended material, and bedload. In general, all factors that cause turbulence and retard flow tend to increase the roughness coefficient (Jarrett, 1984). Channel roughness also is directly related to channel slope (Riggs, 1976; Jarrett, 1984). The relation of roughness to slope results partly from the interrelation between channel slope and bed-material particle size. For similar bed material, however, channels with low gradients have lower roughness coefficients than channels with high gradients (Jarrett, 1984). The direct relation between channel roughness and channel slope is not evident in low-gradient channels where high roughness coefficients result from vegetation. Roughness coefficients as great as 0.20 have been verified for channels with low gradients and dense vegetation (Arcement and Schneider, 1984). For vegetation that will bend under the force of flowing water, the relation between roughness and gradient can be inversely related. Steep slopes cause greater velocities that bend and flatten vegetation if depths of flow are sufficient, resulting in lower *n* values. Because of the relation between channel slope and size of bed material, the effect of slope on *n* values is considered in the selection of base *n* values.

A common method of selecting the roughness coefficient, *n*, is to first select a base value of *n* for the bed material (table 1). The base values of *n* are for a straight uniform channel of a given bed material. Cross-section irregularities, channel alignment, obstructions, vegetation, and other factors that increase roughness are accounted for by adding increments of roughness to the base value of *n*. Ranges of adjustments for the factors that may add to channel roughness are shown in table 2.

Many alluvial channels in Maricopa County have bed material that moves during floodflow. In addition to the changing channel geometry of these channels, the roughness coefficient may change during floodflow because of the changing form of the channel bed in parts of the channel cross section (Davidian, 1984). Bedforms, such as dunes, antidunes, and plane bed have been observed during large floods. Within a few minutes, dunes can appear, disappear, and reappear at different locations across a large stream channel. The Manning roughness coefficient can double or triple when the bedform changes from plane to dunes. A method of defining reliable values of Manning's *n* for unstable alluvial channels is not available. A plane bedform is common during large floods, and for this report, plane-bed conditions are assumed where the roughness coefficient is related to the size of the channel material and not the form of the channel bed. Plane-bed conditions were assumed for nearly all indirect measurements of peak discharge where the slope-area method was used.

Table 1.--*Base values of Manning's n for stable channels*

[Modified from Aldridge and Garrett, 1973, table 1]

Channel material	Size of bed material		Base *n* values	
	Millimeters	Inches	Benson and Dalrymple (1967)[1]	Chow (1959)[2]
Concrete.....	-------	--------	0.012-0.018	0.011
Rock cut.....	-------	--------	----------	.025
Firm soil.....	-------	--------	.025- .032	.020
Coarse sand.....	1-2	--------	.026- .035	-----
Fine gravel.....	-------	--------	----------	.024
Gravel.....	2-64	0.08-2.5	.028- .035	-----
Coarse gravel.....	-------	--------	----------	.028
Cobble.....	64-256	2.5-10.0	.030- .050	-----
Boulder.....	>256	>10.0	.040- .070	-----

[1]Straight uniform channel.
[2]Smoothest channel attainable in indicated material.

Table 2.--*Adjustment factors for the determination of overall Manning's n values*

[Modified from Chow, 1959]

Channel conditions	Manning's n adjustment[1]	Example
Degree of irregularity:		
Smooth	0.000	Smoothest channel attainable in given bed material.
Minor	.001- .005	Channels with slightly eroded or scoured side slopes.
Moderate	.006- .010	Channels with moderately sloughed or eroded side slopes.
Severe	.011- .020	Channels with badly sloughed banks; unshaped, jagged, and irregular surfaces of channels in rock.
Effects of obstruction[2]:		
Negligible	.000- .004	A few scattered obstructions, which include debris deposits, stumps, exposed roots, logs, piers, or isolated boulders, that occupy less than 5 percent of the cross-sectional area.
Minor	.005- .015	Obstructions occupy 5 to 15 percent of the cross-sectional area and the spacing between obstructions is such that the sphere of influence around one obstruction does not extend to the sphere of influence around another obstruction. Smaller adjustments are used for curved smooth-surfaced objects than are used for sharp-edged angular objects.
Appreciable	.020- .030	Obstructions occupy from 15 to 50 percent of the cross-sectional area or the space between obstructions is small enough to cause the effects of several obstructions to be additive, thereby blocking an equivalent part of a cross section.
Severe	.040- .060	Obstructions occupy more than 50 percent of the cross-sectional area or the space between obstructions is small enough to cause turbulence across most of the cross section.
Vegetation:		
Small	.002- .010	Dense growths of flexible turf grass, such as Bermuda, or weeds where the average depth of flow is at least two times the height of the vegetation; supple tree seedlings such as willow, cottonwood, arrow weed, or saltcedar where the average depth of flow is at least three times the height of the vegetation.
Medium	.010- .025	Grass or weeds where the average depth of flow is from one to two times the height of the vegetation; moderately dense stemmy grass, weeds, or tree seedlings where the average depth of flow is from two to three times the height of the vegetation; moderately dense brush, similar to 1- to 2-year-old saltcedar in the dormant season, along the banks and no significant vegetation along the channel bottoms where the hydraulic radius exceeds 2 feet.
Large	.025- .050	Turf grass or weeds where the average depth to flow is about equal to the height of vegetation; small trees intergrown with some weeds and brush where the hydraulic radius exceeds 2 feet.

See footnotes at end of table.

Table 2.--*Adjustment factors for the determination of overall Manning's n values*--Continued

Channel conditions	Manning's n adjustment[1]	Example
Vegetation—Continued:		
Very large	.050- .100	Turf grass or weeds where the average depth of flow is less than half the height of vegetation; small bushy trees intergrown with weeds along side slopes of dense cattails growing along channel bottom; trees intergrown with weeds and brush.
Variations in channel cross section:		
Gradual	.000	Size and shape of cross sections change gradually.
Alternating	.001- .005	Large and small cross sections alternate occasionally, or the main flow occasionally shifts from side to side owing to changes in cross-sectional shape.
Alternating	.010- .015	Large and small cross sections alternate frequently, or the main flow frequently shifts from side to side owing to changes in cross-sectional shape.
Degree of meadering[3]:		
Minor	1.00	Ratio of the meander length to the straight length of the channel reach is 1.0 to 1.2.
Appreciable	1.15	Ratio of the meader length to the straight length of channel is 1.2 to 1.5.
Severe	1.30	Ratio of the meander length to the straight length of channel is greater than 1.5.

[1]Adjustments for degree of irregularity, variations in cross section, effect of obstructions, and vegetation are added to the base n value (table 1) before multiplying by the adjustment for meander.

[2]Conditions considered in other steps must not be reevaluated or duplicated in this section.

[3]Adjustment values apply to flow confined in the channel and do not apply where downvalley flow crosses meanders. The adjustment is a multiplier.

For floodflows in sand channels with moveable beds, roughness mainly is a function of the size of the bed material as shown in the following table (Benson and Dalrymple, 1967, p. 22).

Median grain size, in millimeters	Manning's *n*	Median grain size, in millimeters	Manning's *n*
0.2	0.012	0.6	.023
.3	.017	.8	.025
.4	.020	1.0	.026
.5	.022		

The major adjustments to the base value of *n* used in this report are for cross-section characteristics. Other adjustments for the reach characteristics between cross sections that include changes in shape and size of cross sections and channel meandering are not given. Procedures for evaluating the adjustment factors for the reach characteristics are given in several publications including Chow (1959), Aldridge and Garrett (1973), Jarrett (1985a, b), and Arcement and Schneider (1989).

SUBDIVISION OF CROSS SECTIONS

Sections with distinct changes in shape were divided into subsections, and *n* values were determined separately for each subsection. Subdivision location primarily was based on major breaks in cross-sectional geometry. Cross sections were subdivided if main channel depth was more than twice the depth at the stream edge of the overflow area (fig. 2). Subdivision also commonly was made where the depth of the overflow at the stream edge is nearly half the depth of the main channel and the width of the overflow area is at least five times the depth of the overflow area (fig. 2). Values of *n* for overflow areas commonly were estimated from table 2.

For sections or subsections with a nonuniform distribution of vegetation, a composite *n* was computed by using weighted values for segments having different roughness. Where sections were divided into segments of equal roughness, dividing lines were selected to parallel the general flow line and to represent the average contact between segments of different roughness. Composite *n* values were computed by using weighted values of either area (*A*) or wetted perimeter (*P*). Weighting was done by estimating area or wetted perimeter for each portion of channel and assigning weighting factors that were proportional to the total area or wetted perimeter. The general rule for deciding which weighting method to use is as follows: Use area weighting where vegetation is dense and occupies a distinct part of the cross section. Use wetted-perimeter weighting where the roughness factor for each segment is the result of low-lying boundary material.

Where overflow areas are cultivated fields, *n* values are for fields without crops. Values of *n* for fields with crops can be based on the work of Chow (1959). Fields of mature cotton plants are comparable to dense brush in summer; defoliated cotton to medium to dense brush in winter (fig. 3). Fields of alfalfa are comparable to field crops with *n* value depending on height of the crop and depth of water (table 3). The value of *n* generally varies with the stage of submergence of the vegetation. In all instances, *n* values associated with cultivated fields will change with time.

E.1.2 Washes North of CAP Canal and West of Wittmann Wash.

Wash 3 West

Wash T4N-R3W-S08E

Iona Wash

Iona Tributary

Iona East Split -1

Iona East Split -2

Trilby Wash

Circle City Area – Wash 1

Wash 2 West

2 West Tributary – 1

2 West Tributary – 2

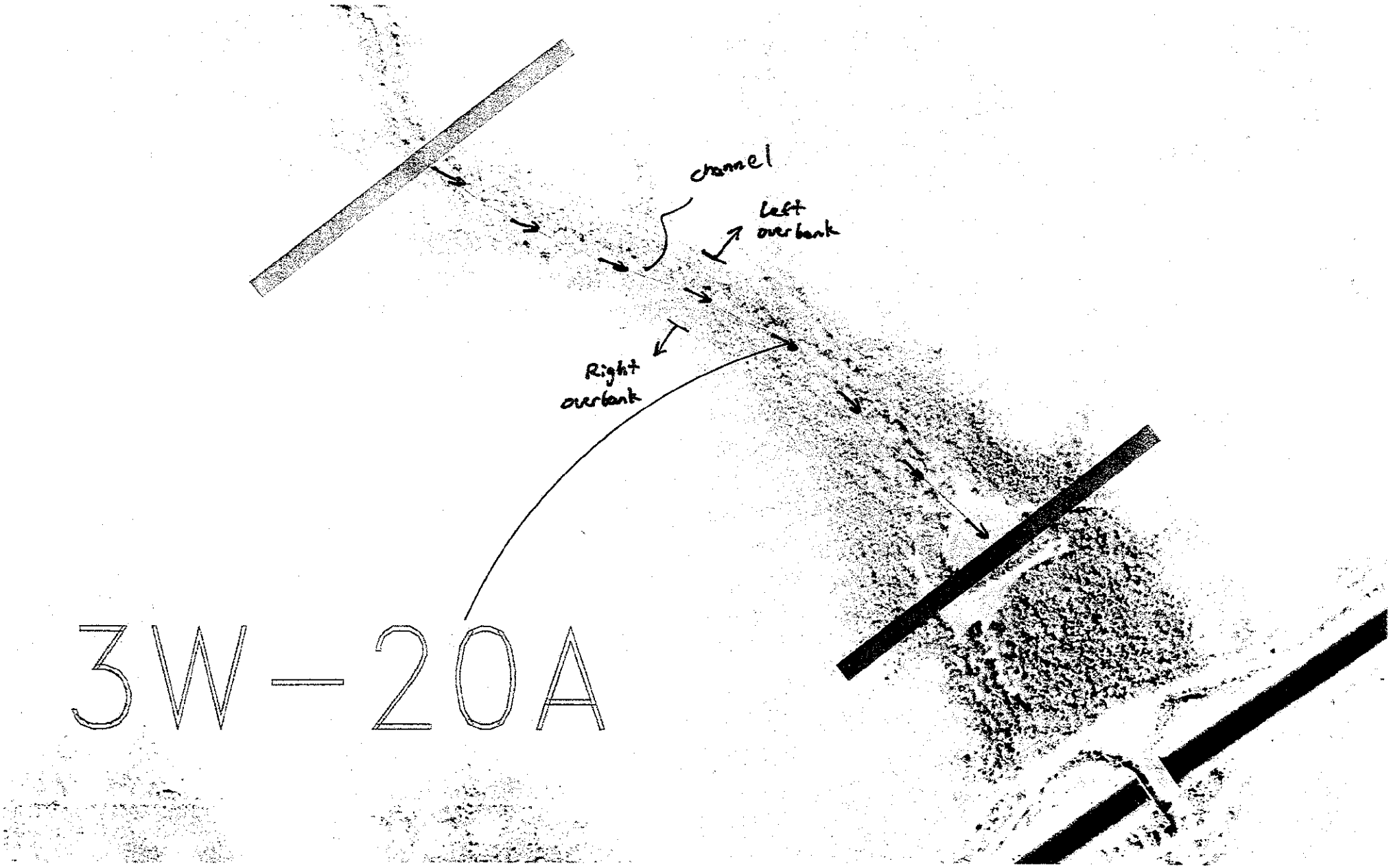
Wash 3 West

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/21/2005

Project: Wittmann ADMSU
Stream: Wash 3 West
Location: Reach - 3W - 20A (Between north of the C.A.P. and 1/4 mile north of the C.A.P.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000		0.000
	Minor		.005-.015			
	Appreciable		.020-.030		0.020	
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010		0.010
	Medium		.010-.025		0.025	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.072**	**0.035**



3W-20A

Figure E-1 (3W-20A)

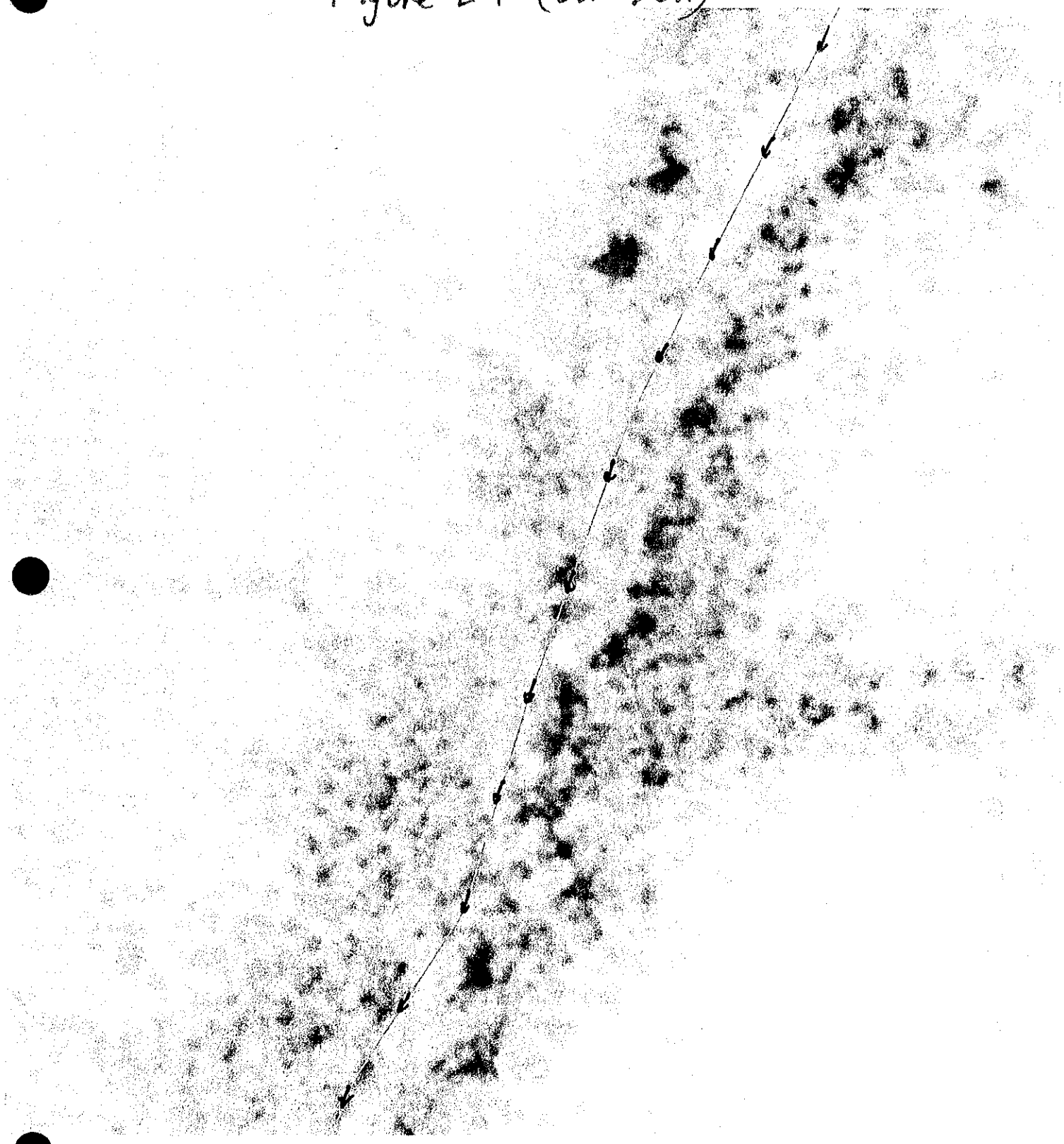


Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/21/2005

Project: Wittmann ADMSU
Stream: Wash 3 West
Location: Reach - 3W - 20B (Between 1/4 mile north of the C.A.P. and the confluence with wash T4N-R3W-S8E.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.042**	**0.033**

Figure E-1
(3W - 20B)

Figure 1. (Photo #422) Channel looking upstream.

Figure 2. (Photo #423) Left Overbank looking downstream.

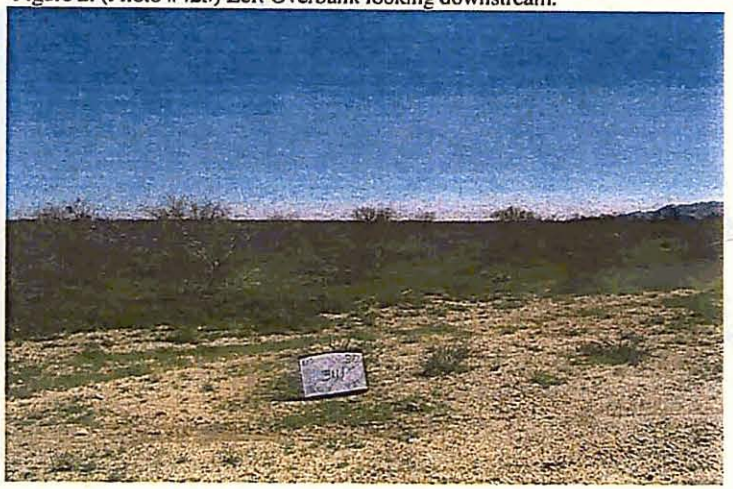
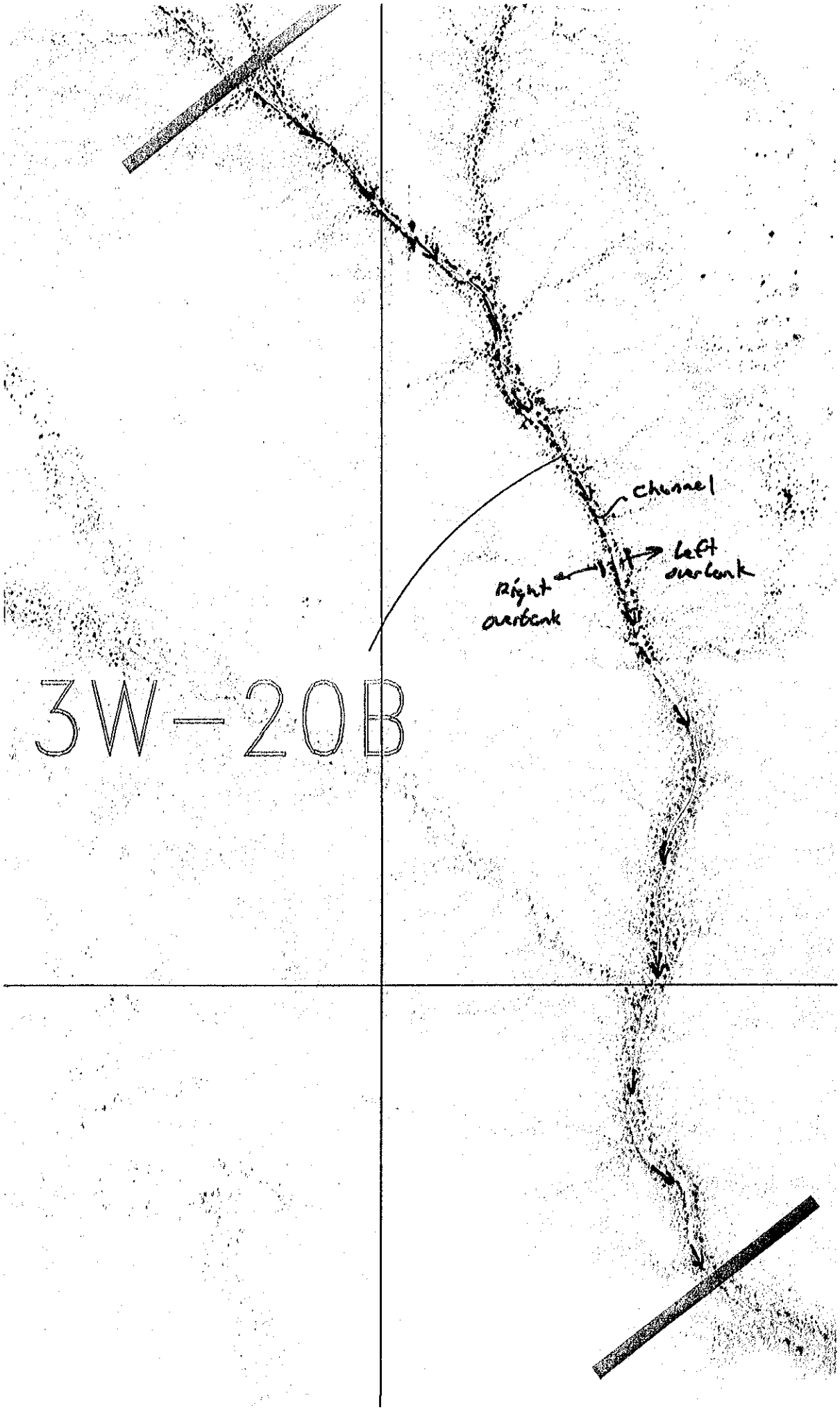


Figure 3. (Photo #424) Right Overbank looking downstream.



3W-20B

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/21/2005

Project: Wittmann ADMSU
Stream: Wash 3 West
Location: Reach - 3W - 21 (Between the confluence with wash T4N-R3W-S8E and 1/2 mile south of Jomax Rd. alignment.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.013	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.038**	**0.033**

Figure E-1
(3W - 21)

Figure 1. (Photo #425) Channel looking downstream.

Figure 2. (Photo #426) Left Overbank looking downstream.

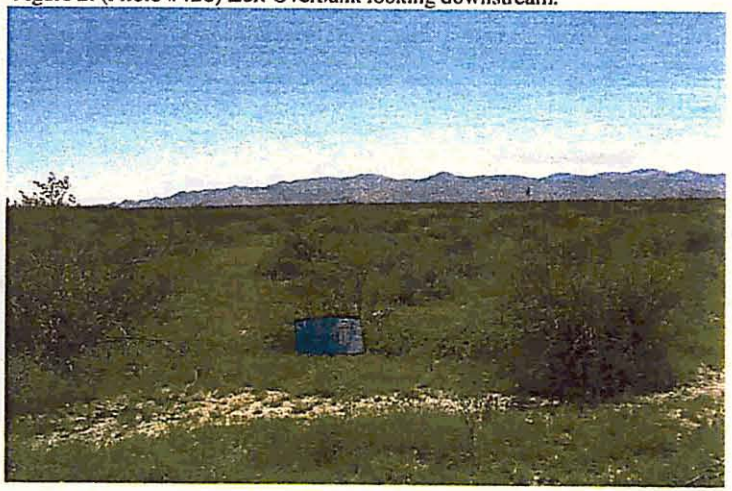


Figure 3. Right Overbank not available.

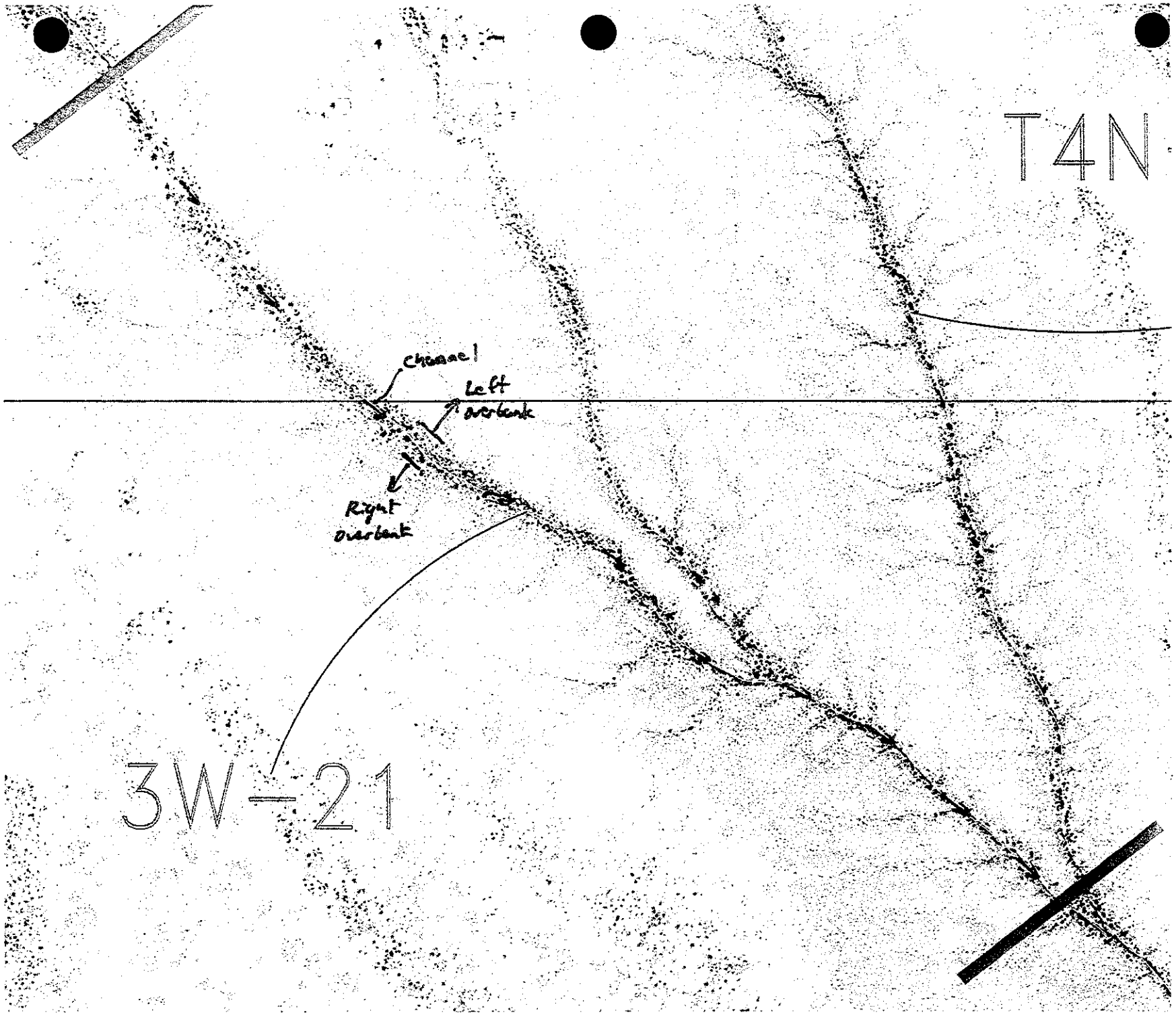

T4N
channel
Left
overbank
Right
overbank
3W-21

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/21/2005

Project: Wittmann ADMSU
Stream: Wash 3 West
Location: Reach - 3W - 22A (Between 1/2 mile south of Jomax Rd. and Jomax Rd. alignment)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.025	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.050**	**0.033**

Figure E-1
(3W - 22A)

Figure 1. (Photo #427) Channel looking upstream.

Figure 2. (Photo #428) Left Overbank looking downstream.

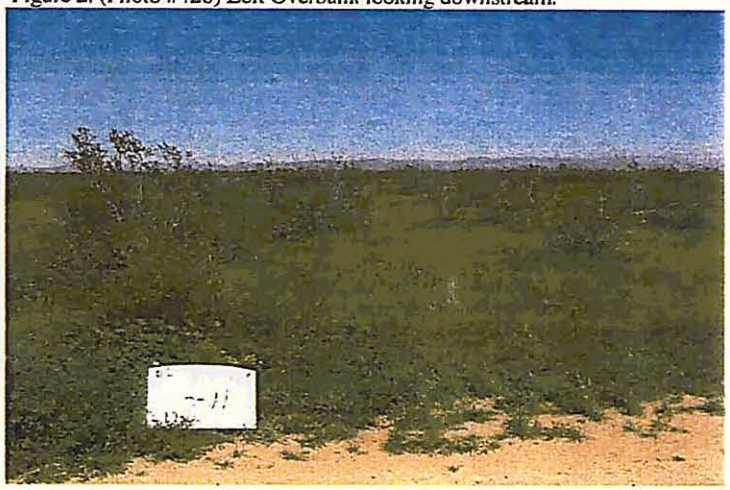


Figure 3. (Photo #429) Right Overbank looking upstream.

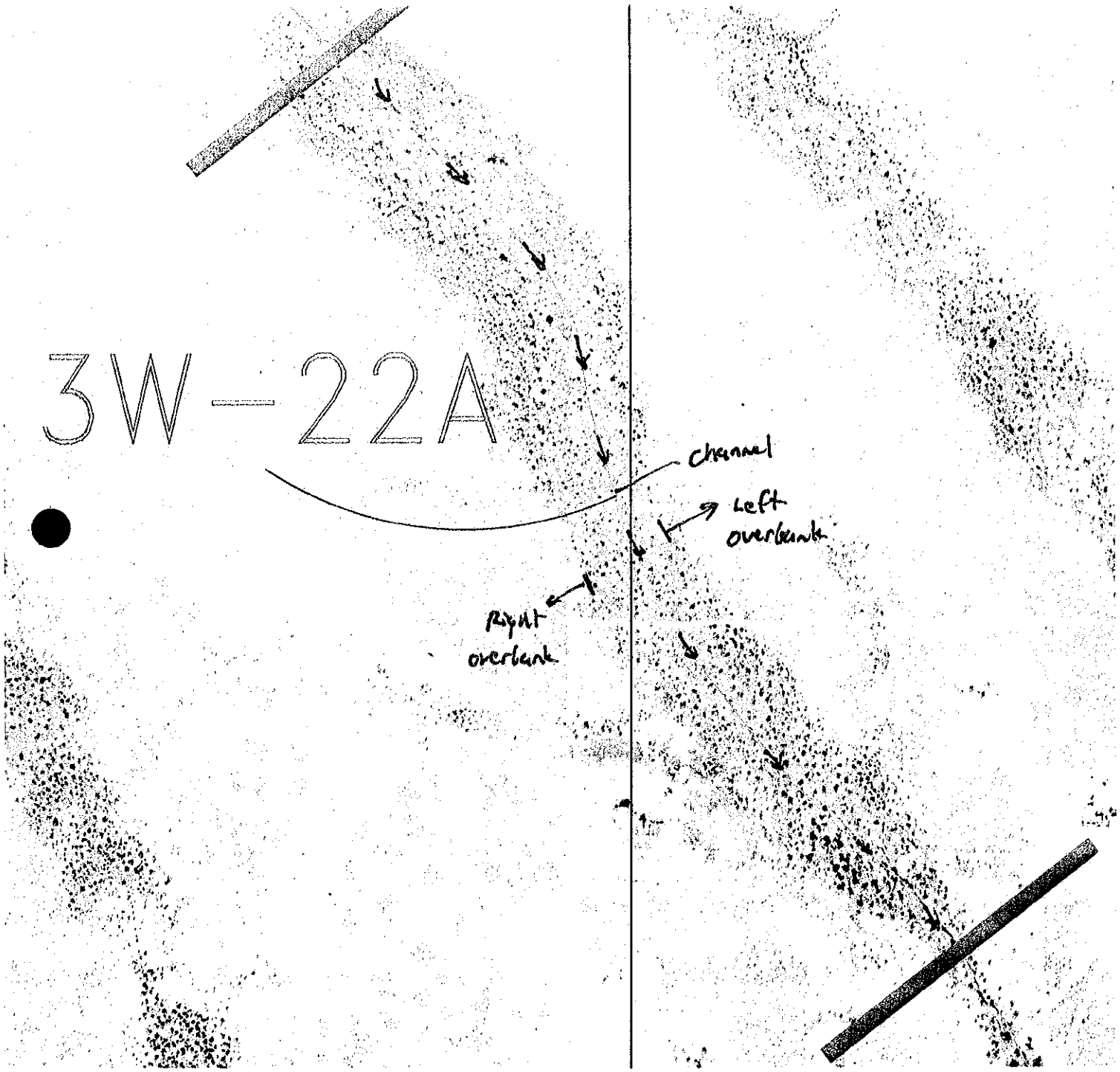

3W-22A
channel
left overbank
Right overbank

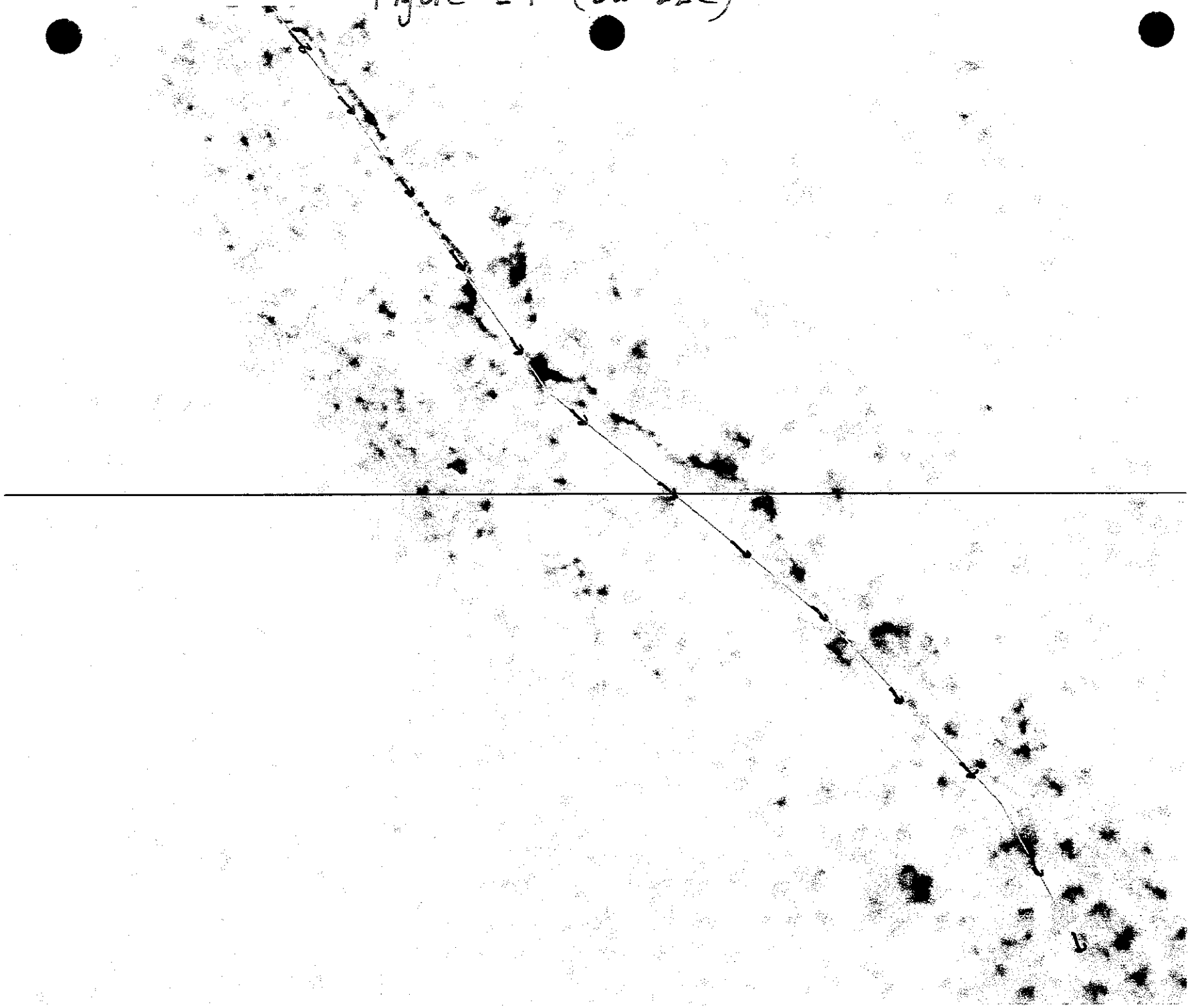
Table E-1

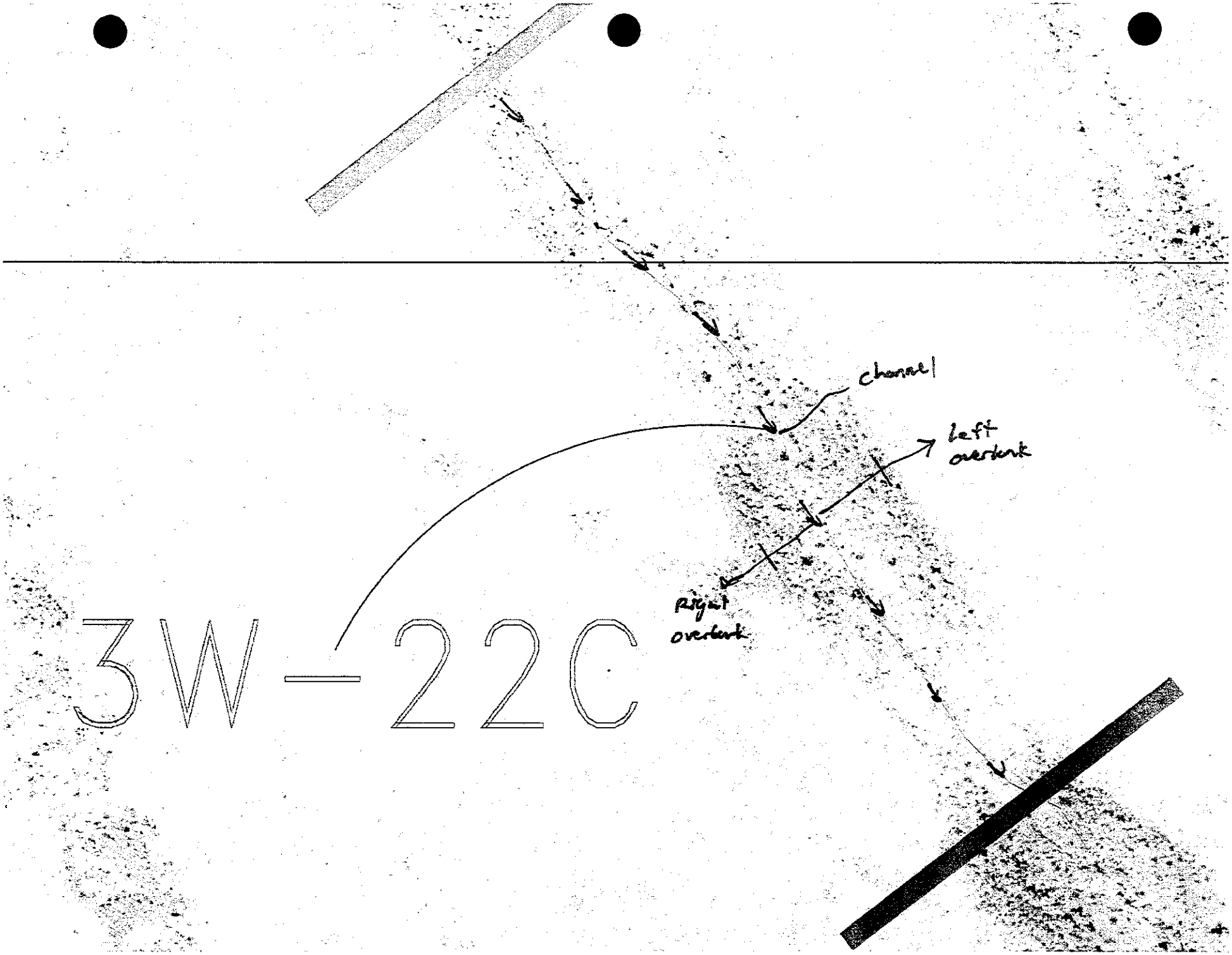
BY JCS DATE 3/16/2005
CHECK GLA DATE 3/21/2005

Project: Wittmann ADMSU
Stream: Wash 3 West
Location: Reach - 3W - 22C (Between Jomax Rd. alignment and Pinnacle Vista Rd. alignment.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.040**	**0.033**

Figure E-1 (3W-22C)





3W-22C

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/21/2005

Project: Wittmann ADMSU
Stream: Wash 3 West
Location: Reach - 3W - 22B (Between Pinnacle Vista Rd. alignment and just south of Dixileta Dr. alignment.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.004	0.000	0.004
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.0~~13~~ 16	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.037**	**~~0.038~~** .041	**0.037**

Figure E-1
(3W - 22B)

Figure 1. (Photo #430) Channel looking downstream.

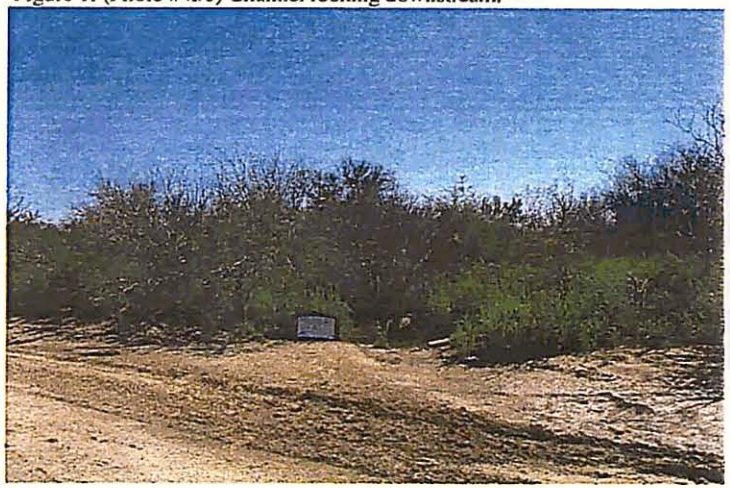


Figure 2. (Photo #431) Left Overbank looking downstream.

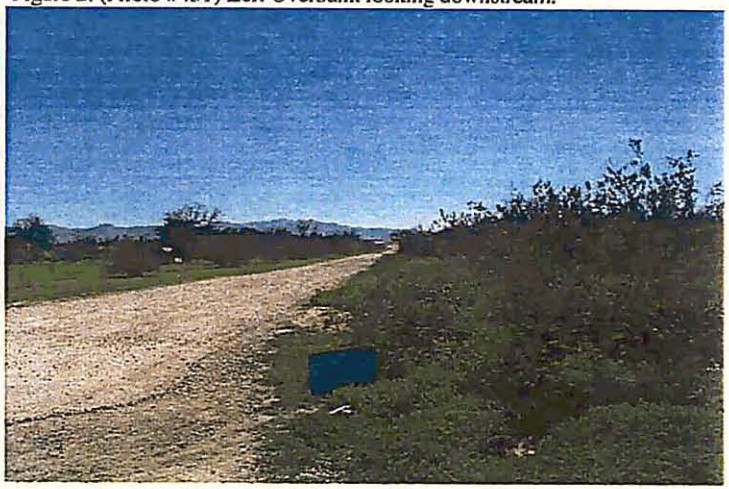


Figure 3. (Photo #432) Right Overbank looking downstream.

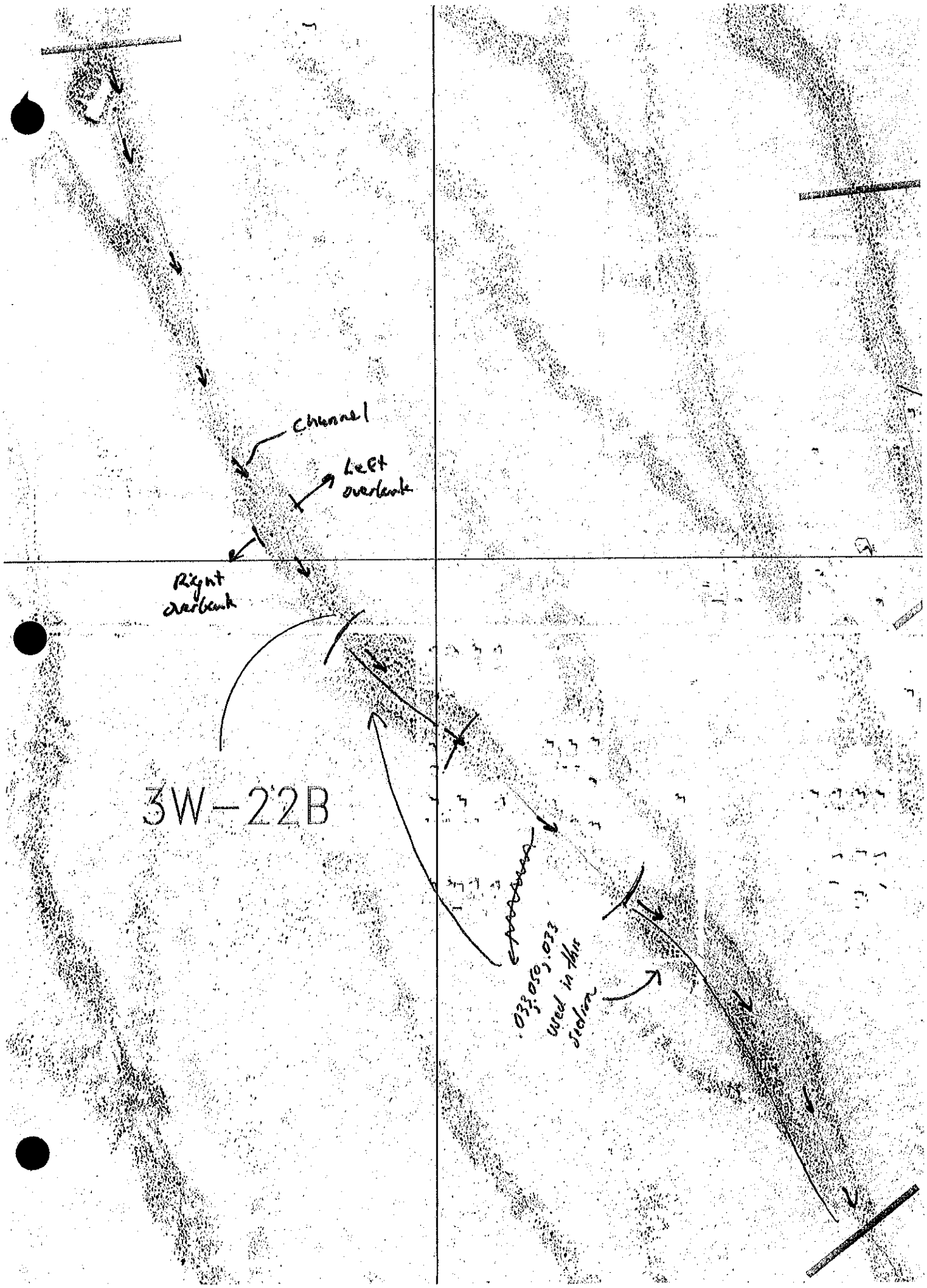

channel
left overbank
Right overbank
3W-22B
033,050,033 used in this section

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/21/2005

Project: Wittmann ADMSU
Stream: Wash 3 West
Location: Reach - 3W - 23 (Between just south of Dixileta Dr. alignment and south of Lone Mtn. Rd. alignment.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.045**	**0.033**

Figure E-1
(3W - 23)

Figure 1. (Photo #433) Channel looking downstream.

Figure 2. (Photo #434) Left Overbank looking downstream.

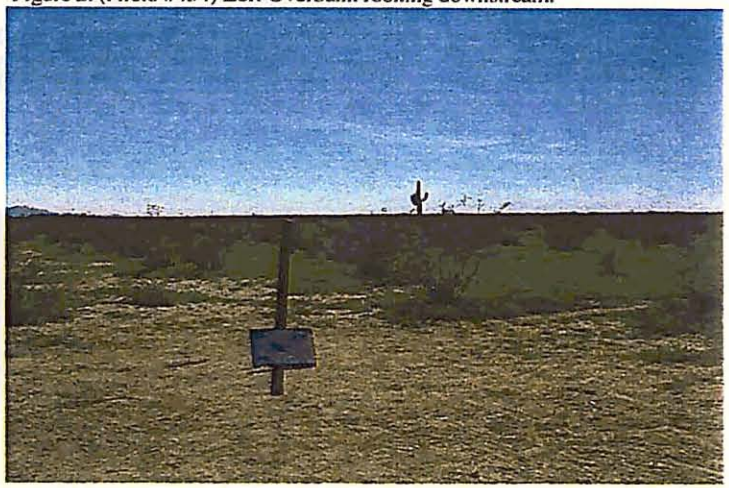
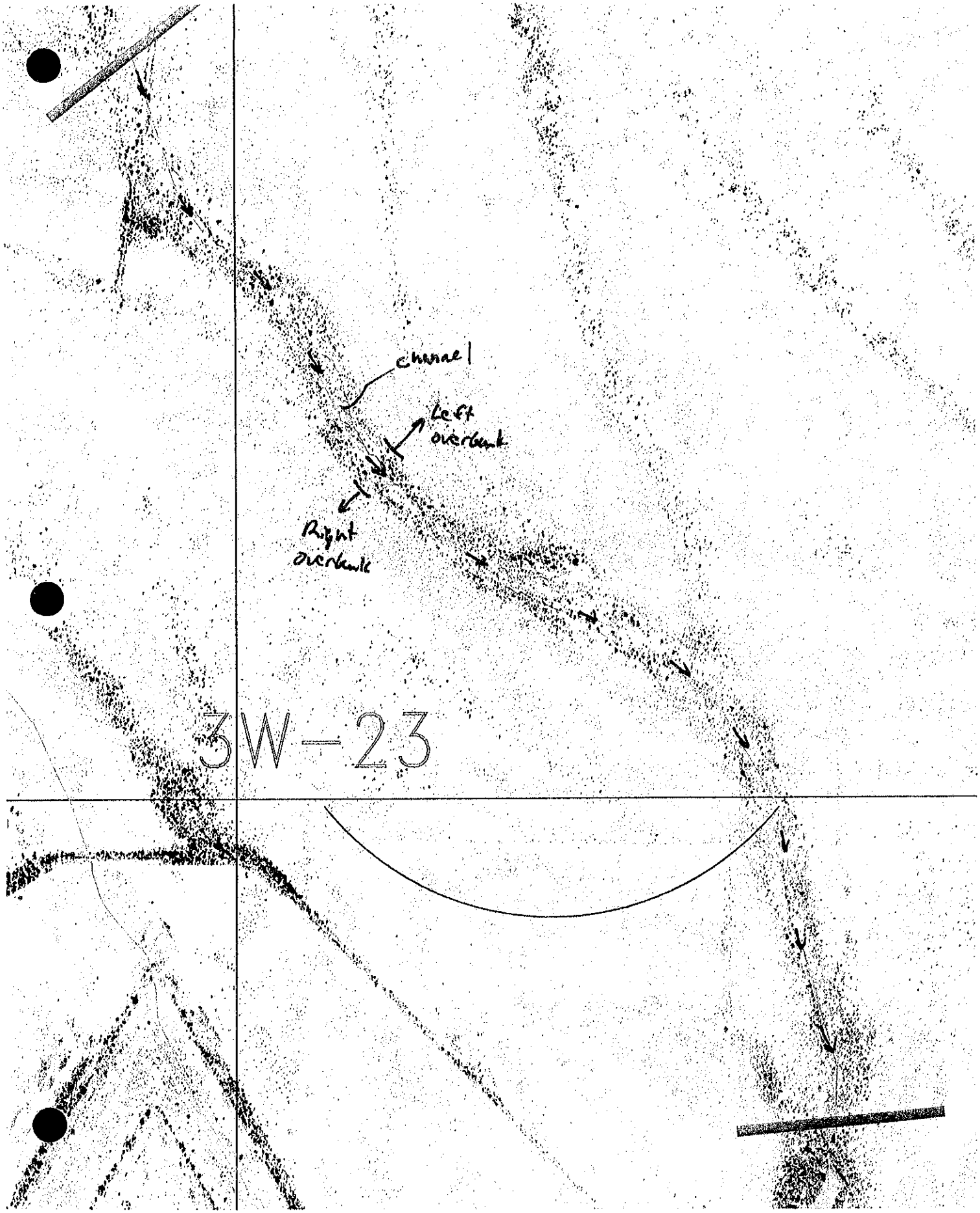


Figure 3. (Photo #435) Right Overbank looking downstream.


channel
Left overbank
Right overbank
3W-23

Wash T4N-R3W-S08E

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/21/2005

Project: Wittmann ADMSU
Stream: Wash T4N-R3W-S8E
Location: Reach - T4N-R3W-S8E - 20 (Between confluence with 3 West and 1/4 mile south of Jomax Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010		0.010
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.043**	**0.035**

Figure E-1
(T4N-R3W-S8E - 20)

Figure 1. (Photo #436) Channel looking upstream.

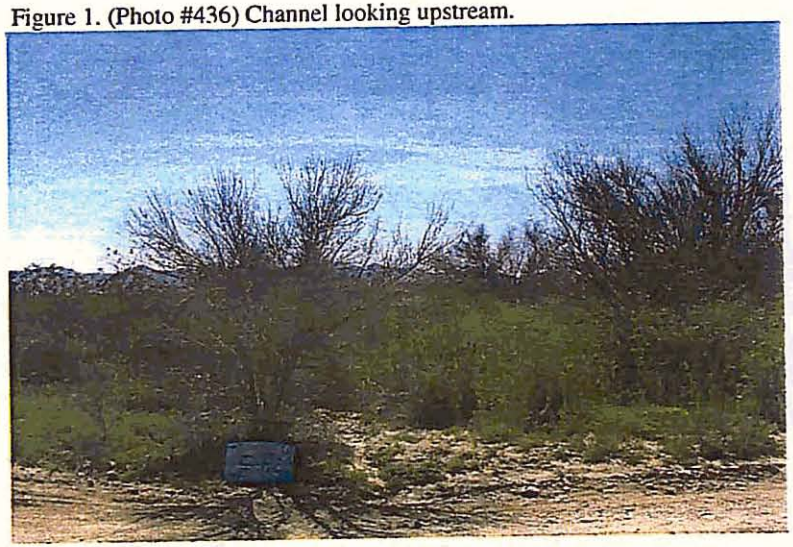


Figure 2. (Photo #437) Left Overbank looking upstream.

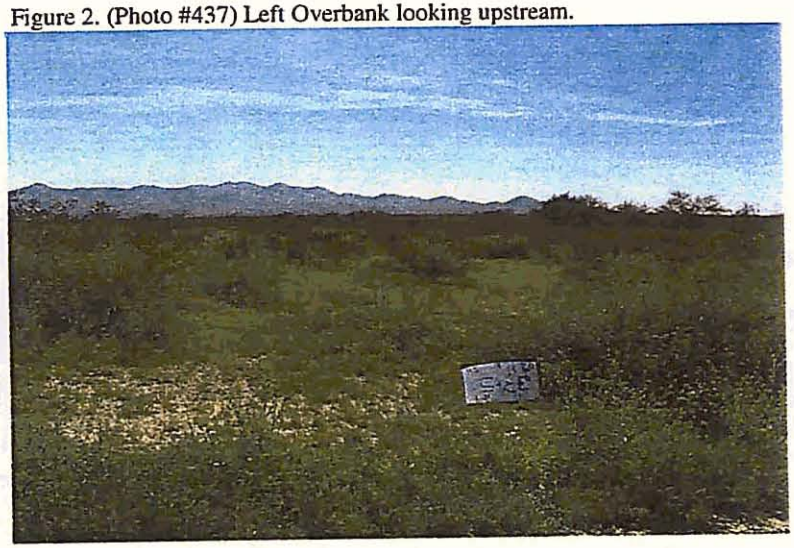
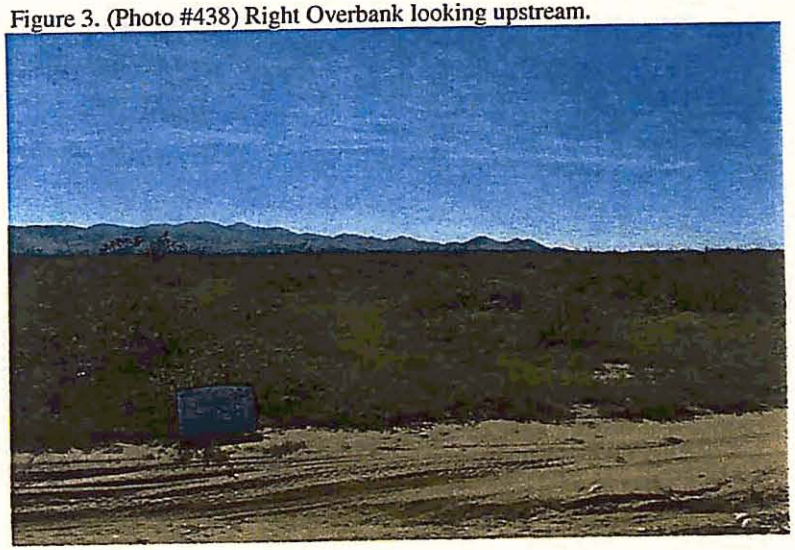


Figure 3. (Photo #438) Right Overbank looking upstream.



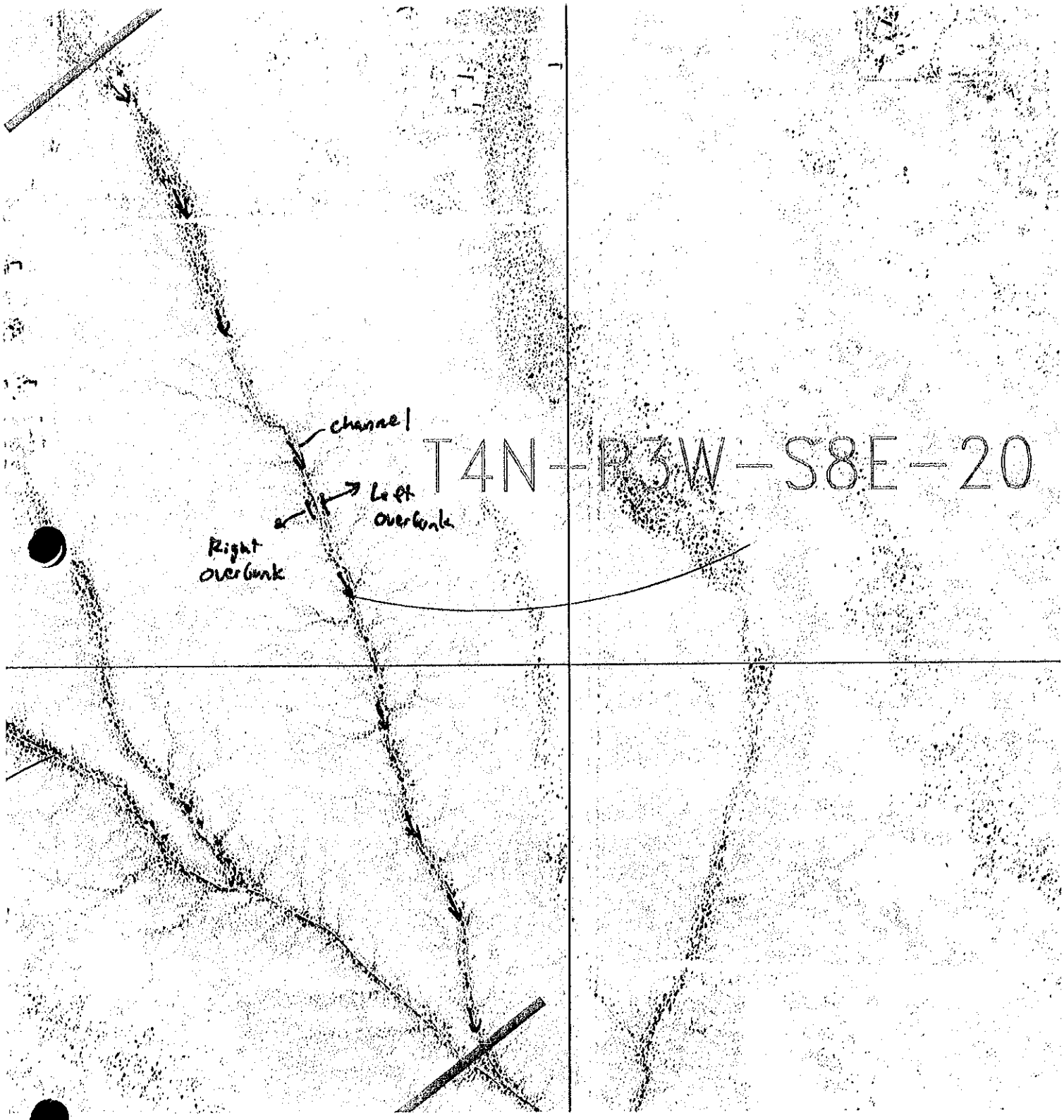

channel
T4N--R3W--S8E--20
Left overbank
Right overbank

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/21/2005

Project: Wittmann ADMSU
Stream: Wash T4N-R3W-S8E
Location: Reach - T4N-R3W-S8E - 21 (Between 1/4 mile south of Jomax Rd. and Pinnacle Vista Dr. alignment.)

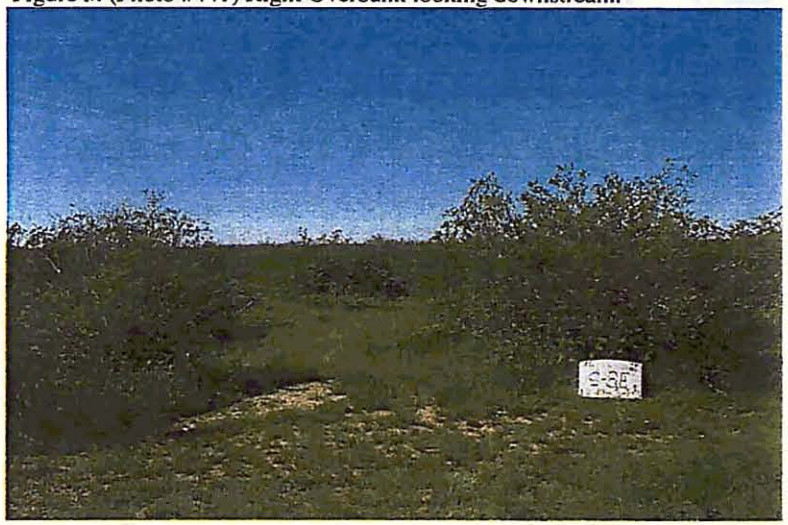
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.002	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.018	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		
	Occ. Alt.		.001-.005		0.001	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.048**	**0.037**

Figure E-1
(T4N-R3W-S8E - 21)

Figure 1. (Photo #439) Channel looking downstream.

Figure 2. (Photo #440) Left Overbank looking downstream.

Figure 3. (Photo #441) Right Overbank looking downstream.



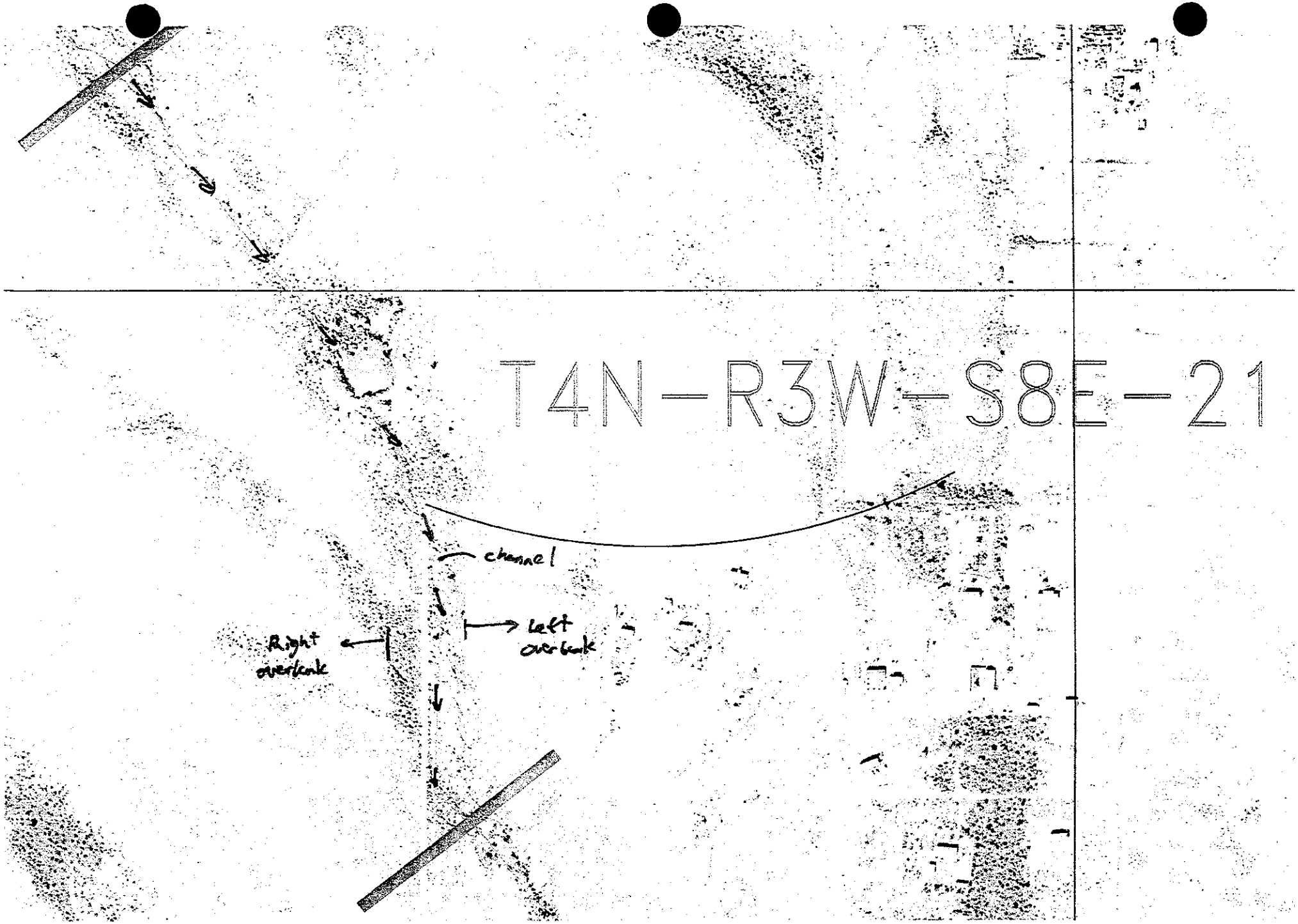

T4N-R3W-S8E-21
channel
Left overbank
Right overbank

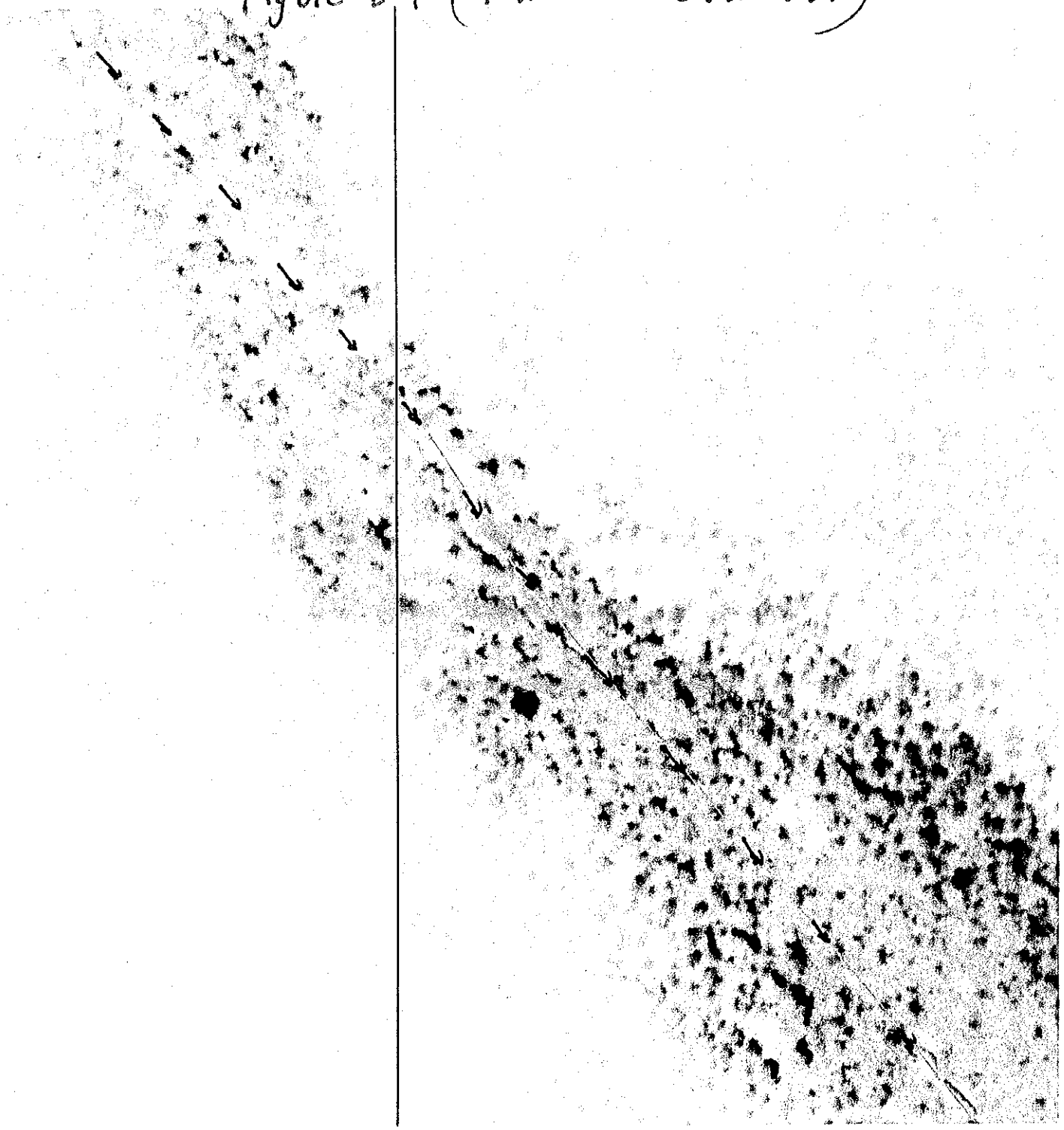
Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/21/2005

Project: Wittmann ADMSU
Stream: Wash T4N-R3W-S8E
Location: Reach - T4N-R3W-S8E - 22A (Between Pinnacle Vista Dr. alignment and 1/4 mile south of Patton Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.025	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.050**	**0.035**

Figure E-1 (T4N- R3W- S8E- 22A)



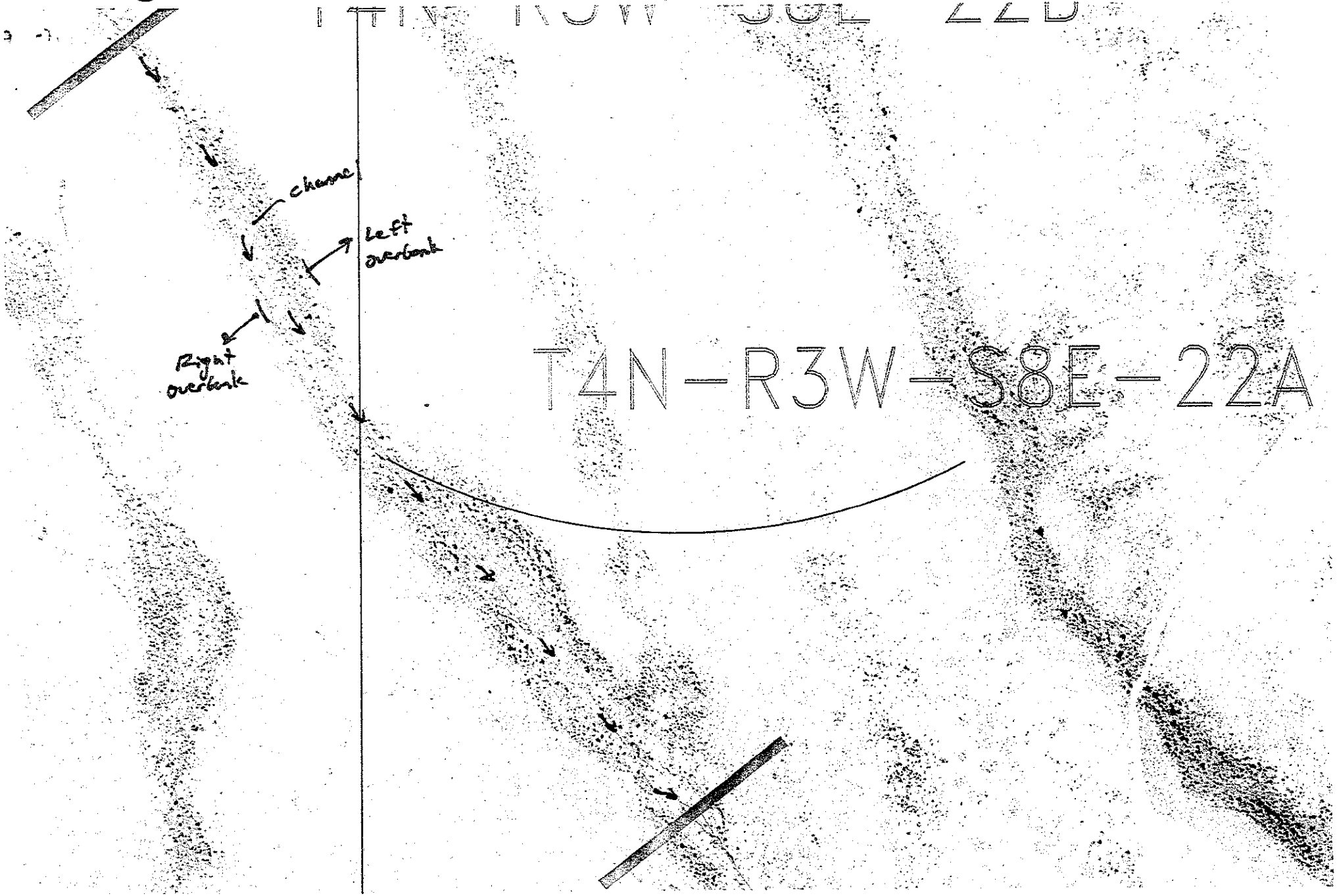

channel
Left overbank
Right overbank
T4N-R3W-S8E-22A

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/21/2005

Project: Wittmann ADMSU
Stream: Wash T4N-R3W-S8E
Location: Reach - T4N-R3W-S8E - 22B (Between 1/4 mile south of Patton Rd. and Patton Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010		0.010
	Medium		.010-.025		0.012	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.037**	**0.035**

Figure E-1
(T4N-R3W-S8E - 22B)

Figure 1. (Photo #442) Channel looking downstream.

Figure 2. (Photo #443) Left Overbank looking downstream.

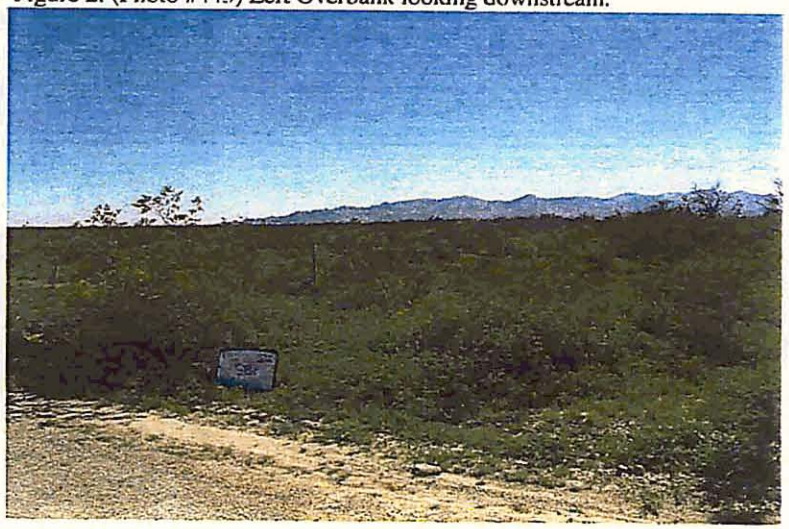


Figure 3. (Photo #444) Right Overbank looking downstream.

Channel
Left overbank
Right overbank
T4N-R3W-S8E-22B

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/21/2005

Project: Wittmann ADMSU
Stream: Wash T4N-R3W-S8E
Location: Reach - T4N-R3W-S8E - 23 (Between Patton Rd. and Peak View Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004		0.000	0.000
	Minor		.005-.015	0.002		
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.018	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.037**	**0.044**	**0.035**

Figure E-1
(T4N-R3W-S8E - 23)

Figure 1. (Photo #445) Channel looking downstream.

Figure 2. (Photo #446) Left Overbank looking downstream.

Figure 3. (Photo #447) Right Overbank looking downstream.

T4N-R3W-S8E-23
Channel
Left overbank
Right overbank

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/21/2005

Project: Wittmann ADMSU
Stream: Wash T4N-R3W-S8E
Location: Reach - T4N-R3W-S8E - 24 (Between Peak View Rd. and 1/2 mile north of Dixileta Dr. alignment.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.022	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.047**	**0.035**

Figure E-1
(T4N-R3W-S8E - 24)

Figure 1. (Photo #448) Channel looking downstream.

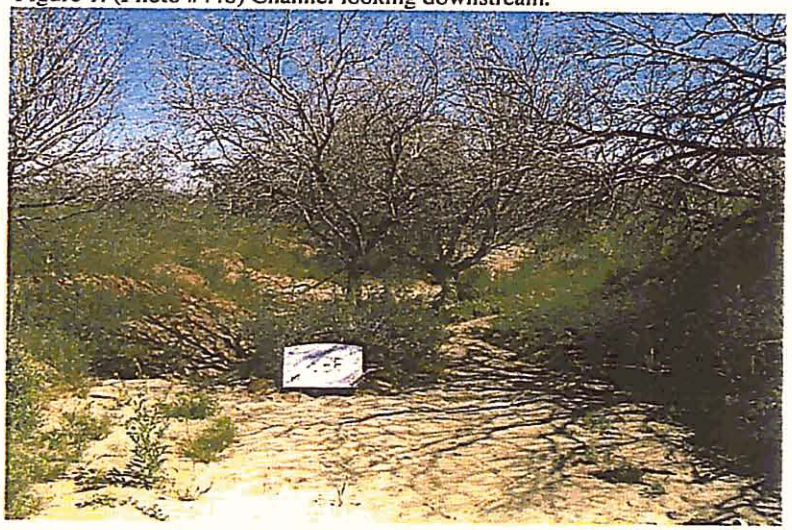


Figure 2. (Photo #449) Left Overbank looking downstream.

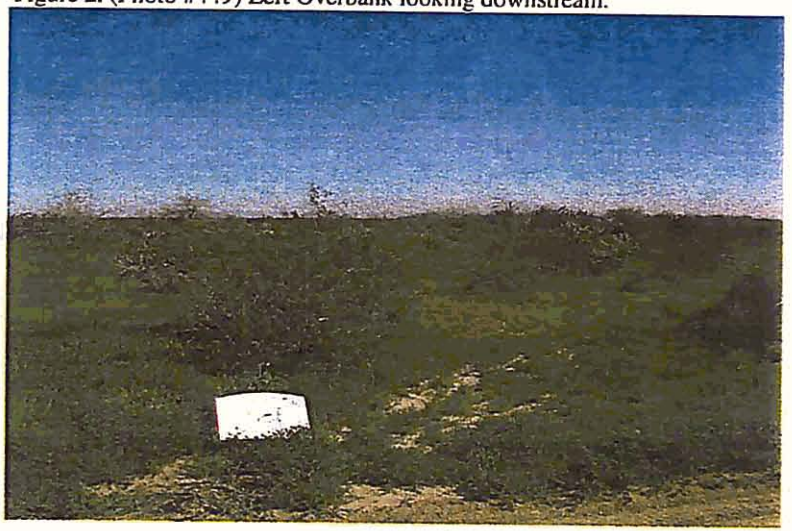


Figure 3. (Photo #450) Right Overbank looking downstream.

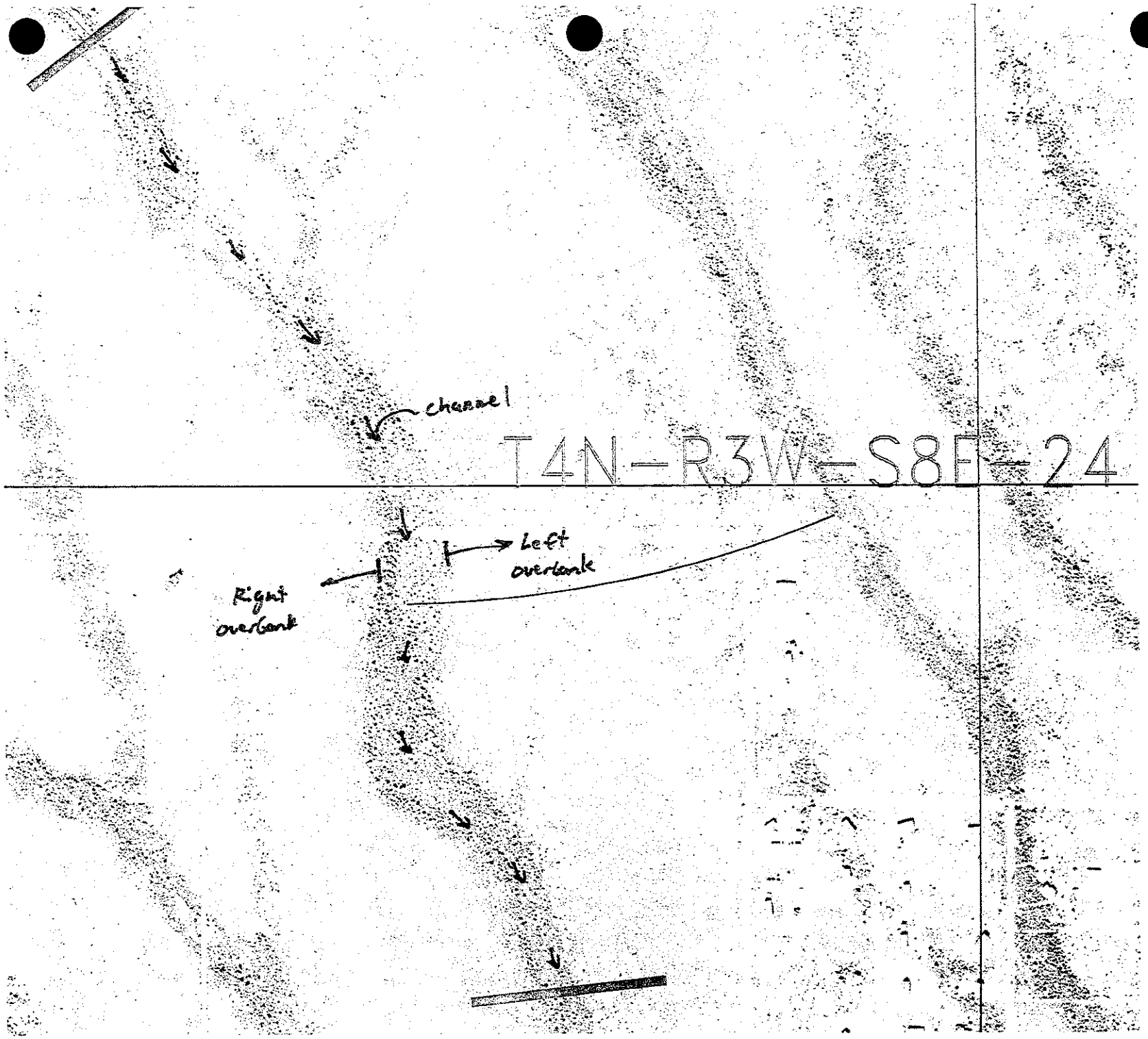

channel
T4N—R3W—S8F—24
Left overbank
Right overbank

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/21/2005

Project: Wittmann ADMSU
Stream: Wash T4N-R3W-S8E
Location: Reach - T4N-R3W-S8E - 25 (Between 1/2 mile north of Dixileta Dr. alignment and Lone Mtn. Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.022	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.047**	**0.035**

Figure E-1
(T4N-R3W-S8E - 25)

Figure 1. (Photo #451) Channel looking downstream.

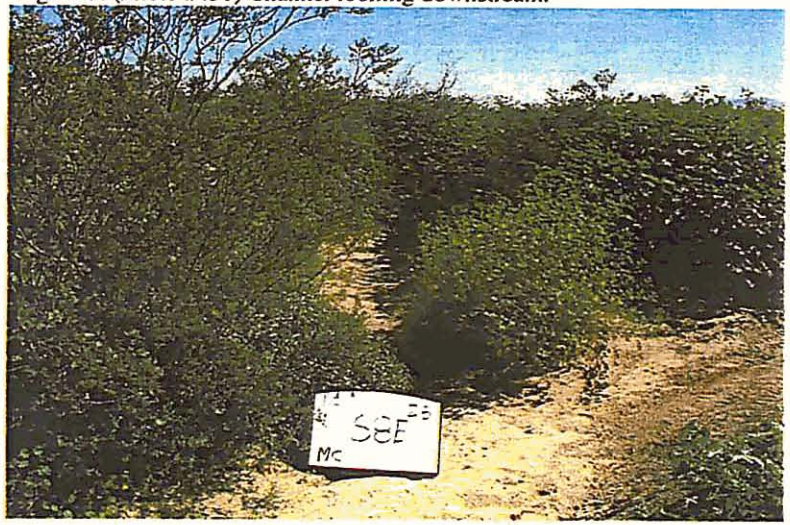
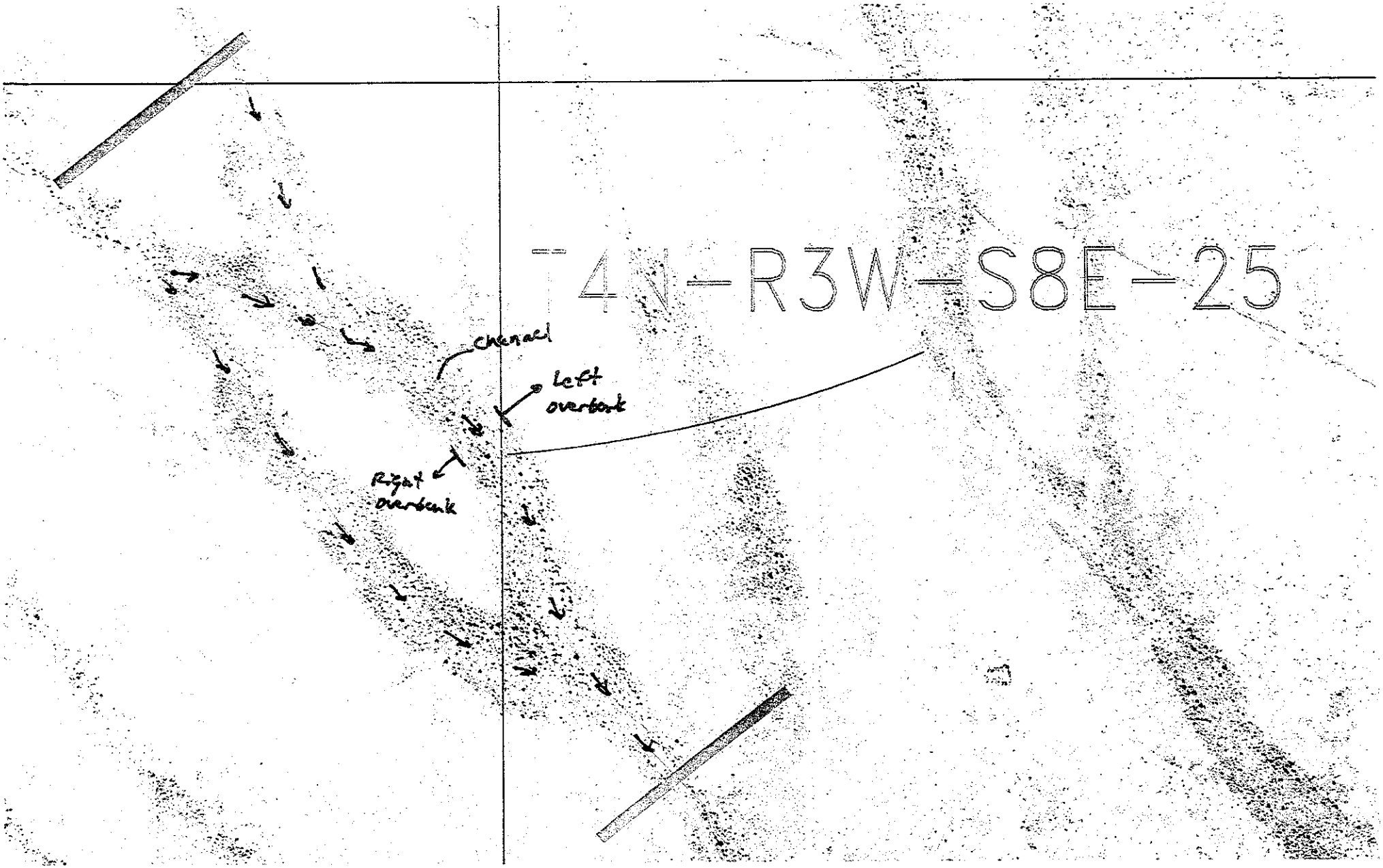


Figure 2. (Photo #452) Left Overbank looking downstream.

Figure 3. (Photo #453) Right Overbank looking downstream.


T4N-R3W-S8E-25
channel
left overbank
Right overbank

Iona Wash

Table E-1

BY AMB DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Iona Wash
Location: Reach - Iona - 20 (Between Jomax Rd. and north of CAP Canal)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.004		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.001	
	Freg. Alt.		.010-.015			
				0.030	0.047	0.034
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.030**	**0.047**	**0.034**

Figure 1. (Photo #271) Channel looking downstream.

Figure 2. (Photo #273) Left Overbank looking downstream.

Figure 3. (Photo #272) Right Overbank looking downstream.

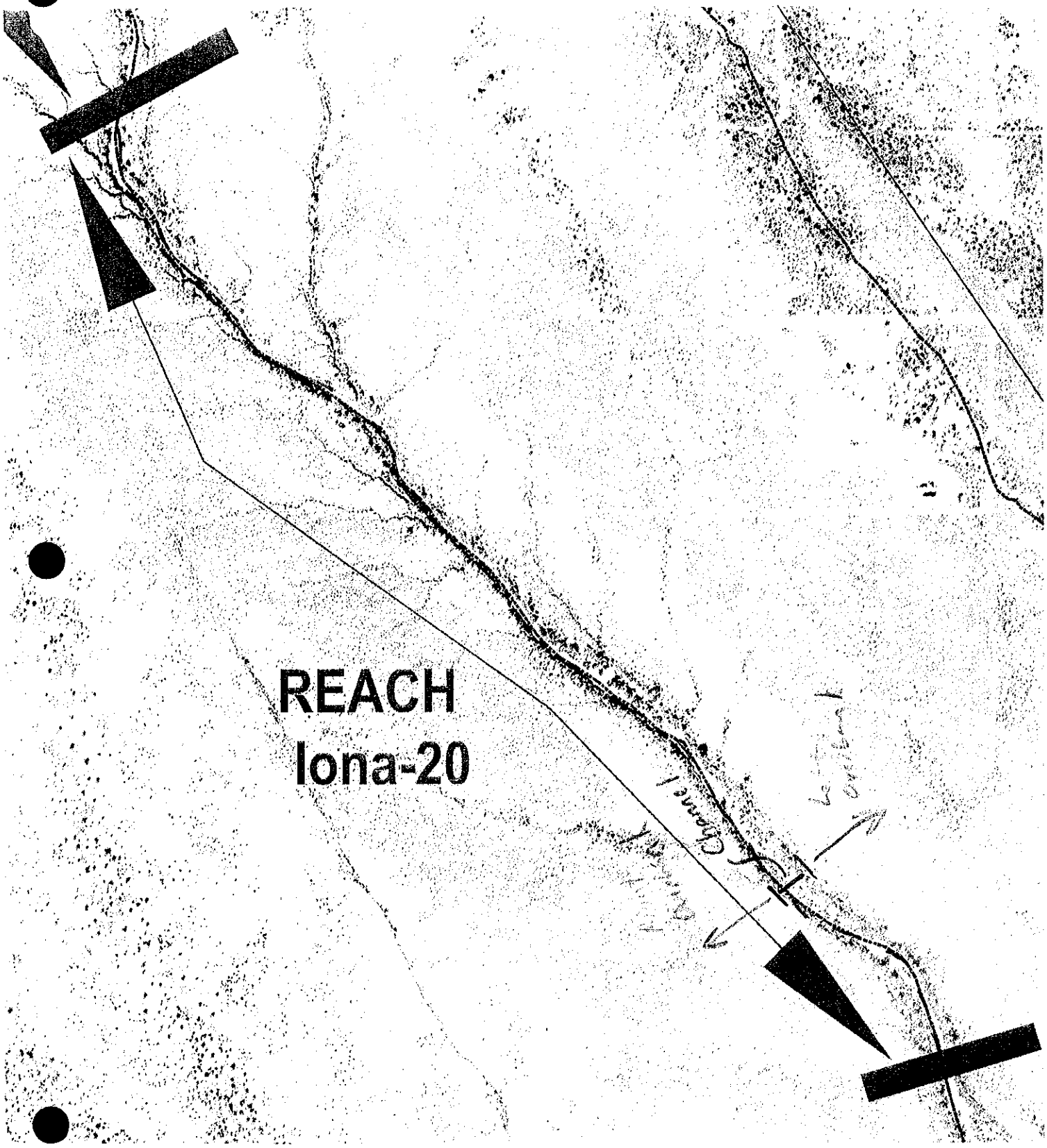

REACH
Iona-20

Table E-1

BY AMB DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Iona Wash
Location: Reach - Iona - 21 (Between Pinnacle Vista Dr. and Jomax Rd.)

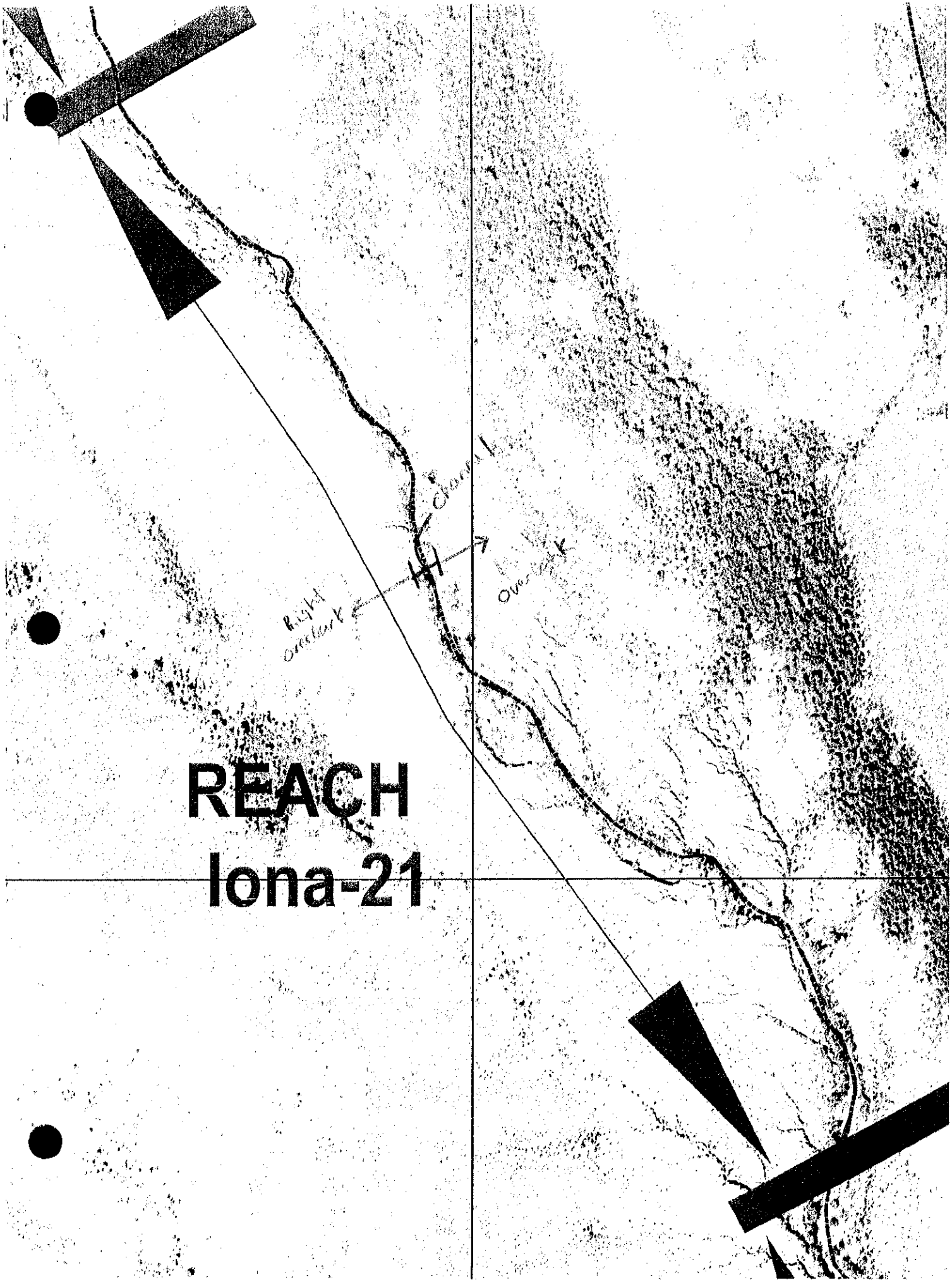
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.004	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.001	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.004		0.004
	Medium		.010-.025		0.017	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
				0.031	0.049	0.030
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.031**	**0.049**	**0.030**

Figure E-1
(Iona - 21)

Figure 1. (Photo #269) Channel looking downstream.

Figure 2. (Photo #268) Right Overbank looking downstream.

Figure 3. (Photo #270) Left Overbank looking upstream.



REACH
Iona-21

Table E-1

BY AMB DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Iona Wash
Location: Reach - Iona - 22 (Between Peak View Rd. and Pinnacle Vista Dr.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.025	0.028	0.025
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.009		
	Medium		.010-.025			0.017
	Large		.025-.050		0.030	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.001	0.002
	Freg. Alt.		.010-.015			
				0.036	0.059	0.044
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.059**	**0.044**

Figure E-1
(Iona - 22)

Figure 1. (Photo #256) Channel looking upstream.

Figure 2. (Photo #257) Right Overbank looking downstream.

Figure 3. (Photo #258) Left Overbank looking downstream.

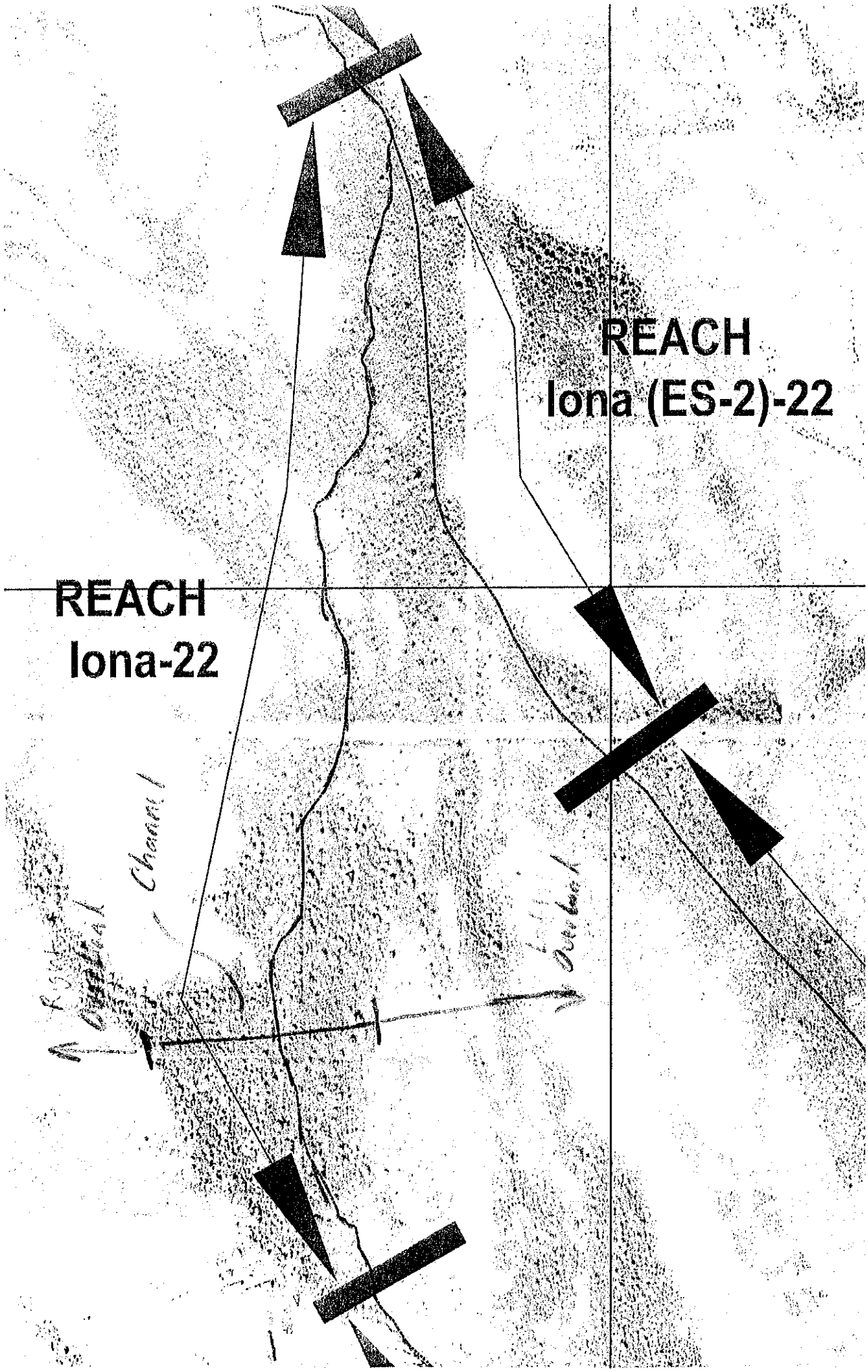

REACH
Iona (ES-2)-22
REACH
Iona-22

Table E-1

BY AMB DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Iona Wash
Location: Reach - Iona - 23 (Between just north of Dixileta Dr. and Peak View Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.006		0.008
	Medium		.010-.025		0.020	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.001
	Freg. Alt.		.010-.015			
				0.034	0.050	0.035
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.050**	**0.035**

Figure E-1
(Iona - 23)

Figure 1. (Photo #367) Channel looking upstream.

Figure 2. (Photo #366) Right Overbank looking downstream.

Figure 3. (Photo #368) Left Overbank looking downstream.

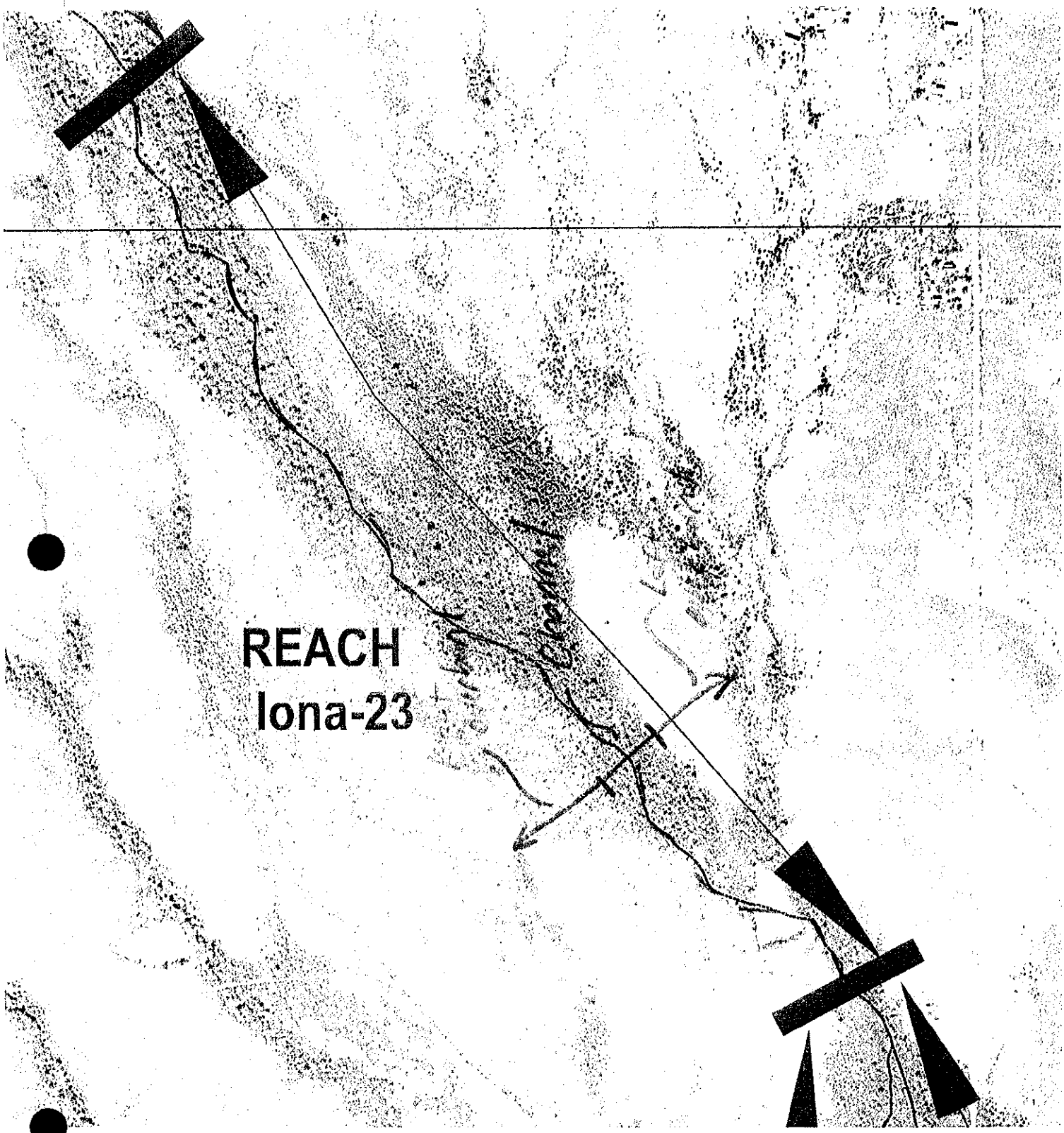

REACH
Iona-23

Table E-1

BY AMB DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Iona Wash
Location: Reach - Iona - 24 (Between just north of Lone Mountain Rd. and just north of Dixileta Dr.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			0.006
	Medium		.010-.025	0.012	0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.000	0.001
	Freg. Alt.		.010-.015			
				0.039	0.046	0.033
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.039**	**0.046**	**0.033**

Figure E-1
(Iona - 24)

Figure 1. (Photo #253) Channel looking upstream.

Figure 2. (Photo #254) Right Overbank looking downstream.

Figure 3. (Photo #255) Left Overbank looking downstream.

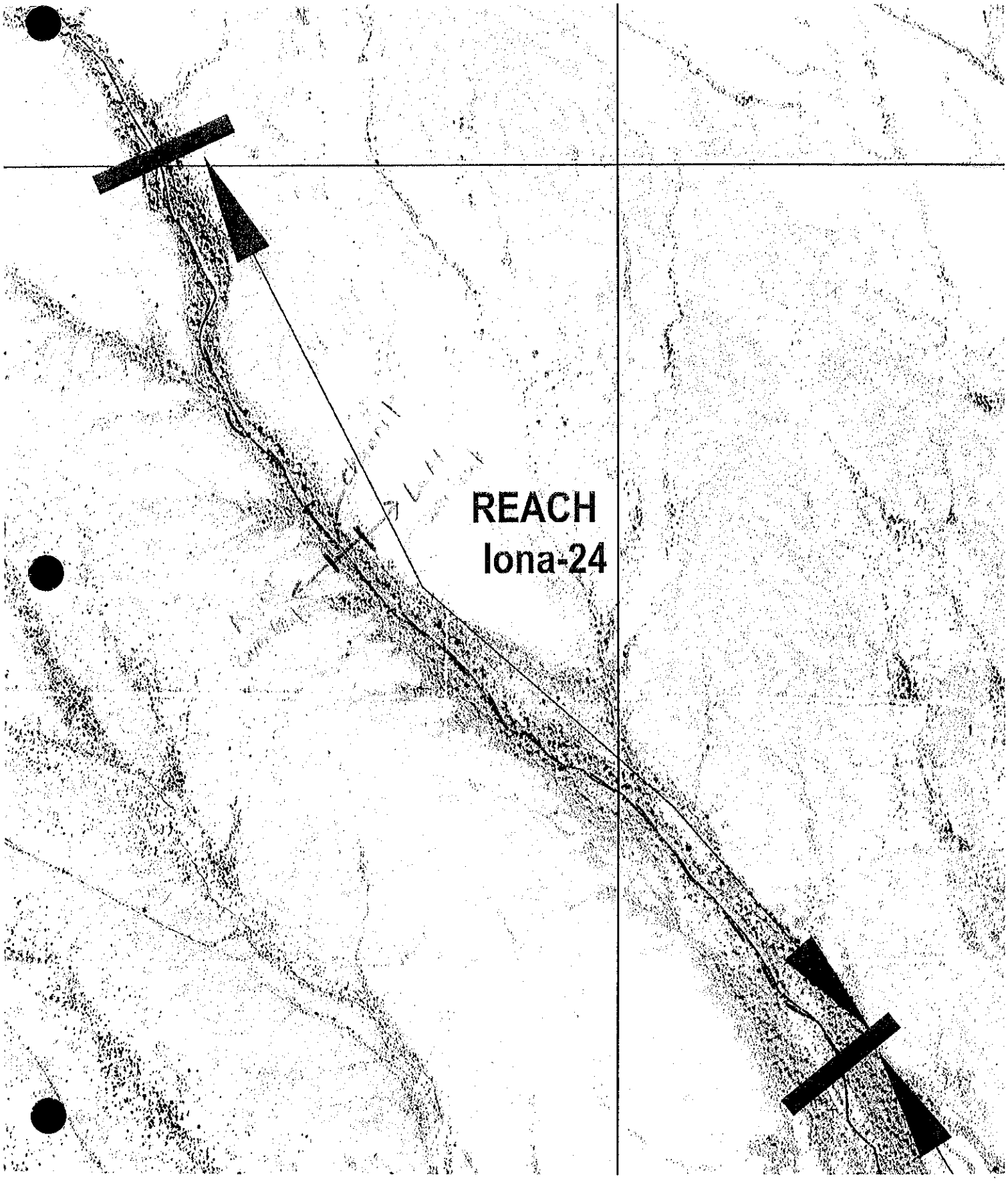

REACH
Iona-24

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona Wash
Location: Reach - Iona - 25 (Between Carefree Hwy. and 1/2 mile south of Black Mountain Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.003	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.012	0.020	0.012
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0		0.000	
	Occ. Alt.		.001-.005	0.001		0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.039**	**0.051**	**0.039**

Figure E-1
(Iona - 25)

Figure 1. (Photo #251) Channel looking upstream.

Figure 2. (Photo #250) Right Overbank looking downstream.

Figure 3. (Photo #252) Left Overbank looking downstream.

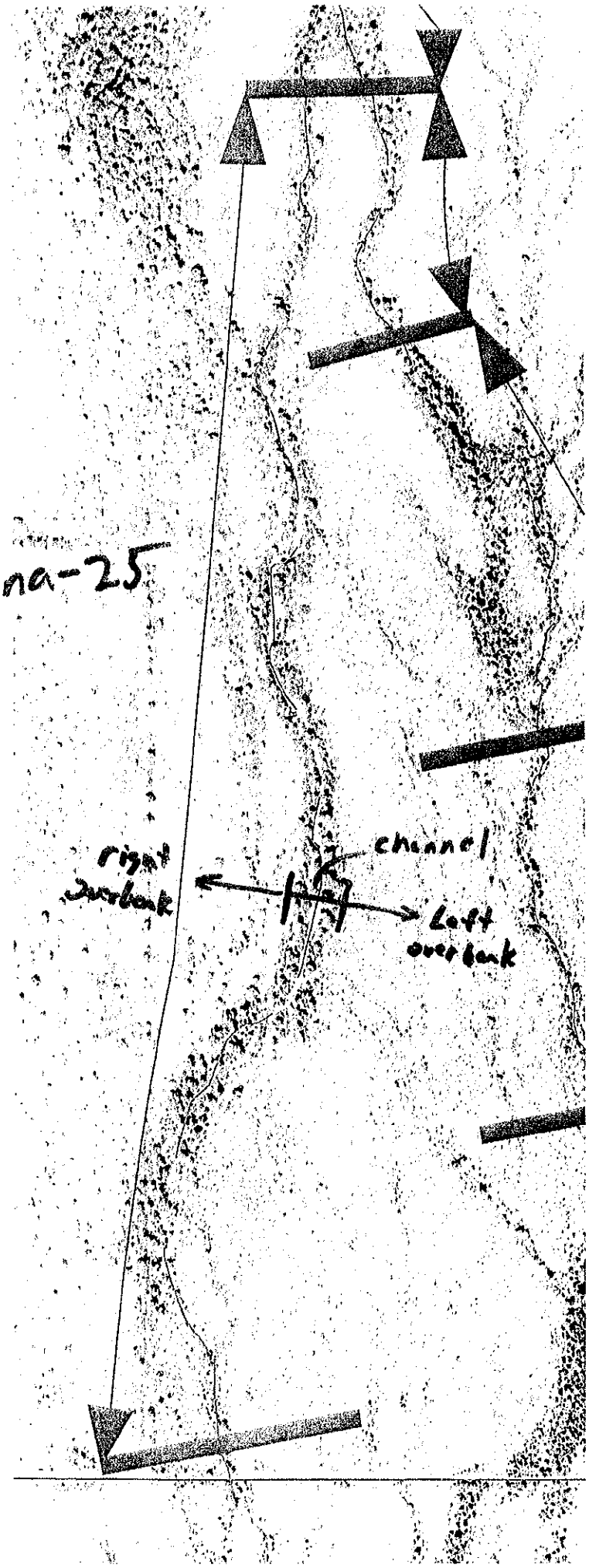

Iona-25
right overbank
channel
Left overbank

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona Wash
Location: Reach - Iona - 26 (Between 1/2 mile south of Black Mountain Rd. to Black Mountain Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.003	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.015	0.025	0.012
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.000	0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.042**	**0.056**	**0.039**

Figure E-1
(Iona - 26)

Figure 1. (Photo #247) Channel looking downstream.

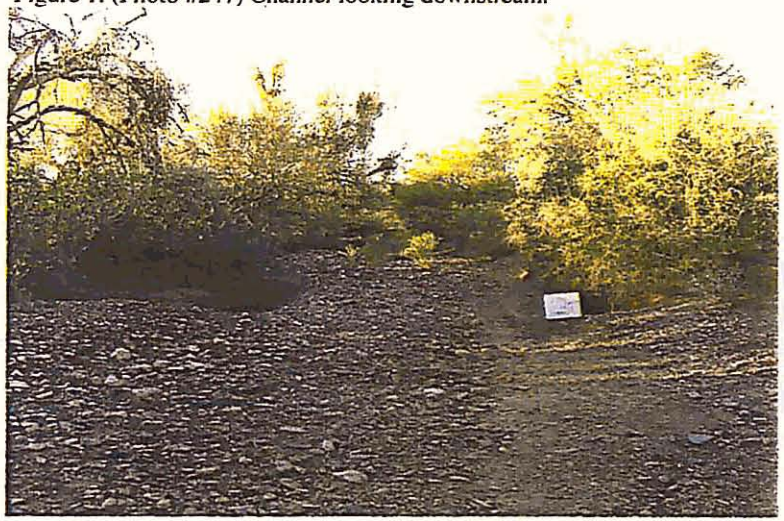


Figure 2. (Photo #248) Right Overbank looking downstream.

Figure 3. (Photo #249) Left Overbank looking downstream.

REACH
Iqna-26
Channel
Left
Right

Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/18/2005

Project: Wittmann ADMSU
Stream: Iona Wash
Location: Reach - Iona - 27 (Between Black Mtn. Rd. and 1/4 mile north of Black Mtn. Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.012	0.020	0.012
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.003	0.003	0.003
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.041**	**0.050**	**0.043**

Figure E-1
(Iona - 27)

Figure 1. (Photo #392) Channel looking downstream.

Figure 2. (Photo #393) Right Overbank looking downstream.

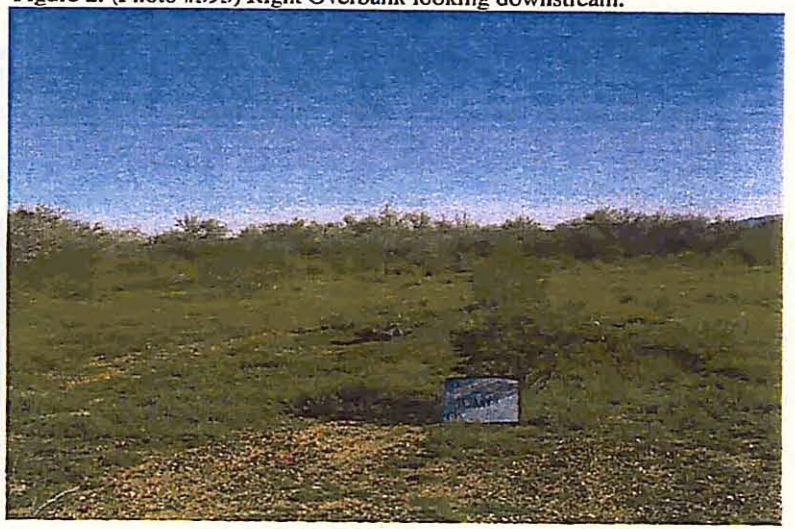
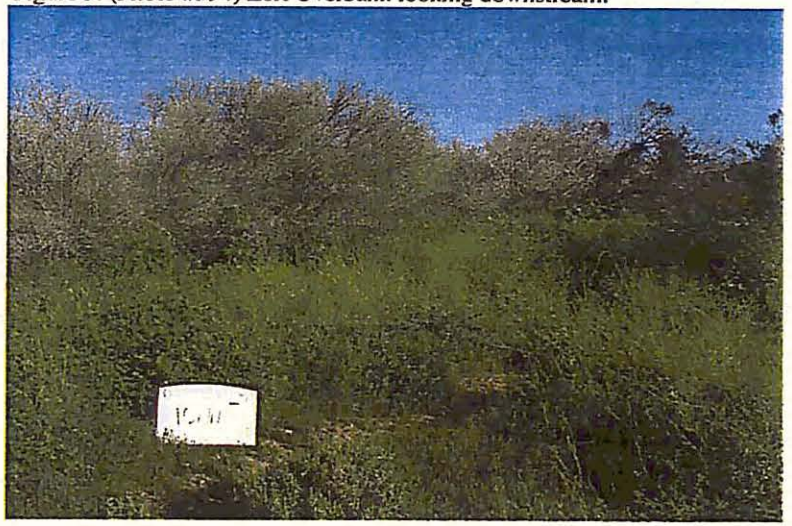


Figure 3. (Photo #394) Left Overbank looking downstream.



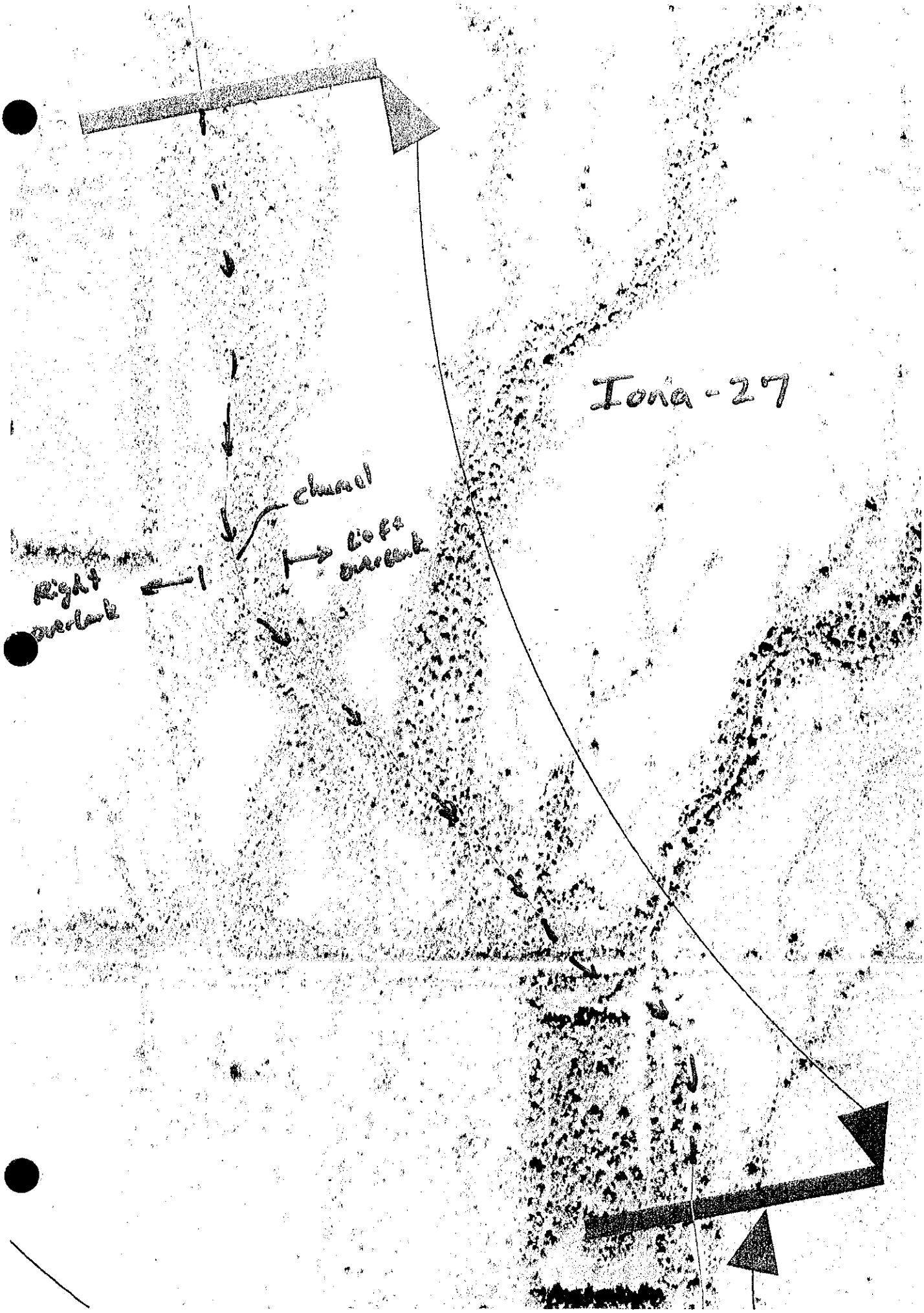

Iona - 27
channel
Left overbank
Right overbank

Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/18/2005

Project: Wittmann ADMSU
Stream: Iona Wash
Location: Reach - Iona - 28 (Between 1/4 mile and 3/4 mile north of Black Mtn. Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.041**	**0.033**

Figure E-1 (Iona-28)

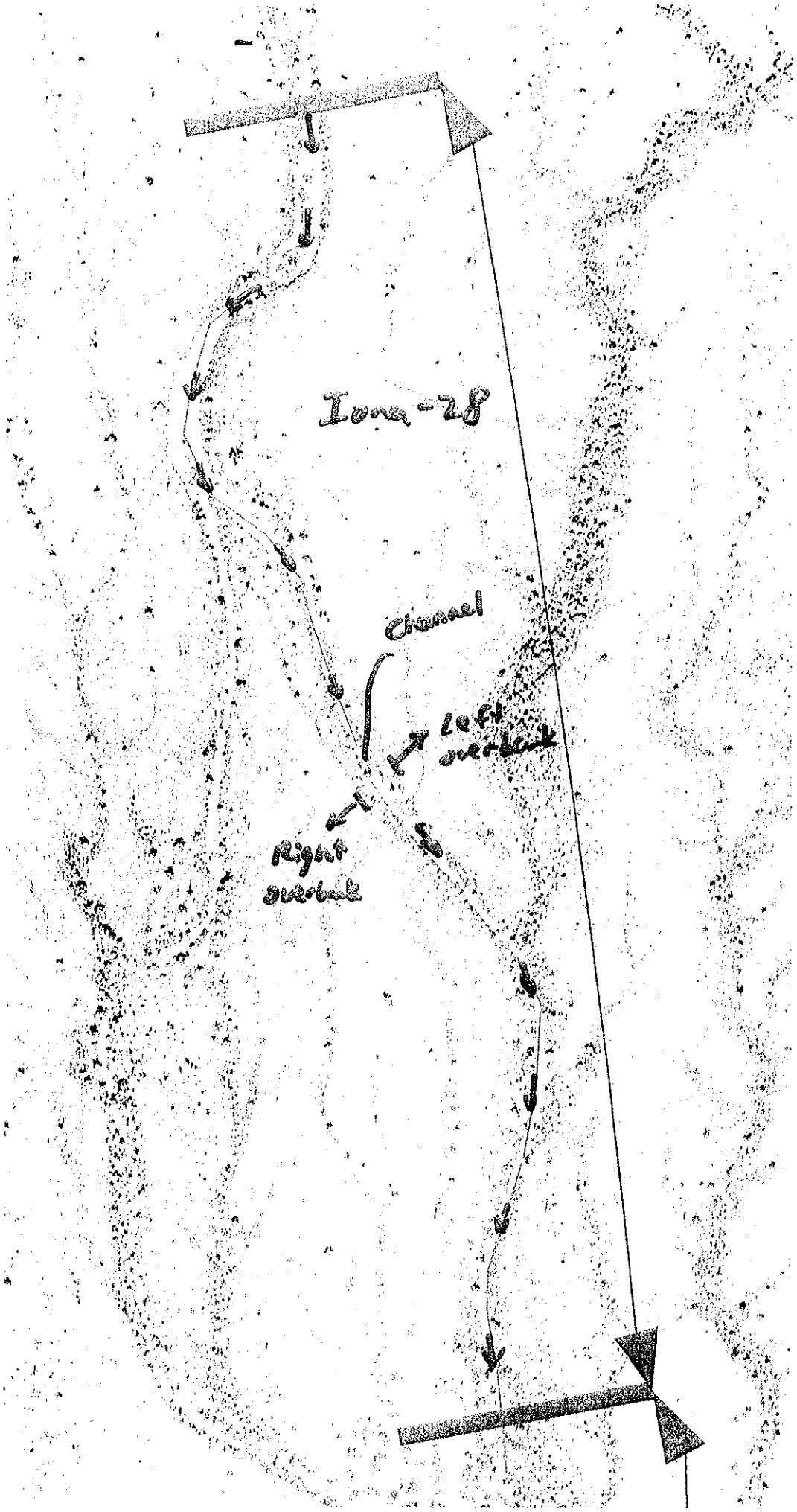

Ion-28
Channel
Left overbank
Right overbank

Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/18/2005

Project: Wittmann ADMSU
Stream: Iona Wash
Location: Reach - Iona - 29 (Between 3/4 mile north of Black Mtn. Rd. and the U.S. 60.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004			
	Minor		.005-.015	0.005	0.005	0.005
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.013	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.041**	**0.048**	**0.041**

Figure E-1
(Iona - 29)

Figure 1. (Photo #395) Channel looking downstream.

Figure 2. (Photo #396) Right Overbank looking downstream.

Figure 3. (Photo #397) Left Overbank looking downstream.

Iona - 29
channel
Right
overbank
Left
overbank

Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/18/2005

Project: Wittmann ADMSU
Stream: Iona Wash
Location: Reach - Iona - 30 (Between The U.S. 60 and 1/2 mile north of the U.S. 60.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.042**	**0.033**

Figure E-1
(Iona - 30)

Figure 1. (Photo #398) Channel looking upstream.

Figure 2. (Photo #399) Right Overbank looking upstream.

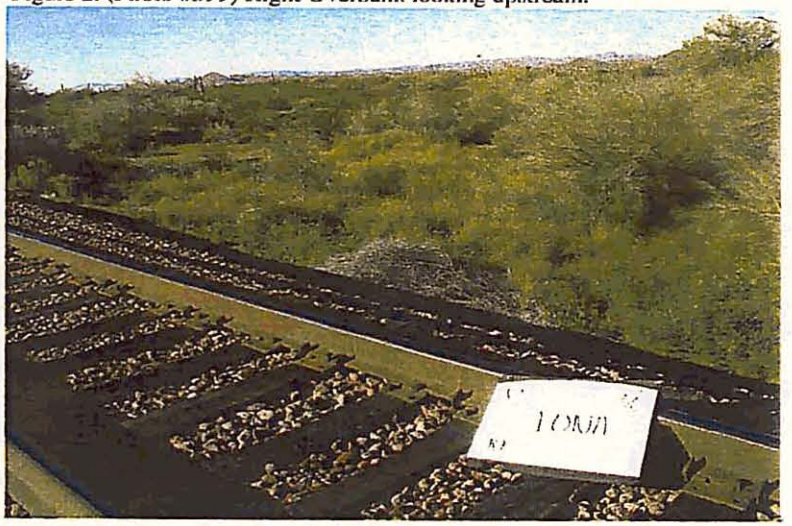


Figure 3. (Photo #400) Left Overbank looking upstream.

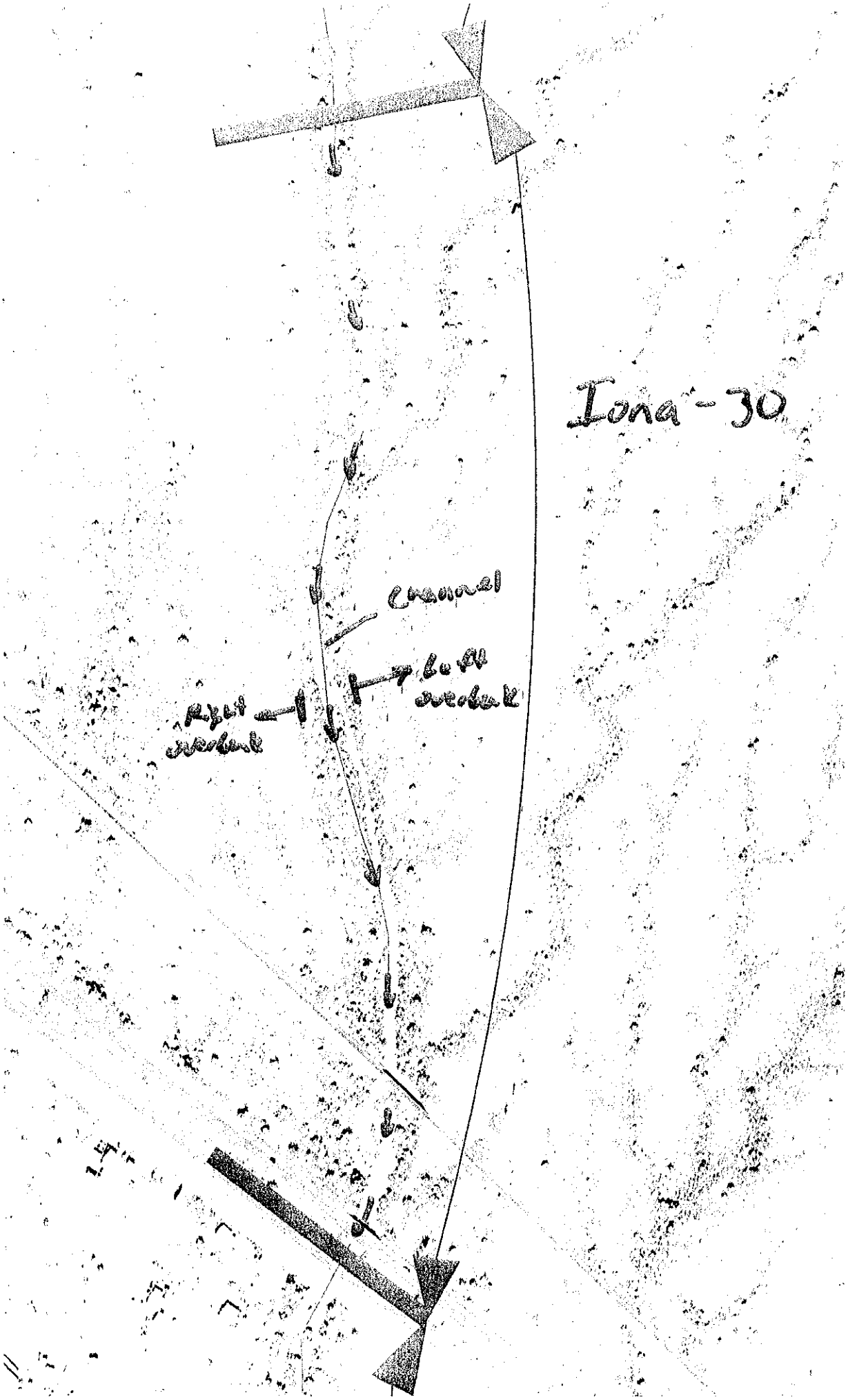

Iona - 30
channel
left bank
right bank

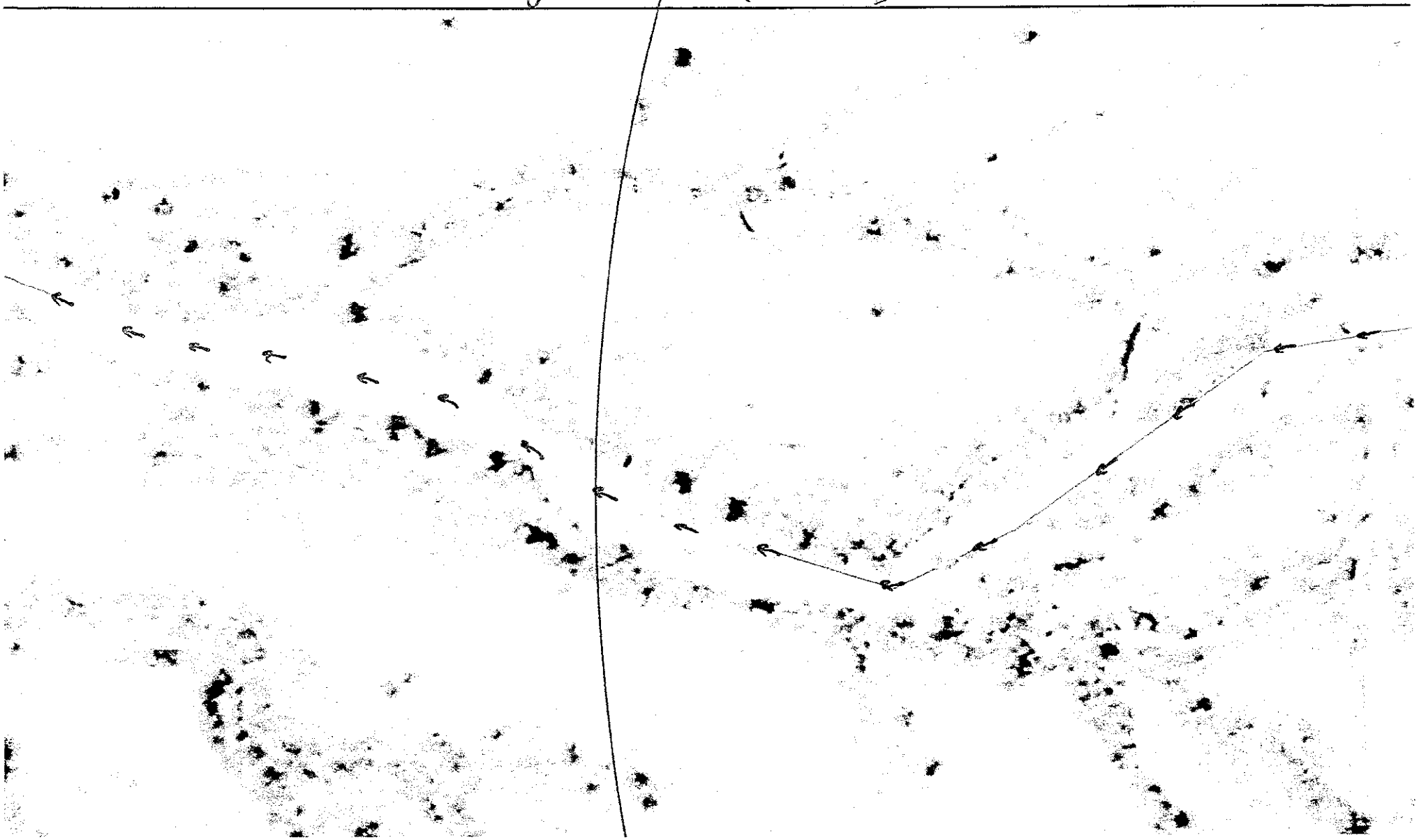
Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/18/2005

Project: Wittmann ADMSU
Stream: Iona Wash
Location: Reach - Iona - 31 (Between 1/2 to 1 mile north of the U.S. 60.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.002	0.002	0.002
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.011	0.015	0.011
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.003	0.003	0.003
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.041**	**0.046**	**0.041**

Figure E-1 (Zona-31)



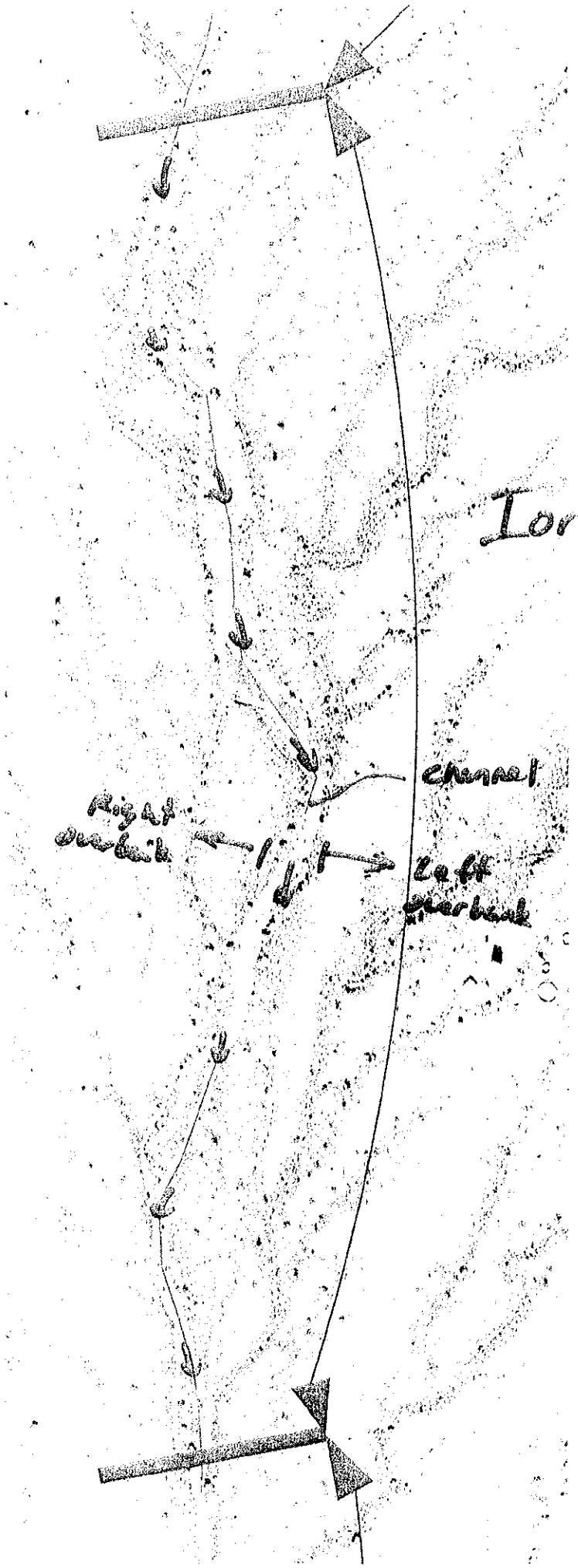

Iona - 31
channel
right overbank
left overbank

Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/18/2005

Project: Wittmann ADMSU
Stream: Iona Wash
Location: Reach - Iona - 32 (Between 1 mile north of the U.S. 60 and S.R. 74)

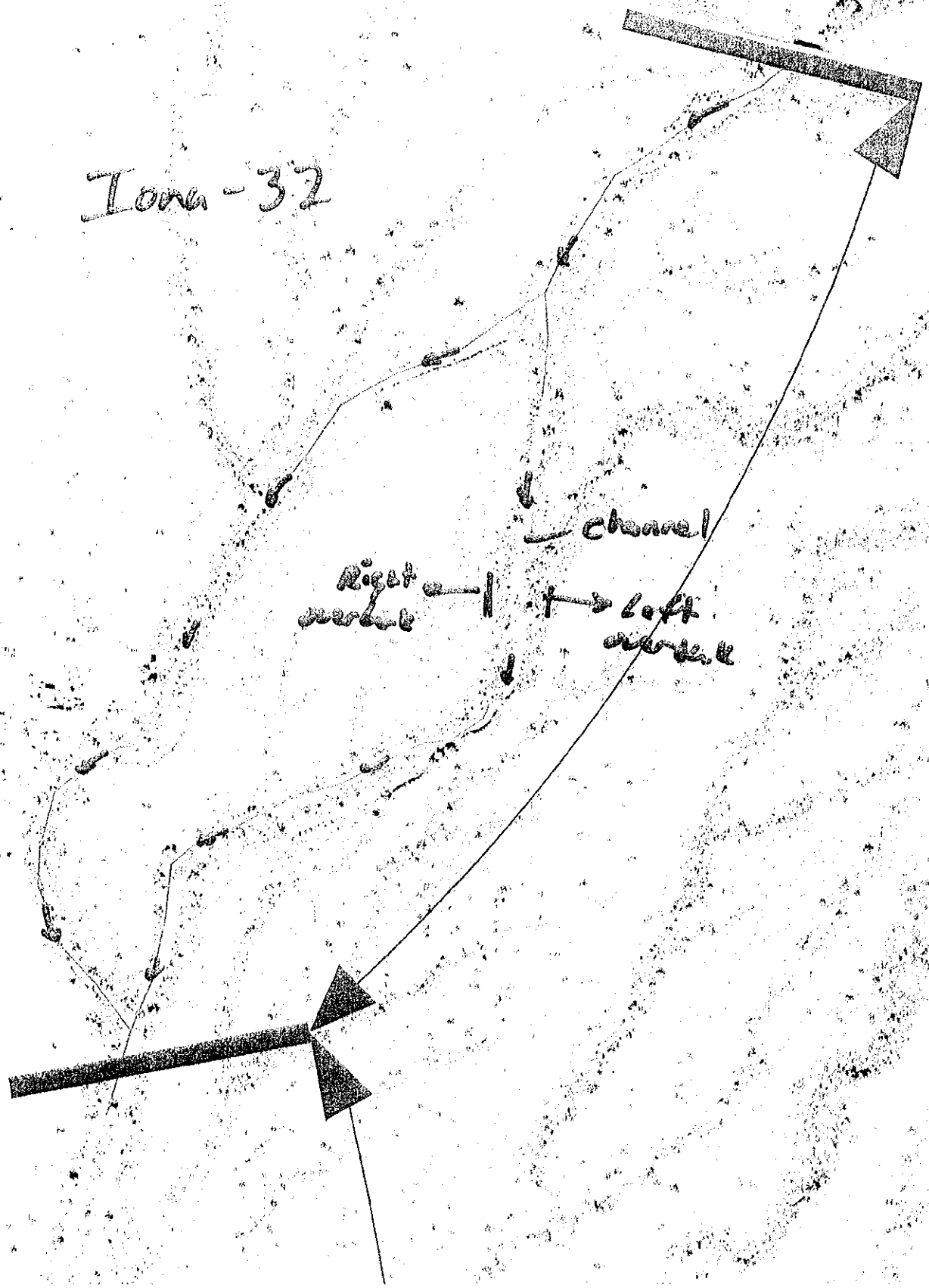
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.013	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.039**	**0.033**

Figure E-1
(Iona - 32)

Figure 1. (Photo #401) Channel looking downstream.

Figure 2. (Photo #402) Right Overbank looking upstream.

Figure 3. (Photo #403) Left Overbank looking downstream.


Iowa-32
channel
Right
middle
Left
middle

Iona Tributary

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/18/2005

Project: Wittmann ADMSU
Stream: Wash Iona Tributary
Location: Reach - Iona Trib - 20 (Between Myers St. alignment and 1/2 mile north of Dove Valley Rd. alignment.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.032	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.002	
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.052**	**0.034**

Figure E-1
(Iona Trib - 20)

Figure 1. (Photo #419) Channel looking upstream.

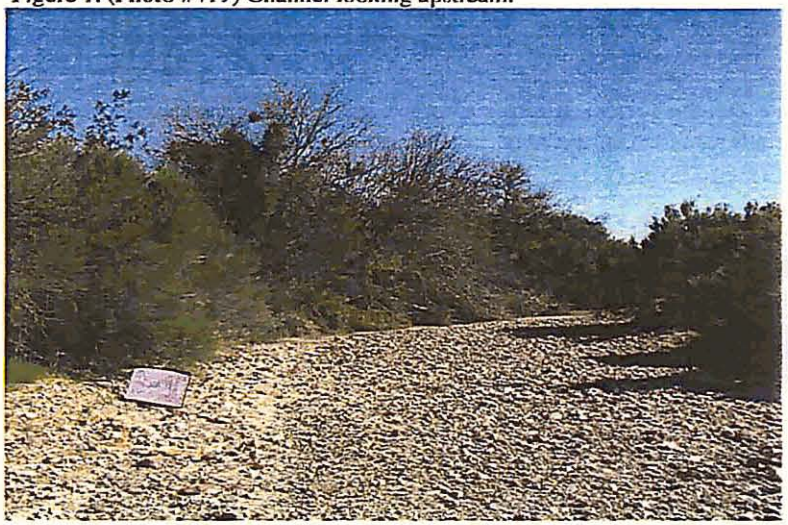


Figure 2. (Photo #420) Left Overbank looking downstream.

Figure 3. (Photo #421) Right Overbank looking downstream.

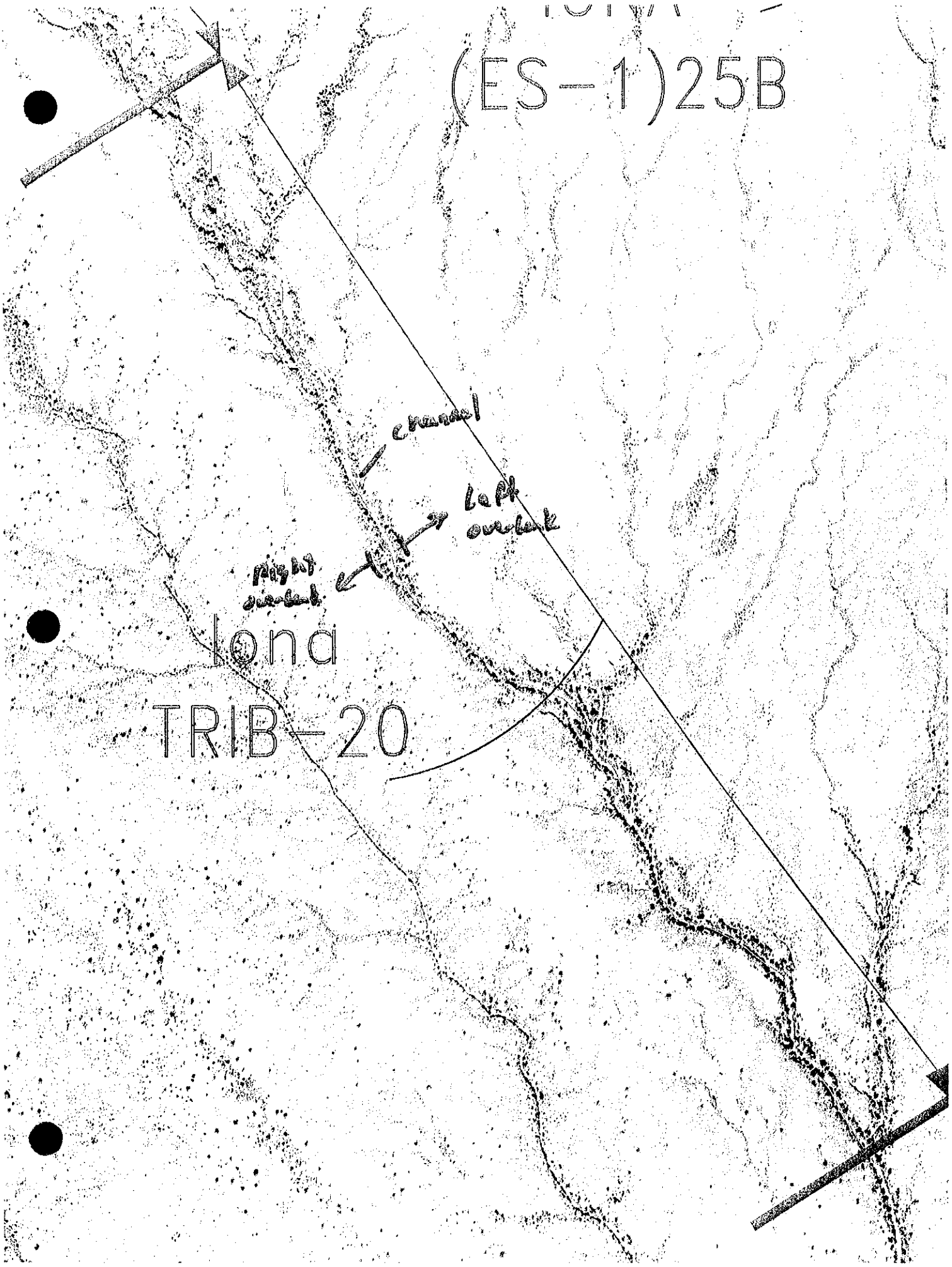

(ES-1)25B
channel
left overbank
right overbank
Iona
TRIB-20

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/18/2005

Project: Wittmann ADMSU
Stream: Wash Iona Tributary
Location: Reach - Iona Trib - 21 (Between 1/2 mile north of Dove Valley Rd. alignment and 1/2 mile south of Black Mtn. Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.030	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.016	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.002	
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.050**	**0.034**

Figure E-1
(Iona Trib - 21)

Figure 1. (Photo #416) Channel looking downstream.

Figure 2. (Photo #417) Left Overbank looking downstream.

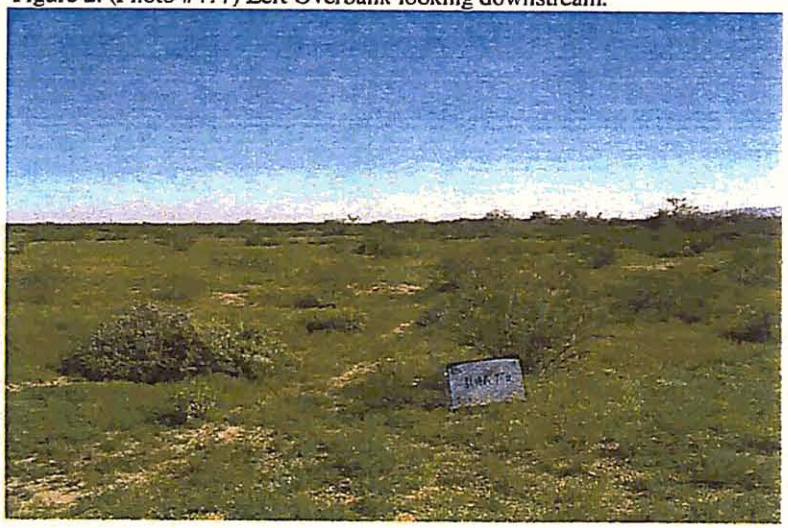
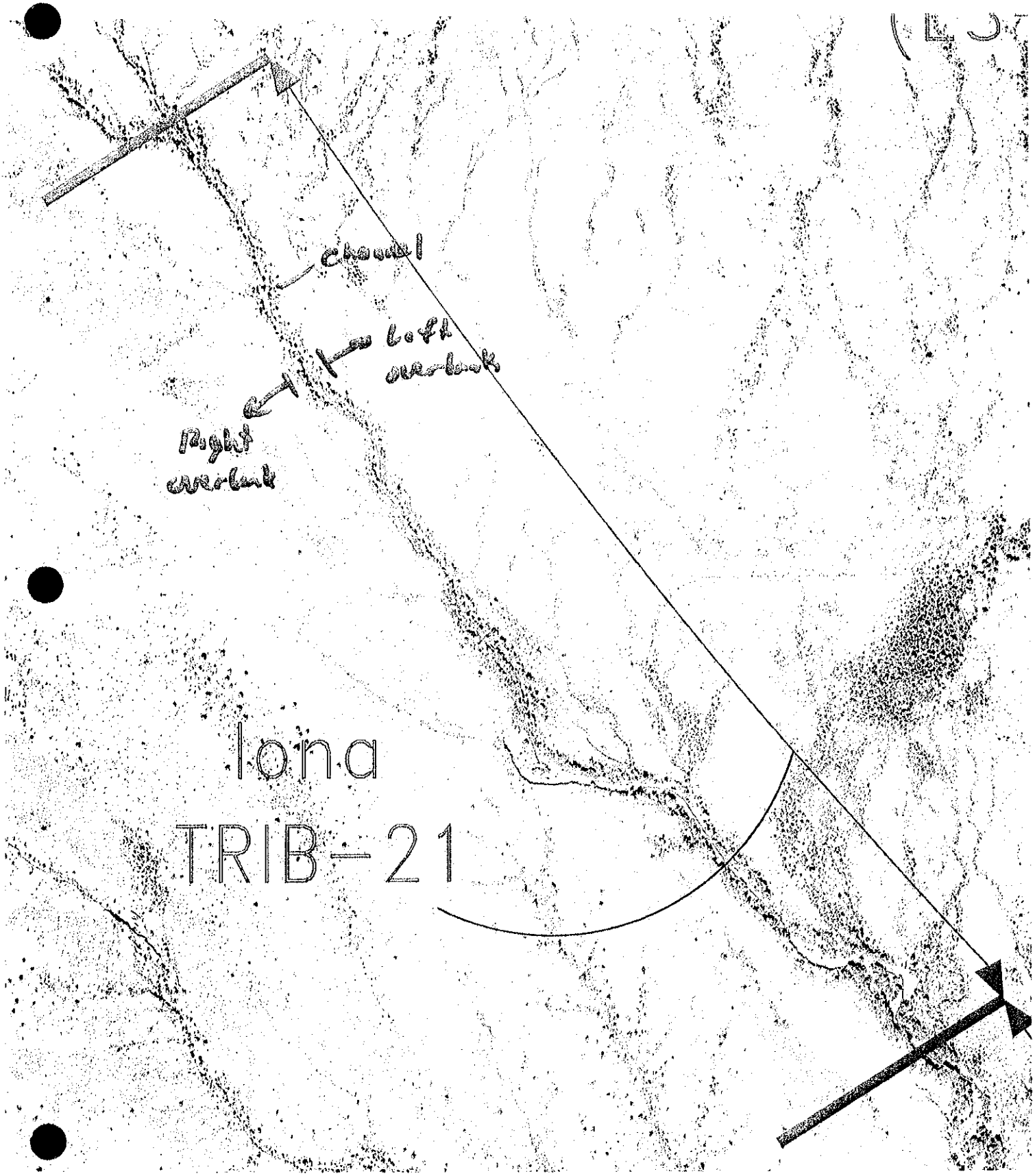


Figure 3. (Photo #418) Right Overbank looking downstream.


channel
left overbank
Right overbank
Iona
TRIB-21

Iona East Split -1

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona East Split-1
Location: Reach - Iona (ES-1) - 20 (On Peak View Rd. to just north of Peak View Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.028	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			0.008
	Medium		.010-.025	0.010	0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.046**	**0.034**

Figure E-1
(Iona Trib - 21)

Figure 1. (Photo #416) Channel looking downstream.

Figure 2. (Photo #417) Left Overbank looking downstream.

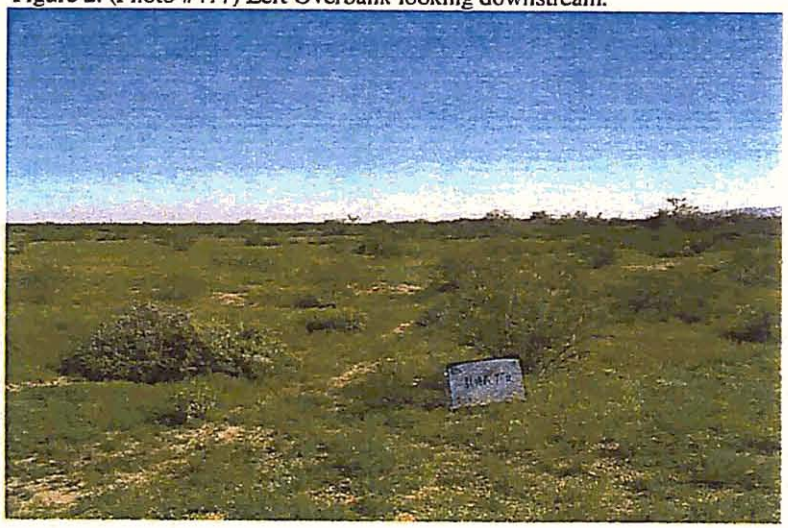


Figure 3. (Photo #418) Right Overbank looking downstream.

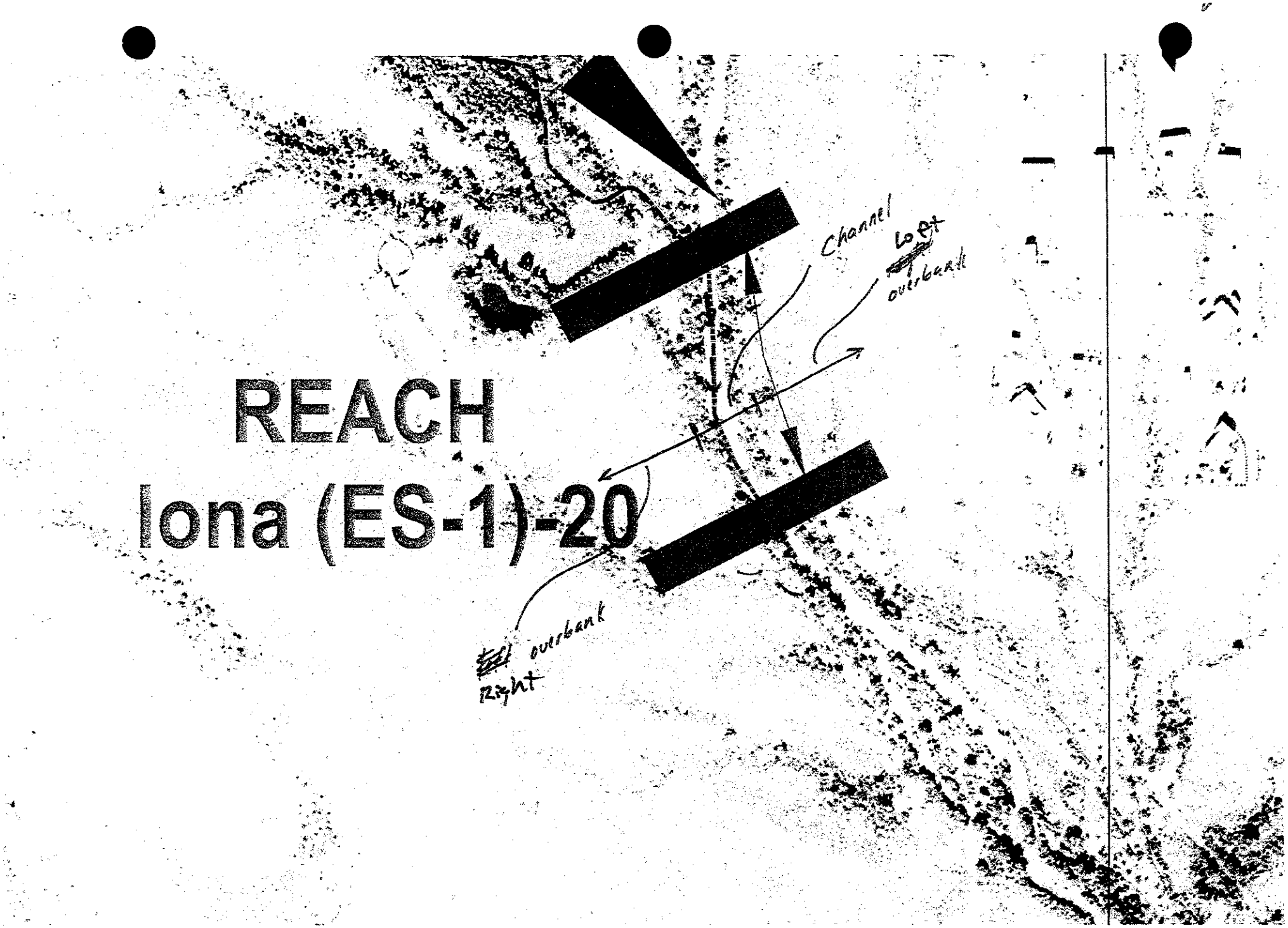

REACH
Iona (ES-1)-20
Channel
Left
overbank
overbank
Right

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona East Split-1
Location: Reach - Iona (ES-1) - 21 (Between just north of Peak View Rd. and Dixileta Dr.)

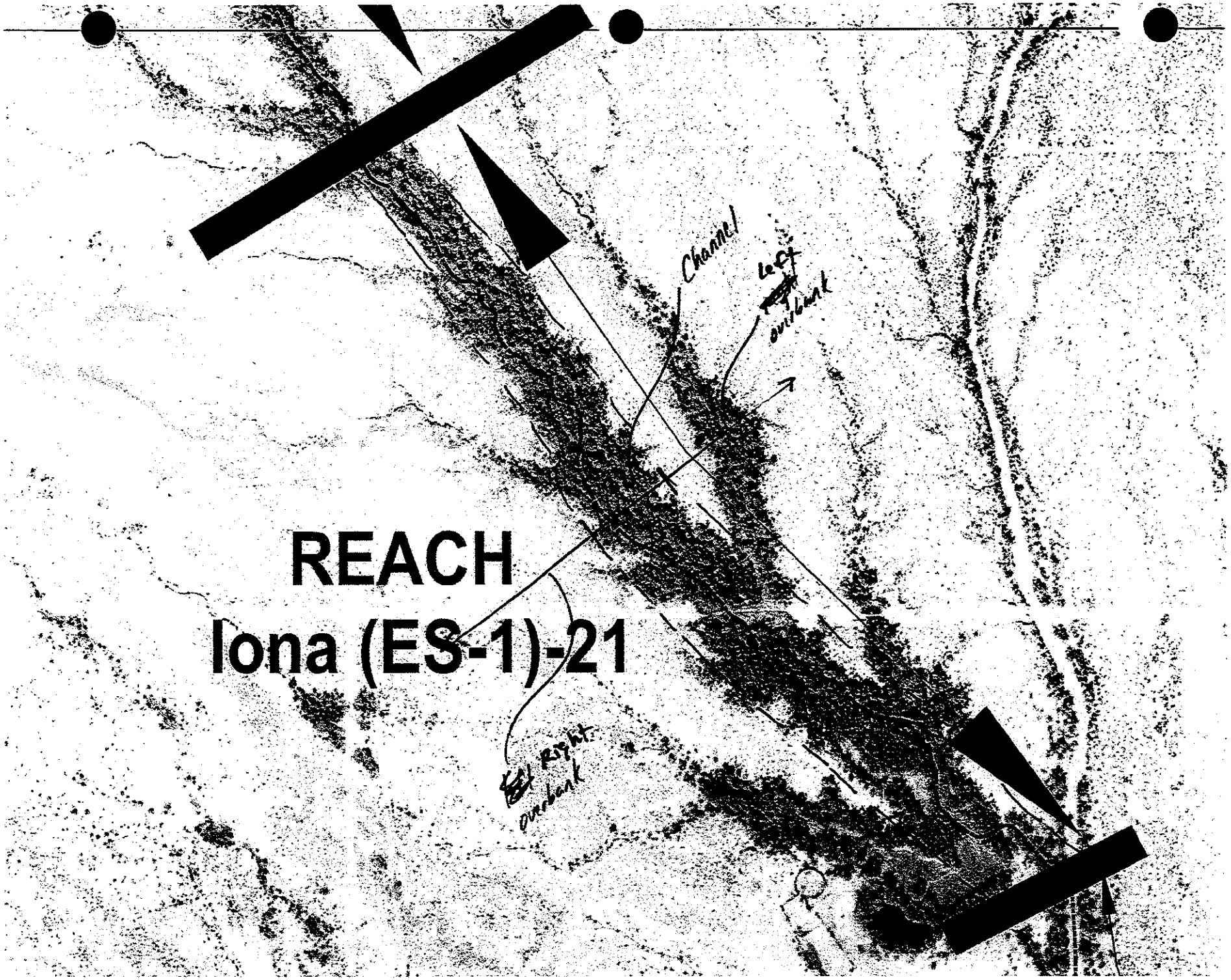
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004			
	Minor		.005-.015	0.005	0.015	0.005
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.012		0.012
	Large		.025-.050		0.027	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.043**	**0.069**	**0.043**

Figure E-1
(Iona (ES-1) - 21)

Figure 1. (Photo #238) Photo not available, see aerial.

Figure 2. (Photo #239) Right Overbank looking downstream.

Figure 3. (Photo #240) Left Overbank looking downstream.



REACH
Iona (ES-1)-21

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona East Split-1
Location: Reach - Iona (ES-1) - 22 (Dixileta Dr. to just east of 235th Ave.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.028		0.028
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005			
	Moderate		.006-.010		0.010	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.006		0.006
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.056**	**0.034**

Figure E-1
(Iona (ES-1) - 22)

Figure 1. (Photo #241) Channel looking downstream.

Figure 2. (Photo #242) Right Overbank looking downstream.

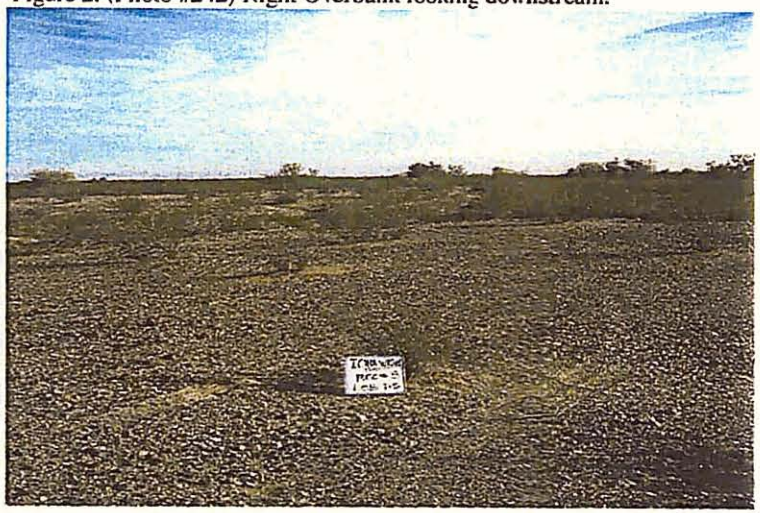


Figure 3. (Photo #243) Left Overbank looking downstream.

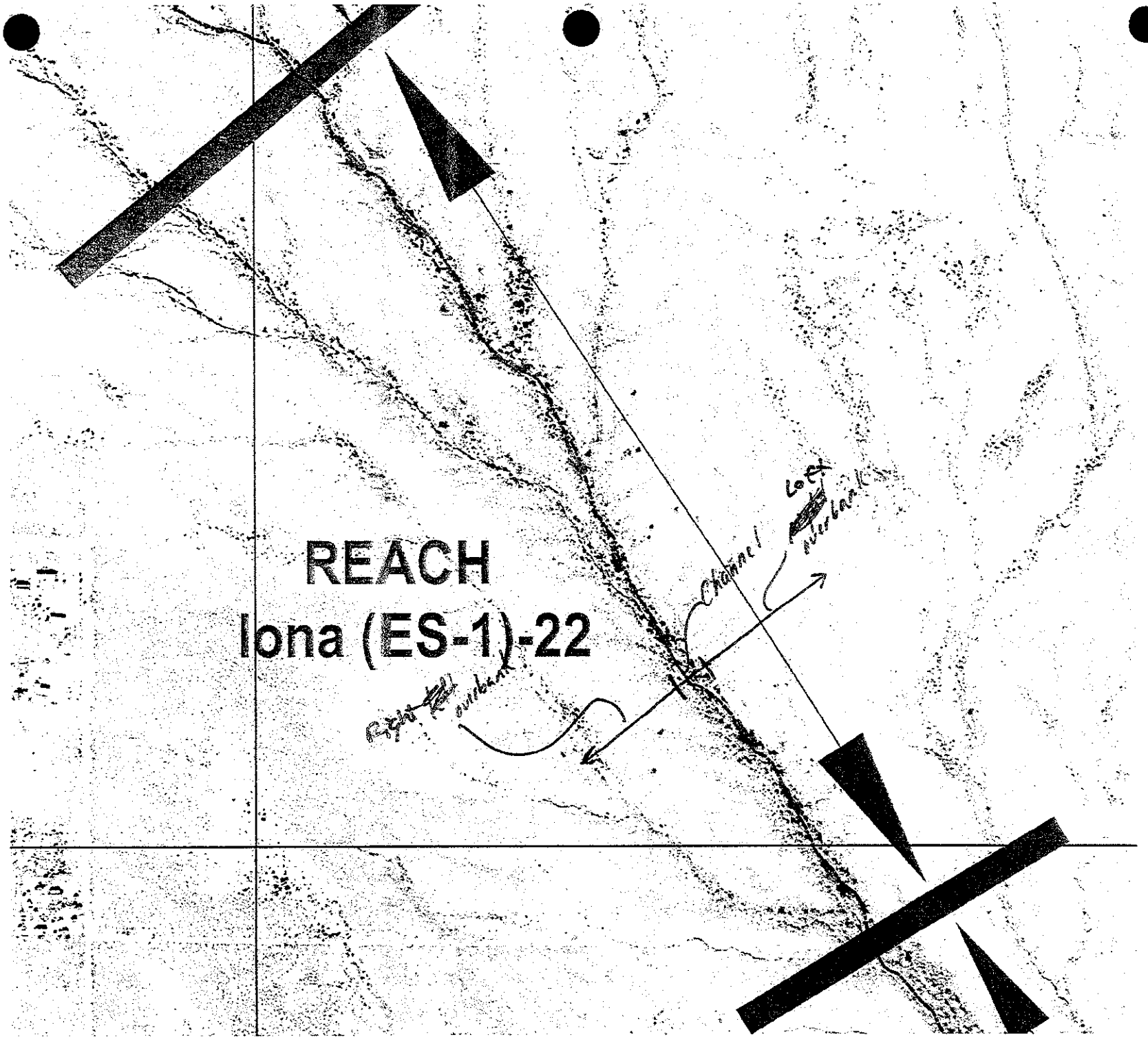

REACH
Iona (ES-1)-22
Channel
Left
Right

Table E-1

BY	JCS	DATE	2/2/2005
CHECK	HAA	DATE	2/4/2005

Project: Wittmann ADMSU
Stream: Iona East Split-1
Location: Reach - Iona (ES-1) - 23 (Between just east of 235th Ave. and Myers St. alignment)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.014	0.020	0.012
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0		0.000	
	Occ. Alt.		.001-.005	0.003		0.003
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.042**	**0.048**	**0.040**

Figure E-1
(Iona (ES-1) - 23)

Figure 1. (Photo #372) Channel looking upstream.

Figure 2. (Photo #371) Right Overbank looking downstream.

Figure 3. (Photo #373) Left Overbank looking downstream.

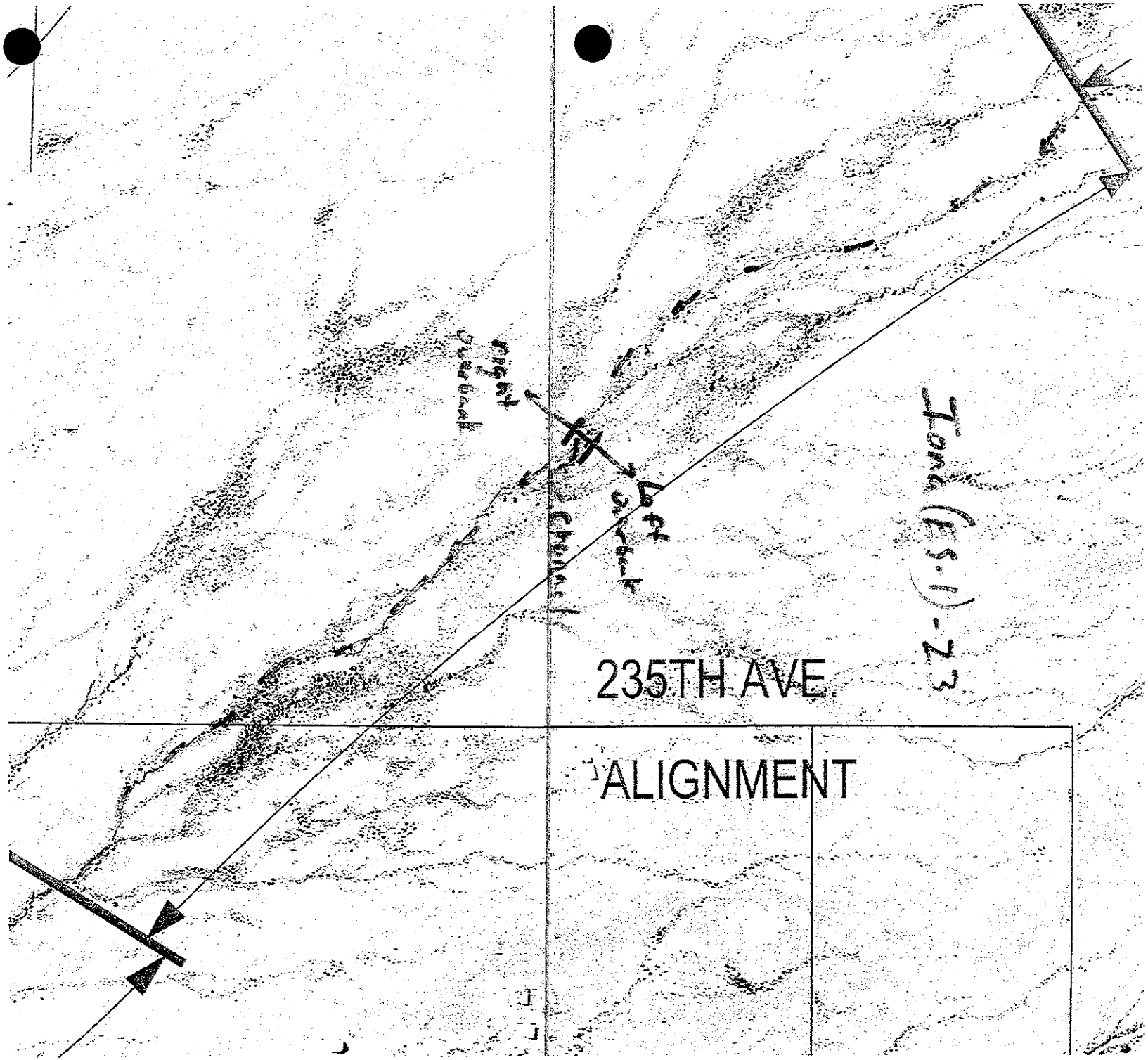

235TH AVE
ALIGNMENT

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona East Split-1
Location: Reach - Iona (ES-1) - 24 (Between Myers St. alignment and 1/4 mile north of Dove Valley Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.027		0.027
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005			
	Moderate		.006-.010		0.010	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.006		0.006
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0		0.000	
	Occ. Alt.		.001-.005	0.003		0.003
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.056**	**0.036**

Figure E-1
(Iona (ES-1) - 24)

Figure 1. (Photo #375) Channel looking upstream.

Figure 2. (Photo #374) Right Overbank looking upstream.

Figure 3. (Photo #376) Left Overbank looking downstream.

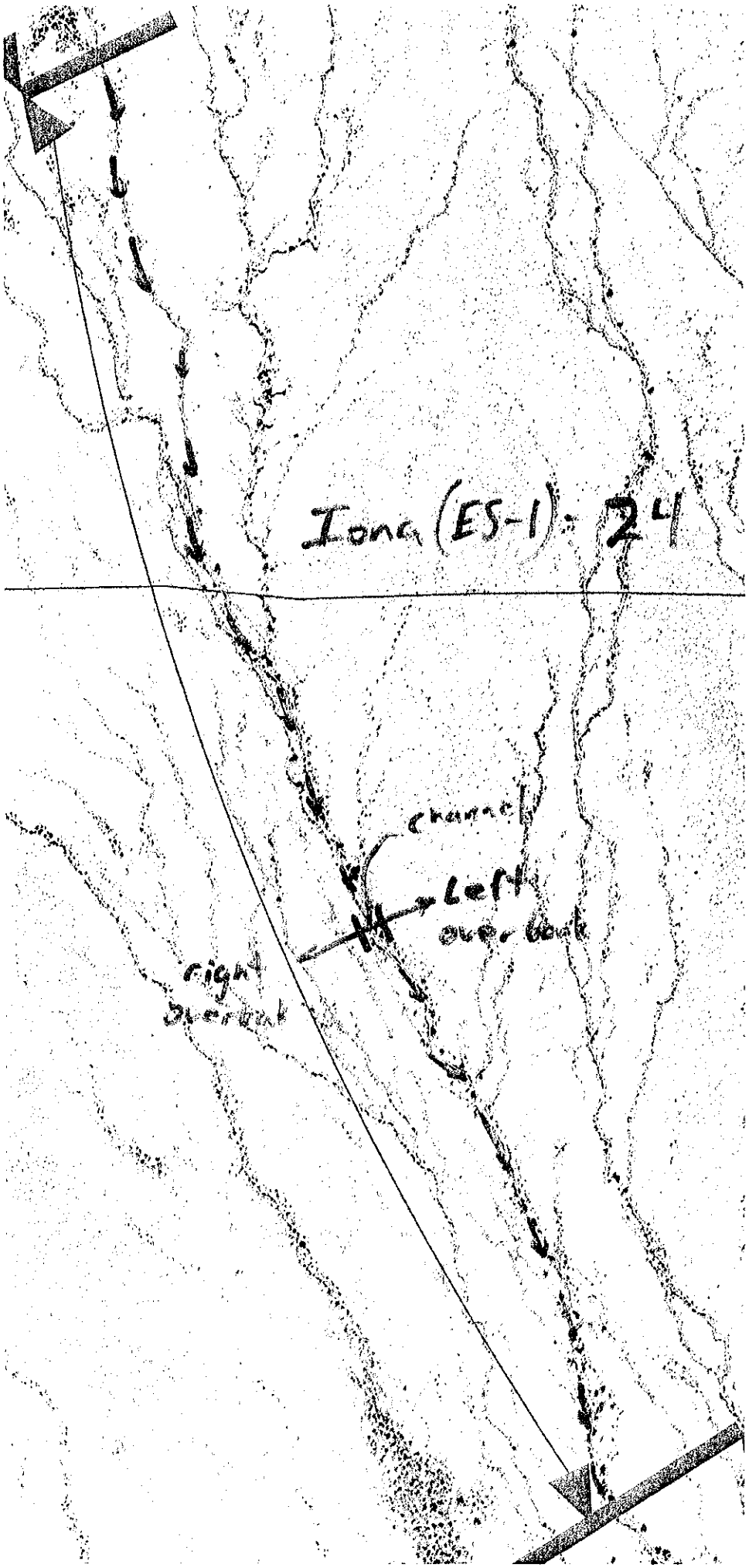

Iona (ES-1) - 24
channel
left
overbank
right
overbank

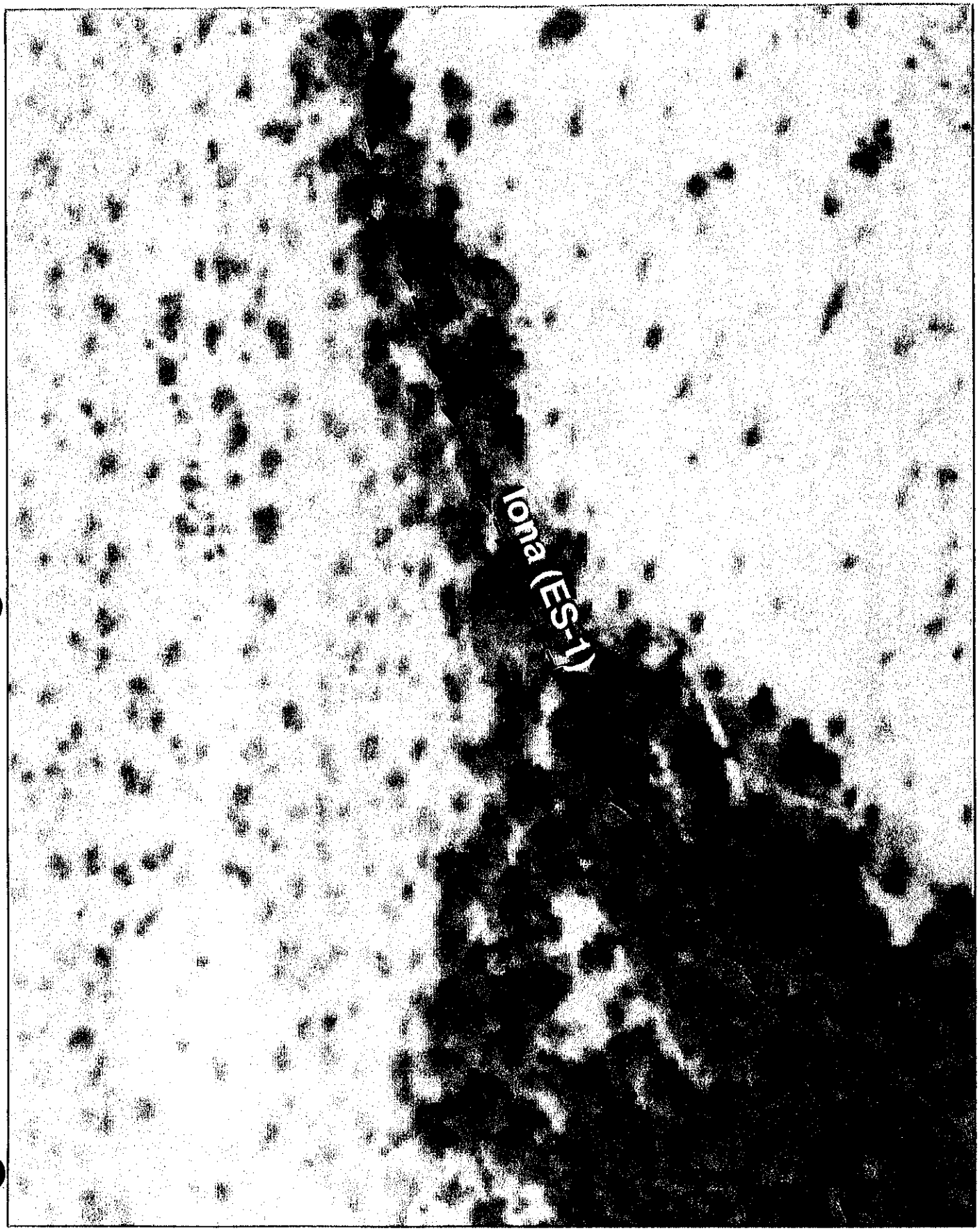
Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona East Split-1
Location: Reach - Iona (ES-1) - 25A (Between 1/4 mile north and 1/2 mile north of North Dove Valley Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.047**	**0.034**

FIGURE E-1: Iona ES-1 - 25A (n-value photo)



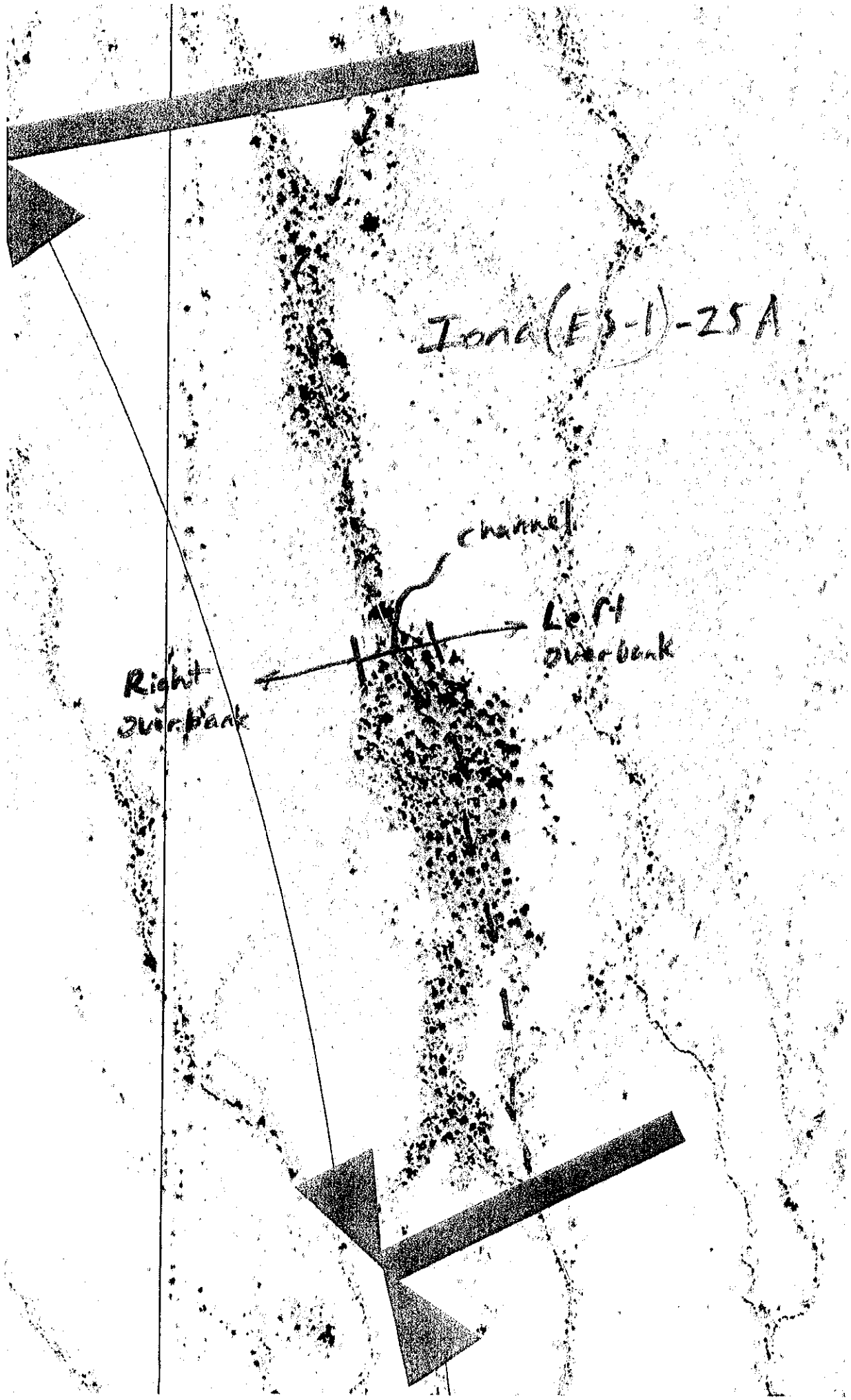

Iona (E3-1)-25A
channel
Left
overbank
Right
overbank

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona East Split-1
Location: Reach - Iona (ES-1) - 25B (Between 1/2 mile north of North Dove Valley Rd. to Carefree Hwy.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		
	Medium		.010-.025		0.018	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.046**	**0.037**

Figure E-1
(Iona (ES-1) - 25B)

Figure 1. (Photo #378) Channel looking downstream.

Figure 2. (Photo #377) Right Overbank looking downstream.

Figure 3. (Photo #379) Left Overbank looking downstream.

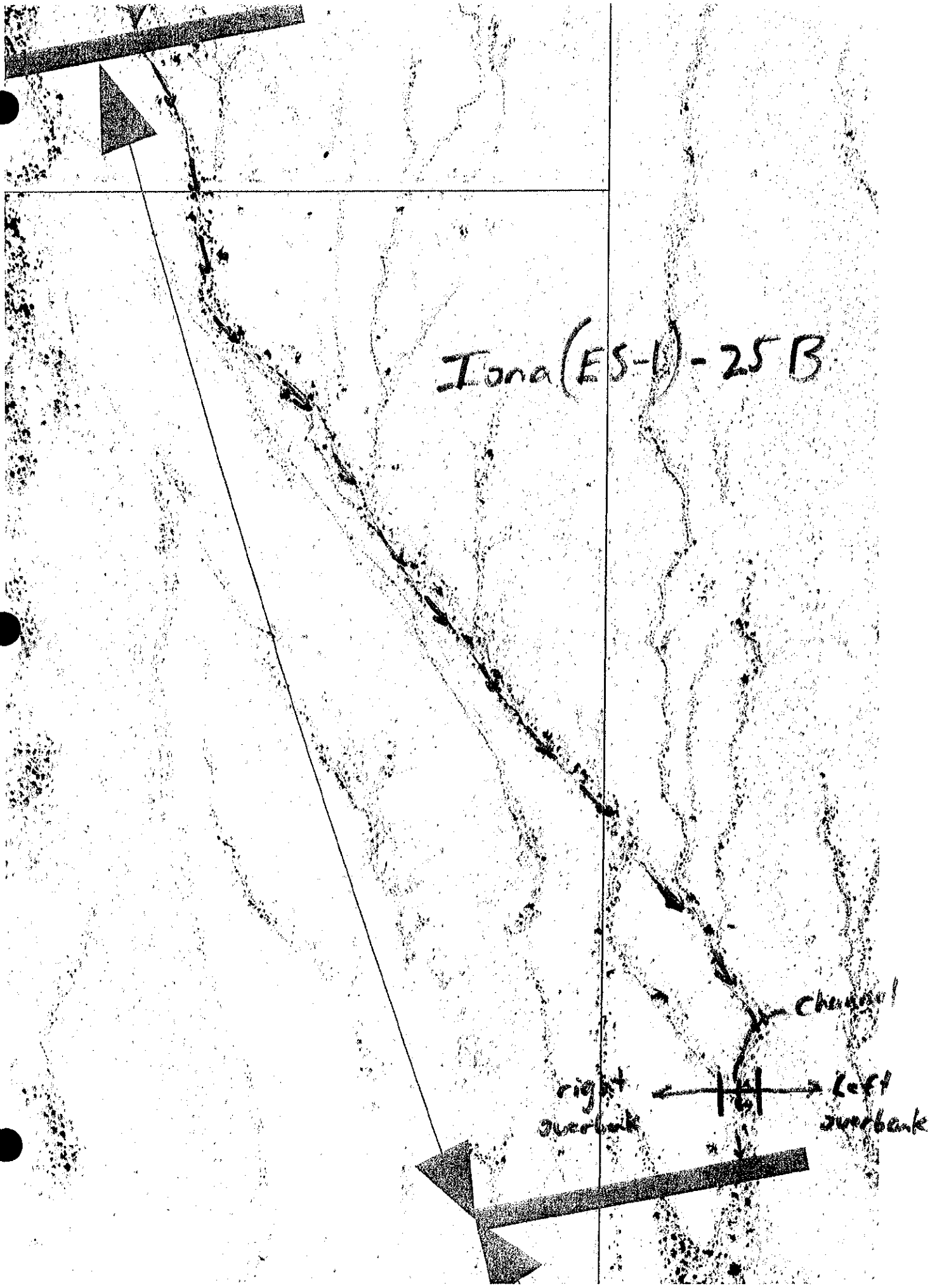

Tona (ES-1) - 25 B
channel
right overbank
left overbank

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona East Split-1
Location: Reach - Iona (ES-1) - 26A (Between Carefree Hwy. to 1/8 mile north of Carefree Hwy.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.022	0.012
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.003	
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.051**	**0.037**

Figure E-1
(Iona (ES-1) - 26A)

Figure 1. (Photo #244) Channel looking downstream.

Figure 2. (Photo #246) Left Overbank looking downstream.

Figure 3. (Photo #245) Right Overbank looking downstream.

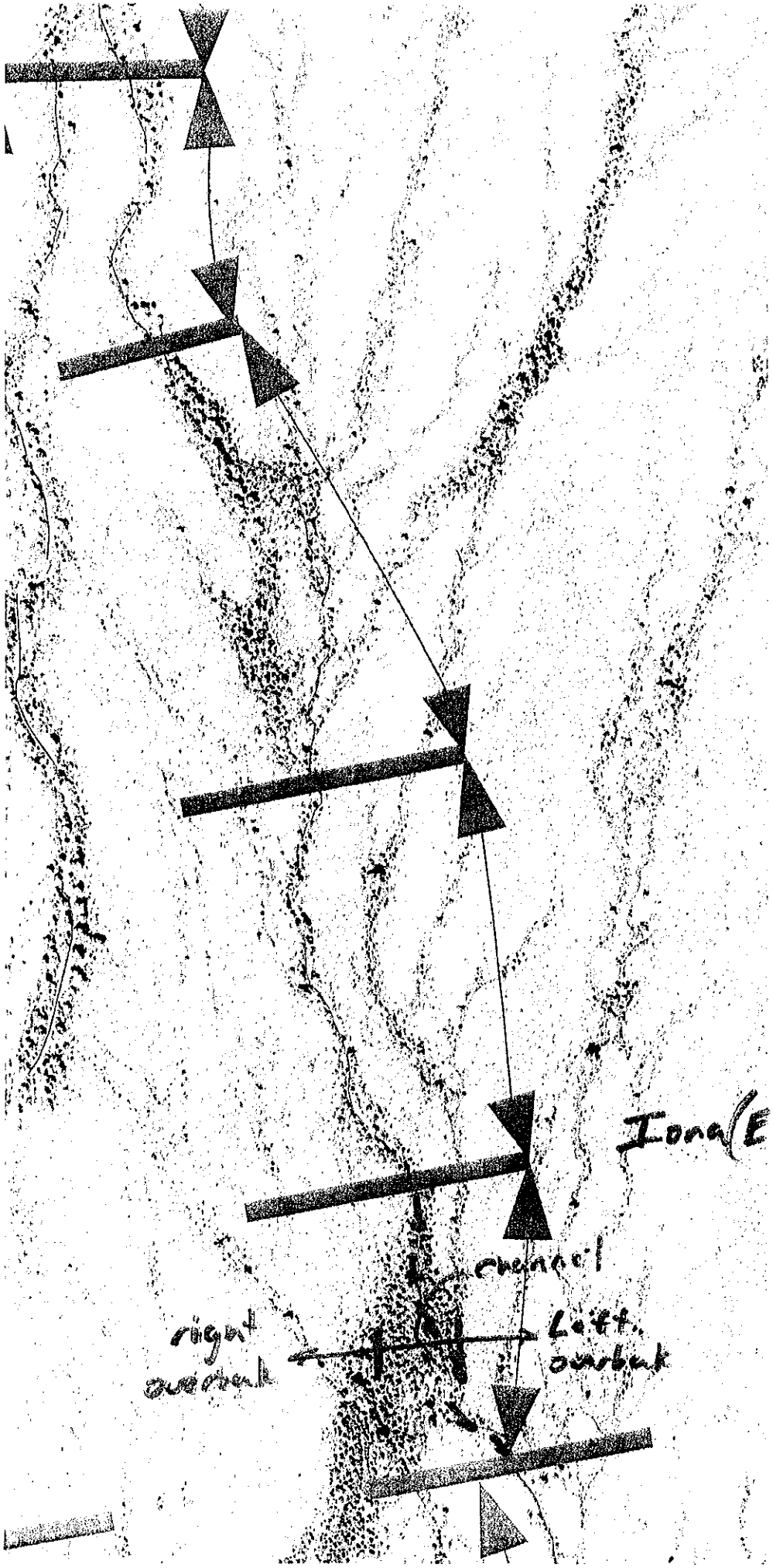

Iona (ES-1) 26 A
channel
right overbank
Left overbank

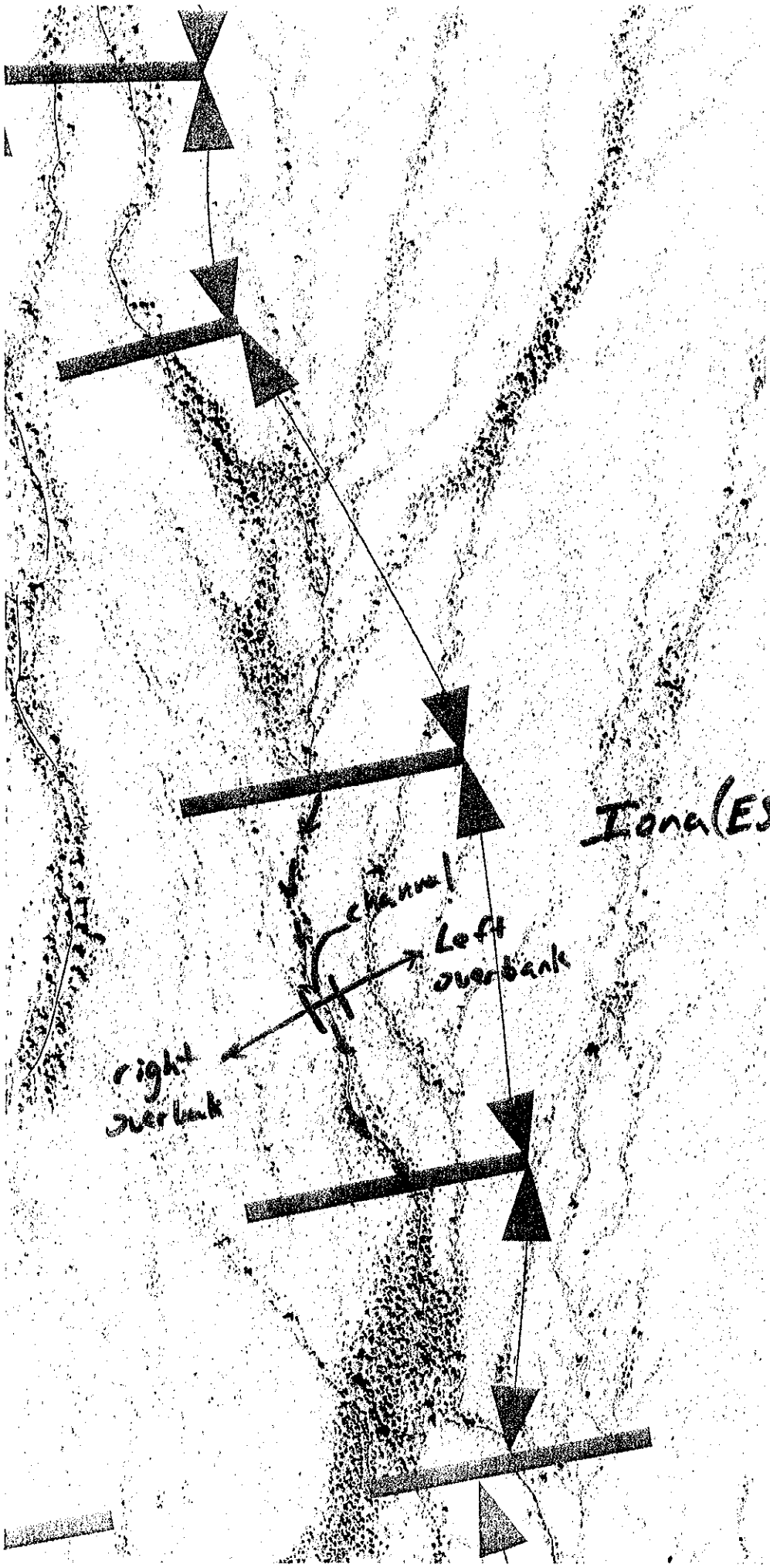
Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona East Split-1
Location: Reach - Iona (ES-1) - 26B (Between 1/8 mile north of Carefree Hwy. to 1/4 mile north of Carefree Hwy.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.003	
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.046**	**0.033**

FIGURE E-1: Iona ES-1 - 26B (n-value photo)



Iona (ES-1) 26 B

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona East Split-1
Location: Reach - Iona (ES-1) - 26C (Between 1/4 mile north of Carefree Hwy. to 1/2 mile north of Carefree Hwy.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.009		
	Medium		.010-.025		0.018	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.003	
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.047**	**0.035**

FIGURE E-1: Iona ES-1 - 26C (n-value photo)

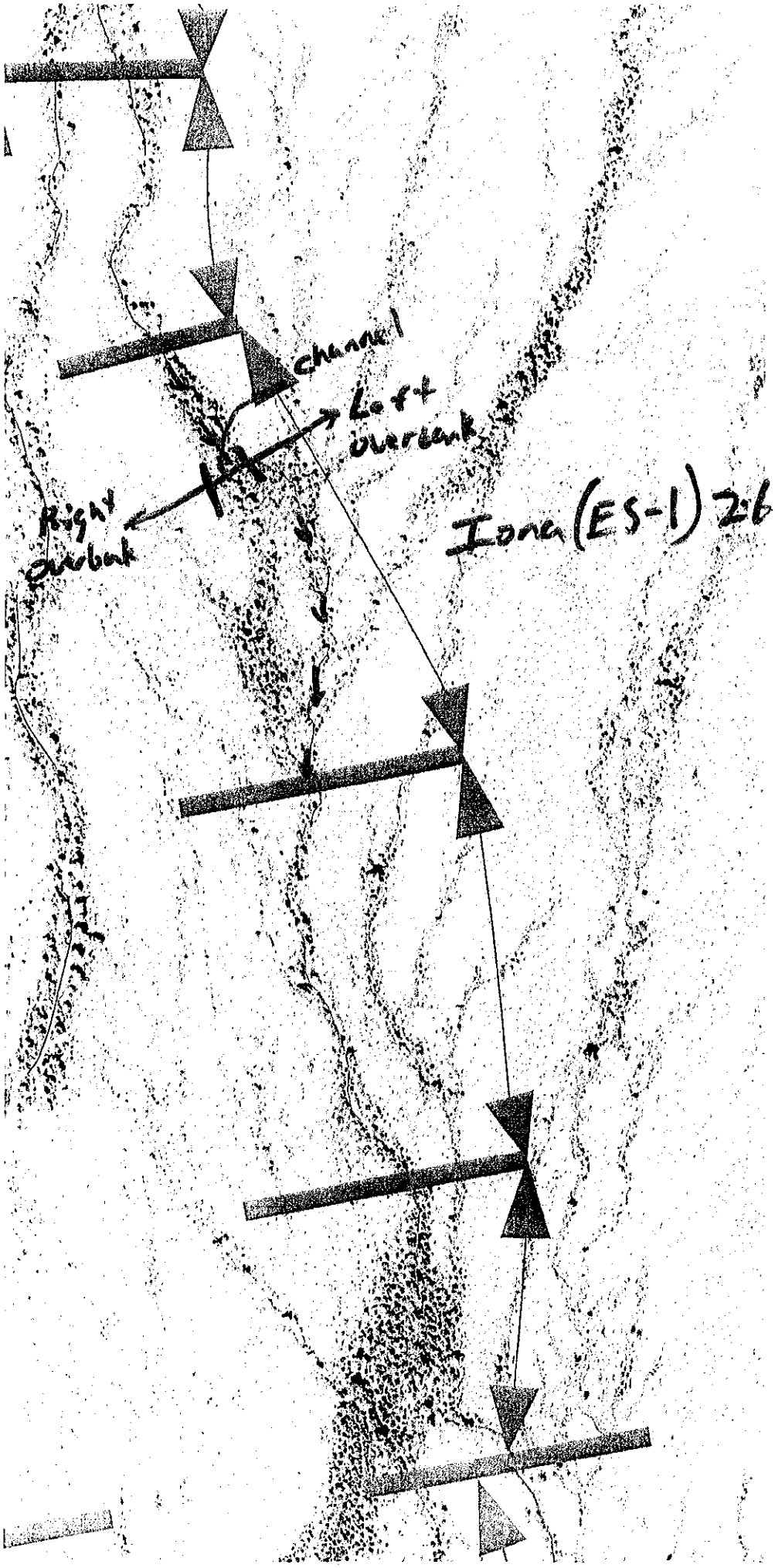

channel
Left overbank
Right overbank
Iona (ES-1) 2.6 C

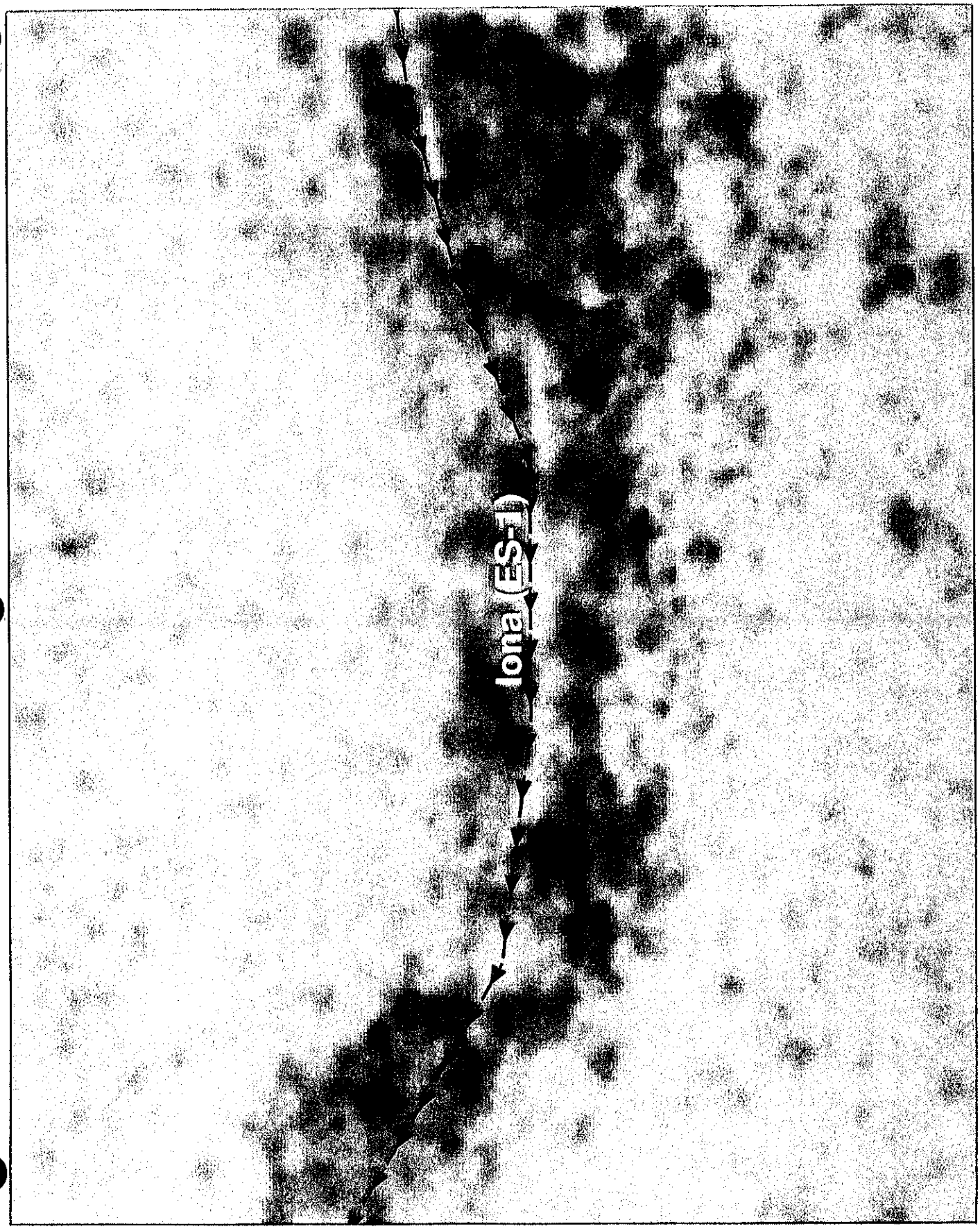
Table E-1

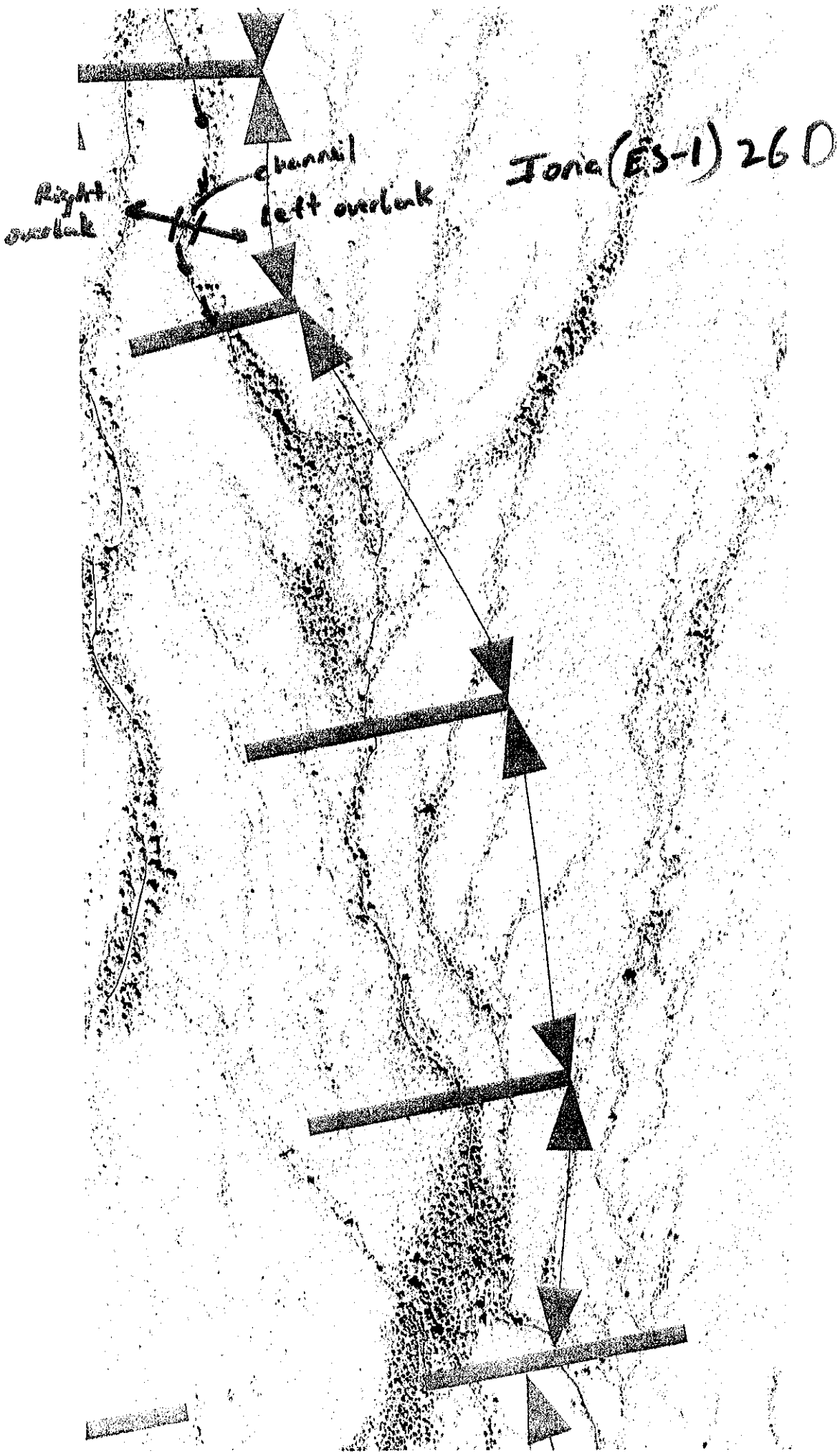
BY JCS DATE 2/2/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona East Split-1
Location: Reach - Iona (ES-1) - 26D (Between 1/2 mile north of Carefree Hwy. to 1/4 mile south of Black Mountain. Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.043**	**0.033**

FIGURE E-1: Iona ES-1 - 26D (n-value photo)




channel
Right overlak
left overlak
Jona (ES-1) 26 D

Iona East Split -2

Table E-1

BY AMB DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Iona East Split-2
Location: Reach - Iona (ES-2) - 20 (North of CAP Canal to Pinnacle Vista Dr.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		
	Coarse Sand		.026-.035		0.035	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.001	0.001	0.001
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.004		0.007
	Medium		.010-.025		0.011	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
				0.030	0.047	0.034
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.030**	**0.047**	**0.034**

Figure E-1
(Iona (ES-2) - 20)

Figure 1. (Photo #265) Channel looking downstream.

Figure 2. (Photo #267) Left Overbank looking downstream.

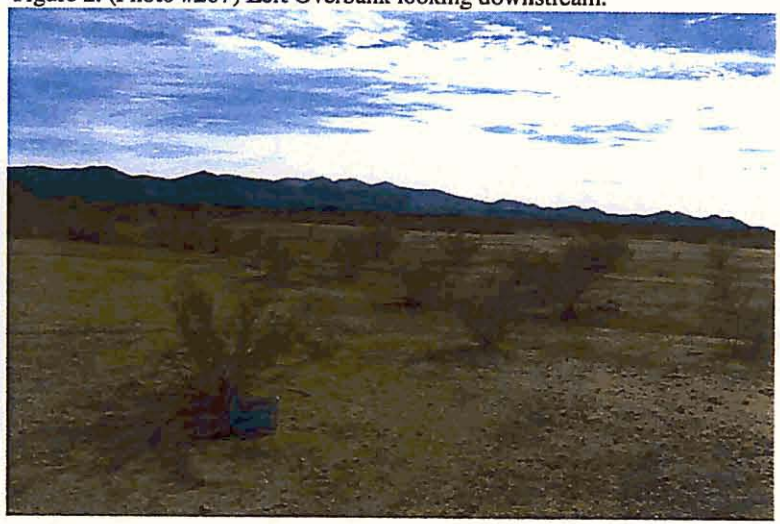
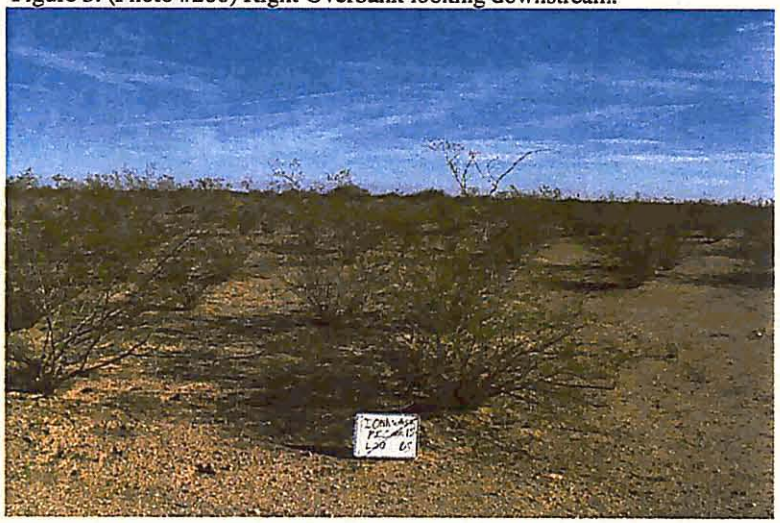


Figure 3. (Photo #266) Right Overbank looking downstream.



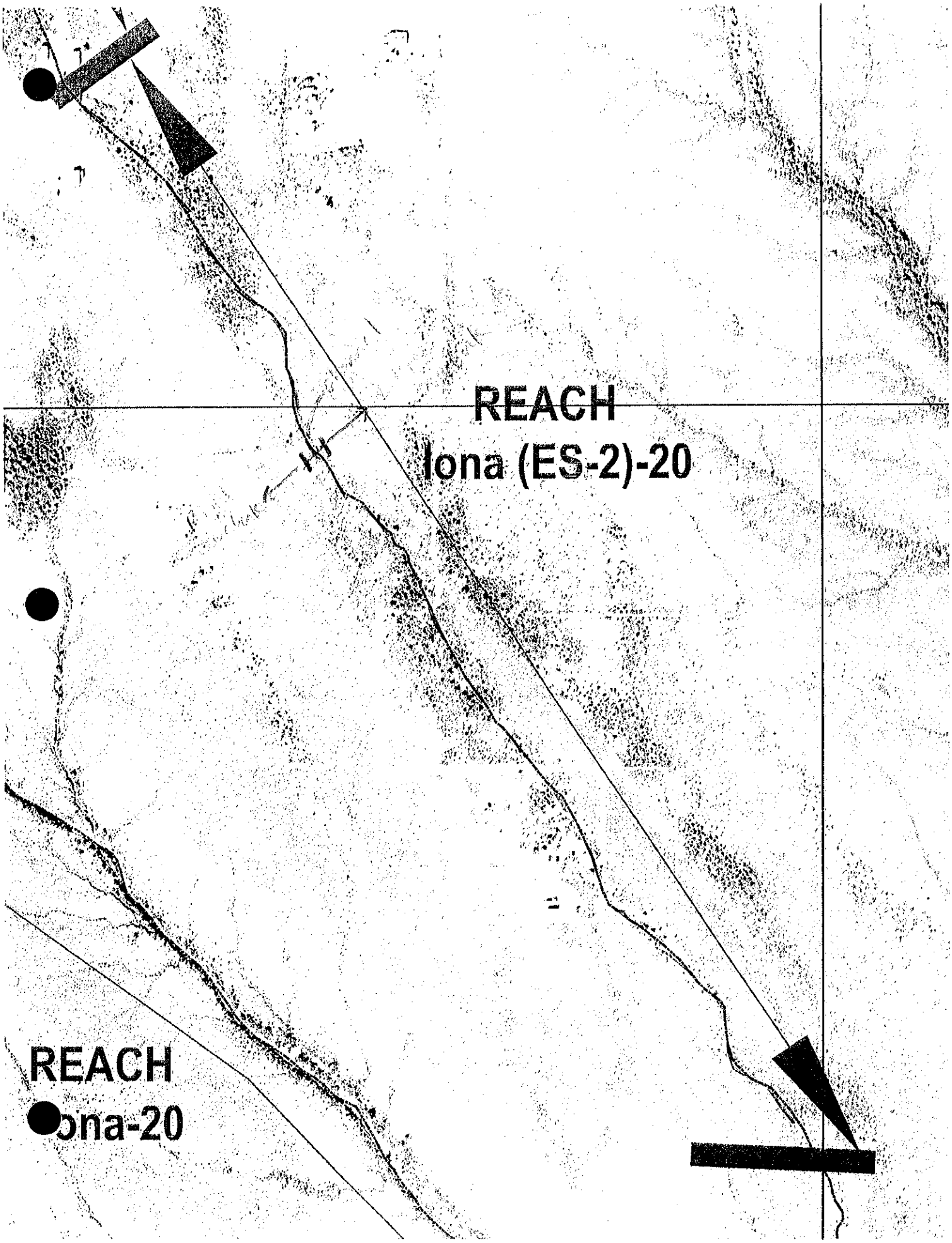

REACH
Iona (ES-2)-20
REACH
Iona-20

Table E-1

BY AMB DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Iona East Split-2
Location: Reach - Iona (ES-2) - 21 (Between Patton Rd. and Pinnacle Vista Dr.)

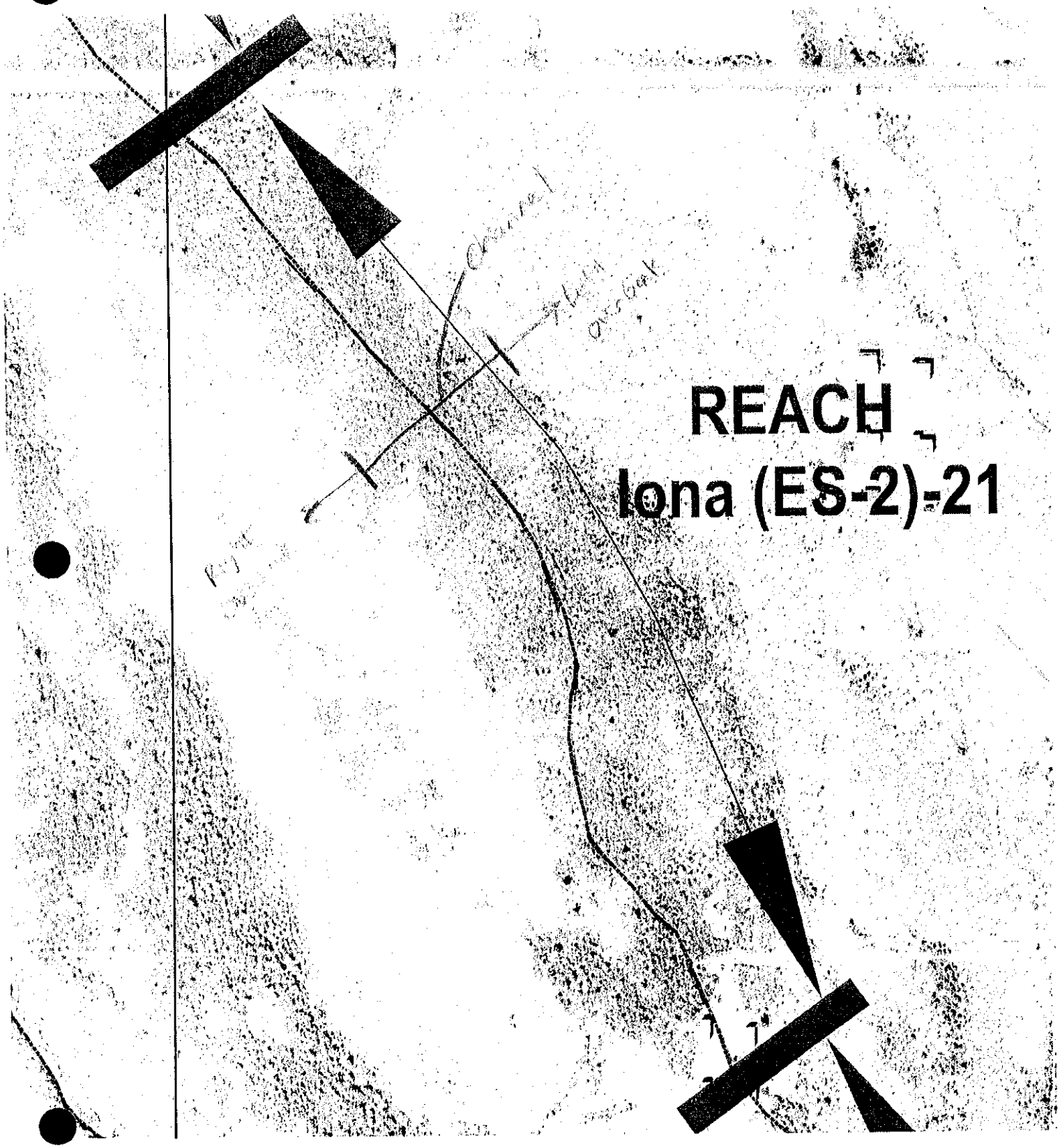
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.005		0.008
	Medium		.010-.025		0.022	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
				0.031	0.049	0.034
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.031**	**0.049**	**0.034**

Figure E-1
(Iona (ES-2) - 21)

Figure 1. (Photo #263) Channel looking upstream.

Figure 2. (Photo #262) Right Overbank looking downstream.

Figure 3. (Photo #264) Left Overbank looking downstream.



REACH
Iona (ES-2)-21

Table E-1

BY AMB DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Iona East Split-2
Location: Reach - Iona (ES-2) - 22 (Between Peak View Rd. and Patton Rd.)

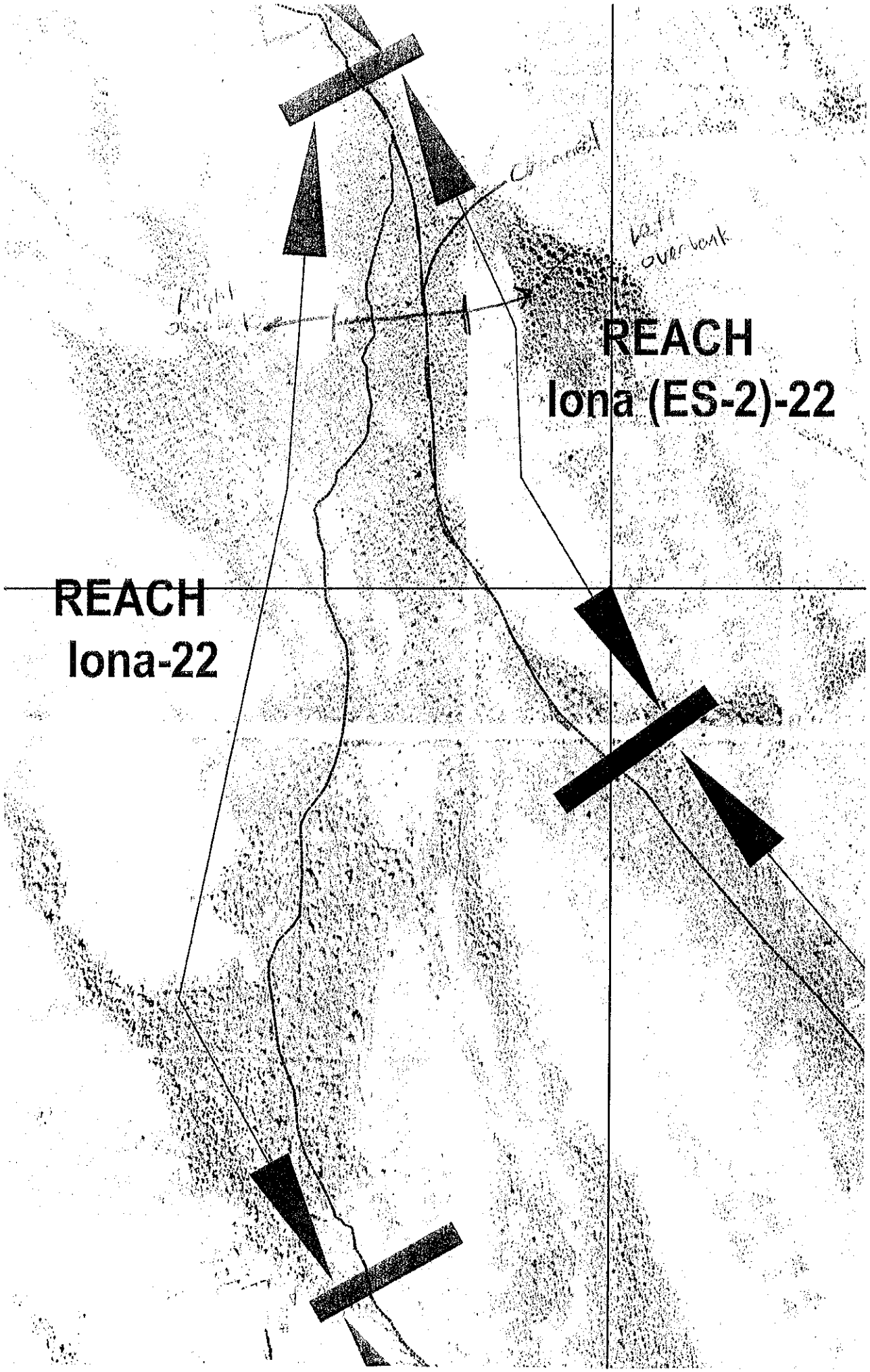
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.001	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		
	Medium		.010-.025		0.018	0.015
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.000	0.001
	Freg. Alt.		.010-.015			
				0.036	0.047	0.042
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.047**	**0.042**

Figure E-1
(Iona (ES-2) - 22)

Figure 1. (Photo #260) Channel looking downstream.

Figure 2. (Photo #259) Right Overbank looking downstream.

Figure 3. (Photo #261) Left Overbank looking upstream.


Channel
Left overbank
Right overbank
REACH
Iona (ES-2)-22
REACH
Iona-22

Trilby Wash

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/18/2005

Project: Wittmann ADMSU
Stream: Wash Trilby
Location: Reach - Trilby - 20 (Between Joy Ranch Rd. alignment and 1 mile north of Joy Ranch Rd. alignment.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.010	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.002	
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.038**	**0.033**

Figure E-1
(Trilby - 20)

Figure 1. (Photo #404) Channel looking upstream.

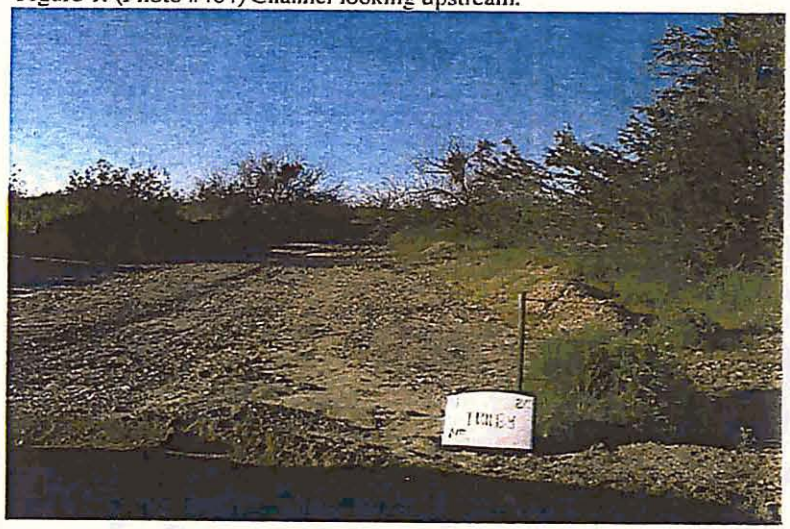


Figure 2. (Photo #405) Left Overbank looking upstream.

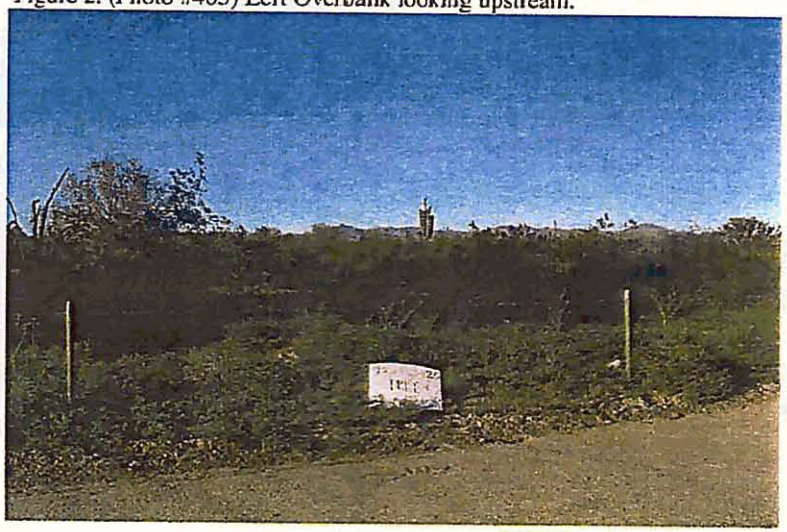
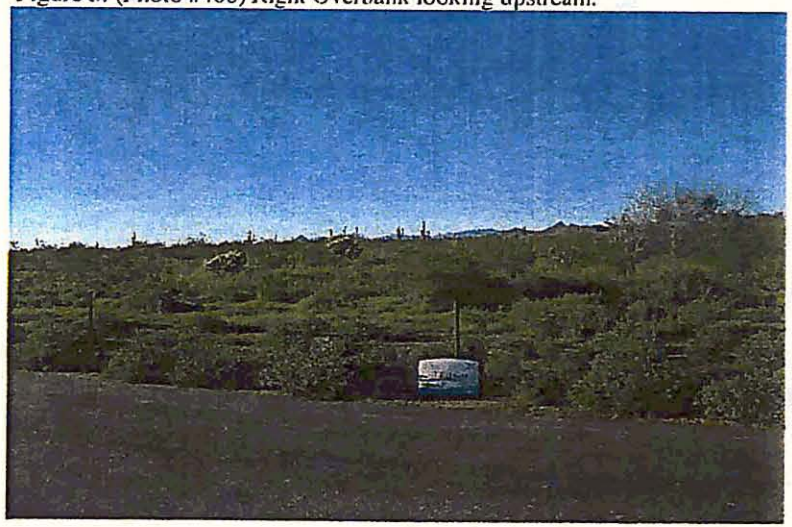


Figure 3. (Photo #406) Right Overbank looking upstream.



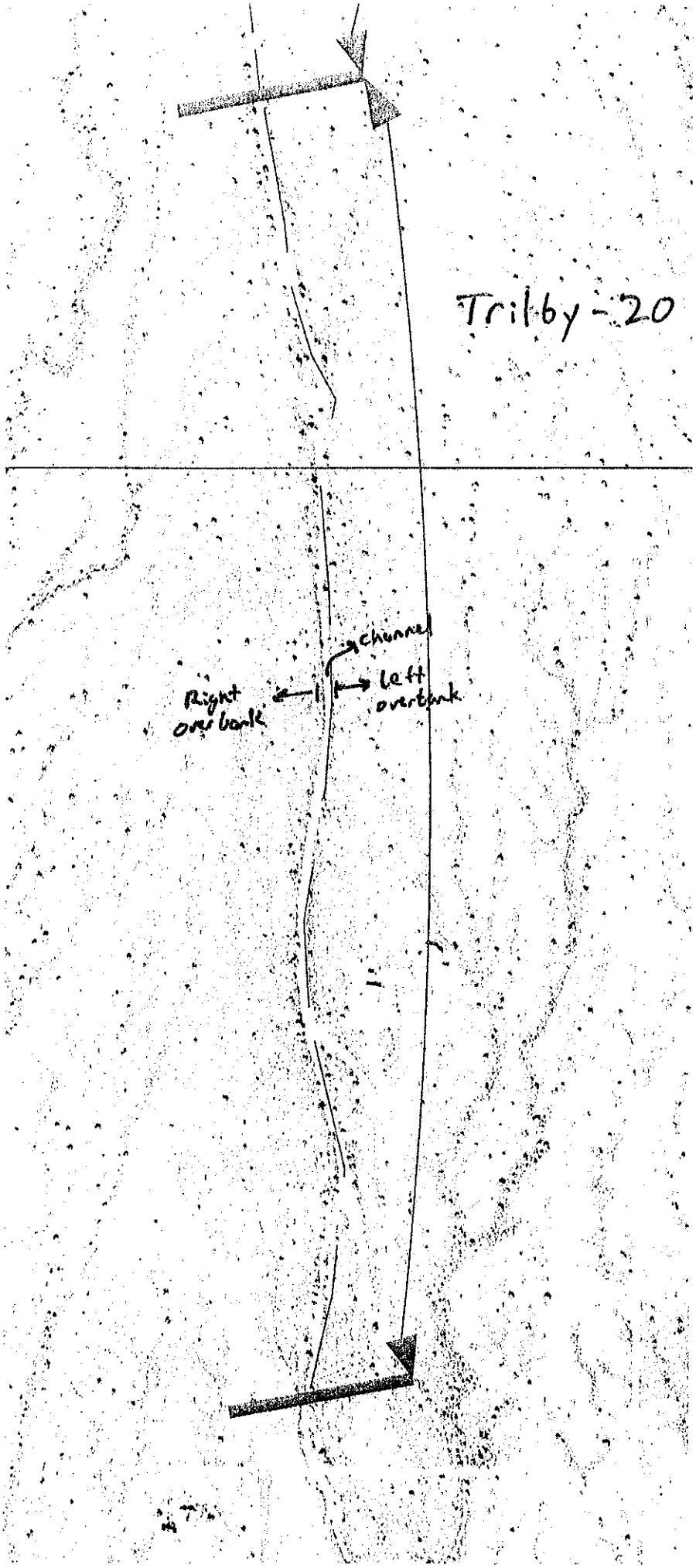

Trilby - 20
channel
Right overbank
left overbank

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 4/14/2005

Project: Wittmann ADMSU
Stream: Wash Trilby
Location: Reach - Trilby - 21 (Between 1 mile north of Joy Ranch Rd. alignment and S.R. 74.)

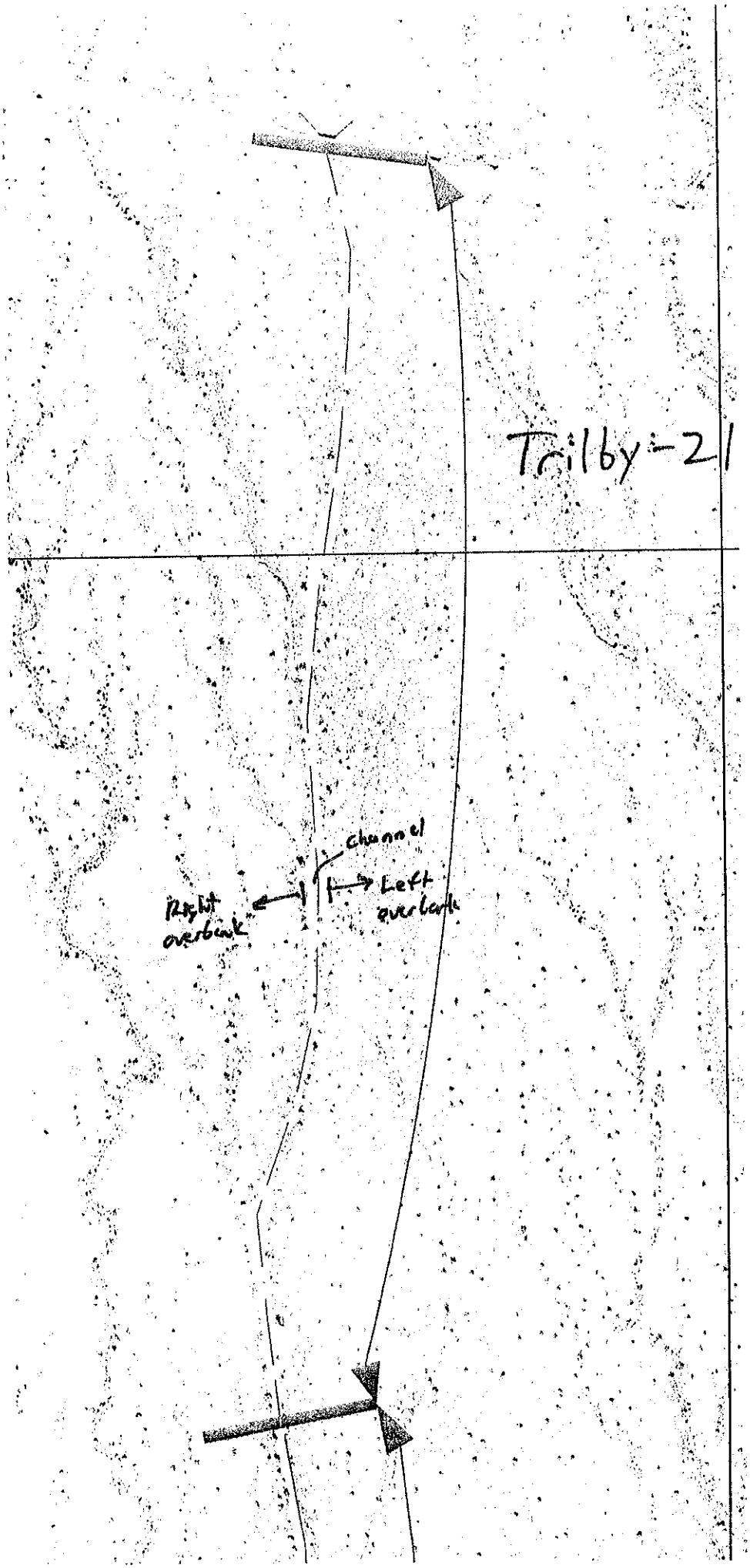
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.011	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.001	0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.038**	**0.034**

Figure E-1
(Trilby - 21)

Figure 1. (Photo #407) Channel looking downstream.

Figure 2. (Photo #408) Left Overbank looking downstream.

Figure 3. (Photo #409) Right Overbank looking downstream.


Trilby-21
channel
Right overbank
Left overbank

Circle City Area Wash 1

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/18/2005

Project: Wittmann ADMSU
Stream: Circle City Area - Wash 1
Location: Reach - Circle City Area - Wash 1 - 20 (Between 1/2 mile north of Dove Valley Rd. and just north of Carefree Hwy. alignment.)

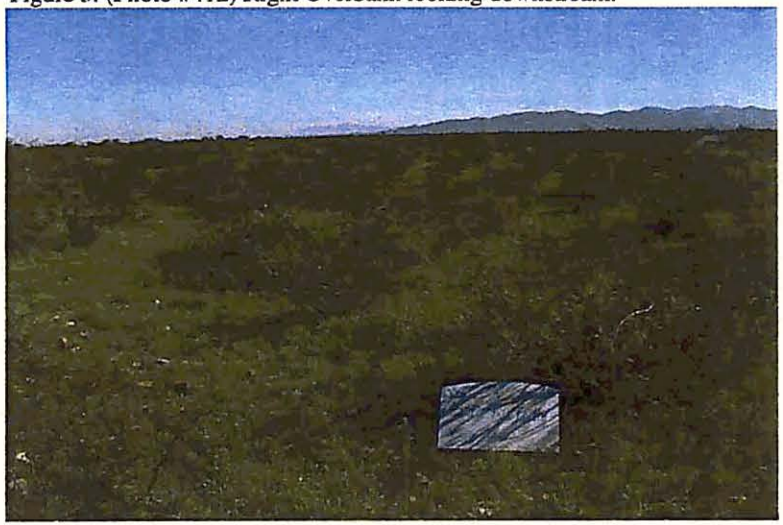
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005			
	Moderate		.006-.010		0.007	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.015	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.048**	**0.035**

Figure E-1
(Circle City Area - Wash 1 - 20)

Figure 1. (Photo #410) Channel looking downstream.

Figure 2. (Photo #411) Left Overbank looking downstream.

Figure 3. (Photo #412) Right Overbank looking downstream.



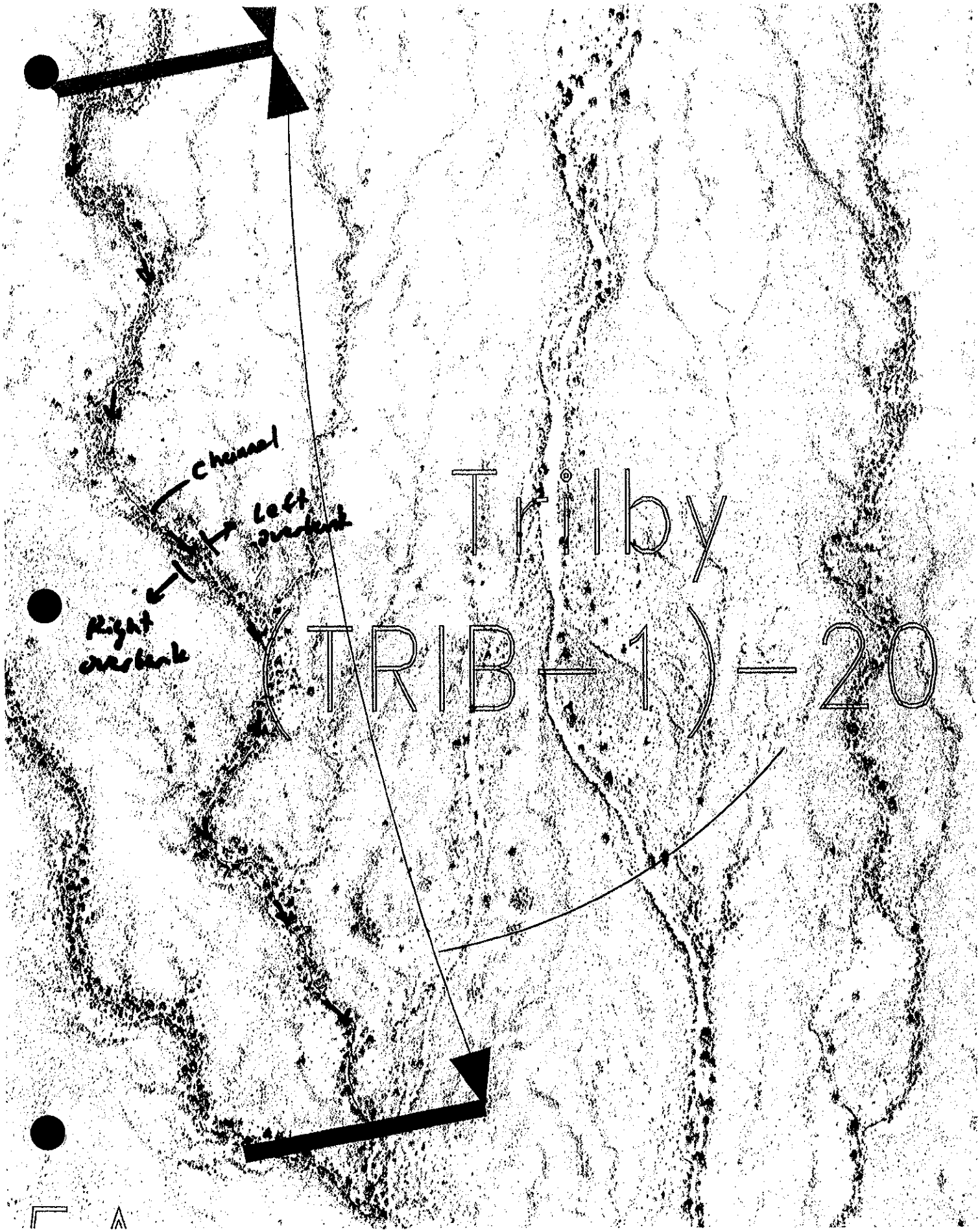

Trilby
(TRIB-1)-20
channel
left overbank
Right overbank

Table E-1

BY JCS DATE 3/16/2005
CHECK GLA DATE 3/18/2005

Project: Wittmann ADMSU
Stream: Circle City Area - Wash 1
Location: Reach - Circle City Area - Wash 1 - 21 (Between just north of Carefree Hwy. alignment and Black Mtn. Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.003	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.043**	**0.033**

Figure E-1
(Circle City Area - Wash 1 - 21)

Figure 1. (Photo #413) Channel looking downstream.

Figure 2. (Photo #414) Left Overbank looking downstream.

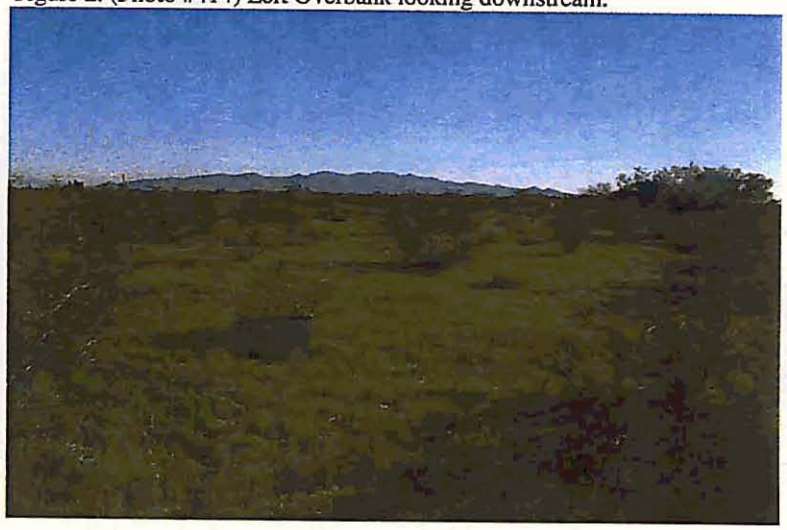
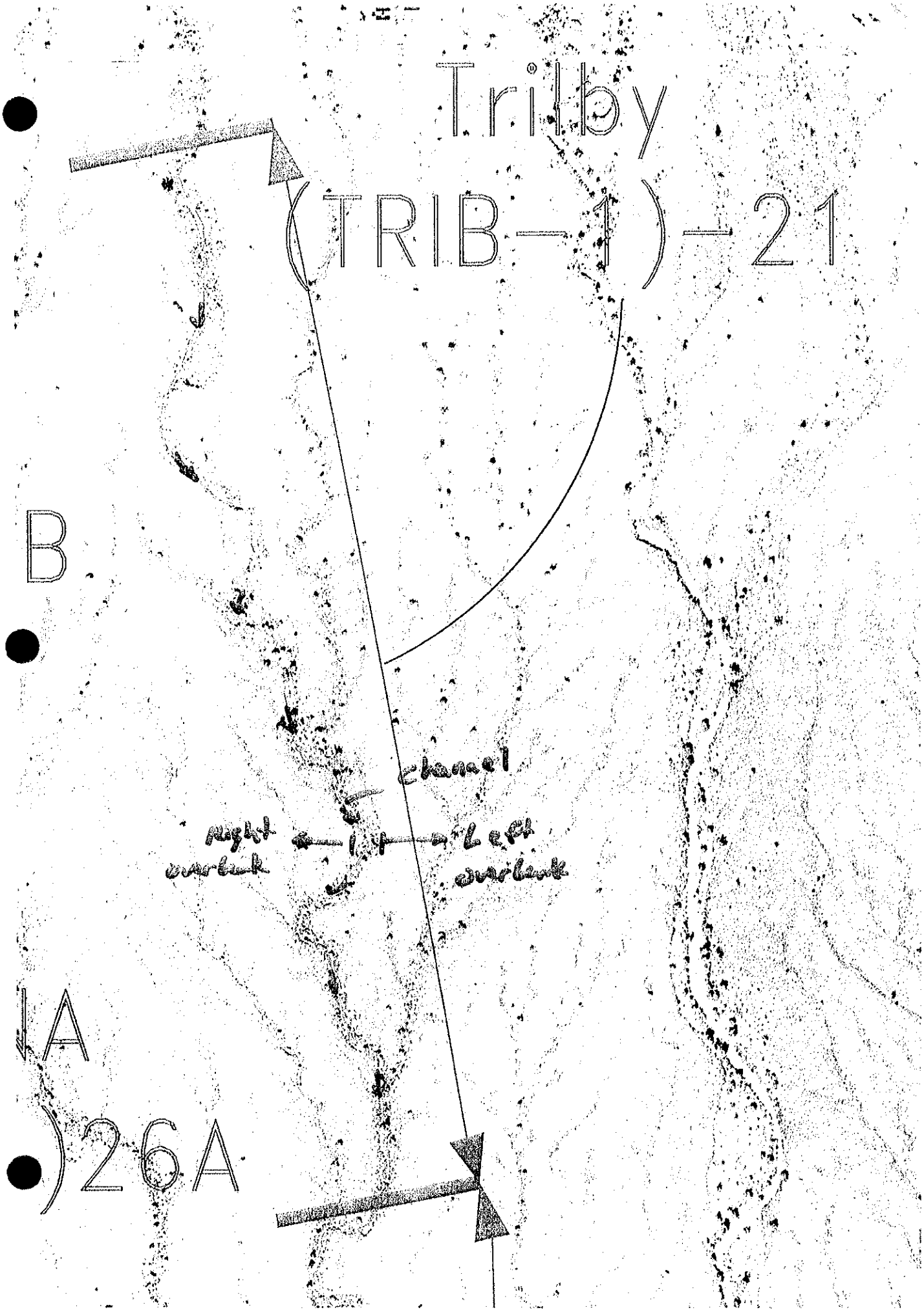


Figure 3. (Photo #415) Right Overbank looking downstream.


Trilby
(TRIB-1)-21
B
channel
right overbank
left overbank
A
)26A

Wash 2 West

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W - 20 (Between Patton Rd. and north of CAP Canal)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005			
	Moderate		.006-.010		0.010	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.055**	**0.033**

Figure E-1
(2W - 20)

Figure 1. (Photo #201) Channel looking downstream.

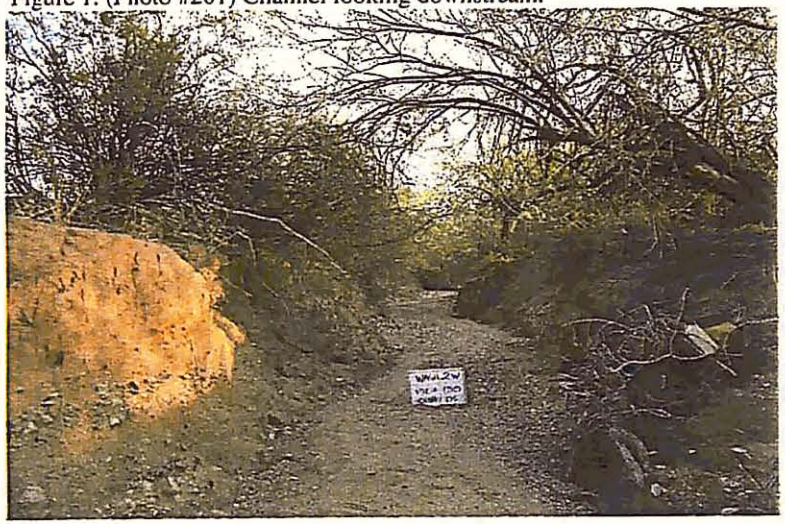
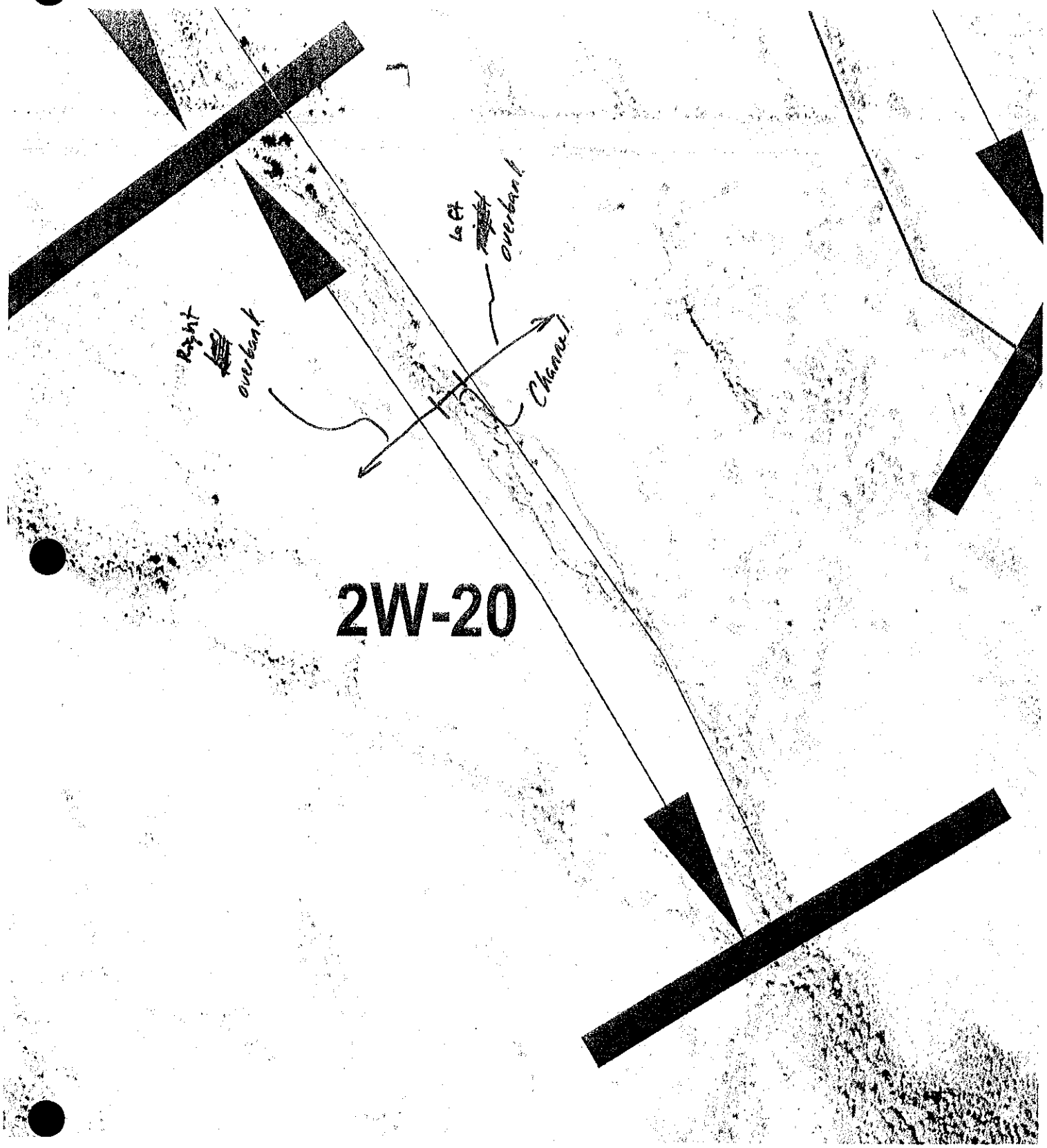


Figure 2. (Photo #203) Left Overbank looking downstream.

Figure 3. (Photo #202) Right Overbank looking downstream.



2W-20

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W - 21 (Between Patton Rd. and 1/4 mile north of Patton Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005			
	Moderate		.006-.010		0.006	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.012	0.025	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.038**	**0.058**	**0.036**

Figure E-1
(2W - 21)

Figure 1. (Photo #207) Channel looking downstream.

Figure 2. (Photo #208) Right Overbank looking downstream.

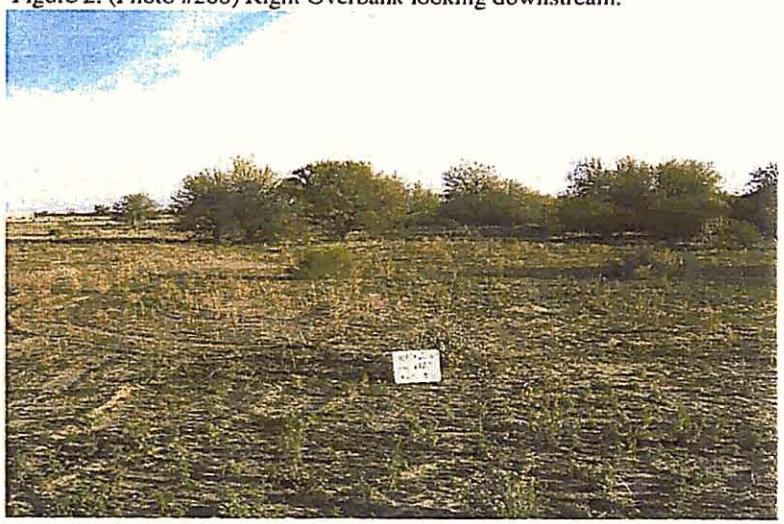


Figure 3. (Photo #209) Left Overbank looking downstream.

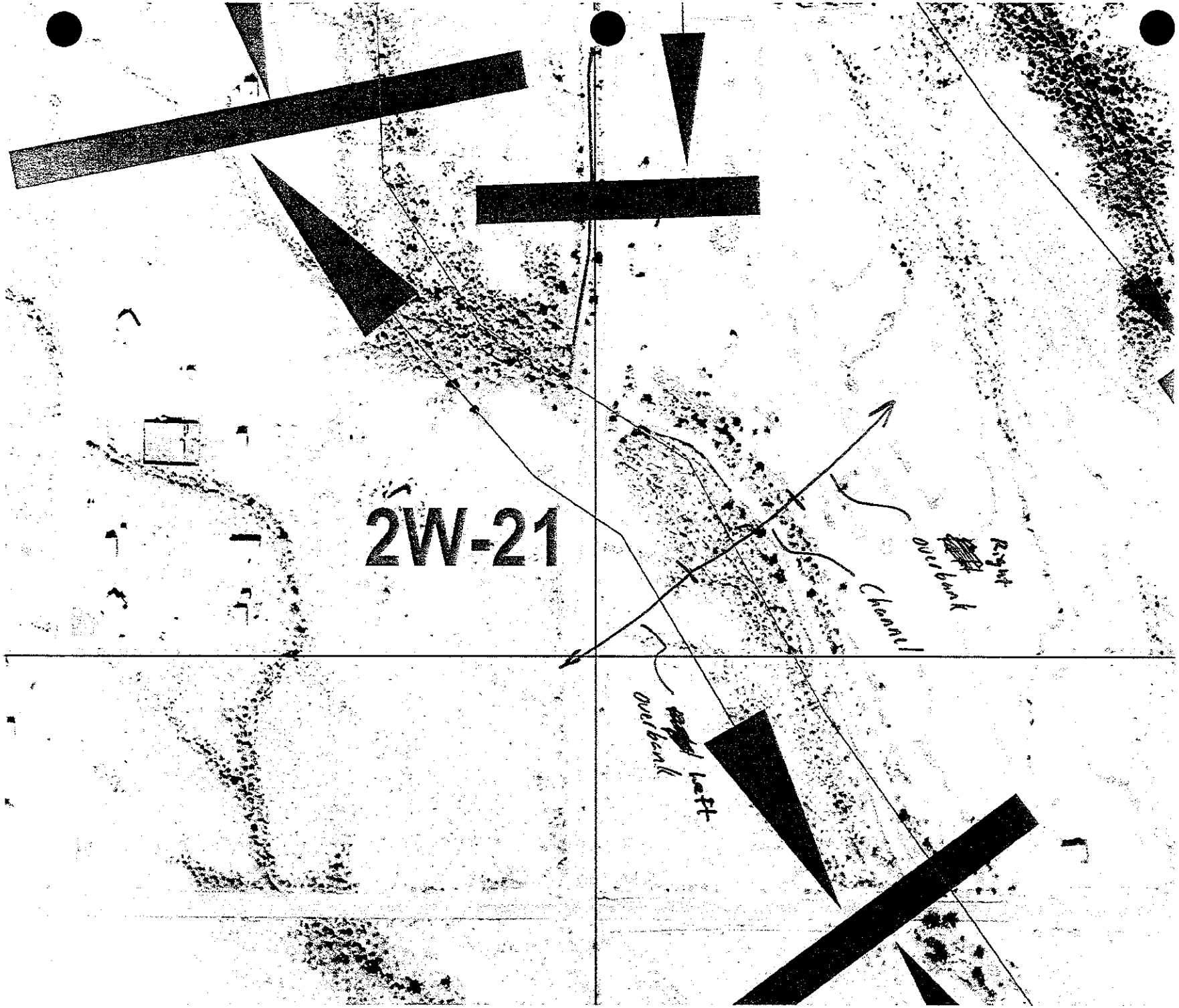

2W-21
Right overbank
Channel
Left overbank

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W - 22 (Between 1/4 mile north of Patton Rd. and just south of Dixileta Dr.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.003	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.020	0.012
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.050**	**0.037**

Figure E-1
(2W - 22)

Figure 1. (Photo #216) Channel looking downstream.

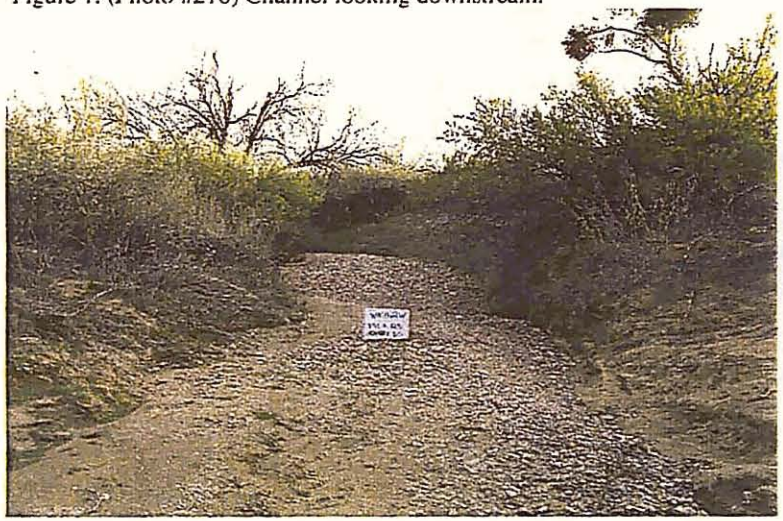


Figure 2. (Photo #217) Right Overbank looking downstream.

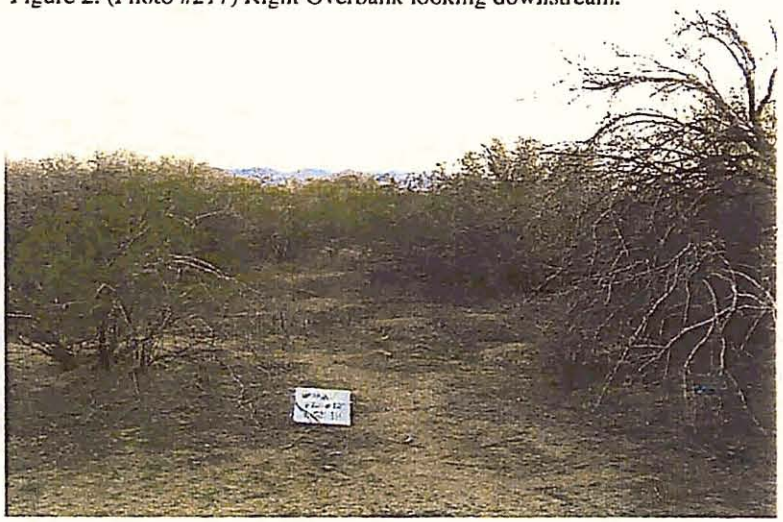


Figure 3. (Photo #215) Left Overbank looking downstream.

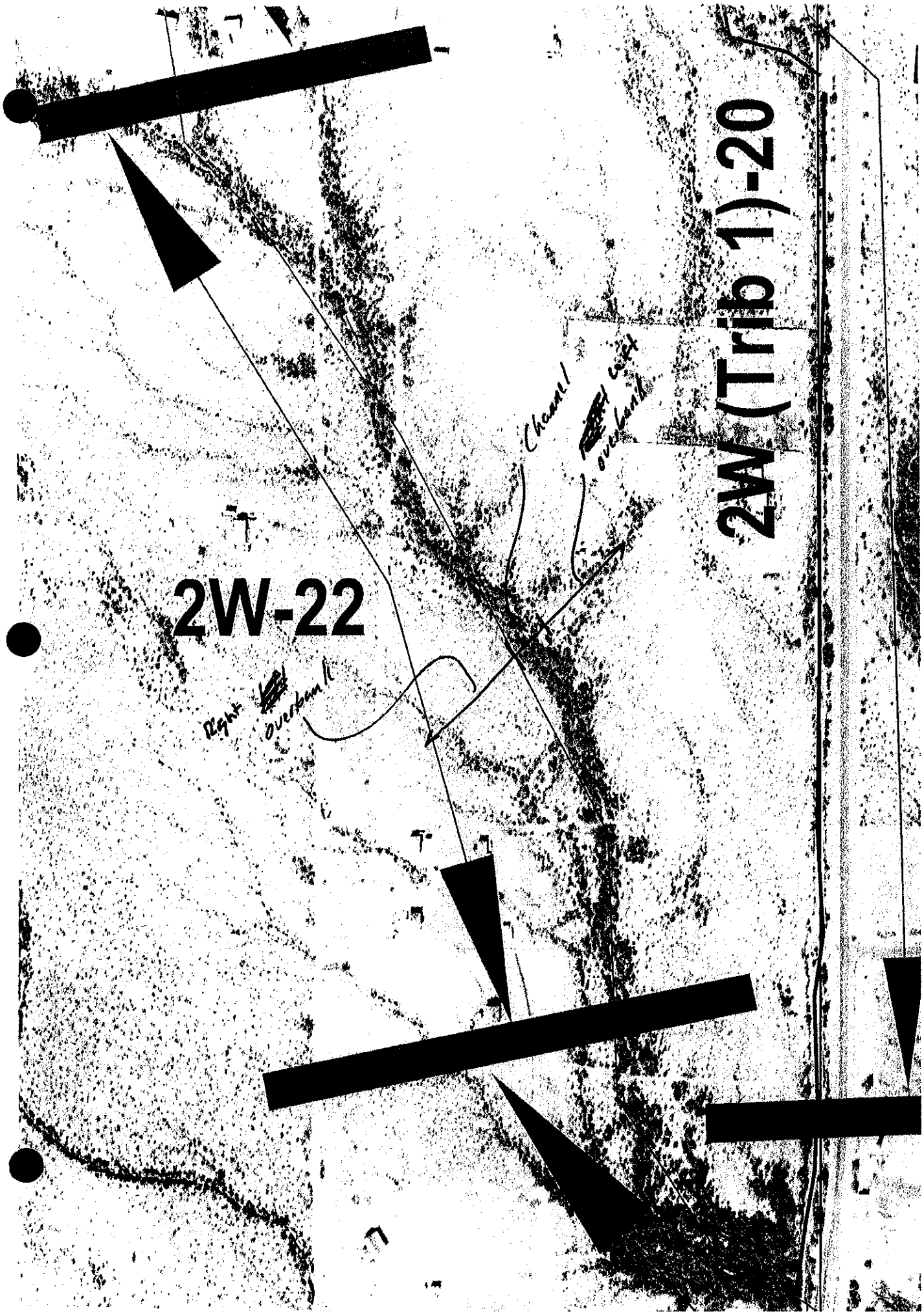

2W-22
2W(Trib 1)-20
Channel
Left overbank
Right overbank

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W - 23 (Between just south of Dixileta Dr. and 1/2 mile north of Dixileta Dr.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.001	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.046**	**0.033**

Figure E-1
(2W - 23)

Figure 1. (Photo #233) Channel looking upstream.

Figure 2. (Photo #232) Right Overbank looking downstream.

Figure 3. (Photo #234) Left Overbank looking downstream.

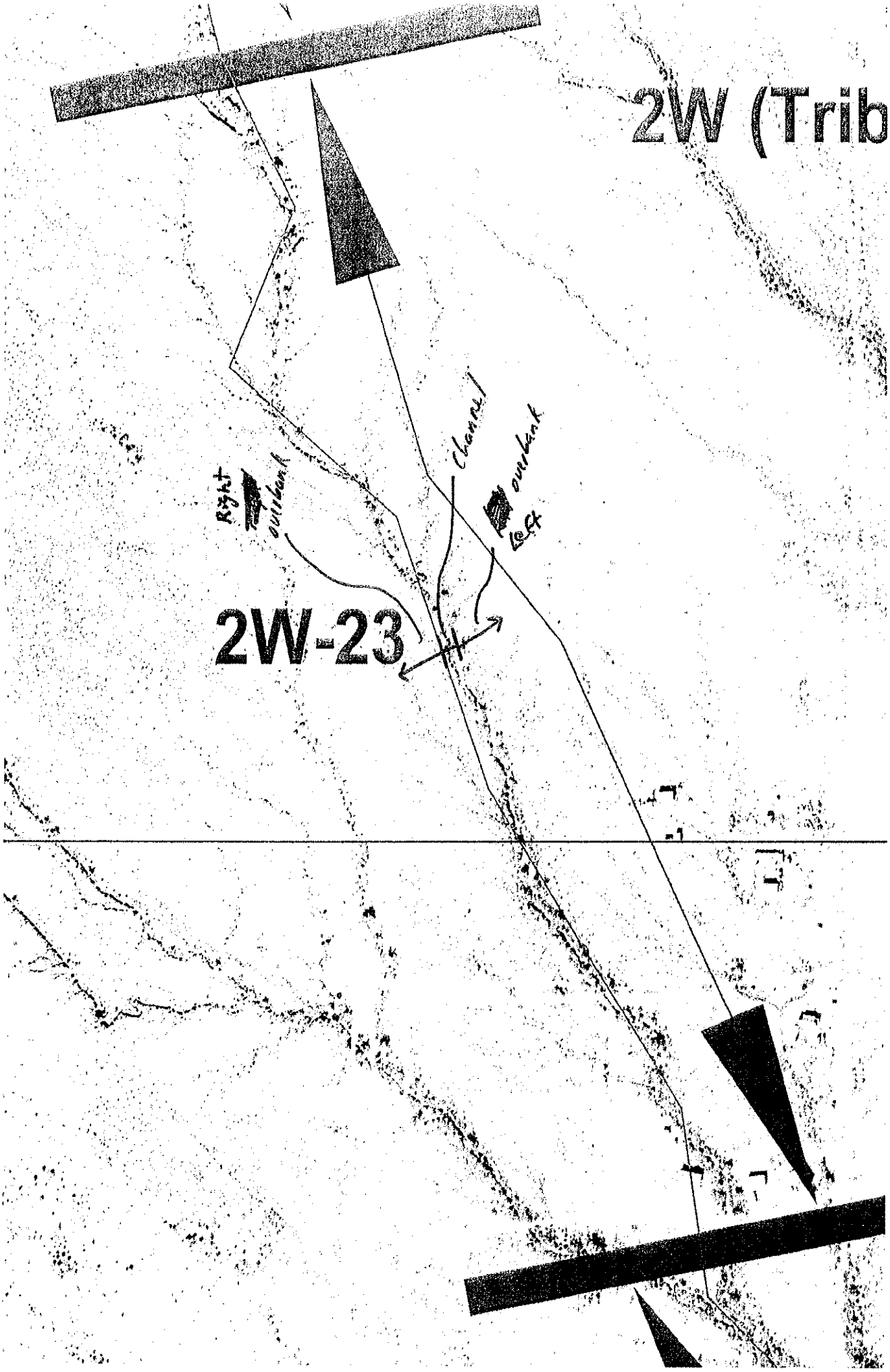

2W (Trib
Right
overbank
Channel
overbank
Left
2W-23

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W - 24 (Between 1/2 mile north of Dixileta Dr. to 1/4 mile south of Lone Mountain Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.003	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.006		0.008
	Medium		.010-.025		0.010	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.031**	**0.038**	**0.033**

Figure E-1
(2W - 24)

Figure 1. (Photo #229) Channel looking upstream.

Figure 2. (Photo #230) Right Overbank looking downstream.

Figure 3. (Photo #231) Left Overbank looking downstream.

Right
overbank
Channel
2W-24
Left
overbank

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W - 25 (1/4 mile south of Lone Mountain Rd. to just north of Lone Mountain Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.002	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010		0.010
	Large		.025-.050		0.028	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.038**	**0.059**	**0.036**

Figure E-1
(2W - 25)

Figure 1. (Photo #232) Channel looking downstream.

Figure 2. (Photo #233) Right Overbank looking downstream.

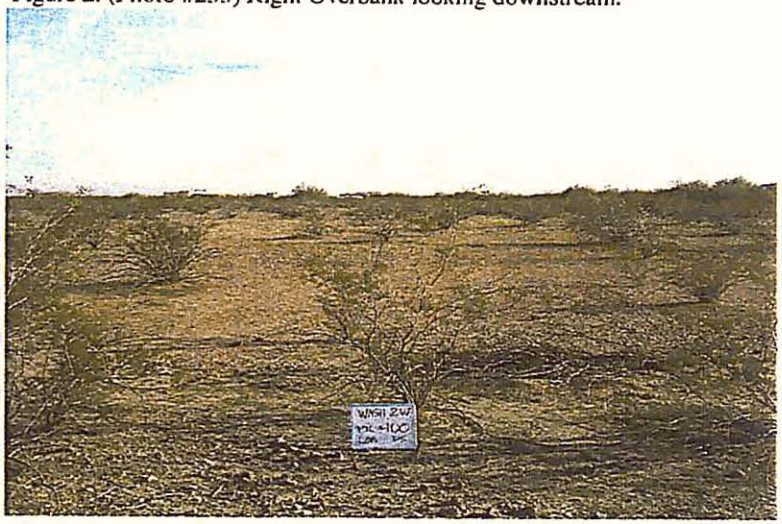
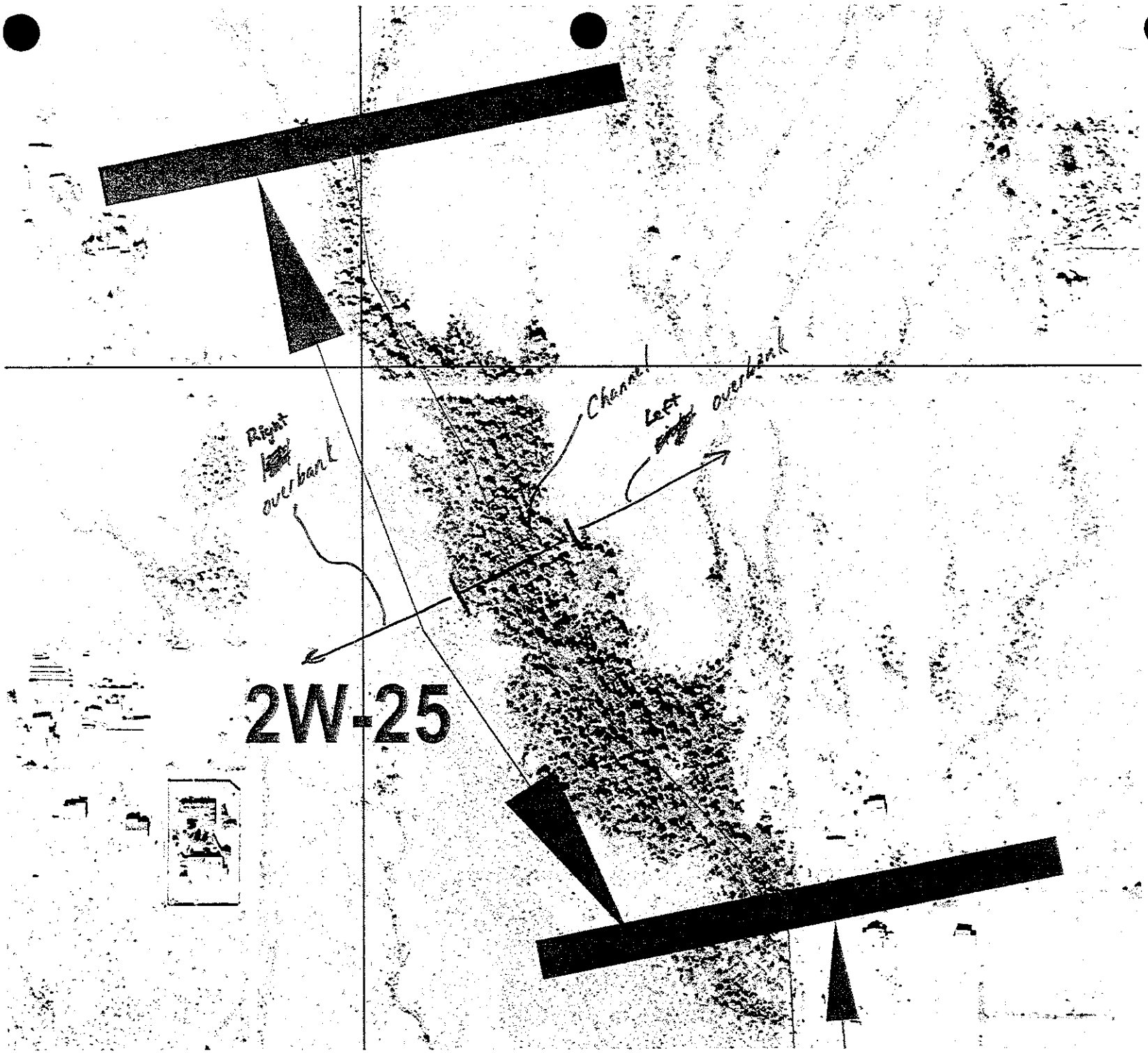


Figure 3. (Photo #234) Left Overbank looking downstream.


Right overbank
Channel
Left overbank
2W-25

2 West Tributary – 1

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/10/2005

Project: Wittmann ADMSU
Stream: 2 West Tributary-1
Location: Reach - 2W (Trib1) - 20 (Adjacent and Parallel to Crozier Rd. between Dixileta Dr. and 1/4 north of Patton Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.020		0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.005		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.025**	**0.048**	**0.033**

Figure E-1
(2W (Trib1) - 20)

Figure 1. (Photo #213) Channel looking downstream.

Figure 2. (Photo #212) Left Overbank looking downstream.

Figure 3. (Photo #214) Right Overbank looking upstream.

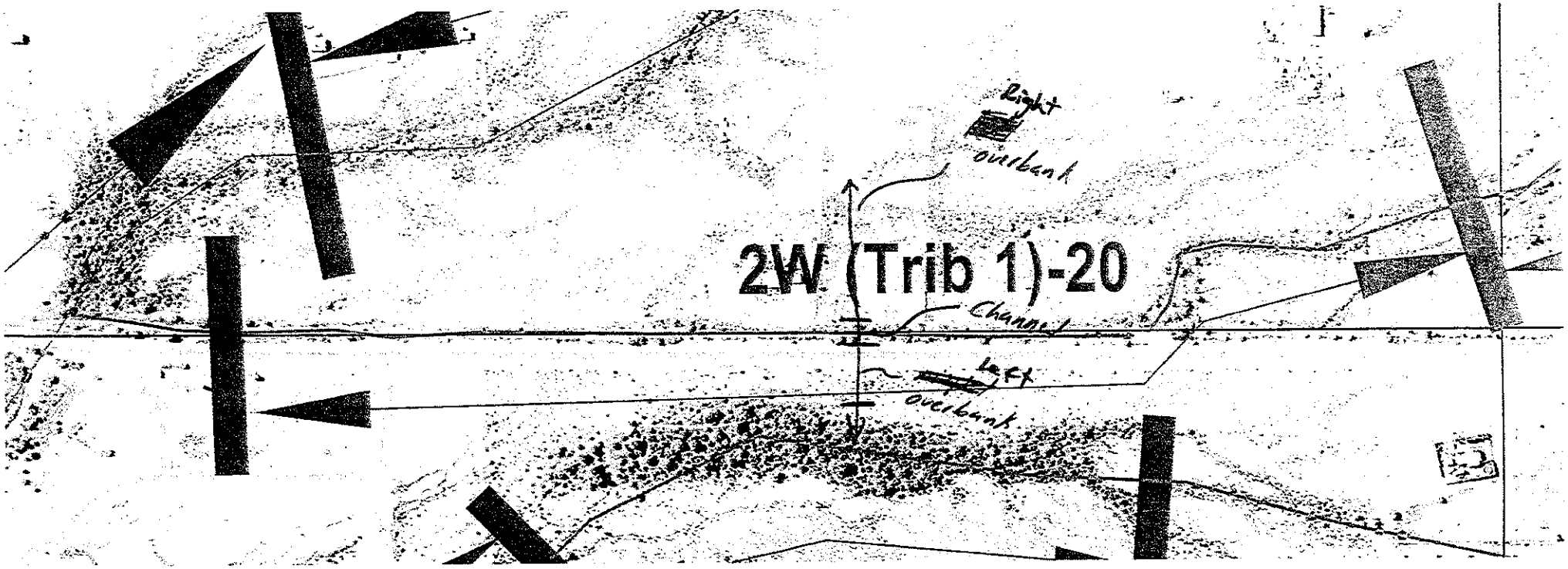

2W (Trib 1)-20
Right
overbank
Channel
Left
overbank

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/10/2005

Project: Wittmann ADMSU
Stream: 2 West Tributary-1
Location: Reach - 2W (Trib1) - 21 (Between Dixileta Dr. to 1/4 south of Lone Mountain Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.026	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.016	0.025	0.012
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.044**	**0.053**	**0.040**

Figure E-1
(2W (Trib1) - 21)

Figure 1. (Photo #382) Channel looking upstream.

Figure 2. (Photo #380) Right Overbank looking downstream.

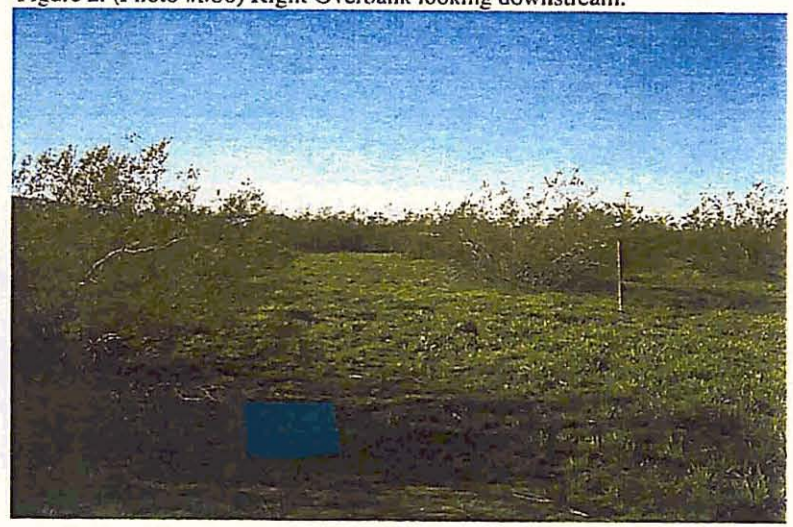
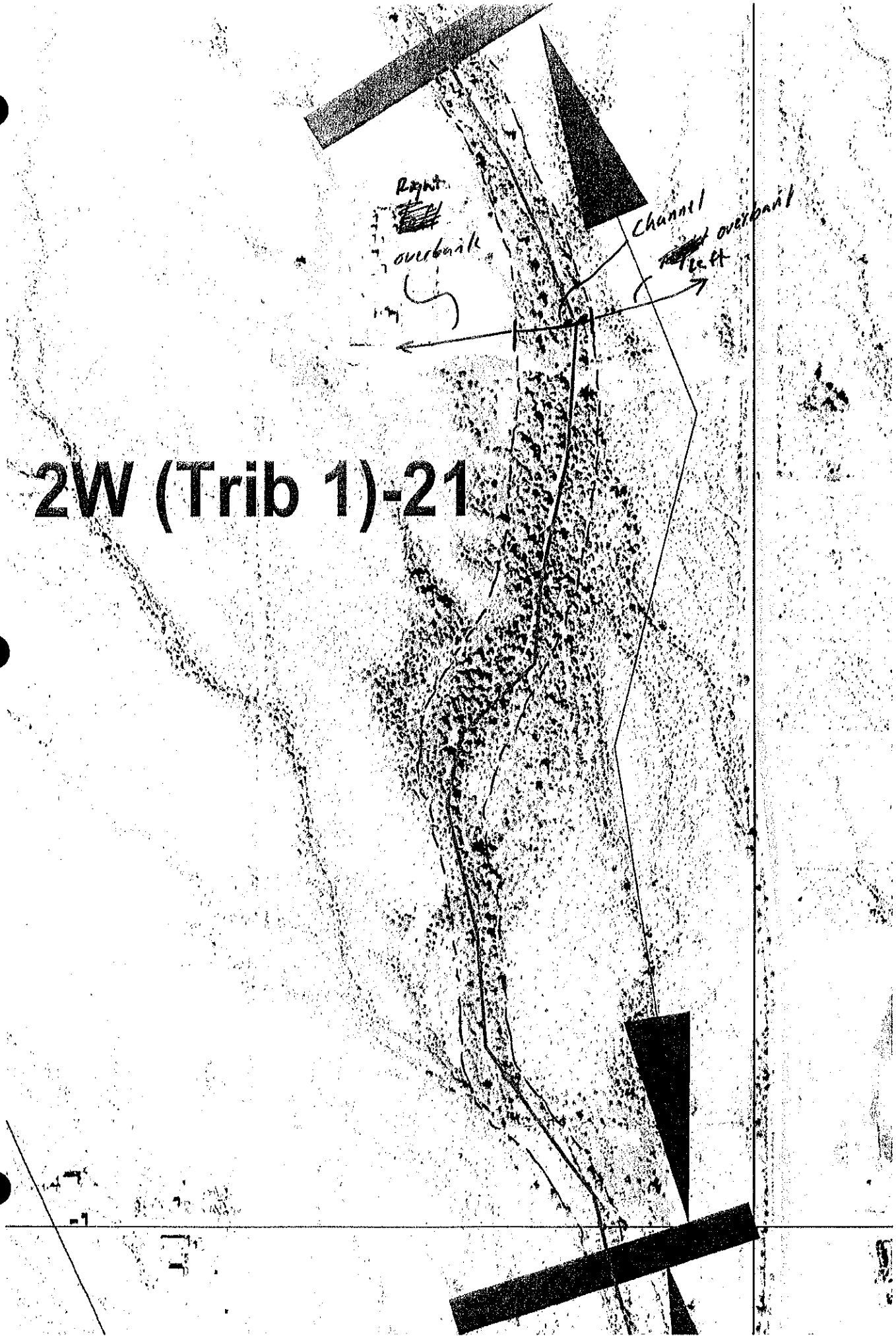


Figure 3. (Photo #381) Left Overbank looking upstream.



2W (Trib 1)-21

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/10/2005

Project: Wittmann ADMSU
Stream: 2 West Tributary-1
Location: Reach - 2W (Trib1) - 22 (Between 1/4 mile south of Lone Mountain Rd. to Laura St.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.020	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.003	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.038**	**0.052**	**0.038**

Figure E-1
(2W (Trib1) - 22)

Figure 1. (Photo #384) Channel looking upstream.

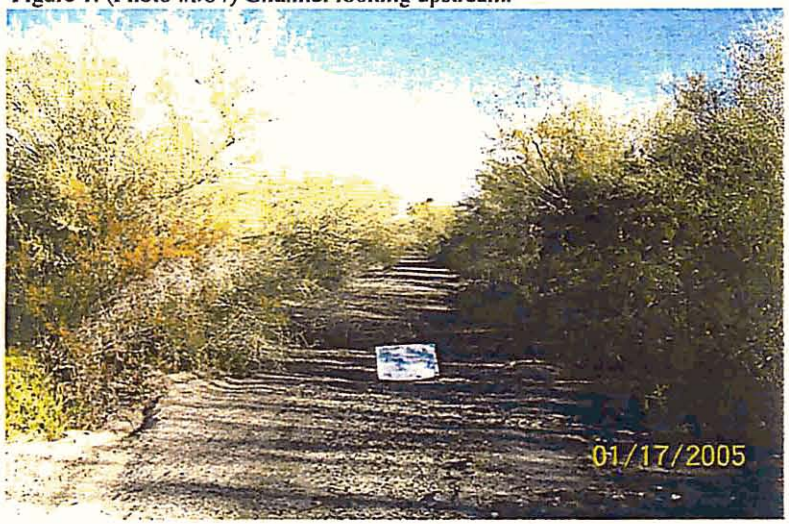


Figure 2. (Photo #383) Right Overbank looking upstream.

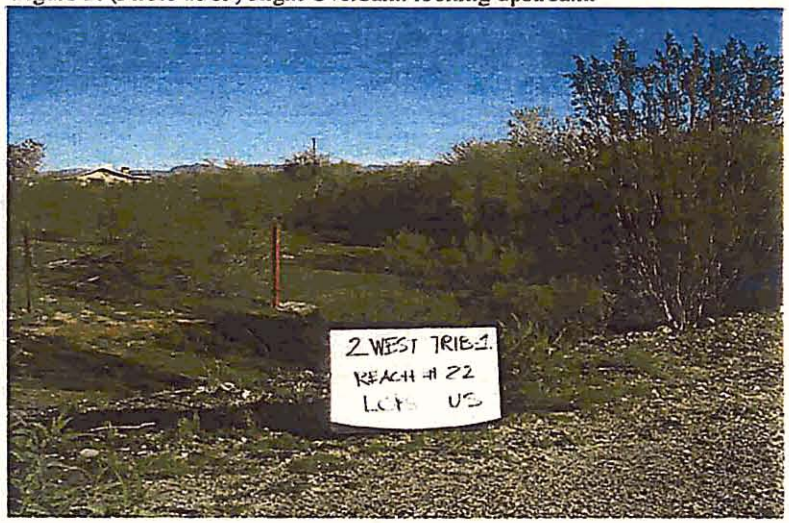
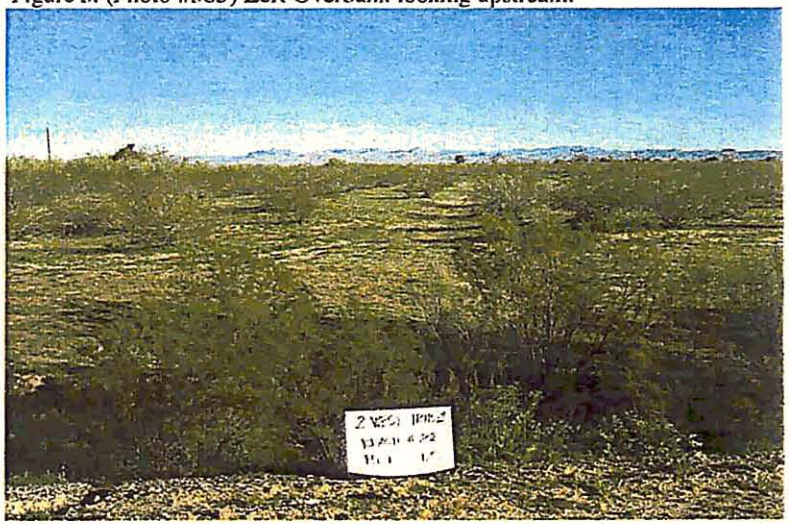


Figure 3. (Photo #385) Left Overbank looking upstream.



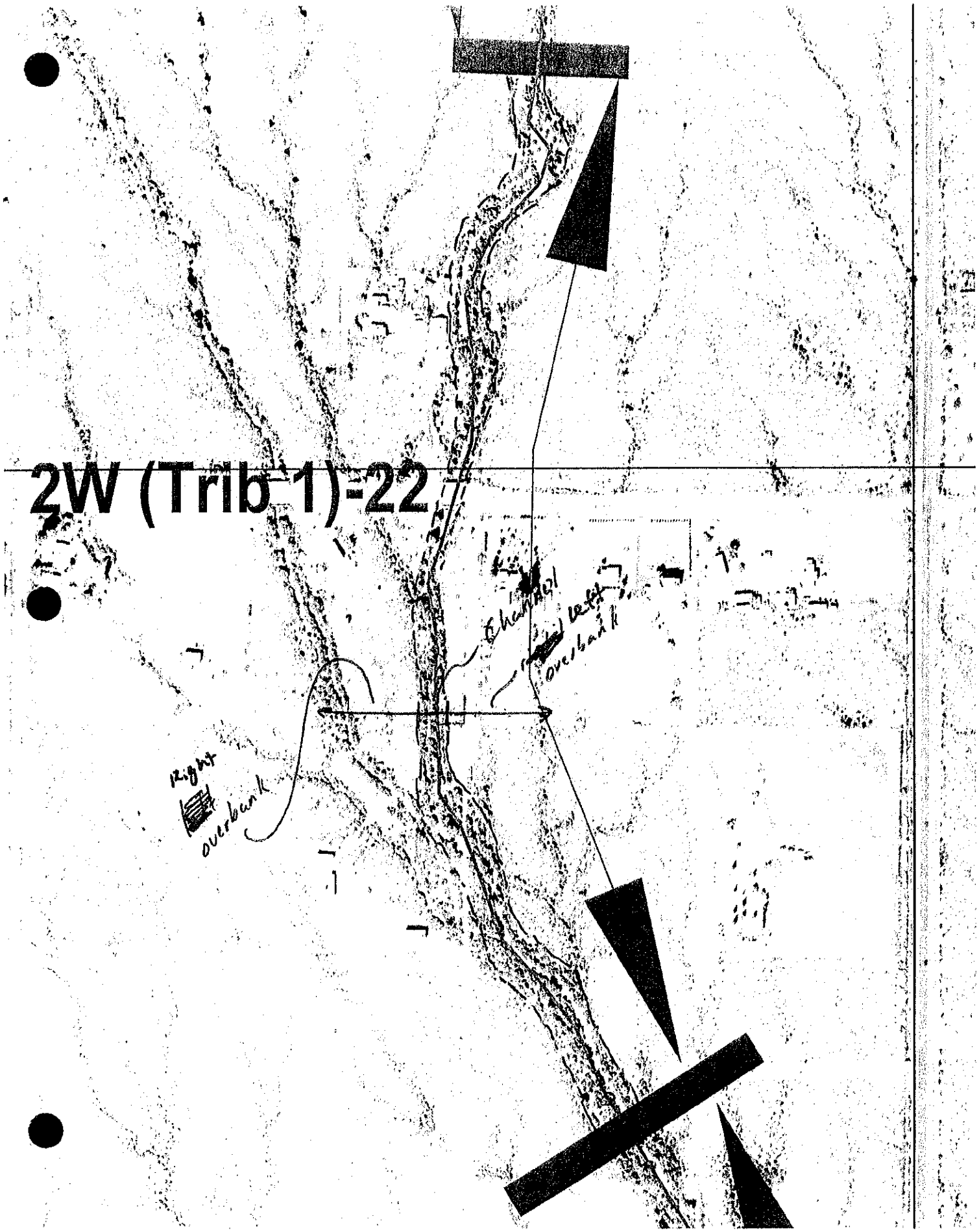

2W (Trib 1)=22
channel
left
overbank
right
overbank

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/10/2005

Project: Wittmann ADMSU
Stream: 2 West Tributary-1
Location: Reach - 2W (Trib1) - 23 (From Laura St. to U.S. 60)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.002	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.020	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.038**	**0.049**	**0.038**

Figure E-1
(2W (Trib1) - 23)

Figure 1. (Photo #387) Channel looking upstream.

Figure 2. (Photo #386) Right Overbank looking upstream.

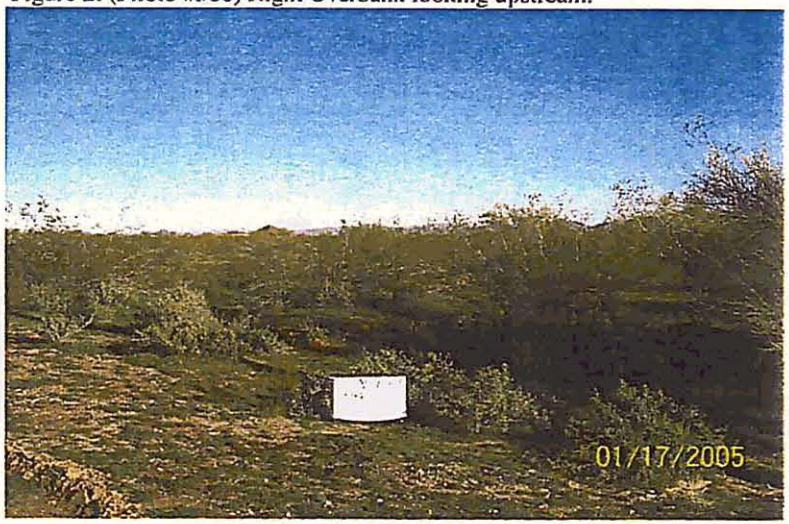
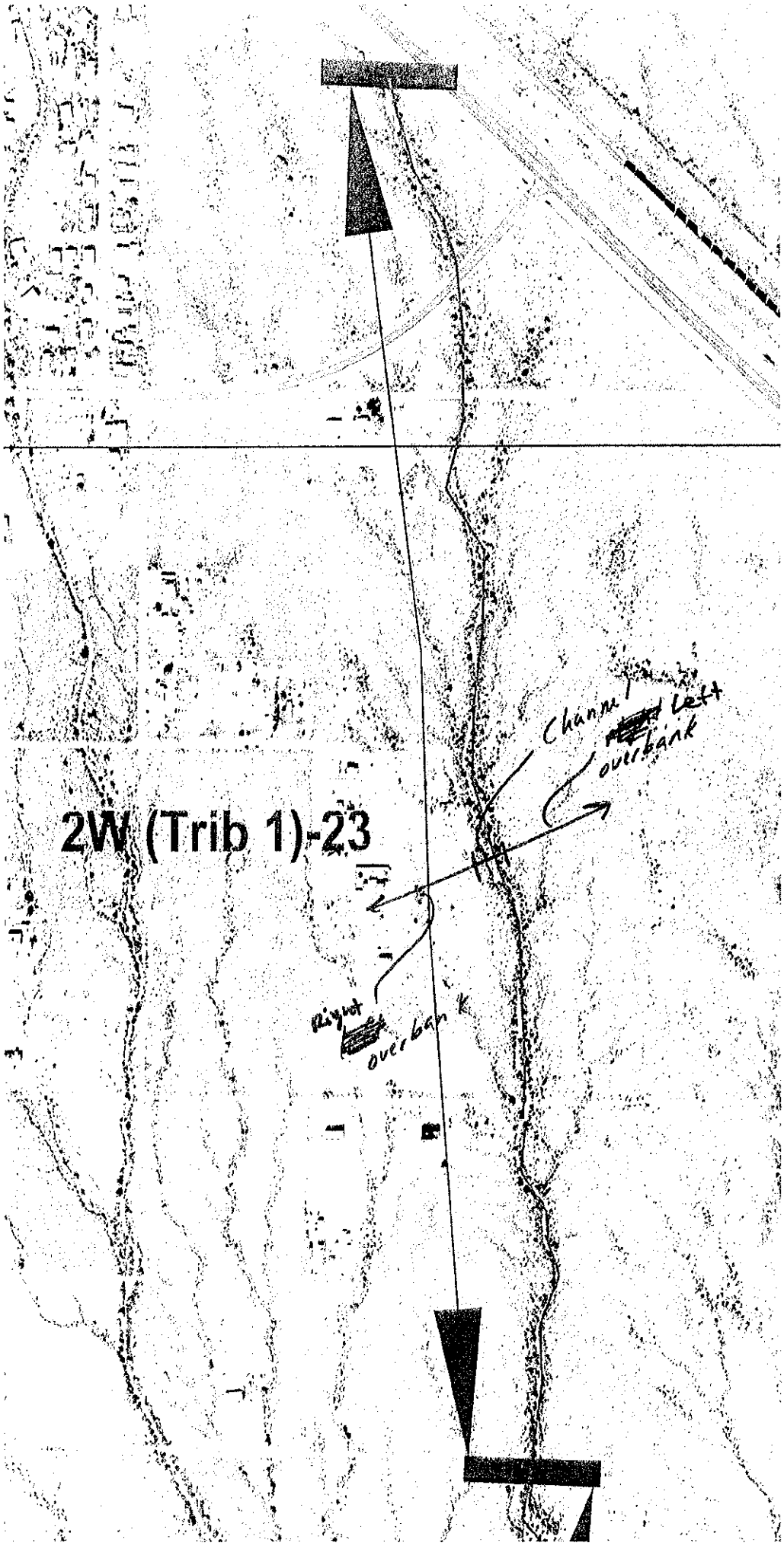


Figure 3. (Photo #388) Left Overbank looking downstream.


2W (Trib 1)-23
Channel
Left
overbank
Right
overbank

2 West Tributary – 2

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/10/2005

Project: Wittmann ADMSU
Stream: 2 West Tributary-2
Location: Reach - 2W (Trib2) - 20 (South of Patton Rd. to Dale Ln. alignment)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.002	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.050**	**0.036**

Figure E-1
(2W (Trib2) - 20)

Figure 1. (Photo #204) Channel looking downstream.

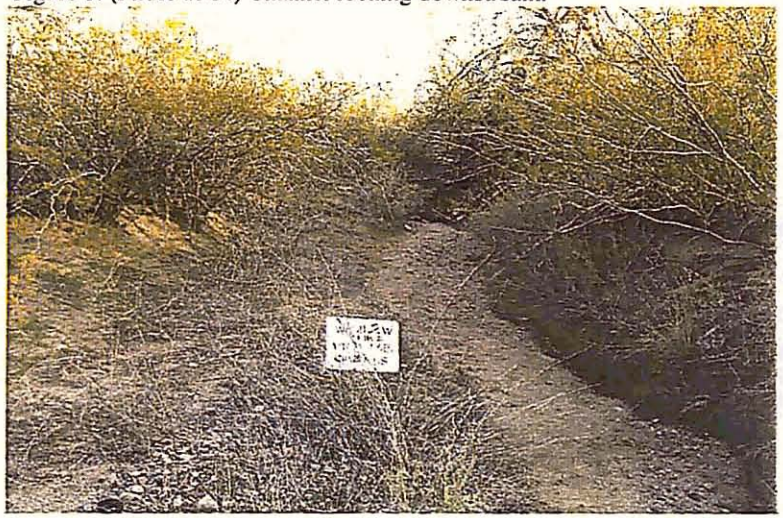
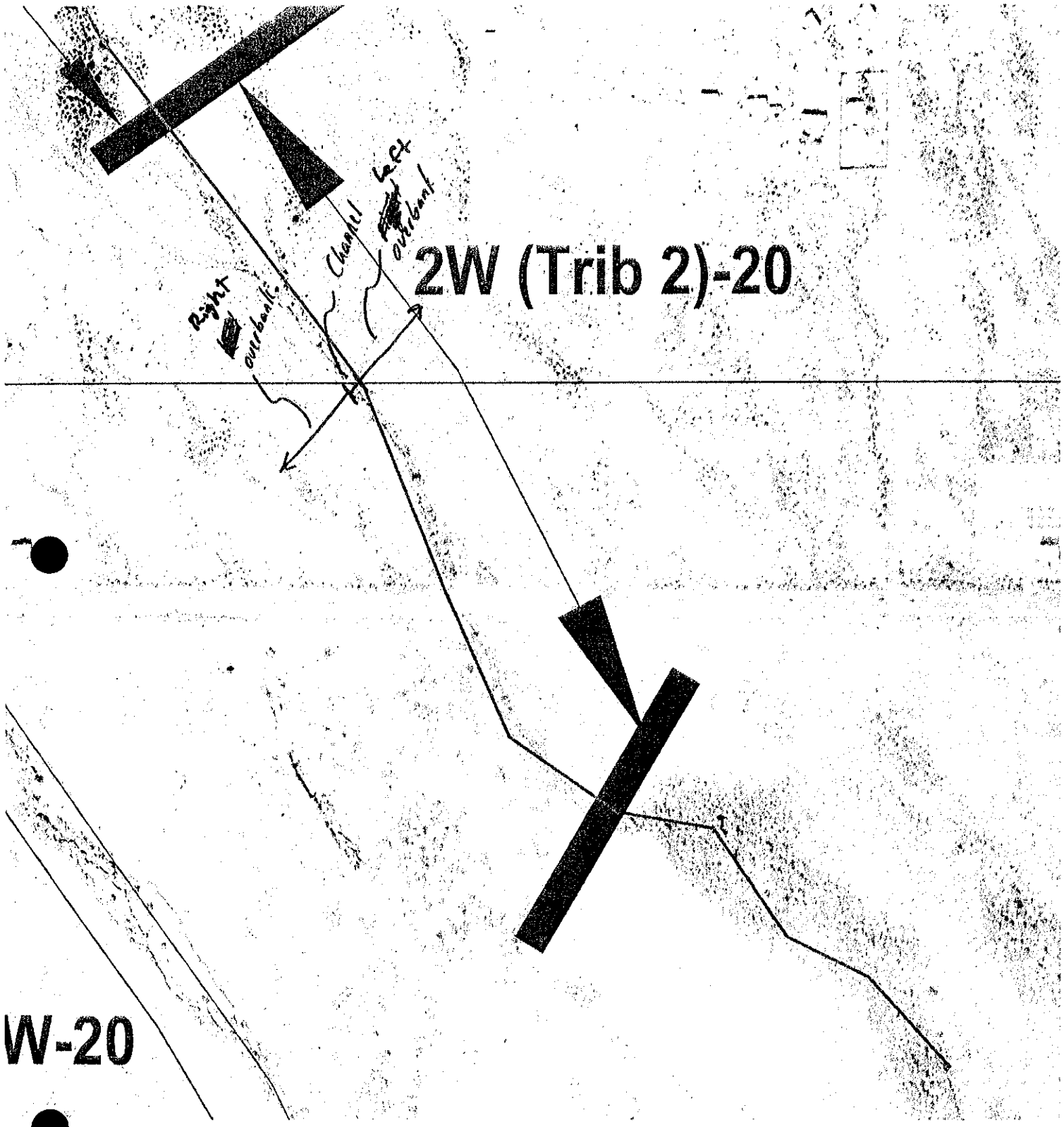


Figure 2. (Photo #206) Left Overbank looking downstream.

Figure 3. (Photo #205) Right Overbank looking downstream.

5



W-20

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/10/2005

Project: Wittmann ADMSU
Stream: 2 West Tributary-2
Location: Reach - 2W (Trib2) - 21 (Between Dale Ln. alignment to Peak View Rd. alignment)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.012	0.022	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.003	
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.038**	**0.053**	**0.036**

Figure E-1
(2W (Trib2) - 21)

Figure 1. (Photo #211) Channel looking downstream.

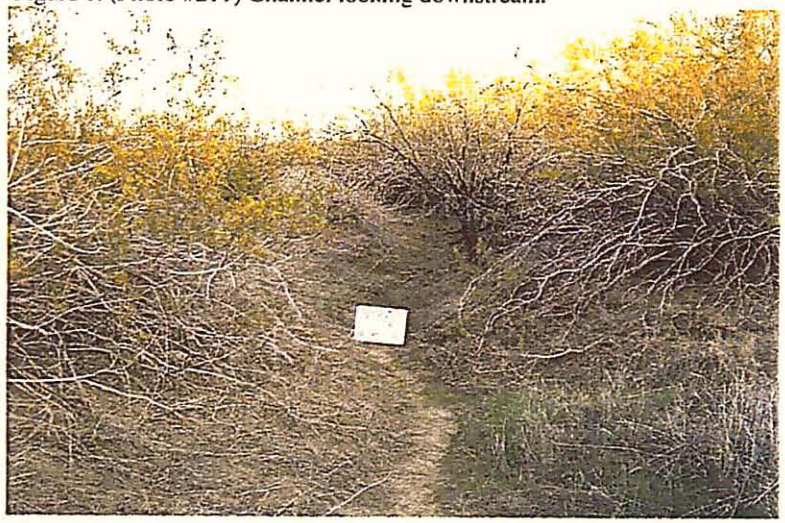


Figure 2. (Photo #369) Right Overbank looking upstream.

Figure 3. (Photo #210) Left Overbank looking downstream.

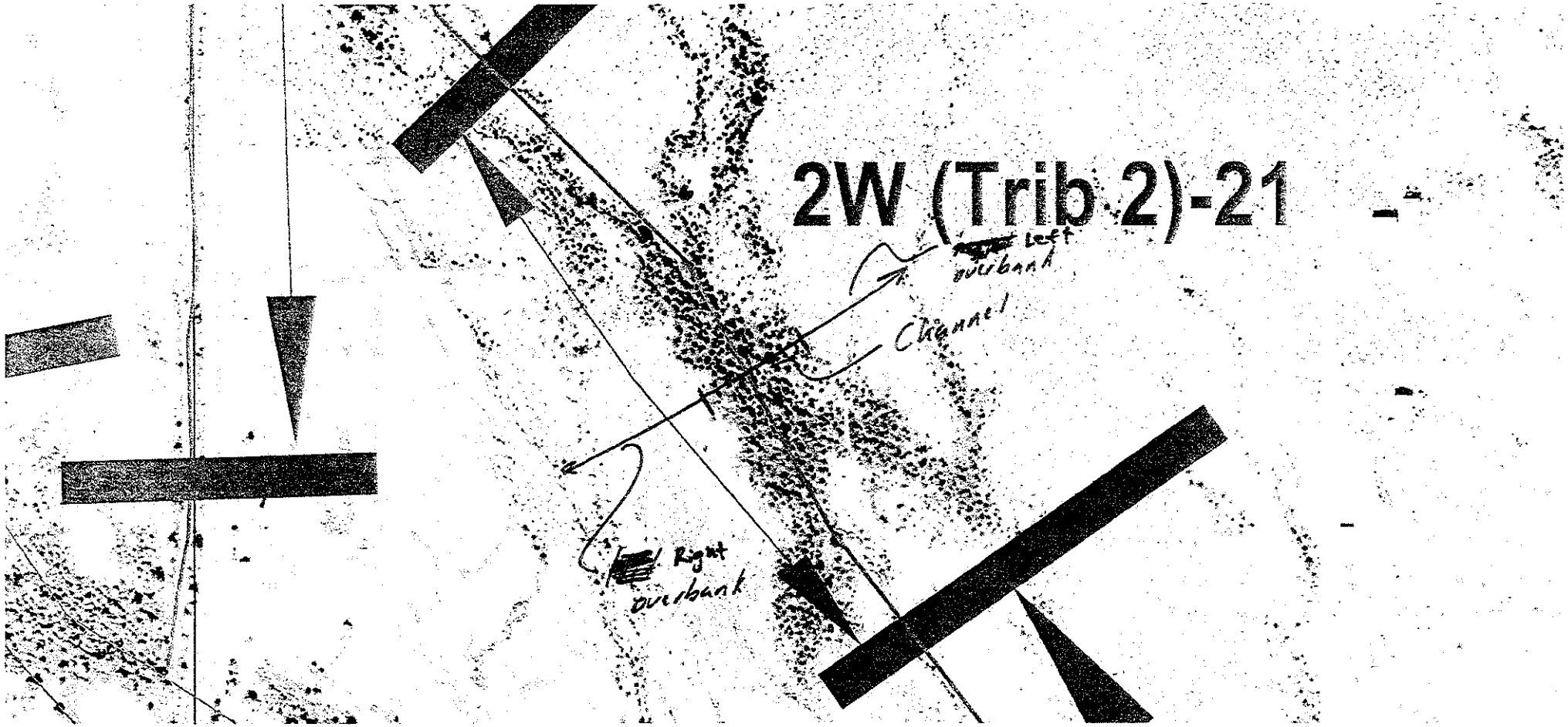

2W (Trib 2)-21
Left overbank
Channel
Right overbank

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/10/2005

Project: Wittmann ADMSU
Stream: 2 West Tributary-2
Location: Reach - 2W (Trib2) - 22 (Between Peak View Rd. alignment to just south of Dixileta Dr.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.012		0.010
	Large		.025-.050		0.026	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.037**	**0.052**	**0.035**

Figure E-1
(2W (Trib2) - 22)

Figure 1. (Photo #219) Channel looking downstream.

Figure 2. (Photo #370) Right Overbank looking downstream.

Figure 3. (Photo #218) Left Overbank looking downstream.

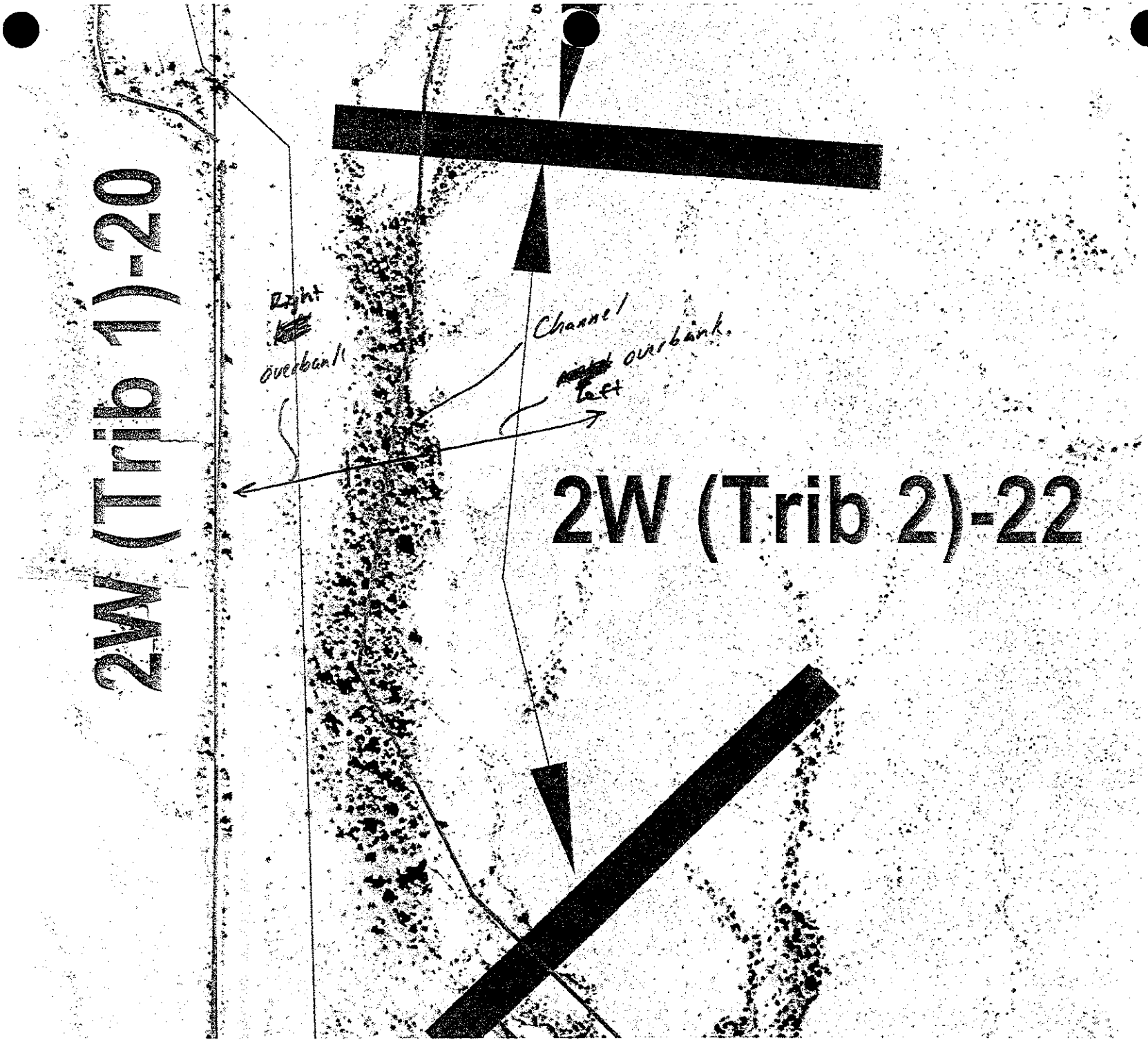

2W (Trib 1)-20
Right overbank
Channel
Left overbank
2W (Trib 2)-22

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/10/2005

Project: Wittmann ADMSU
Stream: 2 West Tributary-2
Location: Reach - 2W (Trib2) - 23 (Just south of Dixileta Dr. to 1/2 mile north of Dixileta Dr.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004		0.000	
	Minor		.005-.015	0.005		0.005
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.018	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.043**	**0.048**	**0.043**

Figure E-1
(2W (Trib2) - 23)

Figure 1. (Photo #221) Channel looking upstream.

Figure 2. (Photo #220) Right Overbank looking downstream.

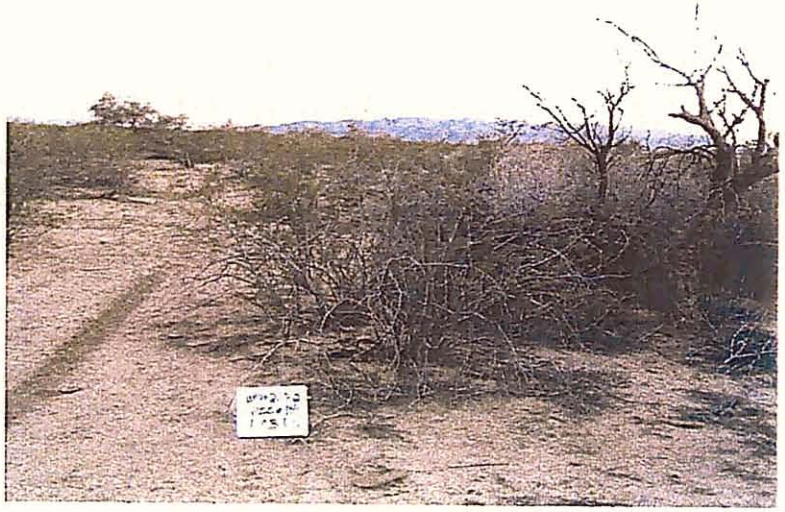


Figure 3. (Photo #222) Left Overbank looking downstream.

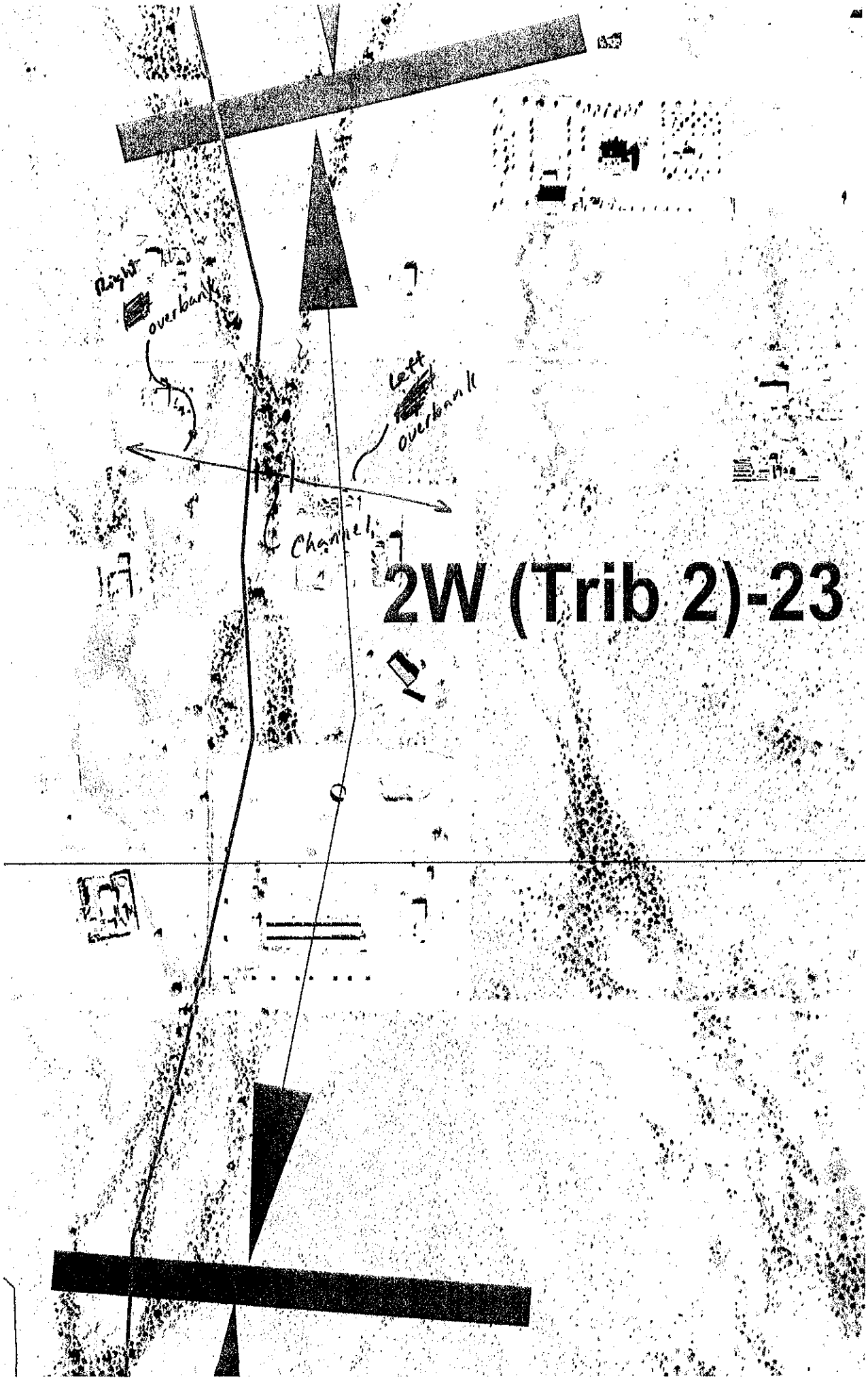

Right
overbank
Left
overbank
Channel
2W (Trib 2)-23

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/10/2005

Project: Wittmann ADMSU
Stream: 2 West Tributary-2
Location: Reach - 2W (Trib2) - 24 (1/2 mile north of Dixileta Dr. to just north of Lone Mountain Rd.)

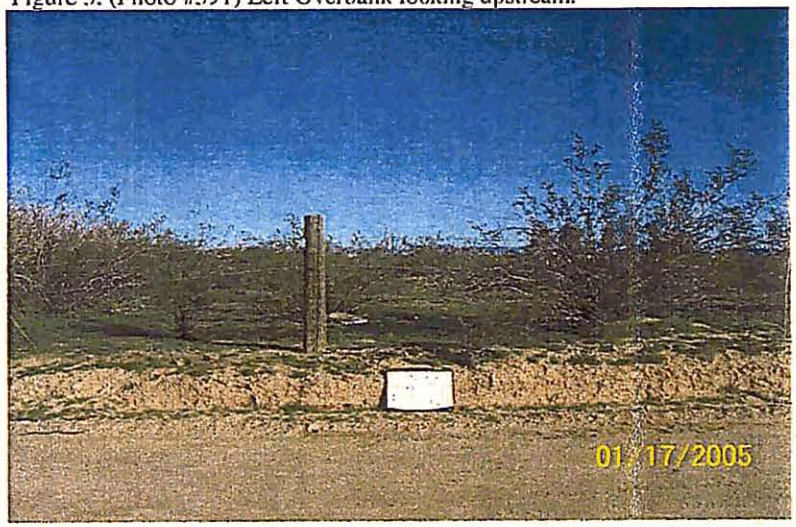
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.003	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.002	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.048**	**0.035**

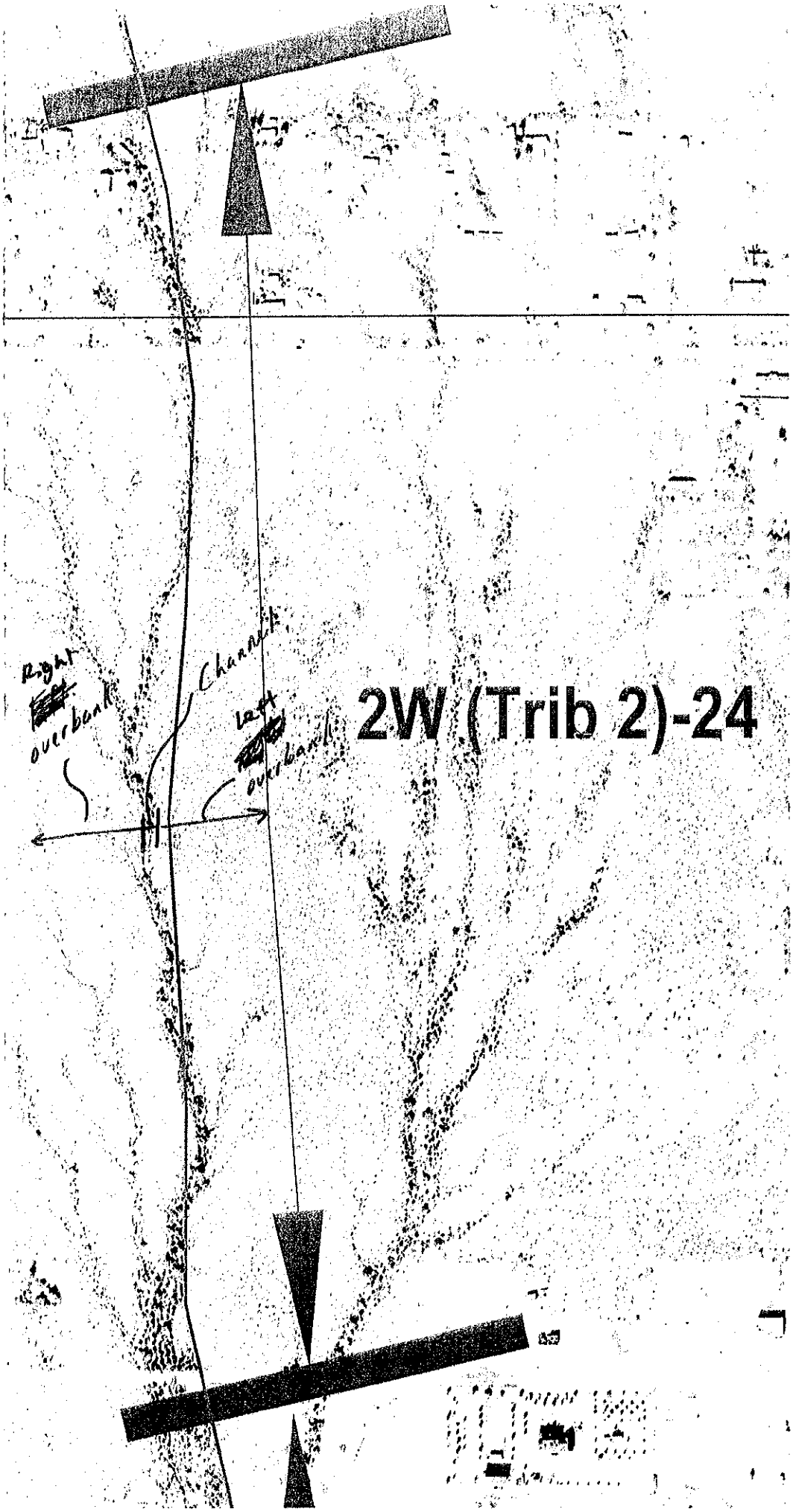
Figure E-1
(2W (Trib2) - 24)

Figure 1. (Photo #390) Channel looking upstream.

Figure 2. (Photo #389) Right Overbank looking downstream.

Figure 3. (Photo #391) Left Overbank looking upstream.




Right
overbank
Channel
Left
overbank
2W (Trib 2)-24

E.1.3 Washes North of CAP Canal and East of 2-West Tributary-2.

Wittmann Wash

Wittmann South Split

Wittmann Wash Tributary

Wash T5N-R3W-S24E

Wash T5N-R2W-S07

Wash T5N-R3W-S01S

Wash T5N-R2W-S19W

Wash T5N-R2W-S19E

2 East Tributary

Wash 2 East

Wash 7 East

Wash T5N-R2W-S14W

Wash T5N-R2W-S14N

Wash T5N-R2W-S14S

Wash T5N-R2W-S11

7 East Tributary

Wittmann Wash

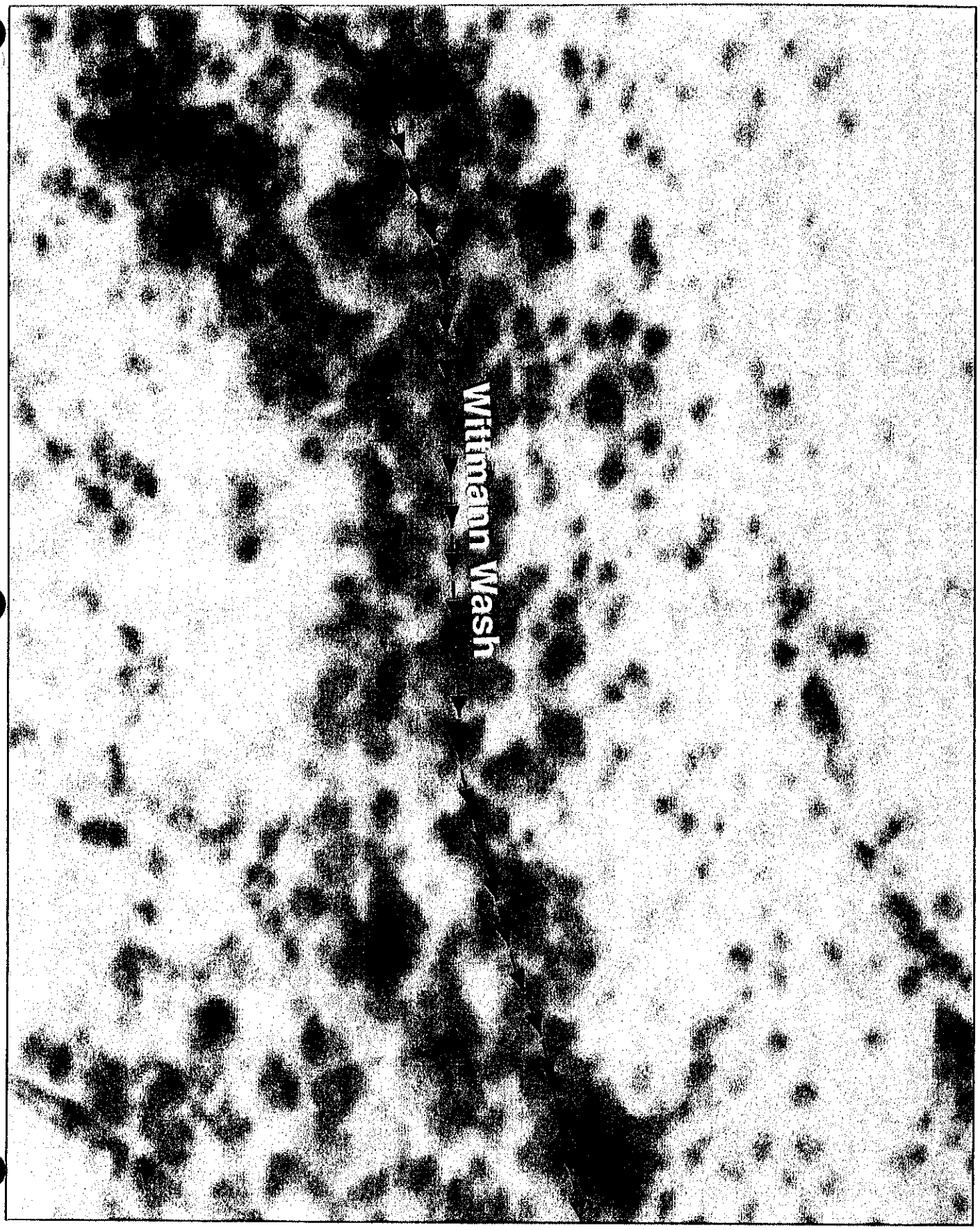
Table E-1

BY JCS DATE 1/24/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wittmann Wash
Location: Reach - Wittmann- 20A (Between 203rd Ave. bypass and just south of Janice Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.026	0.026	0.026
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.004	0.004
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010		0.010
	Medium		.010-.025		0.020	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.004	
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.054**	**0.040**

FIGURE E-1: Wittmann - 20A (n-value photo)



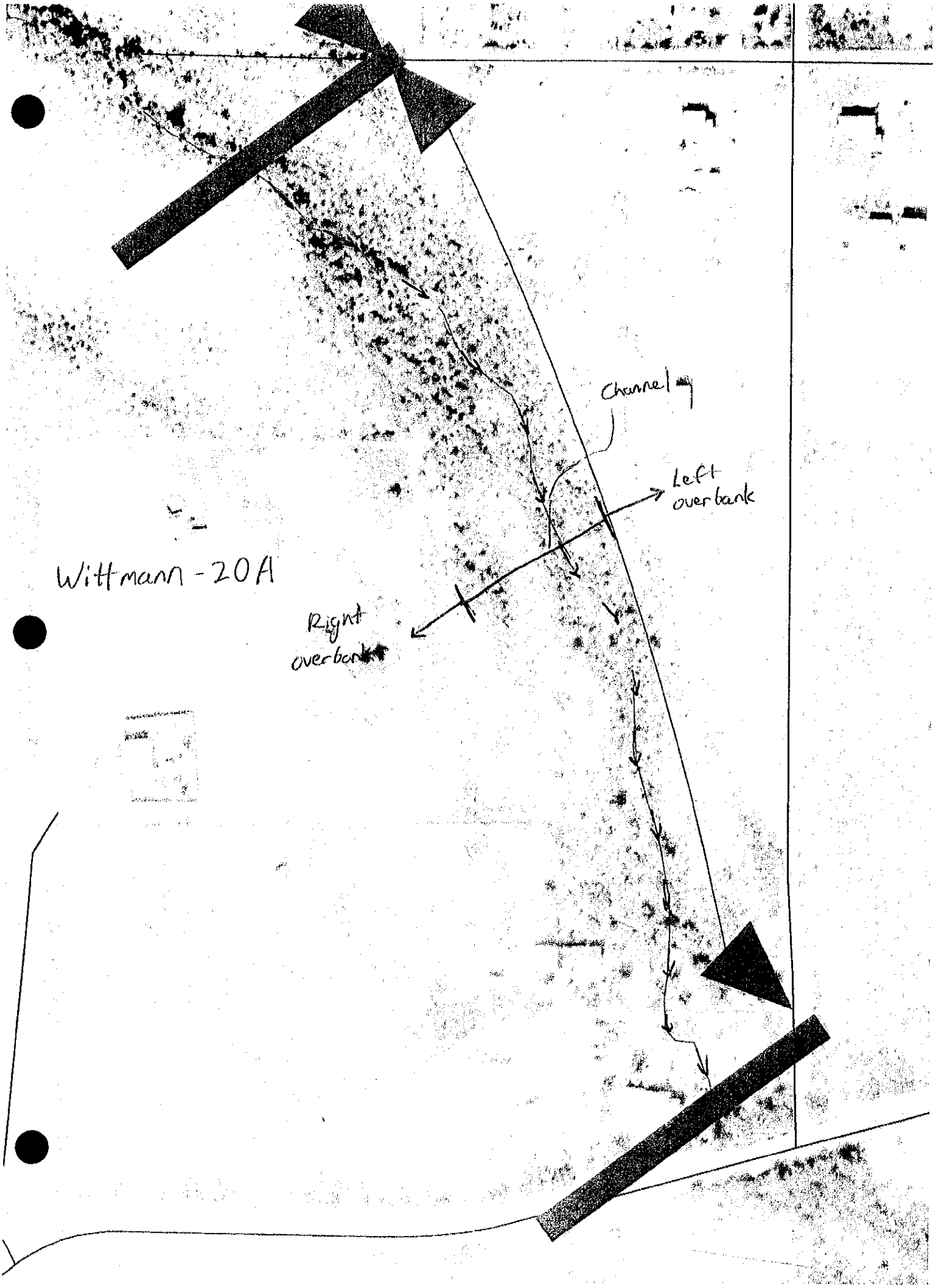

Channel
Left overbank
Wittmann - 20A
Right overbank

Table E-1

BY JCS DATE 1/24/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wittmann Wash
Location: Reach - Wittmann- 20B (Between just south of Janice Rd. and just south of Bradley Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000		0.000
	Minor		.005-.015		0.009	
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010		0.008
	Medium		.010-.025		0.025	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.061**	**0.034**

Figure E-1
(Wittmann - 20B)

Figure 1. (Photo #227) Channel looking upstream.

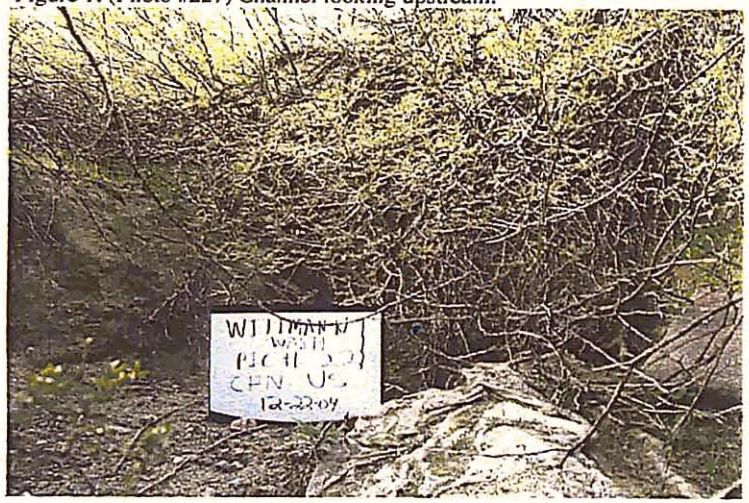
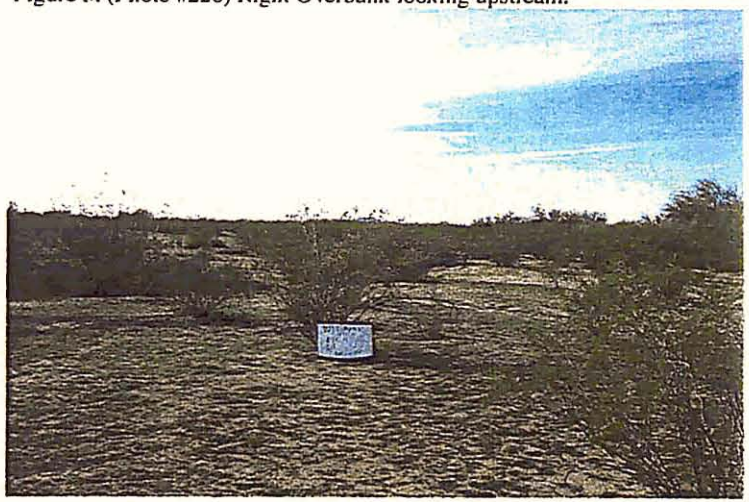


Figure 2. (Photo #228) Left Overbank looking downstream.

Figure 3. (Photo #226) Right Overbank looking upstream.



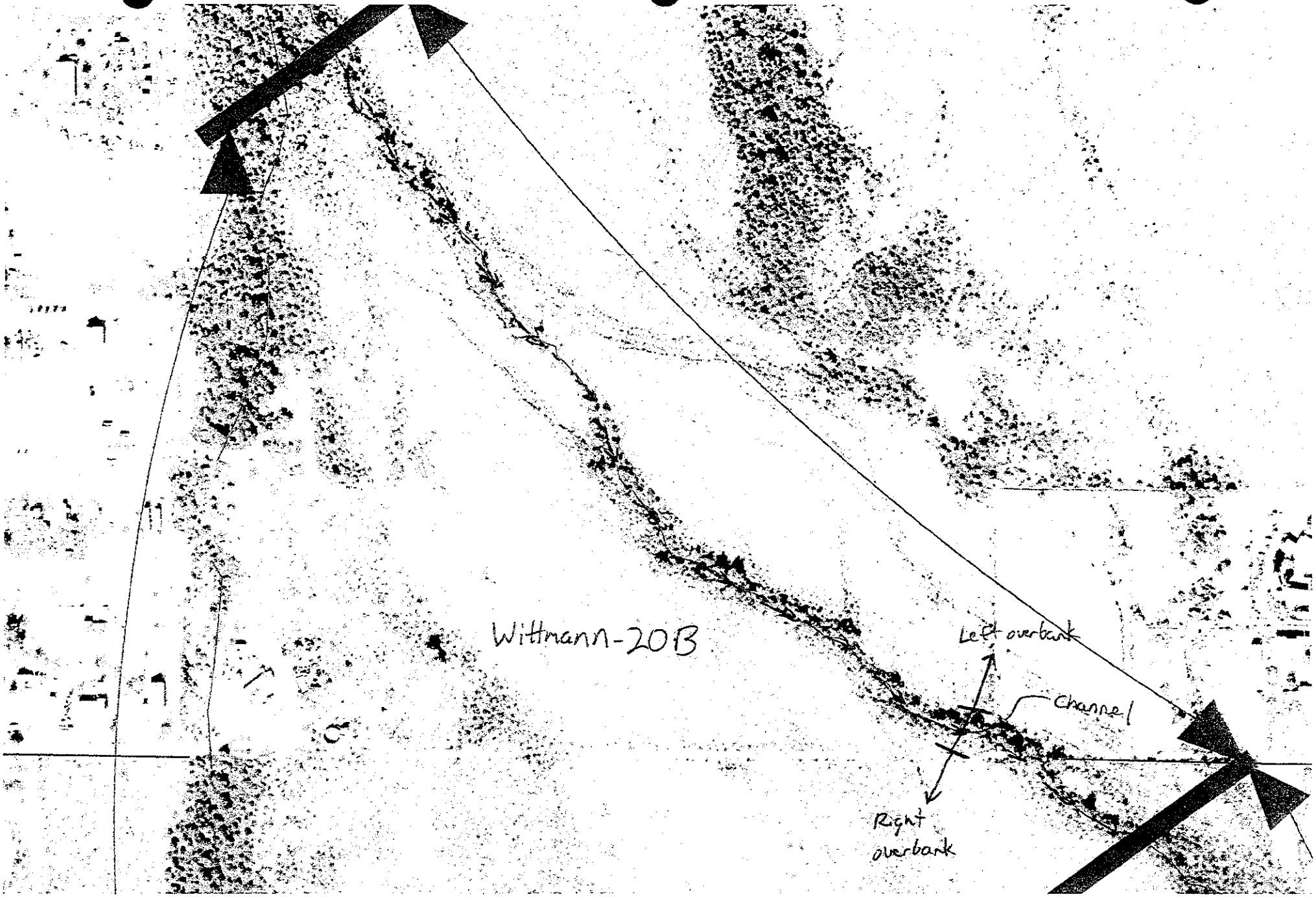

Wittmann-20B
Left overbank
Channel
Right overbank

Table E-1

BY JCS DATE 1/24/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wittmann Wash
Location: Reach - Wittmann- 21 (Between just south of Bradley Rd. and where the wash crosses 211th Ave.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004		0.003	
	Minor		.005-.015	0.005		0.005
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.014		0.011
	Large		.025-.050		0.032	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.044**	**0.060**	**0.041**

Figure E-1
(Wittmann - 21)

Figure 1. (Photo #230) Channel looking downstream.

Figure 2. (Photo #229) Right Overbank looking downstream.

Figure 3. (Photo #231) Left Overbank looking downstream.

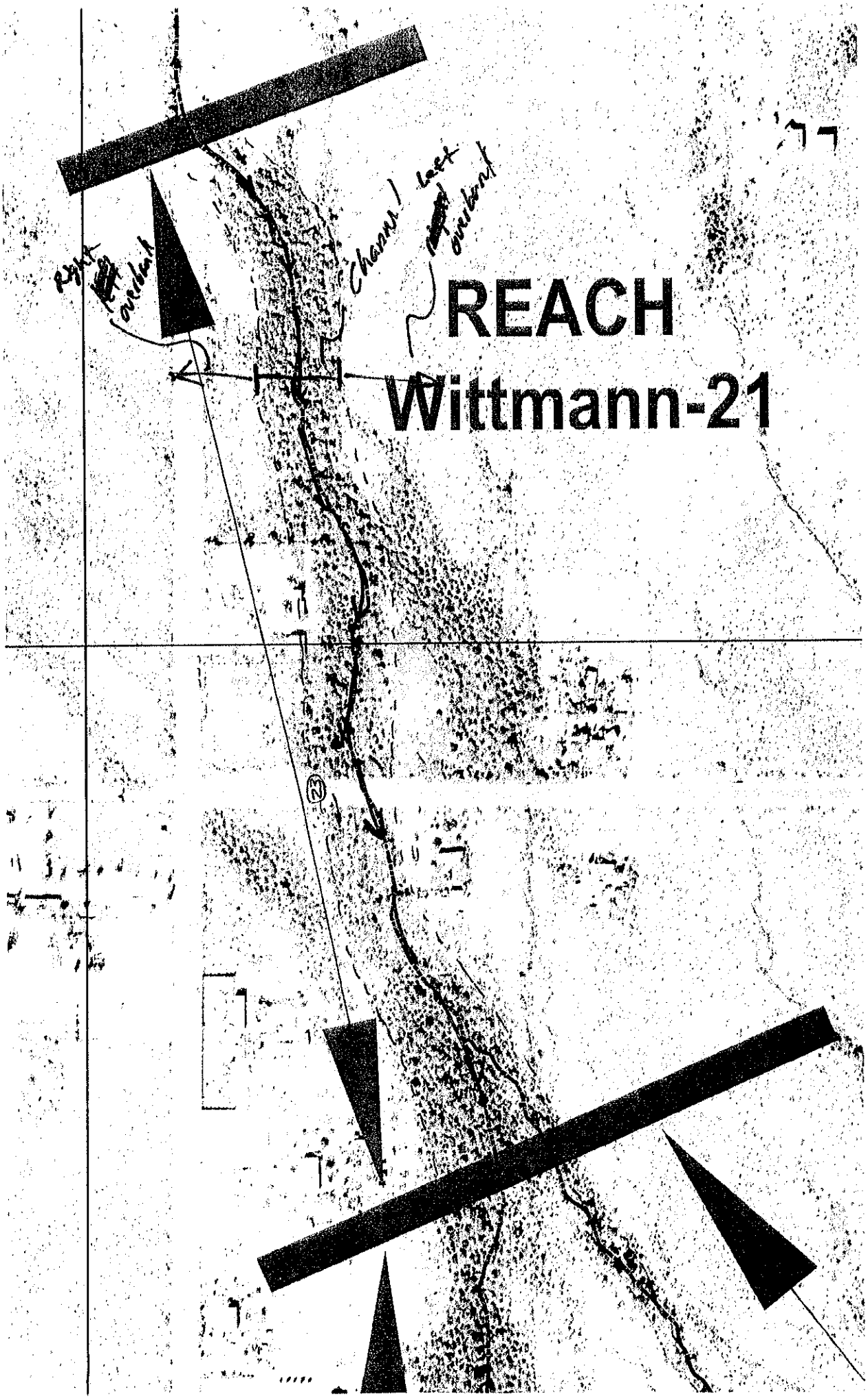

Right floodbank
Channel
Left floodbank
REACH
Wittmann-21

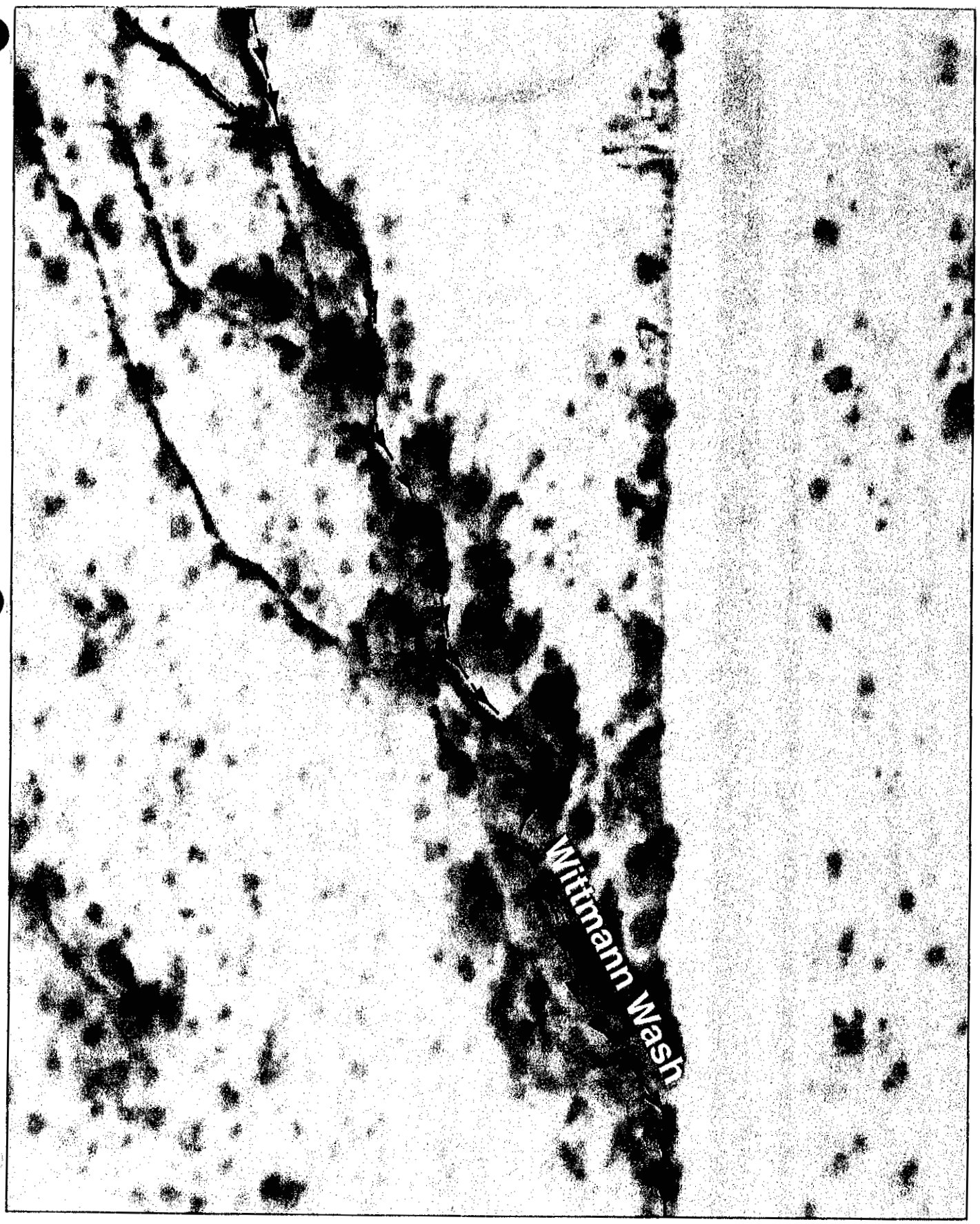
Table E-1

BY JCS DATE 1/24/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wittmann Wash
Location: Reach - Wittmann- 22A (Between where the wash crosses 211th Ave. and 1/4 mile north of where it crosses 211th Ave.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004		0.001	0.000
	Minor		.005-.015	0.005		
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010	0.012	0.002
	Medium		.010-.025			
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.001	0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.041**	**0.041**	**0.028**

FIGURE E-1: Wittmann - 22A (n-value photo)



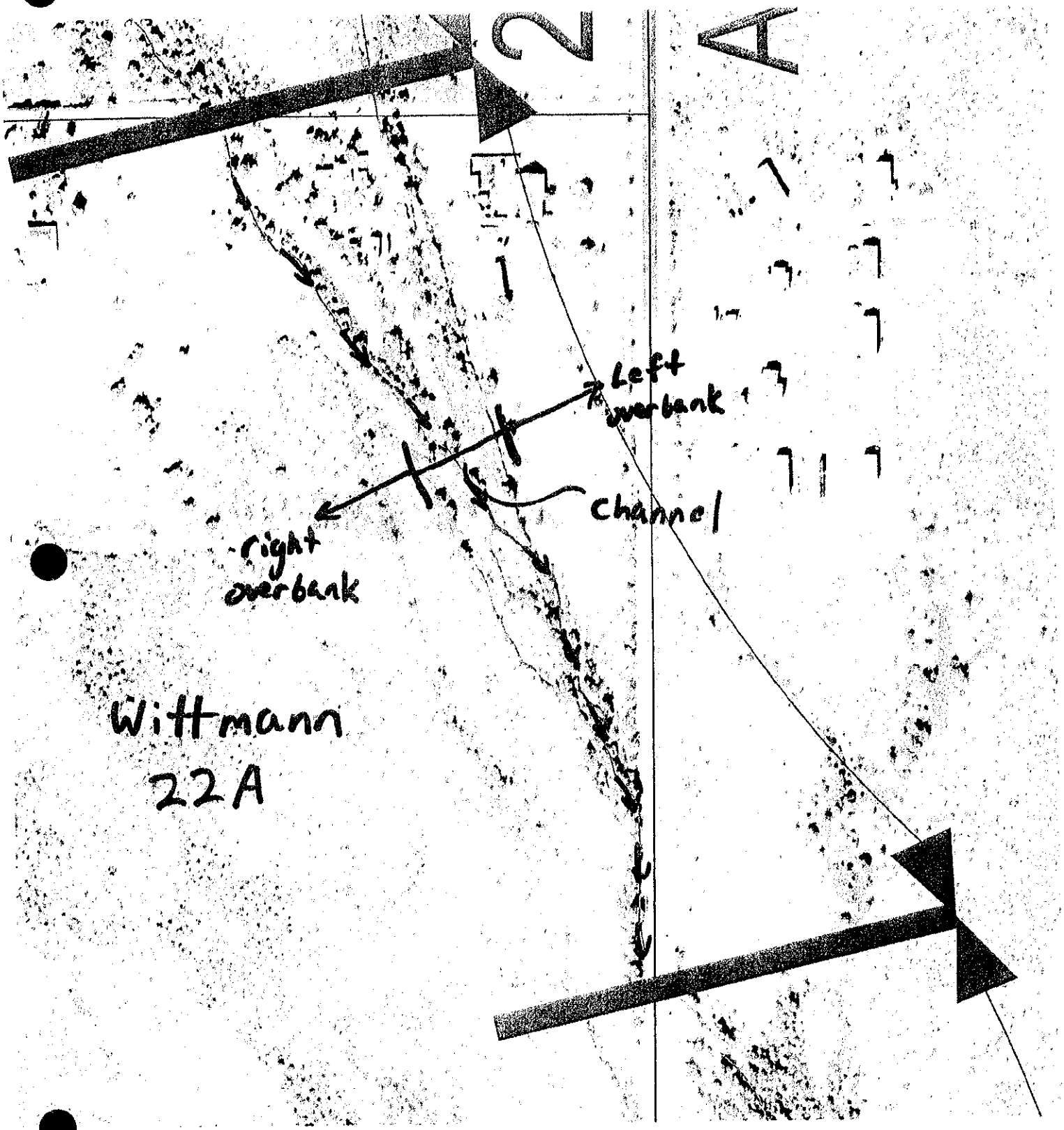

Left overbank
Channel
right overbank
Wittmann
22A

Table E-1

BY JCS DATE 1/24/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wittmann Wash
Location: Reach - Wittmann- 22B (Between 1/4 mile north where the wash crosses 211th Ave. and the U.S. 60.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.001	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.006		
	Medium		.010-.025		0.025	0.012
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.001	0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.032**	**0.052**	**0.038**

Figure E-1
(Wittmann - 22B)

Figure 1. (Photo #275) Channel looking downstream.

Figure 2. (Photo #274) Right Overbank looking downstream.

Figure 3. (Photo #276) Left Overbank looking downstream.

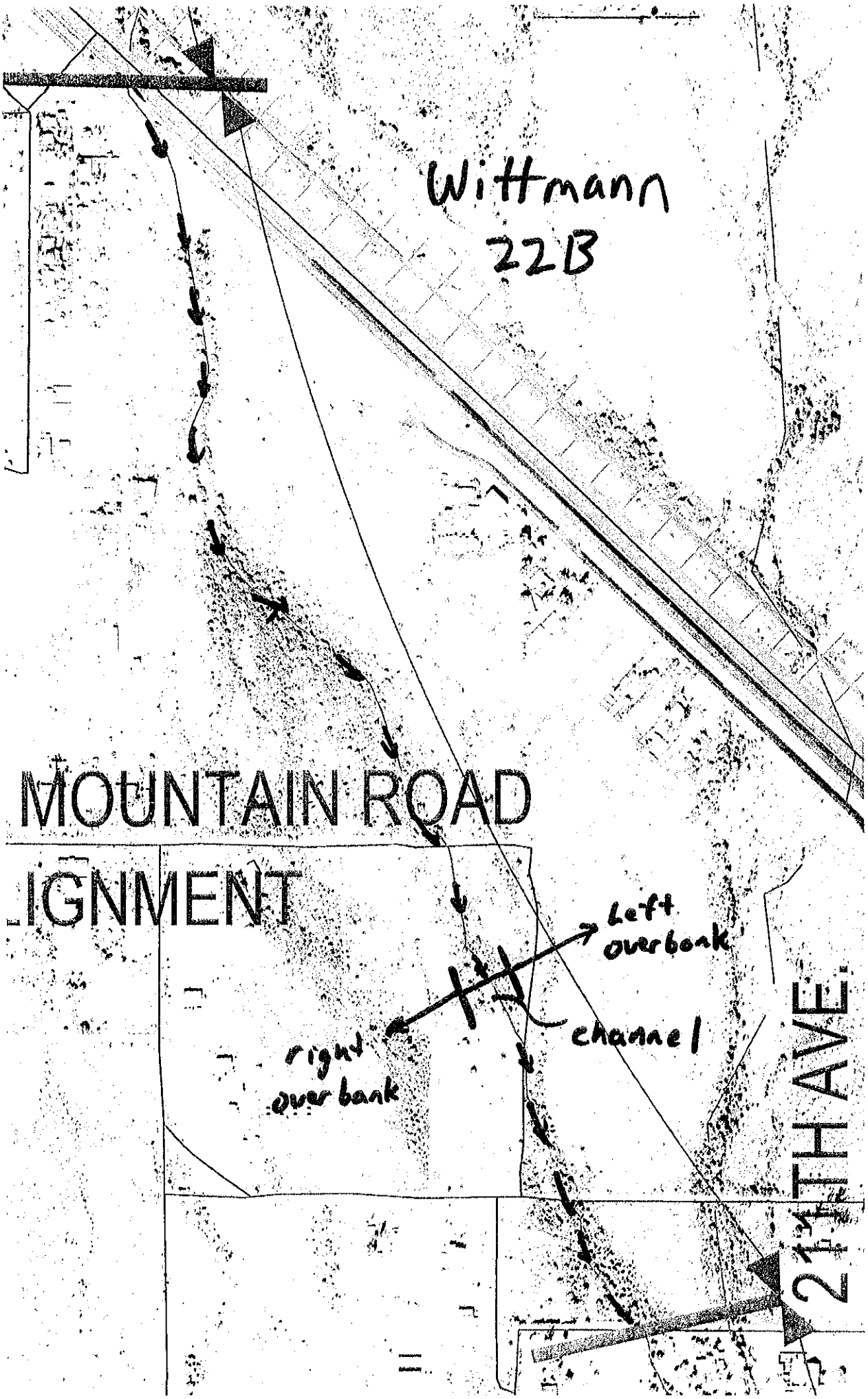

Wittmann
22B
MOUNTAIN ROAD
IGNMENT
Left
overbank
channel
right
overbank
21st AVE.

Table E-1

BY JCS DATE 1/24/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wittmann Wash
Location: Reach - Wittmann- 23 (Between the U.S. 60 and 1/4 mile north of Birdsong Ave.)

	Channel Conditions		Manning's n Adjustment		Left Overbank (**East**)	Channel	Right Overbank (**West**)
	Channel Material	Concrete	n_b	.012-.018			
		Firm Soil		.025-.032		0.025	
0.026		Coarse Sand		.026-.035	0.026		0.026
		Gravel		.028-.035			
		Cobble		.030-.050			
		Boulder		.040-.070			
0	Degree of Irregularity	Smooth	n_1	0	0.000		0.000
		Minor		.001-.005		0.001	
		Moderate		.006-.010			
		Severe		.011-.020			
	Effects of Obstruction	Negligible	n_2	.000-.004			
0.015		Minor		.005-.015	0.007	0.011	0.015
		Appreciable		.020-.030			
		Severe		.040-.060			
	Vegetation	Small	n_3	.002-.010			
0.01		Medium		.010-.025	0.010	0.020	0.010
		Large		.025-.050			
		Very Large		.050-.100			
	Variations in Channel Cross Section	Gradual	n_4	0			
0.002		Occ. Alt.		.001-.005	0.002	0.002	0.002
		Freg. Alt.		.010-.015			
1	Degree of Meandering	Minor	m	1	1	1	1
		Appreciable		1.15			
		Severe		1.3			
	$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.045**	**0.059**	**0.053**

Figure E-1
(Wittmann - 23)

Figure 1. (Photo #278) Channel looking downstream.

Figure 2. (Photo #277) Right Overbank looking downstream.

Figure 3. (Photo #279) Left Overbank looking downstream.

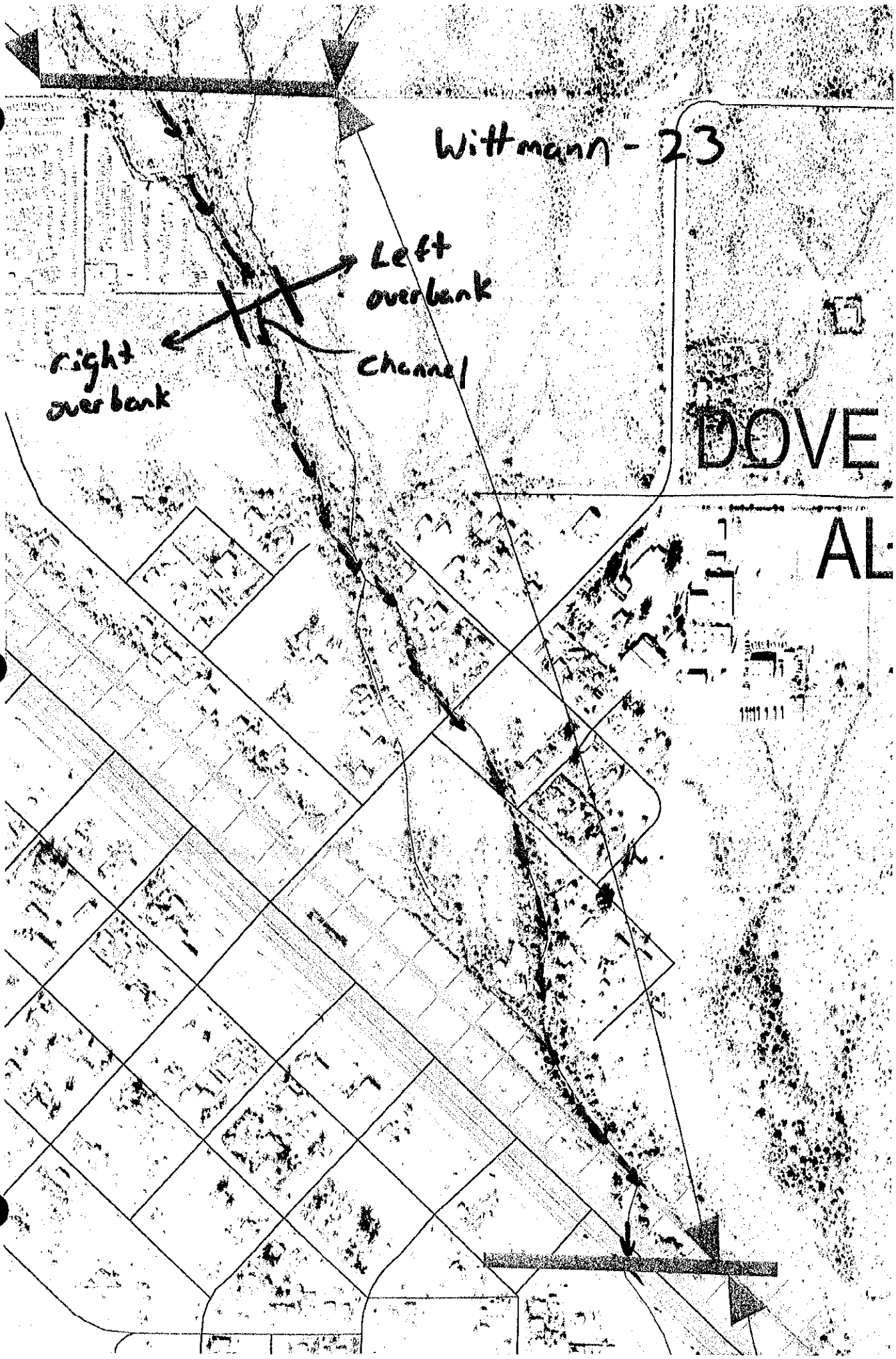

Wittmann - 23
Left overbank
right overbank
Channel
DOVE
AL

Table E-1

BY JCS DATE 1/24/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wittmann Wash
Location: Reach - Wittmann- 24 (Between 1/4 mile north of Birdsong Ave. and 1/2 mile north of Birdsong Ave.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032		0.025	
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.004	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.009		0.005
	Medium		.010-.025		0.020	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.000	0.000	0.000
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.049**	**0.031**

Figure E-1
(Wittmann - 24)

Figure 1. (Photo #281) Channel looking downstream.

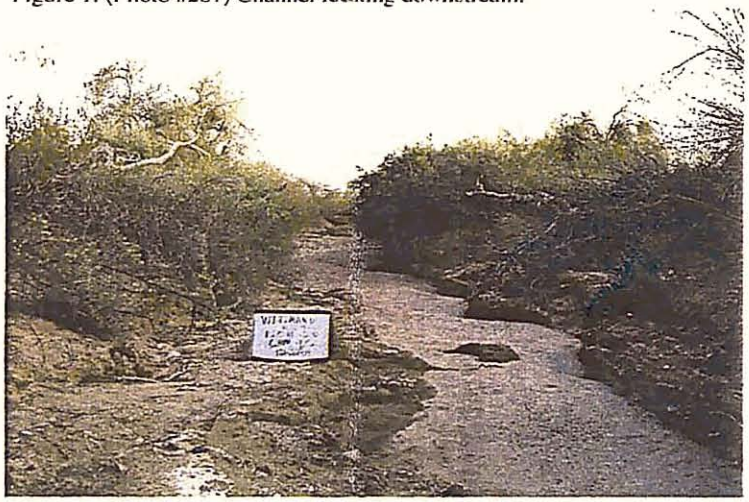
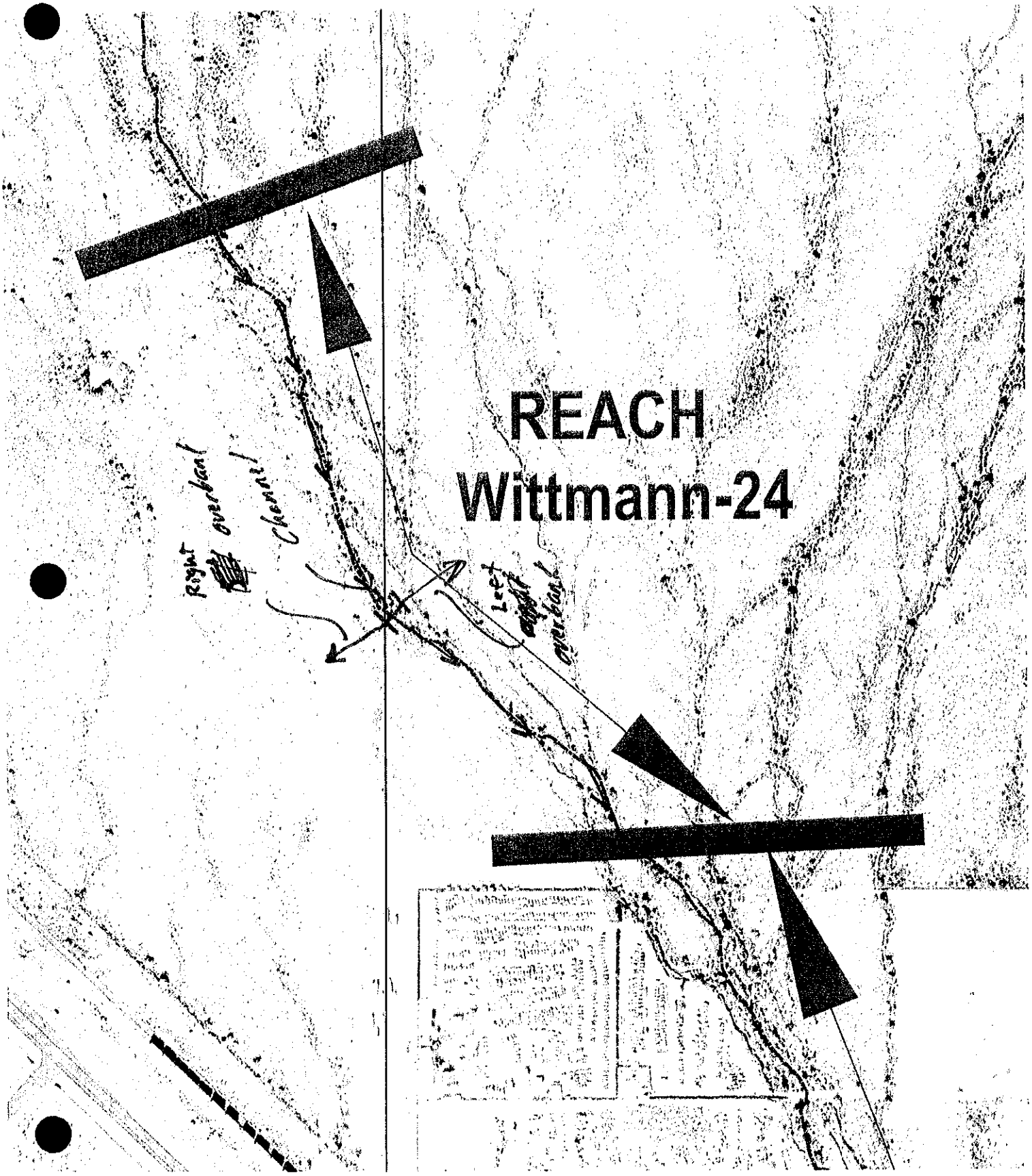


Figure 2. (Photo #280) Right Overbank looking upstream.

Figure 3. (Photo #282) Left Overbank looking upstream.



REACH
Wittmann-24

Table E-1

BY JCS DATE 1/24/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wittmann Wash
Location: Reach - Wittmann- 25 (Between 1/2 mile north and 1 mile north of Birdsong Ave.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035	0.028		0.028
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.003	0.003	0.003
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		
	Medium		.010-.025		0.022	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.039**	**0.051**	**0.041**

Figure E-1
(Wittmann - 25)

Figure 1. (Photo #284) Channel looking upstream.

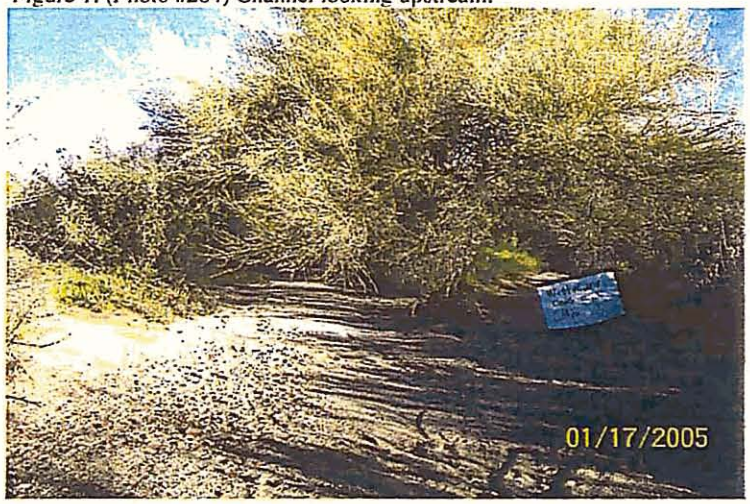
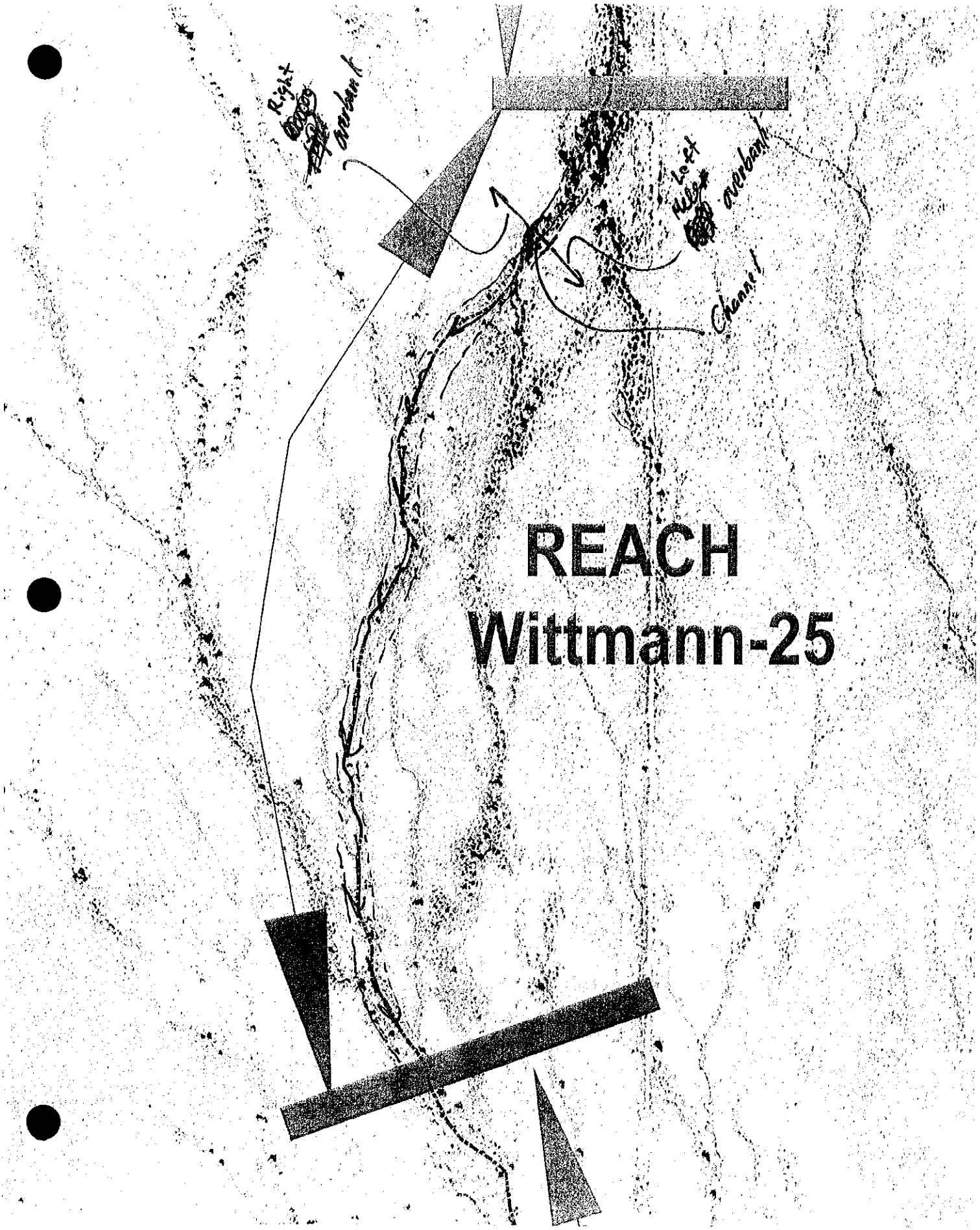


Figure 2. (Photo #283) Right Overbank looking downstream.

Figure 3. (Photo #285) Left Overbank looking downstream.



REACH
Wittmann-25

Table E-1

BY JCS DATE 1/24/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wittmann Wash
Location: Reach - Wittmann- 26 (Between 1 mile north of Birdsong Ave. and Cloud Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.026	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0		0.000	0.000
	Minor		.001-.005	0.002		
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.006		0.006
	Medium		.010-.025			
	Large		.025-.050		0.029	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.000	0.001
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.055**	**0.033**

Figure E-1
(Wittmann - 26)

Figure 1. (Photo #287) Channel looking upstream.

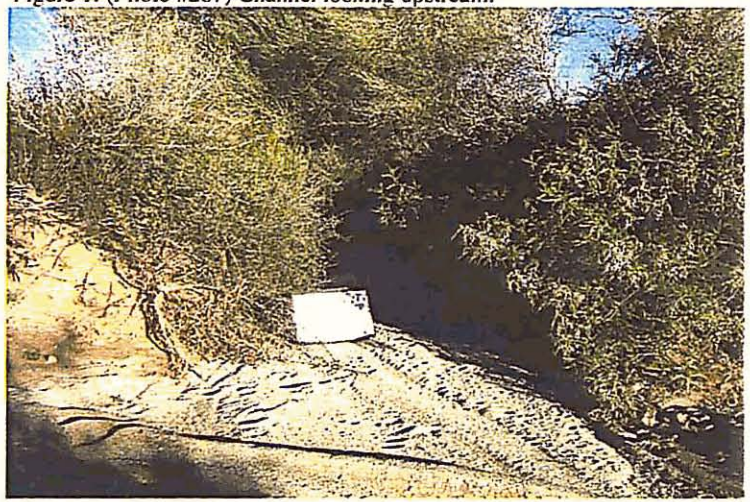


Figure 2. (Photo #286) Right Overbank looking upstream.

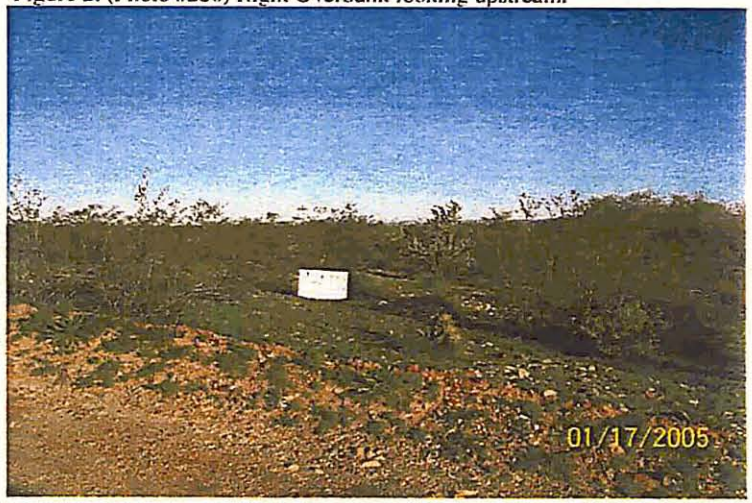
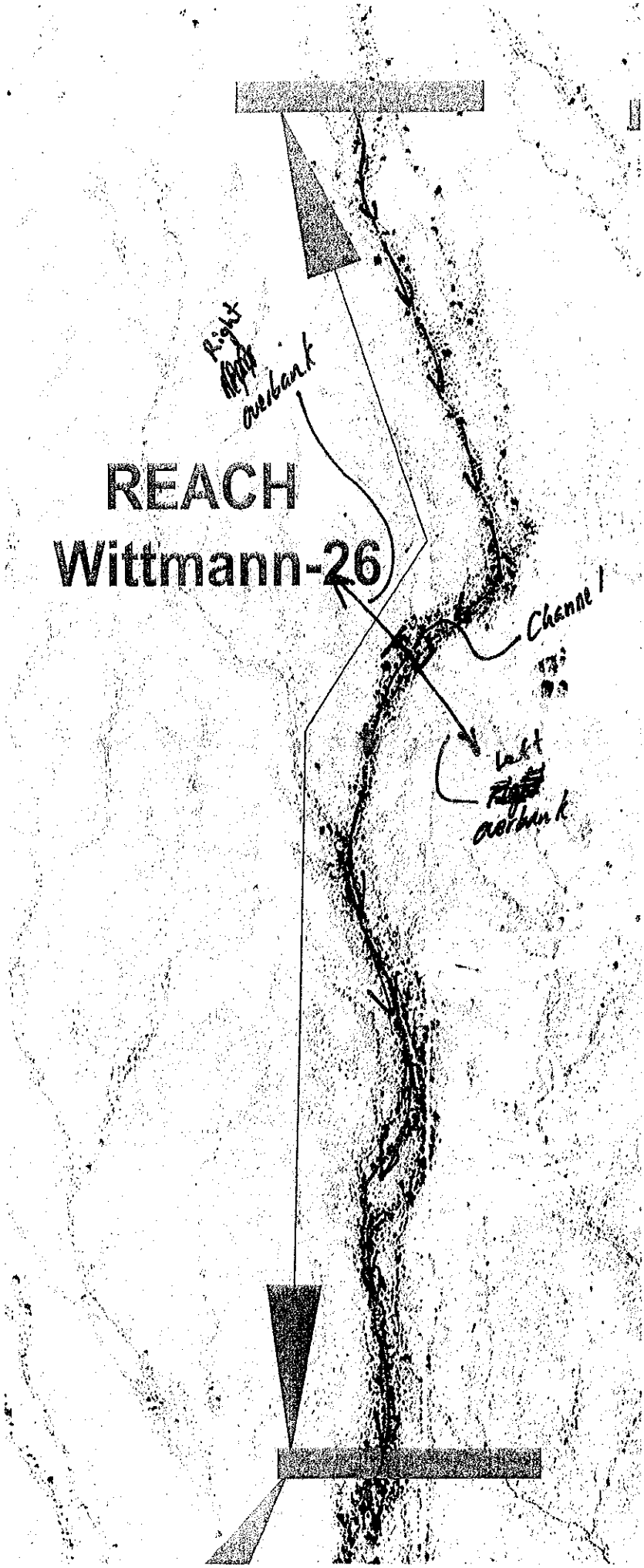


Figure 3. (Photo #288) Left Overbank looking downstream.


Right overbank
REACH
Wittmann-26
Channel
Left overbank

Wittmann South Split

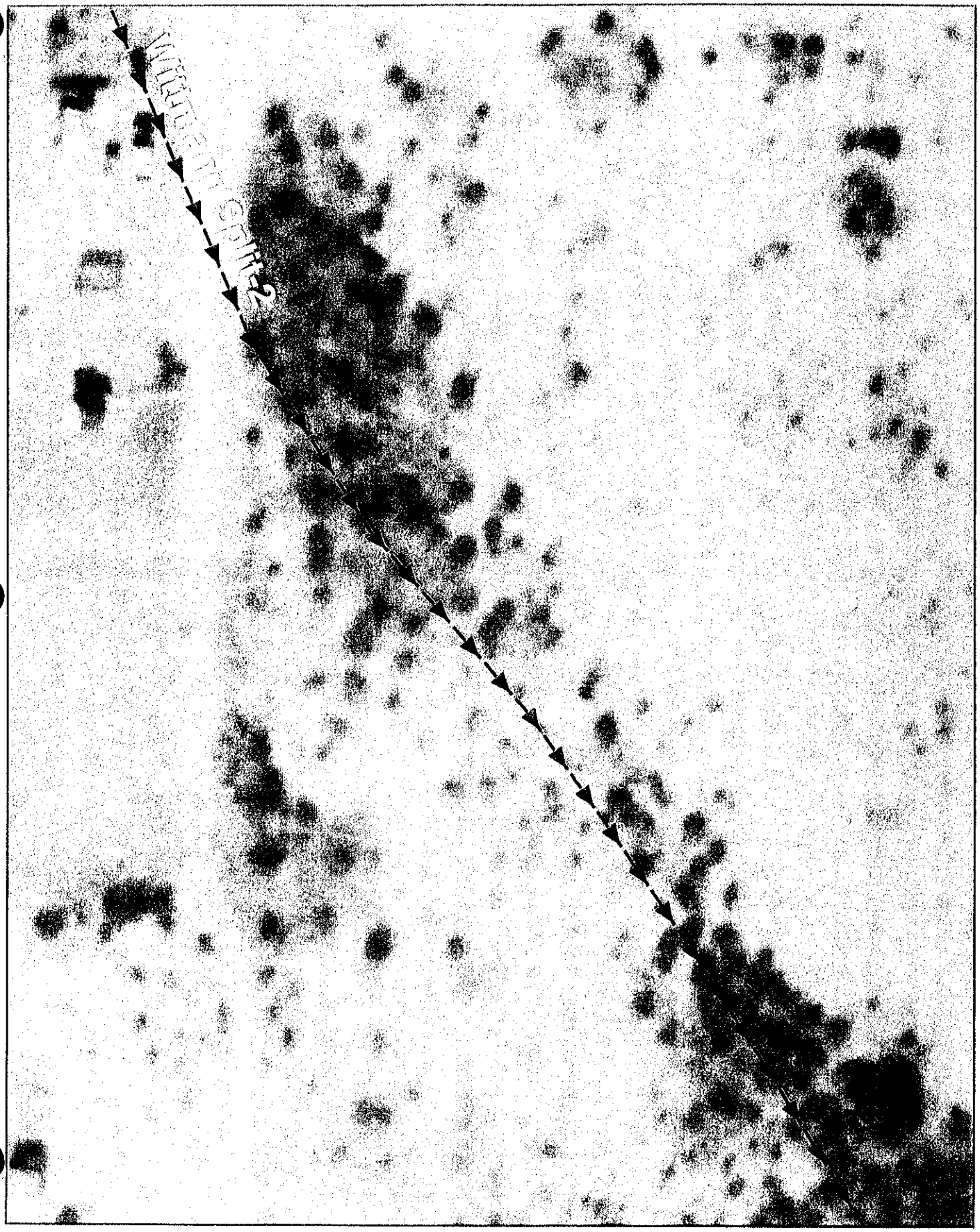
Table E-1

BY JCS DATE 1/24/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wittmann South Split
Location: Reach -Wittmann South Split- 20A (Between The CAP and Dale Ln.)

Channel Conditions		Manning's n Adjustment		Left Overbank (**East**)	Channel	Right Overbank (**West**)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.004	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.047**	**0.033**

FIGURE E-1: Wittmann Split - 20A (n-value photo)



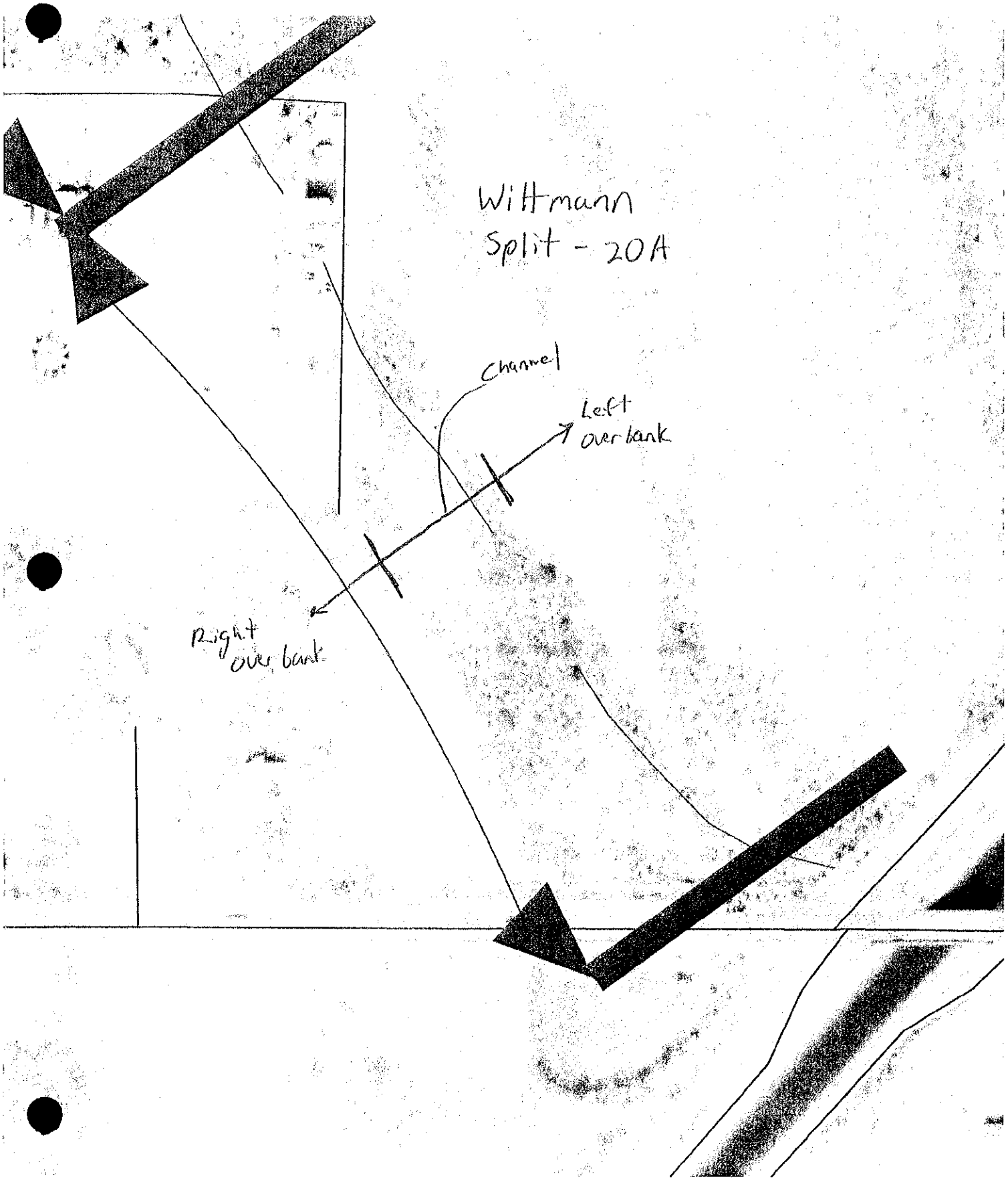

Wittmann
Split - 20A
Channel
Left
over bank
Right
over bank

Table E-1

BY JCS DATE 1/24/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wittmann South Split
Location: Reach -Wittmann South Split- 20B (Between Dale Ln. and just south of Bradley Rd.)

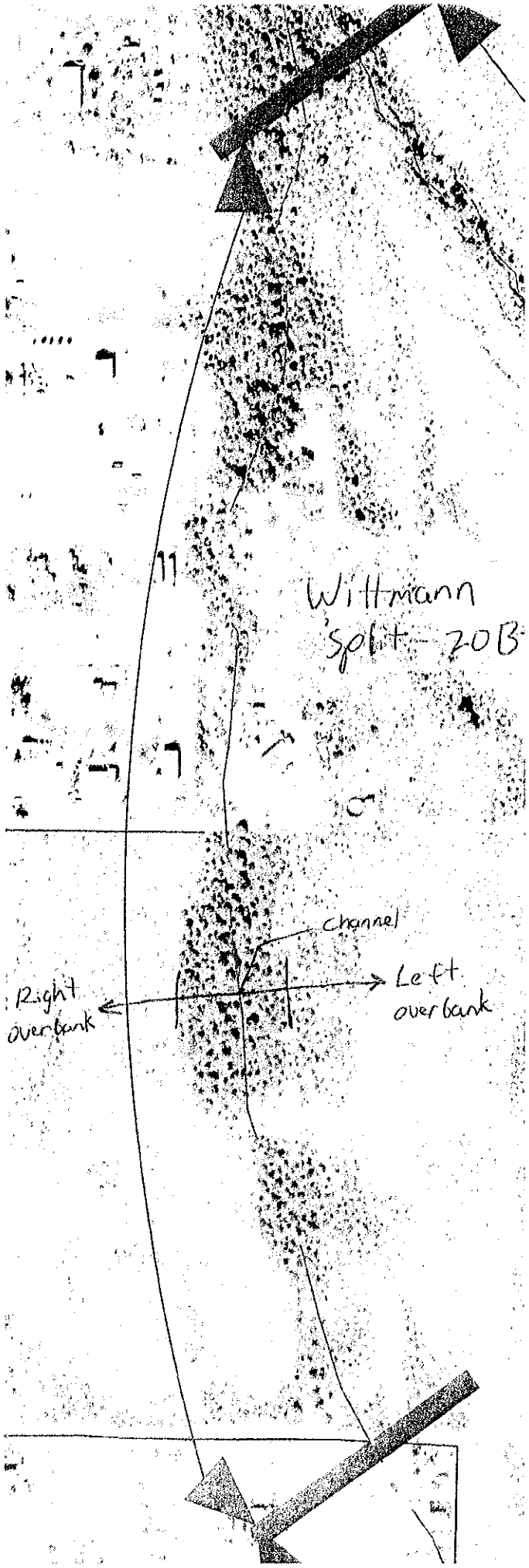
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005			
	Moderate		.006-.010		0.006	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.004	0.004
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.023	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.058**	**0.037**

Figure E-1
(Wittmann South Split - 20B)

Figure 1. (Photo #224) Channel looking downstream.

Figure 2. (Photo #223) Right Overbank looking downstream.

Figure 3. (Photo #225) Left Overbank looking downstream.


Wittmann
split - 20B
channel
Left
overbank
Right
overbank

Wittmann Wash Tributary

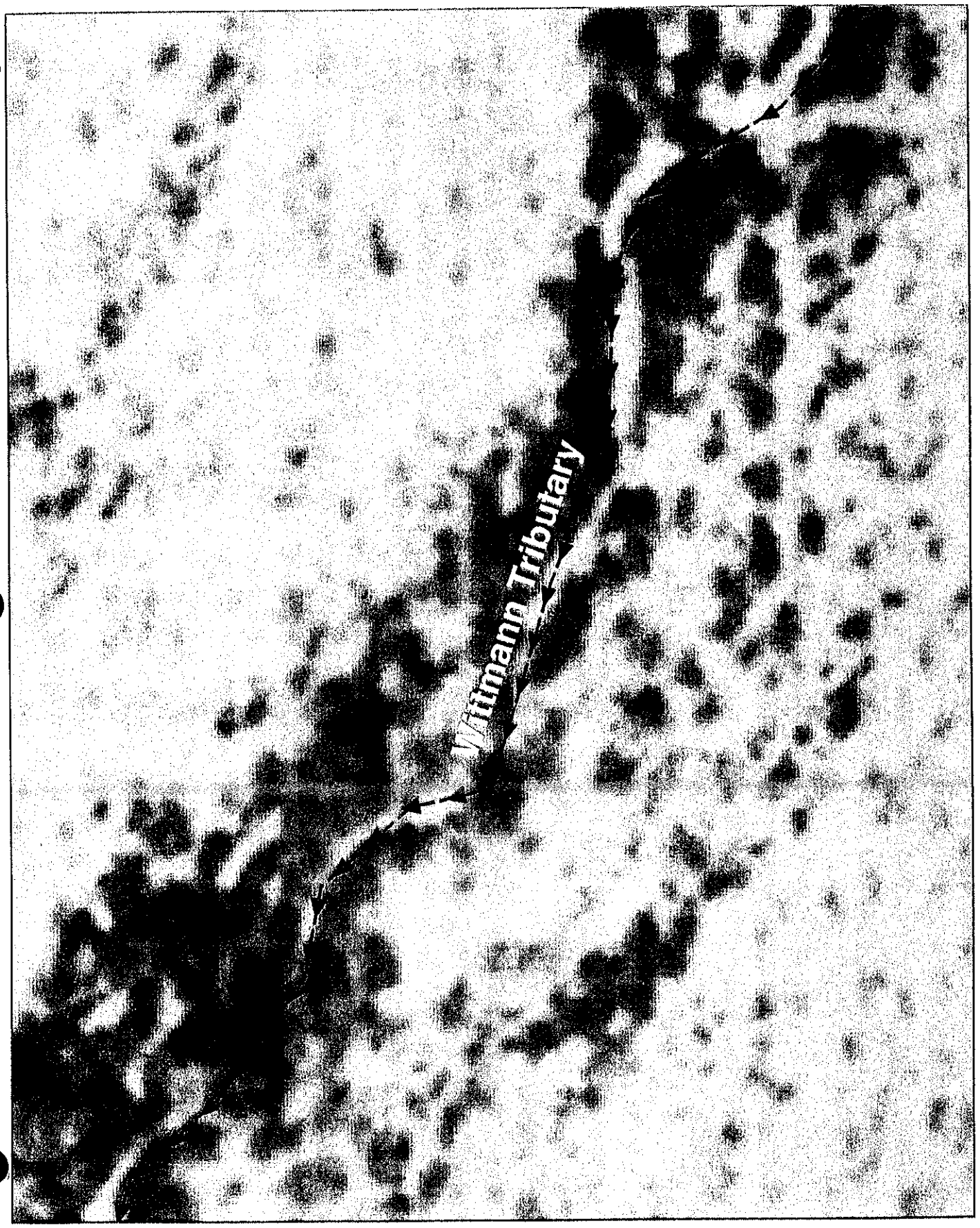
Table E-1

BY JCS DATE 1/24/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wittmann Wash Tributary
Location: Reach - Wittmann Trib-20 (Between 1/4 mile north of Birdsong Ave. and Carefree Hwy. alignment.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.027	0.026	0.027
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.025	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.051**	**0.035**

FIGURE E-1: Wittmann Tributary - 20 (n-value photo)



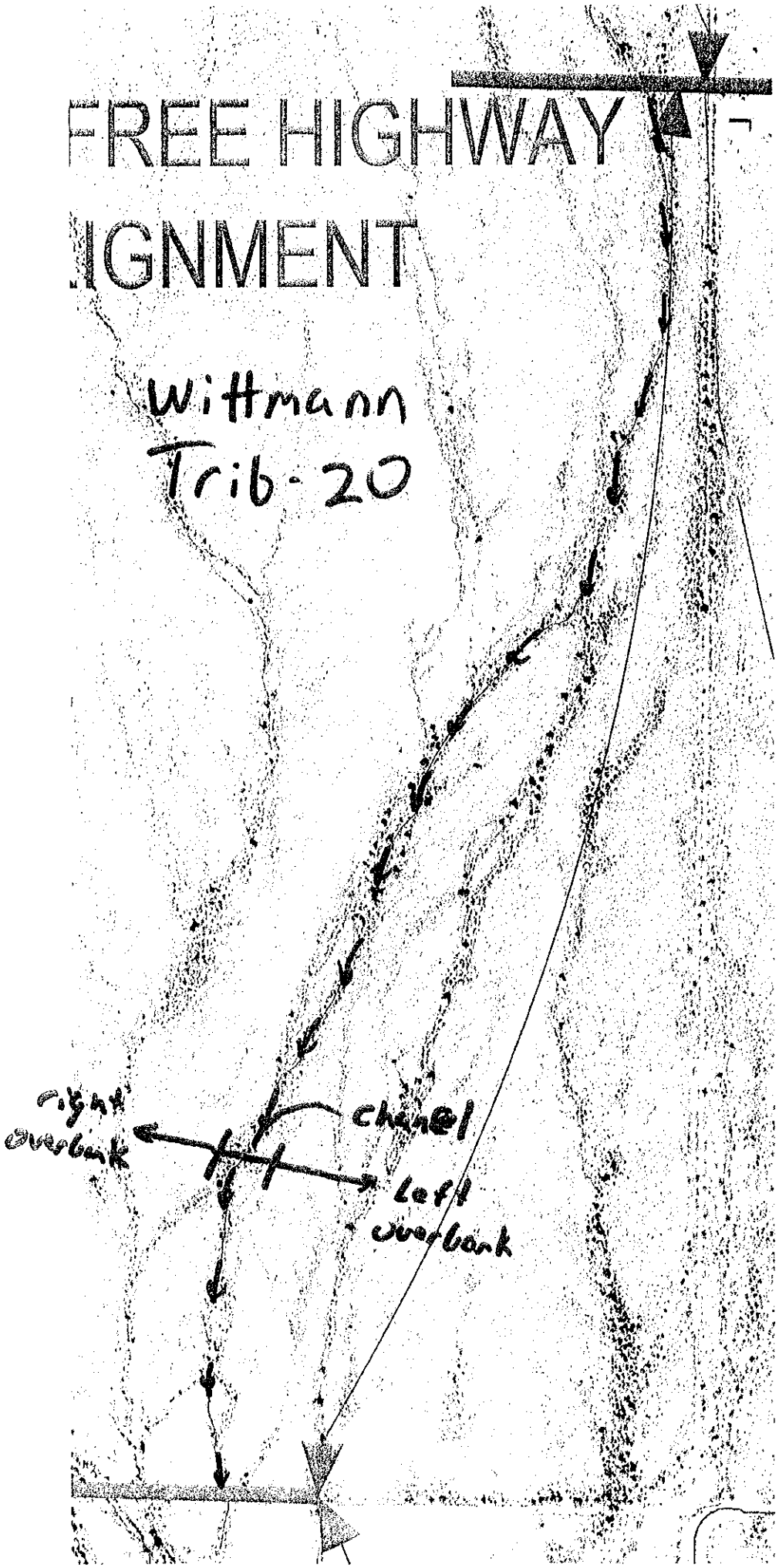

FREE HIGHWAY
IGNMENT
Wittmann
Trib-20
right overbank
channel
Left overbank

Table E-1

BY JCS DATE 1/24/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wittmann Wash Tributary
Location: Reach - Wittmann Trib-21 (Between Carefree Hwy. alignment and Cloud Rd.)

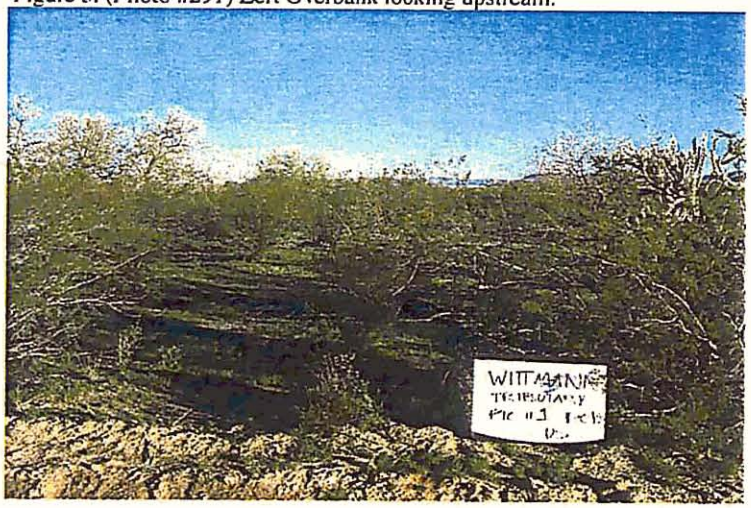
Channel Conditions		Manning's n Adjustment		Left Overbank (**East**)	Channel	Right Overbank (**West**)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.027	0.026	0.027
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.025	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.051**	**0.035**

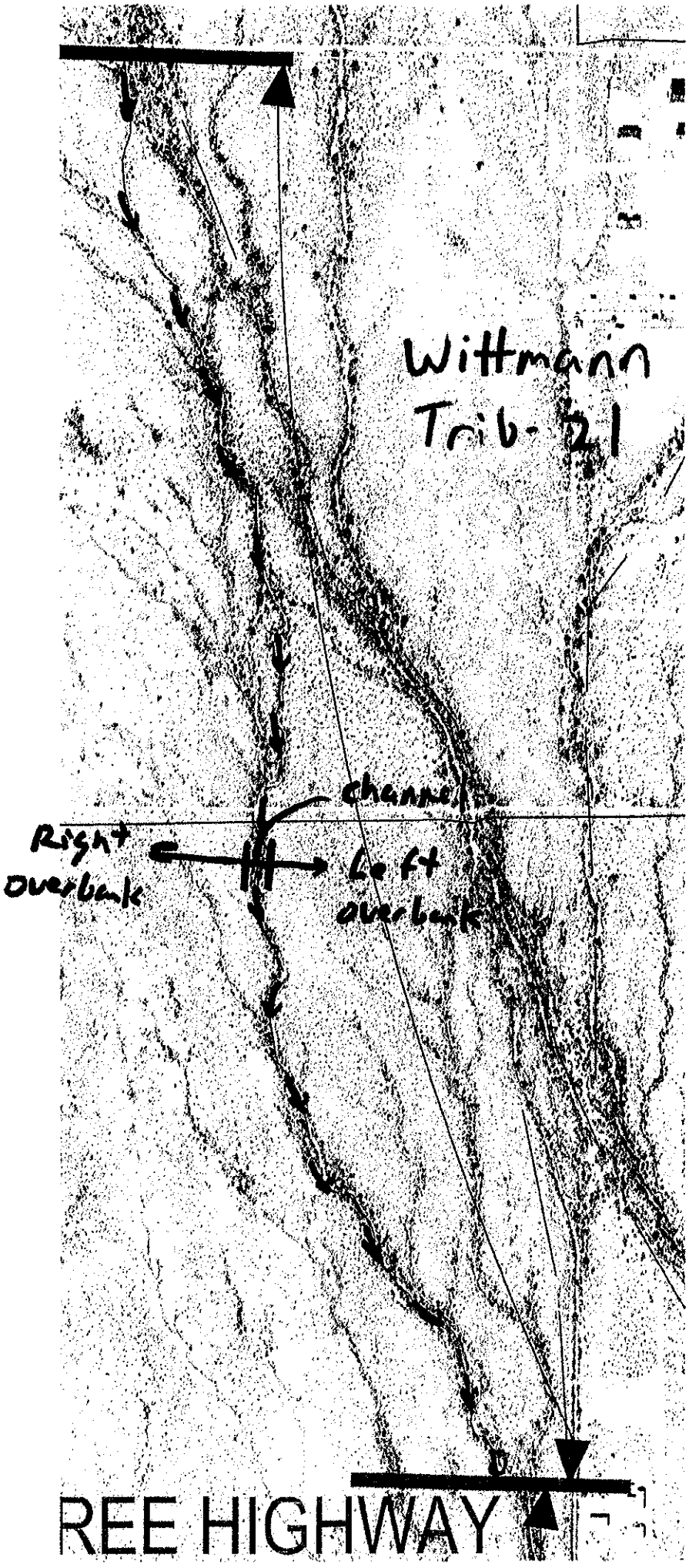
Figure E-1
(Wittmann Trib - 21)

Figure 1. (Photo #290) Channel looking upstream.

Figure 2. (Photo #289) Right Overbank looking upstream.

Figure 3. (Photo #291) Left Overbank looking upstream.




Wittmann
Trib-21
channel
Right
overbank
Left
overbank
REE HIGHWAY

Wash T5N-R3W-S24E

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/23/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R3W-S24E
Location: Reach - T5N-R3W-S24E - 20 (Between the confluence with Wittmann Wash and the U.S. 60.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.018	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.037**	**0.045**	**0.037**

Figure E-1
(T5N-R3W-S24E - 20)

Figure 1. (Photo #475) Channel looking downstream.

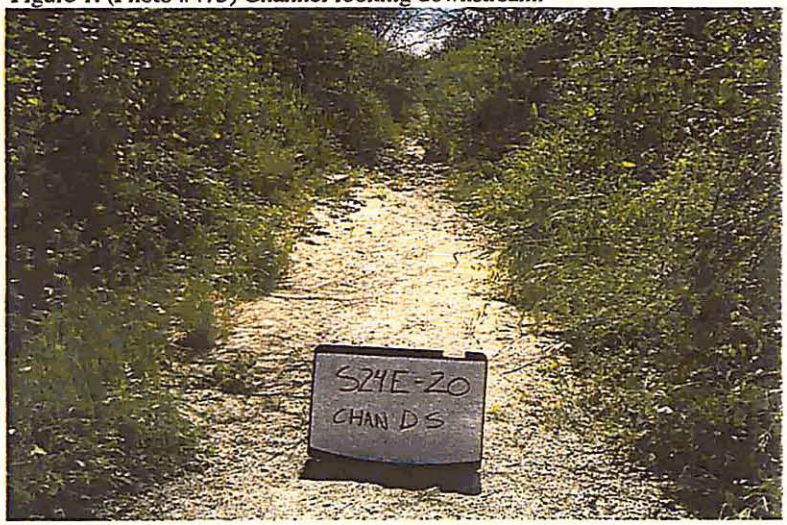
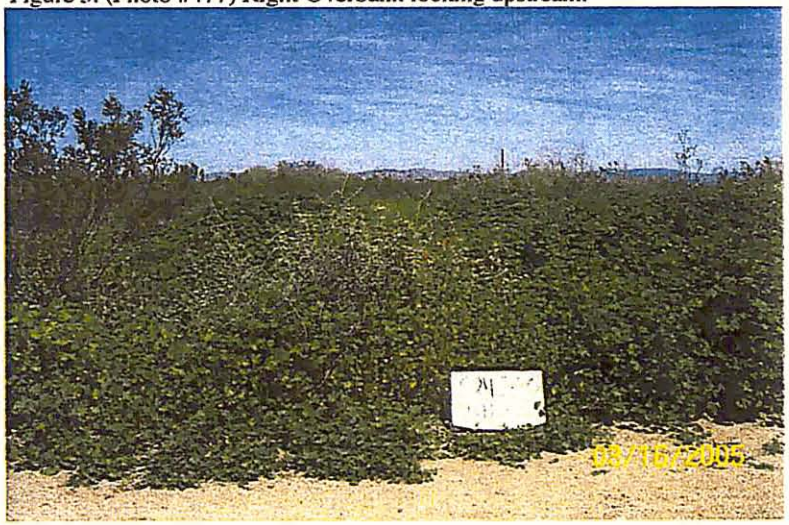


Figure 2. (Photo #476) Left Overbank looking upstream.

Figure 3. (Photo #477) Right Overbank looking upstream.



T5N-R3W-S24E-20

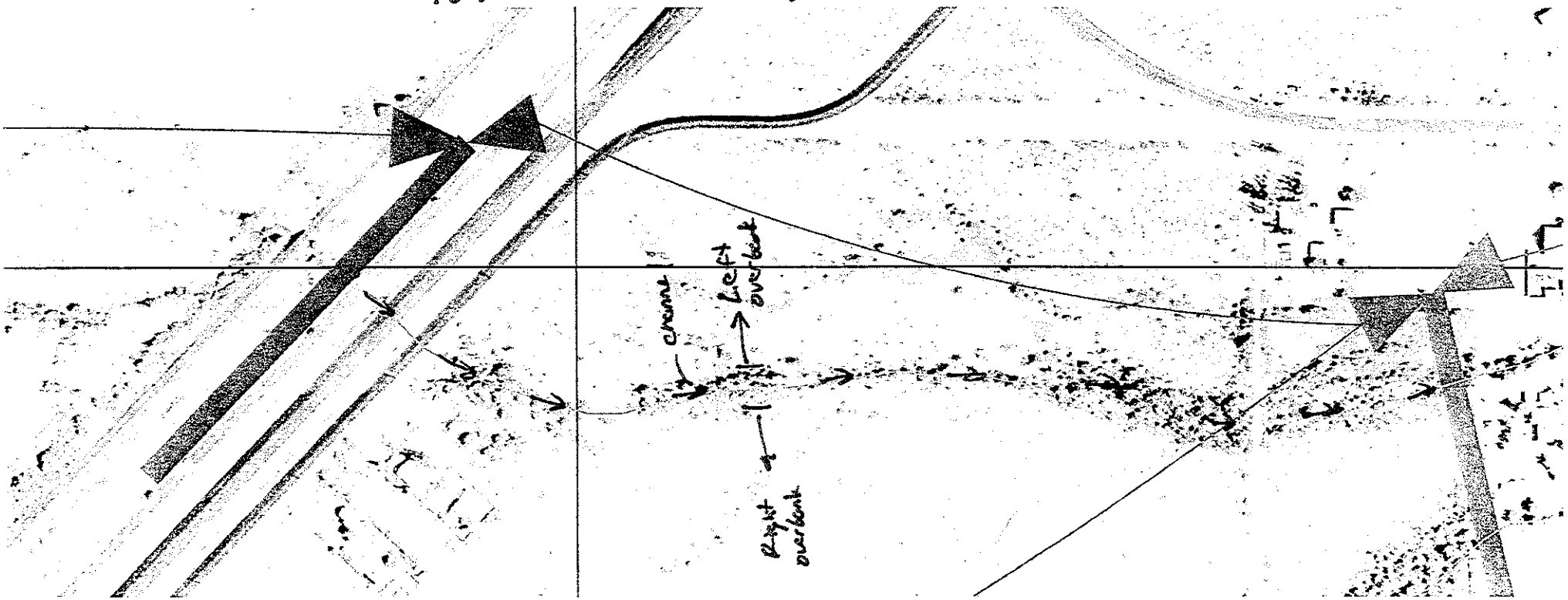


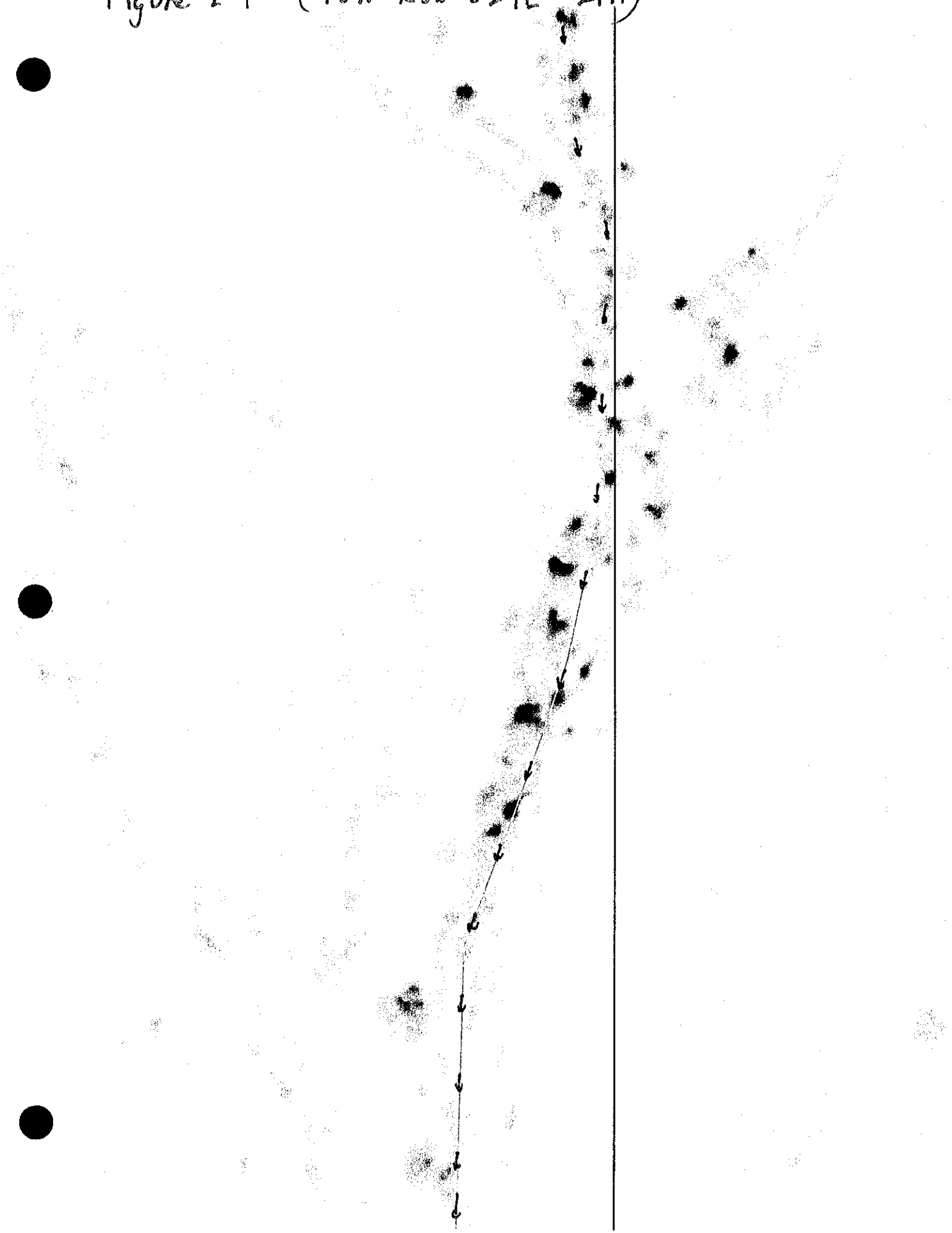
Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/23/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R3W-S24E
Location: Reach - T5N-R3W-S24E - 21A (Between the U.S. 60 and just south of Birdsong Ave.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.001	0.000	0.001
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.011	0.016	0.011
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.002	
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.037**	**0.045**	**0.037**

Figure E-1 (T5N-R3W-S24E-21A)



T5N-R3W-S24E-21A

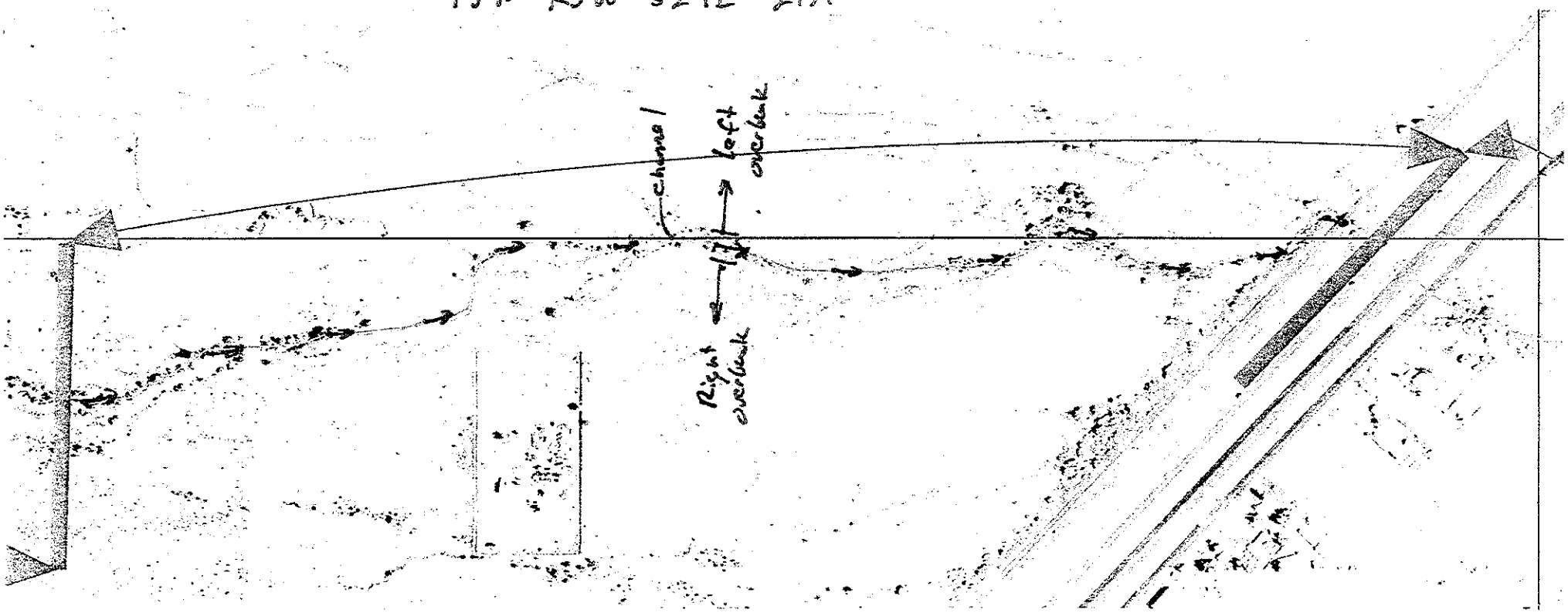


Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/23/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R3W-S24E
Location: Reach - T5N-R3W-S24E - 21B (Between just south of Birdsong Ave. and 1/4 mile north of Birdsong Ave.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.002	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.011	0.018	0.011
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.001	0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.039**	**0.048**	**0.039**

Figure E-1
(T5N-R3W-S24E - 21B)

Figure 1. (Photo #478) Channel looking downstream.

Figure 2. (Photo #479) Left Overbank looking downstream.

Figure 3. (Photo #480) Right Overbank looking downstream.

T5N-R3W-S24E-21B
channel
Right overbank
Left overbank

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/23/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R3W-S24E
Location: Reach - T5N-R3W-S24E - 22 (Between just north of Birdsong Ave. and 1/2 mile south of Galvin St.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.013	0.019	0.013
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.040**	**0.048**	**0.040**

Figure E-1
(T5N-R3W-S24E - 22)

Figure 1. (Photo #481) Channel looking downstream.

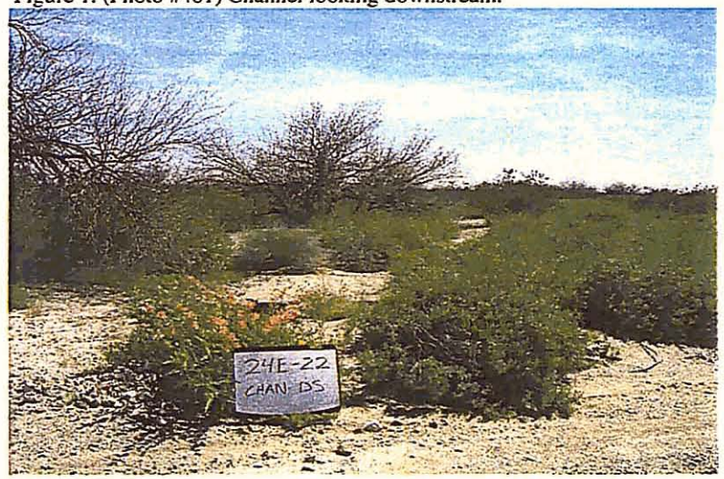


Figure 2. (Photo #482) Left Overbank looking upstream.

Figure 3. (Photo #483) Right Overbank looking upstream.

T5N-R3W-S24E-22
channel
Left overbank
Right overbank

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/23/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R3W-S24E
Location: Reach - T5N-R3W-S24E - 23 (Between 1/2 mile south of Galvin St. and just south of Galvin St.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010		0.010
	Medium		.010-.025		0.020	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.045**	**0.035**

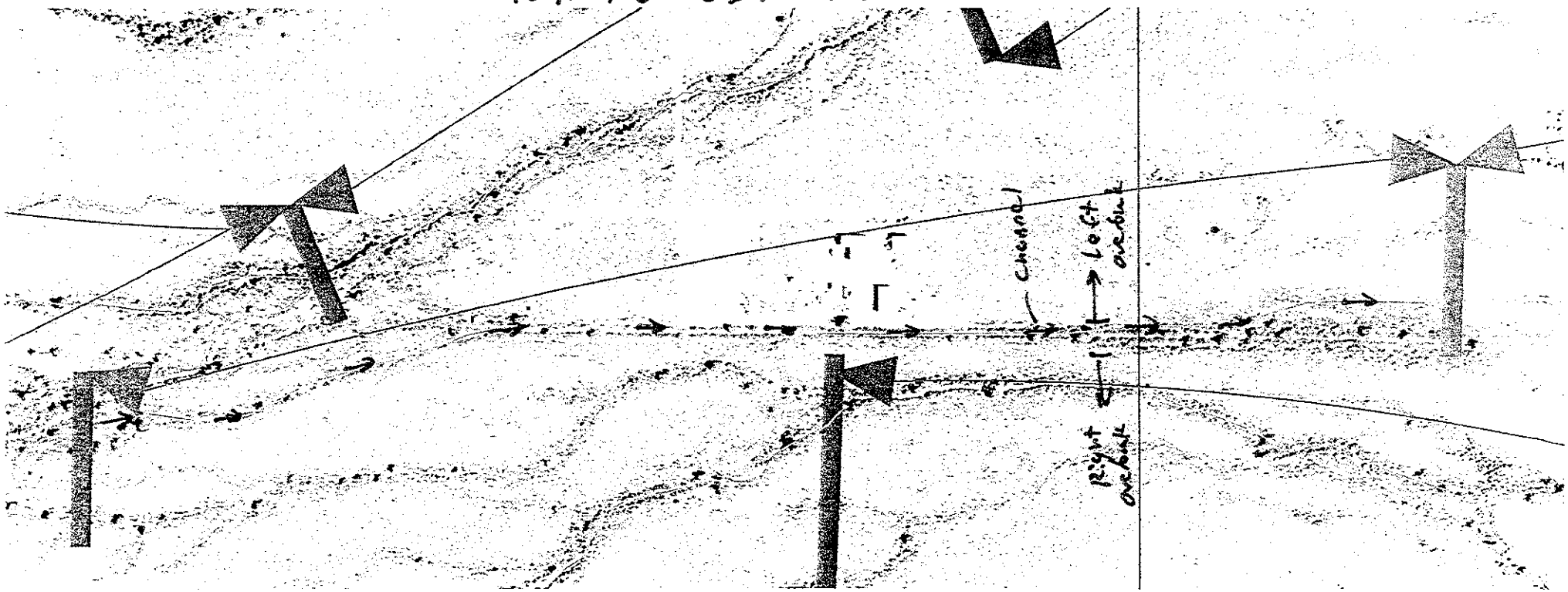
Figure E-1
(T5N-R3W-S24E - 23)

Figure 1. (Photo #484) Channel looking downstream.

Figure 2. (Photo #485) Left Overbank looking downstream.

Figure 3. (Photo #486) Right Overbank looking downstream.

T5N-R3W-S24E-23



Wash T5N-R2W-S07

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/23/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R2W-S07
Location: Reach - T5N-R2W-S07 - 20 (Between the confluence with wash T5N-R2W-S19W and 1/2 mile south of Galvin St.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.013	0.019	0.013
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.041**	**0.048**	**0.041**

Figure E-1
(T5N-R2W-S07 - 20)

Figure 1. (Photo #487) Channel looking upstream.

Figure 2. (Photo #488) Left Overbank looking upstream.

Figure 3. (Photo #489) Right Overbank looking upstream.

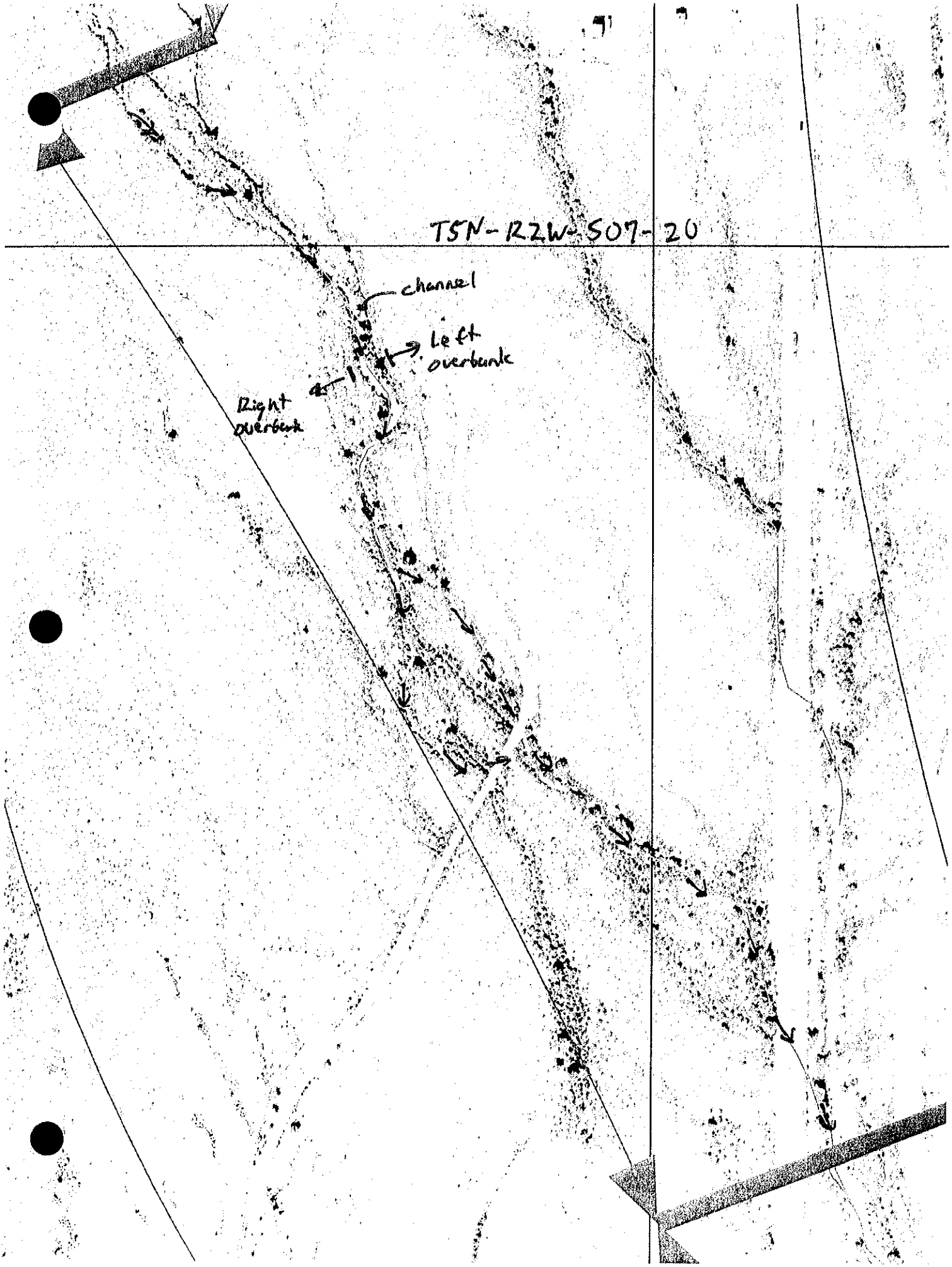

T5N-R2W-S07-20
channel
Left overbank
Right overbank

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/23/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R2W-S07
Location: Reach - T5N-R2W-S07 - 21 (Between 1/2 mile south of Galvin St. and 1/4 mile south of Galvin St.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.016	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.037**	**0.044**	**0.037**

Figure E-1
(T5N-R2W-S07 - 21)

Figure 1. (Photo #490) Channel looking upstream.

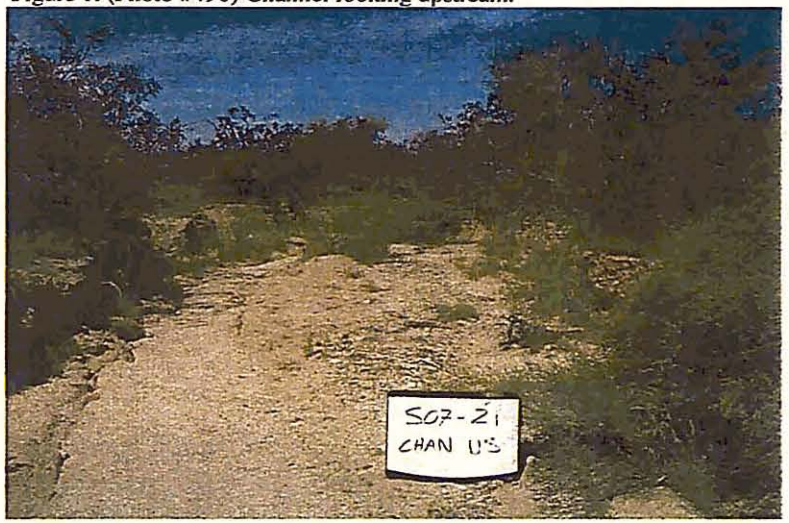


Figure 2. (Photo #491) Left Overbank looking upstream.

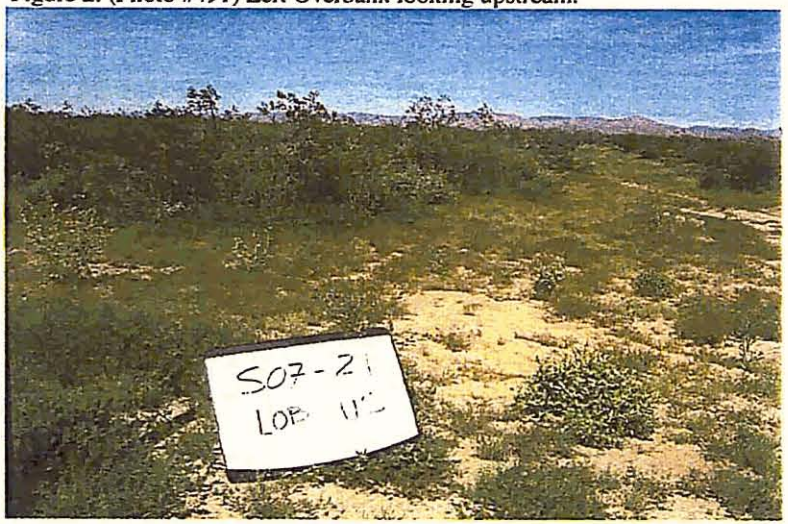


Figure 3. (Photo #492) Right Overbank looking upstream.

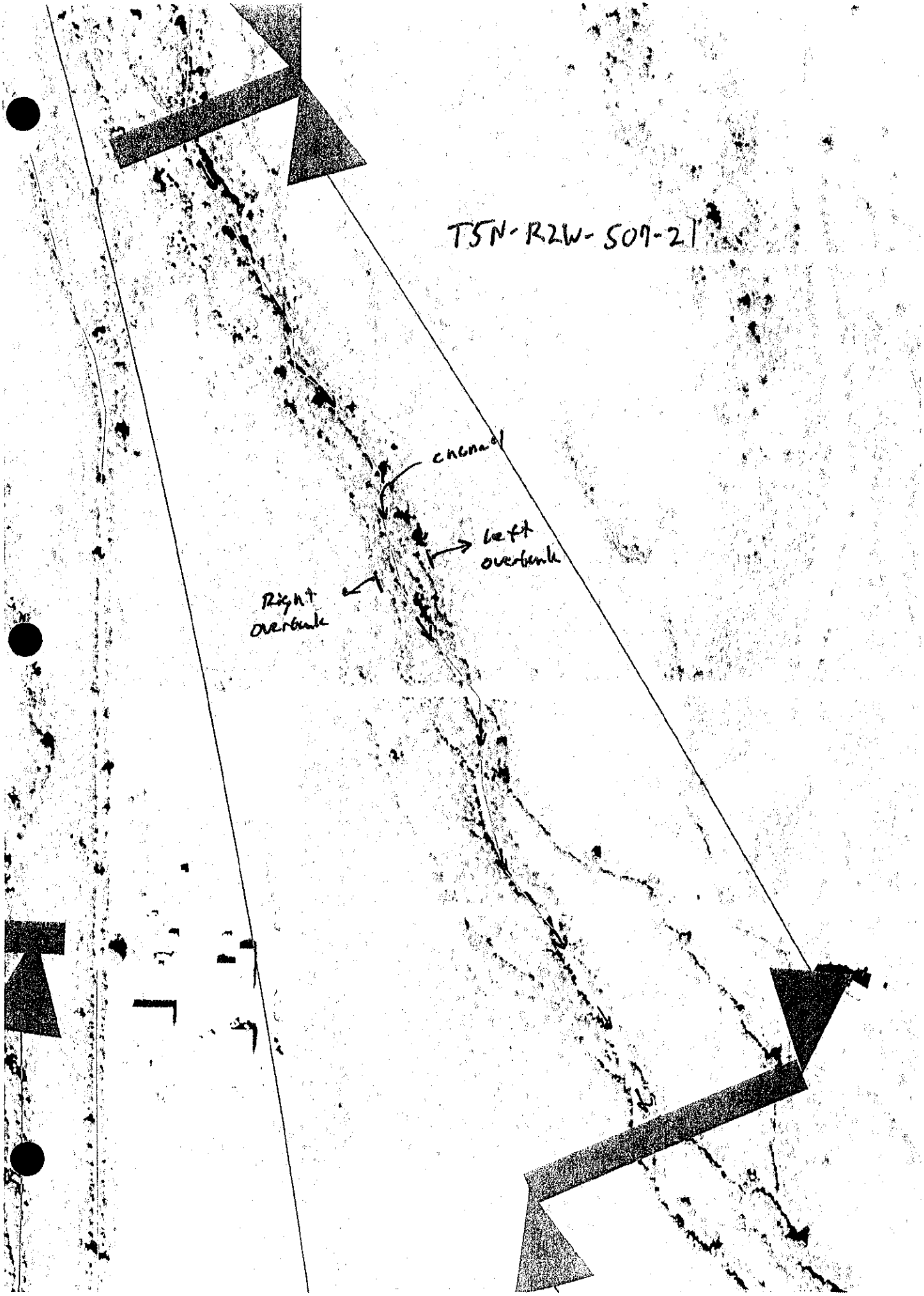

T5N-R2W-S09-21
channel
left overbank
Right overbank

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/23/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R2W-S07
Location: Reach - T5N-R2W-S07 - 22 (Between 1/4 mile south of Galvin St. and Cloud Rd.)

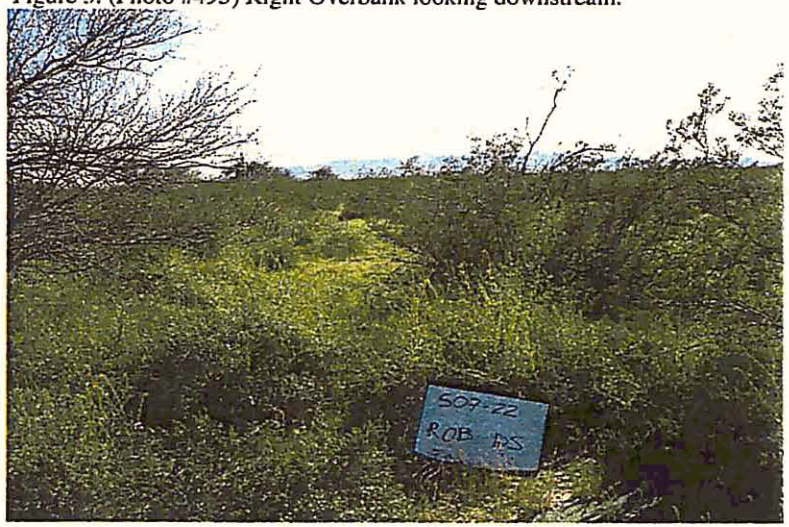
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.012	0.018	0.012
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.039**	**0.046**	**0.039**

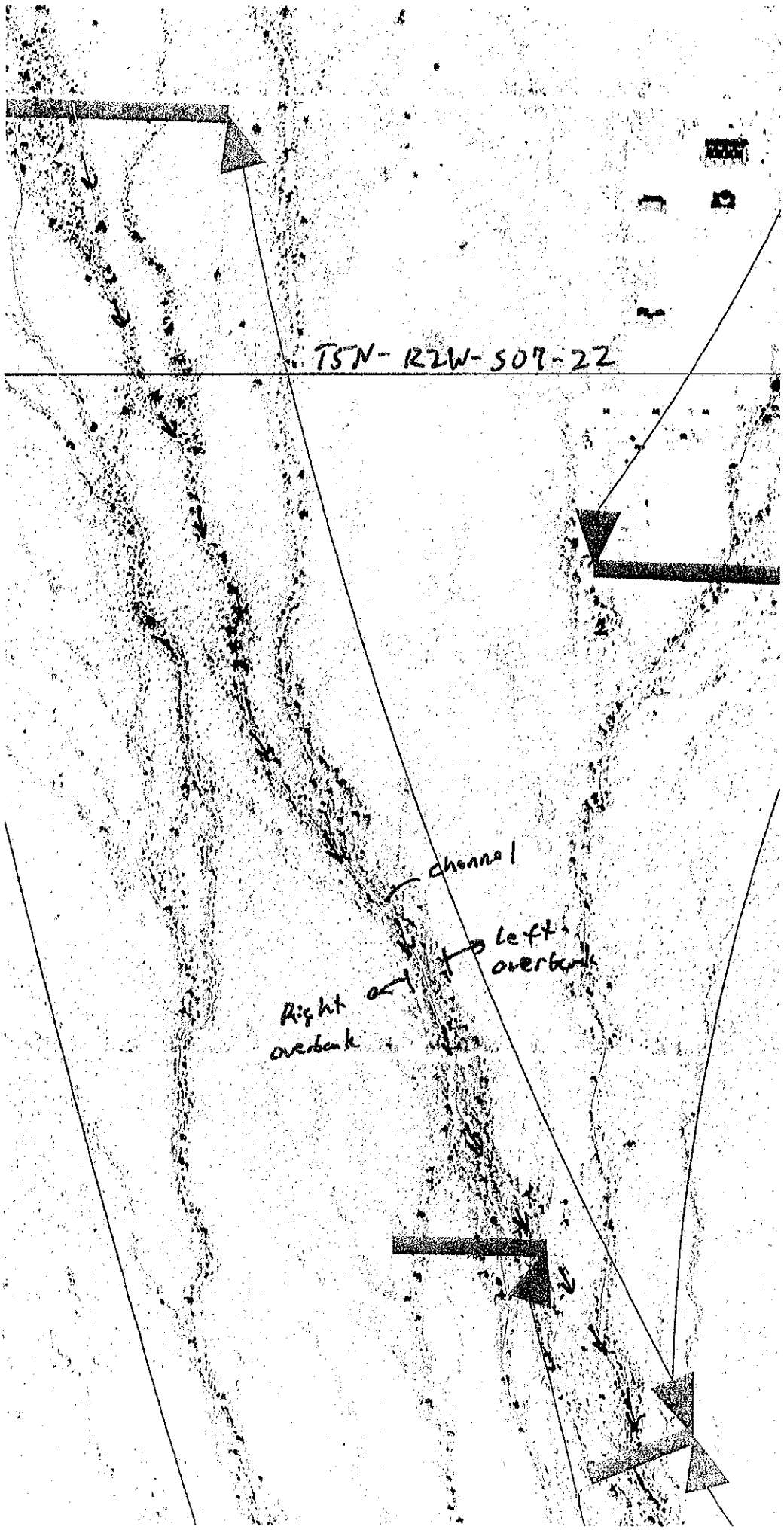
Figure E-1
(T5N-R2W-S07 - 22)

Figure 1. (Photo #493) Channel looking downstream.

Figure 2. (Photo #494) Left Overbank looking downstream.

Figure 3. (Photo #495) Right Overbank looking downstream.




T5N-R2W-S07-22
channel
left overbank
Right overbank

Wash T5N-R3W-S01S

Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/23/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R3W-S01S
Location: Reach - T5N-R3W-S01S - 20 (Between the confluence with wash T5N-R2W-S07 and 1/4 mile south of Cloud Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.001	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.042**	**0.033**

Figure E-1
(T5N-R3W-S01S - 20)

Figure 1. (Photo #496) Channel looking downstream.

Figure 2. (Photo #497) Left Overbank looking downstream.

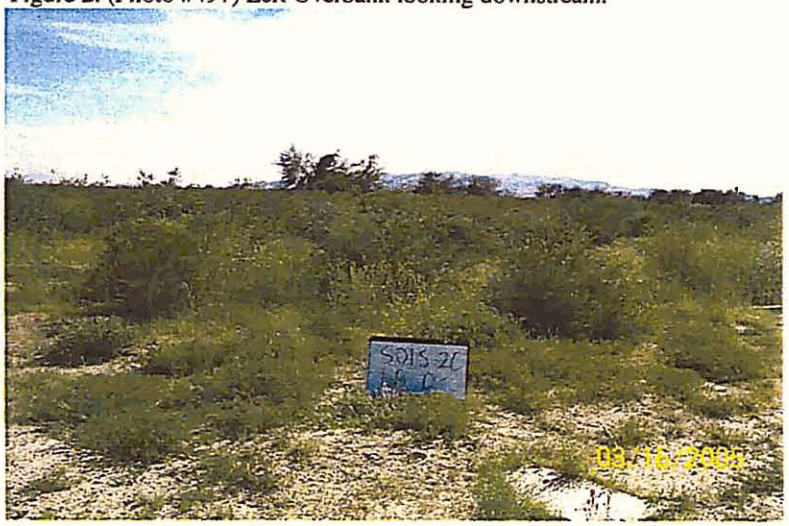


Figure 3. (Photo #498) Right Overbank looking downstream.

T5N-R3W-S015-20

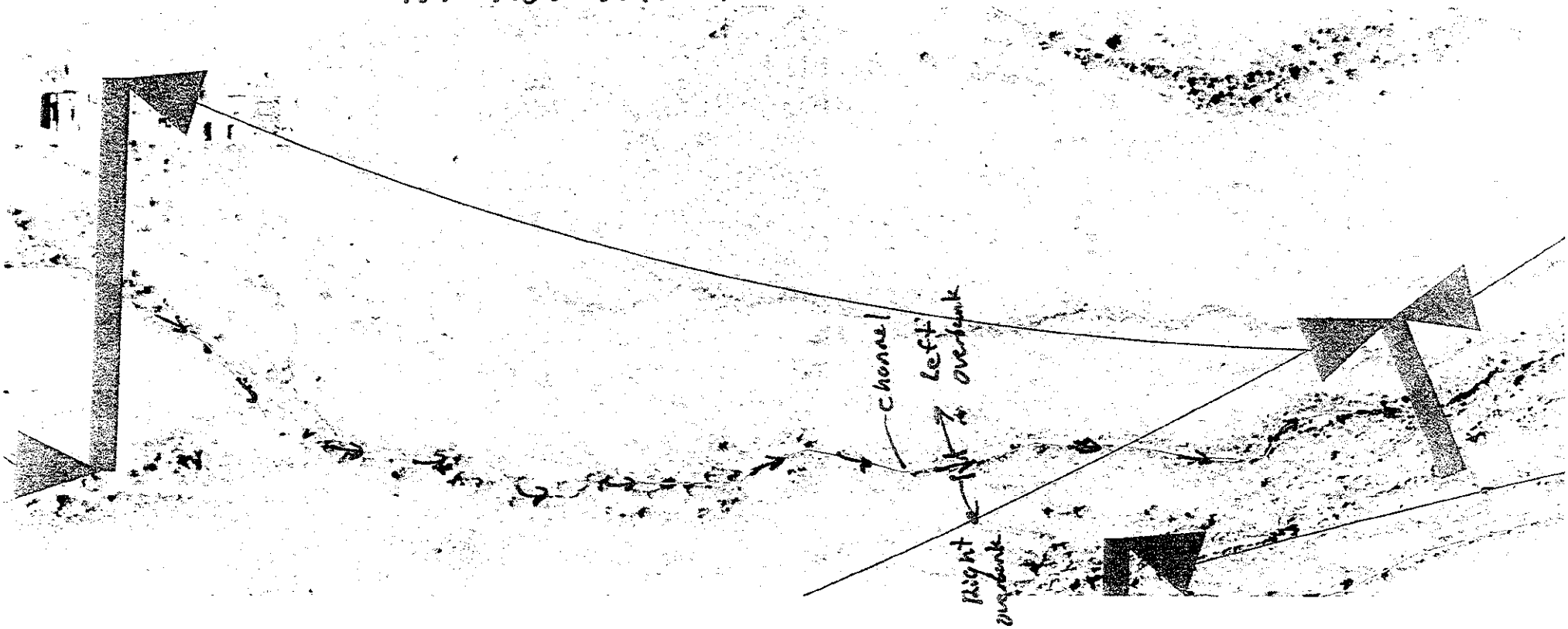


Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/23/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R3W-S01S
Location: Reach - T5N-R3W-S01S - 21 (Between 1/4 mile south of Cloud Rd. and Cloud Rd.)

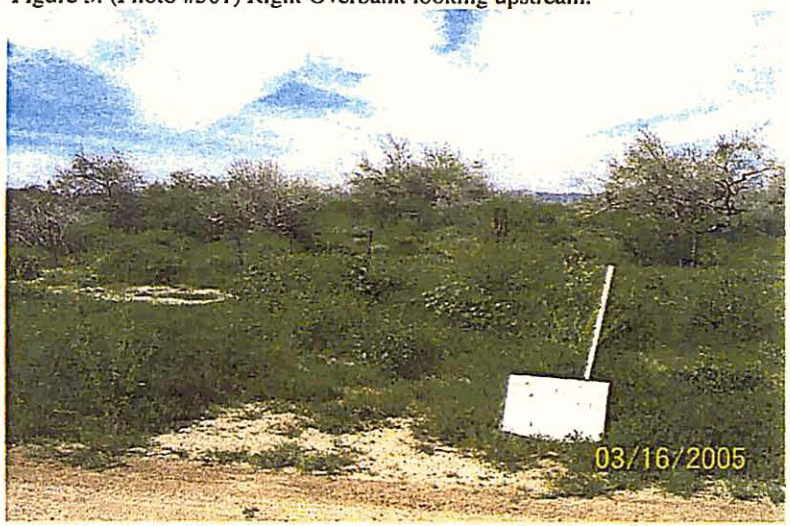
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.000	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.044**	**0.035**

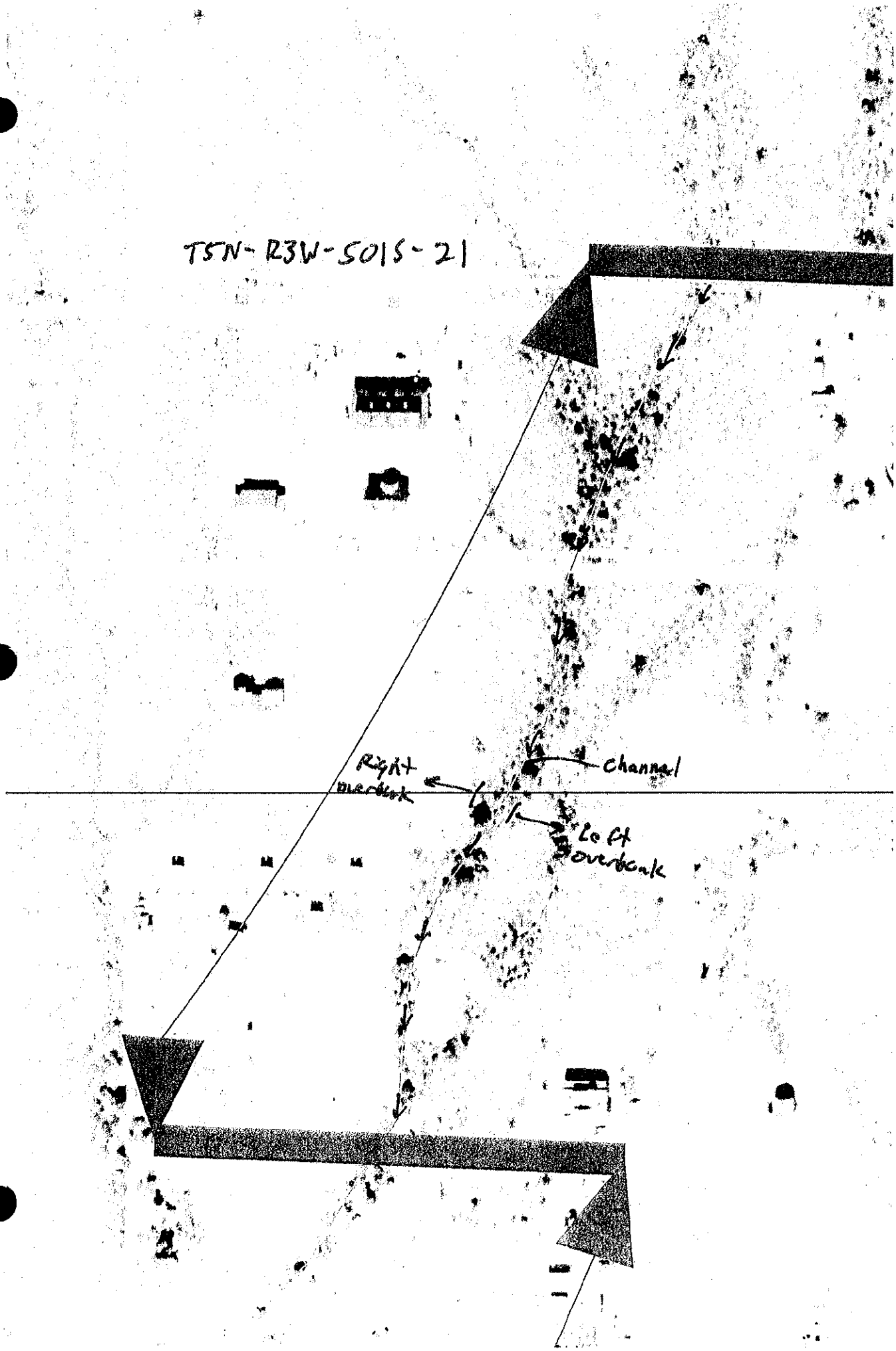
Figure E-1
(T5N-R3W-S01S - 21)

Figure 1. (Photo #499) Channel looking downstream.

Figure 2. (Photo #500) Left Overbank looking upstream.

Figure 3. (Photo #501) Right Overbank looking upstream.




T5N-R3W-5015-21
Right overbank
Channel
Left overbank

Wash T5N-R2W-S19W

Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/22/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R2W-S19W
Location: Reach - T5N-R2W-S19W - 20 (Between the U.S. 60 and 1/4 mile north of Lone Mtn Rd. alignment.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.004	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.012	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.044**	**0.035**

Figure E-1
(T5N-R2W-S19W - 20)

Figure 1. (Photo #454) Channel looking upstream.

Figure 2. (Photo #455) Left Overbank looking upstream.

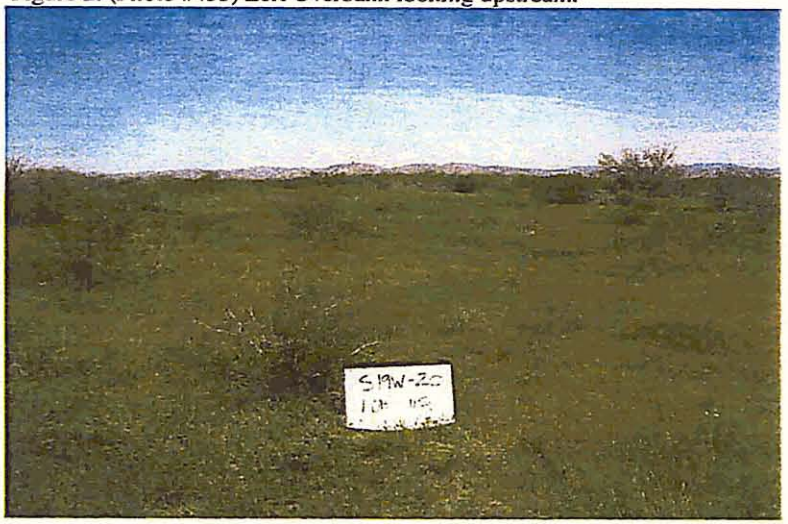


Figure 3. (Photo #456) Right Overbank looking upstream.

channel
Right overbank
Left overbank
T5N-R2W-S19W-20

Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/22/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R2W-S19W
Location: Reach - T5N-R2W-S19W - 21 (Between 1/4 mile north of Lone Mtn. Rd. alignment and Birdsong Ave.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.047**	**0.035**

Figure E-1
(T5N-R2W-S19W - 21)

Figure 1. (Photo #457) Channel looking downstream.

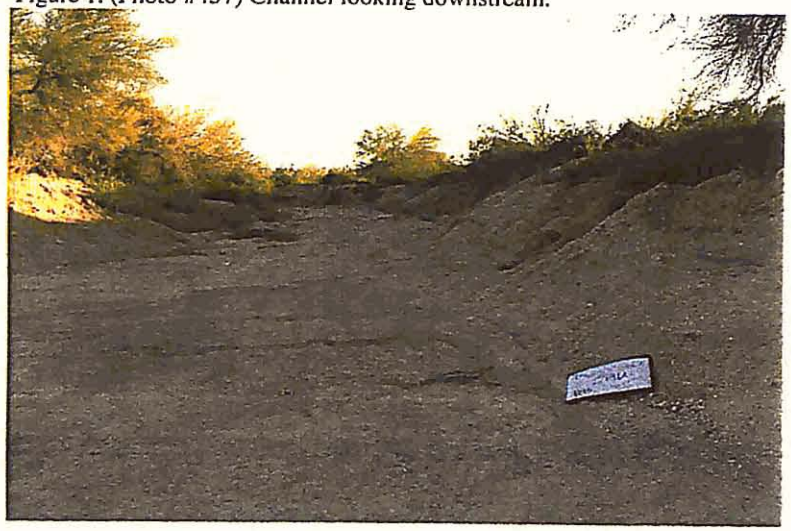
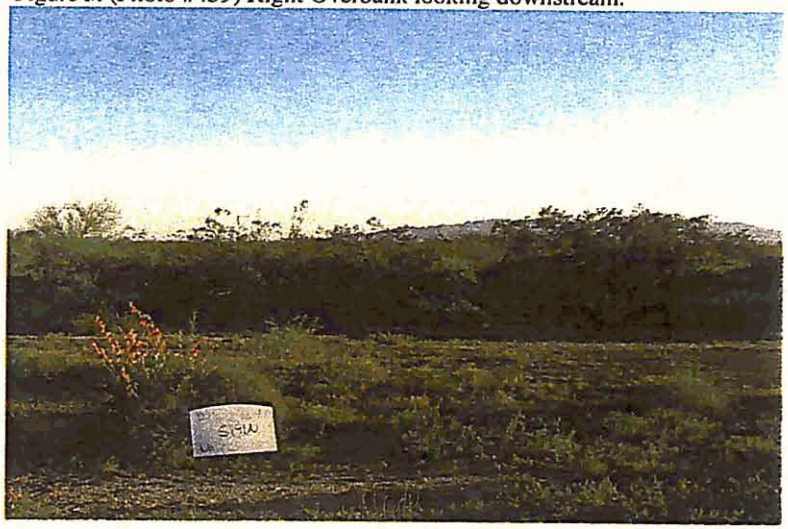


Figure 2. (Photo #458) Left Overbank looking downstream.

Figure 3. (Photo #459) Right Overbank looking downstream.



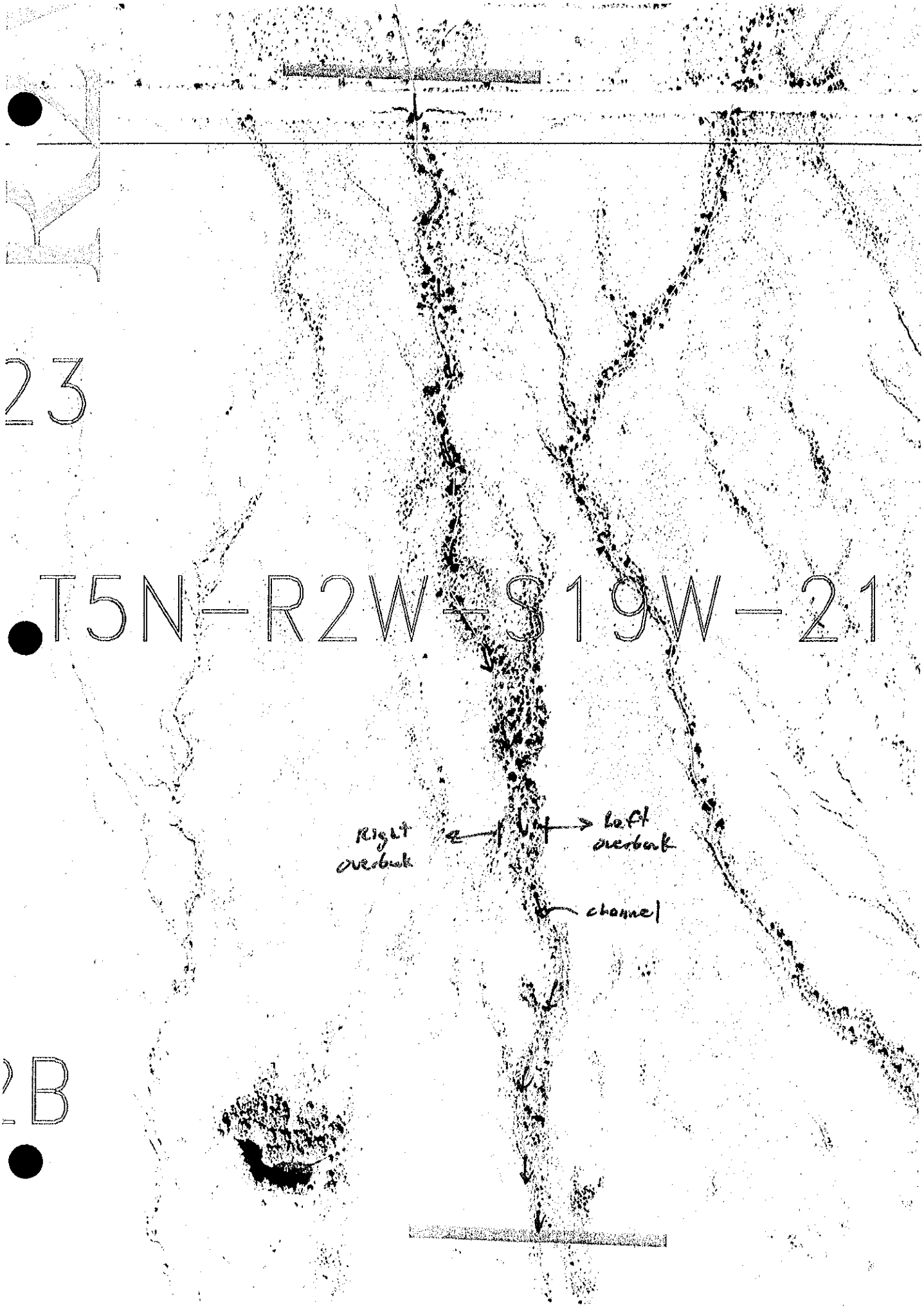

23
T5N-R2W-S19W-21
Right overbank
left overbank
channel
2B

Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/22/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R2W-S19W
Location: Reach -T5N-R2W-S19W - 22 (Between Birdsong Ave. and 1/2 mile north of Birdsong Ave.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.040**	**0.033**

Figure E-1
(T5N-R2W-S19W - 22)

Figure 1. (Photo #460) Channel looking upstream.

Figure 2. (Photo #461) Left Overbank looking upstream.

Figure 3. (Photo #462) Right Overbank looking upstream.

T5N-R2W-S19W-22
channel
Left overbank
Right overbank

Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/22/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R2W-S19W
Location: Reach - T5N-R2W-S19W - 23 (Between 1/2 mile north of Birdsong Ave. and just south of Galvin St.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.026	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.002	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.015	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.037**	**0.043**	**0.037**

Figure E-1
(T5N-R2W-S19W - 23)

Figure 1. (Photo #463) Channel looking upstream.

Figure 2. (Photo #464) Left Overbank looking upstream.

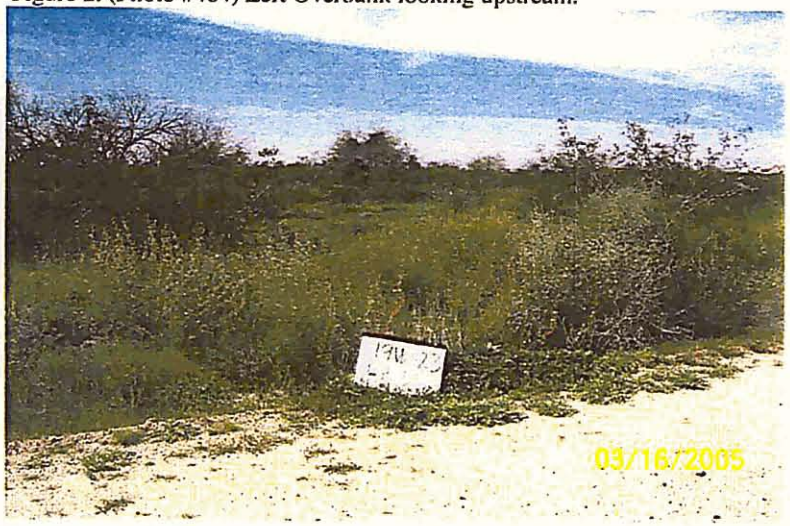


Figure 3. (Photo #465) Right Overbank looking upstream.

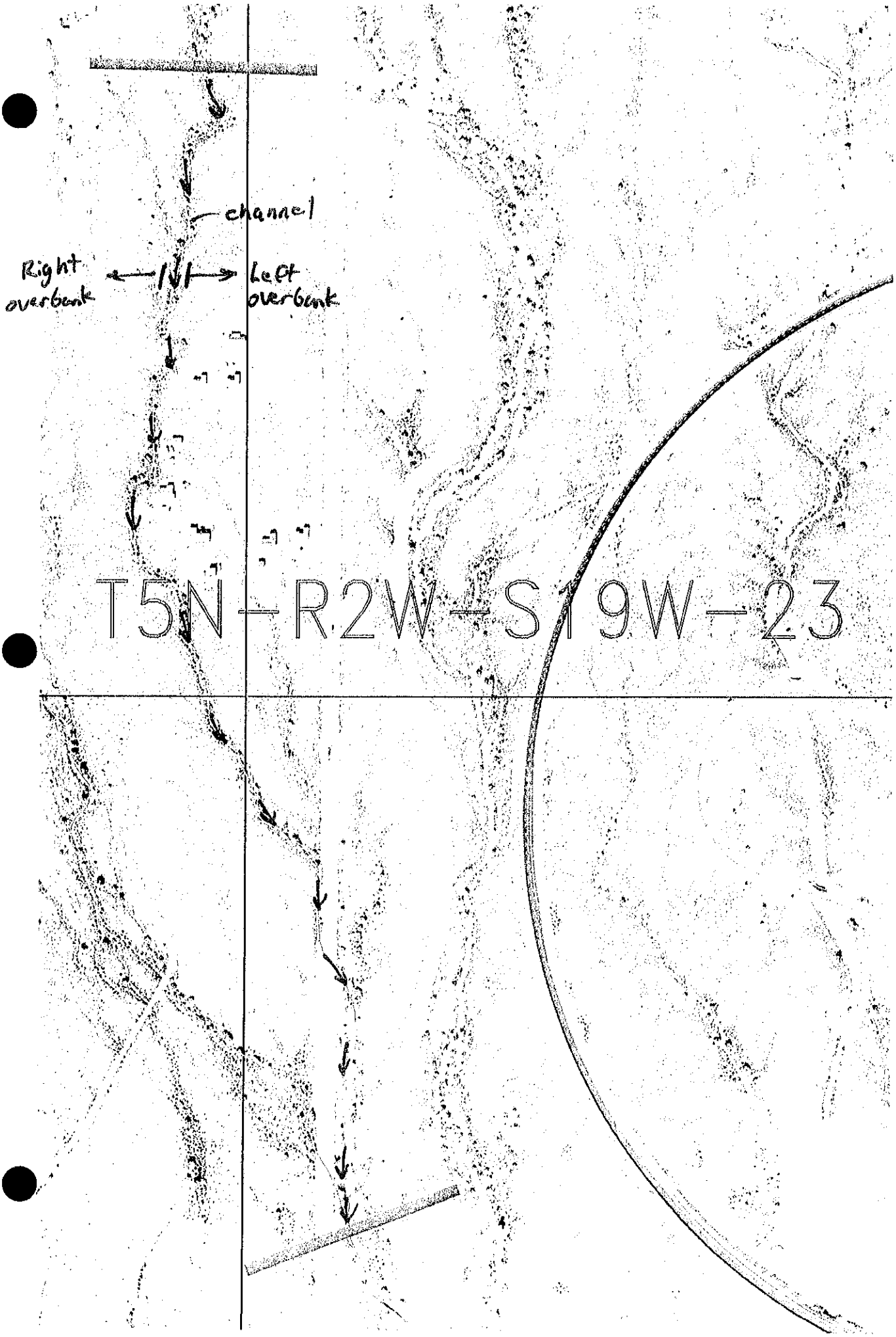

channel
Right overbank
Left overbank
T5N-R2W-S19W-23

Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/22/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R2W-S19W
Location: Reach - T5N-R2W-S19W - 24 (Between just south of Galvin St. and Cloud Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.001	0.002	0.001
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.046**	**0.034**

Figure E-1
(T5N-R2W-S19W - 24)

Figure 1. (Photo #466) Channel looking downstream.

Figure 2. (Photo #467) Left Overbank looking upstream.

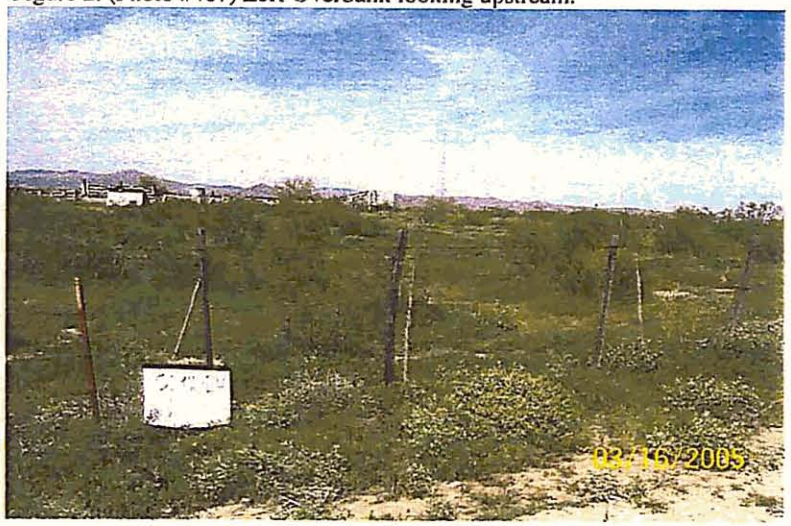
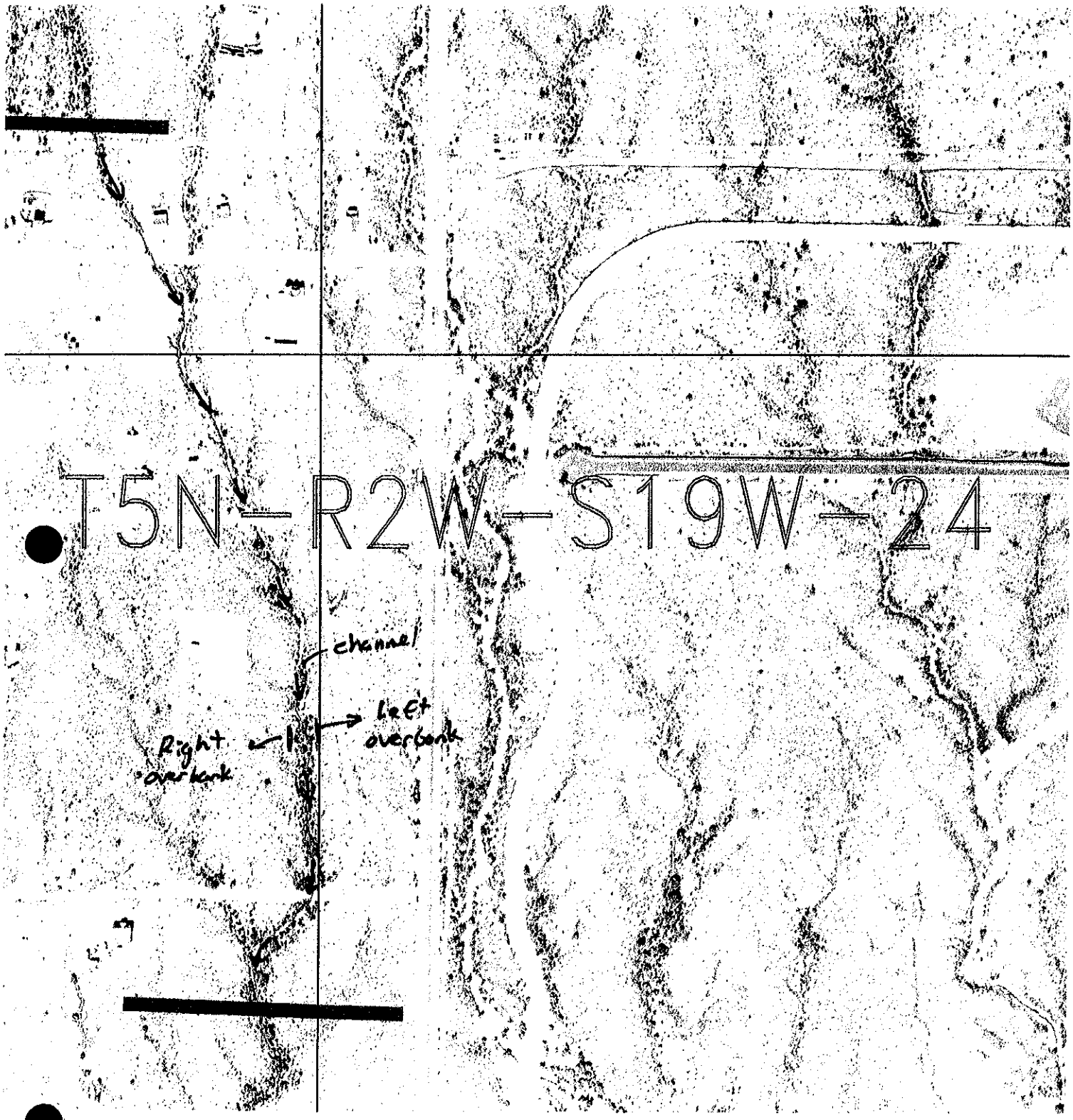


Figure 3. (Photo #468) Right Overbank looking downstream.


T5N-R2W-S19W-24
channel
left overbank
Right overbank

Wash T5N-R2W-S19E

Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/22/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R2W-S19E
Location: Reach - T5N-R2W-S19E - 20 (Between the U.S. 60 and 1/4 mile north of Lone Mtn. Rd. alignment.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.003	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.001	0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.050**	**0.034**

Figure E-1
(T5N-R2W-S19E - 20)

Figure 1. (Photo #469) Channel looking upstream.

Figure 2. (Photo #470) Left Overbank looking upstream.

Figure 3. (Photo #471) Right Overbank looking upstream.

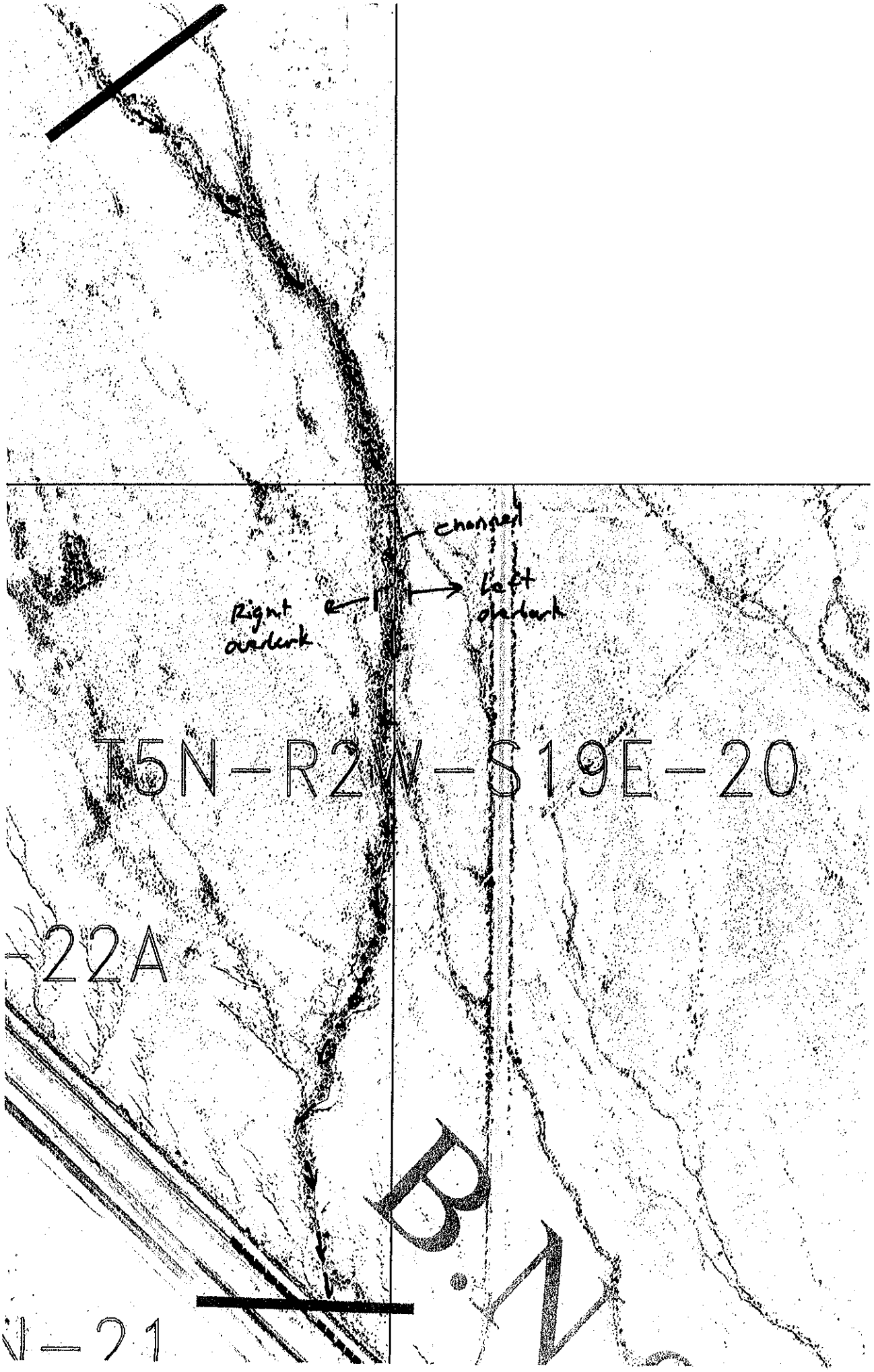

channel
Right overbank
Left overbank
T5N-R2W-S19E-20
-22A
N-21

Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/22/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R2W-S19E
Location: Reach - T5N-R2W-S19E - 21 (Between 1/4 mile north of Lone Mtn. Rd. alignment and Birdsong Ave.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.001	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010		0.010
	Medium		.010-.025		0.013	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.040**	**0.035**

Figure E-1
(T5N-R2W-S19E - 21)

Figure 1. (Photo #472) Channel looking downstream.

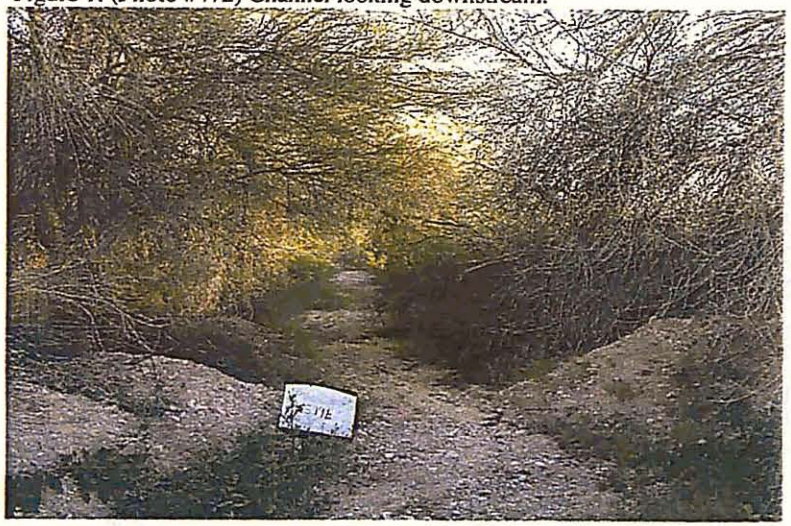


Figure 2. (Photo #473) Left Overbank looking downstream.

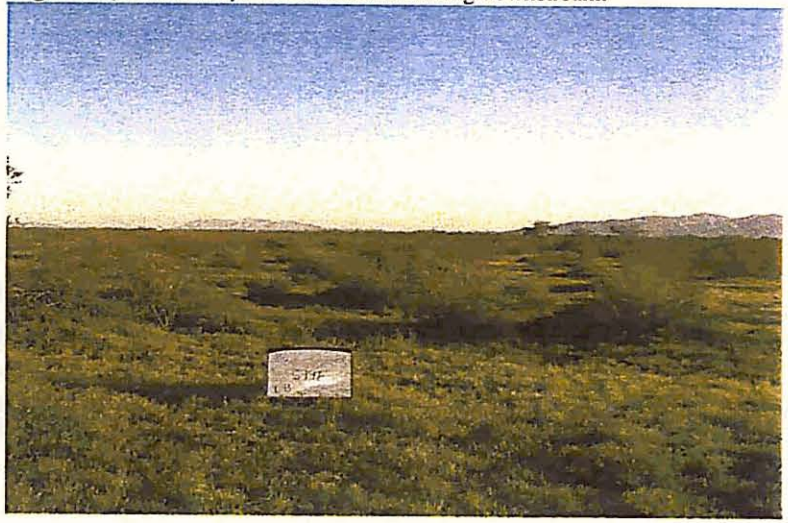
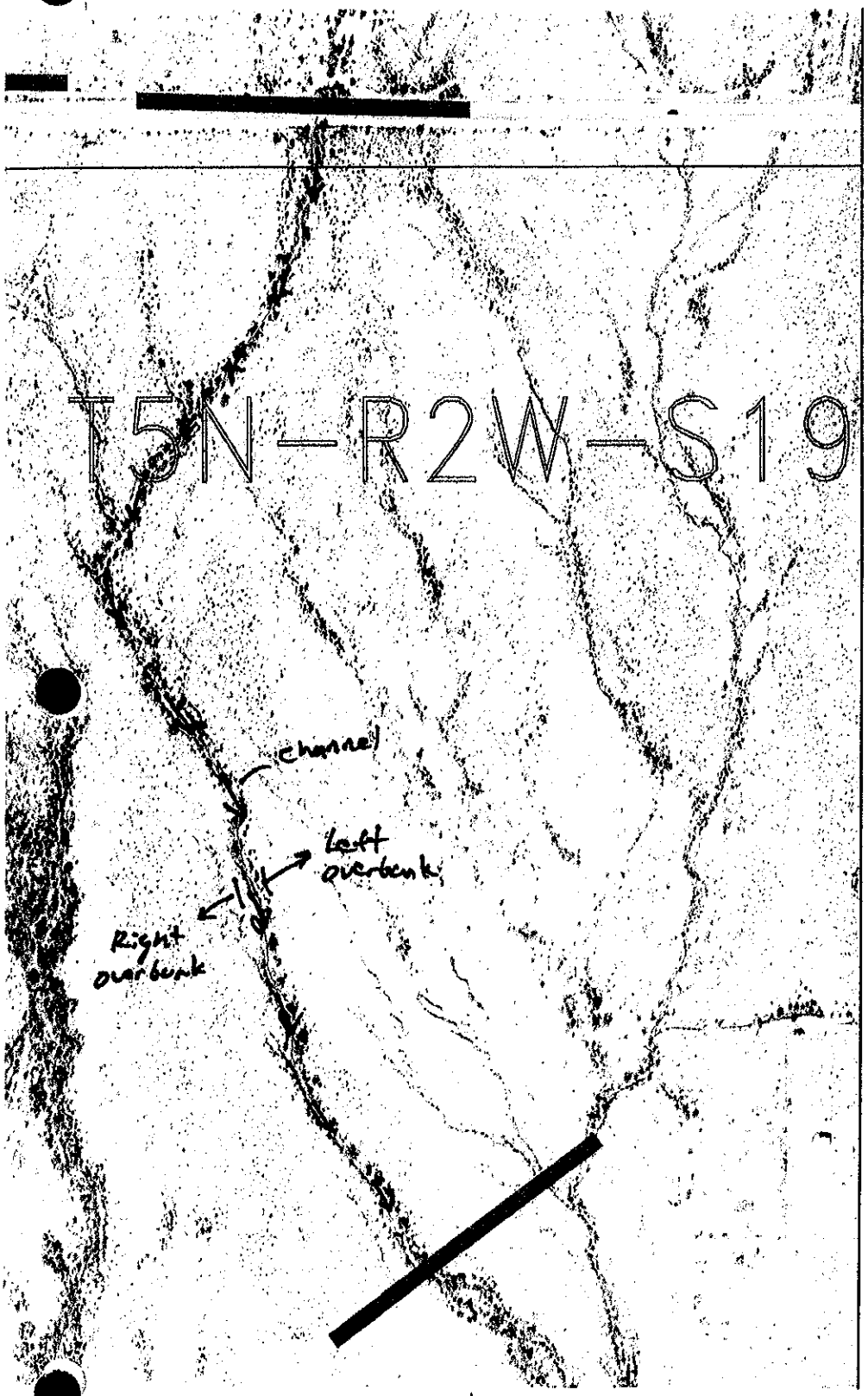


Figure 3. (Photo #474) Right Overbank looking downstream.


T5N-R2W-S19E-21
channel
Left overbank
Right overbank

2 East Tributary

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/23/2005

Project: Wittmann ADMSU
Stream: Wash 2 East Tributary
Location: Reach - 2E - Trib - 20 (Between Lone Mtn. Rd. and 1/2 mile north of Lone Mtn. Rd.) .

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.018	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.045**	**0.035**

Figure E-1
(2E-Trib - 20)

Figure 1. (Photo #502) Channel looking downstream.

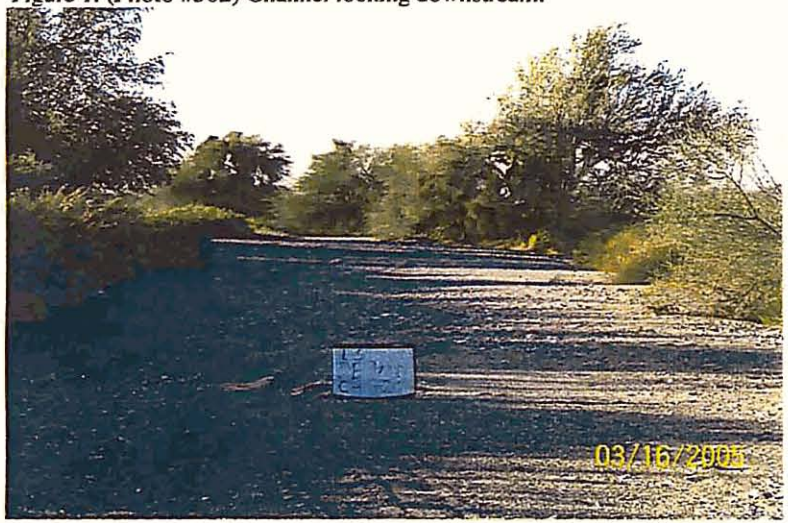


Figure 2. (Photo #503) Left Overbank looking upstream.

Figure 3. (Photo #504) Right Overbank looking downstream.

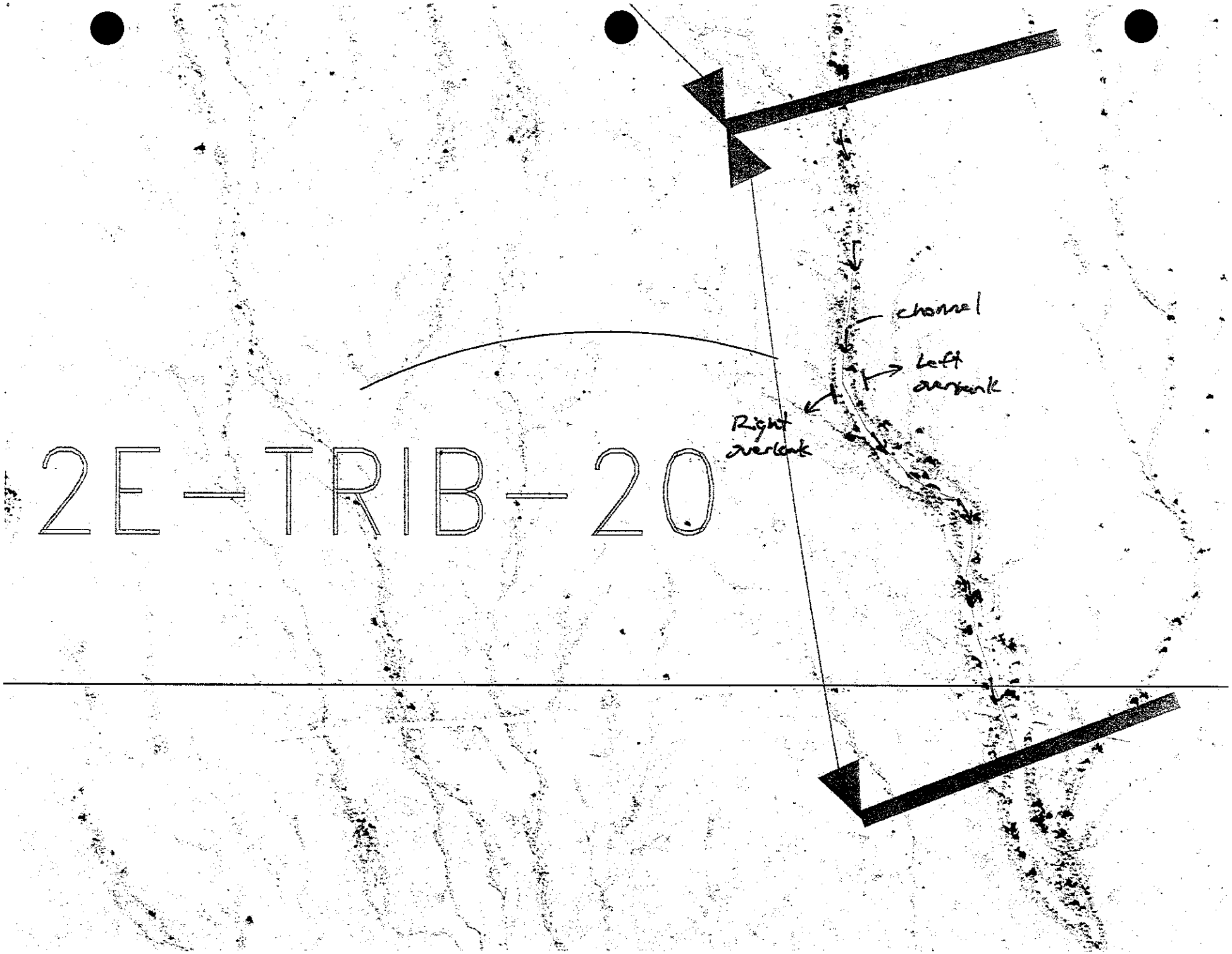

2E-TRIB-20
channel
Left overbank
Right overbank

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/23/2005

Project: Wittmann ADMSU
Stream: Wash 2 East Tributary
Location: Reach - 2E - Trib - 21 (Between 1/2 mile north of Lone Mtn. Rd. and Birdsong Ave.)

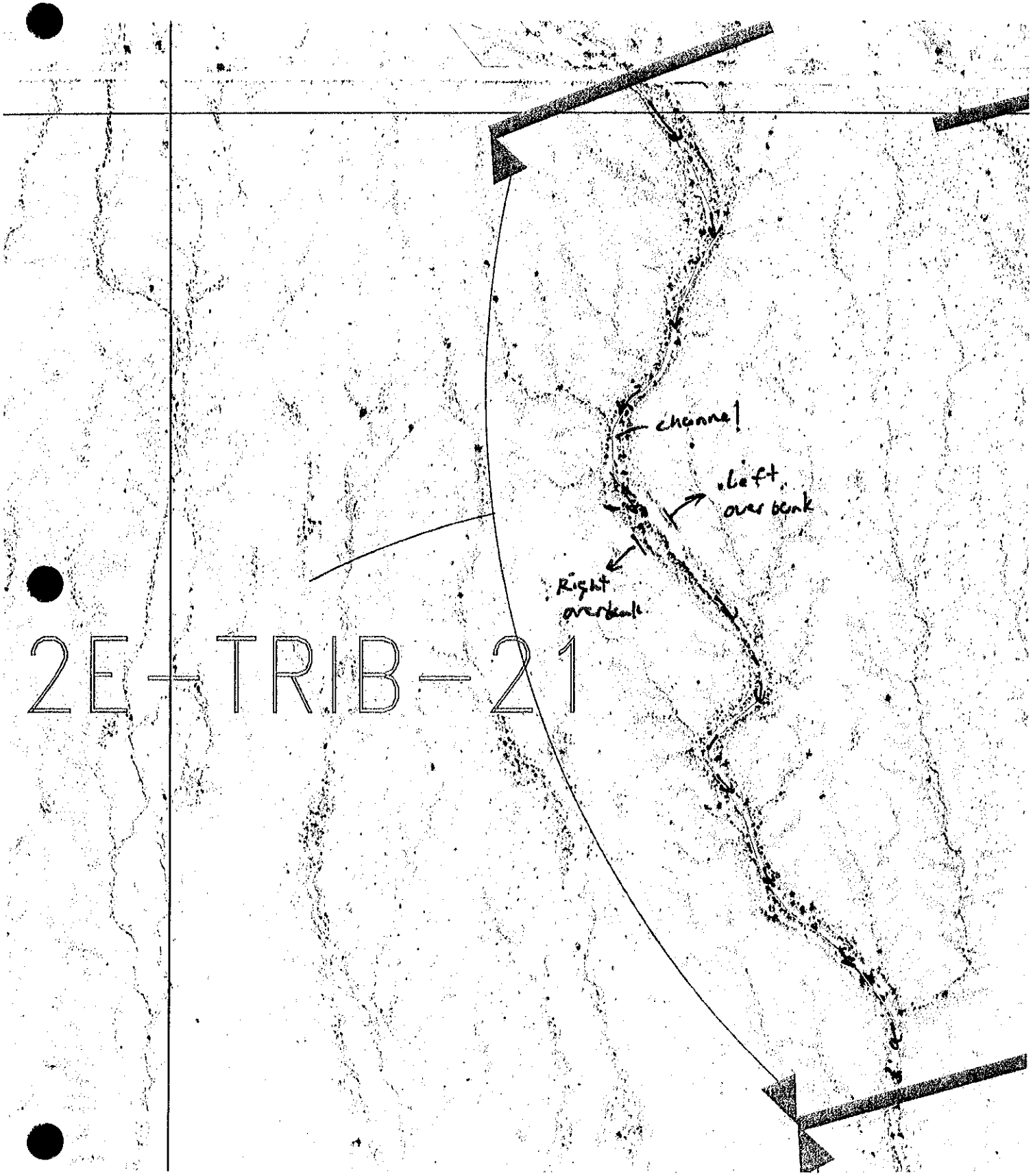
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.045**	**0.033**

Figure E-1
(2E-Trib - 21)

Figure 1. (Photo #505) Channel looking downstream.

Figure 2. (Photo #506) Left Overbank looking downstream.

Figure 3. (Photo #507) Right Overbank looking downstream.



2E-TRIB-21

Wash 2 East

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/23/2005

Project: Wittmann ADMSU
Stream: Wash 2 East
Location: Reach - 2E - 20 (Between Lone Mtn. Rd. and 1/2 mile north of Lone Mtn. Rd.)

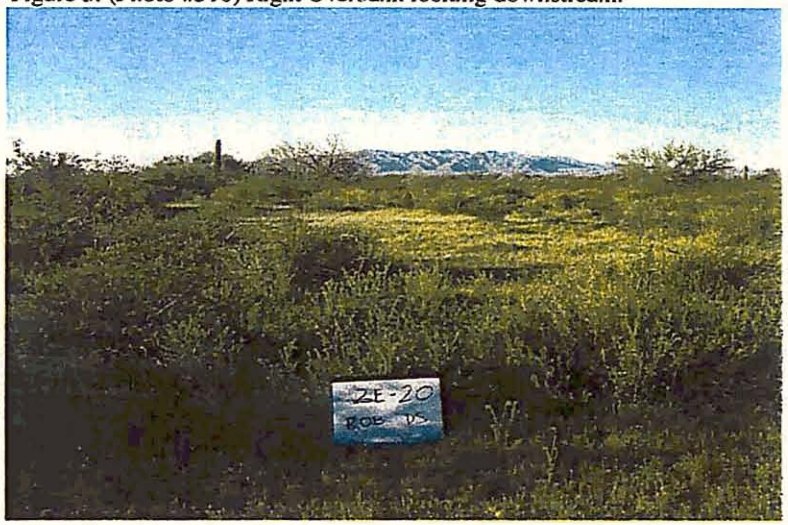
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010		0.010
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.002	
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.046**	**0.036**

Figure E-1
(2E - 20)

Figure 1. (Photo #508) Channel looking downstream.

Figure 2. (Photo #509) Left Overbank looking downstream.

Figure 3. (Photo #510) Right Overbank looking downstream.



2E-20

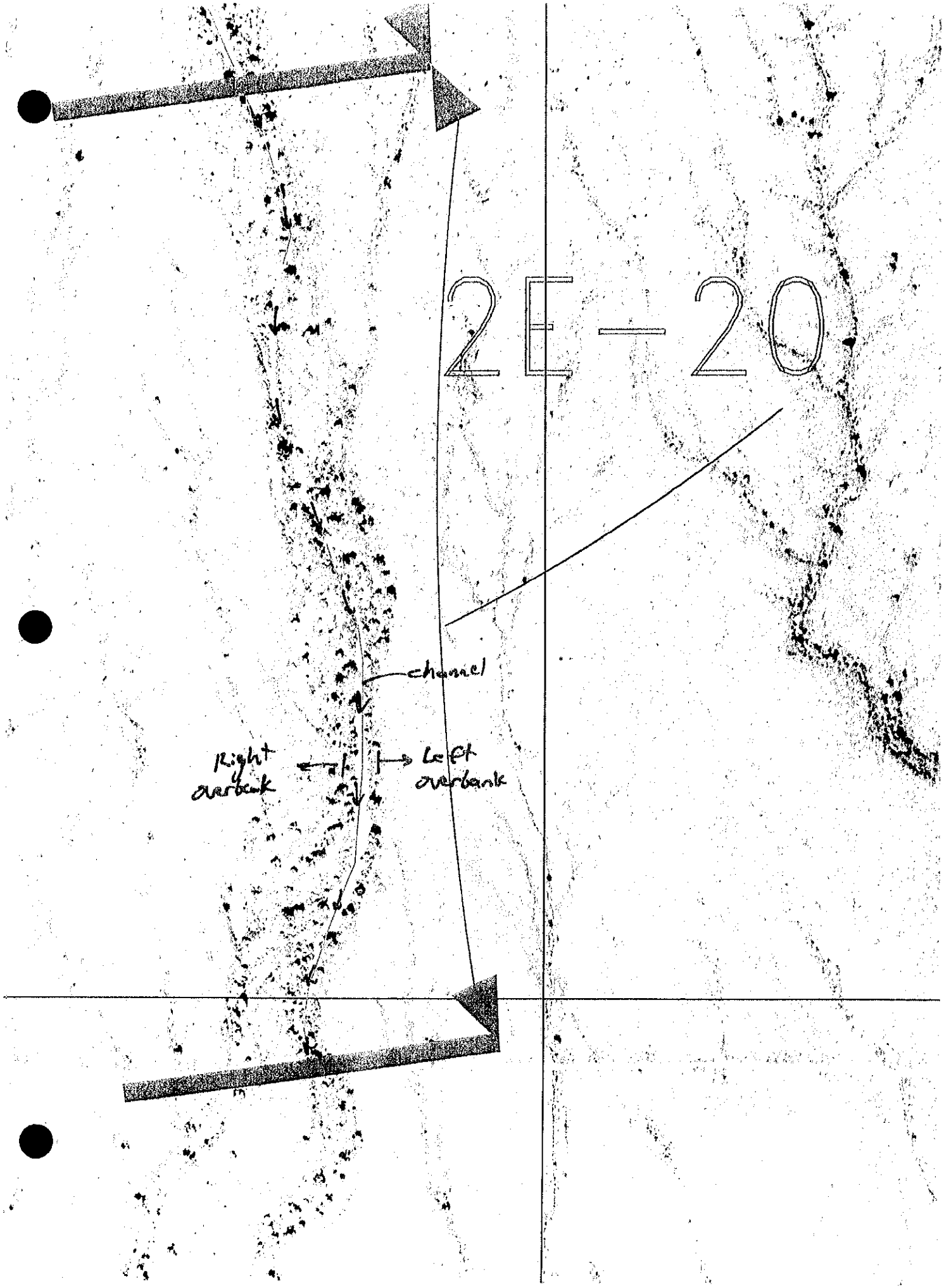


Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/23/2005

Project: Wittmann ADMSU
Stream: Wash 2 East
Location: Reach - 2E - 21 (Between 1/2 mile north of Lone Mtn. Rd. and Birdsong Ave.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010		0.010
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.044**	**0.036**

Figure E-1
(2E - 21)

Figure 1. (Photo #511) Channel looking downstream.

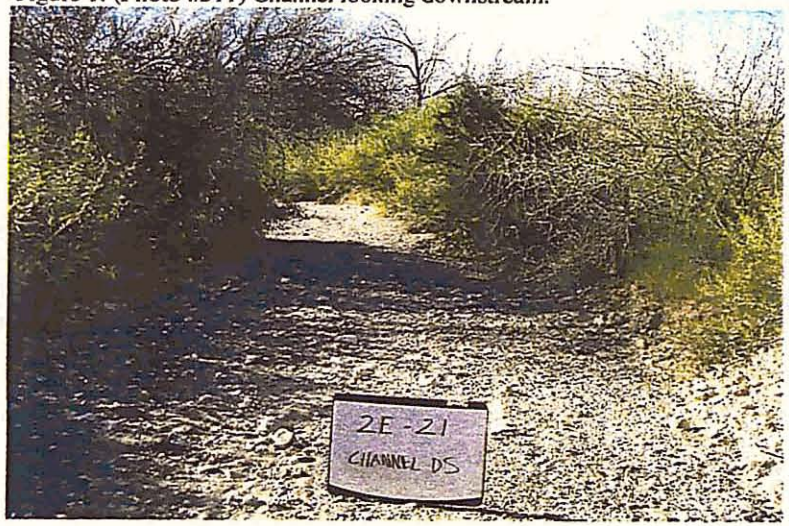
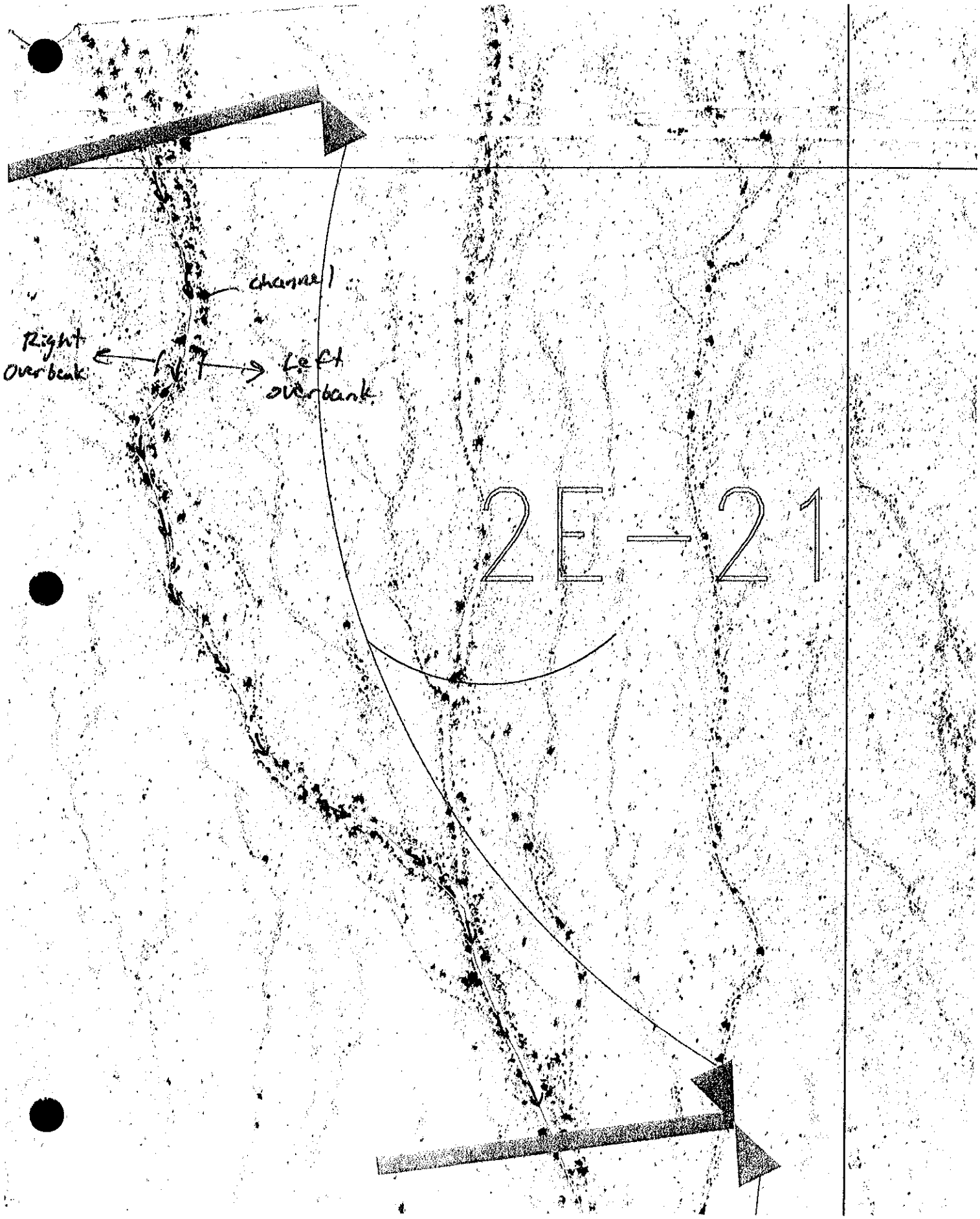


Figure 2. (Photo #512) Left Overbank looking downstream.

Figure 3. (Photo #513) Right Overbank looking downstream.


channel
Right overbank
Left overbank
2E-21

Wash 7 East

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/24/2005

Project: Wittmann ADMSU
Stream: Wash 7 East
Location: Reach - 7E - 20 (Between just north of the C.A.P. and White Wing Rd. alignment.)

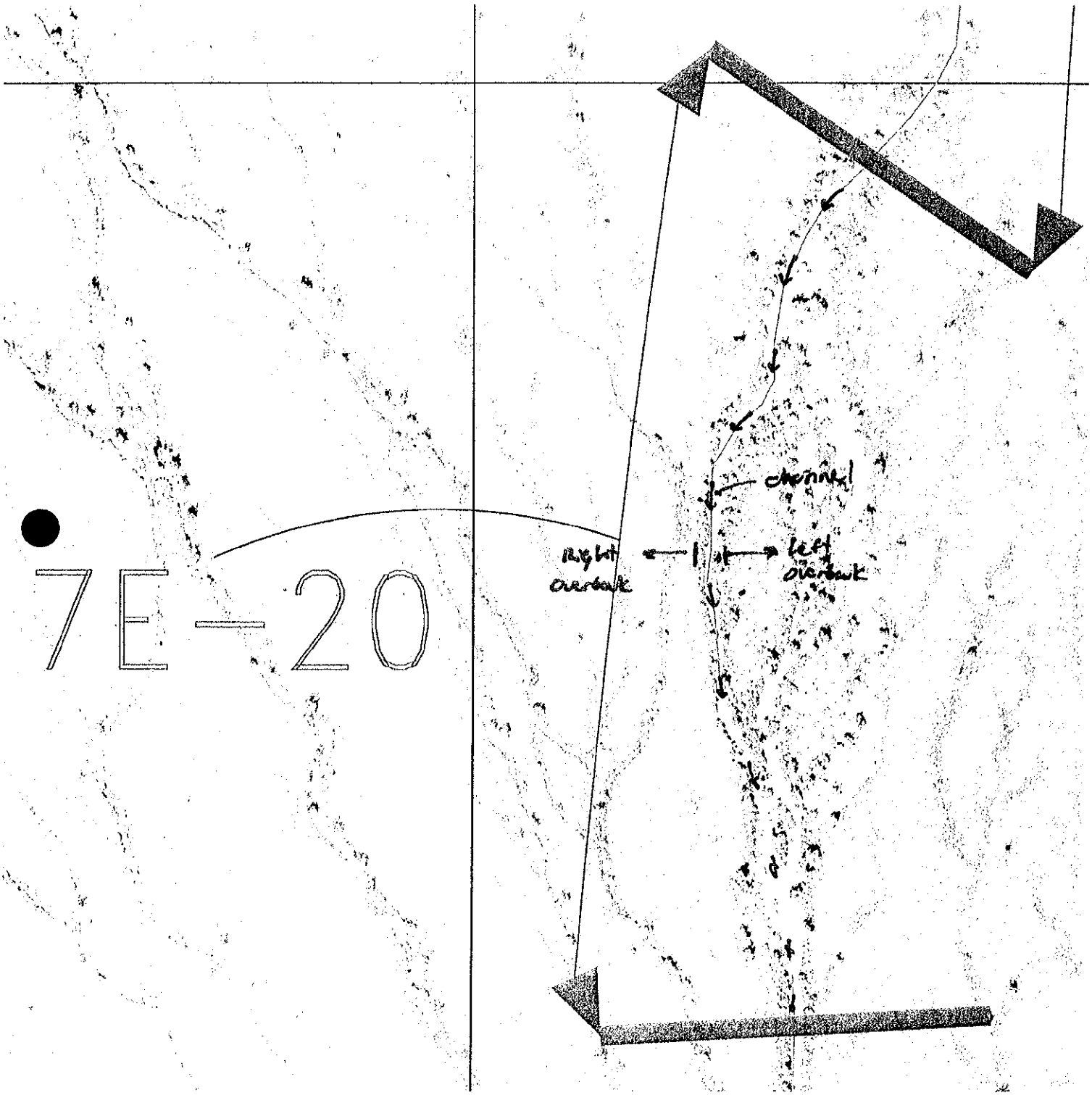
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.012	0.022	0.012
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.038**	**0.050**	**0.038**

Figure E-1
(7E - 20)

Figure 1. (Photo #526) Channel looking downstream.

Figure 2. (Photo #527) Left Overbank looking downstream.

Figure 3. (Photo #528) Right Overbank looking upstream.



7E-20

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/24/2005

Project: Wittmann ADMSU
Stream: Wash 7 East
Location: Reach - 7E - 21 (Between White Wing Rd. alignment and just south of Quail Run Rd.)

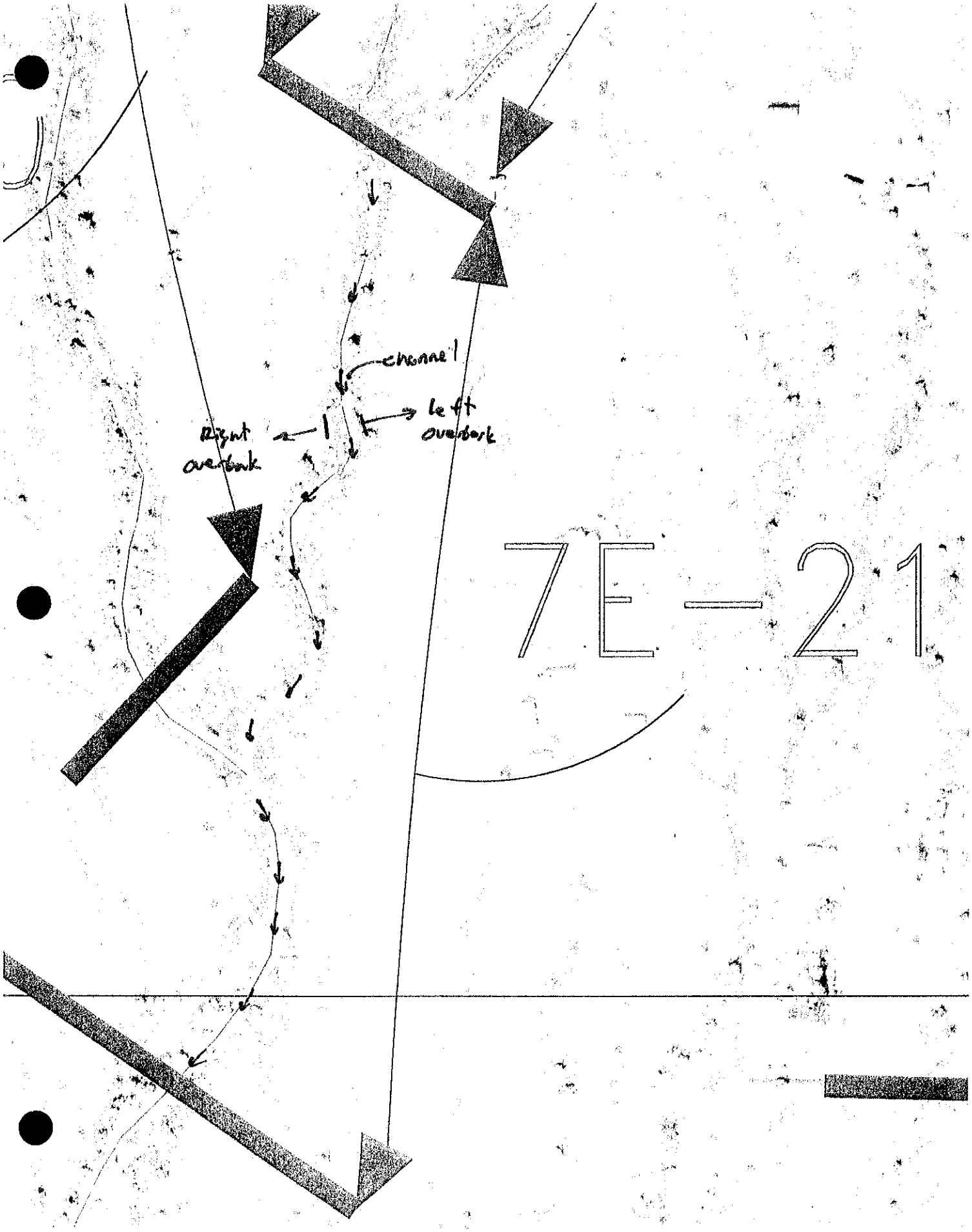
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.015	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.003	0.003	0.003
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.038**	**0.045**	**0.038**

Figure E-1
(7E - 21)

Figure 1. (Photo #529) Channel looking downstream.

Figure 2. (Photo #530) Left Overbank looking downstream.

Figure 3. (Photo #531) Right Overbank looking downstream.



7E-21

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/24/2005

Project: Wittmann ADMSU
Stream: Wash 7 East
Location: Reach - 7E - 22 (Between just south of Quail Run Rd. and Dove Valley Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.015	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.043**	**0.036**

Figure E-1
(7E - 22)

Figure 1. (Photo #532) Channel looking downstream.

Figure 2. (Photo #533) Left Overbank looking downstream.

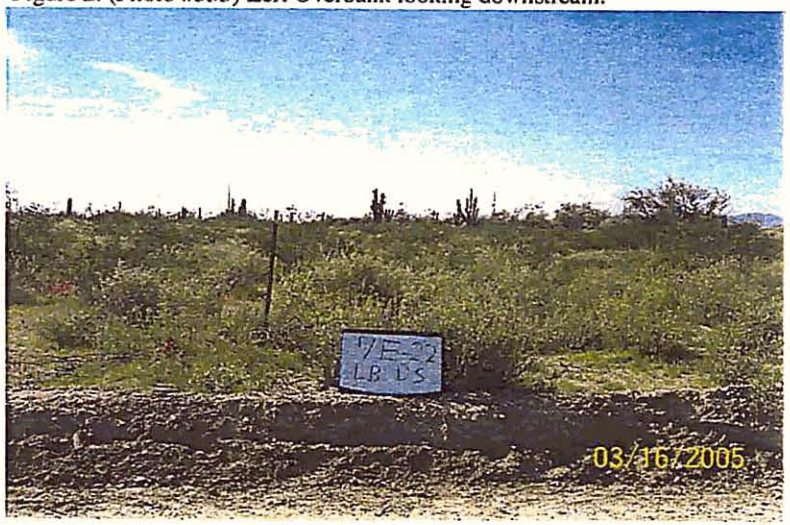
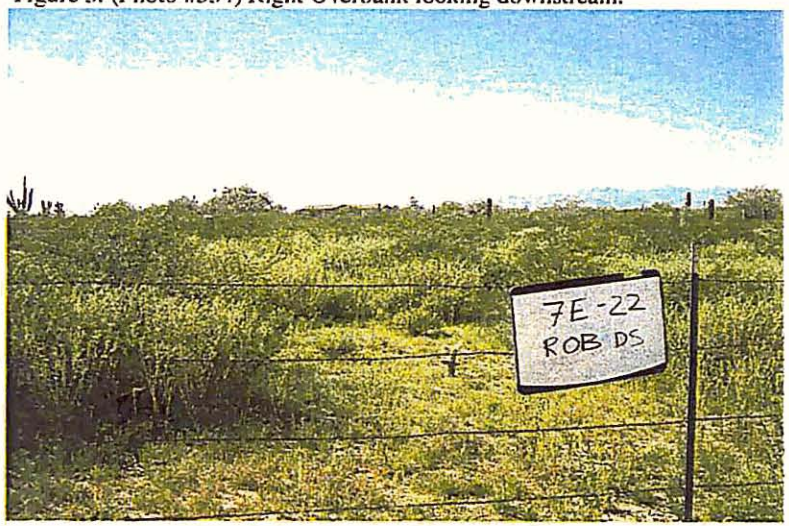
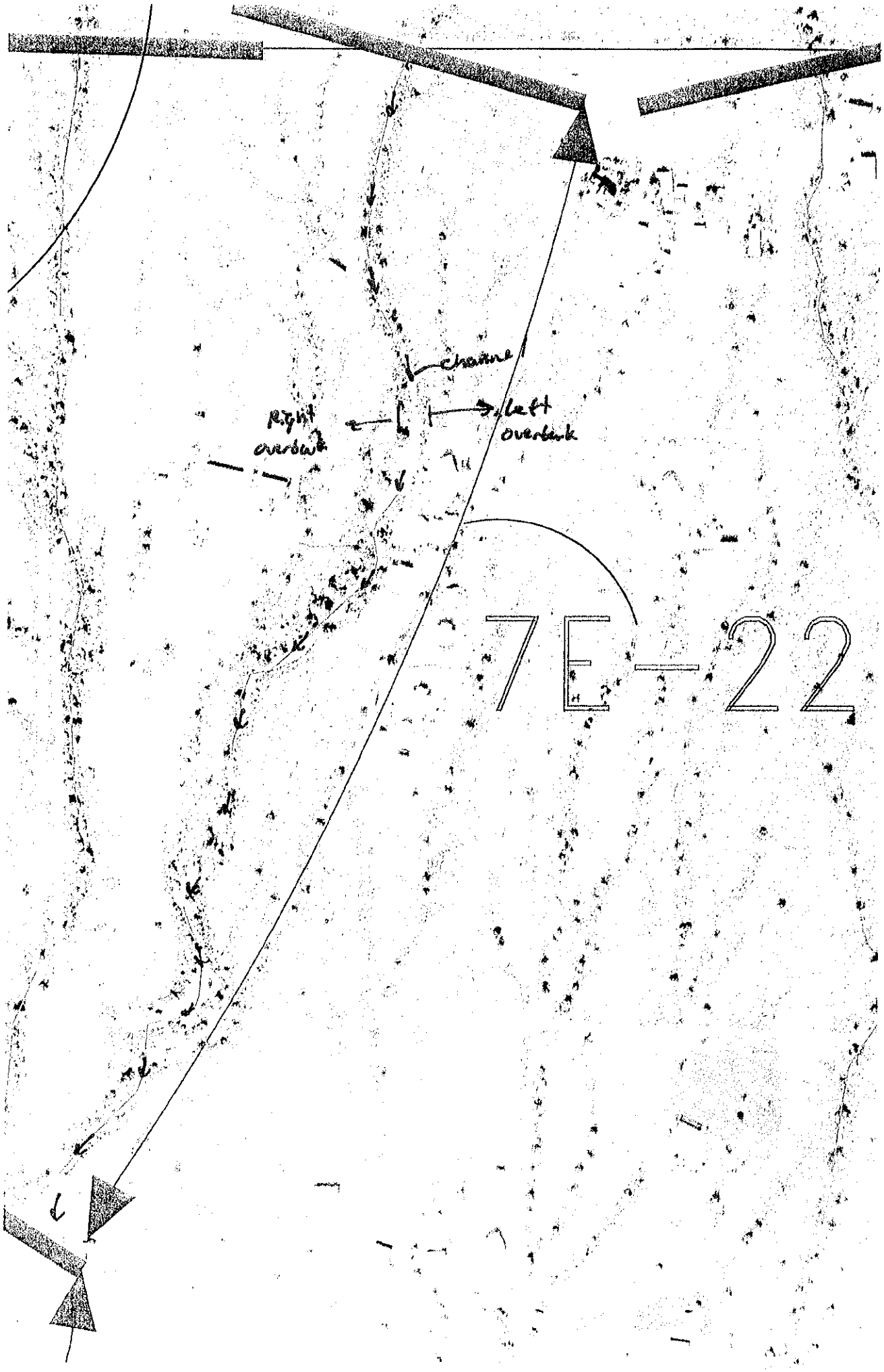


Figure 3. (Photo #534) Right Overbank looking downstream.





7E-22

Wash T5N-R2W-S14W

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/24/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R2W-S14W
Location: Reach - T5N-R2W-S14W - 20 (Between the confluence with wash 7 East to Dove Valley Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.016	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.042**	**0.033**

Figure E-1
(T5N-R2W-S14W - 20)

Figure 1. (Photo #544) Channel looking downstream.

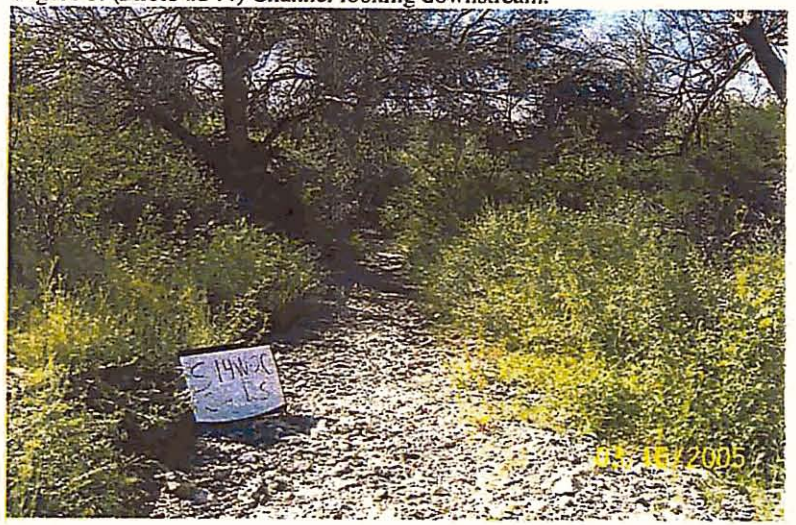
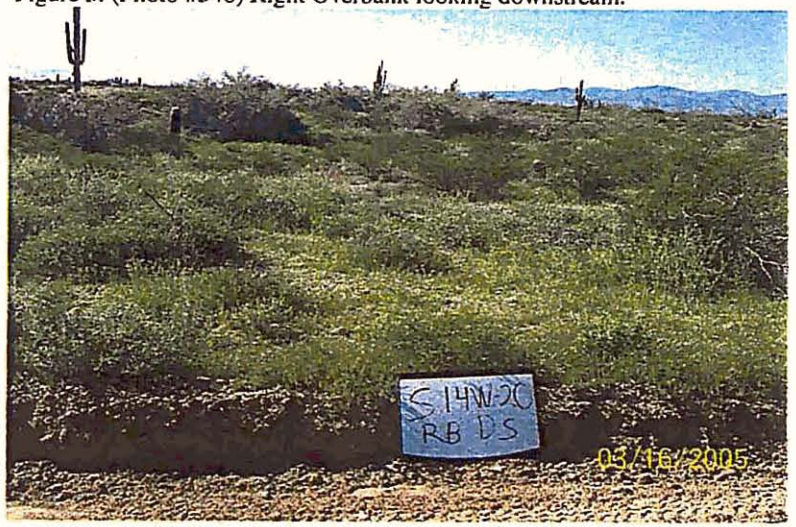
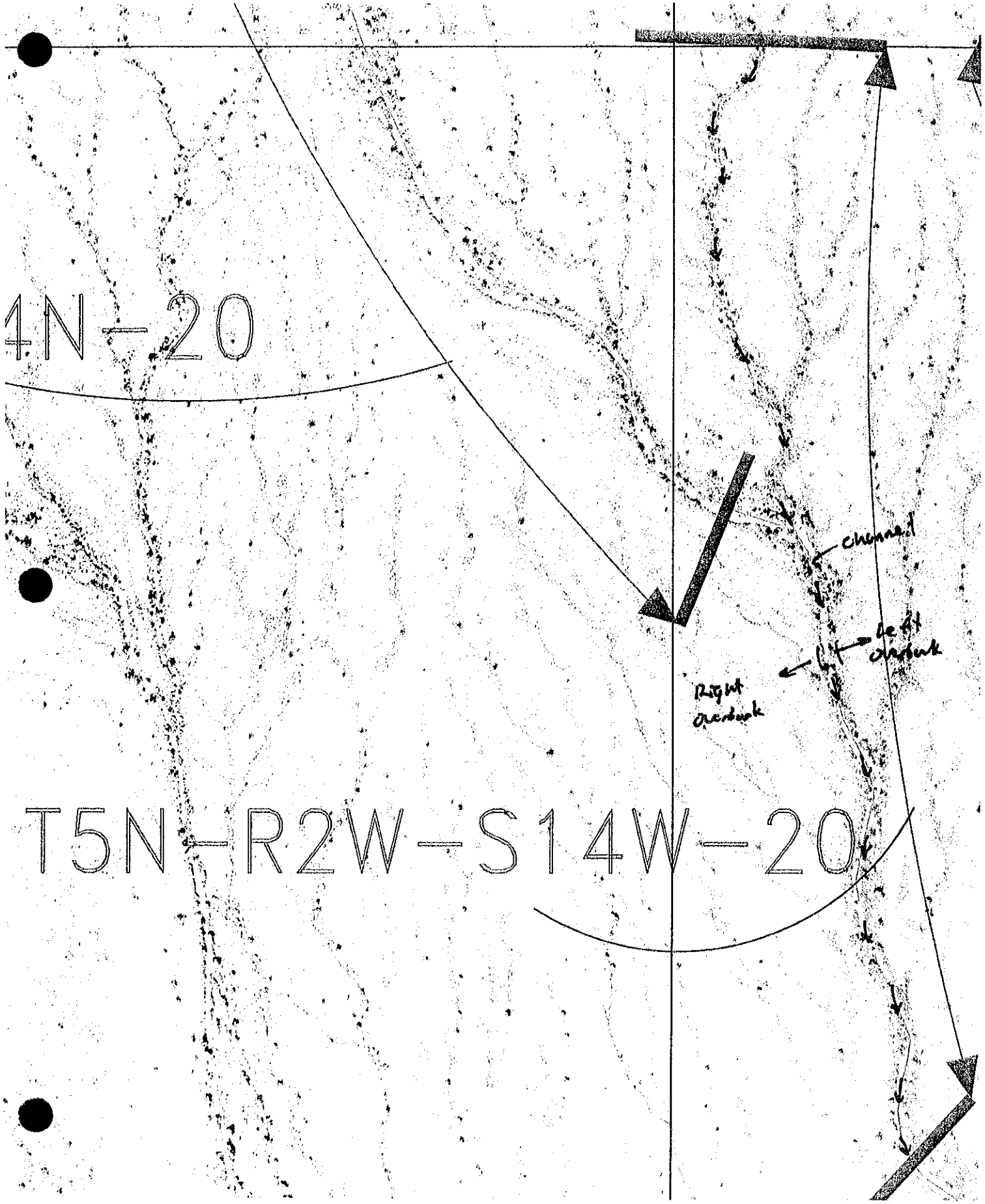


Figure 2. (Photo #545) Left Overbank looking downstream.

Figure 3. (Photo #546) Right Overbank looking downstream.




4N-20
channel
left overbank
Right overbank
T5N-R2W-S14W-20

Wash T5N-R2W-S14N

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/24/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R2W-S14N
Location: Reach - T5N-R2W-S14N - 20 (Between the confluence with wash T5N-R2W-S14W to just north of Dove Valley Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.026		0.026
	Coarse Sand		.026-.035		0.028	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0		0.000	
	Occ. Alt.		.001-.005	0.002		0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.043**	**0.036**

Figure E-1
(T5N-R2W-S14N - 20)

Figure 1. (Photo #535) Channel looking upstream.

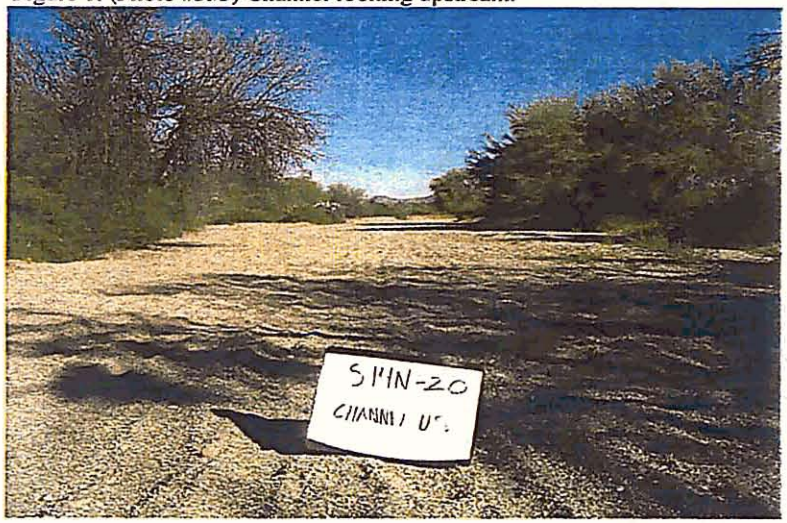


Figure 2. (Photo #536) Left Overbank looking downstream.

Figure 3. (Photo #537) Right Overbank looking upstream.

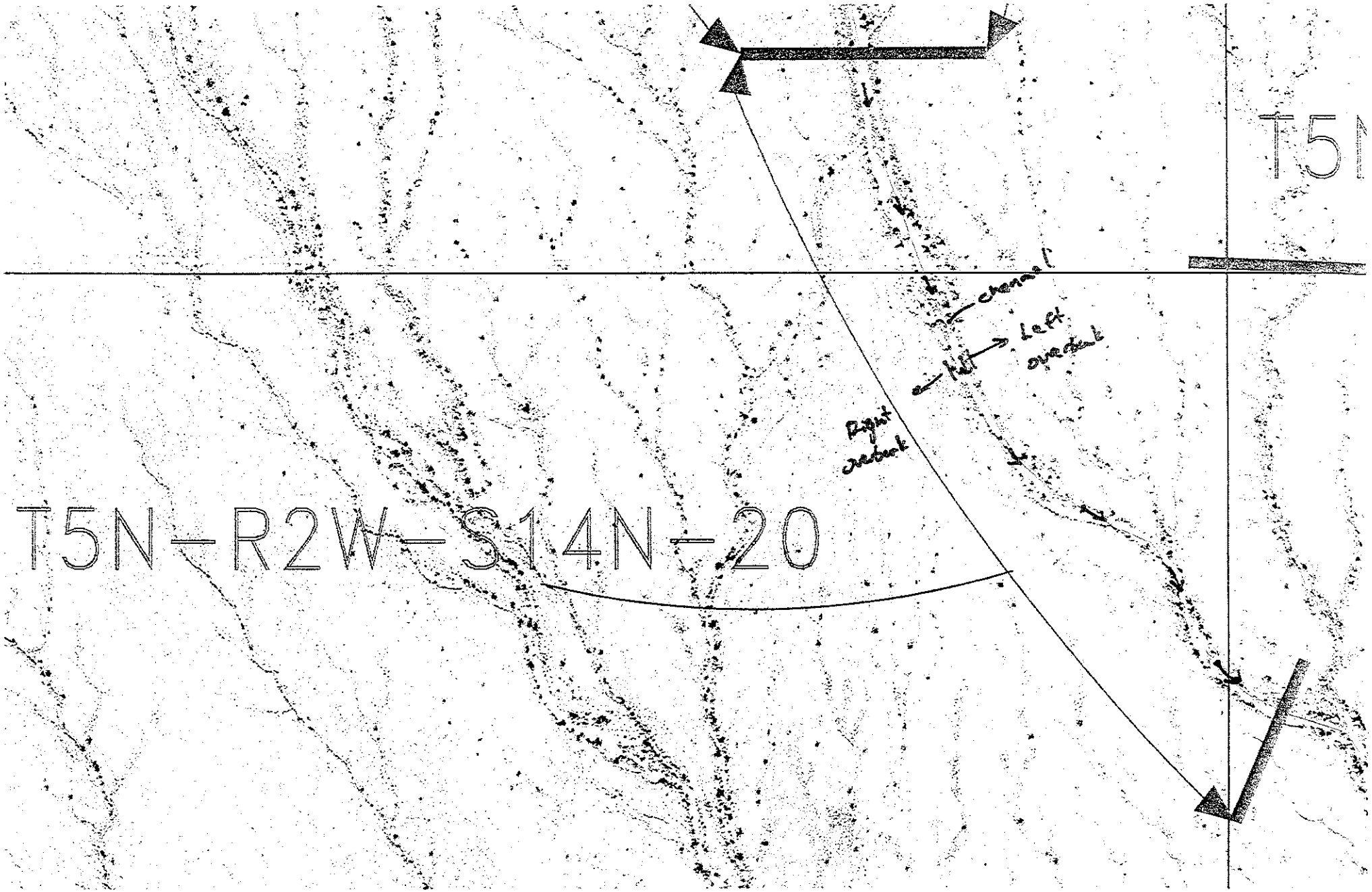

T5N
T5N-R2W-S14N-20
channel
left
Left aqueduct
Right aqueduct

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/24/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R2W-S14N
Location: Reach - T5N-R2W-S14N - 21 (Between just north of Dove Valley Rd. and 1 mile north of Dove Valley Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0		0.000	
	Occ. Alt.		.001-.005	0.001		0.001
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.043**	**0.034**

Figure E-1
(T5N-R2W-S14N - 21)

Figure 1. (Photo #538) Channel looking upstream.

Figure 2. (Photo #539) Left Overbank looking downstream.

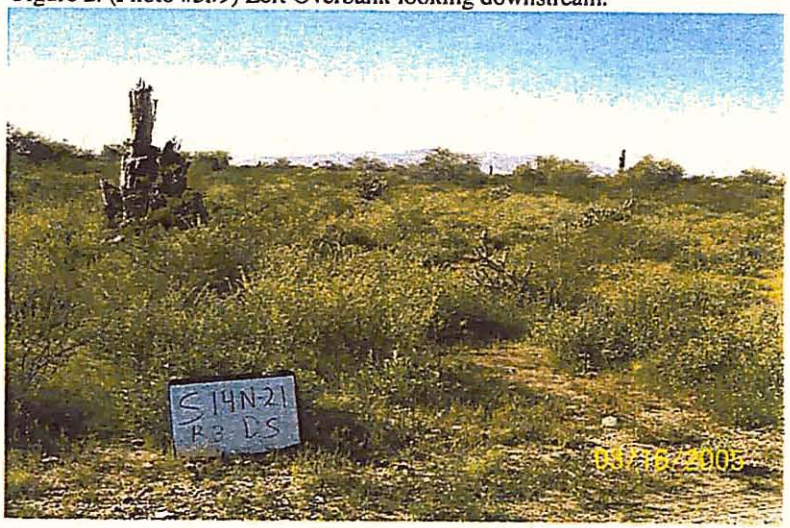
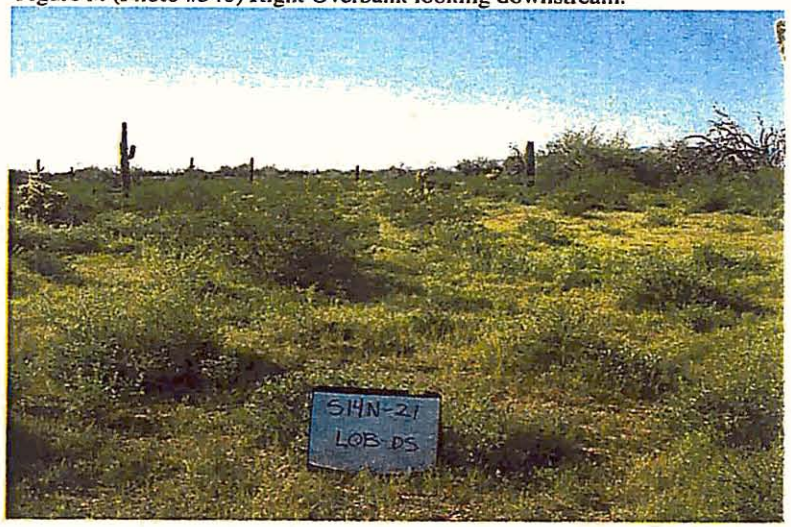


Figure 3. (Photo #540) Right Overbank looking downstream.



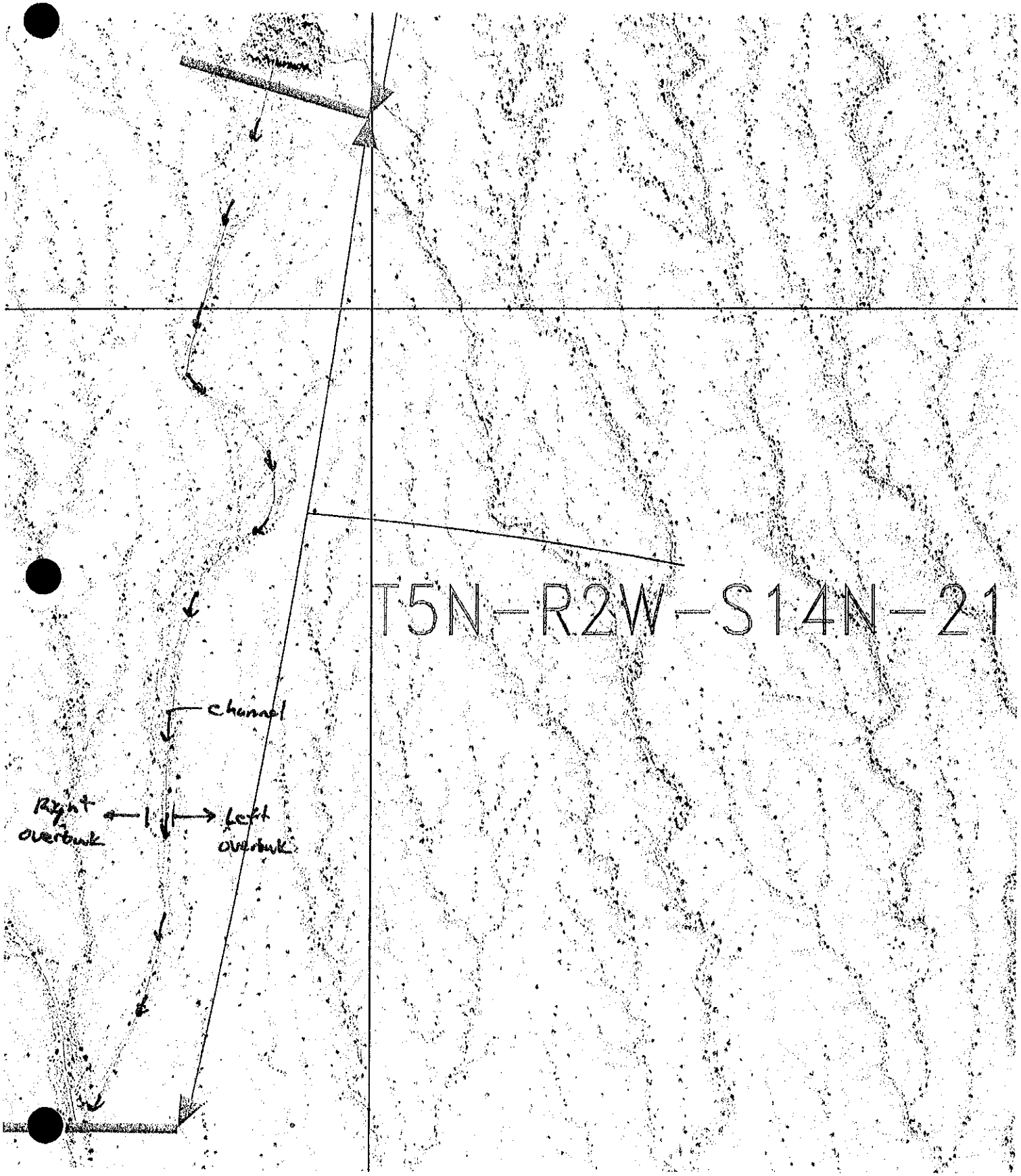

T5N-R2W-S14N-21
channel
Right overbank
Left overbank

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/24/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R2W-S14N
Location: Reach - T5N-R2W-S14N - 22 (Between 1 mile and 1.5 miles north of Dove Valley Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.003	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.012	0.020	0.012
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.040**	**0.053**	**0.040**

Figure E-1
(T5N-R2W-S14N - 22)

Figure 1. (Photo #541) Channel looking downstream.

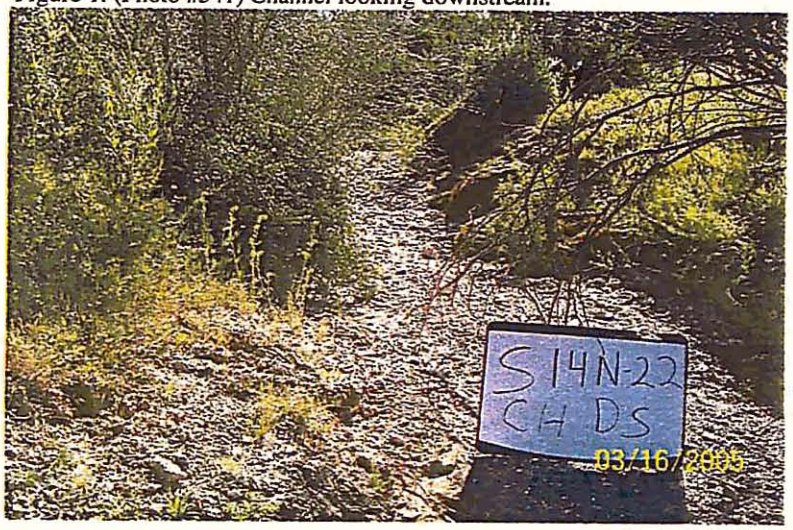
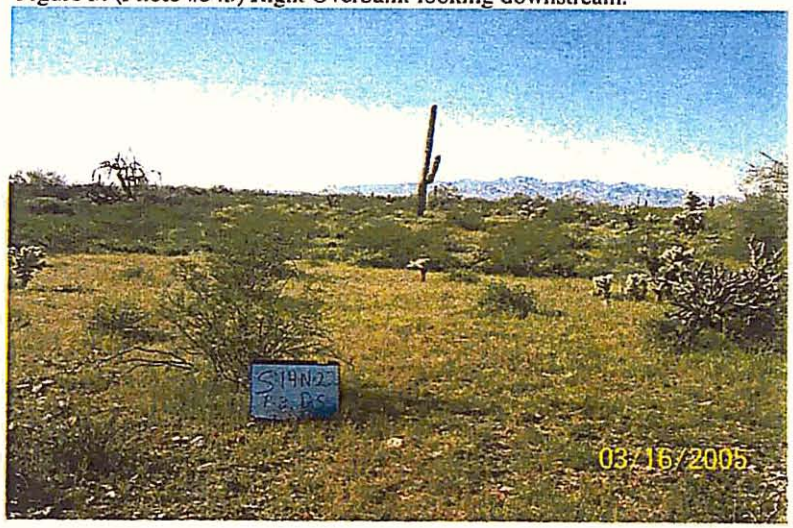
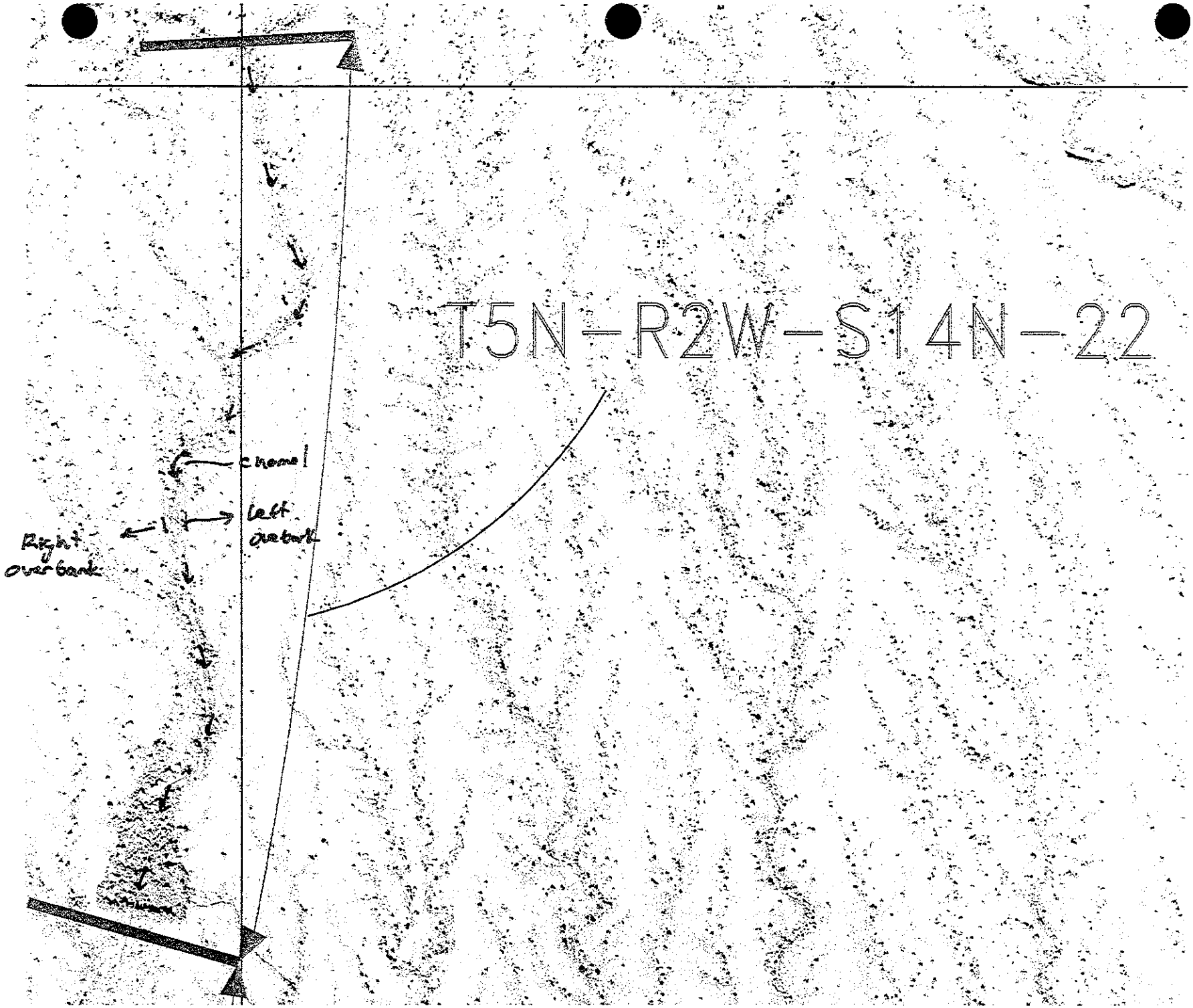


Figure 2. (Photo #542) Left Overbank looking downstream.

Figure 3. (Photo #543) Right Overbank looking downstream.




T5N-R2W-S14N-22
channel
left overbank
Right overbank

Wash T5N-R2W-S14S

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/24/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R2W-S14S
Location: Reach - T5N-R2W-S14S - 20 (Between the confluence with wash 7 East to Dove Valley Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.026	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.010
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0		0.000	0.000
	Occ. Alt.		.001-.005	0.002		
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.037**	**0.041**	**0.035**

Figure E-1
(T5N-R2W-S14S - 20)

Figure 1. (Photo #547) Channel looking downstream.

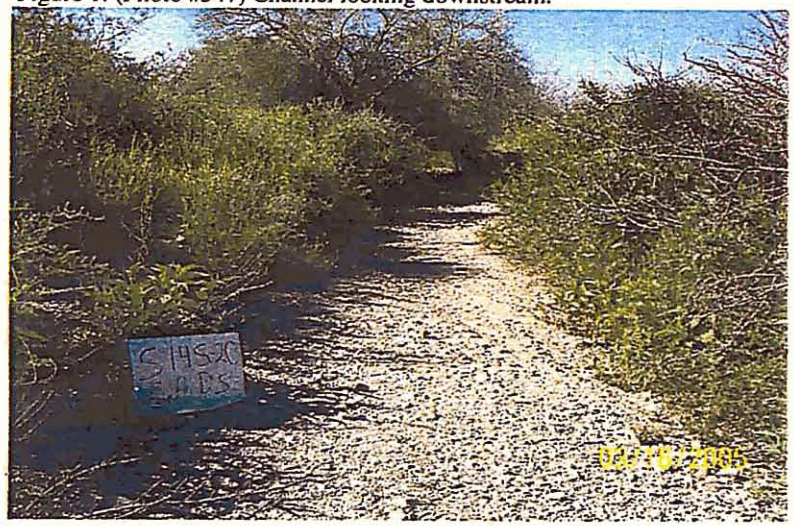


Figure 2. (Photo #548) Left Overbank looking downstream.

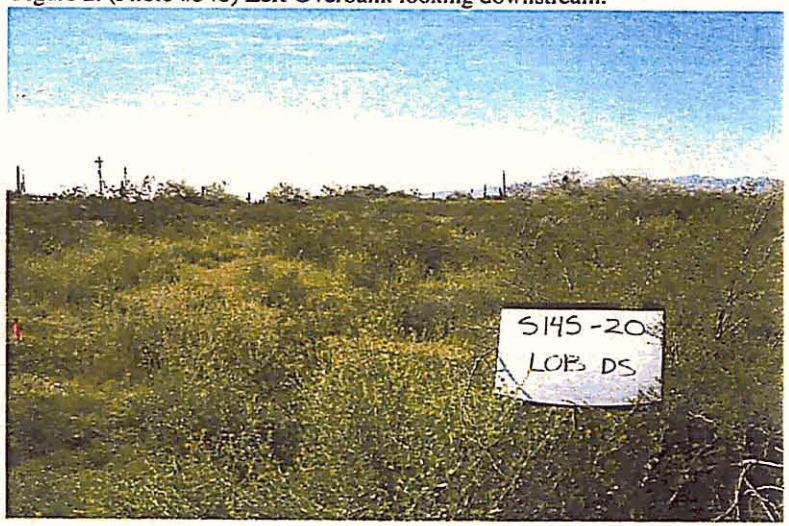
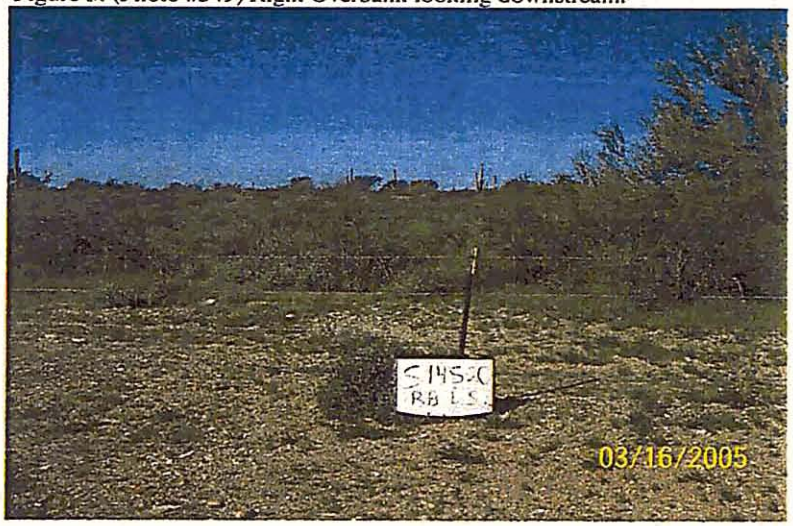
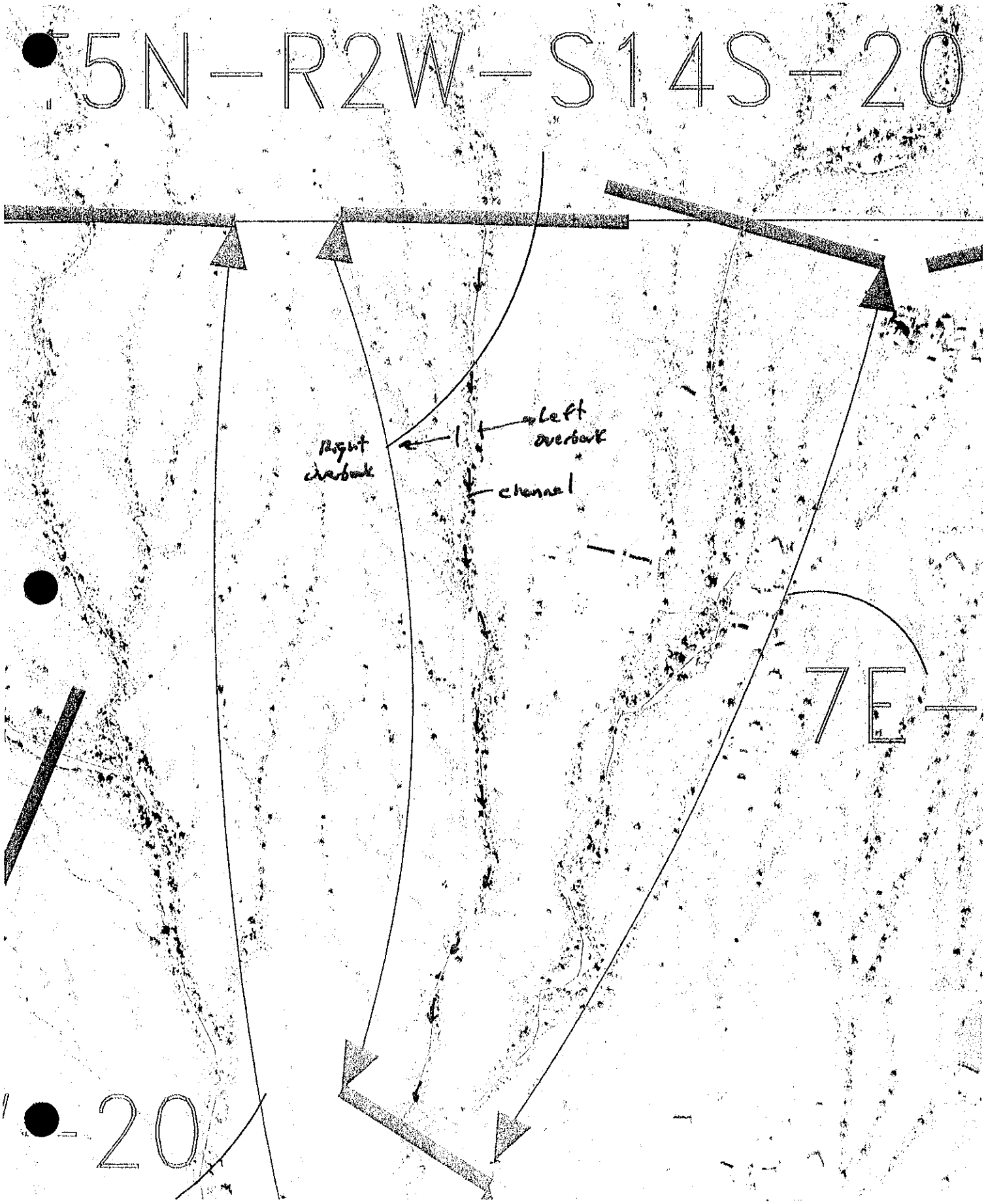


Figure 3. (Photo #549) Right Overbank looking downstream.




5N-R2W-S14S-20
left overbank
right overbank
channel
7E
20

Wash T5N-R2W-S11

Table E-1

BY JCS DATE 3/18/2005
CHECK GLA DATE 3/24/2005

Project: Wittmann ADMSU
Stream: Wash T5N-R2W-S11
Location: Reach - T5N-R2W-S11 - 20 (Between just north of Dove Valley Rd. to 1 mile north of Dove Valley Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.014	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.040**	**0.033**

Figure E-1
(T5N-R2W-S11 - 20)

Figure 1. (Photo #514) Channel looking upstream.

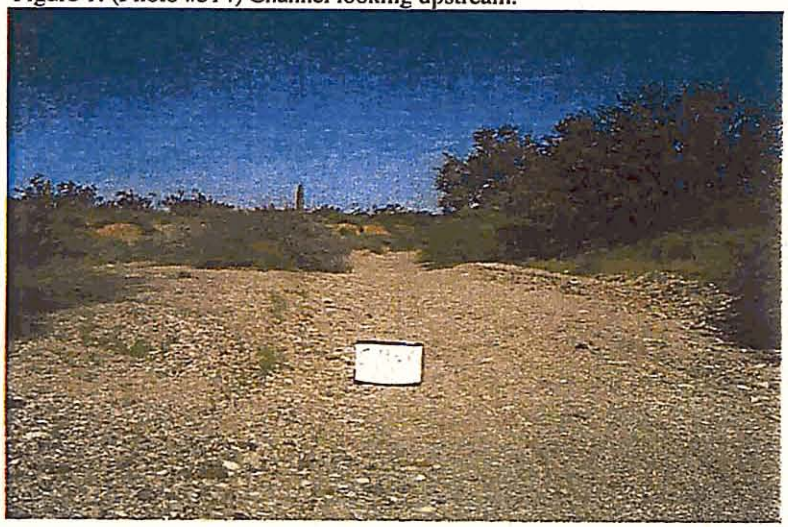


Figure 2. (Photo #515) Left Overbank looking downstream.

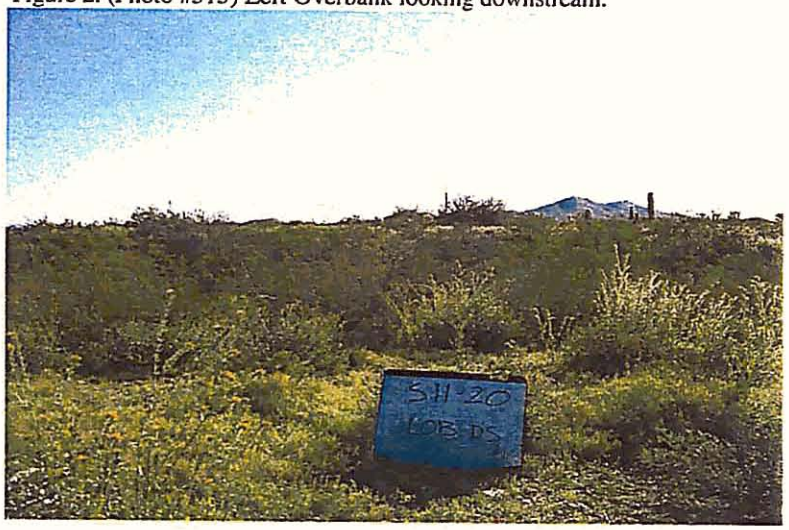
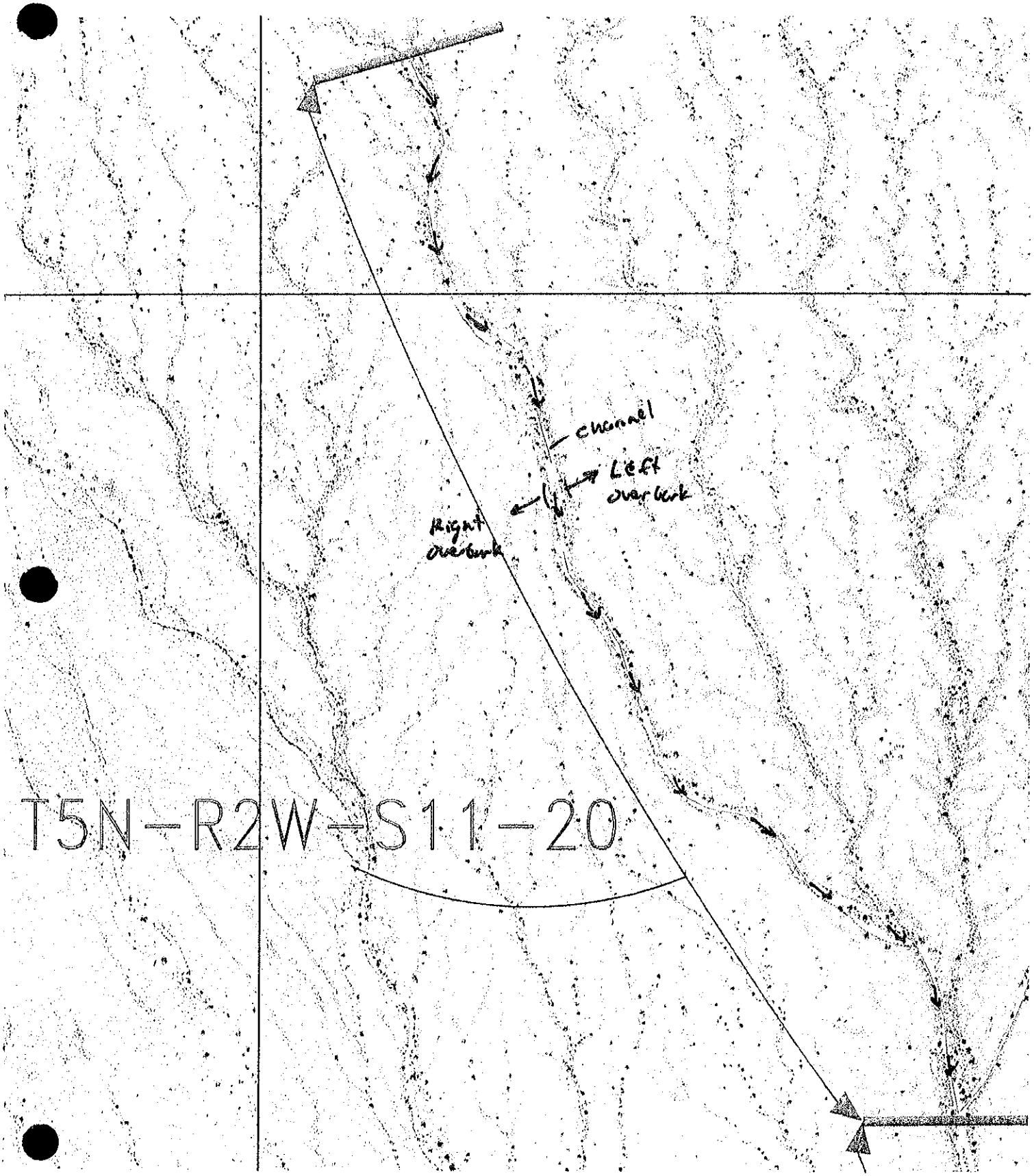


Figure 3. (Photo #516) Right Overbank looking downstream.


channel
Left overbank
Right overbank
T5N-R2W-S11-20

7 East Tributary

Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/24/2005

Project: Wittmann ADMSU
Stream: Wash 7 East Tributary
Location: Reach - 7E Trib - 20 (Between just north of the C.A.P. and Montgomery Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.005		0.005
	Medium		.010-.025		0.013	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.030**	**0.039**	**0.030**

Figure E-1
(7E Trib - 20)

Figure 1. (Photo #517) Channel looking upstream.

Figure 2. (Photo #518) Left Overbank looking upstream.

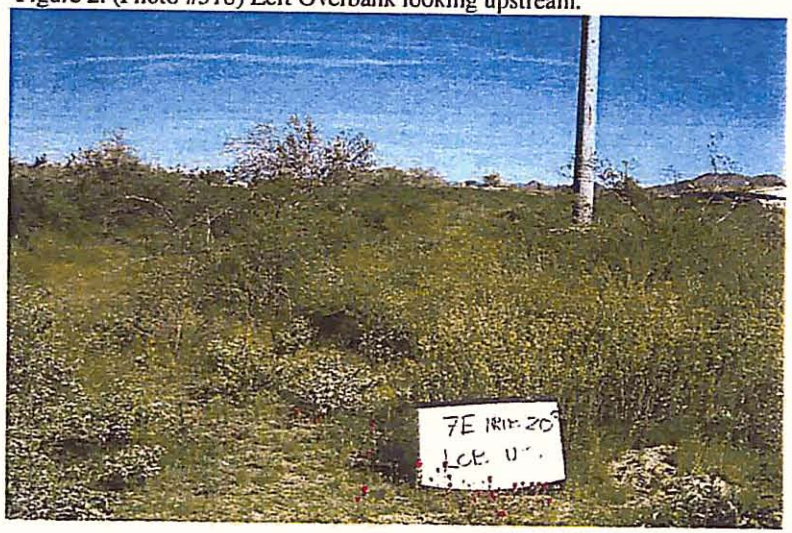
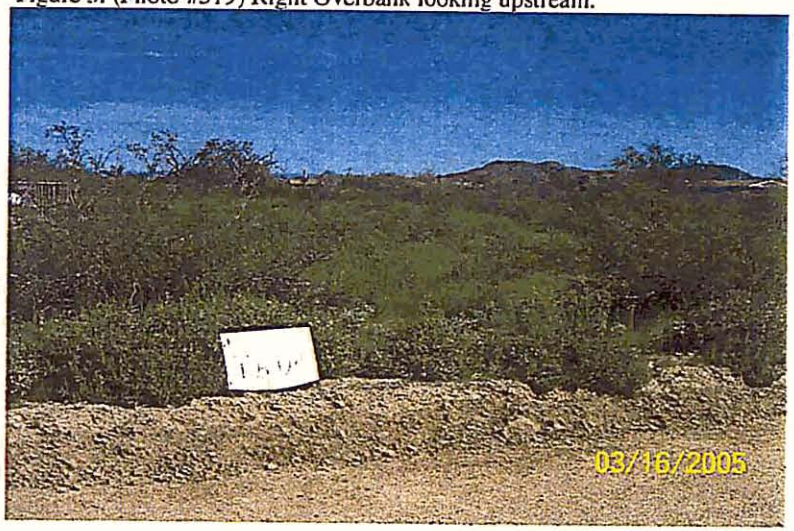
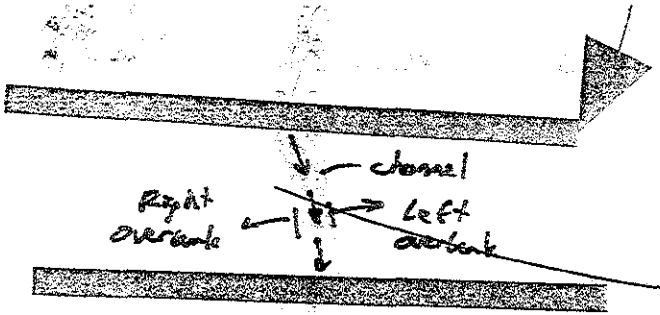


Figure 3. (Photo #519) Right Overbank looking upstream.





7E-TRIB-20

Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/24/2005

Project: Wittmann ADMSU
Stream: Wash 7 East Tributary
Location: Reach - 7E Trib - 21 (Between Montgomery Rd. and just north of White Wing Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.002	
	Minor		.005-.015			0.006
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.044**	**0.039**

Figure E-1
(7E Trib - 21)

Figure 1. (Photo #520) Channel looking downstream.

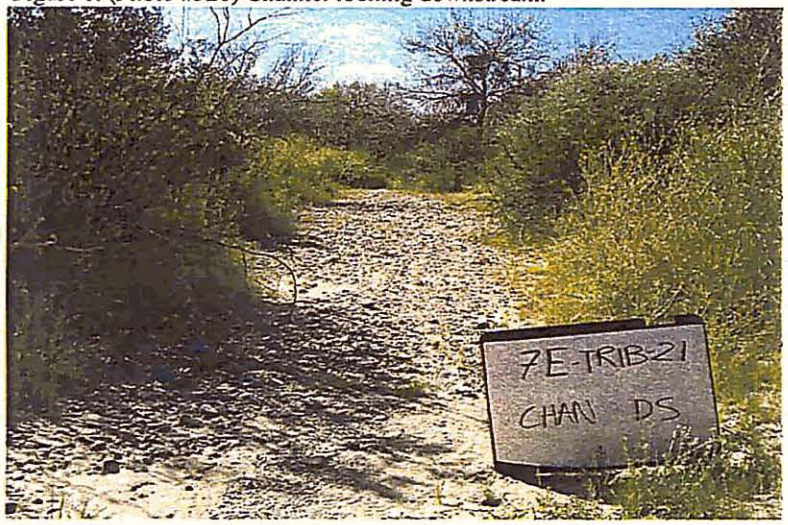


Figure 2. (Photo #521) Left Overbank looking upstream.

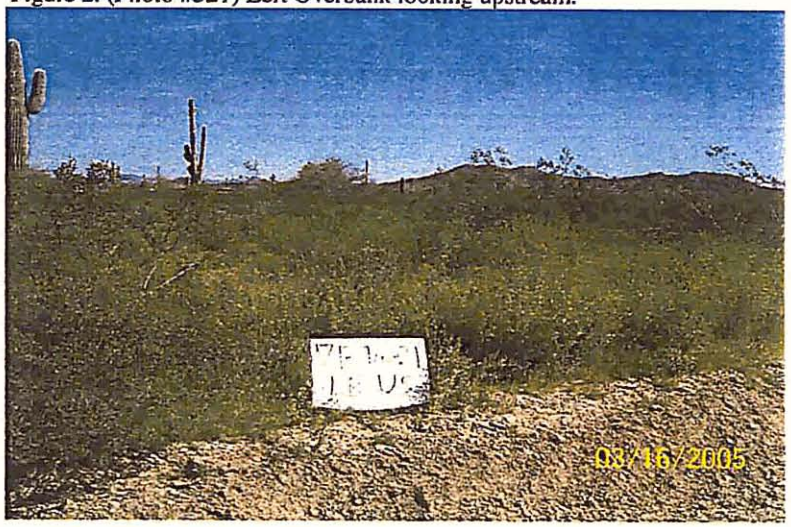
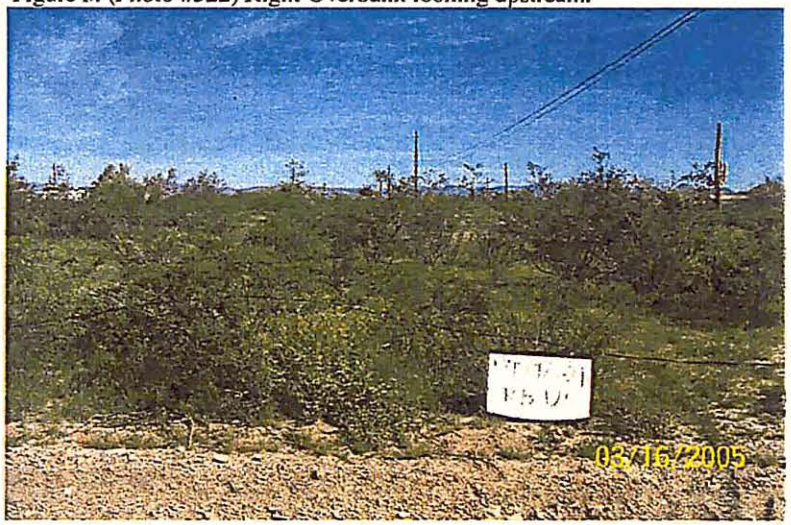
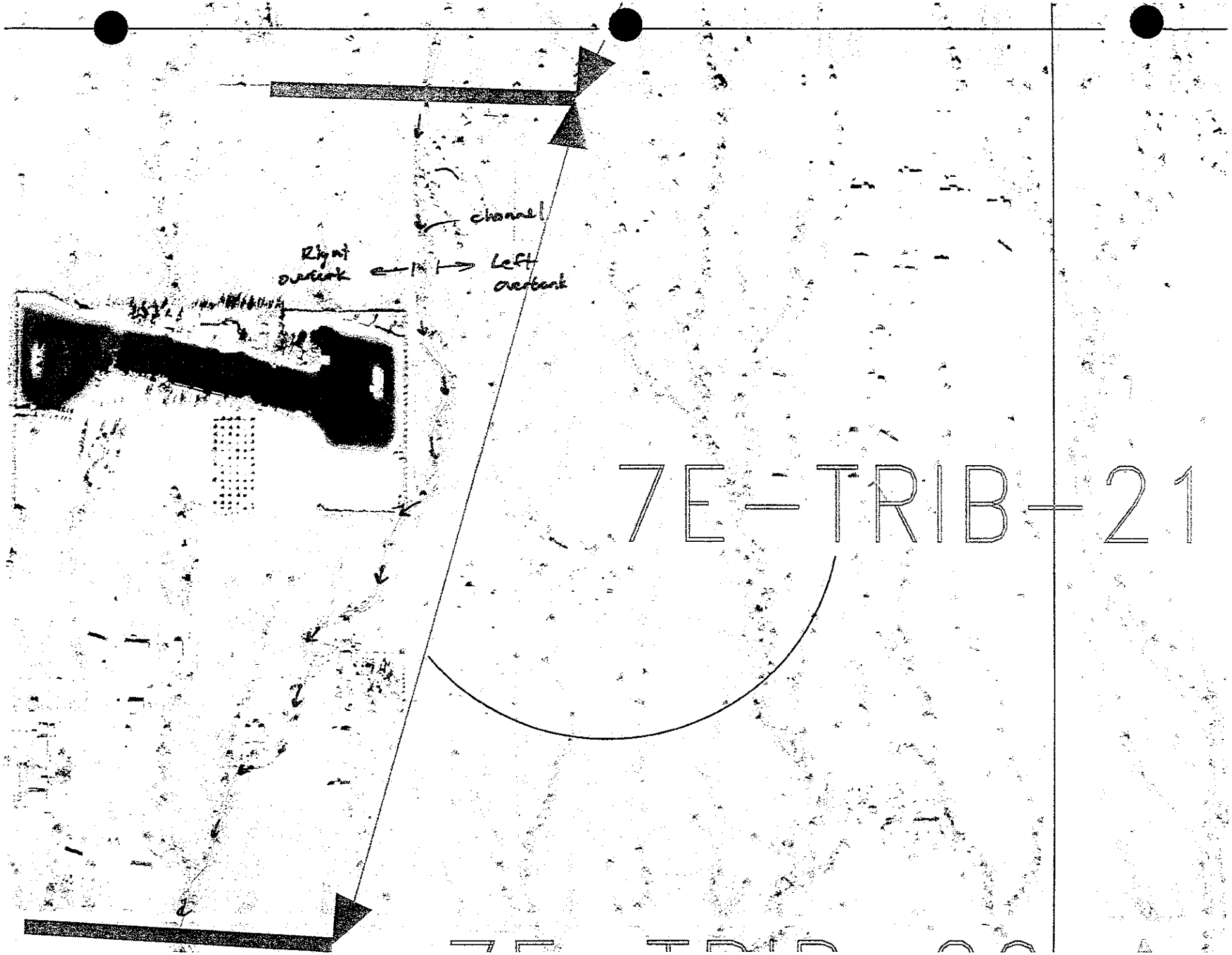


Figure 3. (Photo #522) Right Overbank looking upstream.





7E-TRIB-21

Table E-1

BY JCS DATE 3/17/2005
CHECK GLA DATE 3/24/2005

Project: Wittmann ADMSU
Stream: Wash 7 East Tributary
Location: Reach - 7E Trib - 22 (Between just north of White Wing Rd. and Dove Valley Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.000	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.045**	**0.035**

Figure E-1
(7E Trib - 22)

Figure 1. (Photo #523) Channel looking downstream.

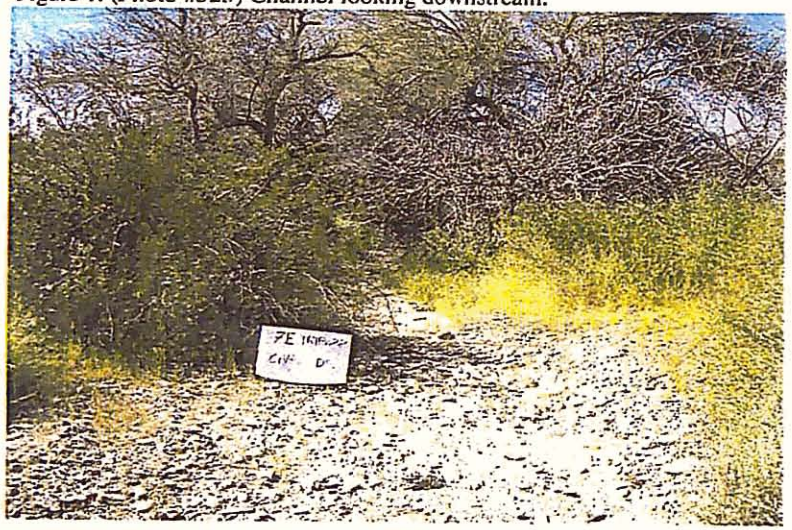


Figure 2. (Photo #524) Left Overbank looking upstream.

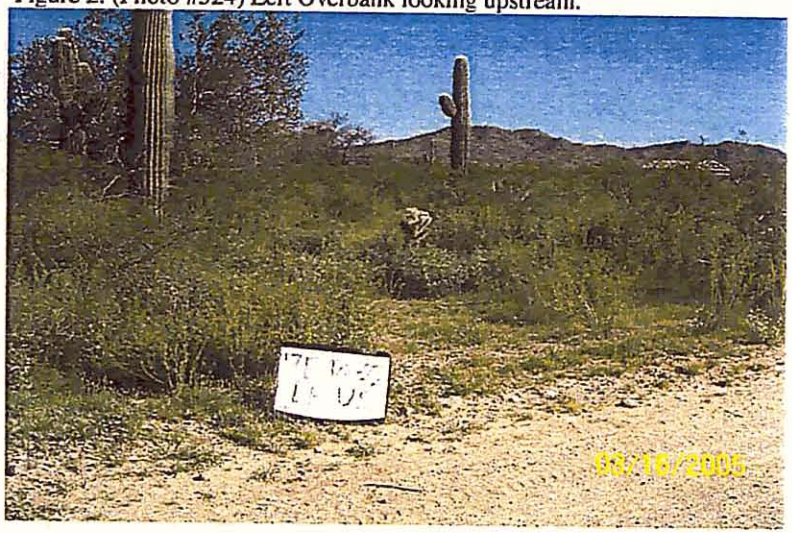
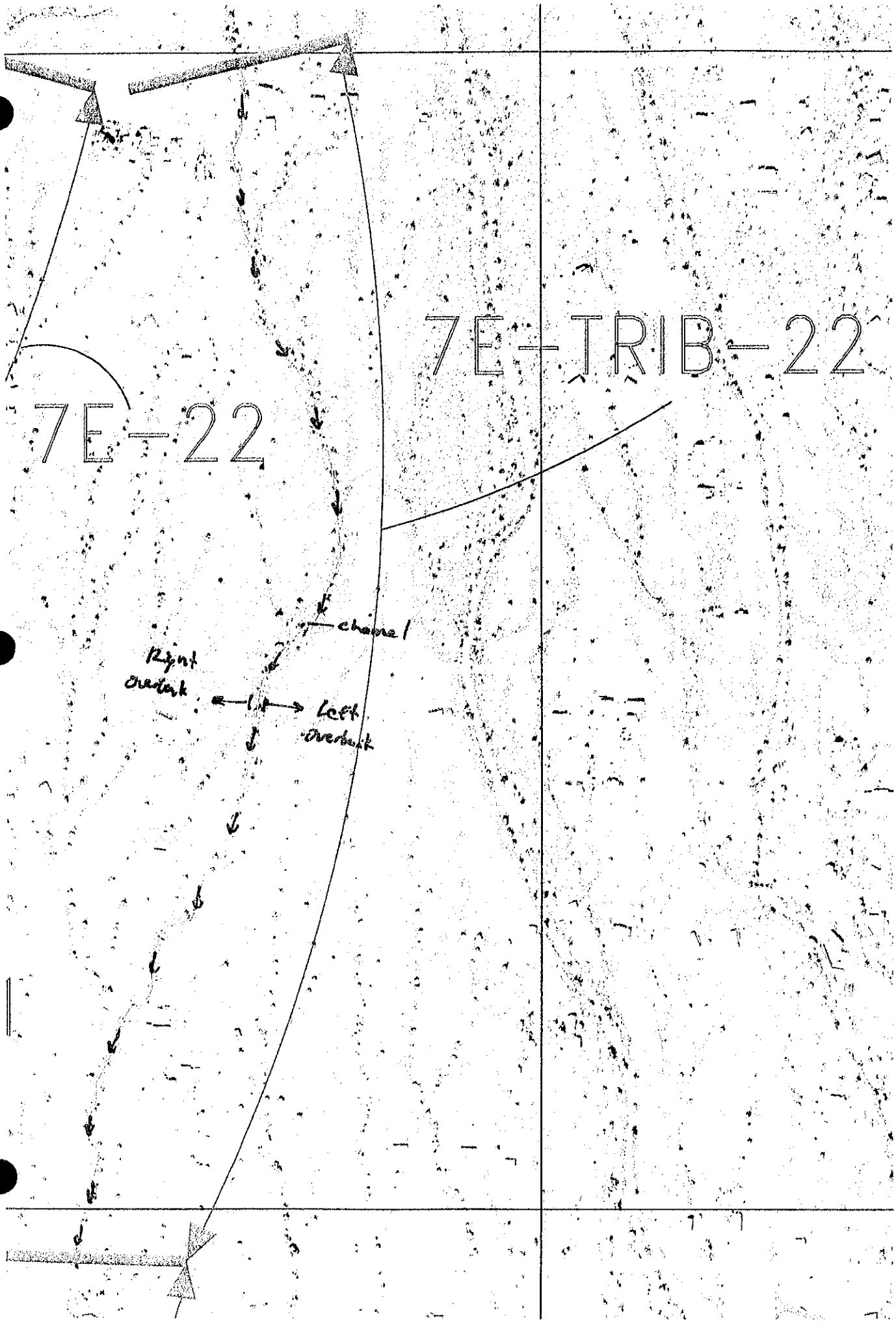


Figure 3. (Photo #525) Right Overbank looking downstream.


7E-22
7E-TRIB-22
channel
Right overbank
Left overbank

E.1.4 Washes South of CAP Canal and West of Wash 5 East.

Iona West Wash

Iona East Wash

Wash 2 West

Wash 1 West

Wash 1 East

Wash 2 East

Wash3 East

Wash 4 East

Iona West Wash

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/10/2005

Project: Wittmann ADMSU
Stream: Iona Wash West
Location: Reach - Iona West- 1 (Between Norwich Dr. alignment and Pinnacle Peak Rd.)

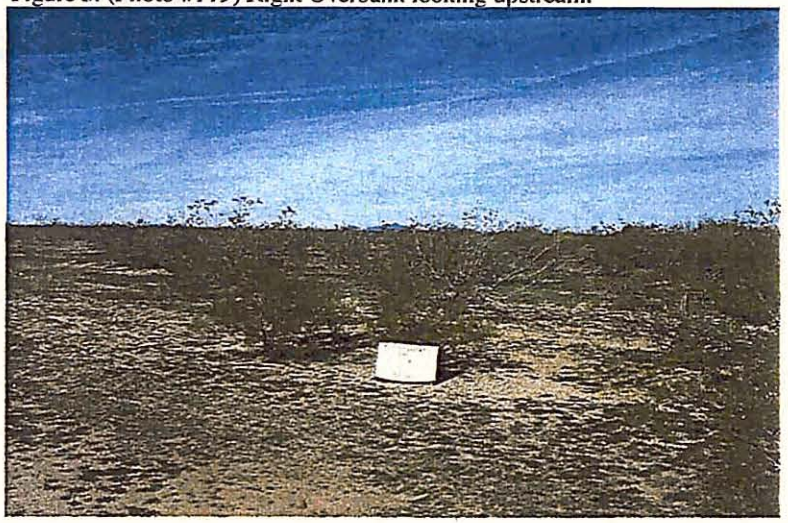
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.003	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		
	Medium		.010-.025		0.018	0.011
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.003	0.003	0.003
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.049**	**0.039**

Figure E-1
(Iona West - 1)

Figure 1. (Photo #120) Channel looking upstream.

Figure 2. (Photo #121) Left Overbank looking upstream.

Figure 3. (Photo #119) Right Overbank looking upstream.



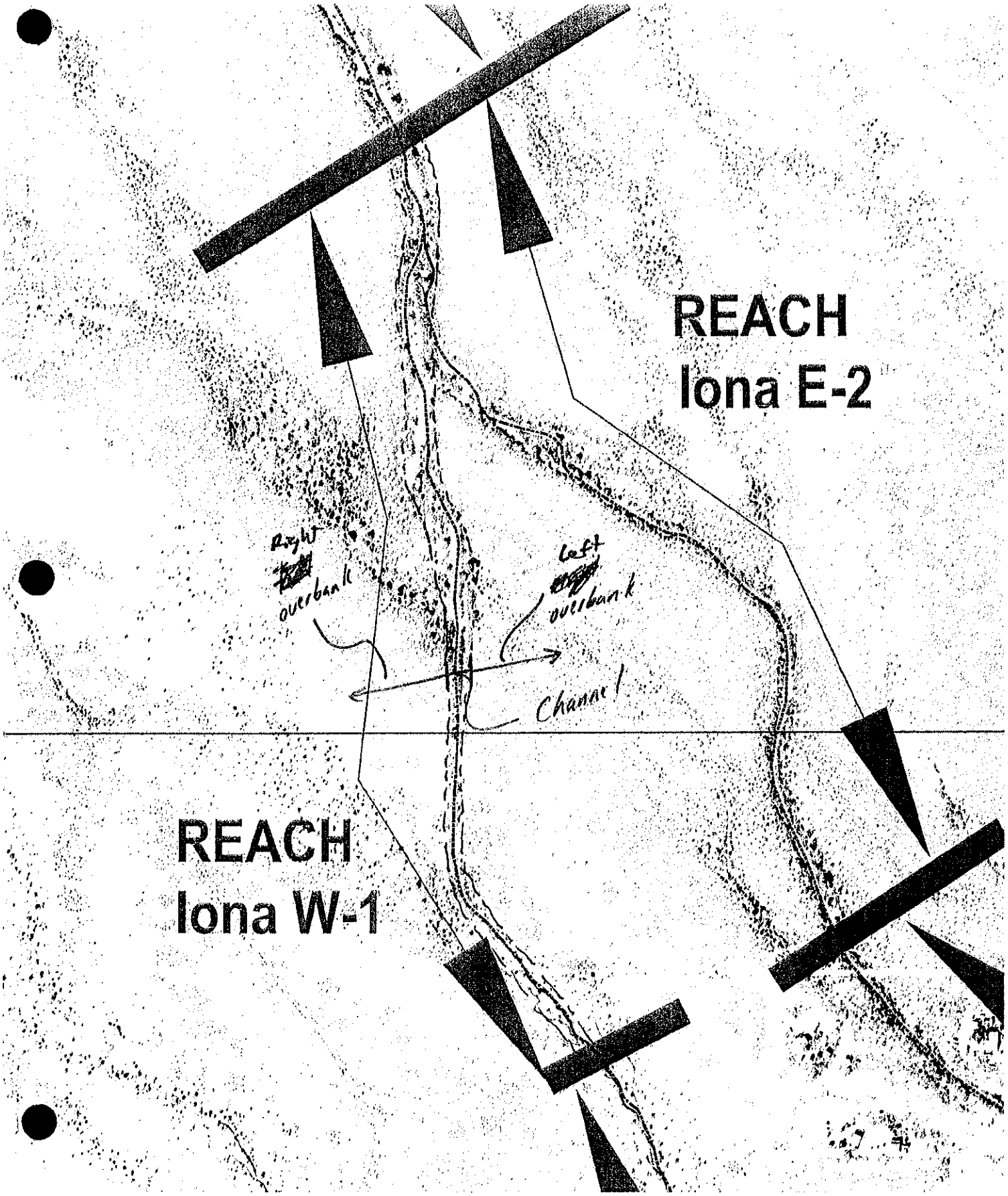

REACH
Iona E-2
Right
overbank
Left
overbank
Channel
REACH
Iona W-1

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/10/2005

Project: Wittmann ADMSU
Stream: Iona Wash West
Location: Reach - Iona West- 2 (Between Pinnacle Peak Rd. and just south of Williams Dr.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.003	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.001
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.013	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.041**	**0.034**

Figure E-1
(Iona West - 2)

Figure 1. (Photo #123) Channel looking upstream.

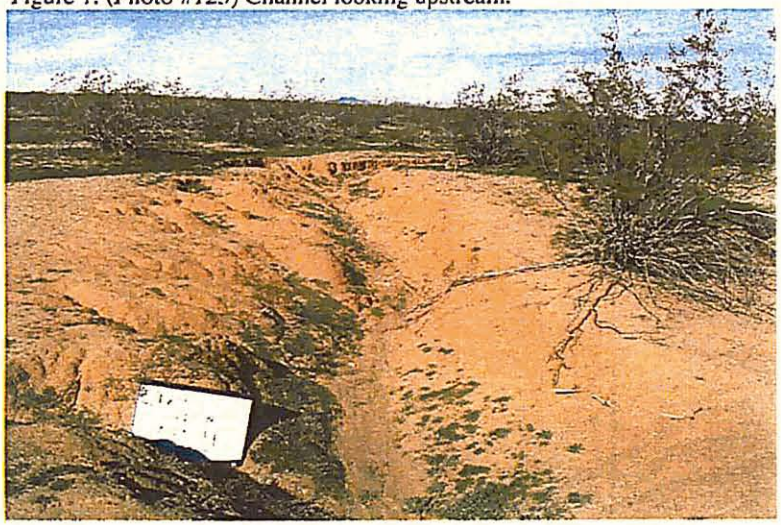


Figure 2. (Photo #122) Right Overbank looking upstream.

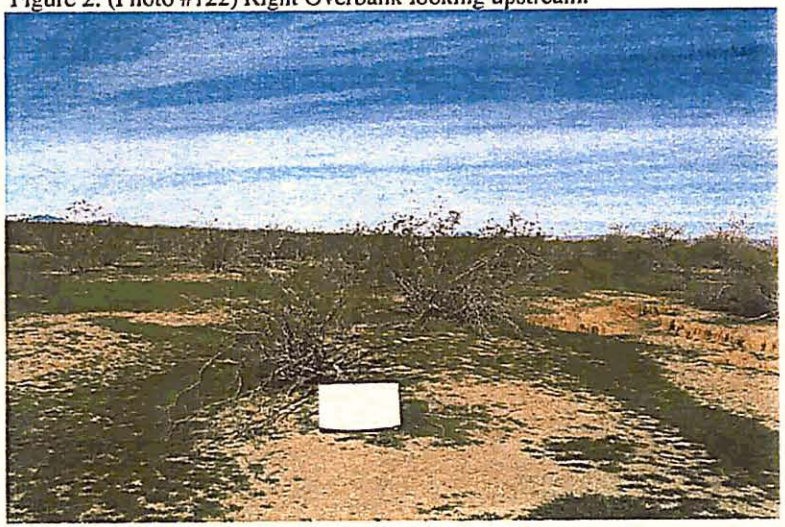
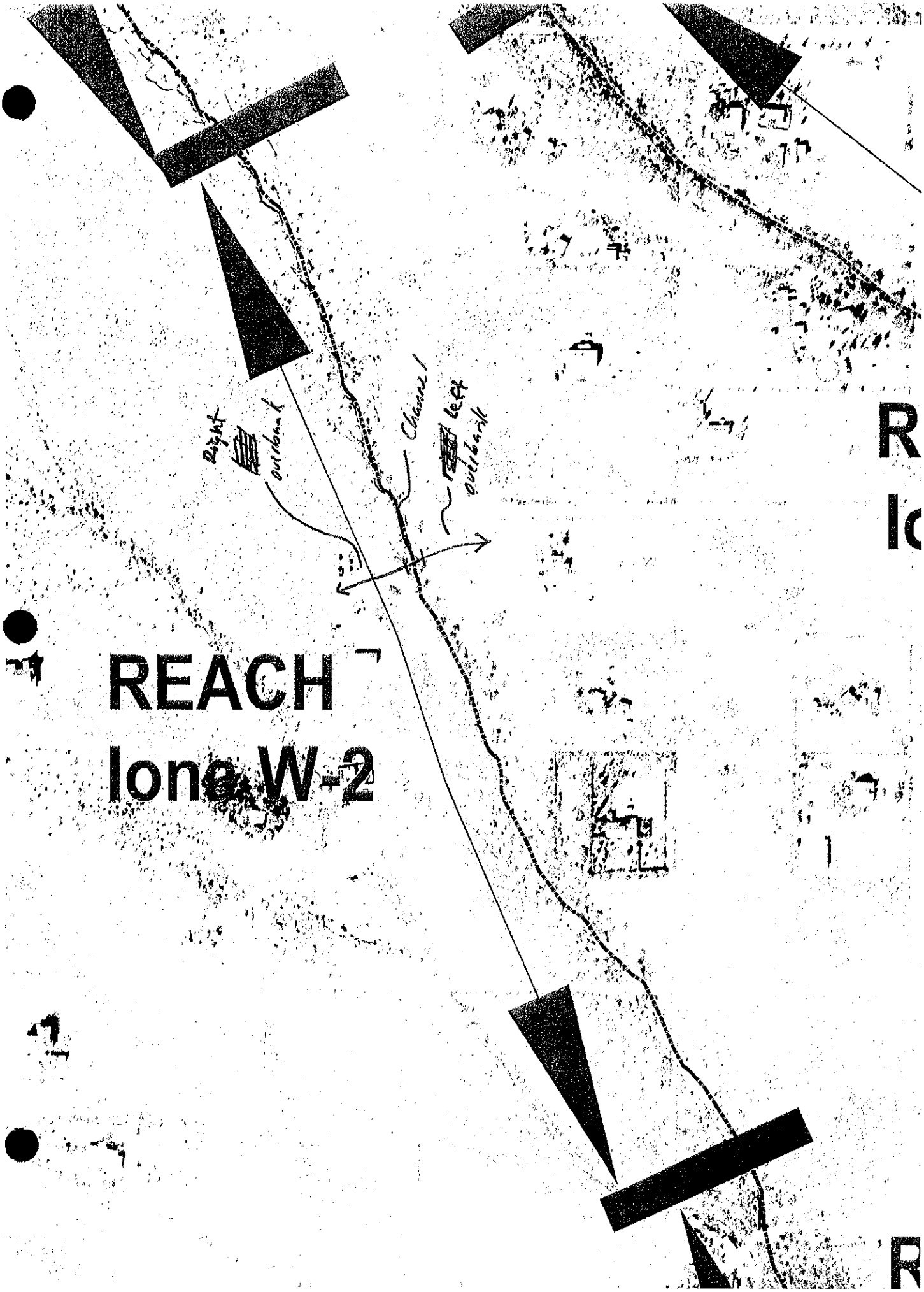


Figure 3. (Photo #124) Left Overbank looking upstream.



REACH
Iona W-2

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/10/2005

Project: Wittmann ADMSU
Stream: Iona Wash West
Location: Reach - Iona West - 3 (Between just south of Williams Dr. and just north of Deer Valley Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.003	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.003	0.000	
	Minor		.005-.015			0.005
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025			
	Large		.025-.050		0.045	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0		0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.073**	**0.038**

Figure E-1
(Iona West - 3)

Figure 1. (Photo #126) Channel looking downstream.

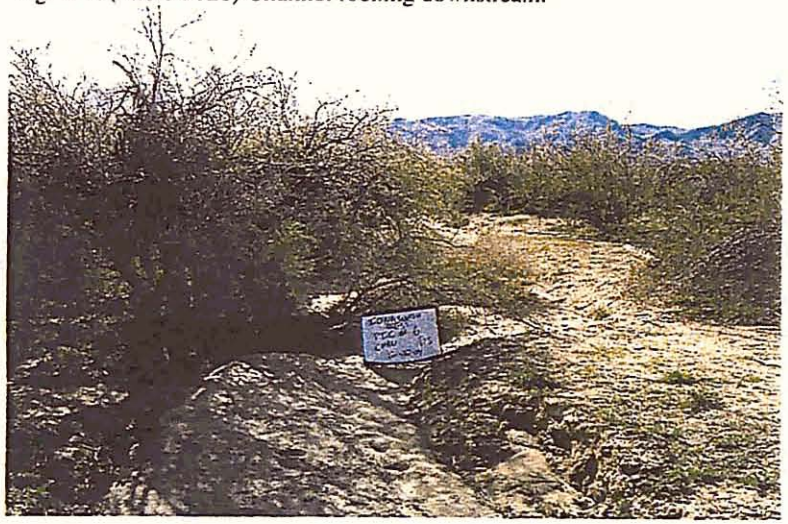


Figure 2. (Photo #125) Right Overbank looking upstream.

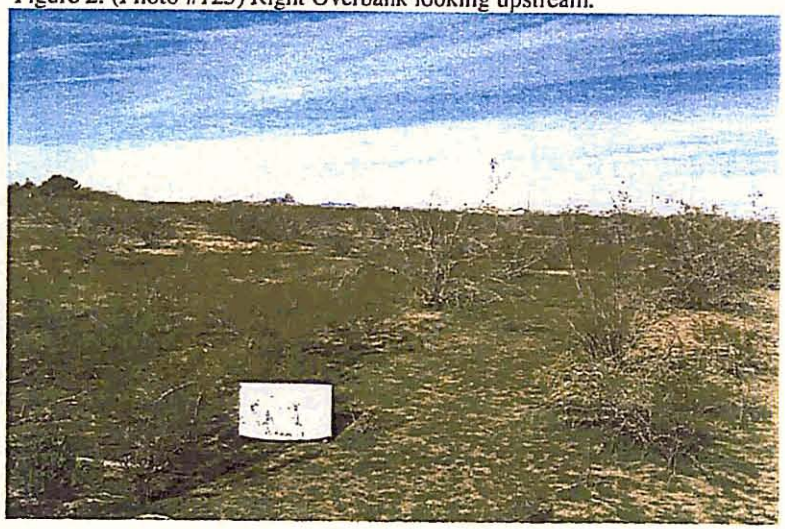
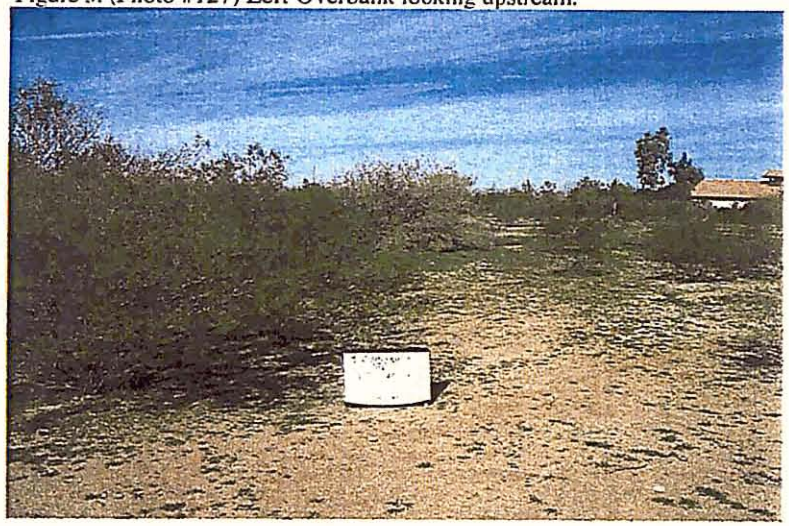


Figure 3. (Photo #127) Left Overbank looking upstream.



REACH
Iona W-3

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/10/2005

Project: Wittmann ADMSU
Stream: Iona Wash West
Location: Reach - Iona West - 4 (Between just north of Deer Valley Rd. and just north of Lone Cactus Dr.)

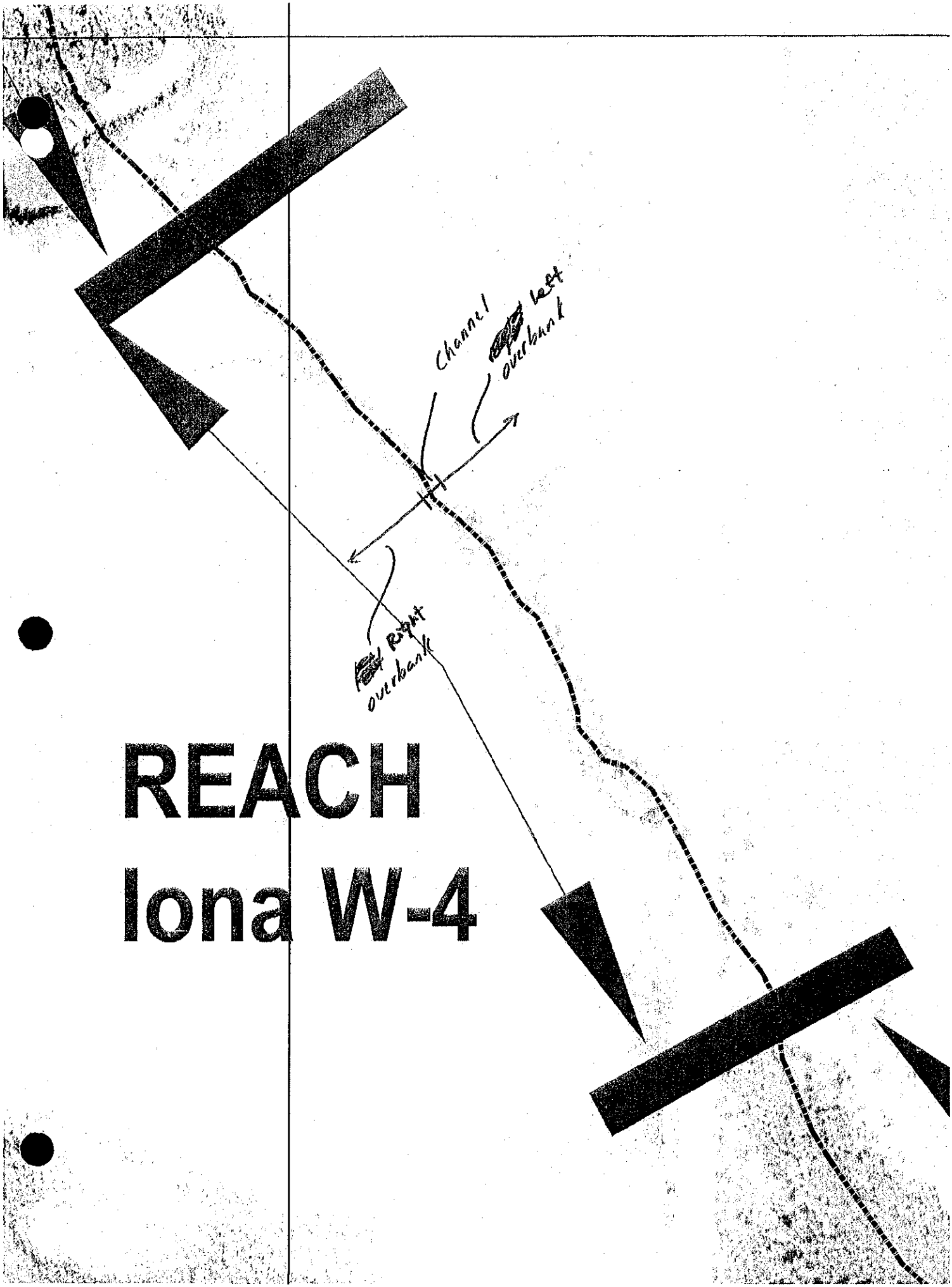
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.042**	**0.033**

Figure E-1
(Iona West - 4)

Figure 1. (Photo #129) Channel looking downstream.

Figure 2. (Photo #128) Right Overbank looking upstream.

Figure 3. (Photo #130) Left Overbank looking downstream.



REACH
Iona W-4

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/10/2005

Project: Wittmann ADMSU
Stream: Iona Wash West
Location: Reach - Iona West- 5 (Between just north of Lone Cactus Dr. and just north of Rose Garden Ln. alignment)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010		0.015
	Large		.025-.050		0.046	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.073**	**0.040**

Figure E-1
(Iona West - 5)

Figure 1. (Photo #132) Channel looking upstream.

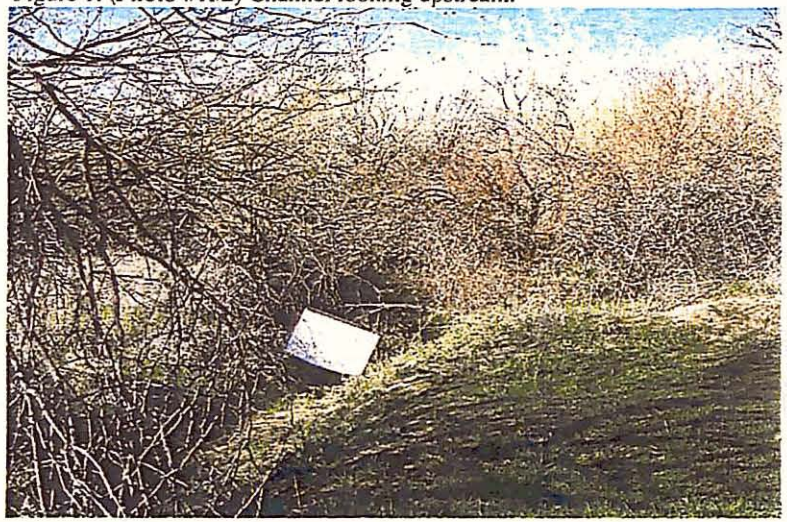


Figure 2. (Photo #131) Right Overbank looking upstream.

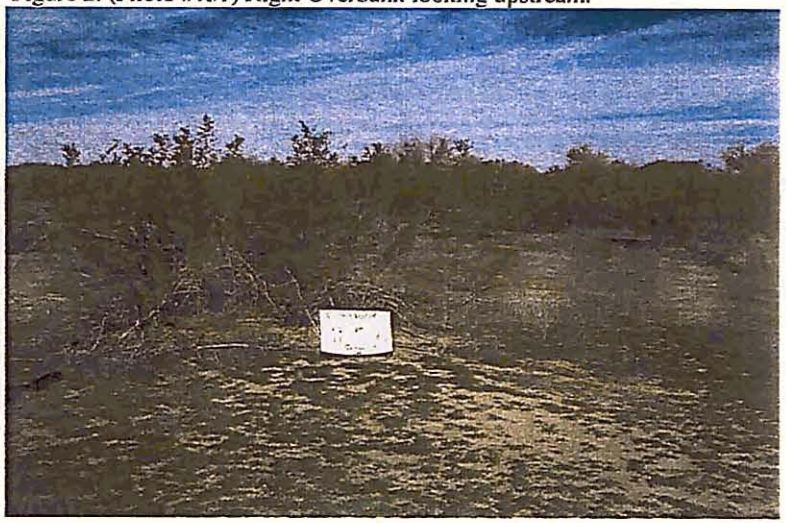
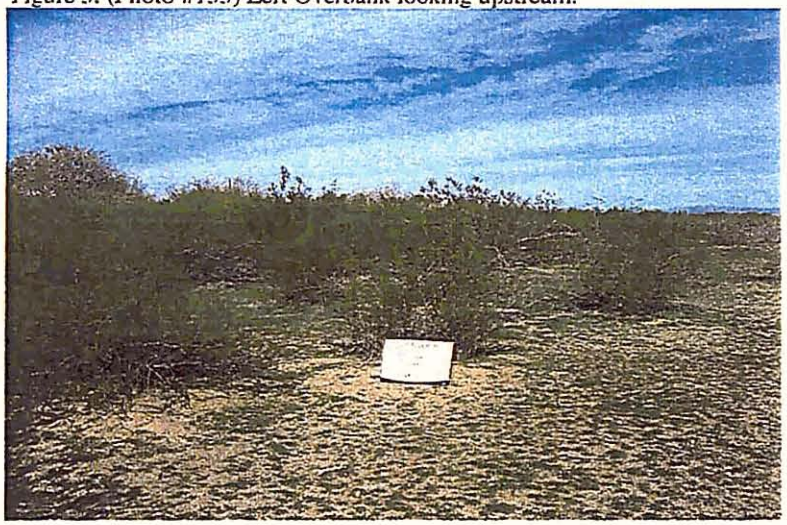
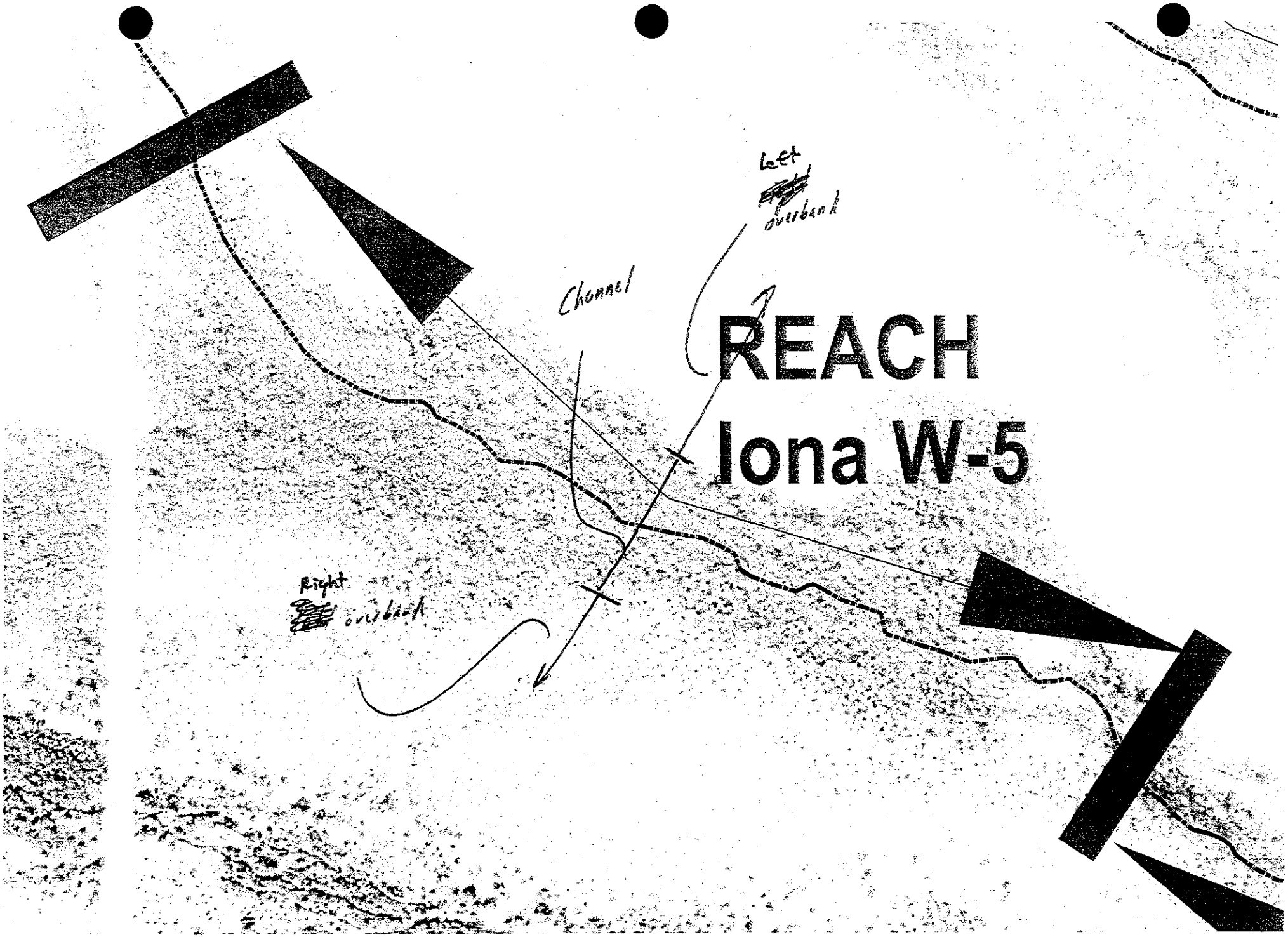


Figure 3. (Photo #133) Left Overbank looking upstream.





REACH
Iona W-5

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/10/2005

Project: Wittmann ADMSU
Stream: Iona Wash West
Location: Reach - Iona West- 6 (Just north of Rose Garden Ln. alignment and just south of Rose garden Ln. alignment)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.018		0.015
	Large		.025-.050		0.028	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.002	
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.043**	**0.055**	**0.040**

Figure E-1
(Iona West - 6)

Figure 1. (Photo #135) Channel looking downstream.

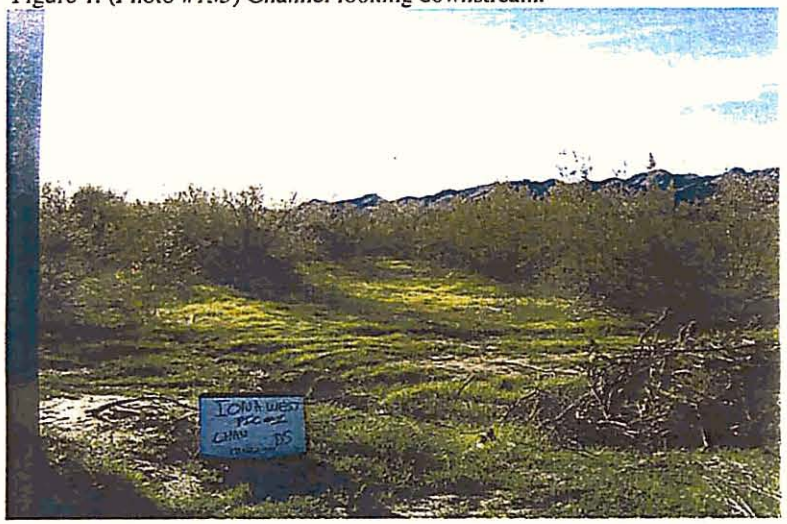


Figure 2. (Photo #134) Right Overbank looking upstream.

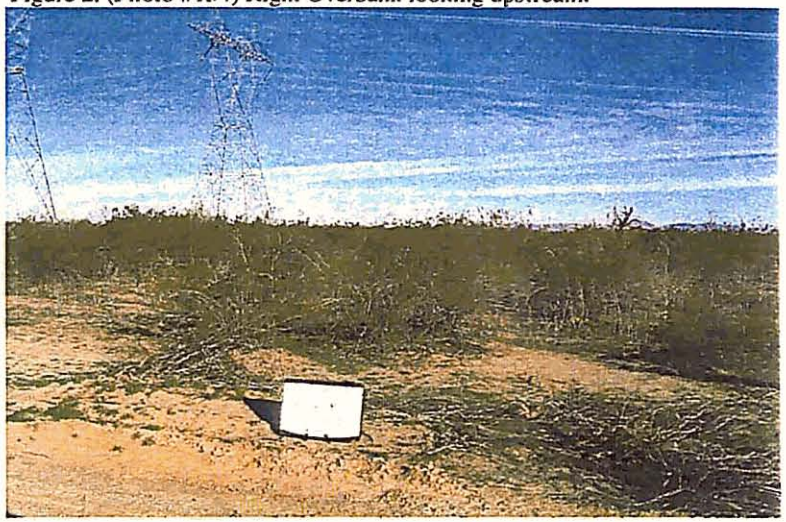
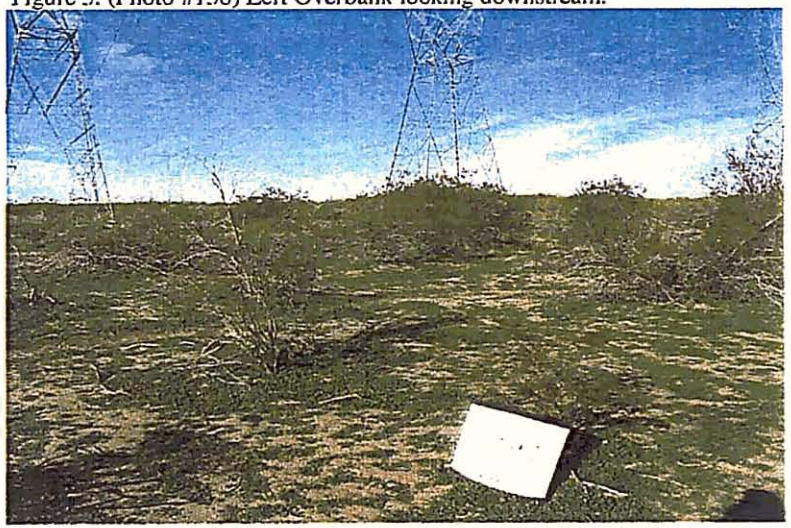
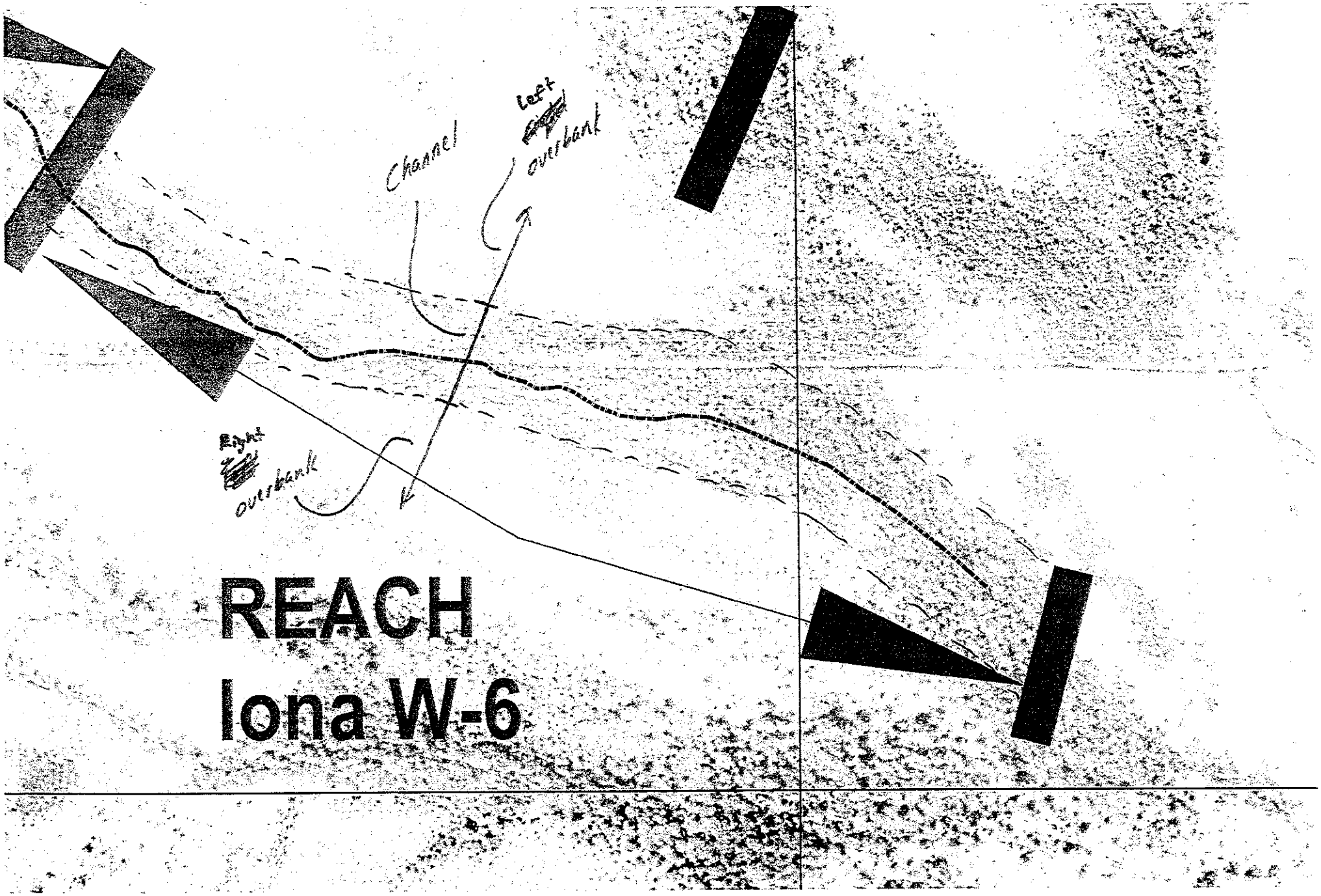


Figure 3. (Photo #136) Left Overbank looking downstream.





REACH
Iona W-6

Iona East Wash

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona Wash East
Location: Reach - Iona East - 1 (Between Norwich Dr. alignment and south of CAP Canal)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.028	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.016	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.044**	**0.033**

Figure E-1
(Iona East - 1)

Figure 1. (Photo #105) Channel looking downstream.

Figure 2. (Photo #106) Left Overbank looking upstream.

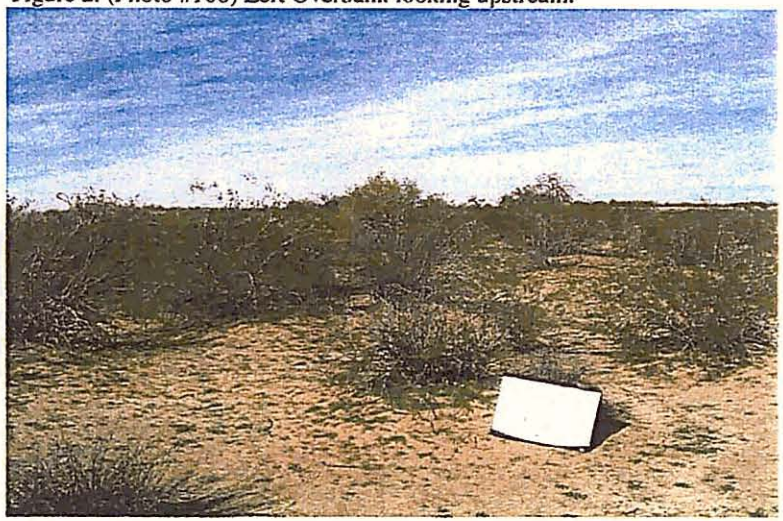
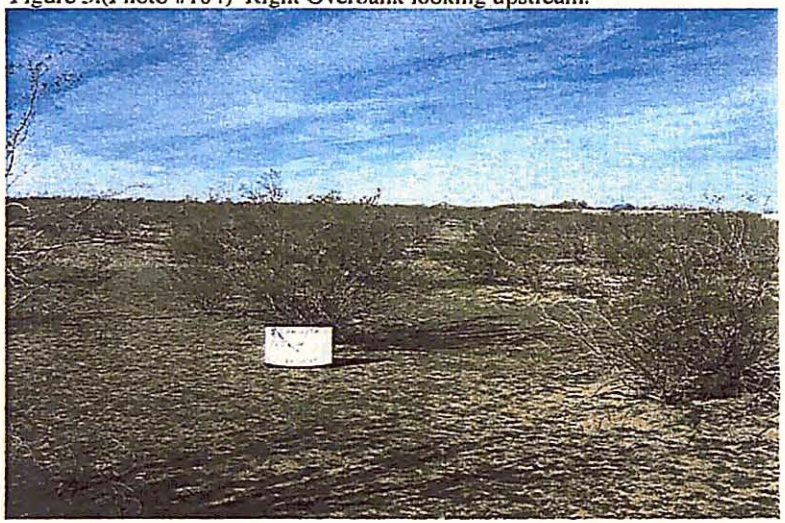


Figure 3.(Photo #104) Right Overbank looking upstream.



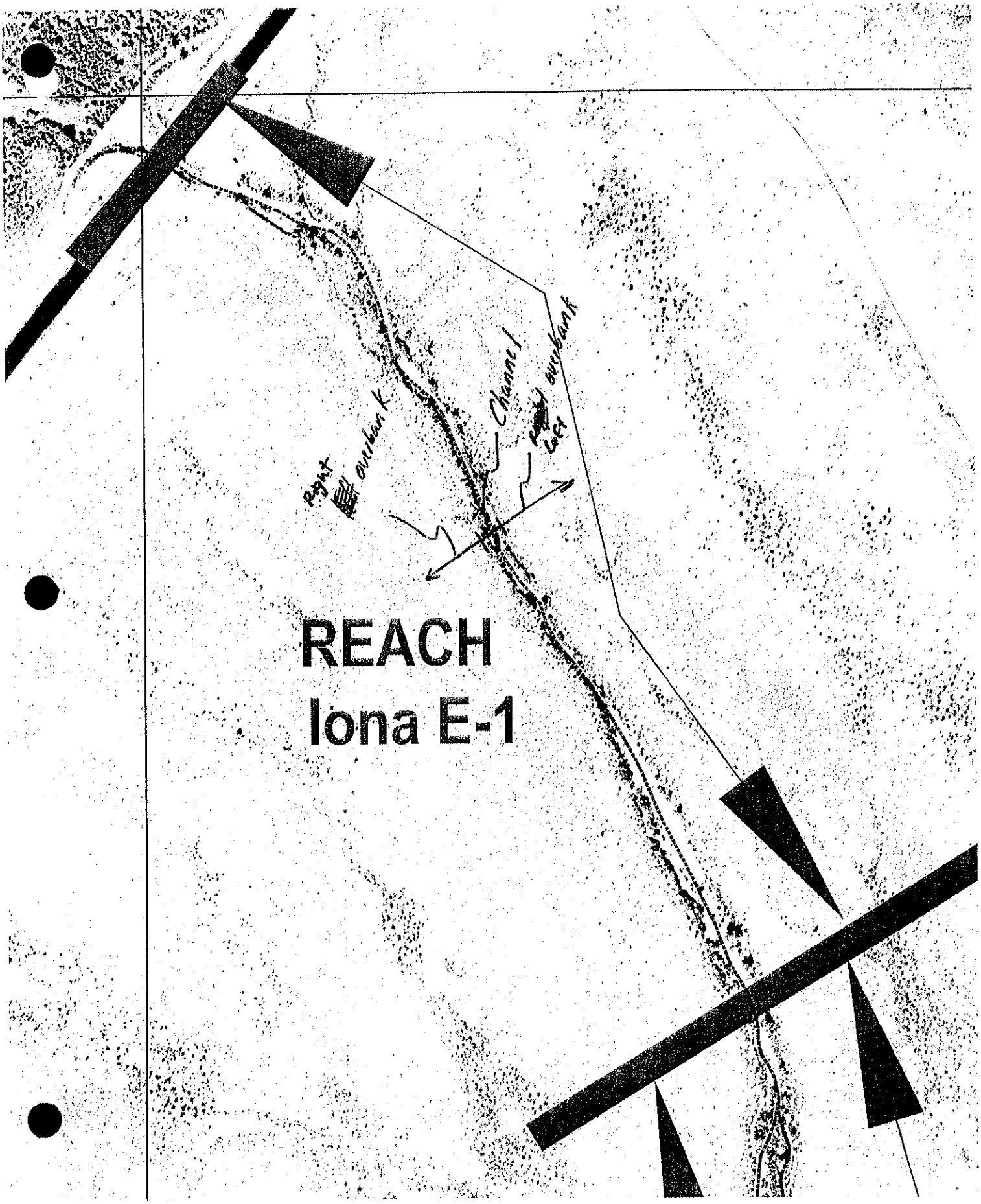

Right overbank
Channel
Left overbank
REACH
Iona E-1

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona Wash East
Location: Reach - Iona East - 2 (Between Norwich Dr. alignment and Pinnacle Peak Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.016	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0		0.000	0.000
	Occ. Alt.		.001-.005	0.003		
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.037**	**0.046**	**0.034**

Figure E-1
(Iona East - 2)

Figure 1. (Photo #108) Channel looking upstream.

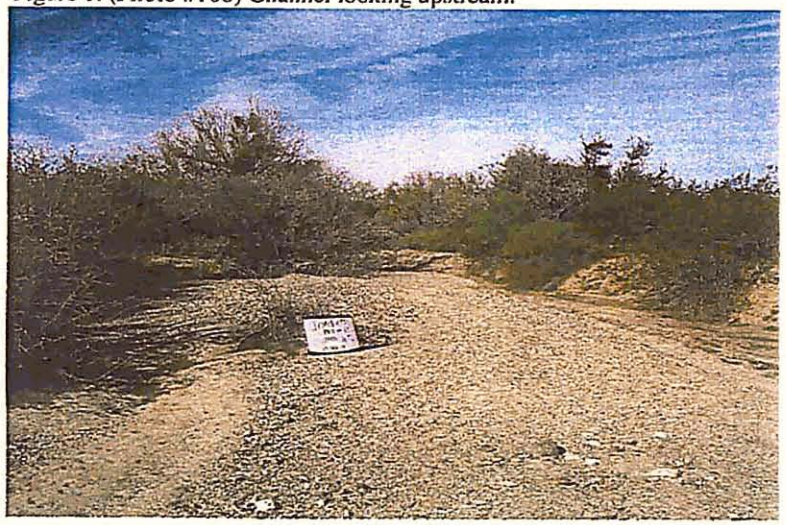
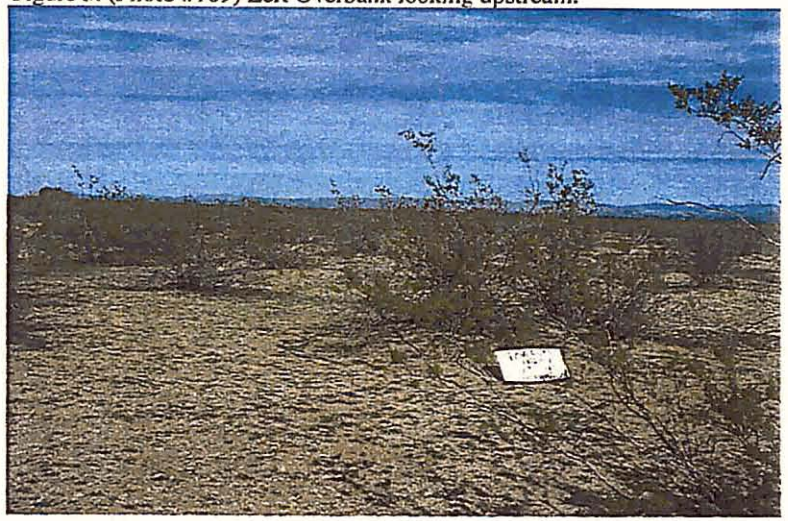


Figure 2. (Photo #107) Right Overbank looking downstream.

Figure 3. (Photo #109) Left Overbank looking upstream.



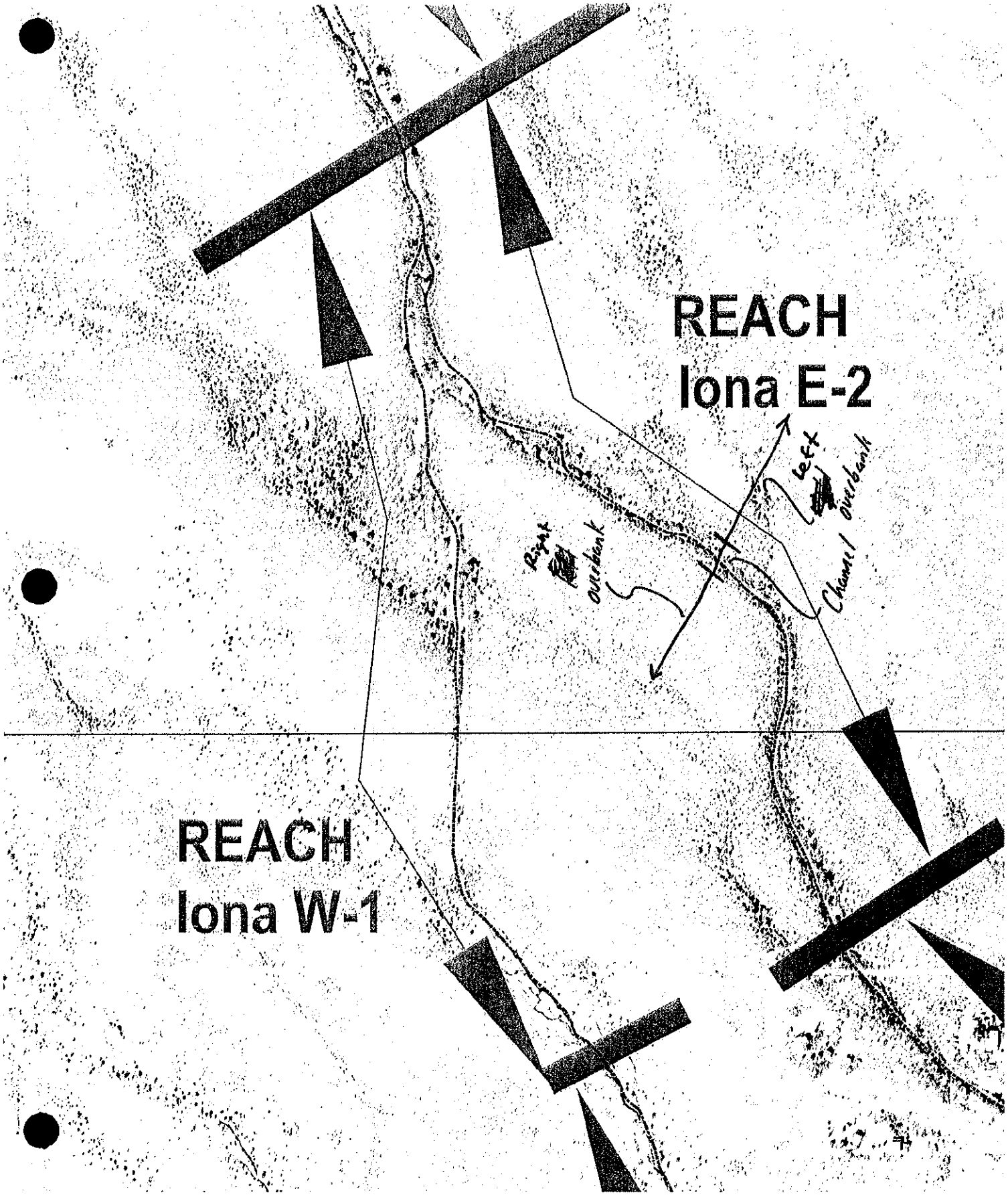

REACH
Iona E-2
Left
Overbank
Channel
Right
Overbank
REACH
Iona W-1

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona Wash East
Location: Reach - Iona East - 3A (Between Pinnacle Peak Rd. and just north of Patrick Ln.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.003	0.000	0.003
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.009		0.009
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	
	Occ. Alt.		.001-.005			0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.037**	**0.043**	**0.039**

Figure E-1
(Iona East - 3A)

Figure 1. (Photo #111) Channel looking upstream.

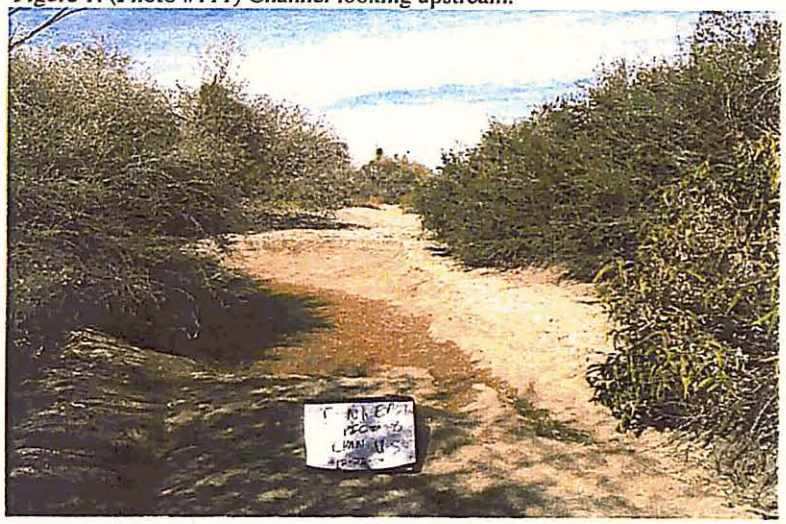


Figure 2. (Photo #112) Right Overbank looking upstream.

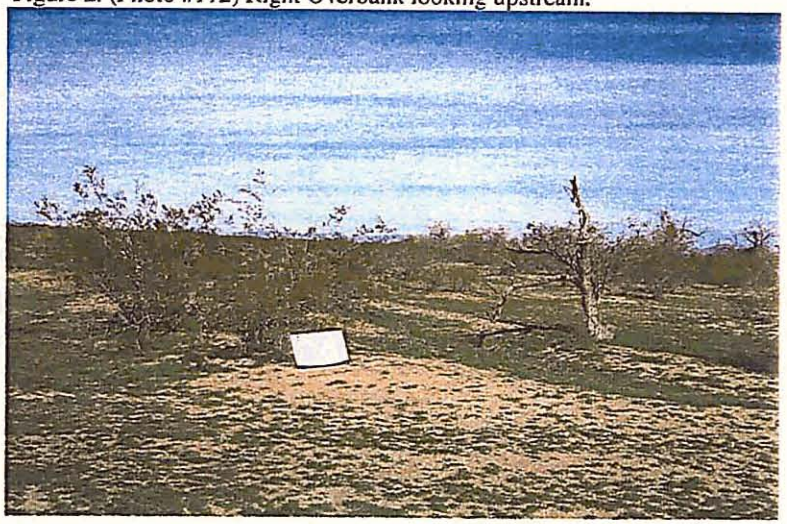


Figure 3. (Photo #110) Left Overbank looking upstream.

Iona E-9A

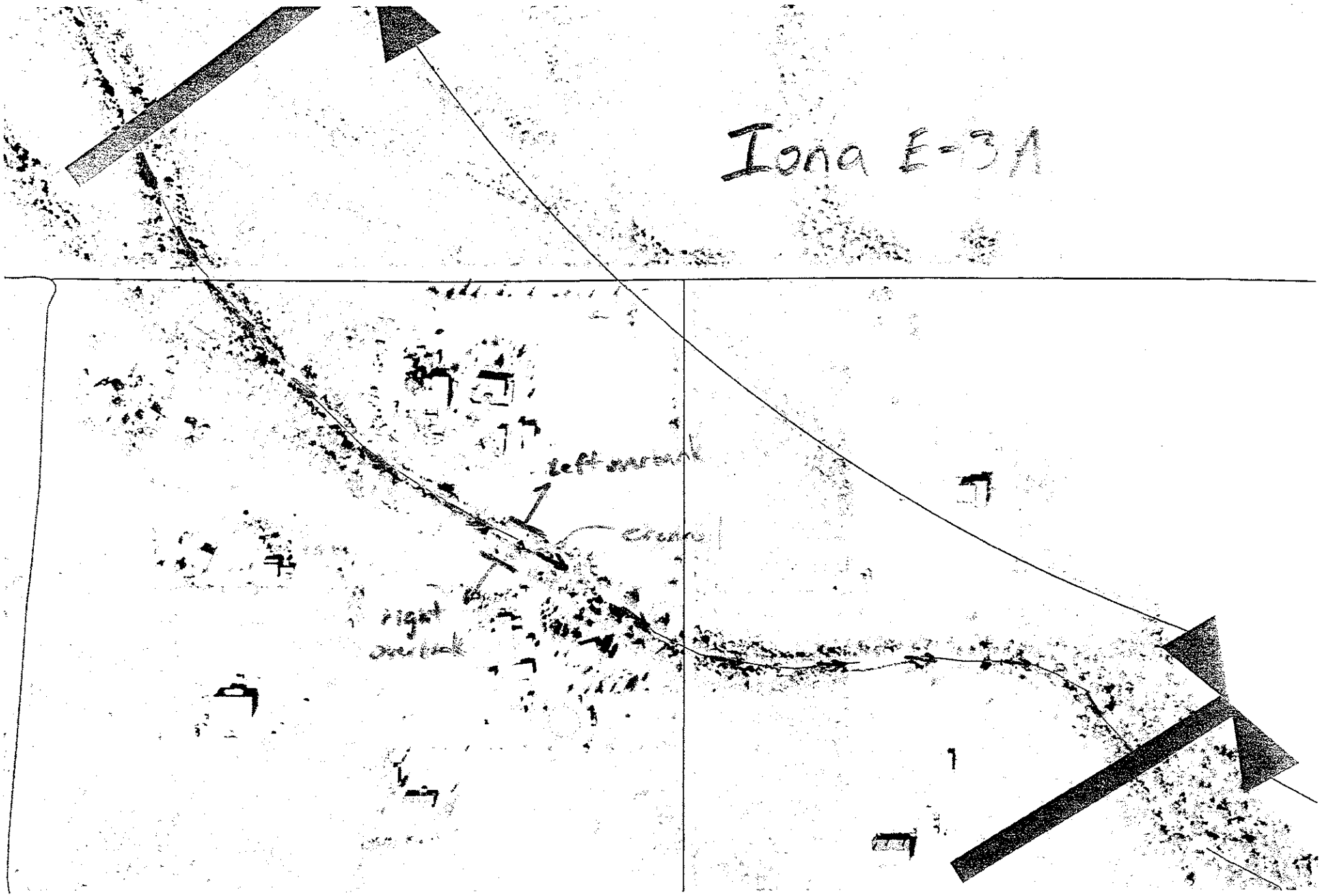


Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona Wash East
Location: Reach - Iona East - 3B (Between just north of Patrick Ln. and just south of Williams Dr.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.003	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.003	0.000	0.003
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.011	0.020	0.011
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.039**	**0.048**	**0.039**

Figure E-1
(Iona East - 3B)

Figure 1. (Photo #114) Channel looking upstream.

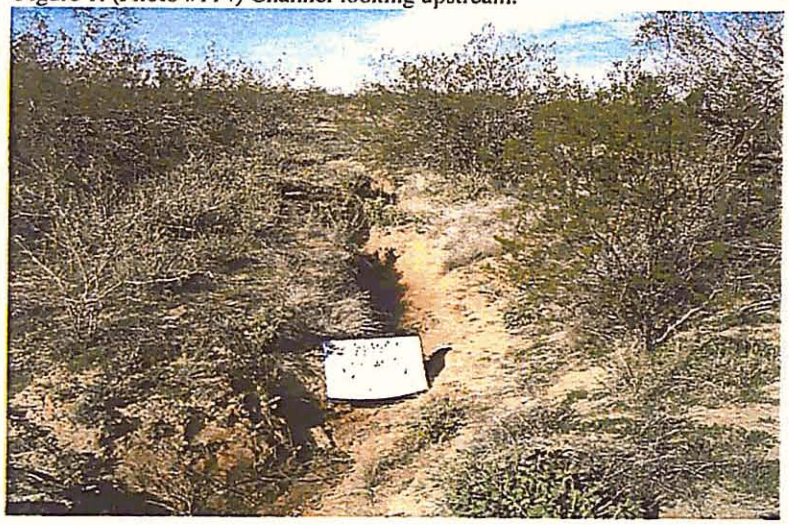


Figure 2. (Photo #113) Right Overbank looking upstream.

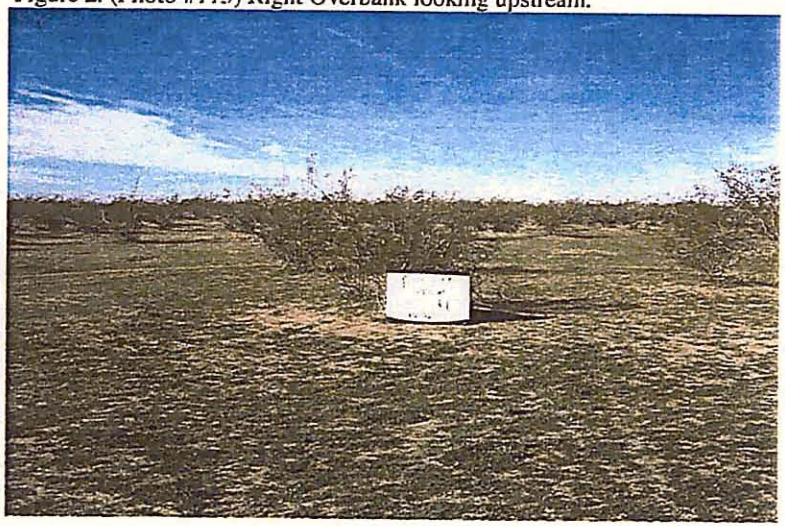
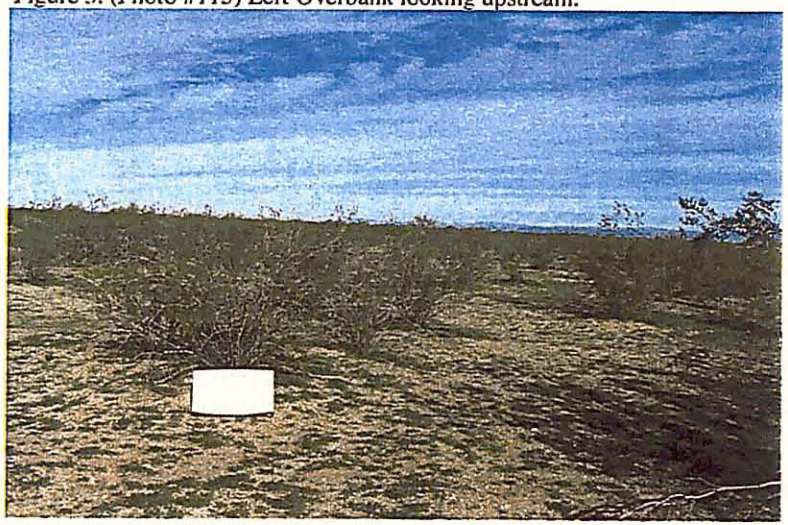


Figure 3. (Photo #115) Left Overbank looking upstream.



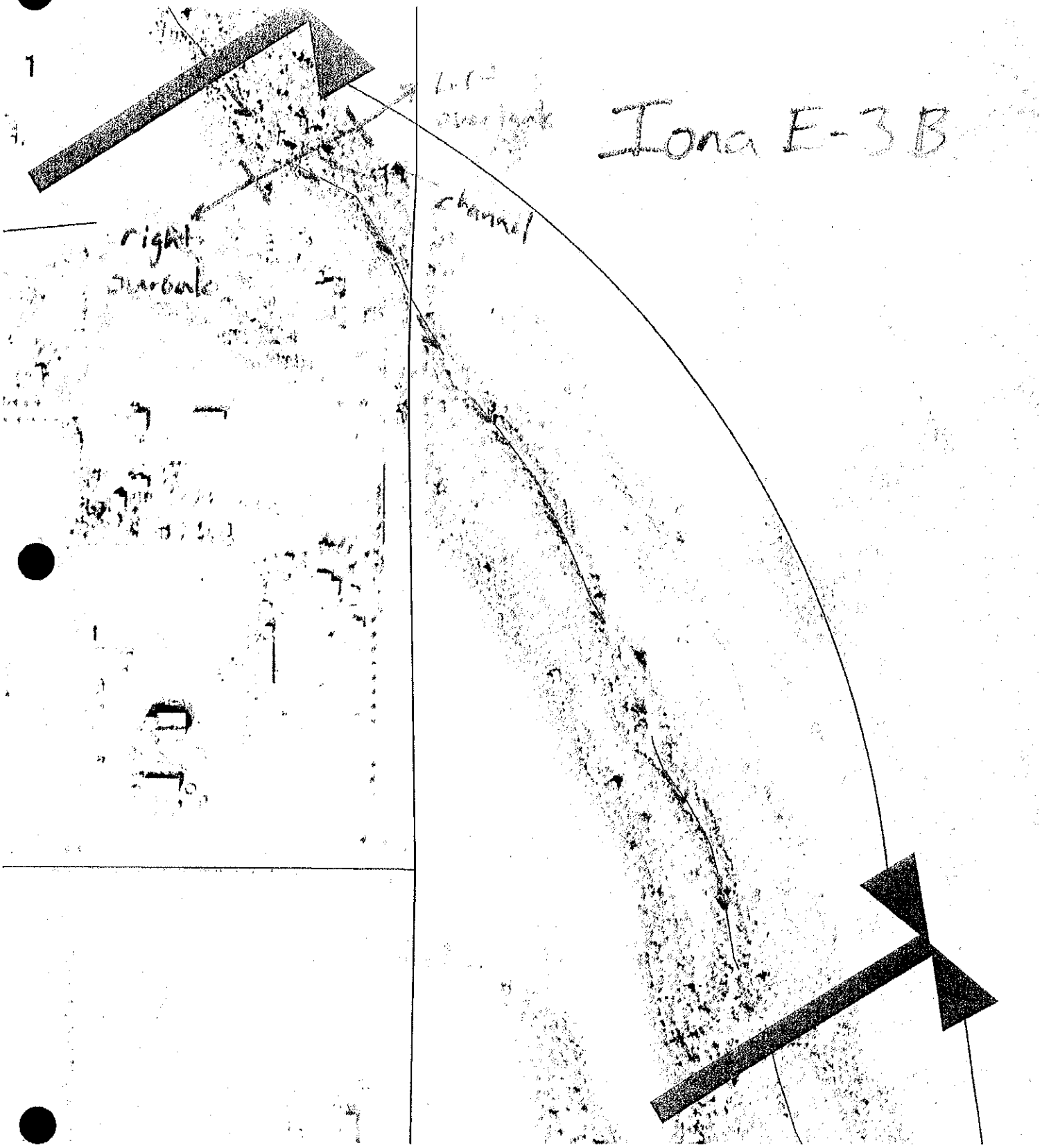

Iona E-3B
channel
right
chute

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona Wash East
Location: Reach - Iona East - 4 (Between Deer Valley Rd. and just south of Williams Dr. alignment)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.026	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.006		0.007
	Medium		.010-.025		0.013	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.032**	**0.039**	**0.033**

FIGURE E-1: Iona East - 4 (n-value photo)

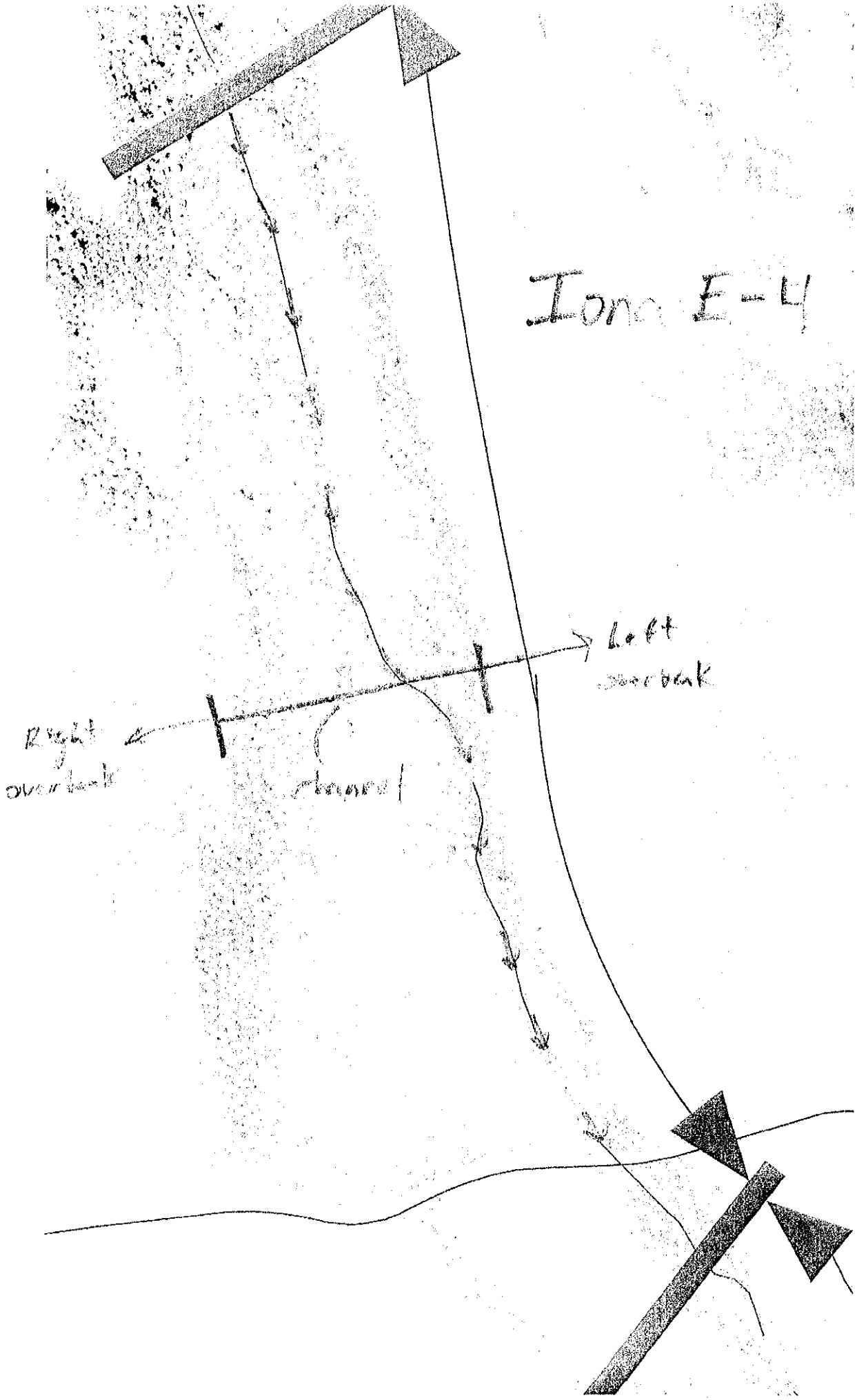

Ion E-4
Left
overbank
Right
overbank
channel

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona Wash East
Location: Reach - Iona East - 5A (Between Deer Valley Rd. and Lone Cactus Dr. alignment)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.006		
	Medium		.010-.025		0.020	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.049**	**0.038**

FIGURE E-1: Iona East - 5a (n-value photo)

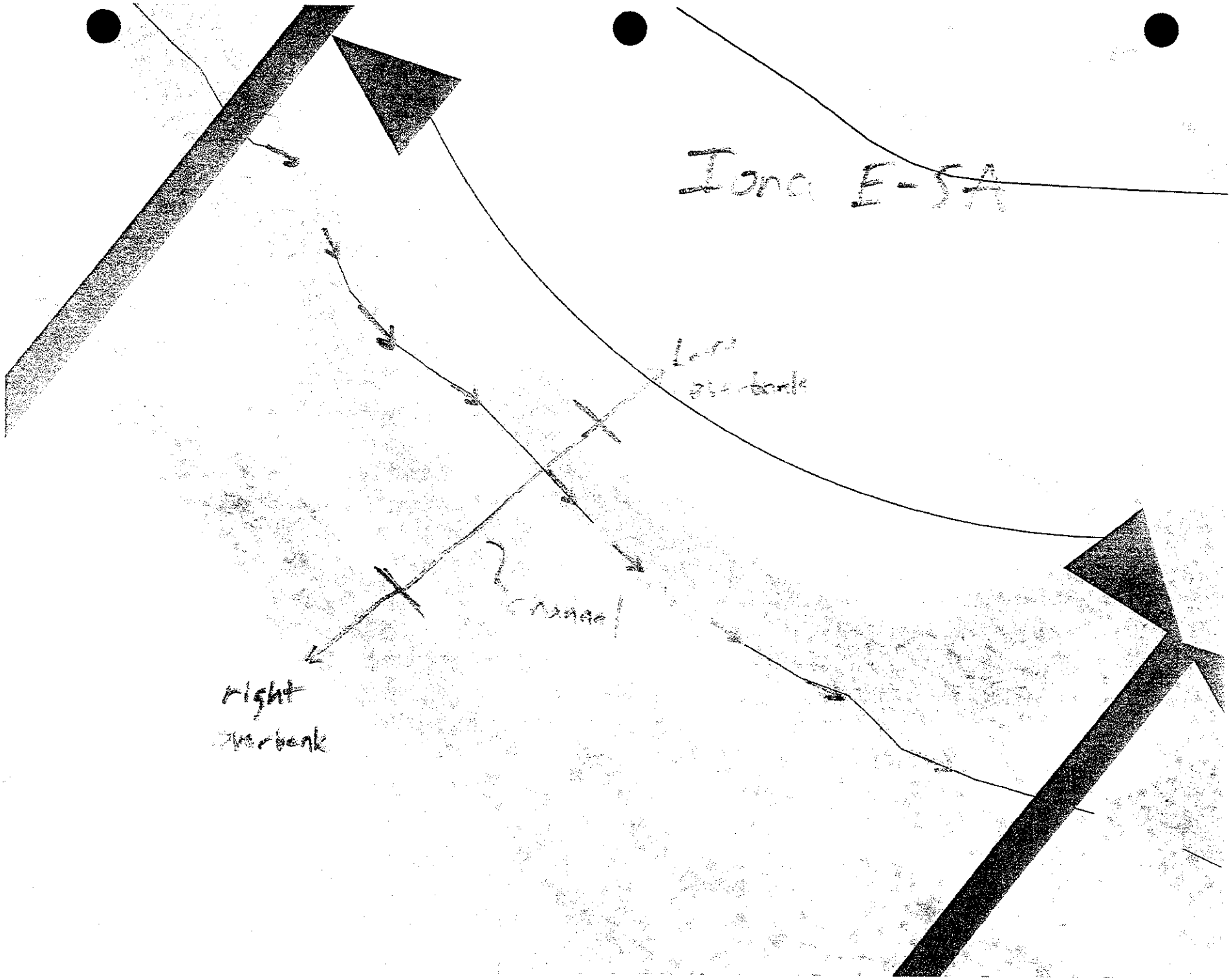

Ions E-SA
left
riverbank
channel
right
riverbank

Table E-1

BY JCS DATE 2/3/2005
CHECK HAA DATE 2/4/2005

Project: Wittmann ADMSU
Stream: Iona Wash East
Location: Reach - Iona East - 5B (Between Lone Cactus Dr. alignment and just north of Rose Garden Ln. alignment)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.021		0.012
	Large		.025-.050		0.025	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.049**	**0.054**	**0.040**

Figure E-1
(Iona East - 5B)

Figure 1. (Photo #117) Channel looking upstream.

Figure 2. (Photo #118) Right Overbank looking upstream.

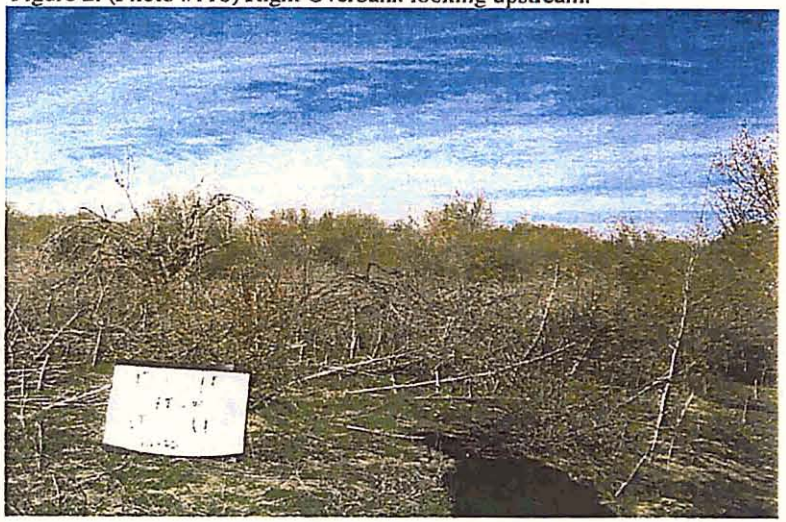
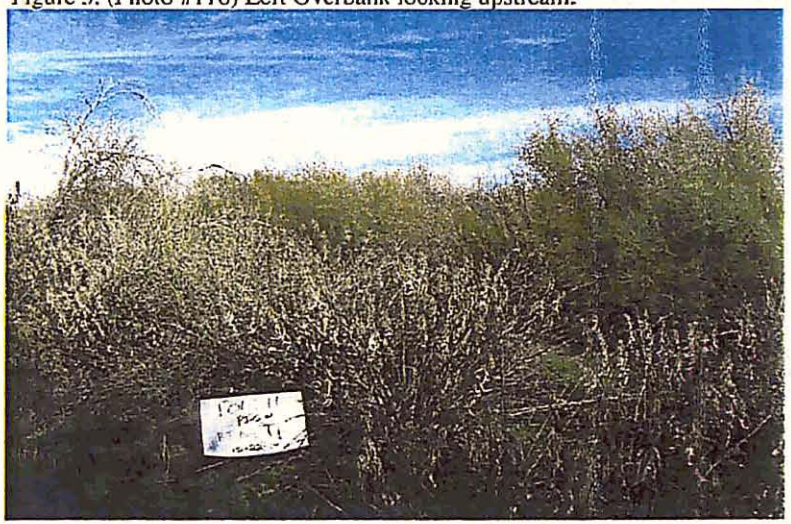
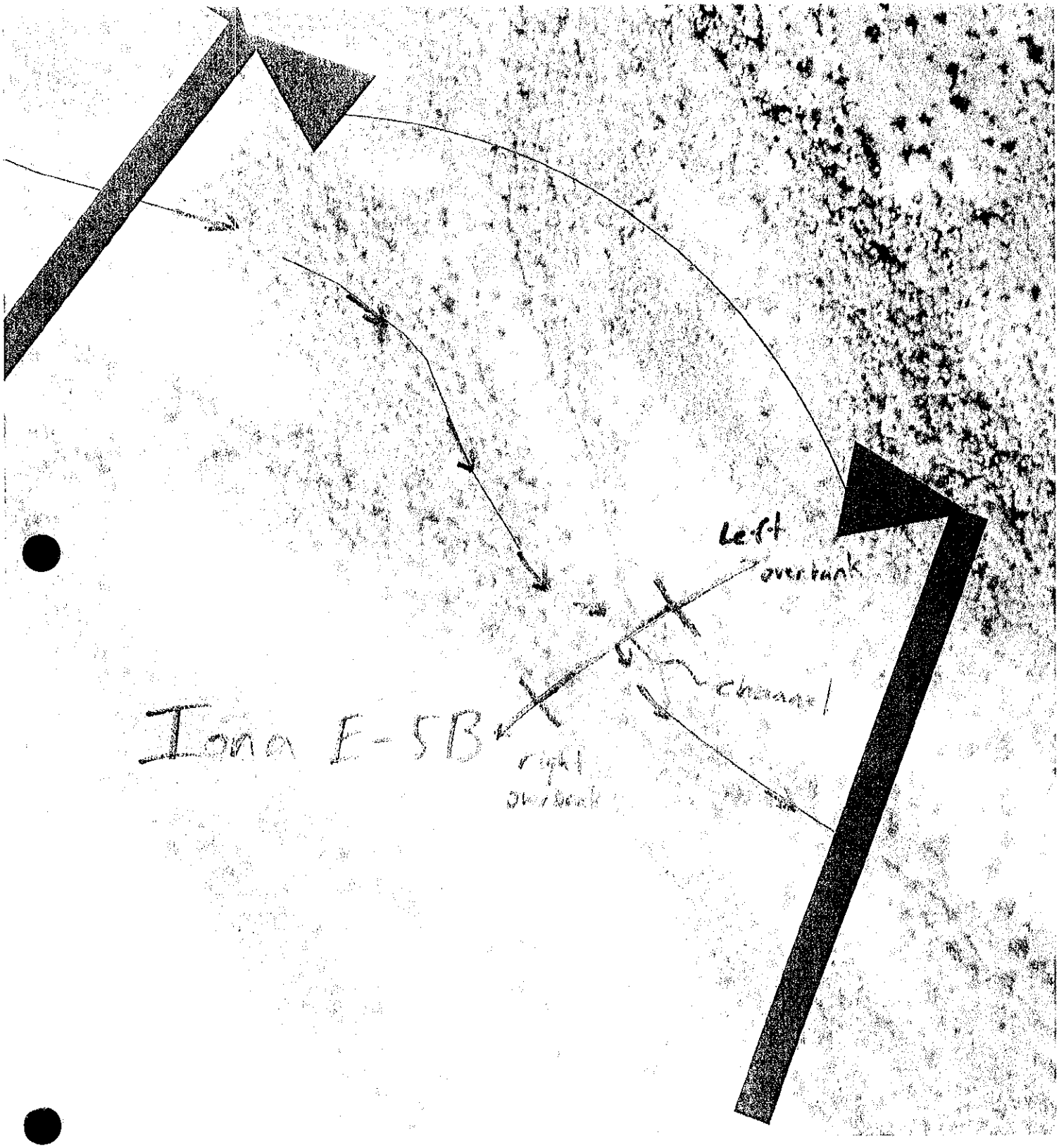


Figure 3. (Photo #116) Left Overbank looking upstream.




Left
overbank
channel
Iona E-5B
right
overbank

Wash 2 West

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W- 1 (Between The CAP and Jomax Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.020	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.045**	**0.033**

Figure E-1
(Reach - 2W-1)

Figure 1. (Photo #80) Channel looking upstream.

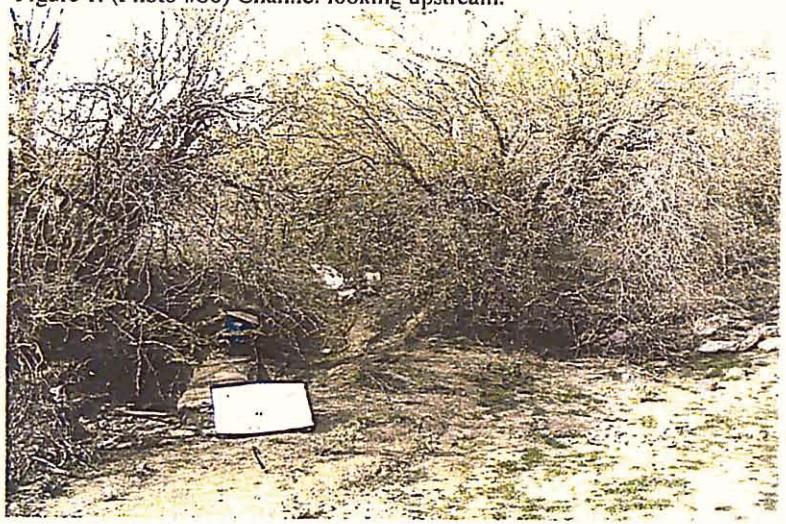
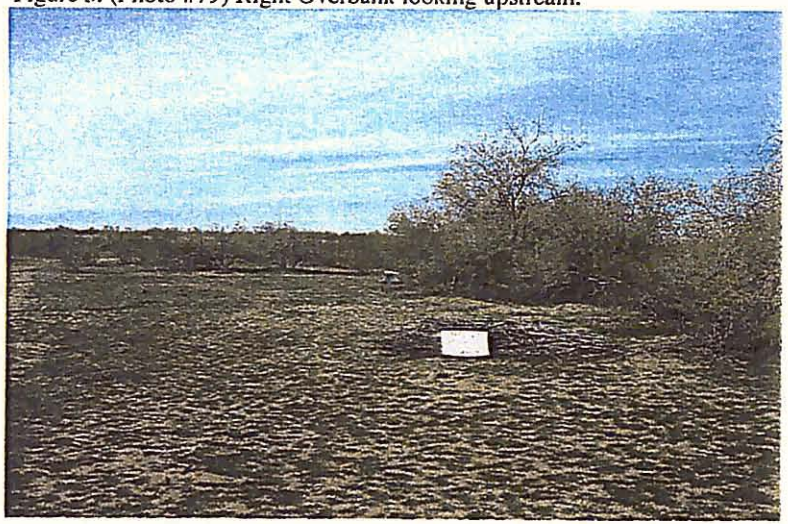
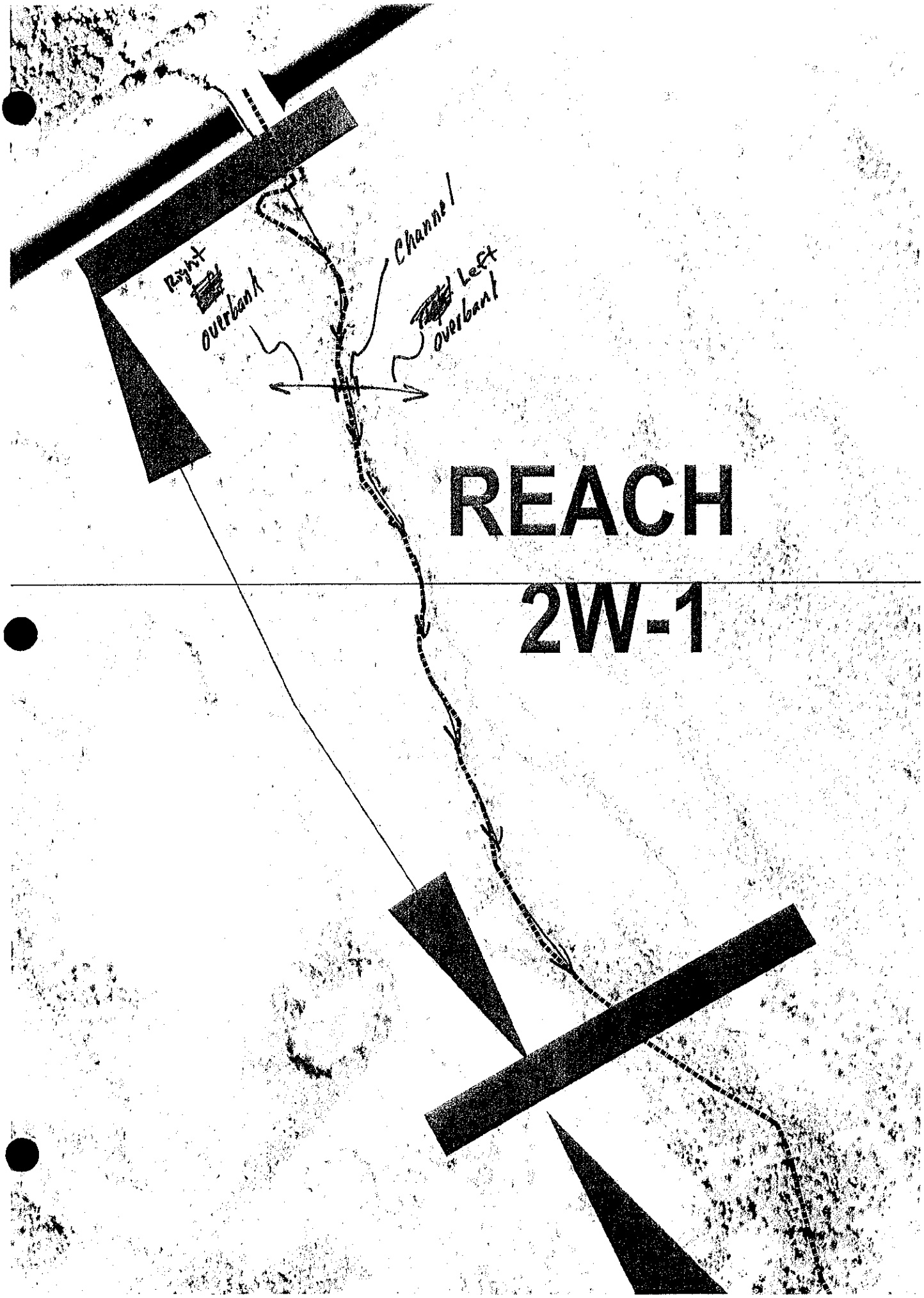


Figure 2. (Photo #81) Left Overbank looking downstream.

Figure 3. (Photo #79) Right Overbank looking upstream.





REACH 2W-1

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W- 2B (Between Jomax Rd. and 1/4 mile south of Jomax Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.028	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.012		0.012
	Large		.025-.050		0.030	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	
	Occ. Alt.		.001-.005			0.002
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.037**	**0.058**	**0.039**

Figure E-1
(Reach - 2W-2B)

Figure 1. (Photo #75) Channel looking upstream.

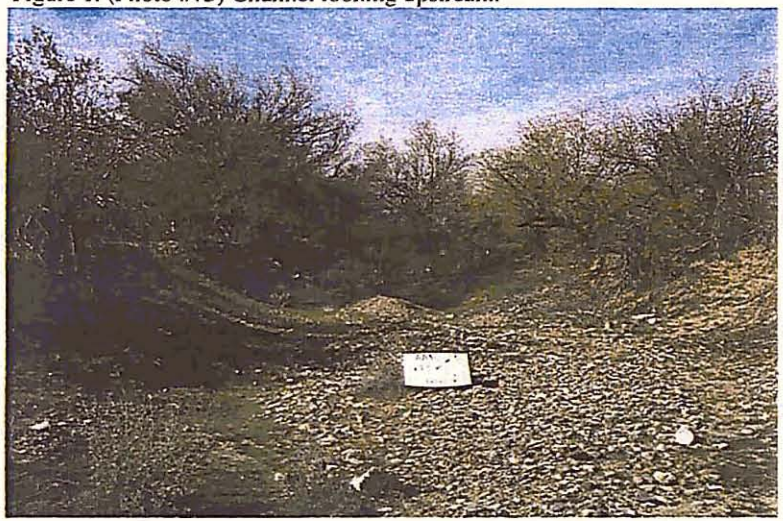


Figure 2. (Photo #77) Right Overbank looking upstream.

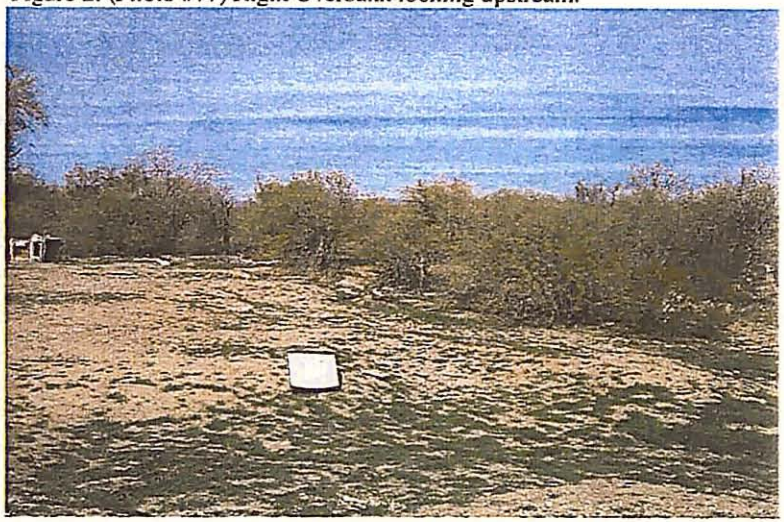


Figure 3. (Photo #76) Left Overbank looking downstream.

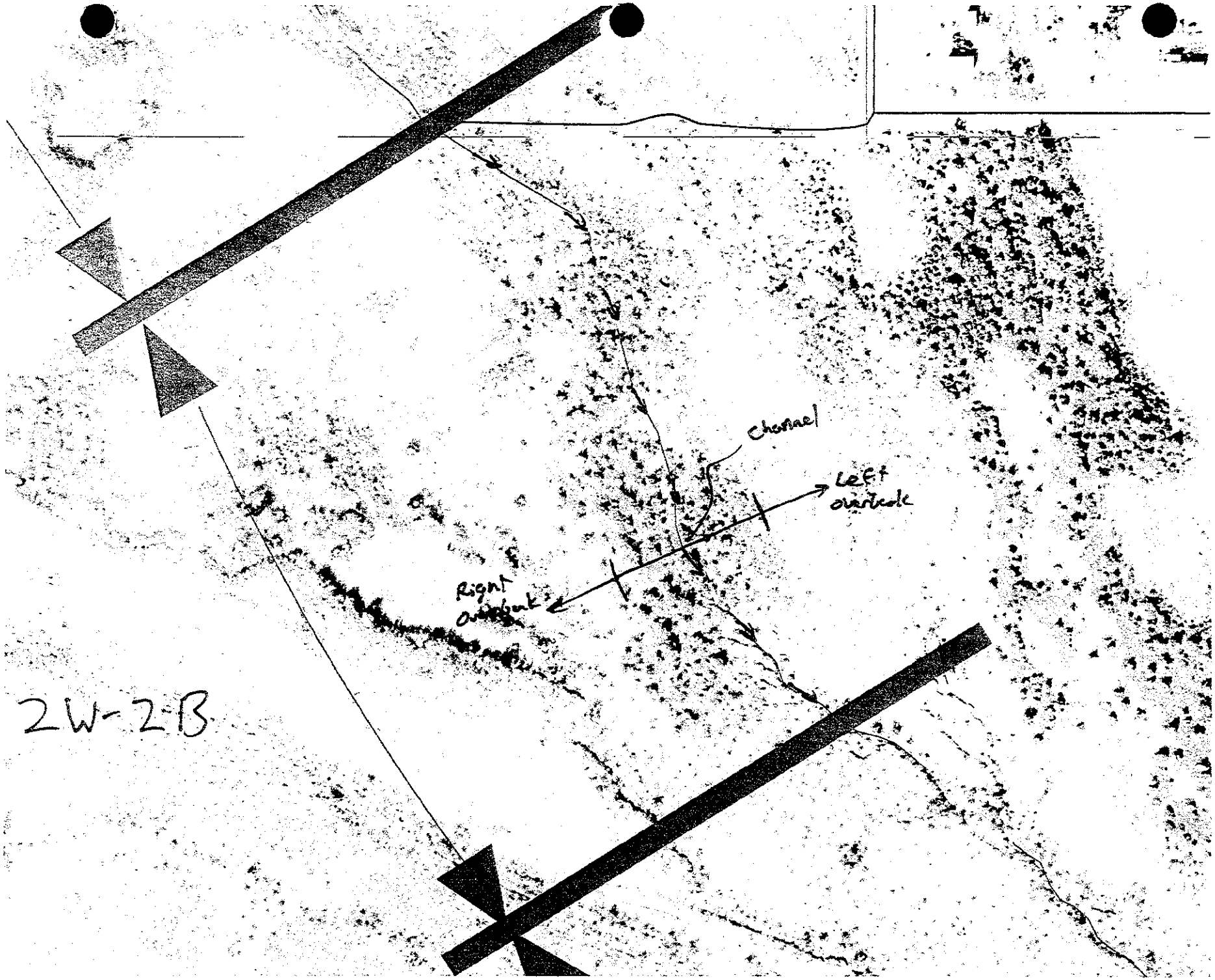

channel
Left overbank
Right overbank
2W-2B

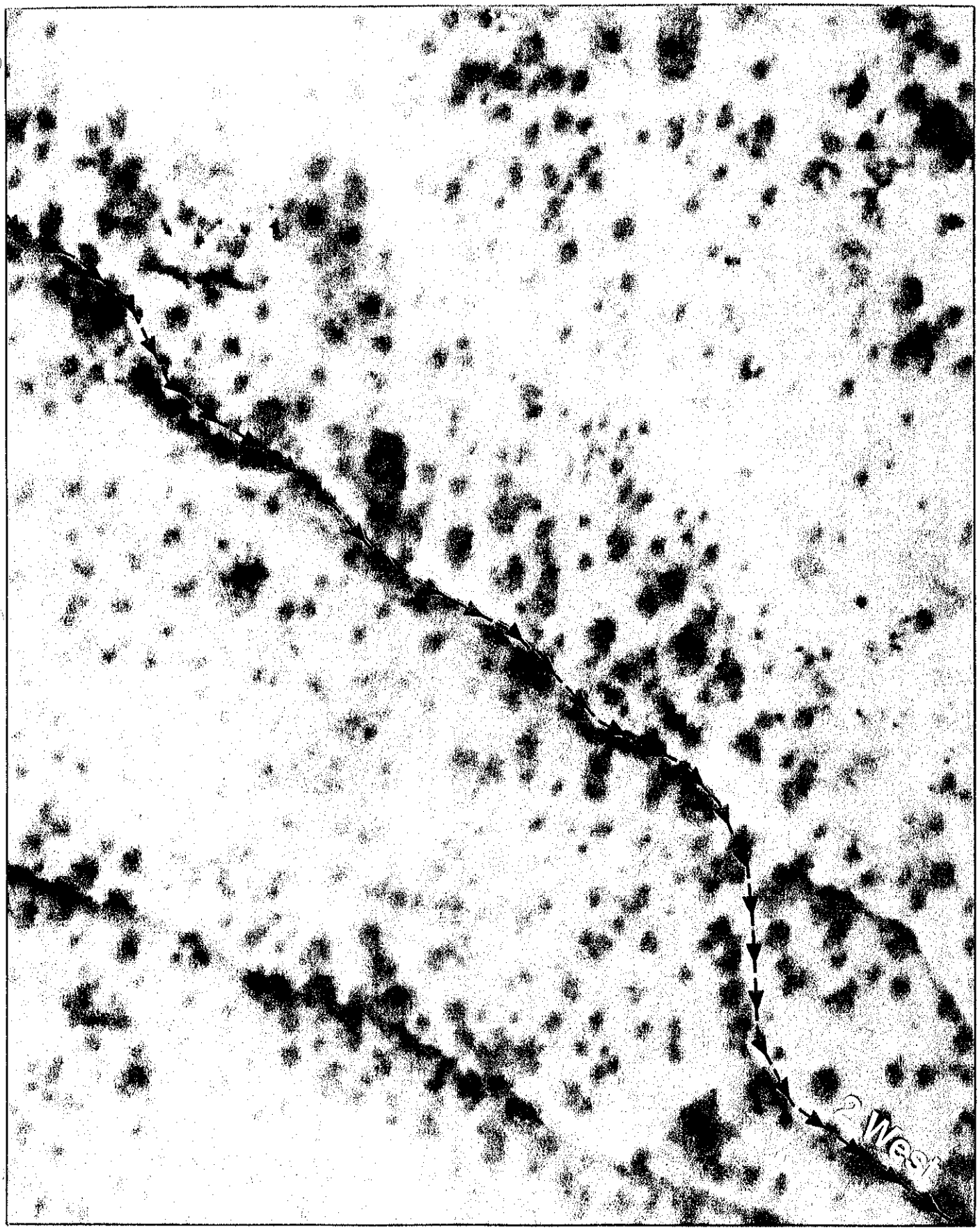
Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W- 2A (Between 1/4 mile south of Jomax Rd. and 1/4 mile north of Happy Valley Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.028	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.022	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.050**	**0.035**

FIGURE E-1: Wash 2W - 2A (n-value photo)



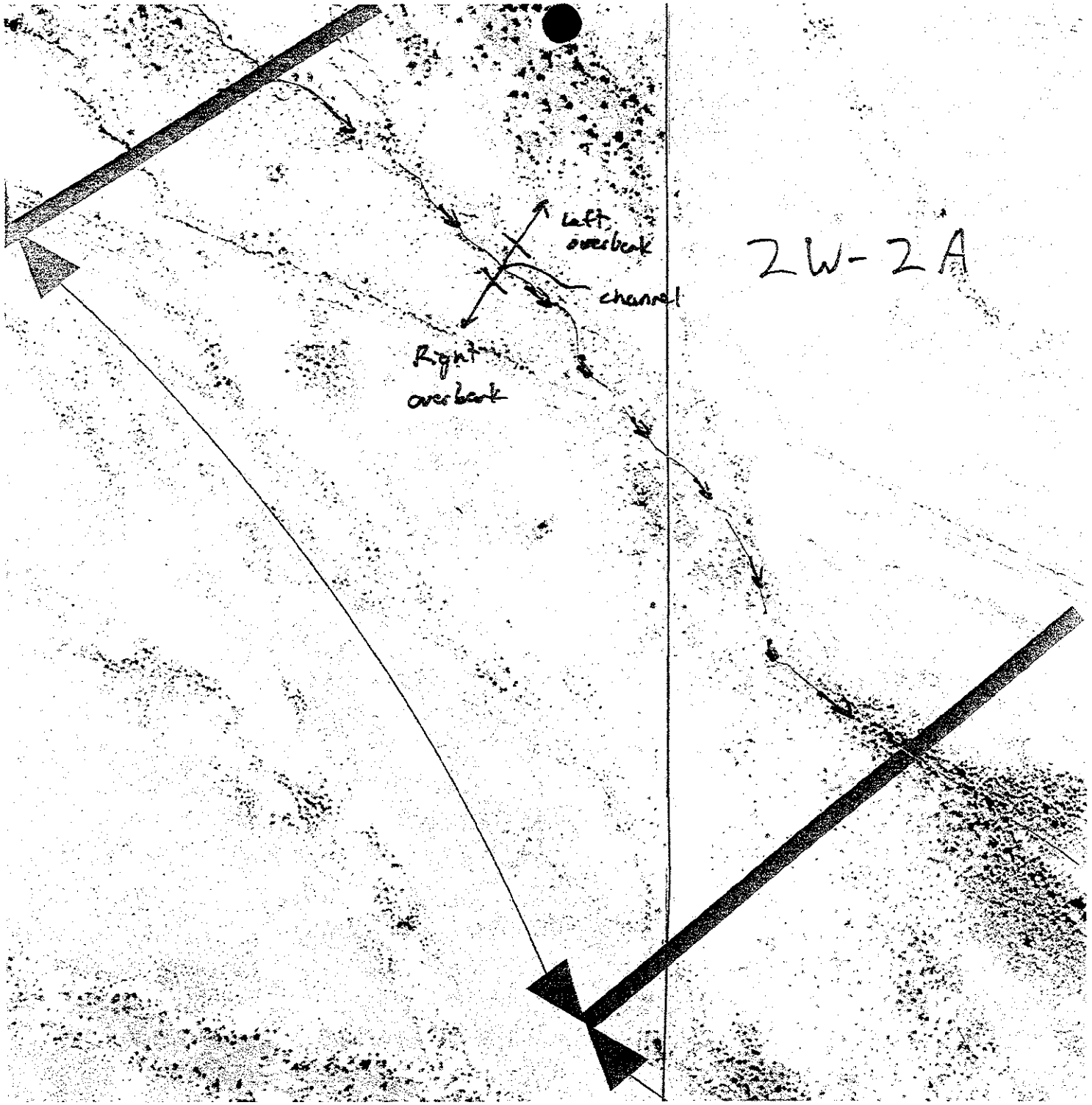

left overbank
channel
Right overbank
2W-2A

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W- 3B (Between 1/4 mile north of Happy Valley Rd. and where wash crosses 207th Ave.)

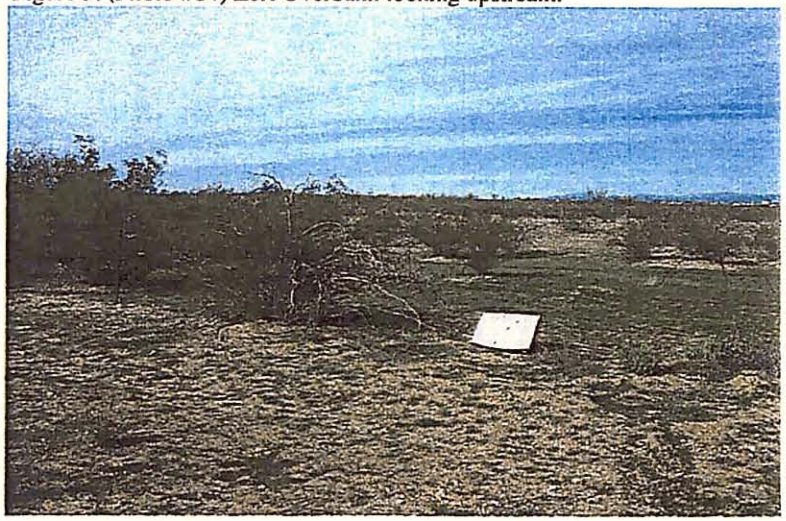
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.001	0.002	0.001
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.002	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010		0.010
	Medium		.010-.025			
	Large		.025-.050		0.028	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.038**	**0.057**	**0.038**

Figure E-1
(Reach - 2W-3B)

Figure 1. (Photo #82) Channel looking downstream.

Figure 2. (Photo #83) Right Overbank looking downstream.

Figure 3. (Photo #84) Left Overbank looking upstream.



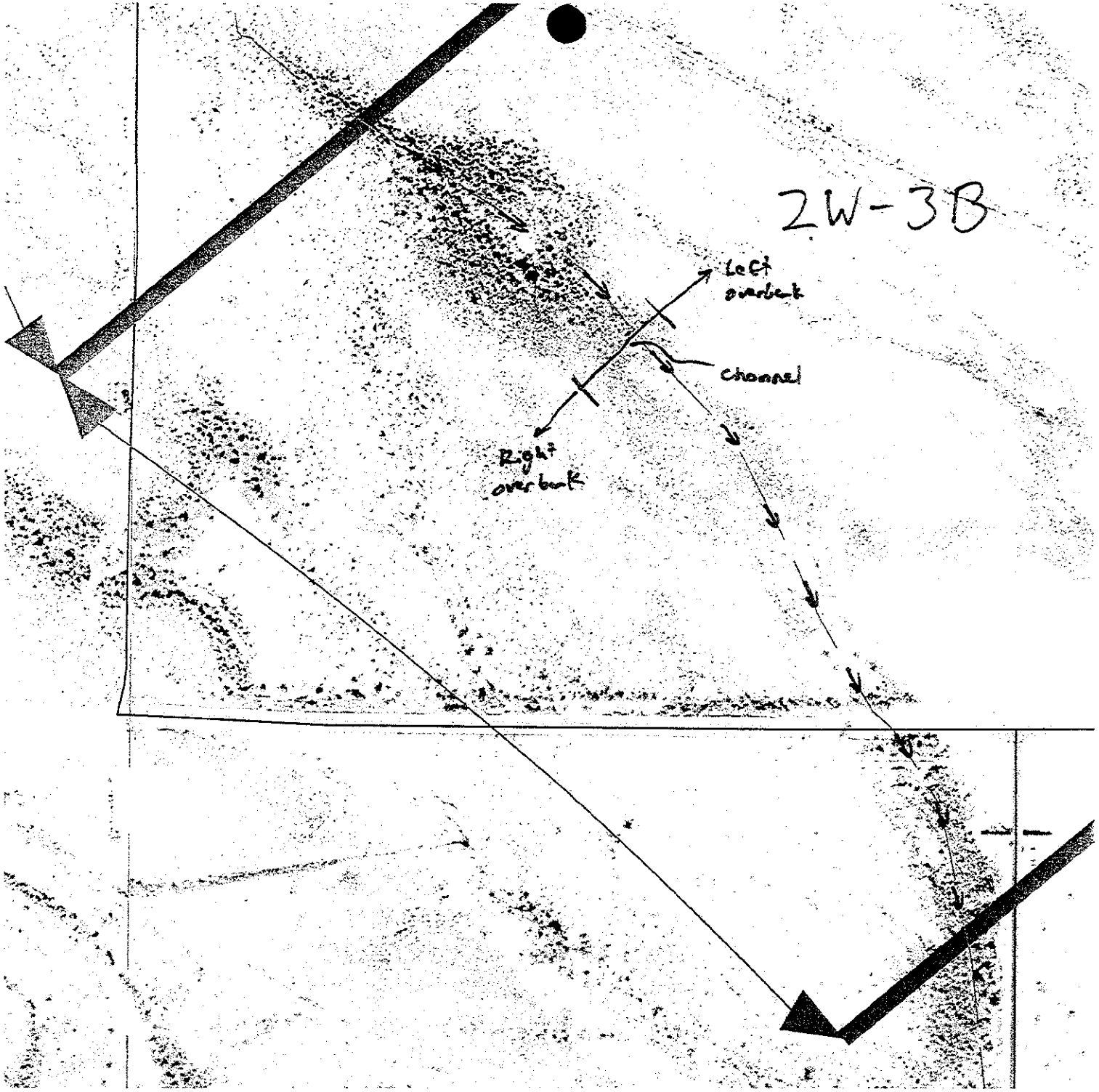

2W-3B
Left overbank
channel
Right overbank

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W- 3A (Between where wash crosses 207th Ave. and 203rd Ave. alignment.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.000	0.003
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.009		0.008
	Medium		.010-.025		0.023	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.050**	**0.036**

FIGURE E-1: Wash 2W - 3A (n-value photo)

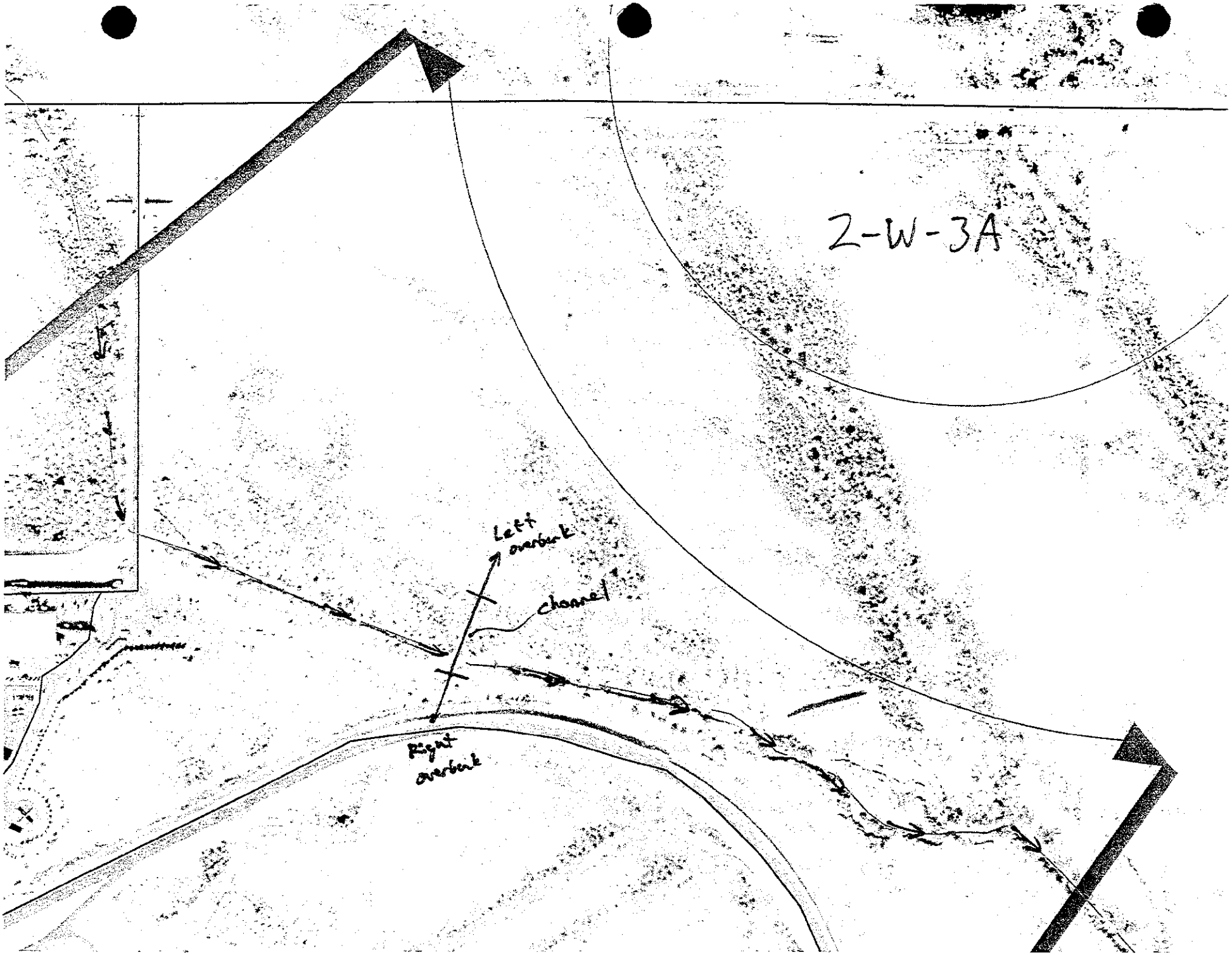

2-W-3A
Left overbank
channel
Right overbank

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W- 4 (Between the 203rd Ave. alignment and 199th Ave. alignment.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.009		0.009
	Medium		.010-.025		0.025	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.050**	**0.034**

Figure E-1
(Reach - 2W-4)

Figure 1. (Photo #85) Channel looking downstream.

Figure 2. (Photo #86) Right Overbank looking downstream.

Figure 3. (Photo #87) Left Overbank looking upstream.

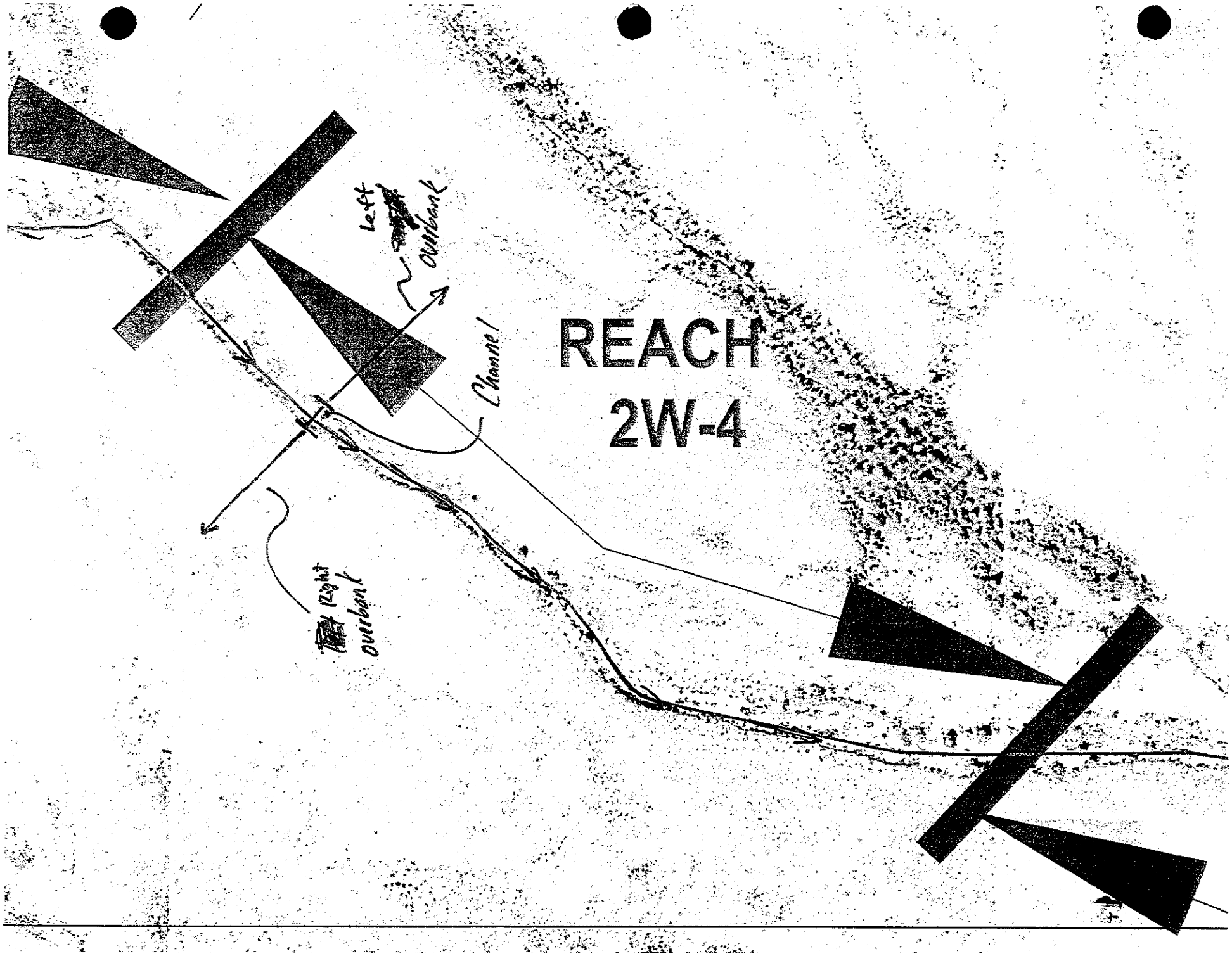

REACH
2W-4
left
overbank
Channel
Right
overbank

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W- 5 (Between 199th Ave. alignment and 195th Ave. about 1/4 mile south of Norwich Dr.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.028		0.028
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010		0.008
	Medium		.010-.025		0.022	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.038**	**0.050**	**0.038**

Figure E-1
(Reach - 2W-5)

Figure 1. (Photo #88) Channel looking downstream.

Figure 2. (Photo #89) Right Overbank looking upstream.

Figure 3. (Photo #90) Left Overbank looking upstream.

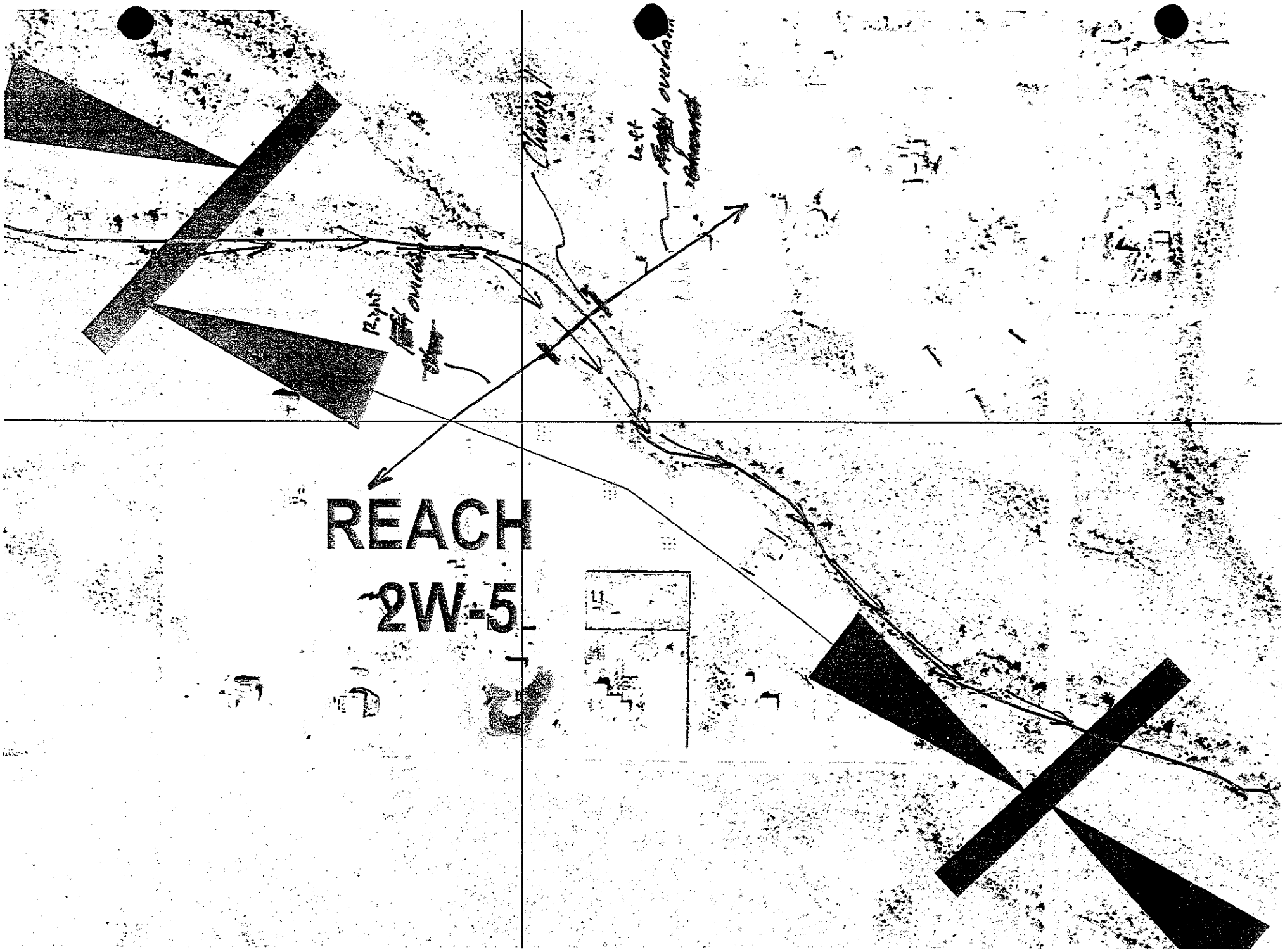

Channel
Left
Right
REACH
2W-5

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W- 6 (Between 195th Ave. and just north of the Fairview Ave. alignment.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.002	0.002	0.002
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			0.010
	Medium		.010-.025	0.011	0.024	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.039**	**0.053**	**0.038**

Figure E-1
(Reach - 2W-6)

Figure 1. (Photo #91) Channel looking downstream.

Figure 2. (Photo #92) Right Overbank looking downstream.

Figure 3. (Photo #93) Left Overbank looking downstream.

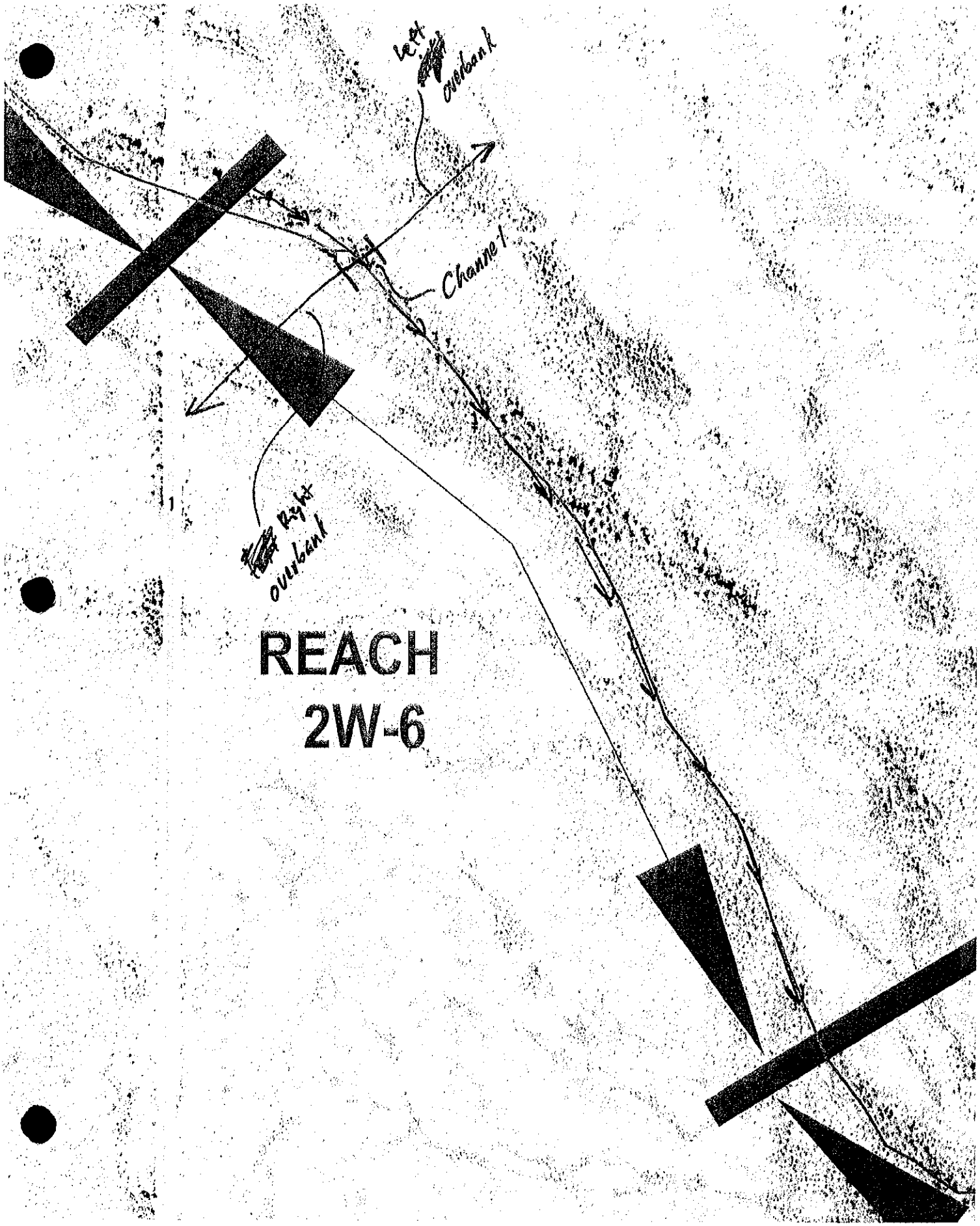

left overbank
Channel
Right overbank
REACH
2W-6

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W- 7 (Between just north of Fairview Ave. alignment and Deer Valley Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.027	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.001	0.001	0.001
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.002	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.012	0.022	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.040**	**0.052**	**0.038**

Figure E-1
(Reach - 2W-7)

Figure 1. (Photo #96) Channel looking upstream.

Figure 2. (Photo #95) Right Overbank looking upstream.

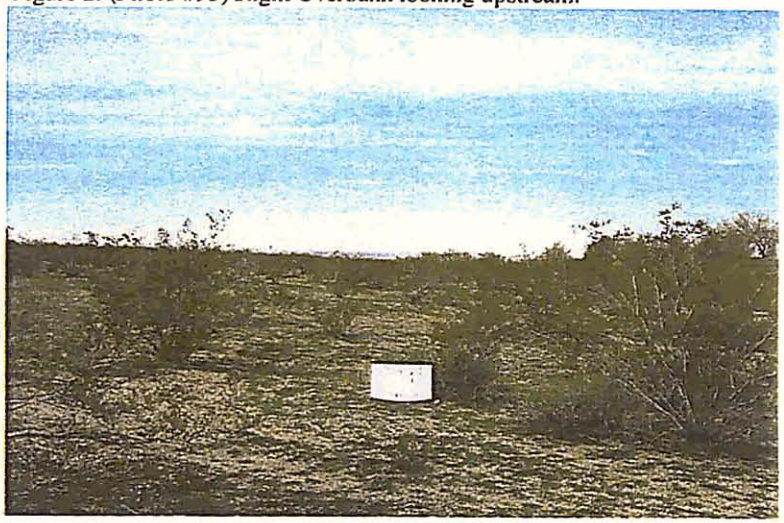
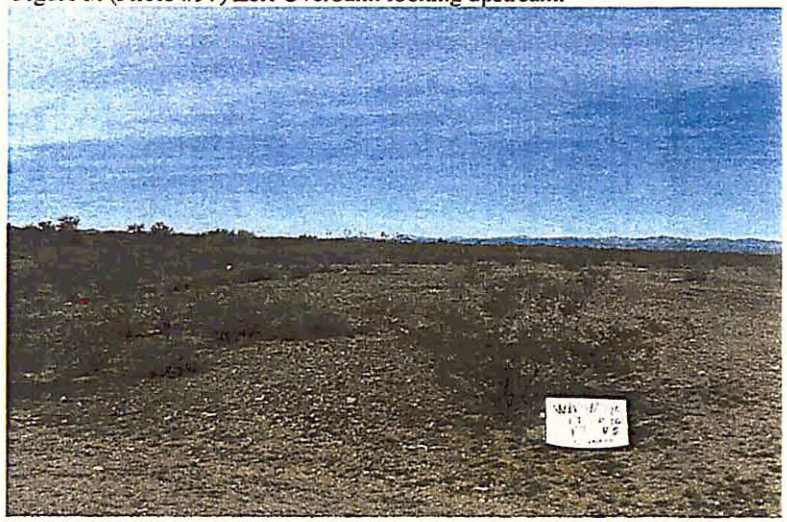


Figure 3. (Photo #97) Left Overbank looking upstream.



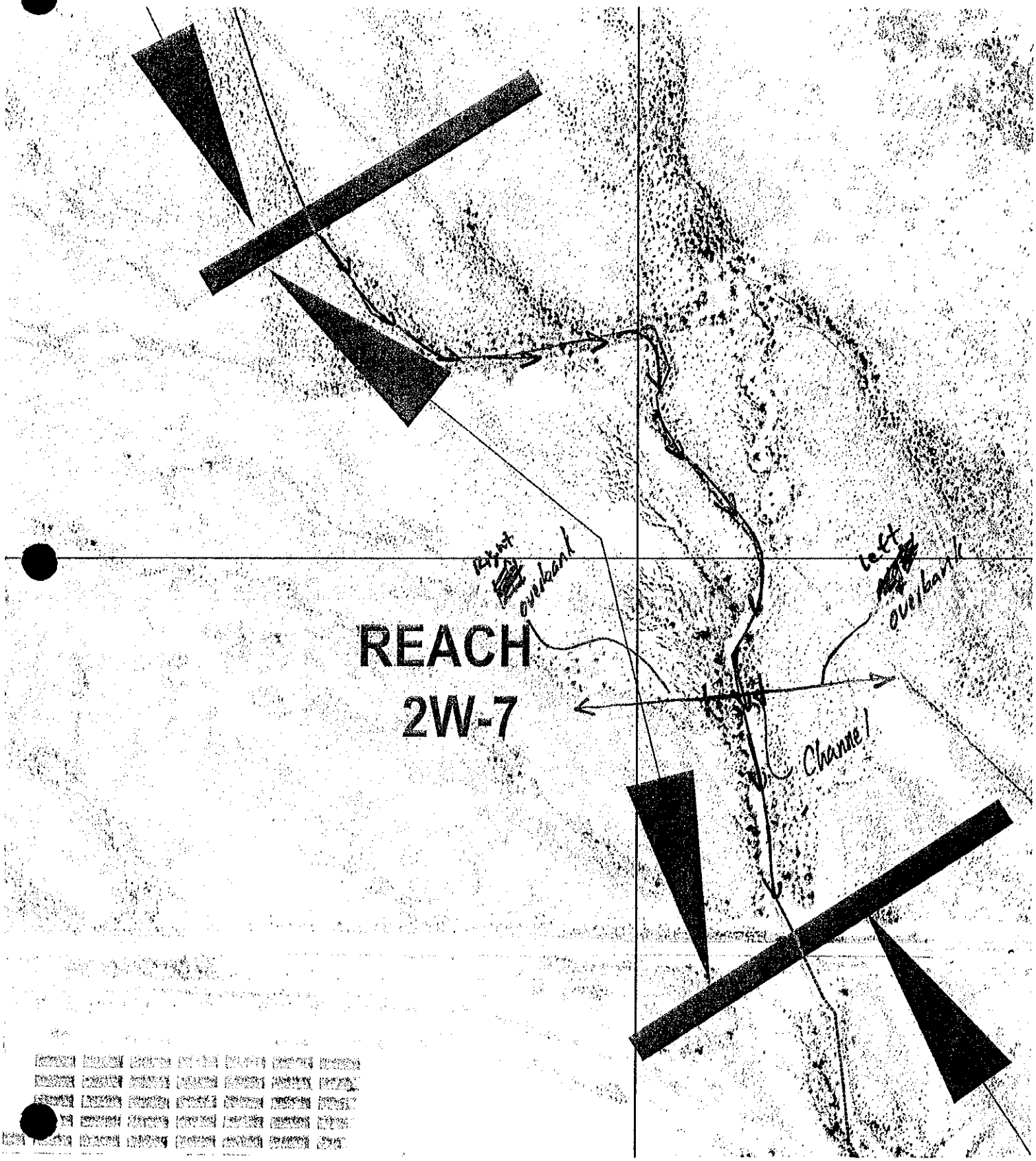

right overbank
left overbank
REACH
2W-7
Channel

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W- 8 (Between Deer Valley Rd. and 187th Ave. just south of Rose Garden Ln. alignment)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005			
	Moderate		.006-.010		0.006	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.003	0.002	0.003
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.009		0.009
	Medium		.010-.025		0.020	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.038**	**0.055**	**0.038**

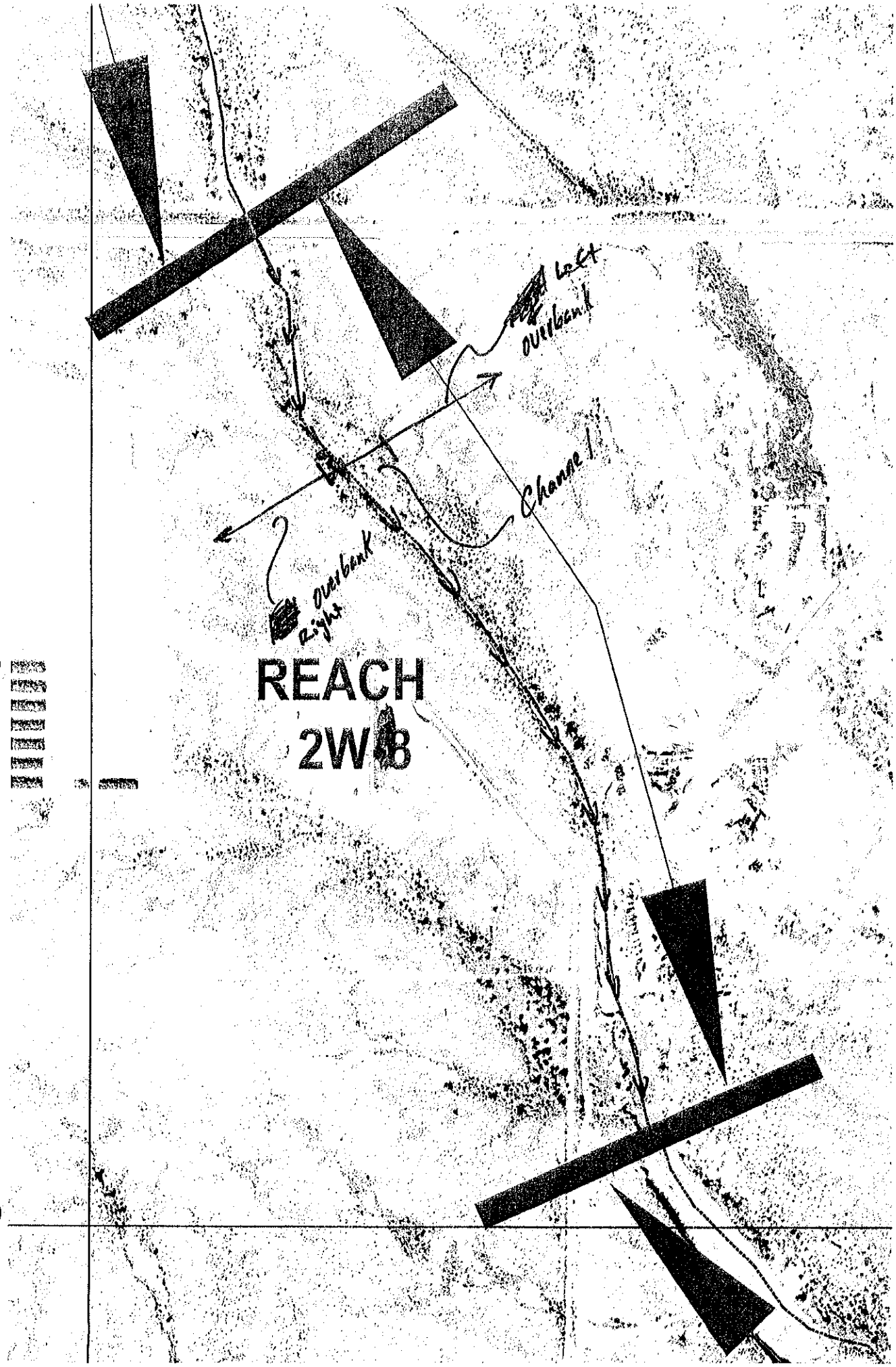

left
overbank
Channel
overbank
right
REACH
2W8

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W- 9 (Between Rose Garden Ln. alignment and Beardsley Rd. alignment.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.002	0.002	0.002
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.025	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.054**	**0.038**

Figure E-1
(Reach - 2W-9)

Figure 1. (Photo #102) Channel looking downstream.

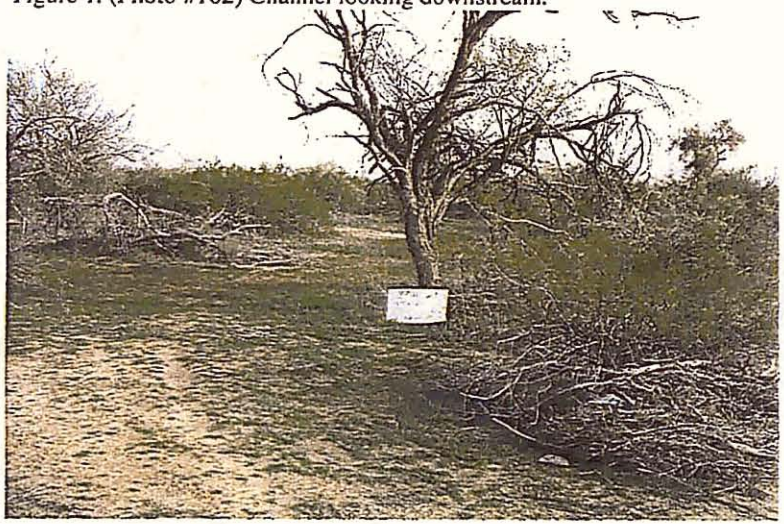
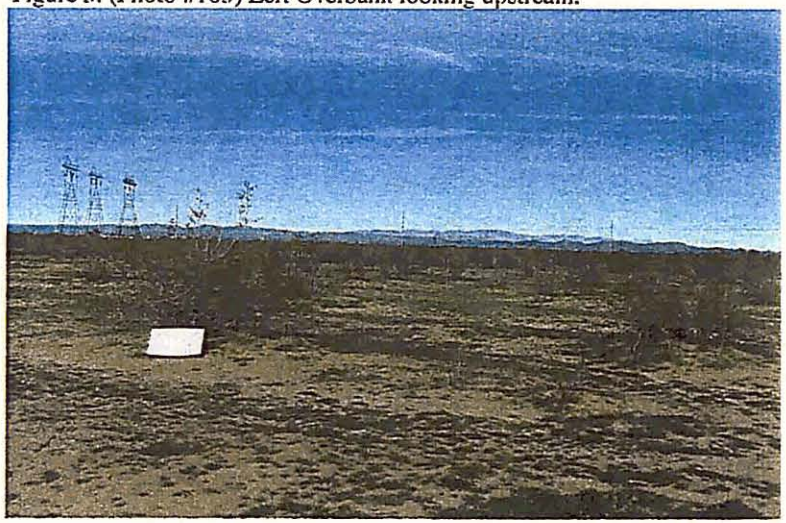


Figure 2. (Photo #101) Right Overbank looking downstream.

Figure 3. (Photo #103) Left Overbank looking upstream.



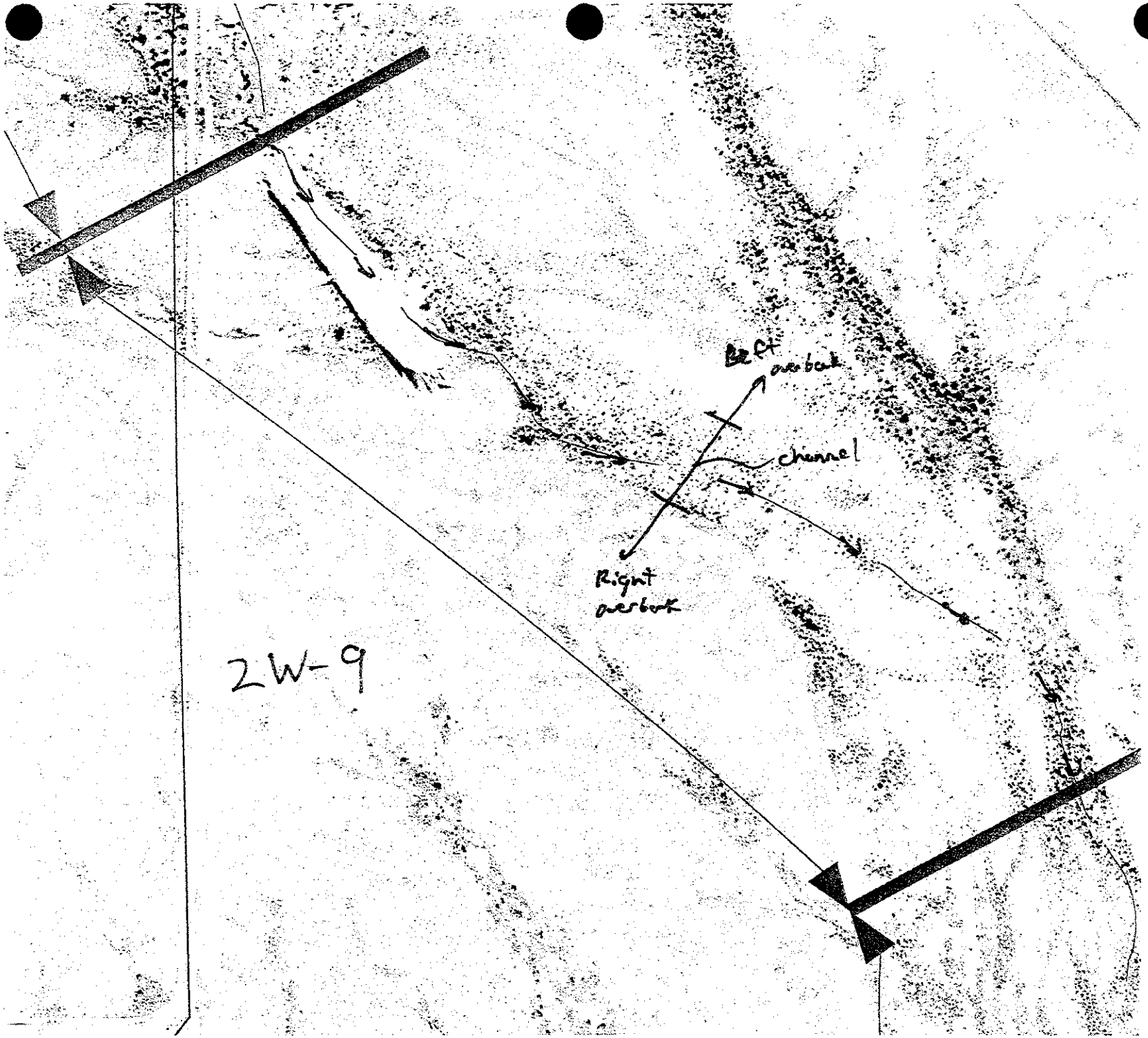

Left overbank
channel
Right overbank
2W-9

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 2 West
Location: Reach - 2W- 10 (Between Beardsley Rd. alignment and just north of Beardsley Canal.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.011		0.011
	Large		.025-.050		0.028	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.037**	**0.056**	**0.037**

Figure E-1
(Reach - 2W-8)

Figure 1. (Photo #99) Channel looking upstream.

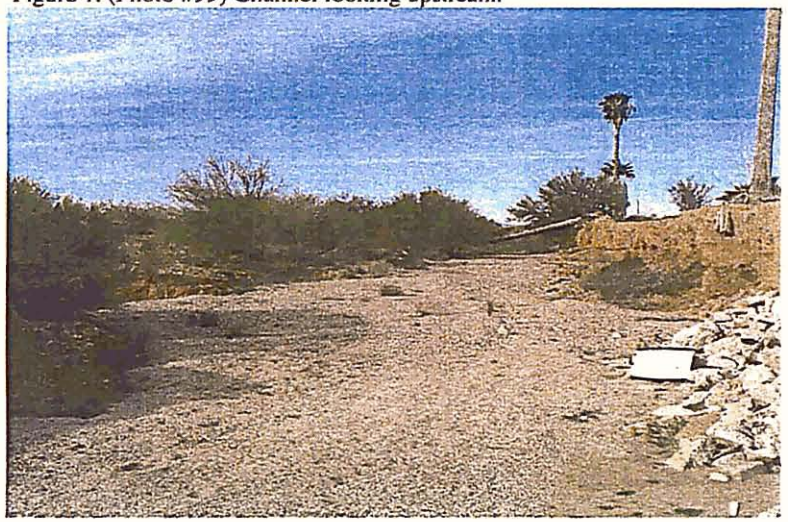
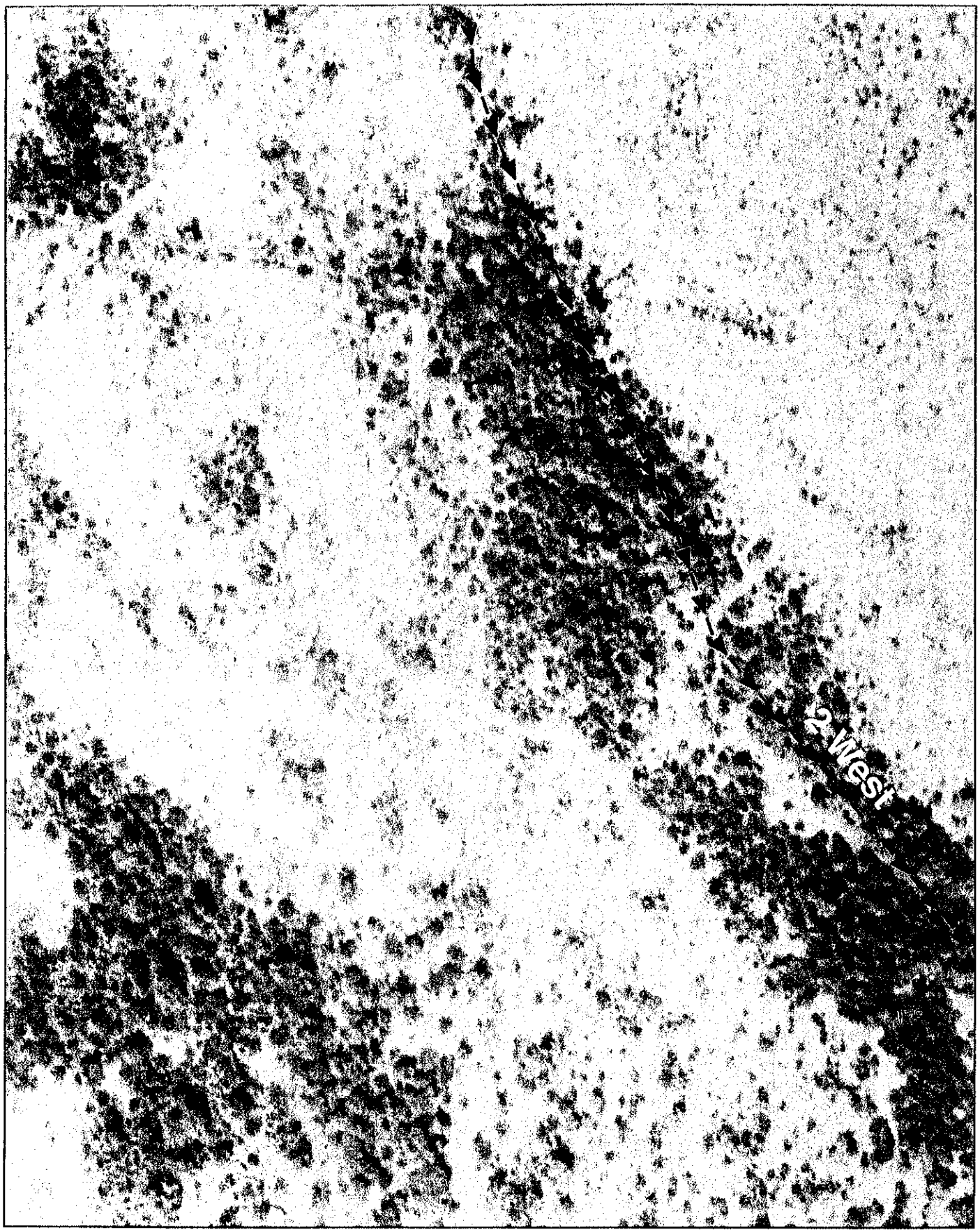
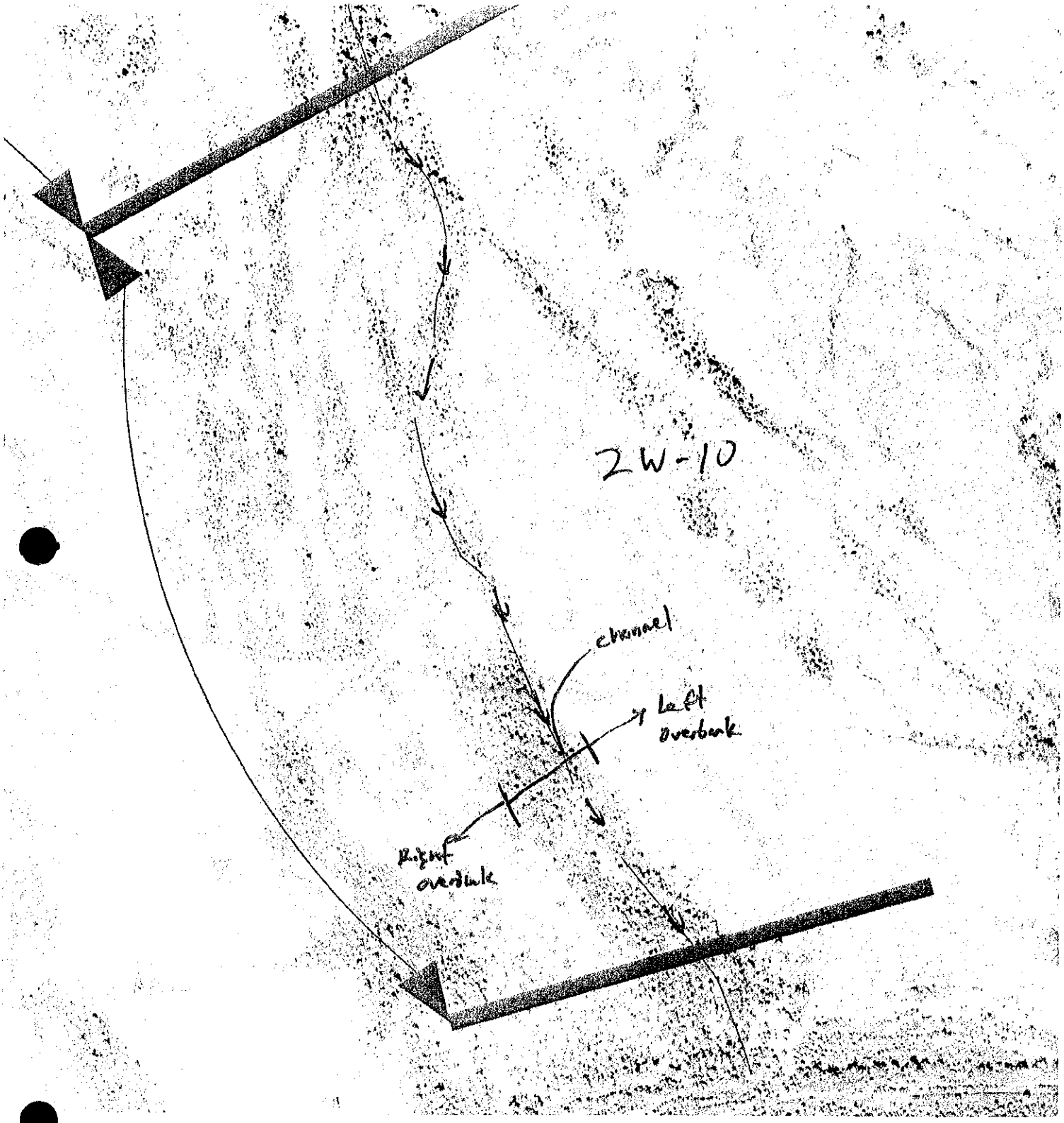


Figure 2. (Photo #98) Right Overbank looking upstream.

Figure 3. (Photo #100) Left Overbank looking upstream.

FIGURE E-1: Wash 2W - 10 (n-value photo)




2W-10
channel
Left overbank
Right overbank

Wash 1 West

Table E-1

BY AMB DATE 1/24/2005
CHECK HAA/JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 1 West
Location: Reaches - 1W - 1 (Between the south side of the CAP Canal and just north of Roadrunner Rd. on 195th Ave.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.005	0.005	0.005
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.026	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.002	0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.042**	**0.060**	**0.042**

Figure E-1
(Reach 1W - 1)

Figure 1. (Photo #72) Channel looking downstream.

Figure 2. (Photo #74) Left Overbank looking downstream.

Figure 3. (Photo #73) Right Overbank looking downstream.

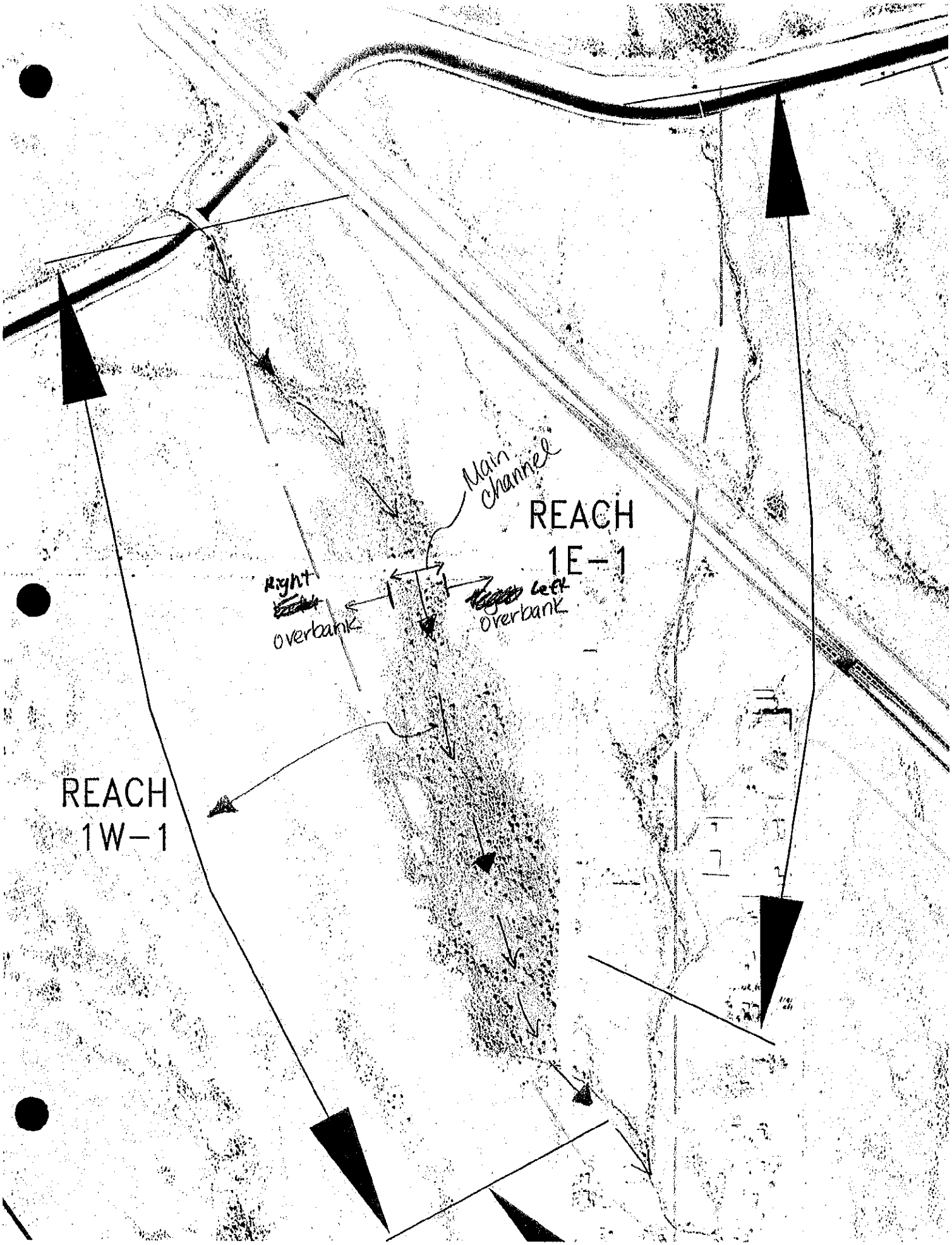

Main channel
REACH
1E-1
Right
overbank
Left
overbank
REACH
1W-1

Table E-1

BY AMB DATE 1/24/2005
CHECK HAA/JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 1 West
Location: Reaches - 1W - 2C (Between just north of Roadrunner Rd. on 195th Ave. and Jomax Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.026	0.026	0.026
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004			
	Minor		.005-.015	0.006	0.006	0.006
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.001	0.002
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.042**	**0.048**	**0.042**

FIGURE E-1: Wash 1W - 2C (n-value photo)

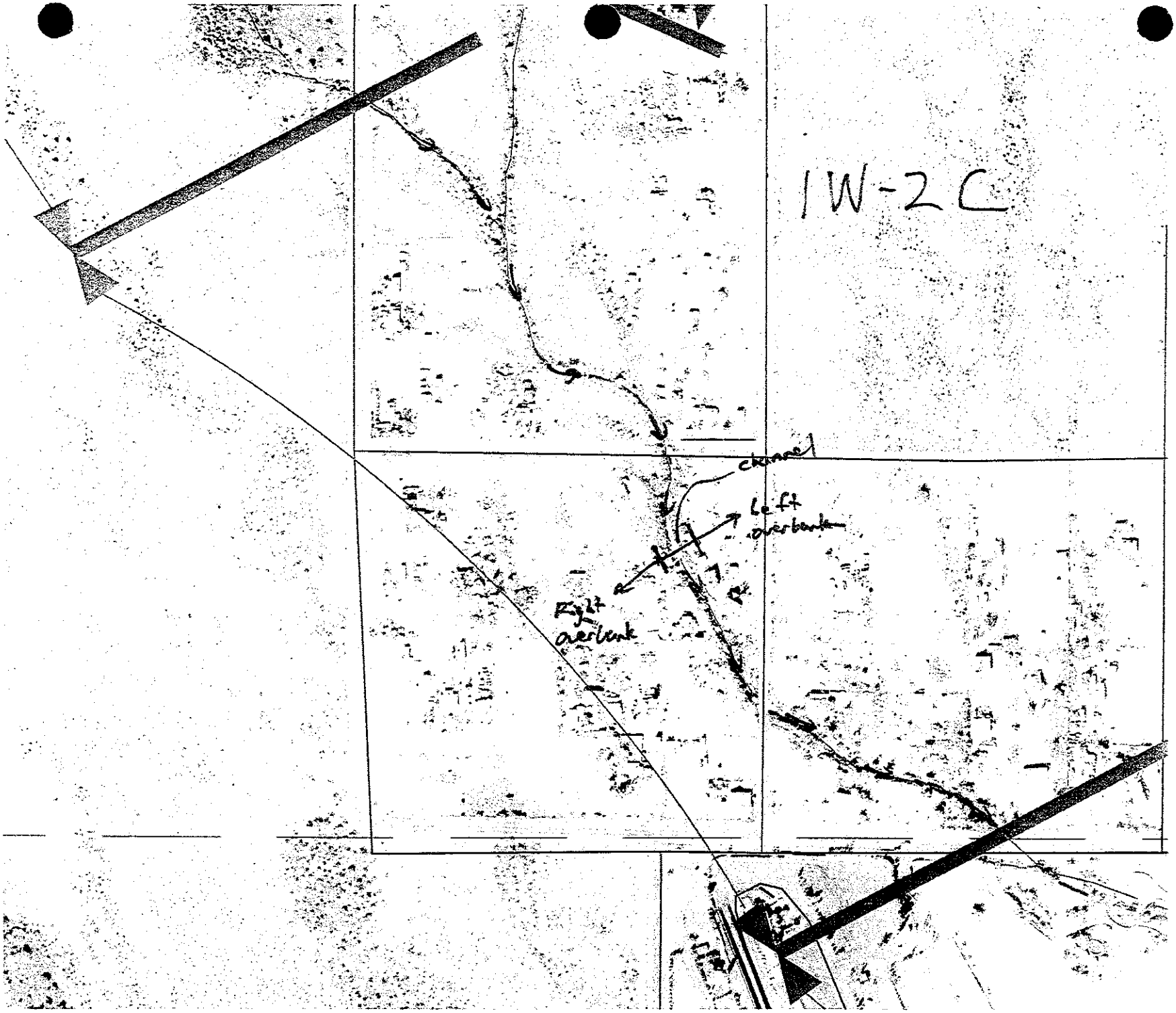

IW-2C
channel
Left overbank
Right overbank

Table E-1

BY AMB DATE 1/24/2005
CHECK HAA/JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 1 West
Location: Reaches - 1W - 2B (Between Jomax Rd. and Frontier Dr. alignment.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.026	0.026	0.026
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.005		0.005
	Moderate		.006-.010		0.008	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.000	0.000	0.000
	Medium		.010-.025			
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015	0.010	0.012	0.010
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.041**	**0.046**	**0.041**

Figure E-1
(Reach 1W - 2B)

Figure 1 - (Photo #64) Left Overbank

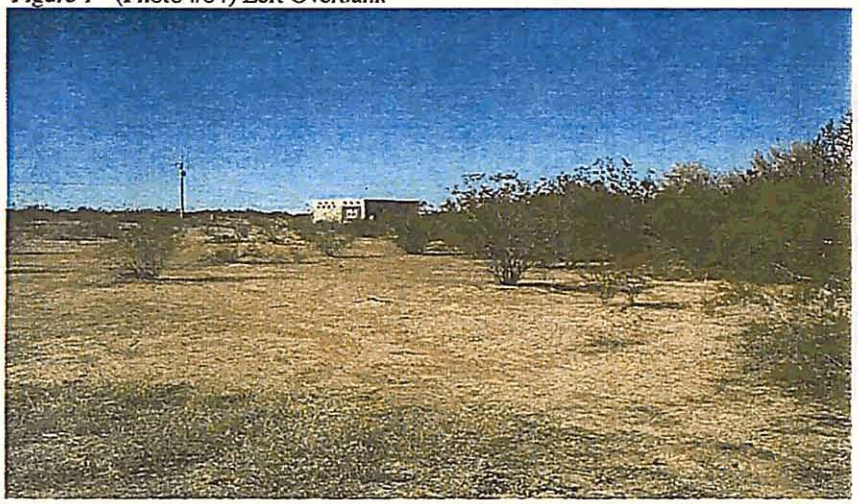


Figure 2 - (Photo #66) Channel

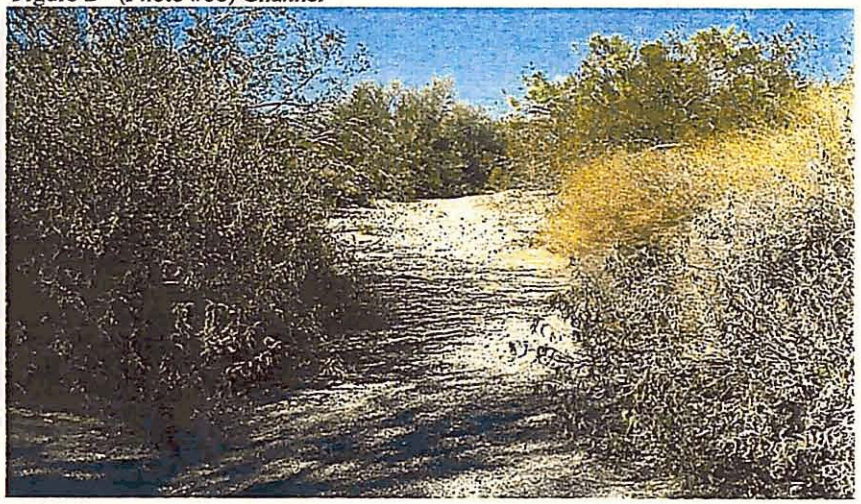
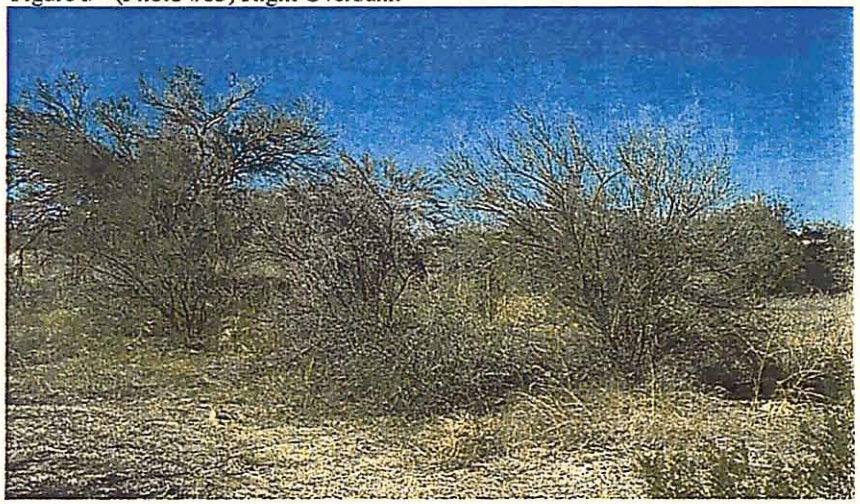


Figure 3 - (Photo #65) Right Overbank



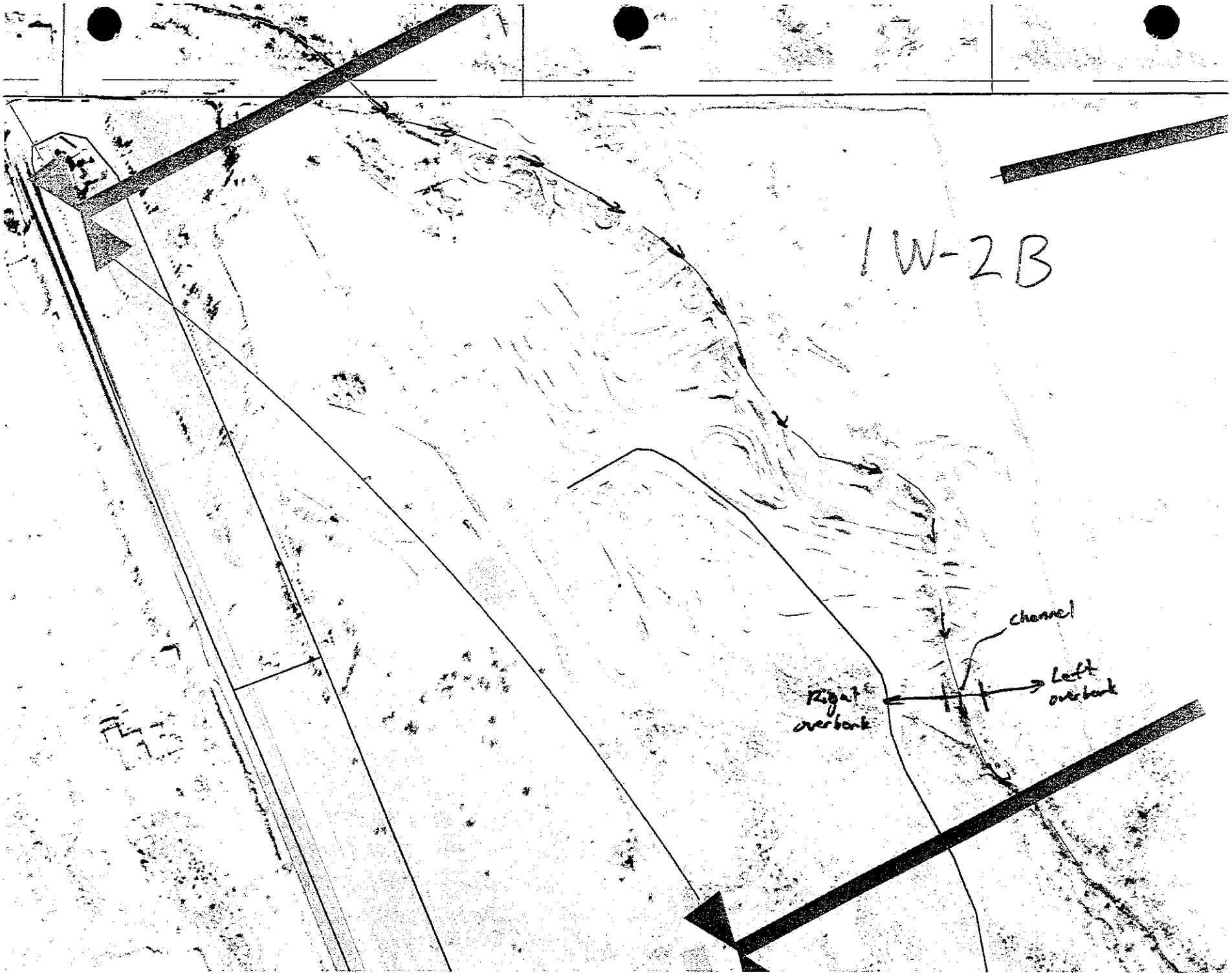

IW-2B
channel
Left overbank
Right overbank

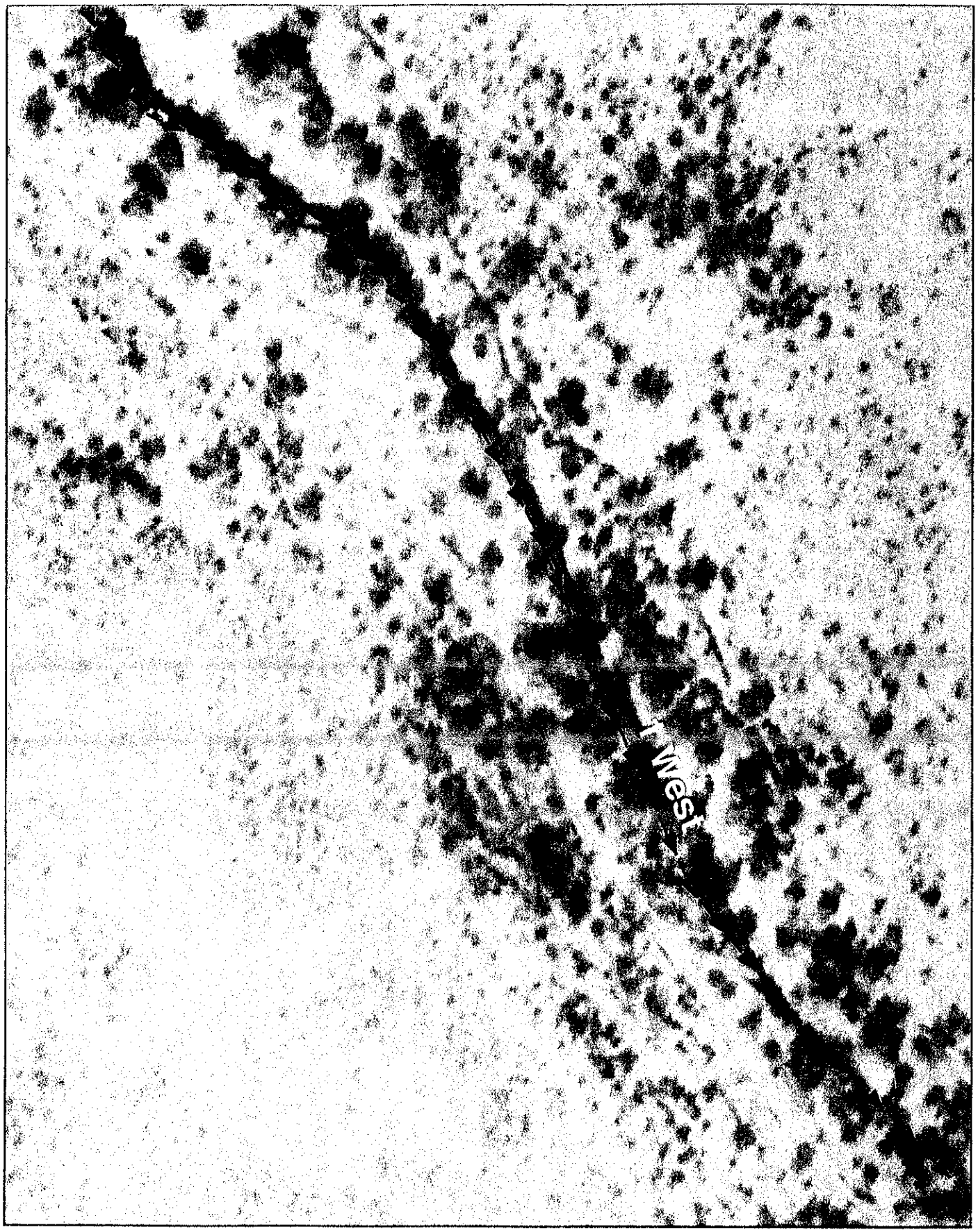
Table E-1

BY AMB DATE 1/24/2005
CHECK HAA/JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 1 West
Location: Reaches - 1W - 2A (Between Frontier Dr. alignment and the confluence with Wash 2 East)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		
	Minor		.001-.005		0.005	0.005
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010		
	Medium		.010-.025		0.022	0.014
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.055**	**0.045**

FIGURE E-1: Wash 1W - 2A (n-value photo)



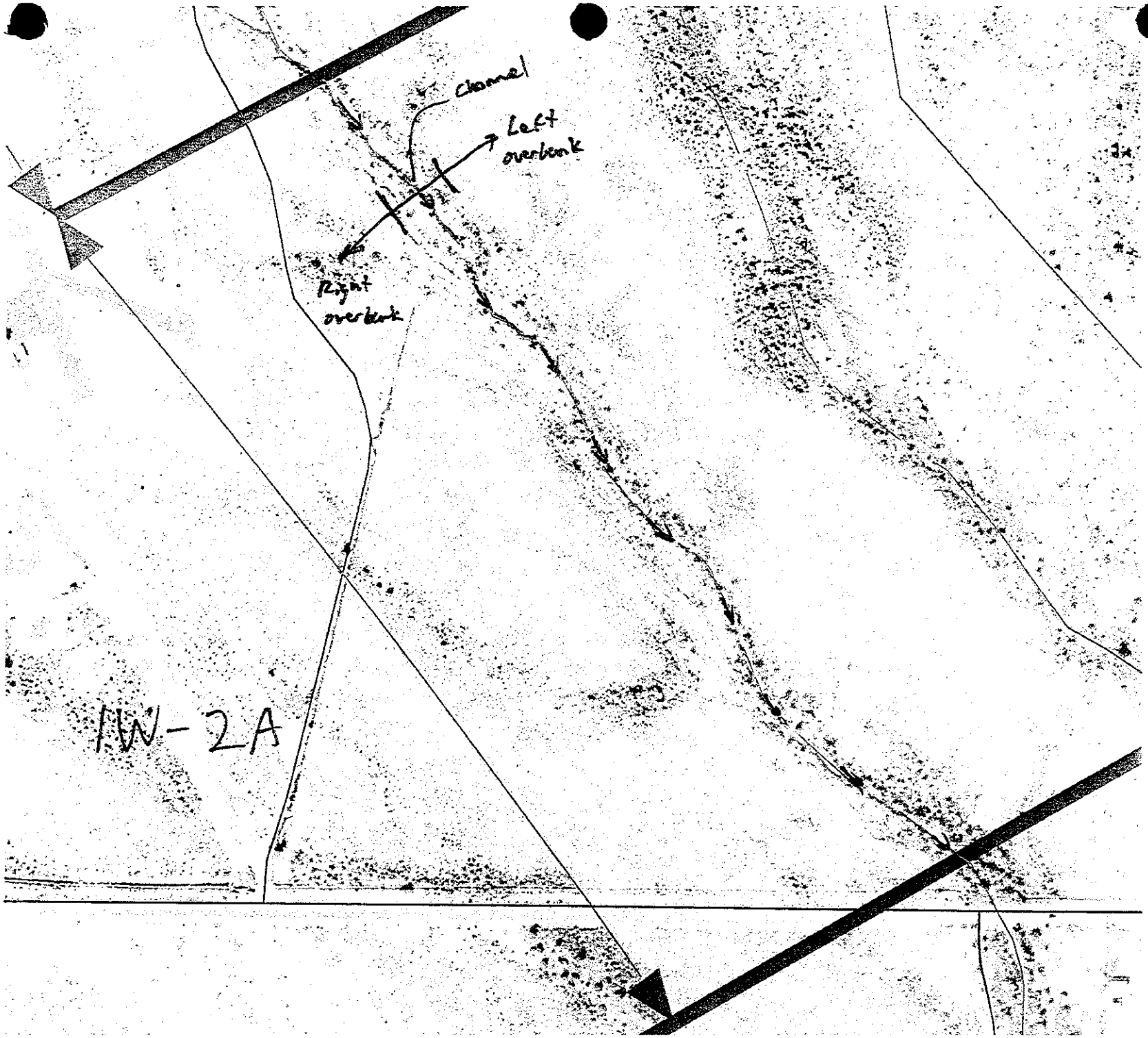

channel
Left overbank
Right overbank
IW-2A

Table E-1

BY AMB DATE 1/24/2005
CHECK HAA/JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 1 West
Location: Reaches - 1W - 3 (Between the confluence with Wash 2 East and just north of Pinnacle Peak Rd)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.028	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.000		0.000
	Moderate		.006-.010		0.006	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.017		0.010
	Large		.025-.050		0.030	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.003	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.045**	**0.067**	**0.038**

Figure E-1
(Reach 1W - 3)

Figure 1 - (Photo #61) Left Overbank

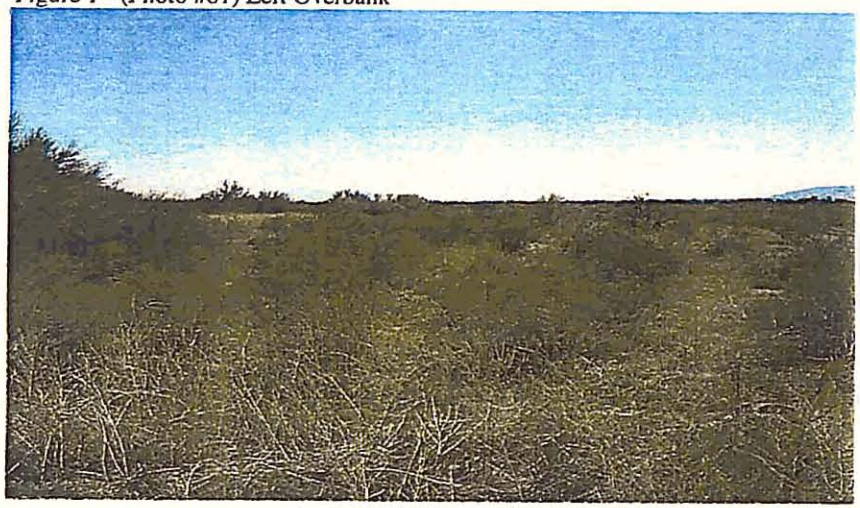


Figure 2 - (Photo #62) Channel Upstream

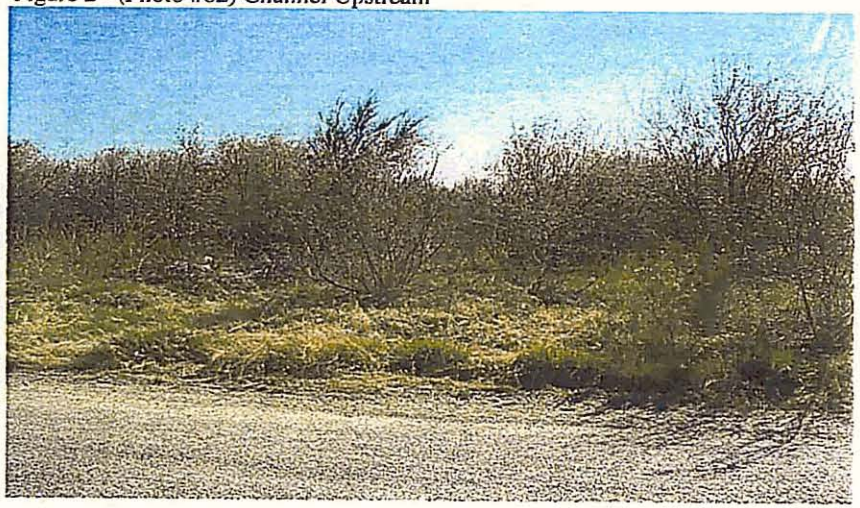


Figure 3 - (Photo #340) Right Overbank

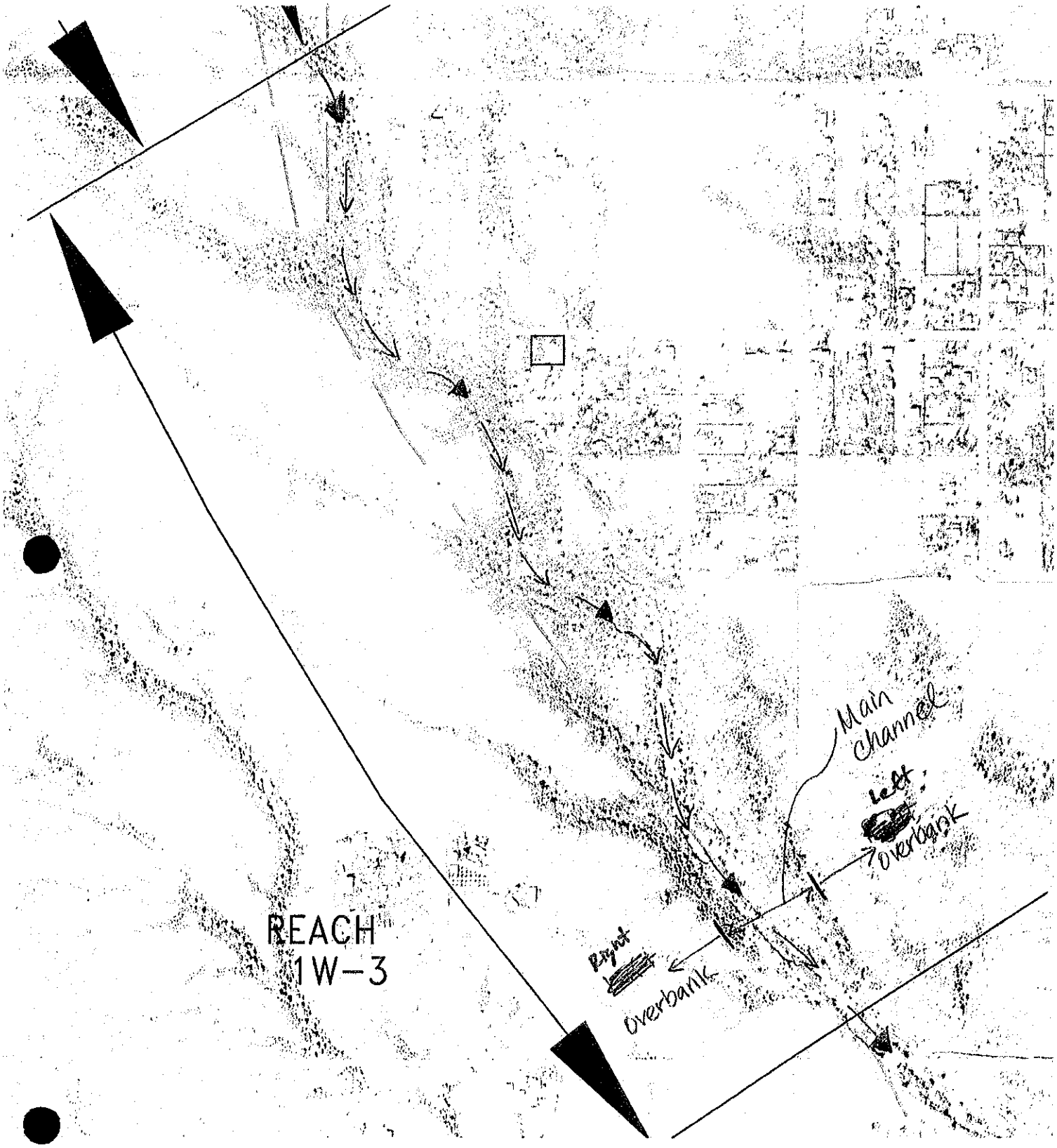

REACH
1W-3
Main channel
Left
overbank
Right
overbank

Table E-1

BY AMB DATE 1/24/2005
CHECK HAA/JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 1 West
Location: Reaches - 1W - 4 (Between just north of Pinnacle Peak Rd and just north of Deer Valley Rd)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.000	0.000	0.000
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.005	0.000	0.005
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.005		0.005
	Medium		.010-.025		0.020	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.001	0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.038**	**0.050**	**0.037**

Figure E-1
(Reach 1W - 4)

Figure 1 - (Photo #57) Left Overbank

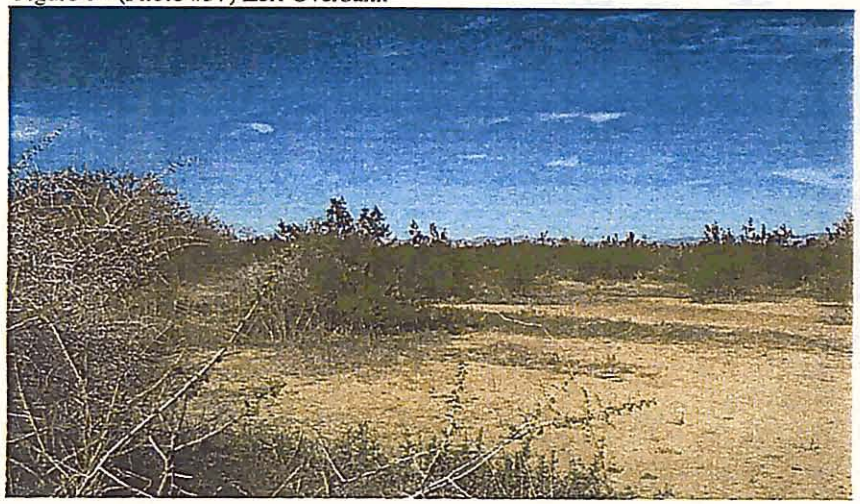


Figure 2 - (Photo #56) Channel

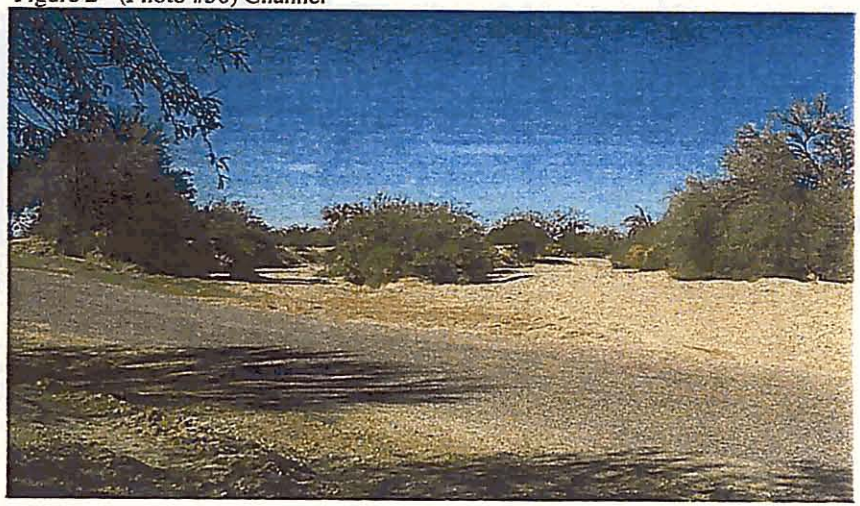
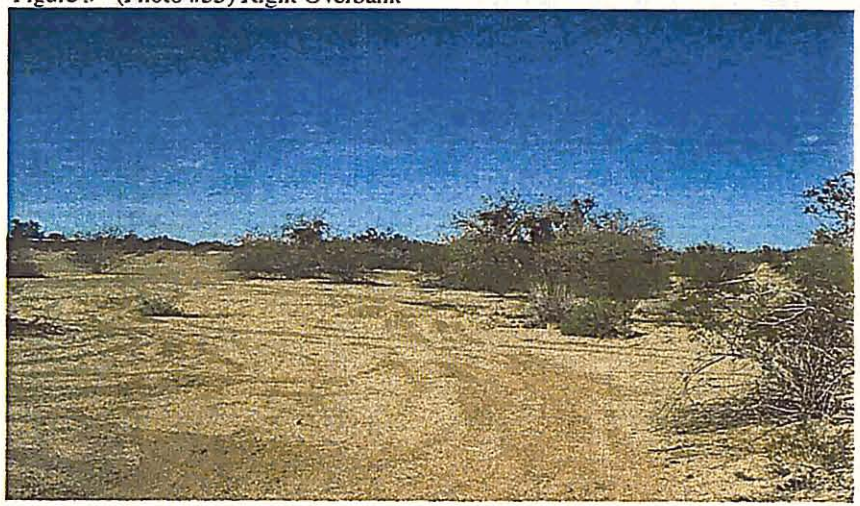


Figure 3 - (Photo #55) Right Overbank



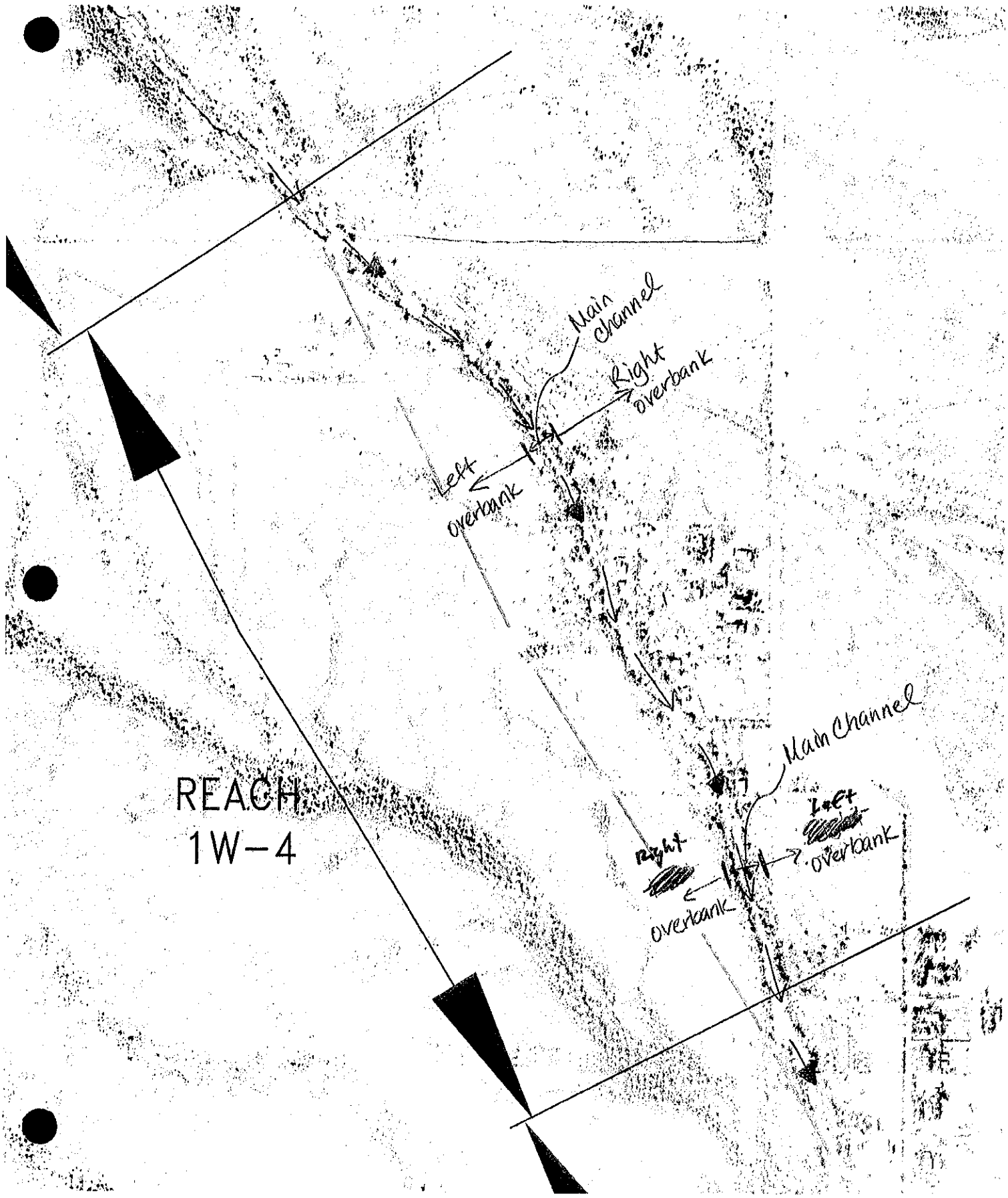

Main channel
Right overbank
Left overbank
Main Channel
Left overbank
Right overbank
REACH
1W-4

Table E-1

BY AMB DATE 1/24/2005
CHECK HAA/JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 1 West
Location: Reaches - 1W - 5B (Between Fairview Ave. alignment and Deer Valley Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.028	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.005	0.005	0.005
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.014	0.022	0.012
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.047**	**0.055**	**0.043**

FIGURE E-1: Wash 1W - 5B (n-value photo)

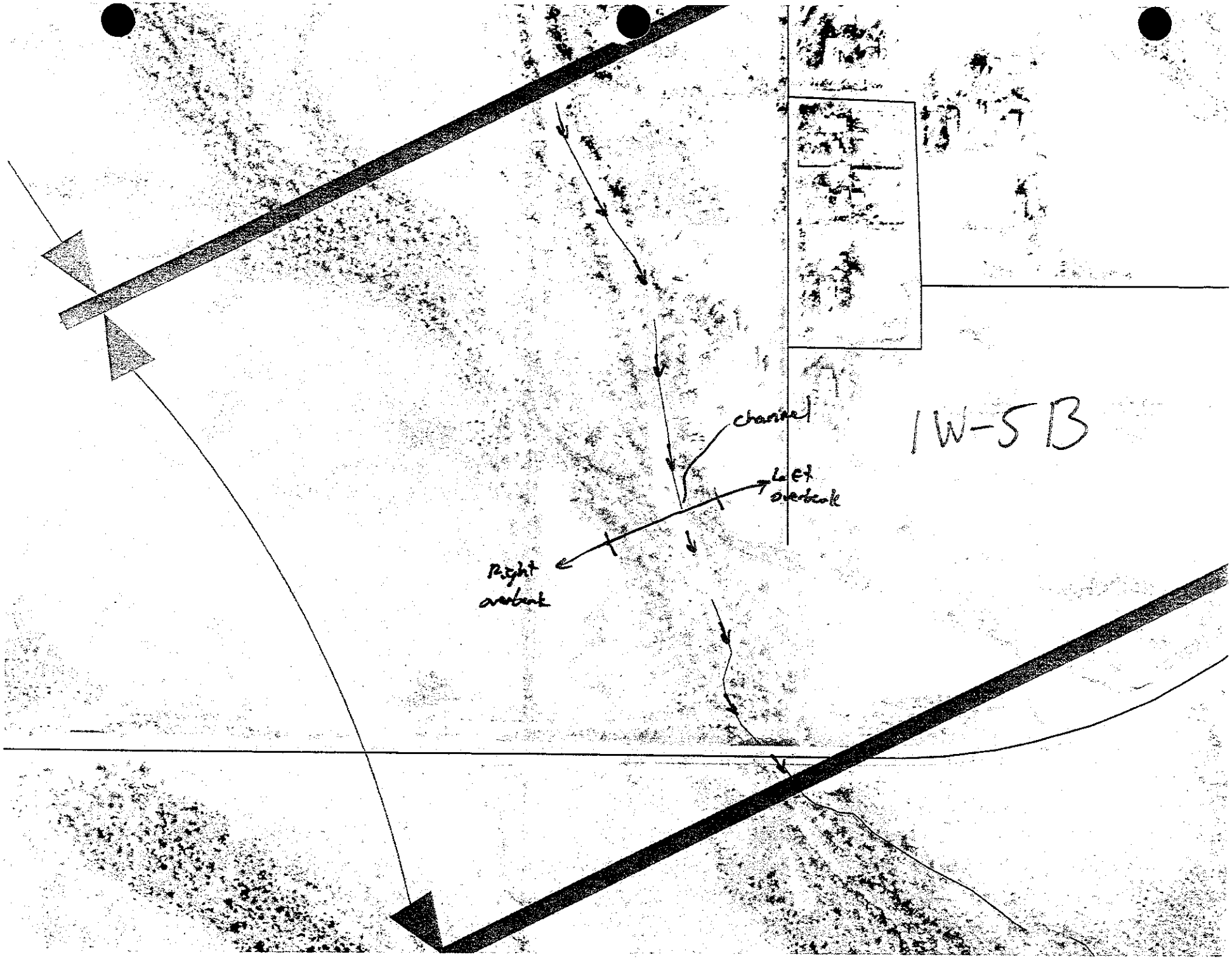

1W-5B
channel
Left overbank
Right overbank

Table E-1

BY AMB DATE 1/24/2005
CHECK HAA/JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 1 West
Location: Reaches - 1W - 5A (Between Deer Valley Rd. and just north of Beardsley Canal.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.028	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.005		0.005
	Moderate		.006-.010		0.006	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.015		0.010
	Large		.025-.050		0.032	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.003	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.048**	**0.069**	**0.043**

Figure E-1
(Reach 1W -5A)

Figure 1 - (Photo #54) Left Overbank

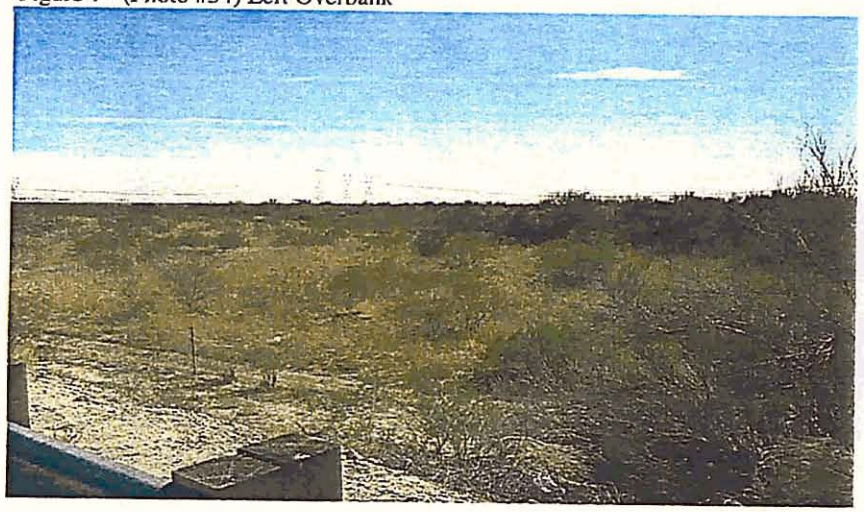
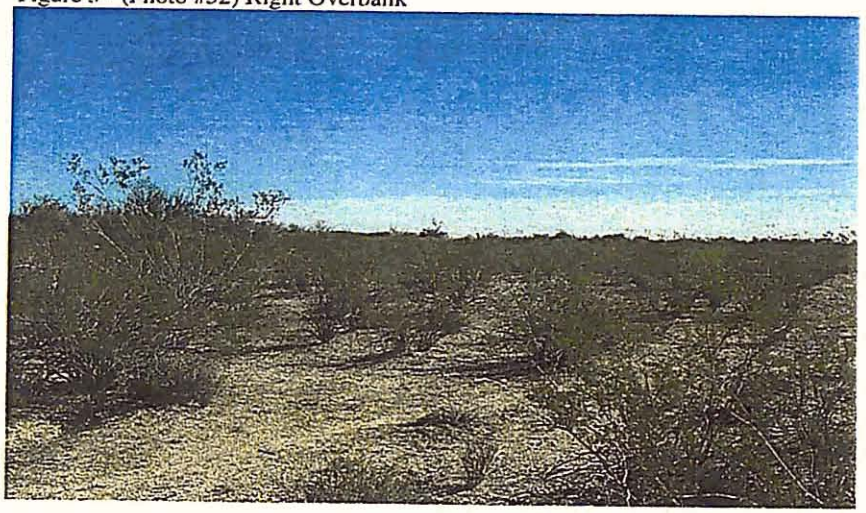
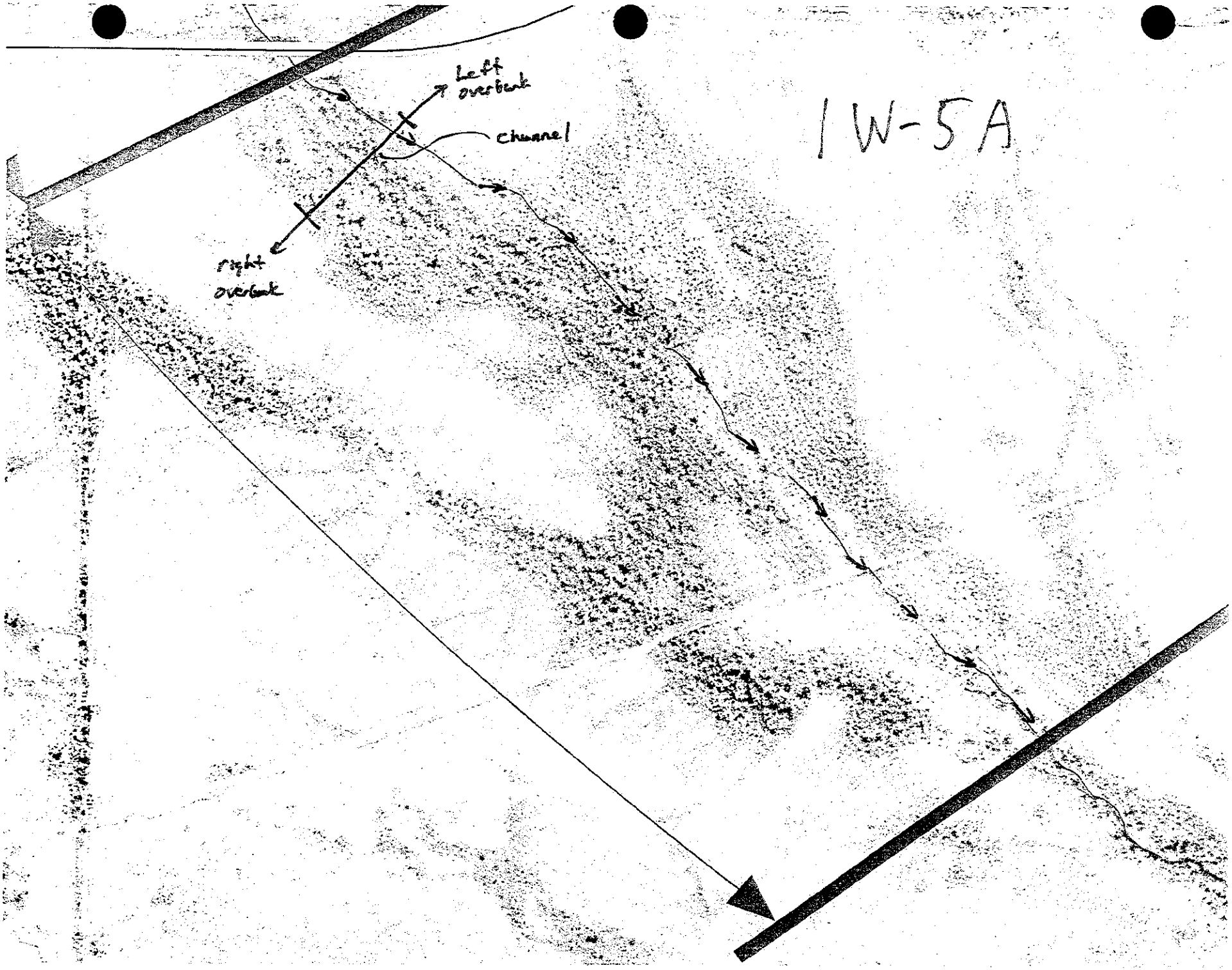


Figure 2 - (Photo #53) Channel

Figure 3 - (Photo #52) Right Overbank




Left overbank
channel
right overbank
1W-5A

Wash 1 East

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS/HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 1 East
Location: Reaches - 1E - 1B (Between the south side of the CAP Canal and just north of U.S. 60)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.030	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.016	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.046**	**0.034**

FIGURE E-1: Wash 1E - 1B (n-value photo)

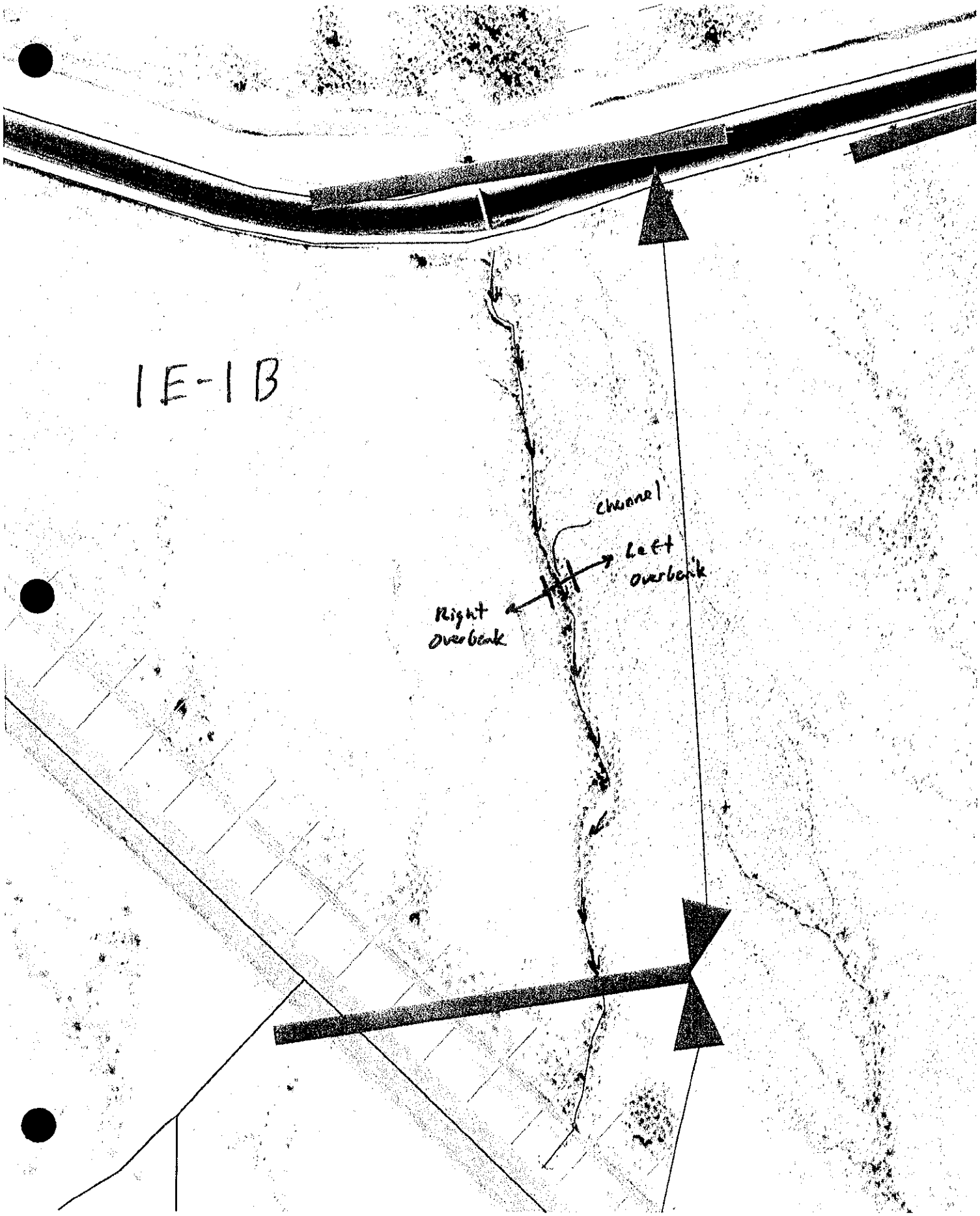

1E-1B
channel
Left overbank
Right overbank

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS/HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 1 East
Location: Reaches - 1E - 1A (Between just north of U.S. 60 and just north of confluence with Wash 1 West)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.028		0.026
	Gravel		.028-.035		0.032	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.005	0.005	0.005
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			0.009
	Medium		.010-.025	0.010	0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.001	0.001
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.044**	**0.056**	**0.041**

Figure E-1
(Reach 1E - 1A)

Figure 1 - (Photo #71) Left Overbank looking upstream

Figure 2 - (Photo #69) Channel looking upstream

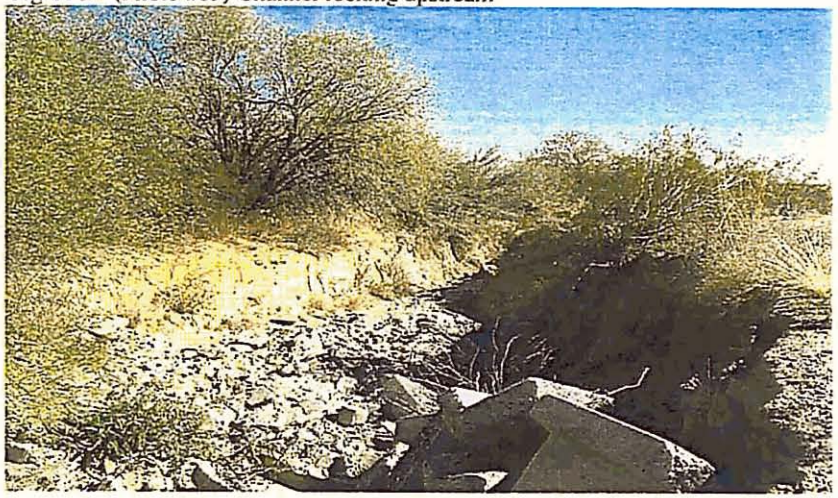
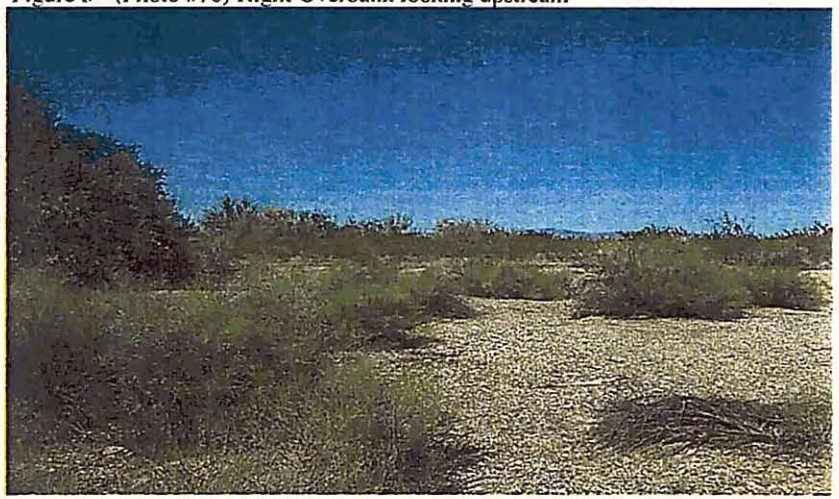
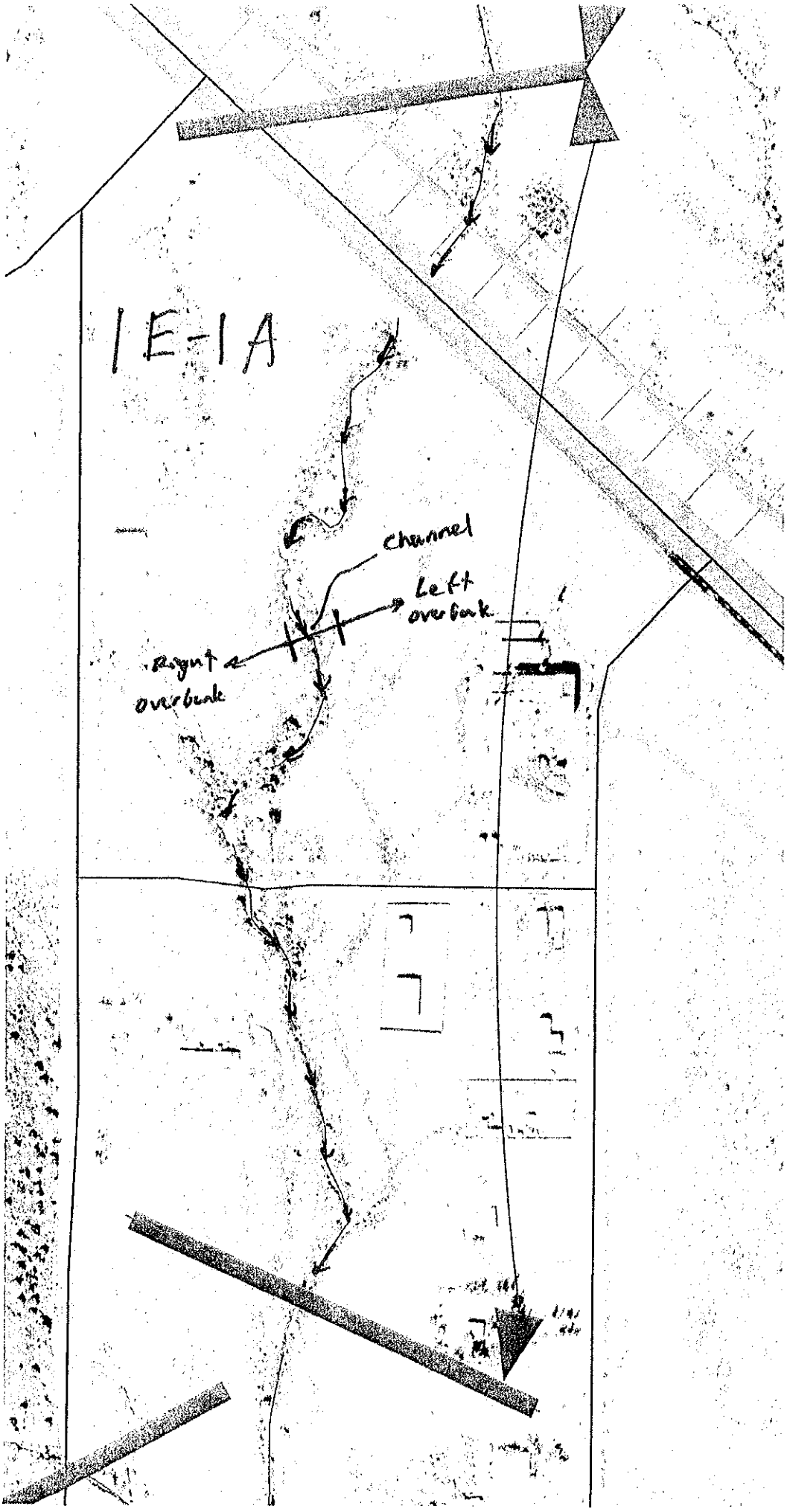


Figure 3 - (Photo #70) Right Overbank looking upstream




1E-1A
channel
Left overbank
Right overbank

Wash 2 East

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 2/14/2005

Project: Wittmann ADMSU
Stream: Wash 2 East
Location: Reaches - 2E - 1 (Between the south side of the CAP Canal and Jomax Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.002	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010	0.020	0.010
	Medium		.010-.025			
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.048**	**0.035**

Figure E-1
(Reach 2E - 1)

Figure 1 - (Photo #308) Left Overbank looking upstream

Figure 2 - (Photo #63) Channel looking upstream

Figure 3 - (Photo #307) Right Overbank looking upstream

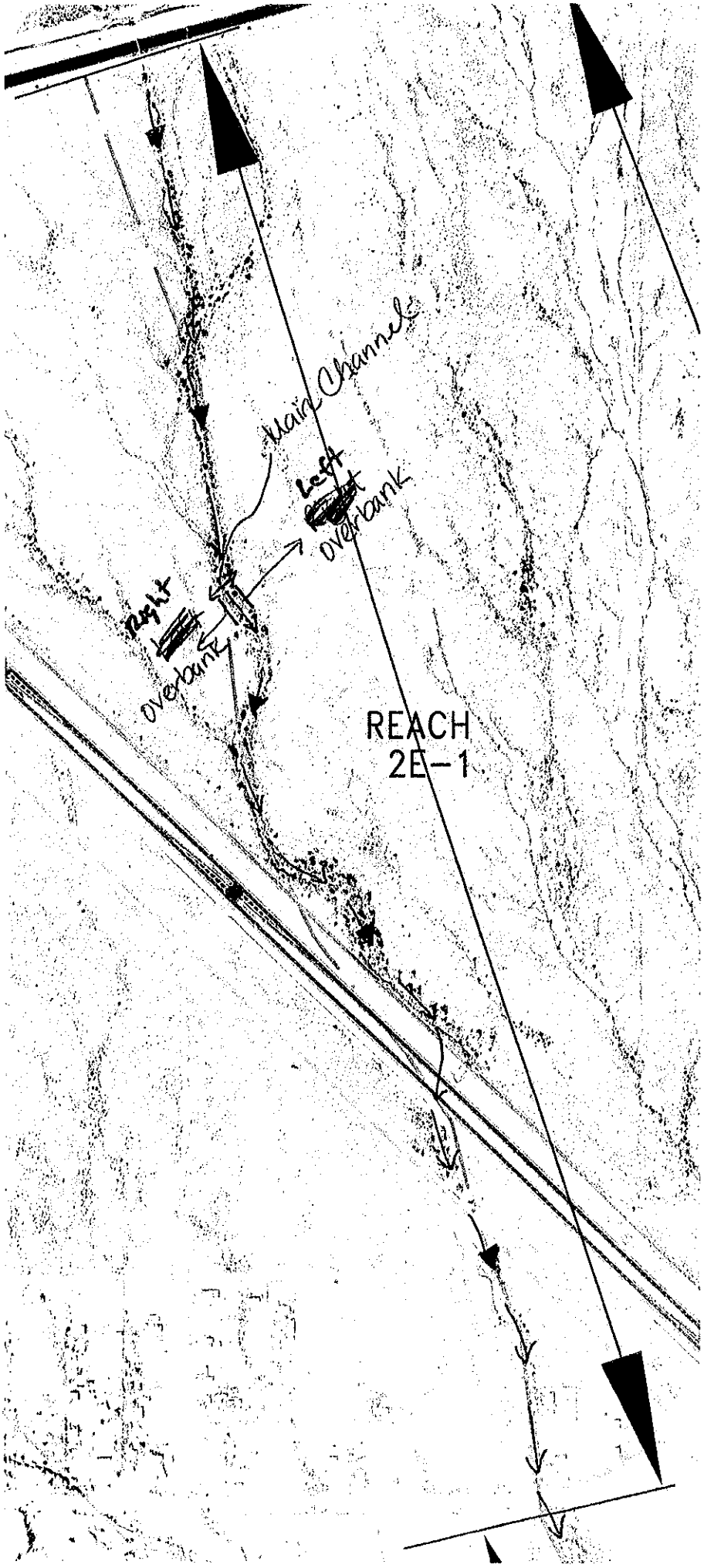

Main Channel
Left
overbank
Right
overbank
REACH
2E-1

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 2/14/2005

Project: Wittmann ADMSU
Stream: Wash 2 East
Location: Reaches - 2E - 2 (Between Jomax Rd. and the confluence with Wash 1 West)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.013		0.010
	Large		.025-.050		0.030	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.005	0.005	0.005
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.044**	**0.063**	**0.041**

Figure E-1
(Reach 2E - 2)

Figure 1. (Photo #310) Channel looking downstream.

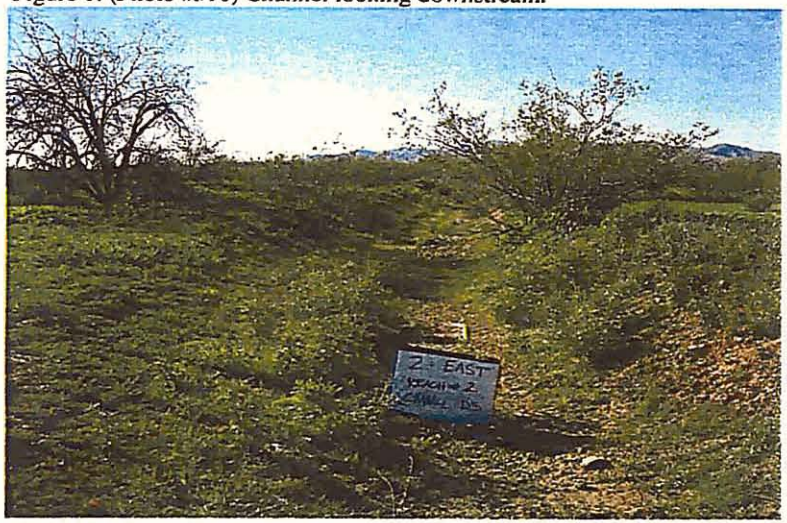


Figure 2. (Photo #311) Right Overbank looking downstream.

Figure 3. (Photo #309) Left Overbank looking downstream.

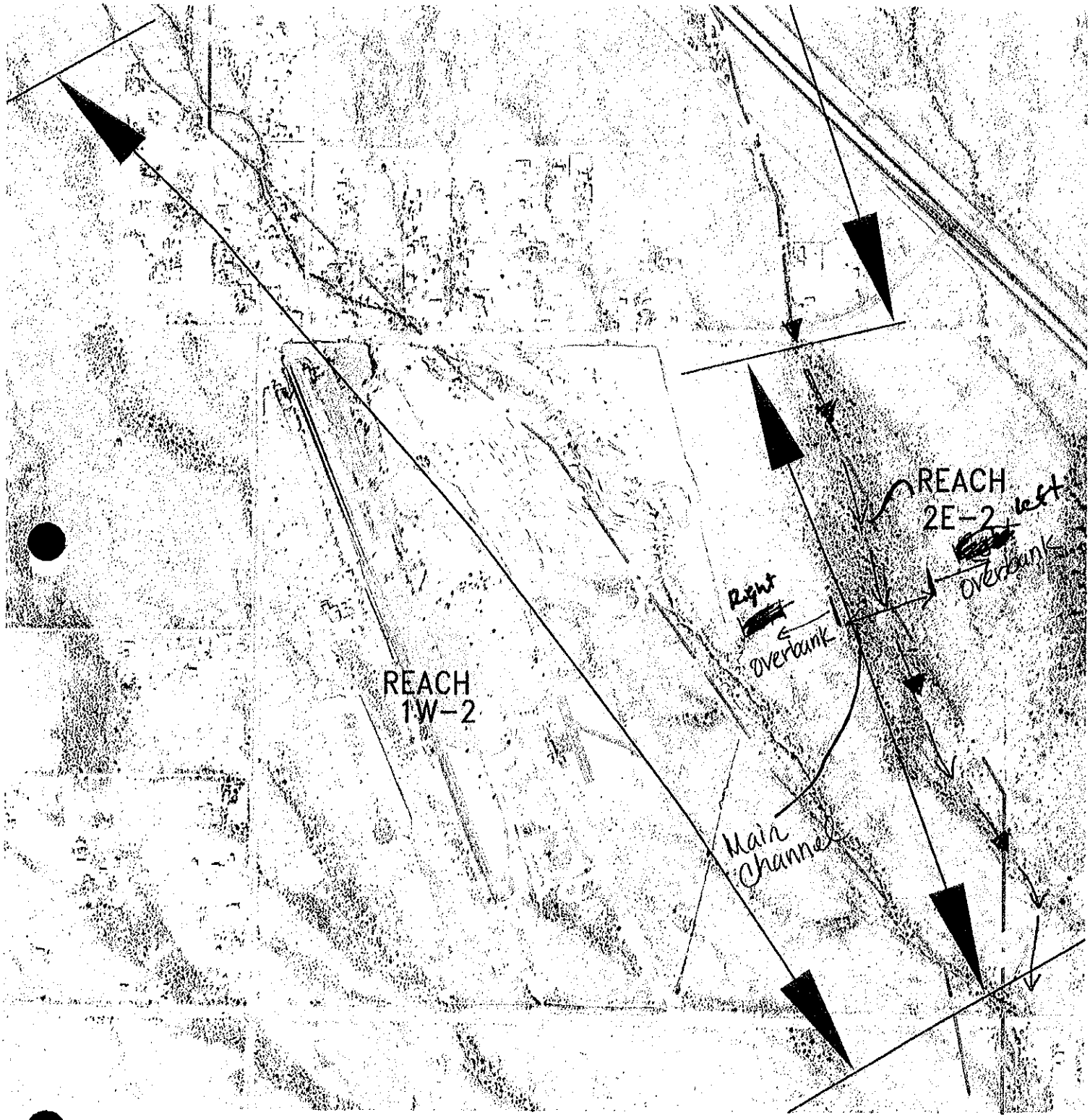

REACH
2E-2
left
overbank
Right
overbank
REACH
1W-2
Main
Channel

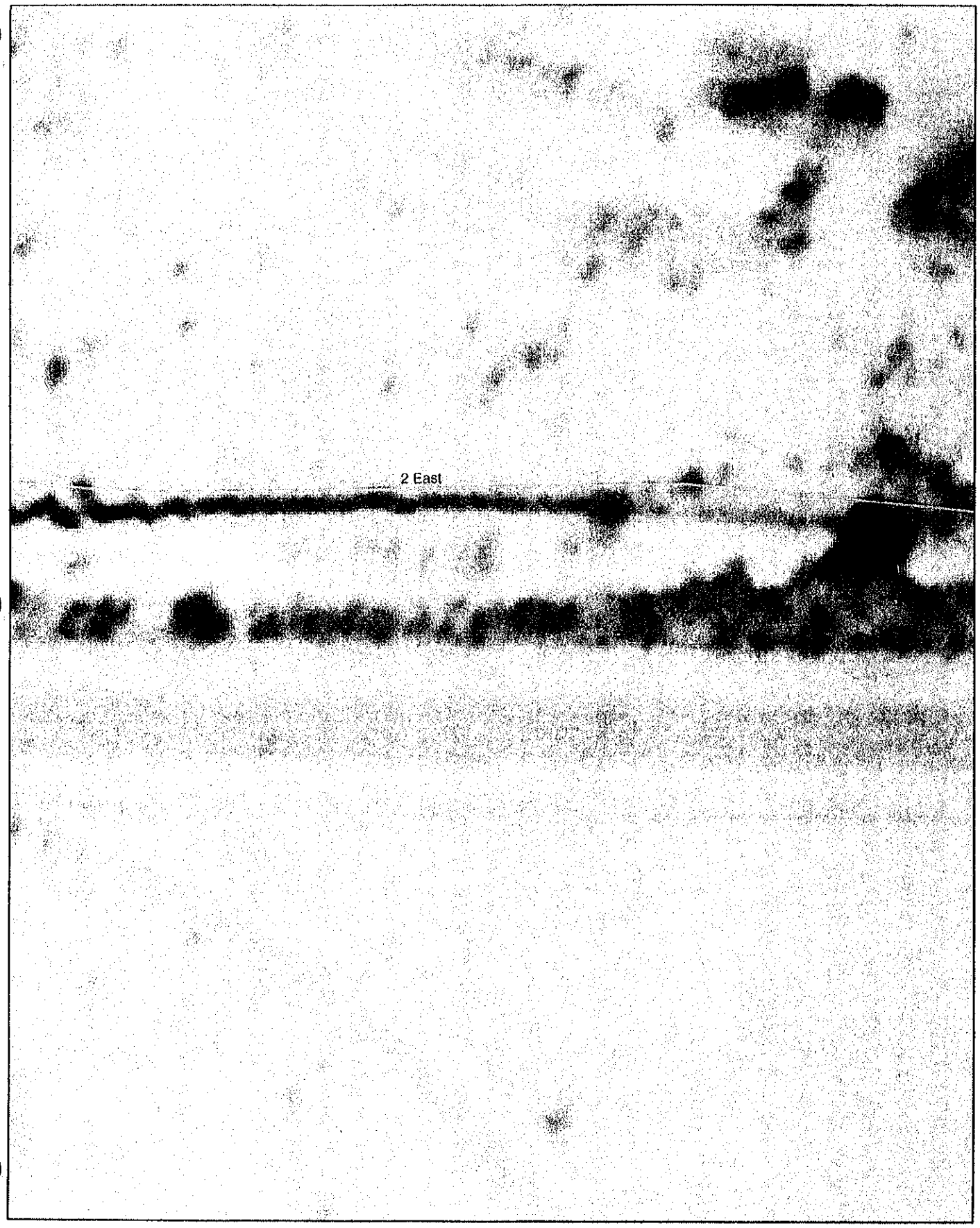
Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 2/14/2005

Project: Wittmann ADMSU
Stream: Wash 2 East
Location: Reaches - 2E - 3 (Along Happy Valley Rd. near 183rd Ave.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.026	0.028	0.026
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.006
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.043**	**0.032**

FIGURE E-1: Wash 2E- 3 (n-value photo)



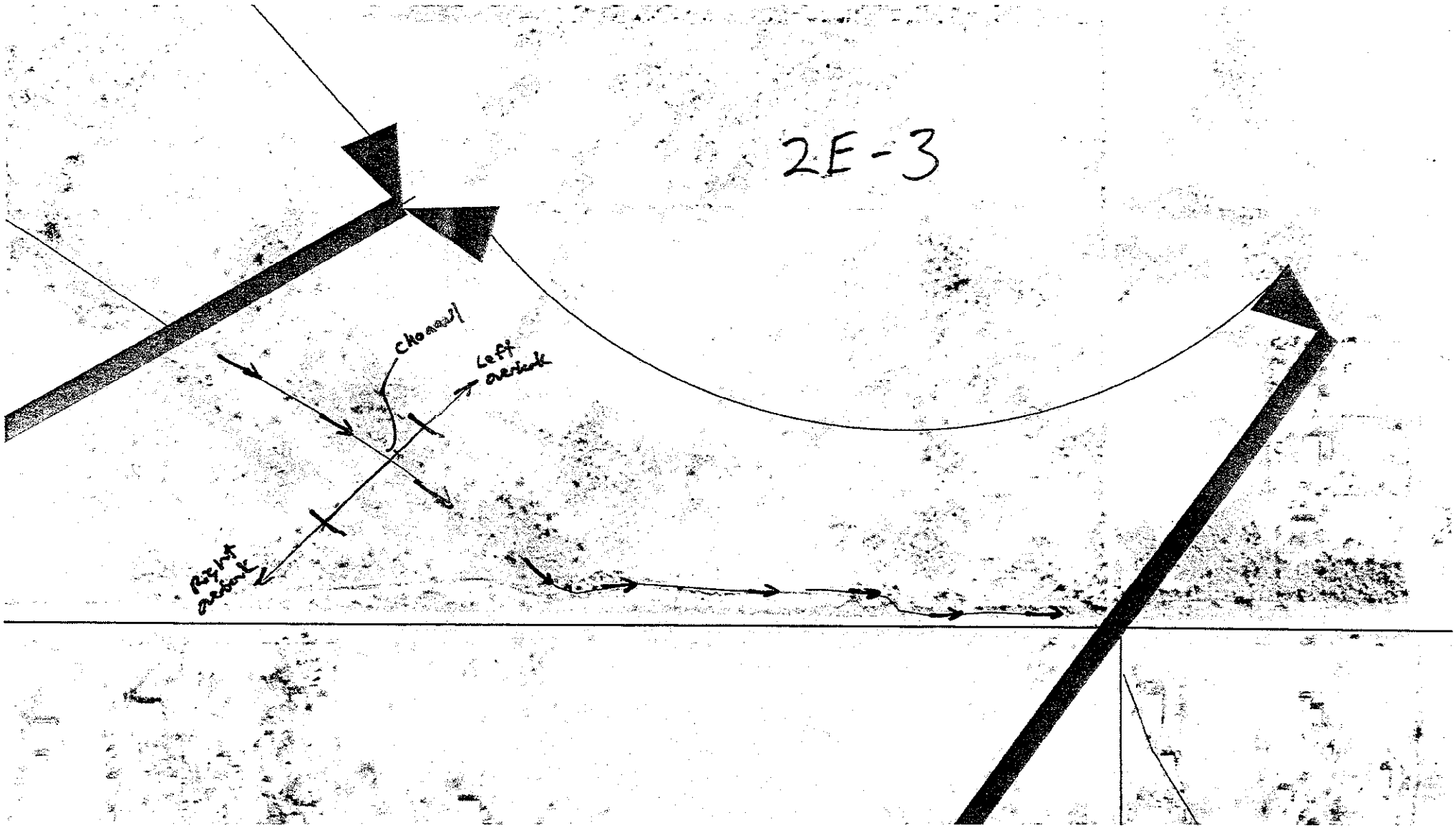

2E-3
Chokeout
Left overtack
Right overtack

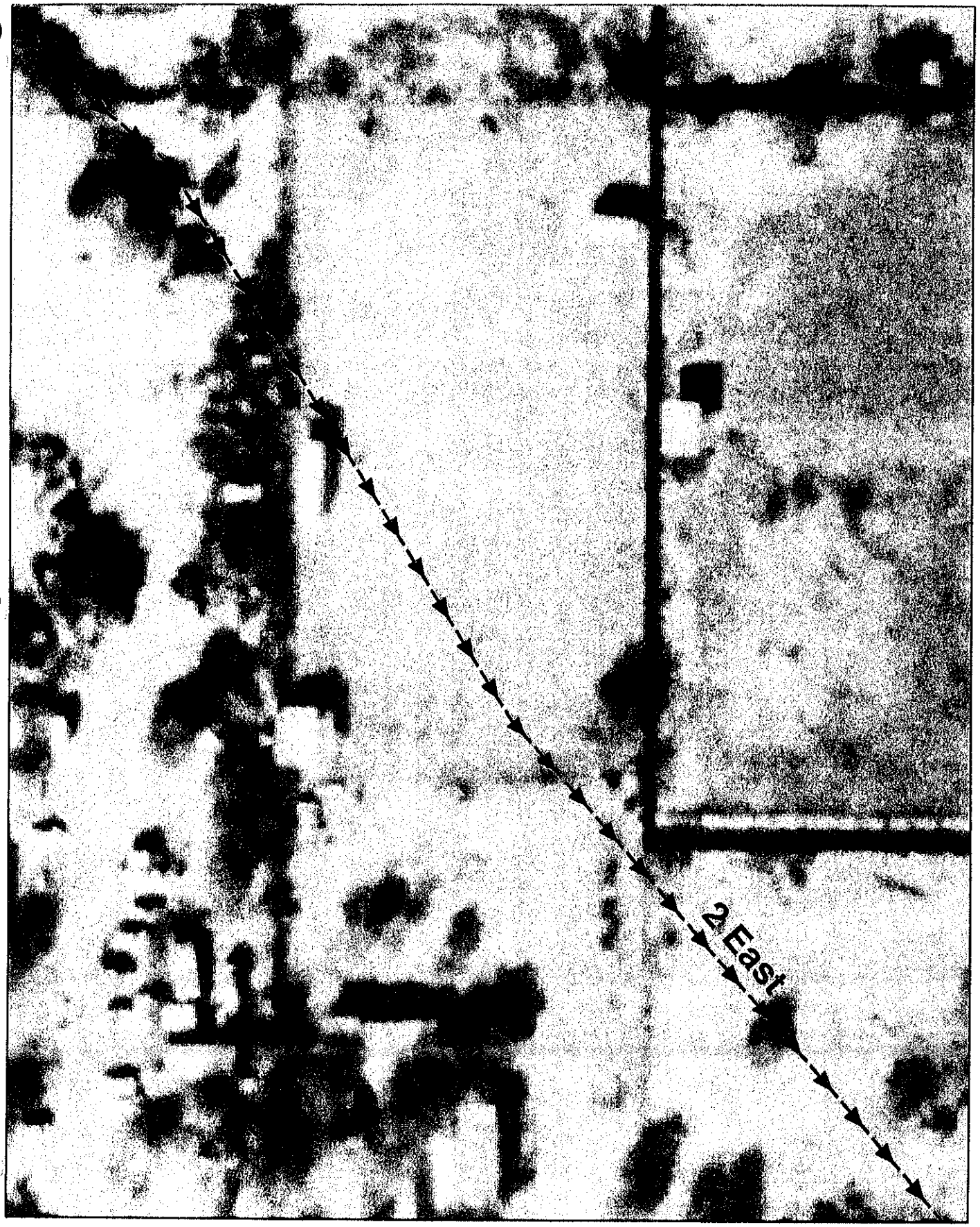
Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 2/14/2005

Project: Wittmann ADMSU
Stream: Wash 2 East
Location: Reaches - 2E - 4 (Between Happy Valley Rd. and Norwich Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.026	0.028	0.026
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004			
	Minor		.005-.015	0.010	0.010	0.010
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008	0.008	0.008
	Medium		.010-.025			
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.004	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.046**	**0.050**	**0.046**

FIGURE E-1: Wash 2E- 4 (n-value photo)



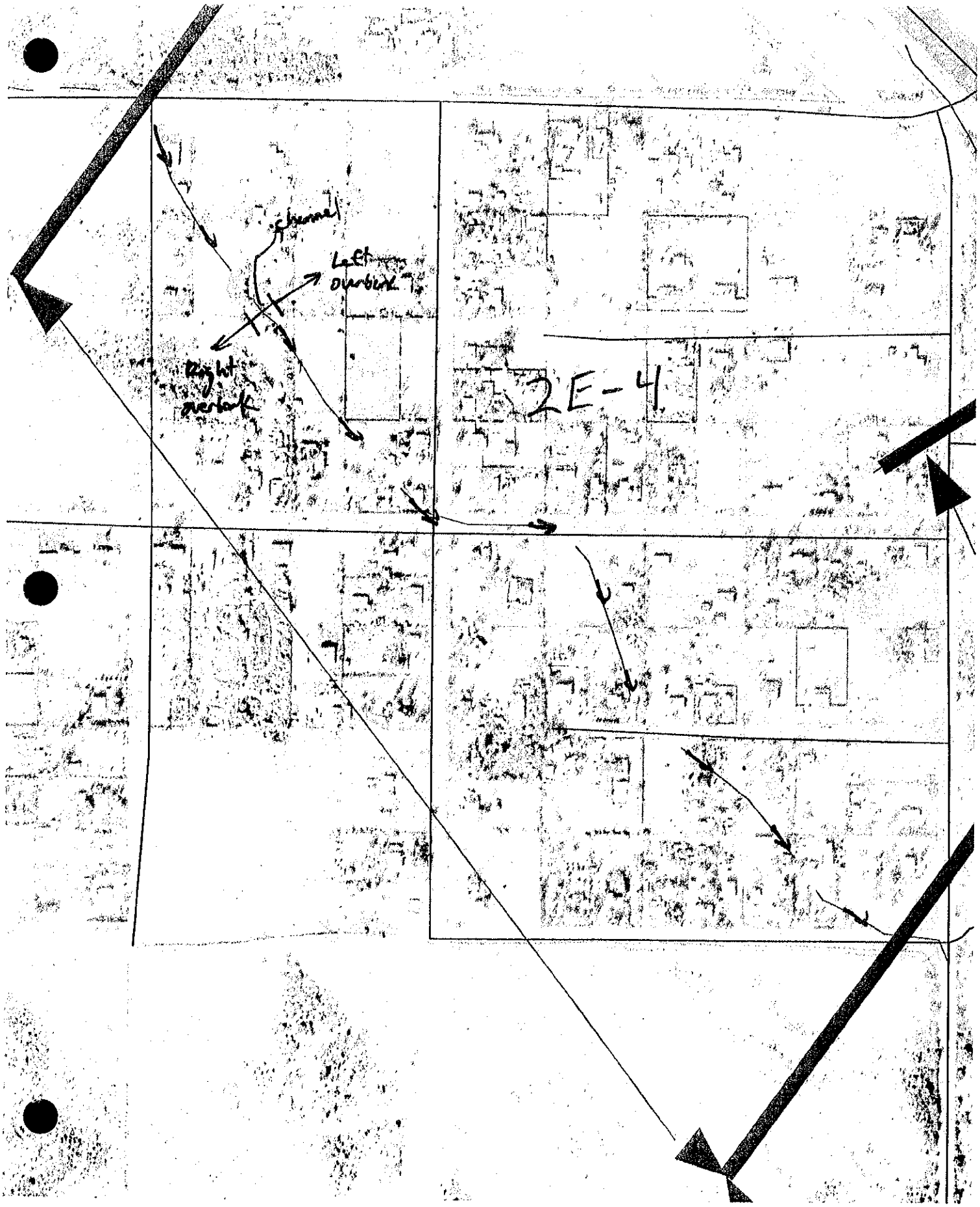

channel
Left overbank
Right overbank
2E-4

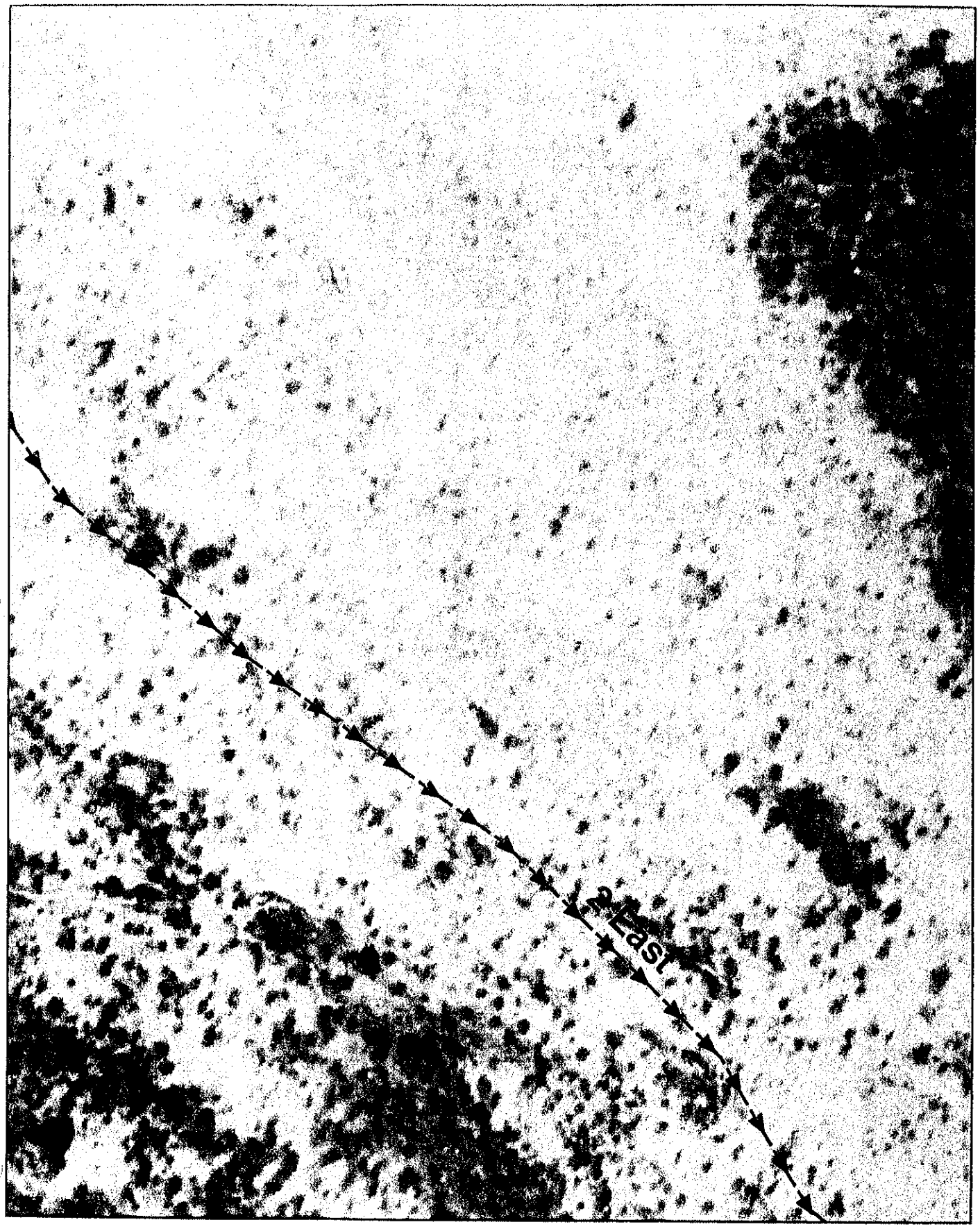
Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 2/14/2005

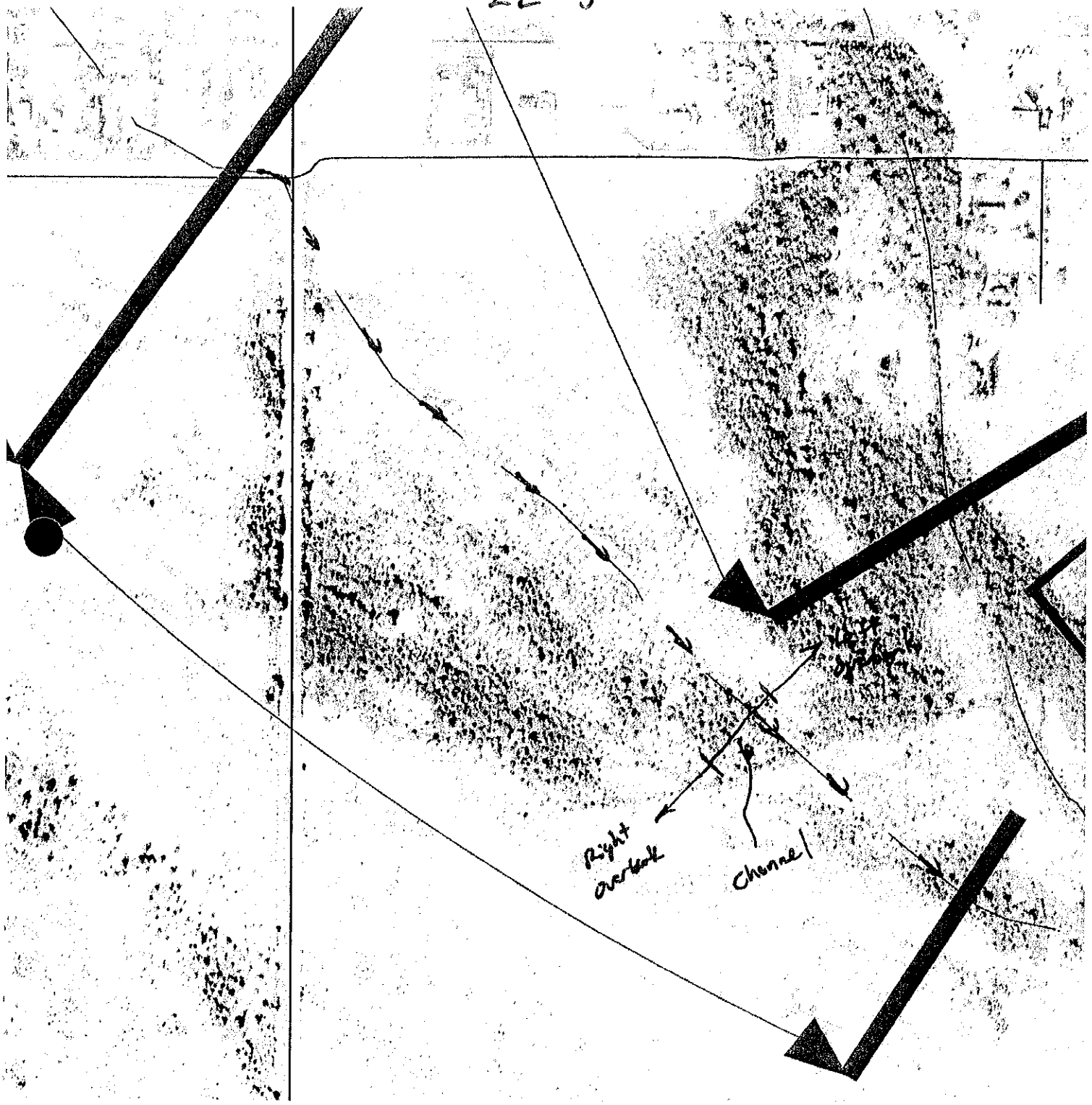
Project: Wittmann ADMSU
Stream: Wash 2 East
Location: Reaches - 2E - 5 (Between Norwich Rd. and Deer Valley Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.026	0.028	0.026
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.001	0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.047**	**0.035**

FIGURE E-1: Wash 2E- 5 (n-value photo)



2E-5



Wash 3 East

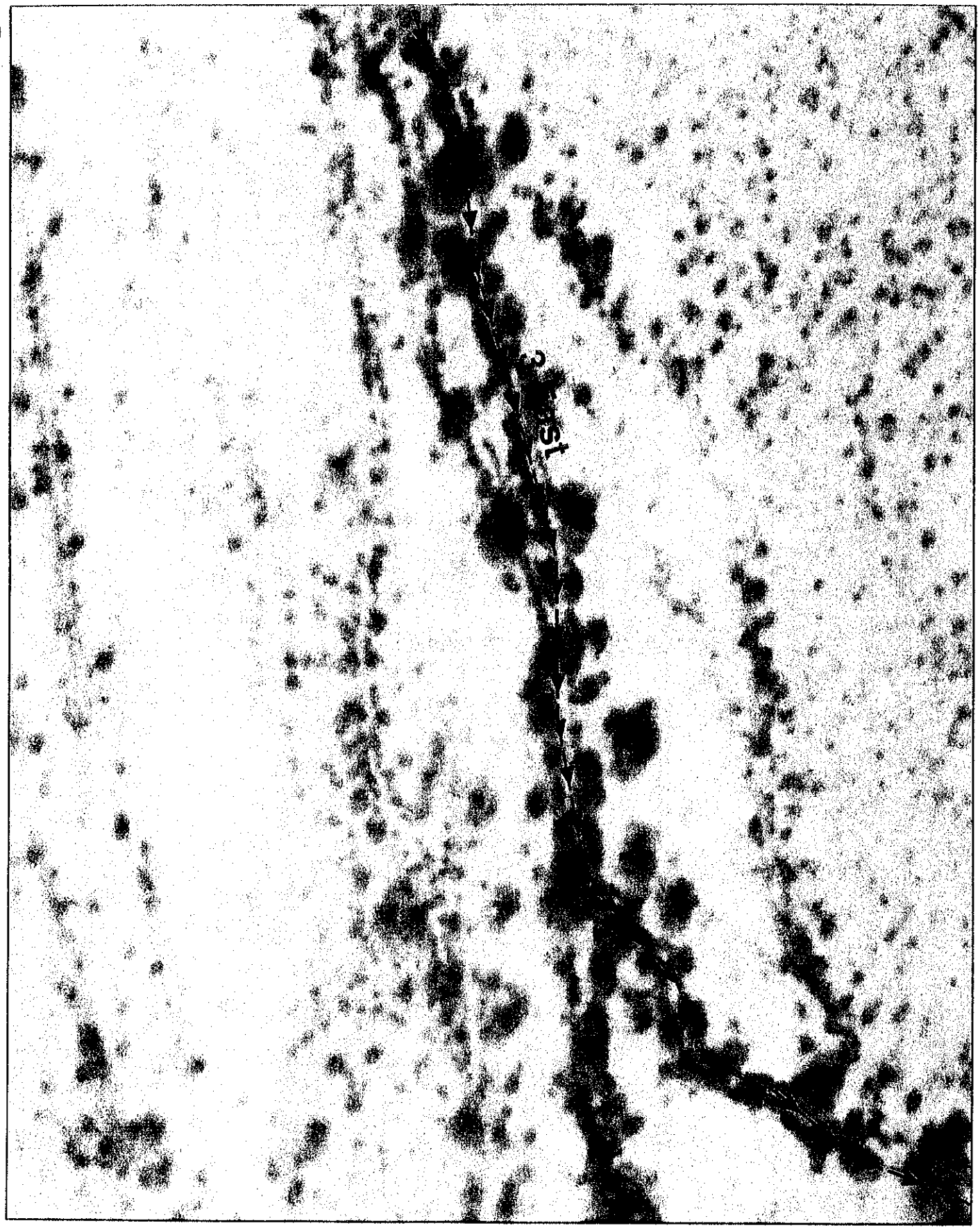
Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 3 East
Location: Reaches - 3E - 1 (Between the south side of the CAP Canal and just south of the alignment of Patton Rd)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.005		0.005
	Moderate		.006-.010		0.006	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.012	0.020	0.012
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0		0.000	
	Occ. Alt.		.001-.005	0.001		0.002
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.044**	**0.054**	**0.045**

FIGURE E-1: Wash 3E- 1 (n-value photo)



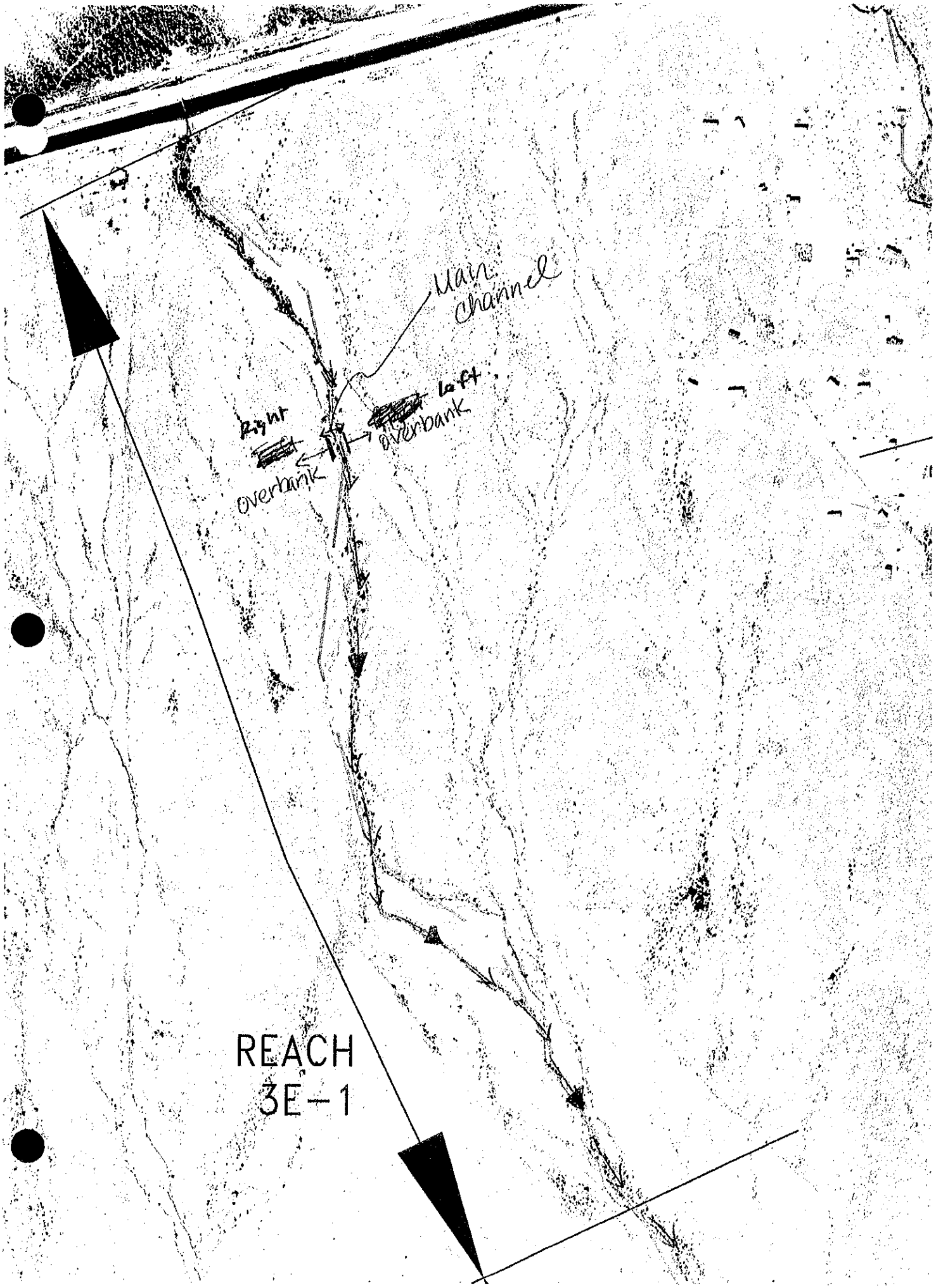

Main channel
Left
overbank
Right
overbank
REACH
3E-1

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 3 East
Location: Reaches - 3E - 2 (Between just south of the alignment of Patton Rd and the confluence with Wash 4 East)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.005	0.005	0.005
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.013	0.025	0.013
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.001	0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.045**	**0.059**	**0.045**

Figure E-1
(Reach 3E - 2)

Figure 1. (Photo #301) Channel looking upstream.

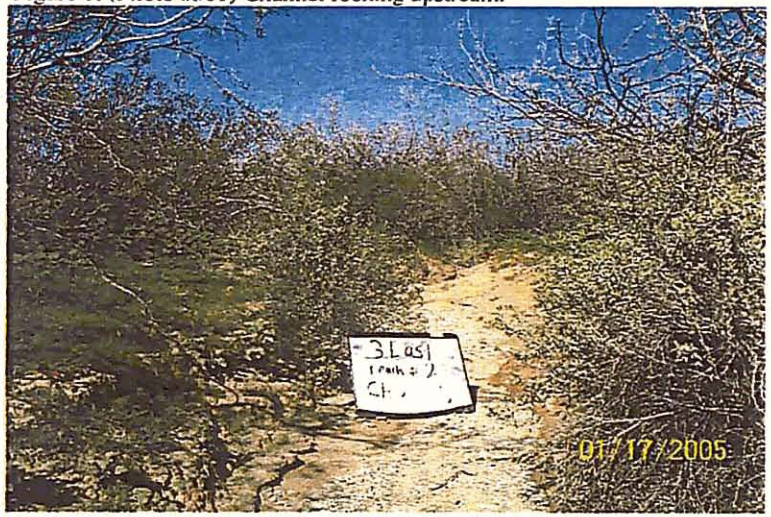


Figure 2. (Photo #302) Left Overbank looking upstream.

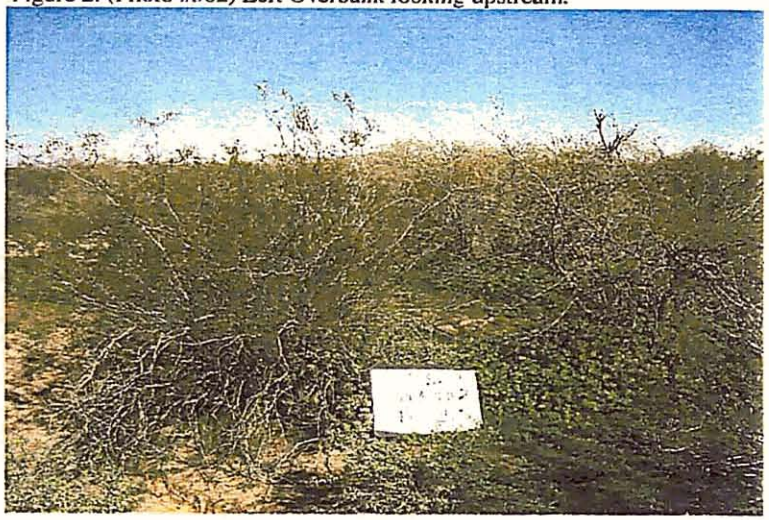


Figure 3. (Photo #300) Right Overbank looking upstream.

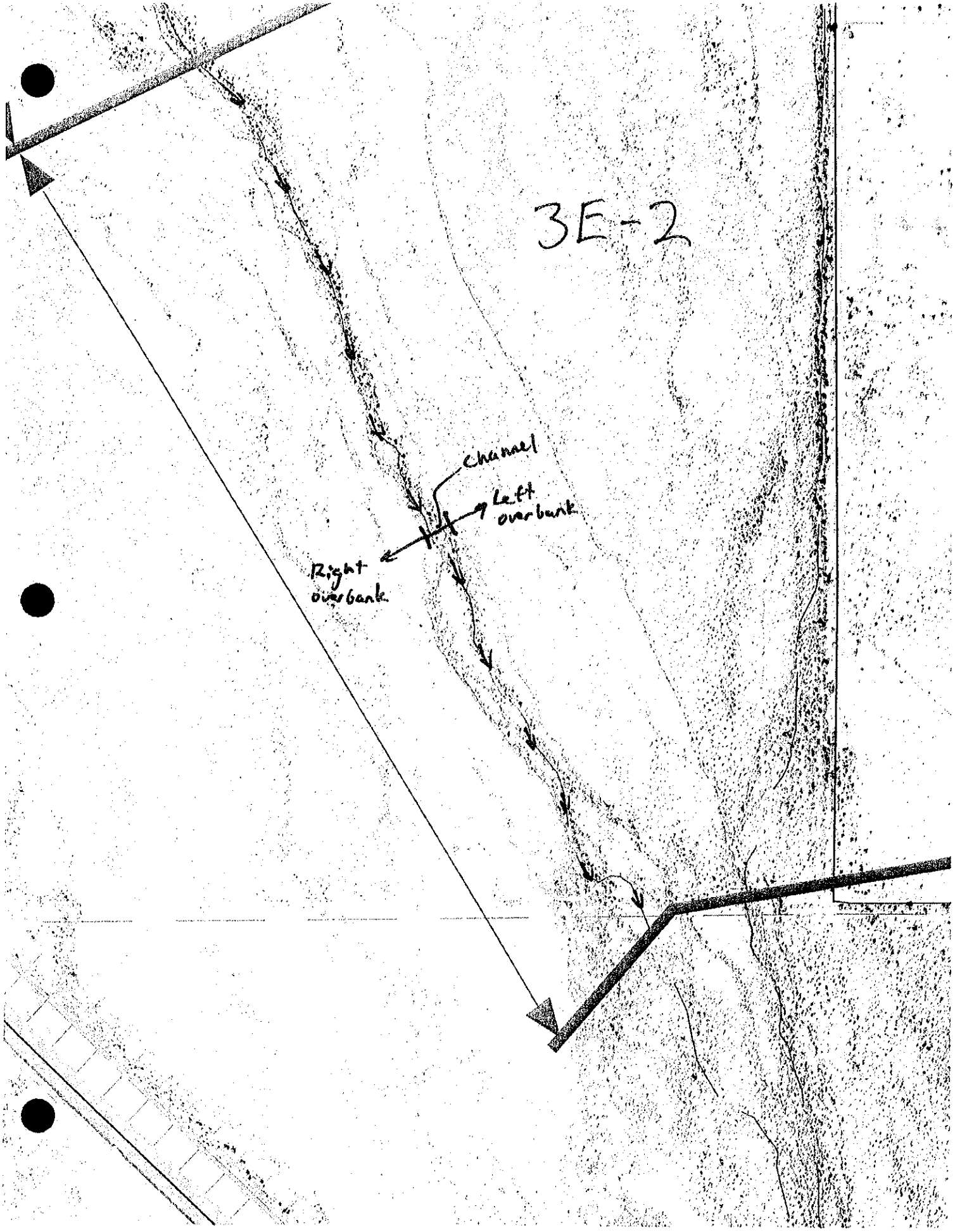

3E-2
Channel
Left overbank
Right overbank

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 3 East
Location: Reaches - 3E - 3 (Between the confluence with Wash 4 East and just south of the US 60)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.026	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.002	0.001	0.002
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008	0.001	0.008
	Medium		.010-.025			
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.038**	**0.030**	**0.038**

Figure E-1
(Reach 3E - 3)

Figure 1. (Photo #313) Channel looking downstream.

Figure 2. (Photo #314) Left Overbank looking downstream.

Figure 3. (Photo #312) Right Overbank looking upstream.

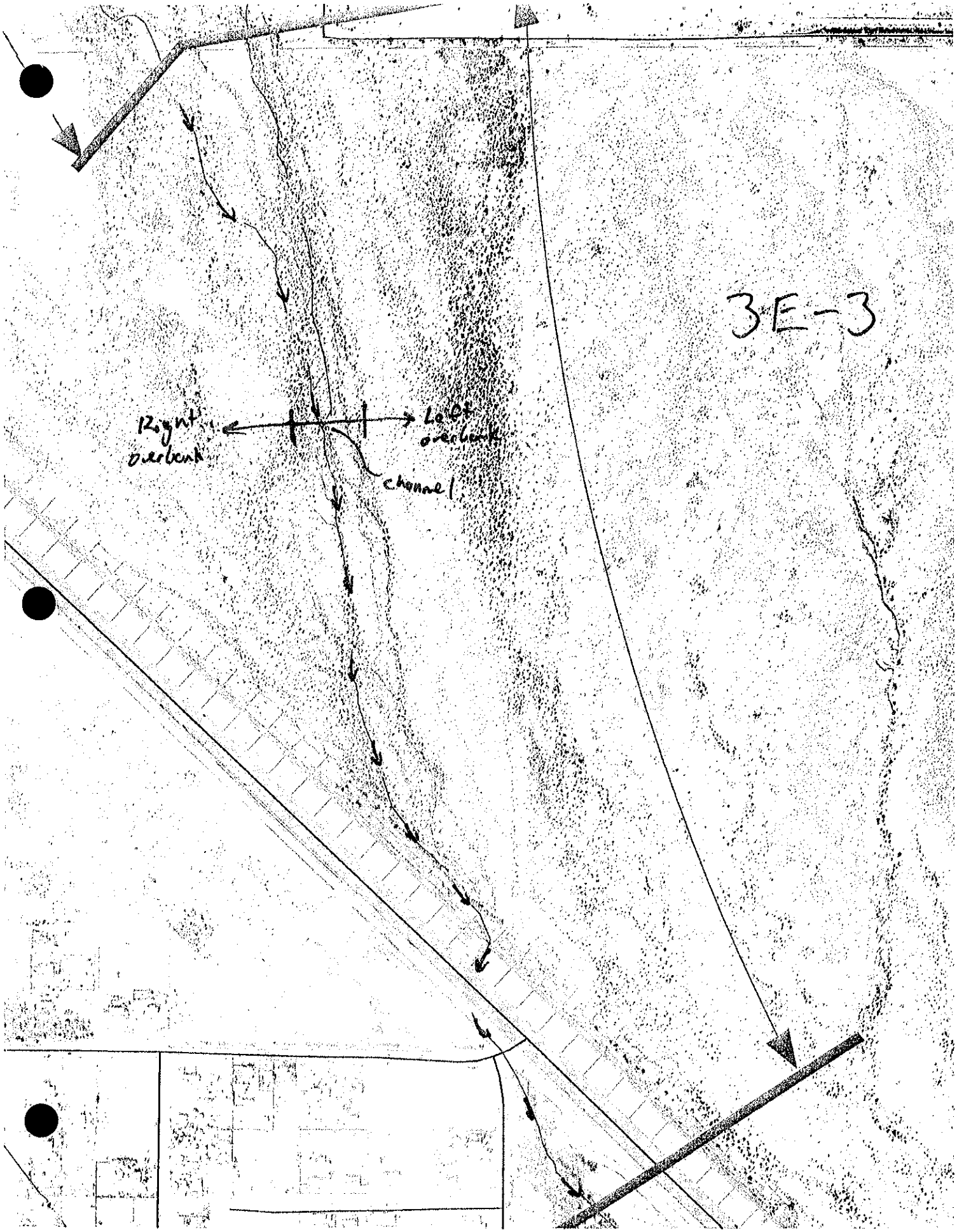

3E-3
Right overbank
Left overbank
channel

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 3 East
Location: Reaches - 3E - 4A (Between just south of the US 60 and just south of Norwich Dr.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.002	0.003	0.002
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004		0.004	
	Minor		.005-.015	0.015		0.010
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.005
	Medium		.010-.025		0.025	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.003	
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.051**	**0.064**	**0.043**

Figure E-1
(Reach 3E - 4A)

Figure 1 - (Photo #60) Left Overbank looking downstream.

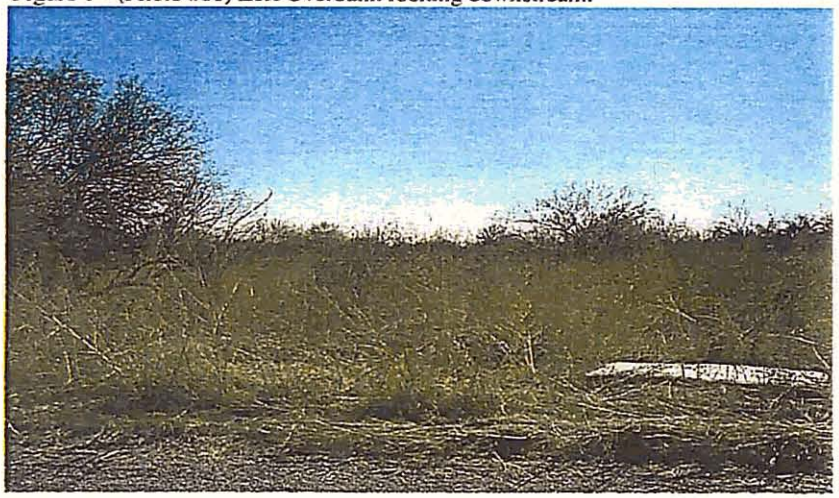


Figure 2 - (Photo #58) Channel looking downstream.

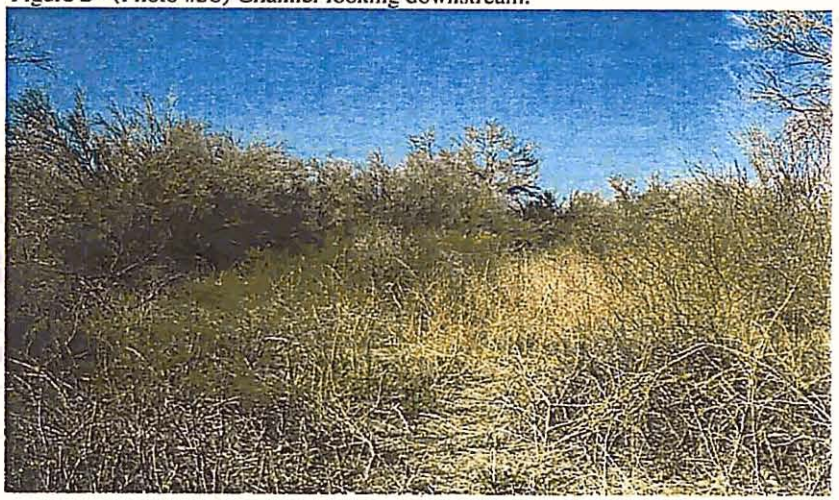
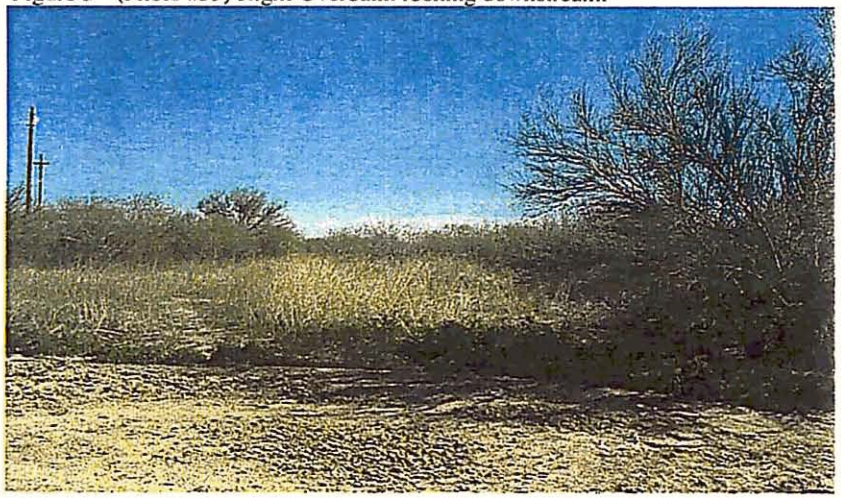


Figure 3 - (Photo #59) Right Overbank looking downstream.



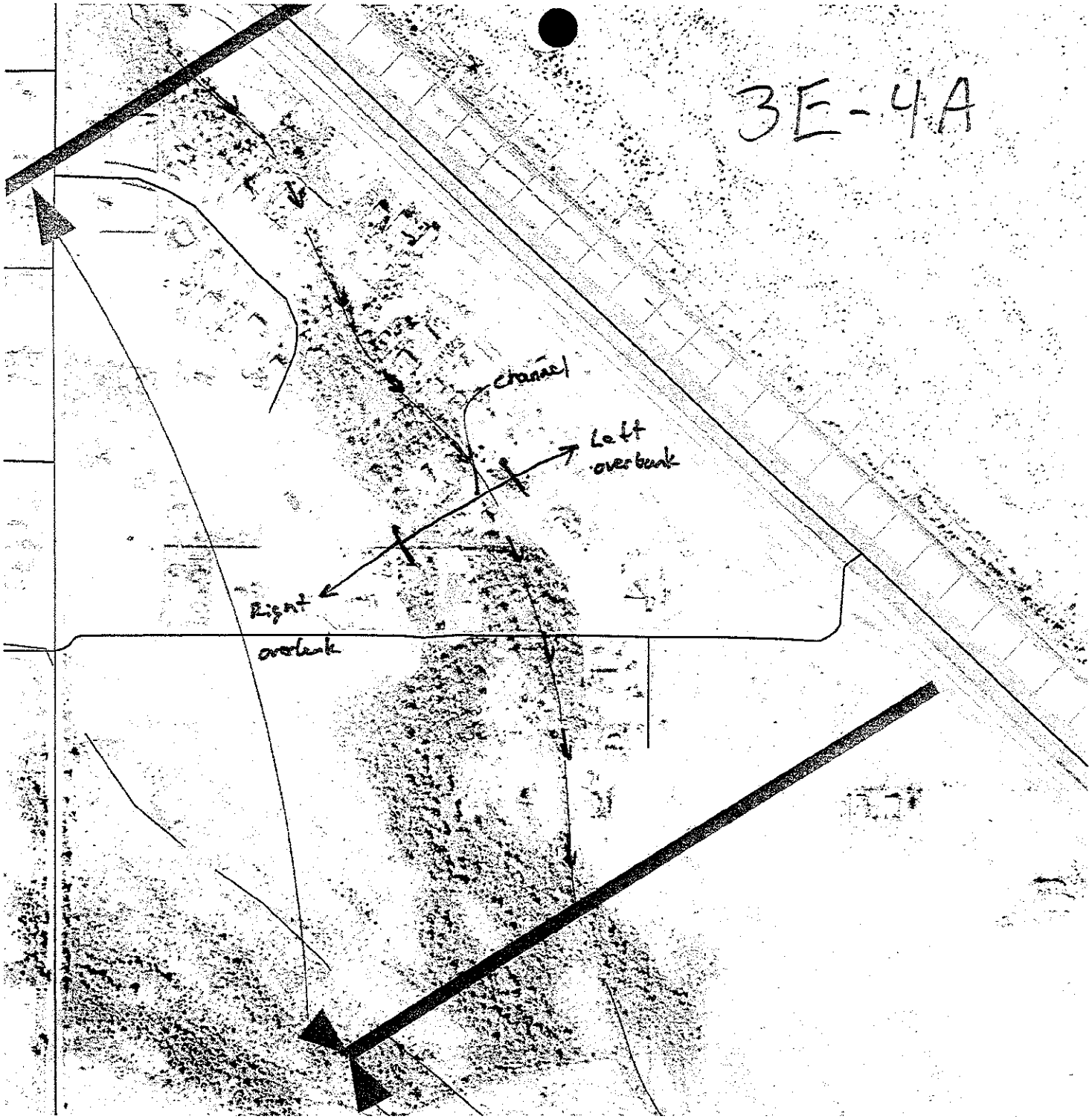

3E-4A
channel
Left
overbank
Right
overbank

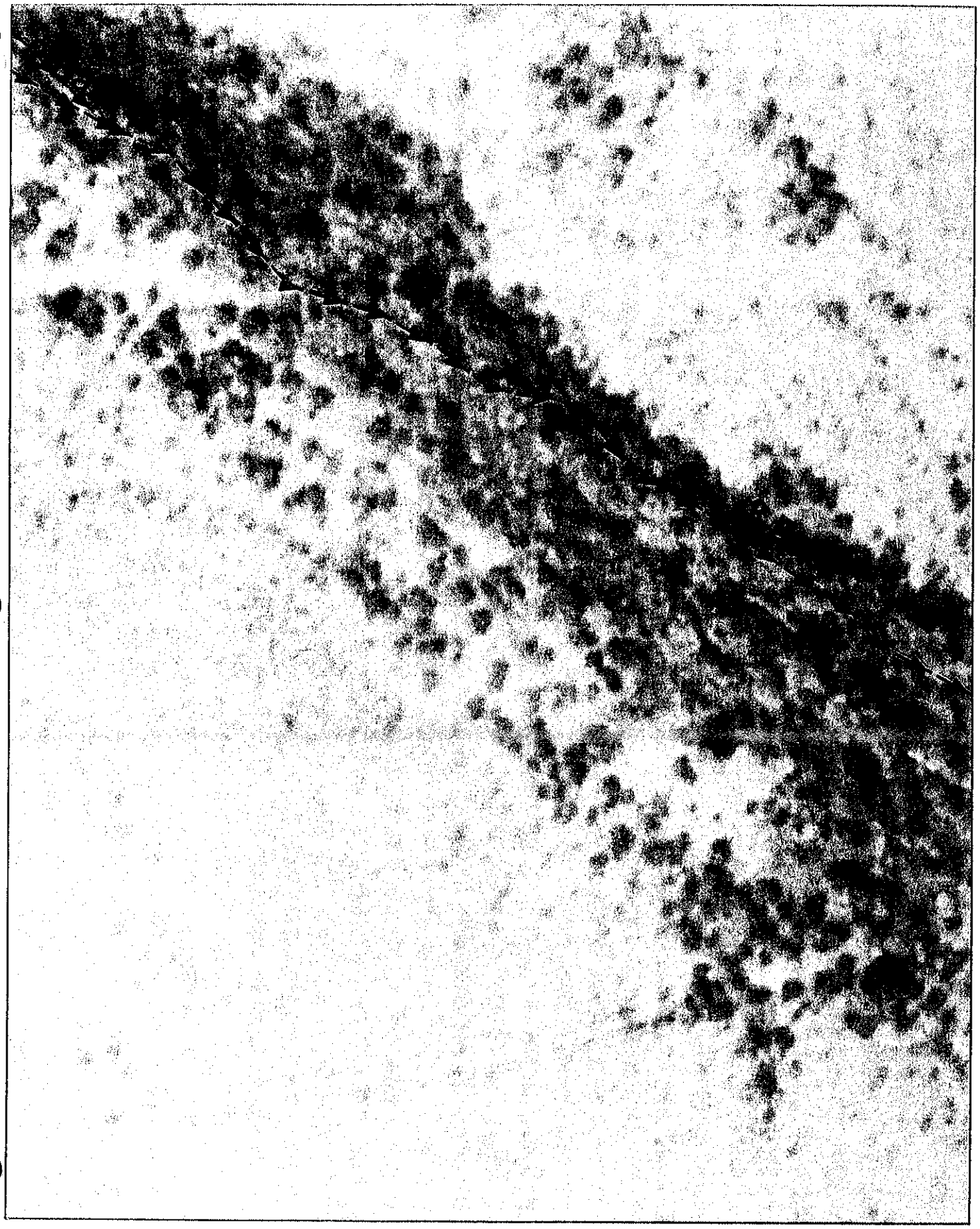
Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 3 East
Location: Reaches - 3E - 4B (Between just south of Norwich Dr. and Deer Valley Rd)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.002		0.002
	Moderate		.006-.010		0.006	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010		0.010
	Large		.025-.050		0.030	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.003	
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.038**	**0.068**	**0.038**

FIGURE E-1: Wash 3E- 4b (n-value photo)



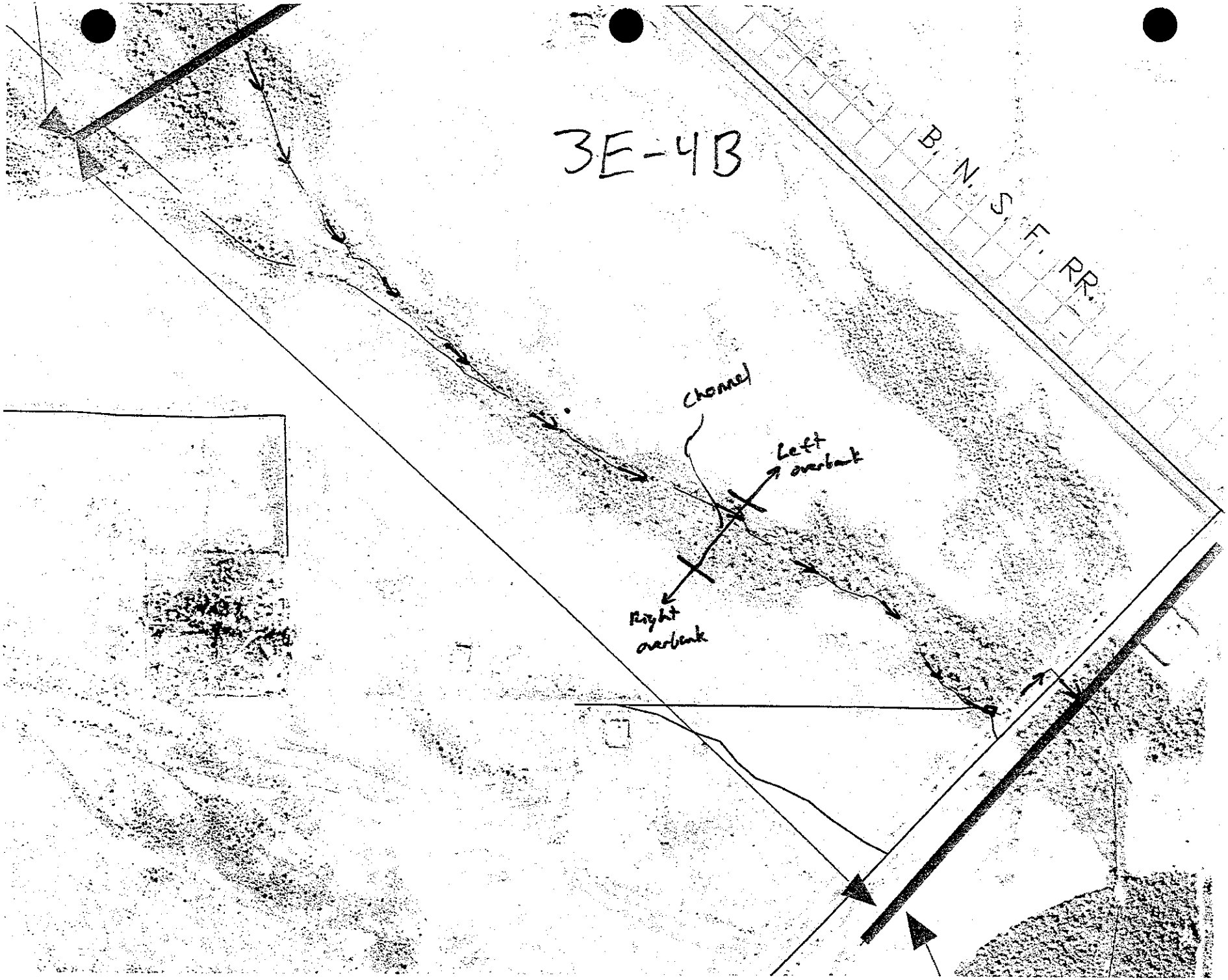

3E-4B
B.N.S.F. RR.
channel
Left overbank
Right overbank

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 3 East
Location: Reaches - 3E - 5 (Between Deer Valley Rd and north of Beardsley Canal)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005			
	Moderate		.006-.010		0.006	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.005		
	Medium		.010-.025			0.015
	Large		.025-.050			
	Very Large		.050-.100		0.055	
Variations in Channel Cross Section	Gradual	n_4	0	0.000		
	Occ. Alt.		.001-.005		0.003	0.003
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.031**	**0.093**	**0.044**

Figure E-1
(Reach 3E -5)

Figure 1. (Photo #51) Channel looking upstream.

Figure 2. (Photo #316) Left Overbank looking upstream.

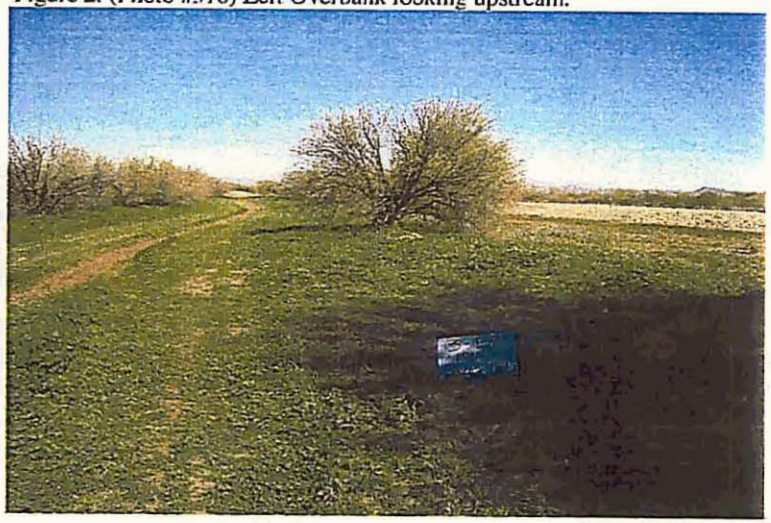
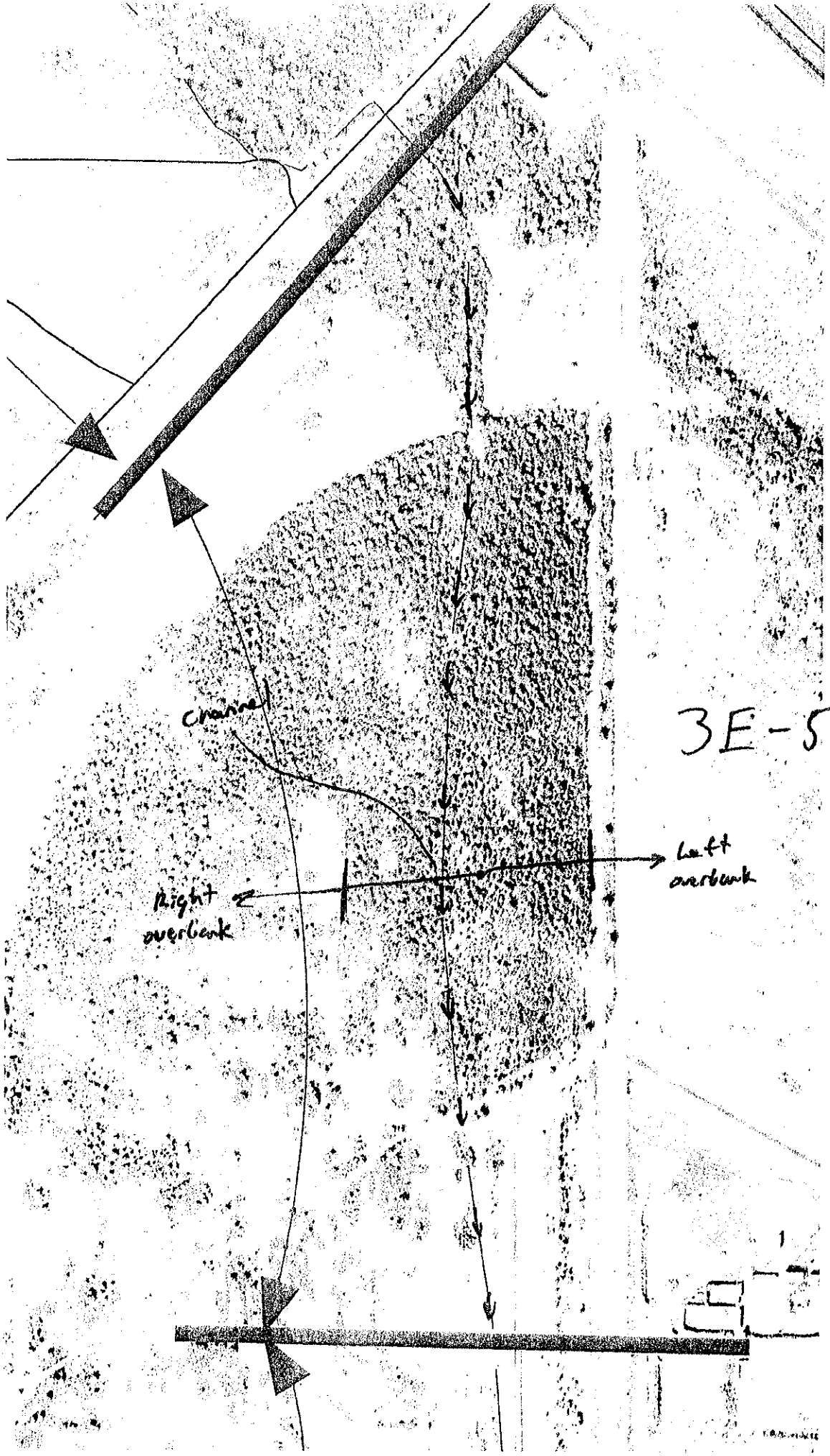


Figure 3. (Photo #315) Right Overbank looking downstream.



3E-5

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 3 East
Location: Reaches - 3E - 6 (Between north of Beardsley Canal and 1/4 mile south of Beardsley Canal)

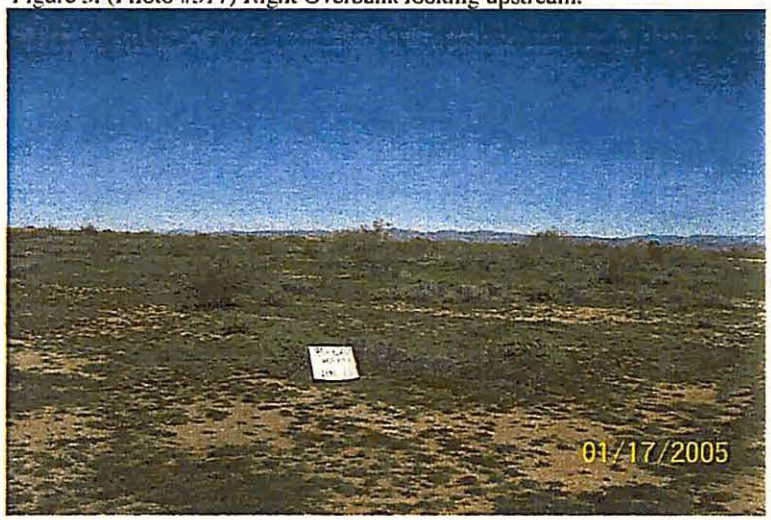
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.026	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008	0.003	0.005
	Medium		.010-.025			
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0		0.000	0.000
	Occ. Alt.		.001-.005	0.001		
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.029**	**0.031**

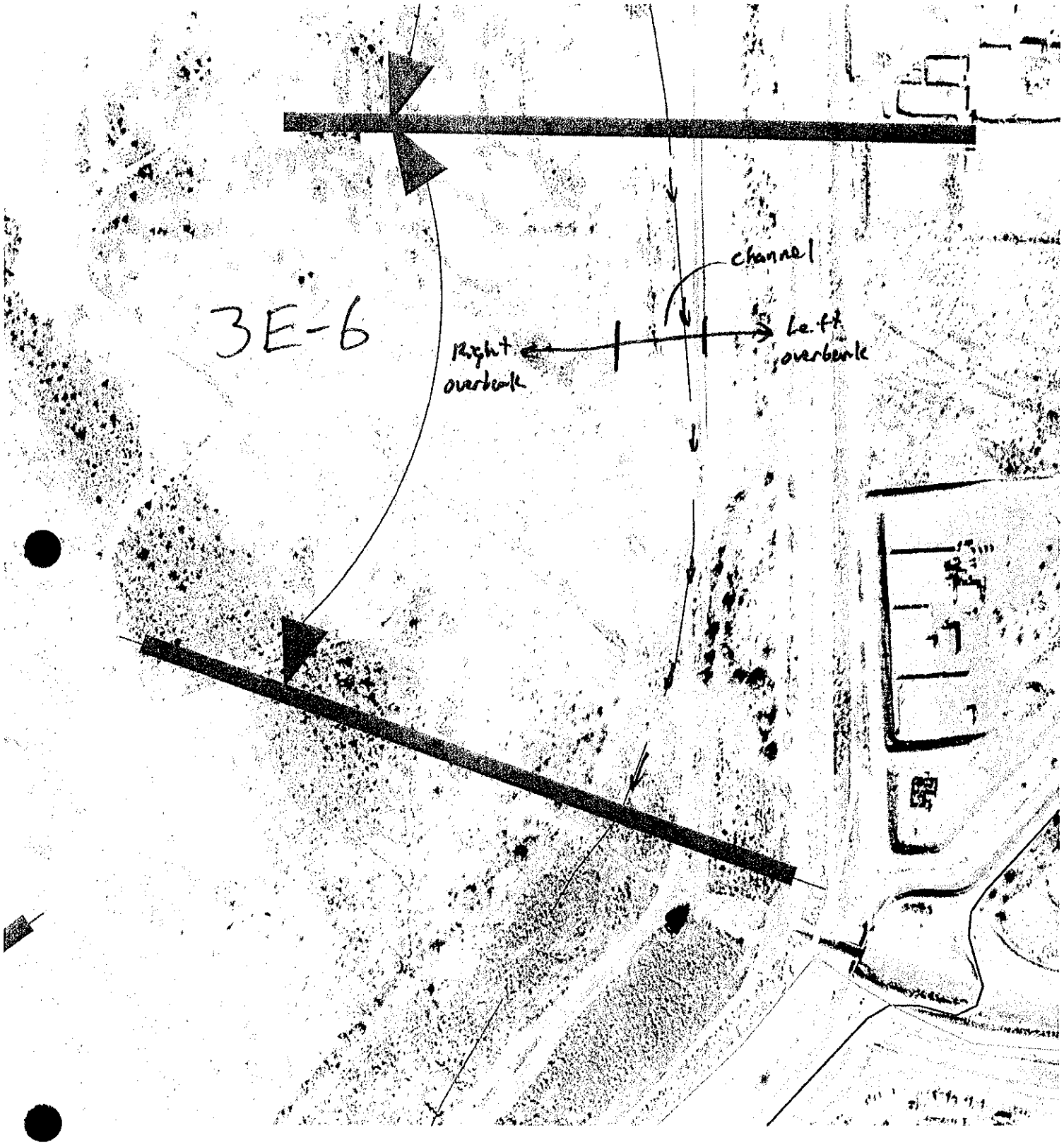
Figure E-1
(Reach 3E -6)

Figure 1. (Photo #318) Channel looking upstream.

Figure 2. (Photo #319) Left Overbank looking upstream.

Figure 3. (Photo #317) Right Overbank looking upstream.




3E-6
channel
Right overbank
Left overbank

Wash 4 East

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 4 East
Location: Reaches - 4E - 1 (Between the south side of the CAP Canal and the alignment of Dale Ln.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.005	0.005	0.005
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.039**	**0.051**	**0.039**

Figure E-1
(Reach 4E - 1)

Figure 1. (Photo #48) Channel looking downstream.

Figure 2. (Photo #47) Left Overbank looking upstream.

Figure 3. (Photo #49) Right Overbank looking downstream.

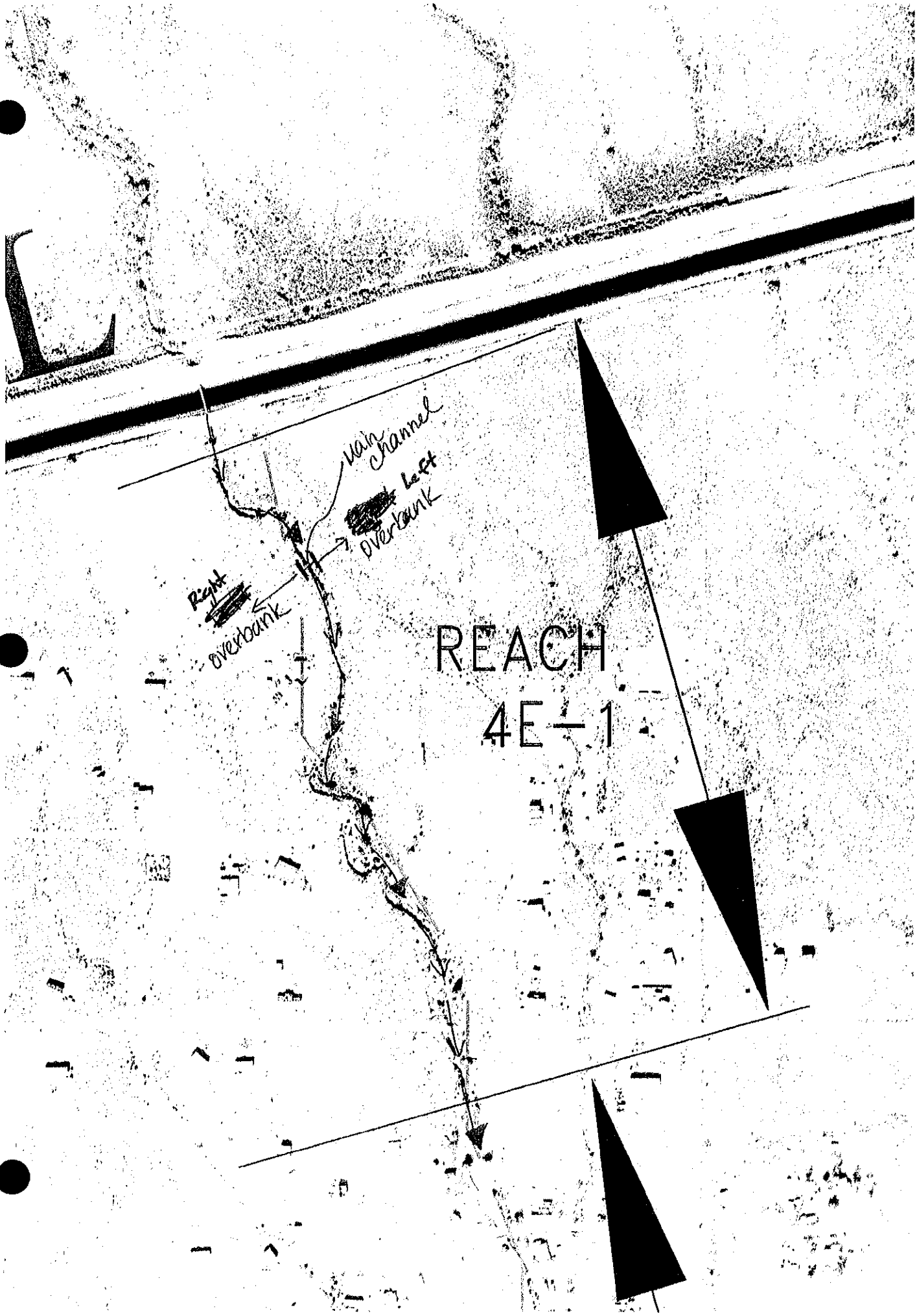

main channel
Left
overbank
Right
overbank
REACH
4E-1

Table E-1

Project: Wittmann ADMSU
Stream: Wash 4 East
Location: Reaches - 4E - 2 (Between Dale Ln. and the confluence with Wash 3 East)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.005		0.005
	Moderate		.006-.010		0.008	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004			
	Minor		.005-.015	0.005	0.005	0.010
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.044**	**0.060**	**0.049**

Figure E-1
(Reach 4E - 2)

Figure 1 - (Photo #42) Left Overbank looking downstream

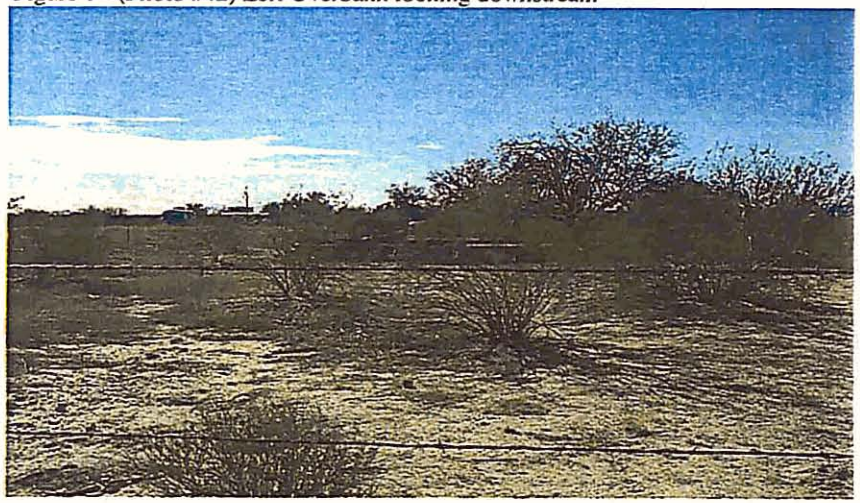


Figure 2 - (Photo #41) Channel looking downstream

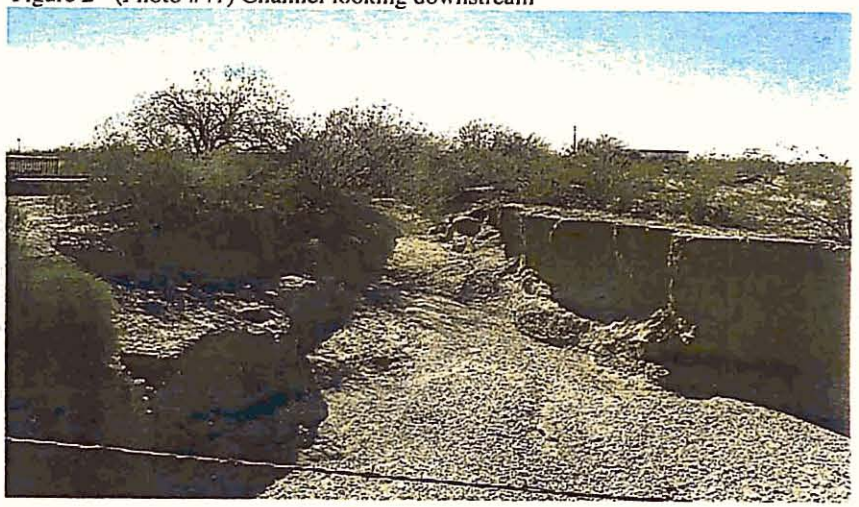
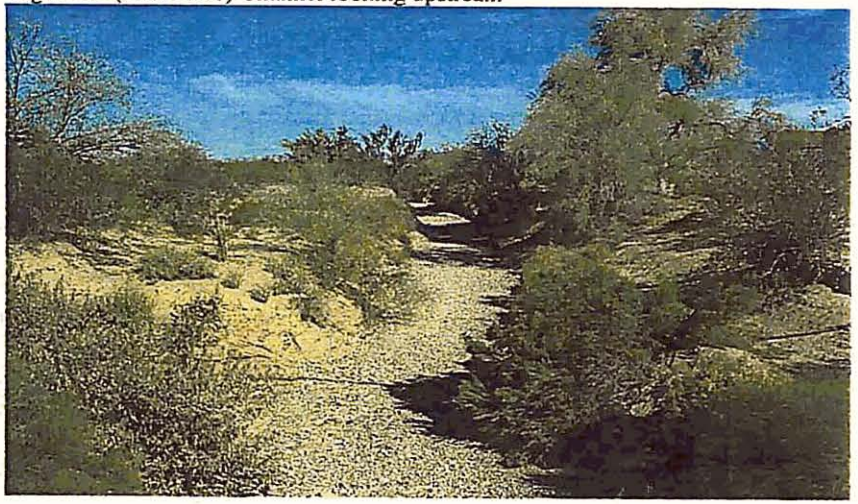
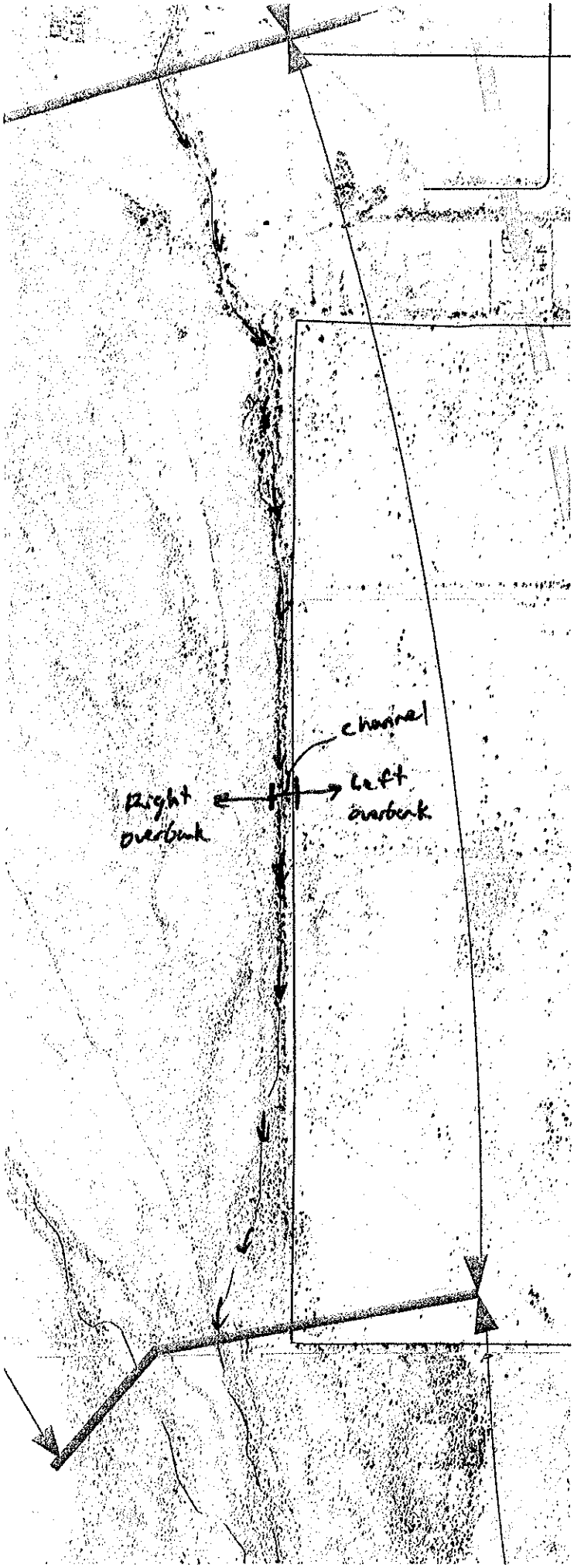


Figure 3 - (Photo #43) Right Overbank looking downstream

Figure 4 - (Photo #40) Channel looking upstream





4E-2

E.1.5 Washes South of CAP Canal and East of Wash 4 East.

Wash 5 East

Wash 6 East

7 East-West Split

7 East-East Split

Wash 8 East

Wash 9 East

Wash 10 East

10 East-East Split-1

10 East-East Split-2

Wash 11 East

Wash 12 East

Wash 13 East

Wash 14 East

Wash 5 East

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 5 East
Location: Reaches - 5E - 1 (Between the south side of the CAP Canal and just north of Dale Ln)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.028	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005			
	Moderate		.006-.010		0.008	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.010
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.001	0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.052**	**0.037**

Figure E-1
(Reach 5E - 1)

Figure 1 - (Photo #39) Left Overbank

Figure 2 - (Photo #37) Channel

Figure 3 - (Photo #38) Right Overbank

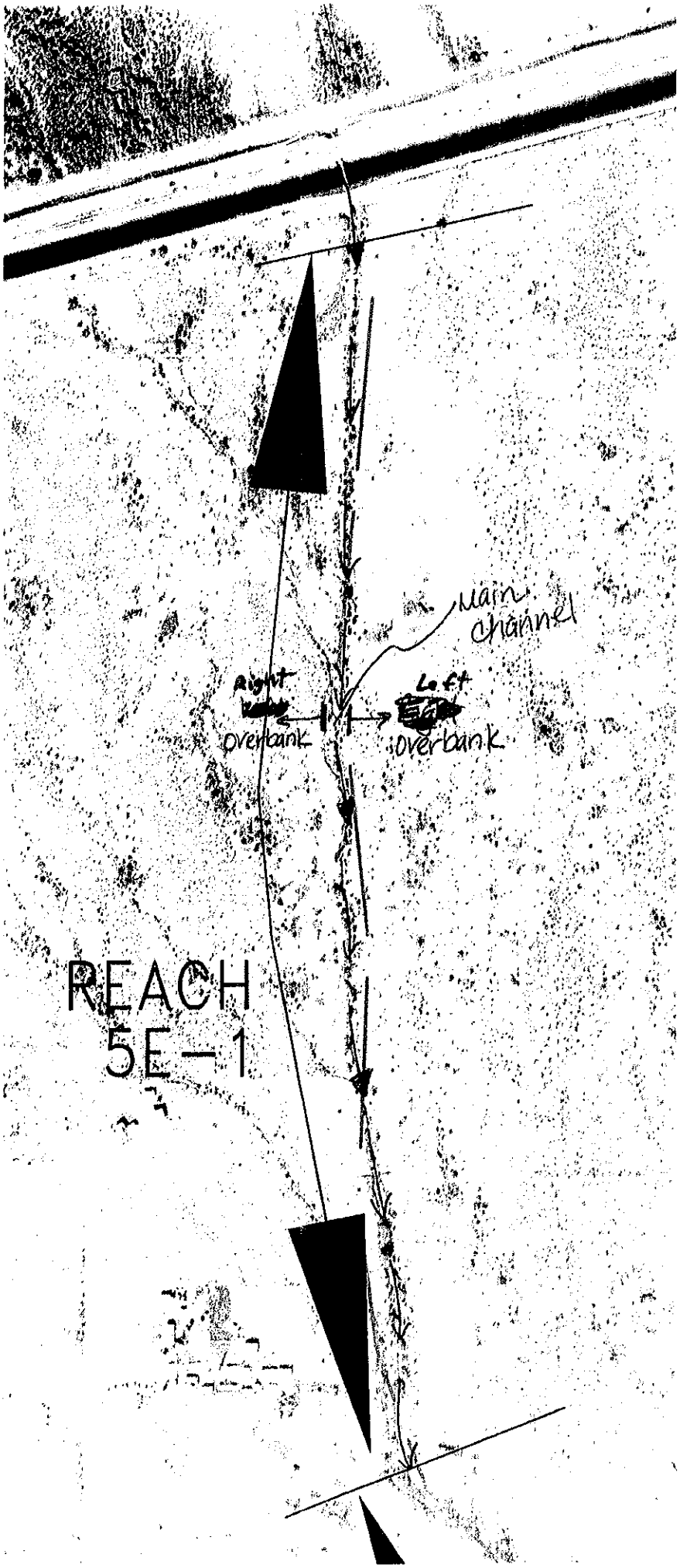

main channel
Right
Left
overbank
overbank
REACH
5E-1

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 5 East
Location: Reaches - 5E - 2 (Between just north of Dale Ln and the intersection of Olia Wy and 171st Ave)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.030	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	
	Minor		.005-.015			0.005
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010		0.005
	Medium		.010-.025			
	Large		.025-.050		0.032	
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.003	0.001
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.037**	**0.065**	**0.037**

Figure E-1
(Reach 5E - 2)

Figure 1 - (Photo #36) Left Overbank

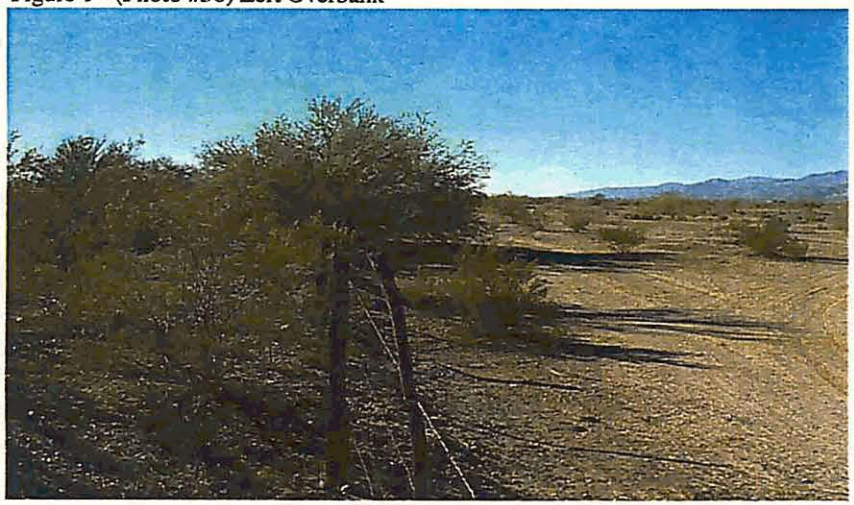


Figure 2 - (Photo #35) Channel

Figure 3 - (Photo #34) Right Overbank

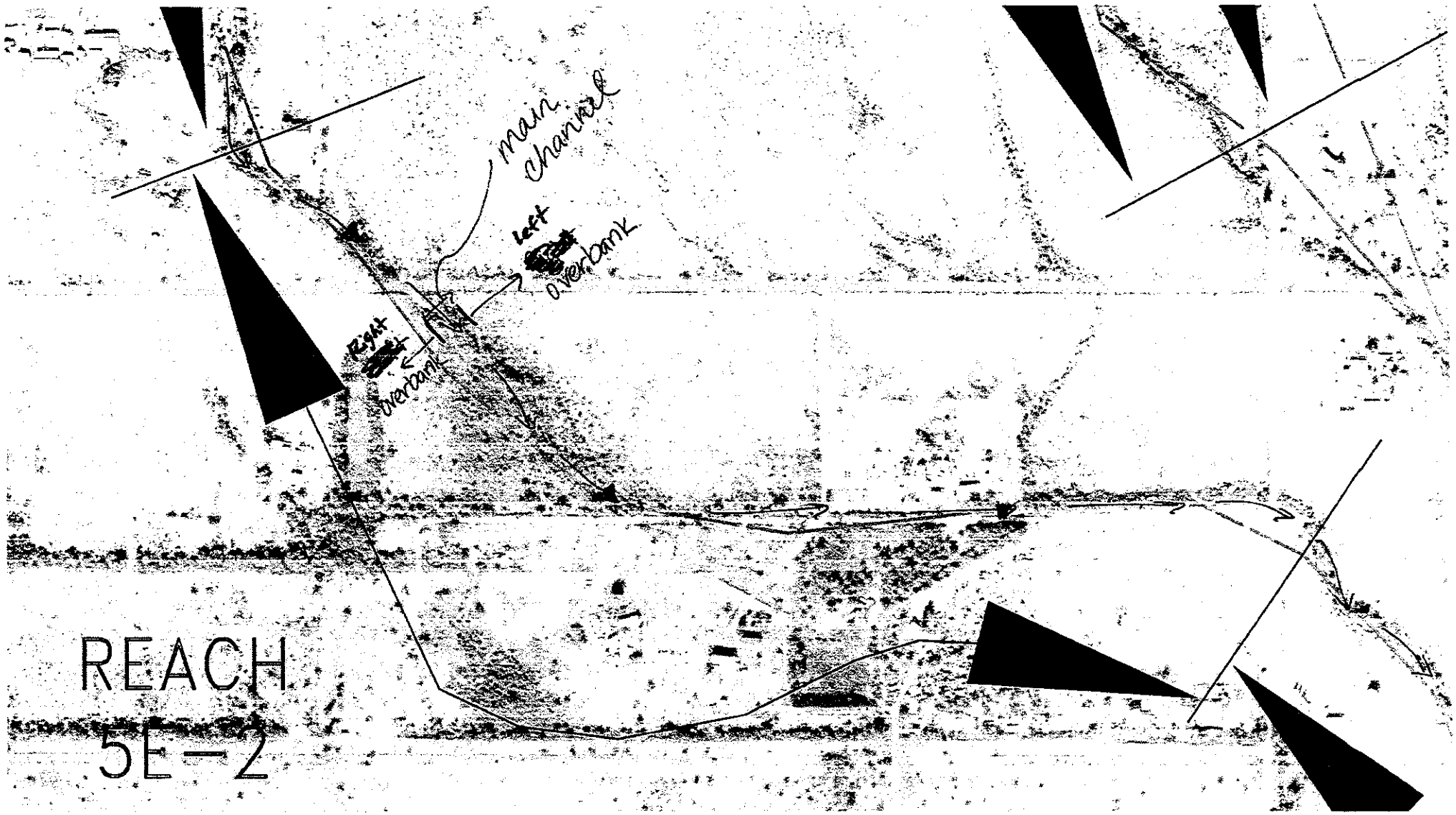

main channel
left
overbank
Right
overbank
REACH
5E-2

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 5 East
Location: Reaches - 5E - 3 (Between the intersection of Olia Wy and 171st Ave and just north of San Ysidro Dr.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.004	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.005
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.002	
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.050**	**0.031**

Figure E-1
(Reach 5E - 3)

Figure 1. (Photo #304) Channel looking upstream.

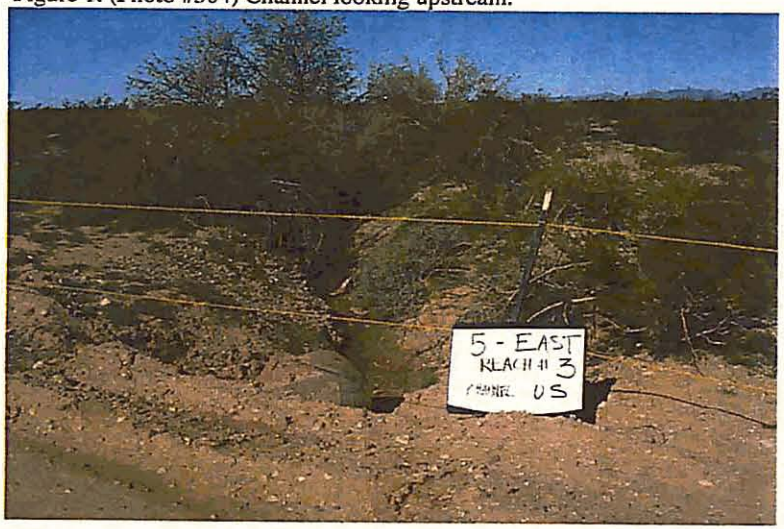
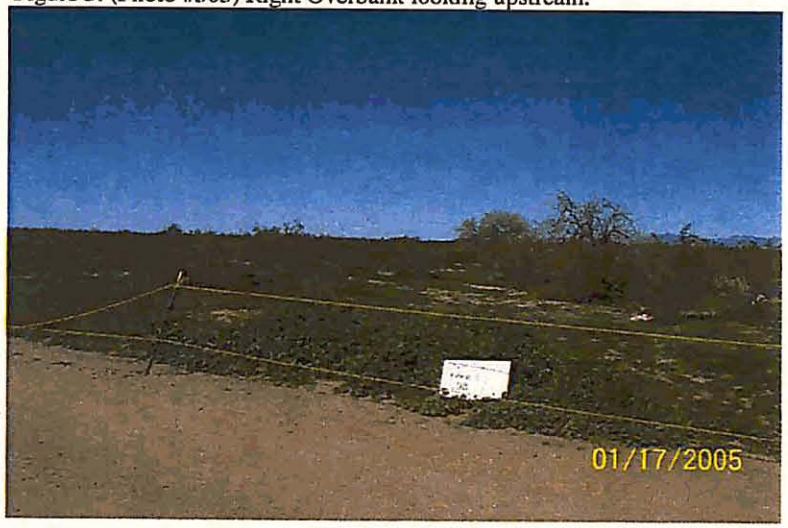
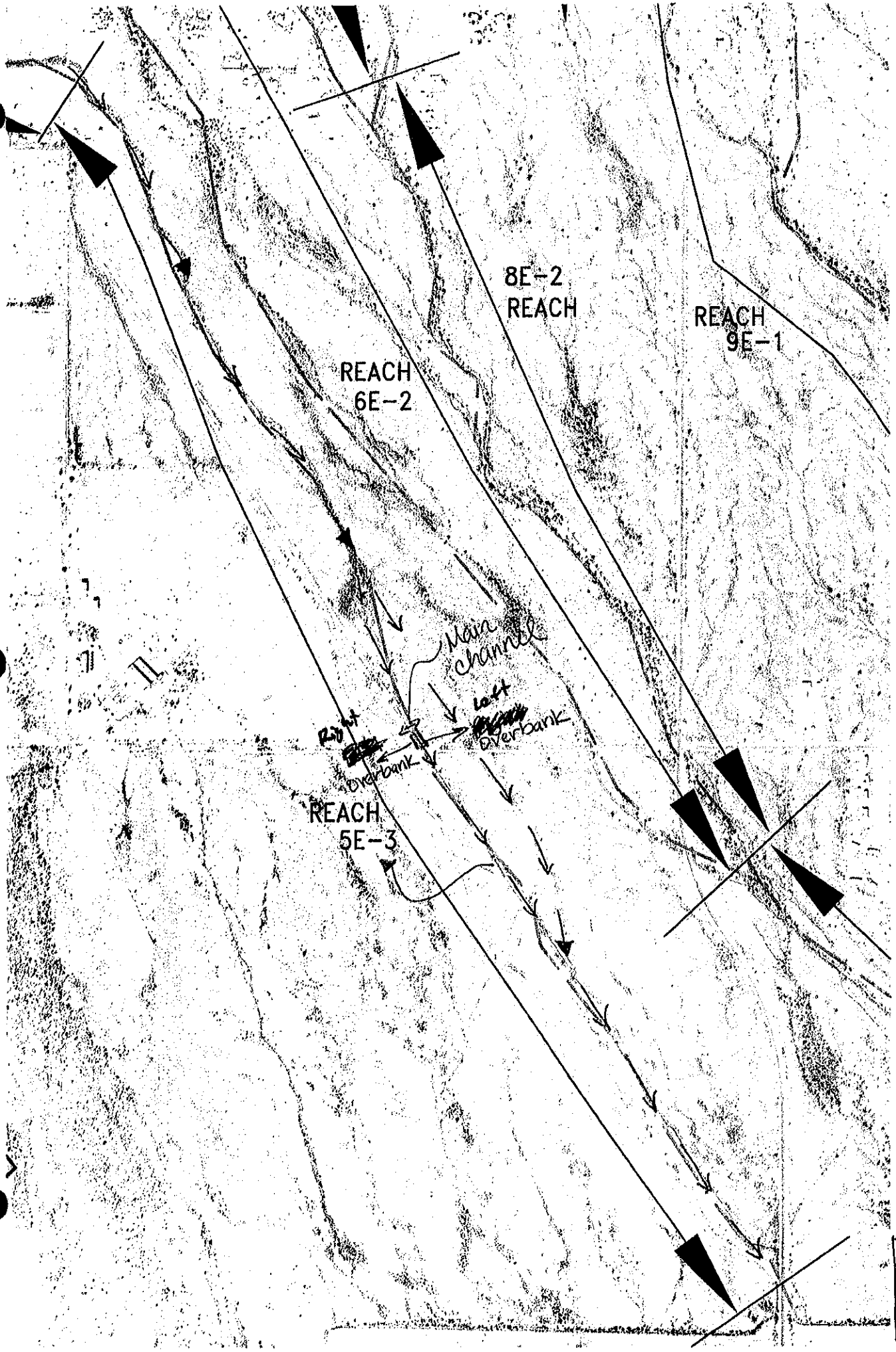


Figure 2. (Photo #305) Left Overbank looking upstream.

Figure 3. (Photo #303) Right Overbank looking upstream.




8E-2
REACH
REACH
9E-1
REACH
6E-2
Main channel
Left
Overbank
Right
Overbank
REACH
5E-3

5E-3 and 8E-2

Wash 6 East

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 6 East
Location: Reaches - 6E - 1 (Between the south side of the CAP Canal and just north of Dale Ln)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.001	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.009
	Medium		.010-.025		0.020	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0		0.000	
	Occ. Alt.		.001-.005	0.001		0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.050**	**0.036**

Figure E-1
(Reach 6E - 1)

Figure 1 - (Photo #321) Left Overbank looking upstream.

Figure 2 - (Photo #322) Channel looking downstream.

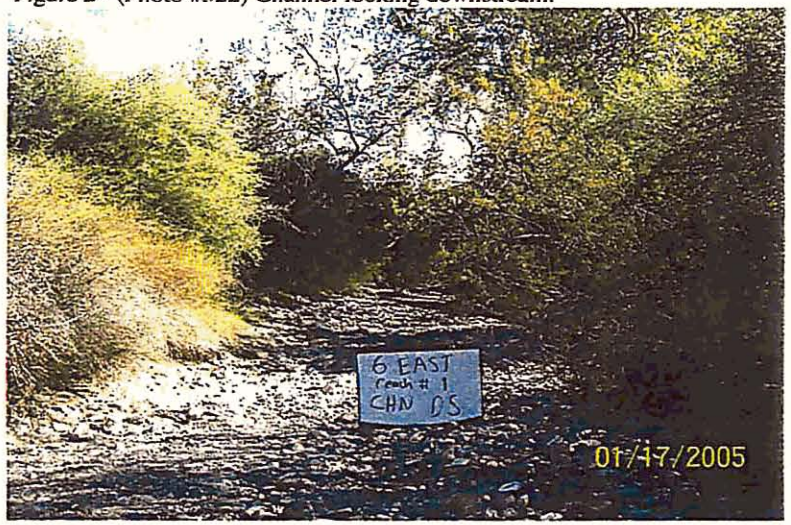
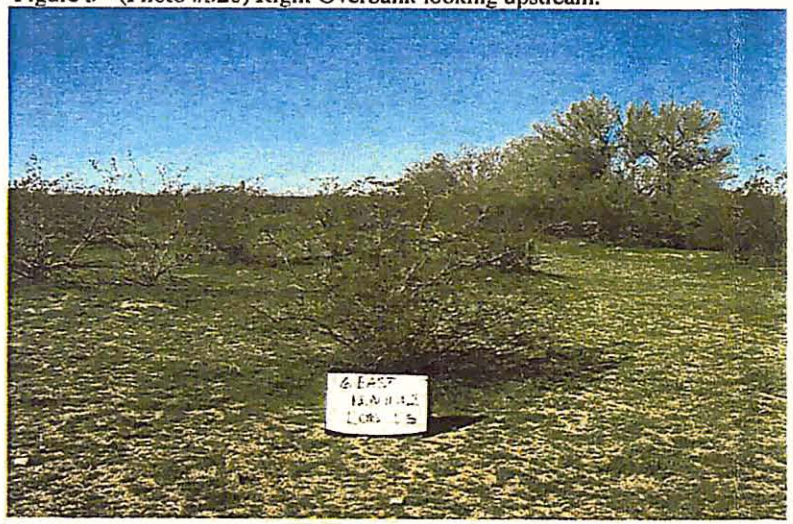
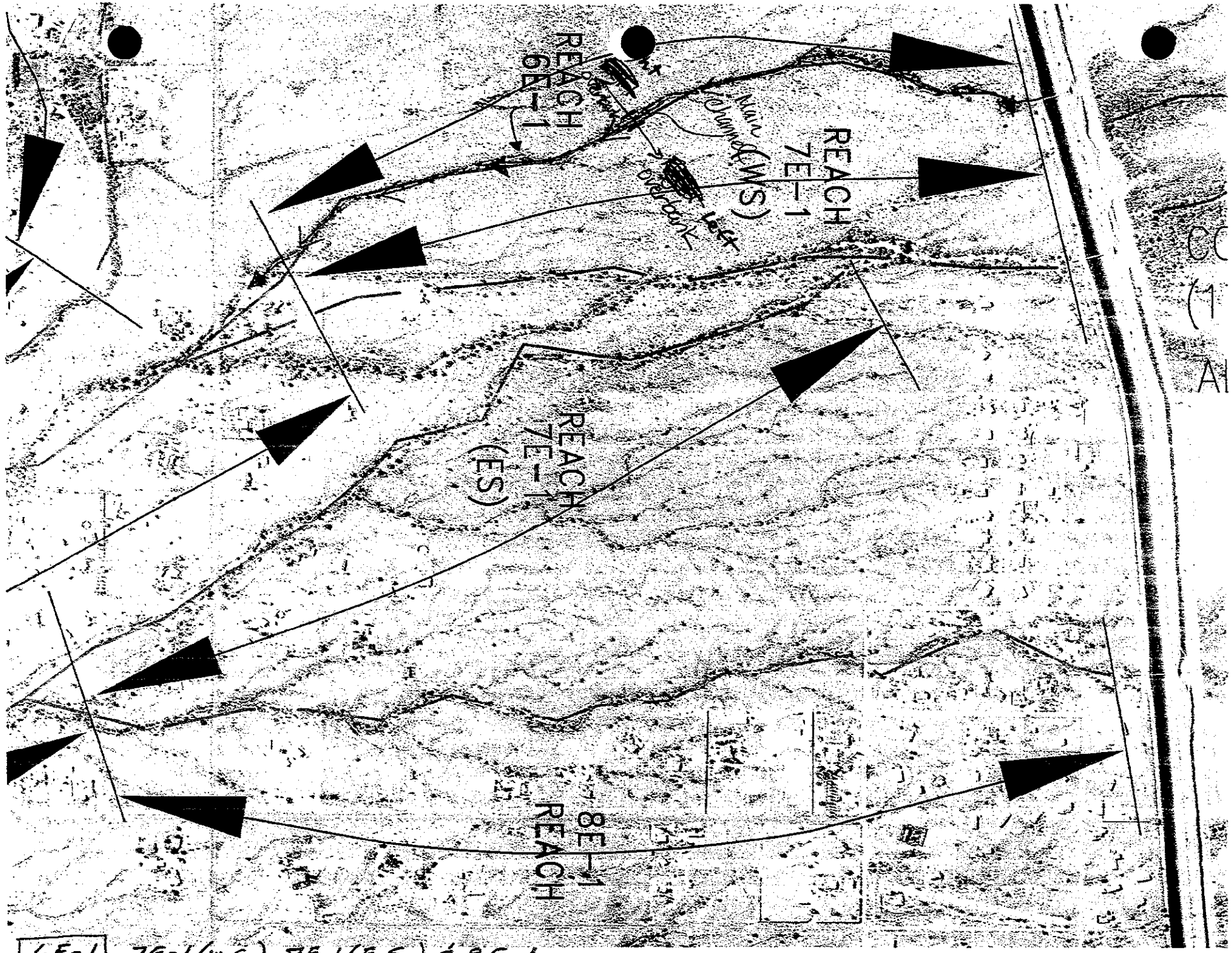


Figure 3 - (Photo #320) Right Overbank looking upstream.





6E-1 7E-1 (w.s.), 7E-1 (E.S.) & 8E-1

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 6 East
Location: Reaches - 6E - 2 (Between just north of Dale Ln and the confluence with Wash 8 East)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.001	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.001	0.000	0.001
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.010		0.010
	Medium		.010-.025		0.020	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.001	
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.037**	**0.051**	**0.037**

Figure E-1
(Reach 6E - 2)

Figure 1 - (Photo #325) Left Overbank looking upstream.

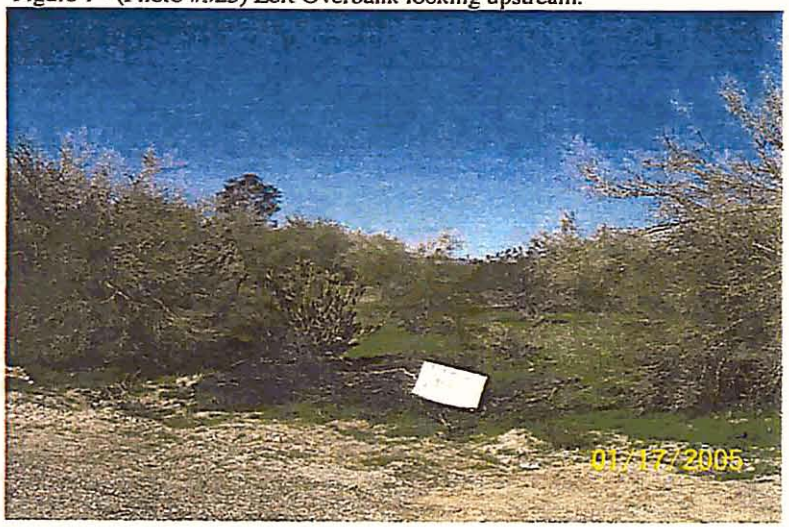


Figure 2 - (Photo #324) Channel looking upstream.

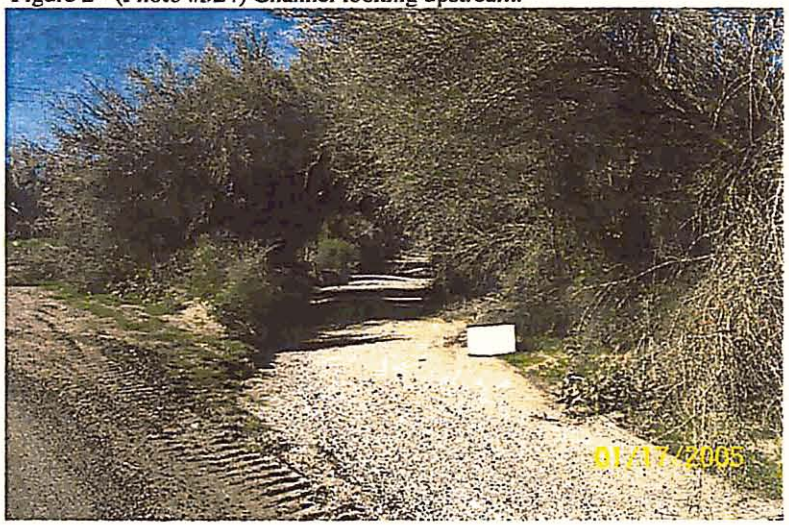


Figure 3 - (Photo #323) Right Overbank looking downstream.

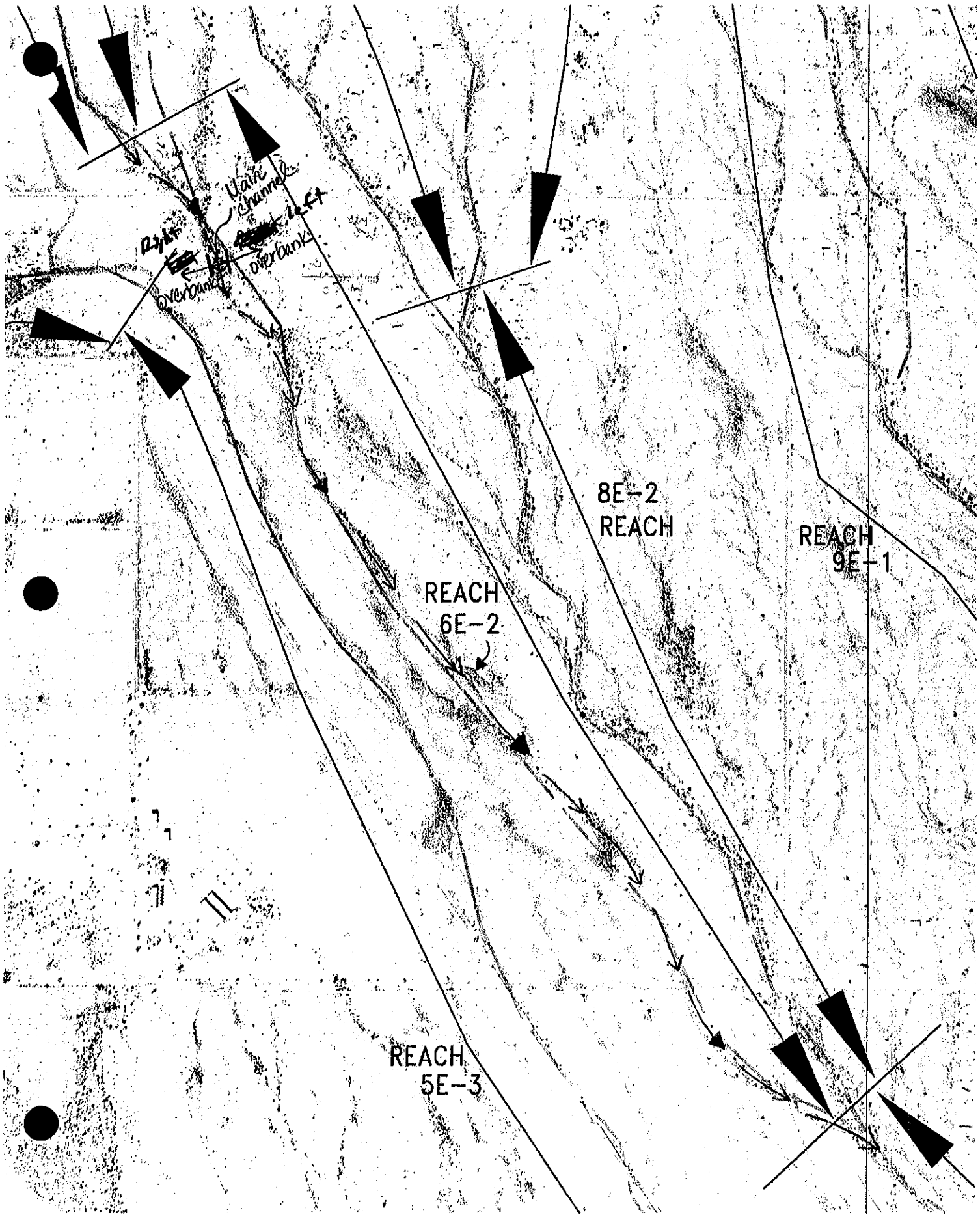

Main channel
Right
overbank
left
overbank
8E-2
REACH
REACH
9E-1
REACH
6E-2
REACH
5E-3

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 6 East
Location: Reaches - 6E - 3 (Between the confluence with Wash 8 East and north of the McMicken Dam Outlet Channel)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.001	
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.047**	**0.034**

Figure E-1
(Reach 6E - 3)

Figure 1 - (Photo #1) Left Overbank looking downstream.

Figure 2 - (Photo #2) Channel looking downstream.

Figure 3 - (Photo #306) Right Overbank looking downstream.

REACH
9E-2
Main channel
Left
overbank
Right
overbank
REACH
6E-3

6E-3 and 9E-2

7 East-West Split

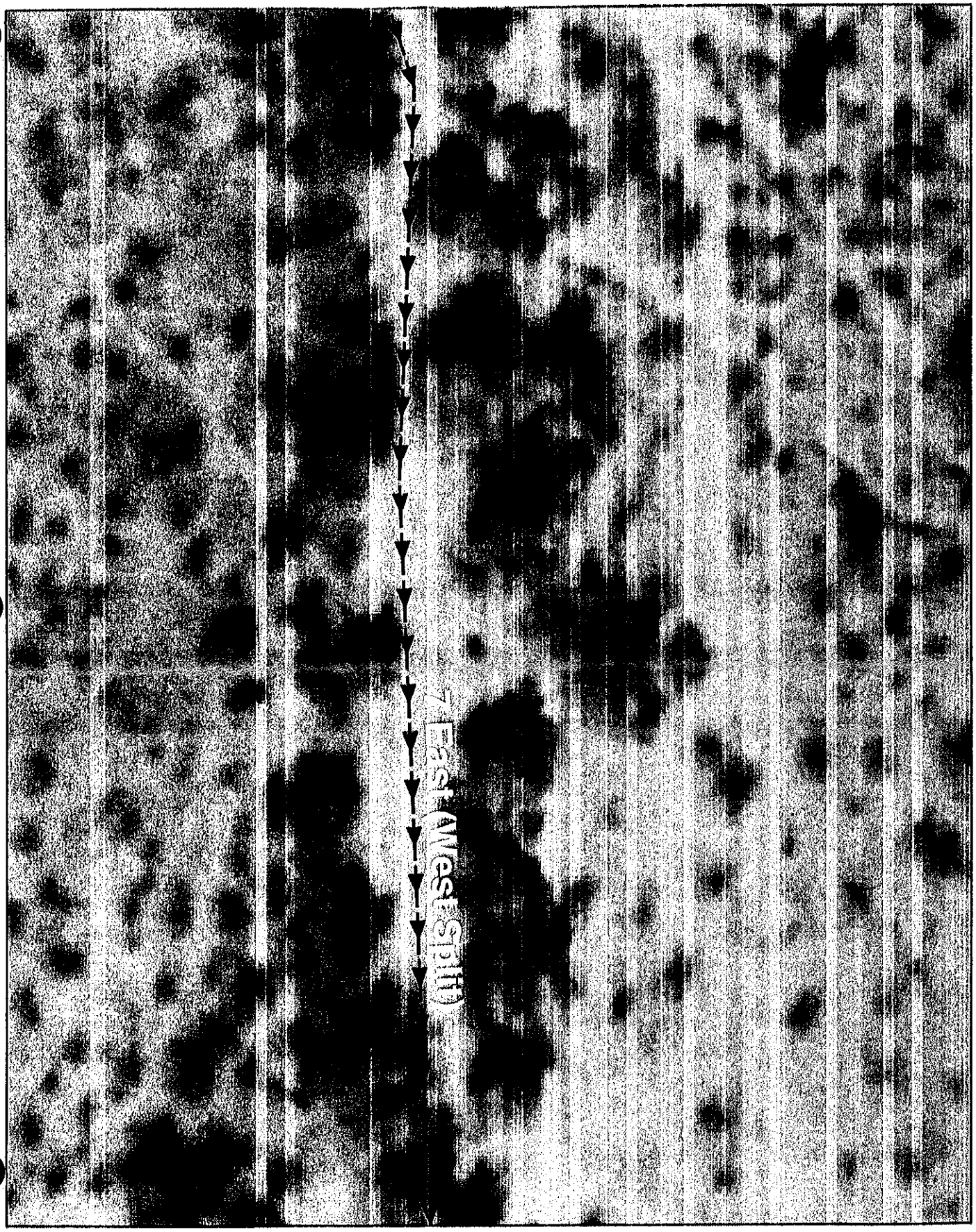
Table E-1

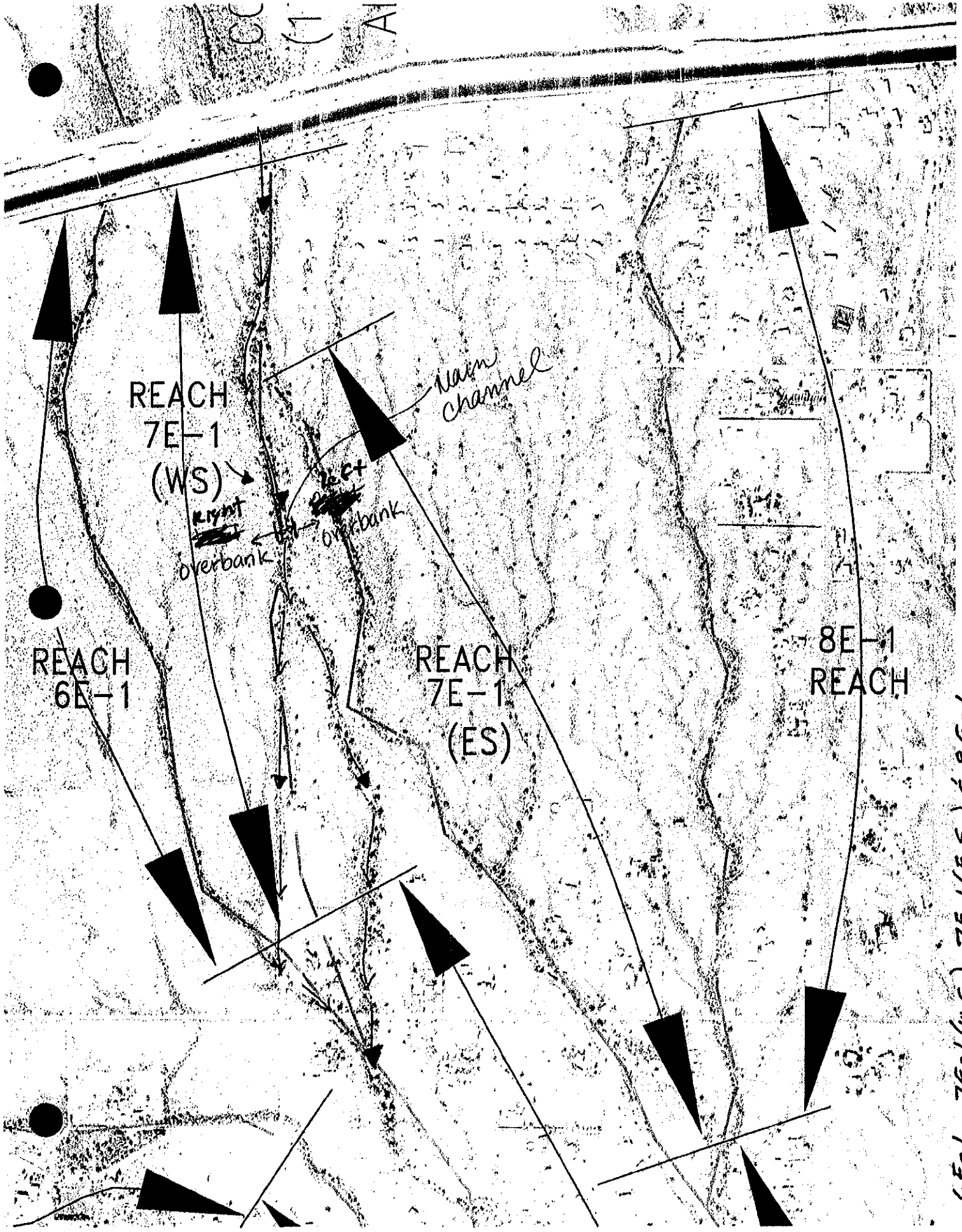
BY AMB DATE 1/20/2005
CHECK JCS DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 7 East-West Split
Location: Reaches - 7E(WS) - 1 (Between the south side of the CAP Canal and confluence with Wash 6 East)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.020	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.049**	**0.036**

FIGURE E-1: Wash 7E - WS - 1 (n-value photo)





6E-1, 7E-1(W.S.), 7E-1(E.S.) & 8E-1

7 East-East Split

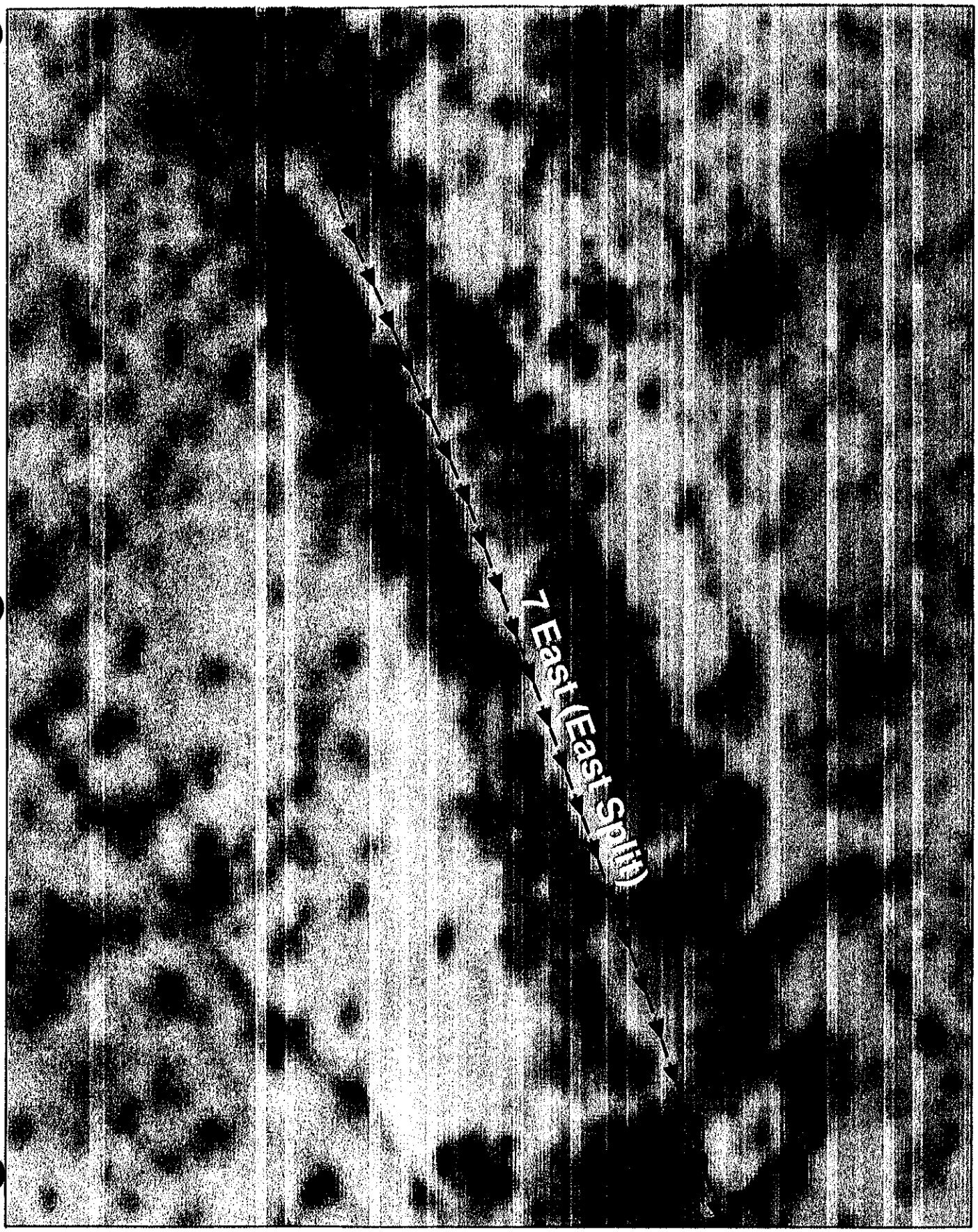
Table E-1

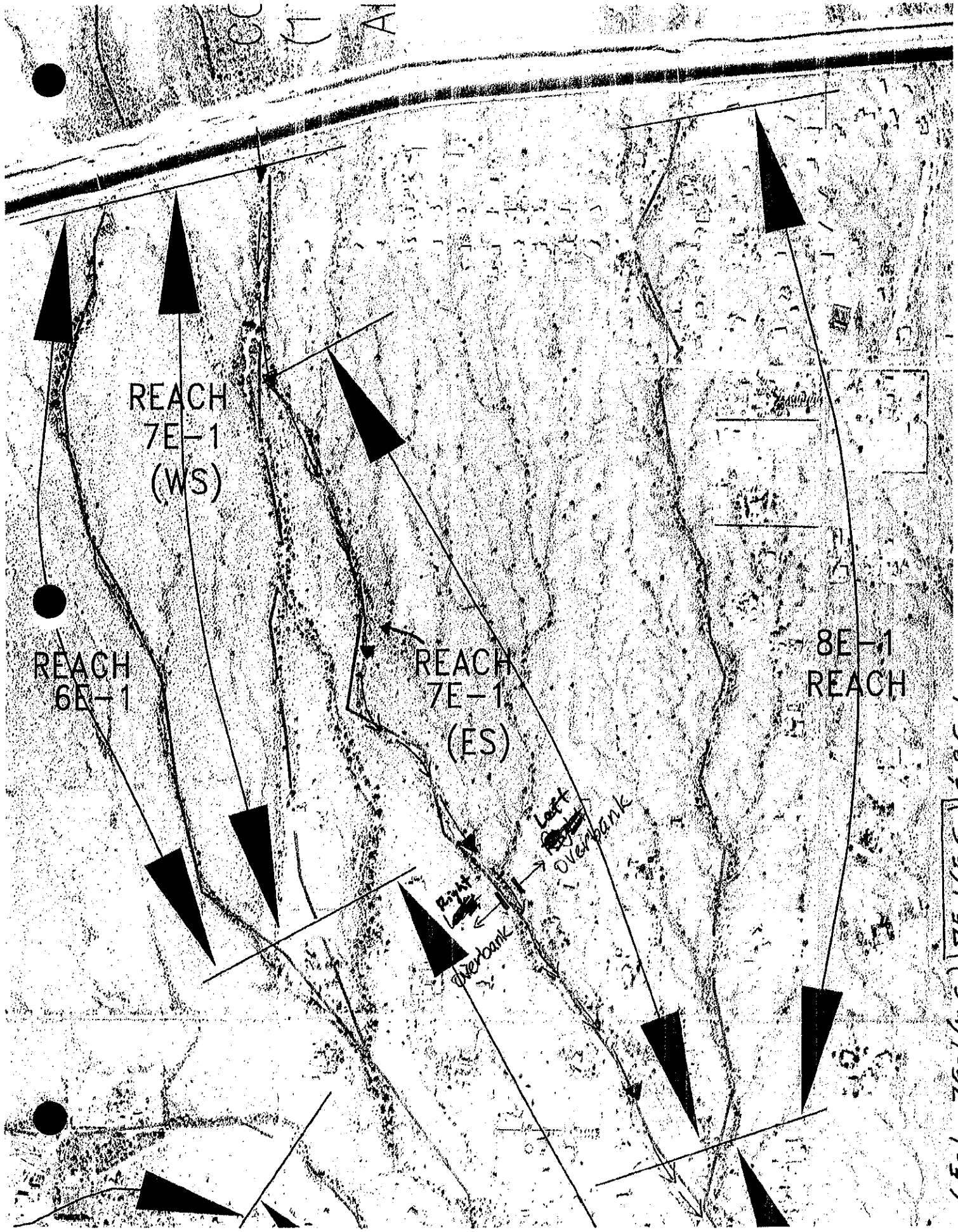
BY AMB DATE 1/20/2005
CHECK JCS DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 7 East-East Split
Location: Reaches - 7E(ES) - 1 (Between the south side of the CAP Canal and the confluence with Wash 8 East)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.020	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	0	0	0	0
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.036**	**0.049**	**0.036**

FIGURE E-1: Wash 7E - ES - 1 (n-value photo)





6E-1, 7E-1 (W.S.), 7E-1 (E.S.) & 8E-1

Wash 8 East

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 8 East
Location: Reaches - 8E - 1 (Between the south side of the CAP Canal and just south of Dale Ln)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.028		0.028
	Gravel		.028-.035		0.030	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.003	0.002	0.003
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.020	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.041**	**0.052**	**0.041**

Figure E-1
(Reach 8E - 1)

Figure 1 - (Photo #26) Left Overbank looking downstream.

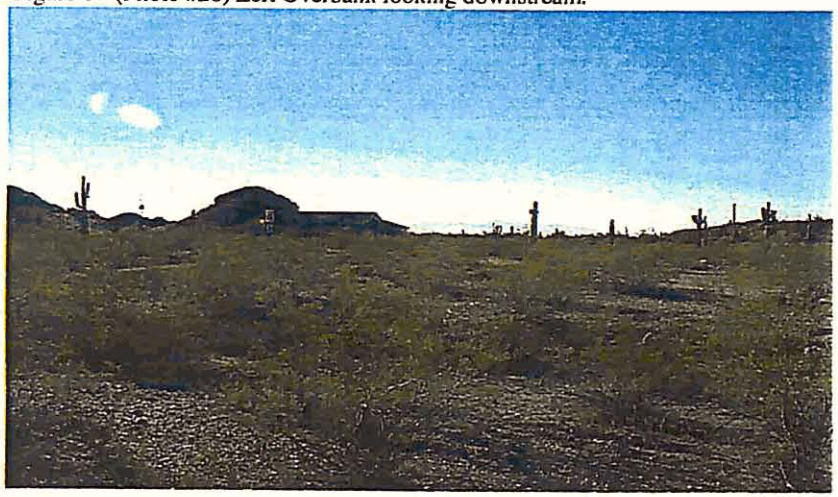


Figure 2 - (Photo #25) Channel looking downstream.

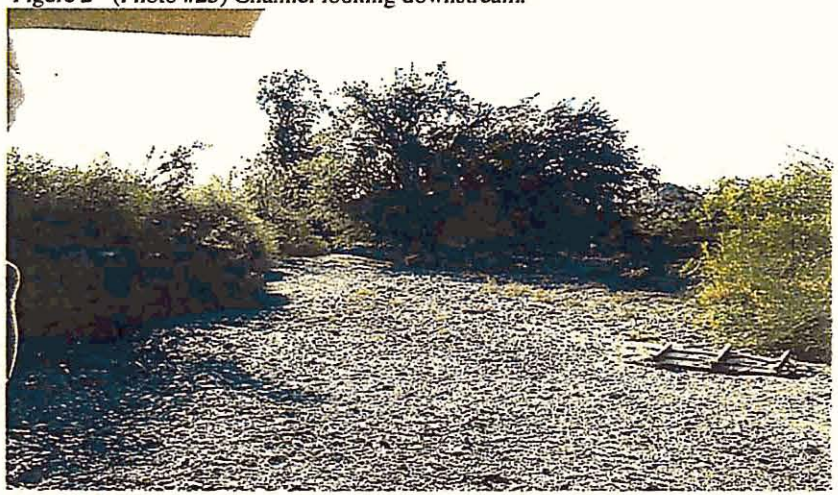
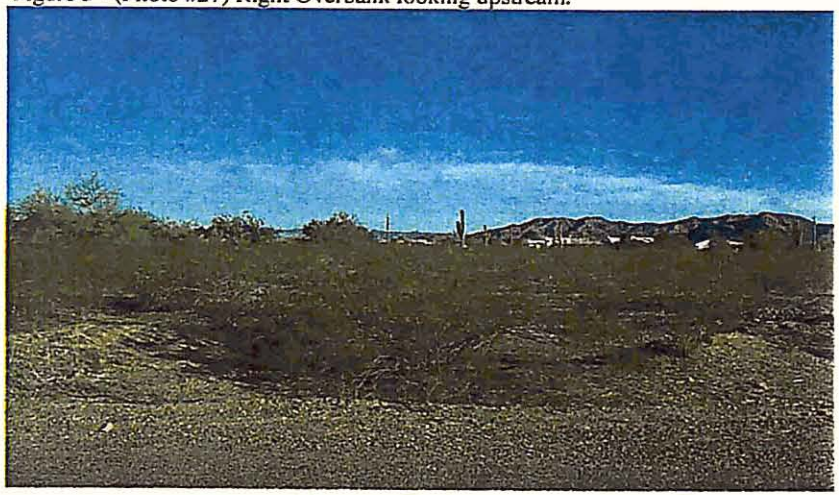
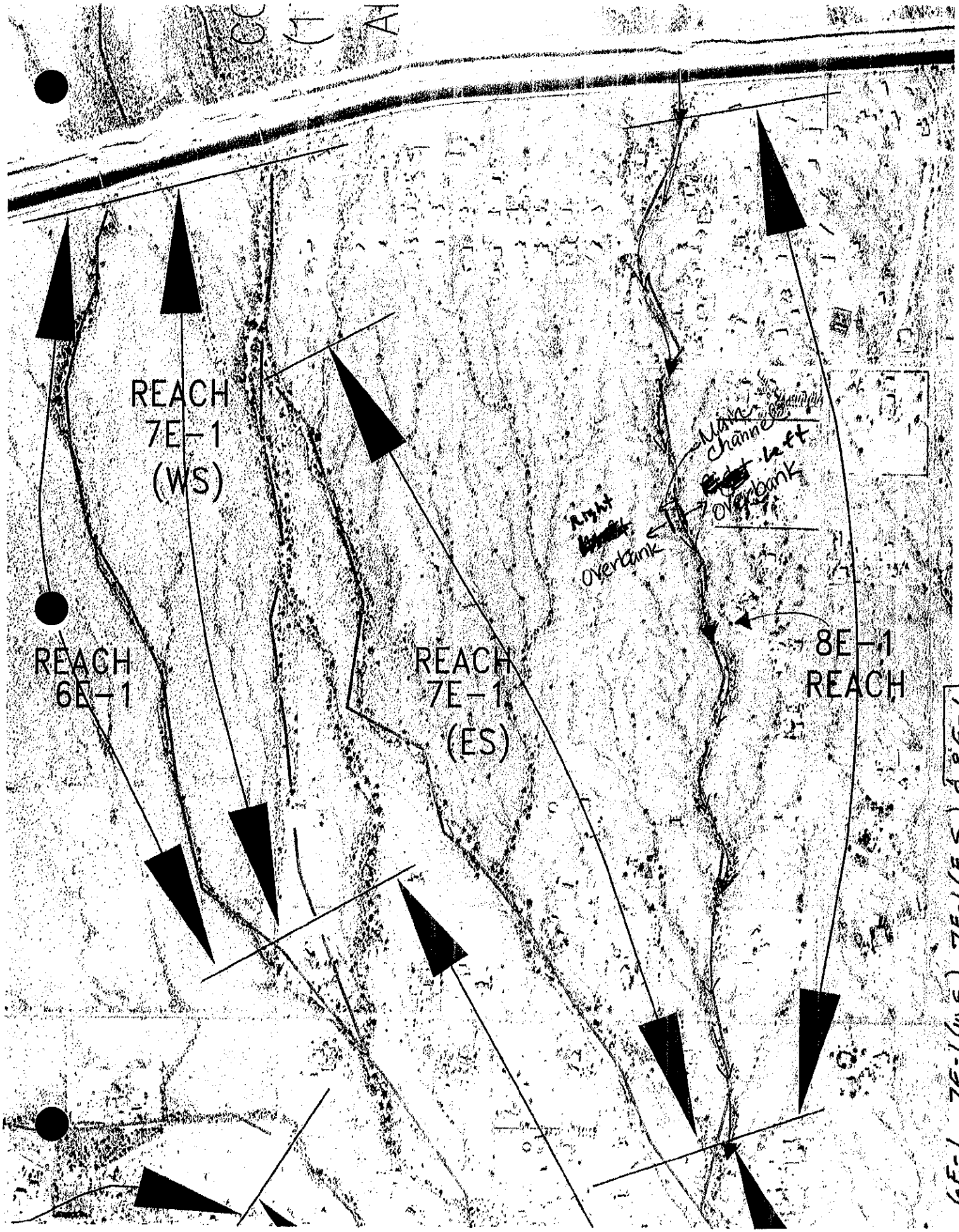


Figure 3 - (Photo #27) Right Overbank looking upstream.





6E-1, 7E-1(W.S.), 7E-1(E.S.) & 8E-1

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 8 East
Location: Reaches - 8E - 2 (Between just south of Dale Ln. and confluence with Wash 6 East)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.028		0.028
	Gravel		.028-.035		0.030	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0		0.000	
	Minor		.001-.005	0.001		0.001
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.002	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.011	0.021	0.011
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.042**	**0.053**	**0.042**

Figure E-1
(Reach 8E - 2)

Figure 1 - (Photo #5) Left Overbank looking upstream.

Figure 2 - (Photo #3) Channel looking upstream.

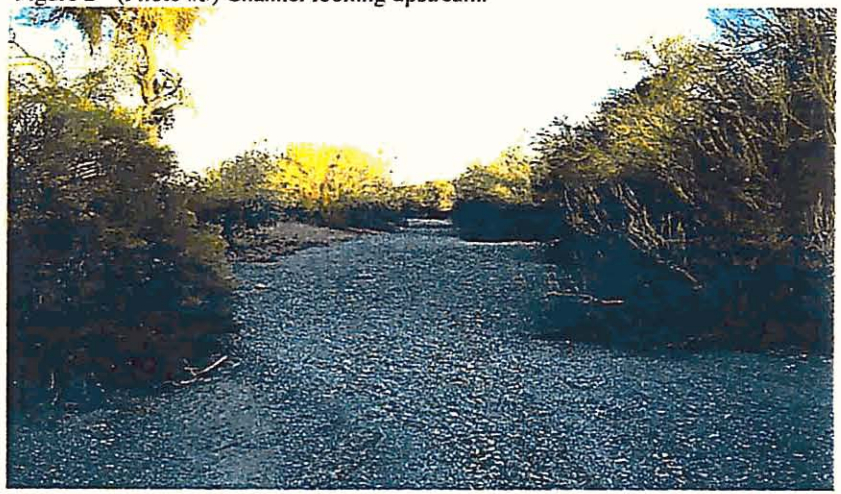
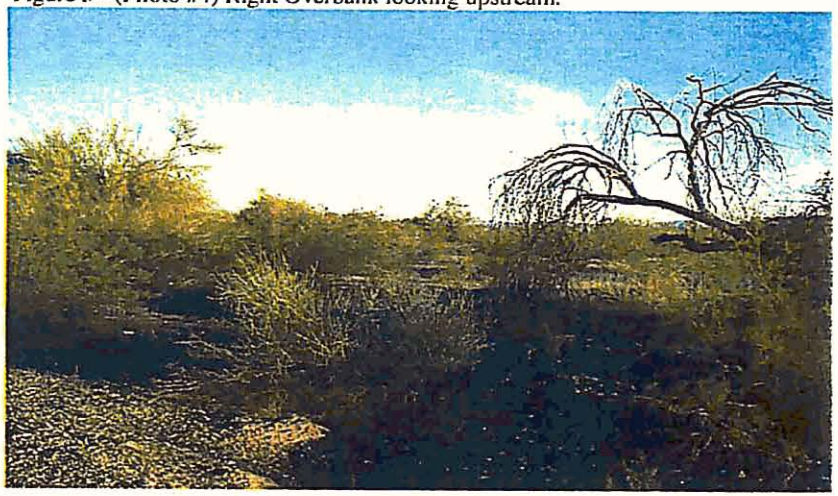
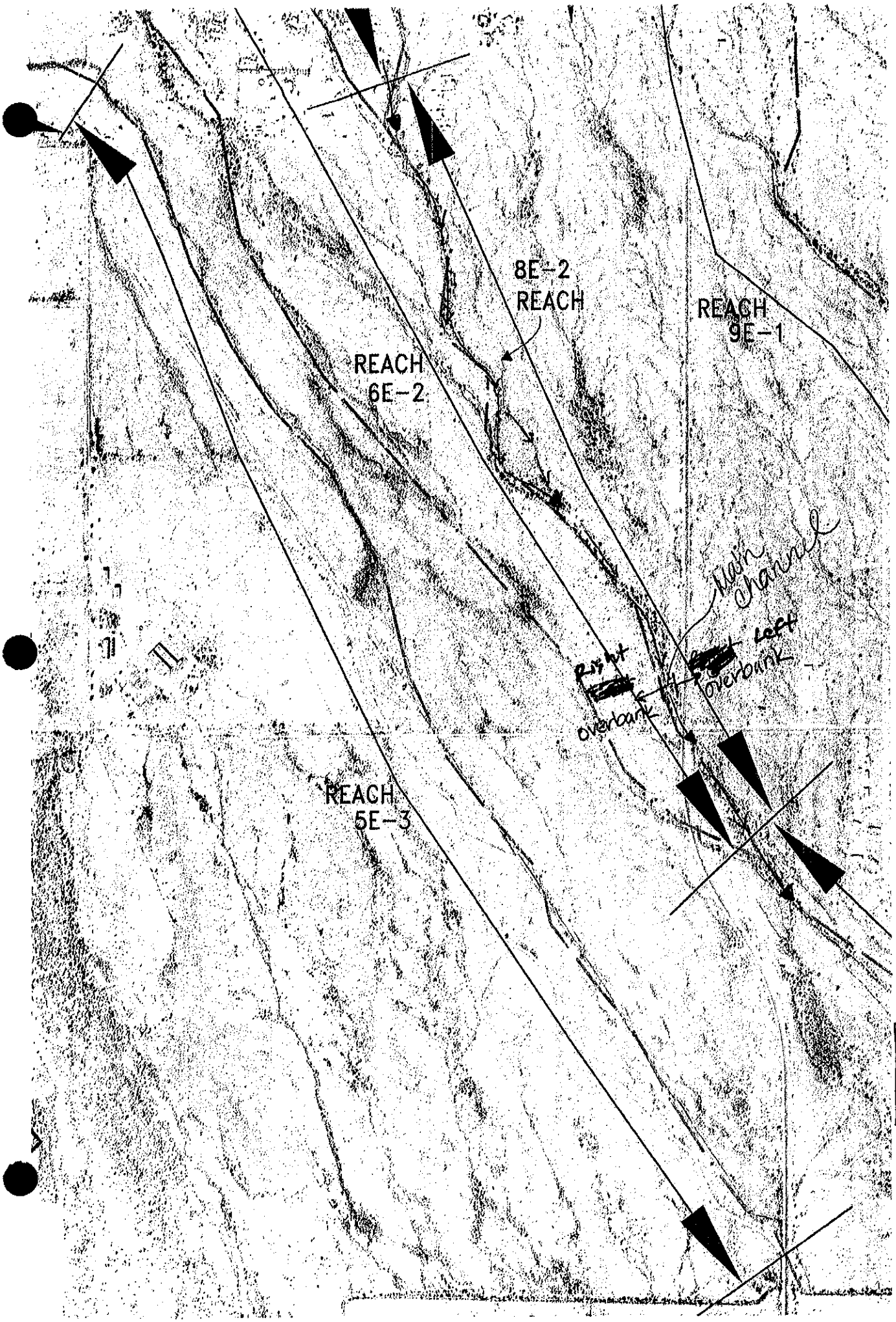


Figure 3 - (Photo #4) Right Overbank looking upstream.




8E-2
REACH
REACH
9E-1
REACH
6E-2
main channel
Right
overbank
left
overbank
REACH
5E-3

5E-3 and 8E-2

Wash 9 East

Table E-1

BY AMB DATE 1/20/2005
CHECK JCS DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 9 East
Location: Reaches - 9E - 1 (Between the south side of the CAP Canal and Patton Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035			
	Gravel		.028-.035	0.028	0.030	0.028
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.003	0.003	0.003
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004		0.003	
	Minor		.005-.015	0.005		0.005
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.012	0.018	0.012
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.004	0.003	0.004
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.052**	**0.057**	**0.052**

Figure E-1
(Reach 9E - 1)

Figure 1 - (Photo #332) Left Overbank looking downstream

Figure 2 - (Photo #331) Channel looking downstream

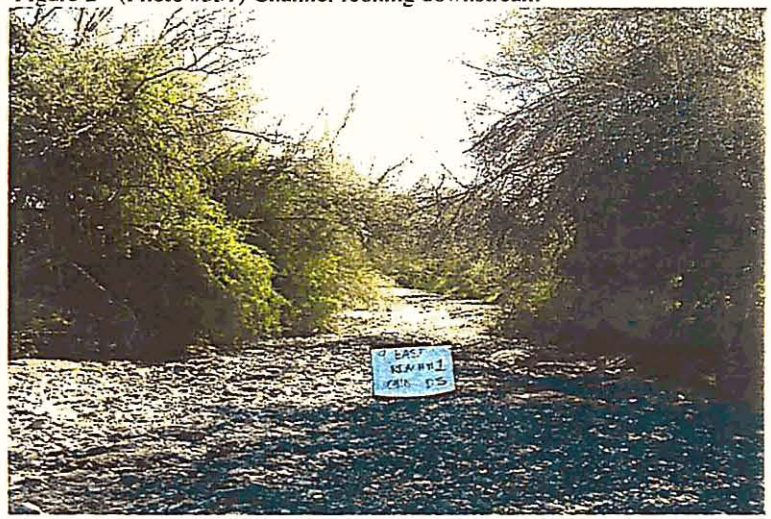
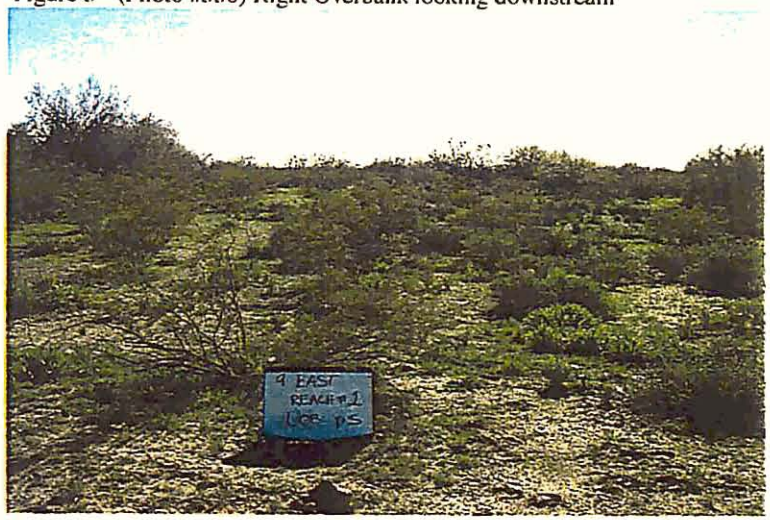


Figure 3 - (Photo #330) Right Overbank looking downstream



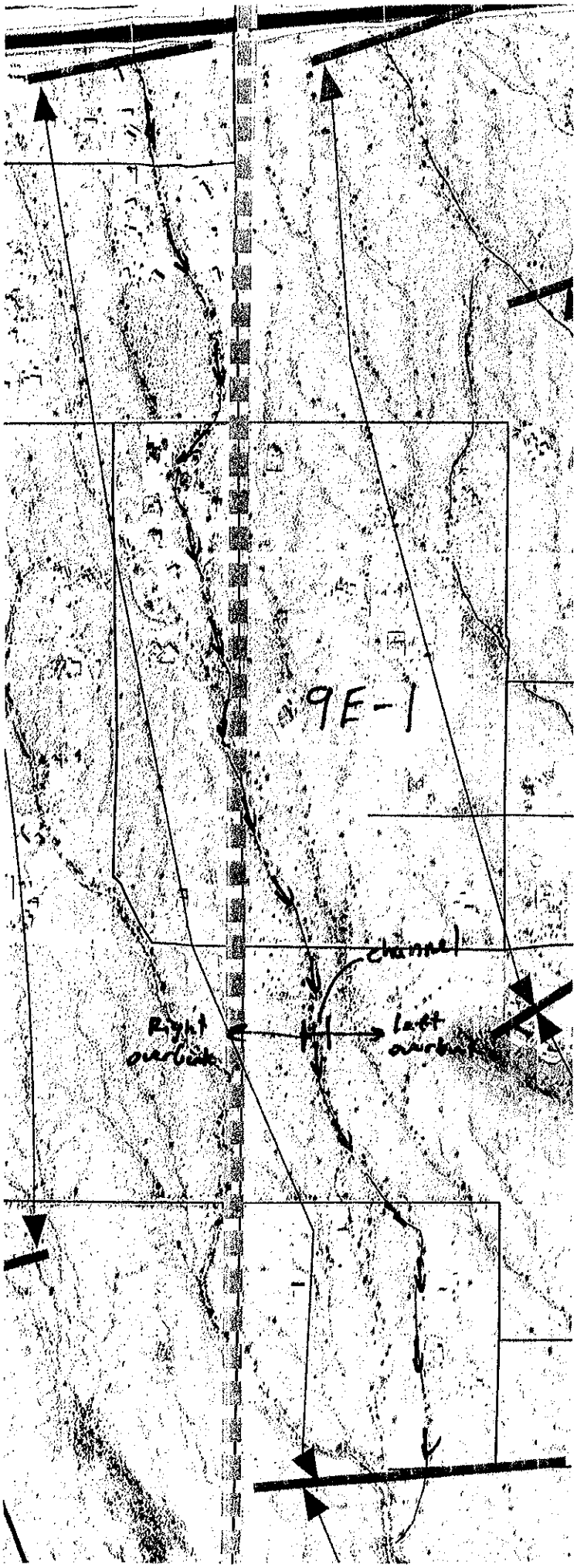

9E-1
channel
Right overbank
Left overbank

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 9 East
Location: Reaches - 9E - 2 (Between Patton Rd and 1/4 mile north of Jomax Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.030	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.005	0.005	0.005
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004		0.000	
	Minor		.005-.015	0.005		0.005
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.001	0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.045**	**0.054**	**0.045**

Figure E-1
(Reach 9E - 2)

Figure 1 - (Photo #335) Left Overbank looking downstream

Figure 2 - (Photo #334) Channel looking downstream

Figure 3 - (Photo #333) Right Overbank looking downstream

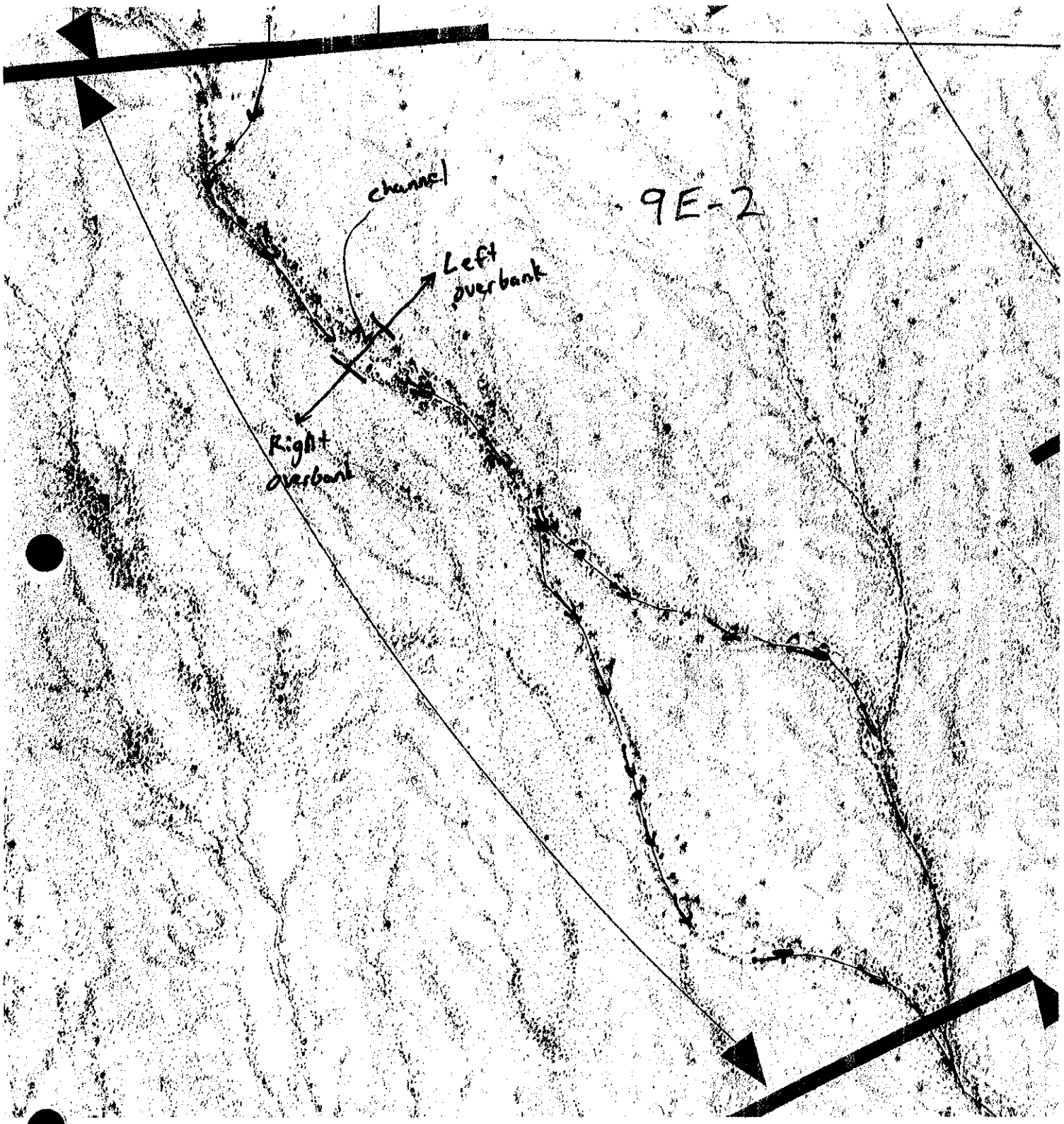

channel
9E-2
Left overbank
Right overbank

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 9 East
Location: Reaches - 9E - 3 (Between 1/4 mile north of Jomax Rd and just north of San Ysidro Rd.)

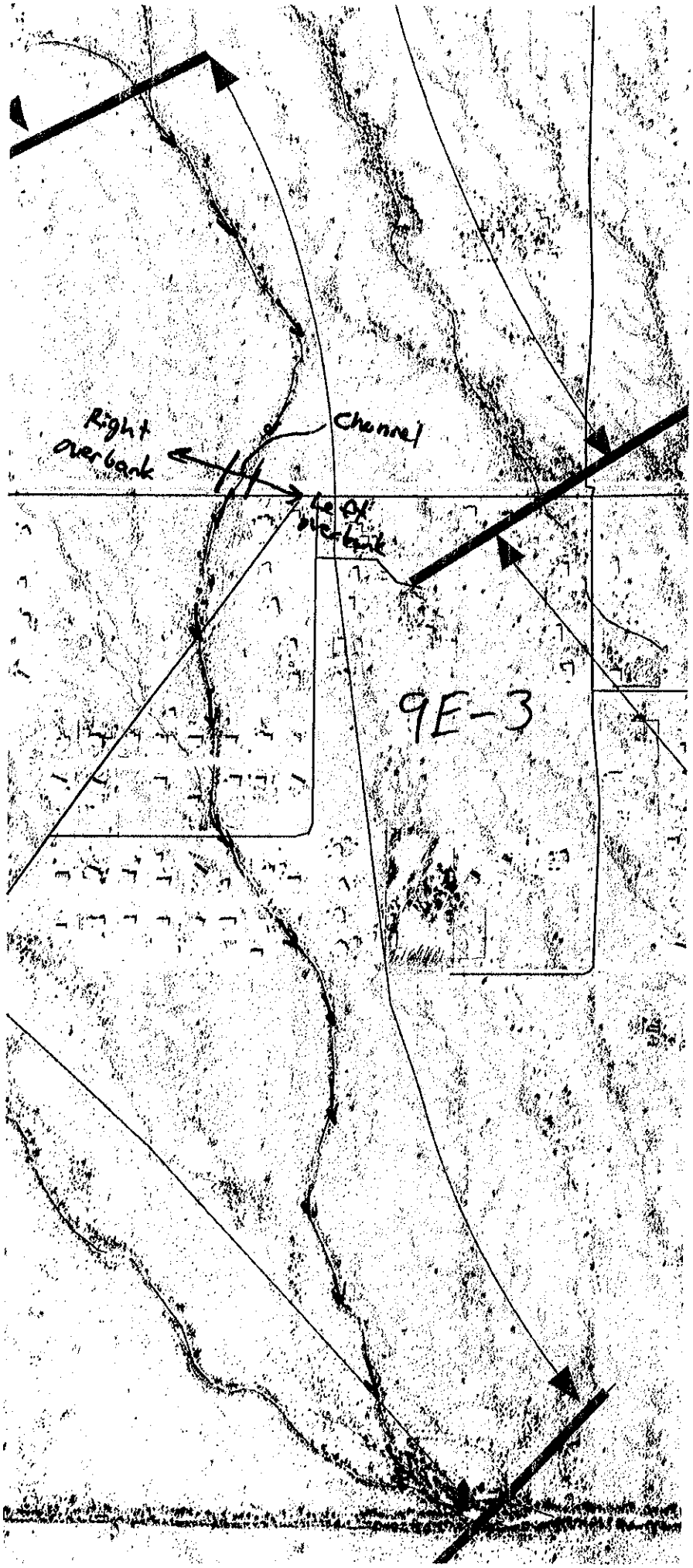
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.005	0.005	0.005
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004		0.000	
	Minor		.005-.015	0.005		0.005
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.009		0.009
	Medium		.010-.025		0.020	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.001	0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.046**	**0.055**	**0.046**

Figure E-1
(Reach 9E - 3)

Figure 1 - (Photo #7) Left Overbank looking downstream

Figure 2 - (Photo #8) Channel looking upstream

Figure 3 - (Photo #6) Right Overbank looking upstream


Right overbank
Channel
Left overbank
9E-3

Wash 10 East

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 10 East
Location: Reaches - 10E - 1 (Between the south side of the CAP Canal and Peak View Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.003	0.003	0.003
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.037**	**0.050**	**0.037**

Figure E-1
(Reach 10E - 1)

Figure 1 - (Photo #338) Left Overbank looking downstream

Figure 2 - (Photo #337) Channel looking downstream

Figure 3 - (Photo #336) Right Overbank looking downstream

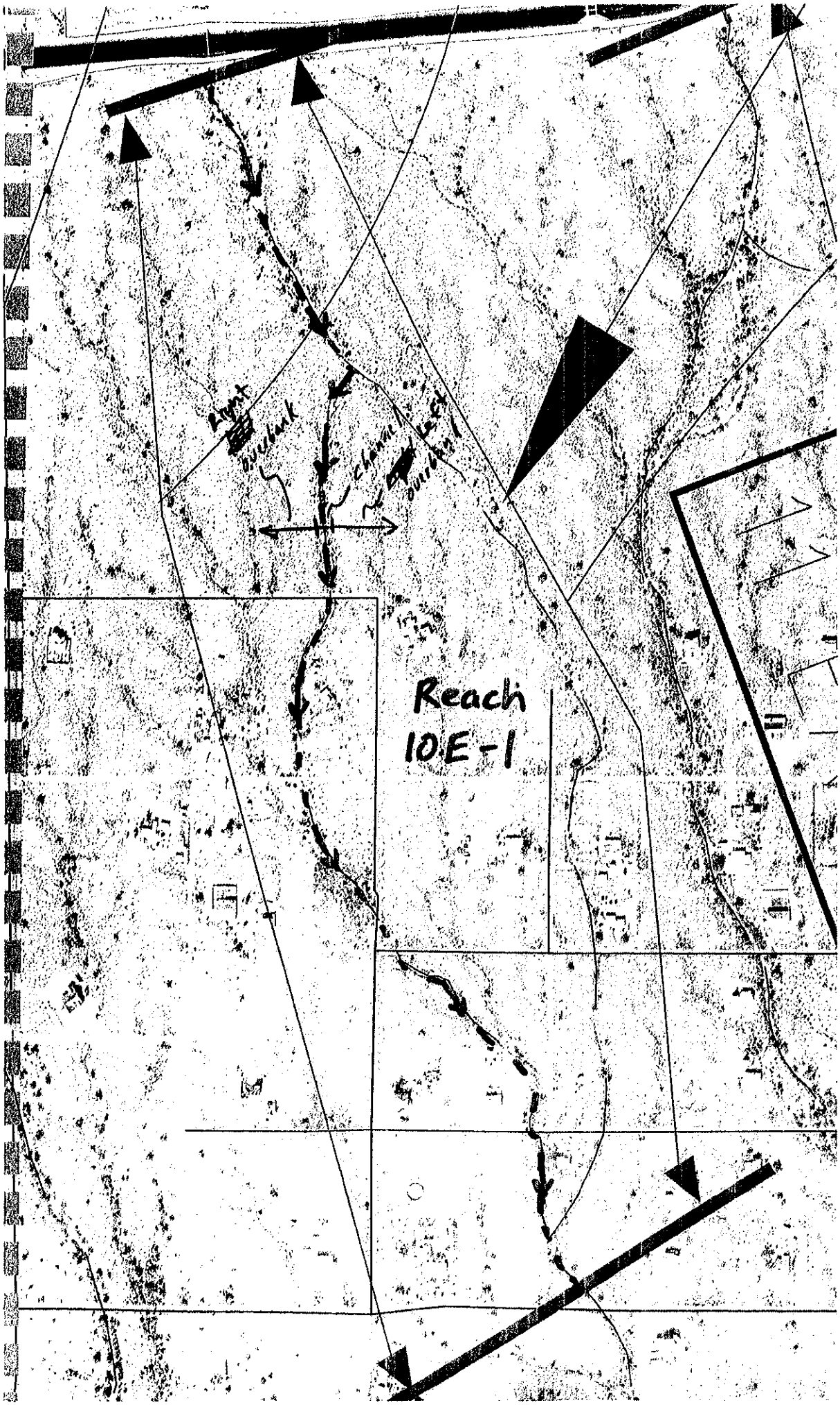

Right overbank
Channel
Left overbank
Reach
10E-1

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 10 East
Location: Reaches - 10E - 2 (Between Peak View Rd. and just north of Olia Wy.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.003	0.003	0.003
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.009		0.009
	Medium		.010-.025		0.020	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	
	Occ. Alt.		.001-.005			0.005
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.038**	**0.052**	**0.043**

Figure E-1
(Reach 10E - 2)

Figure 1 - (Photo #341) Left Overbank looking upstream

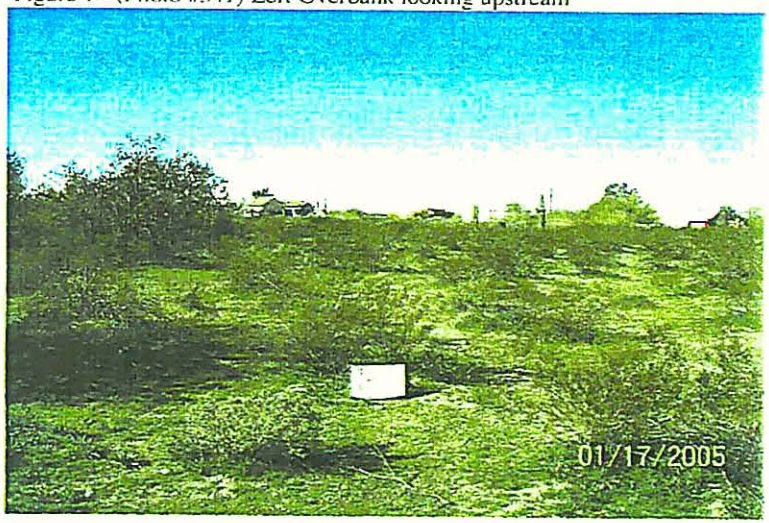
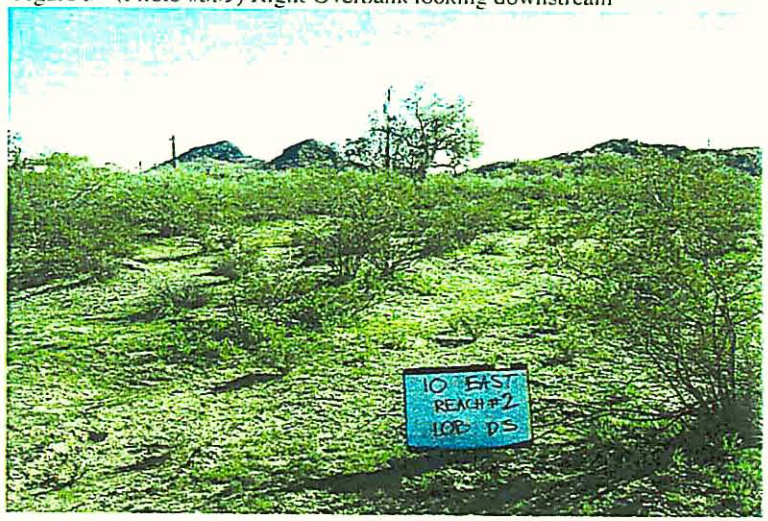


Figure 2 - (Photo #340) Channel looking downstream

Figure 3 - (Photo #339) Right Overbank looking downstream



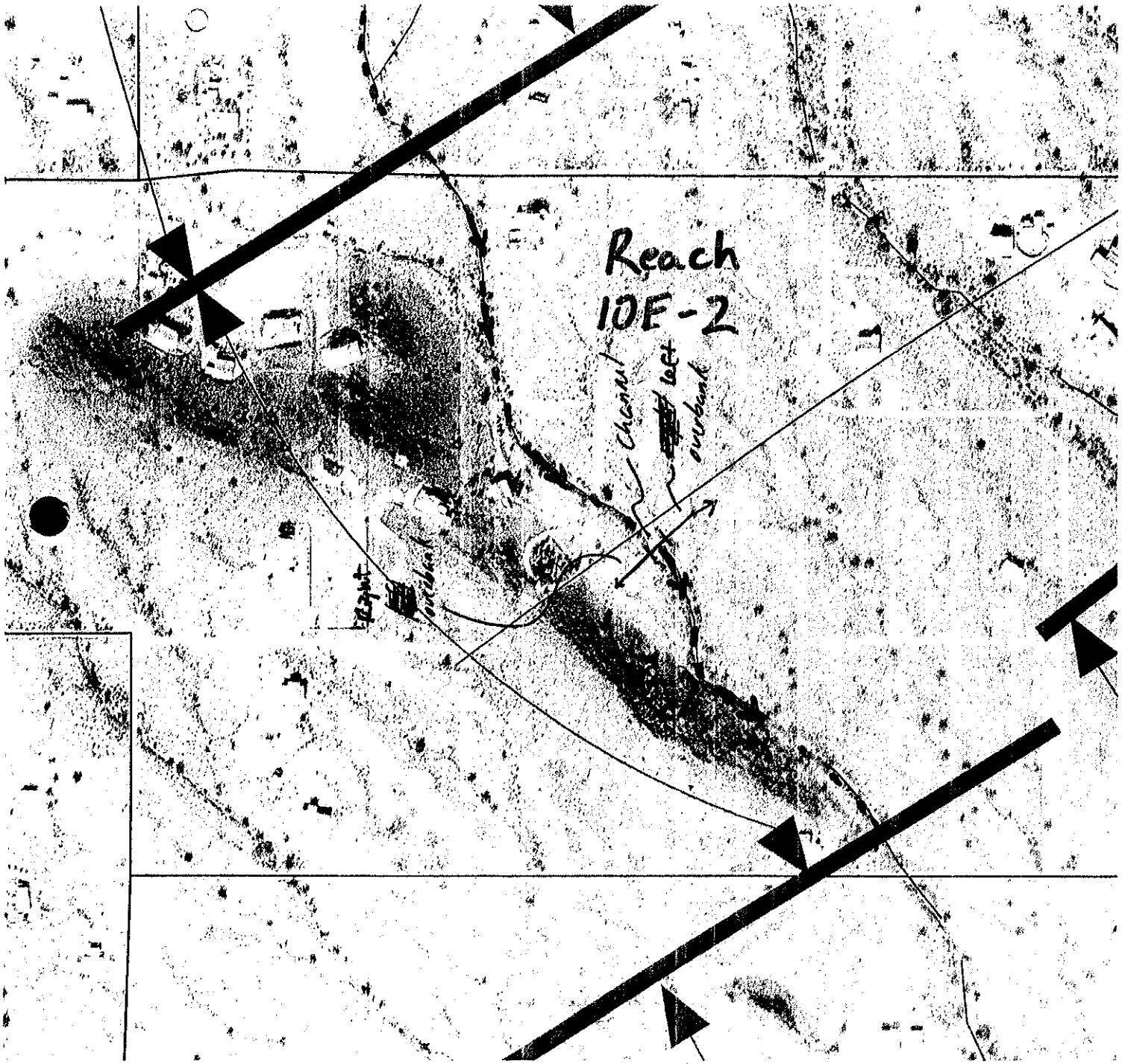

Reach
10E-2
Channel
left
overbank
right
overbank

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 10 East
Location: Reaches - 10E - 3 (Between just north of Olia Wy. and 1/4 mile south of Patton Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.027		0.027
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.001	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.011	0.020	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.040**	**0.049**	**0.039**

Figure E-1
(Reach 10E - 3)

Figure 1 - (Photo #24) Left Overbank looking downstream

Figure 2 - (Photo #23) Channel looking downstream

Figure 3 - (Photo #22) Right Overbank looking downstream

Right
overbank
channel
overbank
Reach
10E-3

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 10 East
Location: Reaches - 10E - 4 (Between 1/4 mile south of Patton Rd. and Jomax Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.027	0.027	0.027
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.011	0.024	0.011
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.038**	**0.051**	**0.038**

Figure E-1
(Reach 10E - 4)

Figure 1 - (Photo #344) Left Overbank looking upstream

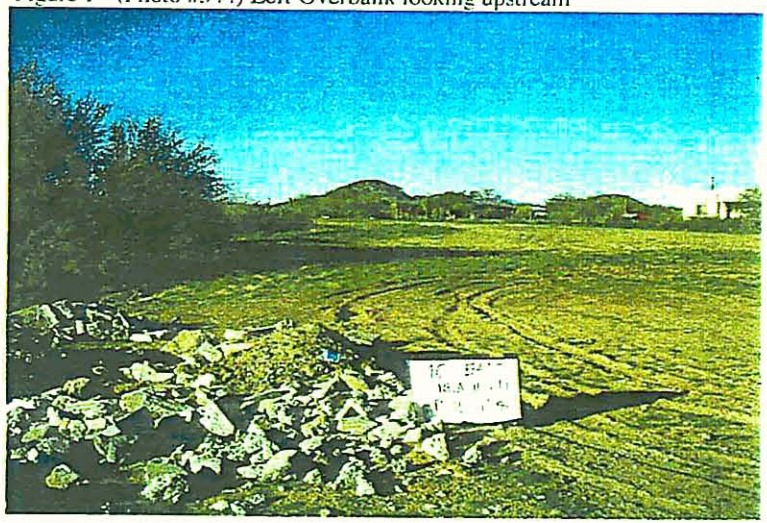
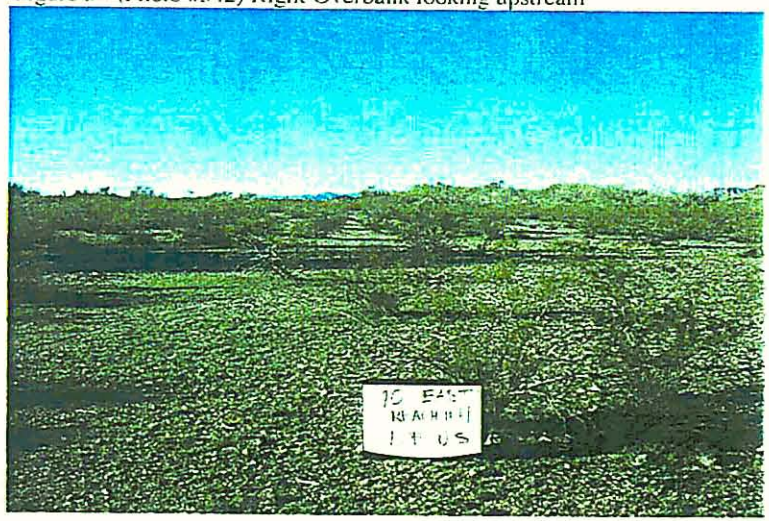


Figure 2 - (Photo #343) Channel looking downstream

Figure 3 - (Photo #342) Right Overbank looking upstream



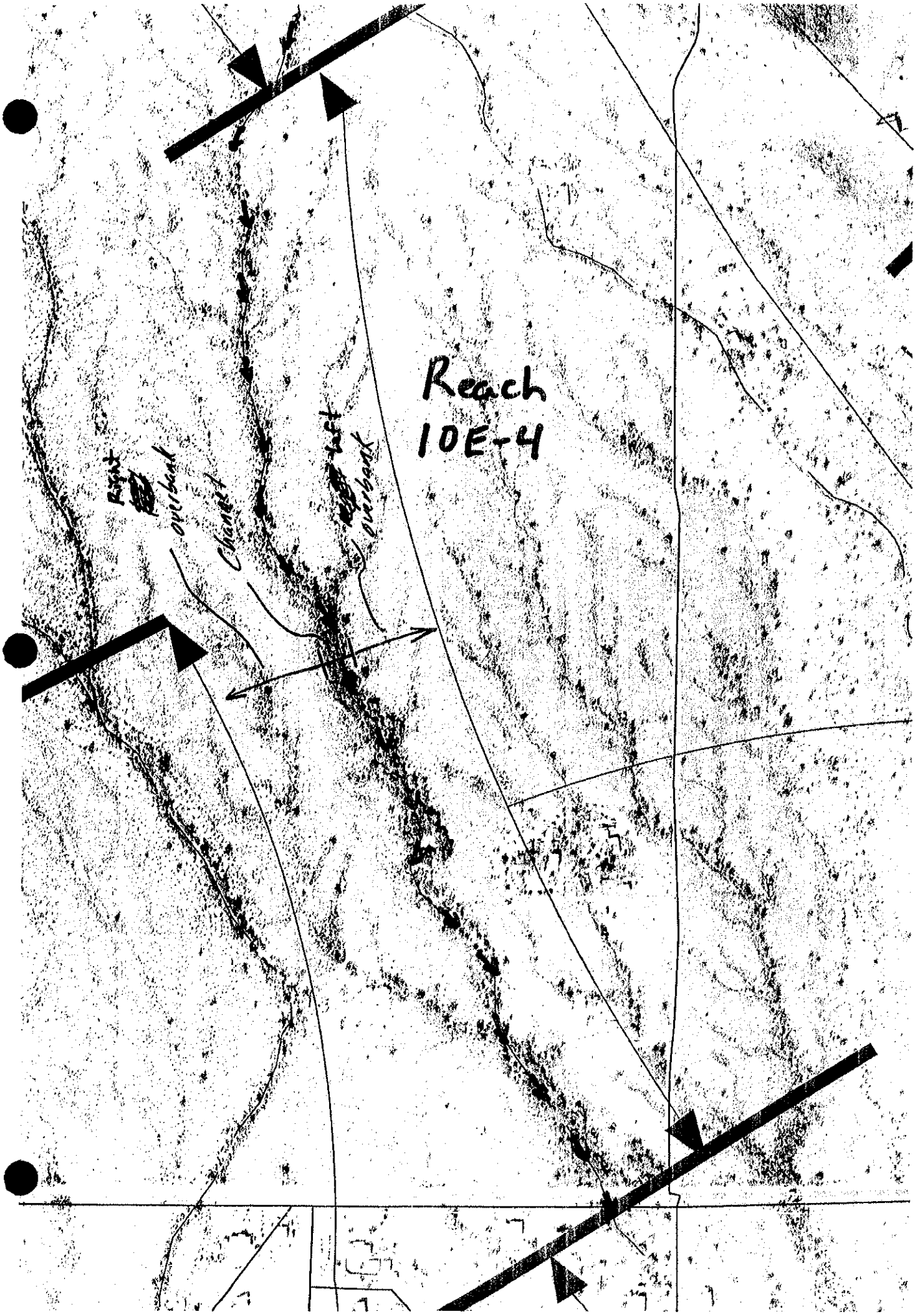

Reach
10E-4
Right
overbank
Channel
Left
overbank

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 10 East
Location: Reaches - 10E - 5 (Between Jomax Rd. and 1/2 mile south of Jomax Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.027	0.027	0.027
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.003	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.000	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		
	Medium		.010-.025		0.018	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.039**	**0.050**	**0.041**

Figure E-1
(Reach 10E - 5)

Figure 1 - (Photo #347) Left Overbank looking upstream

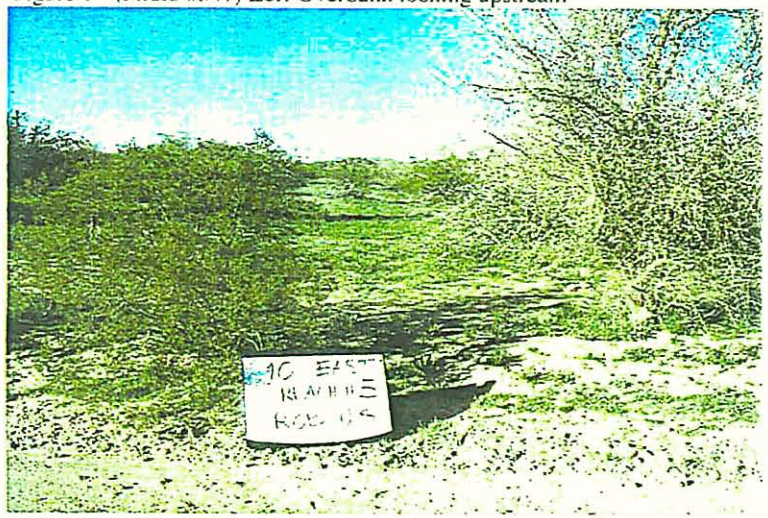
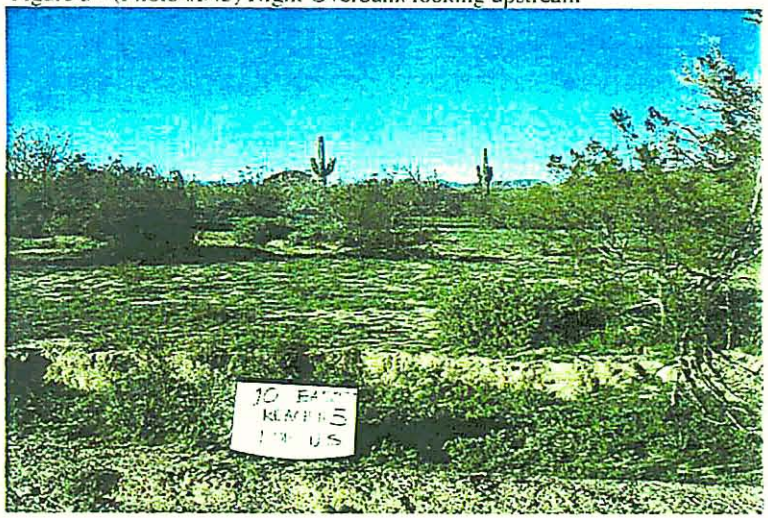


Figure 2 - (Photo #346) Channel looking upstream

Figure 3 - (Photo #345) Right Overbank looking upstream



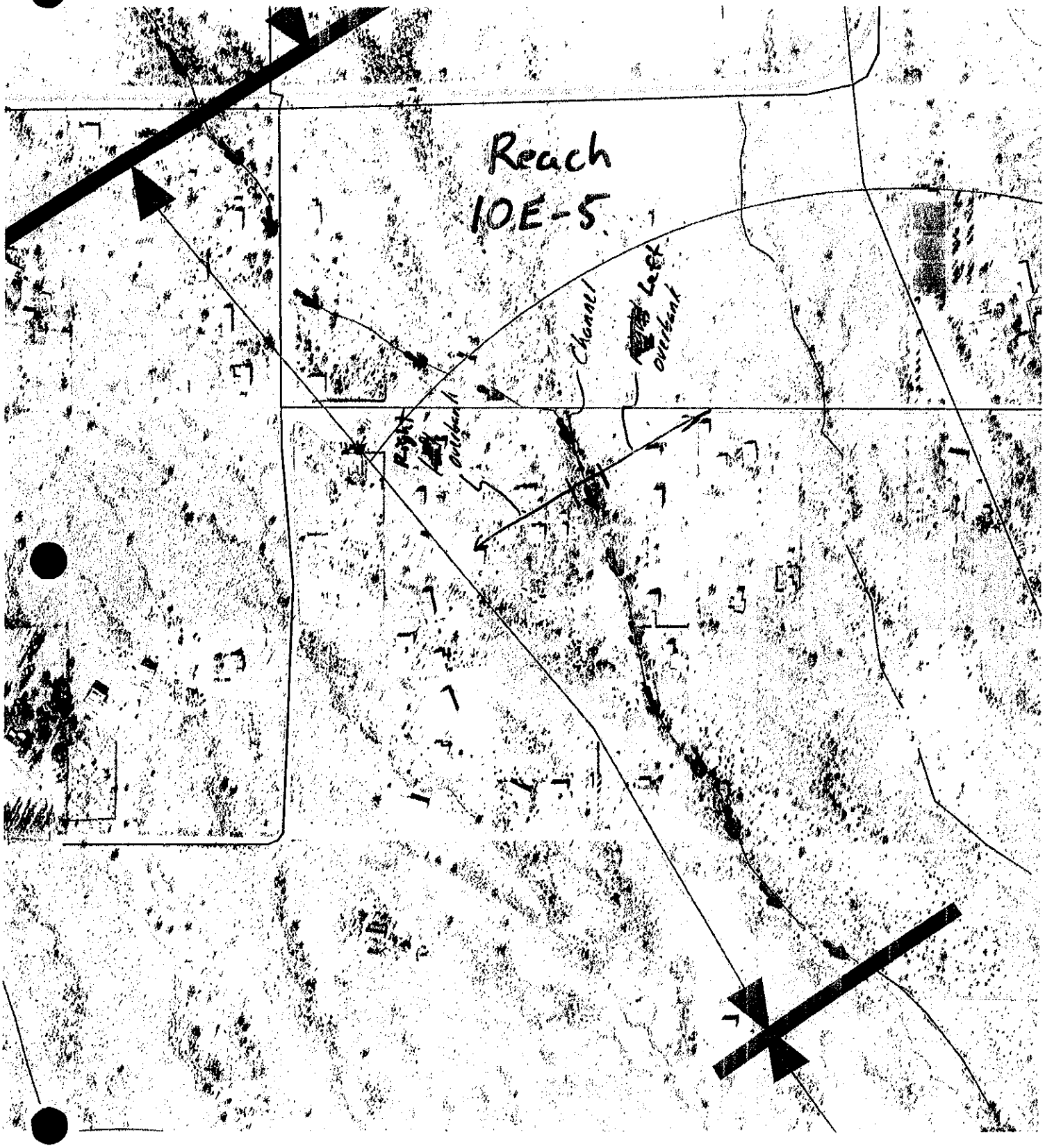

Reach
10E-5
Channel
Left
overbank
Right
overbank

Table E-1

BY JCS DATE 2/2/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 10 East
Location: Reaches - 10E - 6 (Between 1/2 mile south of Jomax Rd. and Happy Valley Rd. alignment)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025		0.025
	Coarse Sand		.026-.035		0.026	
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001-.005		0.003	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.018	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.033**	**0.047**	**0.033**

Figure E-1
(Reach 10E - 6)

Figure 1 - (Photo #350) Left Overbank looking downstream

Figure 2 - (Photo #349) Channel looking upstream

Figure 3 - (Photo #348) Right Overbank looking upstream

Reach
10E-6
Left
overbank
Right
overbank

10 East-East Split-1

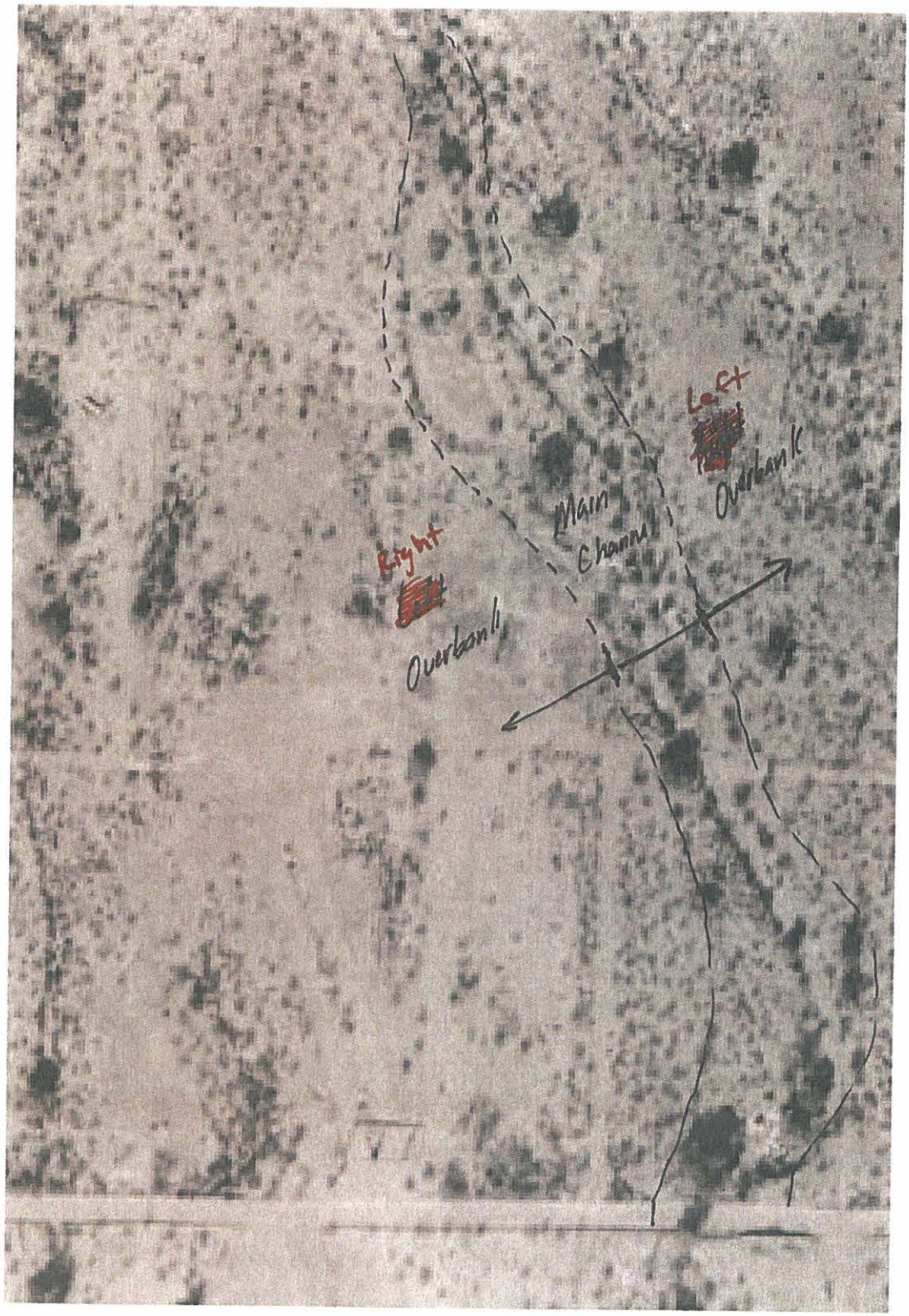
Table E-1

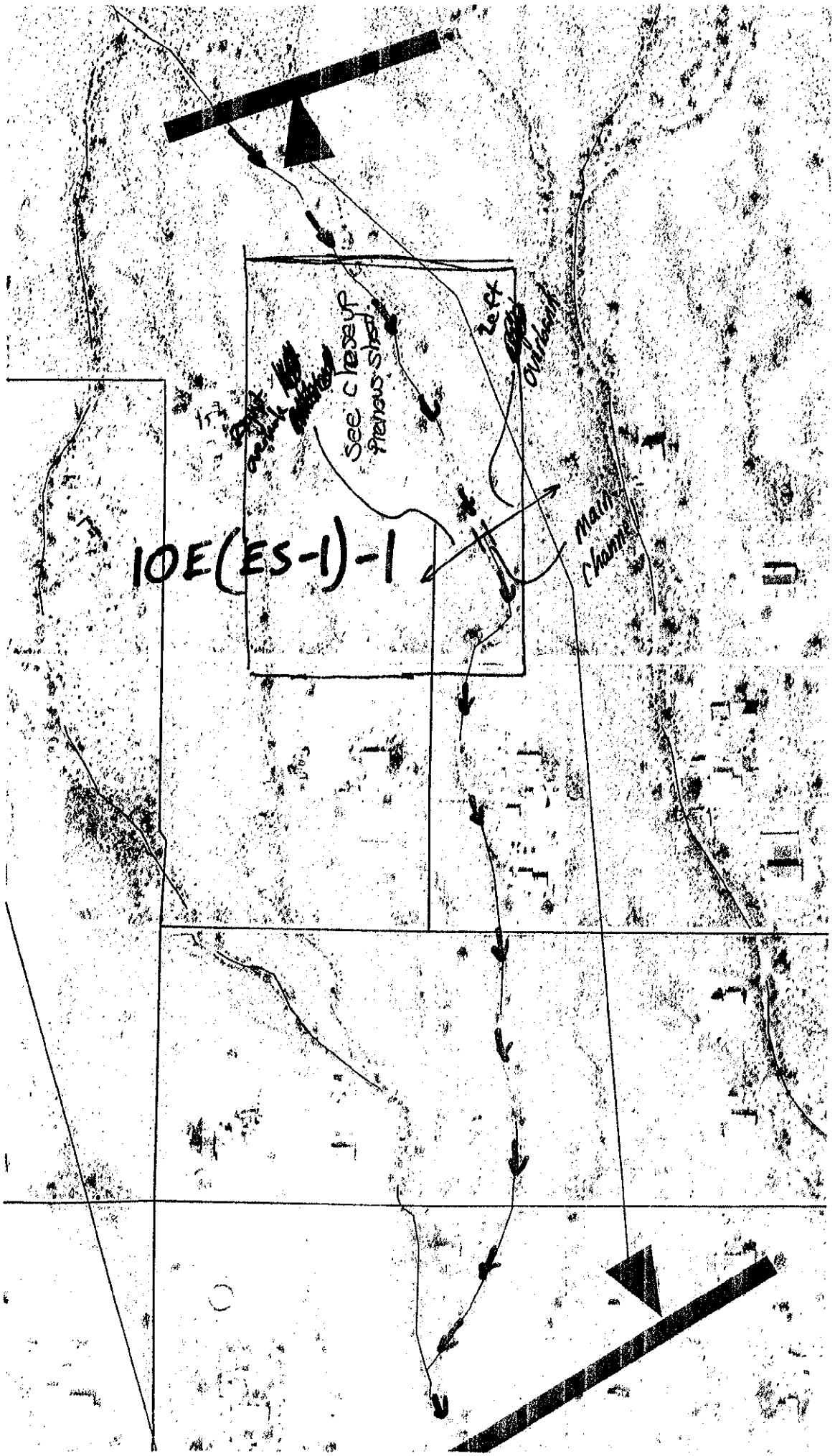
BY JCS DATE 2/8/2005
CHECK HAA DATE 2/8/2005

Project: Wittmann ADMSU
Stream: Wash 10 East-East Split-1
Location: Reaches - 10E(ES - 1) -1 (Between just north of Dixileta Dr. and Peak View Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026	0.027	0.026
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.003	0.000	0.001
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.015	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.037**	**0.042**	**0.035**

10E-Split ES-1




See Previous Sheet
Main Channel
10E(ES-1)-1

10 East-East Split-2

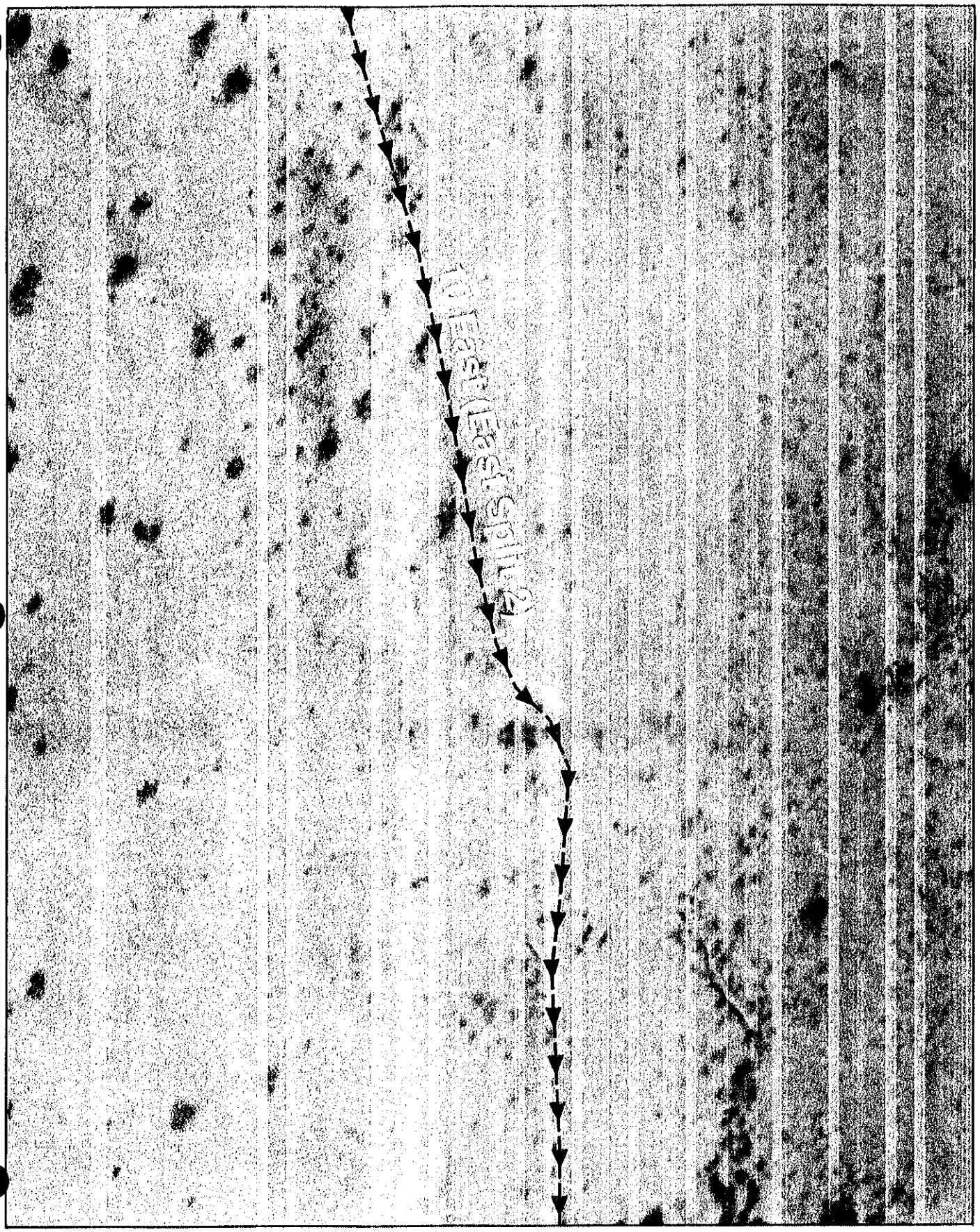
Table E-1

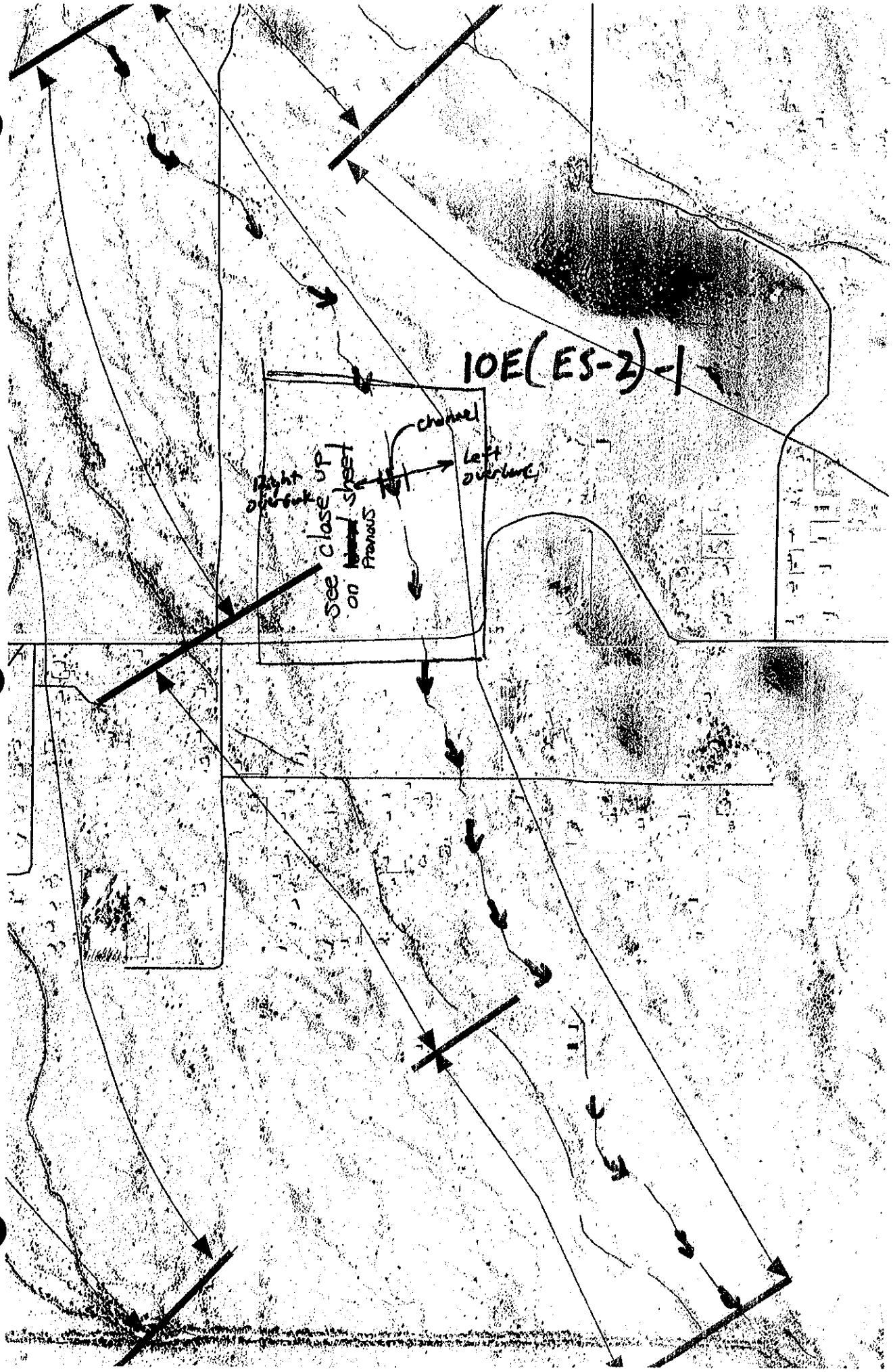
BY JCS DATE 2/8/2005
CHECK HAA DATE 2/8/2005

Project: Wittmann ADMSU
Stream: Wash 10 East-East Split-2
Location: Reaches - 10E(ES - 2) -1 (Between just south of Patton Rd. and the confluence of wash 10 East.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032	0.025	0.025	0.025
	Coarse Sand		.026-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001-.005			
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.000	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.007		0.007
	Medium		.010-.025		0.012	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001-.005			
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.034**	**0.037**	**0.034**

FIGURE E-1: Wash 10E - ES2 - 1 (n-value photo)




10E(ES-2)-1
channel
left overbank
right overbank
See close up sheet on previous

Wash 11 East

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 11 East
Location: Reaches - 11E - 1 (Between the south side of the CAP Canal and just south of Peak View Rd.)

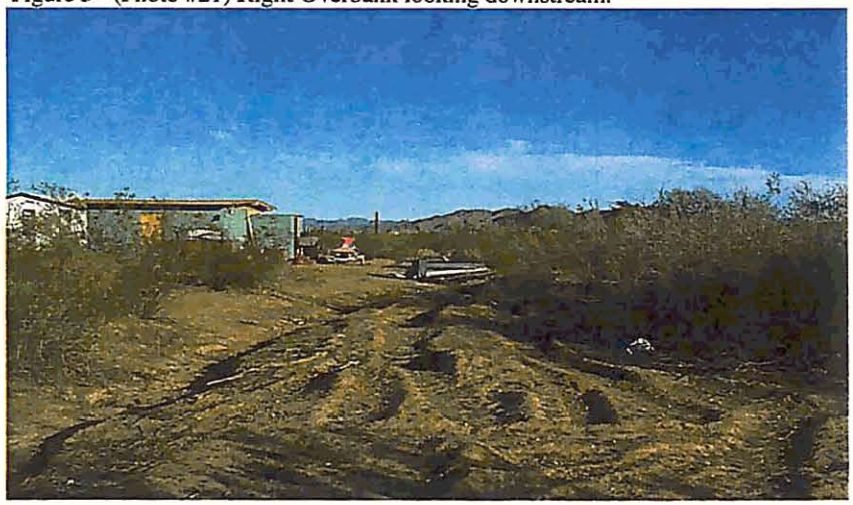
Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.001	0.005	0.001
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.002	0.000	0.002
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.018	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.001	0.001
	Freg. Alt.		.010-.015			
				0.040	0.052	0.040
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.040**	**0.052**	**0.040**

Figure E-1
(Reach 11E - 1)

Figure 1 - (Photo #20) Left Overbank looking upstream.

Figure 2 - (Photo #19) Channel looking downstream.

Figure 3 - (Photo #21) Right Overbank looking downstream.



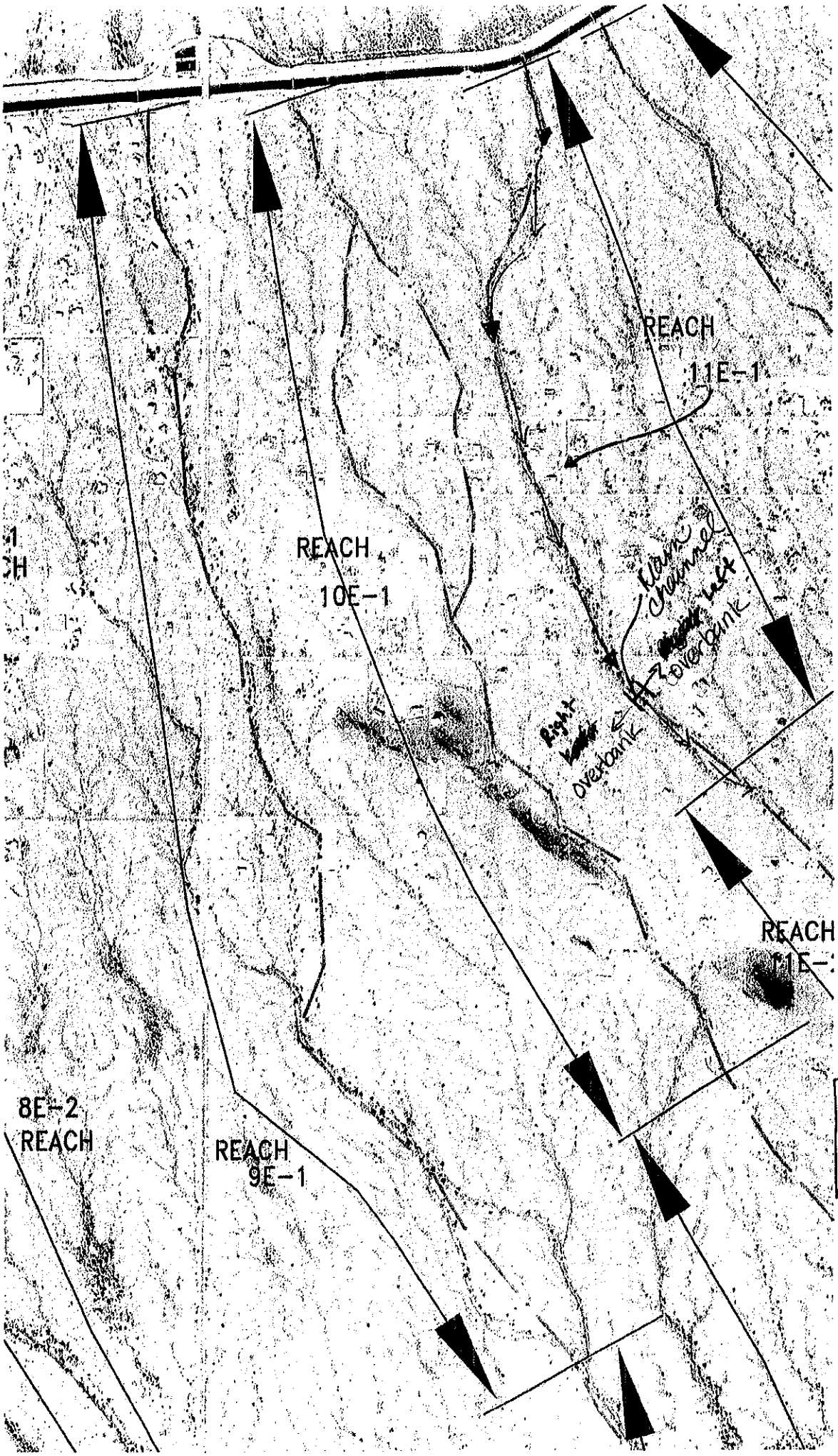

REACH
11E-1
REACH
10E-1
Left
Channel
Overbank
Right
Overbank
REACH
8E-2
REACH
REACH
9E-1
9E-1, 10E-1, 11E-1

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 11 East
Location: Reaches - 11E - 2 (Between just south of Peak View Rd. and just south of Patton Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.001	0.005	0.001
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.008		0.008
	Medium		.010-.025		0.010	
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001-.005		0.001	
	Freg. Alt.		.010-.015			
				0.035	0.044	0.035
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.035**	**0.044**	**0.035**

Figure E-1
(Reach 11E - 2)

Figure 1 - (Photo #353) Left Overbank looking downstream

Figure 2 - (Photo #352) Channel looking downstream

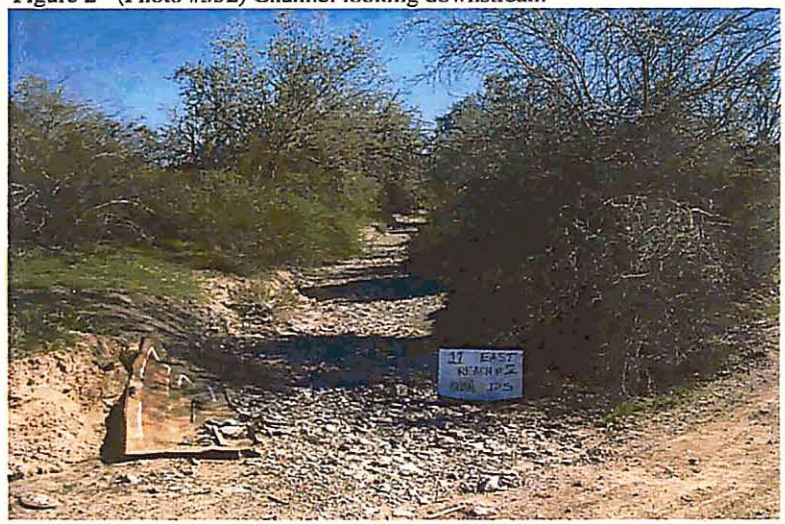
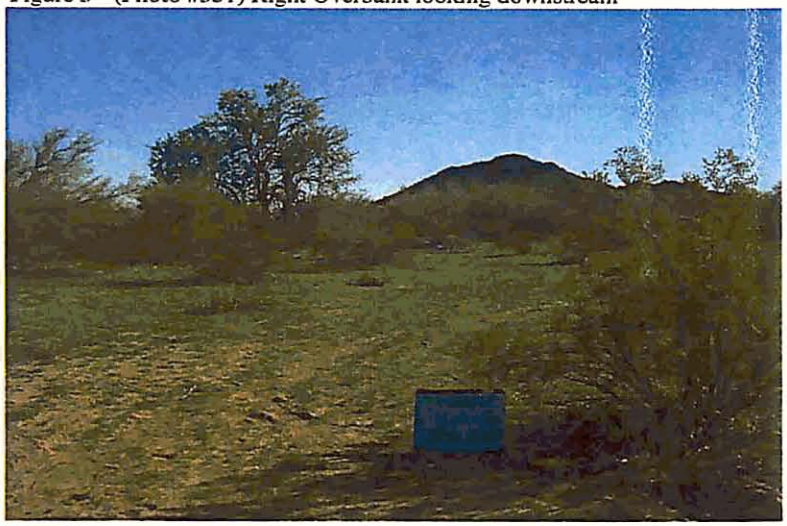
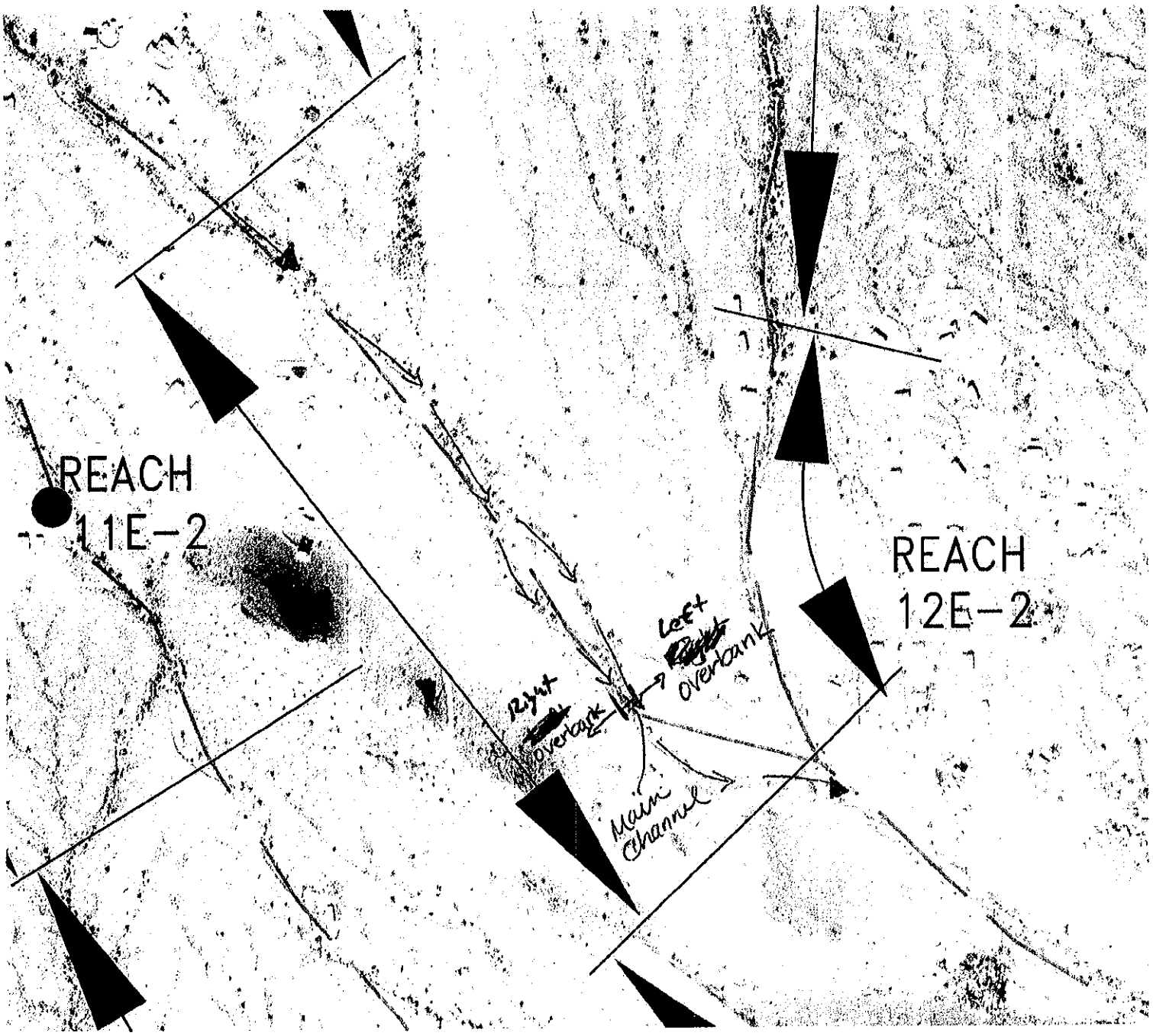


Figure 3 - (Photo #351) Right Overbank looking downstream




REACH
11E-2
REACH
12E-2
Left
overbank
Right
overbank
Main
Channel

11E-2 & 12E-2

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 11 East
Location: Reaches - 11E - 3 (Between just south of Patton Rd and the confluence with Wash 13 East)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.004		0.003
	Moderate		.006-.010		0.007	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.004		
	Minor		.005-.015		0.005	0.005
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.009		
	Medium		.010-.025		0.015	0.011
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.001	0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	0	0	0
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.044**	**0.056**	**0.046**

Figure E-1
(Reach 11E - 3)

Figure 1 - (Photo #13) Left Overbank looking upstream.

Figure 2 - (Photo #12) Channel looking upstream.

Figure 3 - (Photo #15) Right Overbank looking upstream.

Figure 4 - (Photo #14) Channel looking downstream.

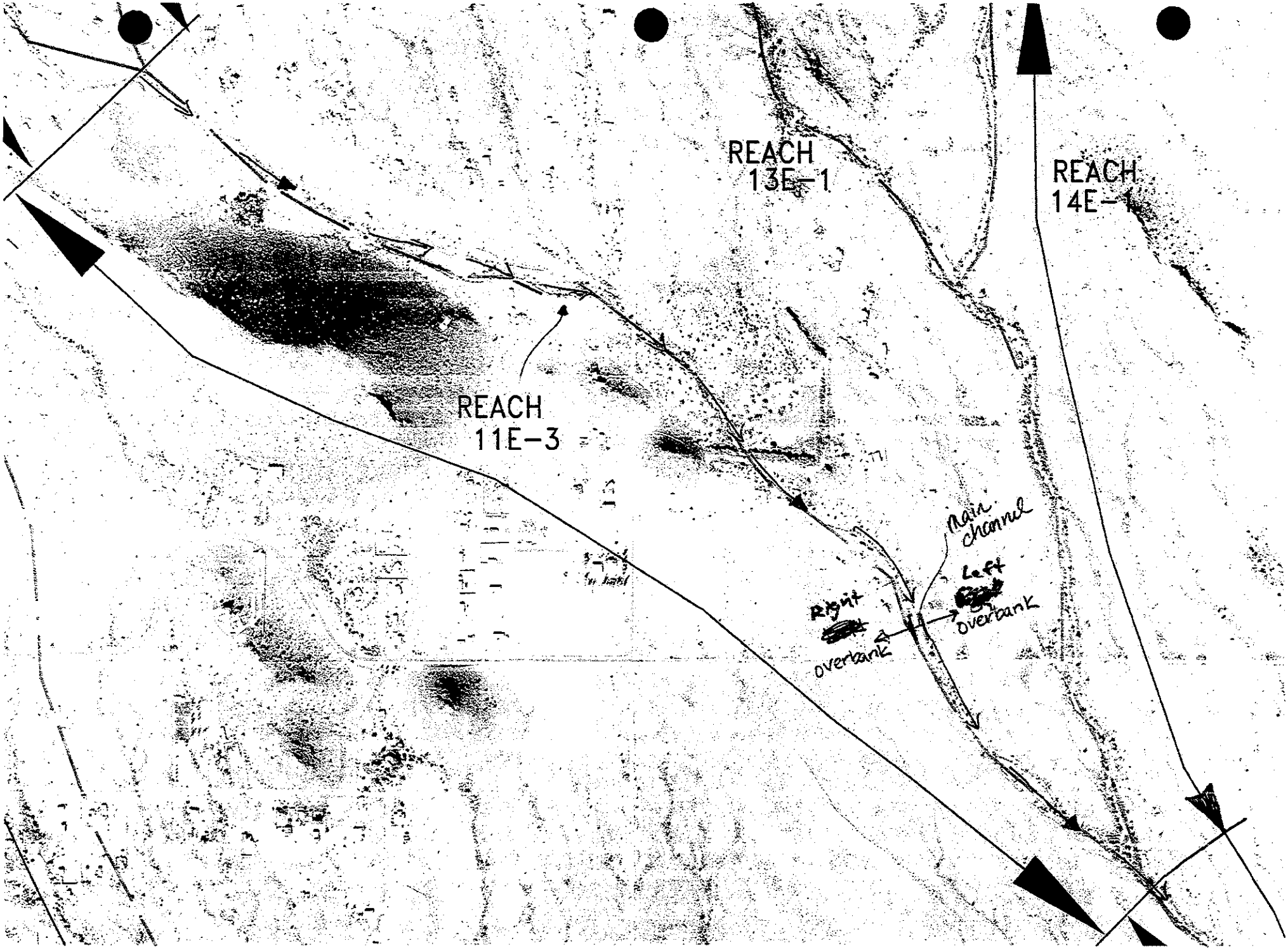

REACH
13E-1
REACH
14E-1
REACH
11E-3
main channel
Left
overbank
Right
overbank

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 2/2/2005

Project: Wittmann ADMSU
Stream: Wash 11 East
Location: Reaches - 11E - 4 (Between confluence with Wash 13 East and north of the McMicken Dam Outlet Channel)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.003	0.005	0.003
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.000	0.000	0.000
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.014	0.022	0.014
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.003	0.005	0.003
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.046**	**0.061**	**0.046**

Figure E-1
(Reach 11E - 4)

Figure 1 - (Photo #356) Left Overbank looking downstream

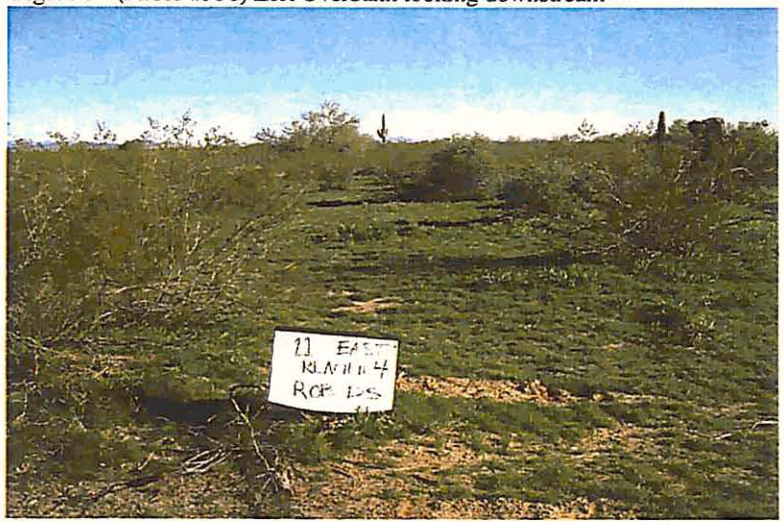
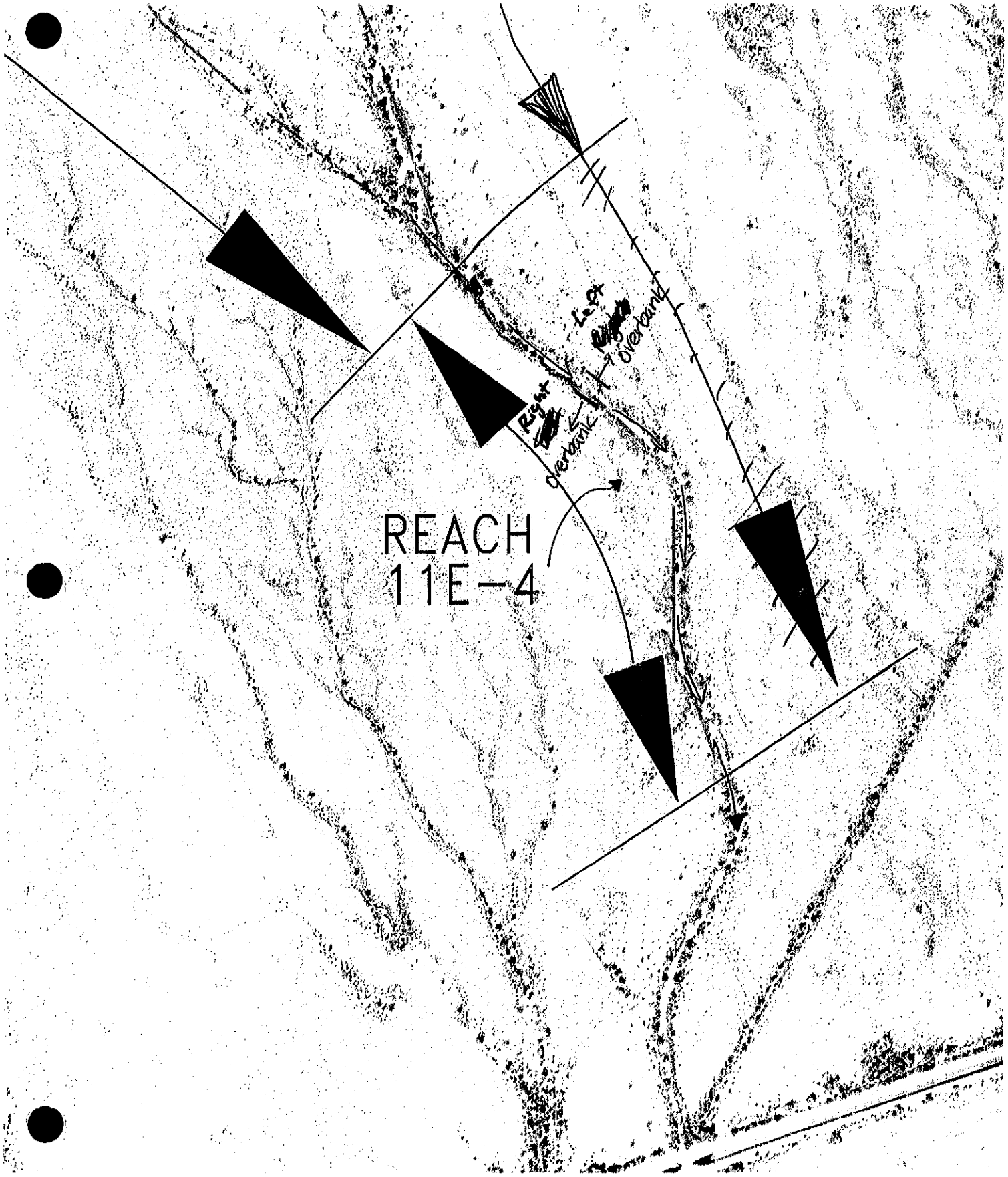


Figure 2 - (Photo #355) Channel looking upstream

Figure 3 - (Photo #354) Right Overbank looking upstream


Left
overbank
Right
overbank
REACH
11E-4

Wash 12 East

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 12 East
Location: Reaches - 12E - 1 (Between the south side of the CAP Canal and Dale Ln)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.003		0.003
	Moderate		.006-.010		0.006	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.004	0.004	0.004
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.012	0.019	0.012
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.002	0.001
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.046**	**0.060**	**0.046**

Figure E-1
(Reach 12E - 1)

Figure 1 - (Photo #33) Left Overbank looking upstream

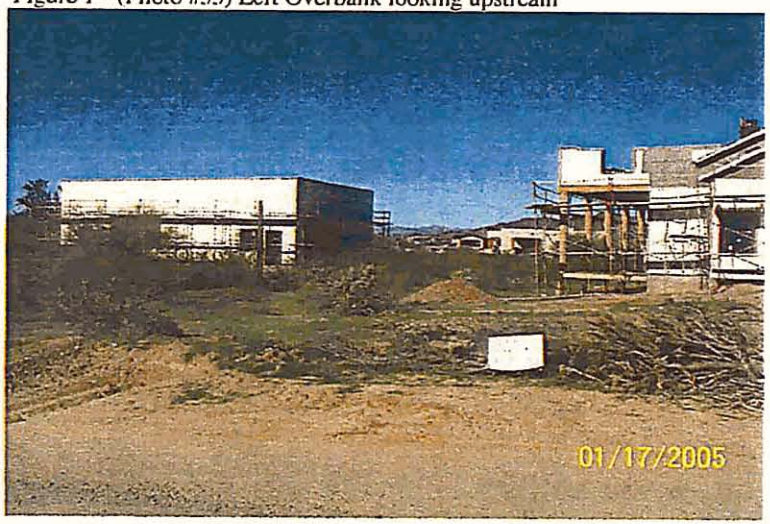
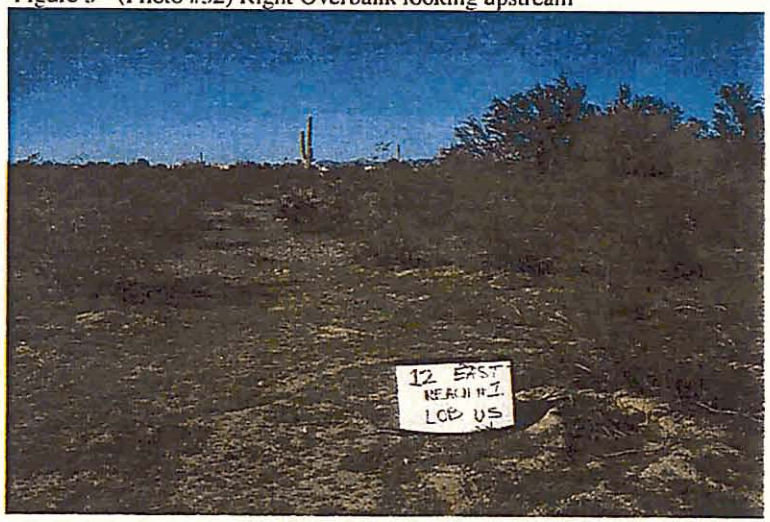


Figure 2 - (Photo #31) Channel looking downstream

Figure 3 - (Photo #32) Right Overbank looking upstream



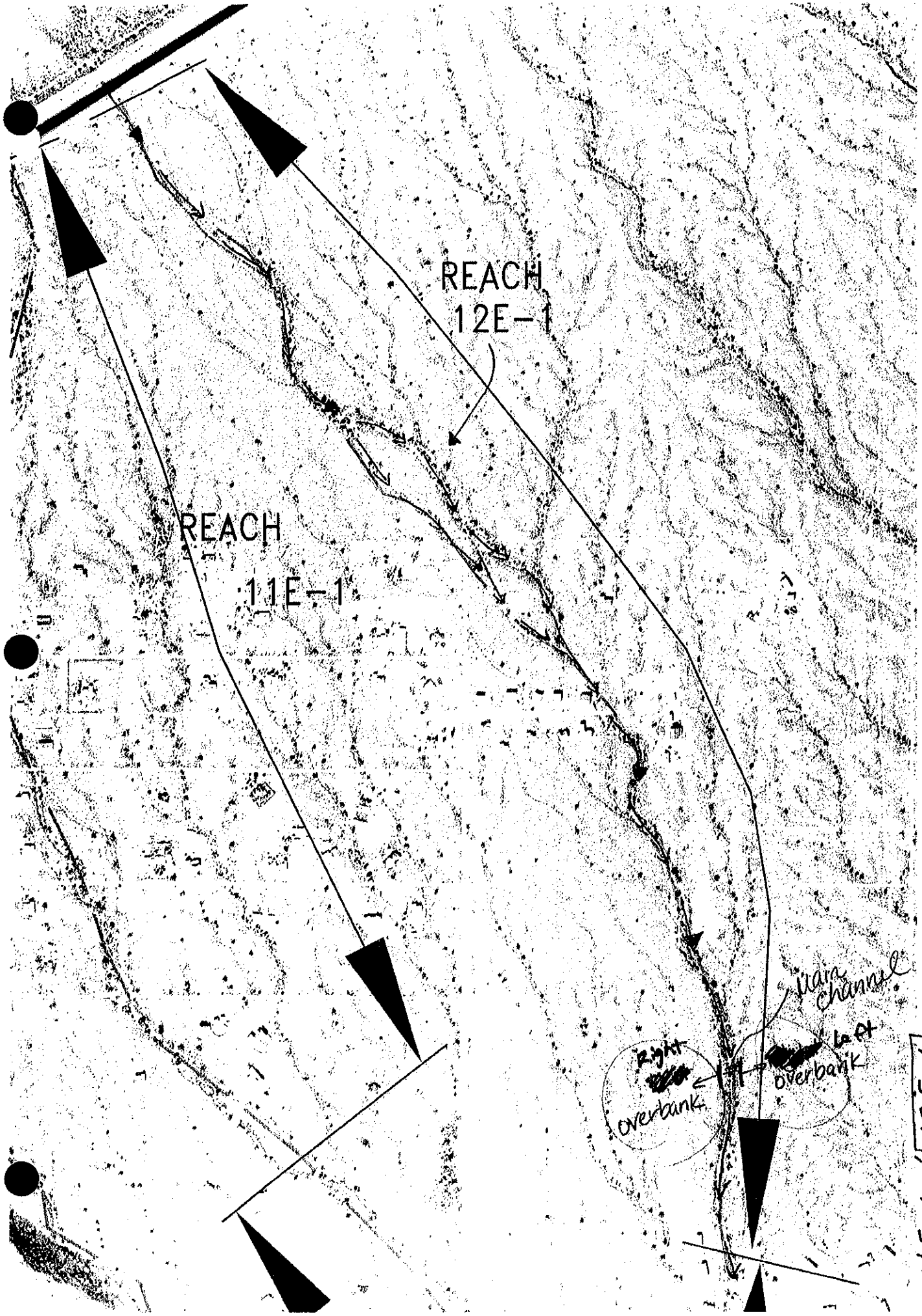

REACH
12E-1
REACH
11E-1
main channel
Right
overbank
Left
overbank
11E-1 & 12E-1

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 12 East
Location: Reaches - 12E - 2 (Between Dale Ln and the confluence with Wash 11 East)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.029	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.002	0.005	0.005
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.004	0.002	0.004
	Minor		.005-.015			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010	0.009		
	Medium		.010-.025		0.018	0.014
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.002	0.002	0.002
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.043**	**0.056**	**0.051**

Figure E-1
(Reach 12E - 2)

Figure 1 - (Photo #18) Left Overbank looking downstream.

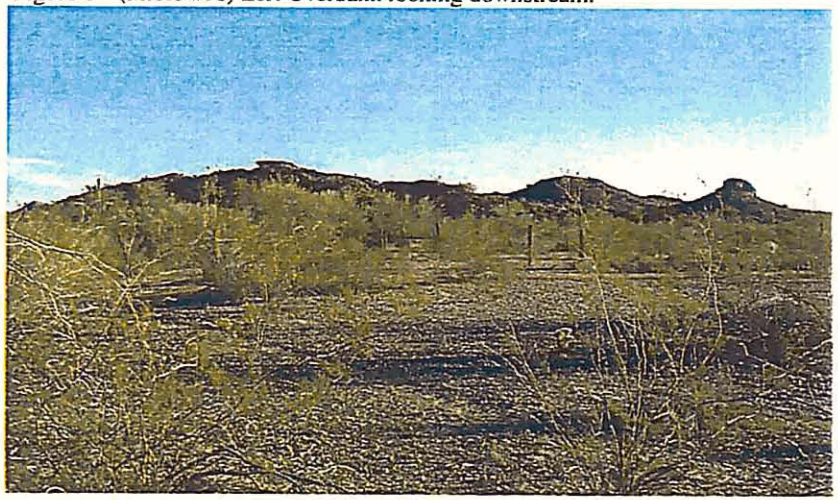
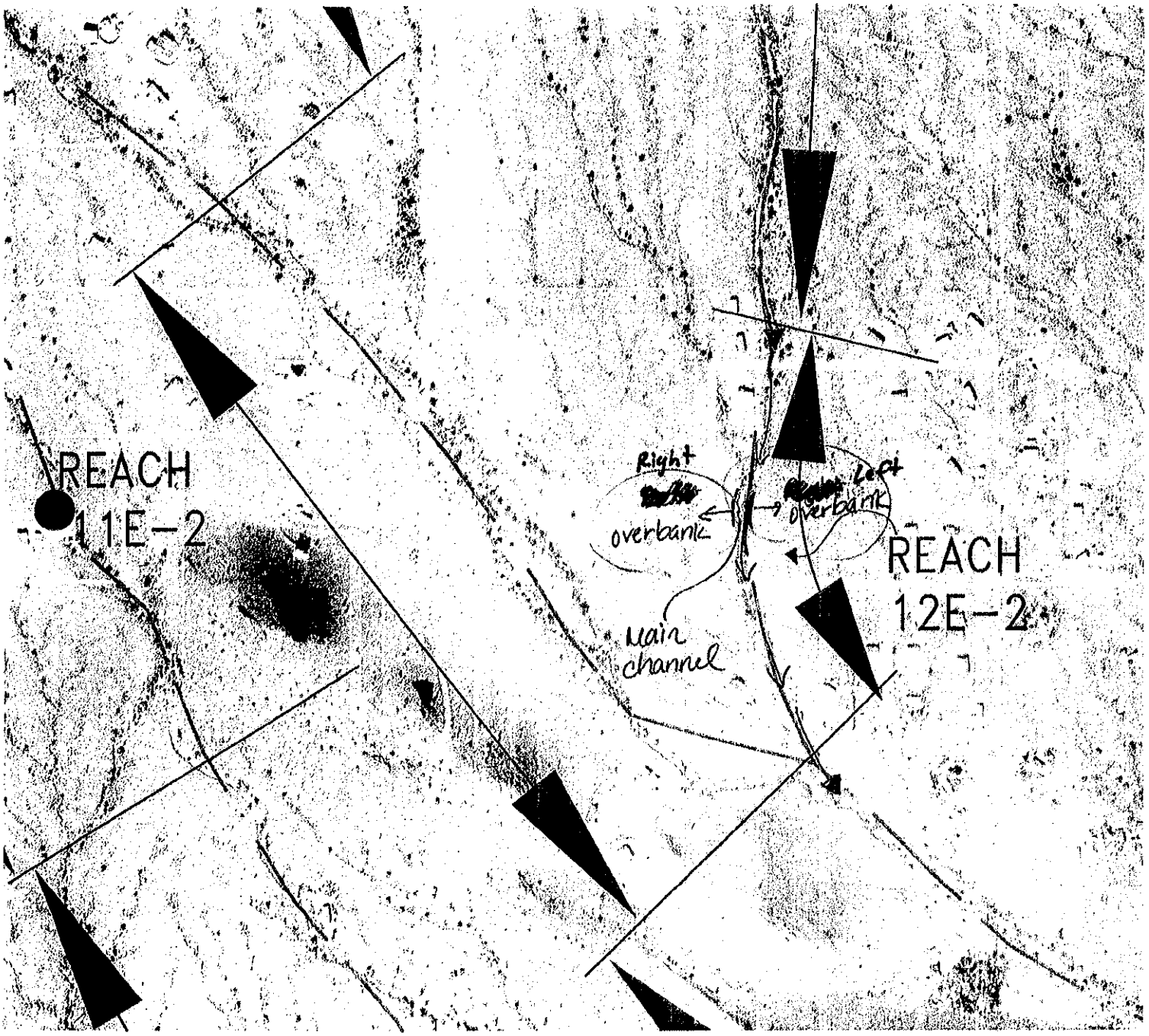


Figure 2 - (Photo #16) Channel looking upstream.

Figure 3 - (Photo#17) Right Overbank looking upstream.


REACH
11E-2
Right
overbank
Left
overbank
main channel
REACH
12E-2

11E-2 & 12E-2

Wash 13 East

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA/JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 13 East
Location: Reaches - 13E - 1 (Between Patton Rd. and just south of Briles Rd. alignment)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.005		0.005
	Moderate		.006-.010		0.007	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.003		0.003
	Minor		.005-.015		0.005	
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.015	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.001	0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.045**	**0.056**	**0.045**

Figure E-1
(13E - 1)

Figure 1. (Photo #9) Channel looking downstream.

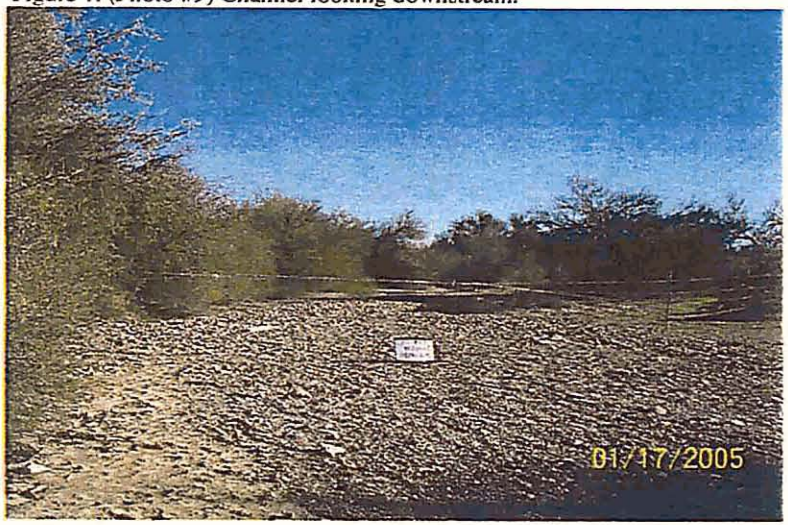


Figure 2. (Photo #10) Left Overbank looking upstream.

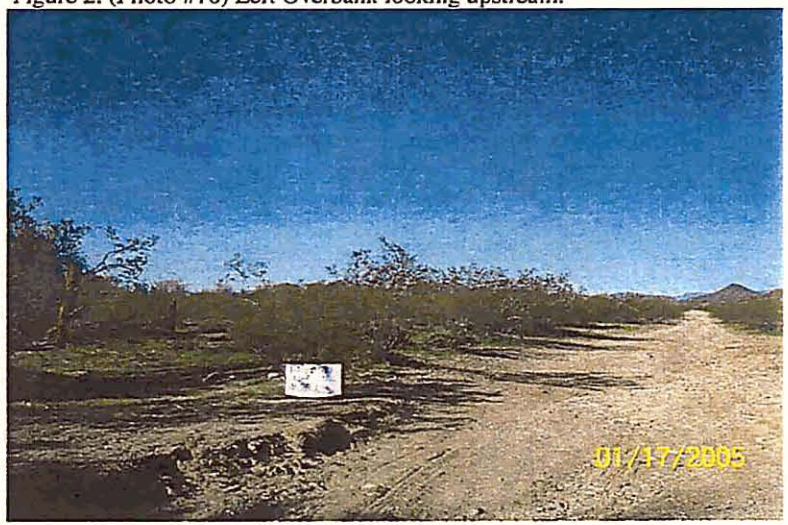
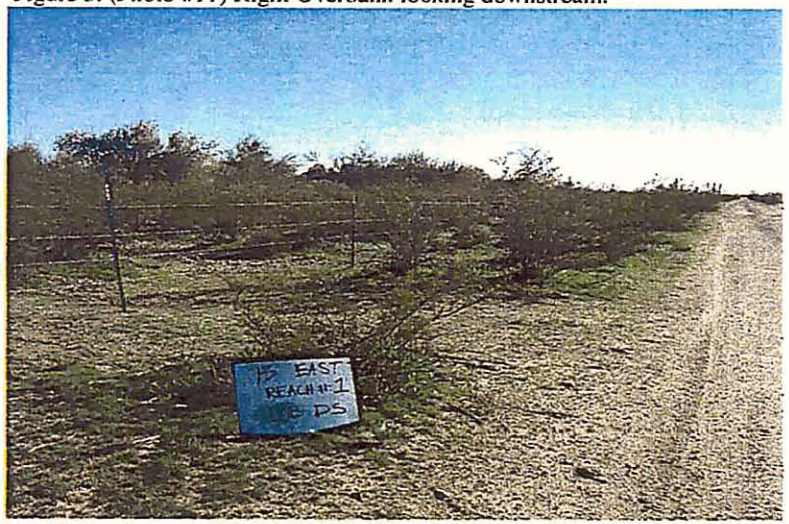
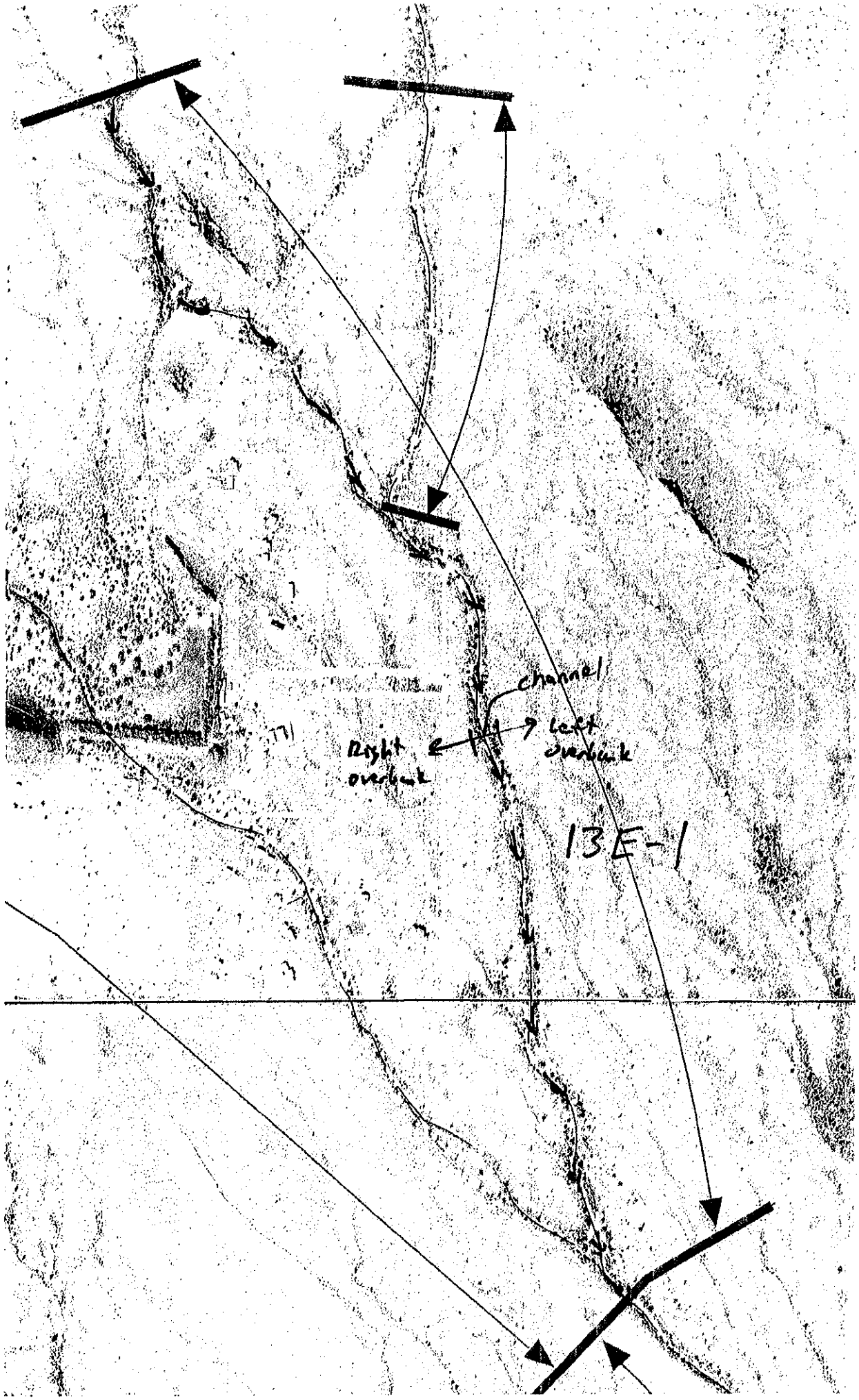


Figure 3. (Photo #11) Right Overbank looking downstream.




channel
left overbank
Right overbank
13E-1

Wash 14 East

Table E-1

BY AMB DATE 1/20/2005
CHECK HAA/JCS DATE 1/24/2005

Project: Wittmann ADMSU
Stream: Wash 14 East
Location: Reaches - 14E - 1 (Between Patton Rd. and 1/2 mile south of Patton Rd.)

Channel Conditions		Manning's n Adjustment		Left Overbank (East)	Channel	Right Overbank (West)
Channel Material	Concrete	n_b	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.026-.035	0.026		0.026
	Gravel		.028-.035		0.028	
	Cobble		.030-.050			
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001-.005	0.005		0.005
	Moderate		.006-.010		0.007	
	Severe		.011-.020			
Effects of Obstruction	Negligible	n_2	.000-.004	0.003		0.003
	Minor		.005-.015		0.005	
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n_3	.002-.010			
	Medium		.010-.025	0.010	0.015	0.010
	Large		.025-.050			
	Very Large		.050-.100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001-.005	0.001	0.001	0.001
	Freg. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n=(n_b+n_1+n_2+n_3+n_4)m$				**0.045**	**0.056**	**0.045**

Figure E-1
(14E - 1)

Figure 1. (Photo #358) Channel looking downstream.

Figure 2. (Photo #359) Left Overbank looking upstream.

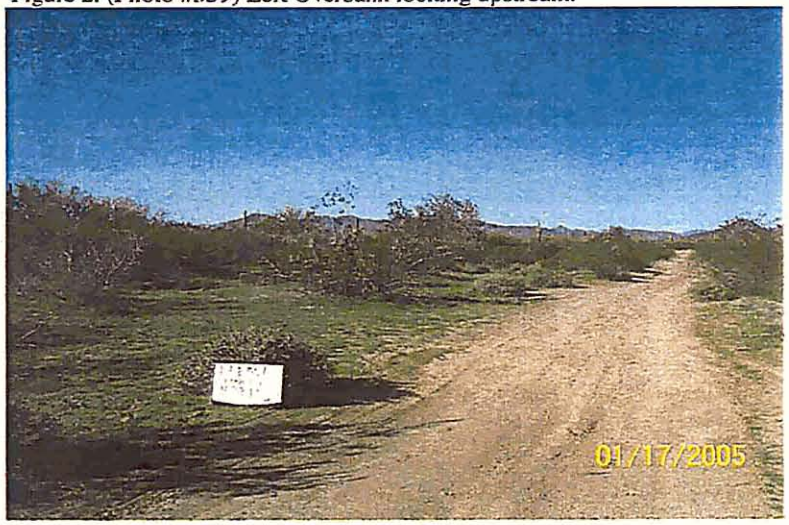
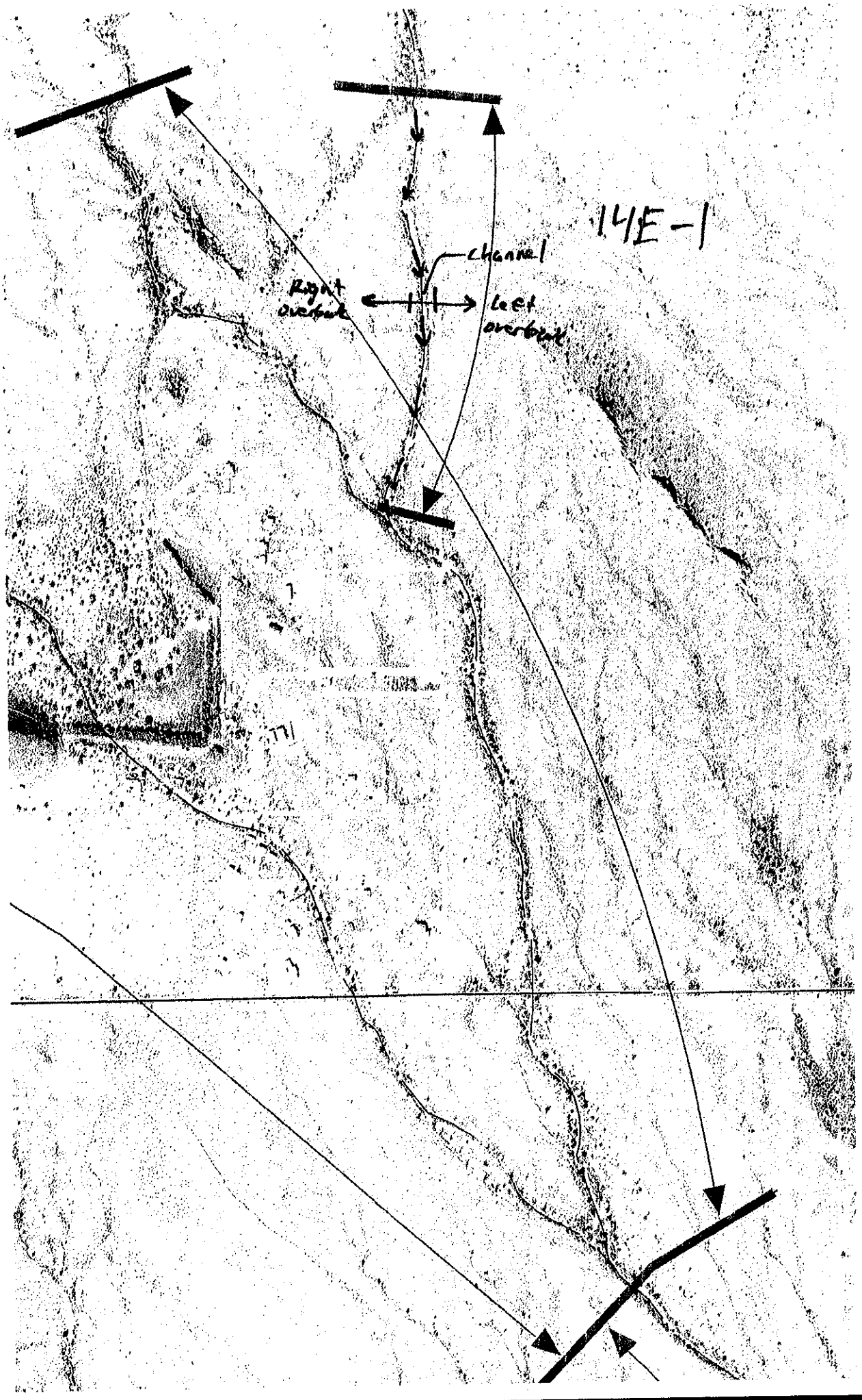
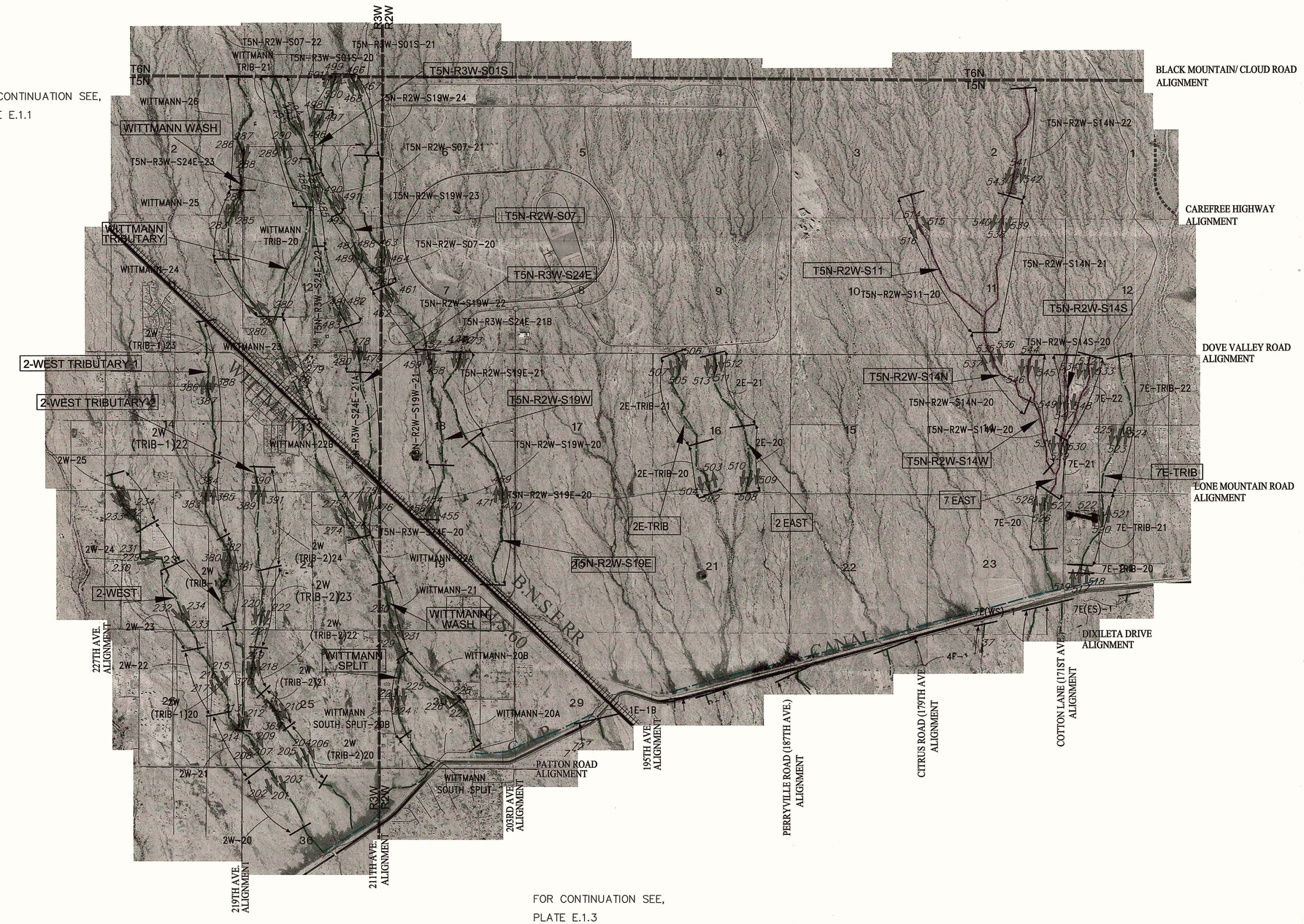


Figure 3. (Photo #357) Right Overbank looking downstream.


14E-1
channel
Right overbank
Left overbank

P:\300\310\310032 (Wittmann ADMS07)\Deliverables\TDM\TDM Section 5- hydraulics\Mannings n-Value Report\gis-n-value-exhibit-2 DATE: 07/27/05



N

500 0 1000 2000

1000

LEGEND

REACH LABEL	2W-3
PHOTO LOCATION, NUMBER and DIRECTION.	2
ZONE AE REACH	
ZONE A REACH	
ZONE AH REACH	
WASH NAME	1 WEST

Entellus™
2255 N. 44th Street Suite 125
Phoenix. AZ 85008.3279
Tel 602.244.2566
Fax 602.244.8947
WEB: www. Entellus.com

	BY	DATE
DESIGN	AMG	7/05
DESIGN CHK.	RAS	7/05
PLANS	KAB	7/05
PLANS CHK.	HAA	7/05

SUBMITTED BY: DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

PLATE E.1.2 MANNINGS ROUGHNESS

P:\3001\310\310032 (Wittmann ADMS)\Deliverables\DM\DM Section 5- hydraulics\Mannings n-Value Report\gis-n-value-exhibit-3 DATE: 07/27/05

LEGEND

REACH LABEL	2W-3
PHOTO LOCATION, NUMBER and DIRECTION.	→ 2
ZONE AE REACH	
ZONE A REACH	
ZONE AH REACH	
WASH NAME	1 WEST

Entellus™
2255 N. 44th Street Suite 125
Phoenix. AZ 85008.3279
Tel 602.244.2566
Fax 602.244.8947
WEB: www. Entellus.com

	BY	DATE
DESIGN	AMG	7/05
DESIGN CHK.	RAS	7/05
PLANS	KAB	7/05
PLANS CHK.	HAA	7/05

SUBMITTED BY: DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

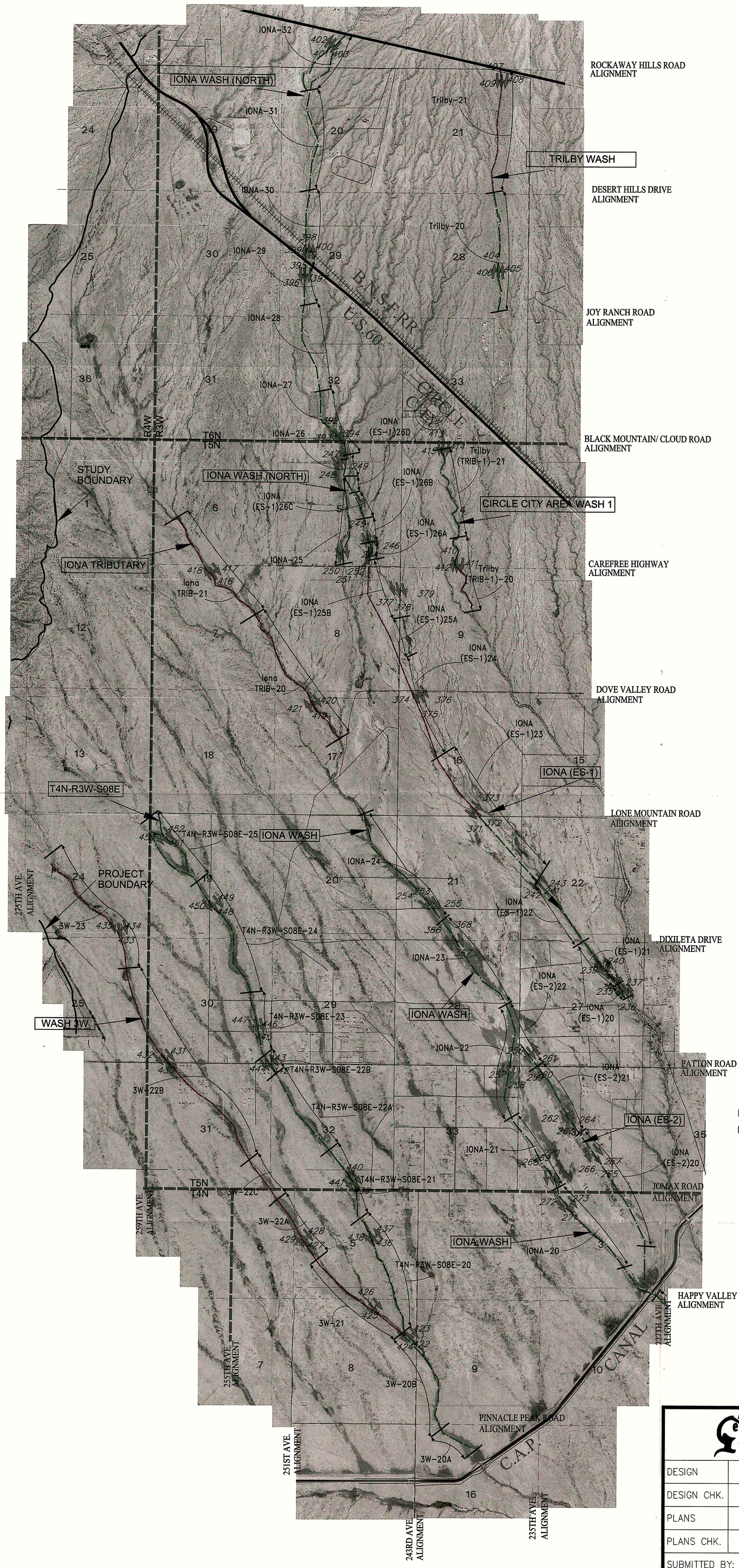
RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

PLATE E.1.3 MANNINGS ROUGHNESS

P:\300\310\310032 (Mittmann ADMSU)\Deliverables\TDN\TDN Section 5- hydraulics\Mannings n-Value Report\glo-n-value-exhibit-1 DATE: 07/27/05



FOR CONTINUATION SEE,
PLATE E.1.2 AND PLATE E.1.3

N

500 0 1000 2000
1000

LEGEND

REACH LABEL	2W-3
PHOTO LOCATION, NUMBER and DIRECTION.	2
ZONE AE REACH	
ZONE A REACH	
ZONE AH REACH	
WASH NAME	1 WEST

Entellus™
2255 N. 44th Street Suite 125
Phoenix. AZ 85008.3279
Tel 602.244.2566
Fax 602.244.8947
WEB: www. Entellus.com

	BY	DATE
DESIGN	AMG	7/05
DESIGN CHK.	RAS	7/05
PLANS	KAB	7/05
PLANS CHK.	HAA	7/05

SUBMITTED BY: DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

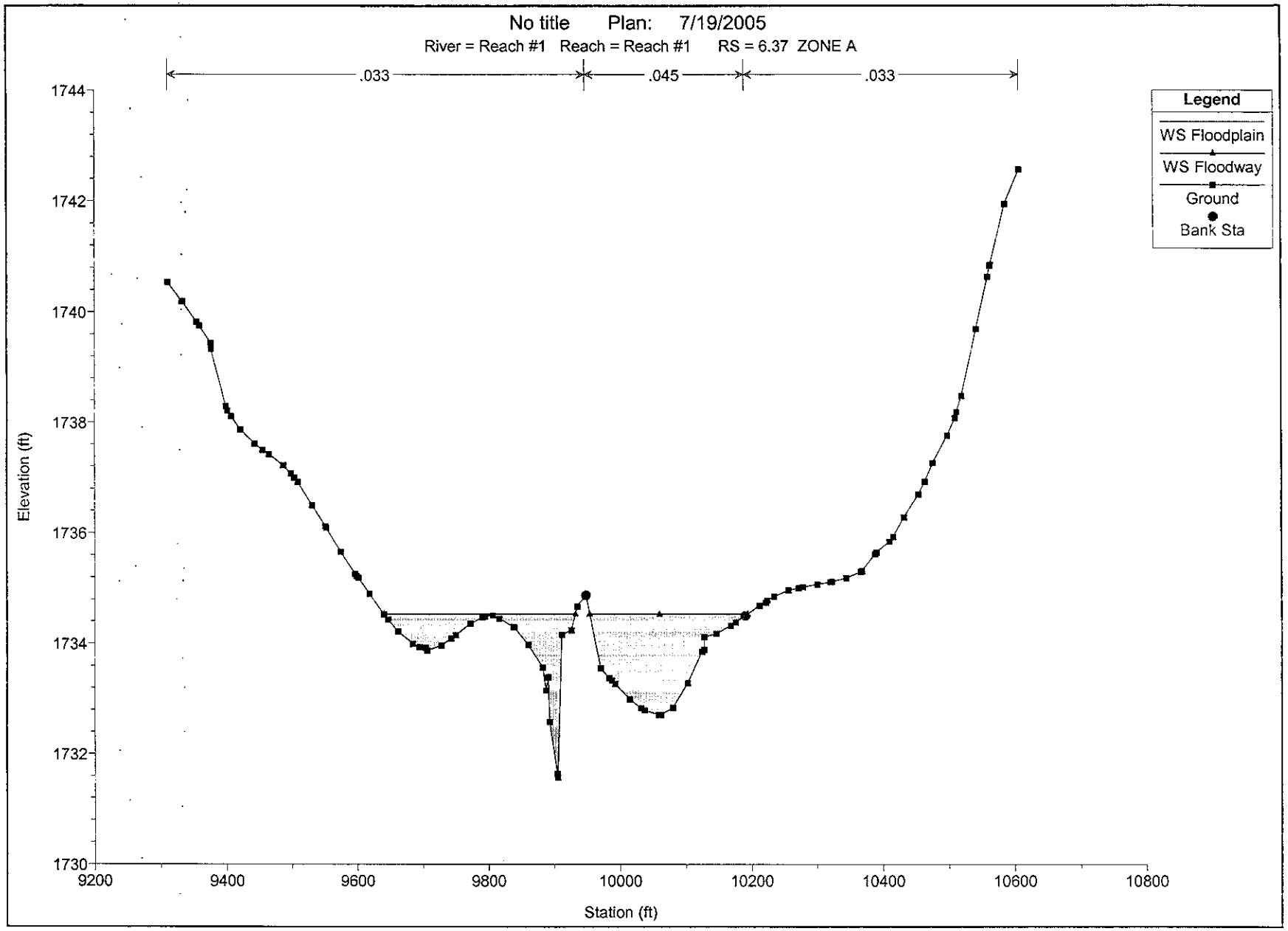
PLATE E.1.1 MANNINGS ROUGHNESS

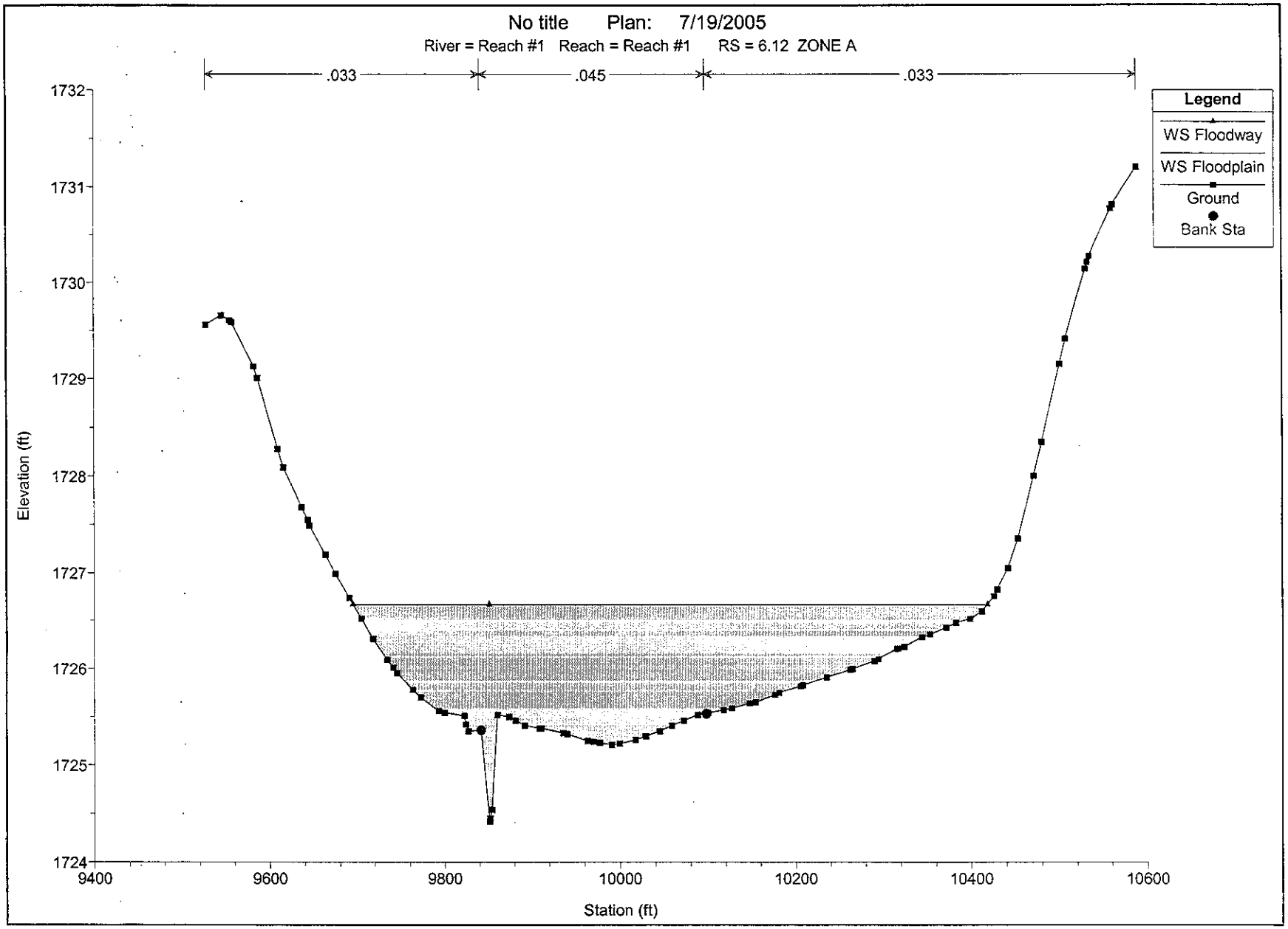
E.2 Cross-Section Plots

List of Washes

1. WASH 3 WEST
2. T4N-R3W-S08E
3. T5N-R3W-S19
4. IONA WASH
5. IONA WASH (ZONE AO)
6. IONA WASH (NORTH)
7. IONA NORTH WEST SPLIT-1
8. IONA TRIBUTARY (ZONE A)
9. IONA EAST SPLIT-1
10. IONA EAST SPLIT-2
11. TRILBY WASH
12. CIRCLE CITY AREA WASH 1
13. WASH 2 WEST (NORTH OF CAP)
14. 2 WEST TRIBUTARY-1
15. 2 WEST TRIBUTARY-2
16. WITTMANN WASH
17. WITTMANN WASH (NORTH SPLIT)
18. WITTMANN WASH (SOUTH SPLIT)
19. WITTMANN TRIBUTARY
20. T5N-R3W-S24E
21. T5N-R2W-S19E
22. T5N-R2W-S19W
23. T5N-R3W-S01S
24. T5N-R2W-S07
25. WASH 2 EAST (NORTH OF CAP)
26. 2 EAST TRIBUTARY
27. T5N-R2W-S14N (ZONE A)
28. T5N-R2W-S14S (ZONE A)
29. T5N-R2W-S14W (ZONE A)
30. T5N-R2W-S11 (ZONE A)
31. WASH 7 EAST
32. 7 EAST TRIBUTARY
33. IONA EAST (SOUTH OF CAP)
34. IONA WEST (SOUTH OF CAP)
35. WASH 2 WEST (SOUTH OF CAP)
36. WASH 1 WEST
37. WASH 1 EAST
38. WASH 2 EAST (SOUTH OF CAP)
39. 2 EAST DIKE FAILURE
40. WASH 3 EAST
41. WASH 3 EAST (ZONE A)
42. WASH 4 EAST
43. 4 EAST DIKE FAILURE
44. WASH 5 EAST
45. WASH 5 EAST (ZONE AO)
46. WASH 6 EAST
47. 6 EAST SOUTH
48. 6 EAST (ZONE A)
49. 7 EAST-EAST SPLIT
50. 7 EAST-WEST SPLIT
51. WASH 8 EAST
52. 7 EAST and 8 EAST (ZONE A)
53. WASH 9 EAST
54. 9 EAST SPLIT
55. WASH 10 EAST
56. 10 EAST (EAST SPLIT-1)
57. 10 EAST (EAST SPLIT-2)
58. WASH 11 EAST
59. 11 EAST DIKE FAILURE
60. BONITA DIKE CHANNEL
61. WASH 12 EAST
62. 12 EAST SPLIT
63. WASH 13 EAST
64. WASH 14 EAST

3 WEST


No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 6.37 ZONE A
.033
.045
.033
Legend
WS Floodplain
WS Floodway
Ground
Bank Sta
Elevation (ft)
1744
1742
1740
1738
1736
1734
1732
1730
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)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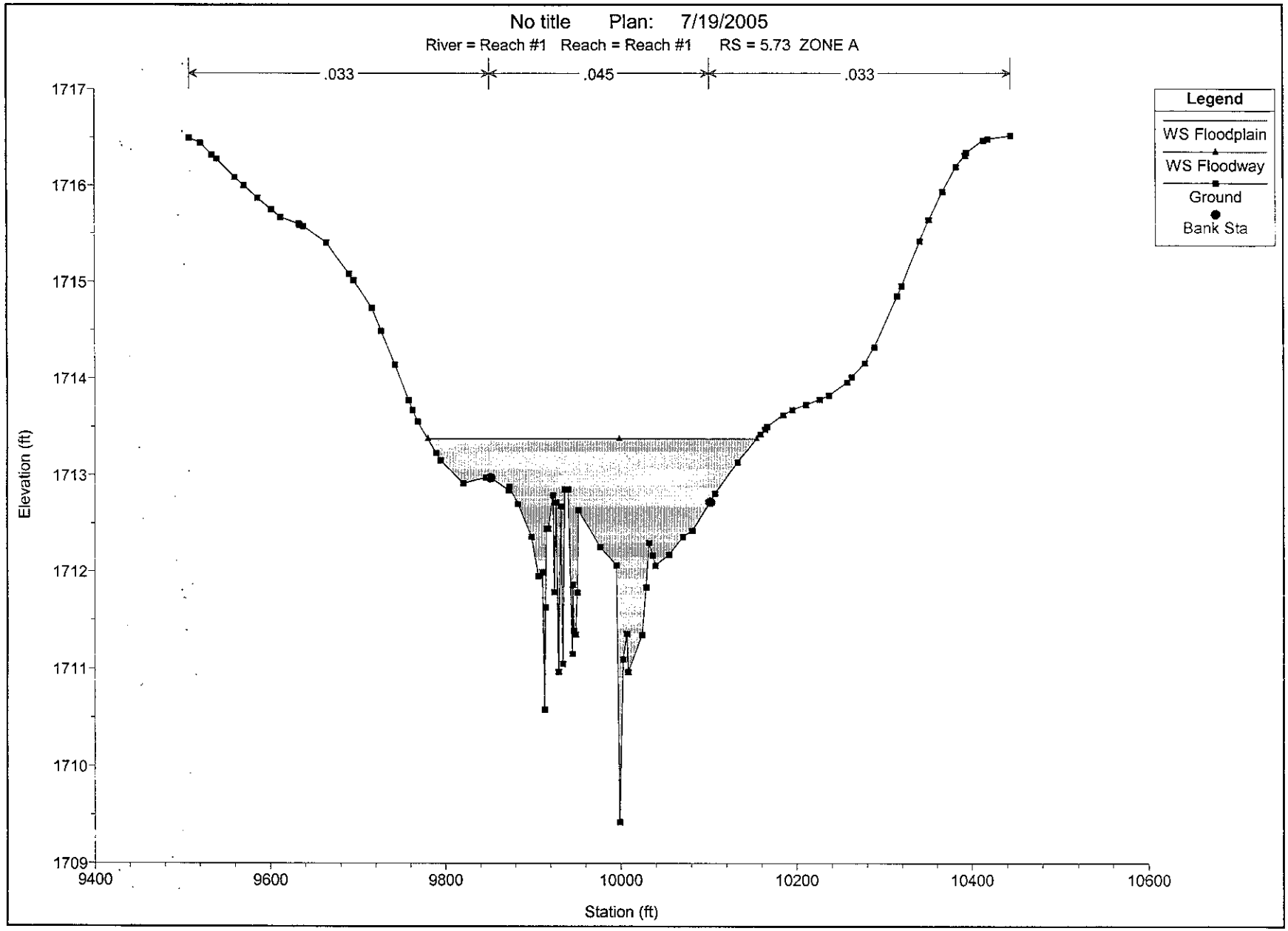
.033
.045
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1732
1731
1730
1729
1728
1727
1726
1725
1724
9400
9600
9800
10000
10200
10400
10600
Station (ft)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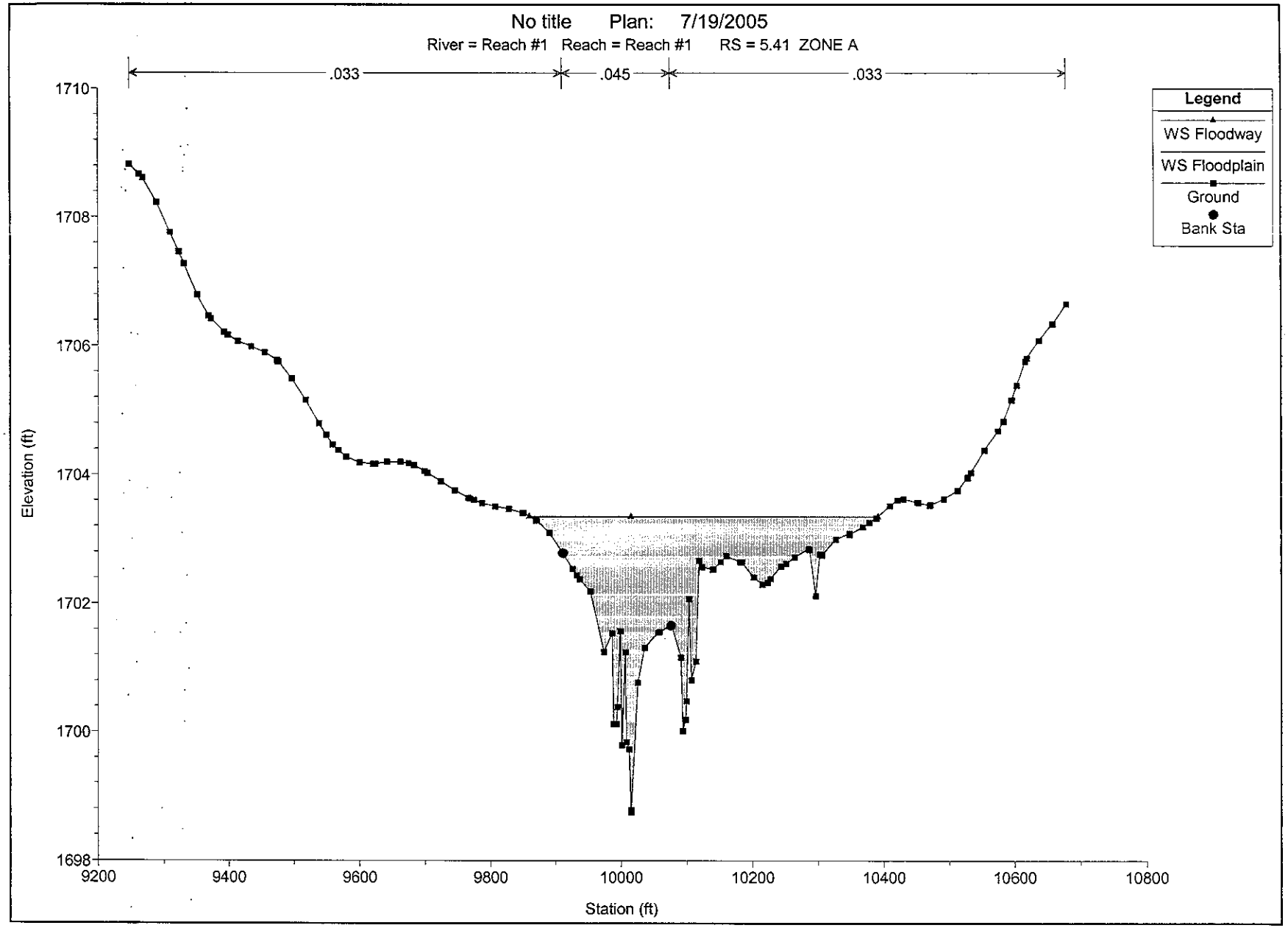
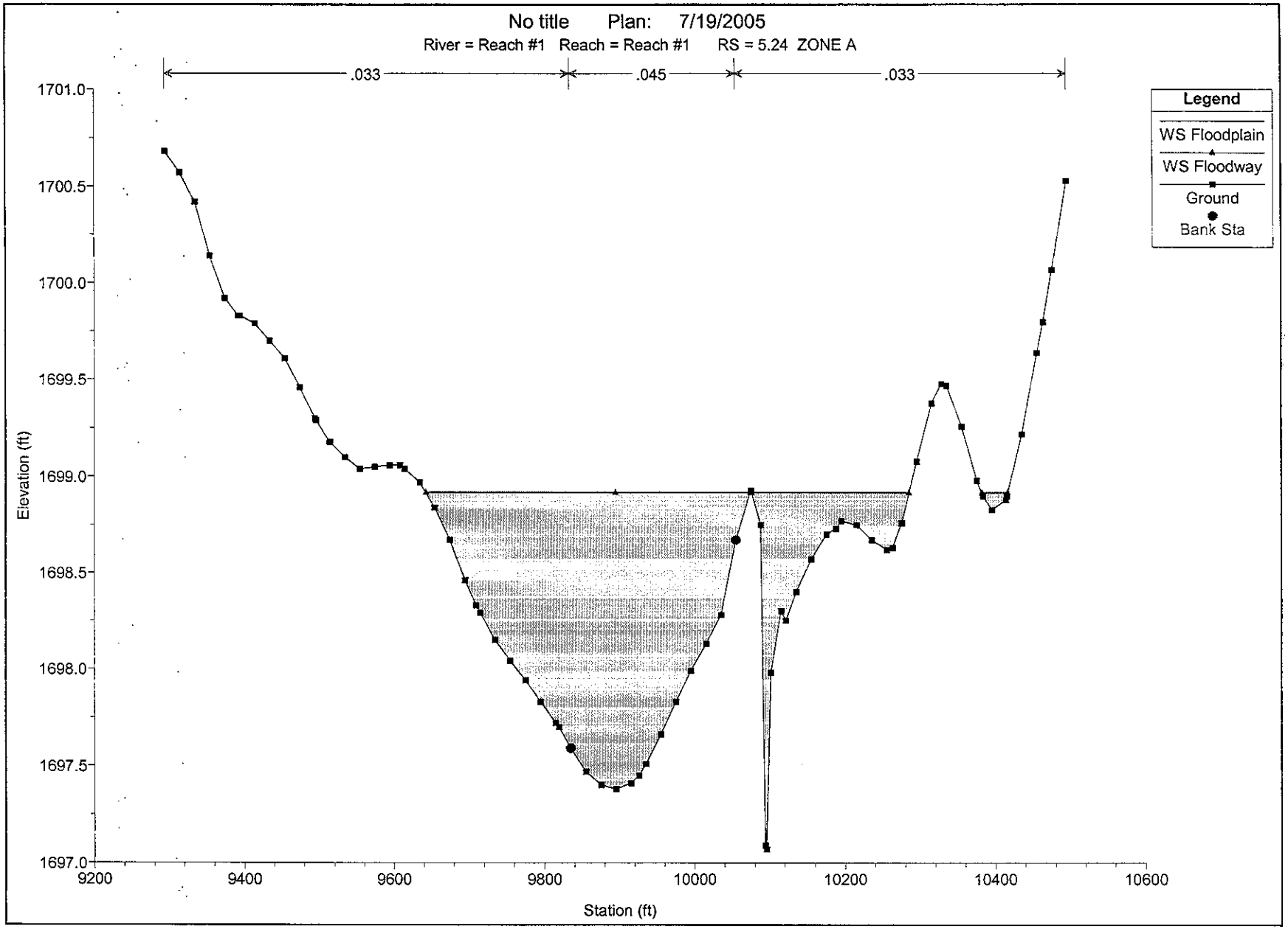
.033
.045
.033
Legend
WS Floodplain
WS Floodway
Ground
Bank Sta
Elevation (ft)
1717
1716
1715
1714
1713
1712
1711
1710
1709
9400
9600
9800
10000
10200
10400
10600
Station (ft)


No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 5.41 ZONE A
.033
.045
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1710
1708
1706
1704
1702
1700
1698
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)


No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 5.24 ZONE A
.033
.045
.033
Legend
WS Floodplain
WS Floodway
Ground
Bank Sta
Elevation (ft)
1701.0
1700.5
1700.0
1699.5
1699.0
1698.5
1698.0
1697.5
1697.0
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9600
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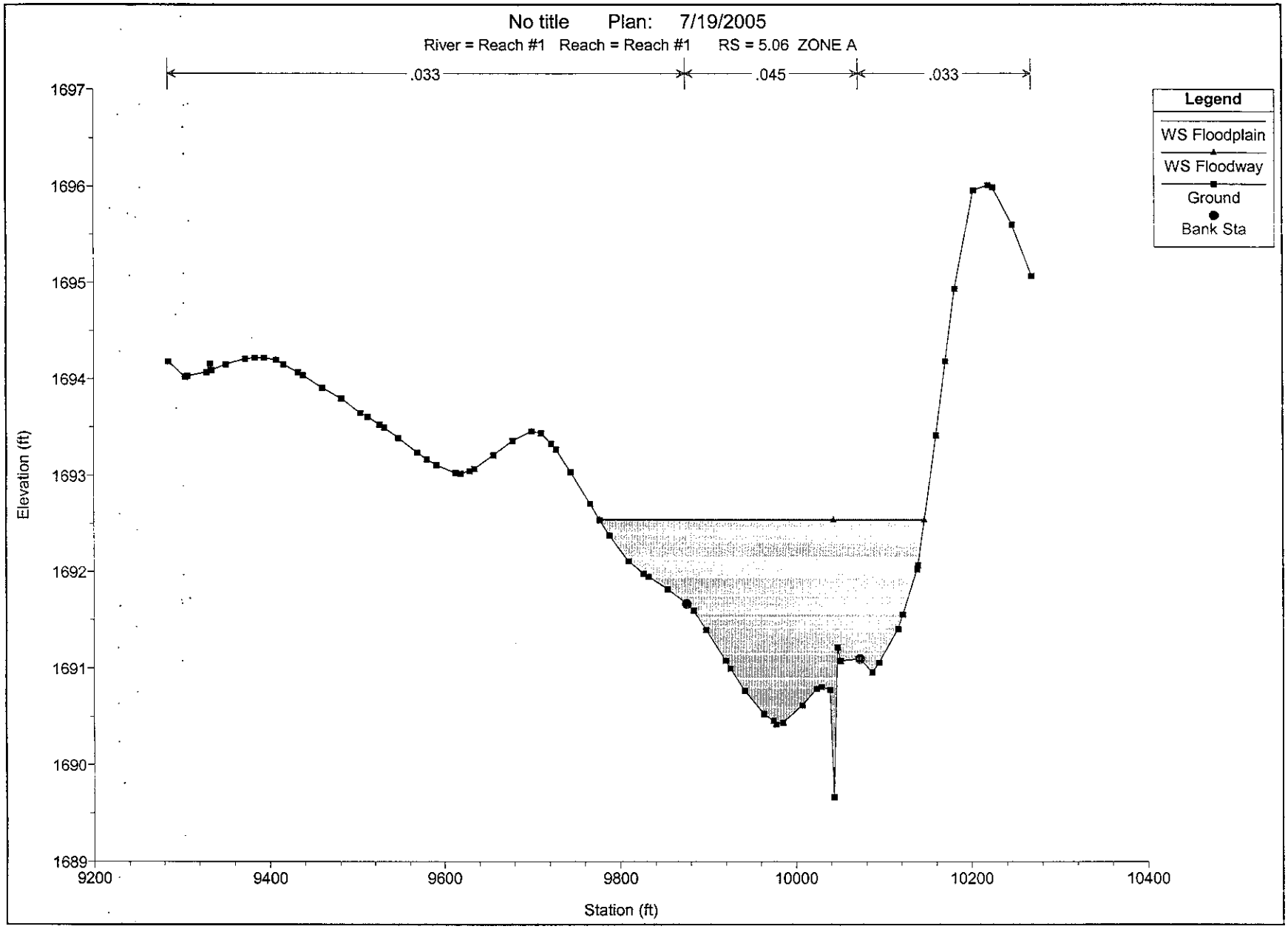
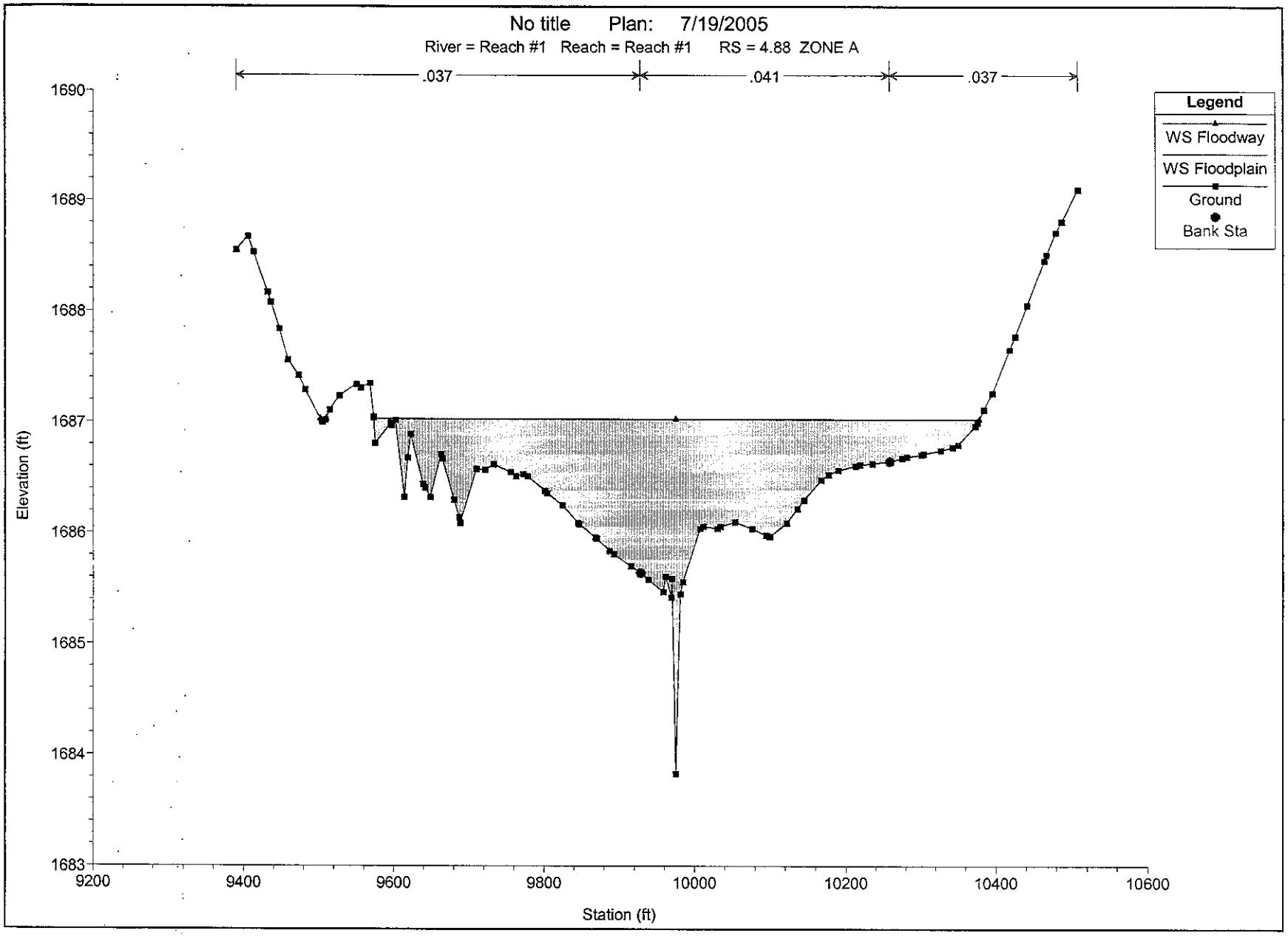
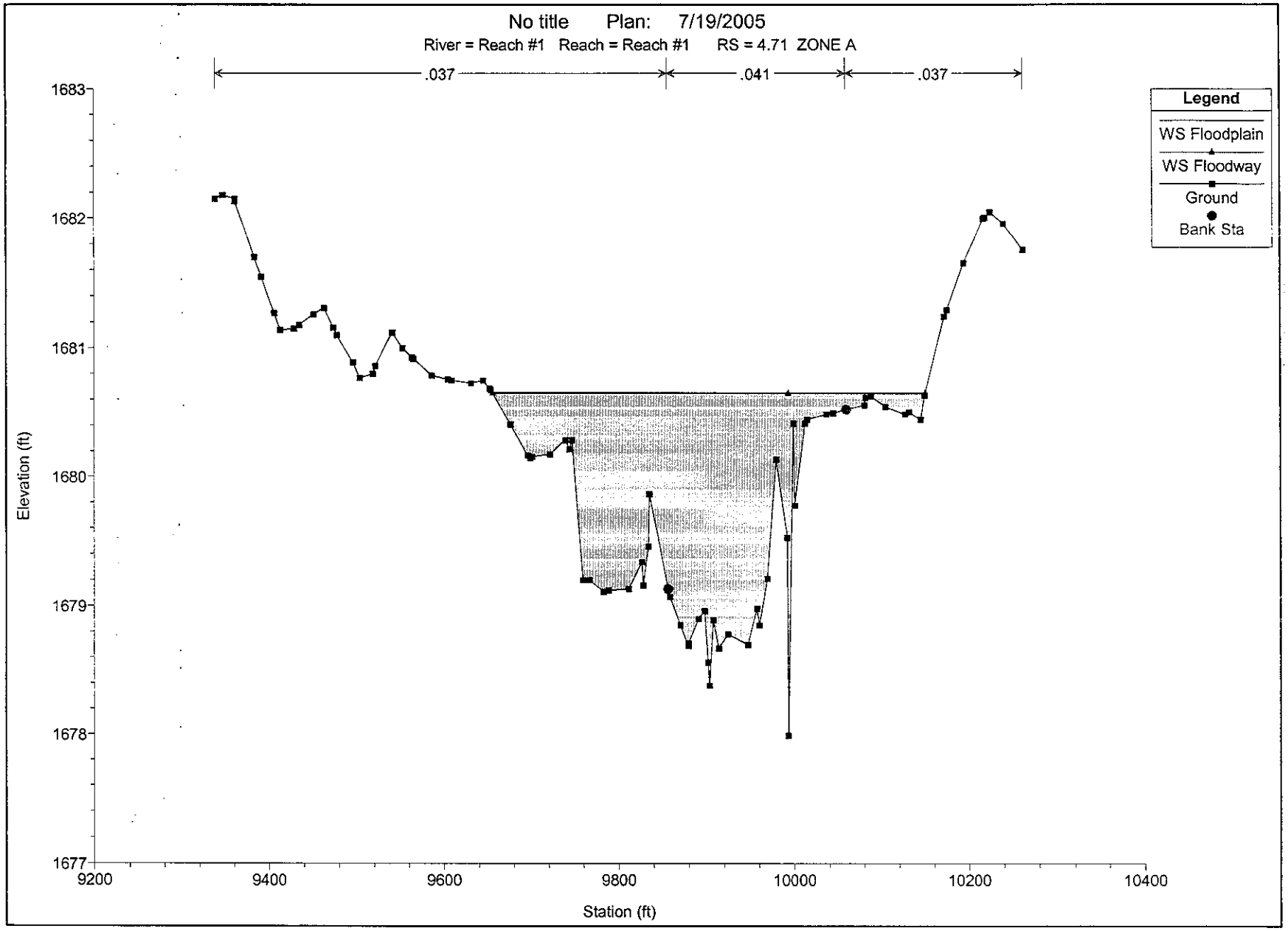
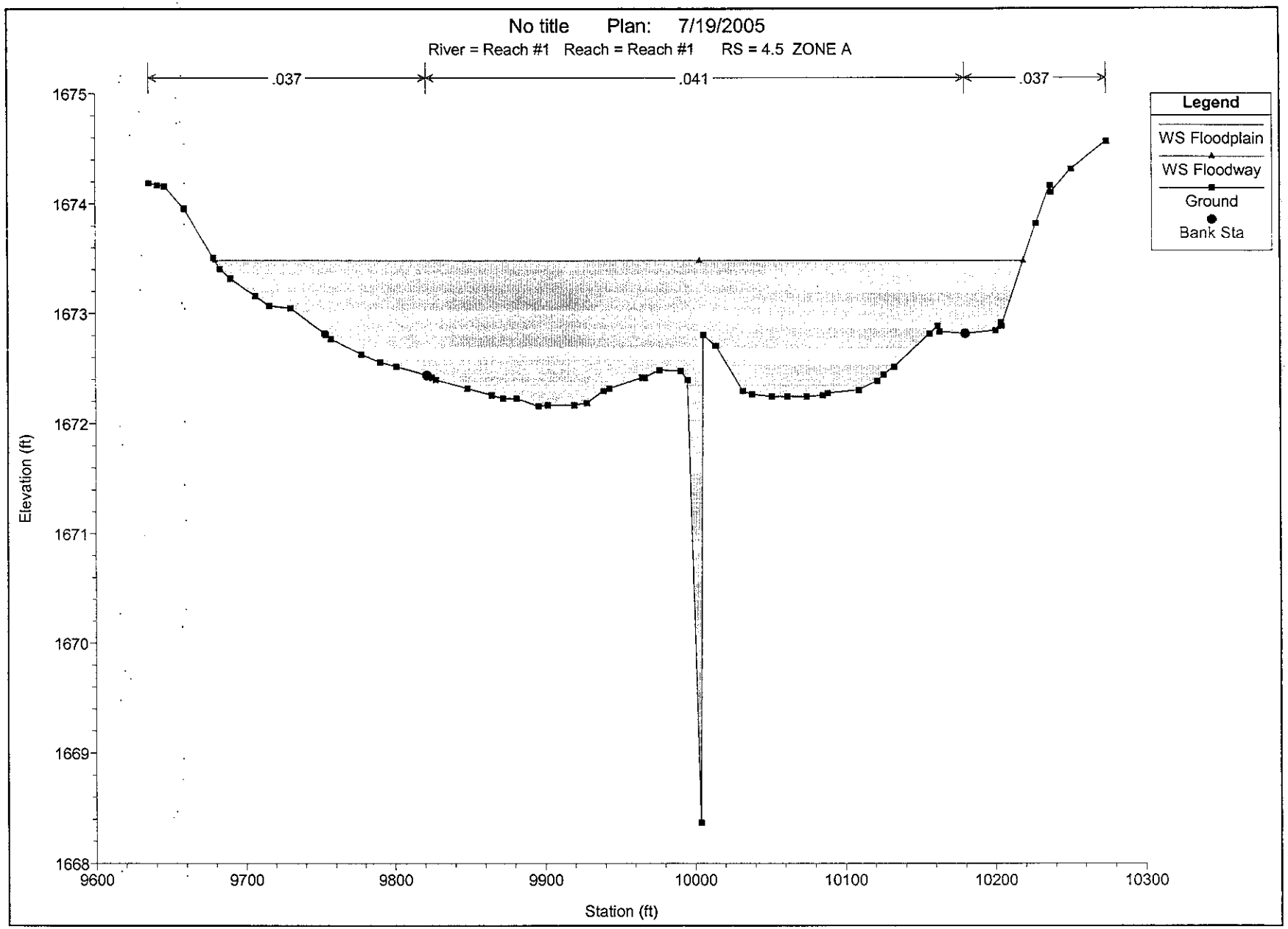
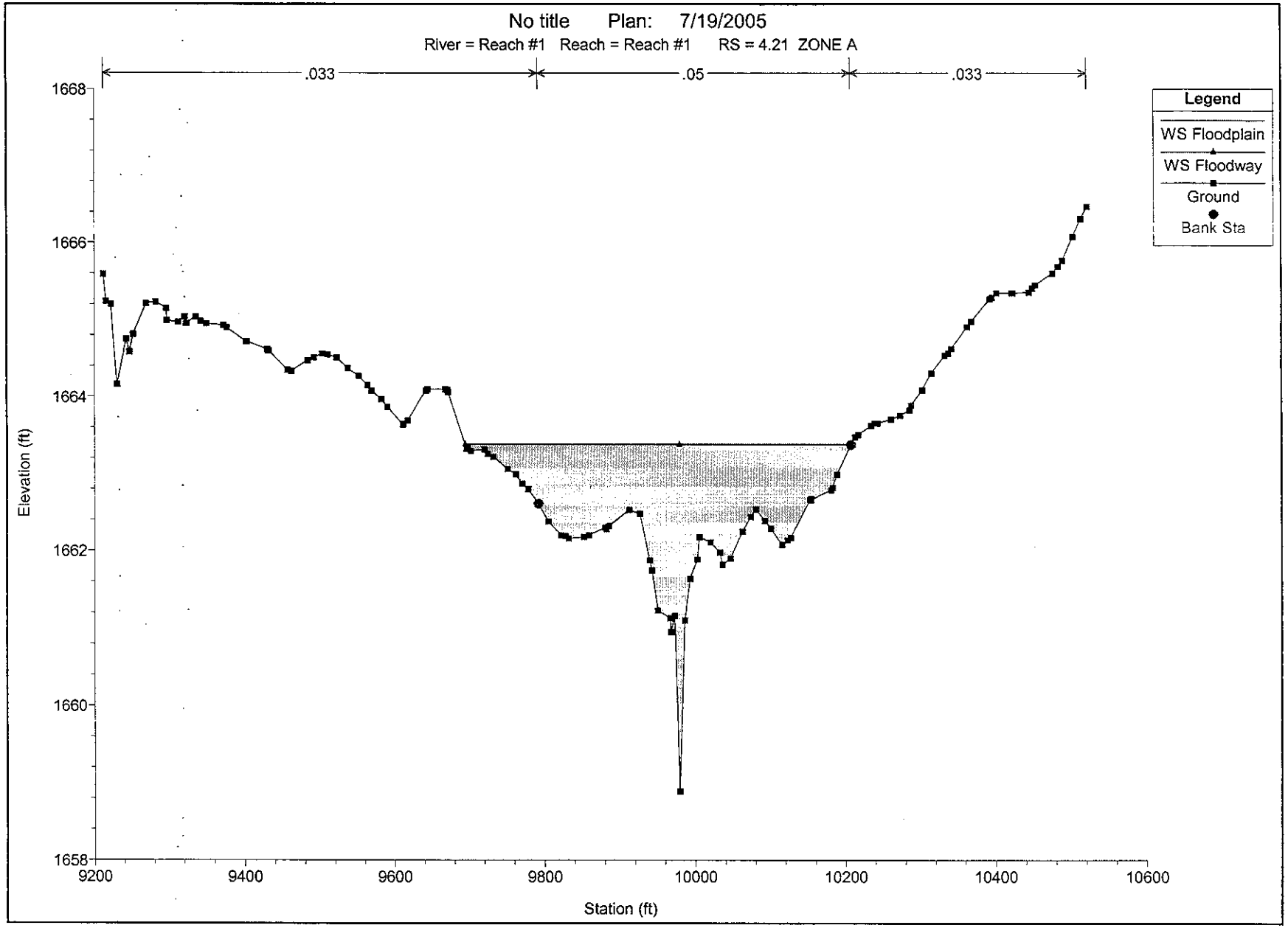
10000
10200
10400
10600
Station (ft)

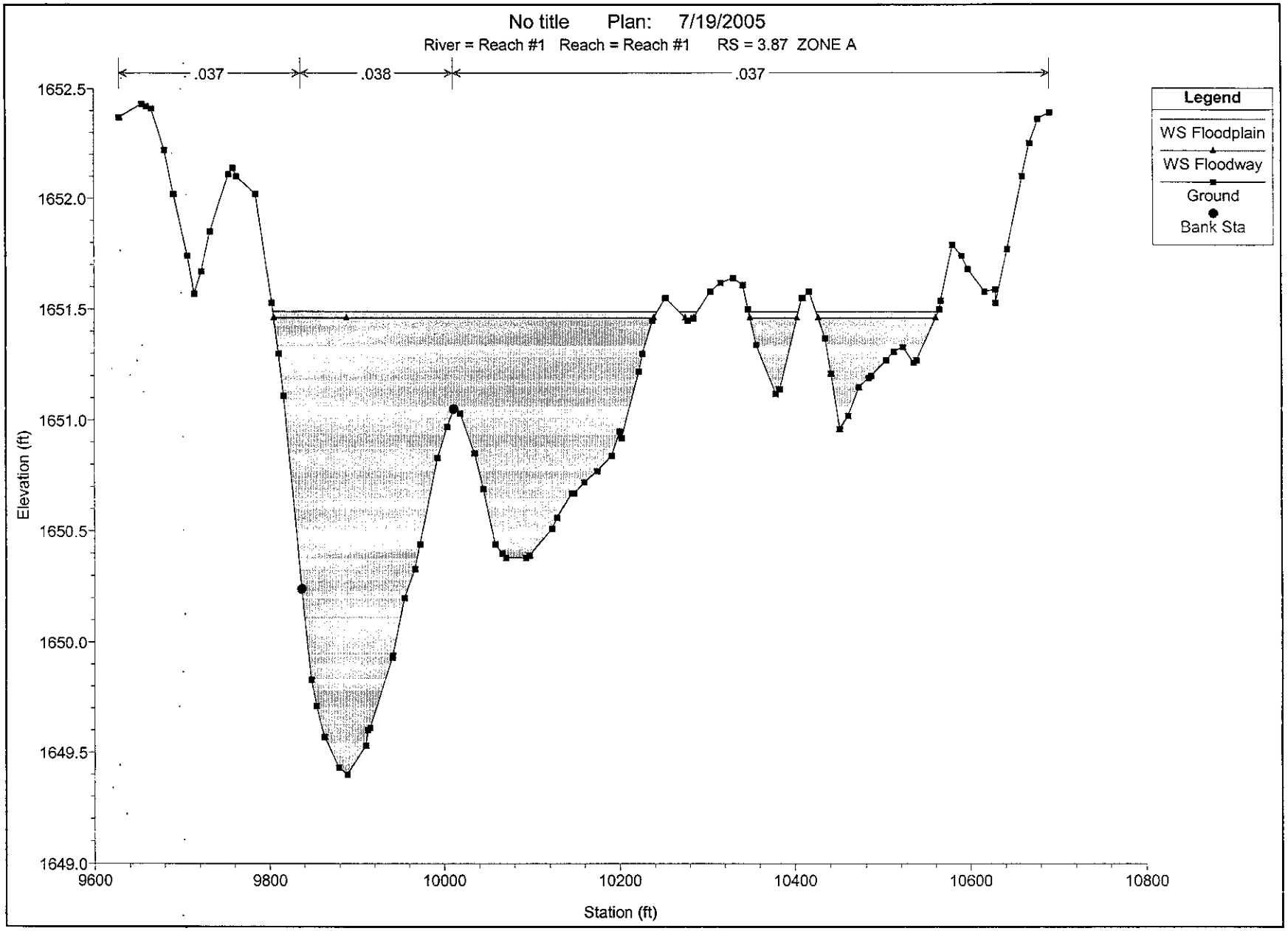

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 5.06 ZONE A
.033
.045
.033
Legend
WS Floodplain
WS Floodway
Ground
Bank Sta
Elevation (ft)
1697
1696
1695
1694
1693
1692
1691
1690
1689
9200
9400
9600
9800
10000
10200
10400
Station (ft)

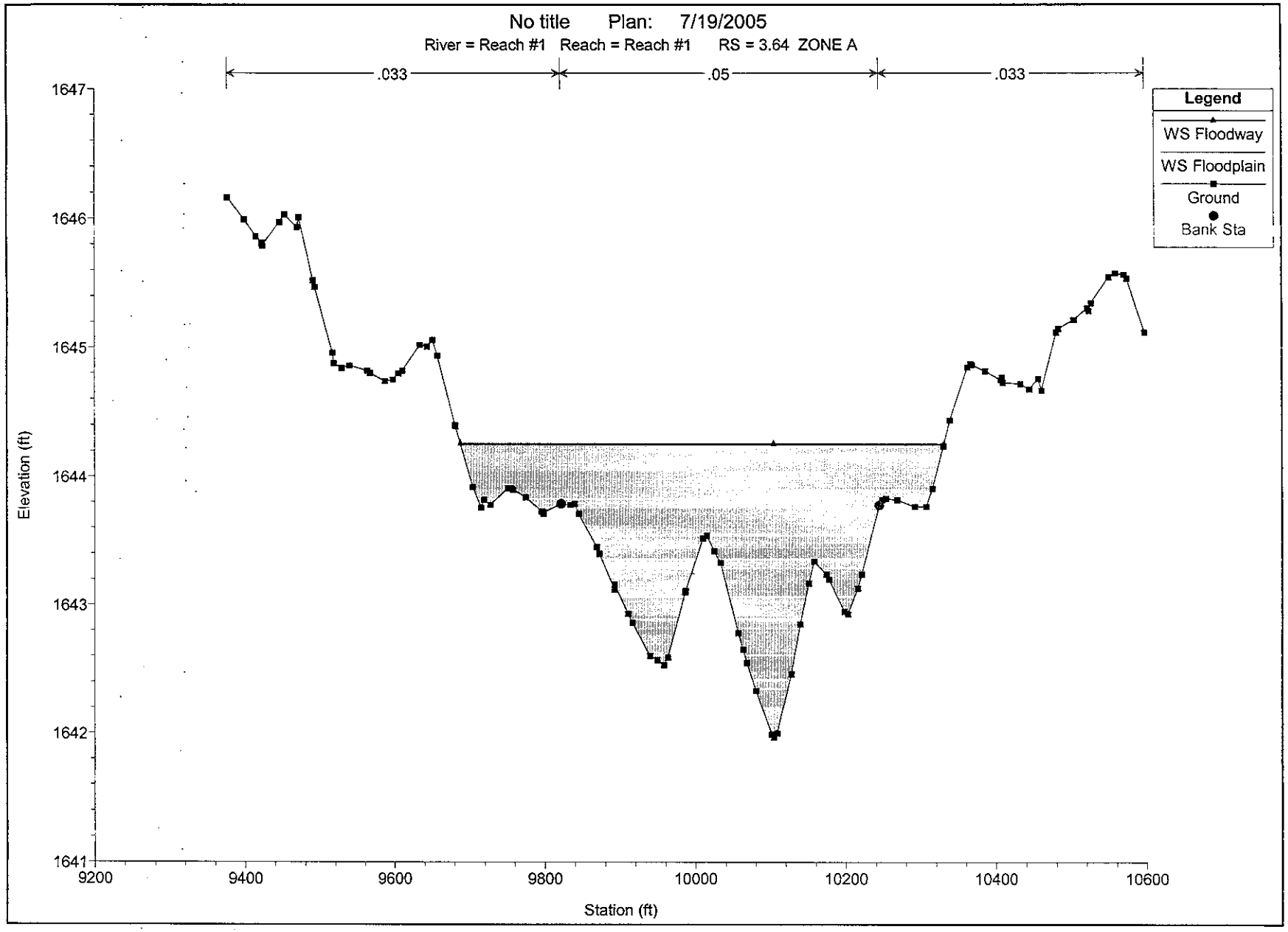

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 4.88 ZONE A
.037
.041
.037
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1690
1689
1688
1687
1686
1685
1684
1683
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)

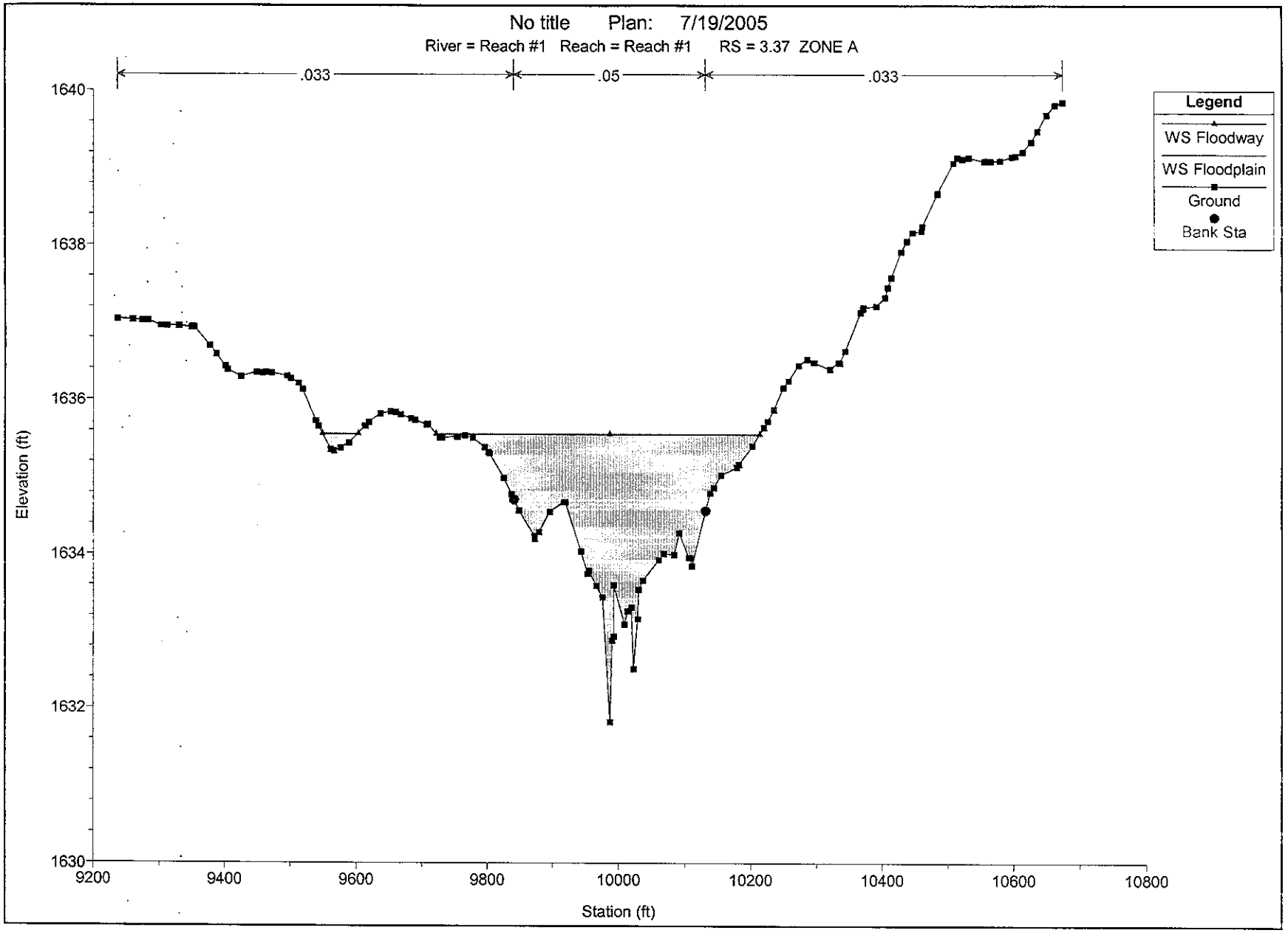

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 4.71 ZONE A
.037
.041
.037
Legend
WS Floodplain
WS Floodway
Ground
Bank Sta
Elevation (ft)
1683
1682
1681
1680
1679
1678
1677
9200
9400
9600
9800
10000
10200
10400
Station (ft)

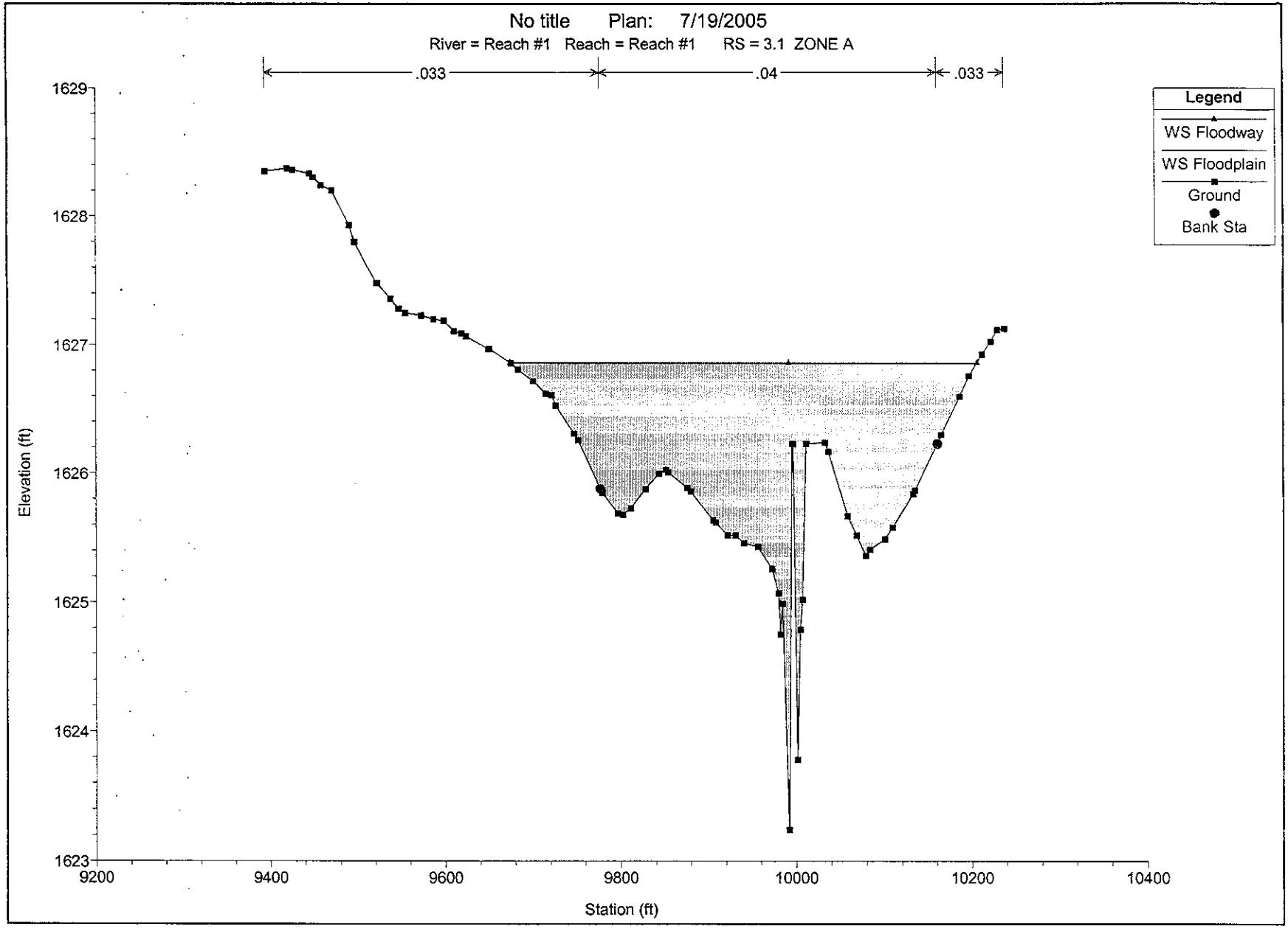

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 4.5 ZONE A
.037
.041
.037
Legend
WS Floodplain
WS Floodway
Ground
Bank Sta
Elevation (ft)
1675
1674
1673
1672
1671
1670
1669
1668
9600
9700
9800
9900
10000
10100
10200
10300
Station (ft)

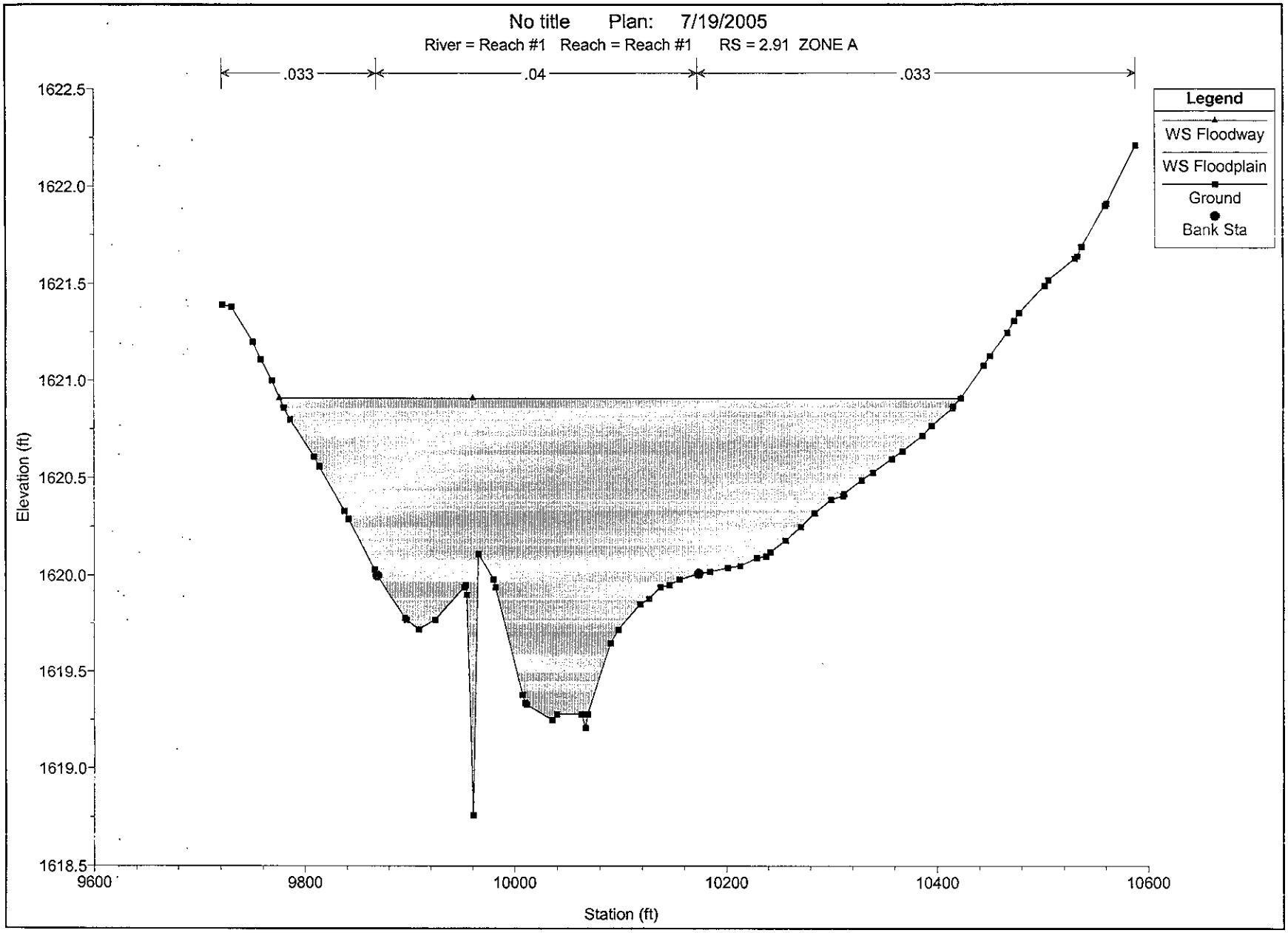

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 4.21 ZONE A
.033
.05
.033
Legend
WS Floodplain
WS Floodway
Ground
Bank Sta
Elevation (ft)
1668
1666
1664
1662
1660
1658
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)

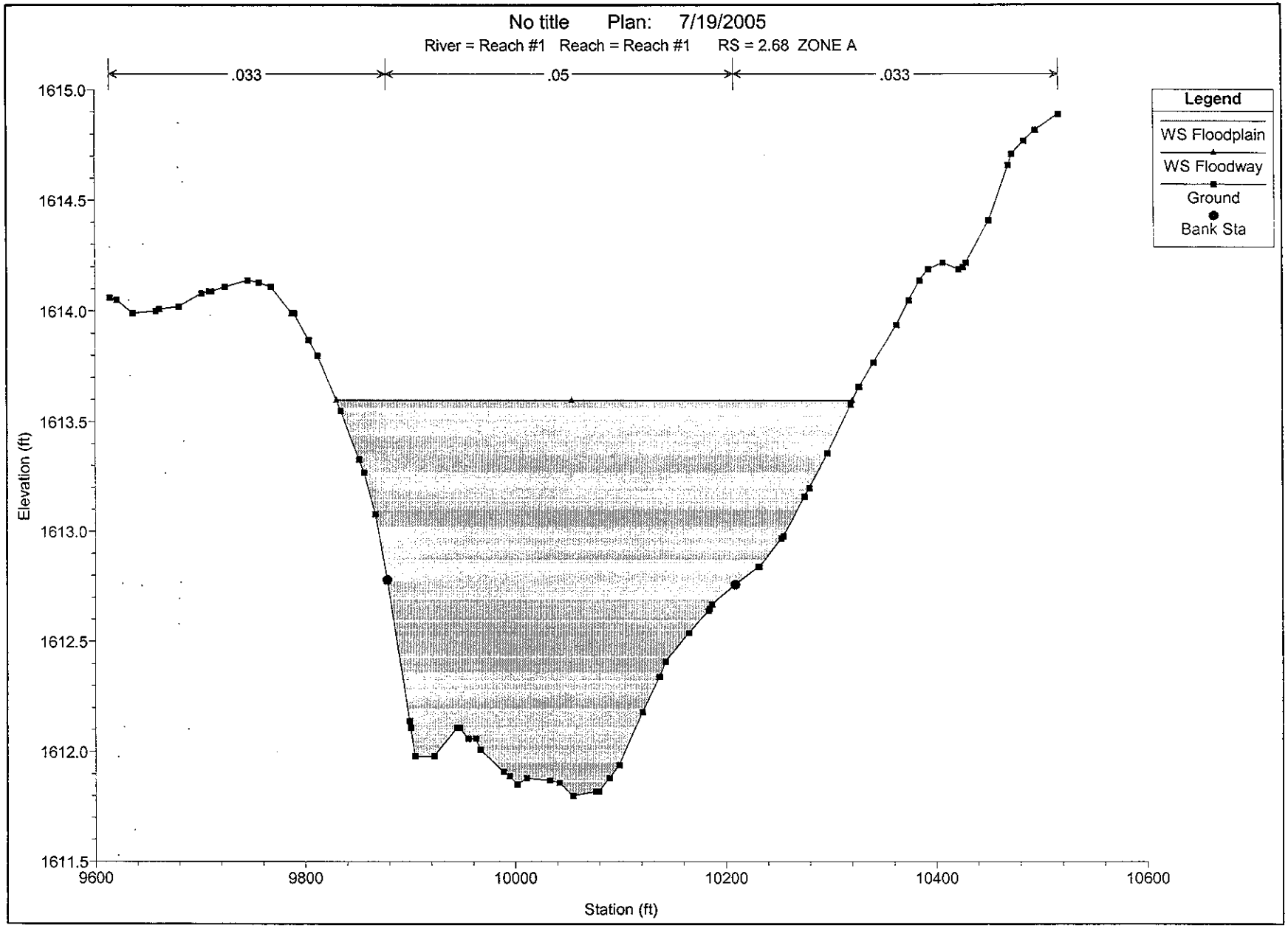

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 3.87 ZONE A
.037
.038
.037
Legend
WS Floodplain
WS Floodway
Ground
Bank Sta
Elevation (ft)
1652.5
1652.0
1651.5
1651.0
1650.5
1650.0
1649.5
1649.0
9600
9800
10000
10200
10400
10600
10800
Station (ft)

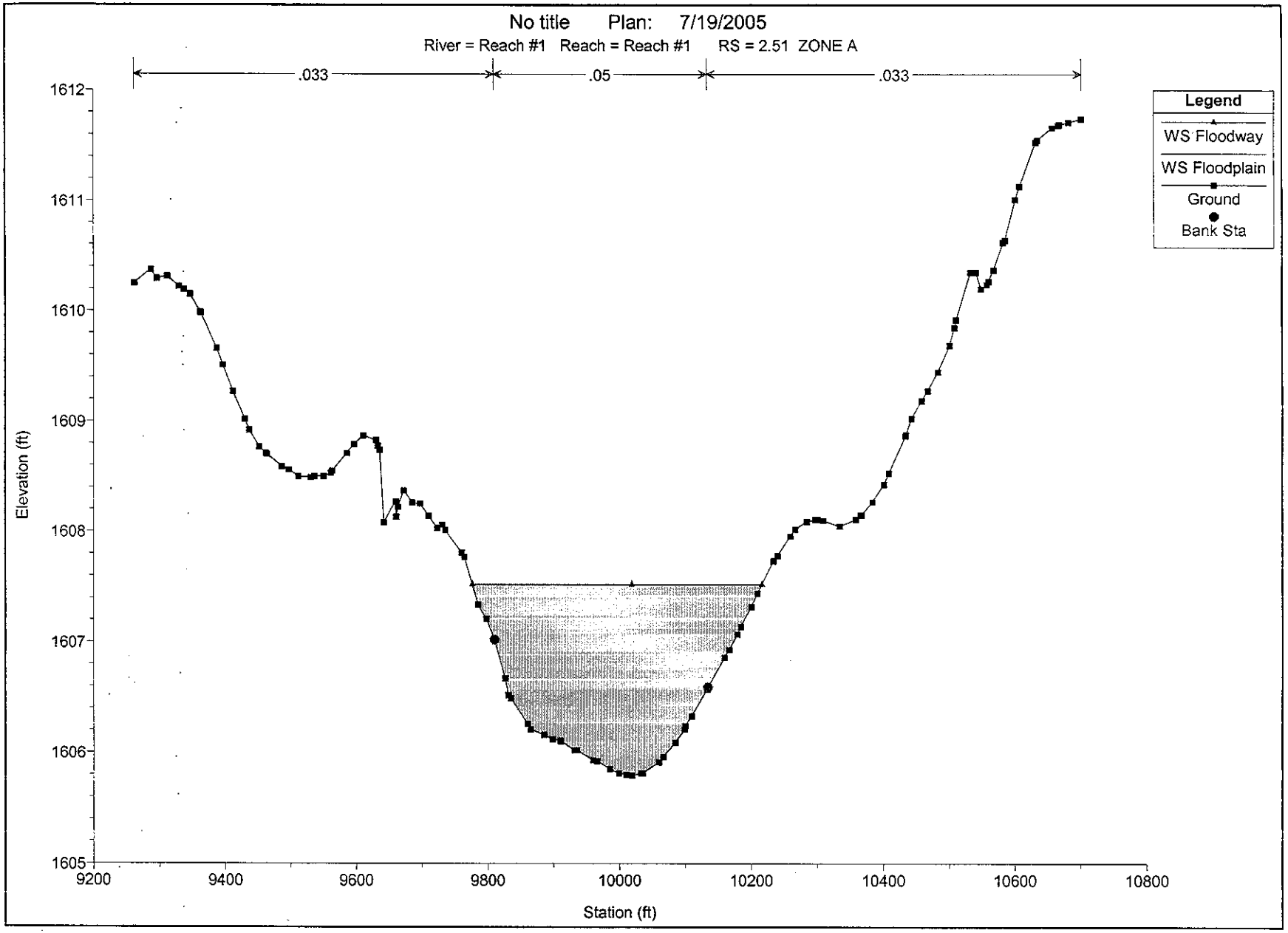

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 3.64 ZONE A
.033
.05
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1647
1646
1645
1644
1643
1642
1641
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)

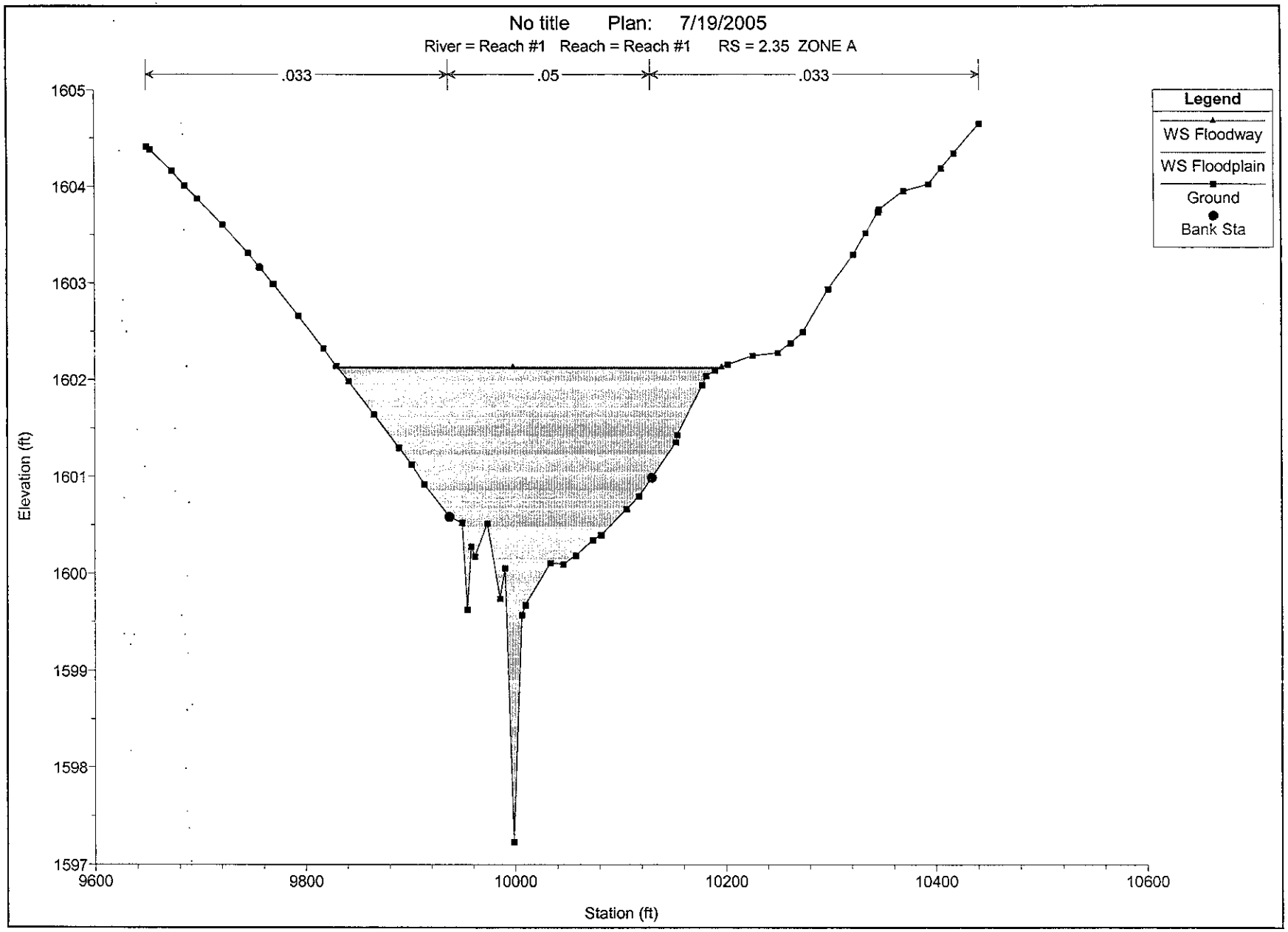

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 3.37 ZONE A
.033
.05
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1640
1638
1636
1634
1632
1630
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

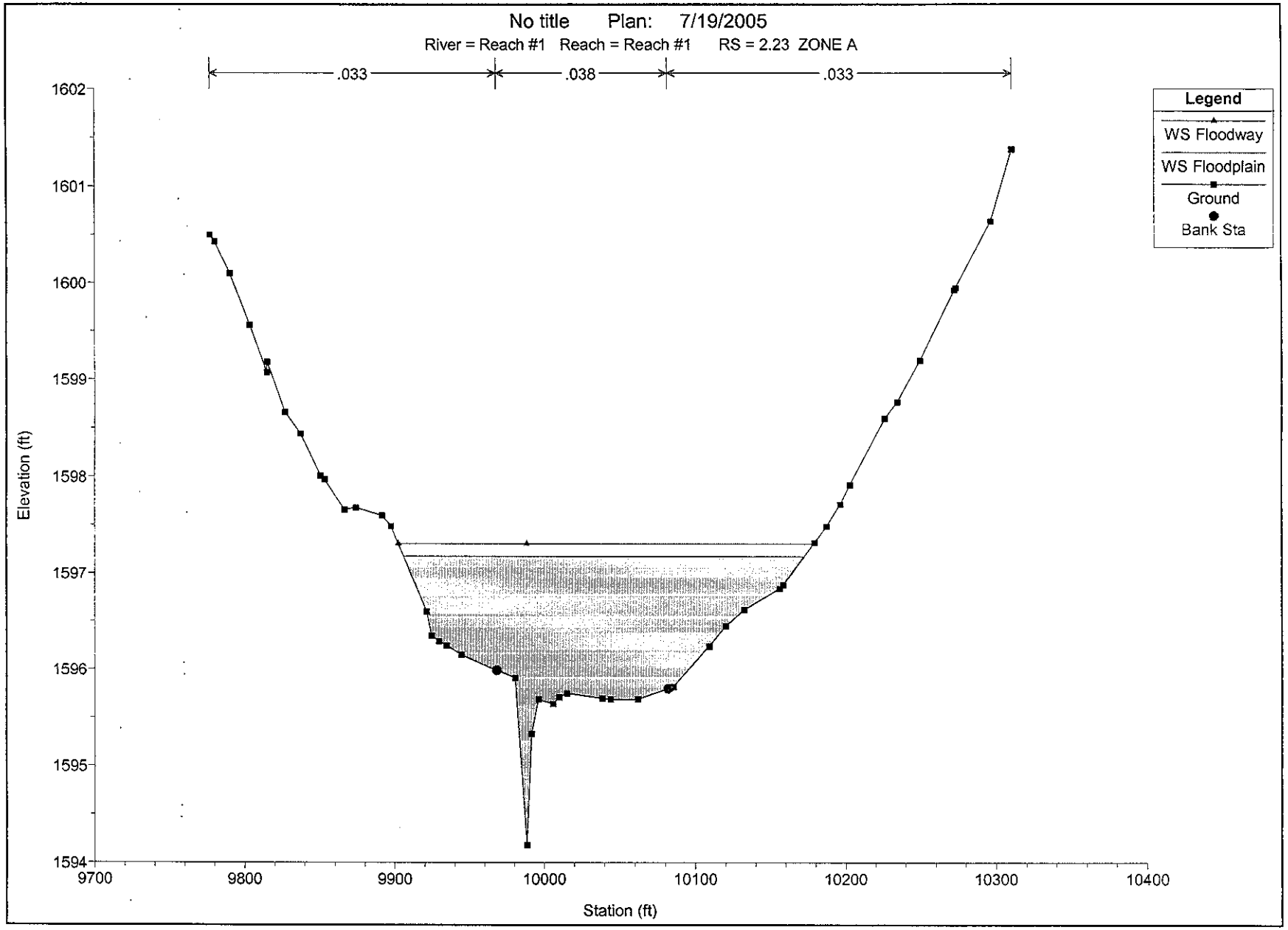

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 3.1 ZONE A
.033
.04
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1629
1628
1627
1626
1625
1624
1623
9200
9400
9600
9800
10000
10200
10400
Station (ft)

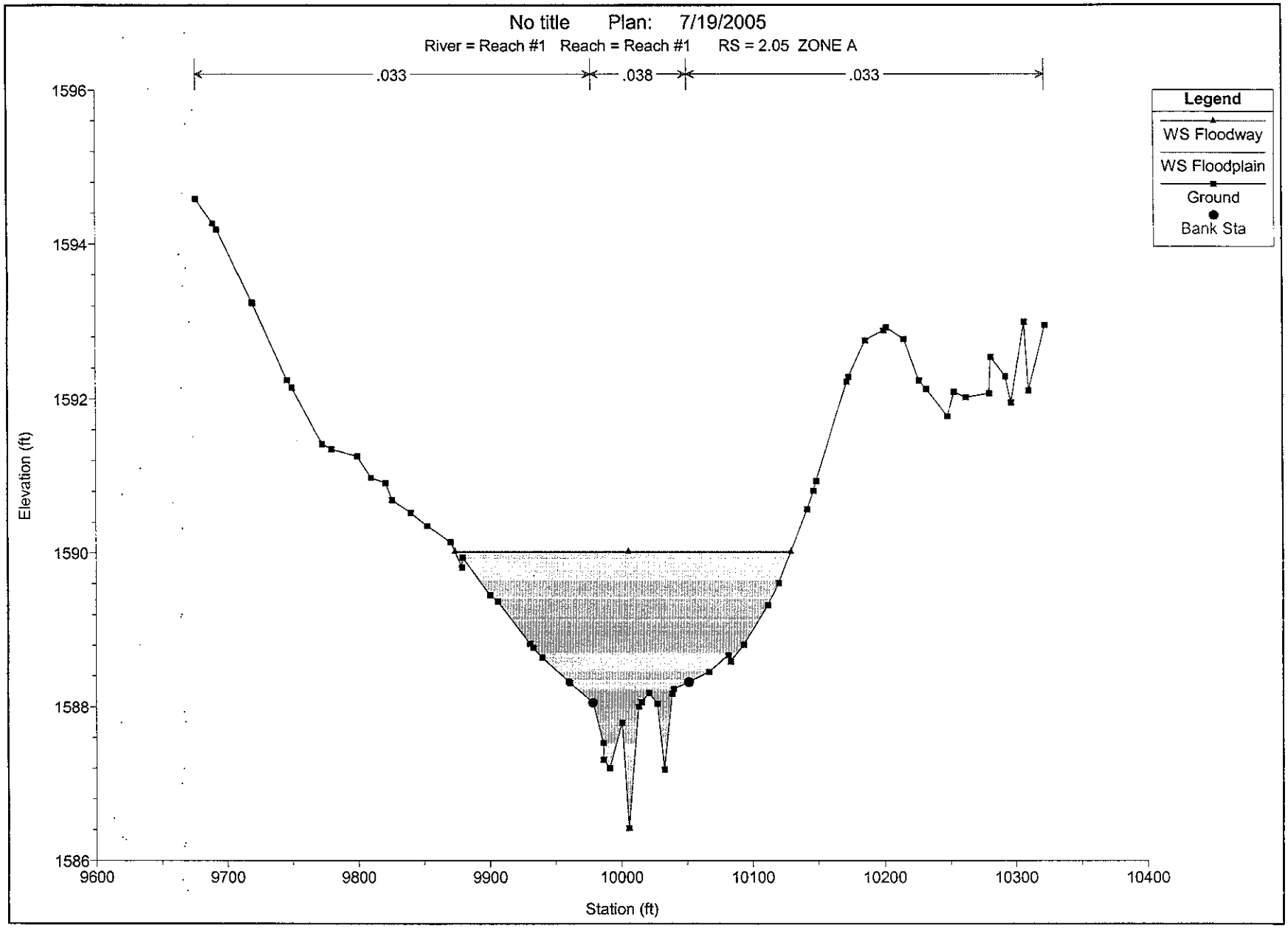

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 2.91 ZONE A
.033
.04
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1622.5
1622.0
1621.5
1621.0
1620.5
1620.0
1619.5
1619.0
1618.5
9600
9800
10000
10200
10400
10600
Station (ft)

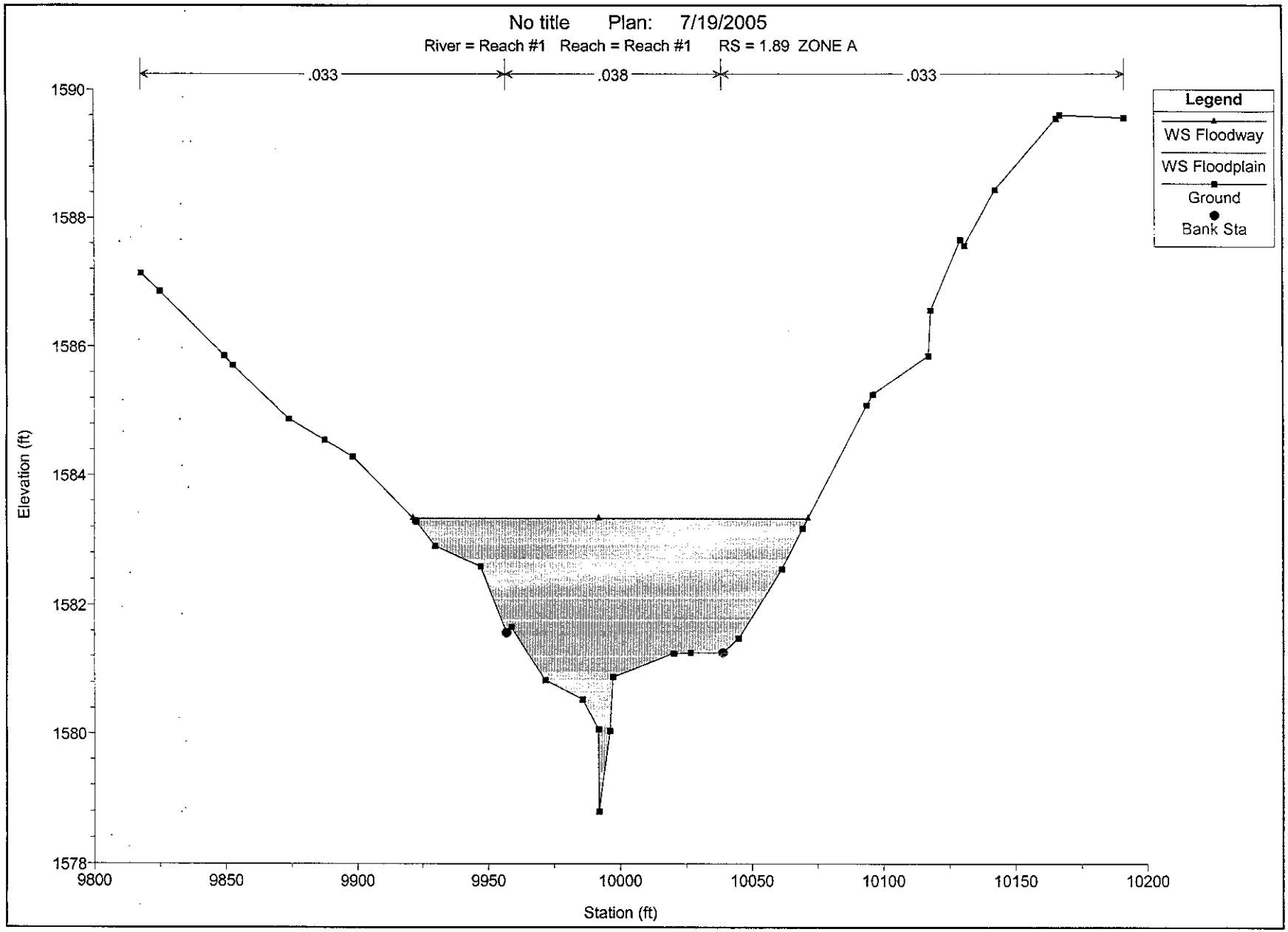

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 2.68 ZONE A
.033
.05
.033
Legend
WS Floodplain
WS Floodway
Ground
Bank Sta
Elevation (ft)
1615.0
1614.5
1614.0
1613.5
1613.0
1612.5
1612.0
1611.5
9600
9800
10000
10200
10400
10600
Station (ft)

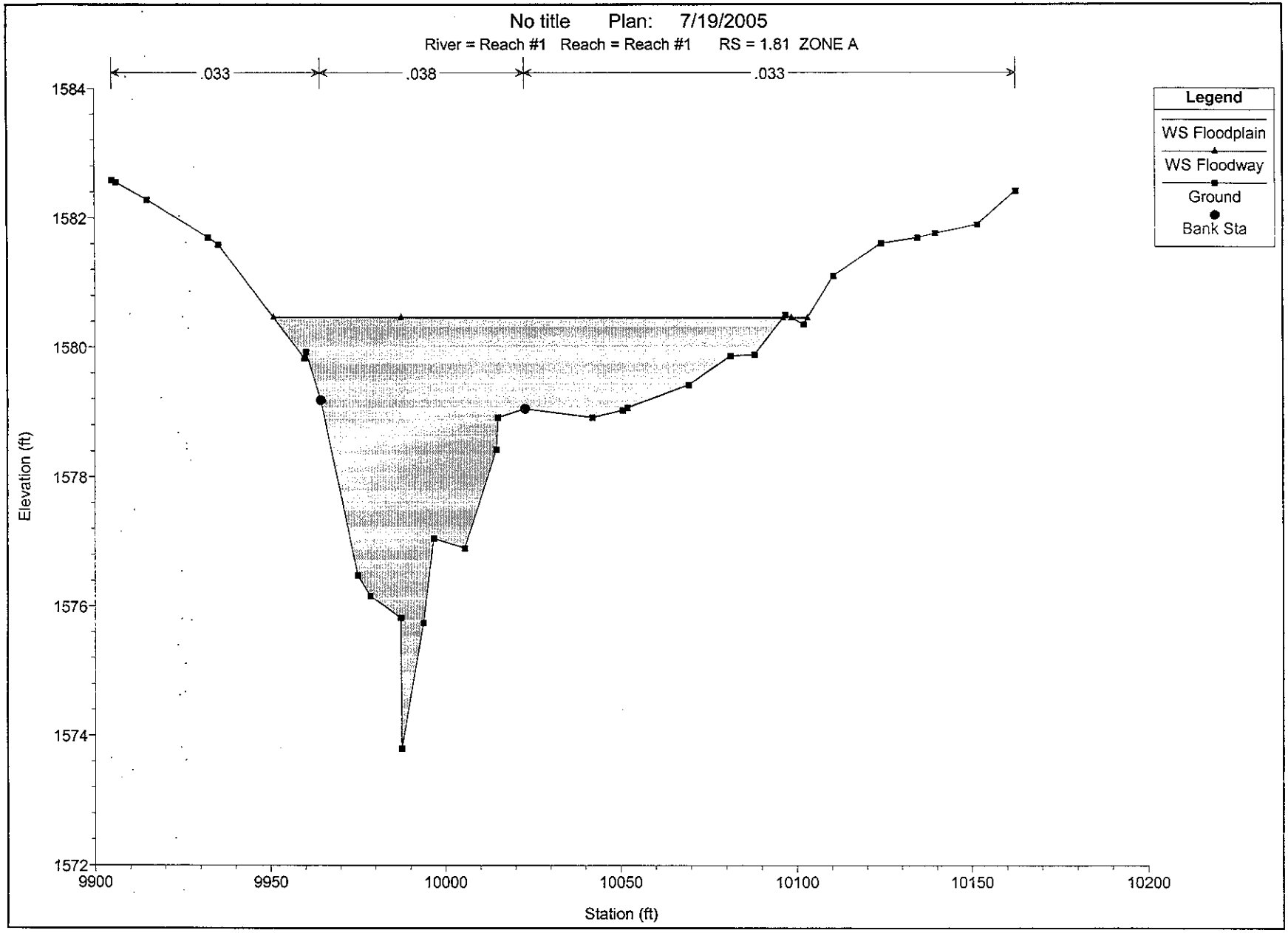

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 2.51 ZONE A
.033
.05
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1612
1611
1610
1609
1608
1607
1606
1605
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

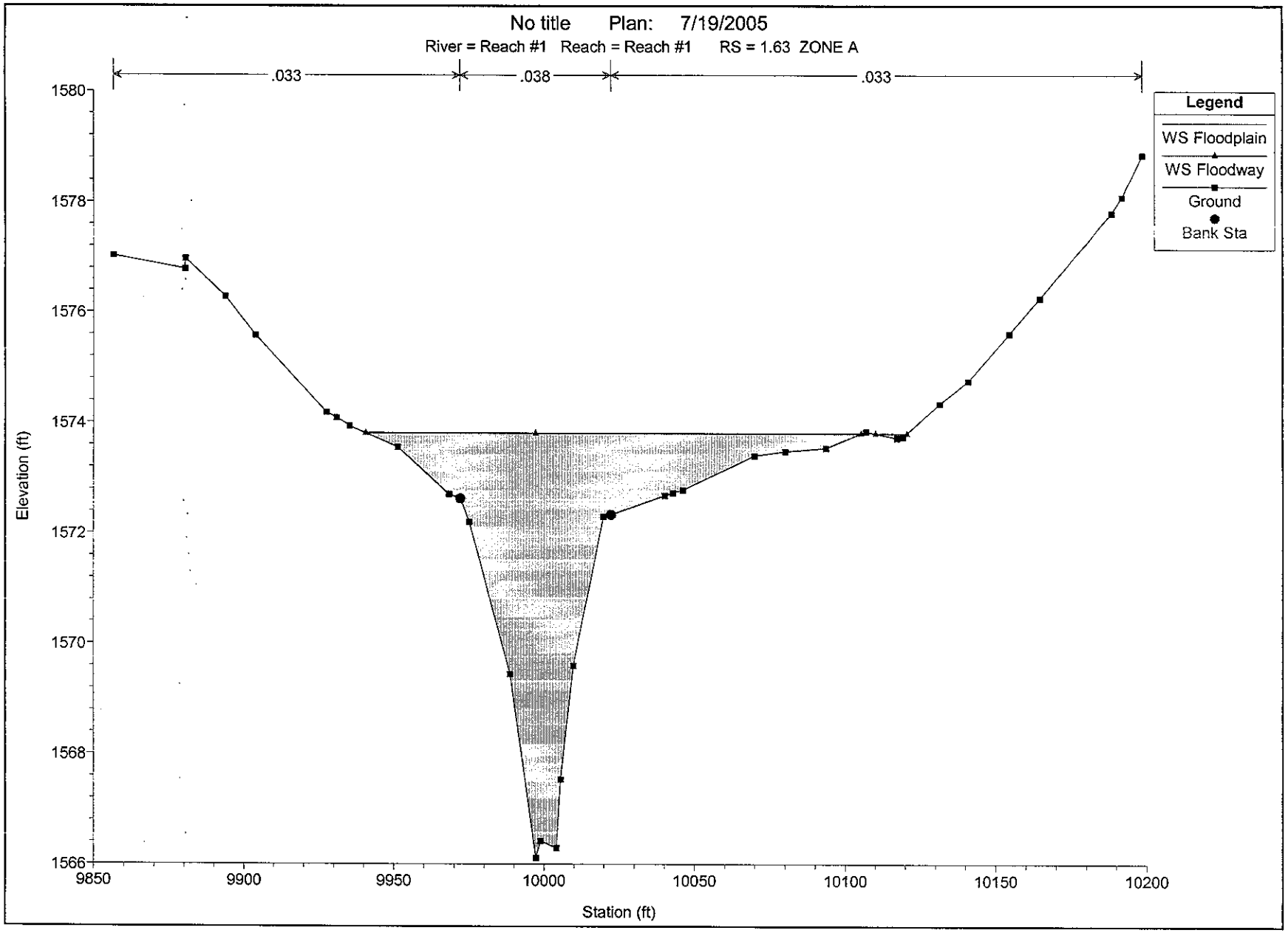

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 2.35 ZONE A
.033
.05
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1605
1604
1603
1602
1601
1600
1599
1598
1597
9600
9800
10000
10200
10400
10600
Station (ft)

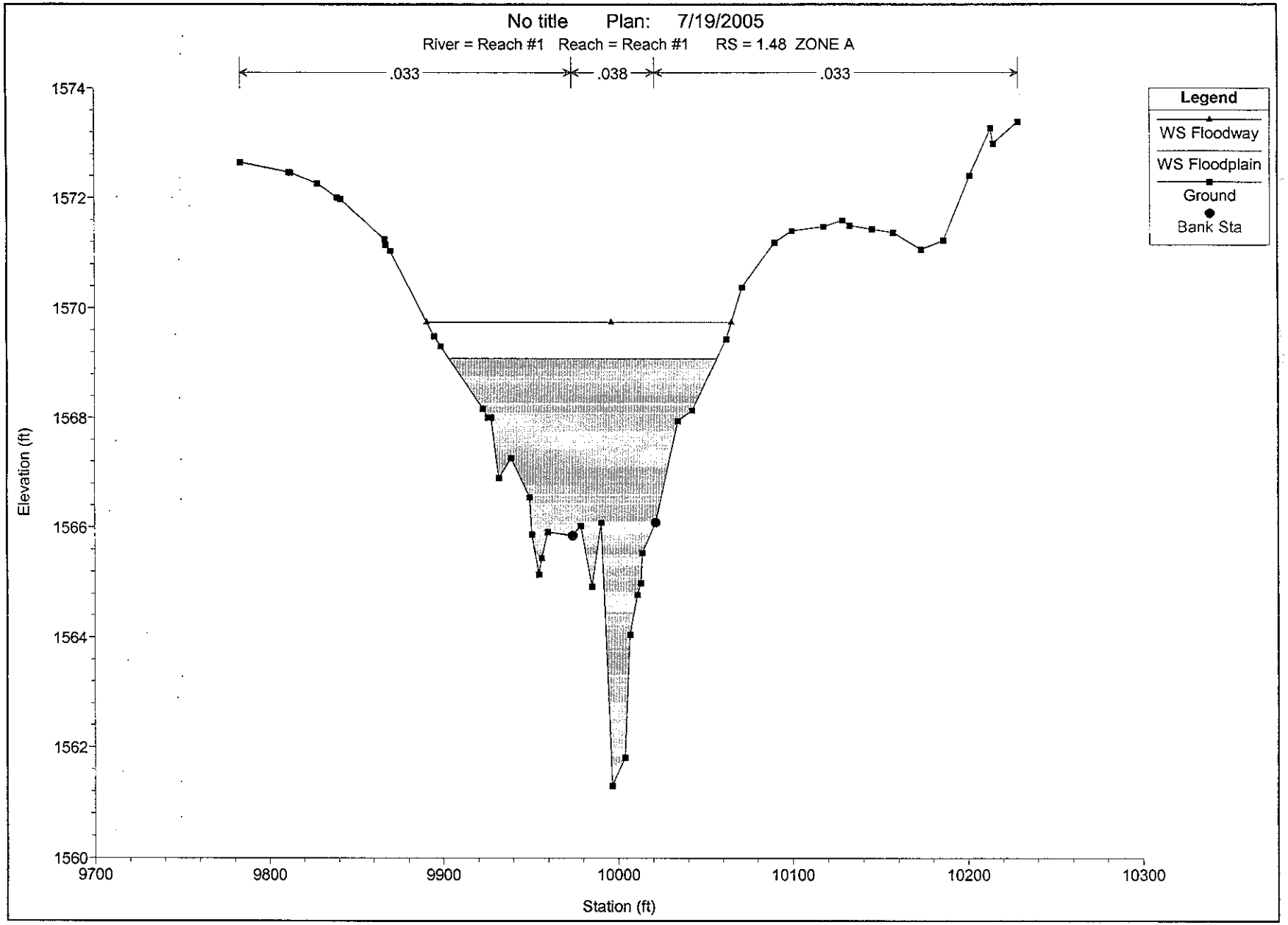

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 2.23 ZONE A
.033
.038
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1602
1601
1600
1599
1598
1597
1596
1595
1594
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

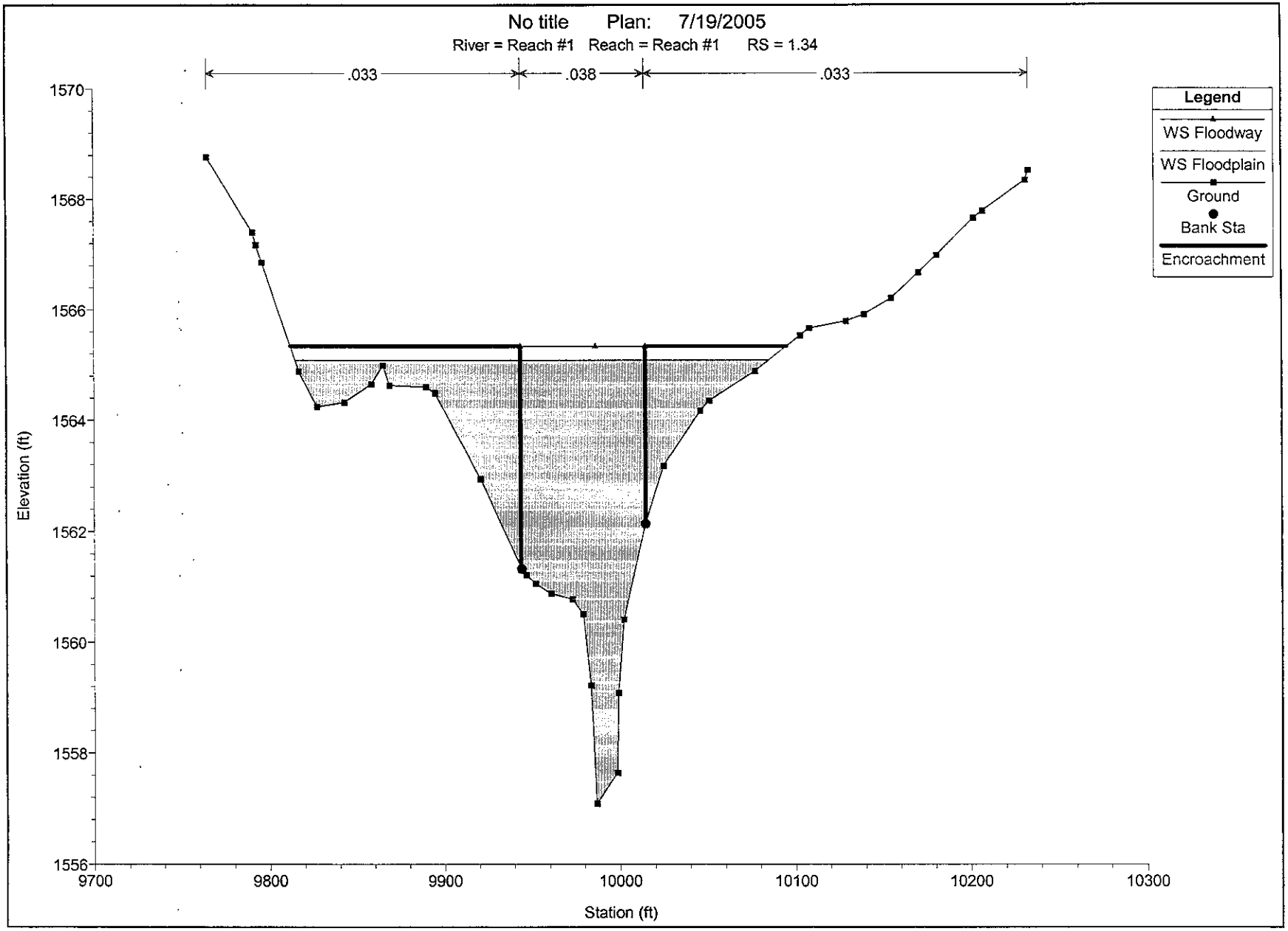

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 2.05 ZONE A
.033
.038
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1596
1594
1592
1590
1588
1586
9600
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

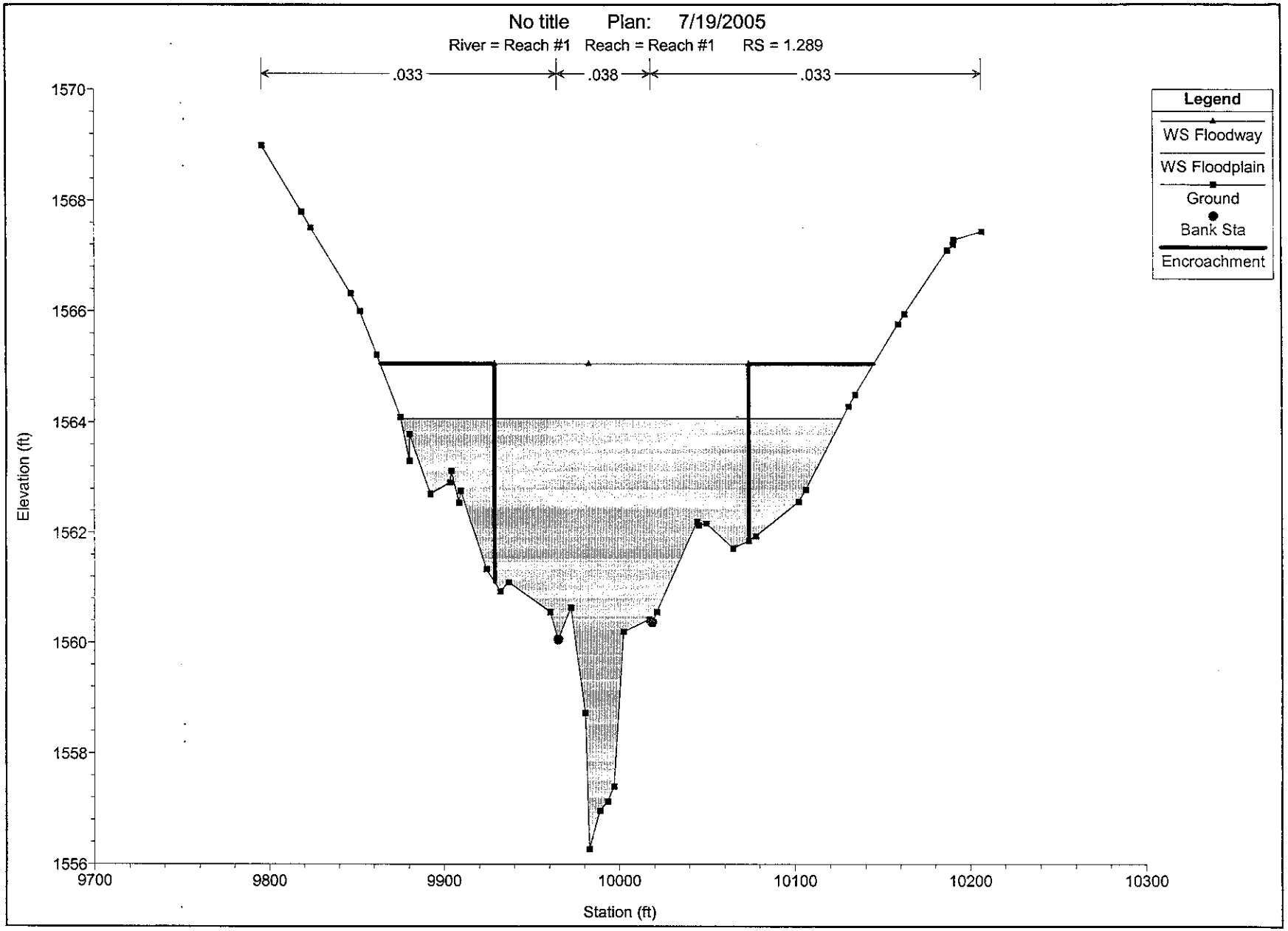

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 1.89 ZONE A
.033
.038
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1590
1588
1586
1584
1582
1580
1578
9800
9850
9900
9950
10000
10050
10100
10150
10200
Station (ft)

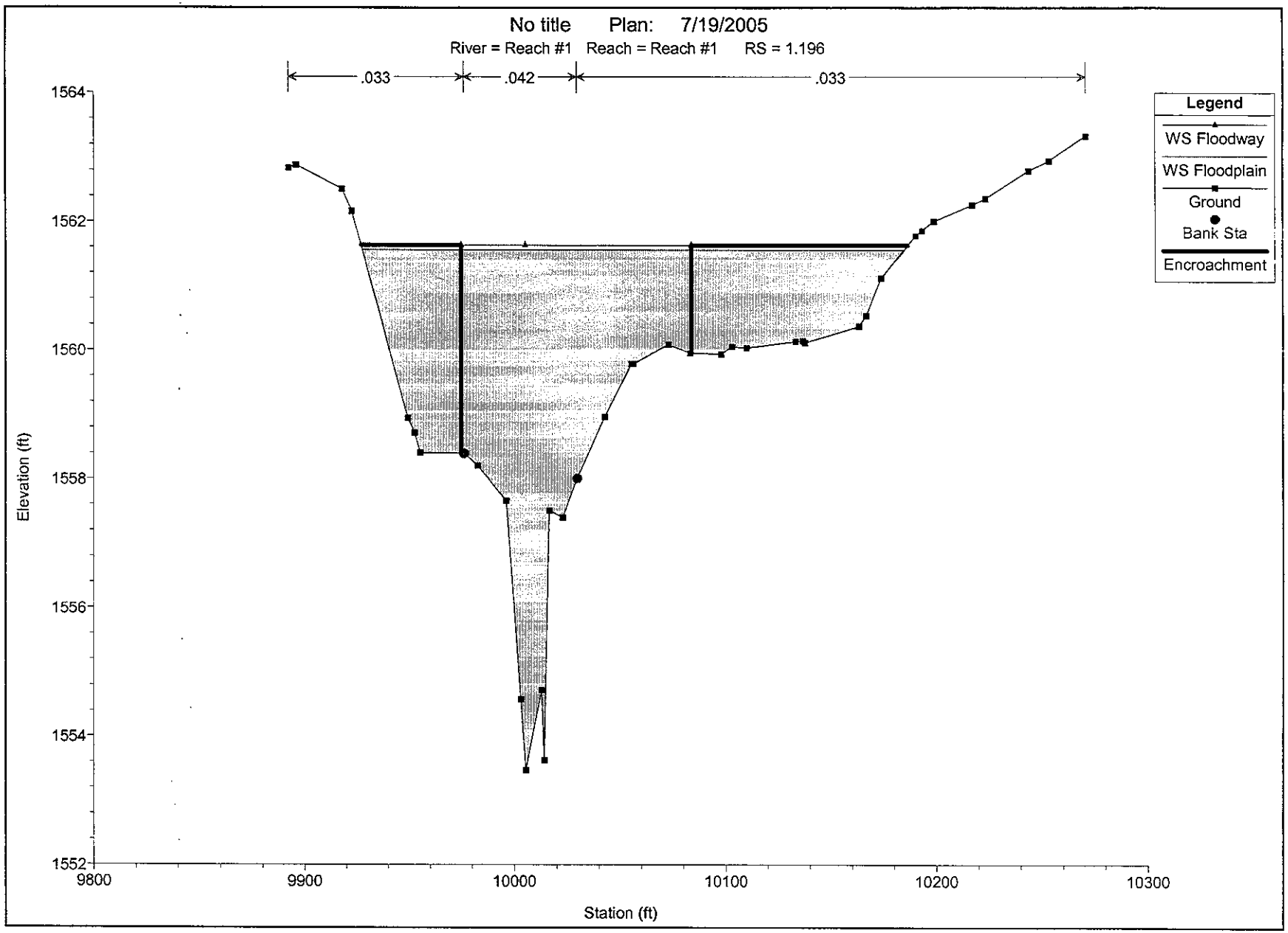

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 1.81 ZONE A
.033
.038
.033
Legend
WS Floodplain
WS Floodway
Ground
Bank Sta
Elevation (ft)
1584
1582
1580
1578
1576
1574
1572
9900
9950
10000
10050
10100
10150
10200
Station (ft)

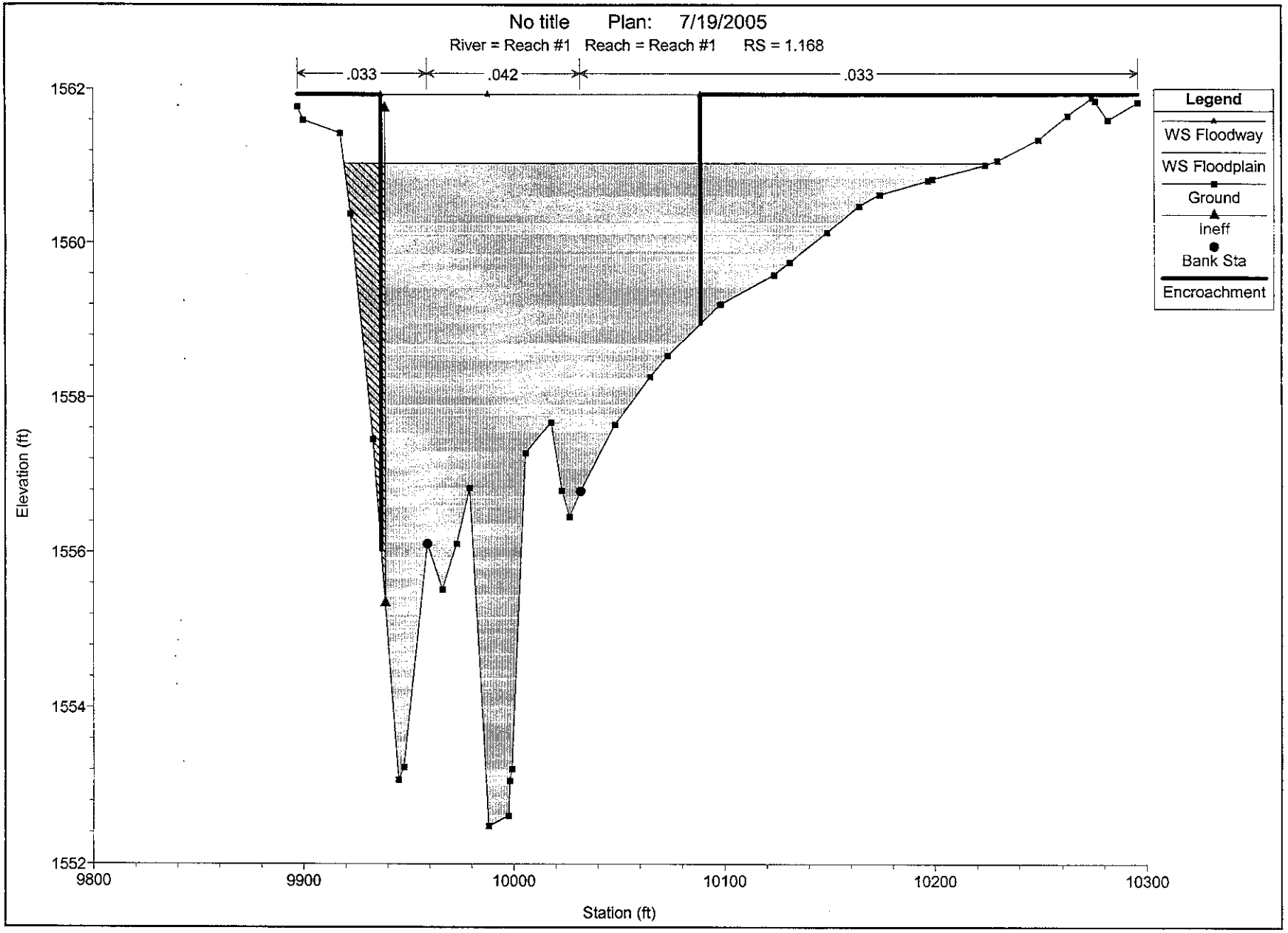

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 1.63 ZONE A
.033
.038
.033
Legend
WS Floodplain
WS Floodway
Ground
Bank Sta
Elevation (ft)
1580
1578
1576
1574
1572
1570
1568
1566
9850
9900
9950
10000
10050
10100
10150
10200
Station (ft)

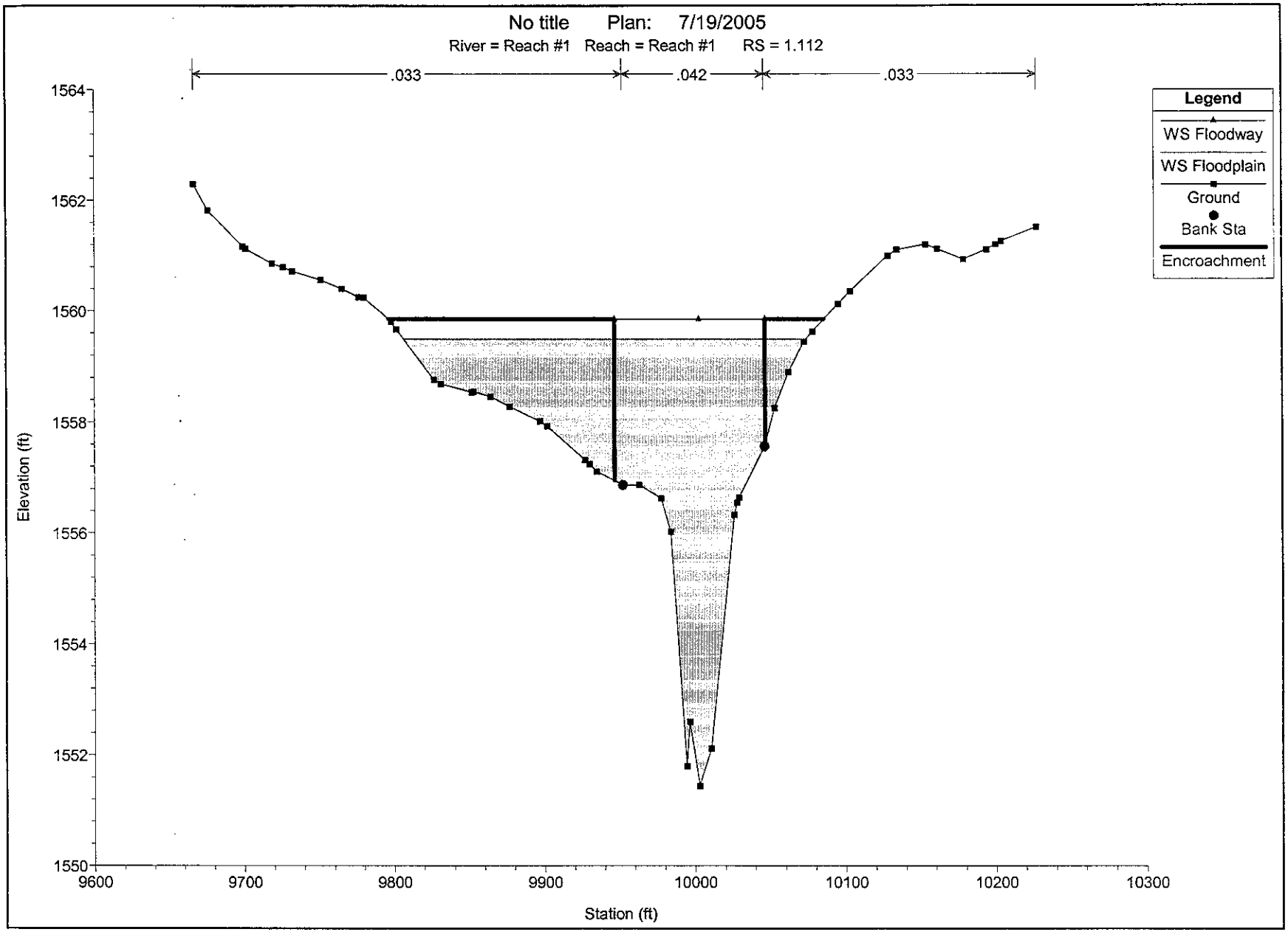

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 1.48 ZONE A
.033
.038
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1574
1572
1570
1568
1566
1564
1562
1560
9700
9800
9900
10000
10100
10200
10300
Station (ft)

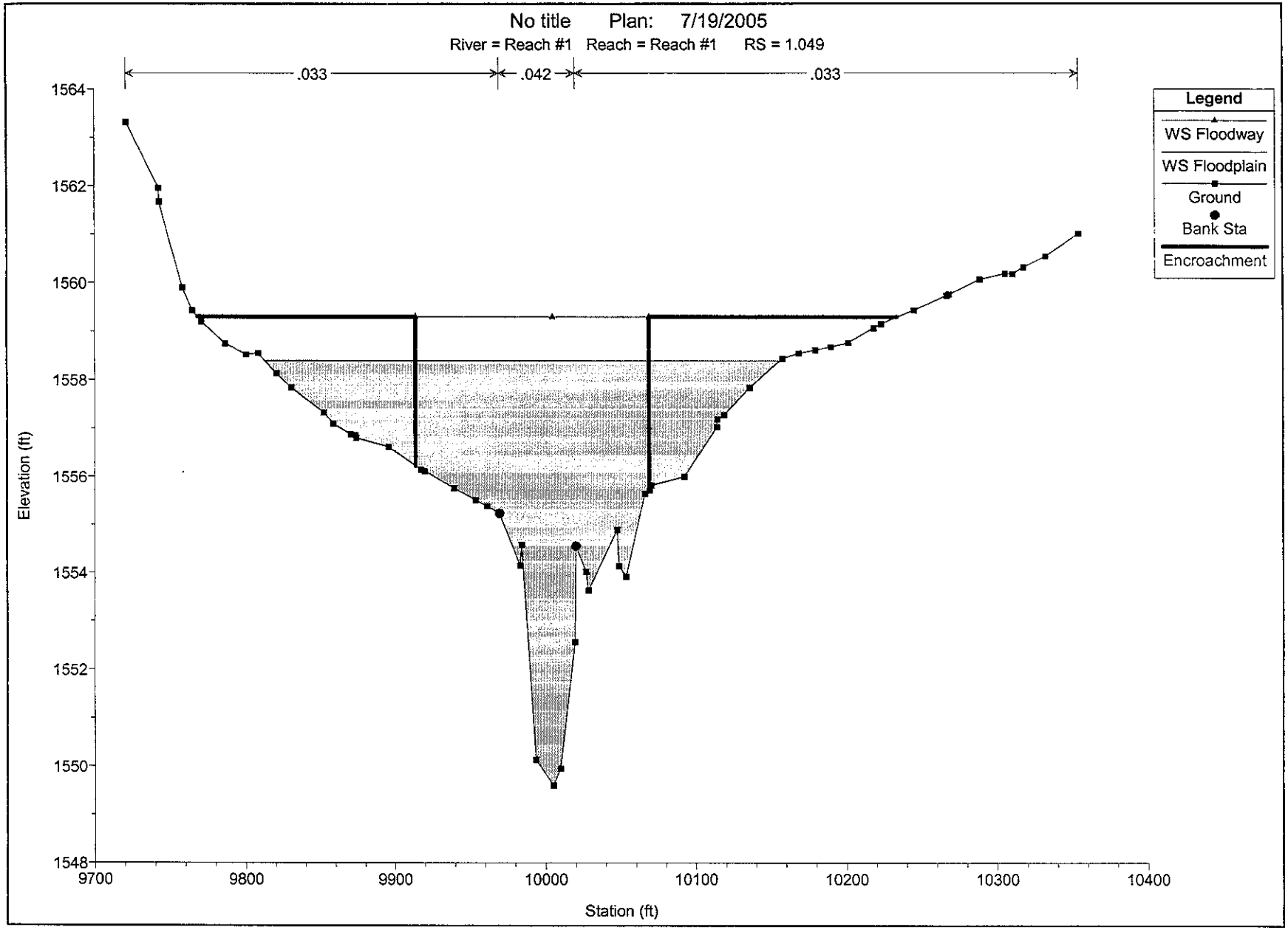

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 1.34
.033
.038
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1570
1568
1566
1564
1562
1560
1558
1556
9700
9800
9900
10000
10100
10200
10300
Station (ft)

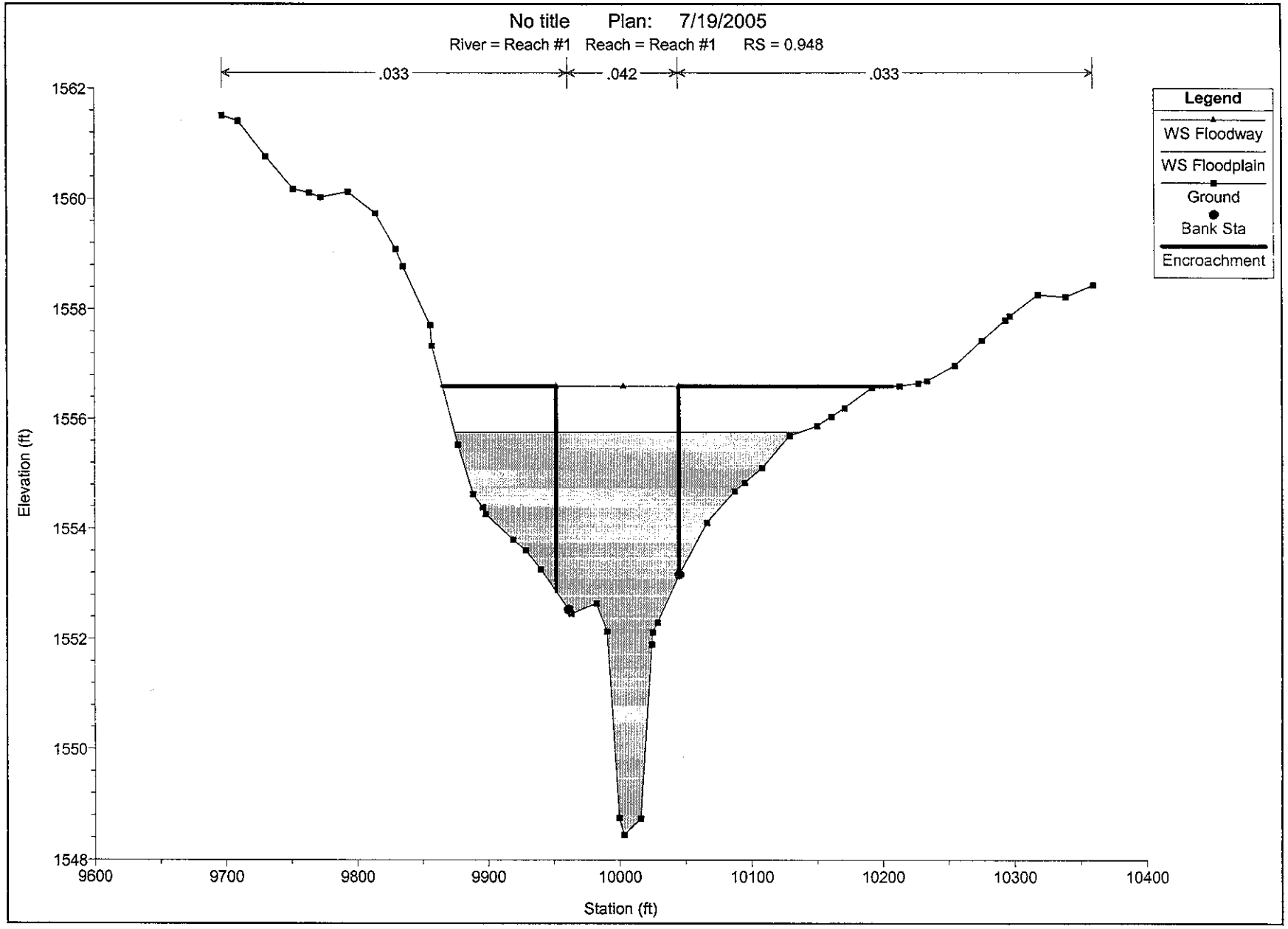

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 1.289
.033
.038
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1570
1568
1566
1564
1562
1560
1558
1556
9700
9800
9900
10000
10100
10200
10300
Station (ft)

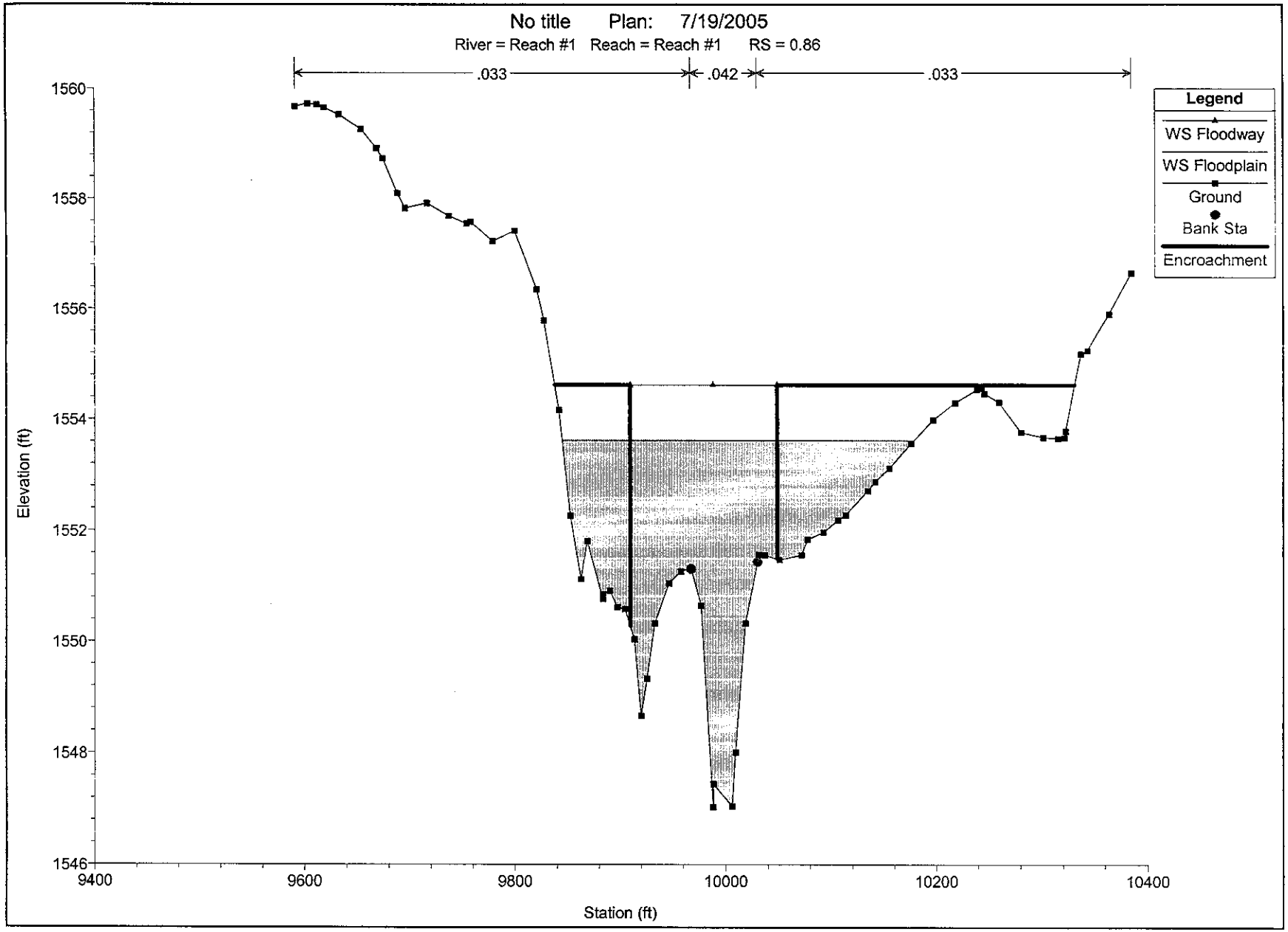

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 1.196
.033
.042
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1564
1562
1560
1558
1556
1554
1552
9800
9900
10000
10100
10200
10300
Station (ft)

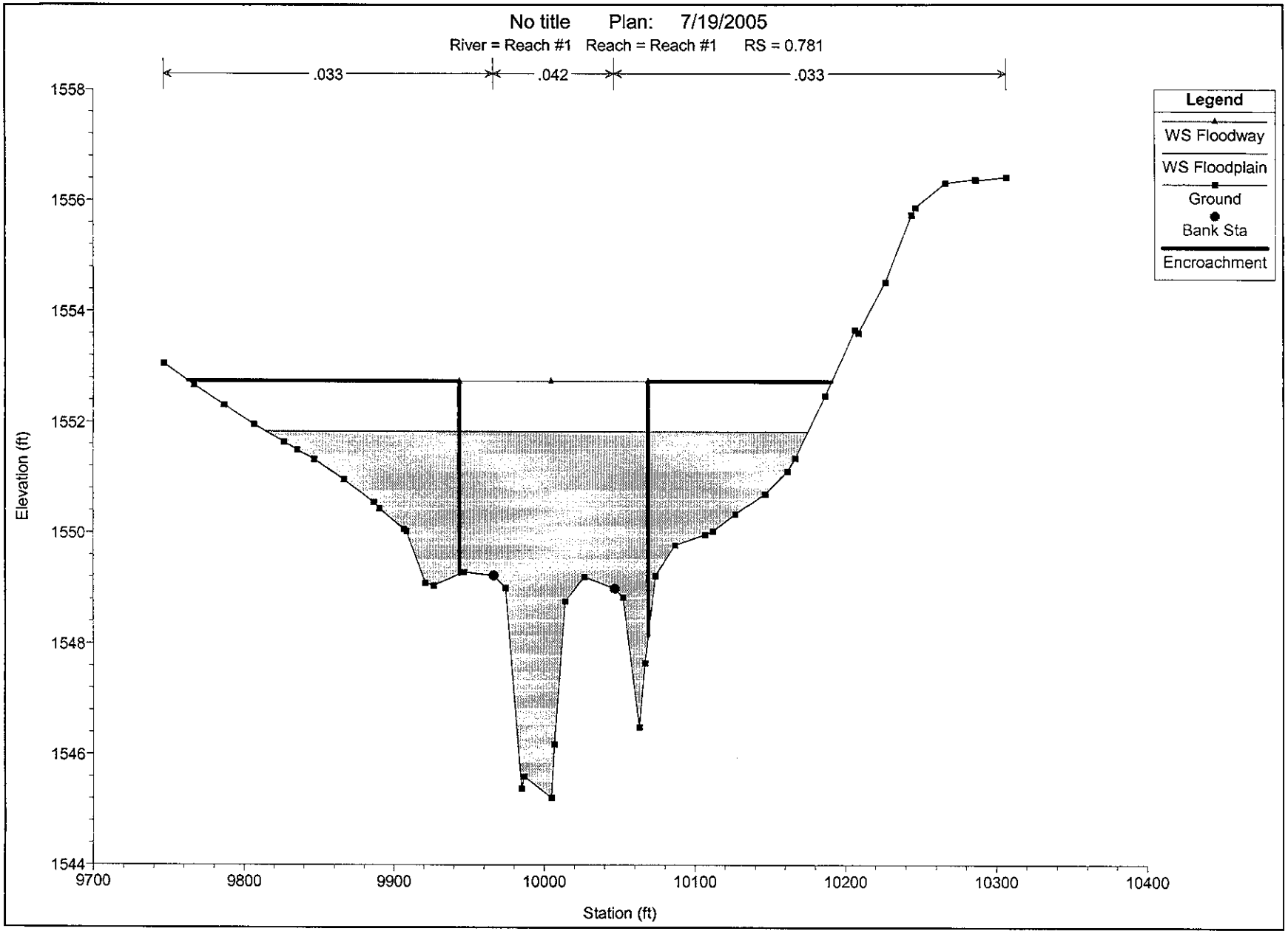

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 1.168
.033
.042
.033
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1562
1560
1558
1556
1554
1552
9800
9900
10000
10100
10200
10300
Station (ft)

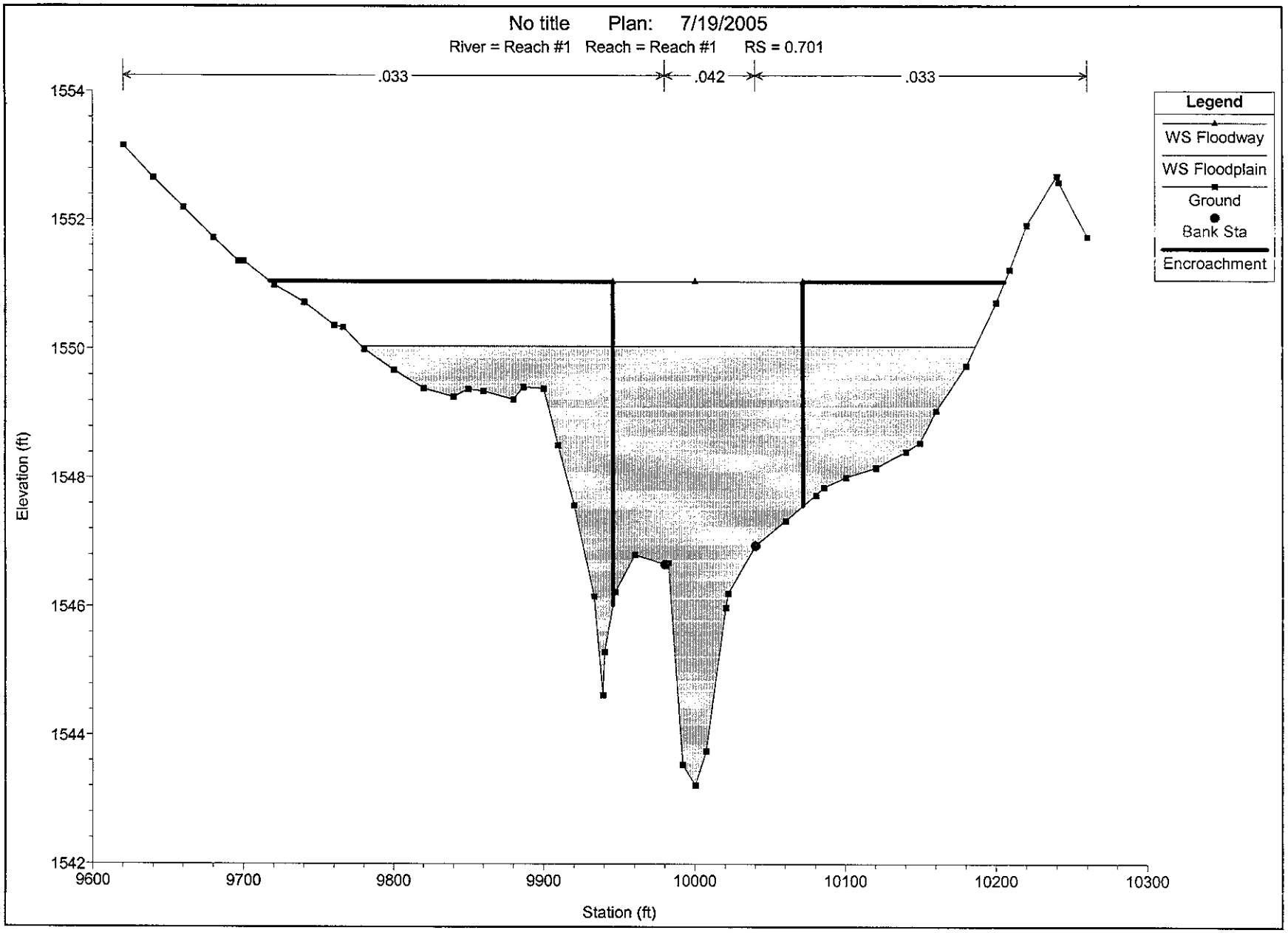

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 1.112
.033
.042
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1564
1562
1560
1558
1556
1554
1552
1550
9600
9700
9800
9900
10000
10100
10200
10300
Station (ft)

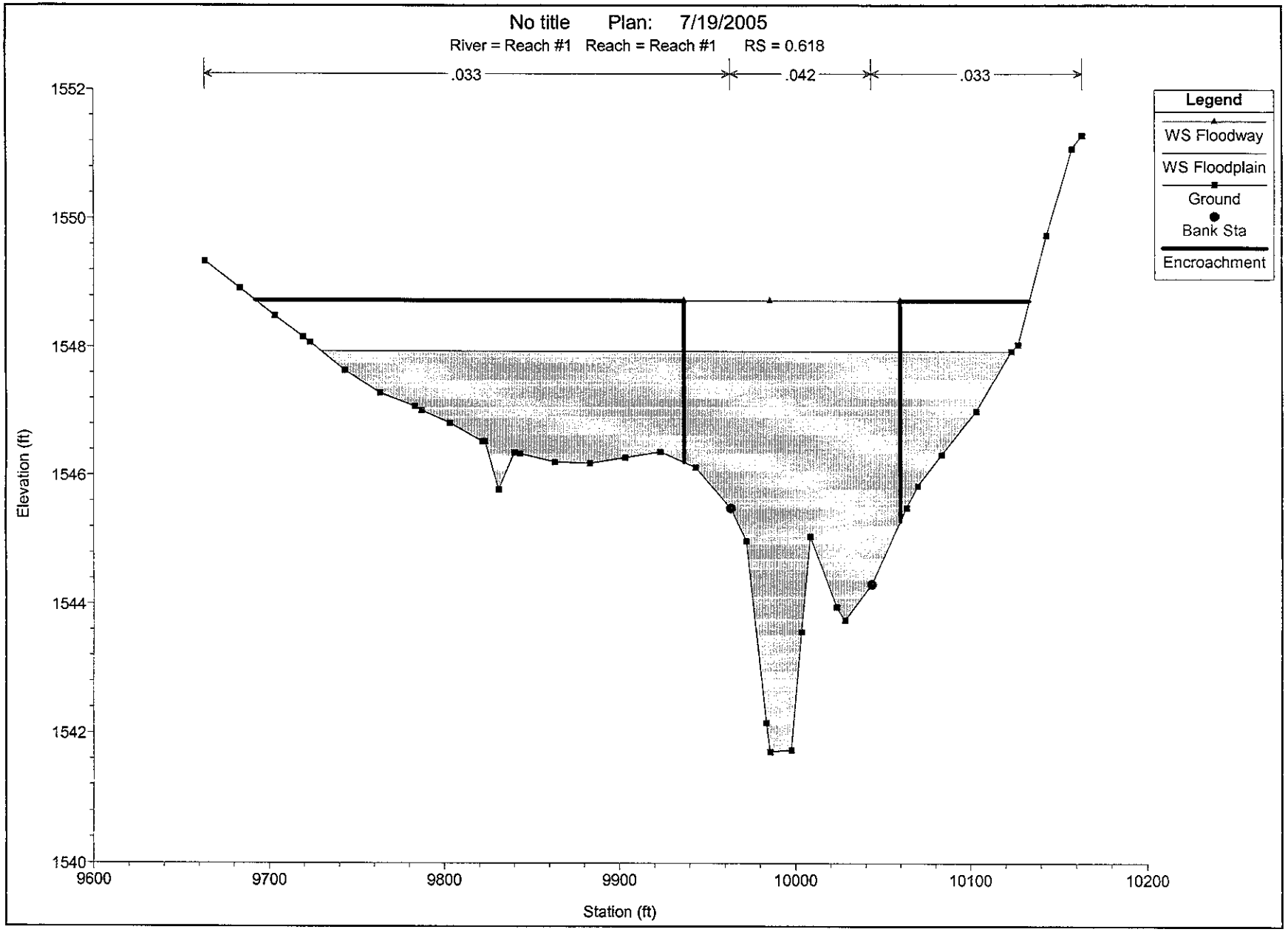

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 1.049
.033
.042
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1564
1562
1560
1558
1556
1554
1552
1550
1548
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

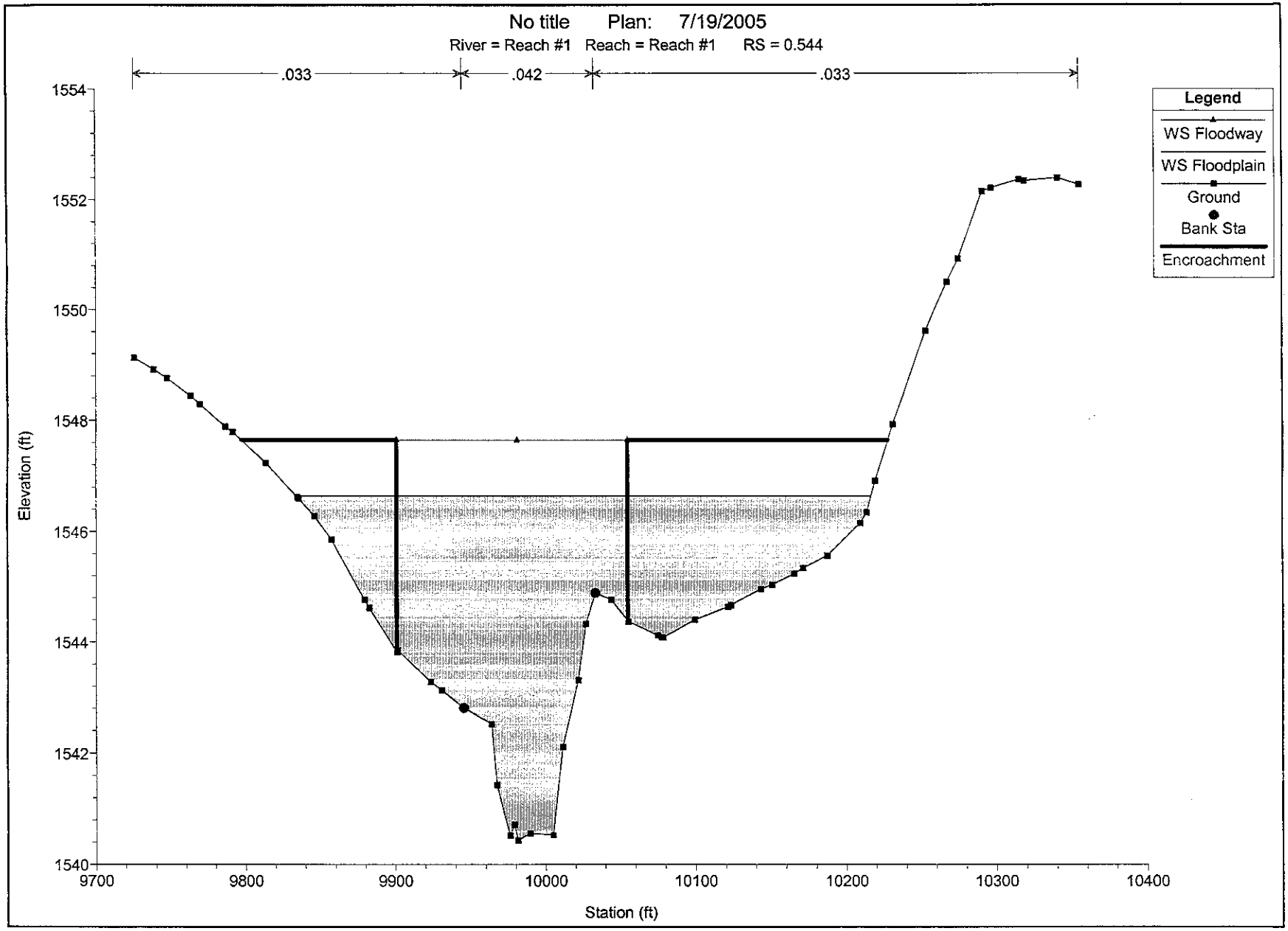

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 0.948
.033
.042
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1562
1560
1558
1556
1554
1552
1550
1548
9600
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

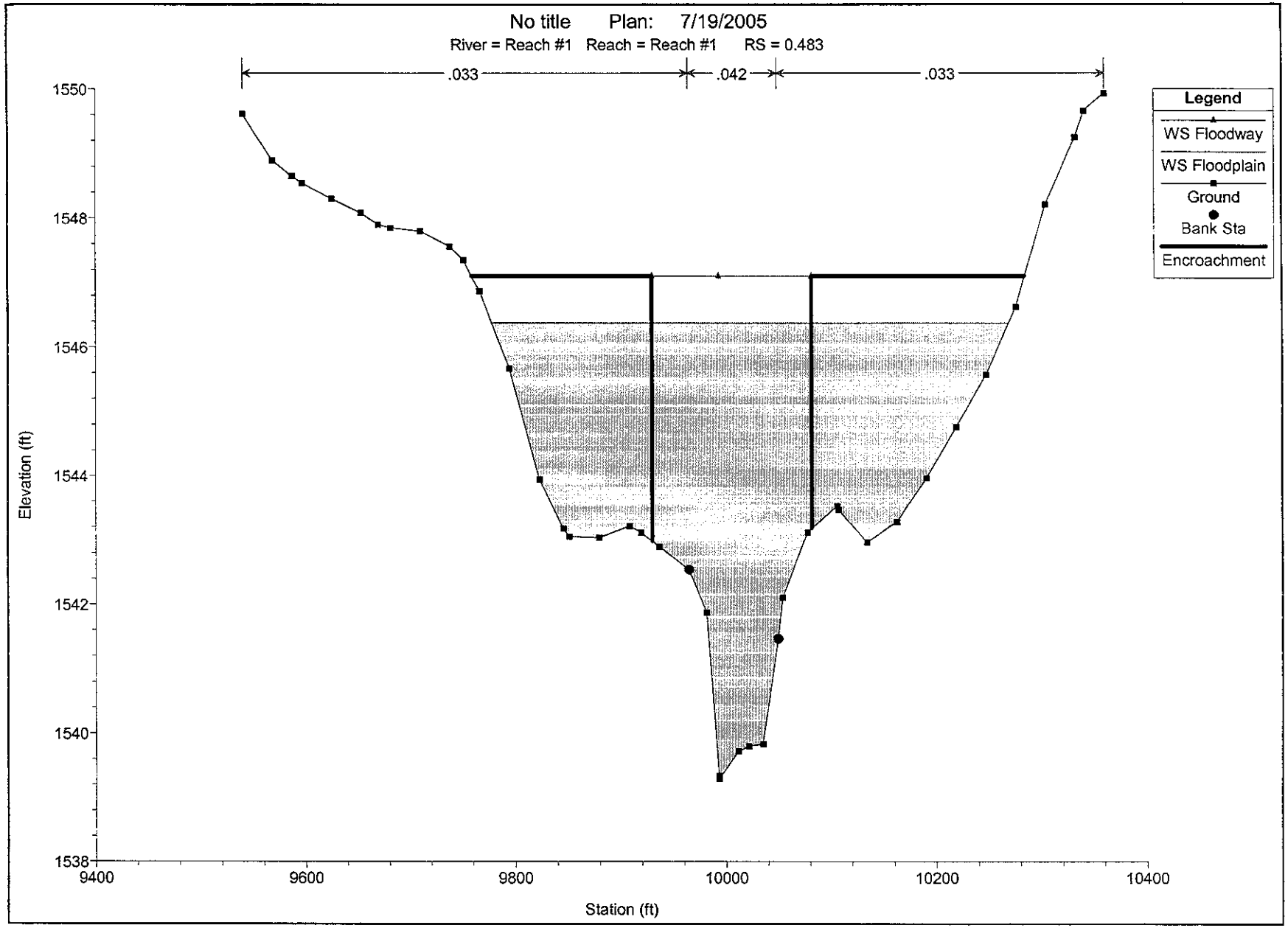

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 0.86
.033
.042
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1560
1558
1556
1554
1552
1550
1548
1546
9400
9600
9800
10000
10200
10400
Station (ft)

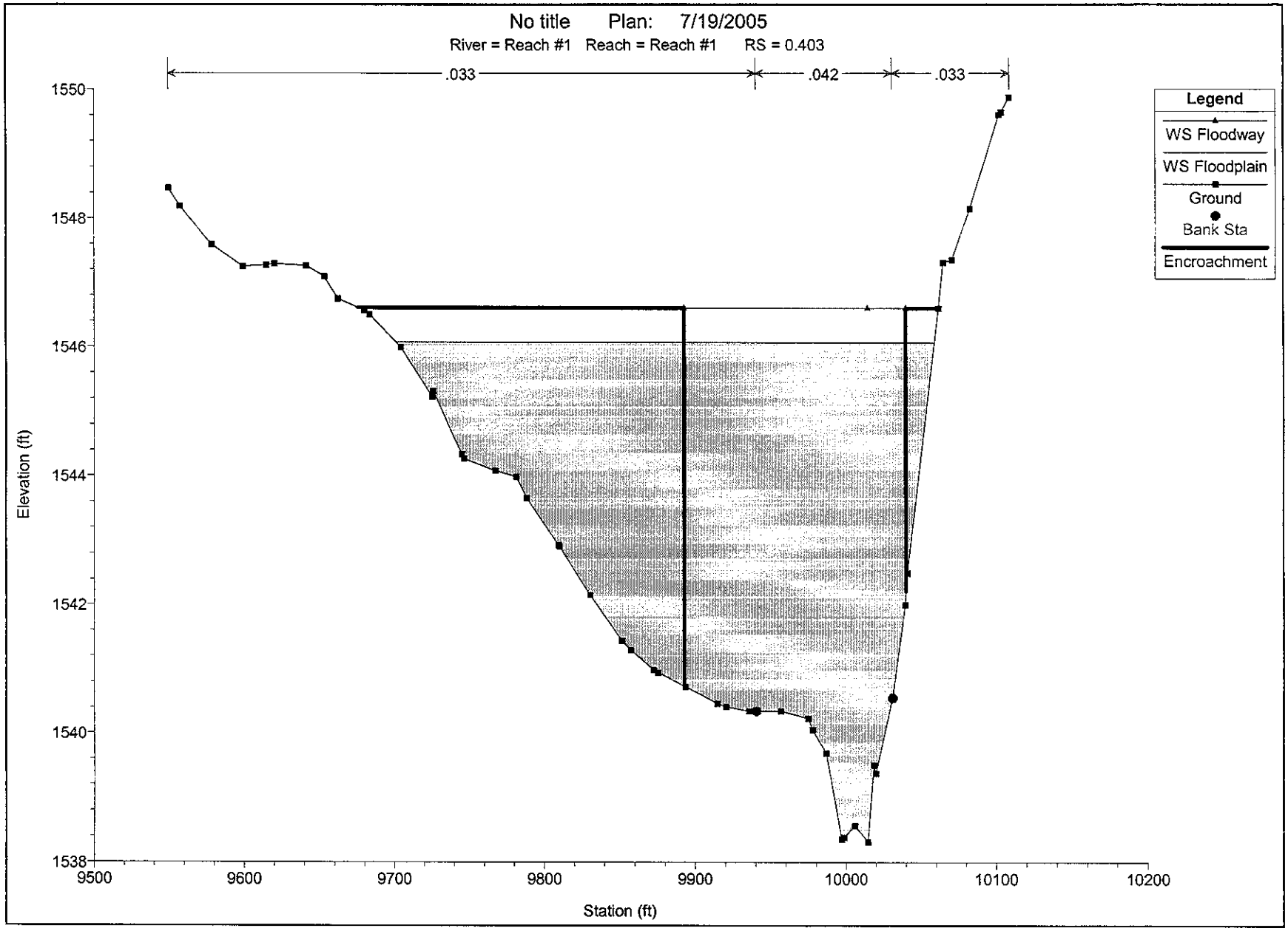

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 0.781
.033
.042
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1558
1556
1554
1552
1550
1548
1546
1544
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

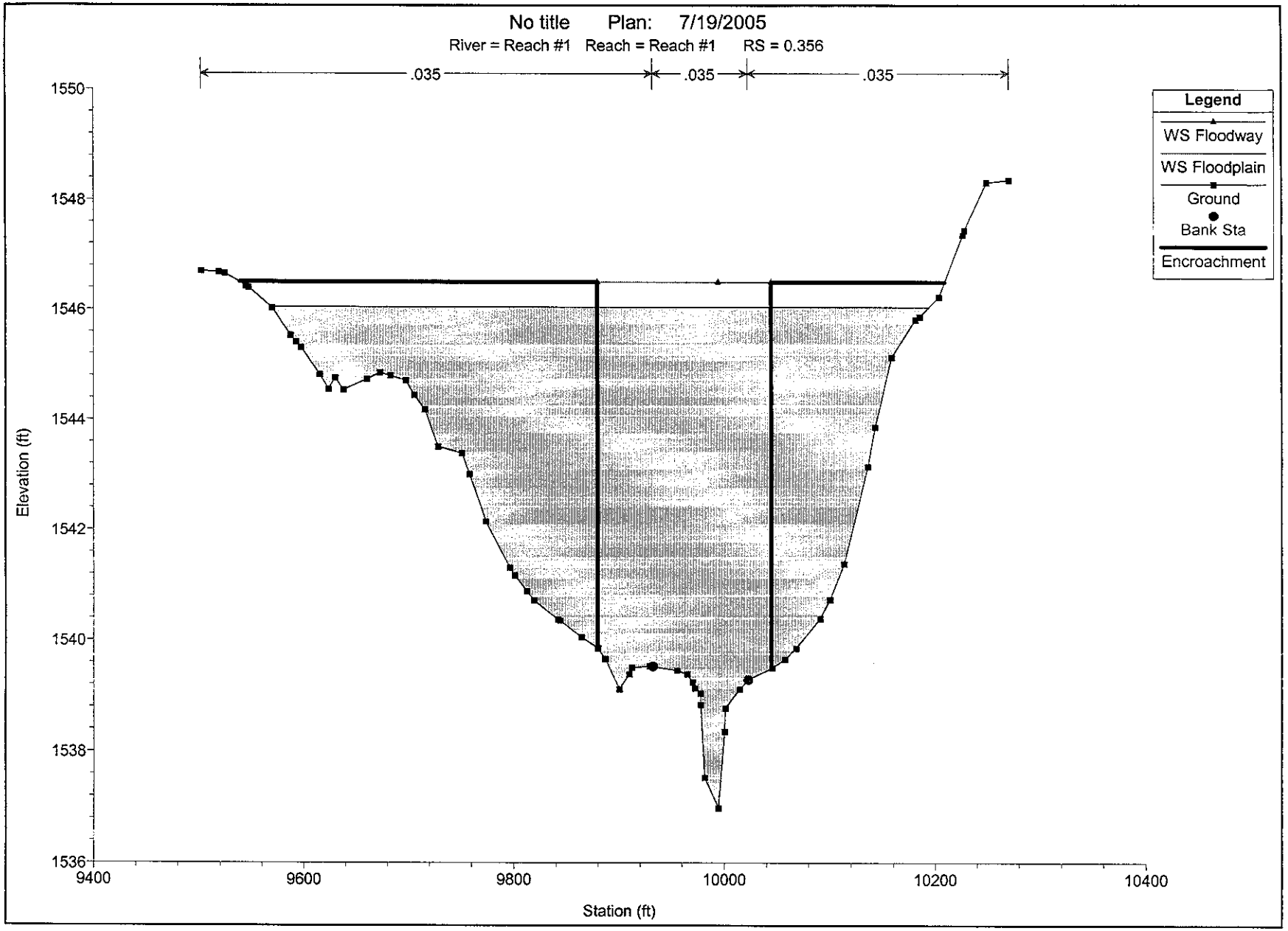

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 0.701
.033
.042
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1554
1552
1550
1548
1546
1544
1542
9600
9700
9800
9900
10000
10100
10200
10300
Station (ft)

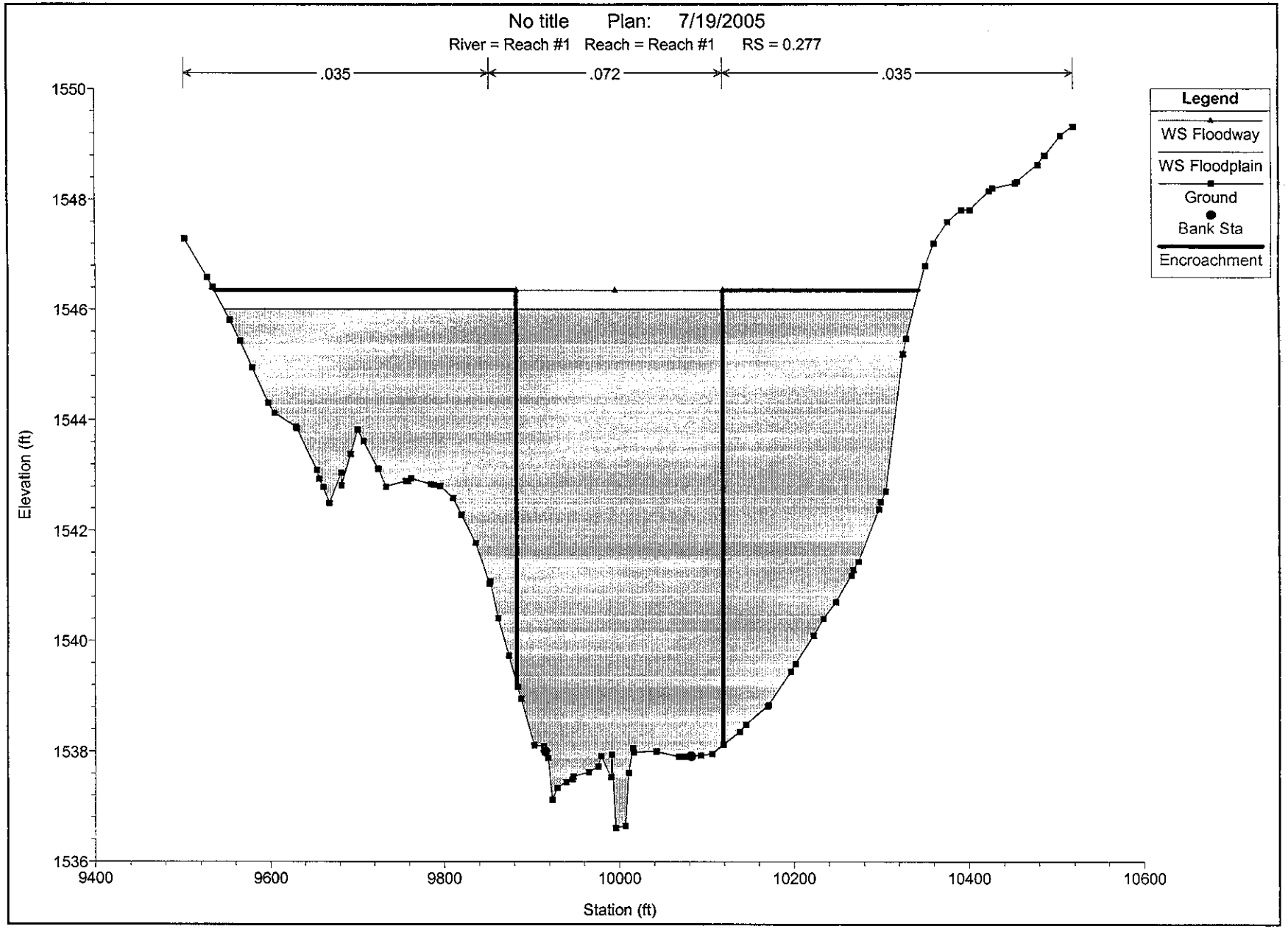

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 0.618
.033
.042
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1552
1550
1548
1546
1544
1542
1540
9600
9700
9800
9900
10000
10100
10200
Station (ft)

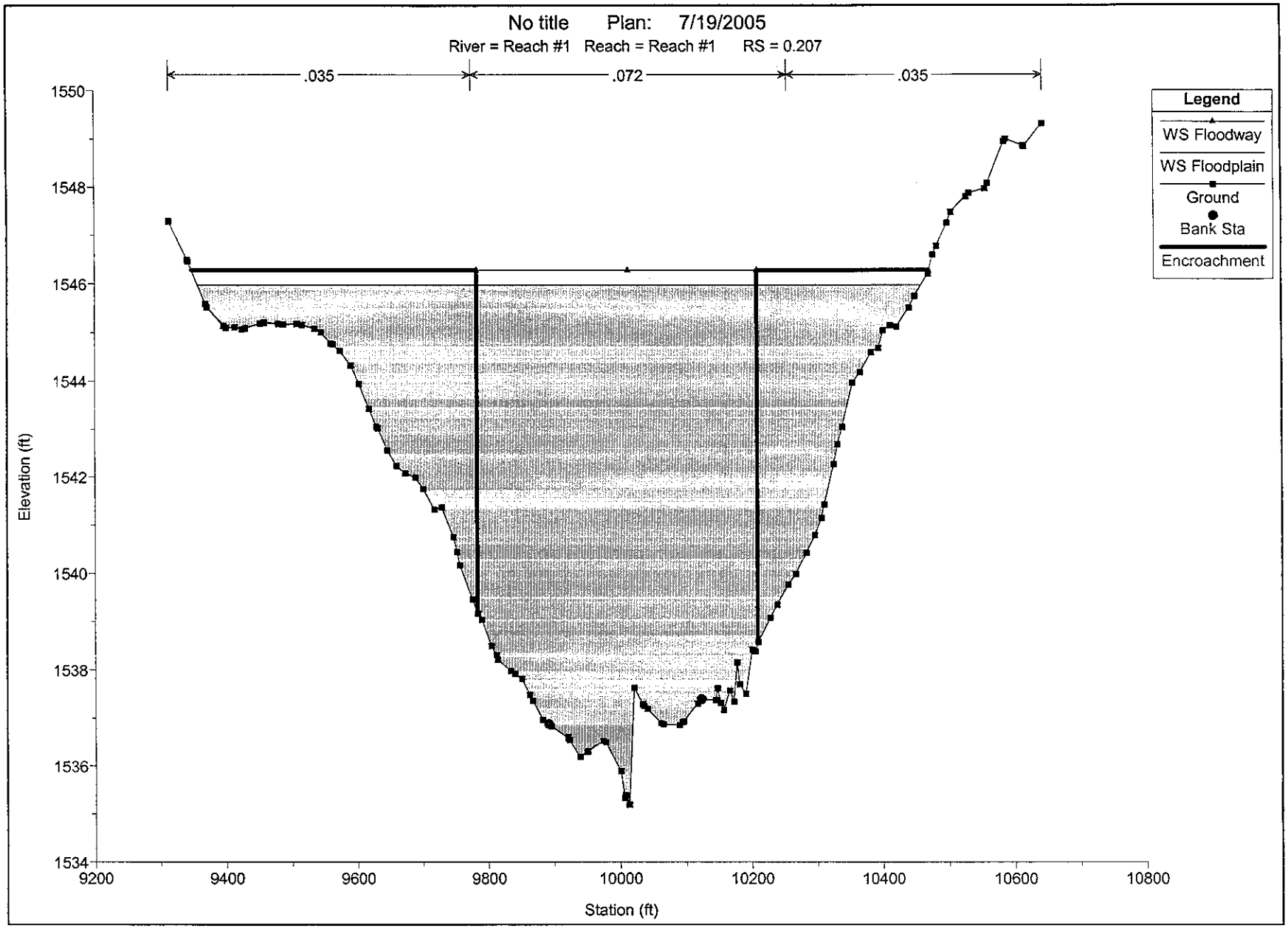

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 0.544
.033
.042
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1554
1552
1550
1548
1546
1544
1542
1540
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

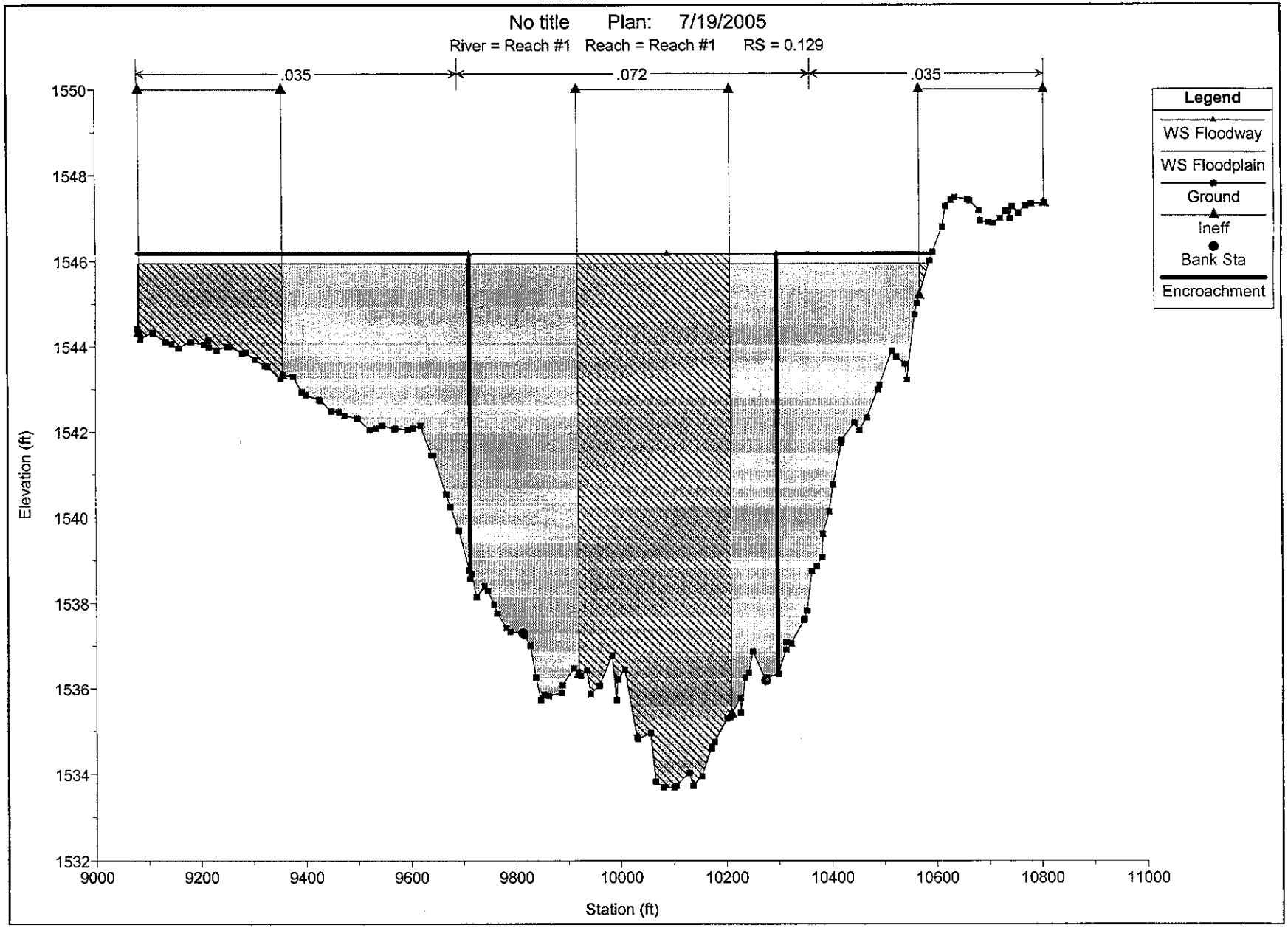

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 0.483
.033
.042
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1550
1548
1546
1544
1542
1540
1538
9400
9600
9800
10000
10200
10400
Station (ft)

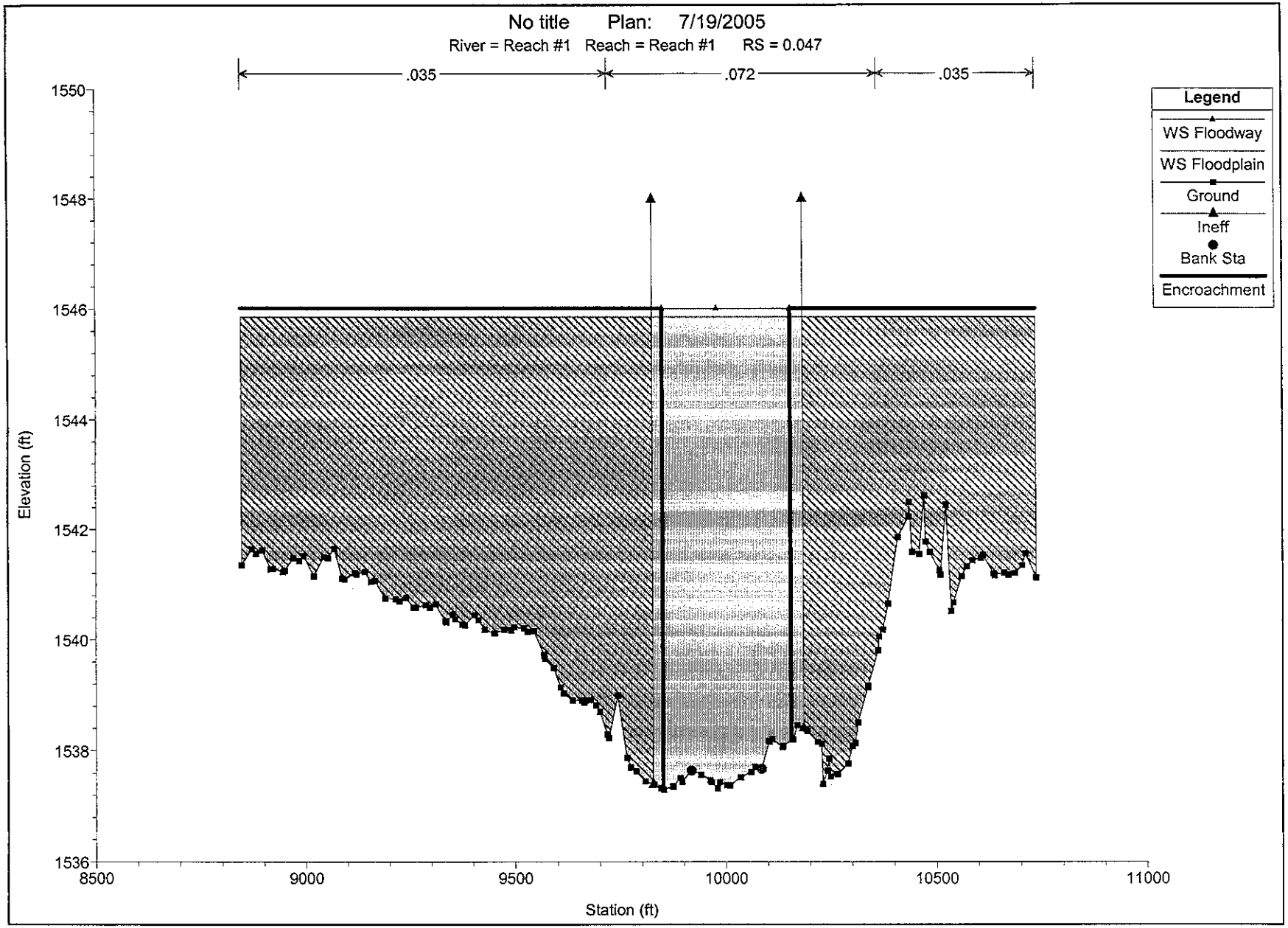

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 0.403
.033
.042
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1550
1548
1546
1544
1542
1540
1538
9500
9600
9700
9800
9900
10000
10100
10200
Station (ft)

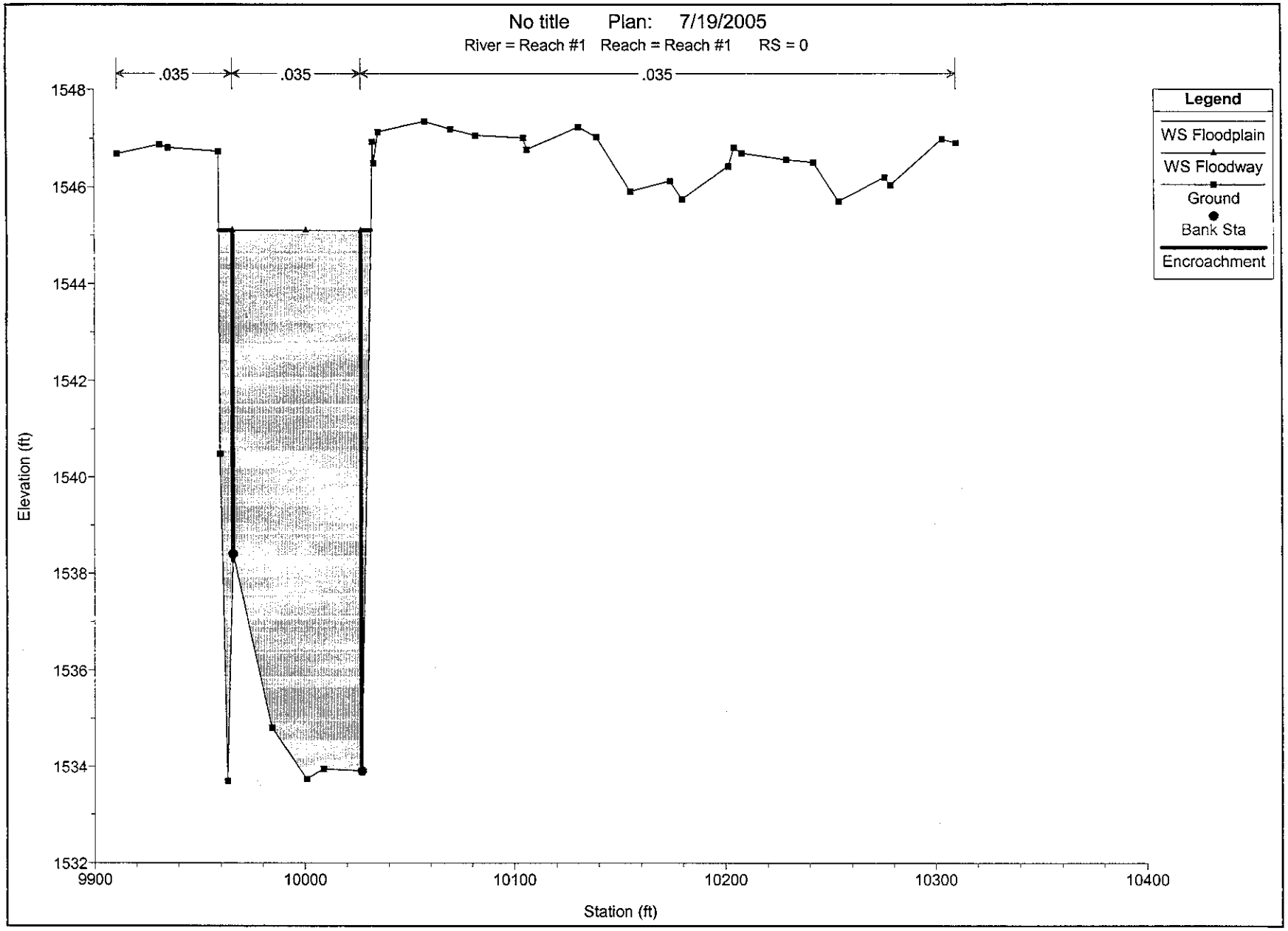

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 0.356
.035
.035
.035
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1550
1548
1546
1544
1542
1540
1538
1536
9400
9600
9800
10000
10200
10400
Station (ft)


No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 0.277
.035
.072
.035
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1550
1548
1546
1544
1542
1540
1538
1536
9400
9600
9800
10000
10200
10400
10600
Station (ft)

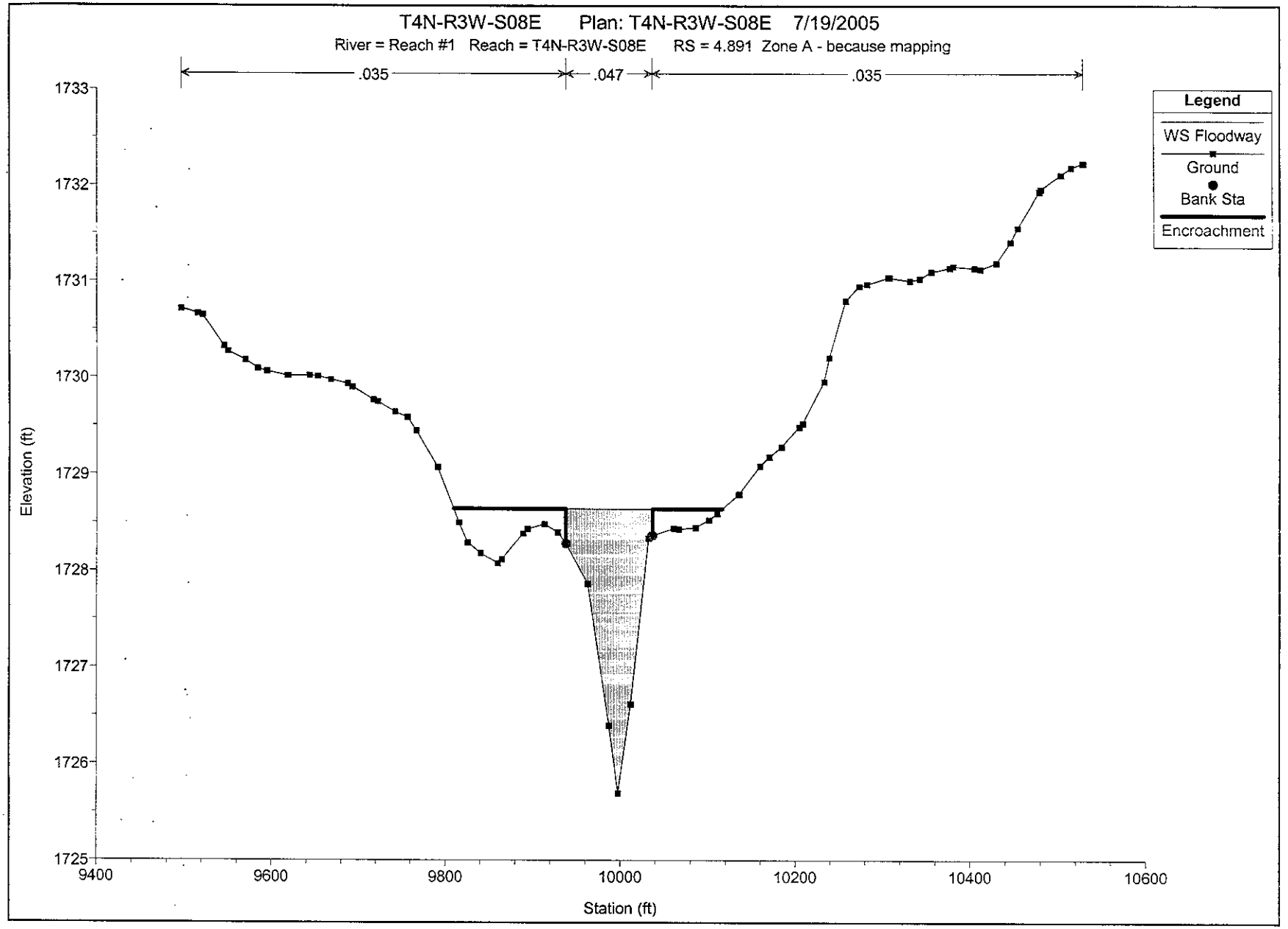

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 0.207
.035
.072
.035
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1550
1548
1546
1544
1542
1540
1538
1536
1534
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

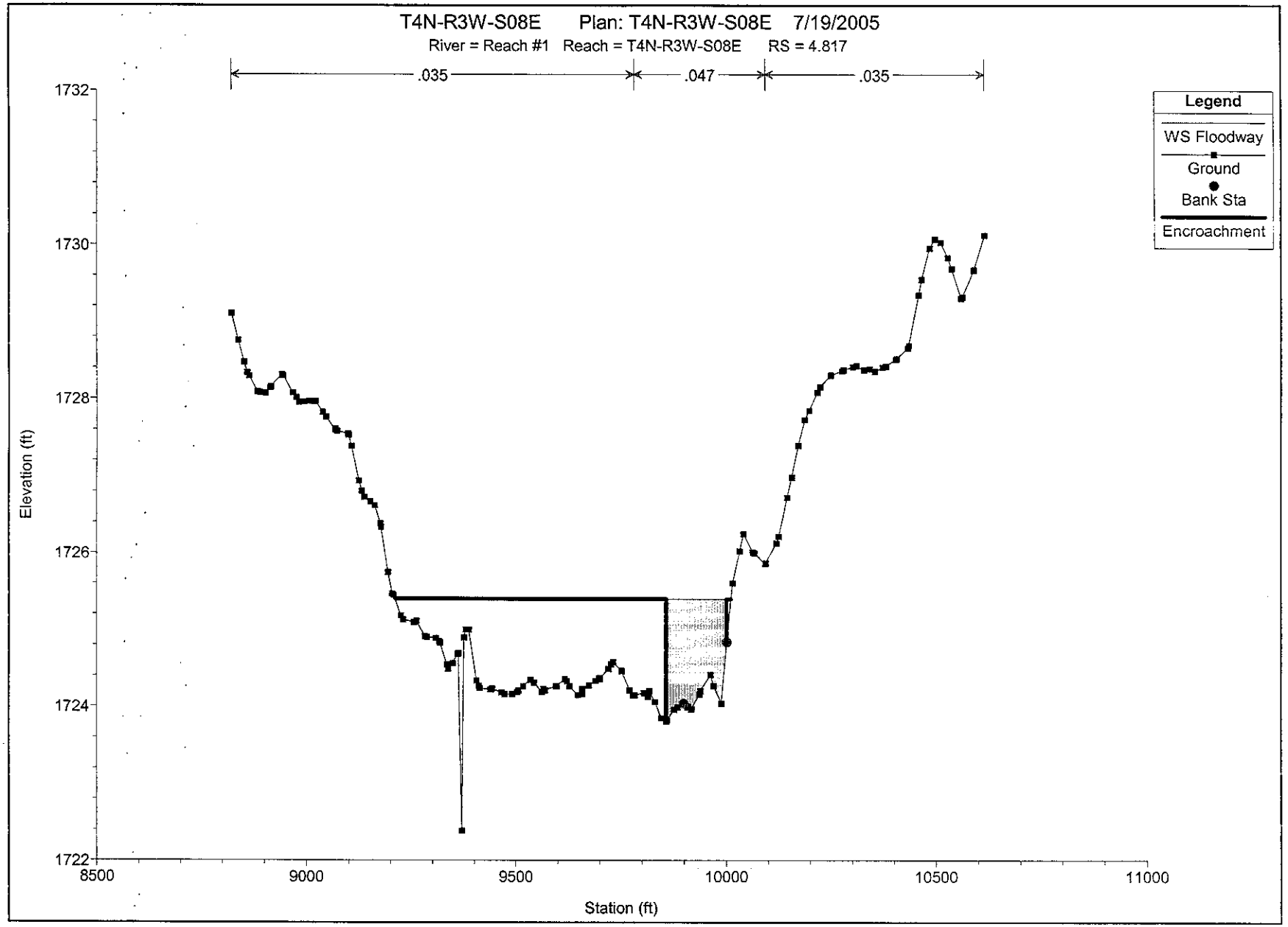

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 0.129
.035
.072
.035
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1550
1548
1546
1544
1542
1540
1538
1536
1534
1532
9000
9200
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

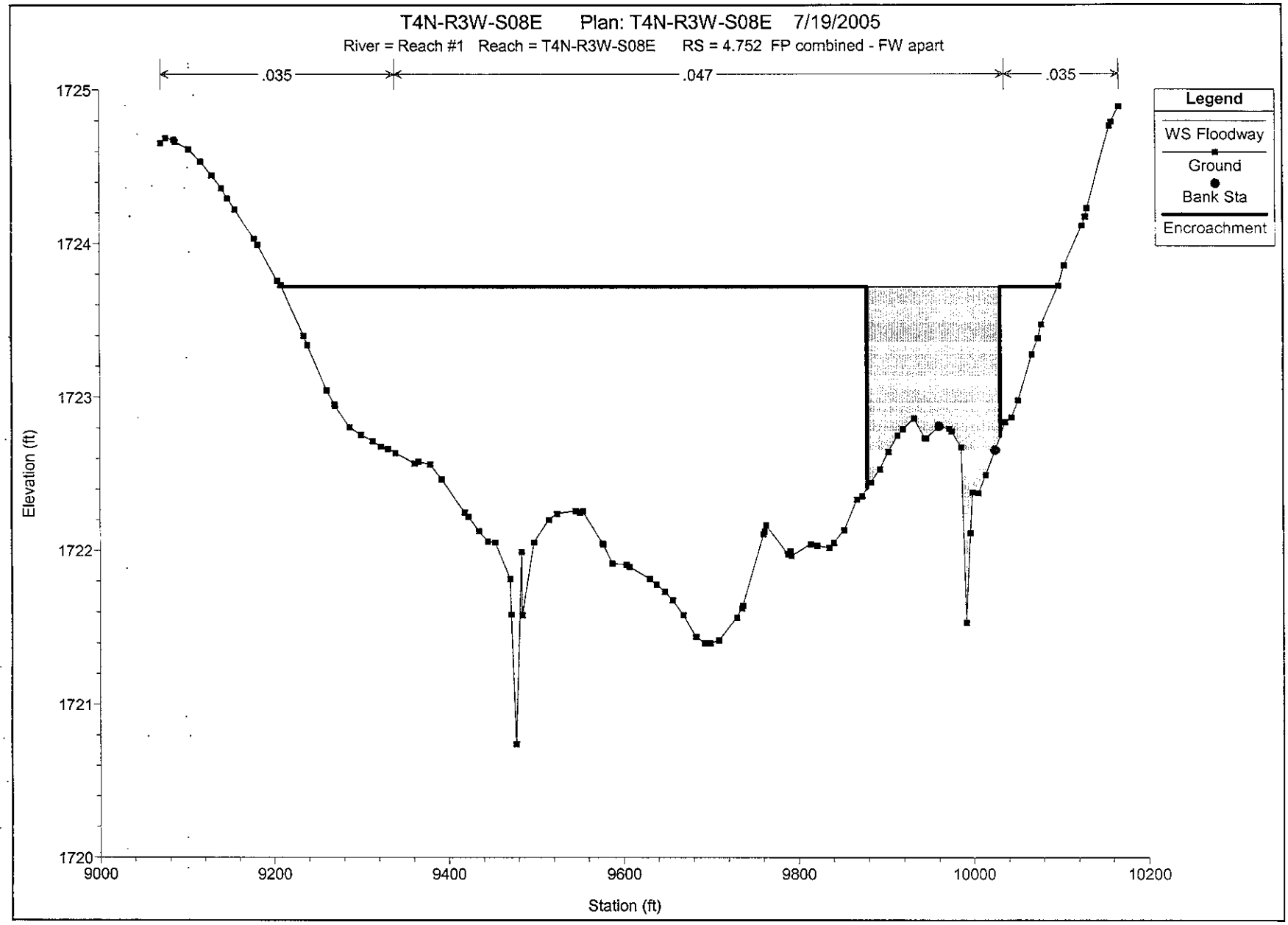

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 0.047
.035
.072
.035
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1550
1548
1546
1544
1542
1540
1538
1536
8500
9000
9500
10000
10500
11000
Station (ft)

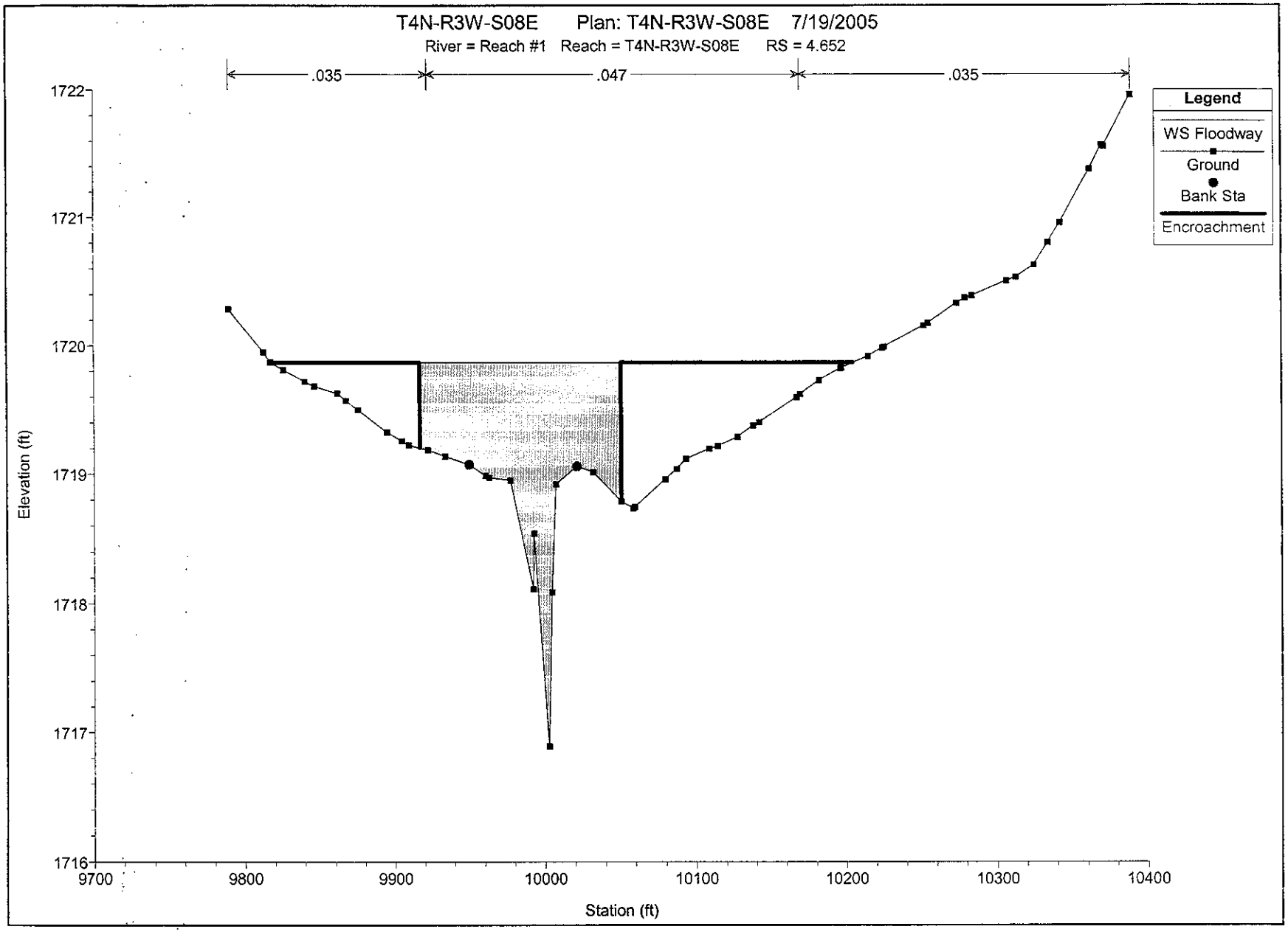

No title Plan: 7/19/2005
River = Reach #1 Reach = Reach #1 RS = 0
.035
.035
.035
Legend
WS Floodplain
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1548
1546
1544
1542
1540
1538
1536
1534
1532
9900
10000
10100
10200
10300
10400
Station (ft)

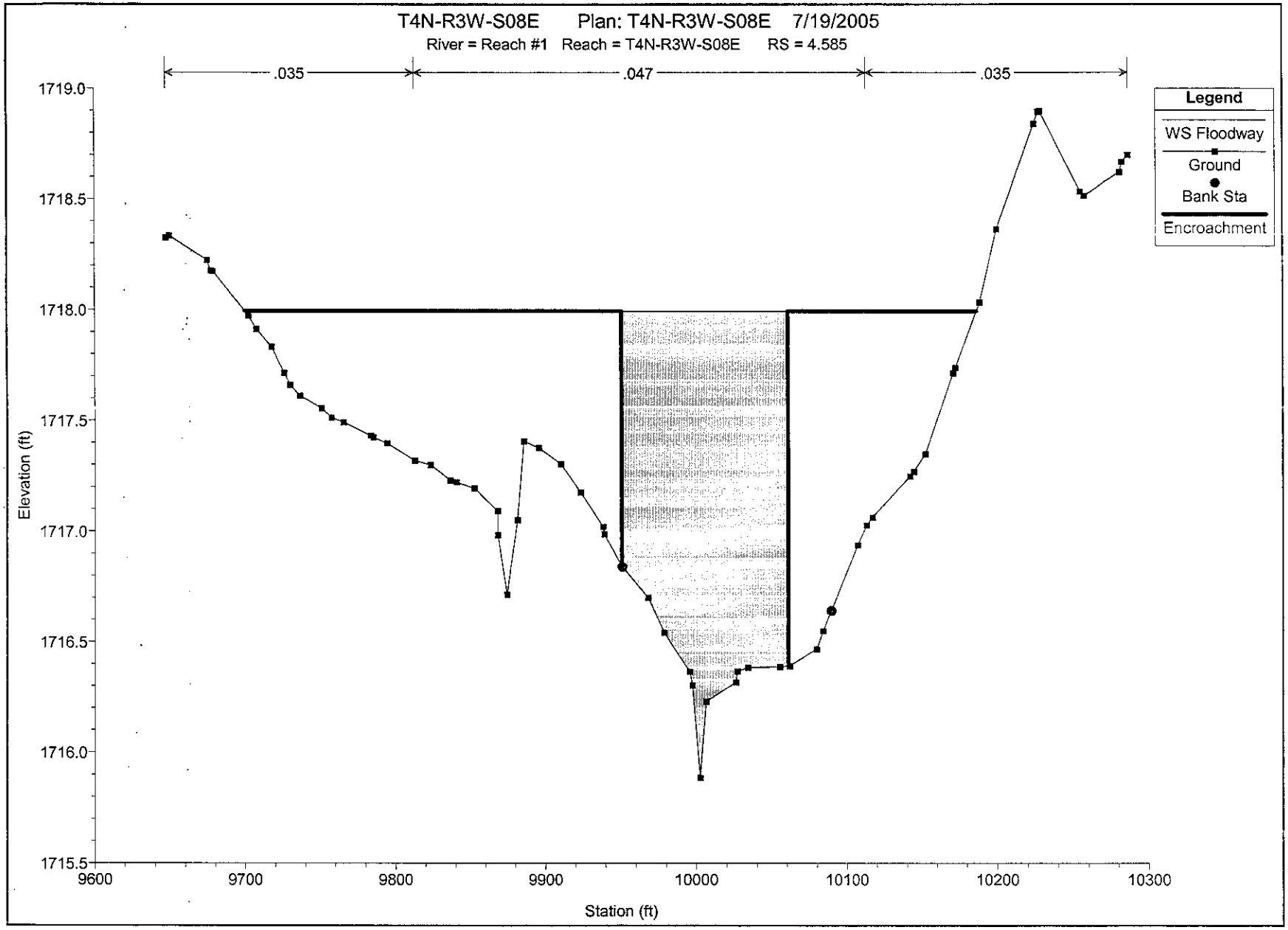
T4N-R3W-S08E

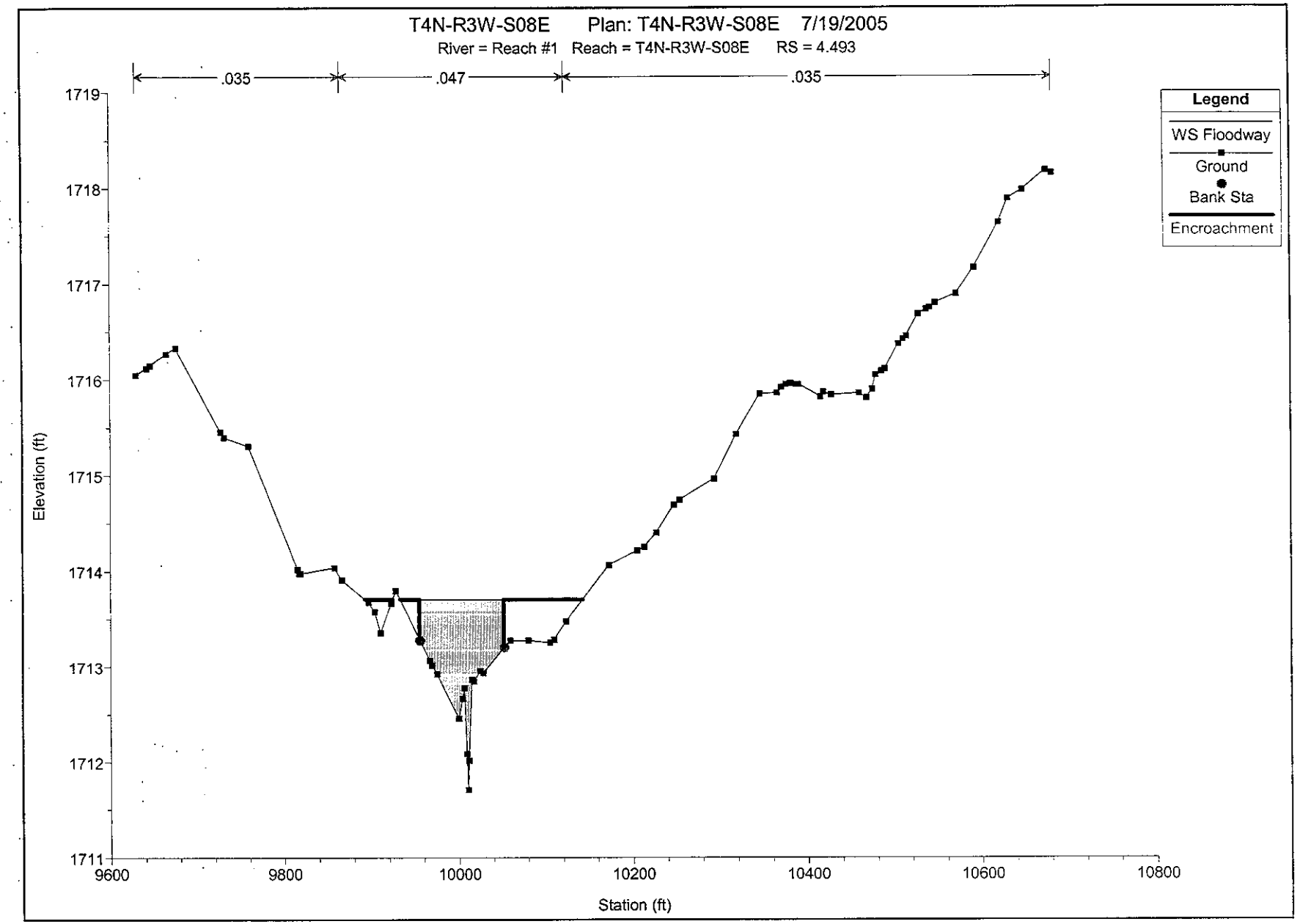

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 4.891 Zone A - because mapping
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1733
1732
1731
1730
1729
1728
1727
1726
1725
9400
9600
9800
10000
10200
10400
10600
Station (ft)

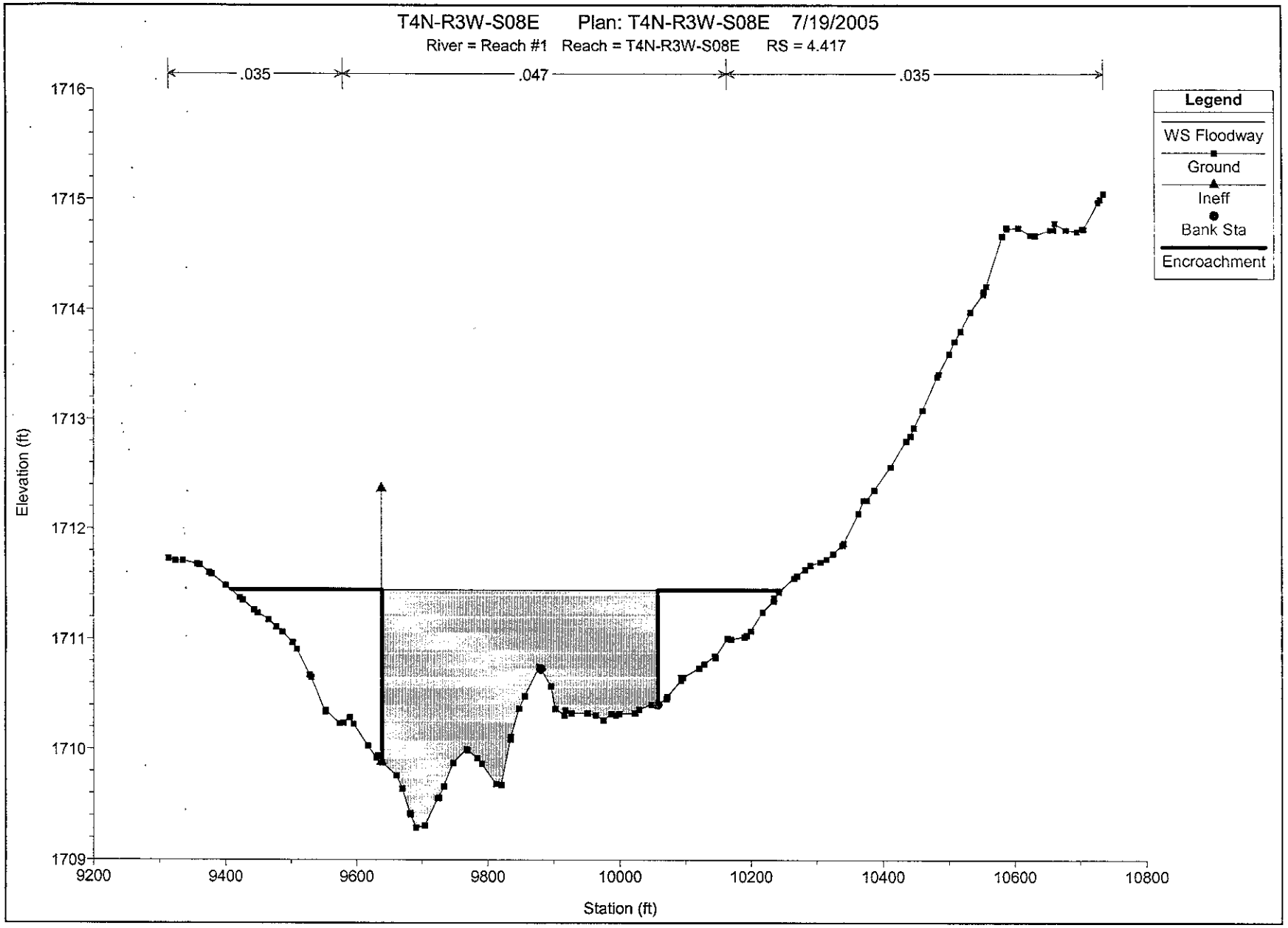

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 4.817
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1732
1730
1728
1726
1724
1722
8500
9000
9500
10000
10500
11000
Station (ft)

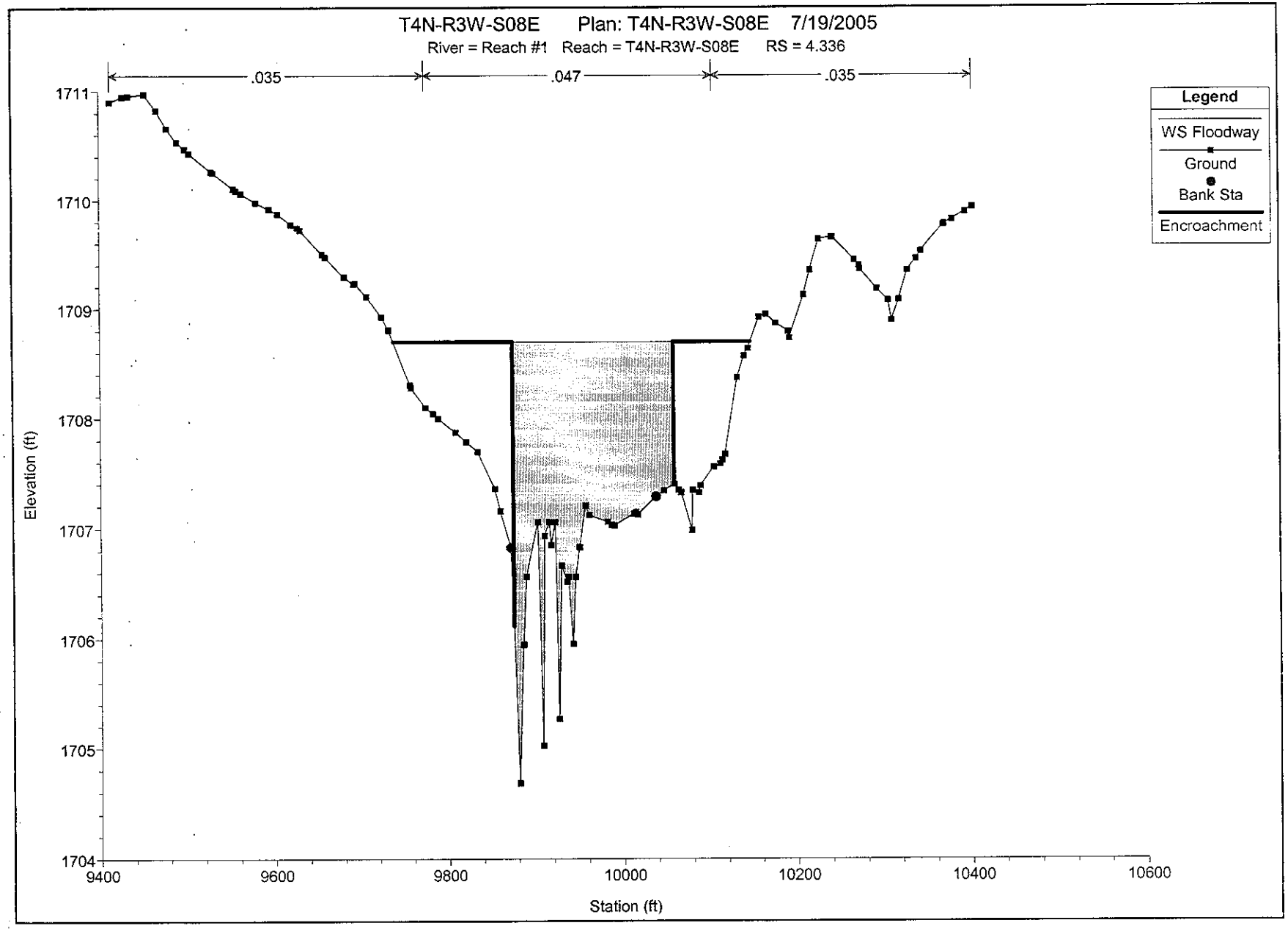

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 4.752 FP combined - FW apart
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1725
1724
1723
1722
1721
1720
9000
9200
9400
9600
9800
10000
10200
Station (ft)

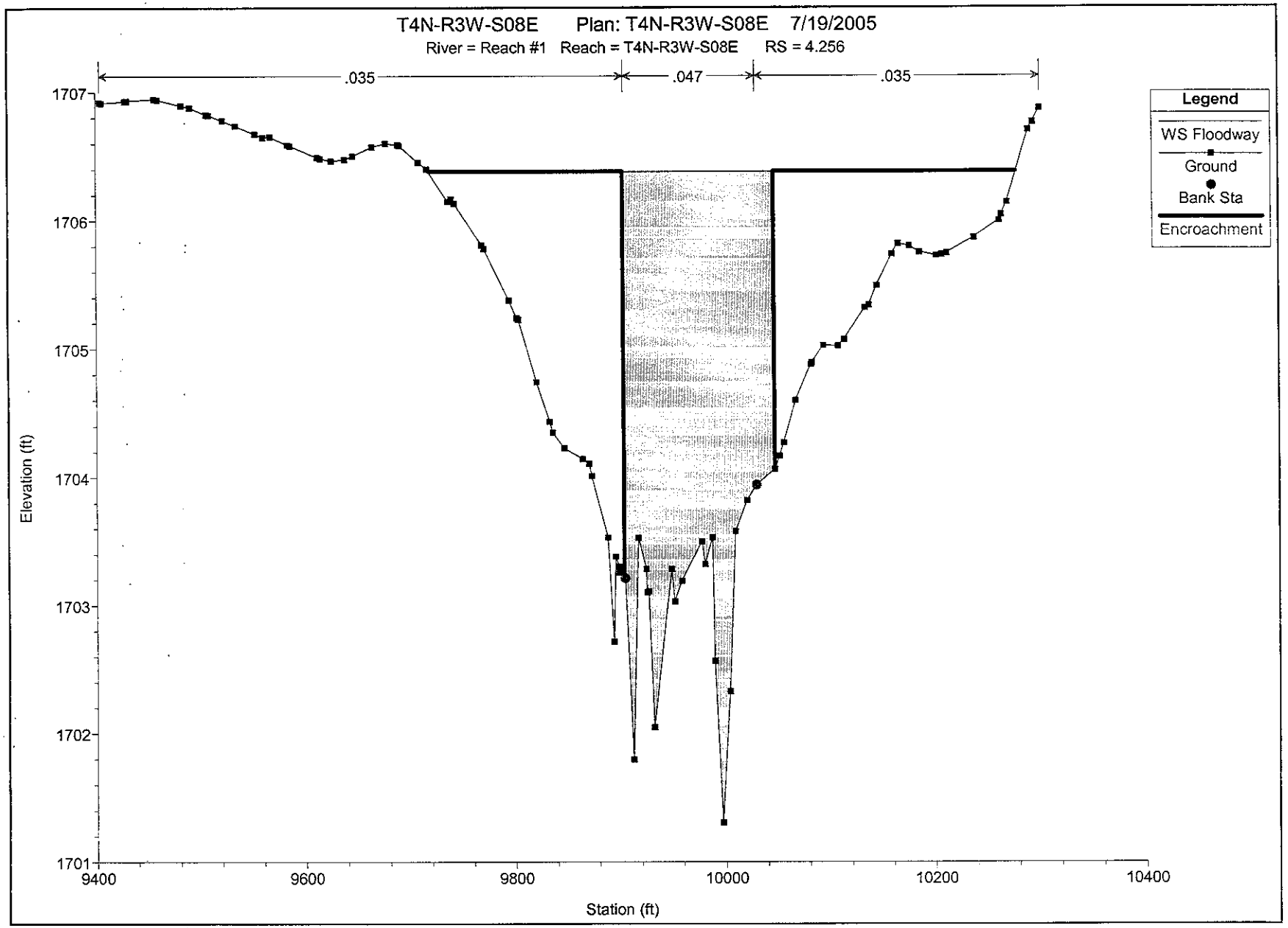

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 4.652
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1722
1721
1720
1719
1718
1717
1716
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

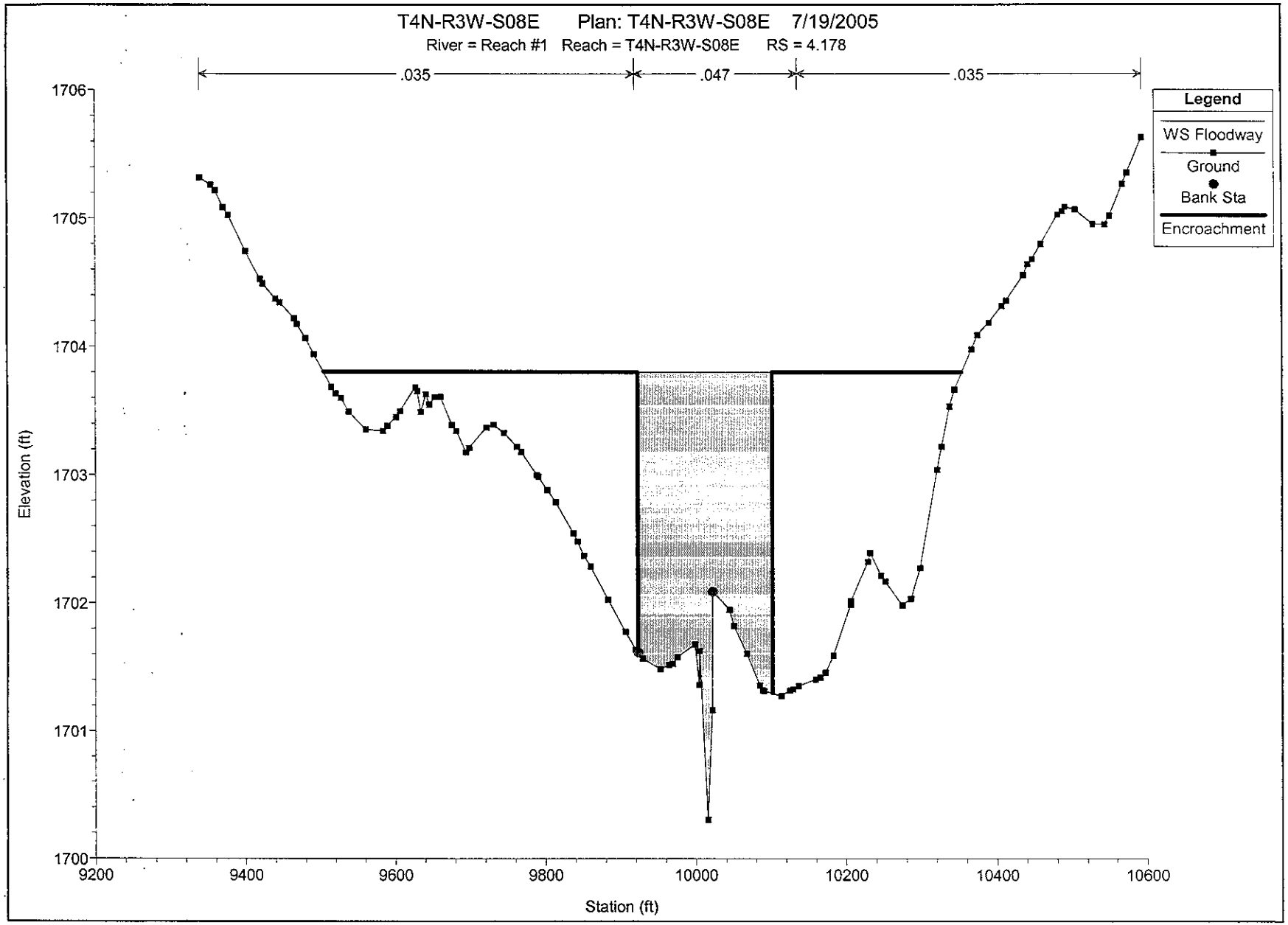

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 4.585
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1719.0
1718.5
1718.0
1717.5
1717.0
1716.5
1716.0
1715.5
9600
9700
9800
9900
10000
10100
10200
10300
Station (ft)

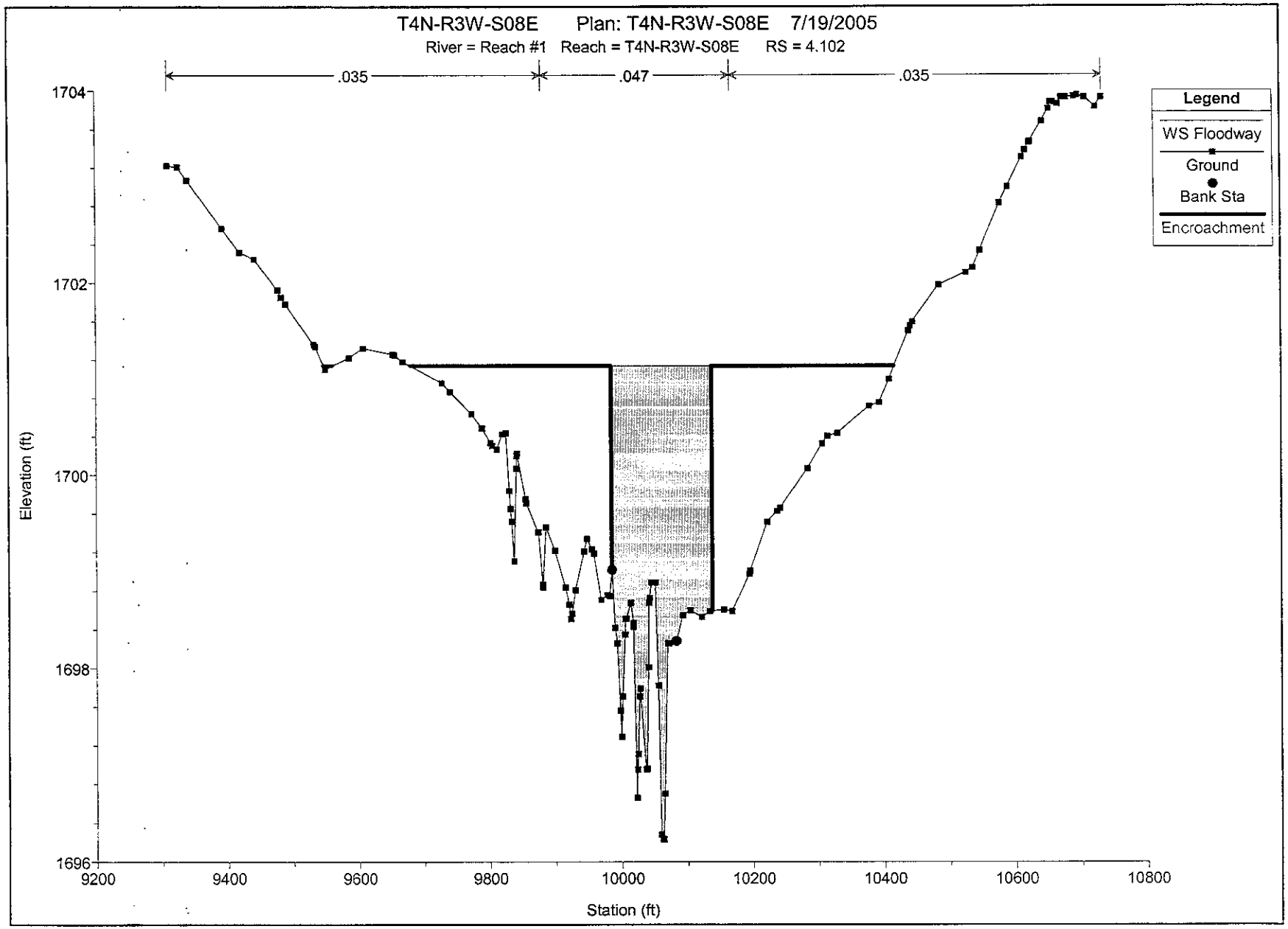

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 4.493
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1719
1718
1717
1716
1715
1714
1713
1712
1711
9600
9800
10000
10200
10400
10600
10800
Station (ft)

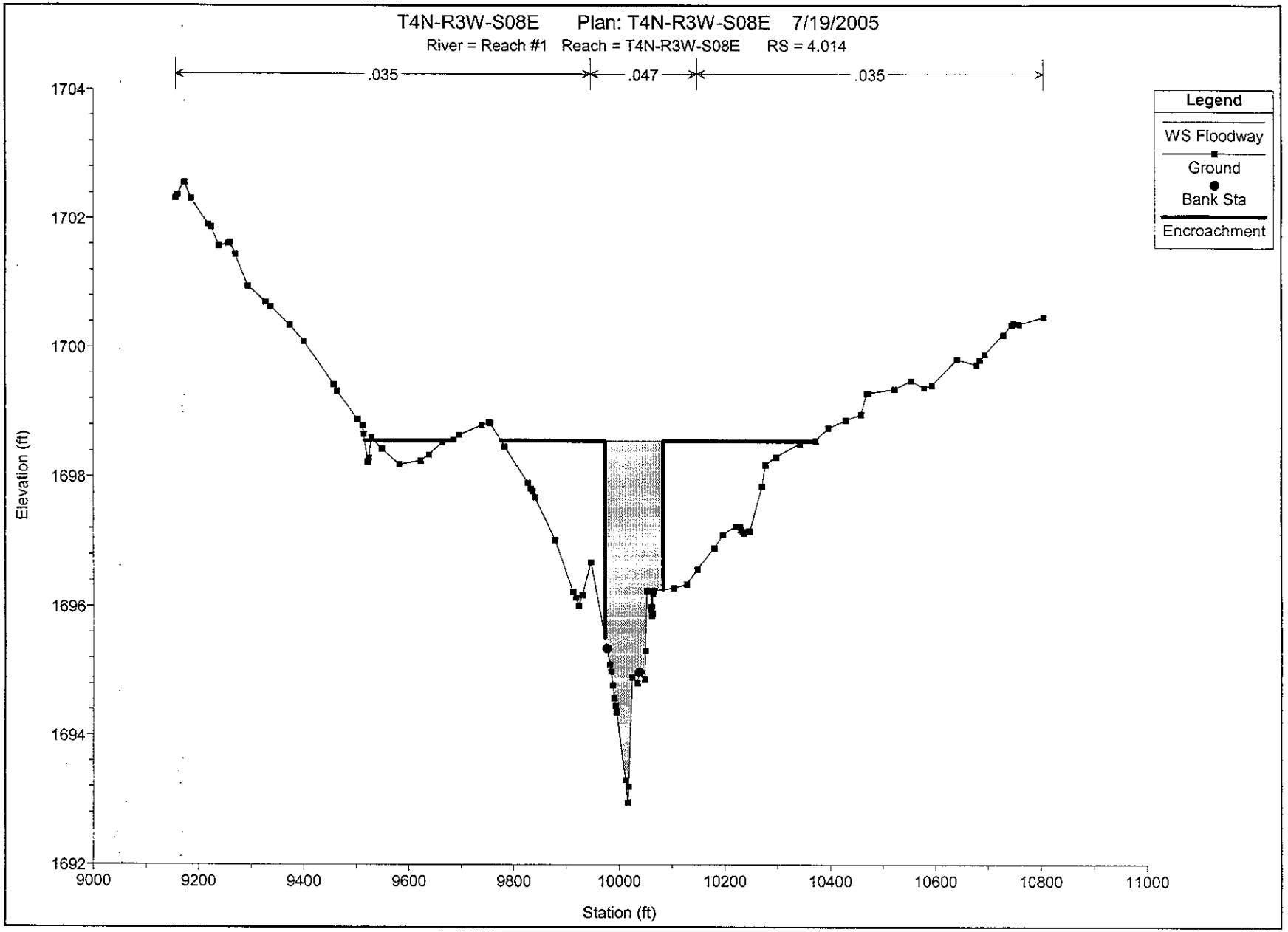

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 4.417
.035
.047
.035
Legend
WS Floodway
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1716
1715
1714
1713
1712
1711
1710
1709
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

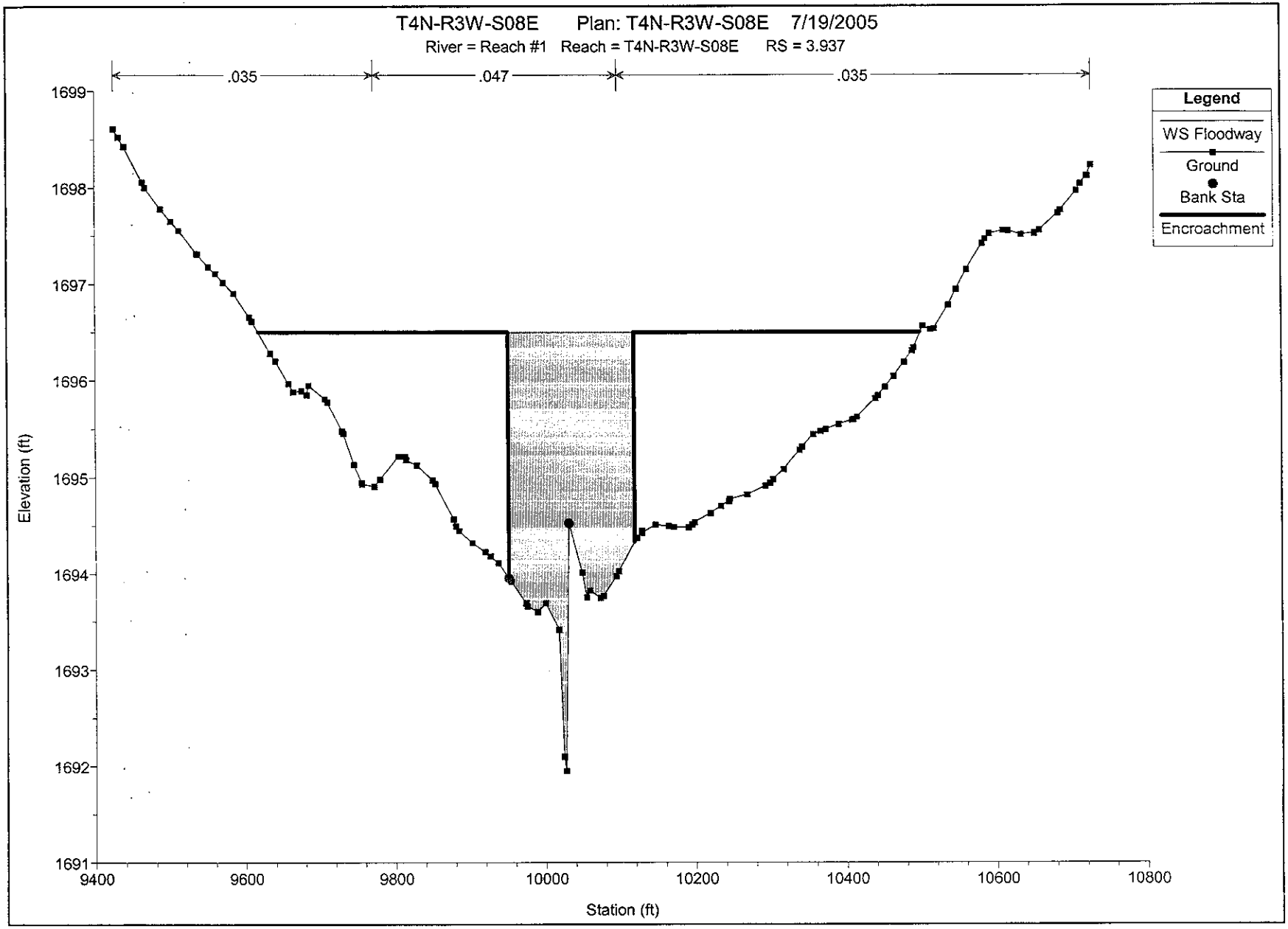

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 4.336
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1711
1710
1709
1708
1707
1706
1705
1704
9400
9600
9800
10000
10200
10400
10600
Station (ft)

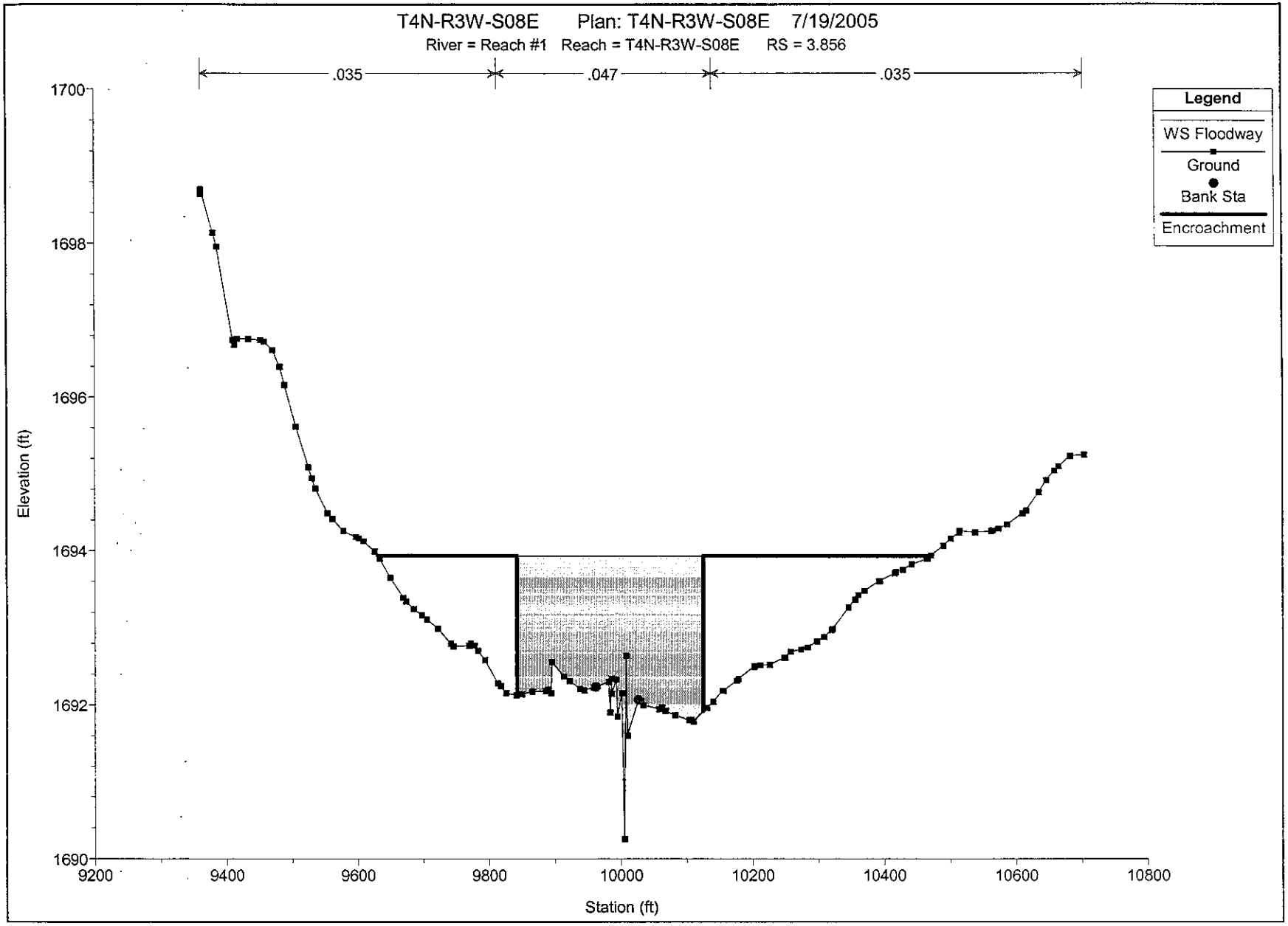

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 4.256
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1707
1706
1705
1704
1703
1702
1701
9400
9600
9800
10000
10200
10400
Station (ft)

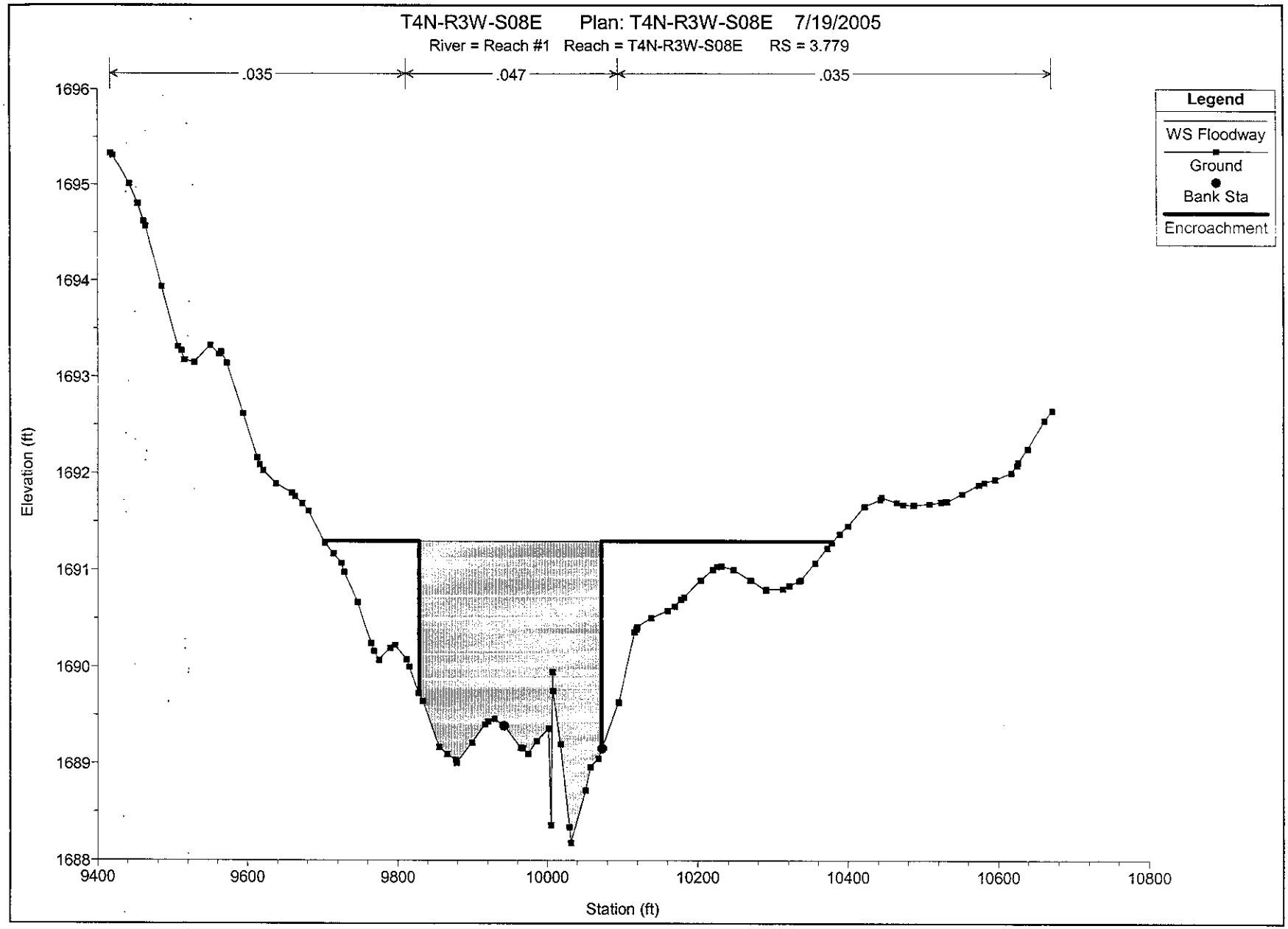

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 4.178
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1706
1705
1704
1703
1702
1701
1700
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)

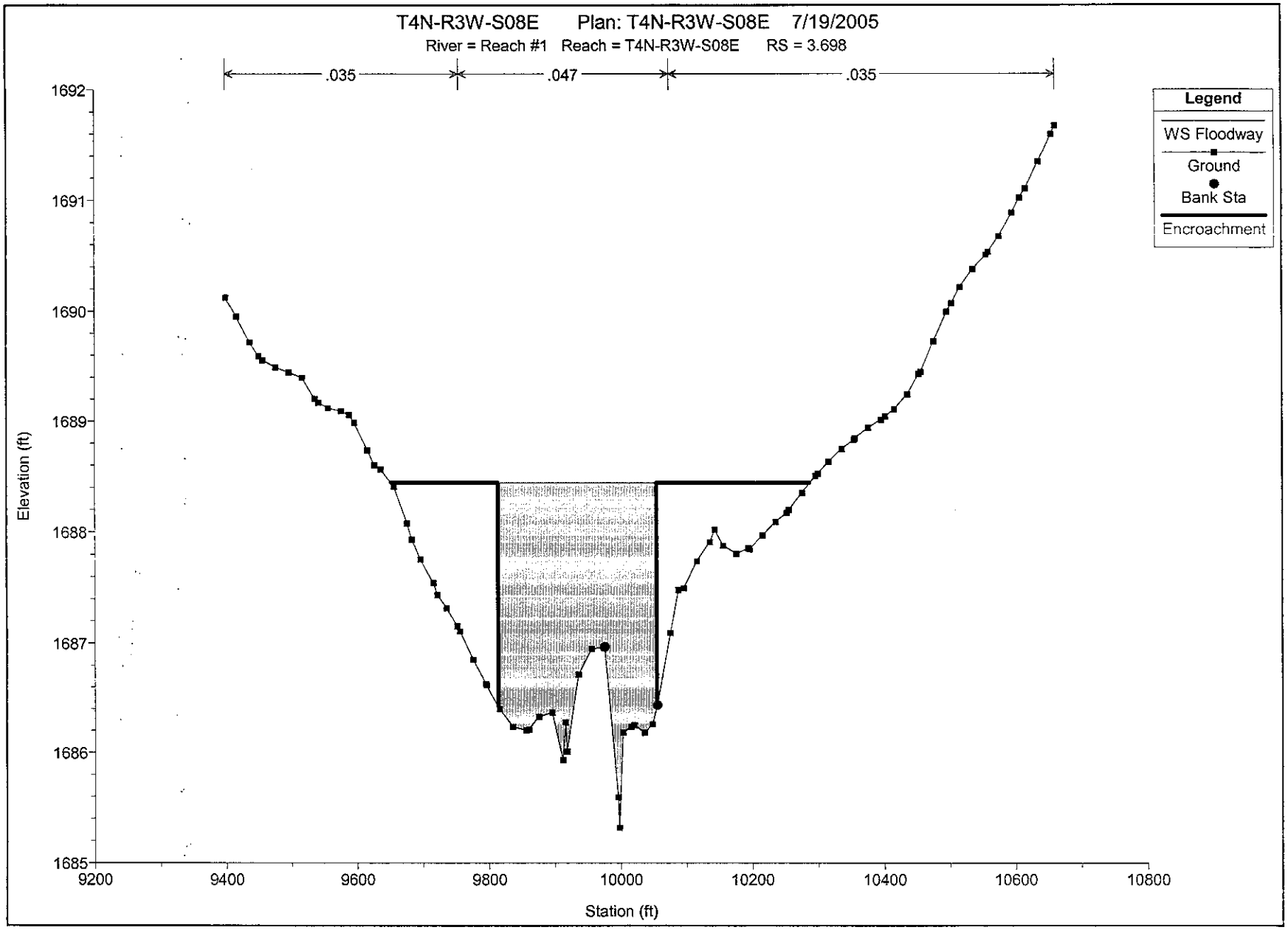

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 4.102
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1704
1702
1700
1698
1696
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

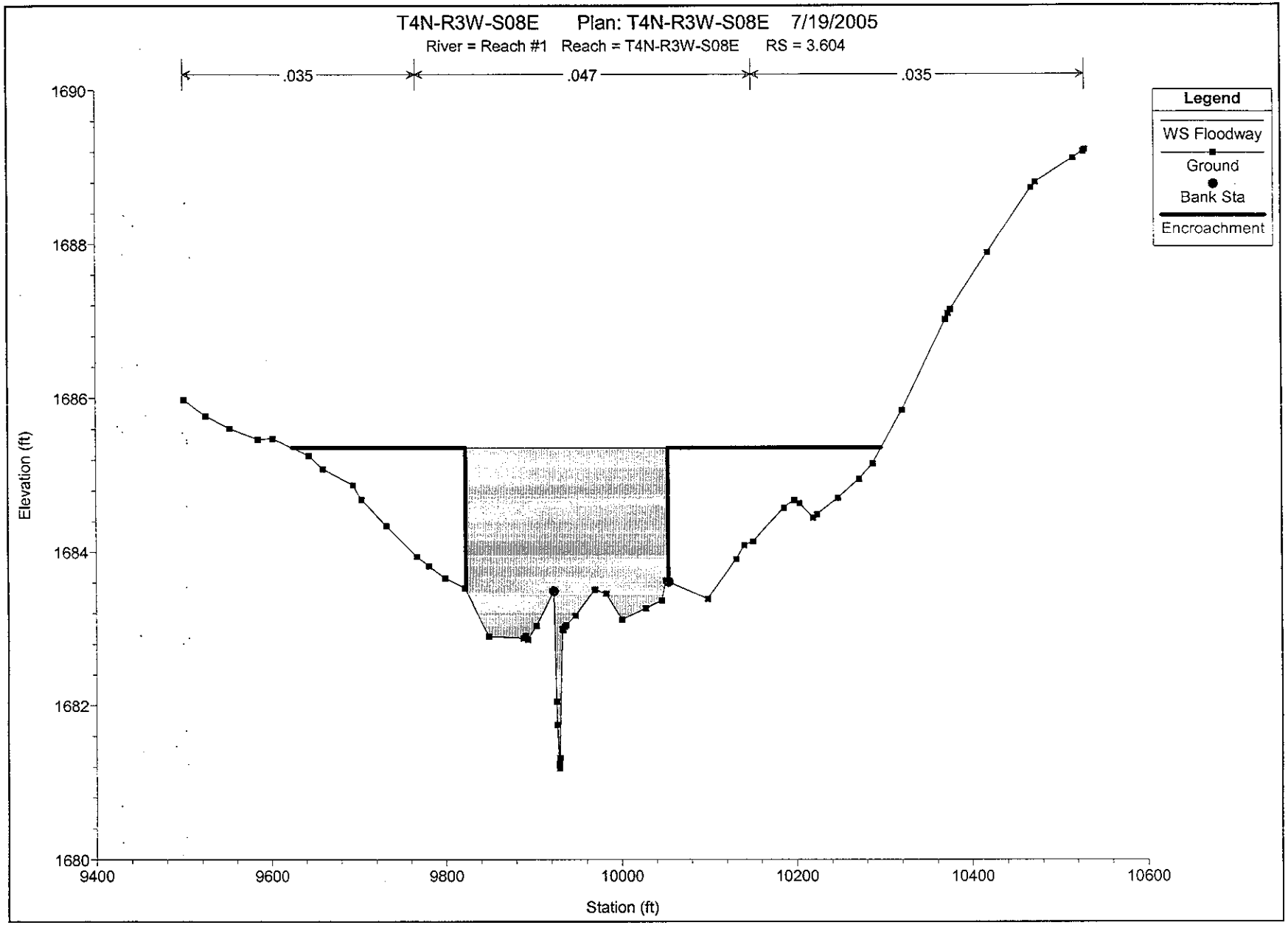

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 4.014
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1704
1702
1700
1698
1696
1694
1692
9000
9200
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

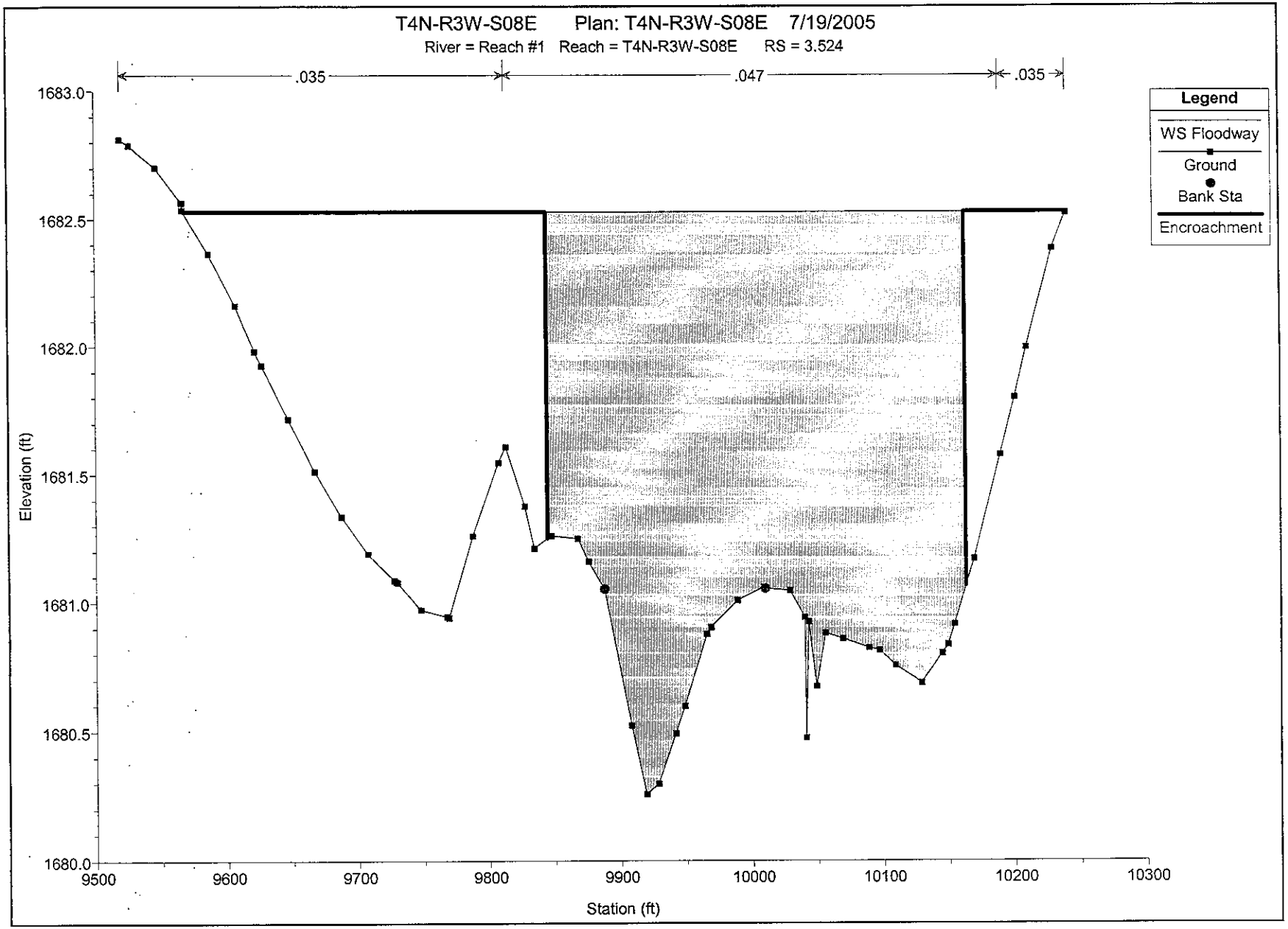

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 3.937
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1699
1698
1697
1696
1695
1694
1693
1692
1691
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

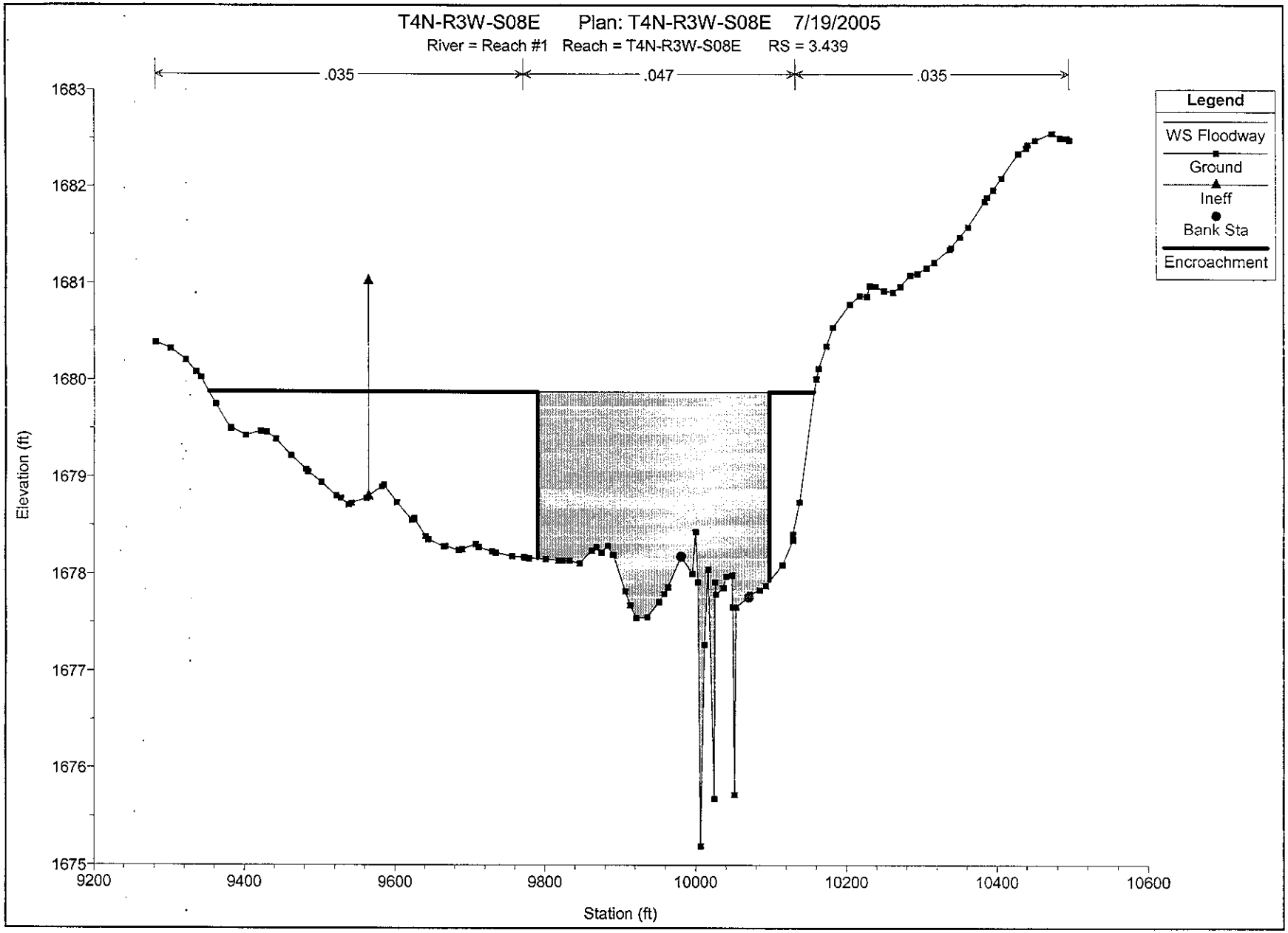

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 3.856
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1700
1698
1696
1694
1692
1690
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

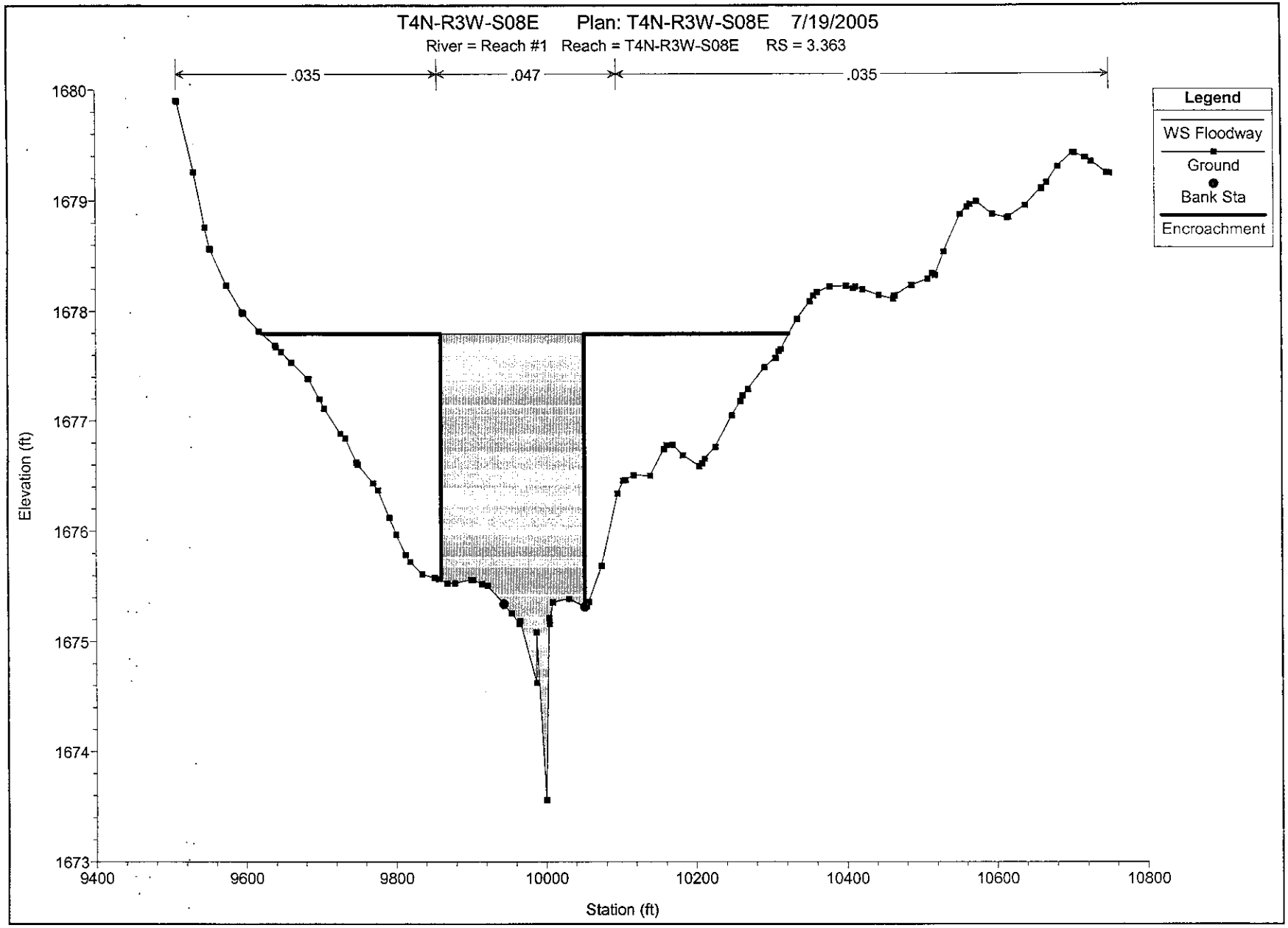

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 3.779
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1696
1695
1694
1693
1692
1691
1690
1689
1688
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

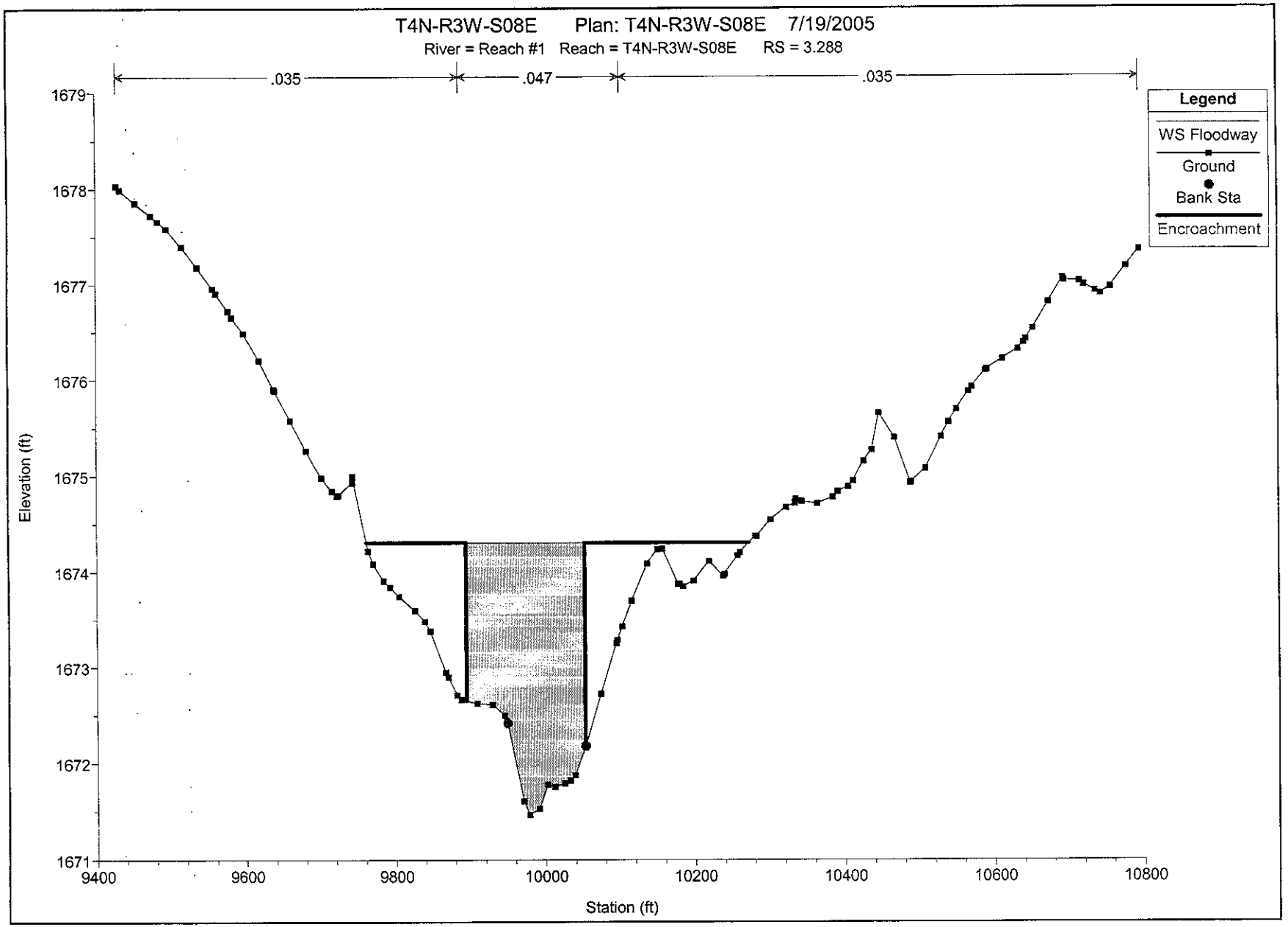

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 3.698
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1692
1691
1690
1689
1688
1687
1686
1685
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

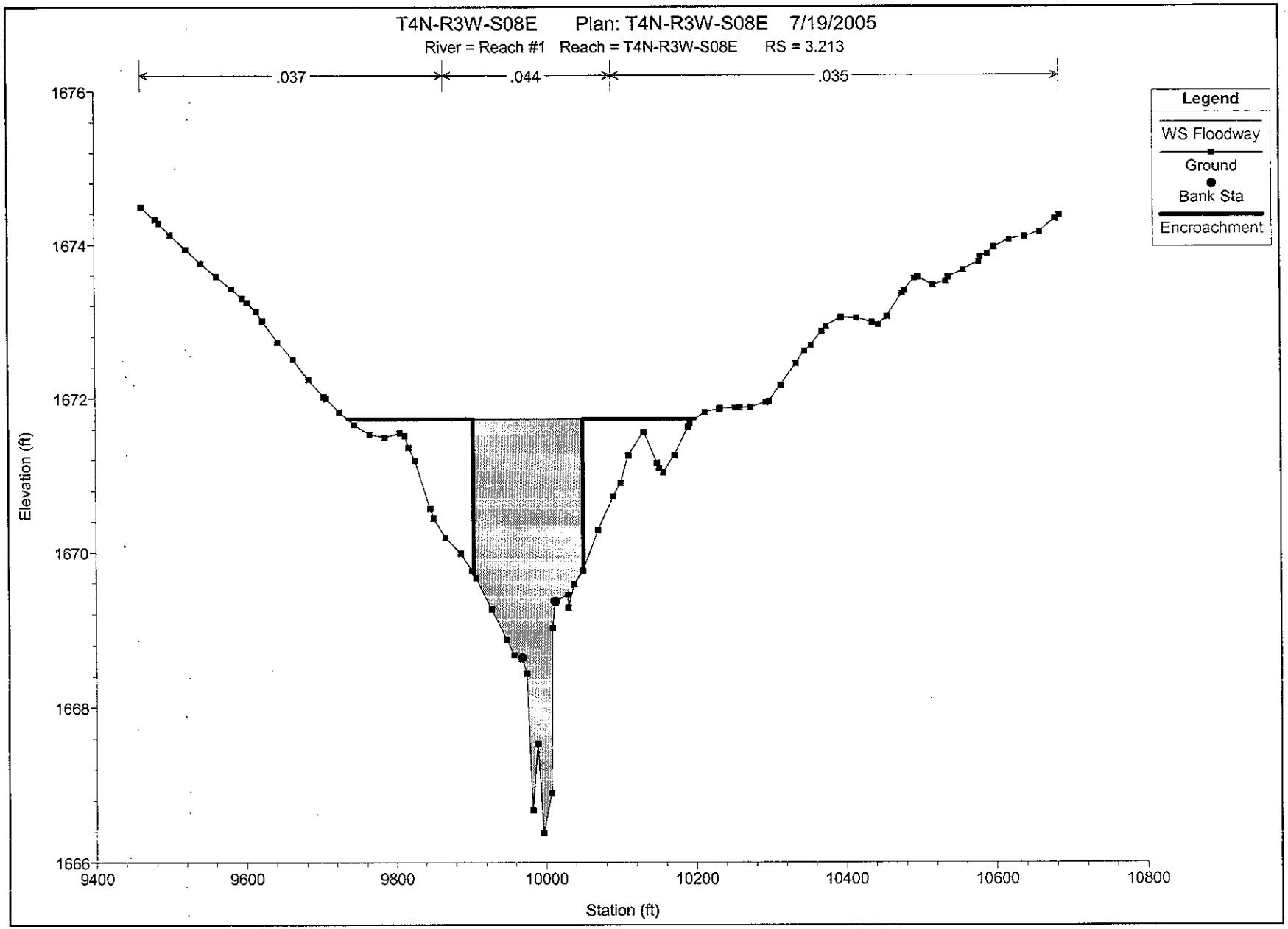

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 3.604
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1690
1688
1686
1684
1682
1680
9400
9600
9800
10000
10200
10400
10600
Station (ft)

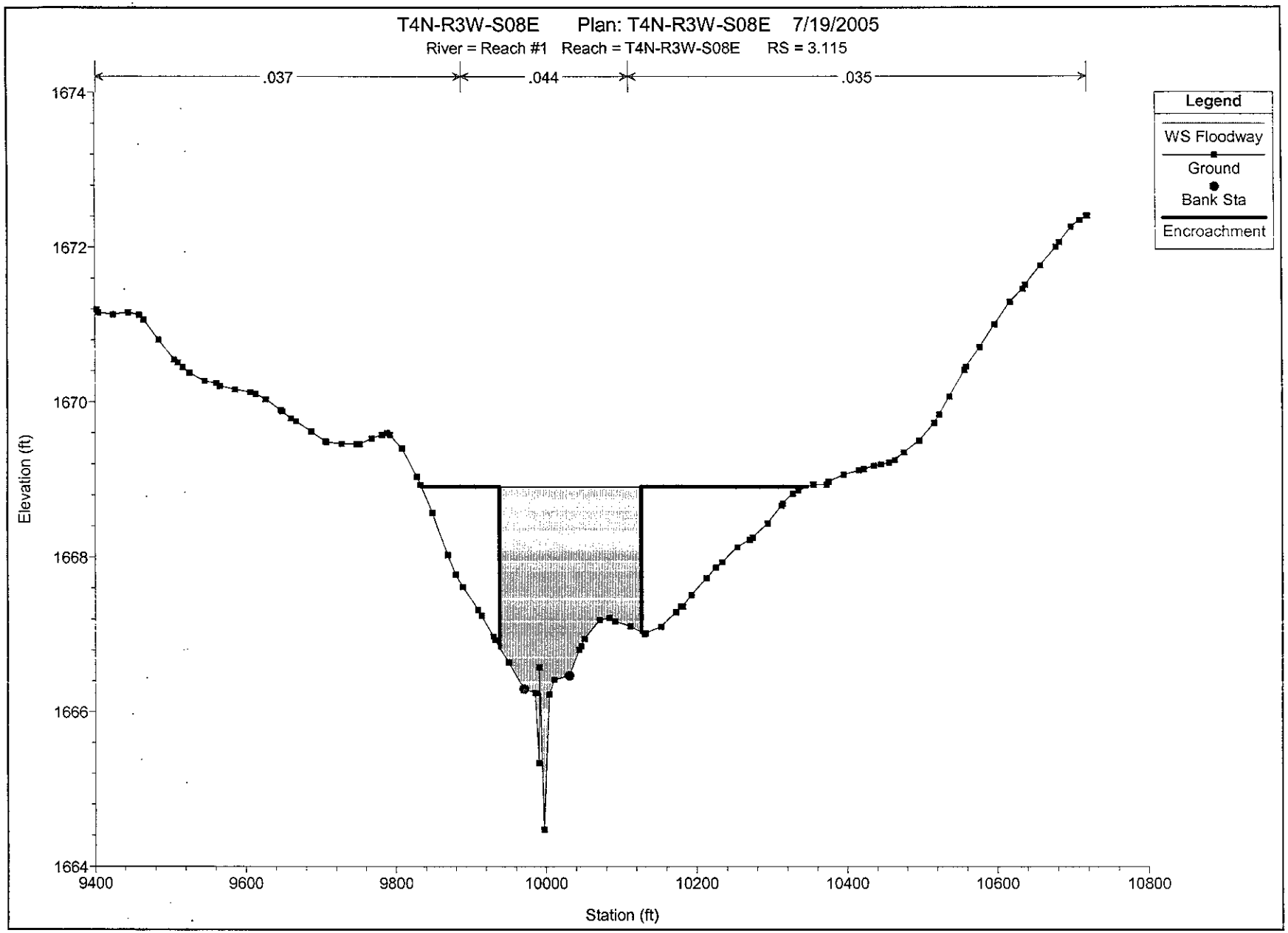

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 3.524
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1683.0
1682.5
1682.0
1681.5
1681.0
1680.5
1680.0
9500
9600
9700
9800
9900
10000
10100
10200
10300
Station (ft)

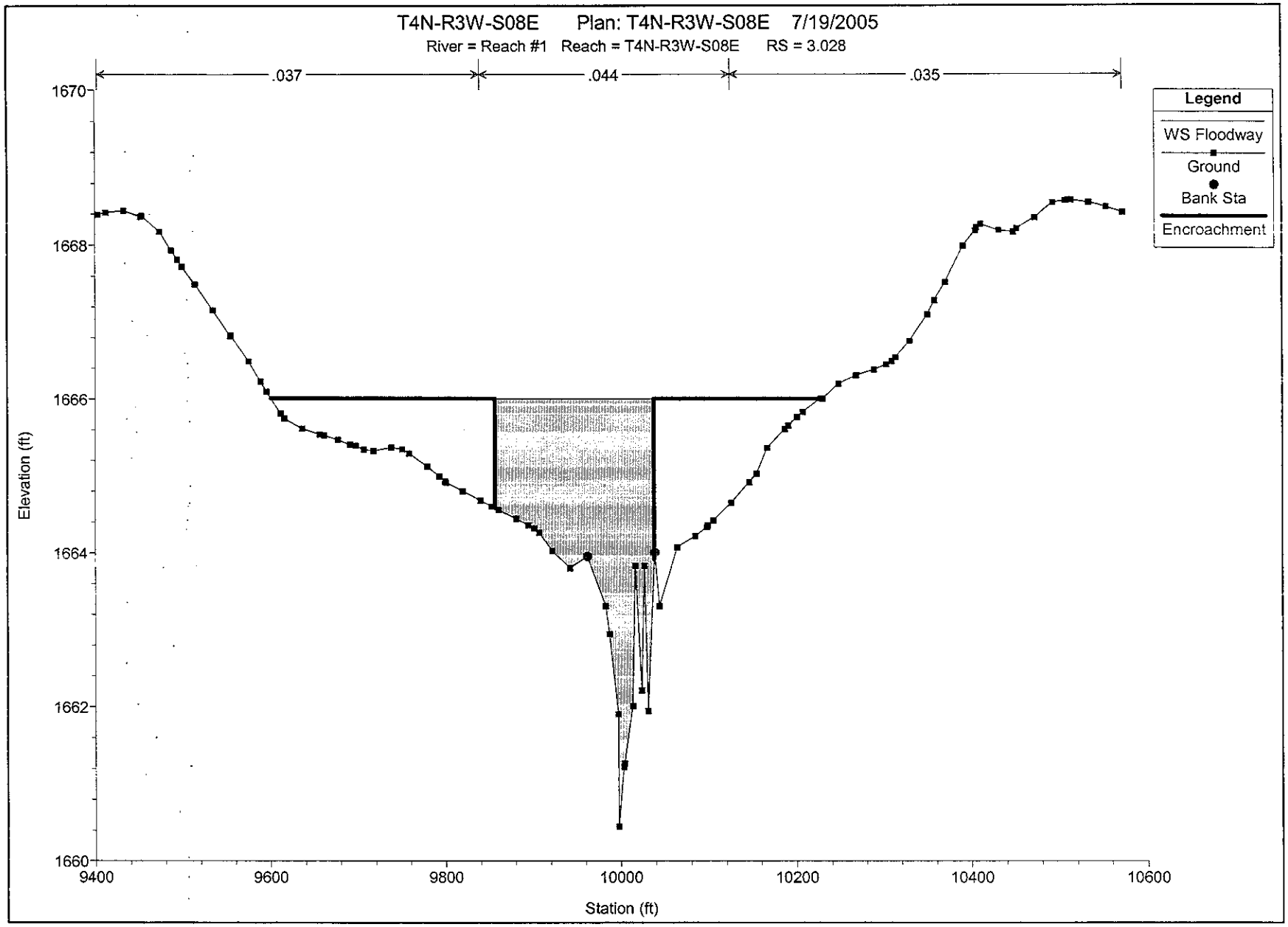

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 3.439
.035
.047
.035
Legend
WS Floodway
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1683
1682
1681
1680
1679
1678
1677
1676
1675
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)

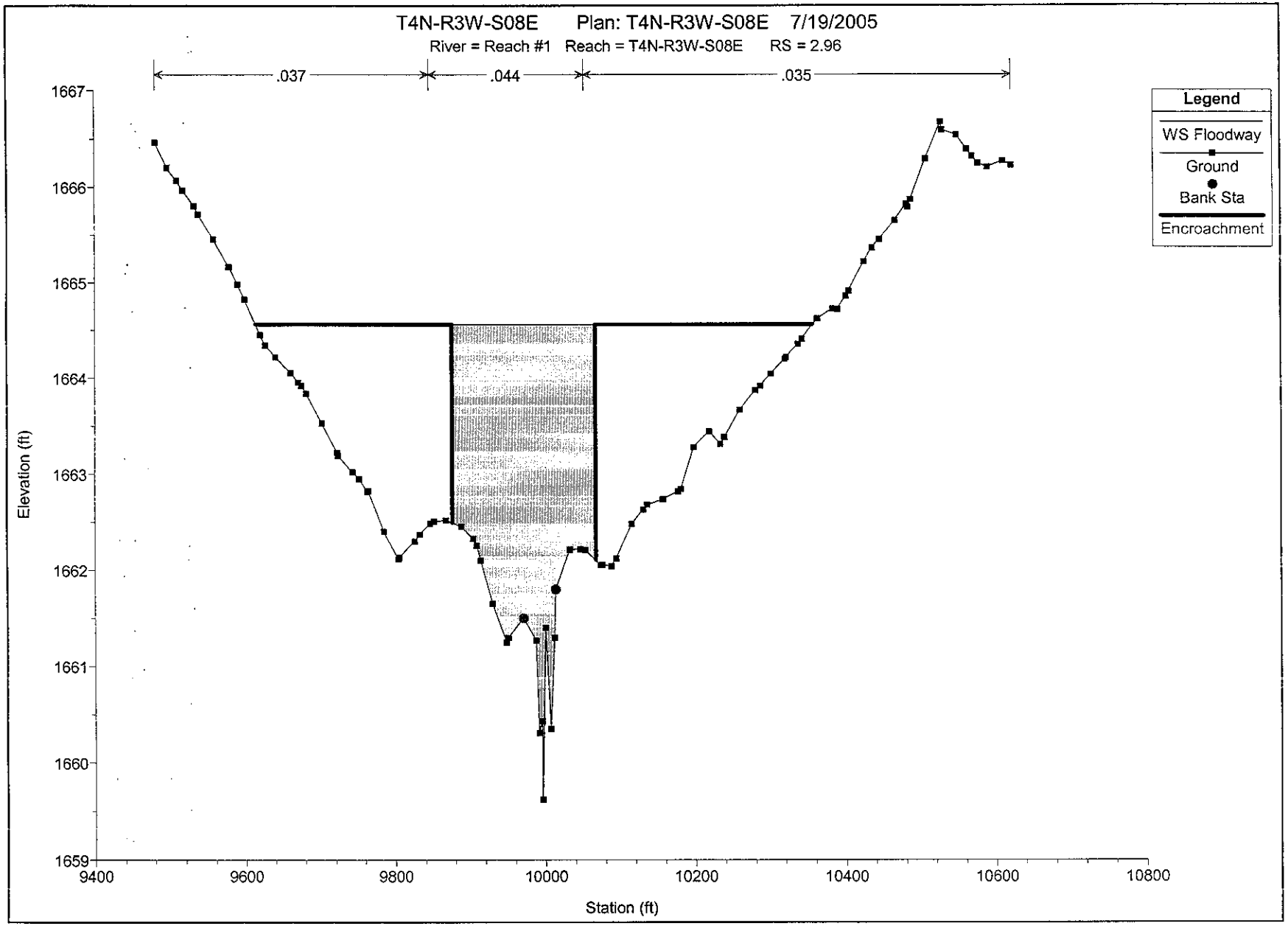

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 3.363
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1680
1679
1678
1677
1676
1675
1674
1673
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

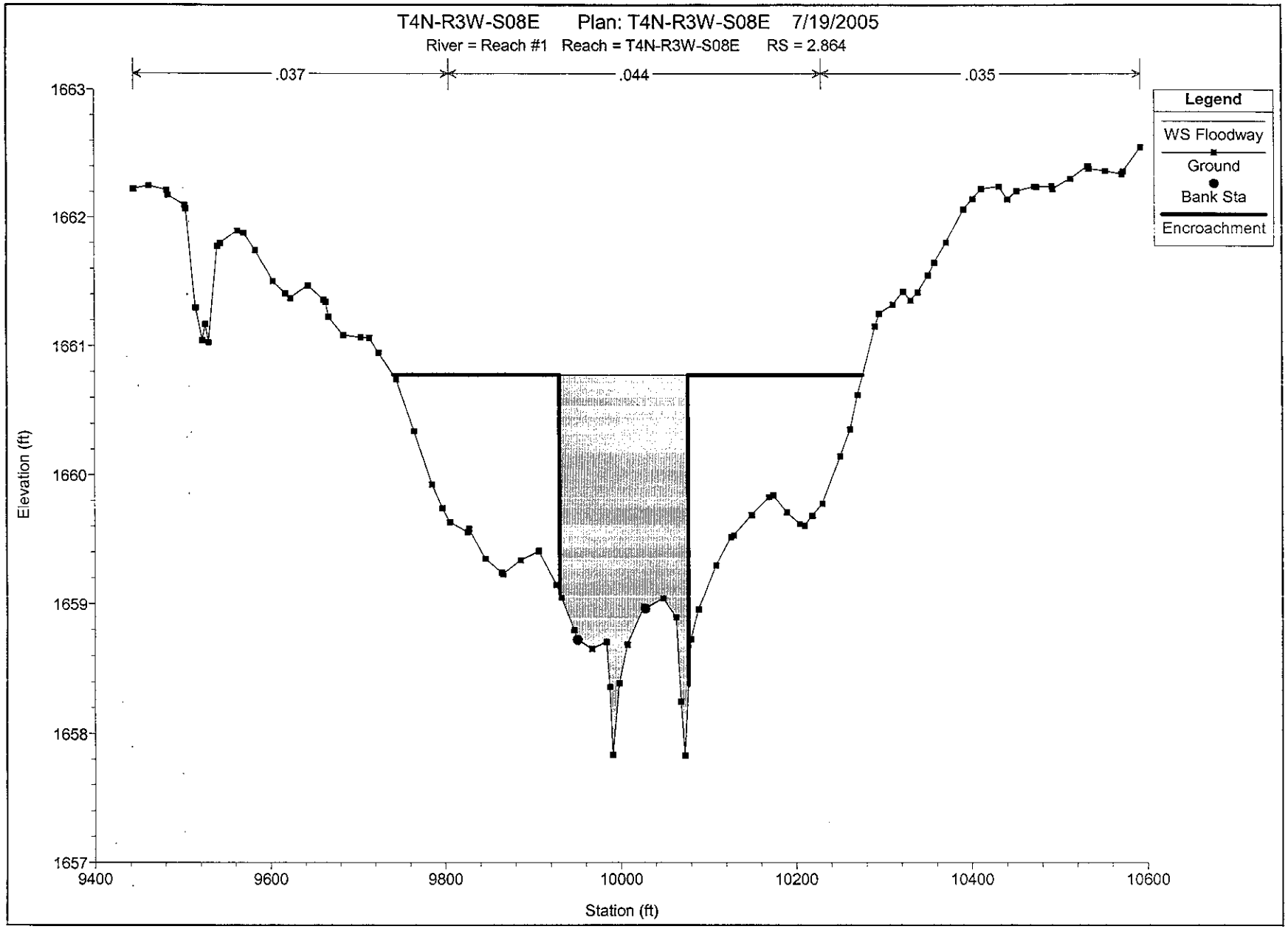

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 3.288
.035
.047
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1679
1678
1677
1676
1675
1674
1673
1672
1671
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

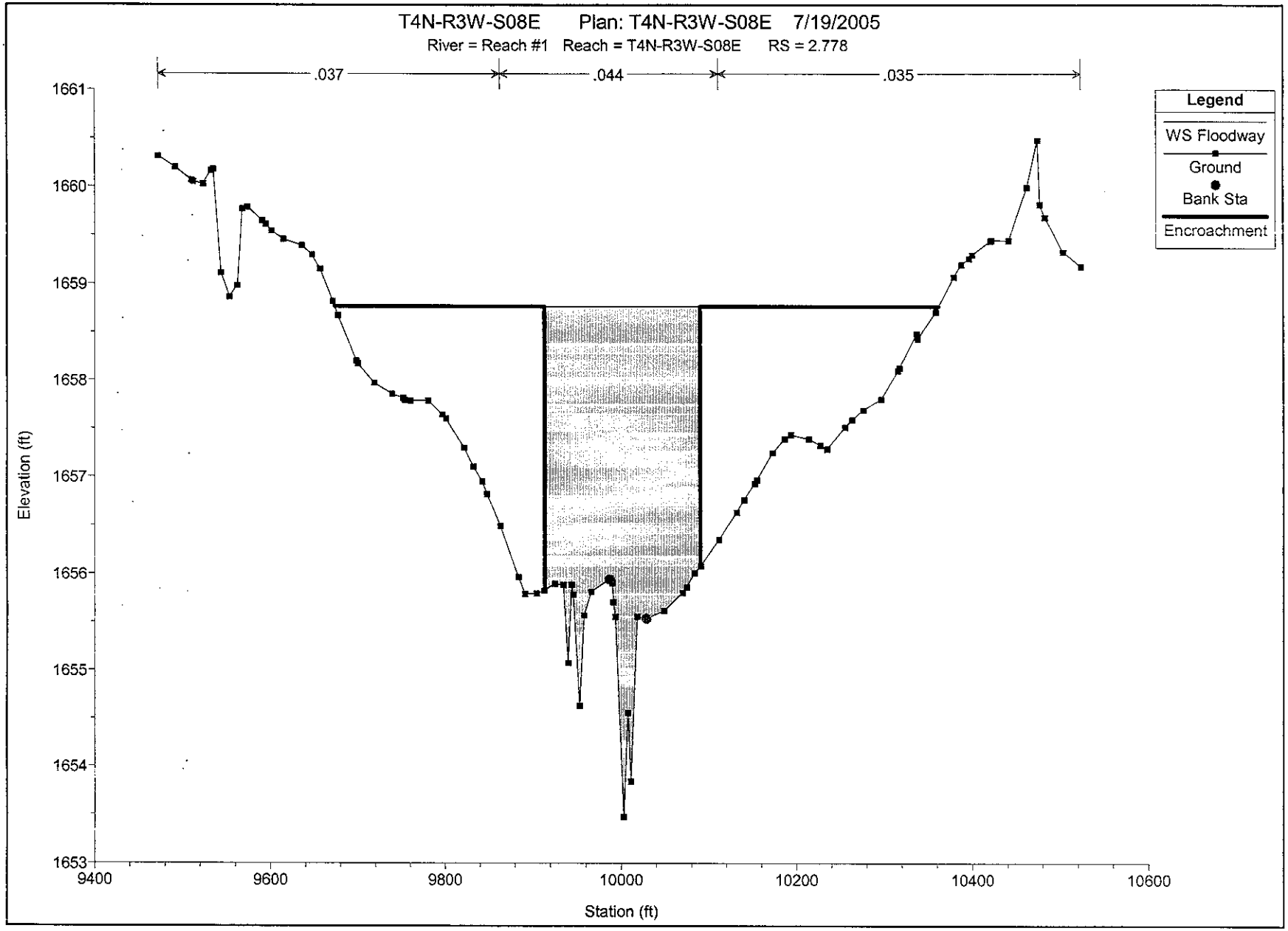

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 3.213
.037
.044
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1676
1674
1672
1670
1668
1666
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

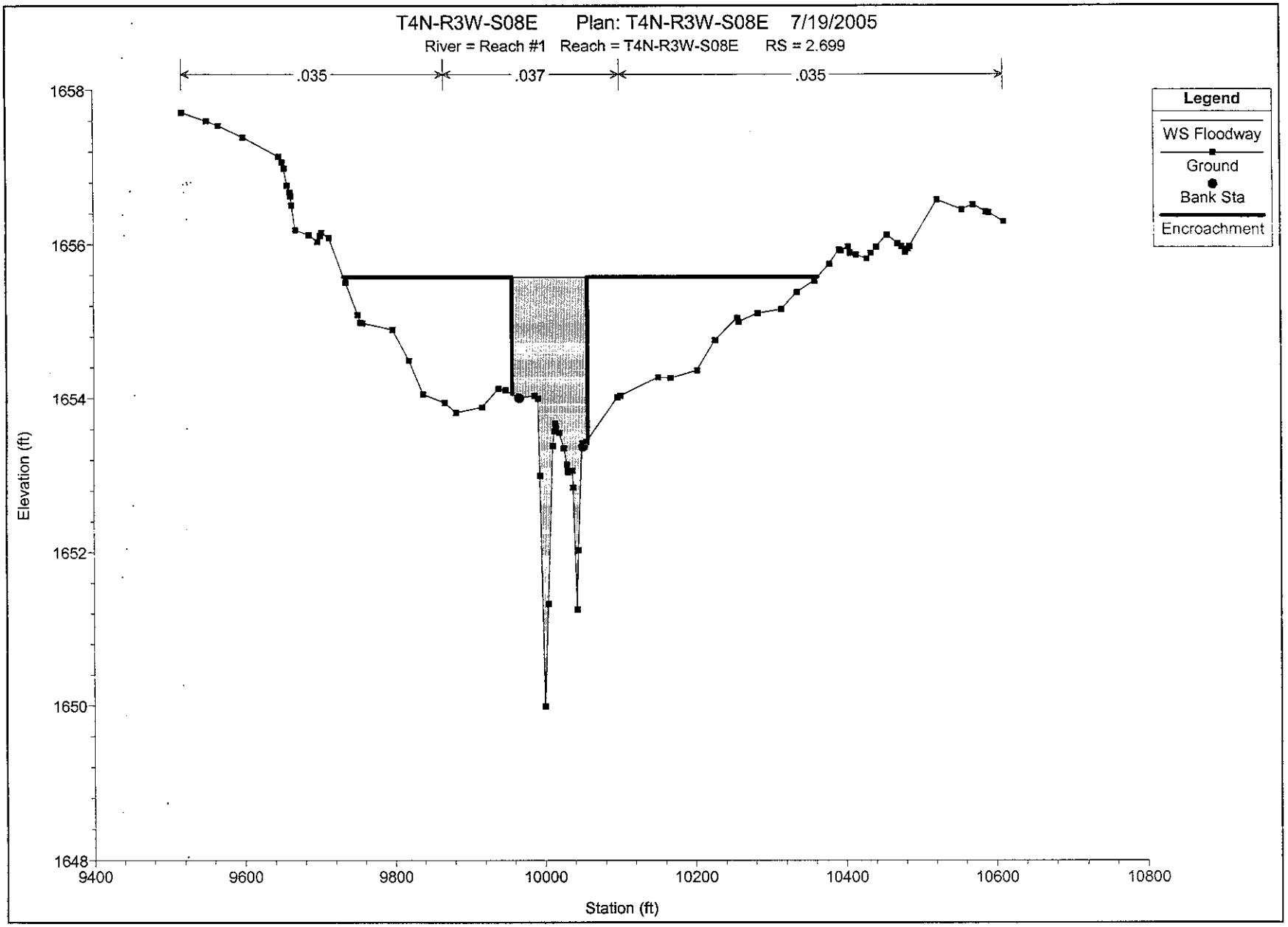

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 3.115
.037
.044
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1674
1672
1670
1668
1666
1664
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

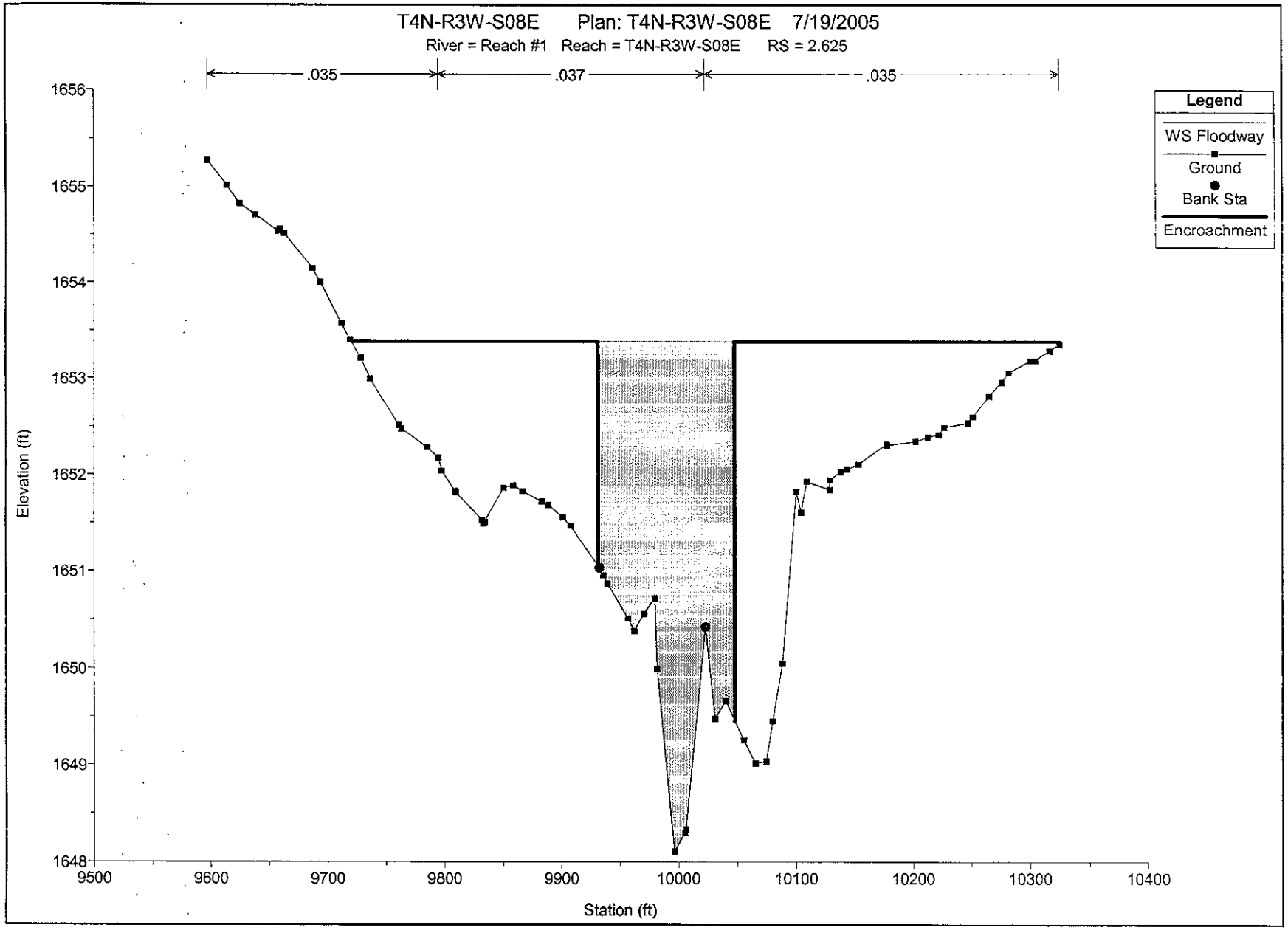

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 3.028
.037
.044
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1670
1668
1666
1664
1662
1660
9400
9600
9800
10000
10200
10400
10600
Station (ft)

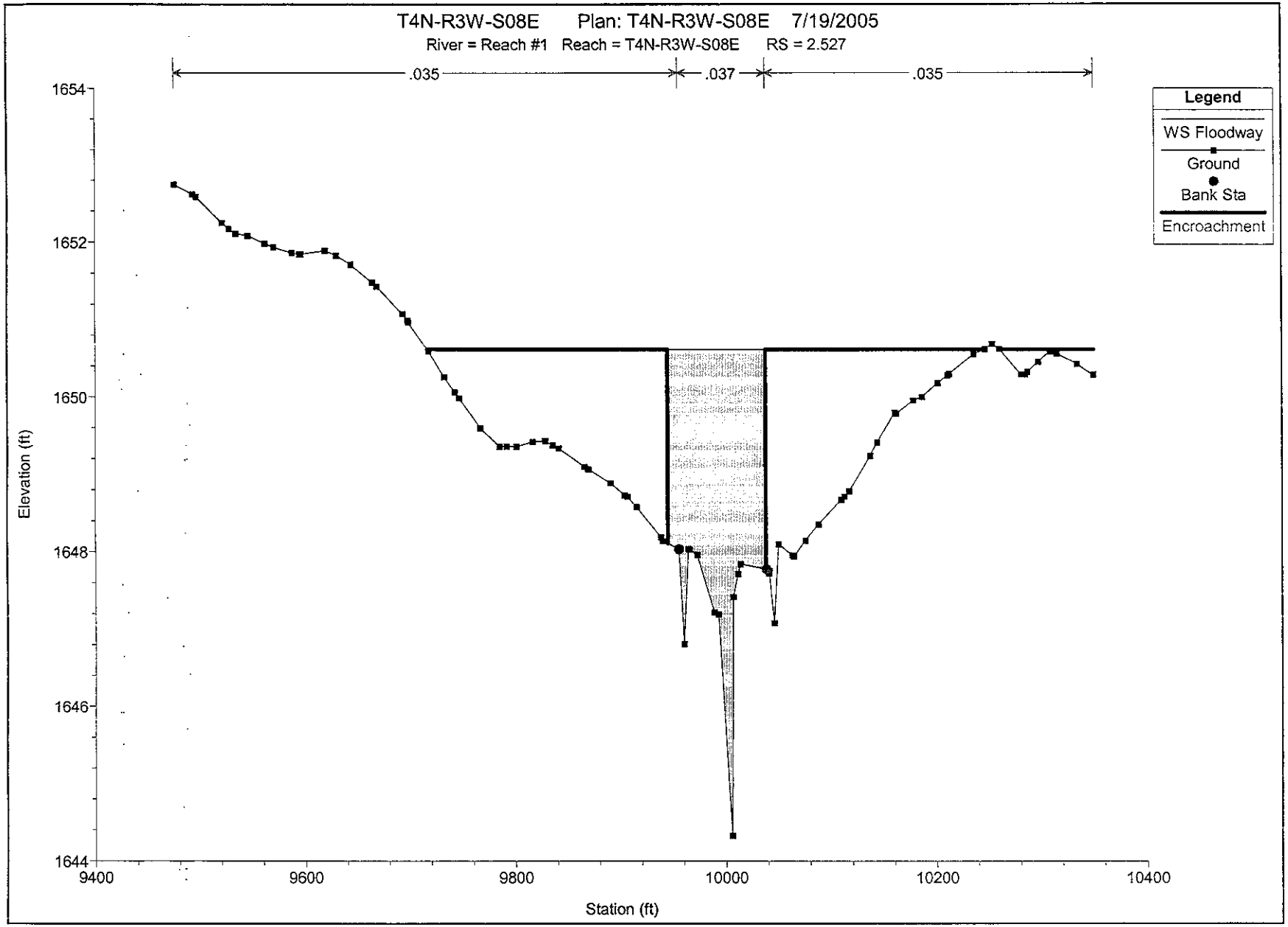

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 2.96
.037
.044
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1667
1666
1665
1664
1663
1662
1661
1660
1659
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

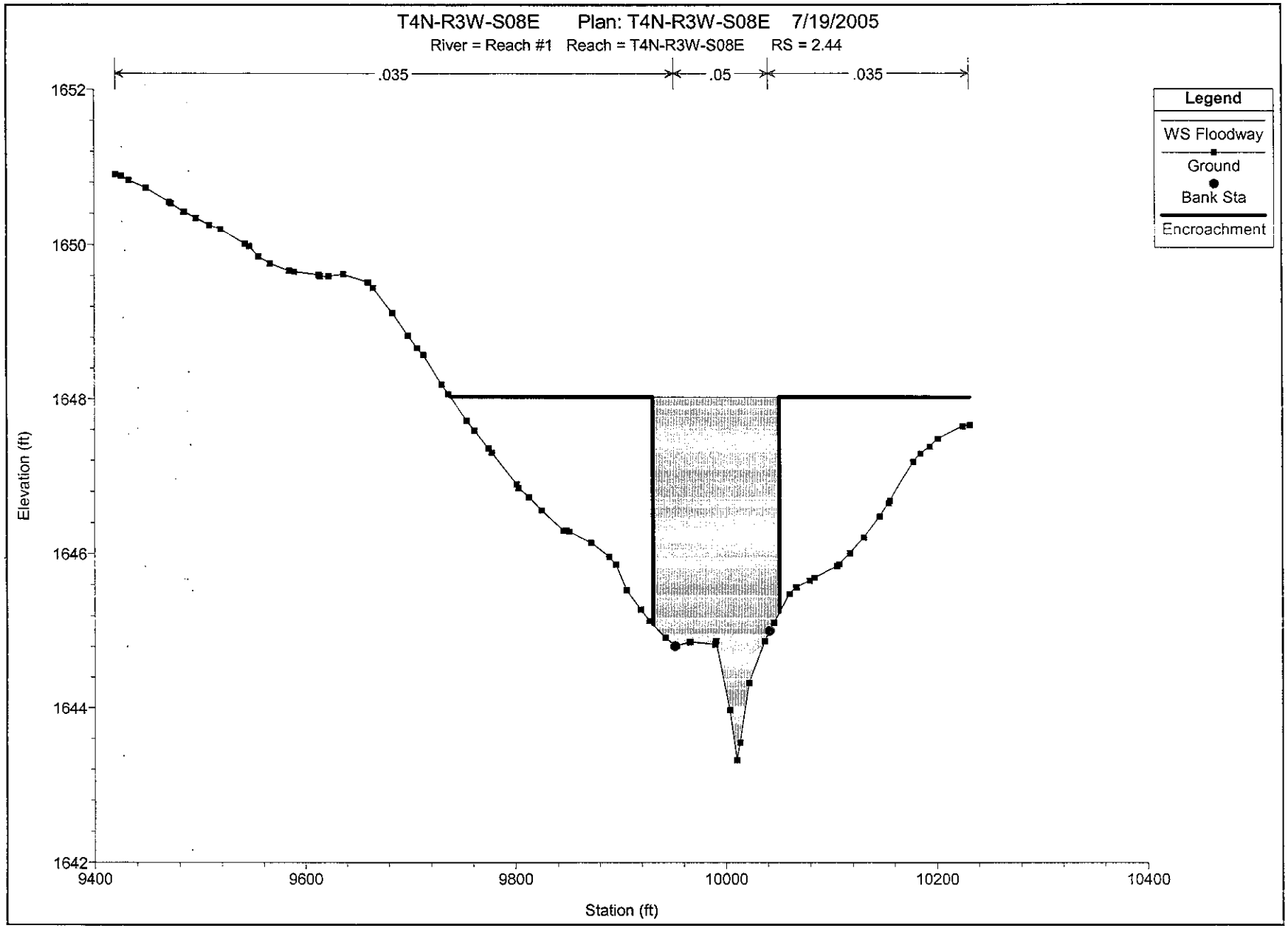

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 2.864
.037
.044
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1663
1662
1661
1660
1659
1658
1657
9400
9600
9800
10000
10200
10400
10600
Station (ft)

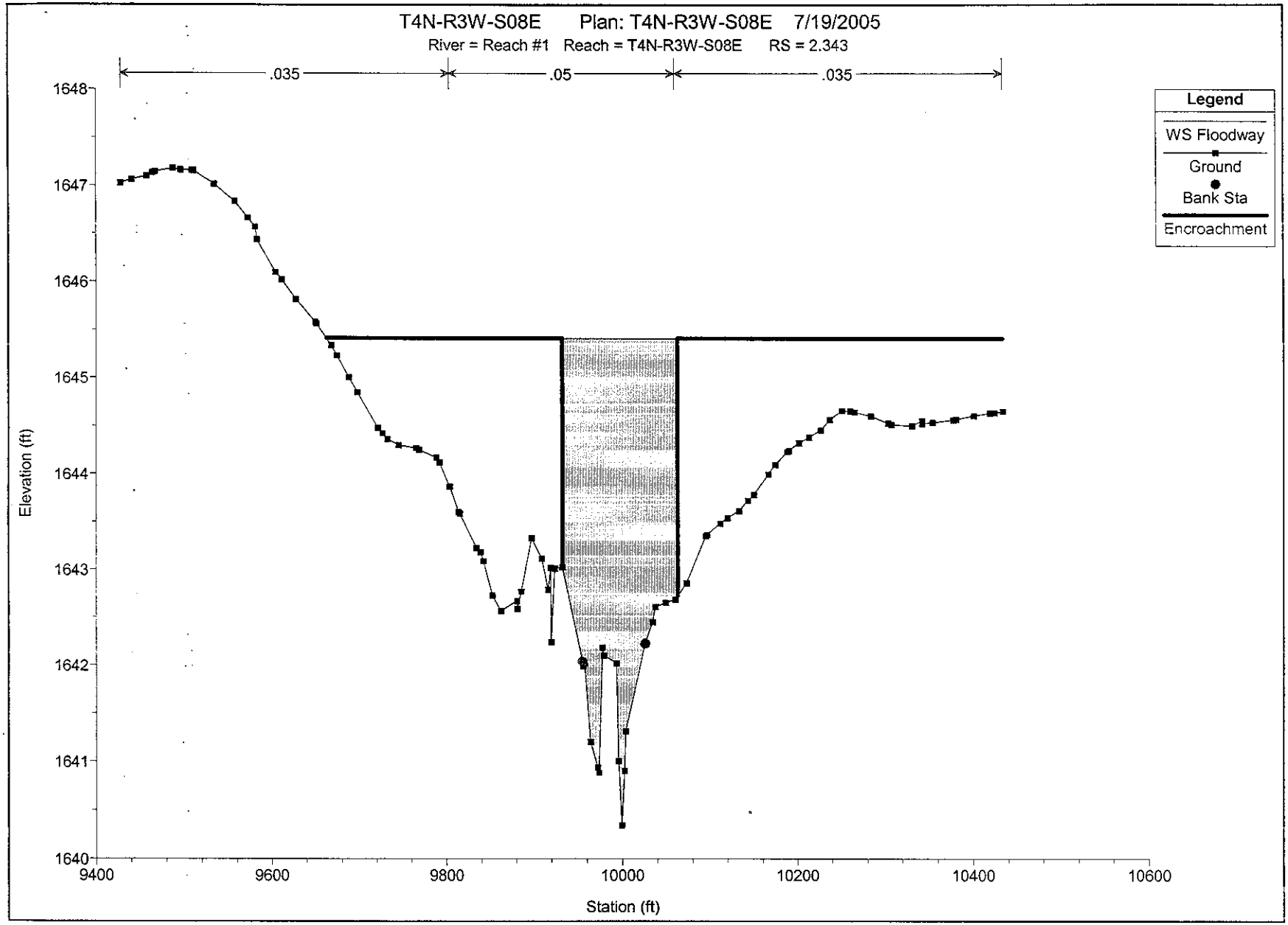

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 2.778
.037
.044
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1661
1660
1659
1658
1657
1656
1655
1654
1653
9400
9600
9800
10000
10200
10400
10600
Station (ft)

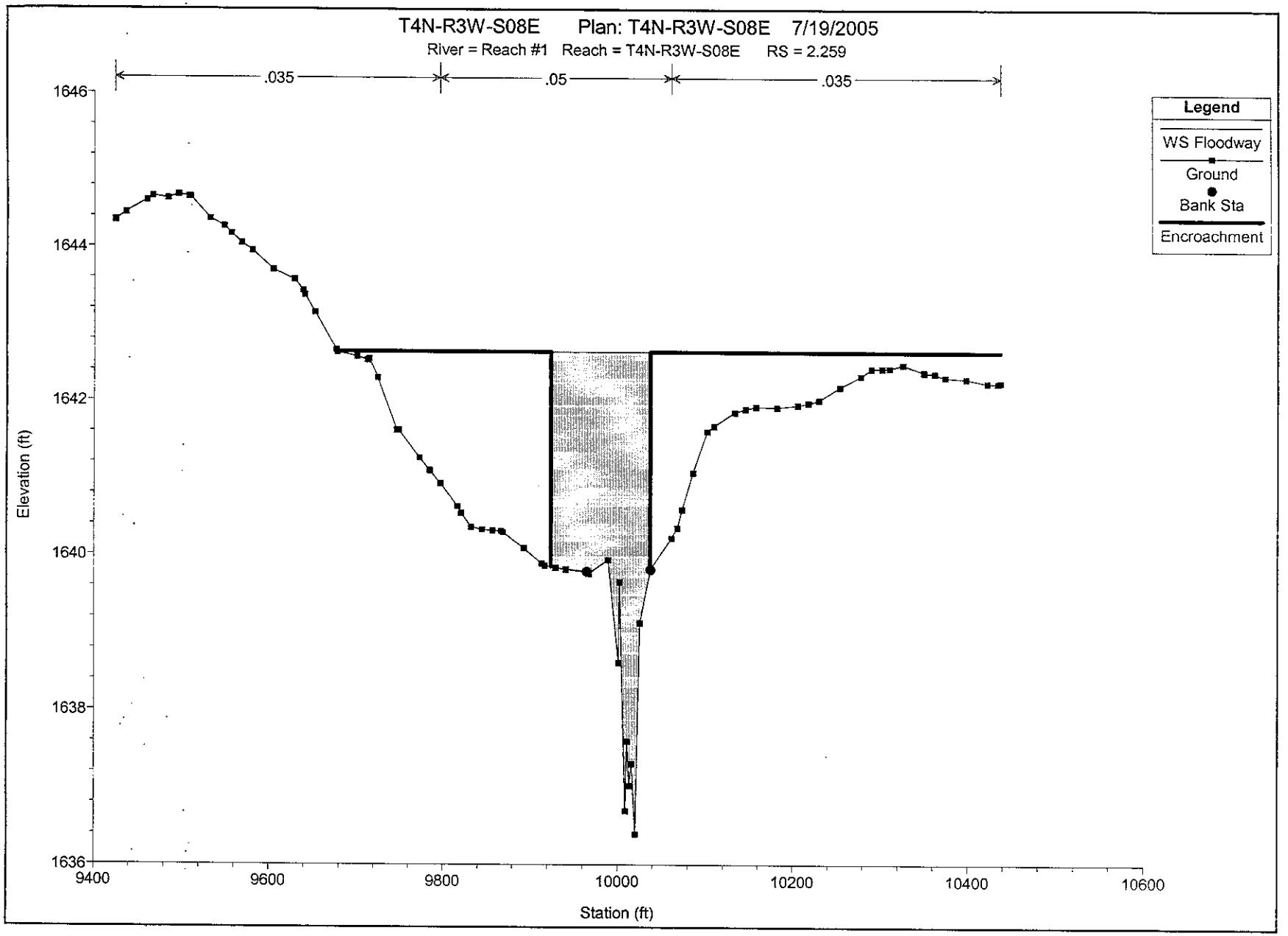

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 2.699
.035
.037
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1658
1656
1654
1652
1650
1648
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

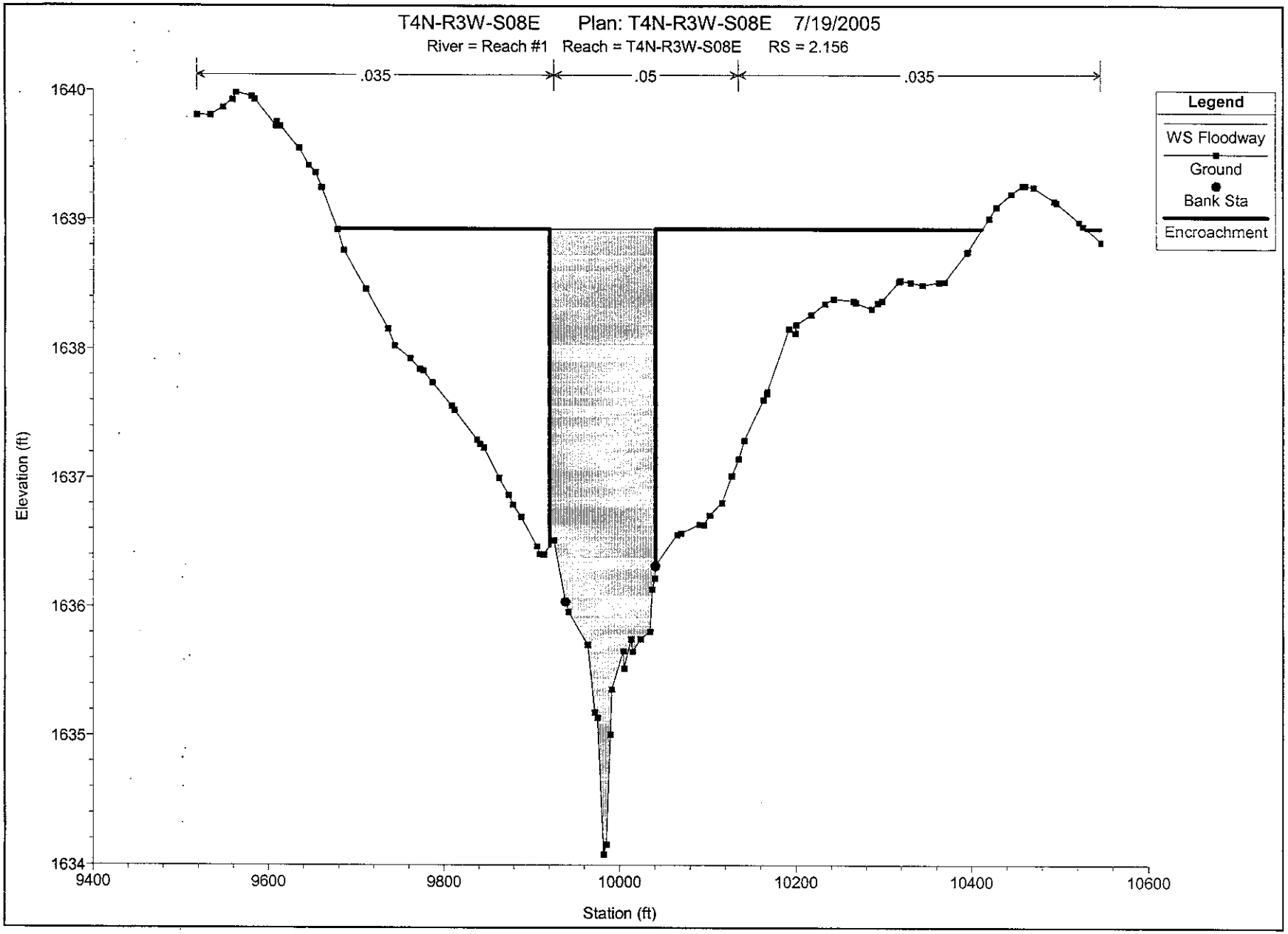

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 2.625
.035
.037
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1656
1655
1654
1653
1652
1651
1650
1649
1648
9500
9600
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

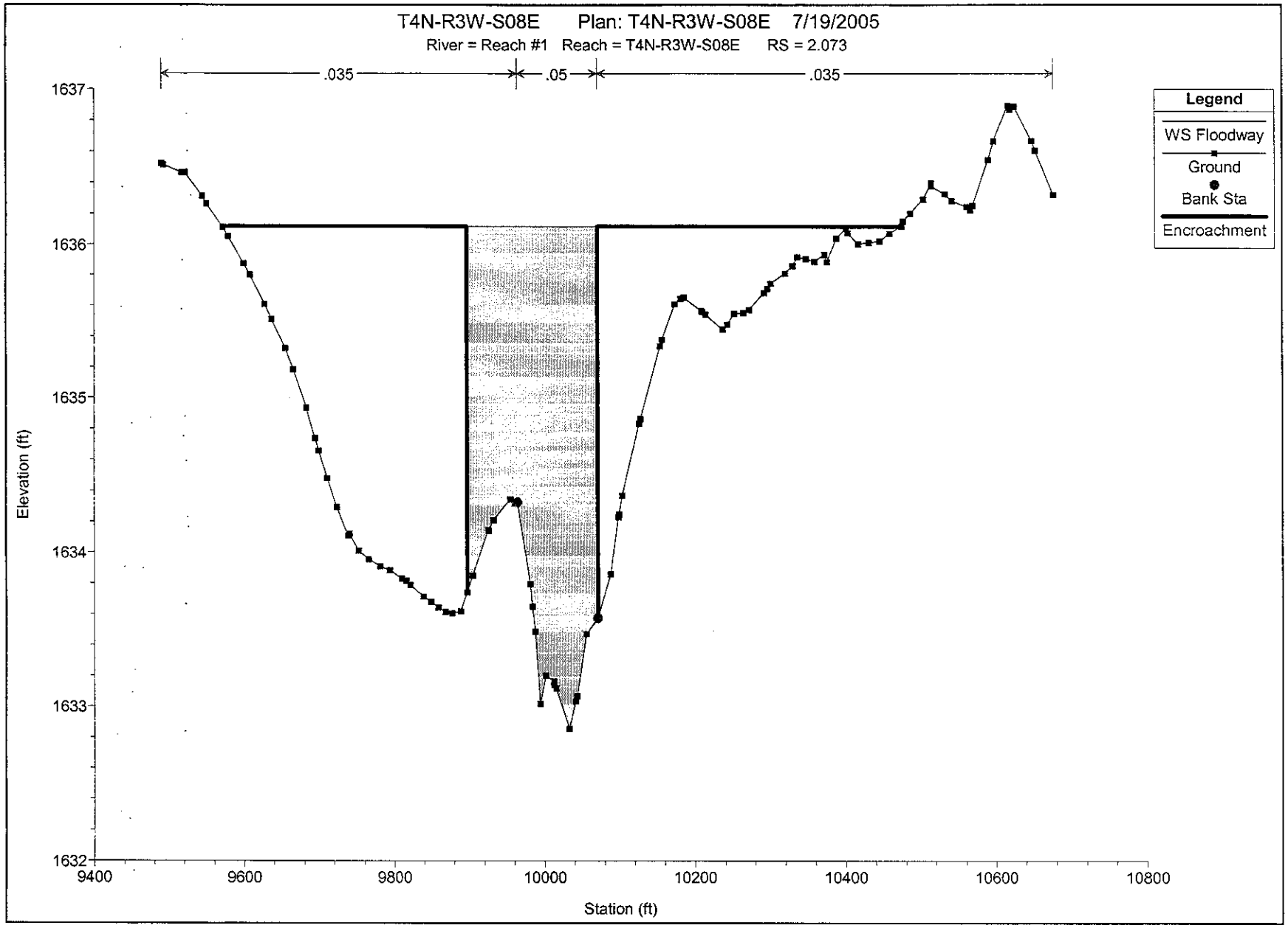

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 2.527
.035
.037
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1654
1652
1650
1648
1646
1644
9400
9600
9800
10000
10200
10400
Station (ft)

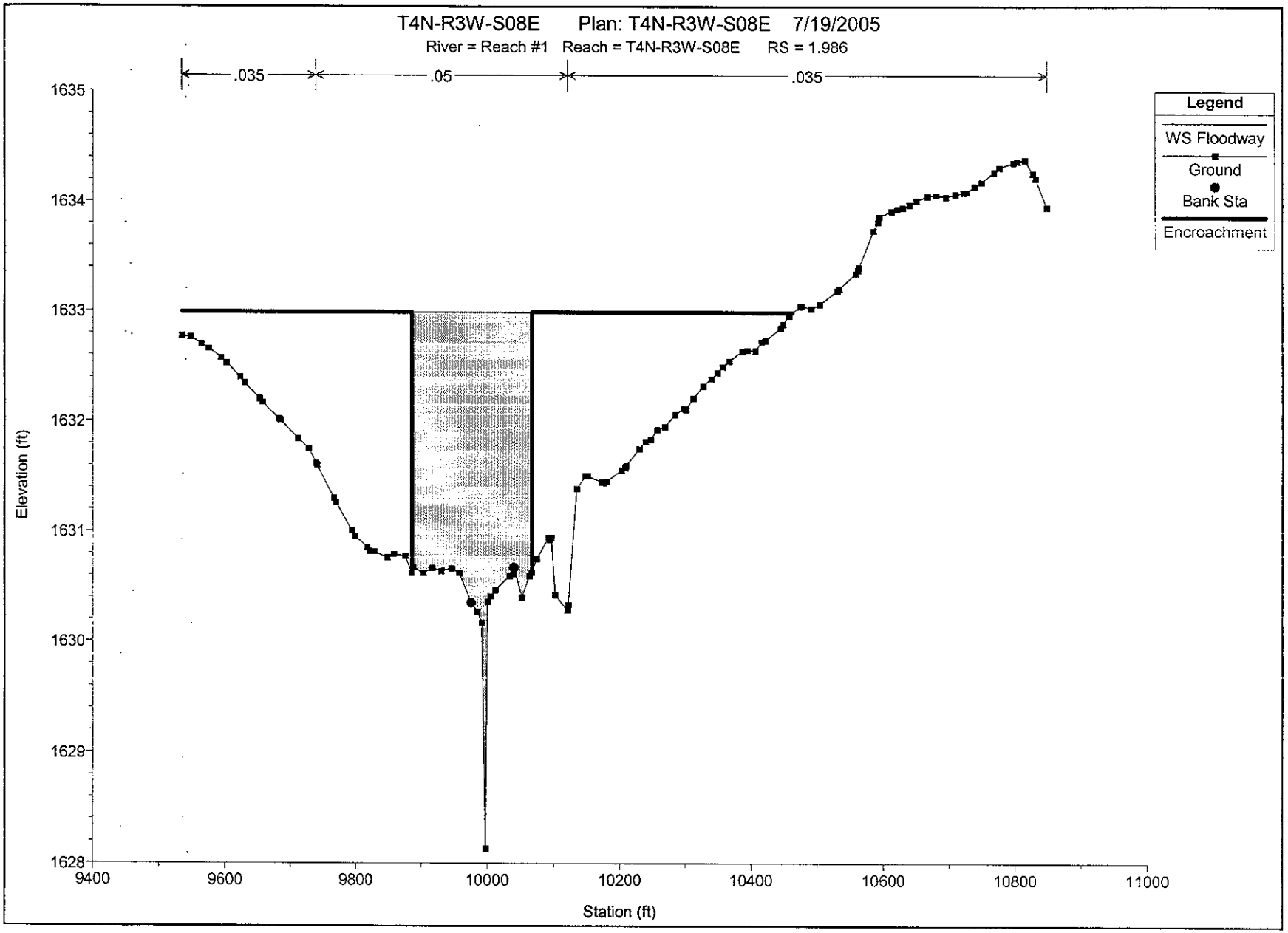

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 2.44
.035
.05
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1652
1650
1648
1646
1644
1642
9400
9600
9800
10000
10200
10400
Station (ft)

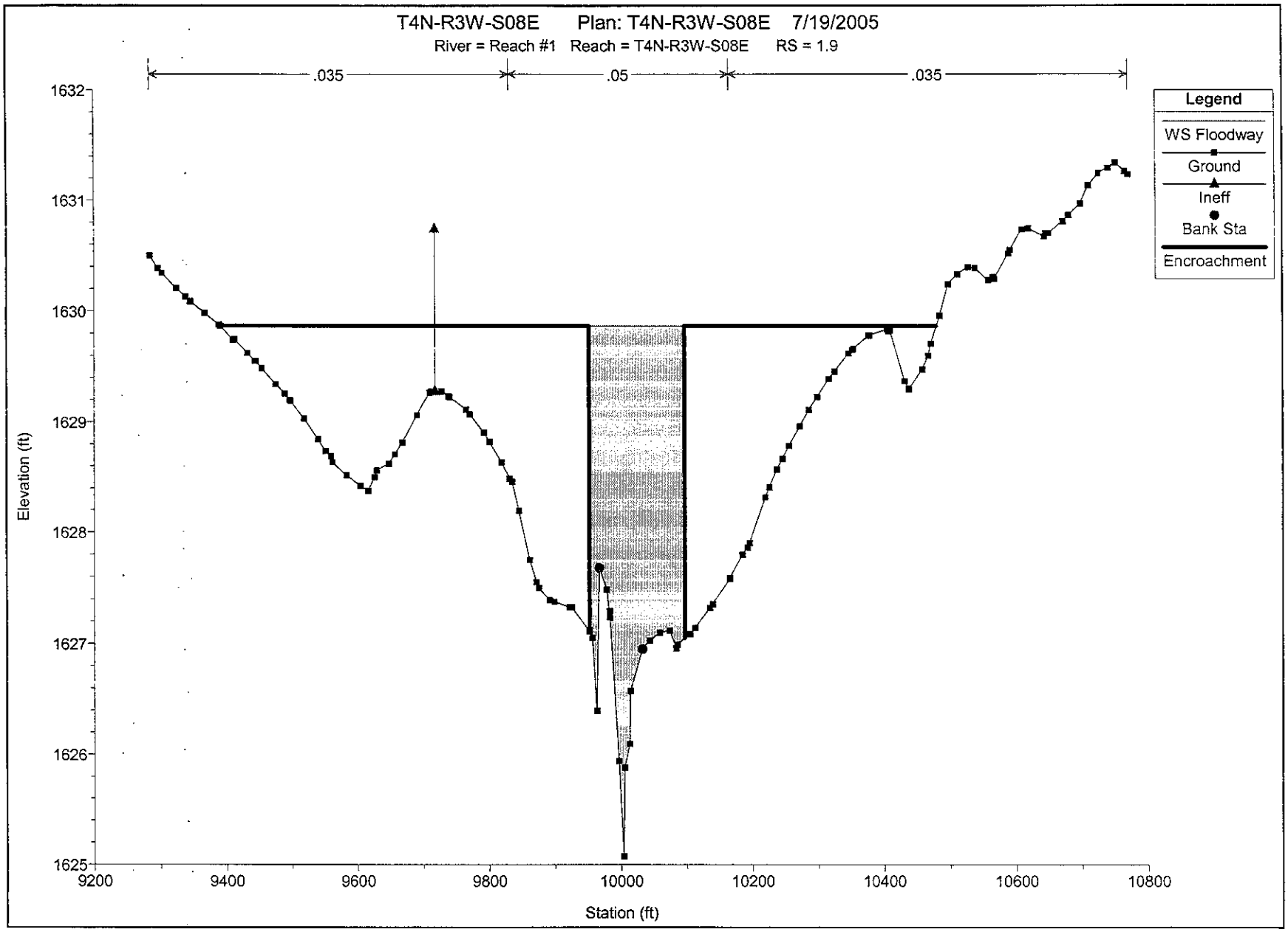

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 2.343
.035
.05
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1648
1647
1646
1645
1644
1643
1642
1641
1640
9400
9600
9800
10000
10200
10400
10600
Station (ft)

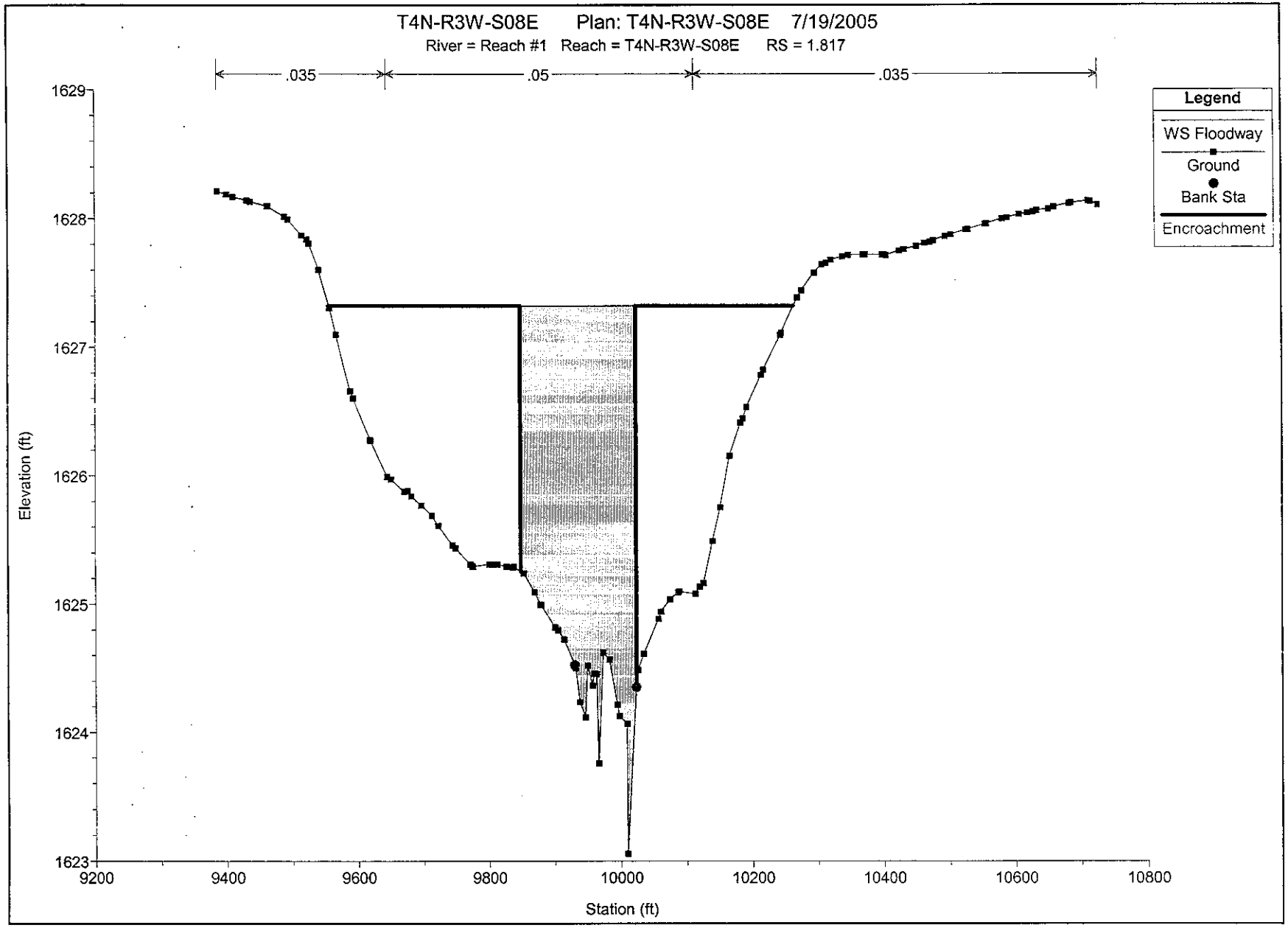

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 2.259
.035
.05
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1646
1644
1642
1640
1638
1636
9400
9600
9800
10000
10200
10400
10600
Station (ft)

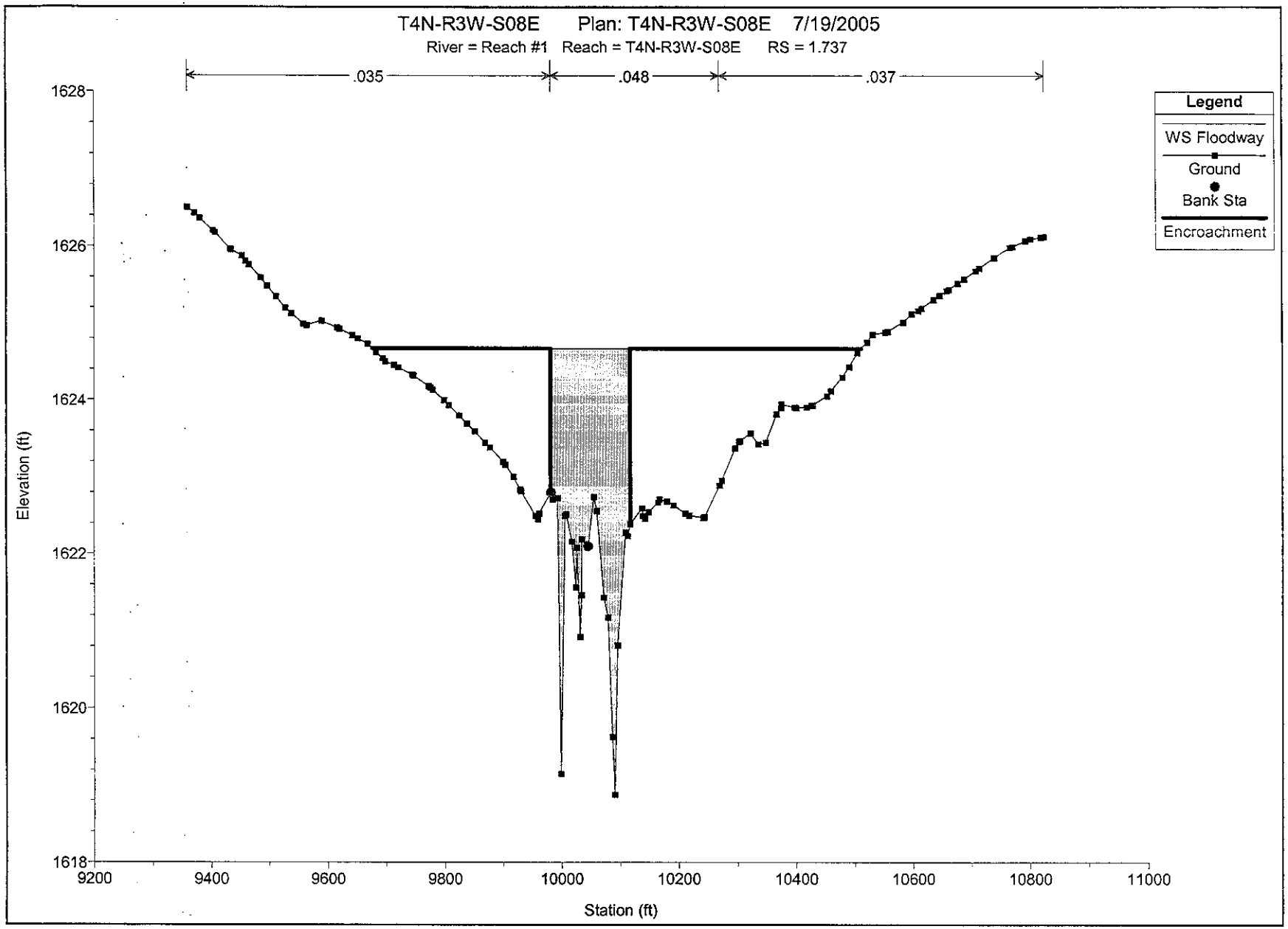

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 2.156
.035
.05
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1640
1639
1638
1637
1636
1635
1634
9400
9600
9800
10000
10200
10400
10600
Station (ft)

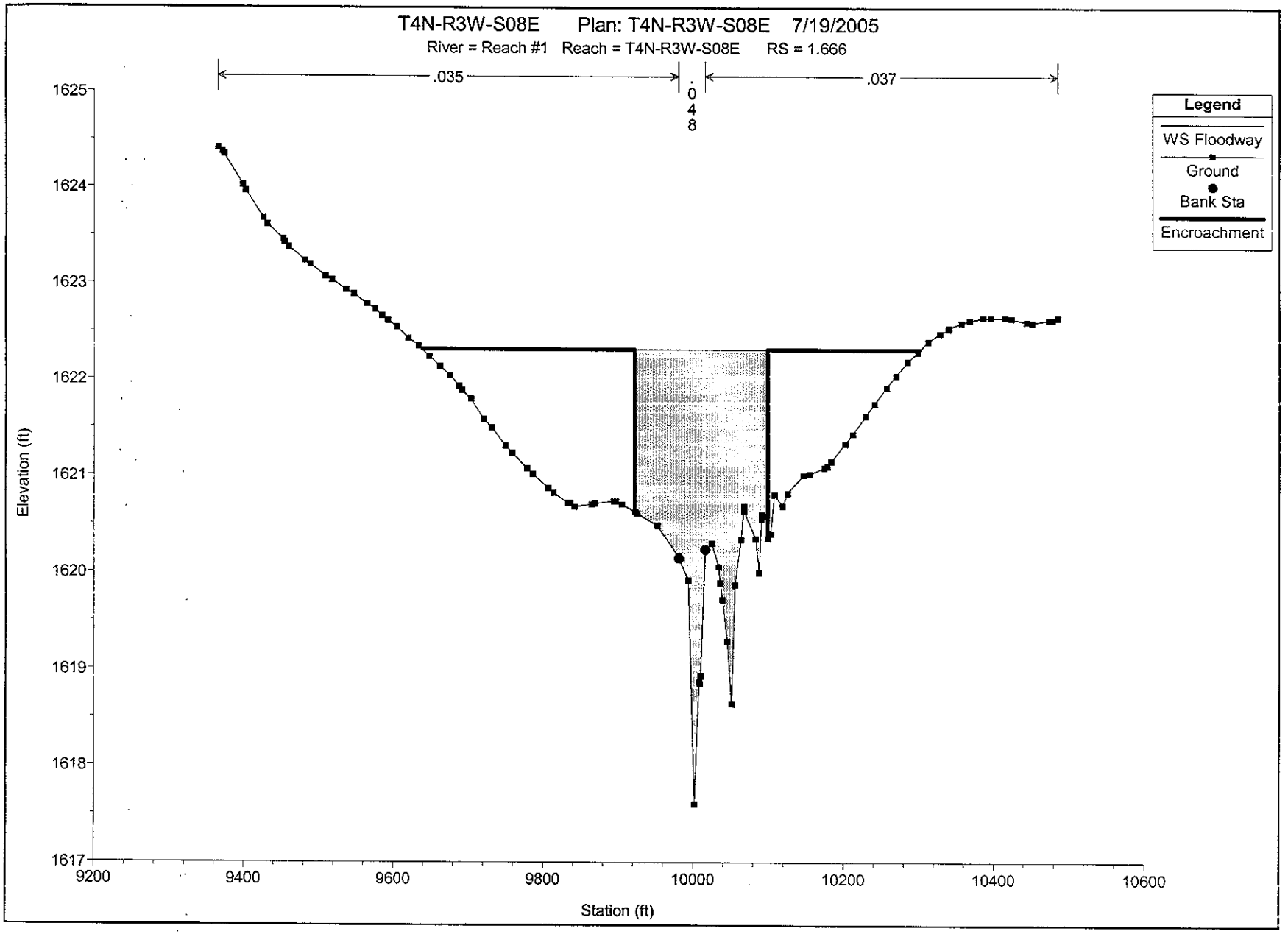

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 2.073
.035
.05
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1637
1636
1635
1634
1633
1632
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

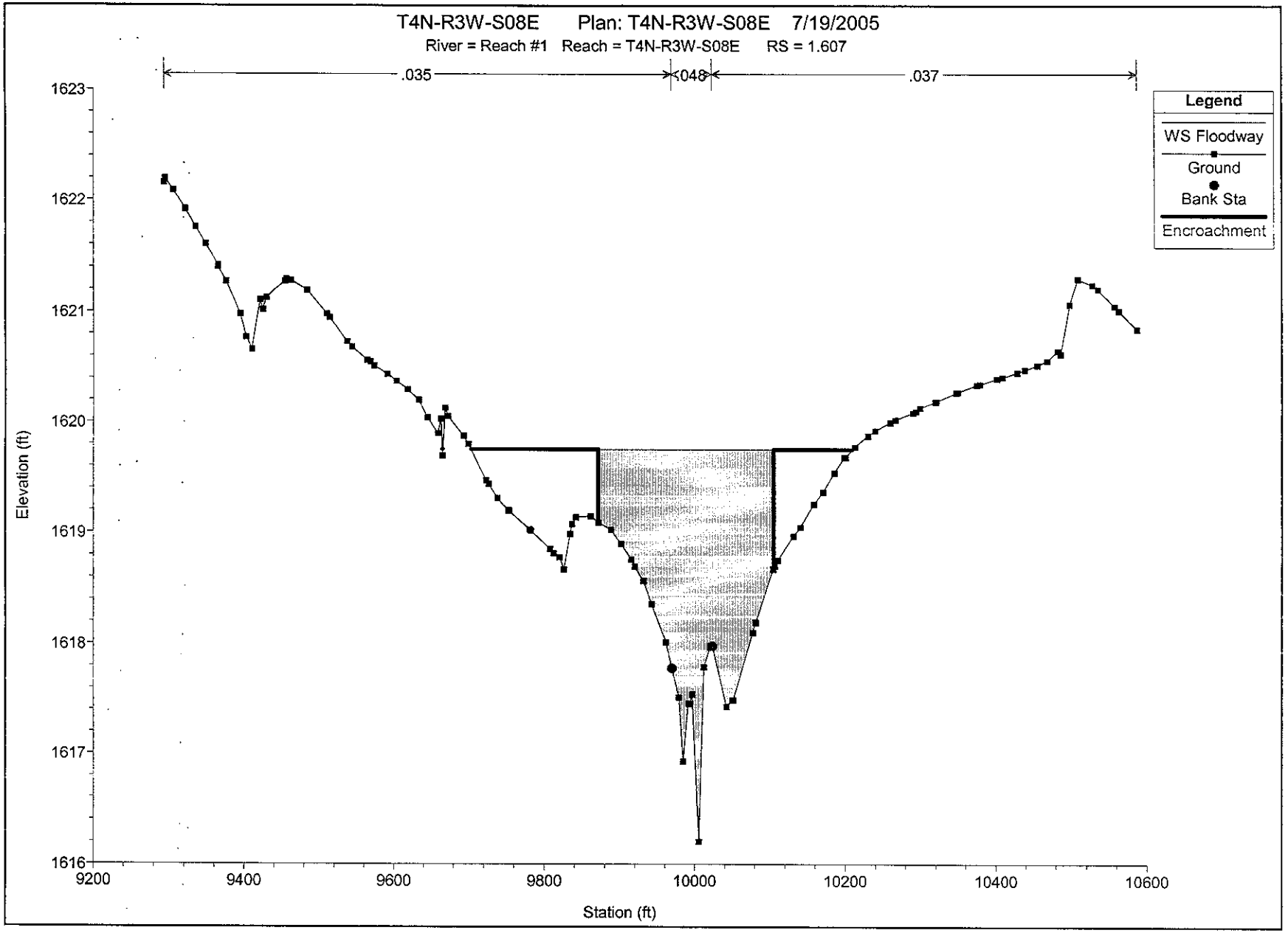

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 1.986
.035
.05
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1635
1634
1633
1632
1631
1630
1629
1628
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

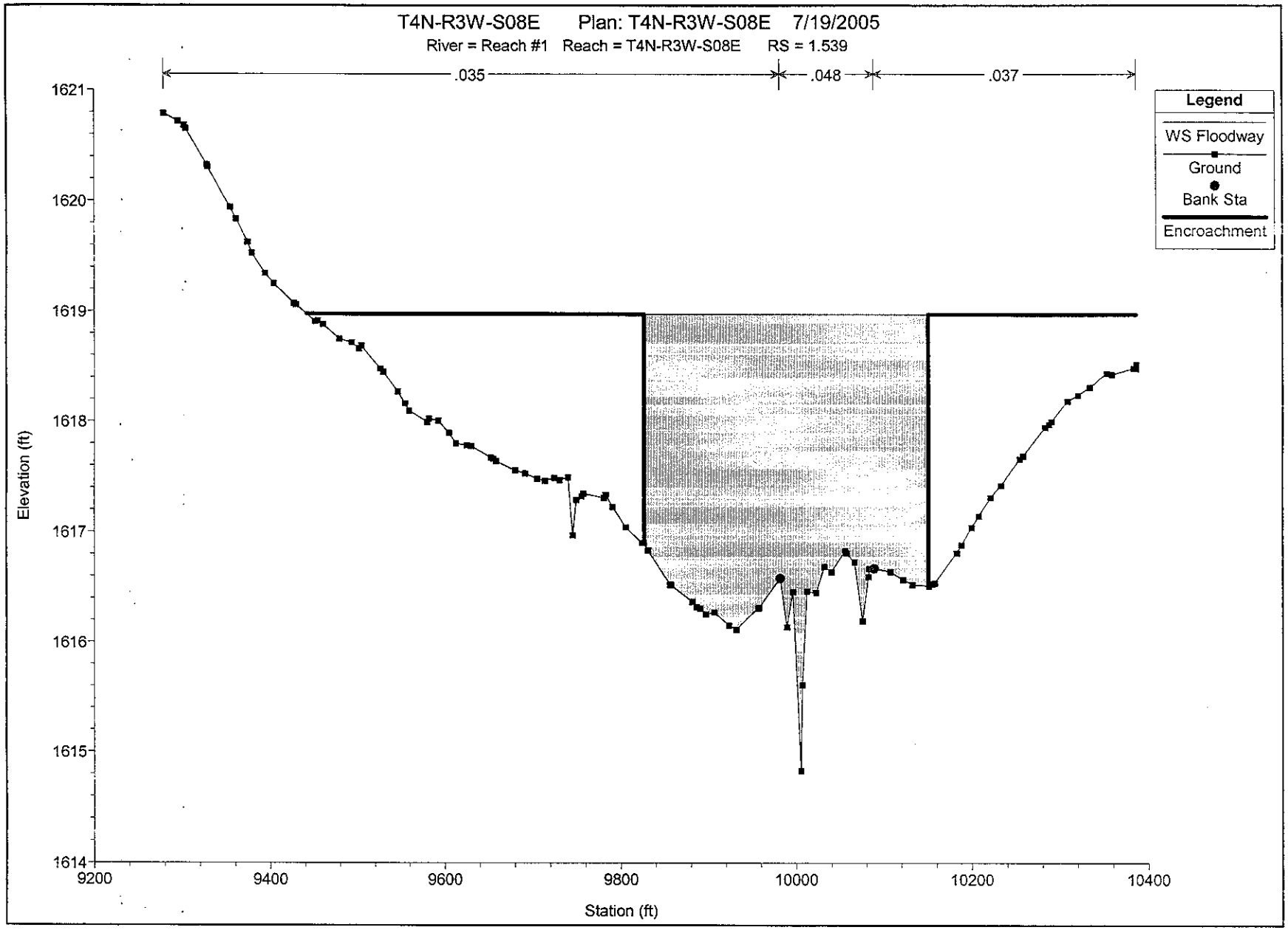

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 1.9
.035
.05
.035
Legend
WS Floodway
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1632
1631
1630
1629
1628
1627
1626
1625
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

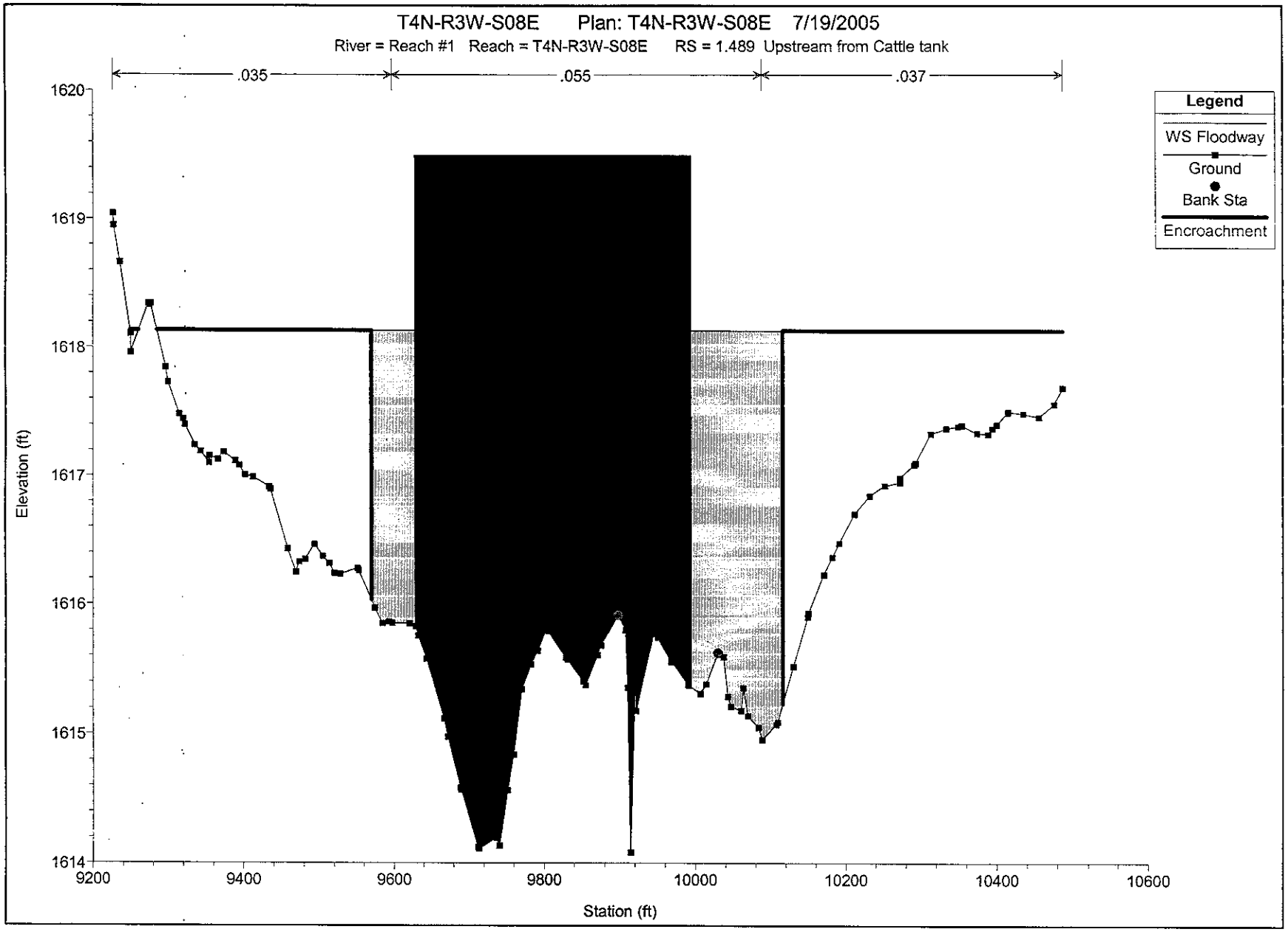

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 1.817
.035
.05
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1629
1628
1627
1626
1625
1624
1623
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

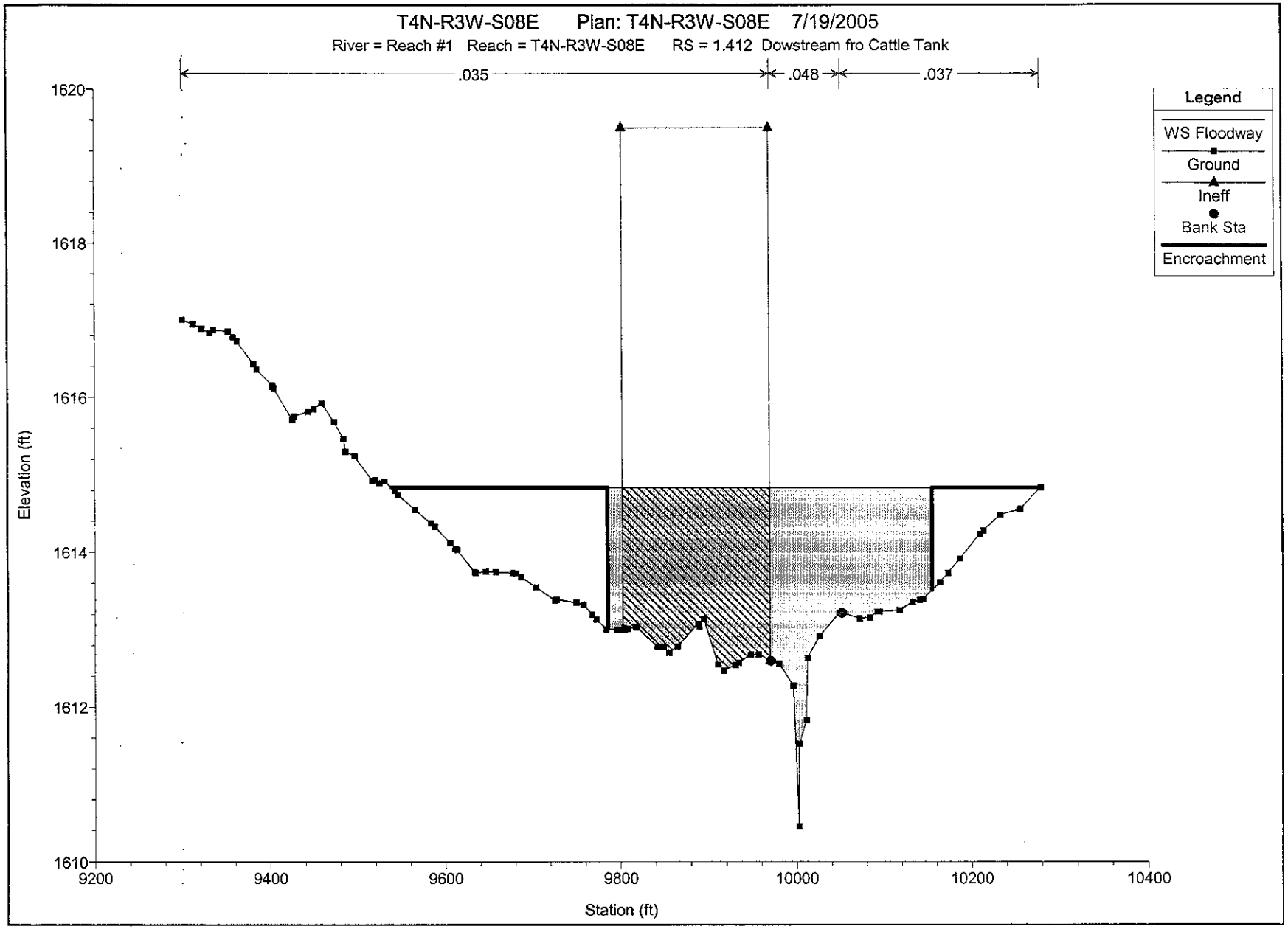

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 1.737
.035
.048
.037
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1628
1626
1624
1622
1620
1618
9200
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

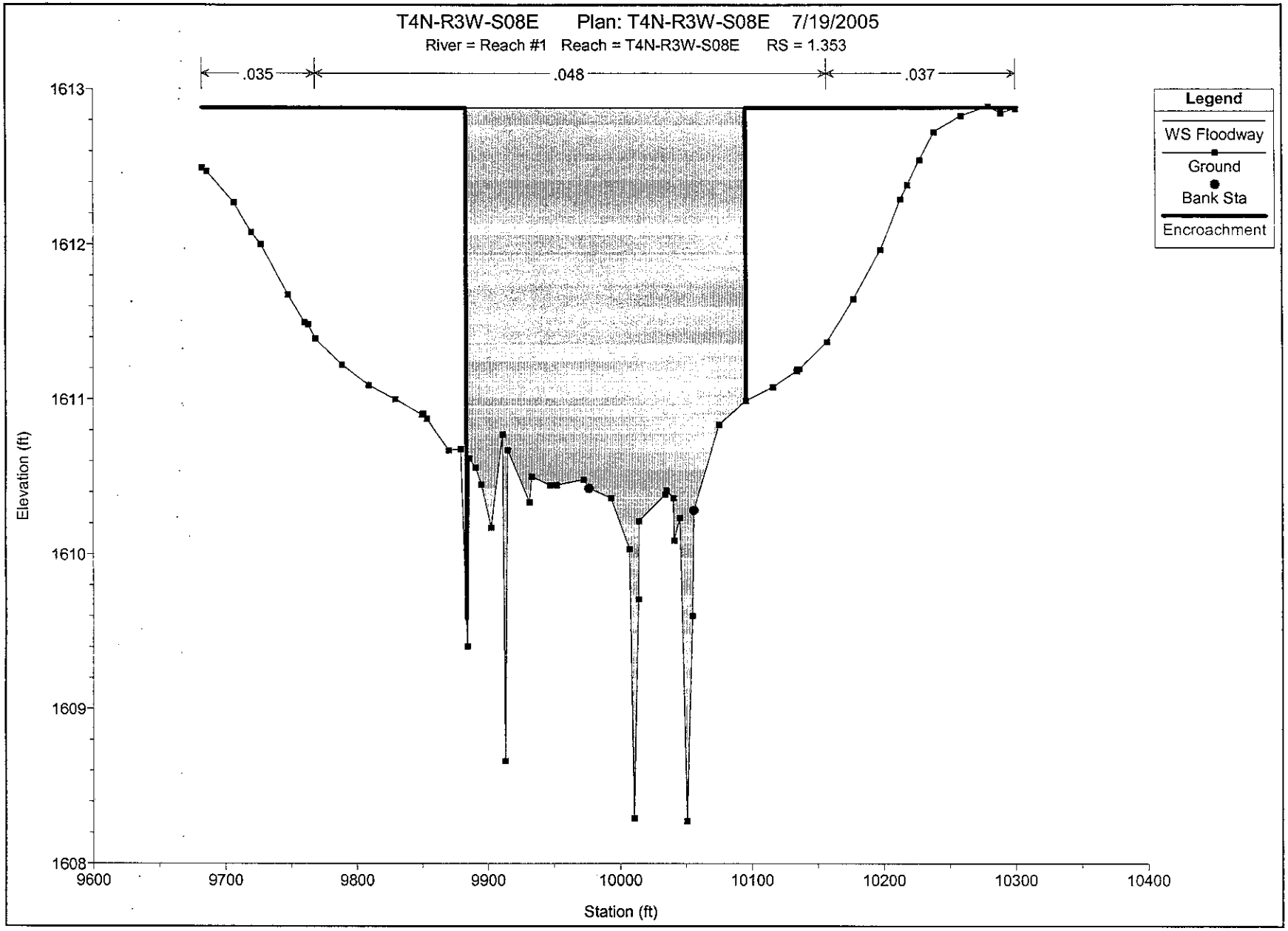

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 1.666
.035
.048
.037
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1625
1624
1623
1622
1621
1620
1619
1618
1617
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)

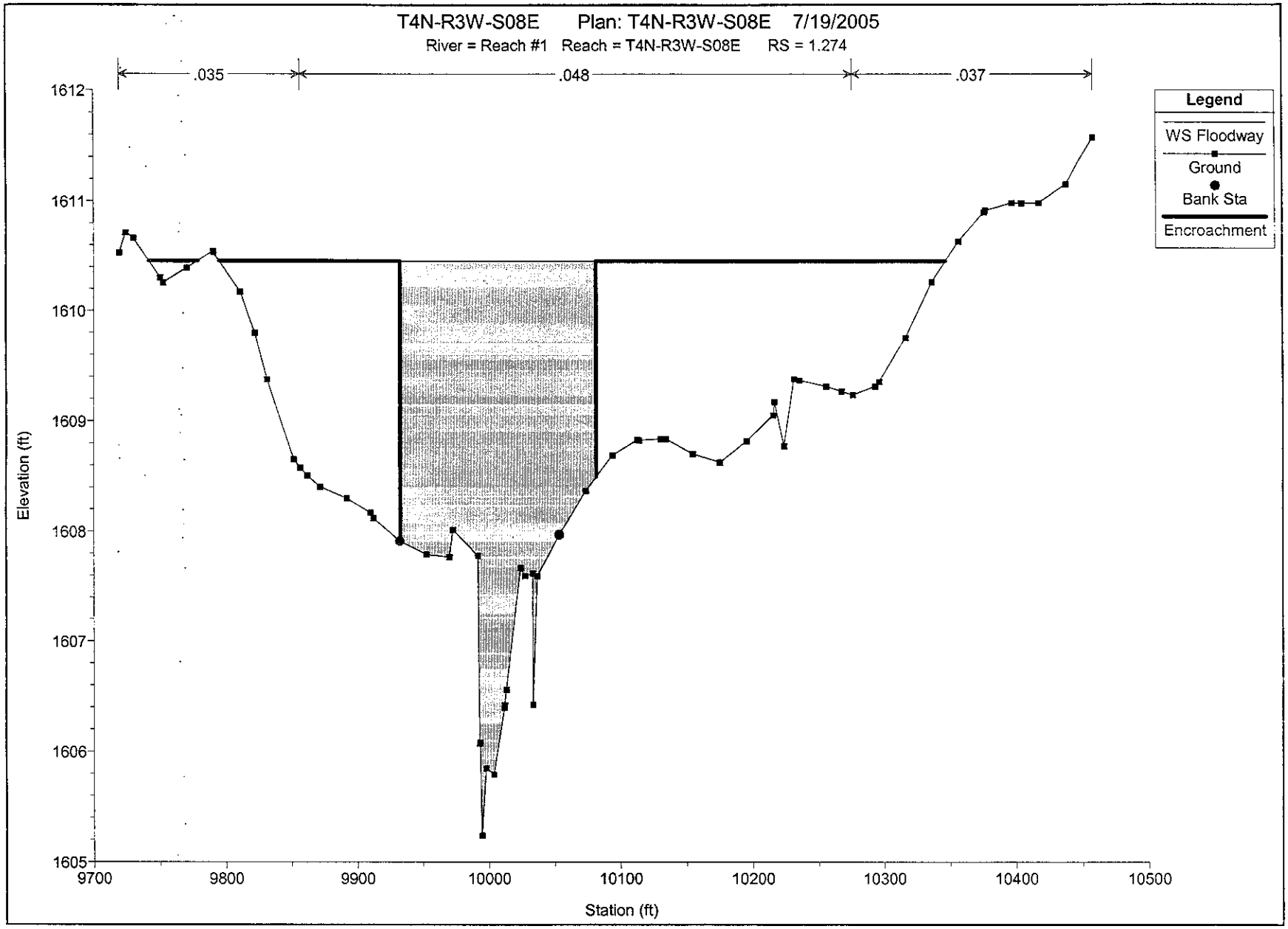

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 1.607
.035
.048
.037
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1623
1622
1621
1620
1619
1618
1617
1616
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)

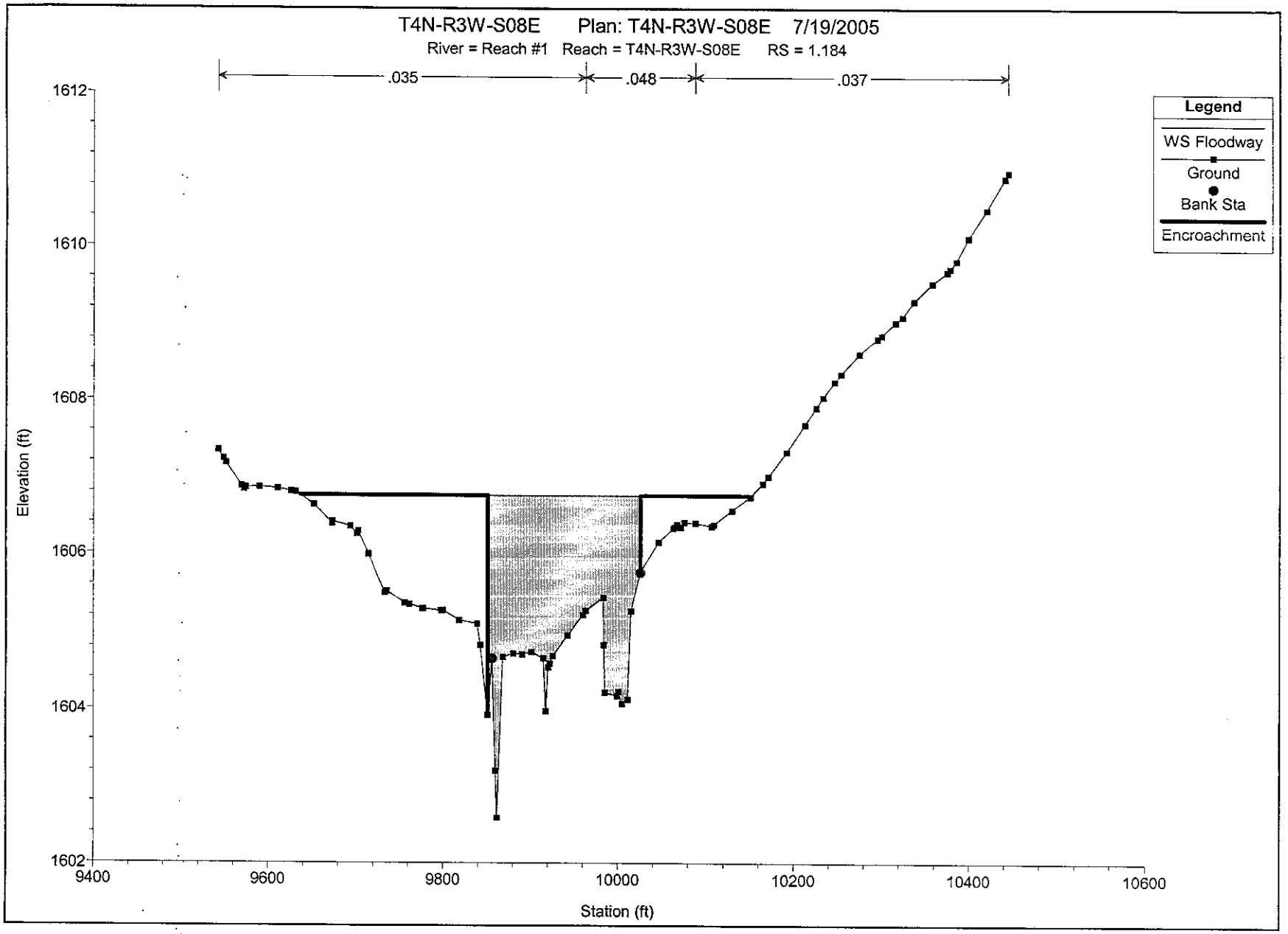

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 1.539
.035
.048
.037
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1621
1620
1619
1618
1617
1616
1615
1614
9200
9400
9600
9800
10000
10200
10400
Station (ft)

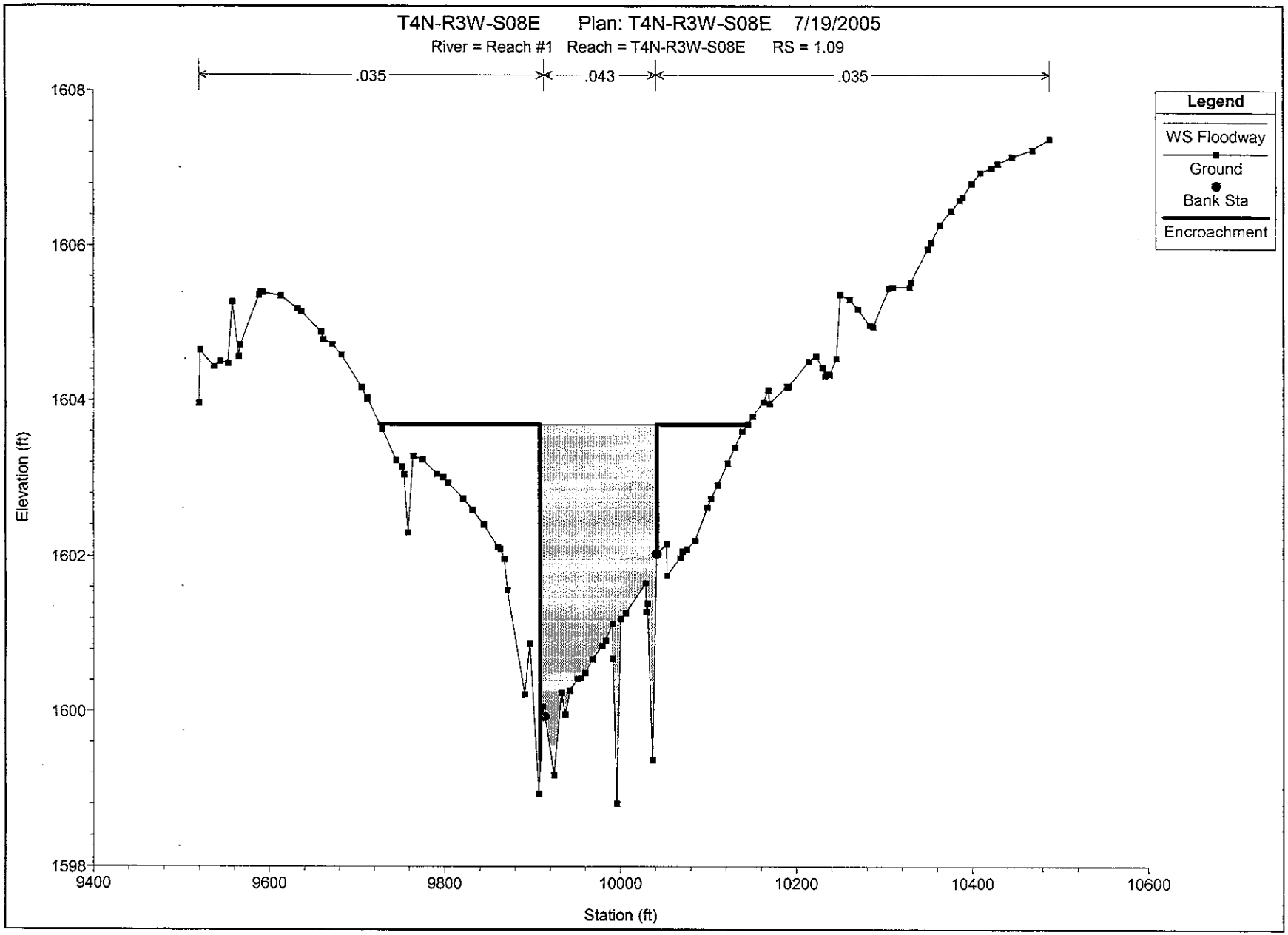

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 1.489 Upstream from Cattle tank
.035
.055
.037
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1620
1619
1618
1617
1616
1615
1614
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)

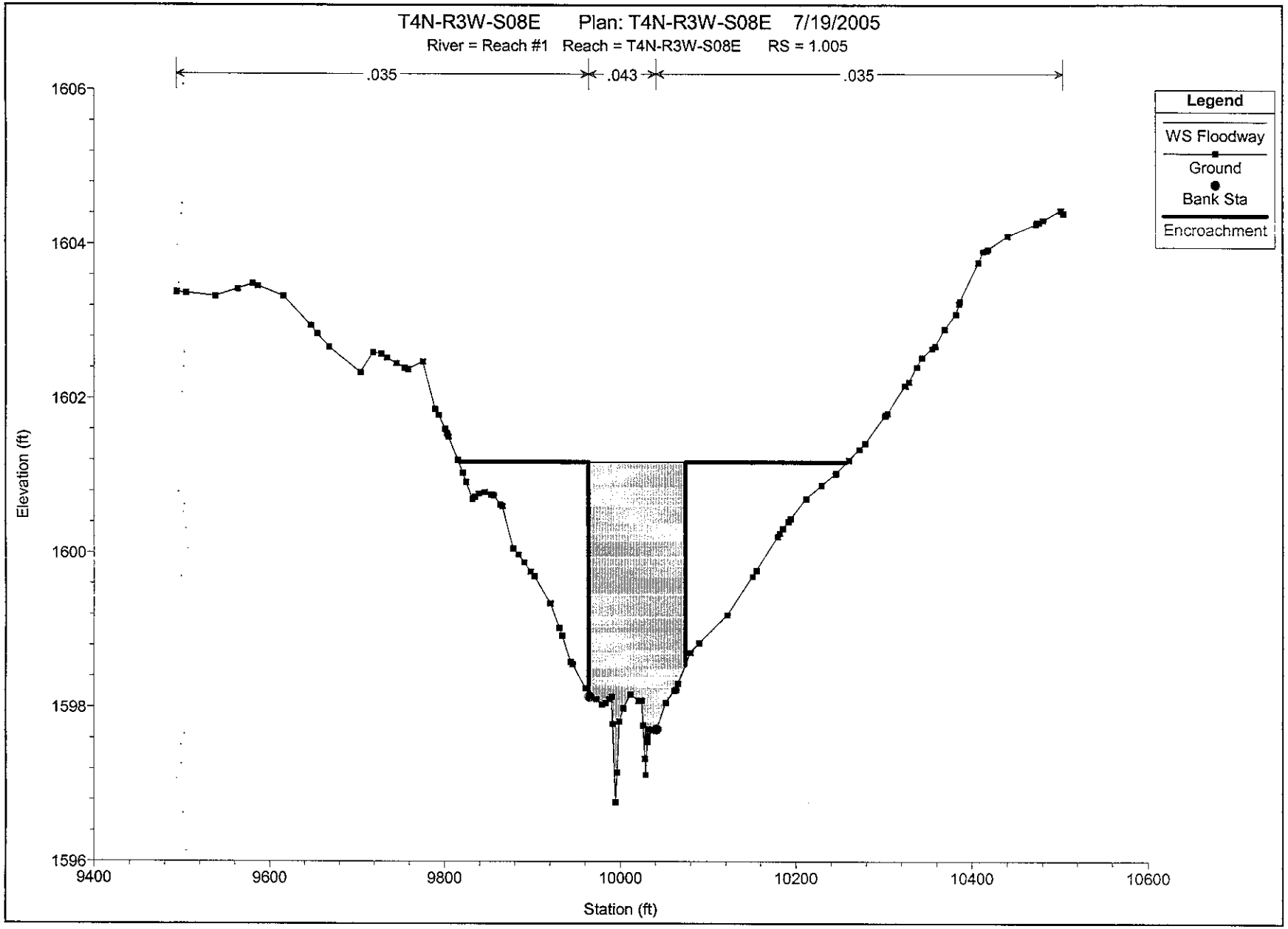

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 1.412 Dowstream fro Cattle Tank
.035
.048
.037
Legend
WS Floodway
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1620
1618
1616
1614
1612
1610
9200
9400
9600
9800
10000
10200
10400
Station (ft)

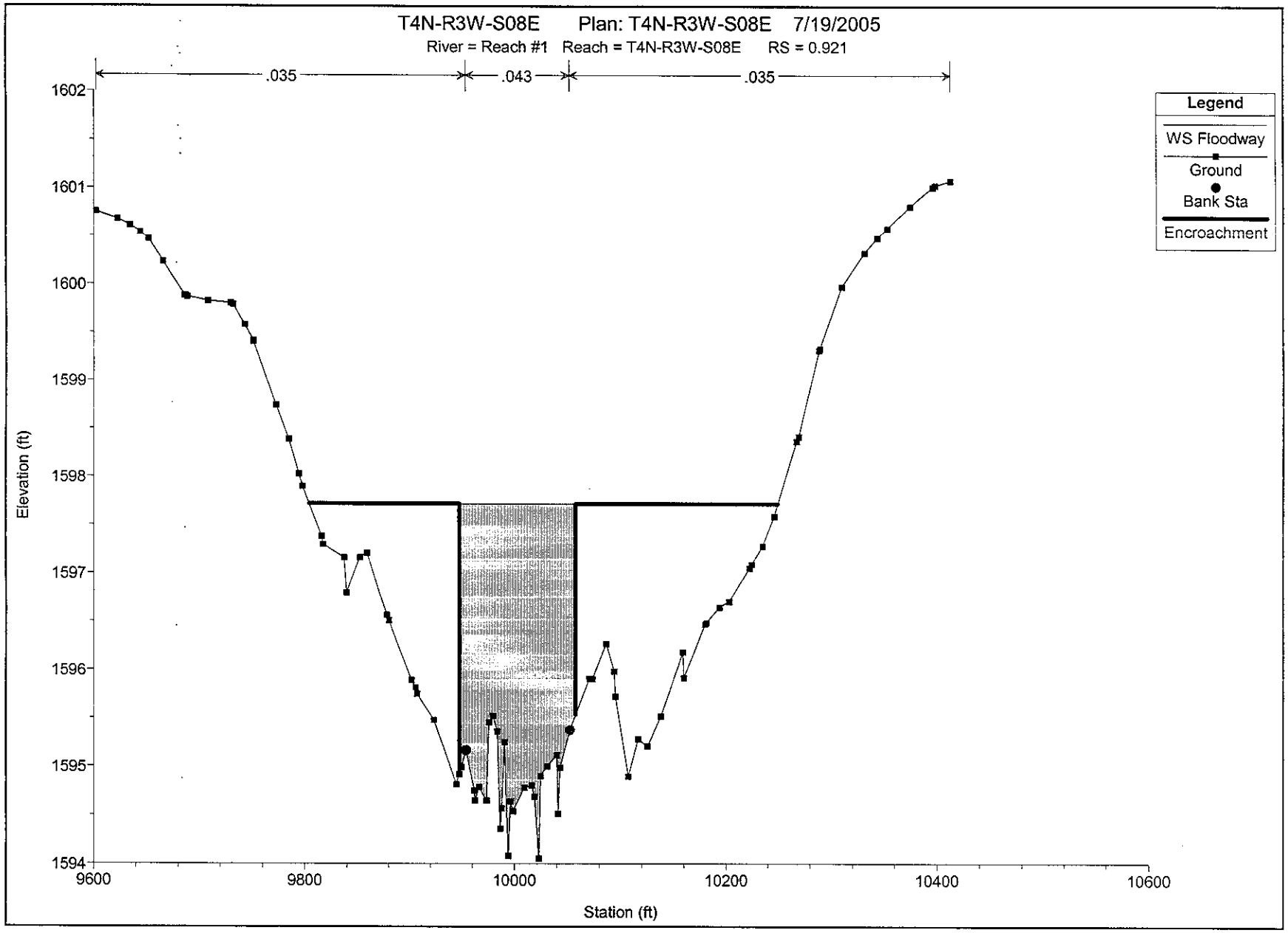

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 1.353
.035
.048
.037
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1613
1612
1611
1610
1609
1608
9600
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

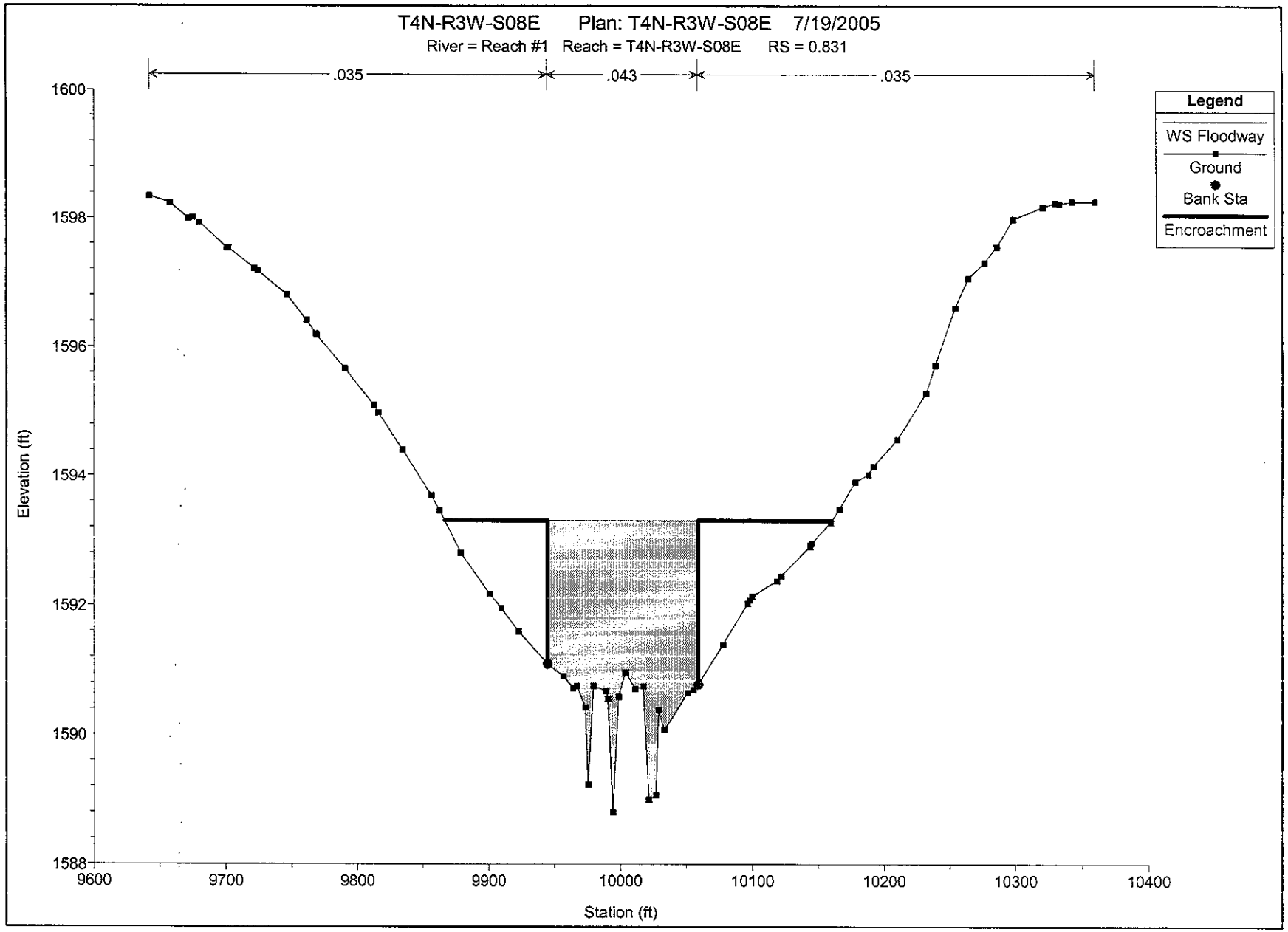

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 1.274
.035
.048
.037
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1612
1611
1610
1609
1608
1607
1606
1605
9700
9800
9900
10000
10100
10200
10300
10400
10500
Station (ft)

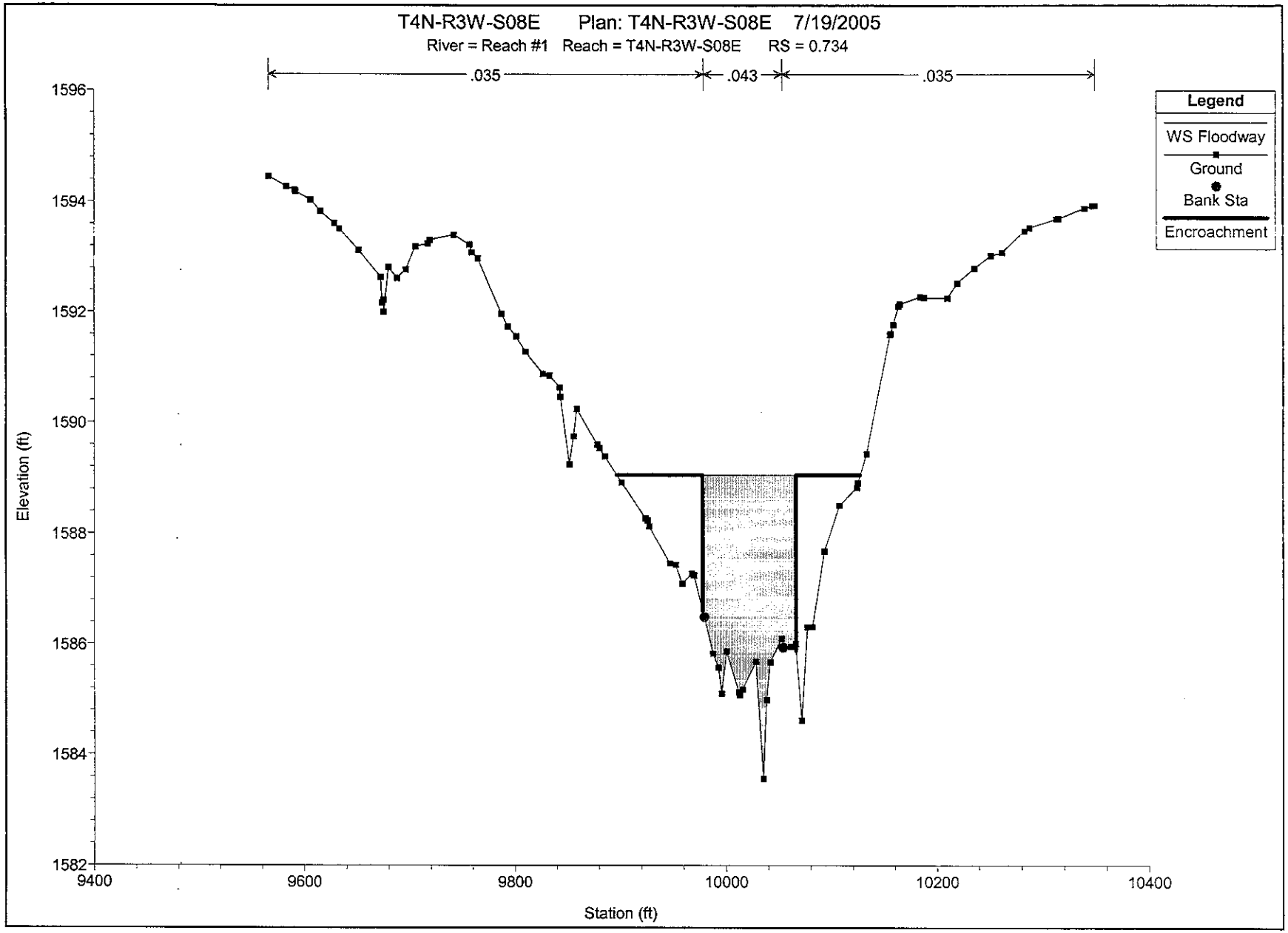

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 1.184
.035
.048
.037
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1612
1610
1608
1606
1604
1602
9400
9600
9800
10000
10200
10400
10600
Station (ft)

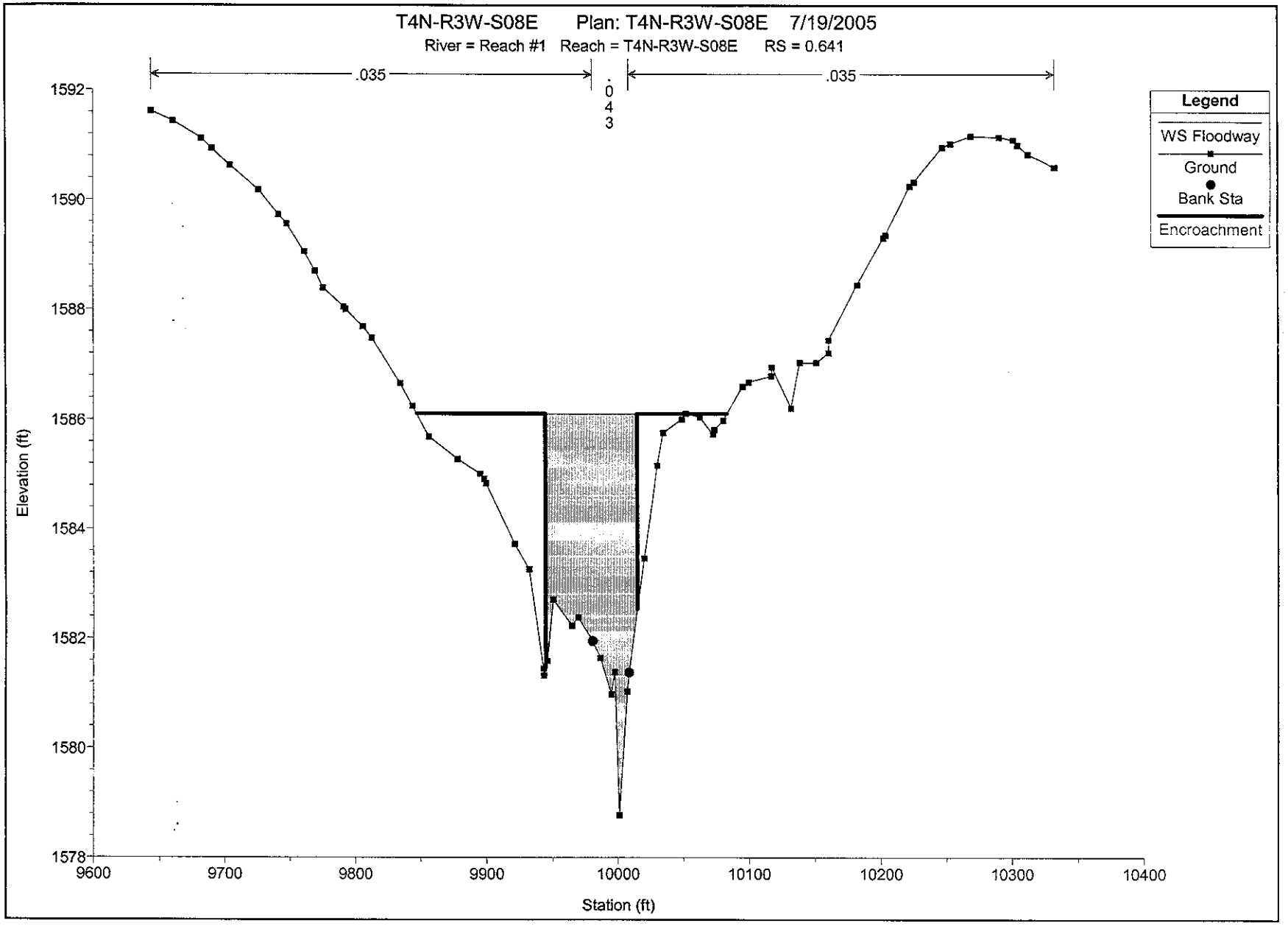

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 1.09
.035
.043
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1608
1606
1604
1602
1600
1598
9400
9600
9800
10000
10200
10400
10600
Station (ft)

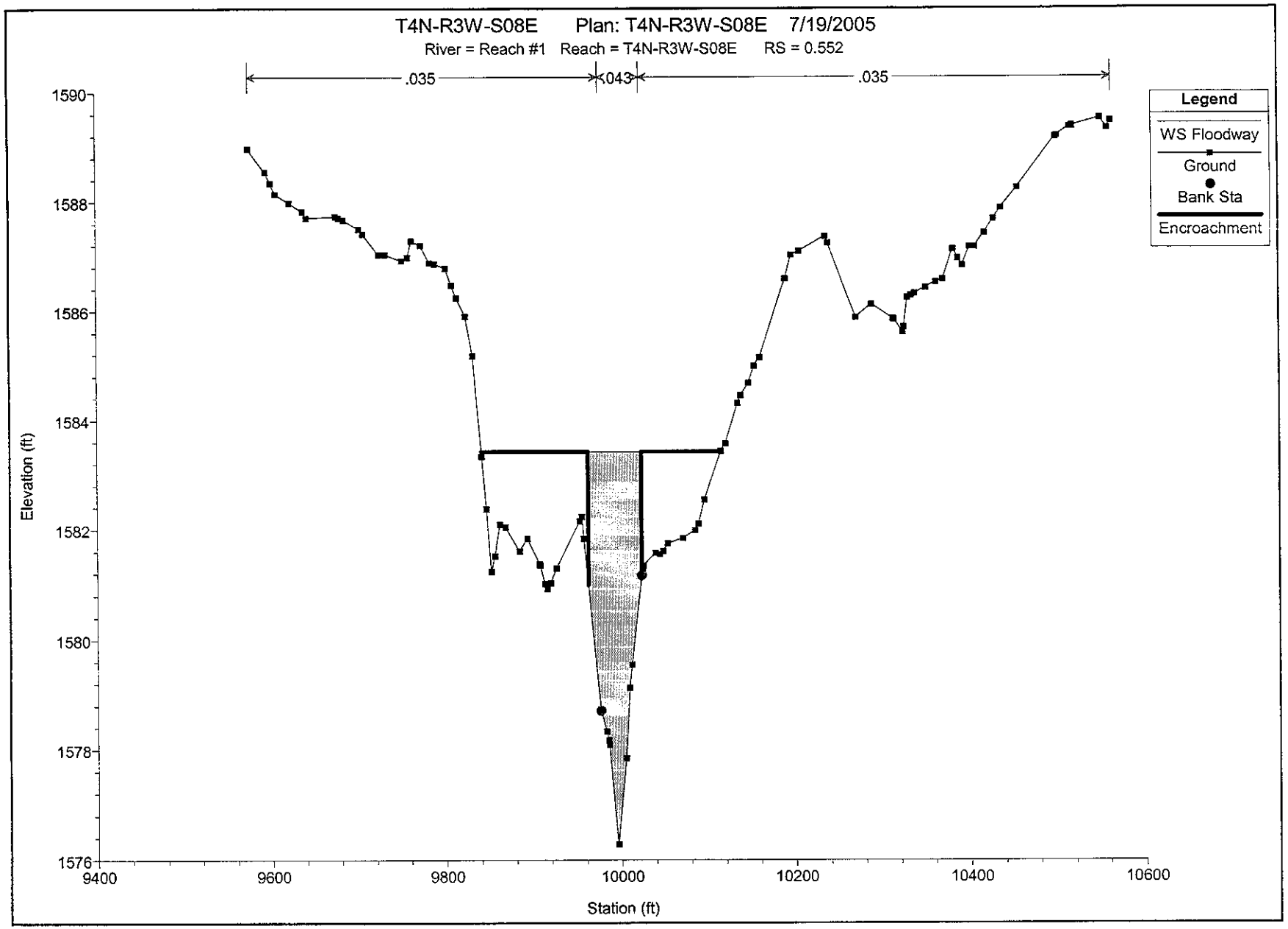

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 1.005
.035
.043
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1606
1604
1602
1600
1598
1596
9400
9600
9800
10000
10200
10400
10600
Station (ft)

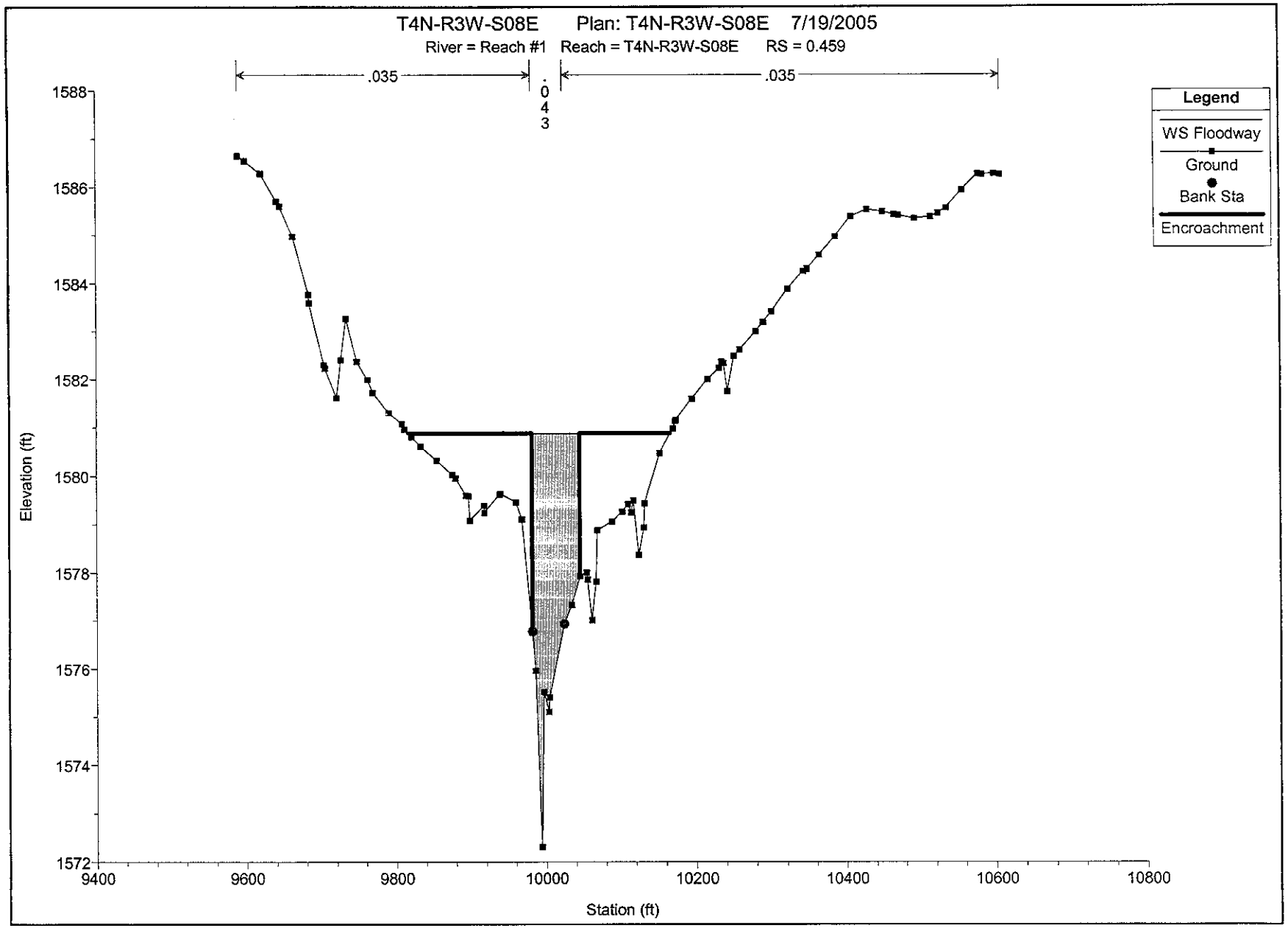

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 0.921
.035
.043
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1602
1601
1600
1599
1598
1597
1596
1595
1594
9600
9800
10000
10200
10400
10600
Station (ft)

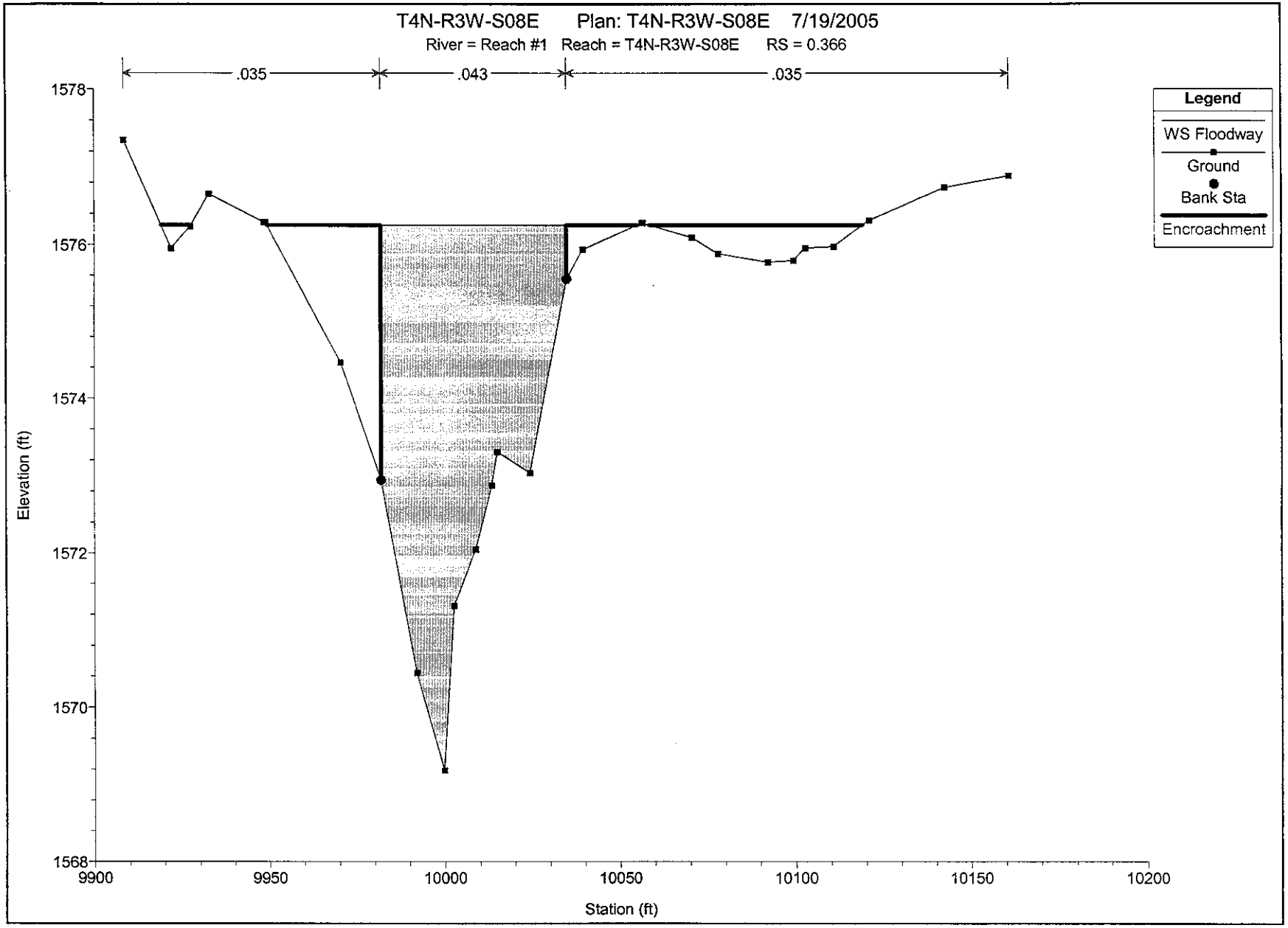

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 0.831
.035
.043
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1600
1598
1596
1594
1592
1590
1588
9600
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

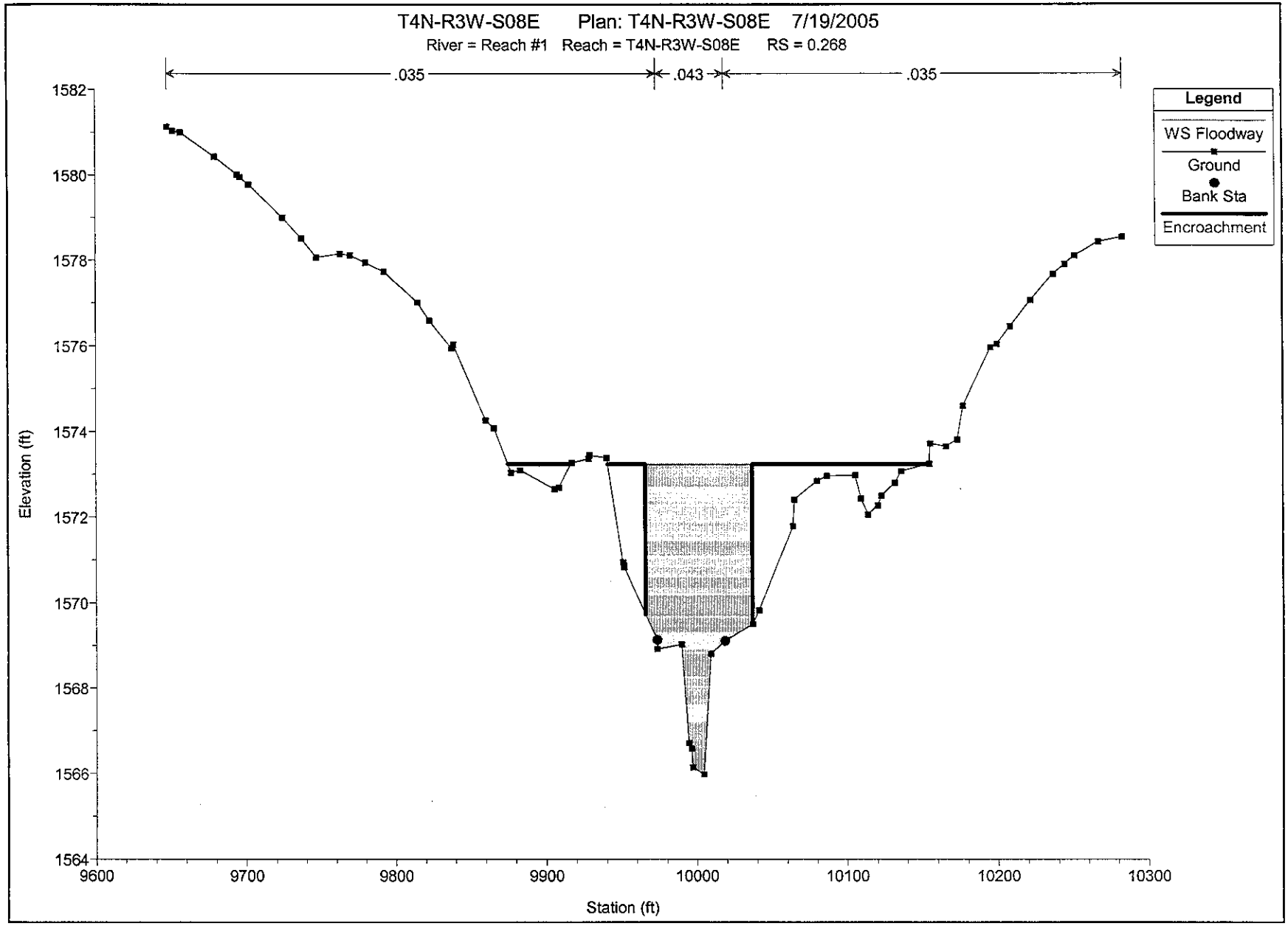

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 0.734
.035
.043
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1596
1594
1592
1590
1588
1586
1584
1582
9400
9600
9800
10000
10200
10400
Station (ft)

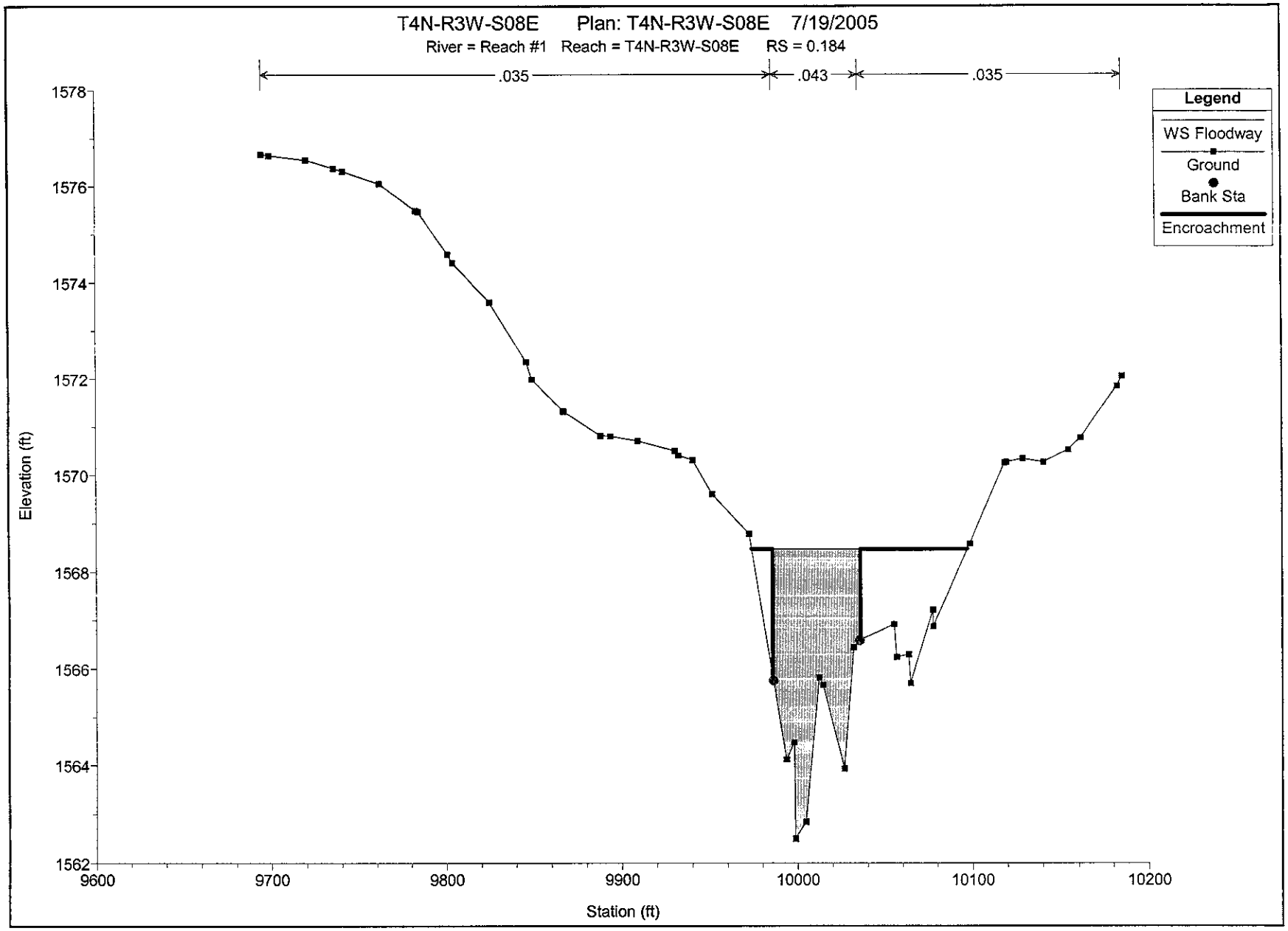

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 0.641
.035
.043
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1592
1590
1588
1586
1584
1582
1580
1578
9600
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

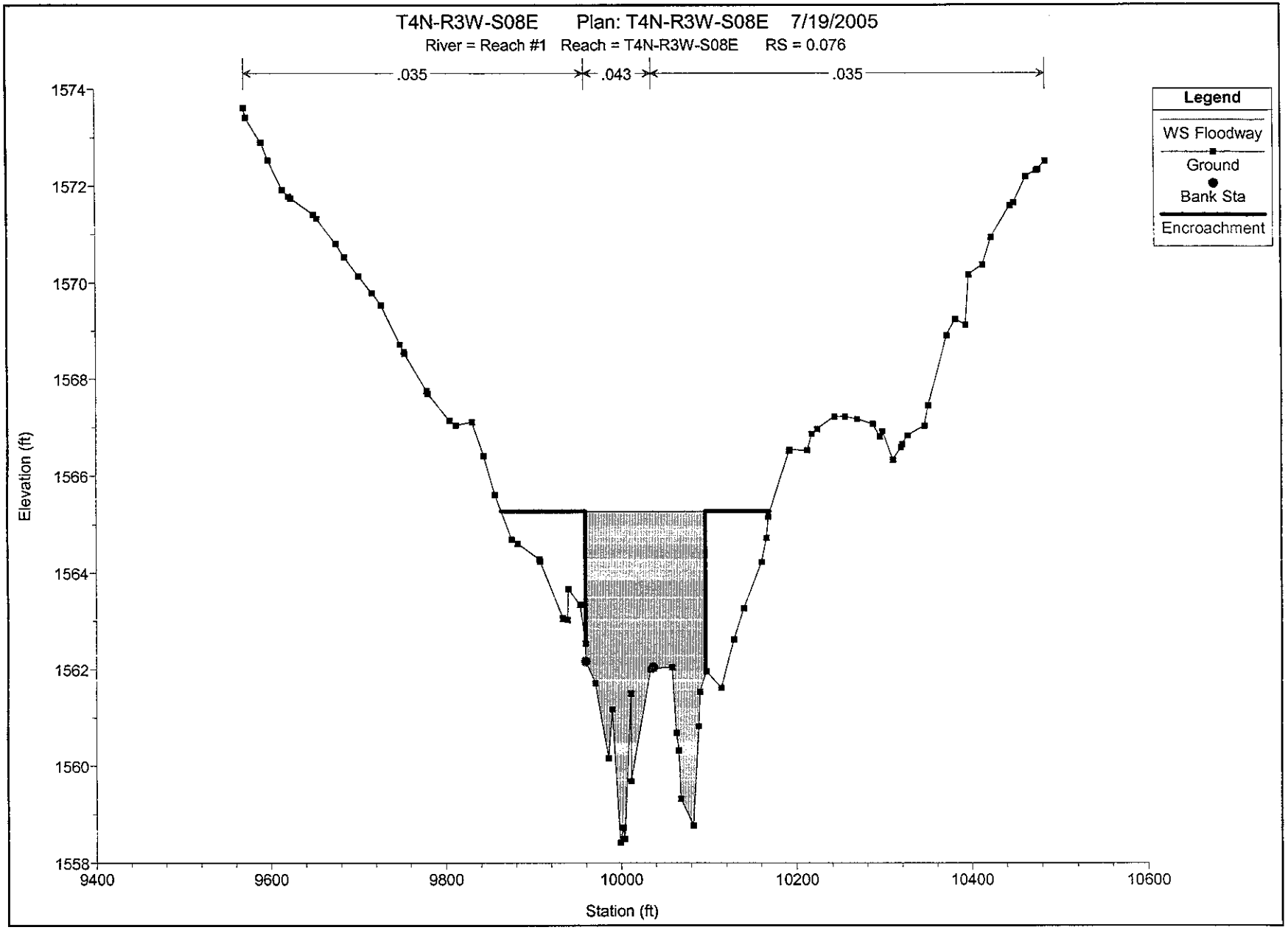

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 0.552
.035
.043
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1590
1588
1586
1584
1582
1580
1578
1576
9400
9600
9800
10000
10200
10400
10600
Station (ft)

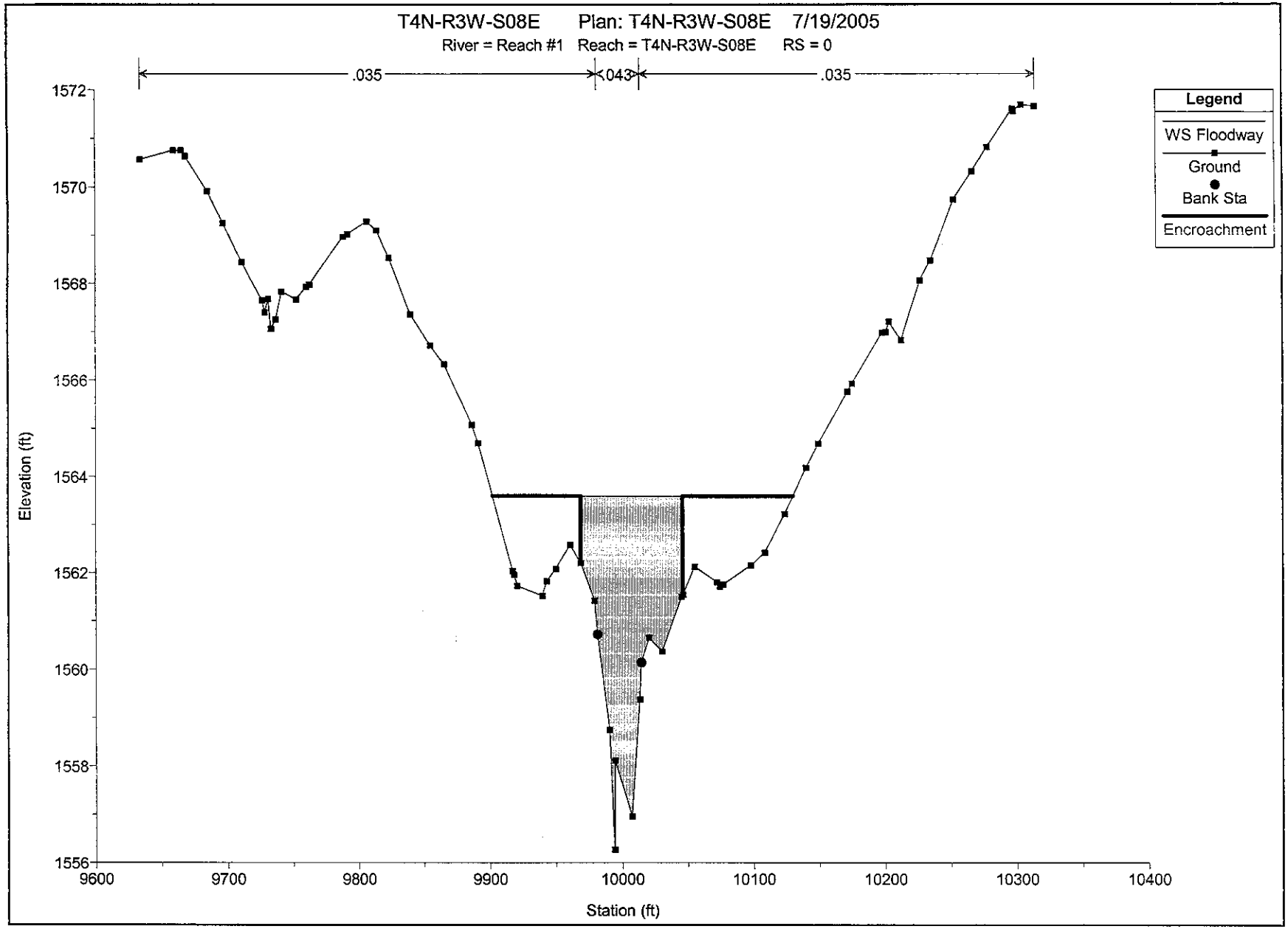

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 0.459
.035
.043
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1588
1586
1584
1582
1580
1578
1576
1574
1572
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)


T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 0.366
.035
.043
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1578
1576
1574
1572
1570
1568
9900
9950
10000
10050
10100
10150
10200
Station (ft)

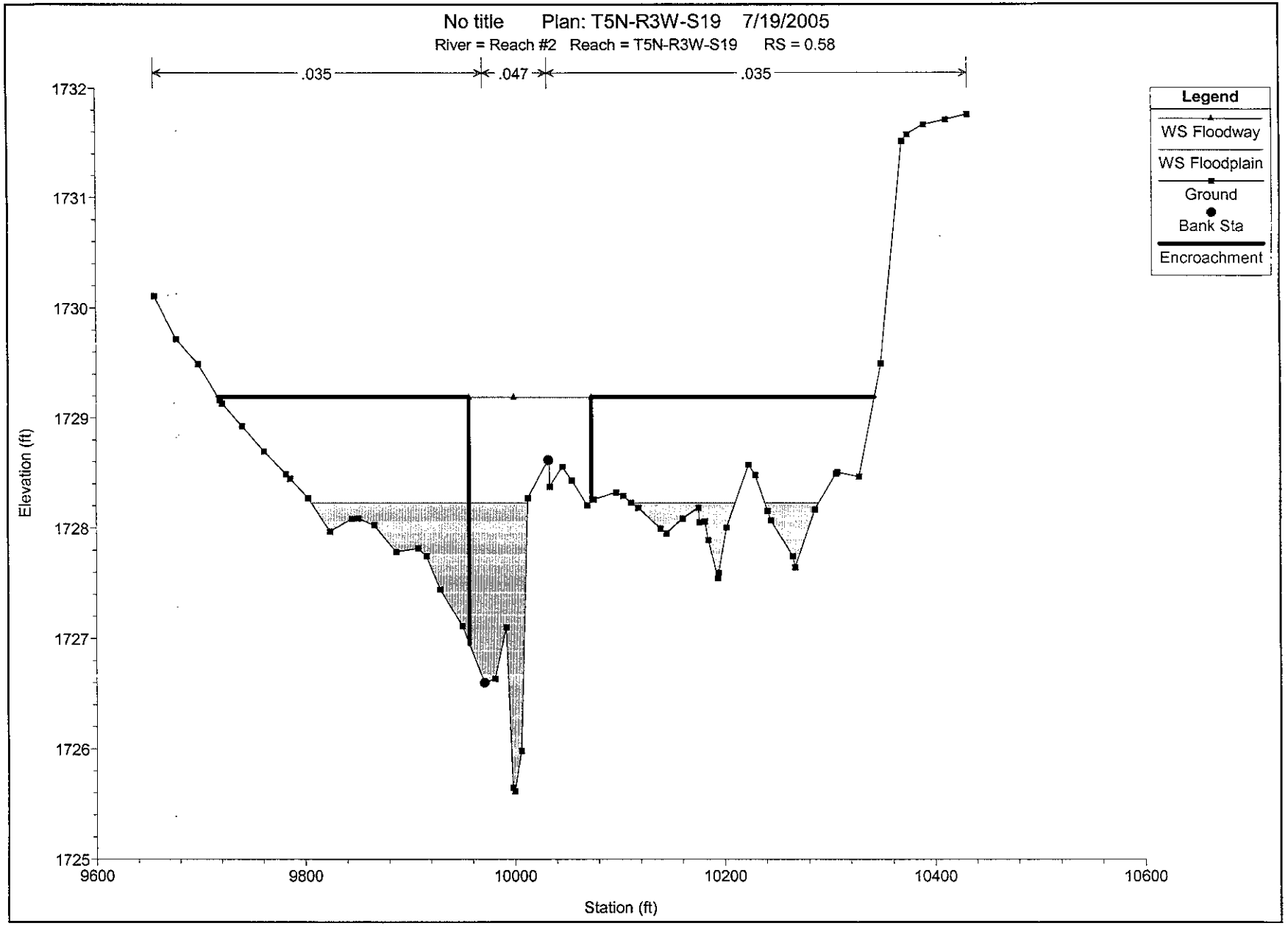

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 0.268
.035
.043
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1582
1580
1578
1576
1574
1572
1570
1568
1566
1564
9600
9700
9800
9900
10000
10100
10200
10300
Station (ft)

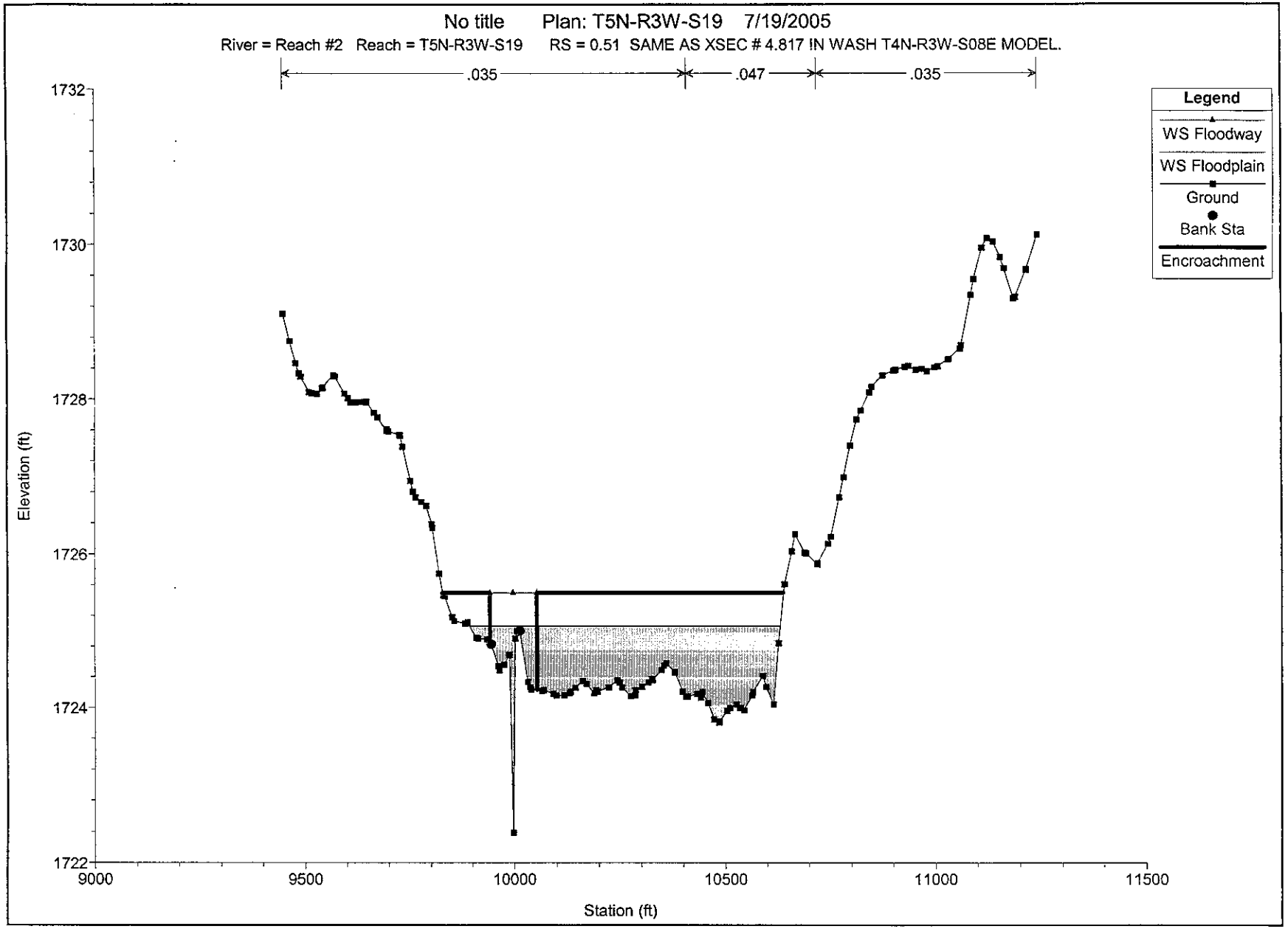

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 0.184
.035
.043
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1578
1576
1574
1572
1570
1568
1566
1564
1562
9600
9700
9800
9900
10000
10100
10200
Station (ft)

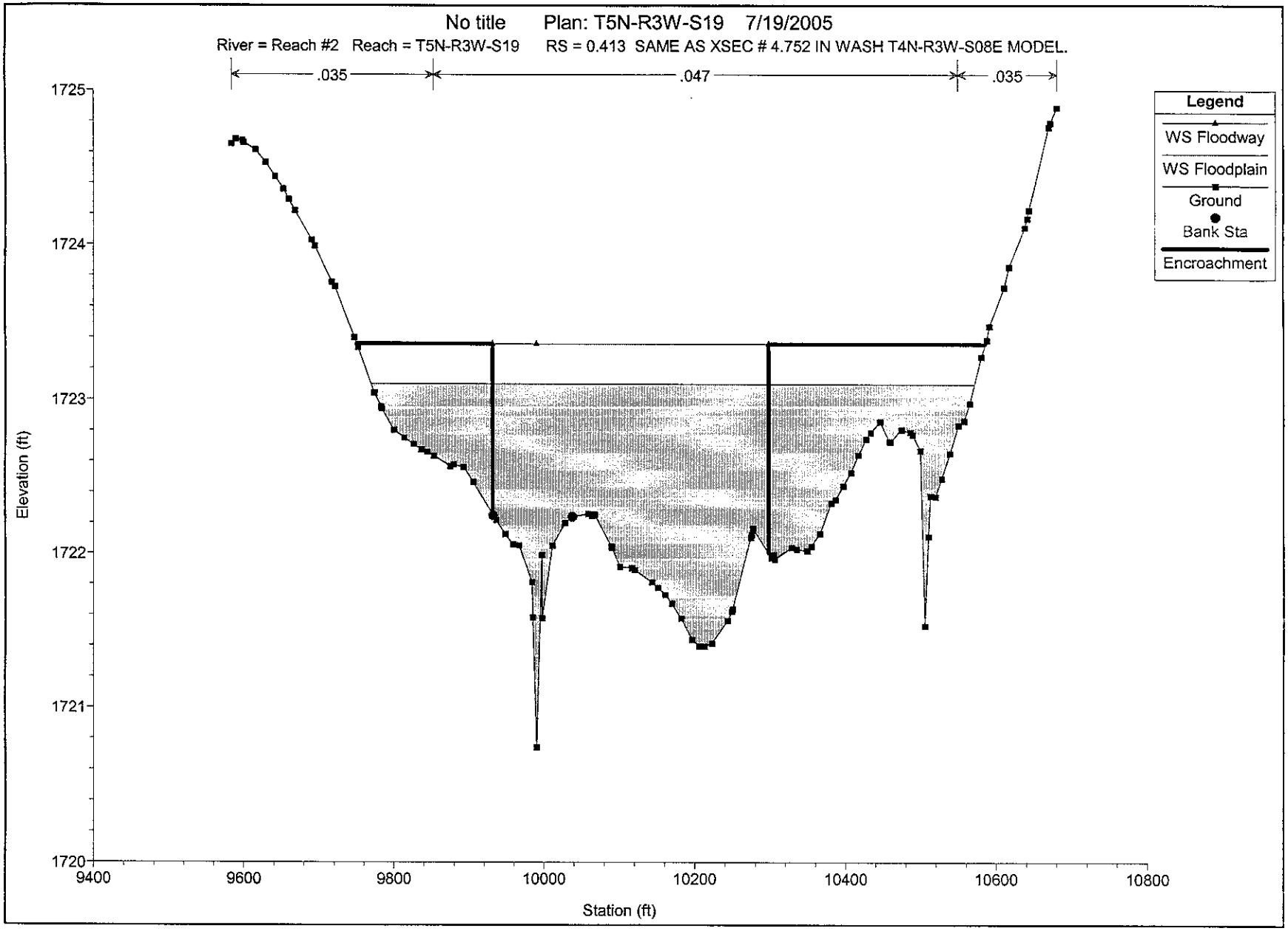

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 0.076
.035
.043
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1574
1572
1570
1568
1566
1564
1562
1560
1558
9400
9600
9800
10000
10200
10400
10600
Station (ft)

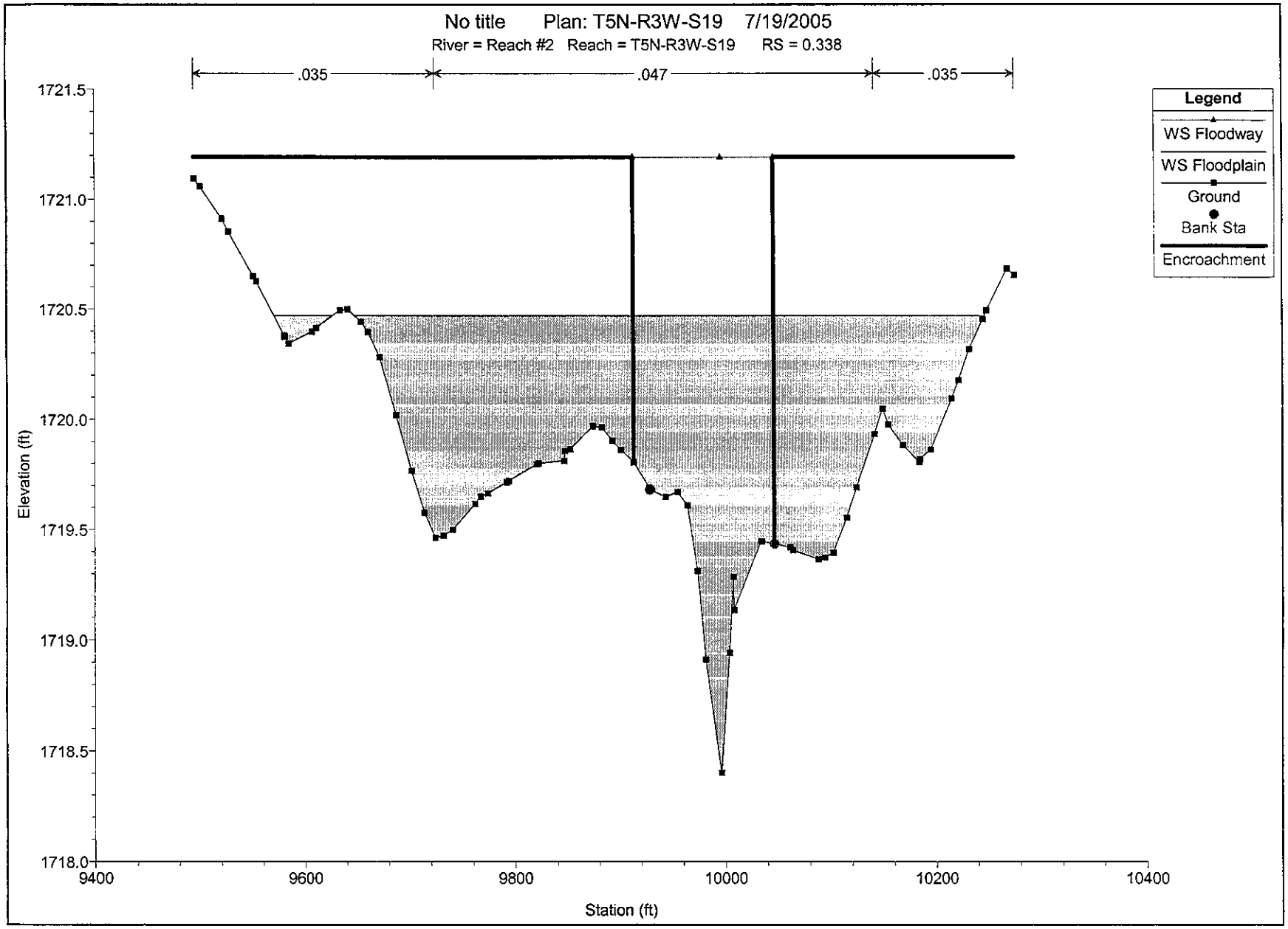

T4N-R3W-S08E Plan: T4N-R3W-S08E 7/19/2005
River = Reach #1 Reach = T4N-R3W-S08E RS = 0
.035
.043
.035
Legend
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1572
1570
1568
1566
1564
1562
1560
1558
1556
9600
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

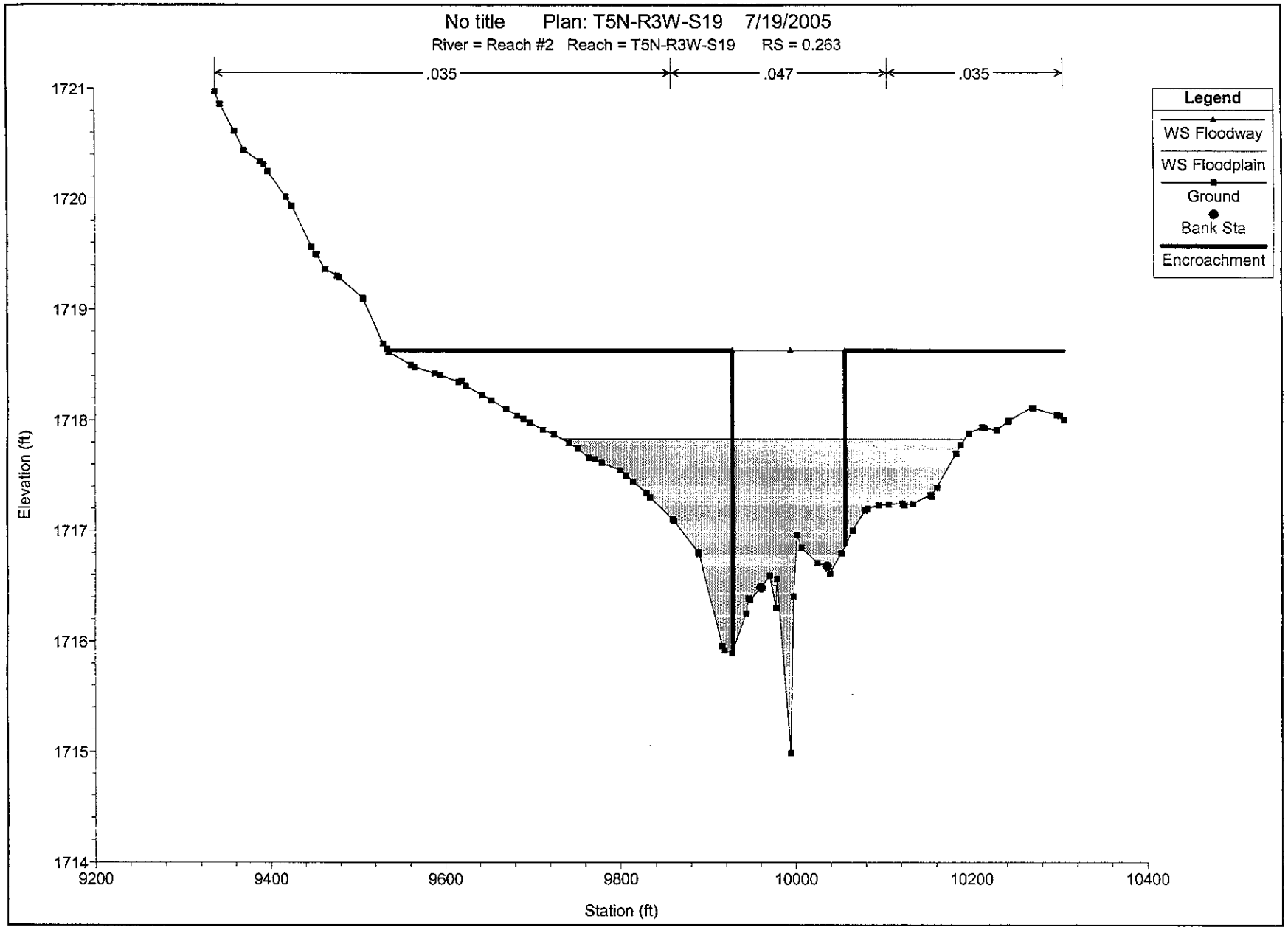
T5N-R3W-S19

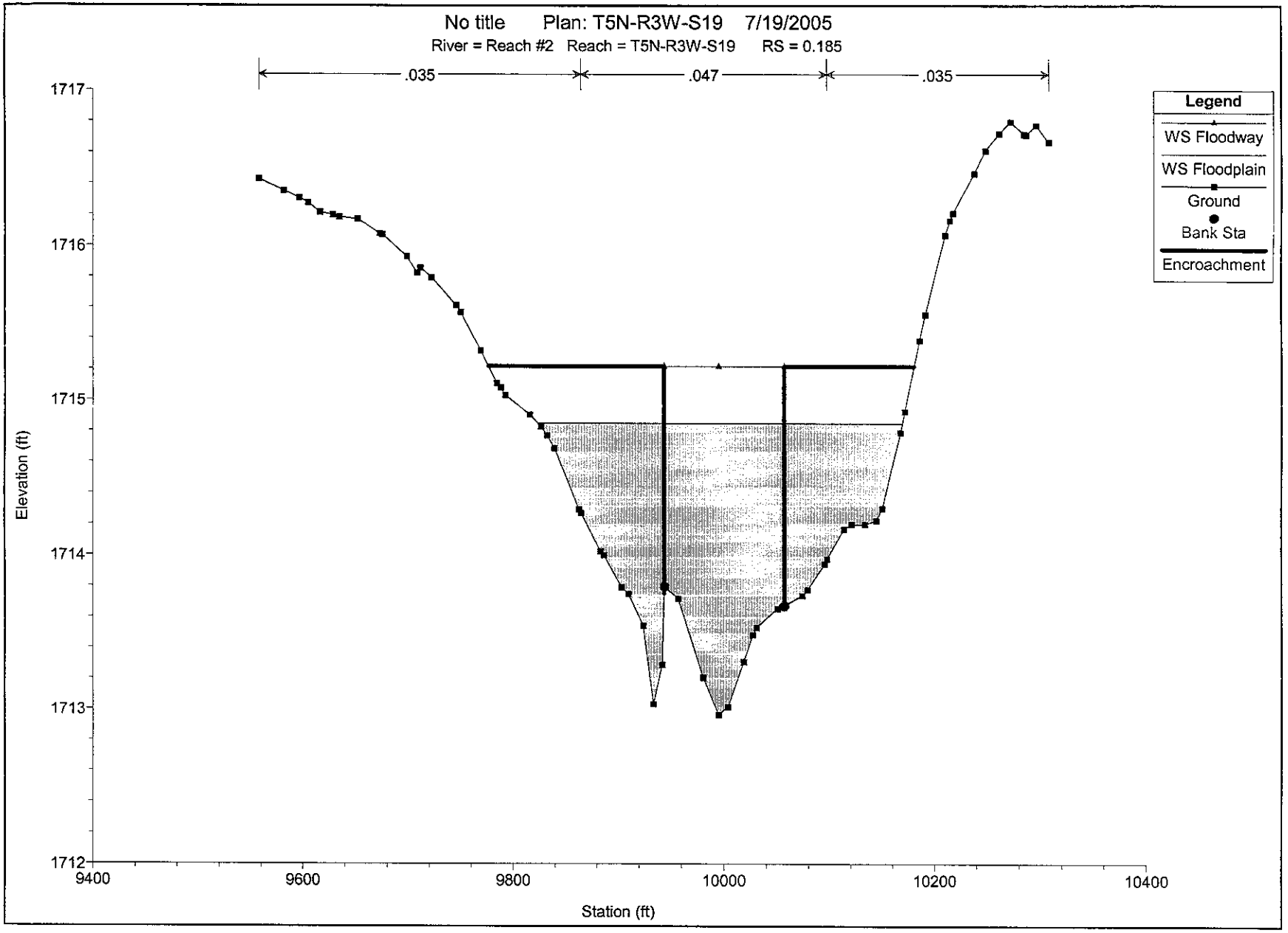

No title Plan: T5N-R3W-S19 7/19/2005
River = Reach #2 Reach = T5N-R3W-S19 RS = 0.58
.035
.047
.035
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1732
1731
1730
1729
1728
1727
1726
1725
9600
9800
10000
10200
10400
10600
Station (ft)

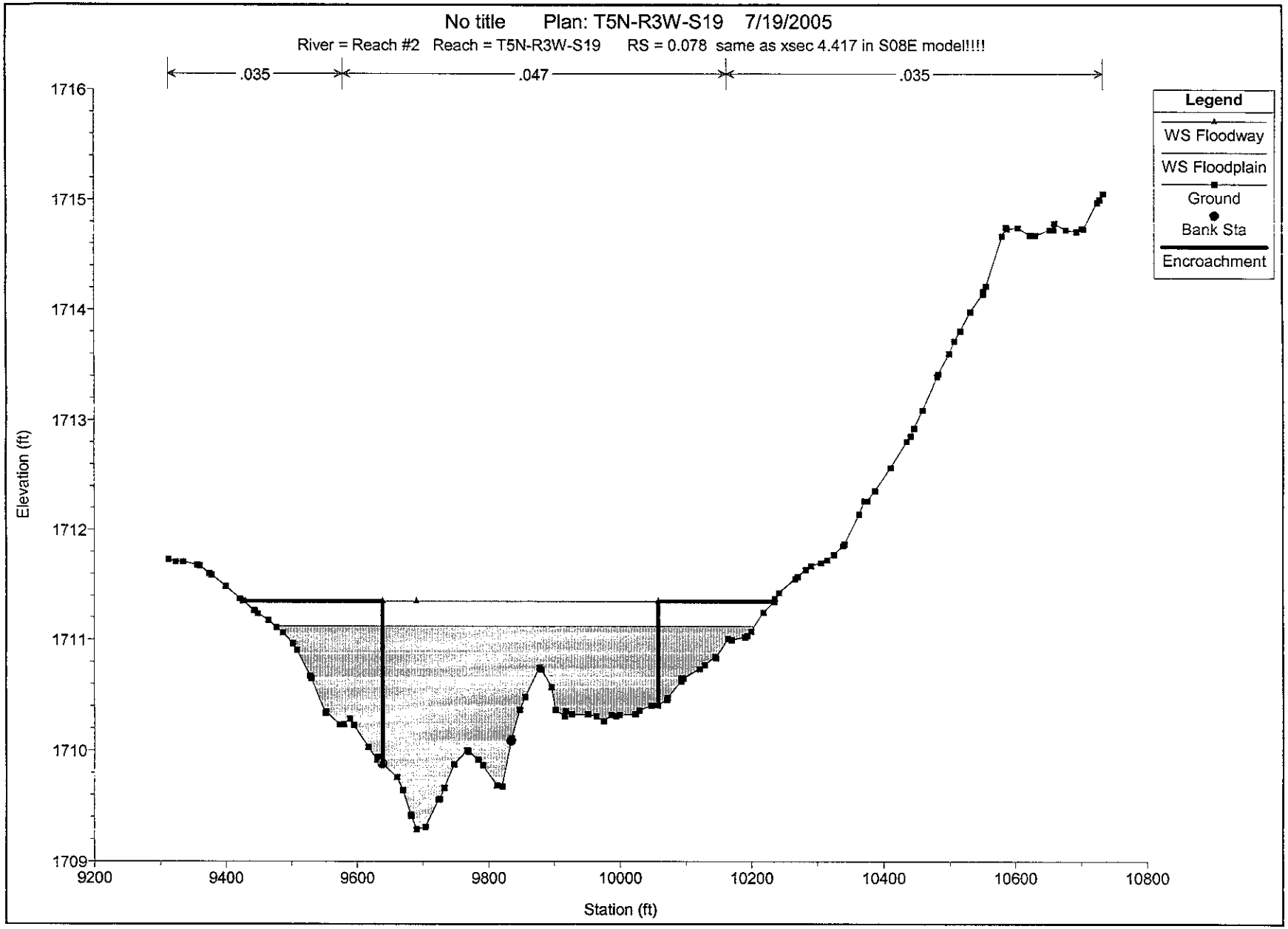

No title Plan: T5N-R3W-S19 7/19/2005
River = Reach #2 Reach = T5N-R3W-S19 RS = 0.51 SAME AS XSEC # 4.817 IN WASH T4N-R3W-S08E MODEL.
.035
.047
.035
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1732
1730
1728
1726
1724
1722
9000
9500
10000
10500
11000
11500
Station (ft)

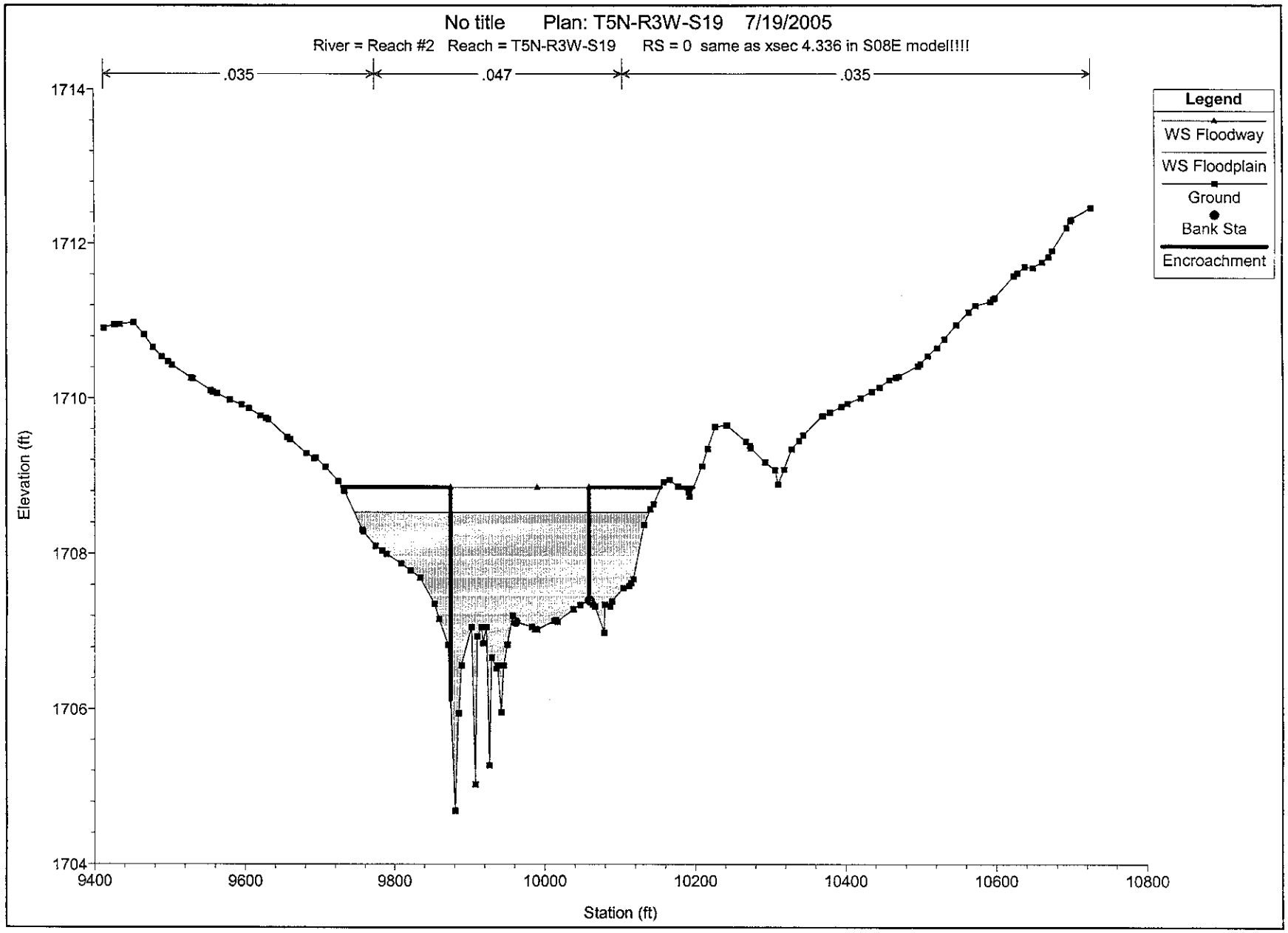

No title Plan: T5N-R3W-S19 7/19/2005
River = Reach #2 Reach = T5N-R3W-S19 RS = 0.413 SAME AS XSEC # 4.752 IN WASH T4N-R3W-S08E MODEL.
.035
.047
.035
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1725
1724
1723
1722
1721
1720
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)


No title Plan: T5N-R3W-S19 7/19/2005
River = Reach #2 Reach = T5N-R3W-S19 RS = 0.338
.035
.047
.035
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1721.5
1721.0
1720.5
1720.0
1719.5
1719.0
1718.5
1718.0
9400
9600
9800
10000
10200
10400
Station (ft)

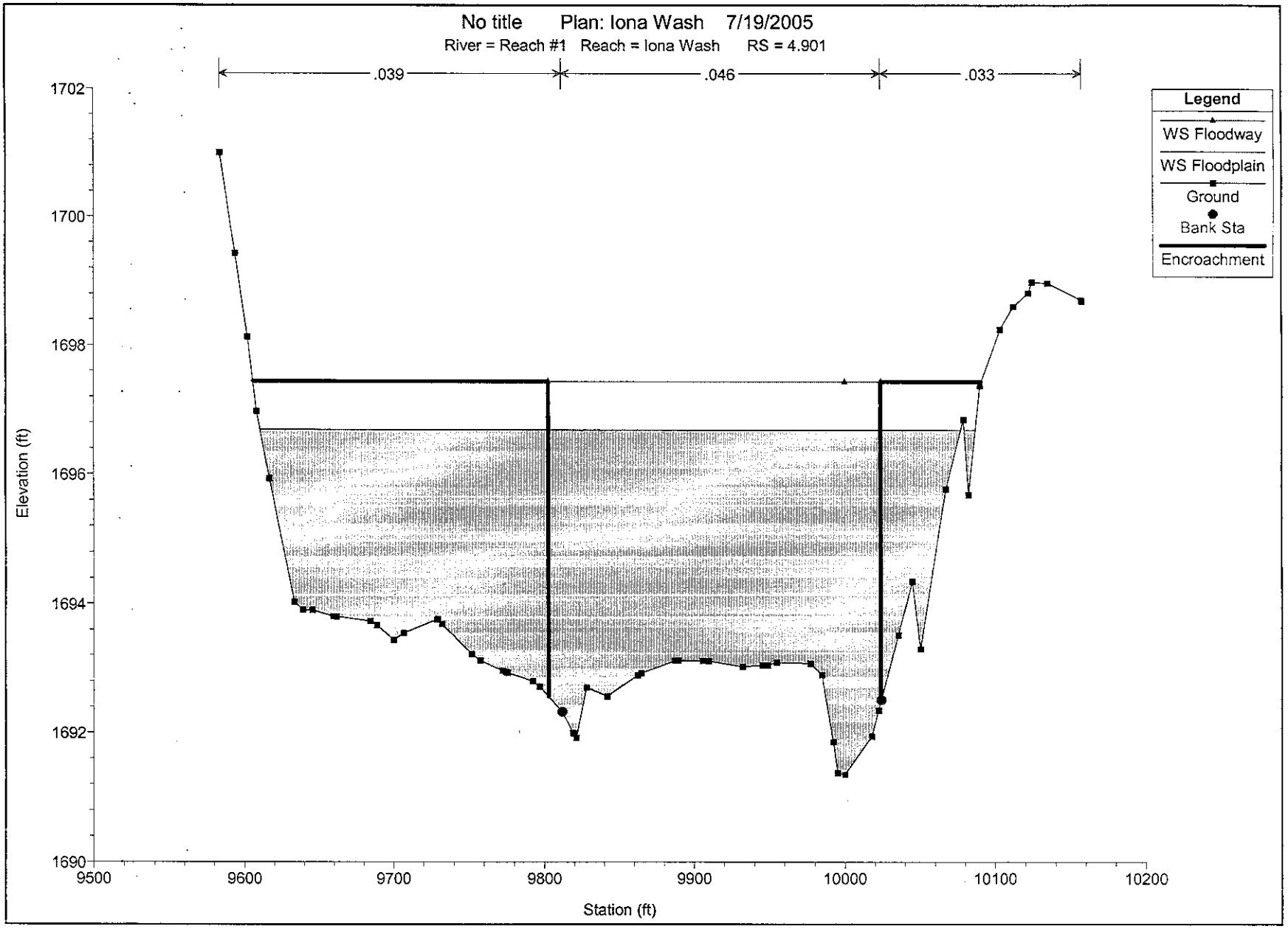

No title Plan: T5N-R3W-S19 7/19/2005
River = Reach #2 Reach = T5N-R3W-S19 RS = 0.263
.035
.047
.035
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1721
1720
1719
1718
1717
1716
1715
1714
9200
9400
9600
9800
10000
10200
10400
Station (ft)

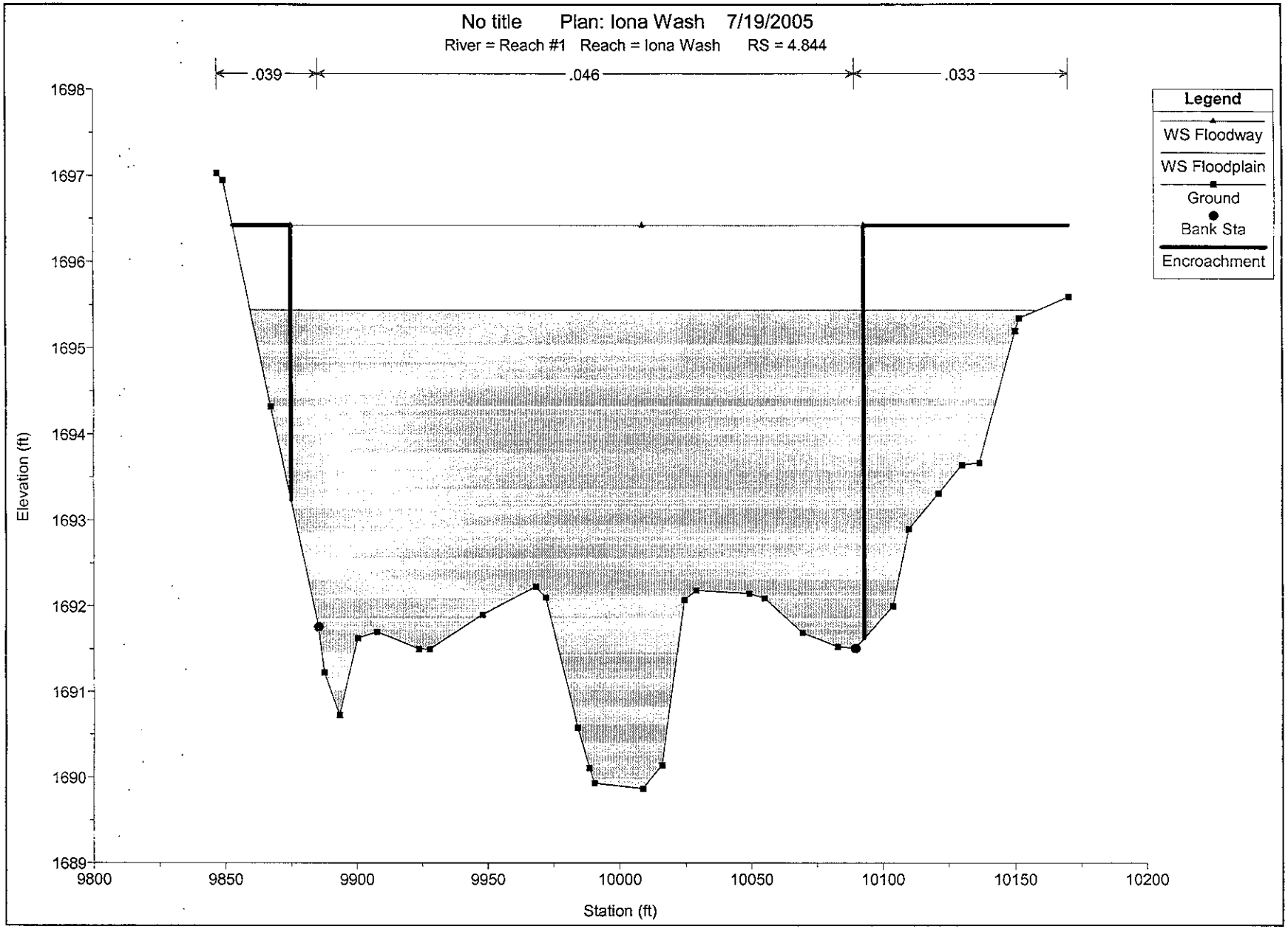

No title Plan: T5N-R3W-S19 7/19/2005
River = Reach #2 Reach = T5N-R3W-S19 RS = 0.185
.035
.047
.035
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1717
1716
1715
1714
1713
1712
9400
9600
9800
10000
10200
10400
Station (ft)

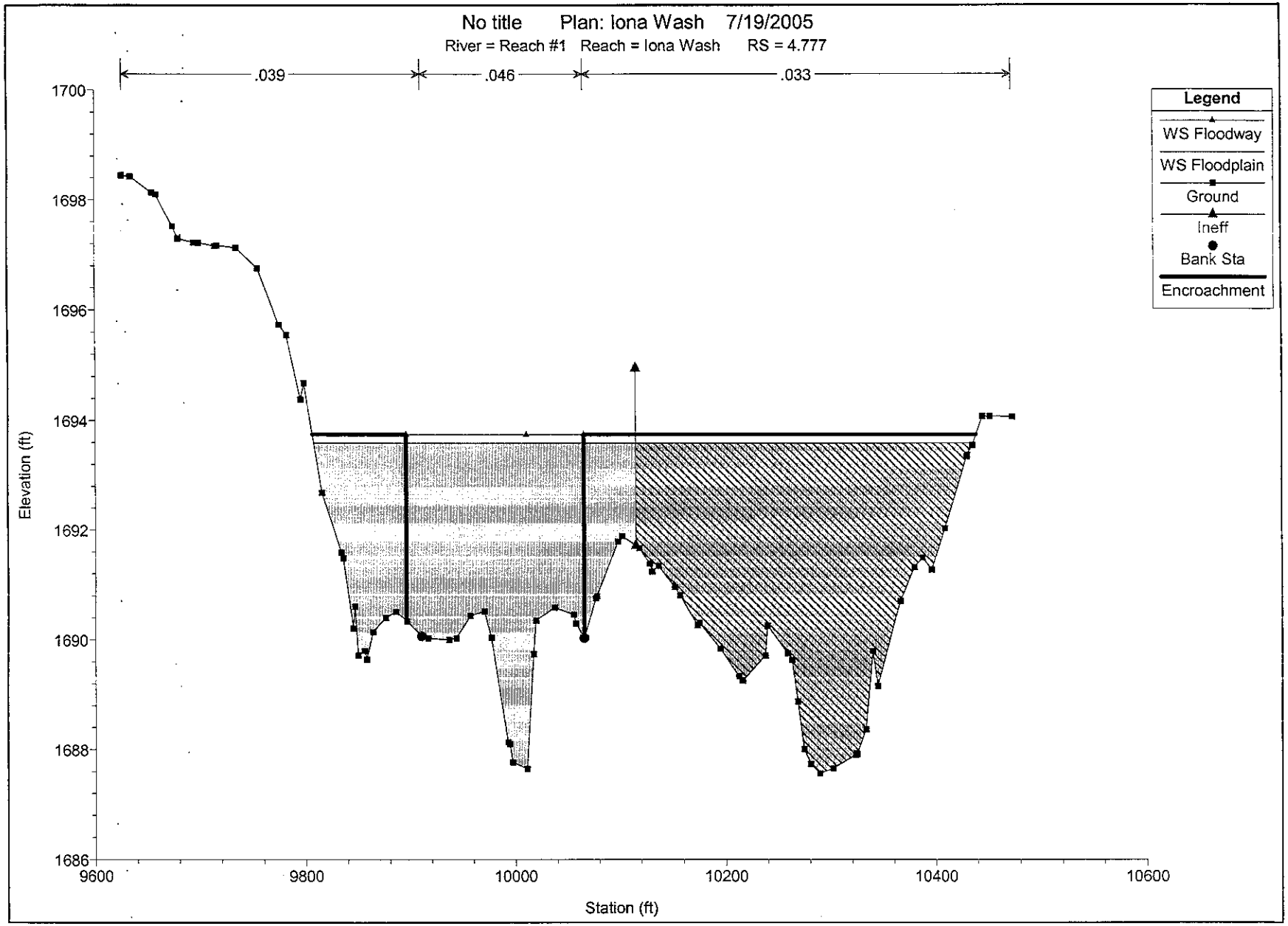

No title Plan: T5N-R3W-S19 7/19/2005
River = Reach #2 Reach = T5N-R3W-S19 RS = 0.078 same as xsec 4.417 in S08E model!!!!
.035
.047
.035
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1716
1715
1714
1713
1712
1711
1710
1709
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

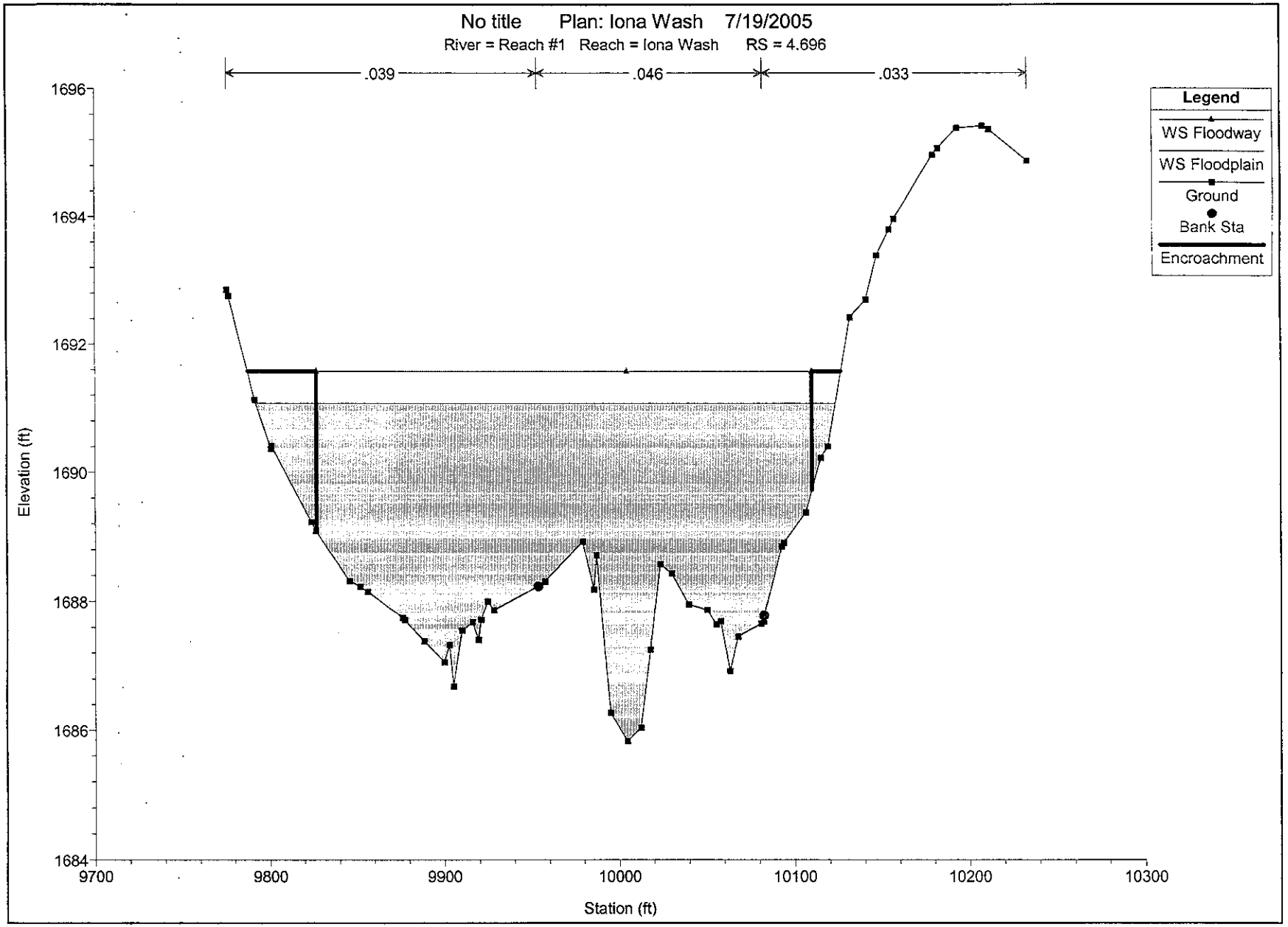

No title Plan: T5N-R3W-S19 7/19/2005
River = Reach #2 Reach = T5N-R3W-S19 RS = 0 same as xsec 4.336 in S08E model!!!!
.035
.047
.035
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1714
1712
1710
1708
1706
1704
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

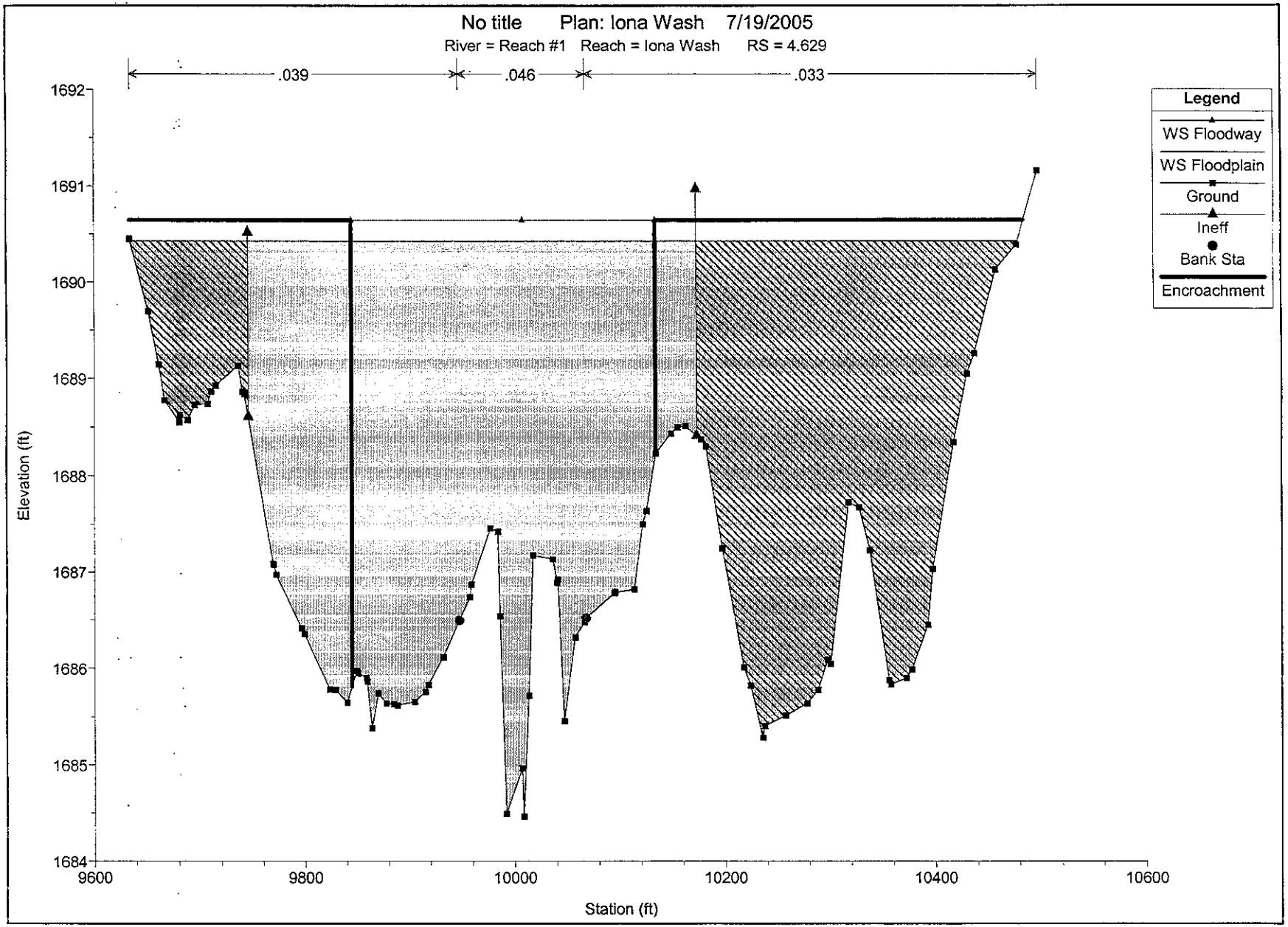
IONA WASH

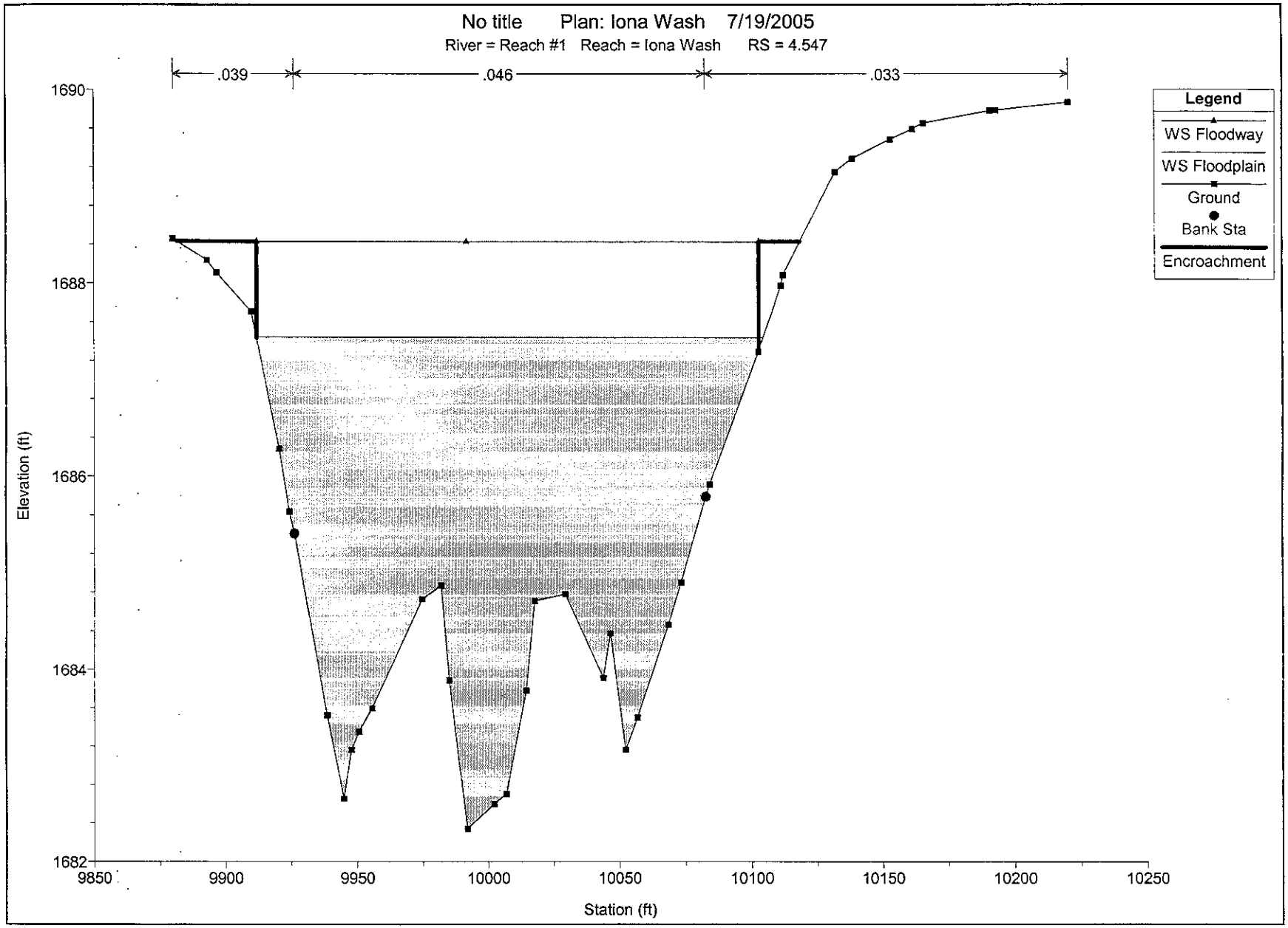

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 4.901
.039
.046
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1702
1700
1698
1696
1694
1692
1690
9500
9600
9700
9800
9900
10000
10100
10200
Station (ft)

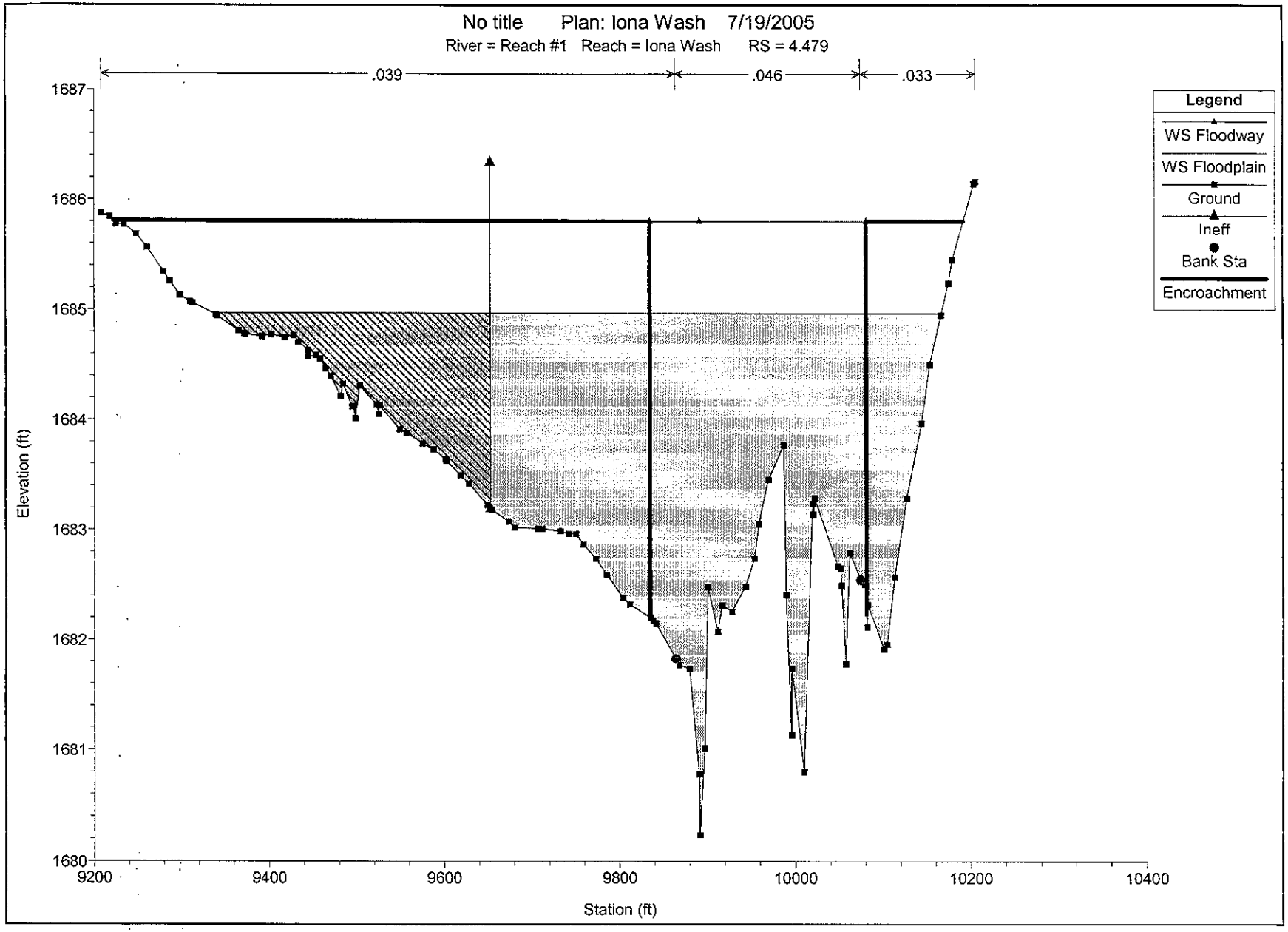

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 4.844
.039
.046
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1698
1697
1696
1695
1694
1693
1692
1691
1690
1689
9800
9850
9900
9950
10000
10050
10100
10150
10200
Station (ft)

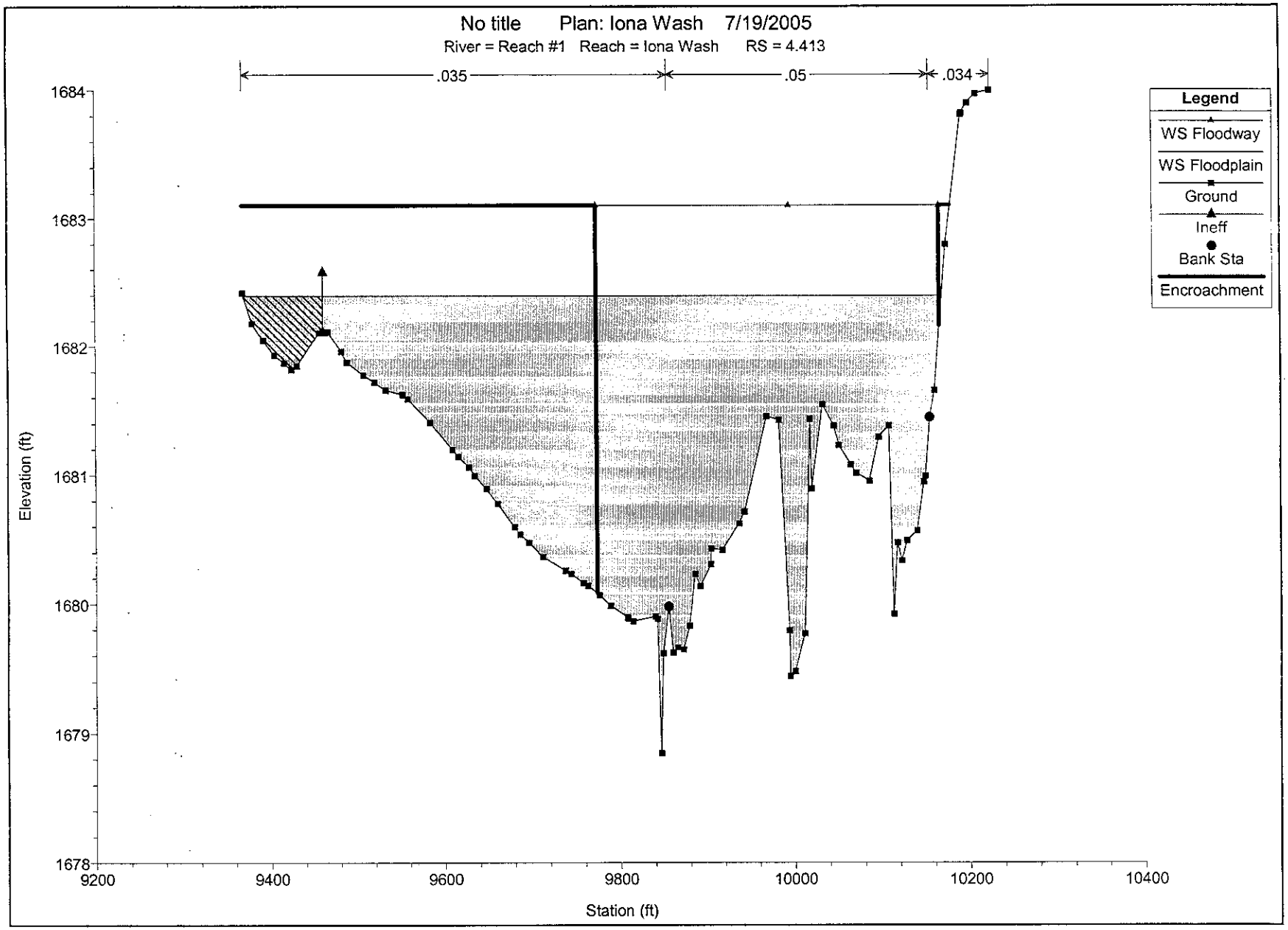

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 4.777
.039
.046
.033
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1700
1698
1696
1694
1692
1690
1688
1686
9600
9800
10000
10200
10400
10600
Station (ft)

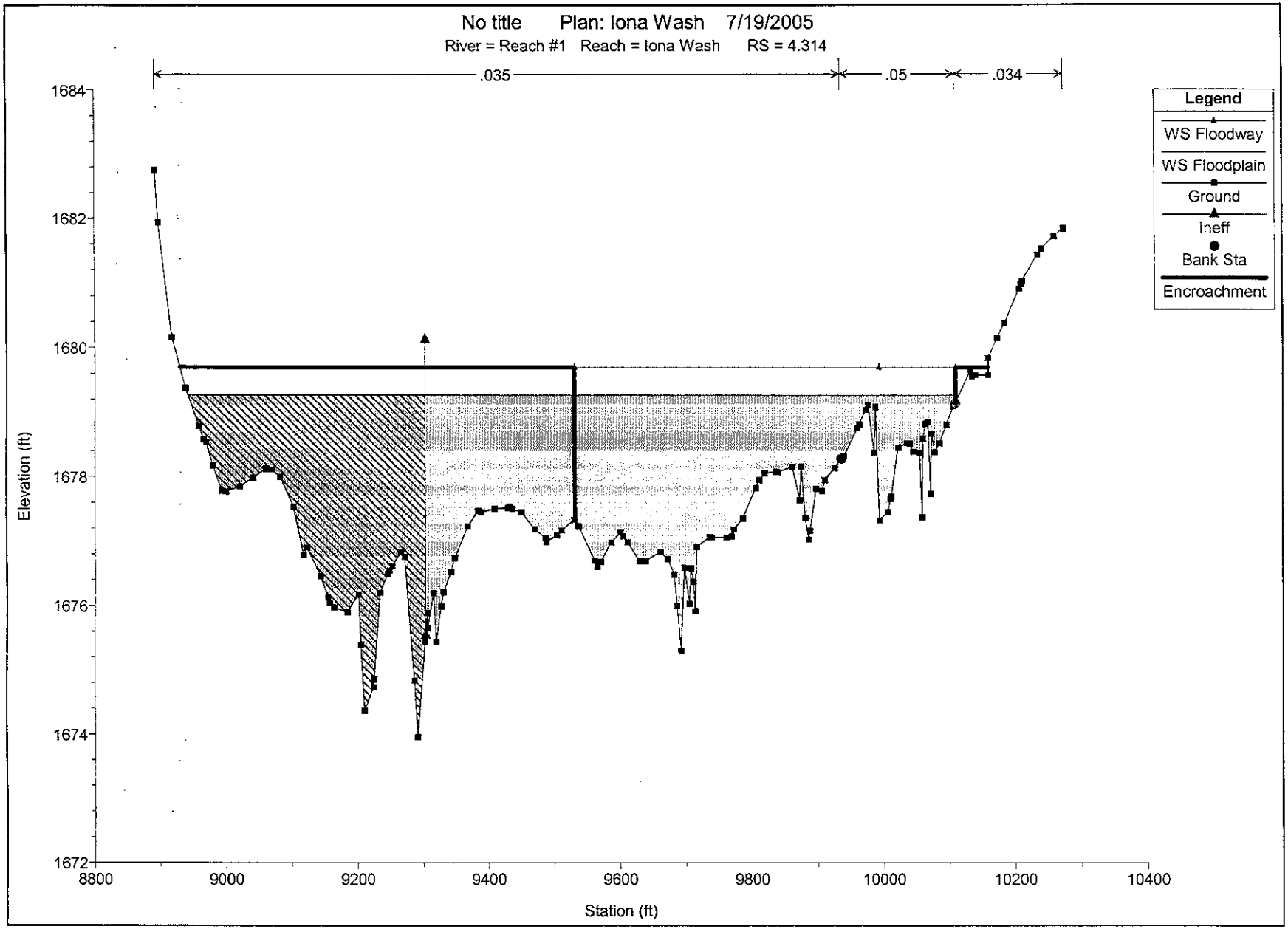

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 4.696
.039
.046
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1696
1694
1692
1690
1688
1686
1684
9700
9800
9900
10000
10100
10200
10300
Station (ft)

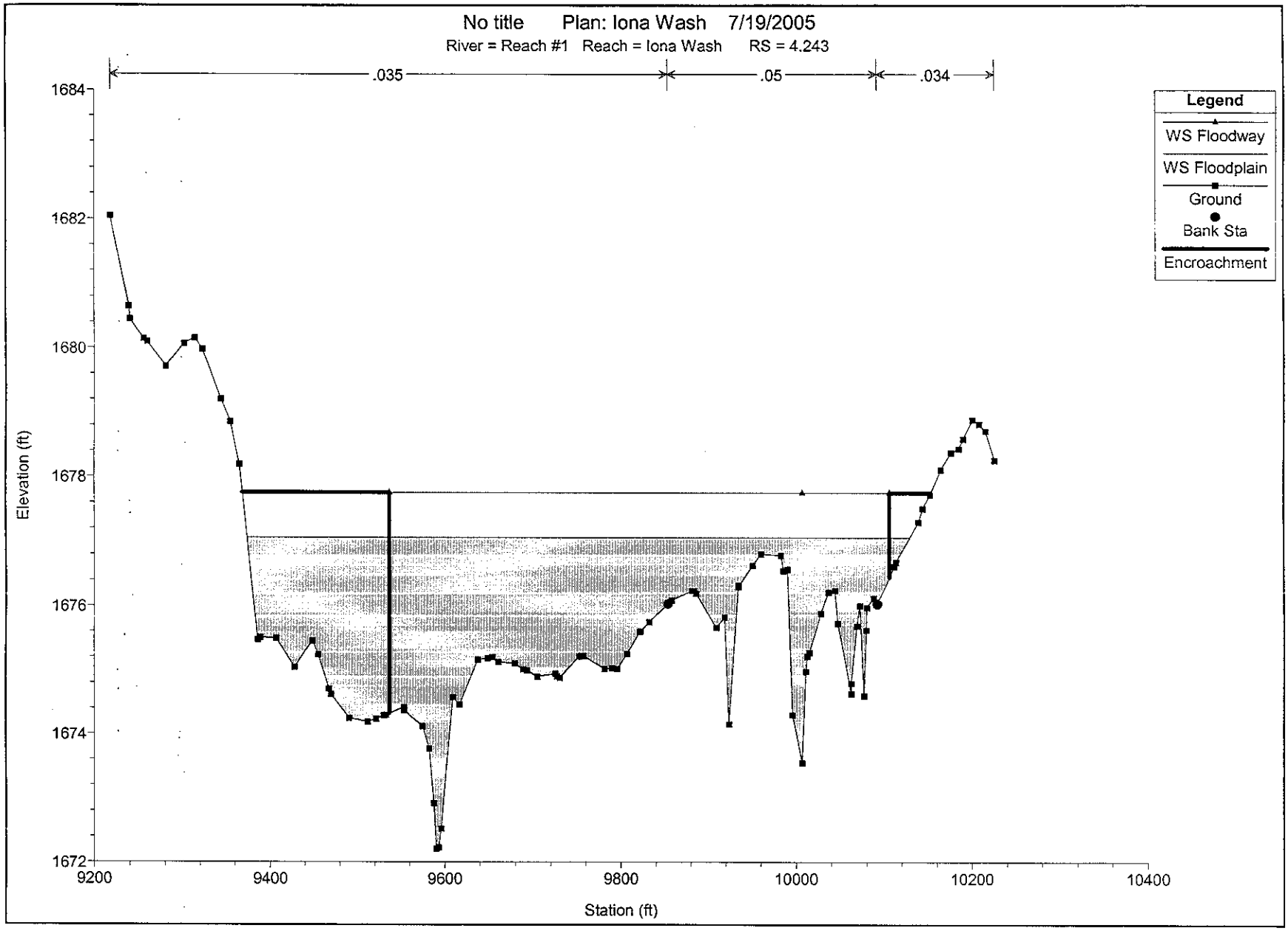

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 4.629
.039
.046
.033
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1692
1691
1690
1689
1688
1687
1686
1685
1684
9600
9800
10000
10200
10400
10600
Station (ft)

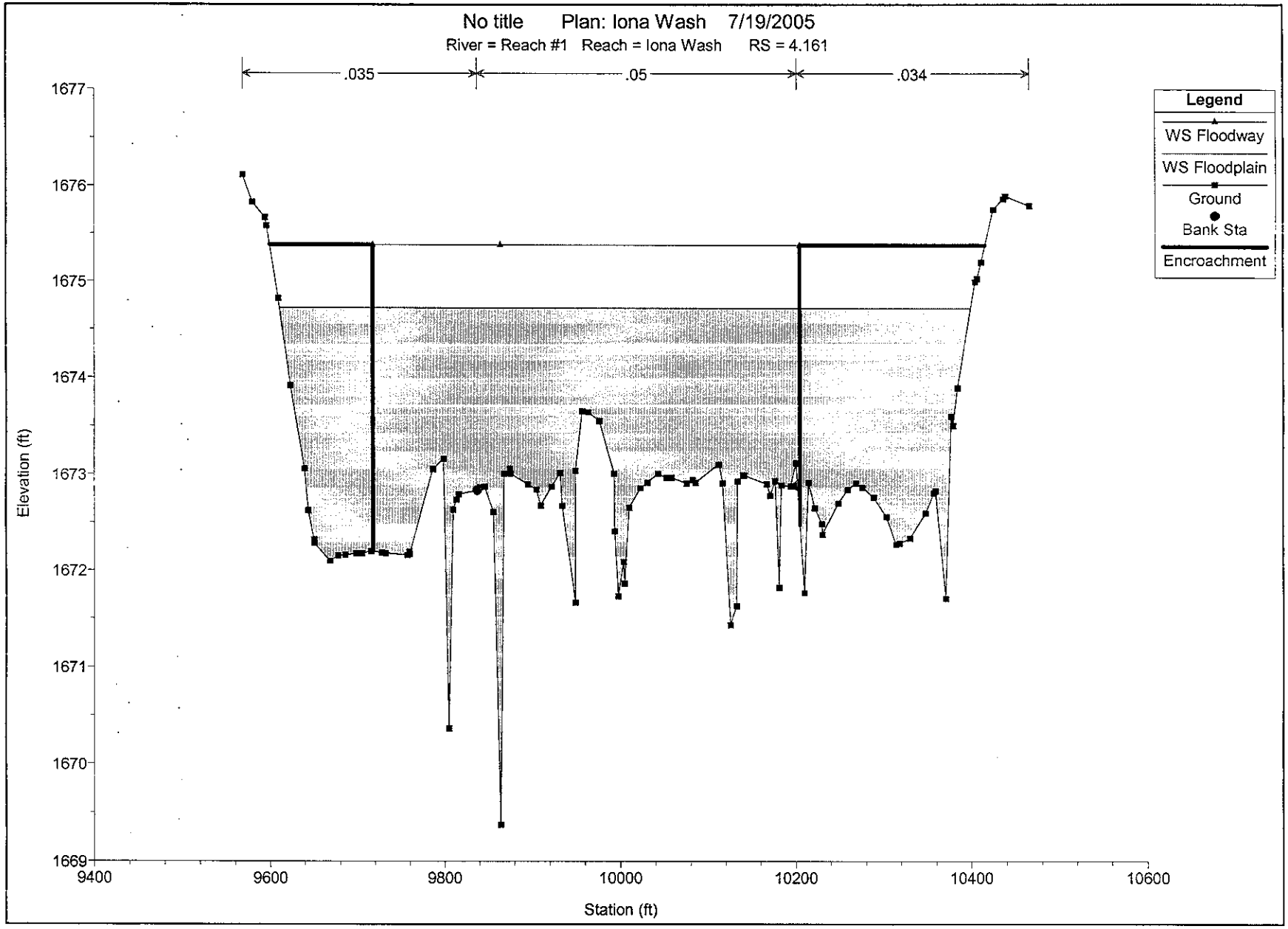

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 4.547
.039
.046
.033
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1690
1688
1686
1684
1682
9850
9900
9950
10000
10050
10100
10150
10200
10250
Station (ft)

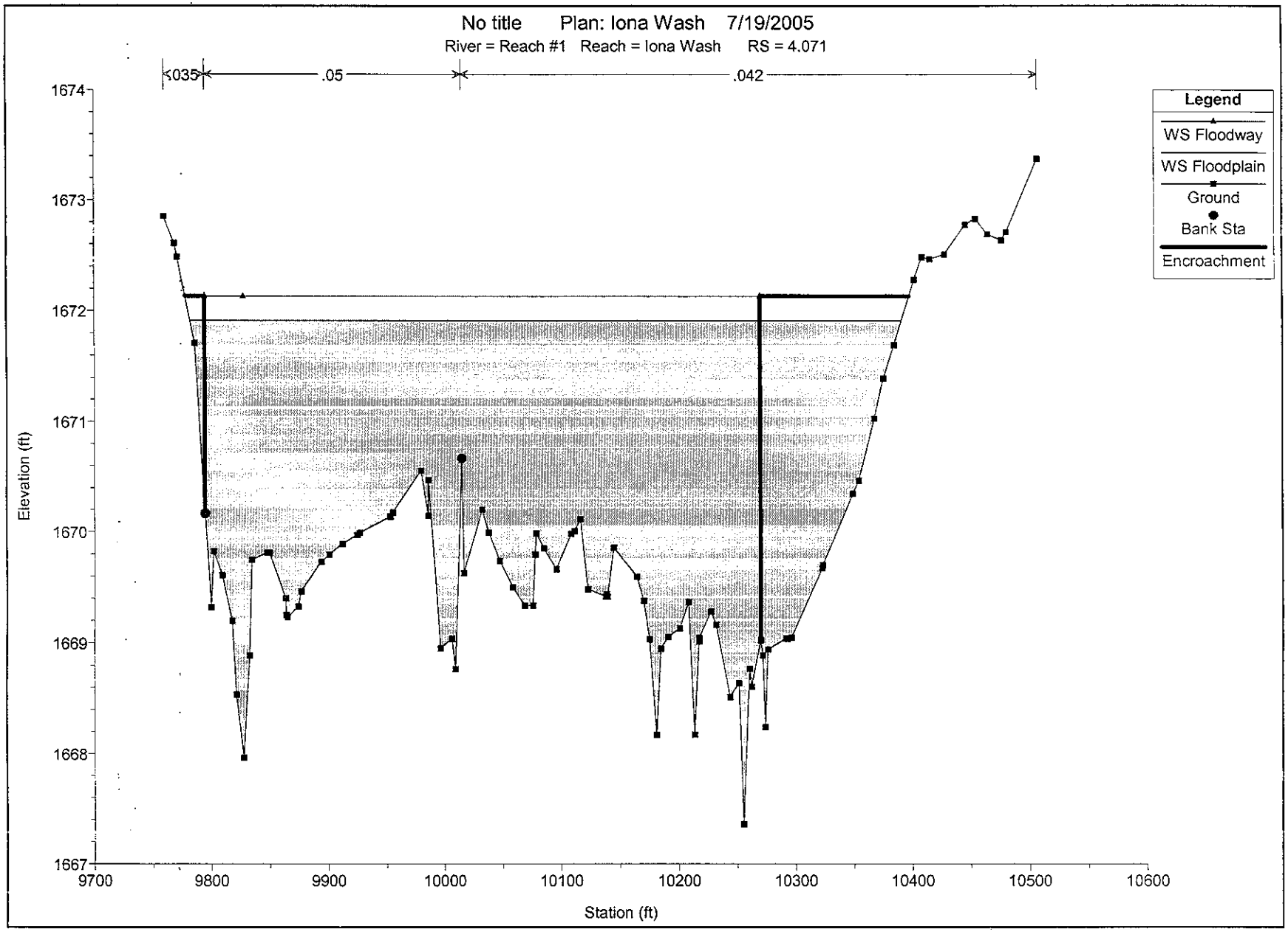

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 4.479
.039
.046
.033
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1687
1686
1685
1684
1683
1682
1681
1680
9200
9400
9600
9800
10000
10200
10400
Station (ft)

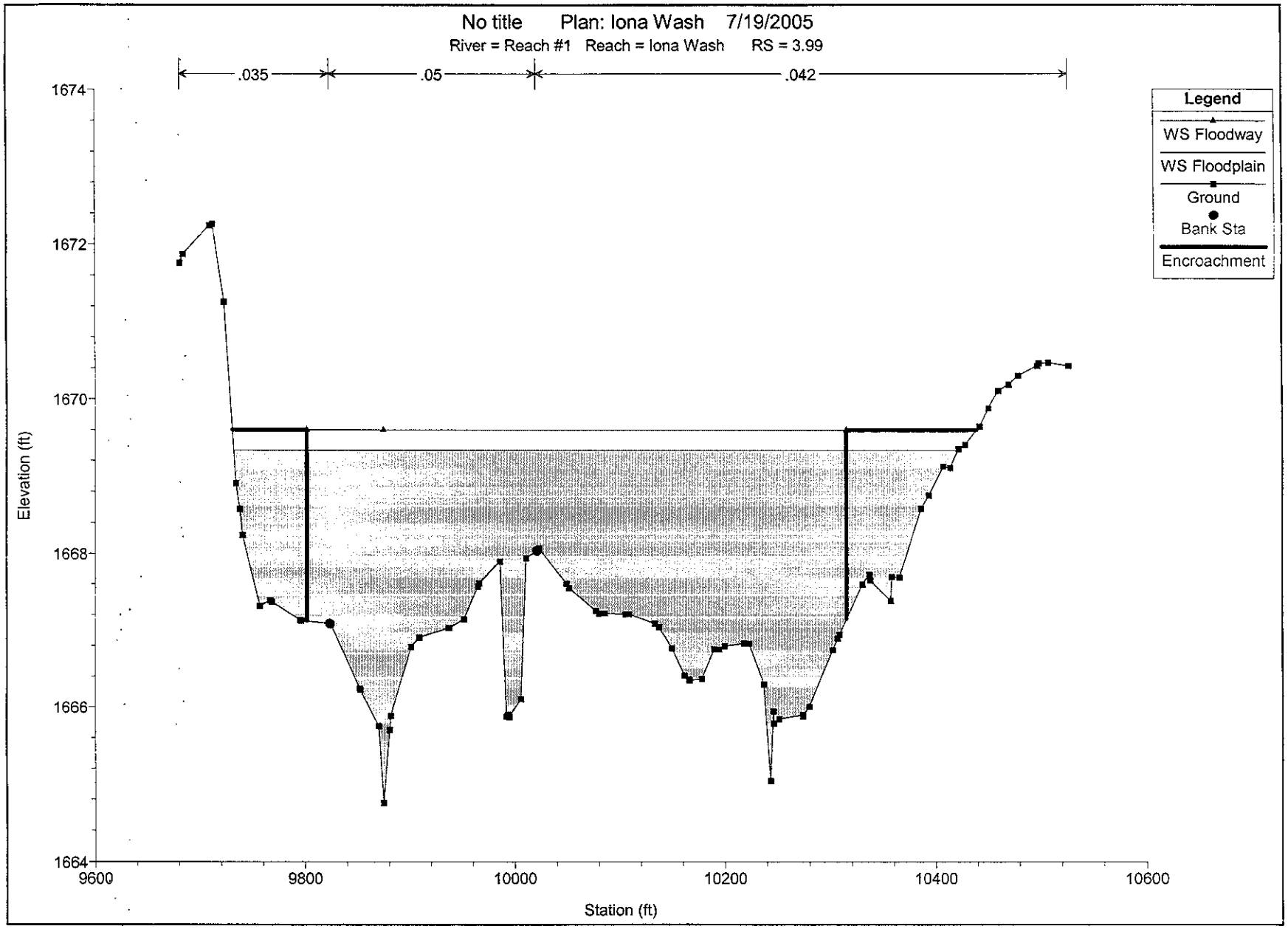

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 4.413
.035
.05
.034
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1684
1683
1682
1681
1680
1679
1678
9200
9400
9600
9800
10000
10200
10400
Station (ft)

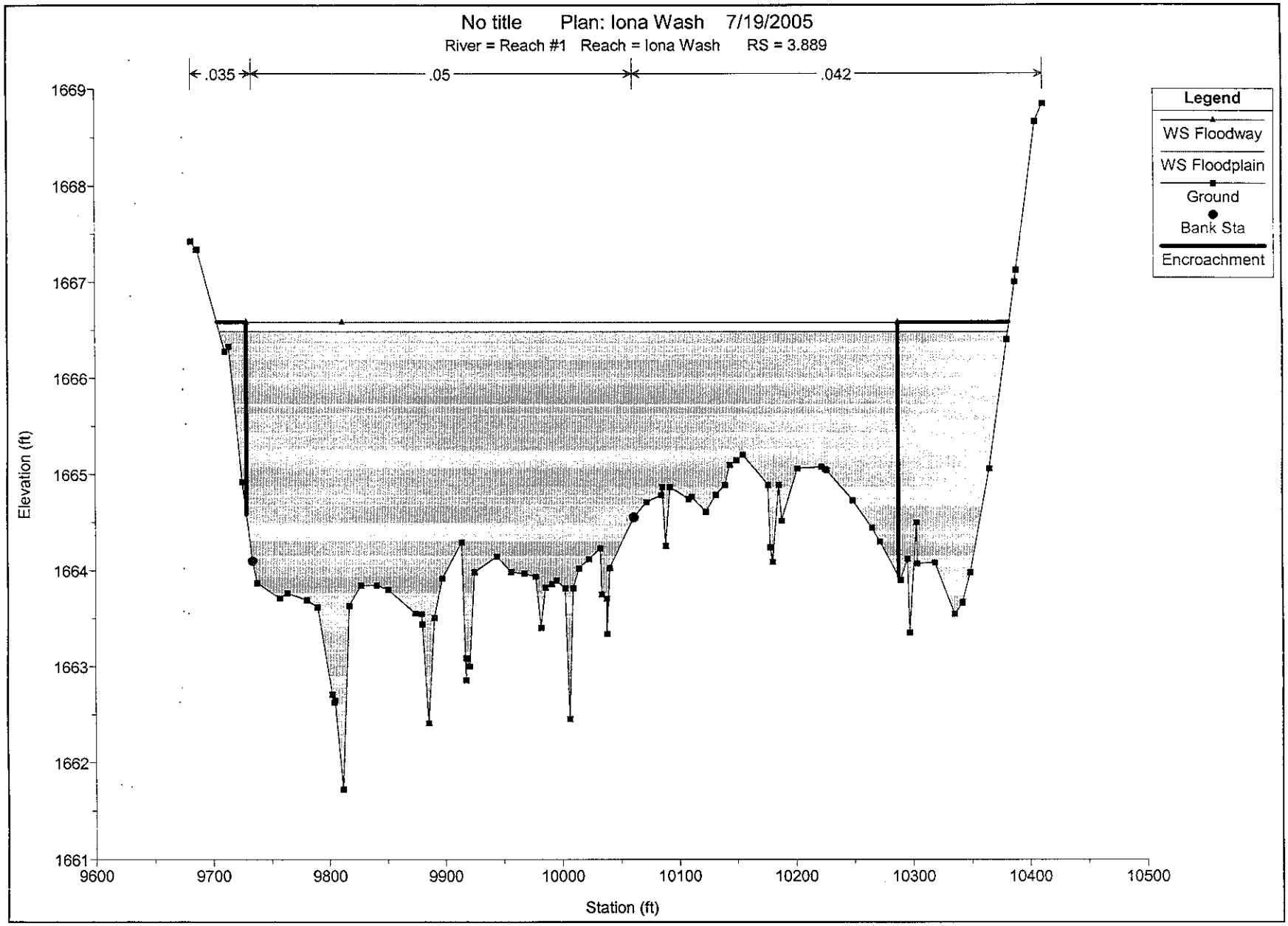

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 4.314
.035
.05
.034
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1684
1682
1680
1678
1676
1674
1672
8800
9000
9200
9400
9600
9800
10000
10200
10400
Station (ft)

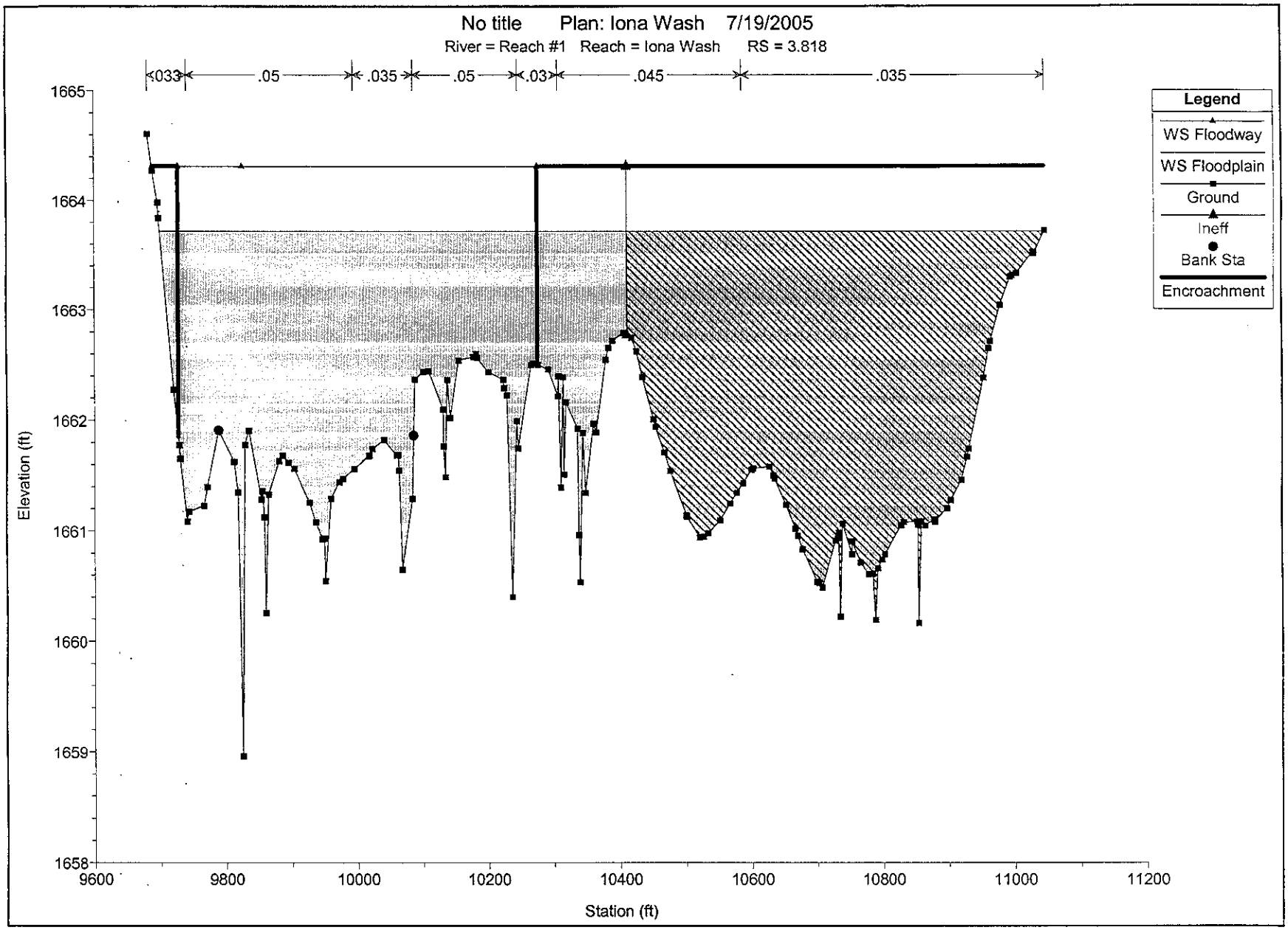

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 4.243
.035
.05
.034
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1684
1682
1680
1678
1676
1674
1672
9200
9400
9600
9800
10000
10200
10400
Station (ft)

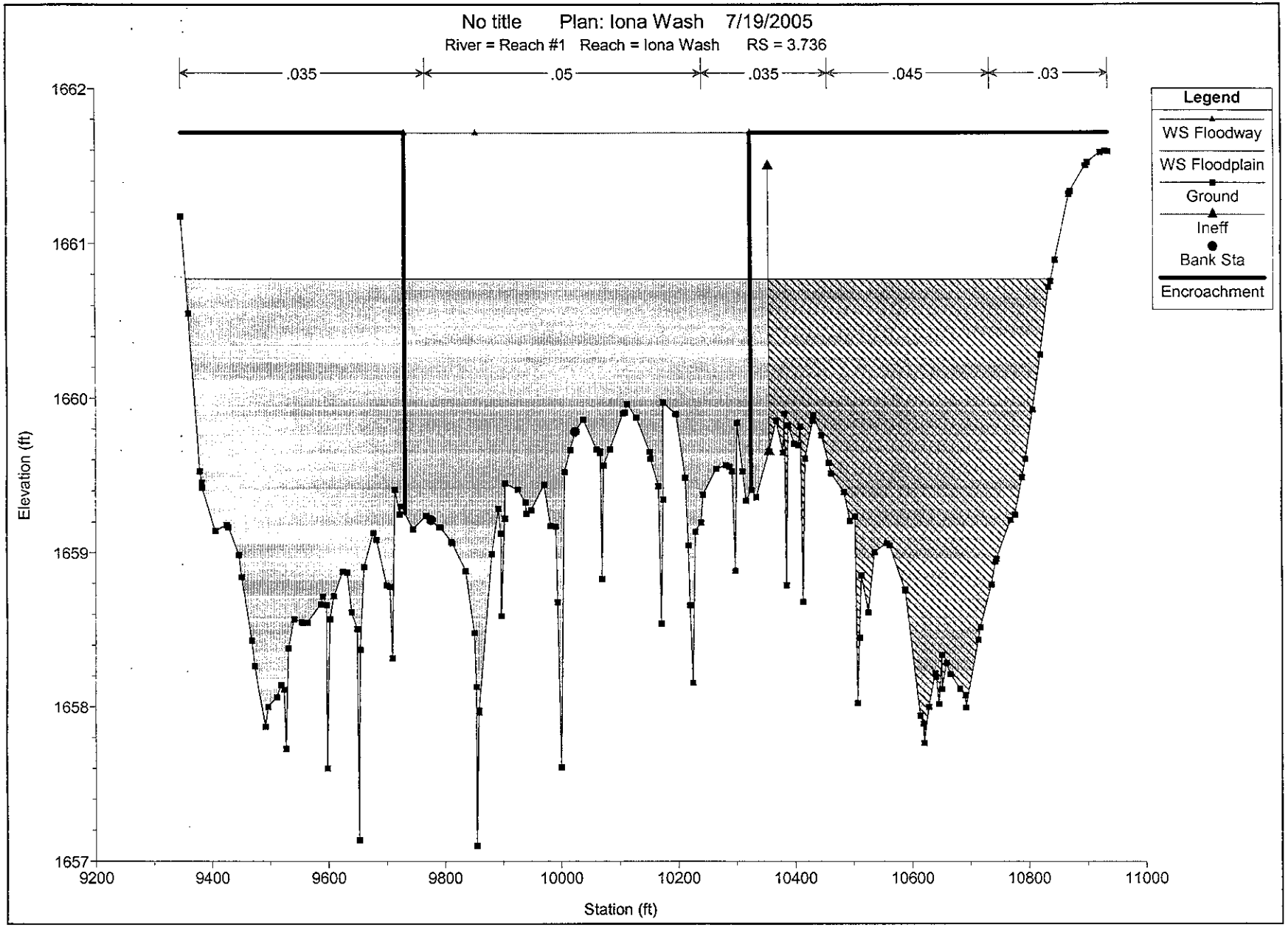

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 4.161
.035
.05
.034
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1677
1676
1675
1674
1673
1672
1671
1670
1669
9400
9600
9800
10000
10200
10400
10600
Station (ft)

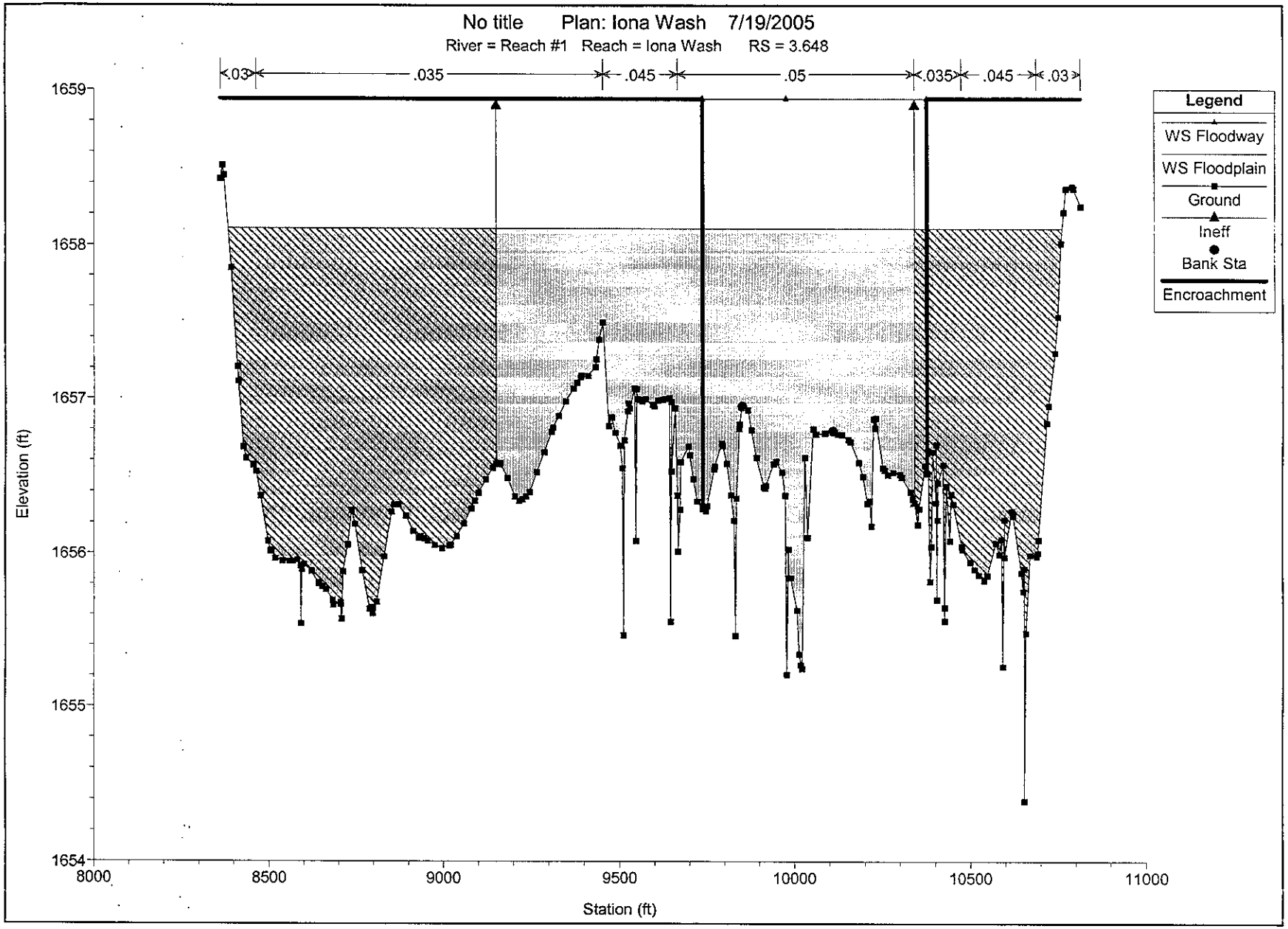

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 4.071
.035
.05
.042
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1674
1673
1672
1671
1670
1669
1668
1667
9700
9800
9900
10000
10100
10200
10300
10400
10500
10600
Station (ft)

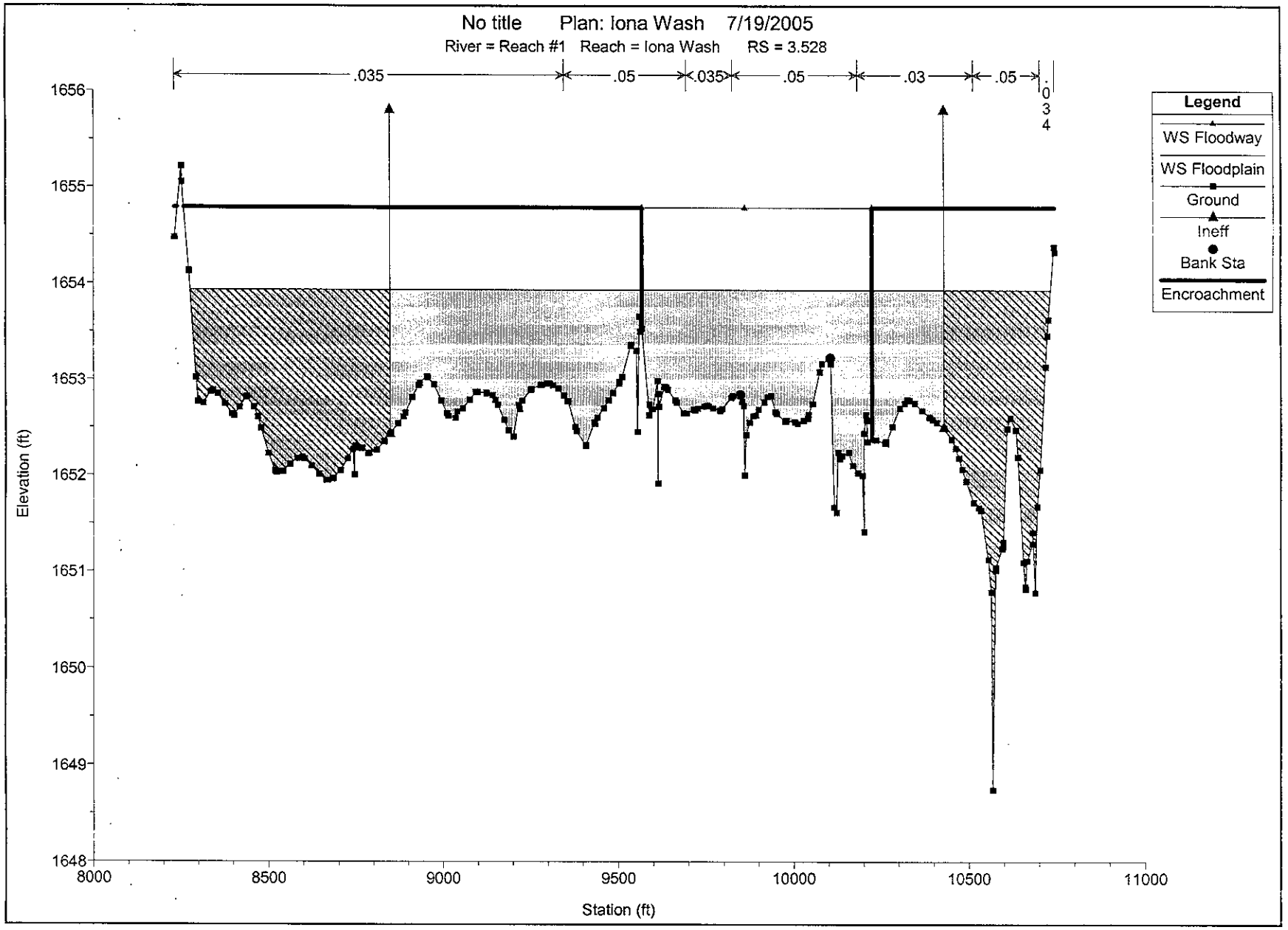

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 3.99
.035
.05
.042
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1674
1672
1670
1668
1666
1664
9600
9800
10000
10200
10400
10600
Station (ft)

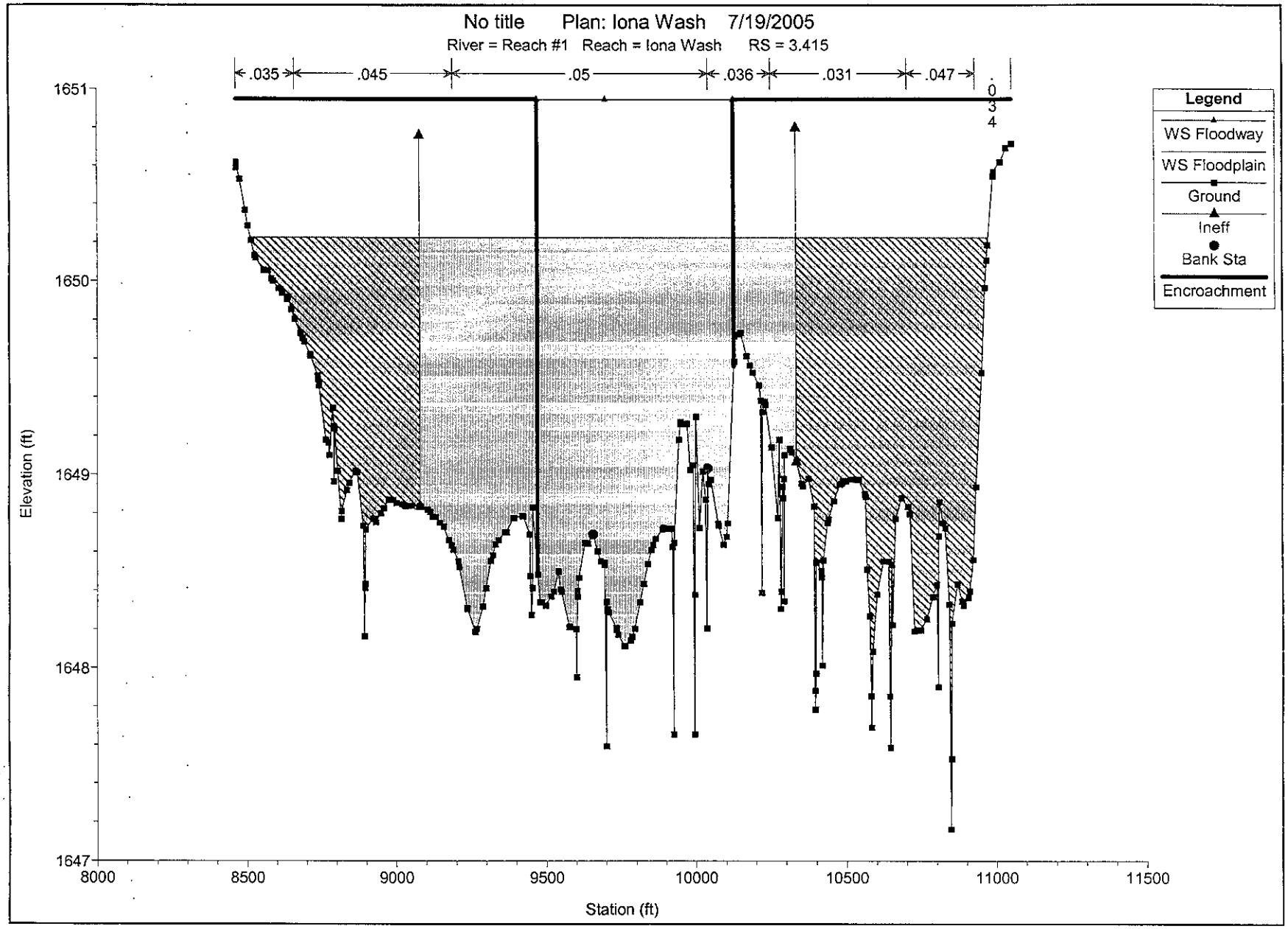

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 3.889
.035
.05
.042
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1669
1668
1667
1666
1665
1664
1663
1662
1661
9600
9700
9800
9900
10000
10100
10200
10300
10400
10500
Station (ft)

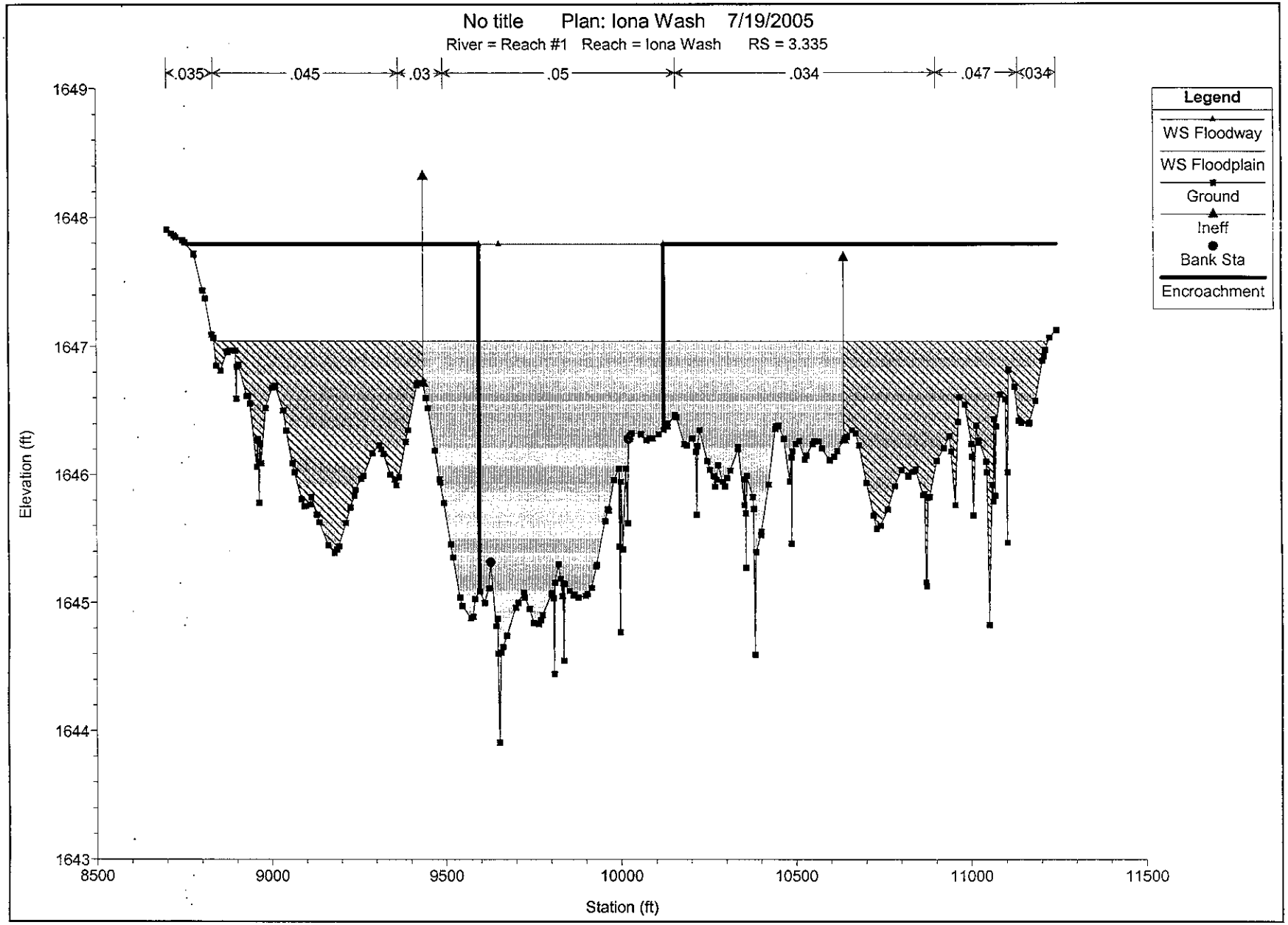

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 3.818
.033
.05
.035
.05
.03
.045
.035
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1665
1664
1663
1662
1661
1660
1659
1658
9600
9800
10000
10200
10400
10600
10800
11000
11200
Station (ft)

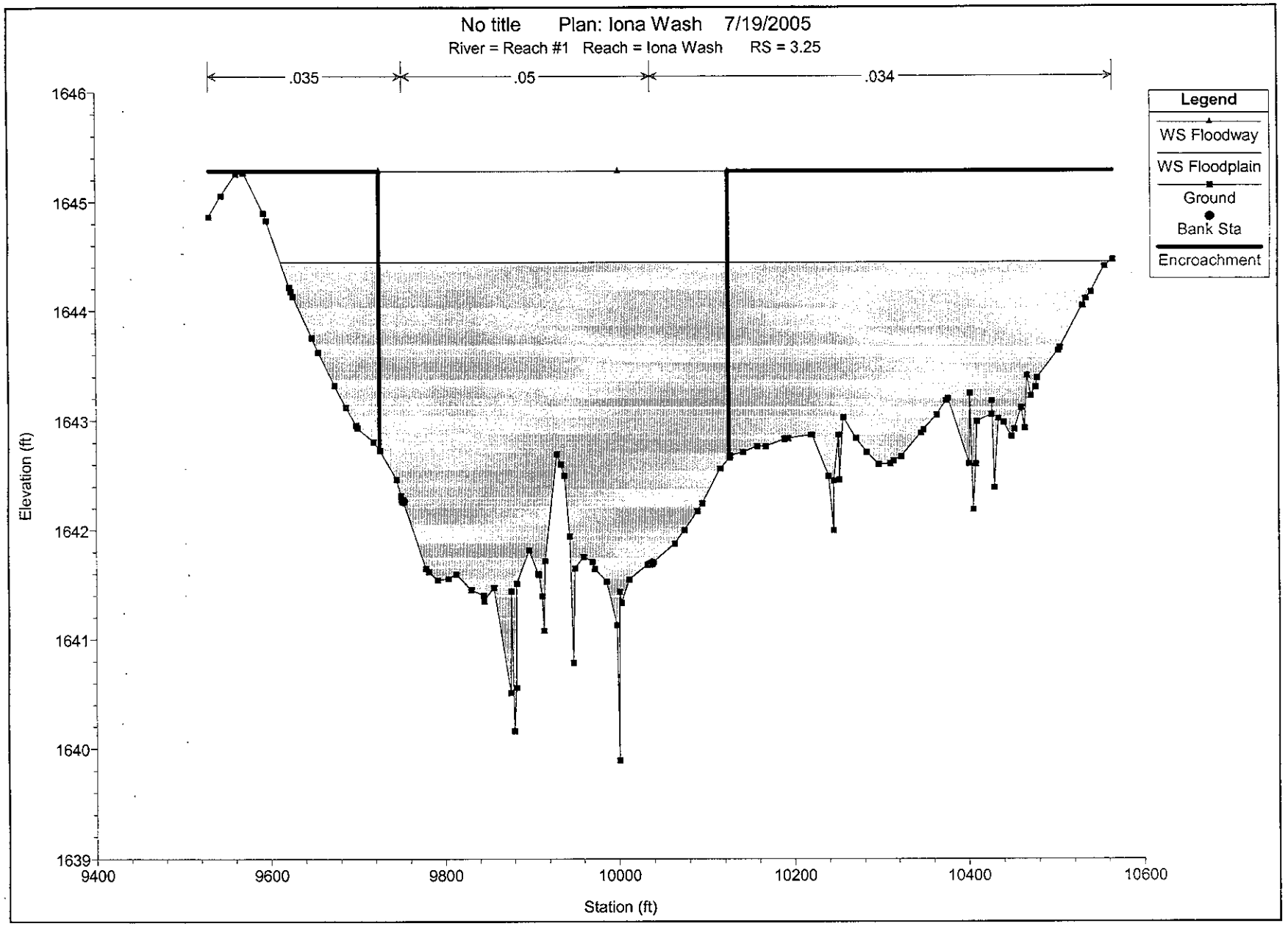

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 3.736
.035
.05
.035
.045
.03
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1662
1661
1660
1659
1658
1657
9200
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

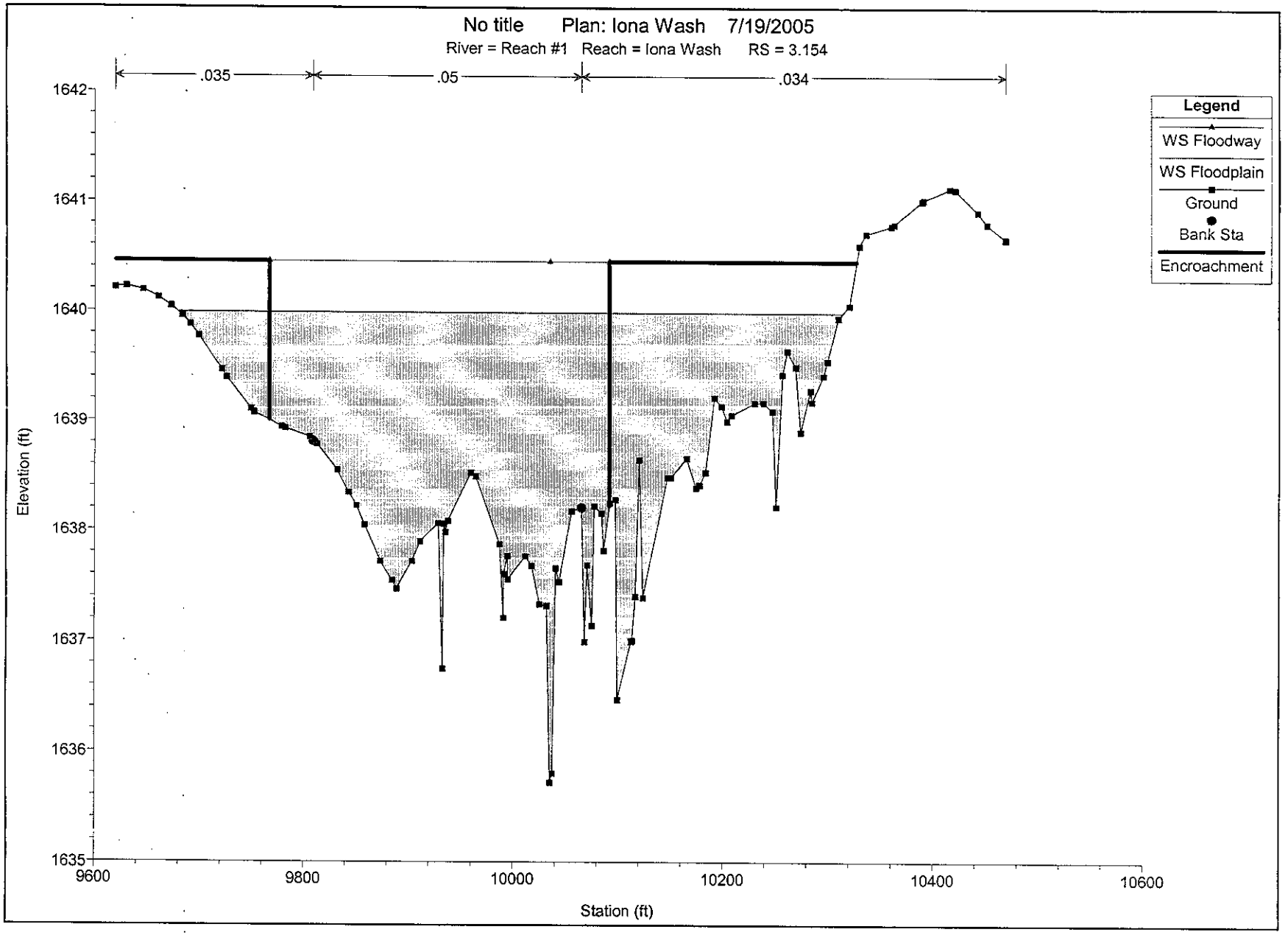

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 3.648
.03
.035
.045
.05
.035
.045
.03
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1659
1658
1657
1656
1655
1654
8000
8500
9000
9500
10000
10500
11000
Station (ft)

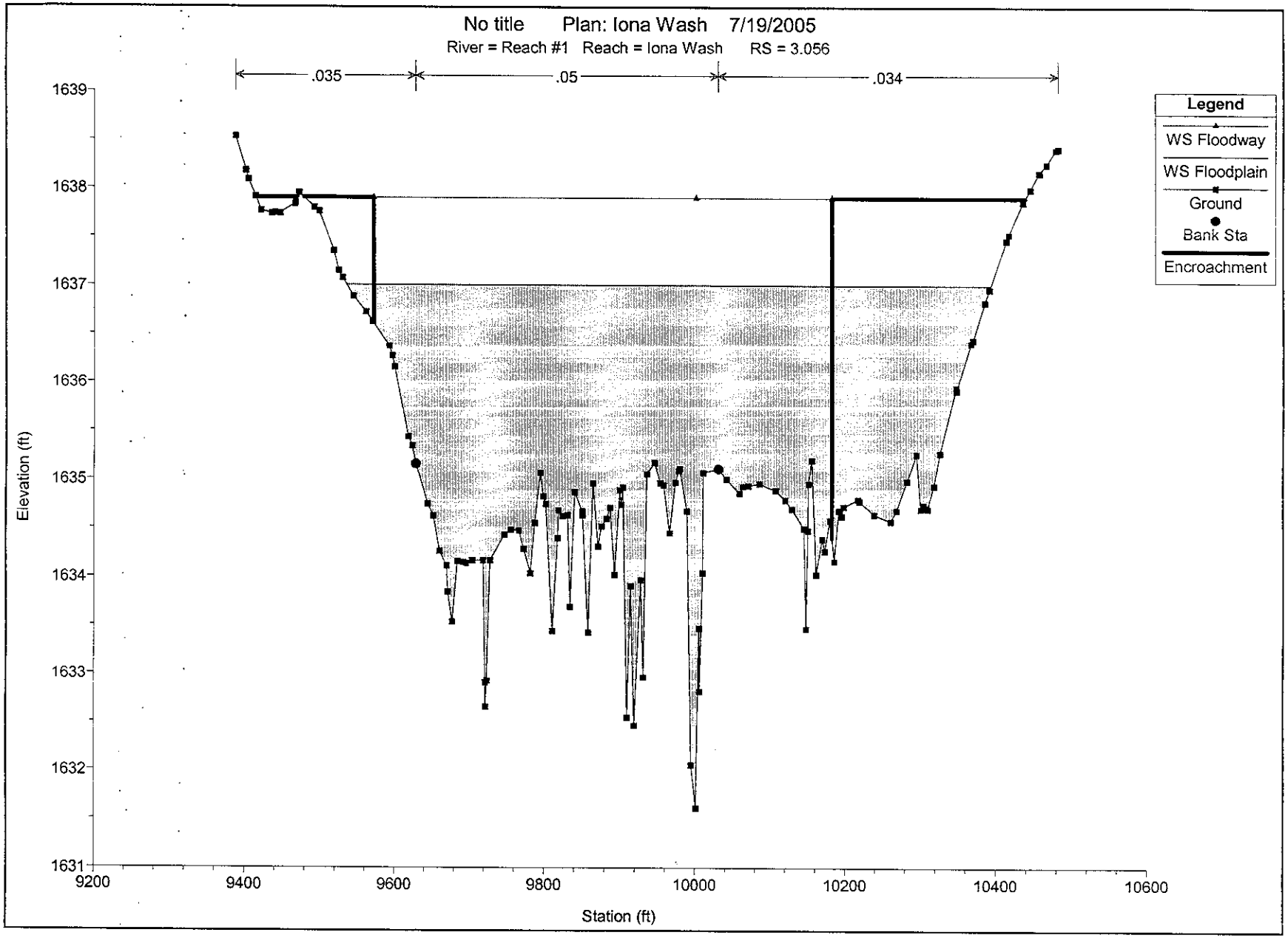

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 3.528
.035
.05
.035
.05
.03
.05
.034
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1656
1655
1654
1653
1652
1651
1650
1649
1648
8000
8500
9000
9500
10000
10500
11000
Station (ft)

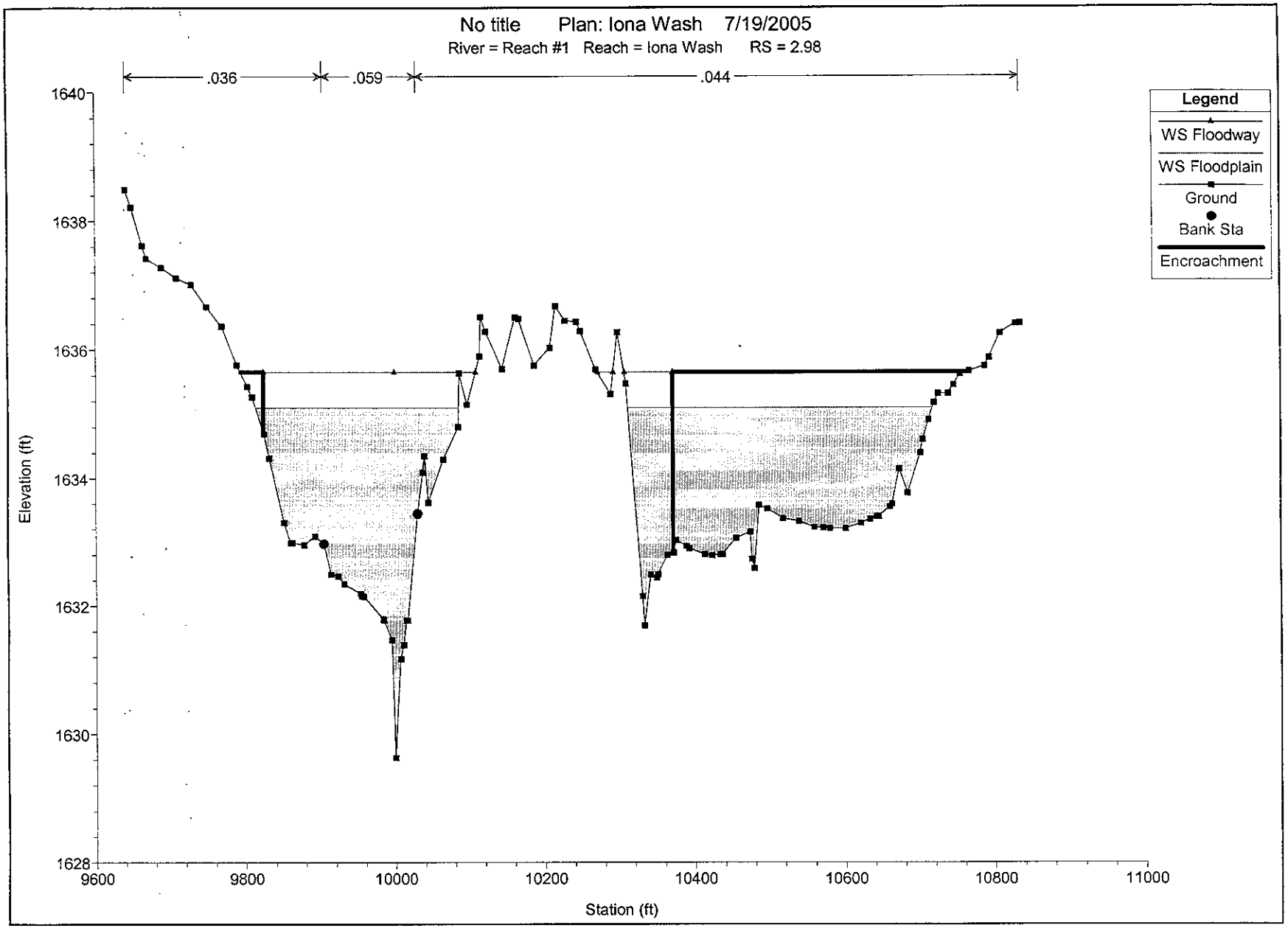

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 3.415
.035
.045
.05
.036
.031
.047
0
3
4
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1651
1650
1649
1648
1647
8000
8500
9000
9500
10000
10500
11000
11500
Station (ft)

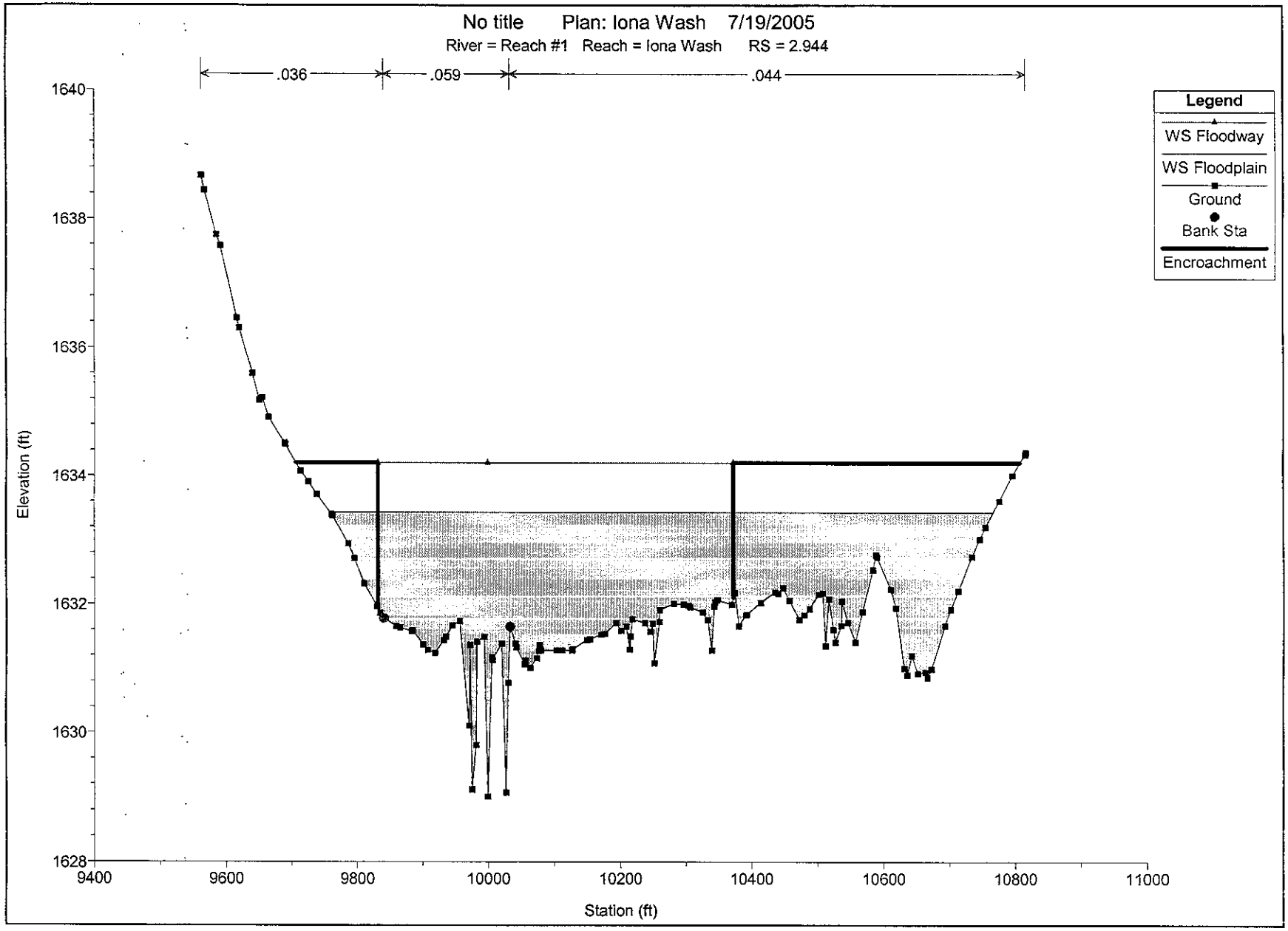

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 3.335
.035
.045
.03
.05
.034
.047
.034
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1649
1648
1647
1646
1645
1644
1643
8500
9000
9500
10000
10500
11000
11500
Station (ft)

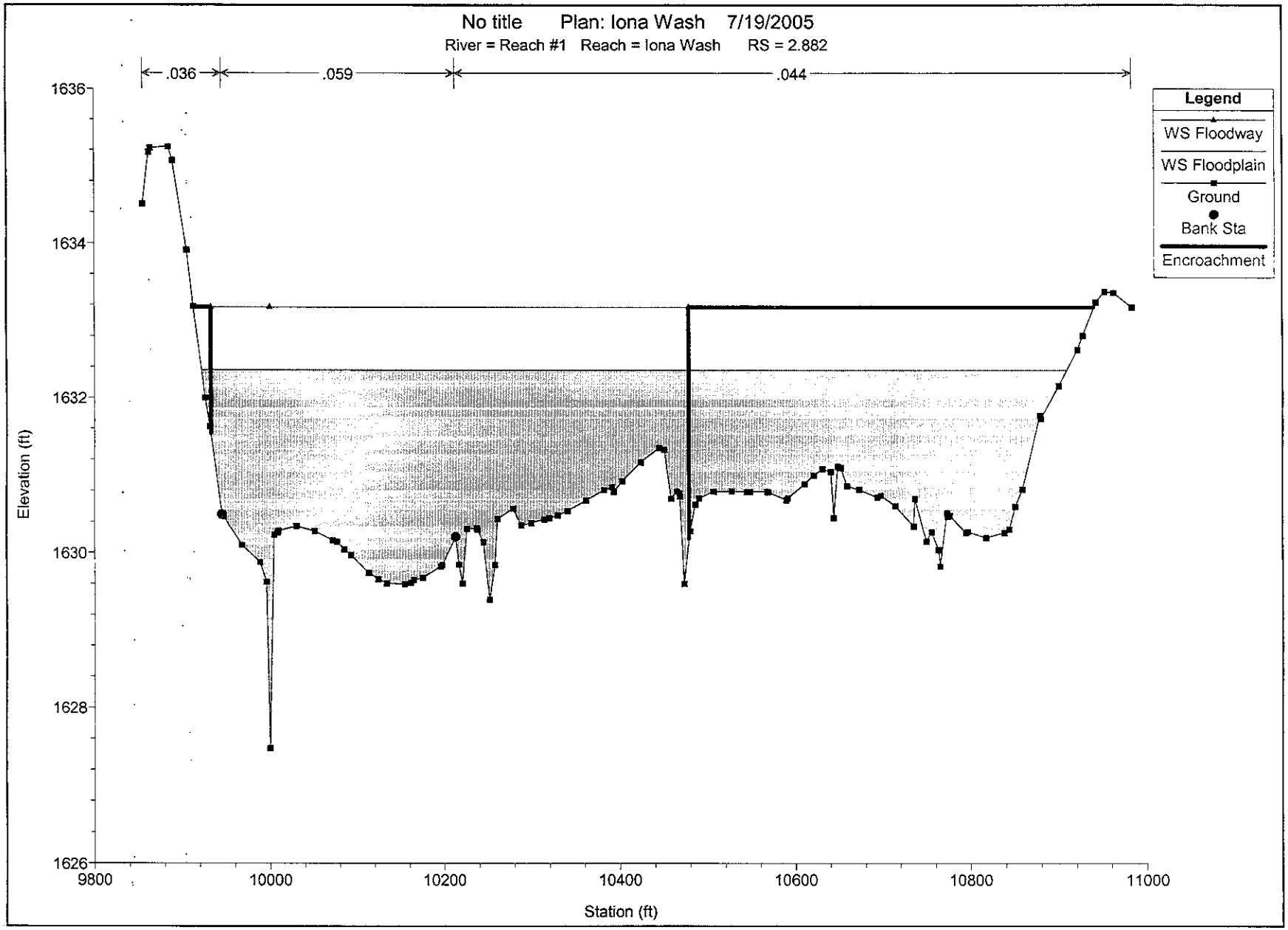

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 3.25
.035
.05
.034
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1646
1645
1644
1643
1642
1641
1640
1639
9400
9600
9800
10000
10200
10400
10600
Station (ft)

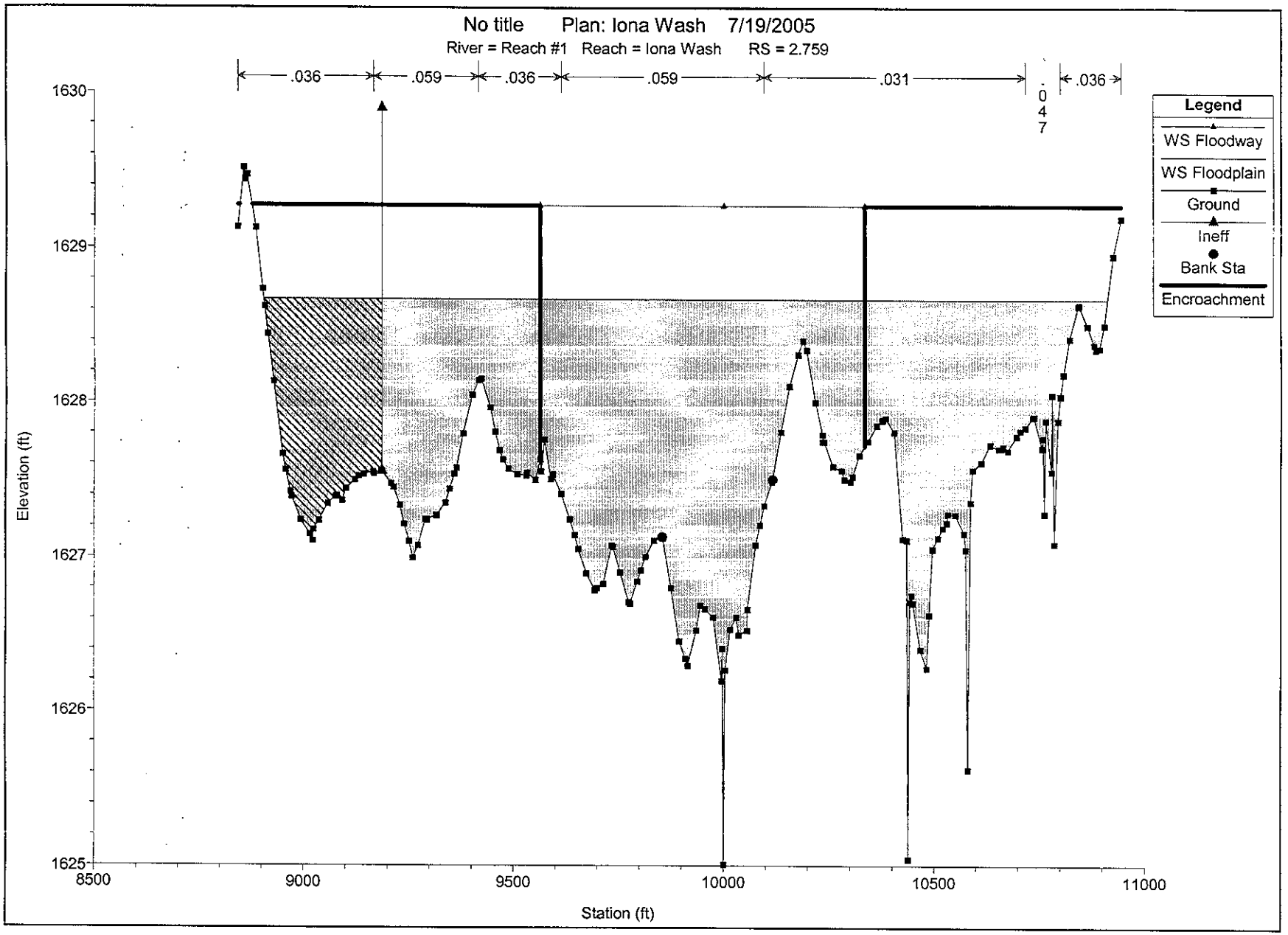

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 3.154
.035
.05
.034
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1642
1641
1640
1639
1638
1637
1636
1635
9600
9800
10000
10200
10400
10600
Station (ft)

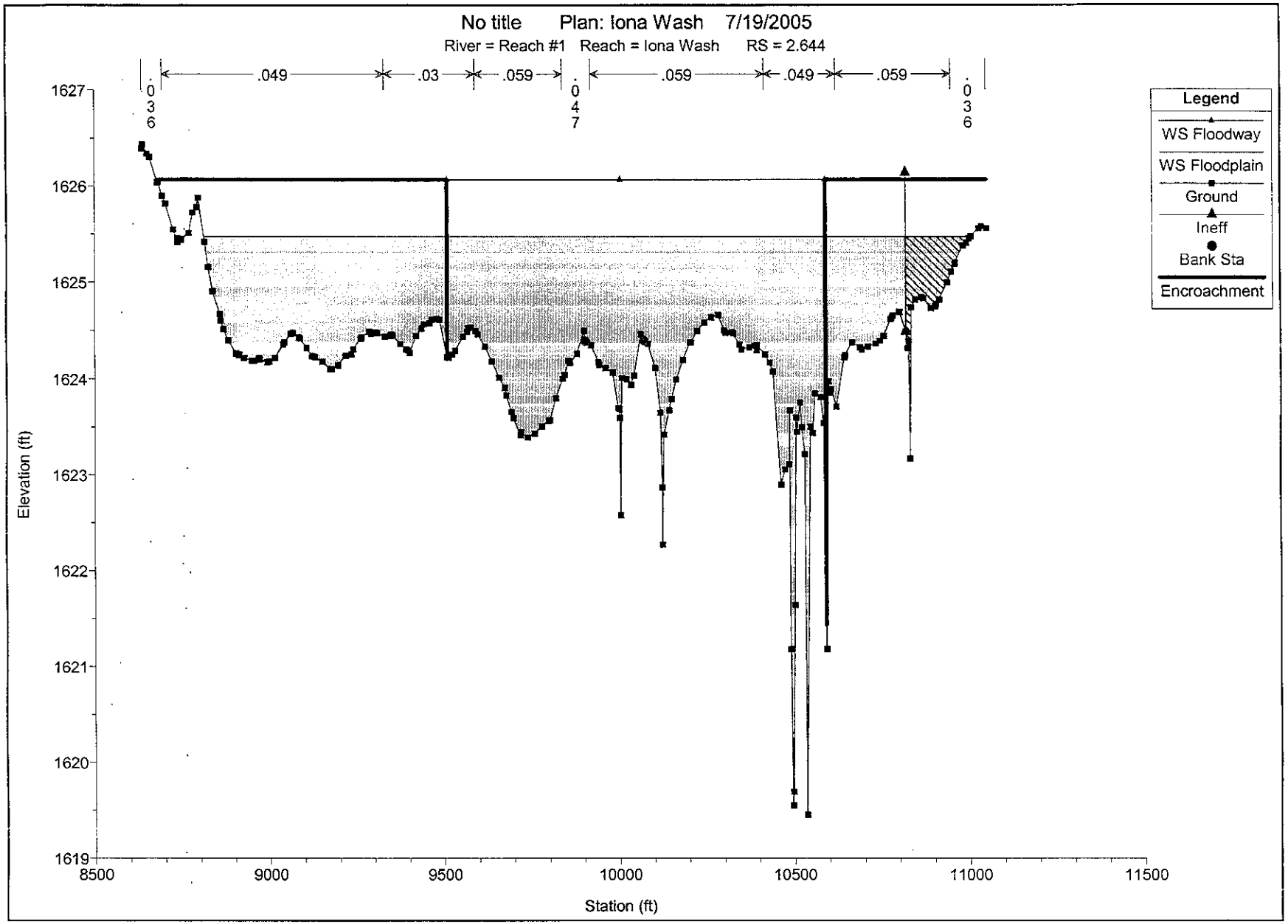

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 3.056
.035
.05
.034
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1639
1638
1637
1636
1635
1634
1633
1632
1631
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)

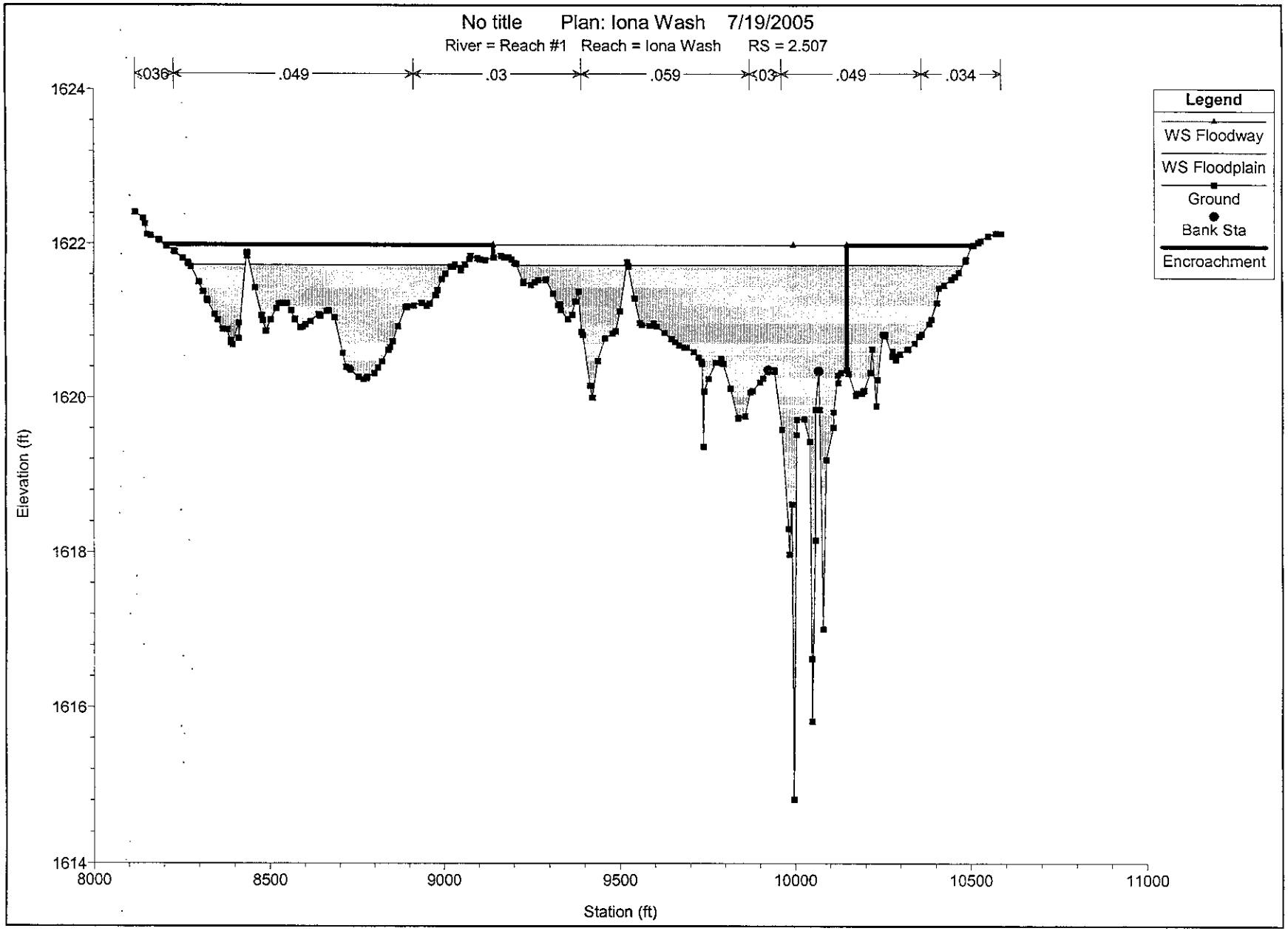

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 2.98
.036
.059
.044
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1640
1638
1636
1634
1632
1630
1628
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

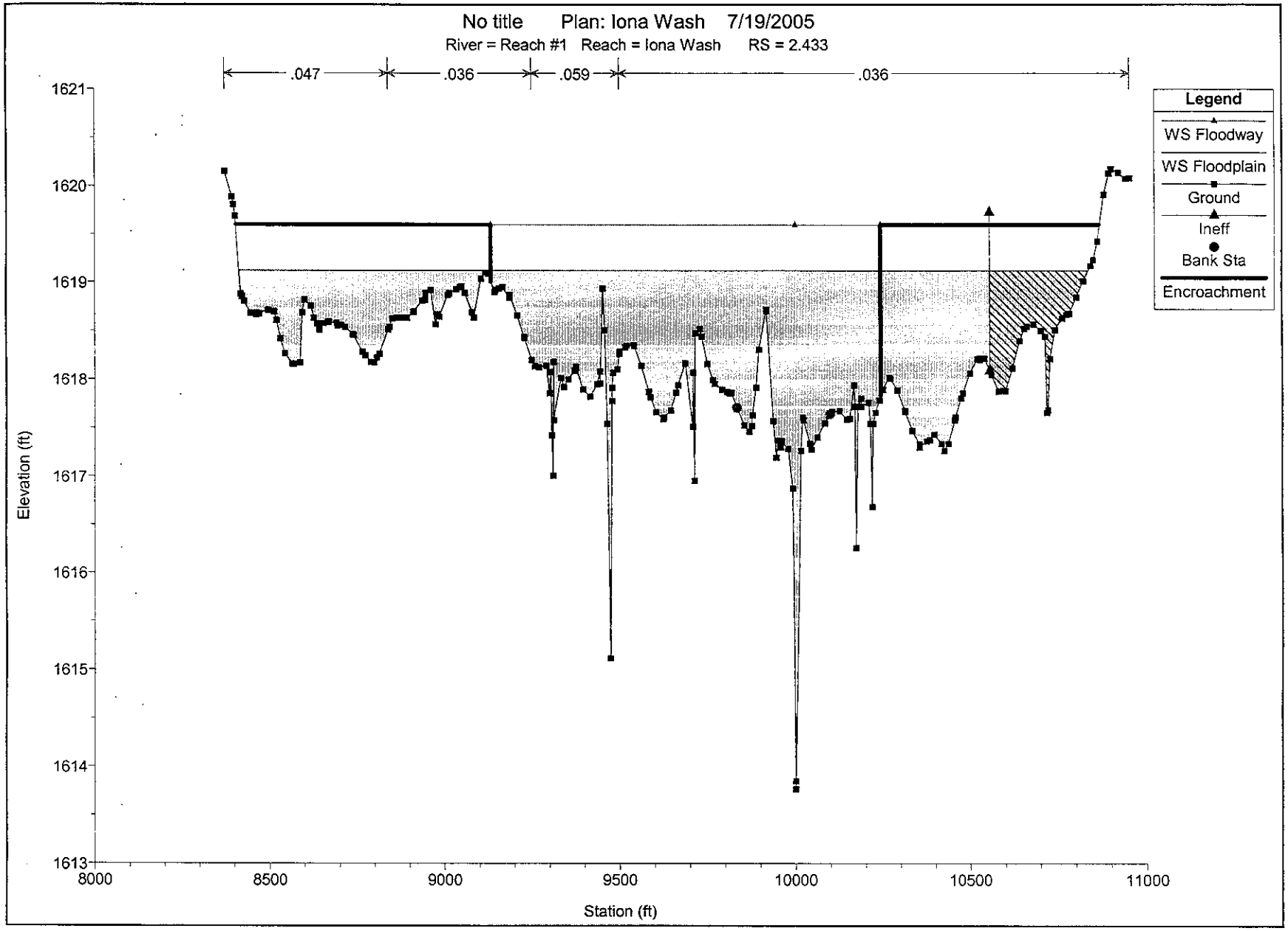

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 2.944
.036
.059
.044
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1640
1638
1636
1634
1632
1630
1628
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

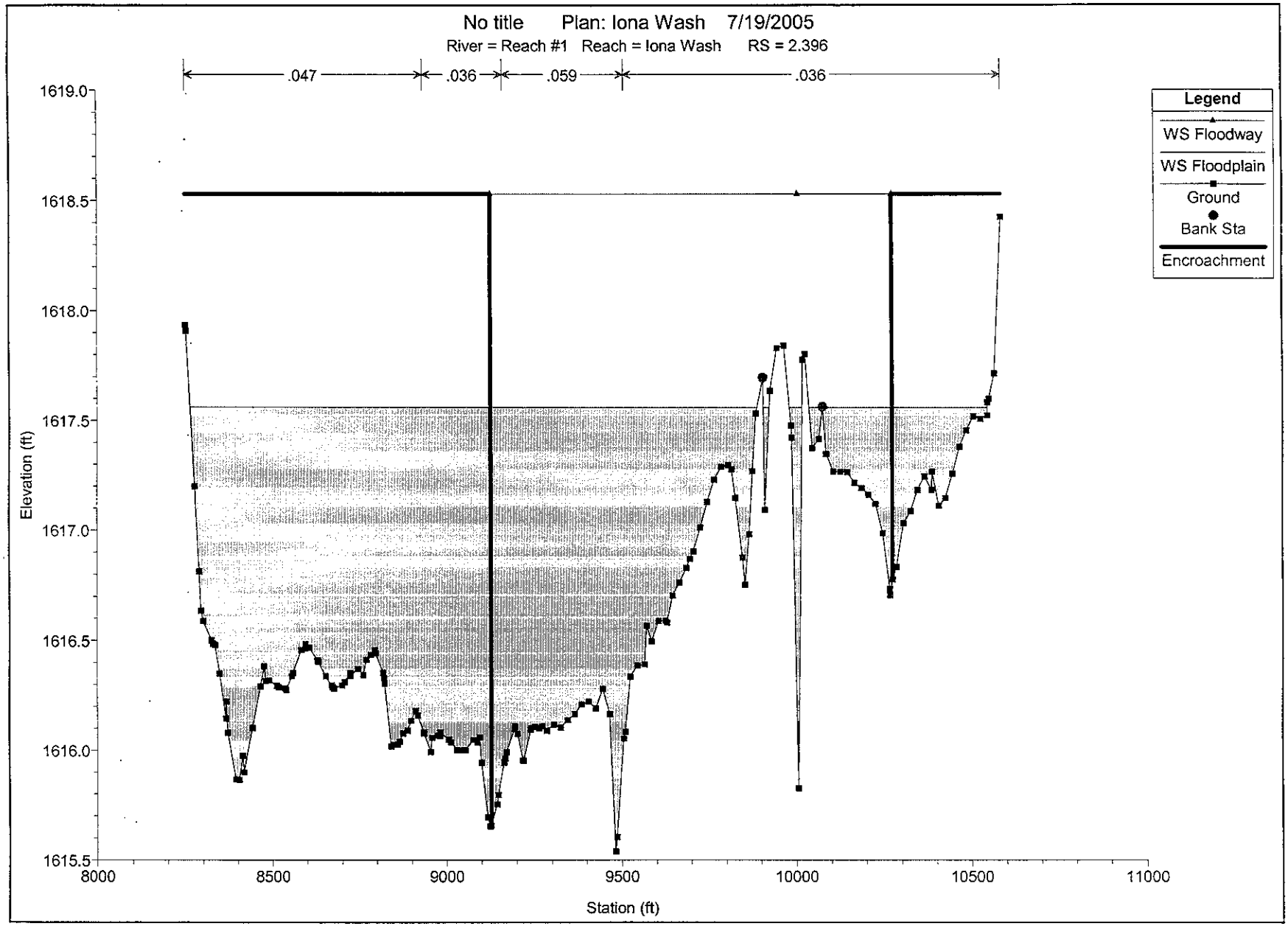

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 2.882
.036
.059
.044
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1636
1634
1632
1630
1628
1626
9800
10000
10200
10400
10600
10800
11000
Station (ft)

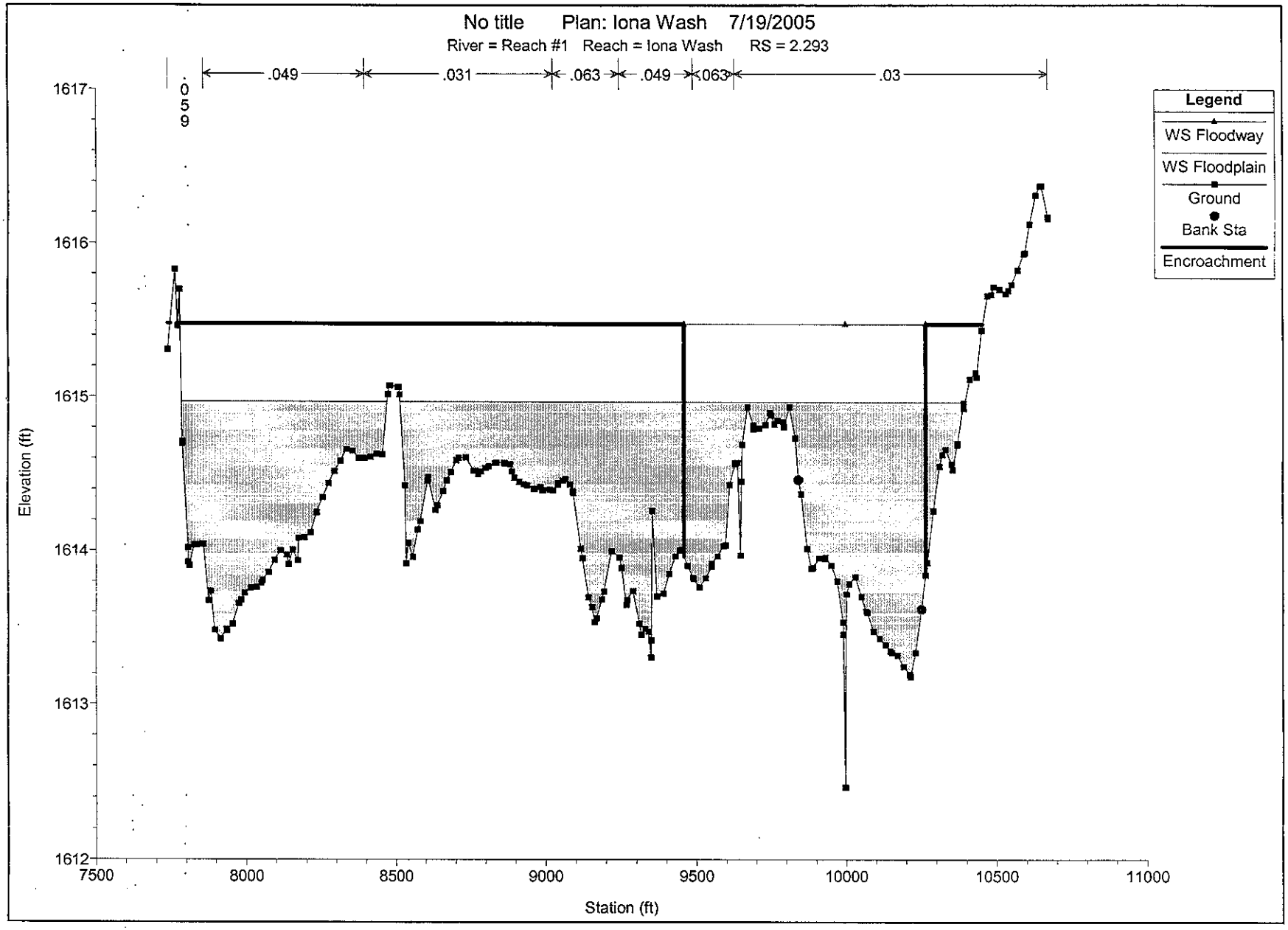

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 2.759
.036
.059
.036
.059
.031
.047
.036
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1630
1629
1628
1627
1626
1625
8500
9000
9500
10000
10500
11000
Station (ft)

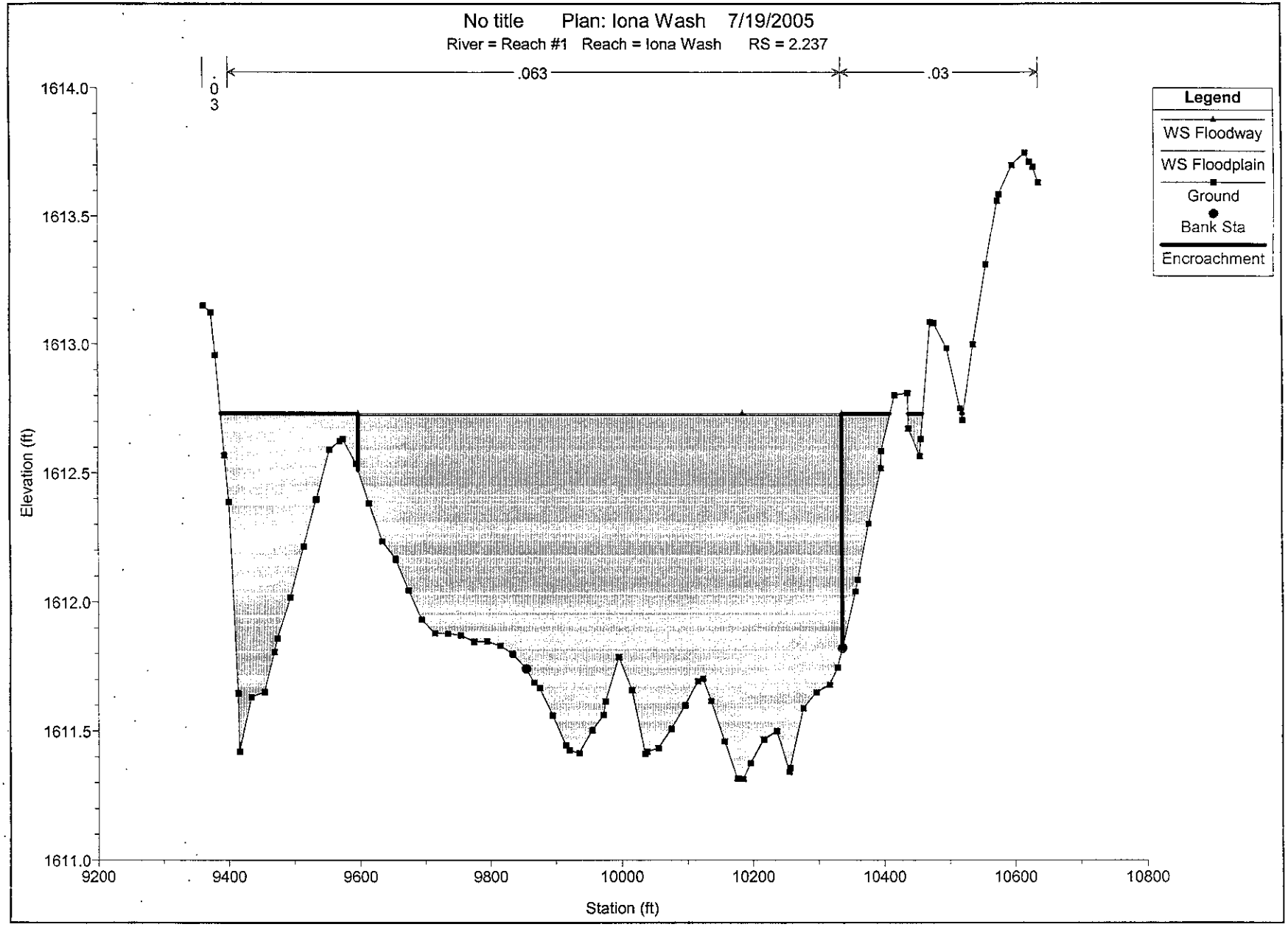

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 2.644
.036
.049
.03
.059
.047
.059
.049
.059
.036
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1627
1626
1625
1624
1623
1622
1621
1620
1619
8500
9000
9500
10000
10500
11000
11500
Station (ft)

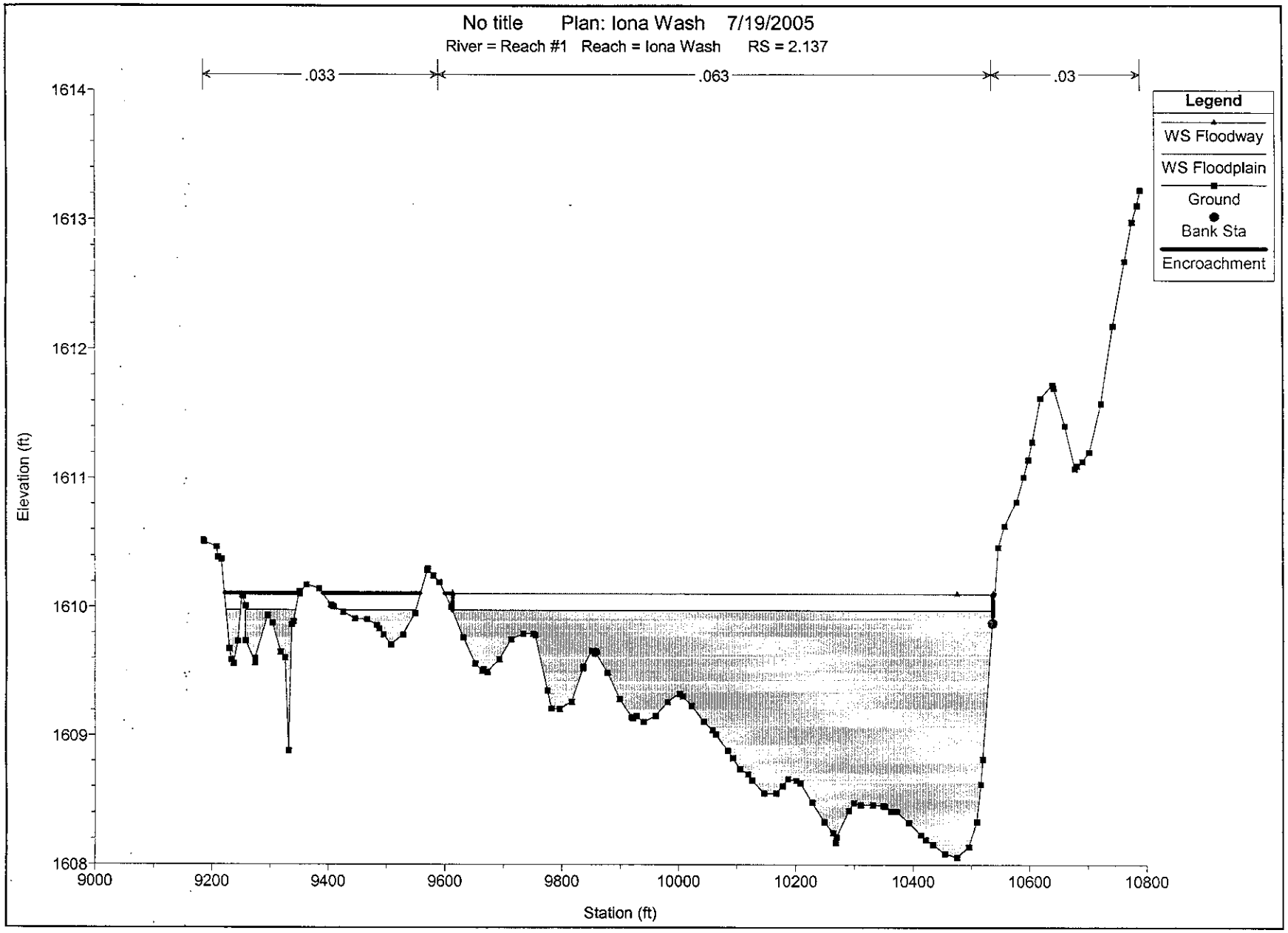

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 2.507
.030
.049
.03
.059
.03
.049
.034
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1624
1622
1620
1618
1616
1614
8000
8500
9000
9500
10000
10500
11000
Station (ft)

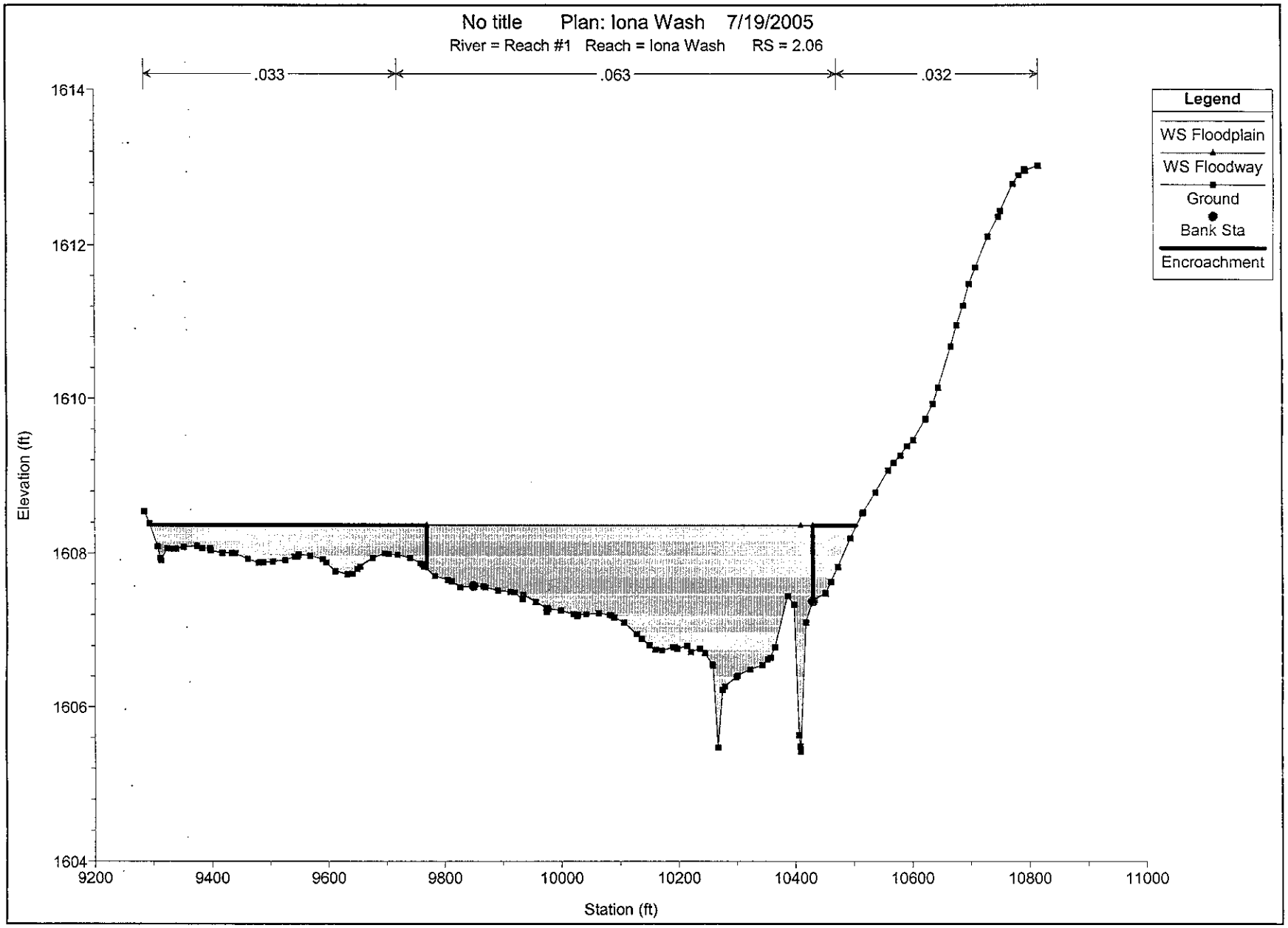

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 2.433
.047
.036
.059
.036
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1621
1620
1619
1618
1617
1616
1615
1614
1613
8000
8500
9000
9500
10000
10500
11000
Station (ft)

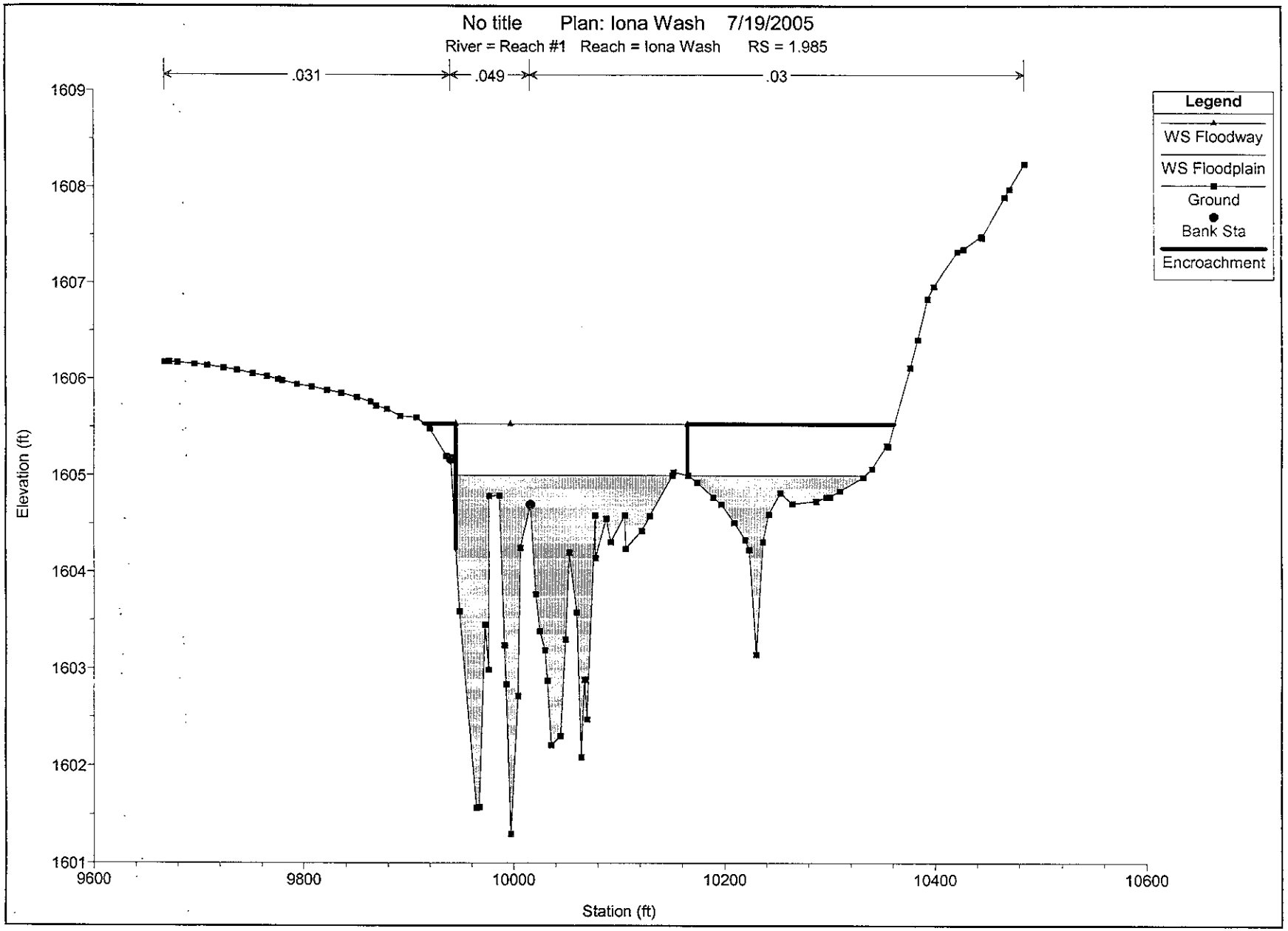

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 2.396
.047
.036
.059
.036
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1619.0
1618.5
1618.0
1617.5
1617.0
1616.5
1616.0
1615.5
8000
8500
9000
9500
10000
10500
11000
Station (ft)

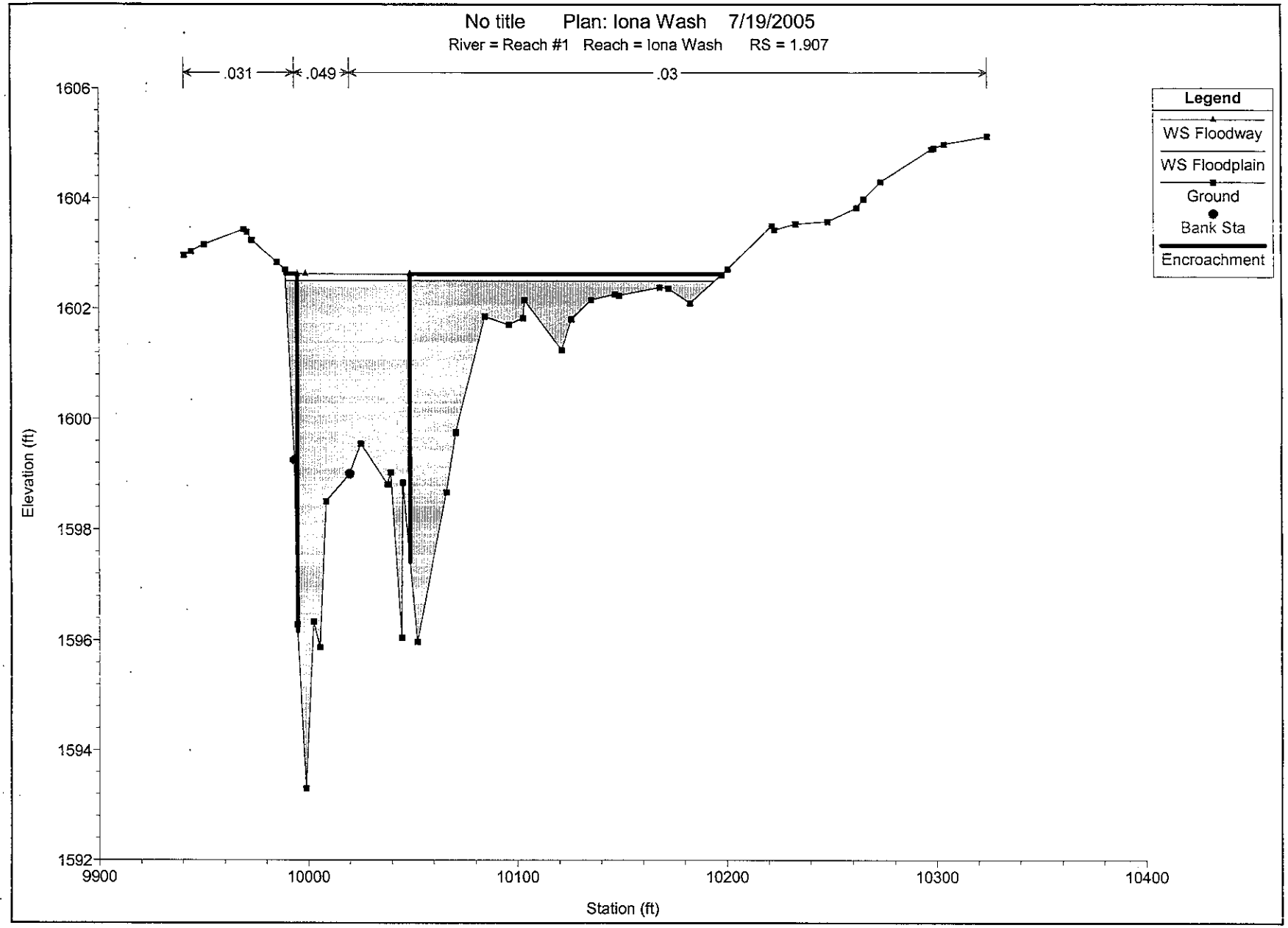

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 2.293
.059
.049
.031
.063
.049
.063
.03
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1617
1616
1615
1614
1613
1612
7500
8000
8500
9000
9500
10000
10500
11000
Station (ft)

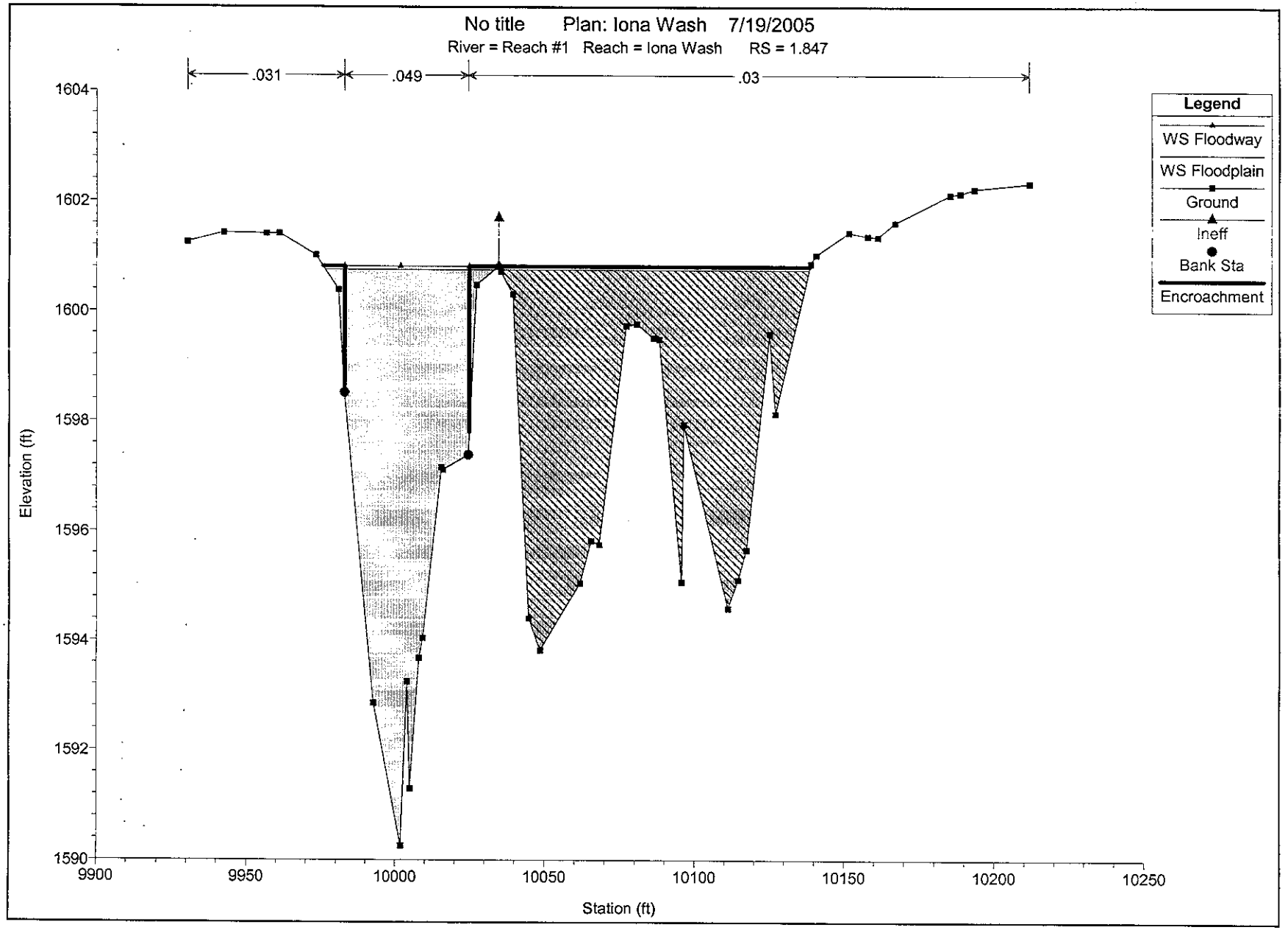

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 2.237
.03
.063
.03
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1614.0
1613.5
1613.0
1612.5
1612.0
1611.5
1611.0
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

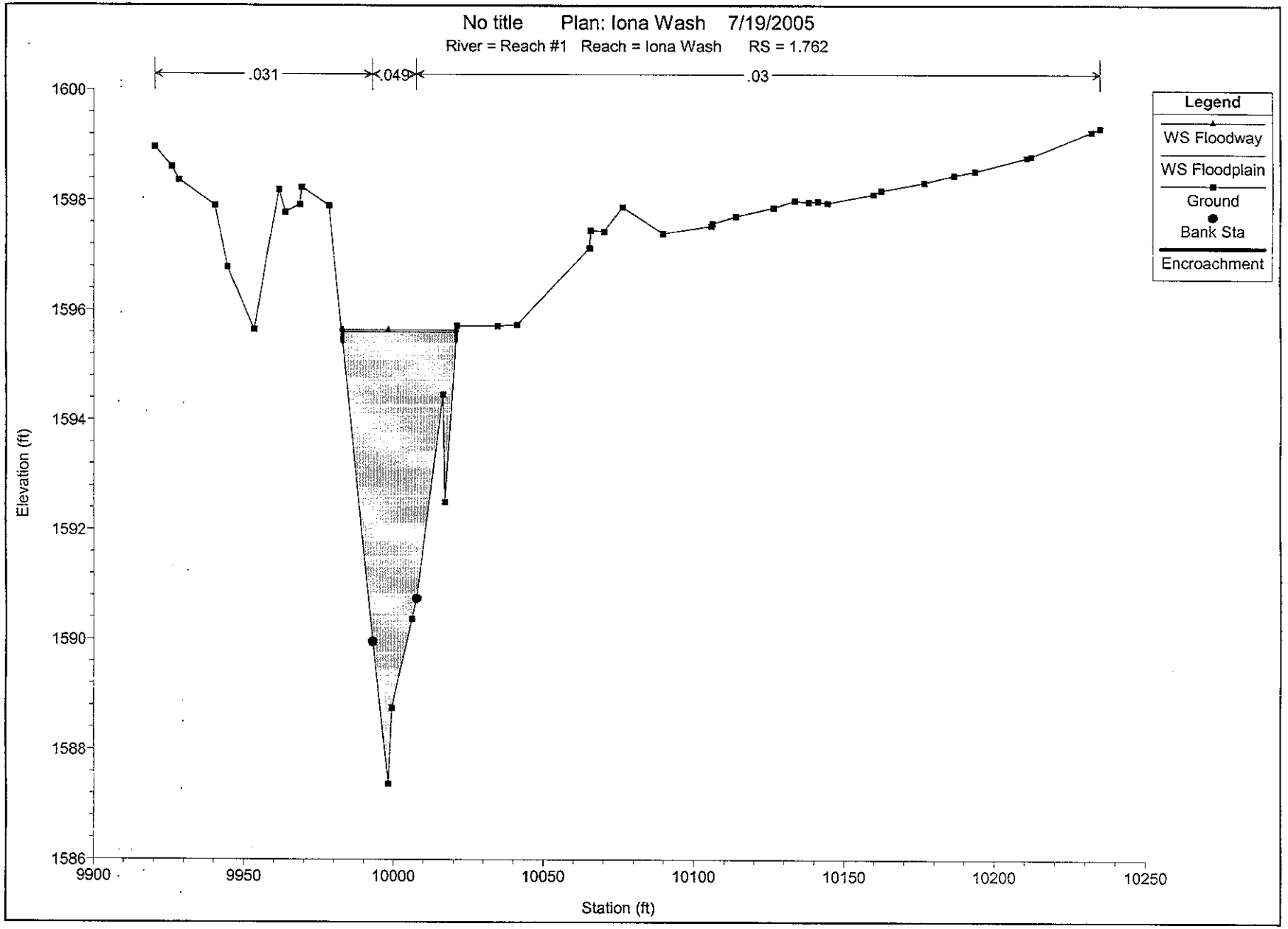

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 2.137
.033
.063
.03
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1614
1613
1612
1611
1610
1609
1608
9000
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

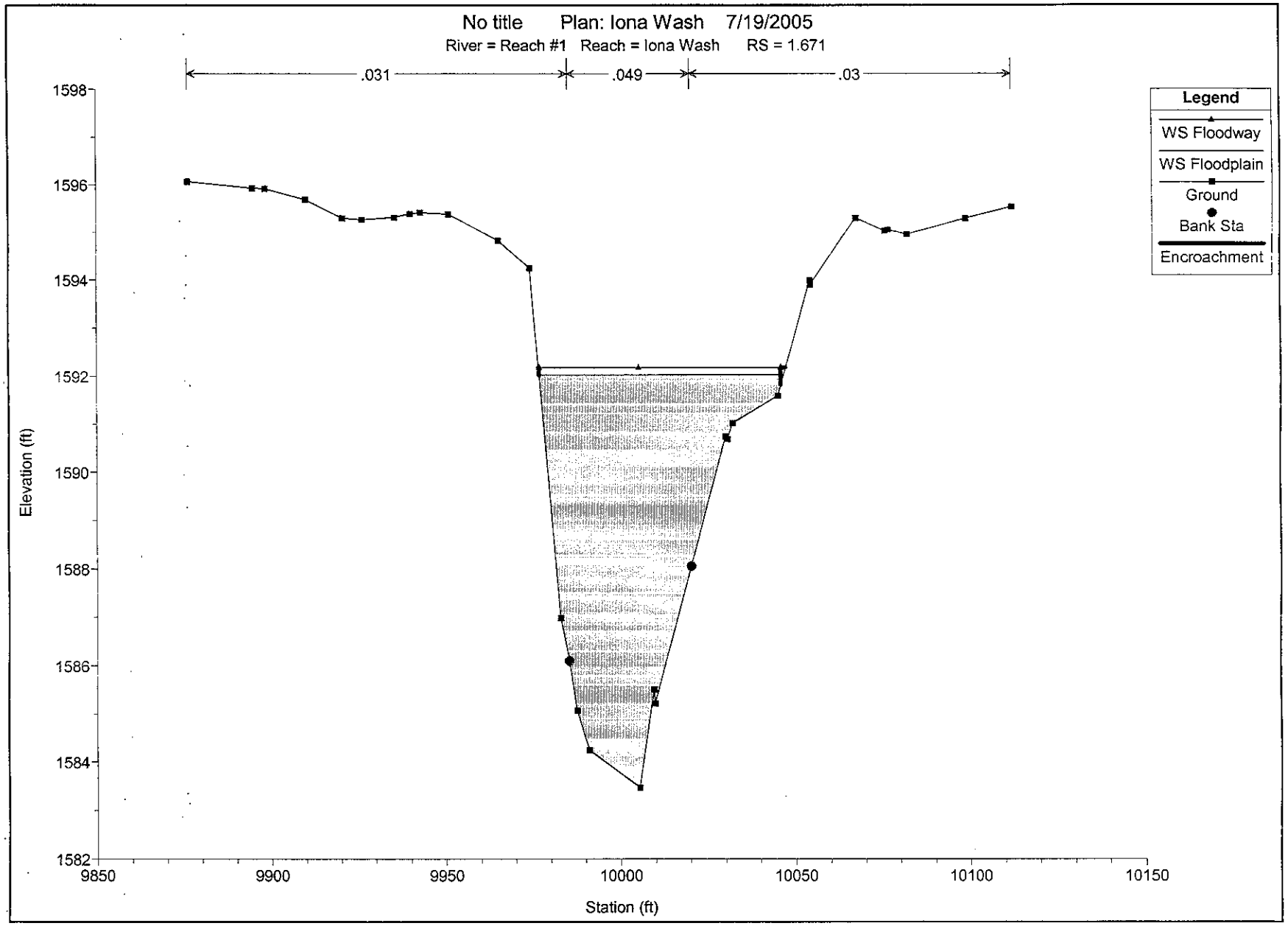

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 2.06
.033
.063
.032
Legend
WS Floodplain
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1614
1612
1610
1608
1606
1604
9200
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

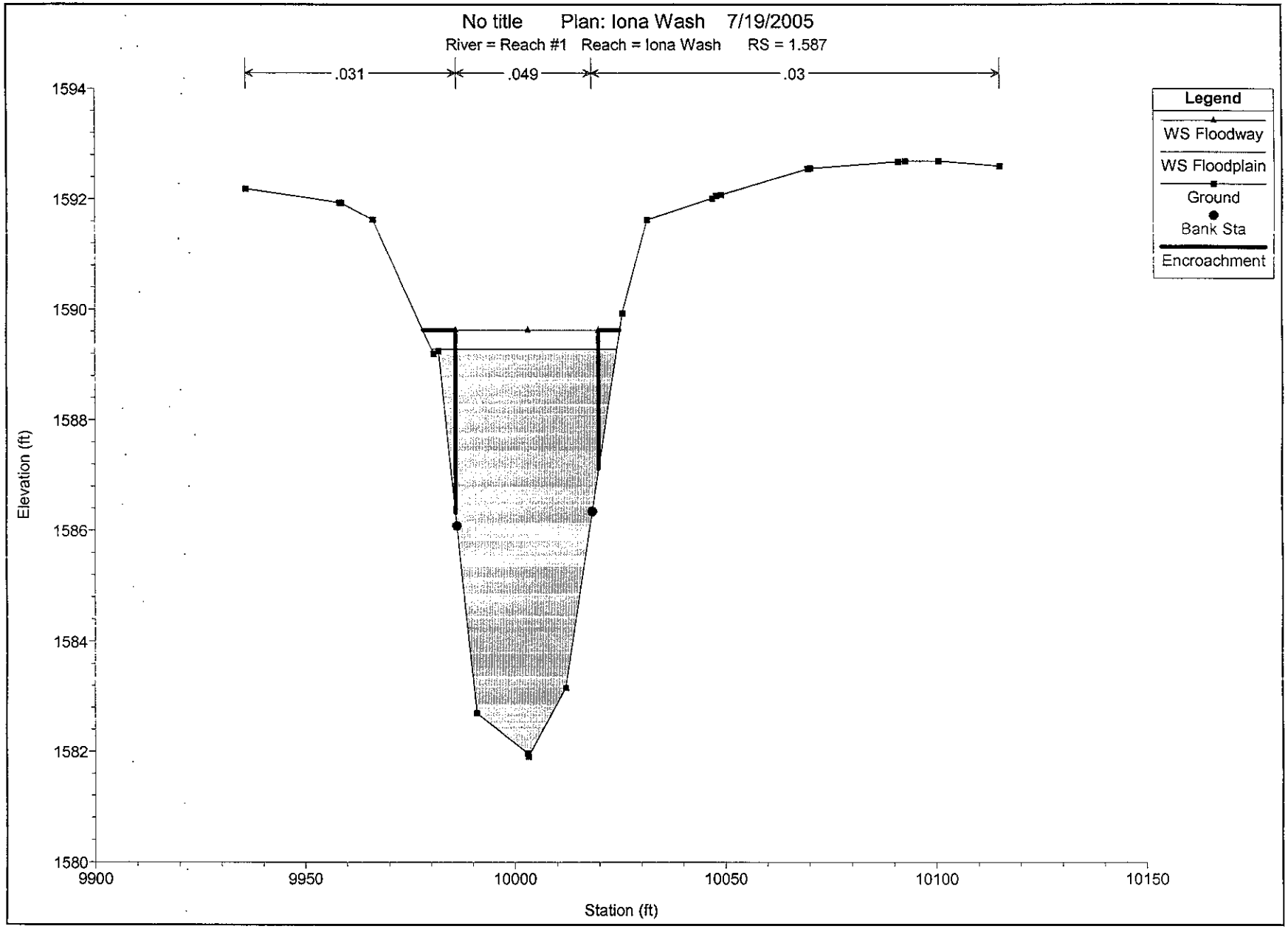

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 1.985
.031
.049
.03
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1609
1608
1607
1606
1605
1604
1603
1602
1601
9600
9800
10000
10200
10400
10600
Station (ft)

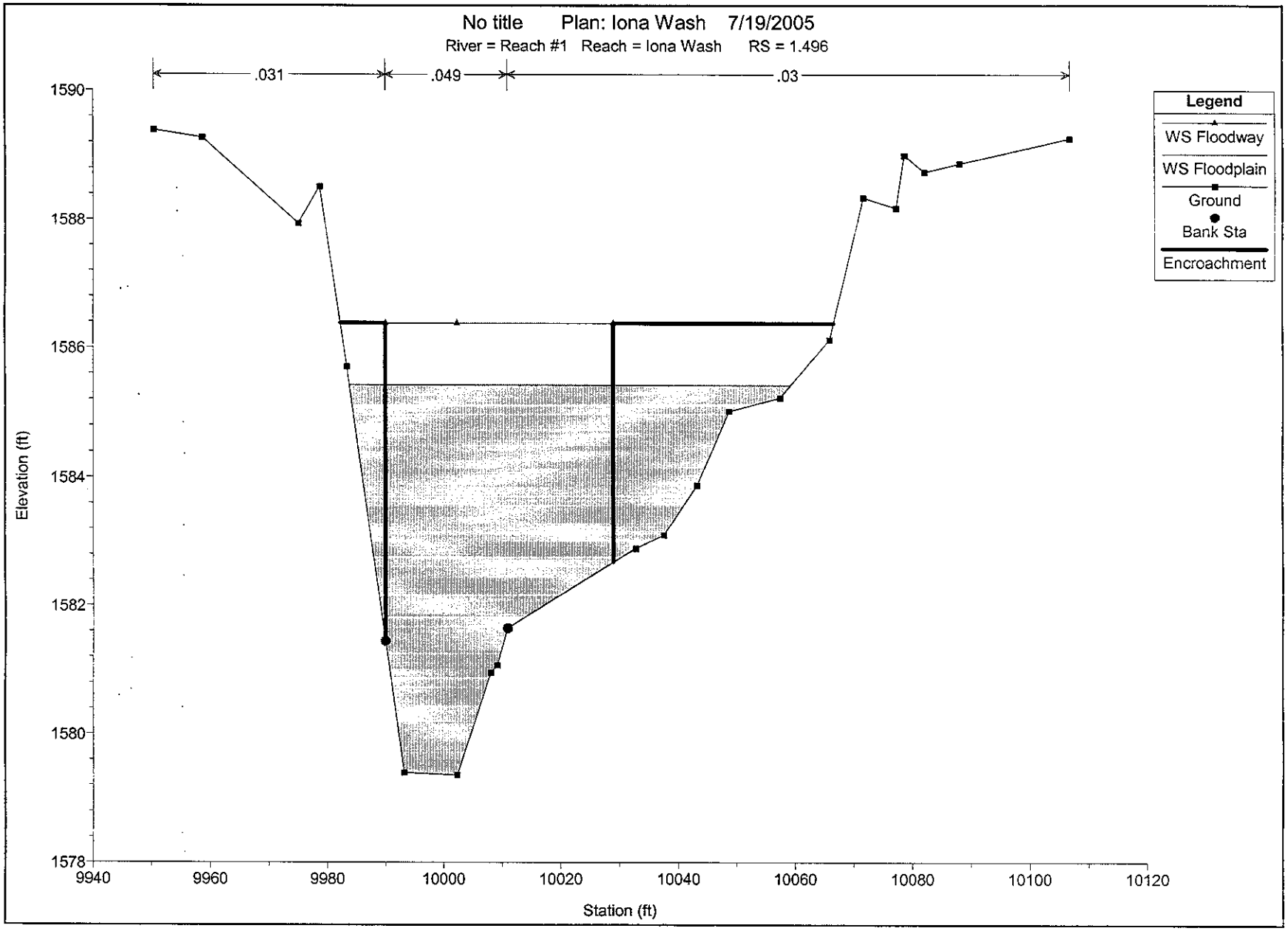

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 1.907
.031
.049
.03
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1606
1604
1602
1600
1598
1596
1594
1592
9900
10000
10100
10200
10300
10400
Station (ft)

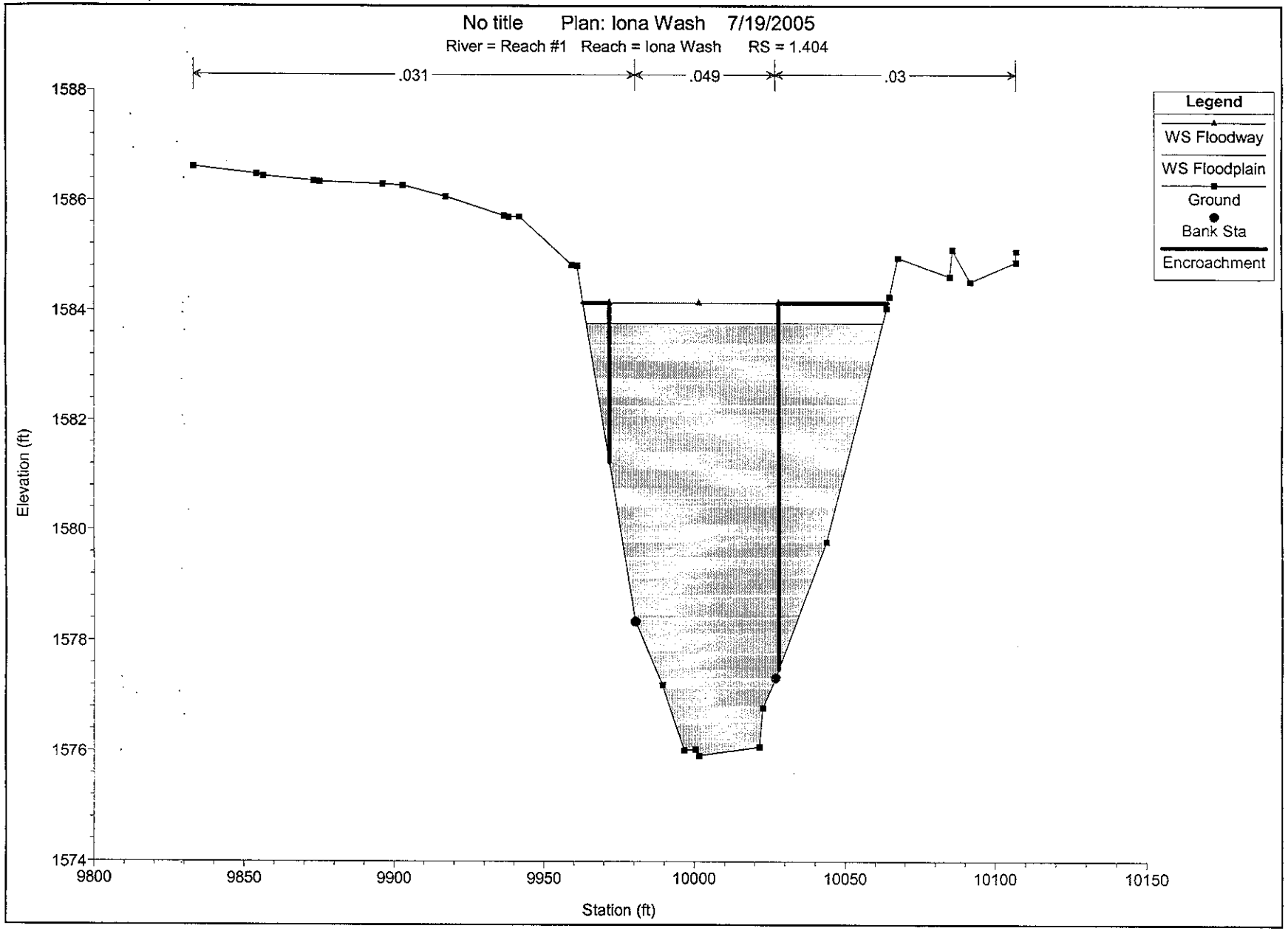

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 1.847
.031
.049
.03
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1604
1602
1600
1598
1596
1594
1592
1590
9900
9950
10000
10050
10100
10150
10200
10250
Station (ft)

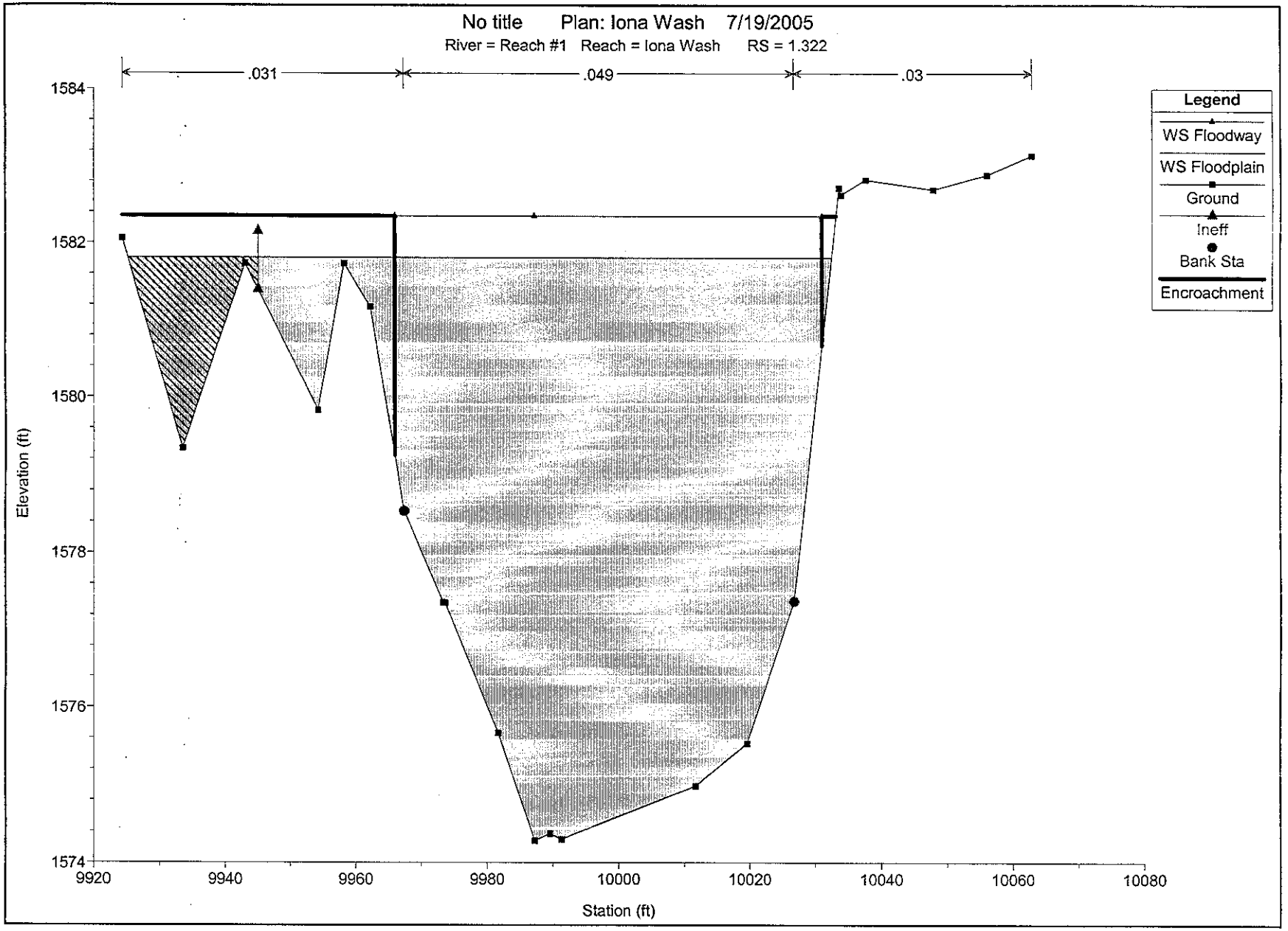

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 1.762
.031
.049
.03
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1600
1598
1596
1594
1592
1590
1588
1586
9900
9950
10000
10050
10100
10150
10200
10250
Station (ft)

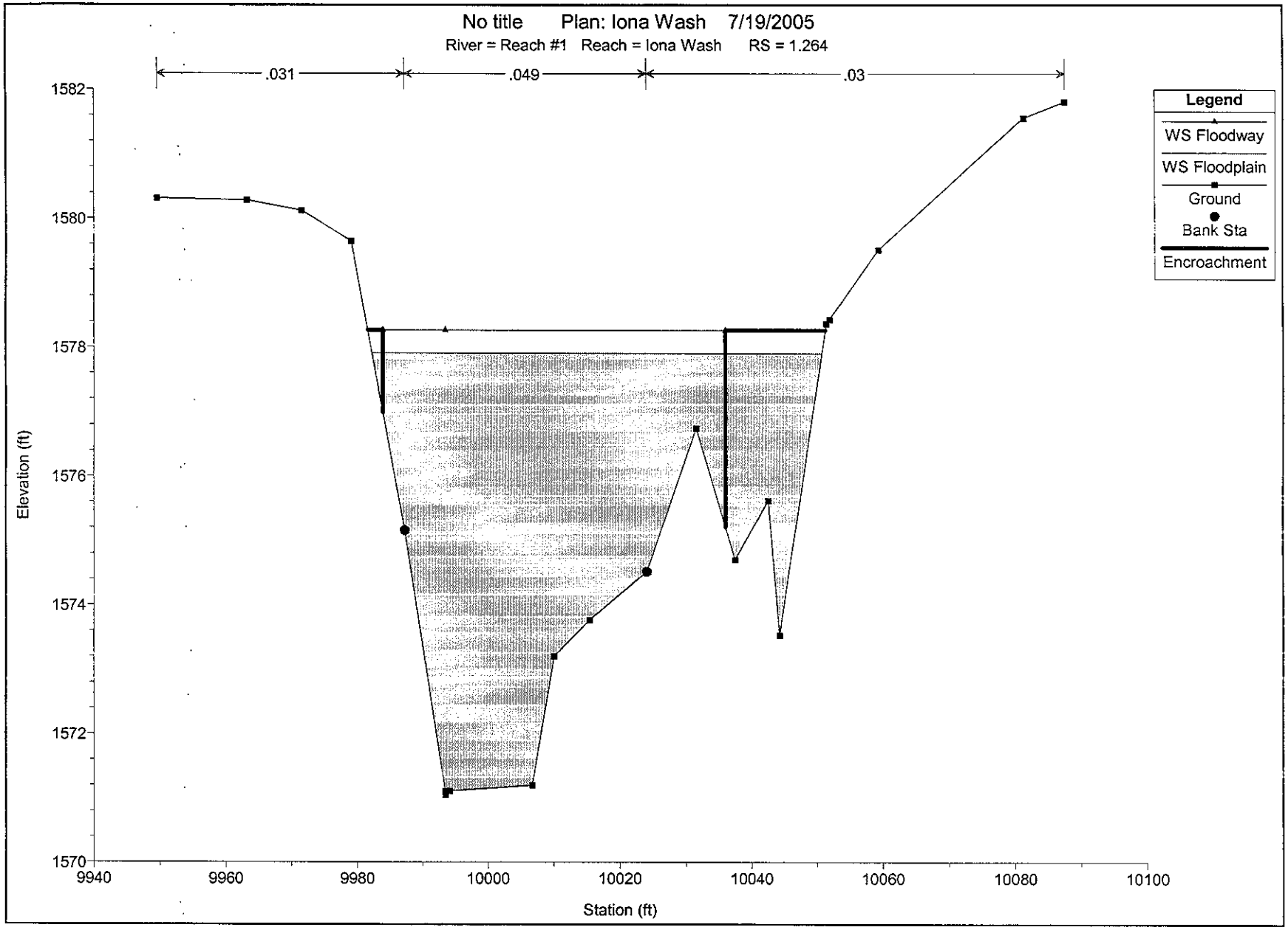

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 1.671
.031
.049
.03
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1598
1596
1594
1592
1590
1588
1586
1584
1582
9850
9900
9950
10000
10050
10100
10150
Station (ft)

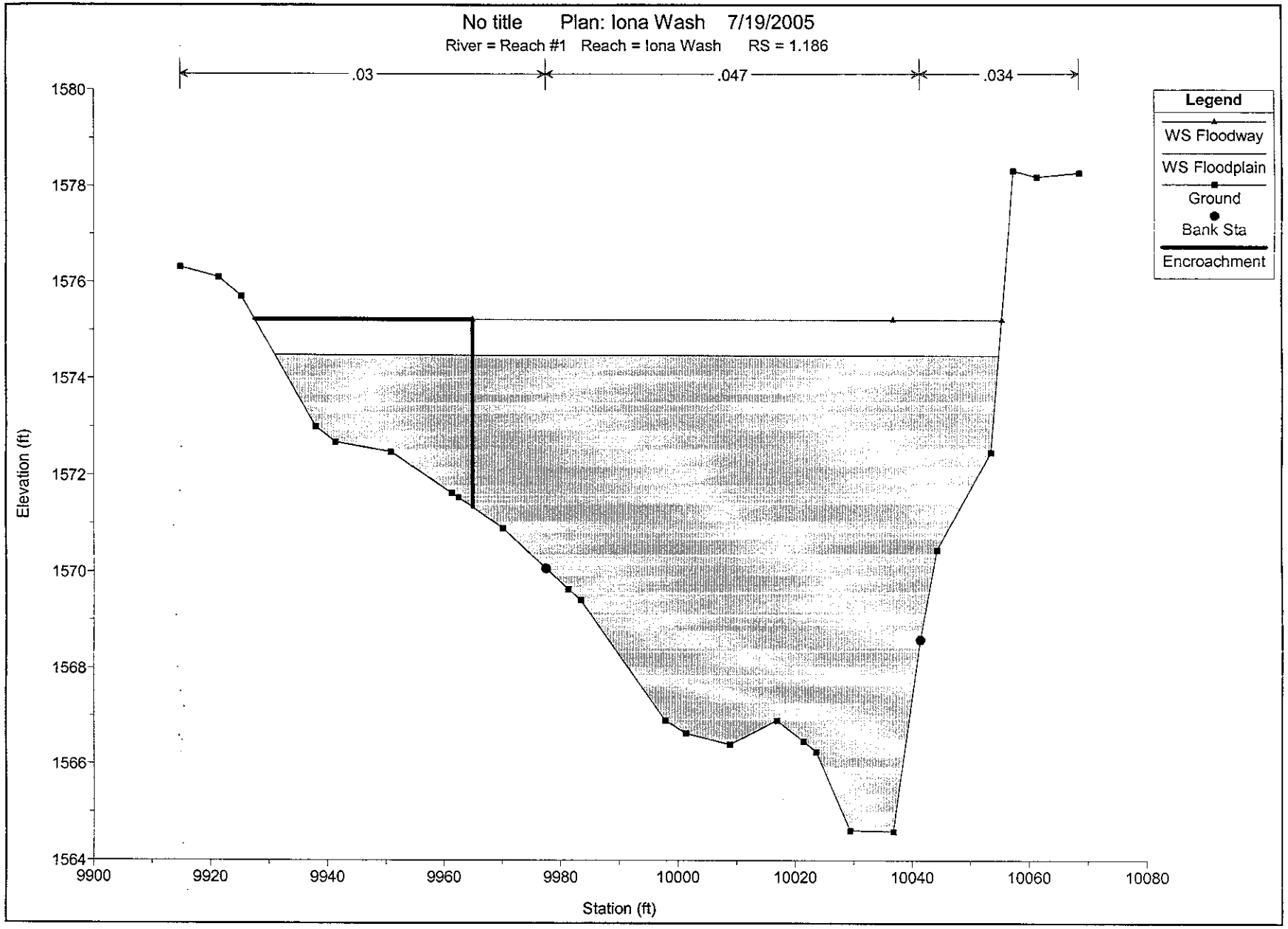

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 1.587
.031
.049
.03
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1594
1592
1590
1588
1586
1584
1582
1580
9900
9950
10000
10050
10100
10150
Station (ft)

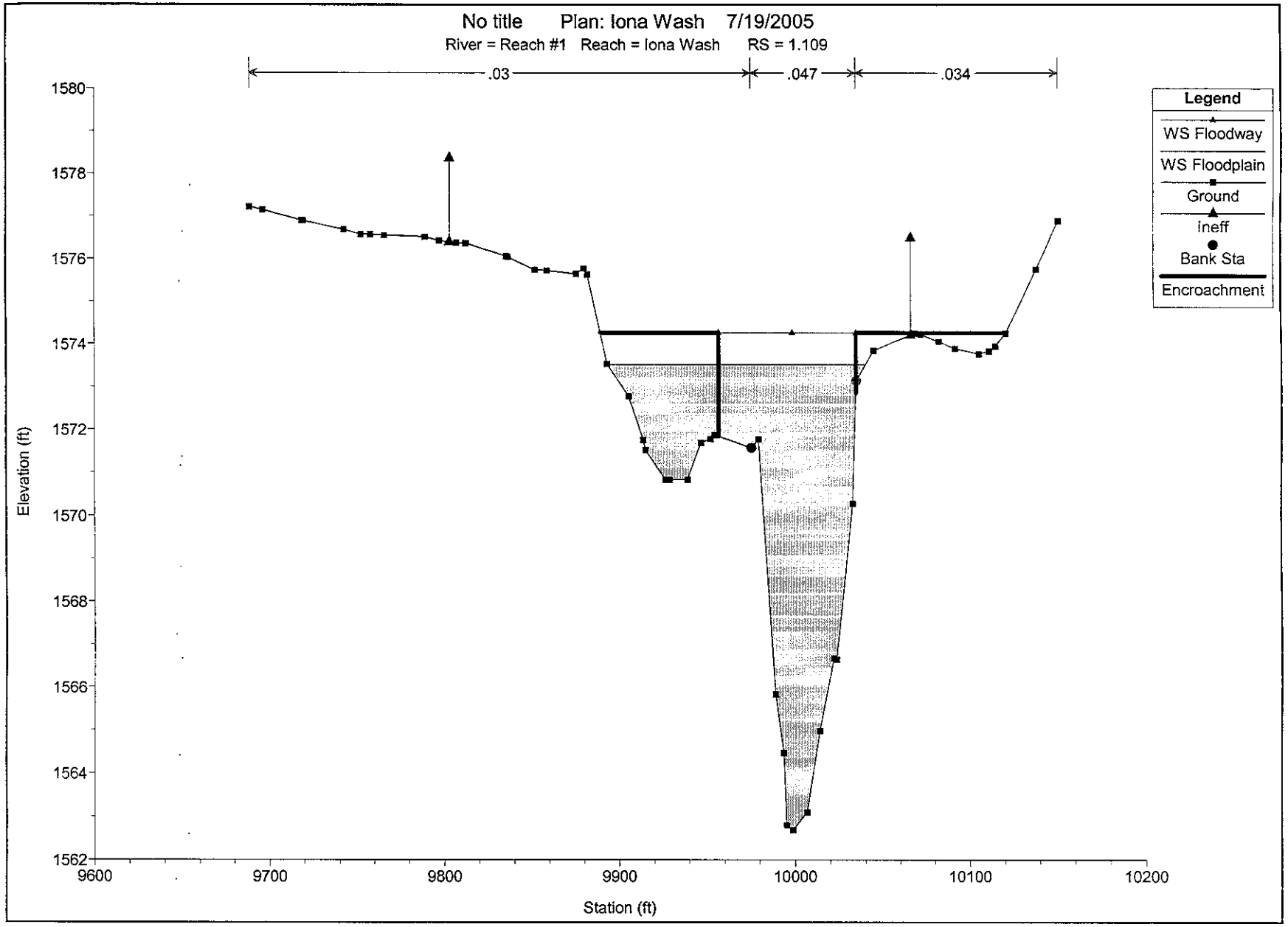

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 1.496
.031
.049
.03
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1590
1588
1586
1584
1582
1580
1578
9940
9960
9980
10000
10020
10040
10060
10080
10100
10120
Station (ft)

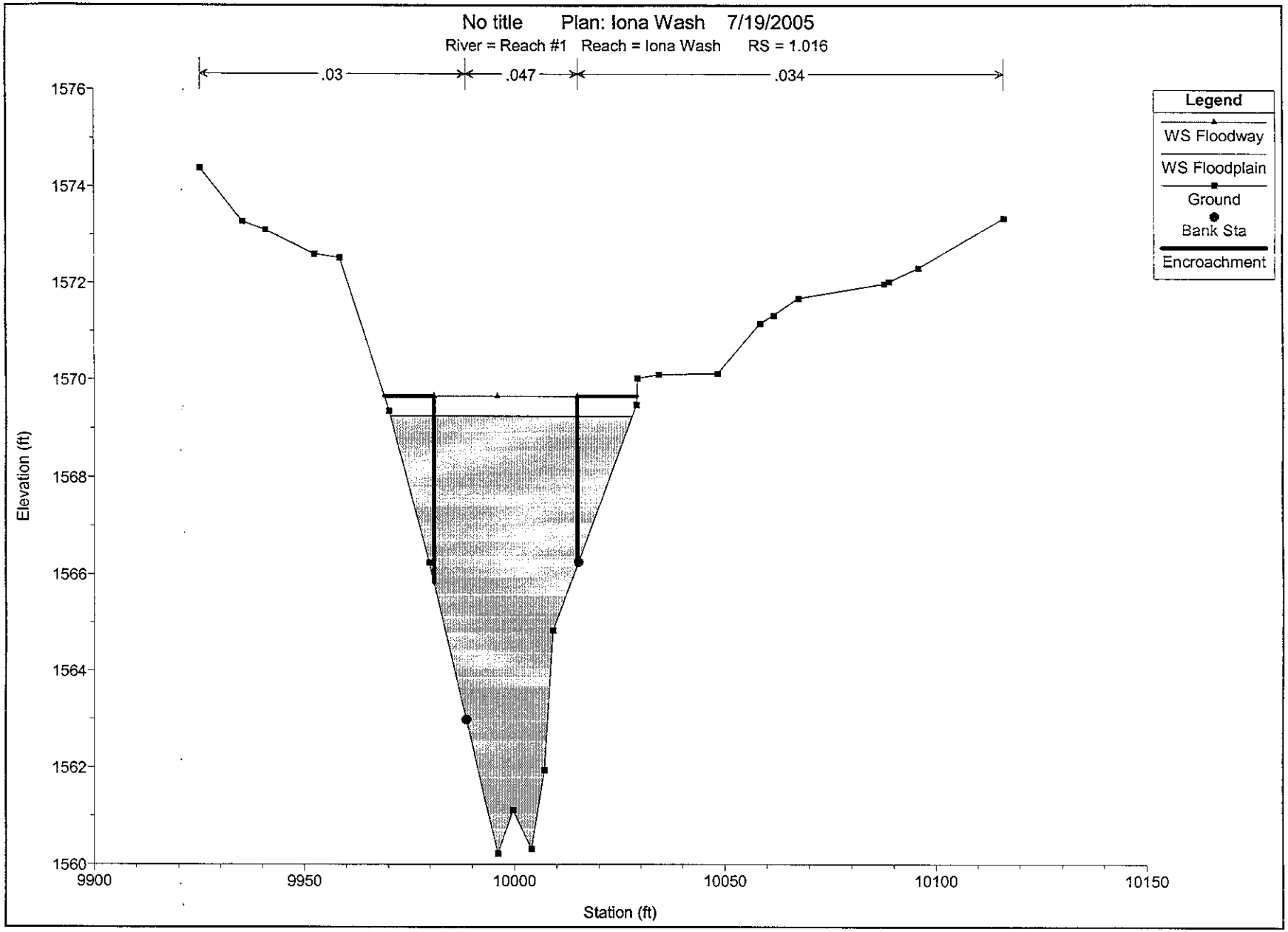

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 1.404
.031
.049
.03
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1588
1586
1584
1582
1580
1578
1576
1574
9800
9850
9900
9950
10000
10050
10100
10150
Station (ft)

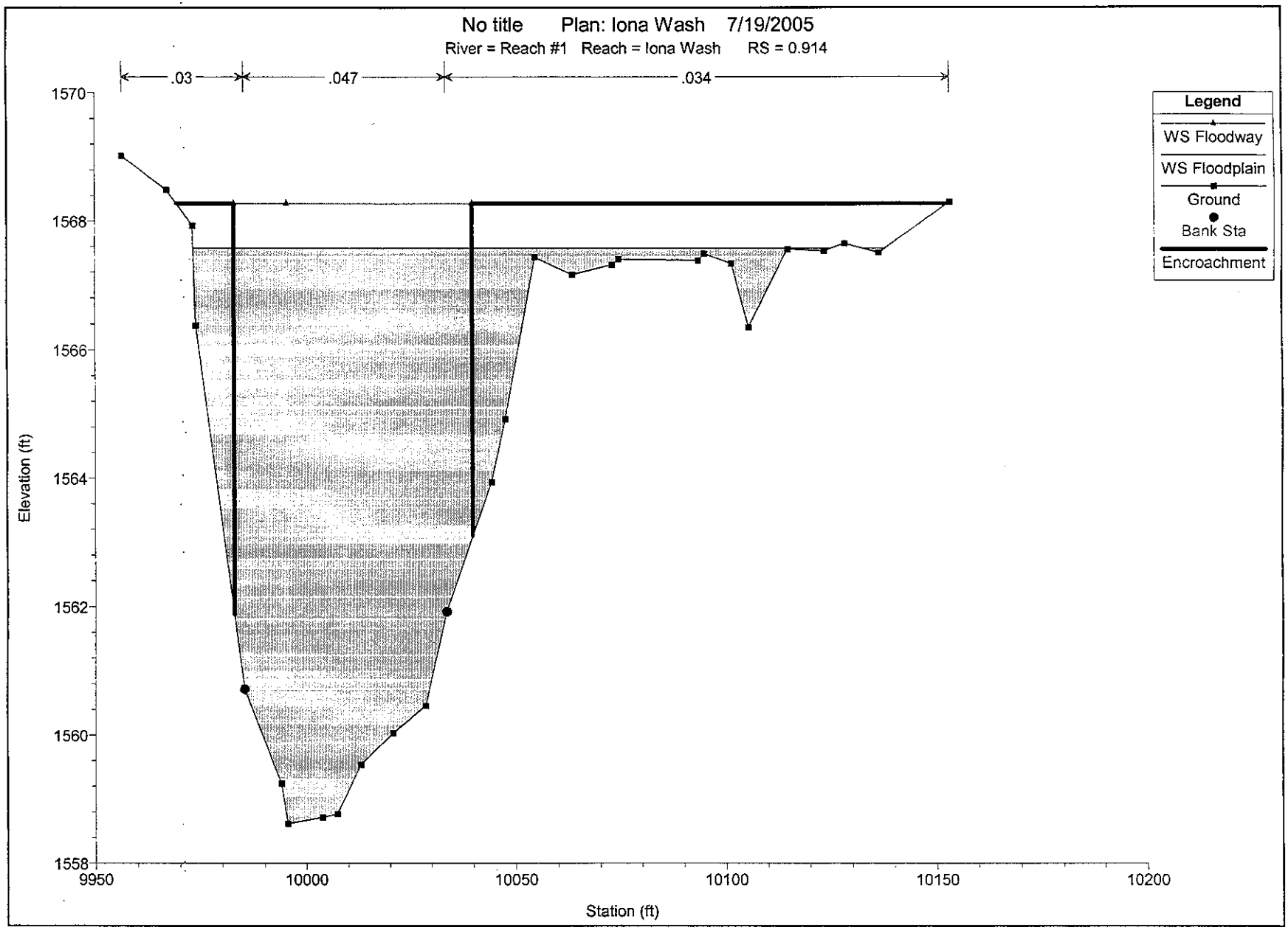

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 1.322
.031
.049
.03
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1584
1582
1580
1578
1576
1574
9920
9940
9960
9980
10000
10020
10040
10060
10080
Station (ft)

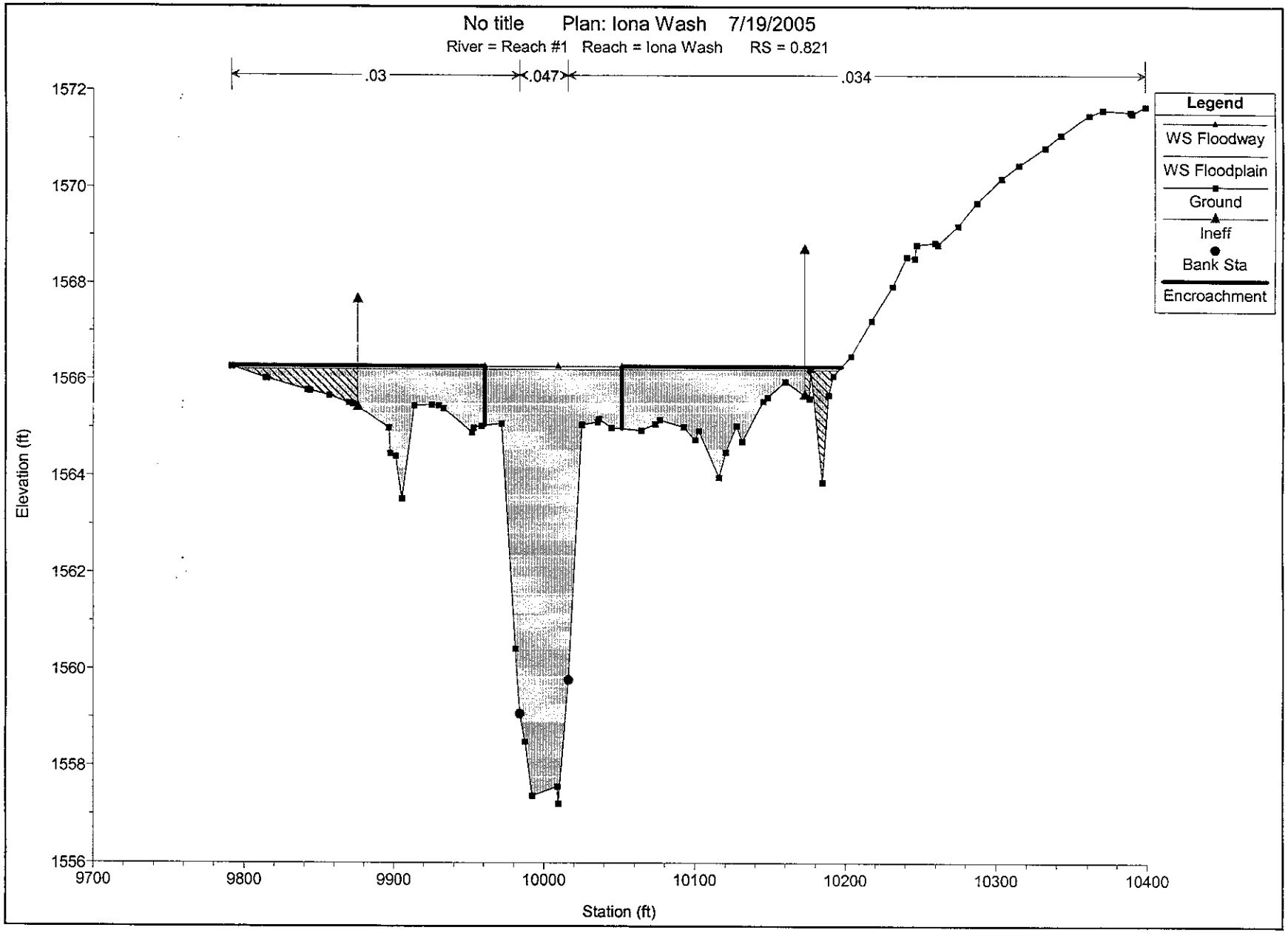

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 1.264
.031
.049
.03
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1582
1580
1578
1576
1574
1572
1570
9940
9960
9980
10000
10020
10040
10060
10080
10100
Station (ft)

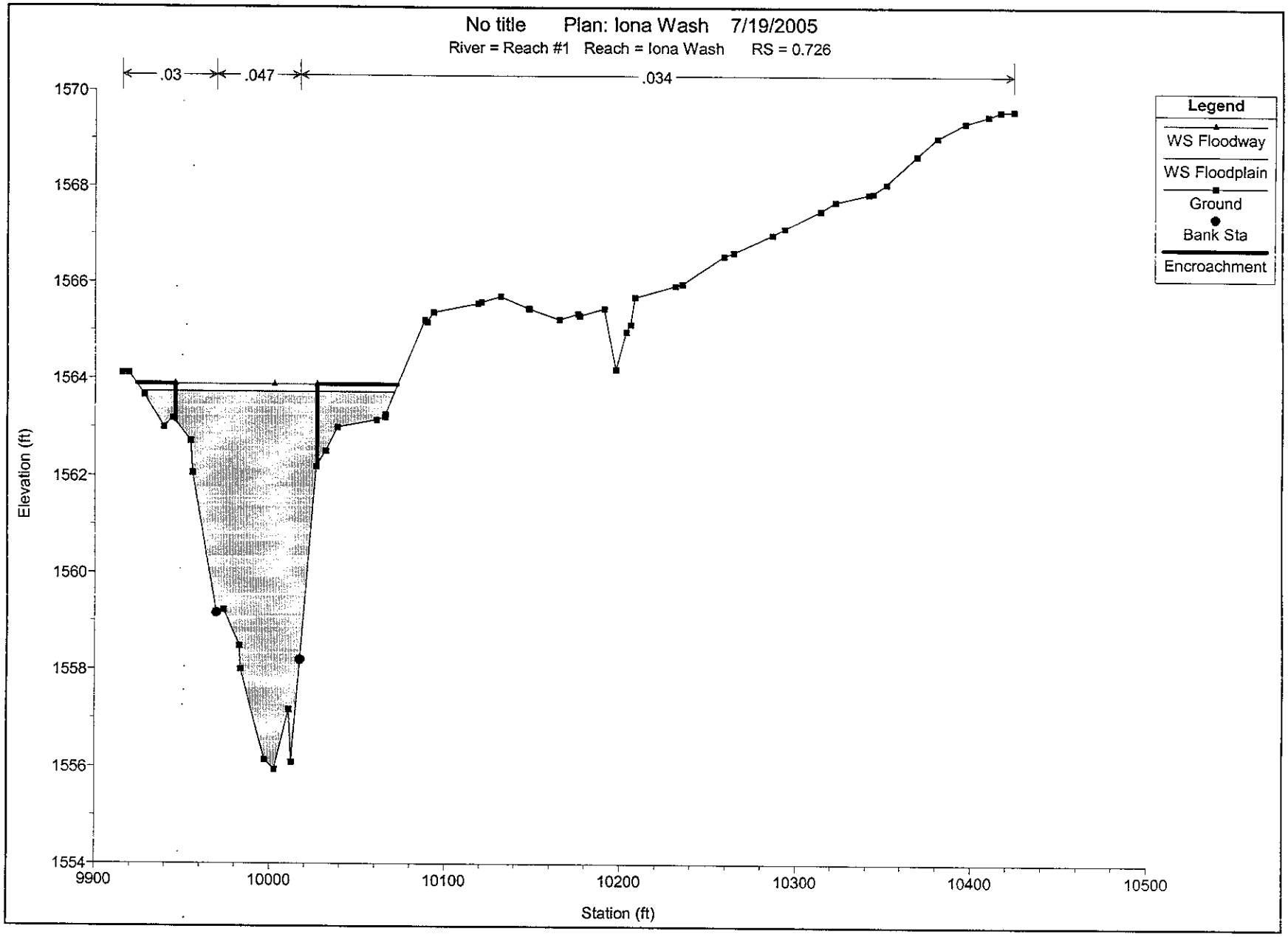

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 1.186
.03
.047
.034
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1580
1578
1576
1574
1572
1570
1568
1566
1564
9900
9920
9940
9960
9980
10000
10020
10040
10060
10080
Station (ft)

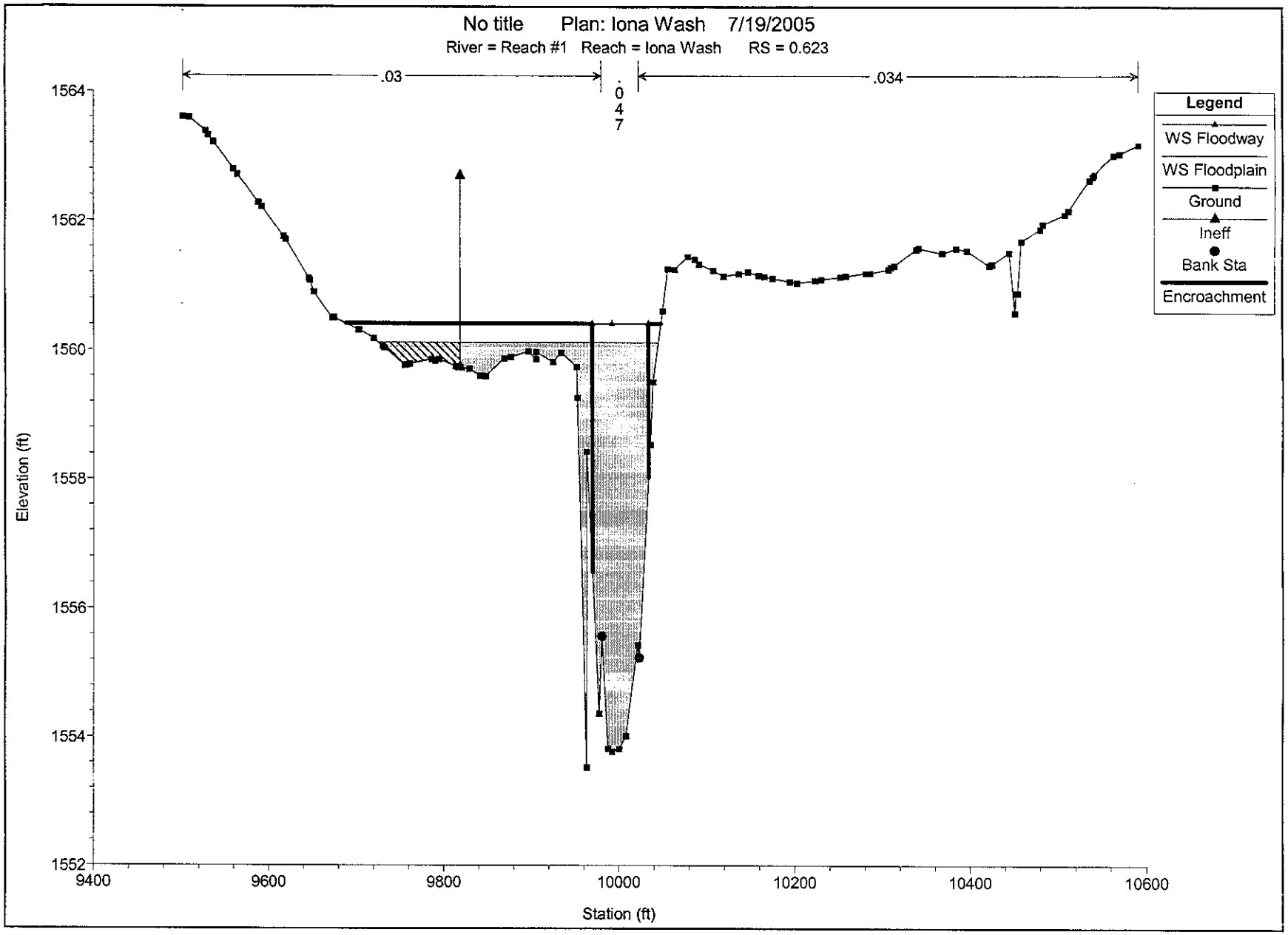

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 1.109
.03
.047
.034
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1580
1578
1576
1574
1572
1570
1568
1566
1564
1562
9600
9700
9800
9900
10000
10100
10200
Station (ft)

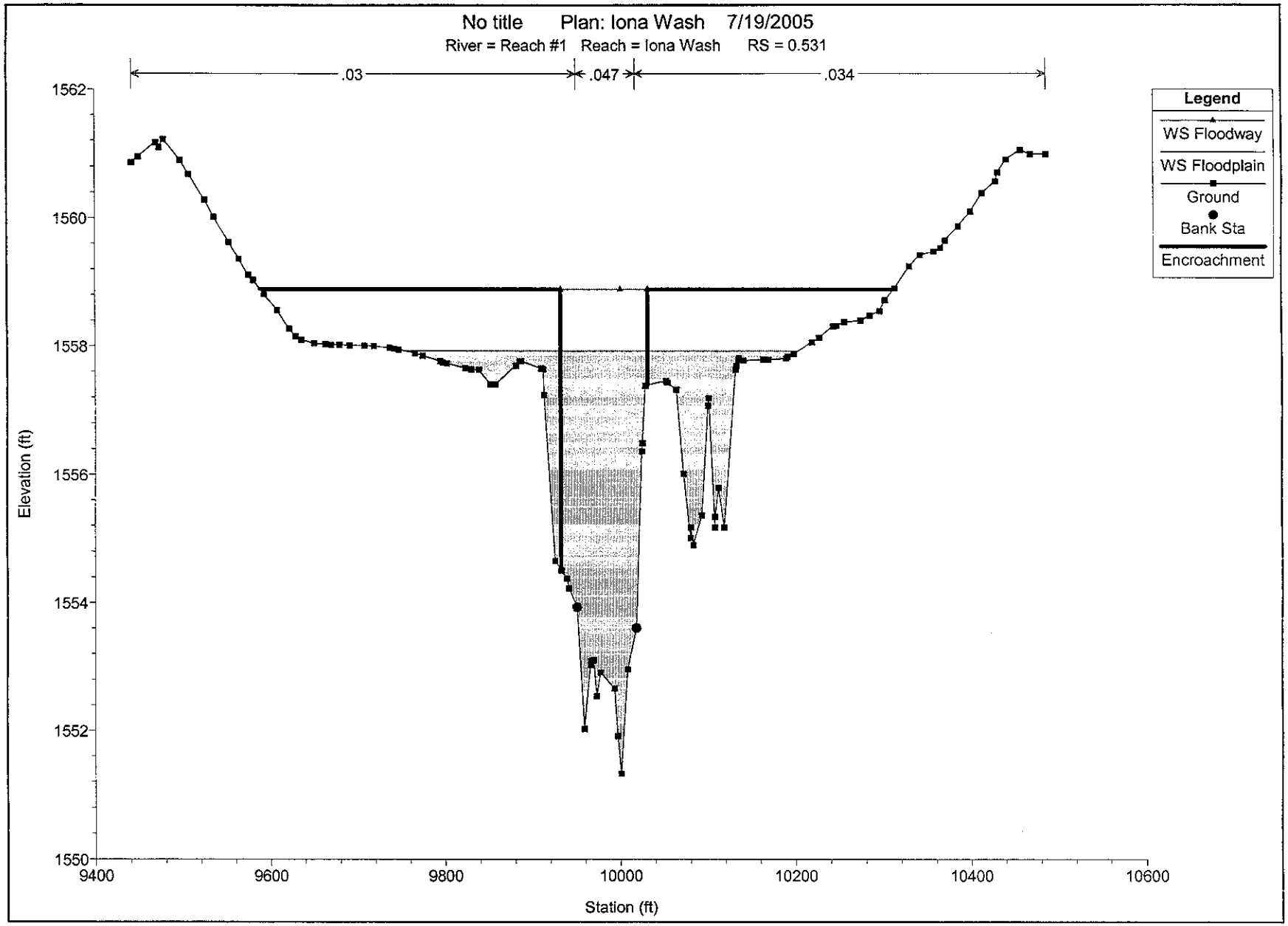

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 1.016
.03
.047
.034
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1576
1574
1572
1570
1568
1566
1564
1562
1560
9900
9950
10000
10050
10100
10150
Station (ft)

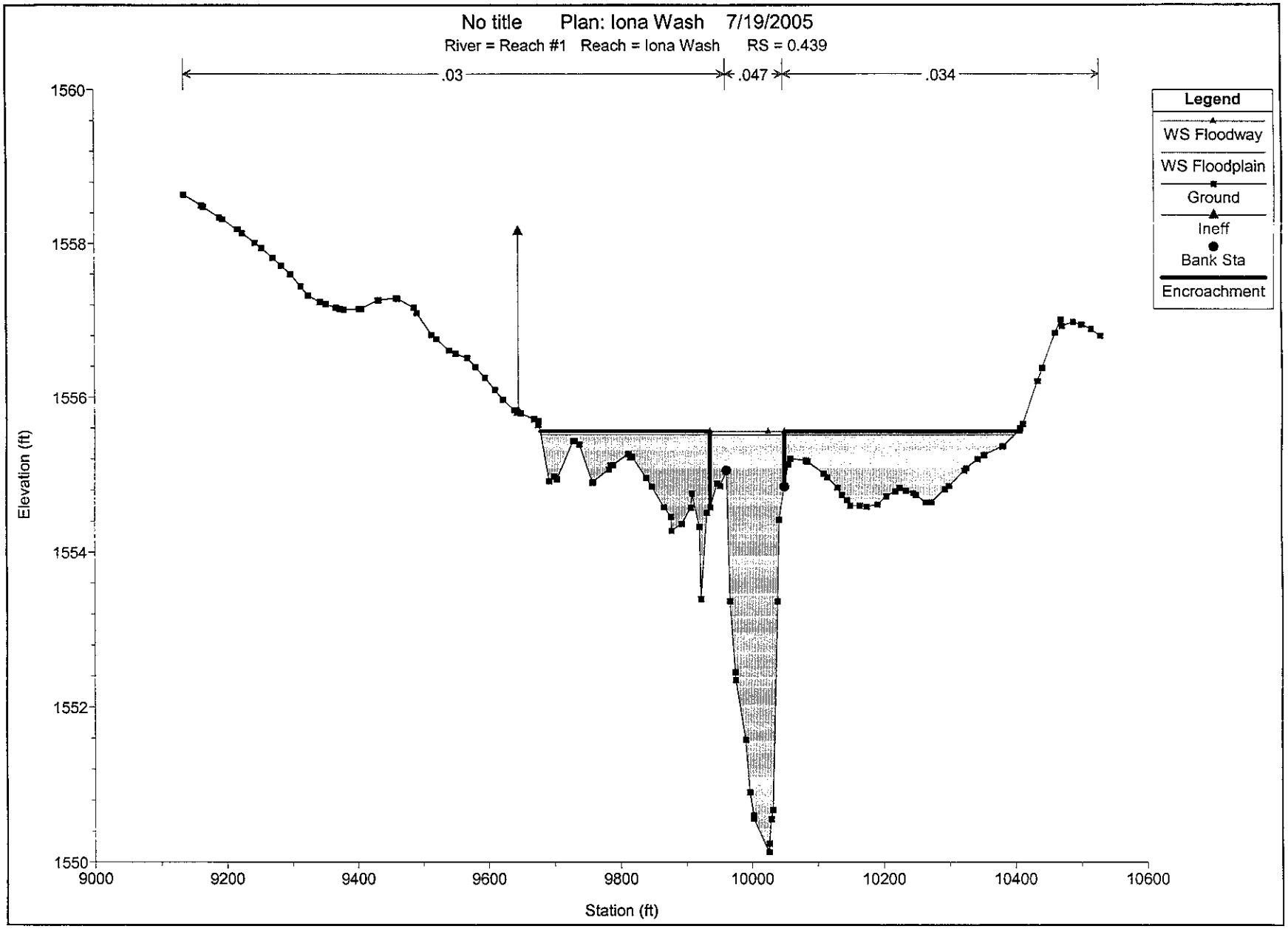

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 0.914
.03
.047
.034
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1570
1568
1566
1564
1562
1560
1558
9950
10000
10050
10100
10150
10200
Station (ft)

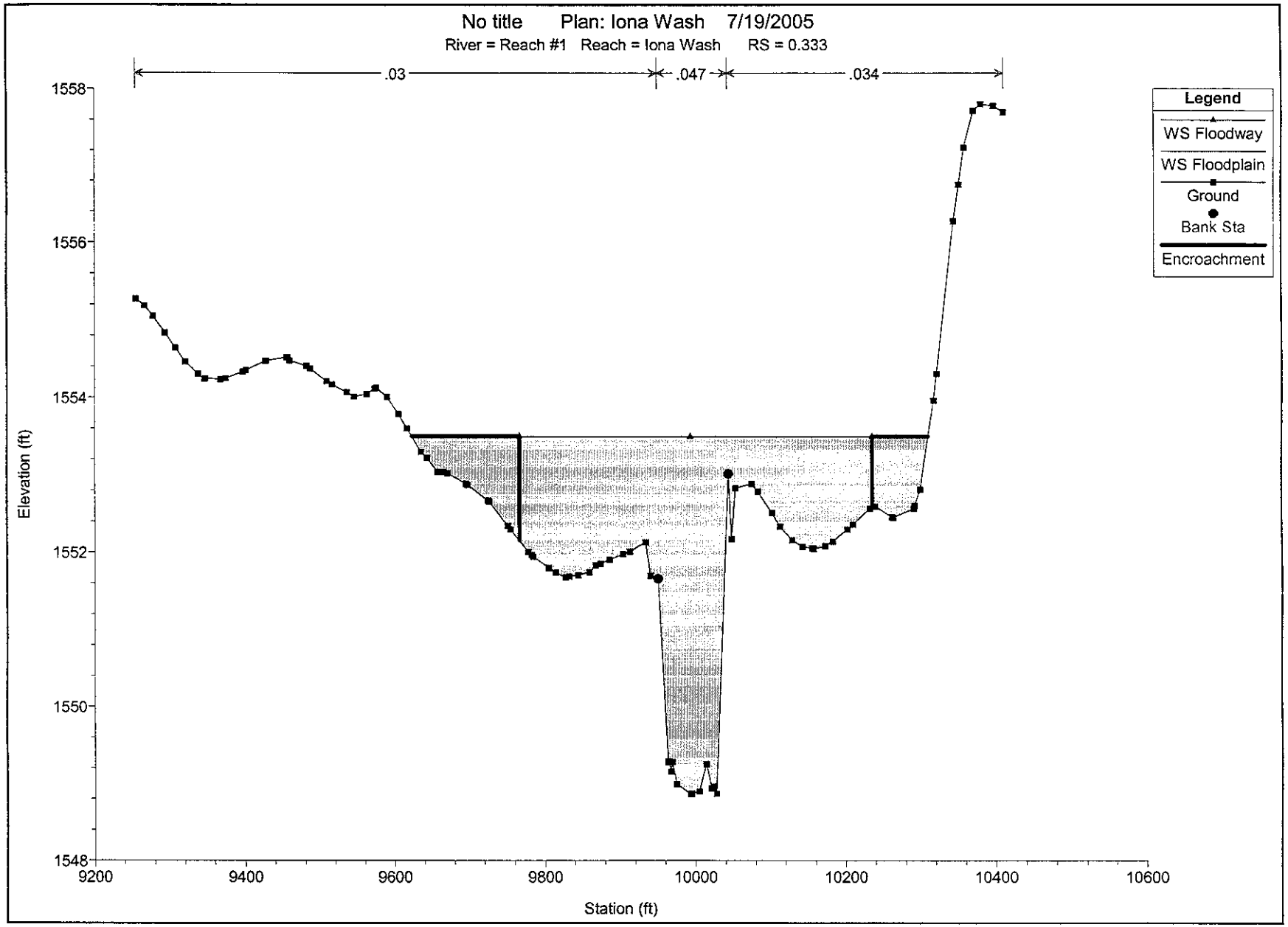

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 0.821
.03
.047
.034
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1572
1570
1568
1566
1564
1562
1560
1558
1556
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

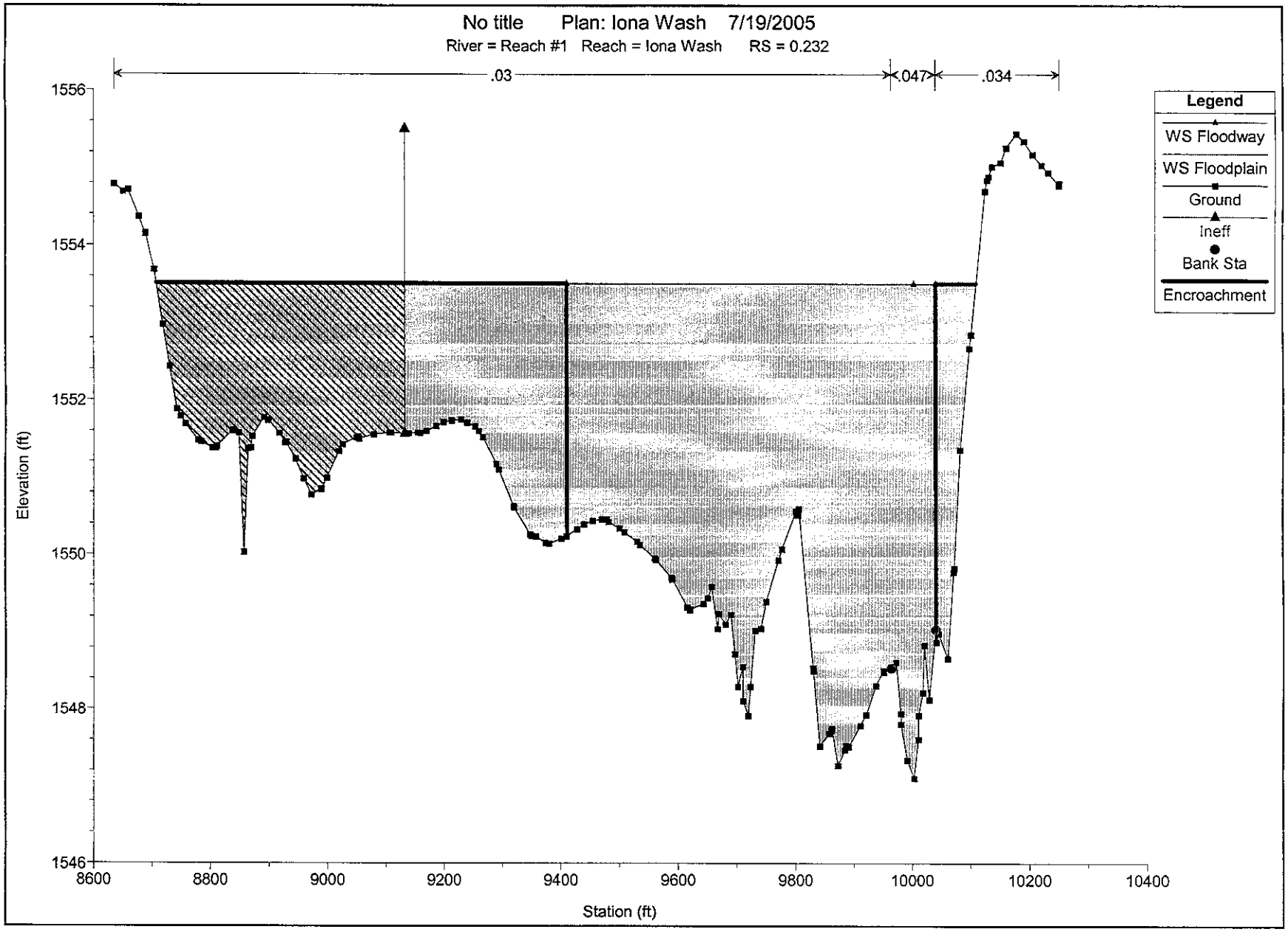

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 0.726
.03
.047
.034
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1570
1568
1566
1564
1562
1560
1558
1556
1554
9900
10000
10100
10200
10300
10400
10500
Station (ft)

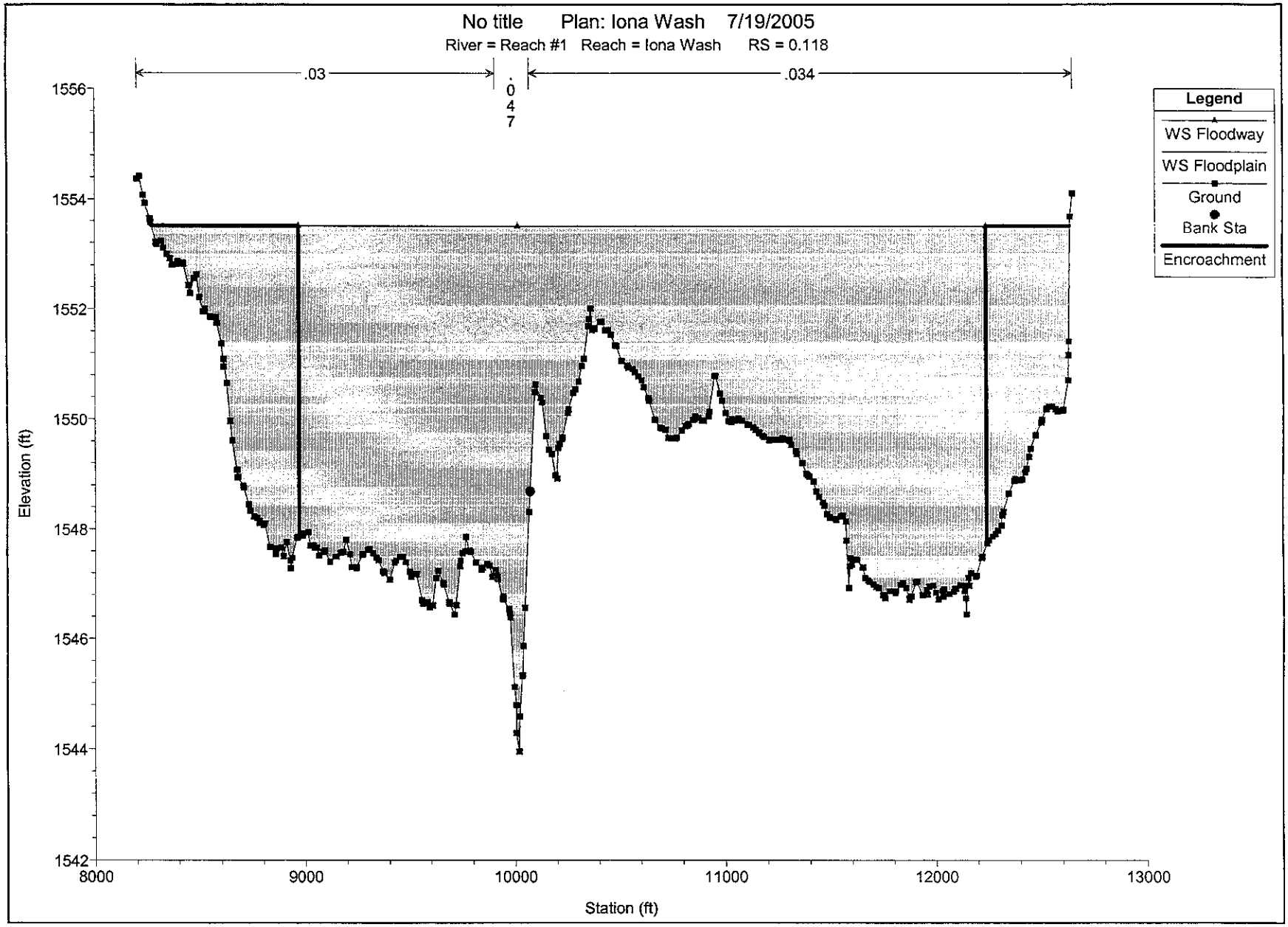

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 0.623
.03
.047
.034
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1564
1562
1560
1558
1556
1554
1552
9400
9600
9800
10000
10200
10400
10600
Station (ft)

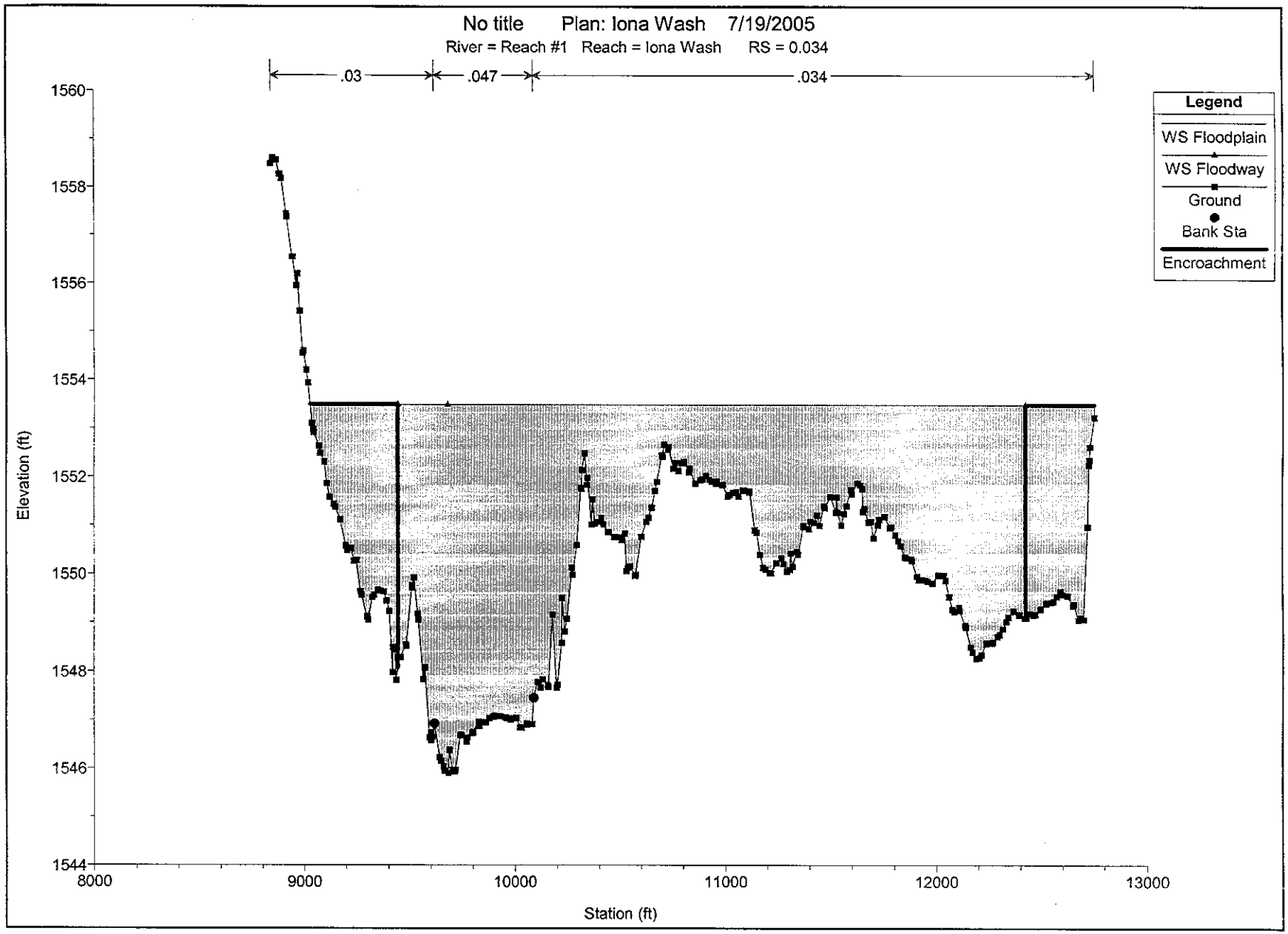

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 0.531
.03
.047
.034
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1562
1560
1558
1556
1554
1552
1550
9400
9600
9800
10000
10200
10400
10600
Station (ft)


No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 0.439
.03
.047
.034
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1560
1558
1556
1554
1552
1550
9000
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)

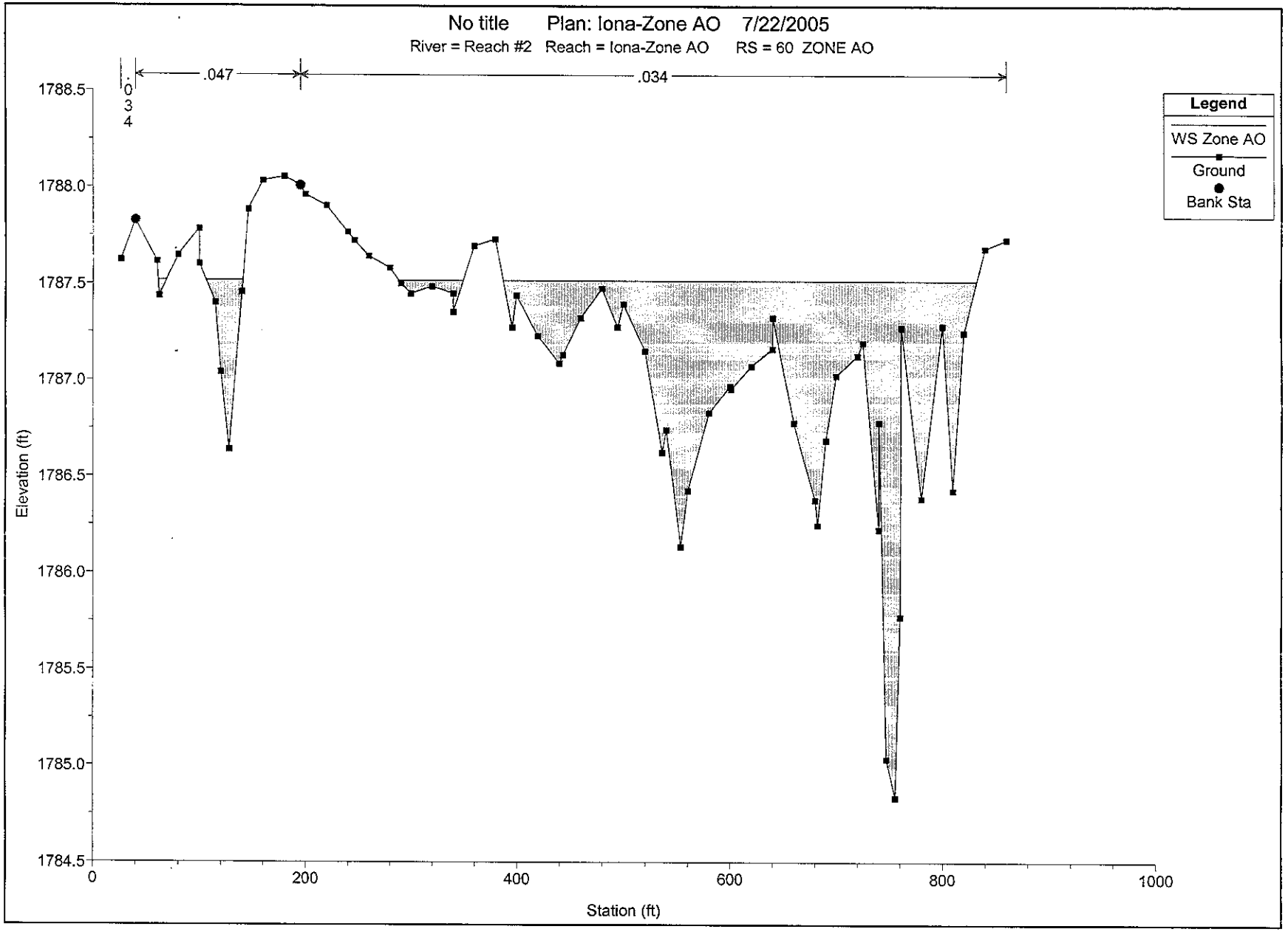

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 0.333
.03
.047
.034
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1558
1556
1554
1552
1550
1548
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)

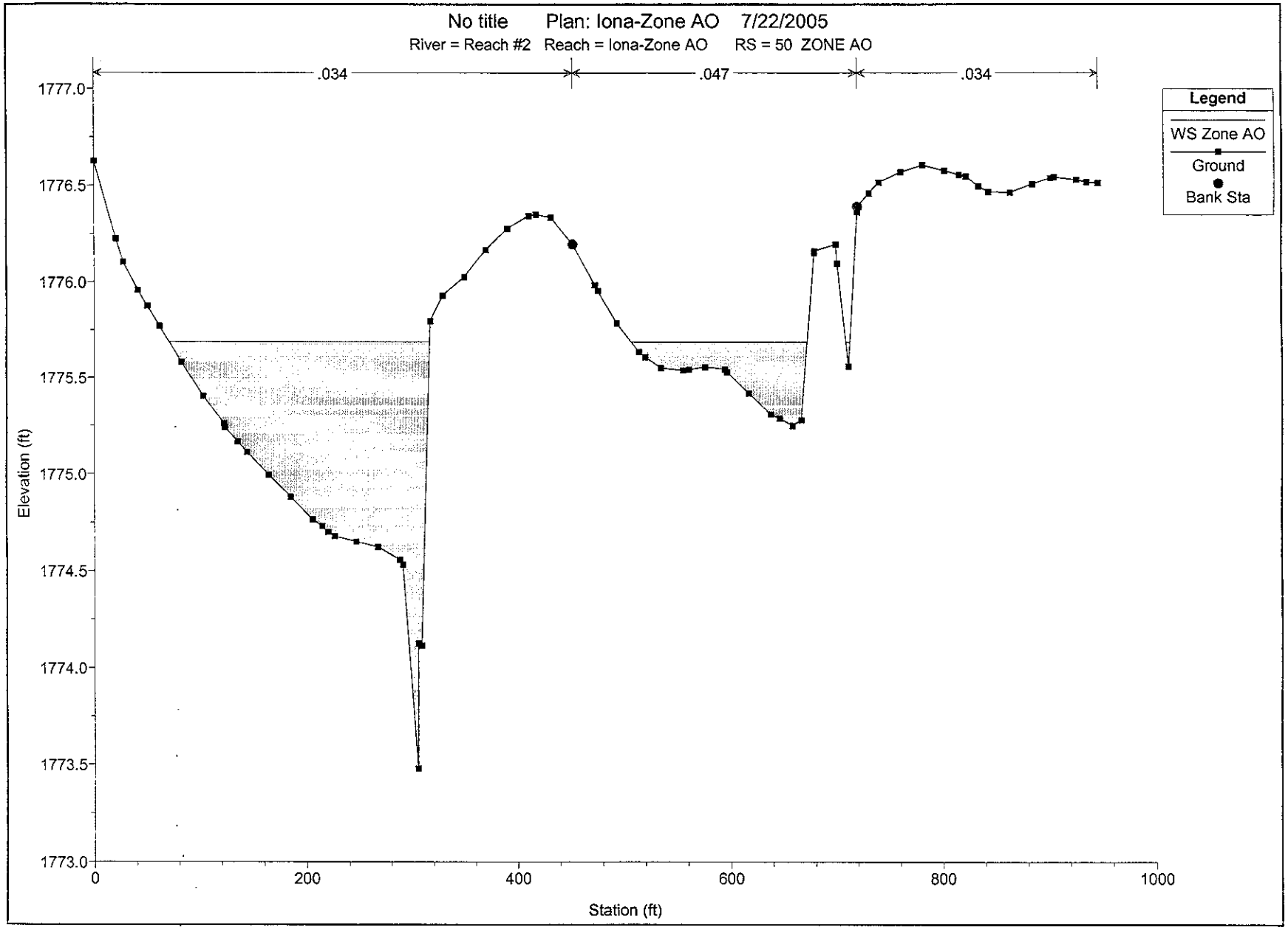

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 0.232
.03
.047
.034
Legend
WS Floodway
WS Floodplain
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
1556
1554
1552
1550
1548
1546
8600
8800
9000
9200
9400
9600
9800
10000
10200
10400
Station (ft)

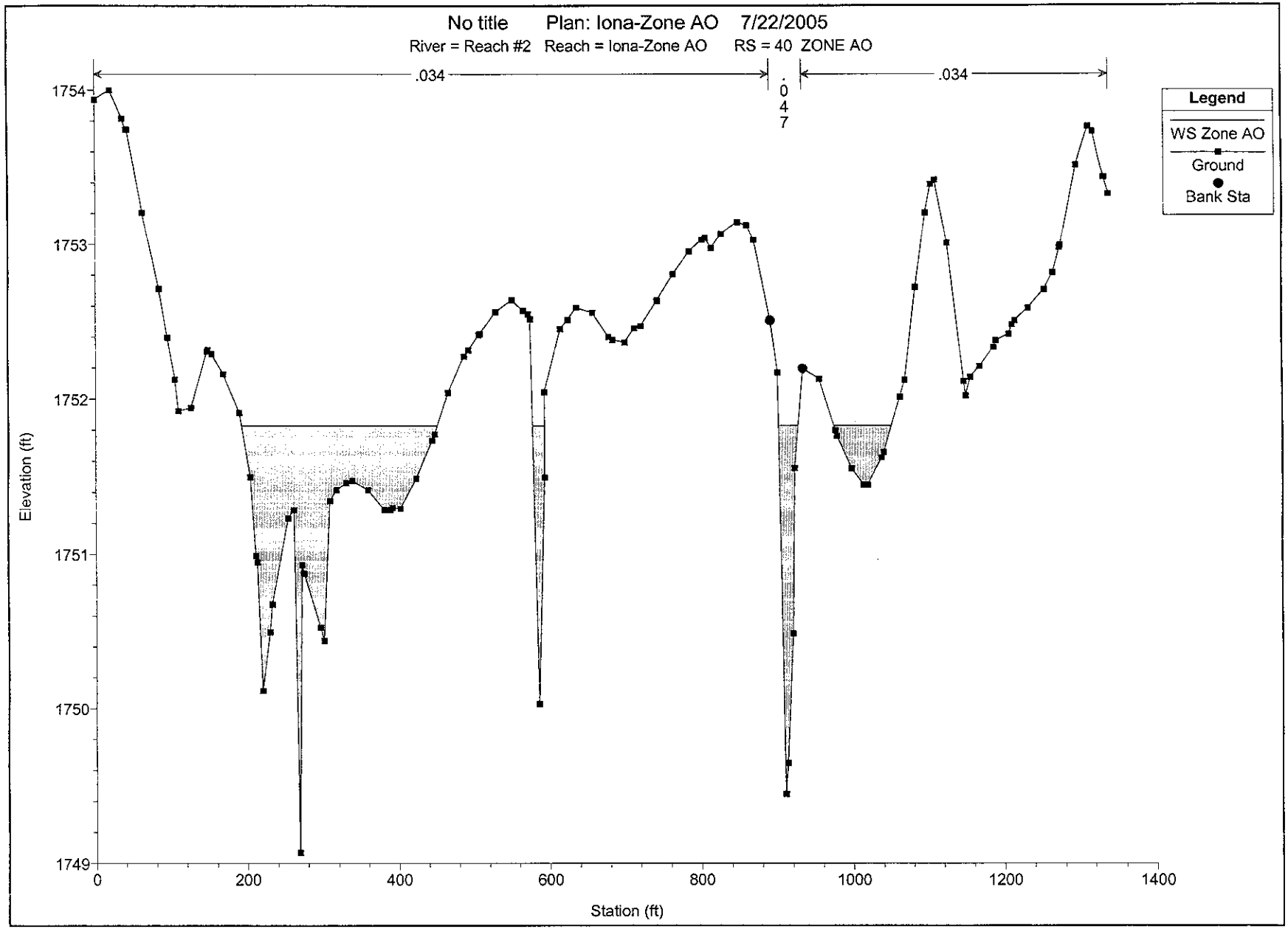

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 0.118
.03
.047
.034
Legend
WS Floodway
WS Floodplain
Ground
Bank Sta
Encroachment
Elevation (ft)
1556
1554
1552
1550
1548
1546
1544
1542
8000
9000
10000
11000
12000
13000
Station (ft)

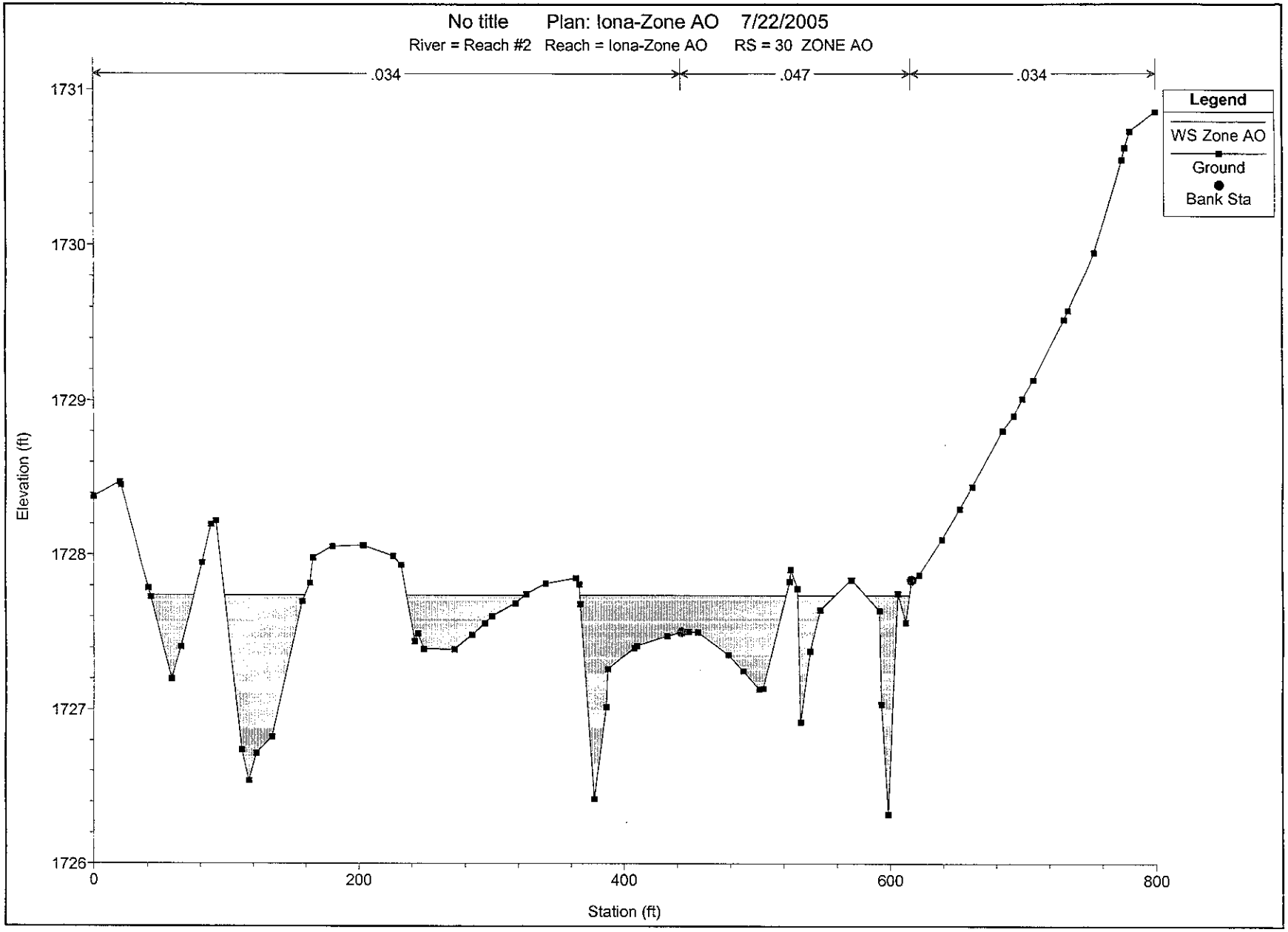

No title Plan: Iona Wash 7/19/2005
River = Reach #1 Reach = Iona Wash RS = 0.034
.03
.047
.034
Legend
WS Floodplain
WS Floodway
Ground
Bank Sta
Encroachment
Elevation (ft)
1560
1558
1556
1554
1552
1550
1548
1546
1544
8000
9000
10000
11000
12000
13000
Station (ft)

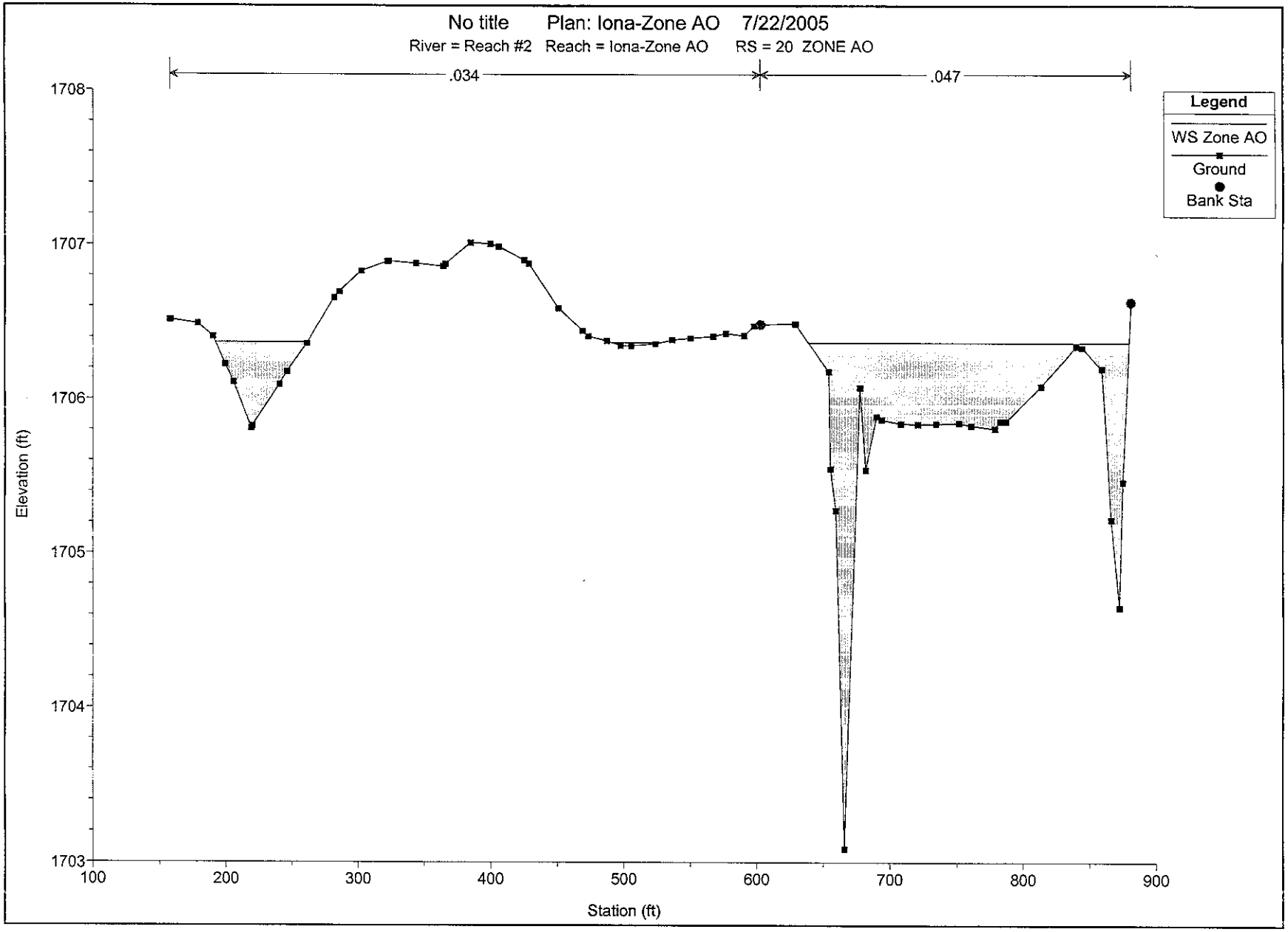
IONA WASH (ZONE AO)

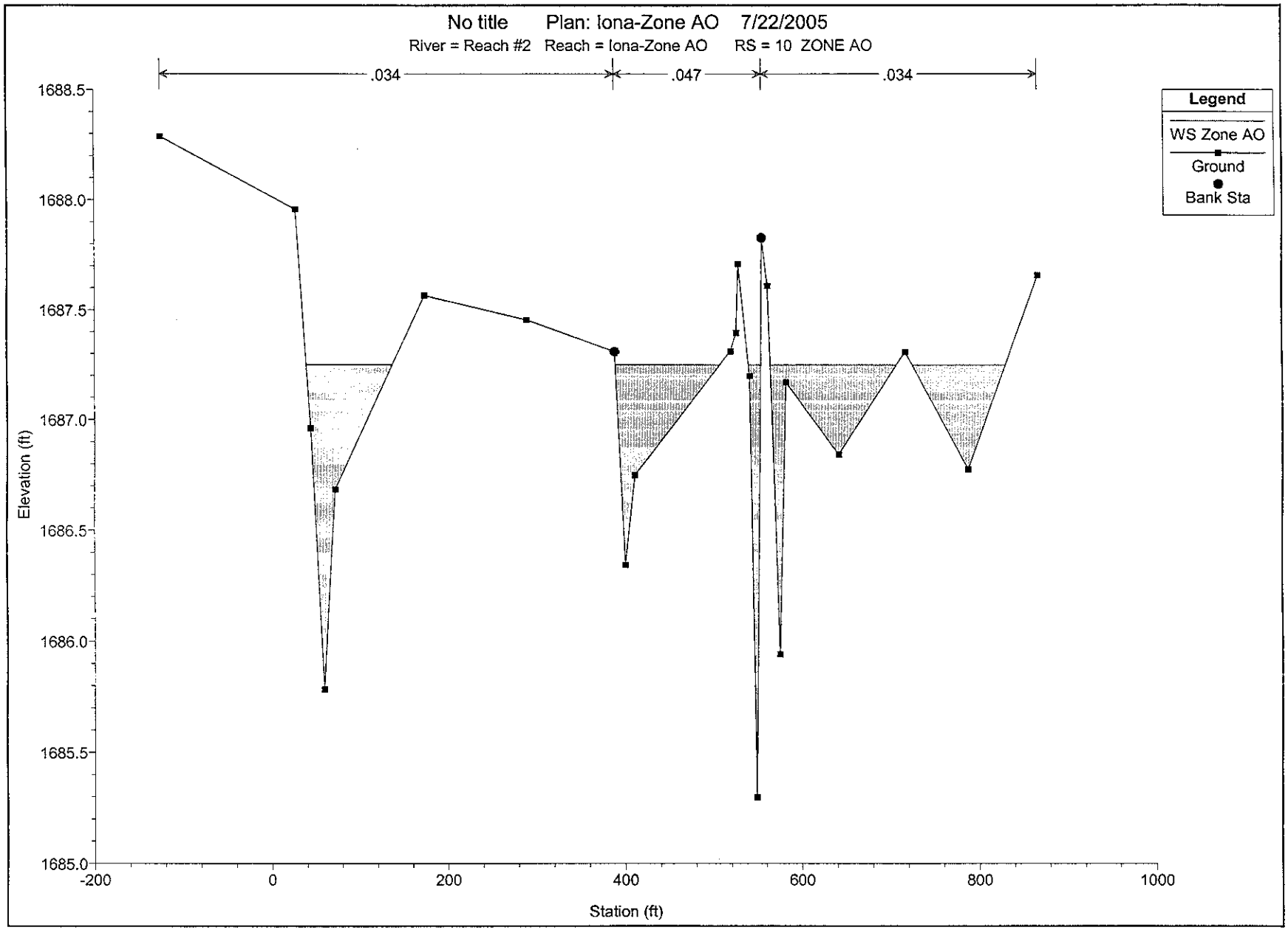

No title Plan: Iona-Zone AO 7/22/2005
River = Reach #2 Reach = Iona-Zone AO RS = 60 ZONE AO
.034
.047
.034
Legend
WS Zone AO
Ground
Bank Sta
Elevation (ft)
1788.5
1788.0
1787.5
1787.0
1786.5
1786.0
1785.5
1785.0
1784.5
0
200
400
600
800
1000
Station (ft)


No title Plan: Iona-Zone AO 7/22/2005
River = Reach #2 Reach = Iona-Zone AO RS = 50 ZONE AO
.034
.047
.034
Legend
WS Zone AO
Ground
Bank Sta
Elevation (ft)
1777.0
1776.5
1776.0
1775.5
1775.0
1774.5
1774.0
1773.5
1773.0
0
200
400
600
800
1000
Station (ft)


No title Plan: Iona-Zone AO 7/22/2005
River = Reach #2 Reach = Iona-Zone AO RS = 40 ZONE AO
.034
.047
.034
Legend
WS Zone AO
Ground
Bank Sta
Elevation (ft)
1754
1753
1752
1751
1750
1749
0
200
400
600
800
1000
1200
1400
Station (ft)


No title Plan: Iona-Zone AO 7/22/2005
River = Reach #2 Reach = Iona-Zone AO RS = 30 ZONE AO
.034
.047
.034
Legend
WS Zone AO
Ground
Bank Sta
Elevation (ft)
1731
1730
1729
1728
1727
1726
0
200
400
600
800
Station (ft)


No title Plan: Iona-Zone AO 7/22/2005
River = Reach #2 Reach = Iona-Zone AO RS = 20 ZONE AO
.034
.047
Legend
WS Zone AO
Ground
Bank Sta
Elevation (ft)
1708
1707
1706
1705
1704
1703
100
200
300
400
500
600
700
800
900
Station (ft)


No title Plan: Iona-Zone AO 7/22/2005
River = Reach #2 Reach = Iona-Zone AO RS = 10 ZONE AO
.034
.047
.034
Legend
WS Zone AO
Ground
Bank Sta
Elevation (ft)
1688.5
1688.0
1687.5
1687.0
1686.5
1686.0
1685.5
1685.0
-200
0
200
400
600
800
1000
Station (ft)