



**U S Army Corps
of Engineers**
Huntington District

Public Notice

In reply refer to Public Notice No.
200500588

Issuance Date: September 12, 2005

Stream: Brandywine Creek

Closing Date: October 12, 2005

Please address all comments and inquiries to:

U.S. Army Corps of Engineers, Huntington District

ATTN: CELRH-OR-F Public Notice No. (reference above)

502 Eighth Street

Huntington, West Virginia 25701-2070

Phone: (304) 399-5210

PUBLIC NOTICE: The purpose of this public notice is to inform you of a proposal for work in which you might be interested. It is also to solicit your comments and information to better enable us to make a reasonable decision on factors affecting the public interest. We hope you will participate in this process.

REGULATORY PROGRAM: Since its early history, the U.S. Army Corps of Engineers (Corps) has played an important role in the development of the nation's water resources. Originally, this involved construction of harbor fortifications and coastal defenses. Later duties included the improvement of waterways to provide avenues of commerce. An important part of our mission today is the protection of the nation's waterways through the administration of the Corps Regulatory Program.

SECTION 404: The Corps is directed by Congress under Section 404 of the Clean Water Act (33 USC 1344) to regulate the discharge of dredged and fill material into all waters of the United States, including wetlands. The intent of the law is to protect the nation's waters from the indiscriminate discharge of material capable of causing pollution and to restore and maintain their chemical, physical and biological integrity.

TO WHOM IT MAY CONCERN: The following application has been submitted for a Department of the Army Permit under the provisions of Section 404 of the Clean Water Act. This notice serves as the Corps of Engineers' request to the Ohio Environmental Protection Agency (OEPA) to act on Section 401 Water Quality Certification for the following application:

APPLICANTS: Ohio Department of Transportation
 1980 West Broad Street
 Columbus, Ohio 43223

LOCATION: The proposed project is located within Brandywine Creek, several unnamed tributaries of Brandywine Creek, one unnamed tributary of Indian Creek, and their adjacent wetlands along State Route (SR) 8 in northern Summit County, Ohio. The project corridor runs between SR 303 in the south to Interstate (I) 271 in the north. The corridor lies in the City of Macedonia, Northfield Center Township, and the Village of Boston Heights. Nearby communities include the City of Hudson, the Village of Peninsula, Boston Township, Sagamore Hills Township, and the Village of Northfield.

DESCRIPTION OF THE PROPOSED WORK: The applicant is proposing to make improvements to 4.79 miles of SR 8 and 1.42 miles of I-271 in the vicinity of the SR 8 intersection. The purpose of the project is to reduce the congestion on SR 8 between SR 303 and I-271 and at the intersections of SR 8 and the local roads. In addition, the project is intended to improve this portion of SR 8, and its attendant interchanges, to meet current ODOT and FHWA design standards. According to the applicant, SR 8, the existing at-grade intersections and the SR 8/I-271 interchange are all congested and operate at a poor Level of Service (LOS).

SR 8 is currently a controlled access facility with signalized intersections, two lanes northbound, two lanes southbound and associated turn lanes. The proposed project will keep the through lanes in essentially the same location, keep the existing median and provide upgraded shoulders. The overhead bridge abutments will be constructed to allow a third lane in each direction to be added at a later date and if traffic conditions require it, a third lane can be added in the future within the existing median.

Work associated with the proposal would consist of upgrading SR 8 to a limited access facility by removing the signalized, at-grade intersections with local roadways. At-grade intersections will be eliminated at Boston Mills Road, Hines Hill Road, and Twinsburg Road. The at-grade intersection at Highland Road will be maintained. The project will also involve upgrading access ramps to I-80 and I-270 and Hines Hill Road by improving some of the existing ramps, building several new ramps, and abandoning one existing ramp. Limited access also requires the construction of two short service roads to maintain local access for existing businesses and neighborhoods (the 0.59 mile-long Frontage Road and the 0.39 mile-long relocation of Industrial Parkway). In addition, the proposed improvements require the relocation of a powerline to a new location just west of the proposed highway right-of-way through most of the project area. The new powerline right-of-way will consist of a 30-foot wide swath.

The proposal would result in impacts to 4,063 linear feet of 23 streams and 14.45 acres of 30 wetlands. The construction of ramps, embankments, turn lanes, and service roads in addition to road widening will require impacts to waters of the United States including wetland fills and stream culverting or relocation. Approximately 22,206.7 cubic yards of standard road fill materials and 74.7 cubic yards of concrete/rock channel protection (RCP) will be placed in approximately 14.63 acres of waters of the United States in conjunction with this proposal. Specifics regarding the proposed impacts can be found in Tables A-C.

MITIGATION PLAN: The applicant has submitted a conceptual compensatory mitigation plan (CMP) to compensate for permanent impacts to waters of the United States regulated by the United States Army Corps of Engineers. As mitigation for the wetland and stream impacts associated with the SR 8 improvements, ODOT, in coordination with Metro Parks, Serving Summit County, the City of Twinsburg and Wetlands Resource Center proposes to restore wetland and stream channels within an approximately 164 acre area located in the northeastern portion of Liberty Park. Liberty Park is located north of SR 82 (East Aurora Road), east of Liberty Road, south of Glenwood Drive, and west of the Summit/Portage County line in the City of Twinsburg and the Village of Reminderville, Summit County, Ohio. The mitigation site has been subdivided into three cells based upon the natural segmentation of the area by the Pond Brook channel and associated tributary ditches.

Cell 1 is approximately 39 acres in size and is a predominantly shrub-scrub area with a section of forest present on the northern quarter of the cell. The vegetative community within Cell 1 is largely dominated by shrubs remnant of a wetter condition in the past and upland species that have moved in as wetland hydrology was removed. The entire cell is mapped as hydric Willette muck soils. Substantial historic hydrologic manipulation on the site has significantly limited or eliminated the natural wetland hydrology within Cell 1. Wetland restoration of a minimum of 14.56 acres of shrub-scrub wetland is proposed to occur in Cell 1 via improvement of existing embankments, installation of a clay curtain and rehydration of the soils through water diversion.

Cell 2 is approximately 42.3 acres in size and contains an abundance of wetlands areas including scrub-shrub swamp, forested swamp, invasive cattail marsh, and a small area of button bush swamp. As the majority of Cell 2 is already composed of higher quality forested and shrub-scrub wetlands, no wetland mitigation activities are planned within Cell 2.

Cell 3 is approximately 82.4 acres in size and is dominated by a large herbaceous invasive cattail marsh, including smaller areas of invasive reed canary grass. A small stand of buttonbush is also present in the interior of the cattail marsh. Cell 3 additionally contains successional old field and forested areas, upland forest, and areas of scrub-shrub wetland. The area is mapped as "Water" according to the county soil survey; however, the mapping reflects an historic use and is not the current condition. The cell formerly contained a man-made pond or lake area, which was drained. Based on surrounding soils shown on the survey, Cell 3 likely contains both Canadice silty clay loam, and Willette muck with some areas of non-hydric Bogart-Haskins loams. Mitigation is proposed to occur through the eradication of the invasive emergent community and re-establishment of a native scrub/shrub community characterized by *Cephalanthus* and other native shrubs. To accommodate the entire amount of mitigation necessary to satisfy the SR 8 improvement project, 34.90 acres of Cell 3 must be enhanced. In reality, the entire area of Cell 3 will require eradication and enhancement as it would not be feasible to conduct invasive species management on only a portion of the *Typha/Phalaris* marsh.

Streams: Approximately 6,095 linear feet must replace the loss of the stream impacted by the project. Two potential options are being considered. Option A would involve rerouting and restoring a new channel to carry the flows from current Ditch 2 through Cell 2 and Cell 3 to the Pond Brook mainstem. (Ditch 2 is located south of Cell 1 and north of Cell 2.) The stream rerouting is proposed to create an E-type channel. Option A additionally provides for the restoration of the mainstem of Pond Brook from the northern boundary of Liberty Park south to Pond Brook's confluence with Ditch 2. The restoration along the main stem will be comprised of up to 2,245 feet to supplement the restoration activities associated with Ditch 2 and to provide the total restoration length of 6,095. Pond Brook was channelized (deepened, straightened and widened) in the early 1900's to accommodate agricultural practices. The restoration of the Pond Brook mainstem will include raising the channel invert up as much as possible without adversely affecting drainage and lowering the adjacent floodplain to create a stable, functional channel and floodplain. The restoration of the Pond Brook main channel would result in creating an E-type channel and floodplain increasing stream length. Option B would abandon the concept of rerouting and restoring Ditch 2 and would focus all stream restoration within the mainstem of Pond Brook.

Copies of the conceptual mitigation plan are available for review upon request.

Plans of the proposed work are attached to this notice.

ALTERNATIVE ANALYSIS: This project is not considered to be water dependent; therefore, the applicant is required to show that other less damaging practicable alternatives are not available that would achieve the applicant's goal. The applicant has submitted an alternatives analysis, which is currently under review. No permit will be issued until our review of the alternatives analysis clearly shows that upland alternatives are not available to achieve the applicant's purpose.

WATER QUALITY CERTIFICATION: A section 401 Water Quality Certification is required for this project. It is the applicant's responsibility to obtain the certification from the Ohio Environmental Protection Agency.

HISTORIC AND CULTURAL RESOURCES: The Federal Highways Administration (FHWA) is the lead Federal Agency for this proposal. As such, FHWA is ultimately responsible for compliance with the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act.

Project Site: By letter dated November 10, 1999, ODOT forwarded to the State Historic Preservation Office (SHPO) a copy of a Phase II testing report for a specific site to be affected by the project and a copy of an Addendum report for supplemental testing at Ramp EE. In accordance with 36 CFR 800.4(d)(1), ODOT determined that no historic properties would be affected by the proposal. On November 18, 1999, SHPO concurred with the determination. ODOT has indicated design changes have been made to the project, subsequent to the concurrence, which could result in additional studies being conducted and additional coordination with SHPO.

Mitigation Site: By Inter-Office Communication dated August 26, 2005, ODOT determined that the proposed undertaking at the mitigation site will have no affect on any historic property.

A copy of this public notice will be furnished to the SHPO for their review and comment.

ENDANGERED/THREATENED SPECIES REVIEW: The project is located within the known or historic range of the following candidate, threatened, or endangered species:

Indiana Bat (E)
Northern monkshood (T)
Bald Eagle (T)

As noted above, FHWA is the lead Federal agency for this project. FHWA is responsible for compliance with the National Environmental Policy Act (NEPA) and Section 7 of the Endangered Species Act. By letters dated October 26, 2001, and December 20, 2001, the U.S. Fish and Wildlife Service (USFWS) responded to direct inquiries of the applicant. USFWS noted that the project lies in the range of the three species stated above. Avoidance and minimization measures were recommended

for the Indiana bat along with recommendations for determining if suitable habitat is present within the project area for the northern monkshood. USFWS also recommended contacting the Ohio Division of Wildlife for the location of eagle nests in the county and indicated further coordination would be necessary if any nests are located within ½ mile of the project site. The Huntington District has consulted the most recently available information. As such it has been determined that the project has the may affect the Indiana bat. The applicant has obtained a consultant to prepare a Biological Assessment for the Indiana Bat and formal consultation may be needed depending on the results of the Biological Assessment. Suitable habitat for the Northern monkshood does not exist in the project area, therefore, the project will have no affect on this species. In addition, since there are no Bald Eagle nests within ½ mile of the project site there would be no affect on this species.

This public notice serves as a request to the U.S. Fish and Wildlife Service for any additional information they may have on whether any listed or proposed to be listed endangered or threatened species may be present in the area which would be affected by the activity, pursuant to Section 7(c) of the Endangered Species Act of 1972 (as amended).

PUBLIC INTEREST REVIEW AND COMMENT: Any person who has an interest that may be adversely affected by the issuance of a permit may request a public hearing. The request must be submitted in writing to the District Engineer on or before the expiration date of this notice and must clearly set forth the interest which may be adversely affected and the manner in which the interest may be adversely affected by the activity. This application will be reviewed in accordance with 33 CFR 320-331, the Regulatory Program of the U. S. Army Corps of Engineers (USACE), and other pertinent laws, regulations, and executive orders. Our evaluation will also follow the guidelines published by the U. S. Environmental Protection Agency pursuant to Section 404(b) (1) of the CWA. Interested parties are invited to state any objections they may have to the proposed work. The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit that reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors that may be relevant to the proposal will be considered including the cumulative effects thereof; of those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and, in general, the needs and welfare of the people. Written statements on these factors received in this office on or before the expiration date of this public notice will become a part of the record and will be considered in the final determination. A permit will be granted unless its issuance is found to be contrary to the public interest.

SOLICITATION OF COMMENTS: The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. For accuracy and completeness of the administrative record, all data in support of or in opposition to the proposed work should be submitted in writing setting forth sufficient detail to furnish a clear understanding of the reasons for support or opposition. Any comments received will be considered by the Corps of Engineers to

determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

CLOSE OF COMMENT PERIOD: All comments pertaining to this Public Notice must reach this office on or before the close of the comment period listed on page one of this Public Notice. If no comments are received by that date, it will be considered that there are no objections.

Comments and requests for additional information should be submitted to:

Ms. Jean B. Siedel, Regulatory Project Manager
North Regulatory Permit Section, CELRH-OR-FN
U. S. Army Corps of Engineers Huntington District
502 Eighth Street
Huntington, West Virginia 25701-2070.

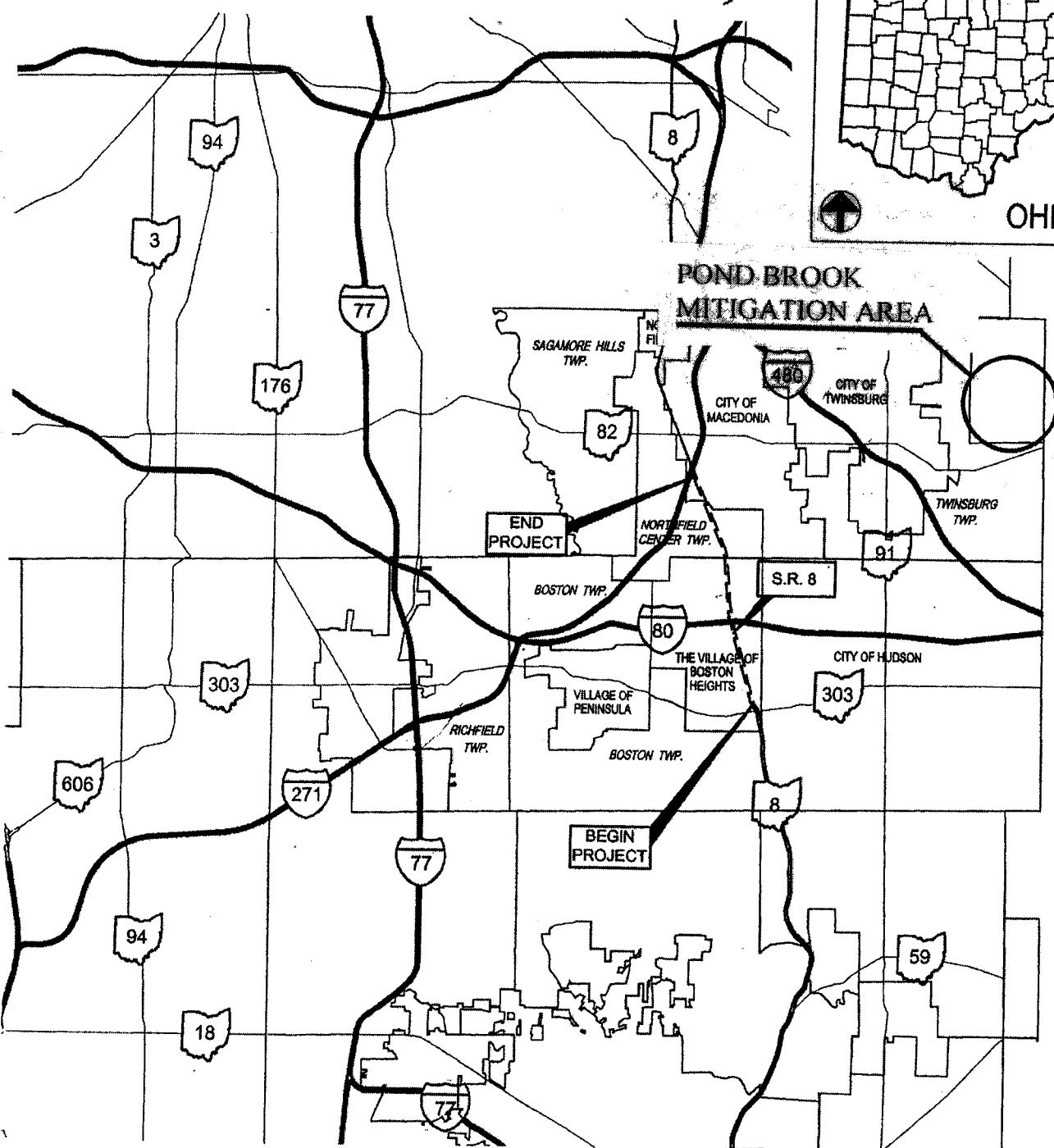
Please note names and addresses of those who submit comments in response to this public notice may be made publicly available. Thank you for your interest in our nation's water resources. If you have any questions concerning this public notice, please contact Ms. Jean B. Siedel of the North Regulatory Section, Dover Regulatory Field Office at (330)364-6177.



Ginger Mullins
Ginger Mullins, Chief
Regulatory Branch

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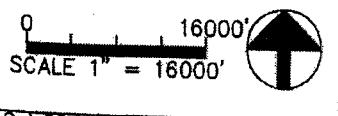
PROJECT LOCATION
(Summit County)



S.R. 8 SUM -8-12.72
Environmental Assessment

Figure 1
Project Location
Map

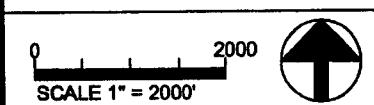
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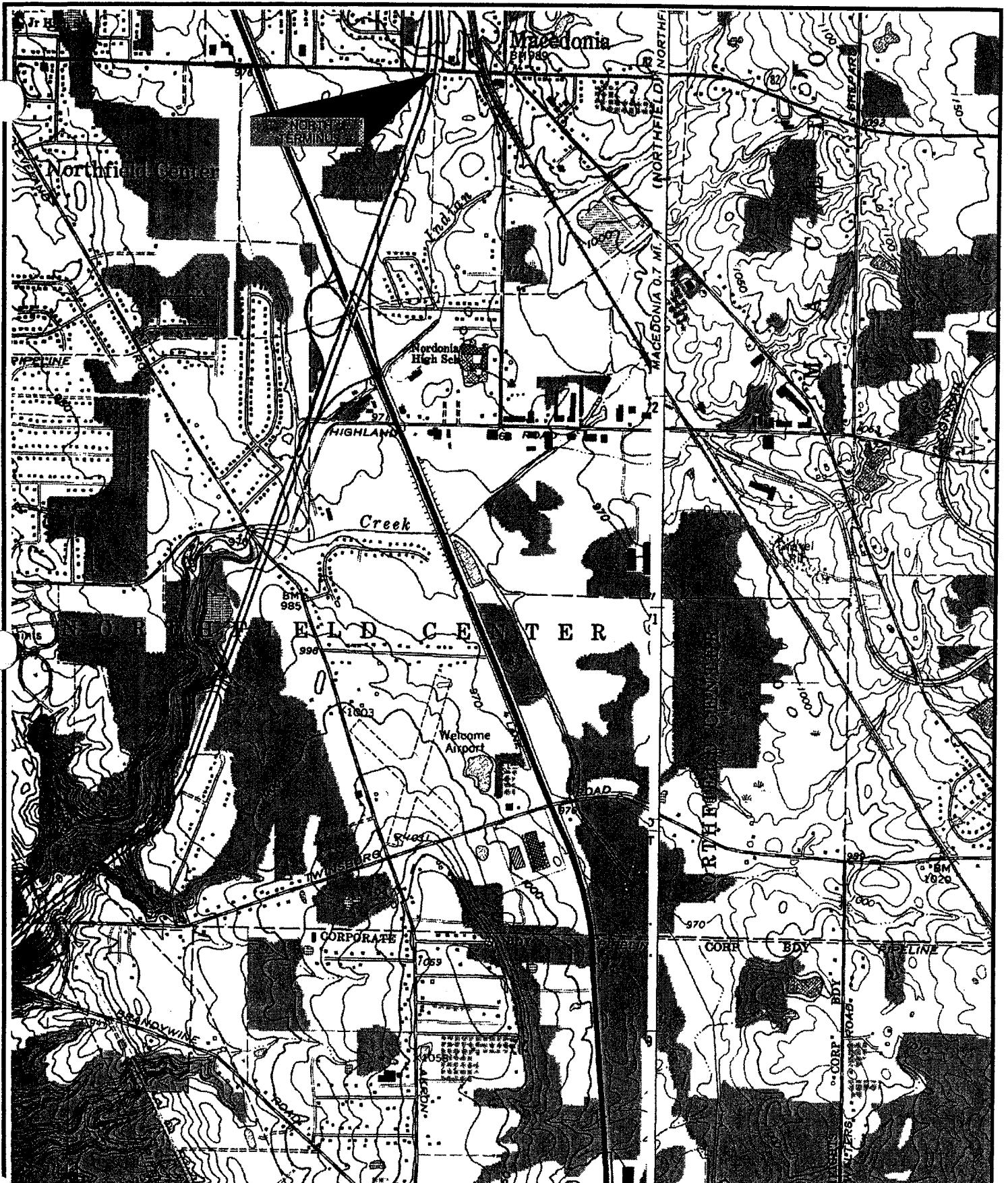
**S.R. 8 SUM-8-13.30/15.63; PID 24507/24508
404/401 Permit Application**

Figure 2a
USGS Topographic Map (south)



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S.R. 8 SUM-8-13.30/15.63; PID 24507/24508
404/401 Permit Application

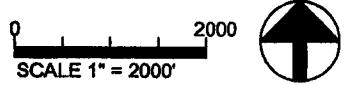
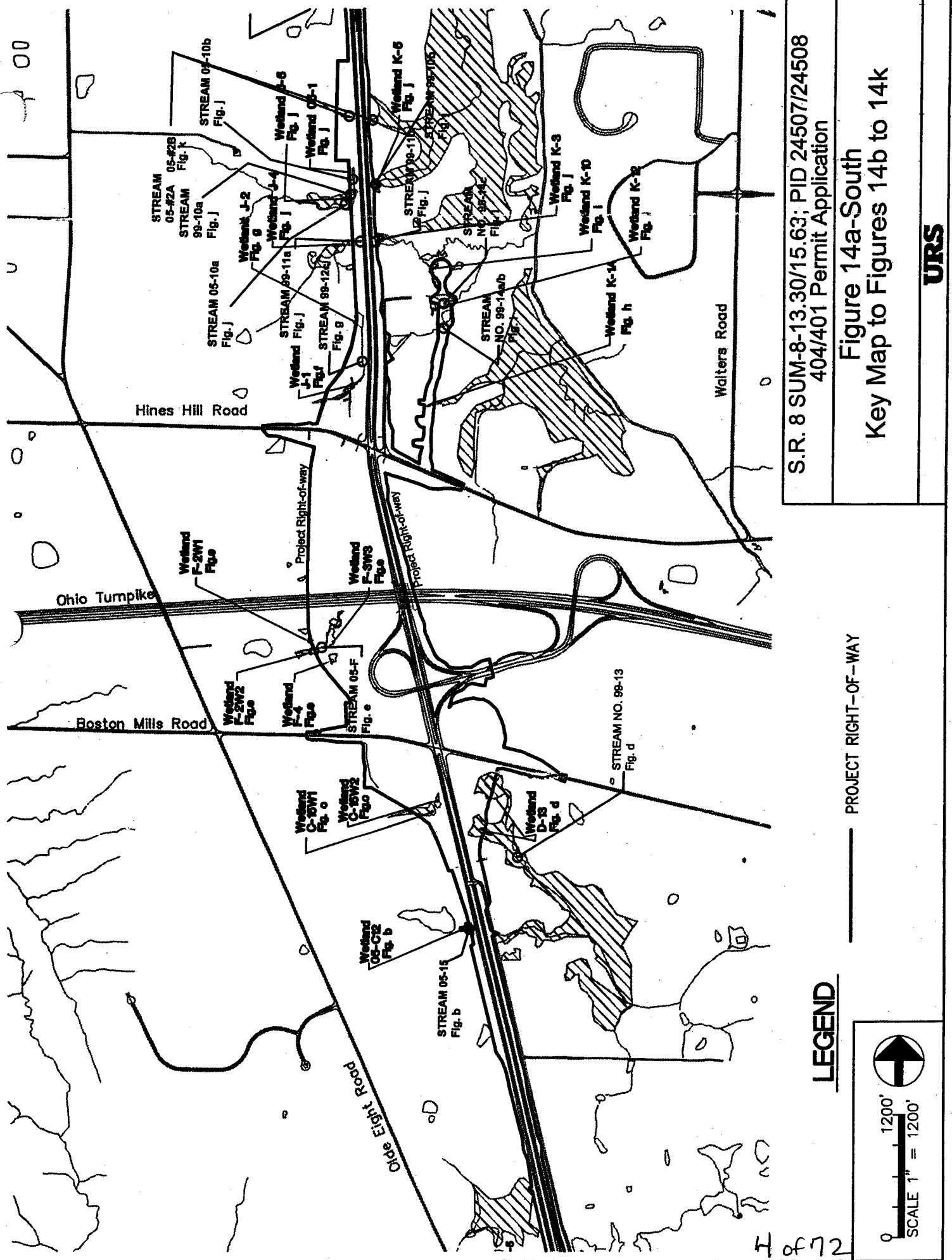


Figure 2b
USGS Topographic Map (north)

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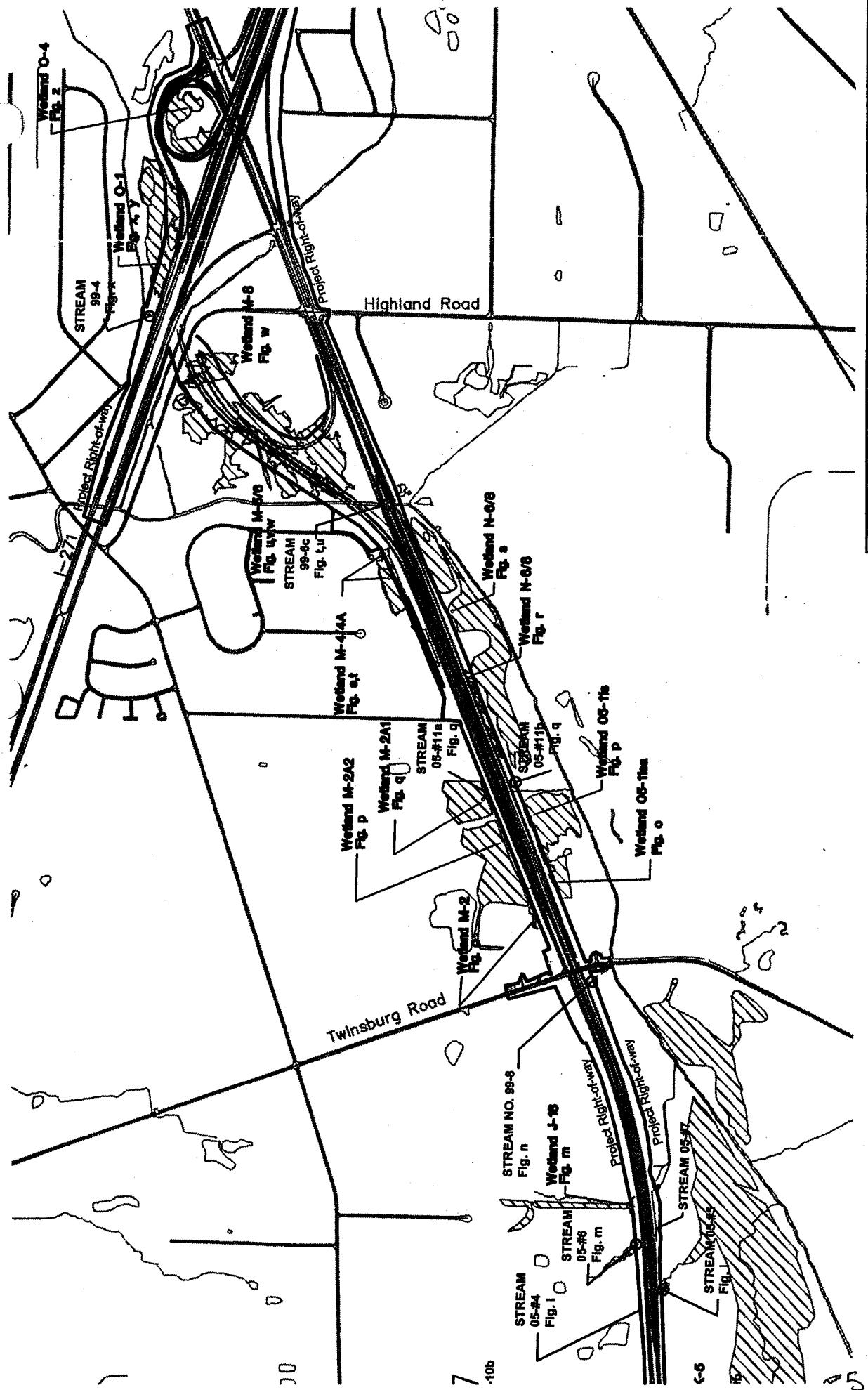
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Figure 14a-South
Key Map to Figures 14b to 14k

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**S.R. 8 SUM-8-13.30/15.63; PID 24507/24508
404/401 Permit Application**

Figure 14a-North Key Map to Figures 14i to 14z

TURS

LEGEND



SCALE 1" = 1200'

STREAM 05-15

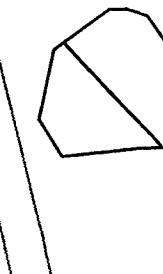
Wetland
05-C12

LA-RNN
Const. Limits

LA-RNN
Const. Limits

SB SR 8

LA-RNN
Const. Limits



Ex. Culvert

NB SR 8

Chittenden Road

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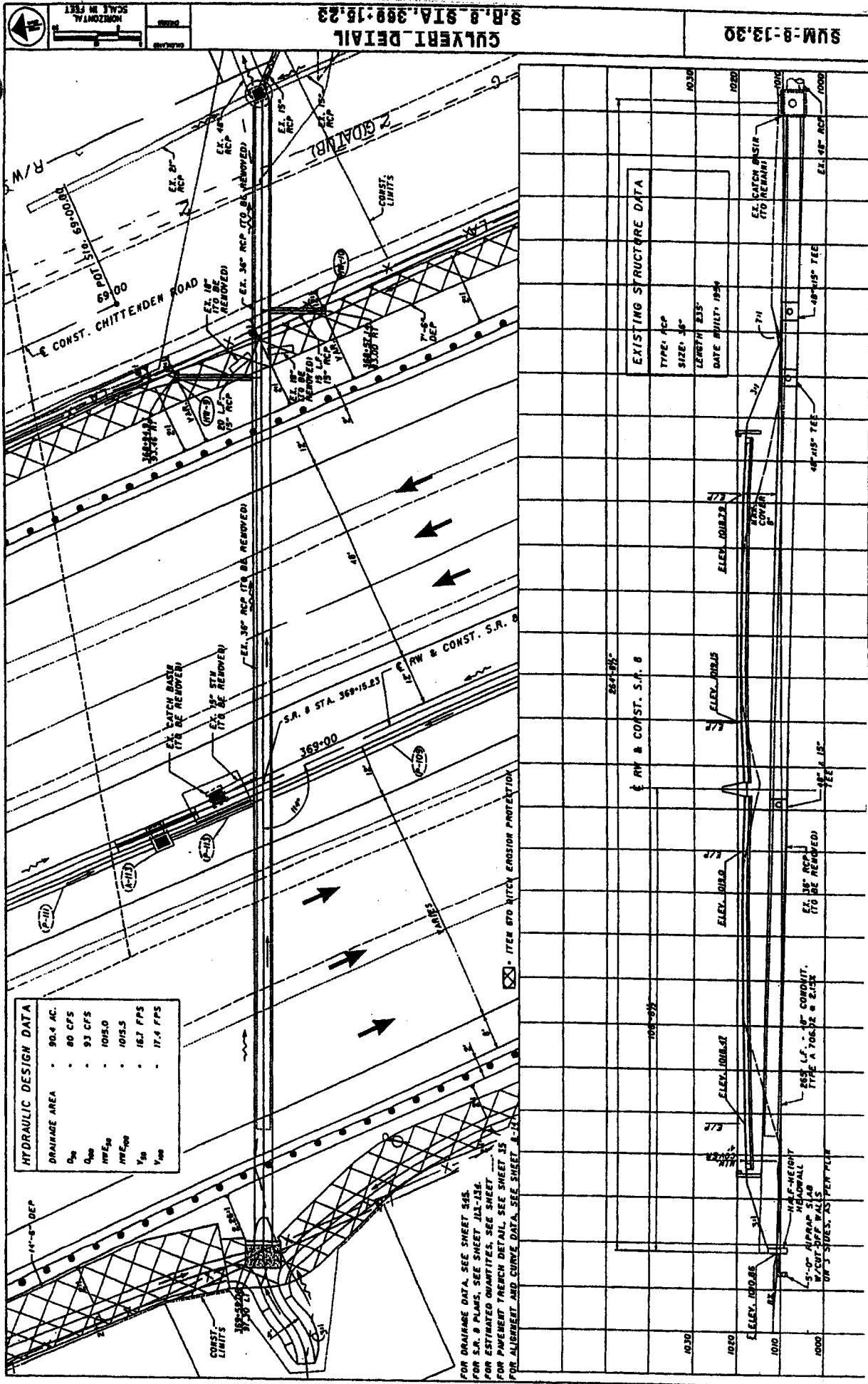
Wetland 05-C12 (0.138 total acres)
Total wetland loss (0.138 acres)
Acreage within ROW: (0.075)
Direct Impact acreage
(within construction limits): (0.065)
Indirect Impact acreage
(outside construction limits): (0.071)
Wetland acreage avoided: (0.0)
Percent wetland avoided (0.0 %)

Stream 05-15 (Intermittent)
Linear ft. within ROW: (124)
Linear ft. impact proposed: (58)

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404/401 Permit Application

Figure 14b
Impacts to Wetland 05-C12
And Stream 05-15
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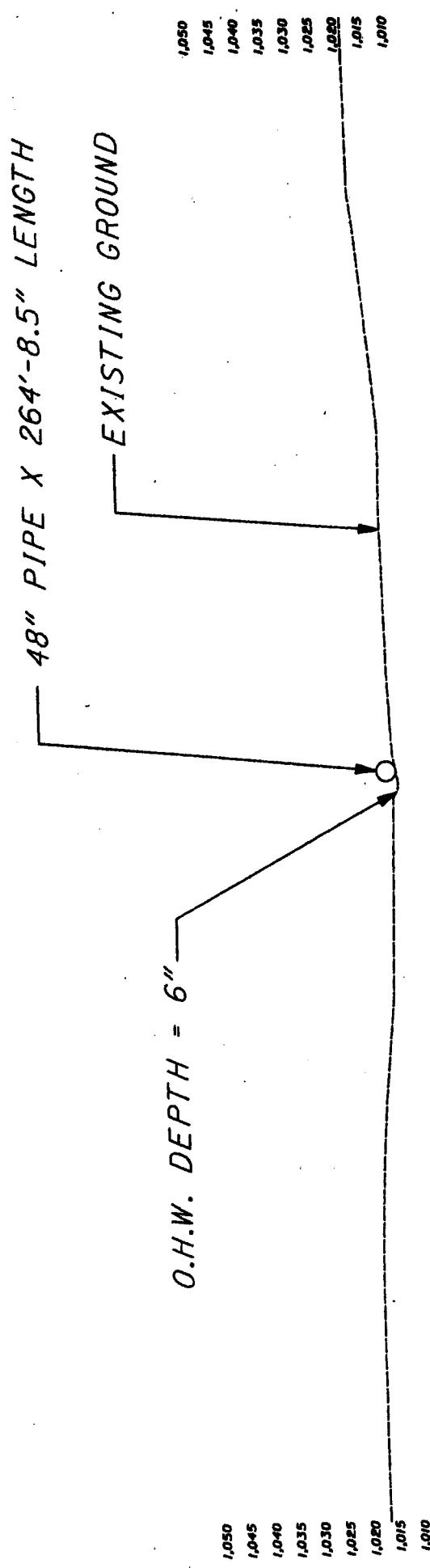
SCALE 1" = 100'



S.R. 8 SUM-8-13.30/15.63; PID 24507/24508
404/401 Permit Application

Figure 14b-1 Dec 51 501 Street, SF 15

105

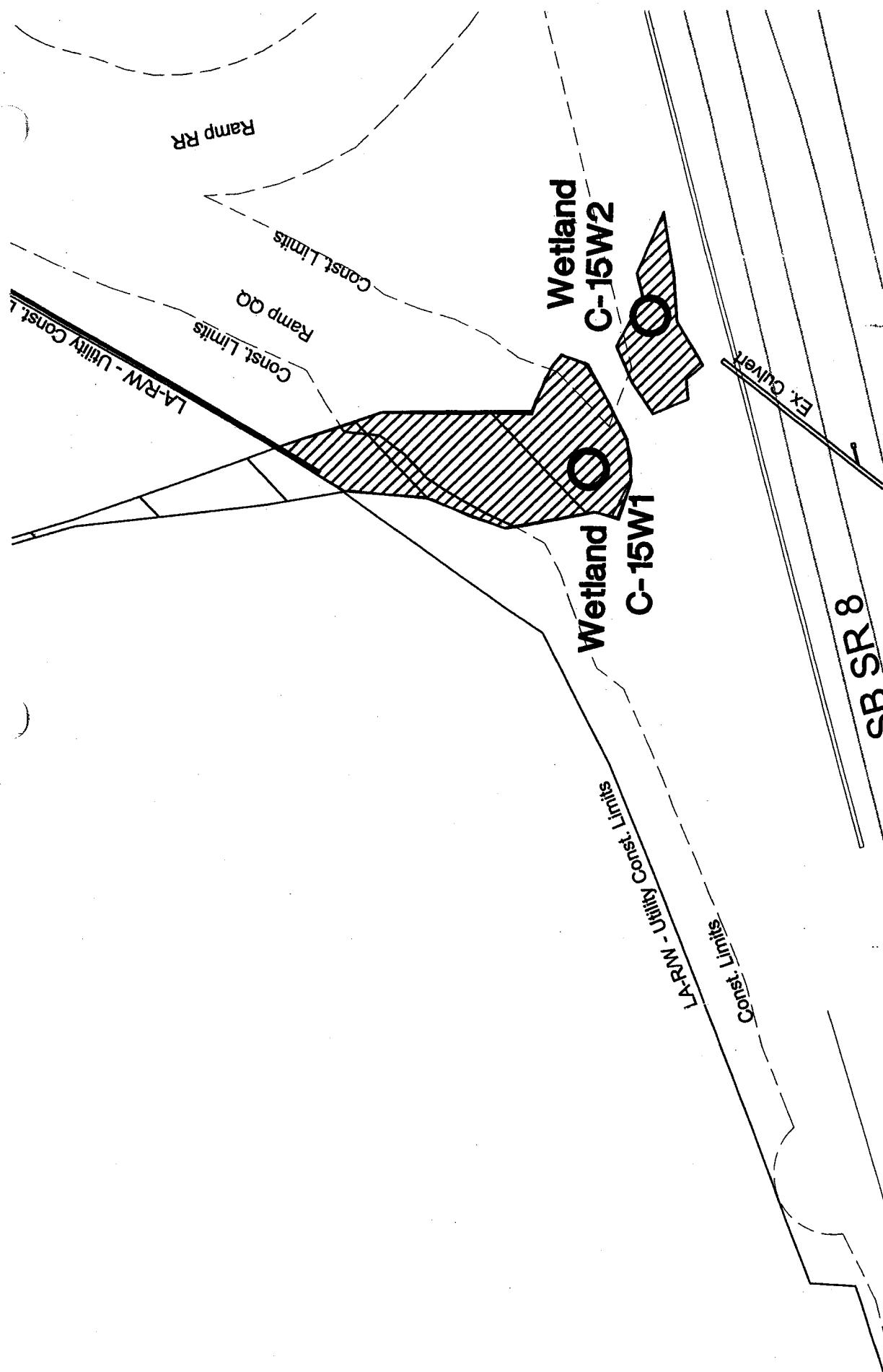


S.R. 8 STA. 369+15.23

S.R. 8 SUM-8-13.30/15.63; PLD 2450//24508
404/401 Permit Application

Figure 14b-2
Section for Stream 05-15

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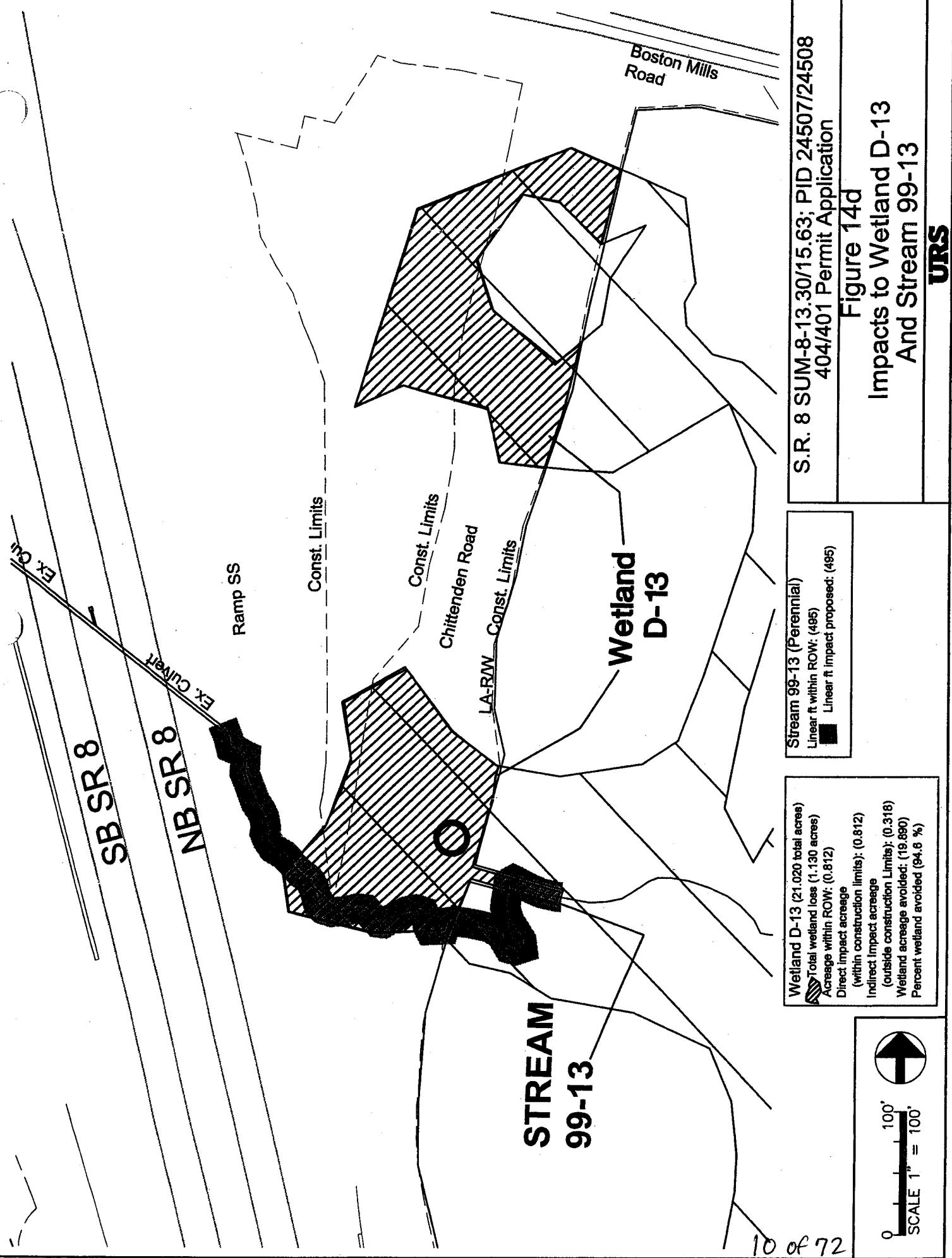
S.R. 8 SUM-8-13, 30/15.63; PID 24507/24508
404/401 Permit Application

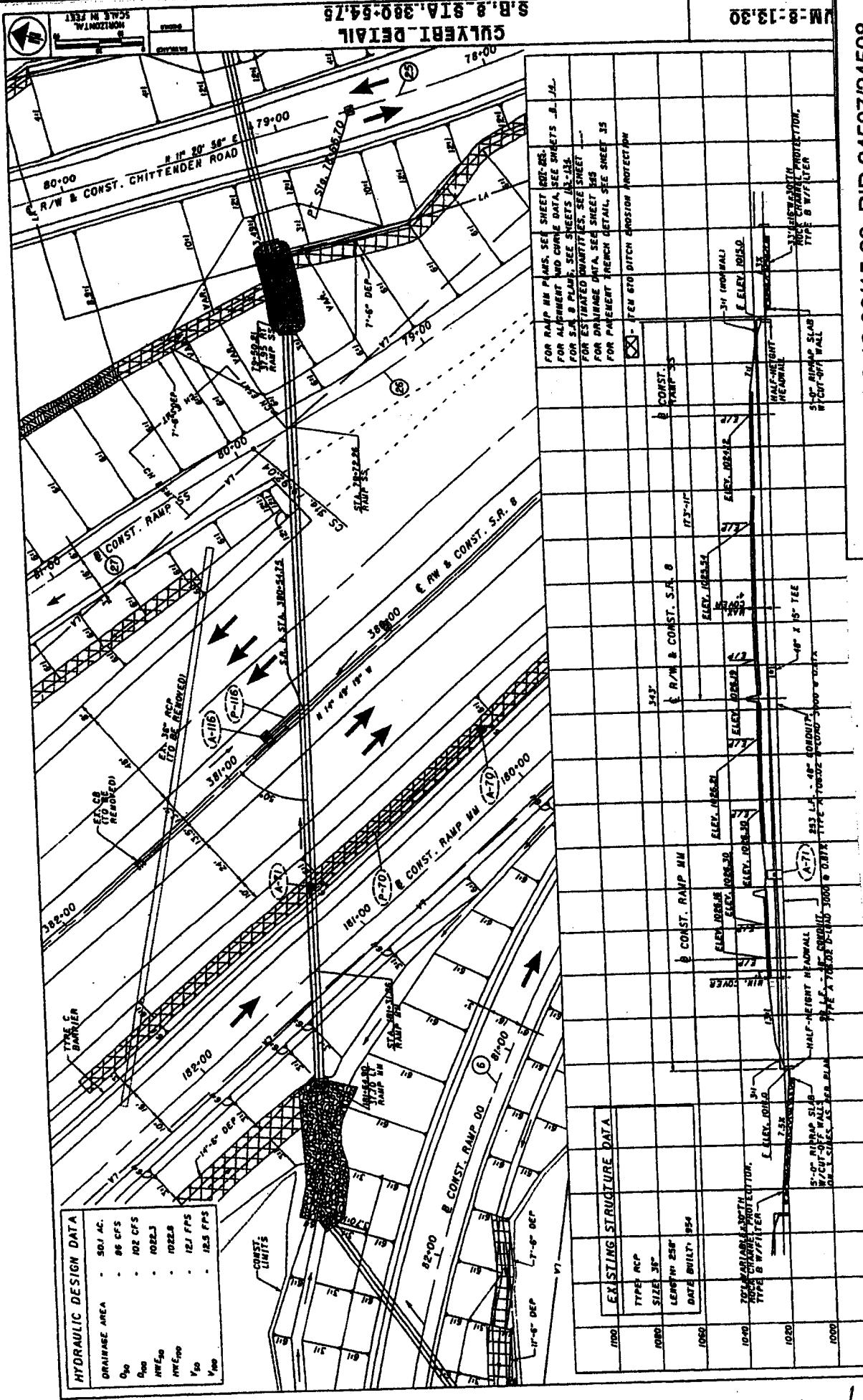
Figure 14C
Impacts to Wetlands
C-15W1 and C-15W2

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Wetland C-15W2 (0.100 total acres)
Total wetland loss (0.100 acres)
Acreage within ROW: (0.097)
Direct Impact acreage (within construction limits): (0.097)
Indirect Impact acreage (outside construction limits): (0.003)
Wetland acreage avoided: (0.0)
Percent wetland avoided (0.0 %)

Wetland C-15W1 (0.490 total acres)
Total wetland loss (0.384 acres)
Acreage within ROW: (0.364)
Direct Impact acreage (within construction limits): (0.364)
Indirect Impact acreage (outside construction limits): (0.020)
Wetland acreage avoided: (0.108)
Percent wetland avoided (21.8 %)





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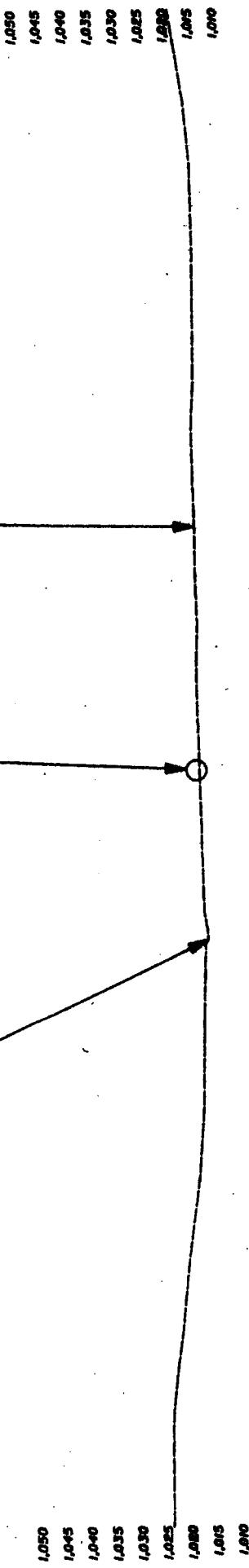
Figure 14-d-1
Profile for Stream 99-13

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48" PIPE X 343' LENGTH

O.H.W. DEPTH = 12"

EXISTING GROUND

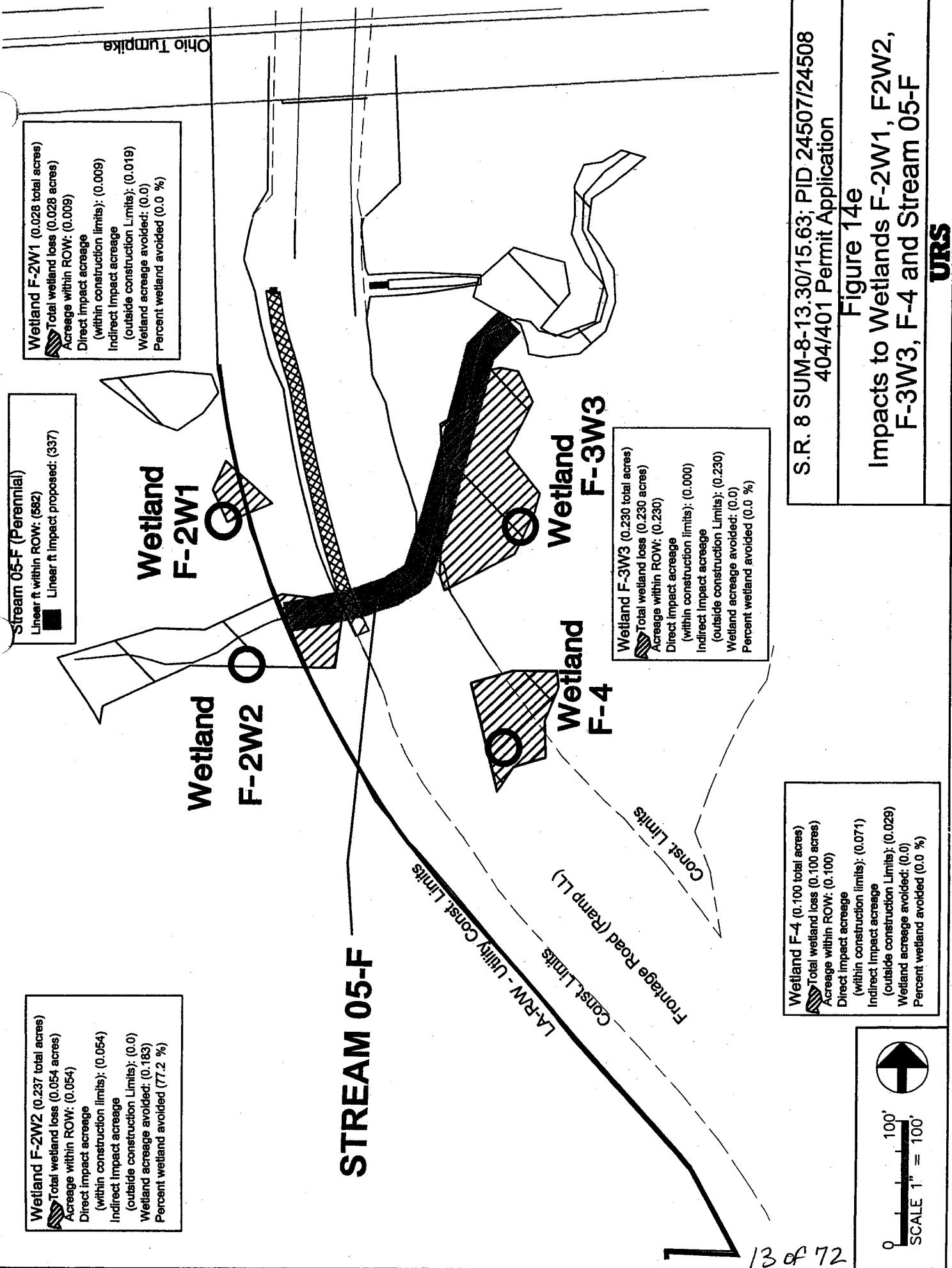


S.R. 8 STA. 380+54.75

S.R. 8 SUM-8-13.30/15.63; PID 24507/24508
404/401 Permit Application

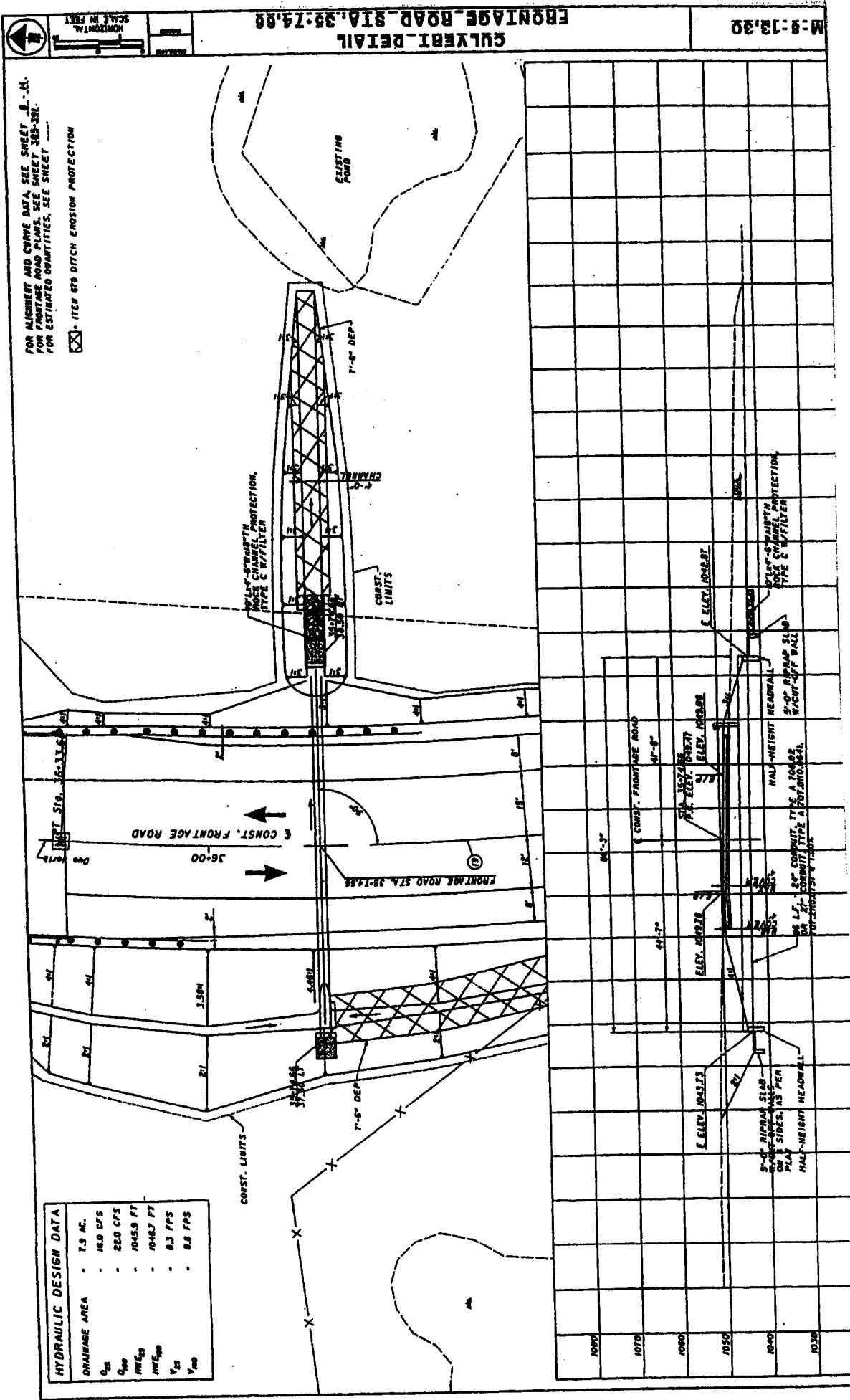
Figure 14d-2
Section for Stream 99-13

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S.R. 8 SUM-8-13-30/15.63; PID 24507/24508
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Figure 14e
**Impacts to Wetlands F-2W1, F2W2,
F-3W3, F-4 and Stream 05-F**



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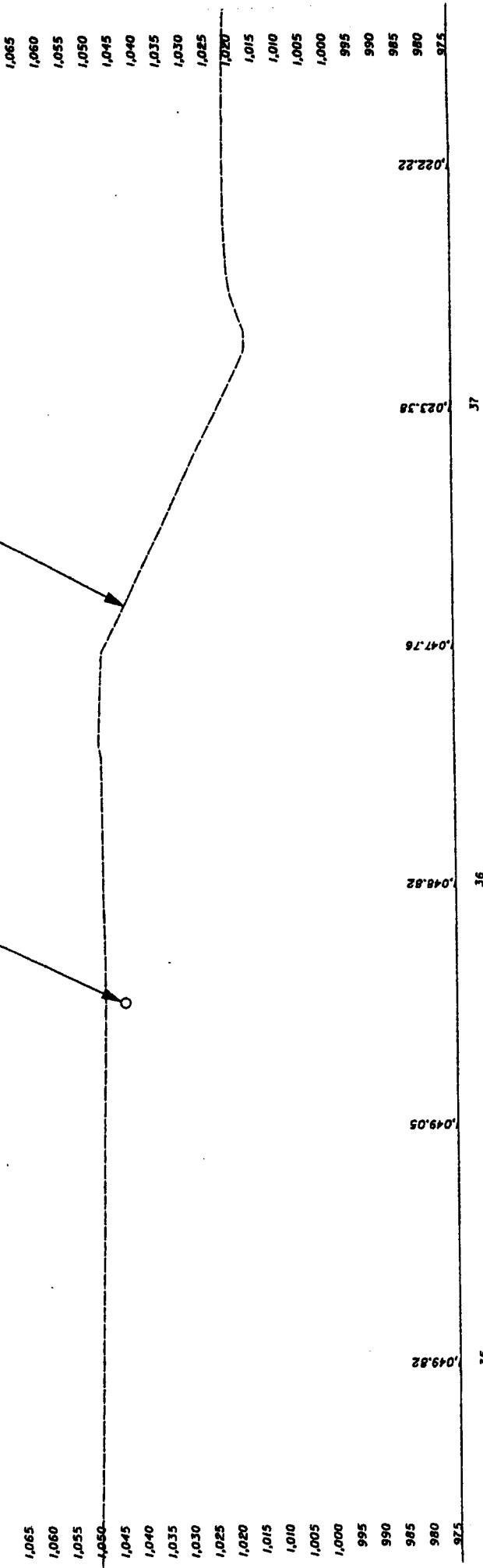
Figure 14e-1
Profile for Stream 05-F

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24" PIPE OR 27" PIPE X 86'-3" LENGTH

O.H.W. DEPTH = 6"

EXISTING GROUND



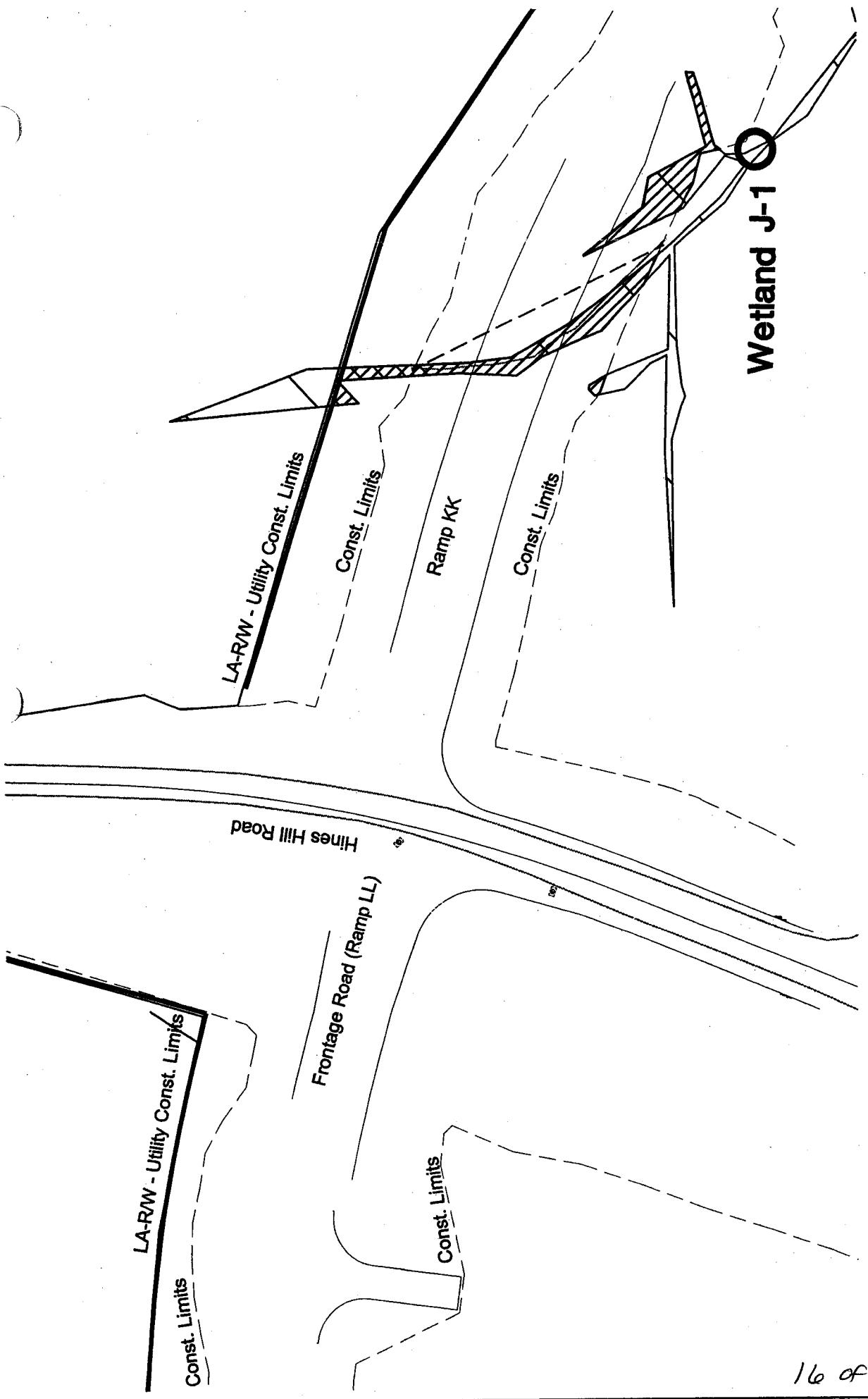
FRONTAGE ROAD STA. 35+74.66

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Figure 14e-2
Section for Stream 05-F

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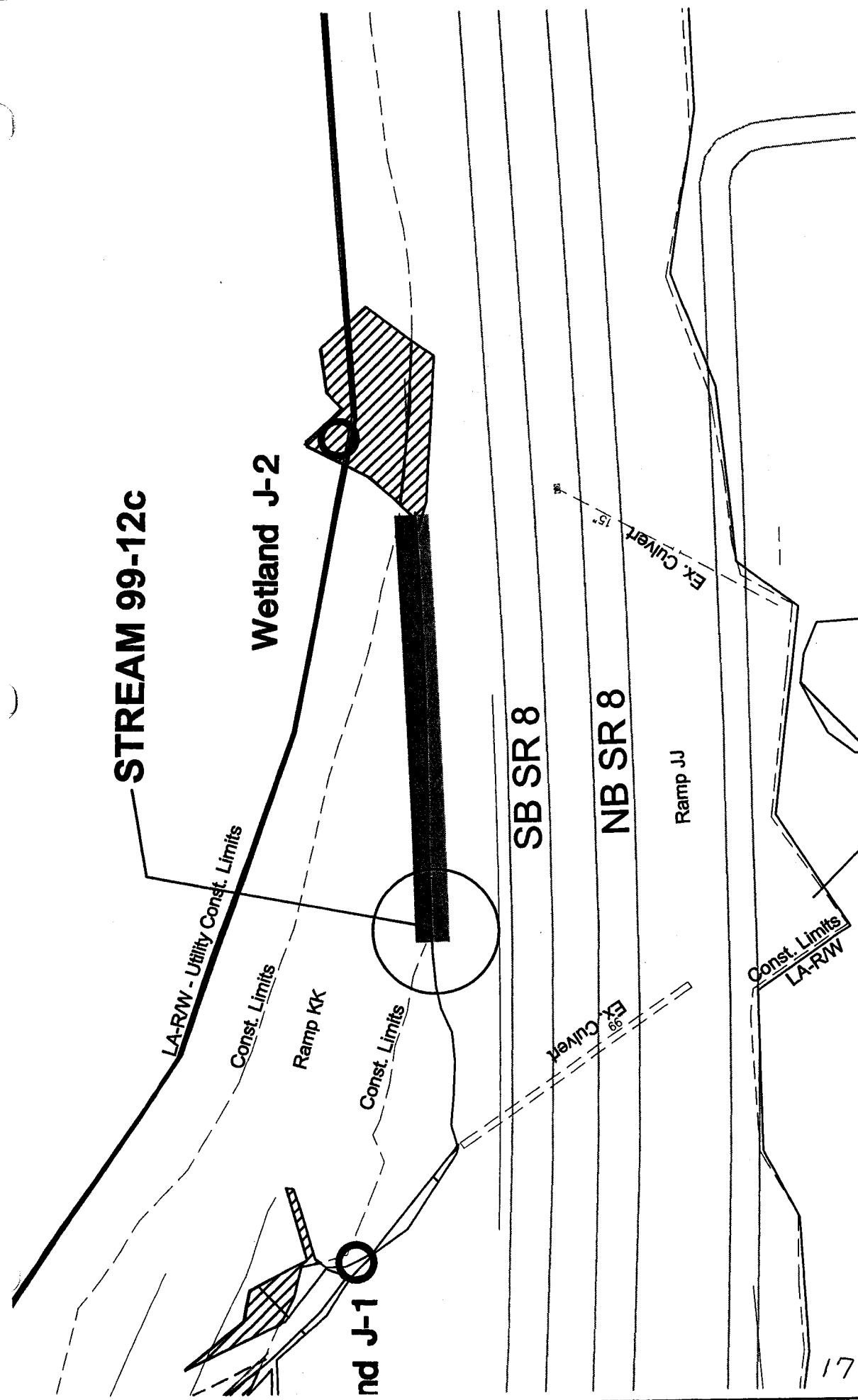
**S.R. 8 SUM-8-13.30/15.63; PID 24507/24508
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Figure 14f
Impacts to Wetland J-1

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Wetland J-1	(0.240 total acres)
 Total wetland loss	(0.114 acres)
Acreage within ROW:	(0.230)
Direct Impact acreage	
(within construction limits):	(0.101)
Indirect Impact acreage	
(outside construction Limits):	(0.01)
Wetland acreage avoided:	(0.126)
Percent wetland avoided	(52.5 %)

STREAM 99-12c

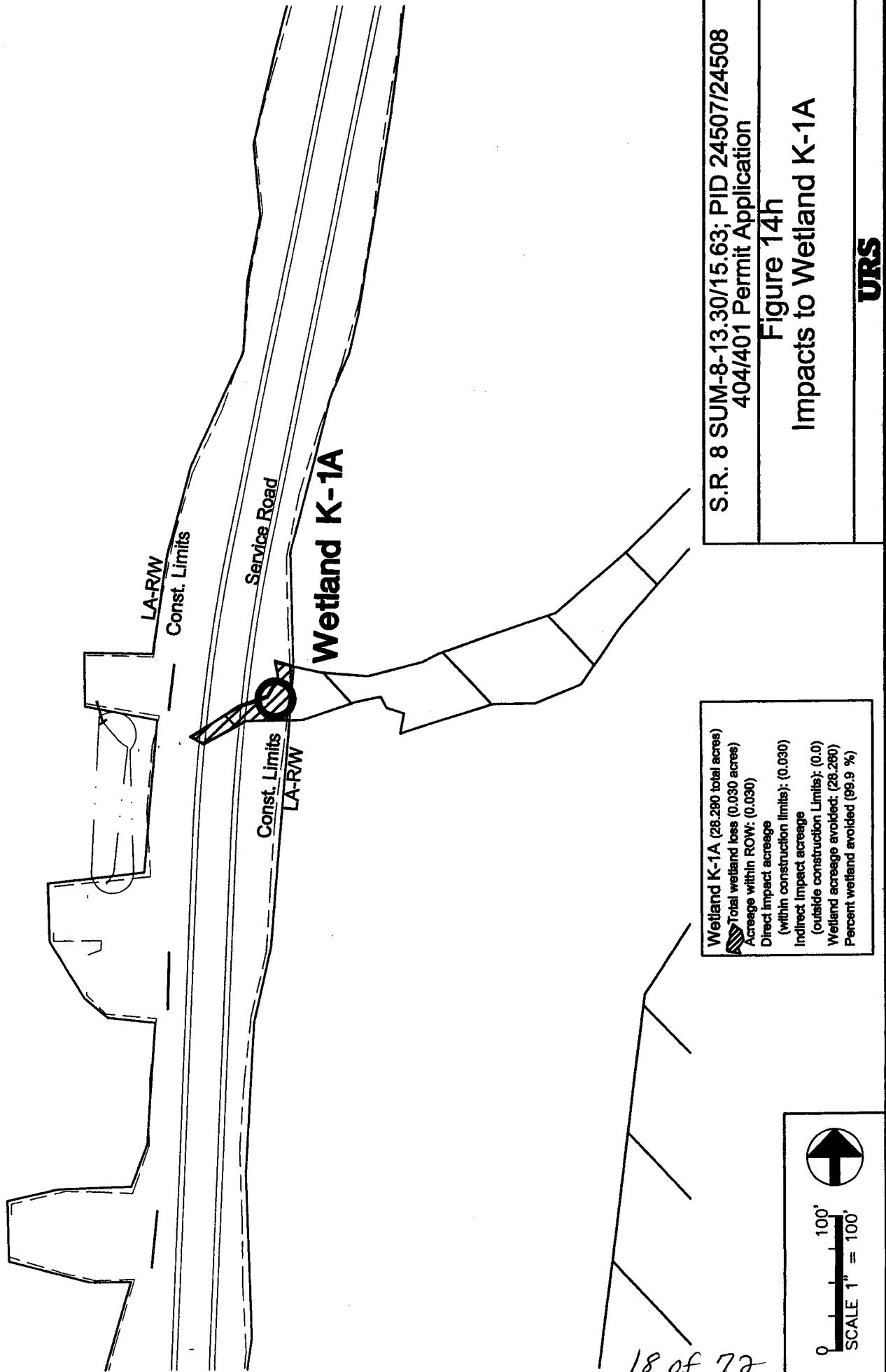


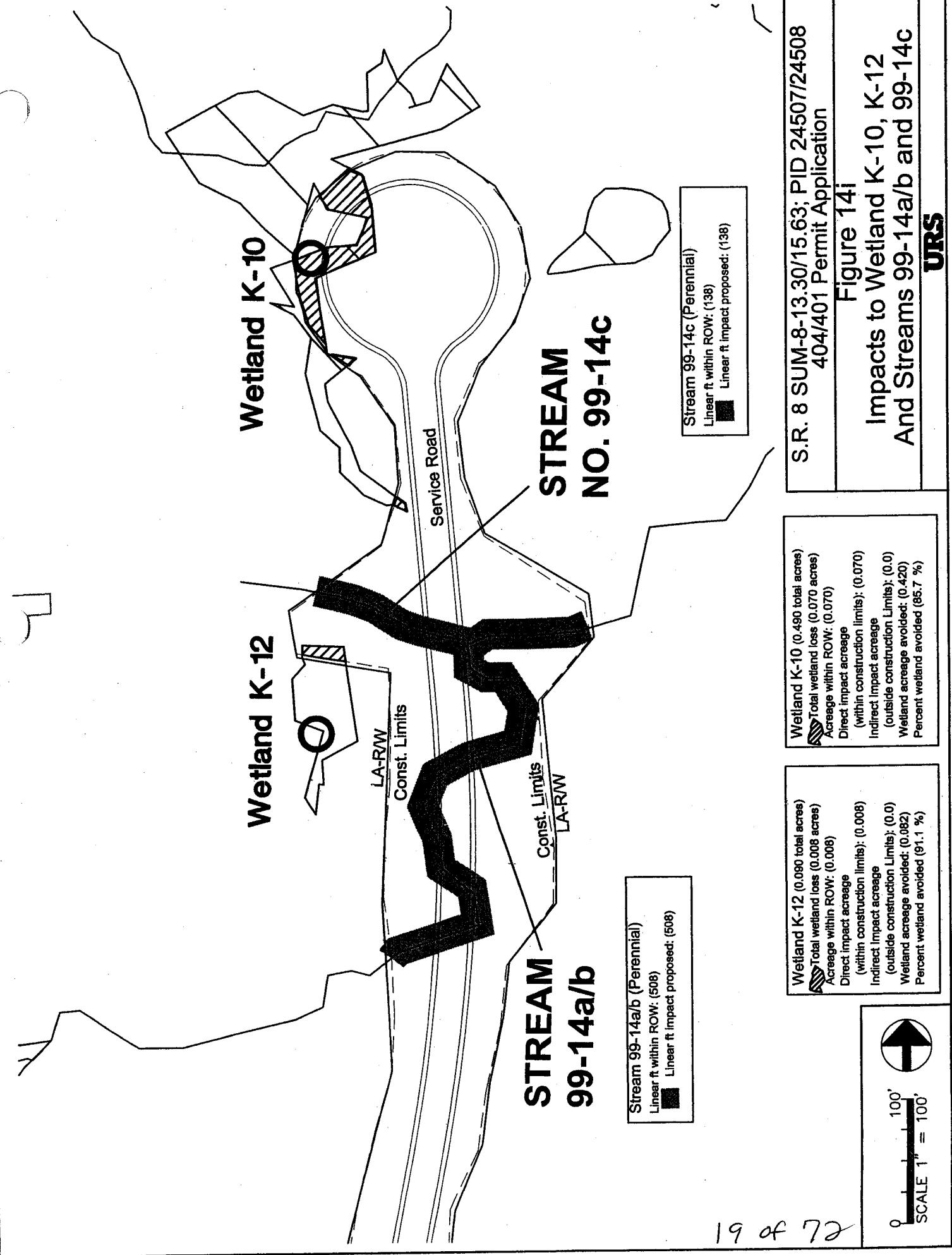
S.R. 8 SUM-8-13.30/15.63; PID 24507/24508
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Figure 14g

Impacts to Wetland J-2
And Stream 99-12c

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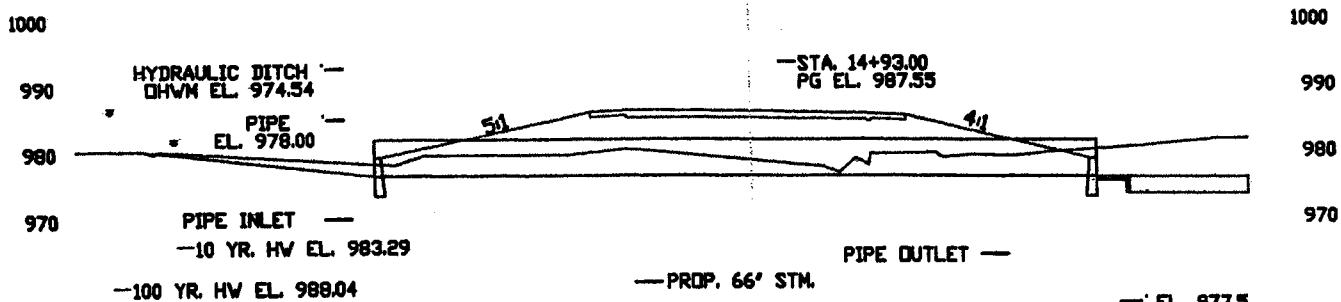




I SERVICE ROAD
STA. 14+93

T/HEADWALL
EL. 980.25

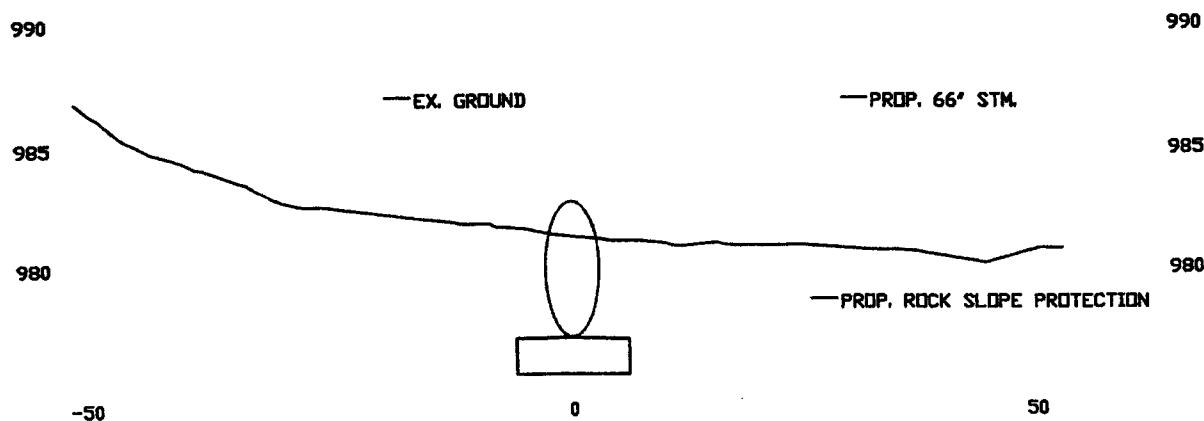
ROCK CHANNEL PROTECTION
TYPE B, 30' OF 12" ROCK



CULVERT PROFILE

APPROXIMATE SCALE: 1' = 20'

CHANNEL DISTURBANCE (BELOW DHWM)	
Length of Channel Disturbed	508 LINEAR FEET
Excavation Below DHWM	14 CUBIC YARDS
FILL Below DHWM	40 CUBIC YARDS
Standard Roadfill	35 CUBIC YARDS
Rock Channel Protection	5 CUBIC YARDS



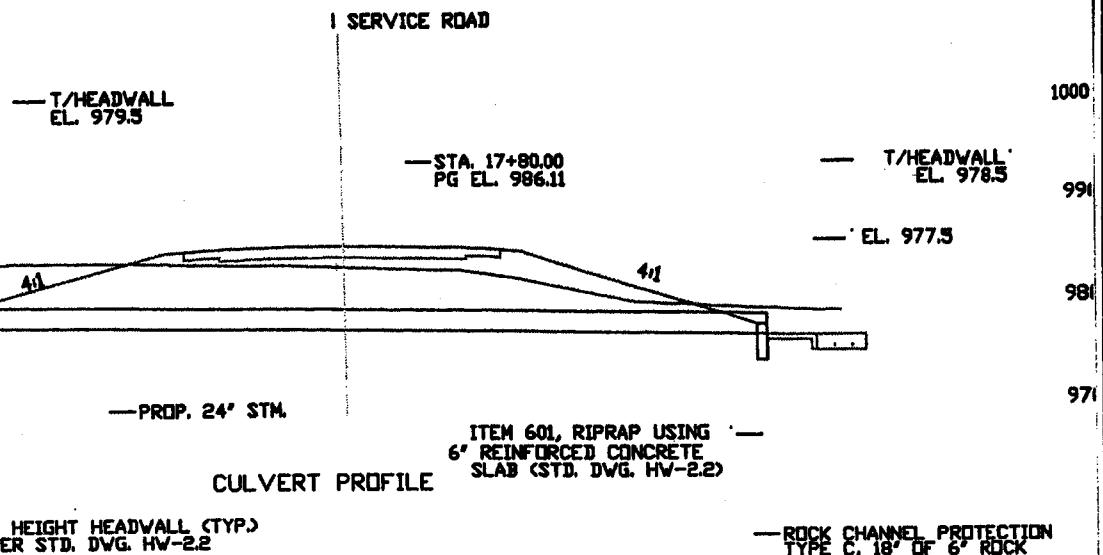
APPROXIMATE SCALE: HOR. 1' = 20'
VER. 1' = 8'

CROSS SECTION STREAM 99-14a/b
SHOWING PIPE PLACEMENT

S.R. 8 SUM-8-13.30/15.63; PID 24507/24508
404/401 Permit Application

Figure 14i-1
Profile for Stream 99-14a/b

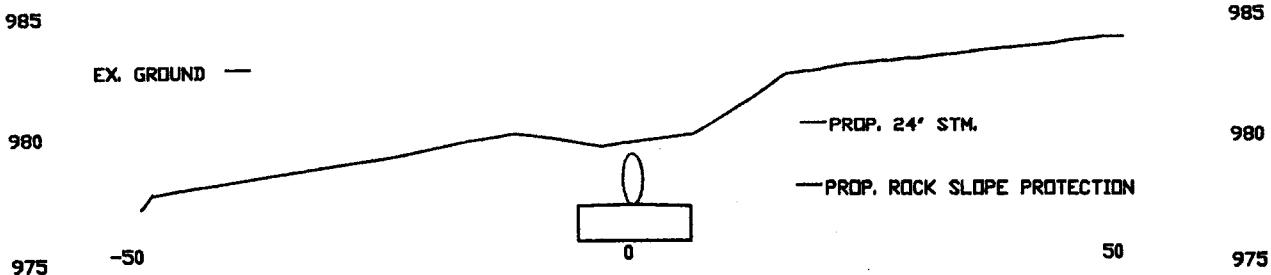
HYDRAULIC DITCH
DHWM EL. 985.25



APPROXIMATE SCALE: 1' = 20'

CHANNEL DISTURBANCE (BELOW OHWM)

Length of Channel Disturbed:	138 LINEAR FEET
Excavation Below OHWM:	3 CUBIC YARDS
FILL Below OHWM:	9 CUBIC YARDS
Standard Roadfill:	8 CUBIC YARDS
Rock Channel Protection:	1 CUBIC YARDS

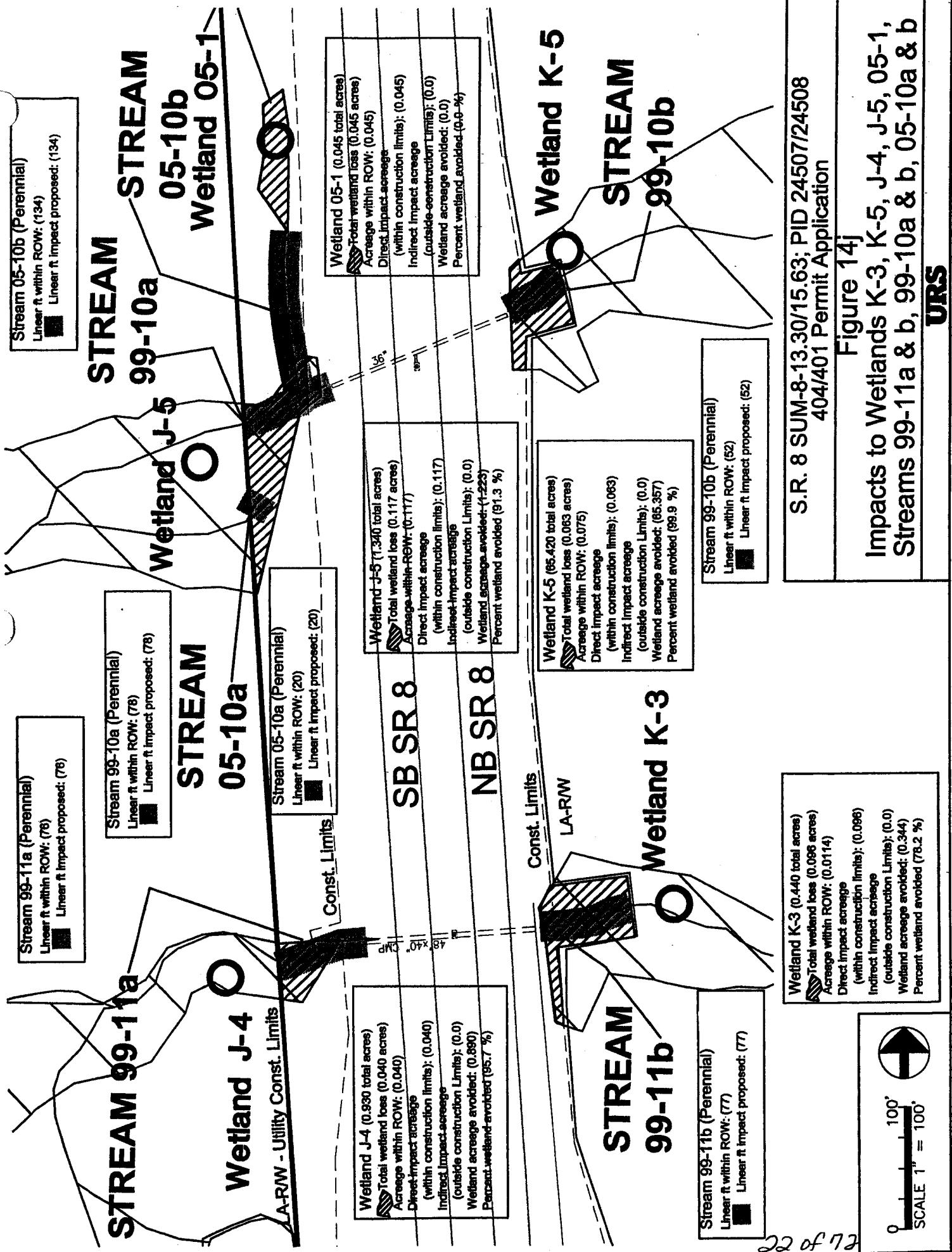


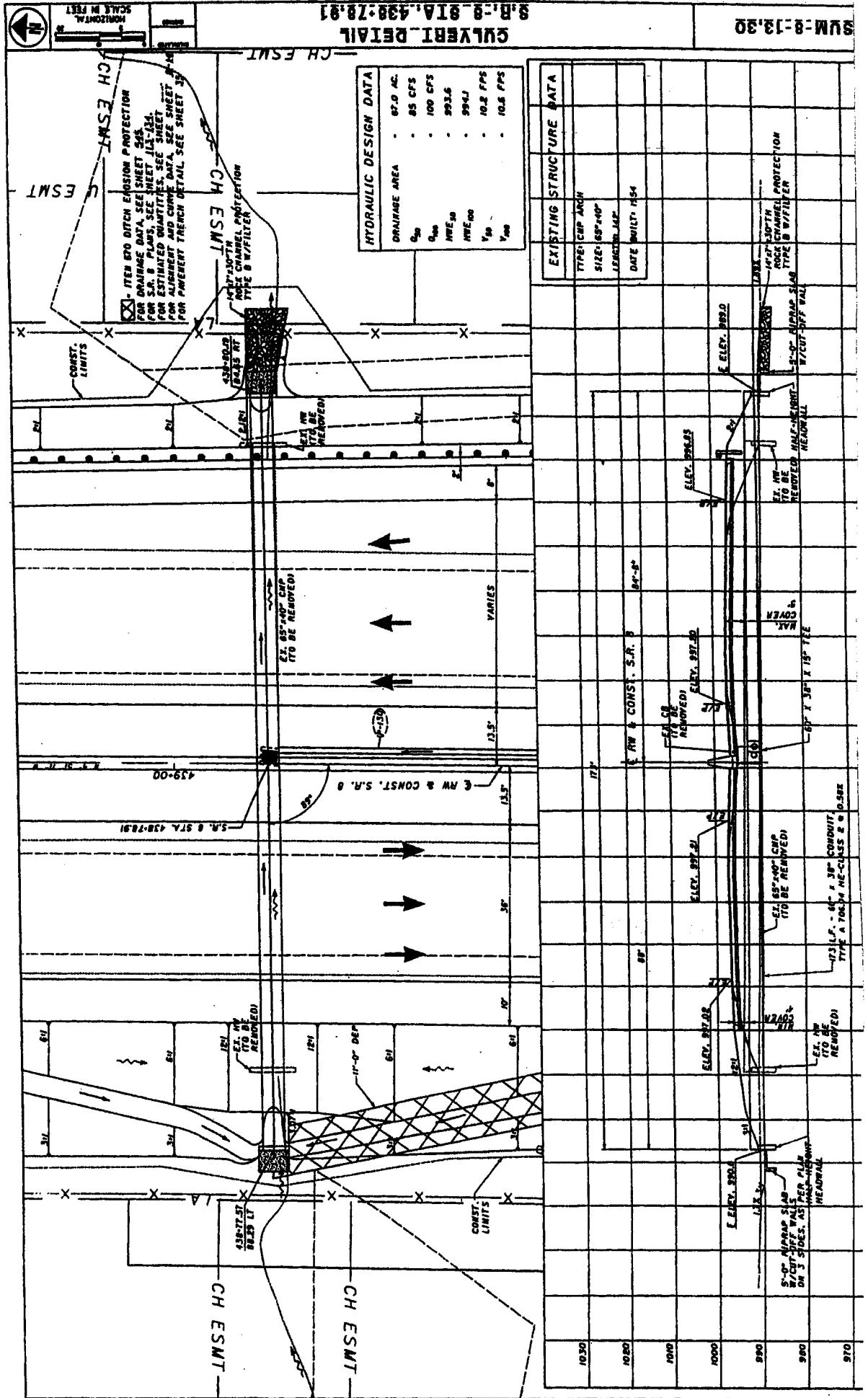
CROSS SECTION STREAM 99-14c
SHOWING PIPE PLACEMENT

APPROXIMATE SCALE: HOR. 1' = 20'
VER. 1' = 8'

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Figure 14i-2
Profile for Stream 99-14c





**S.R. 8 SUM-8-13.30/15.63; PID 24507/24508
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Figure 14j-1
Profile for Stream 99-11a/b

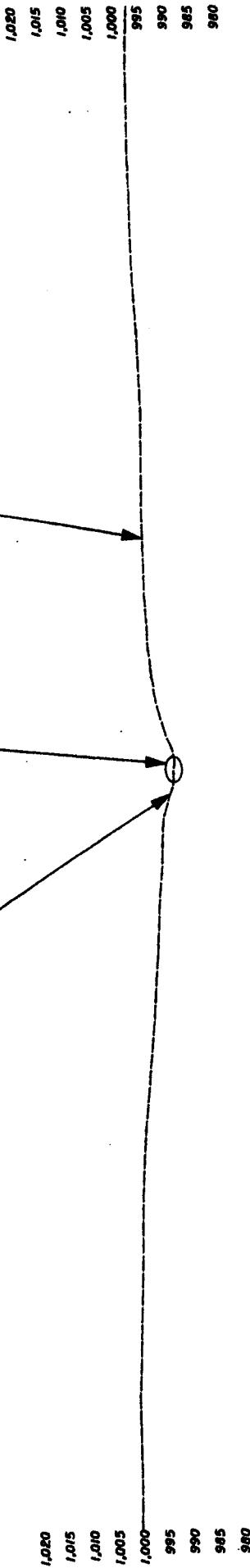
URS

C

60" X 38" PIPE X 173' LENGTH

EXISTING GROUND

O.H.W. DEPTH = 12"



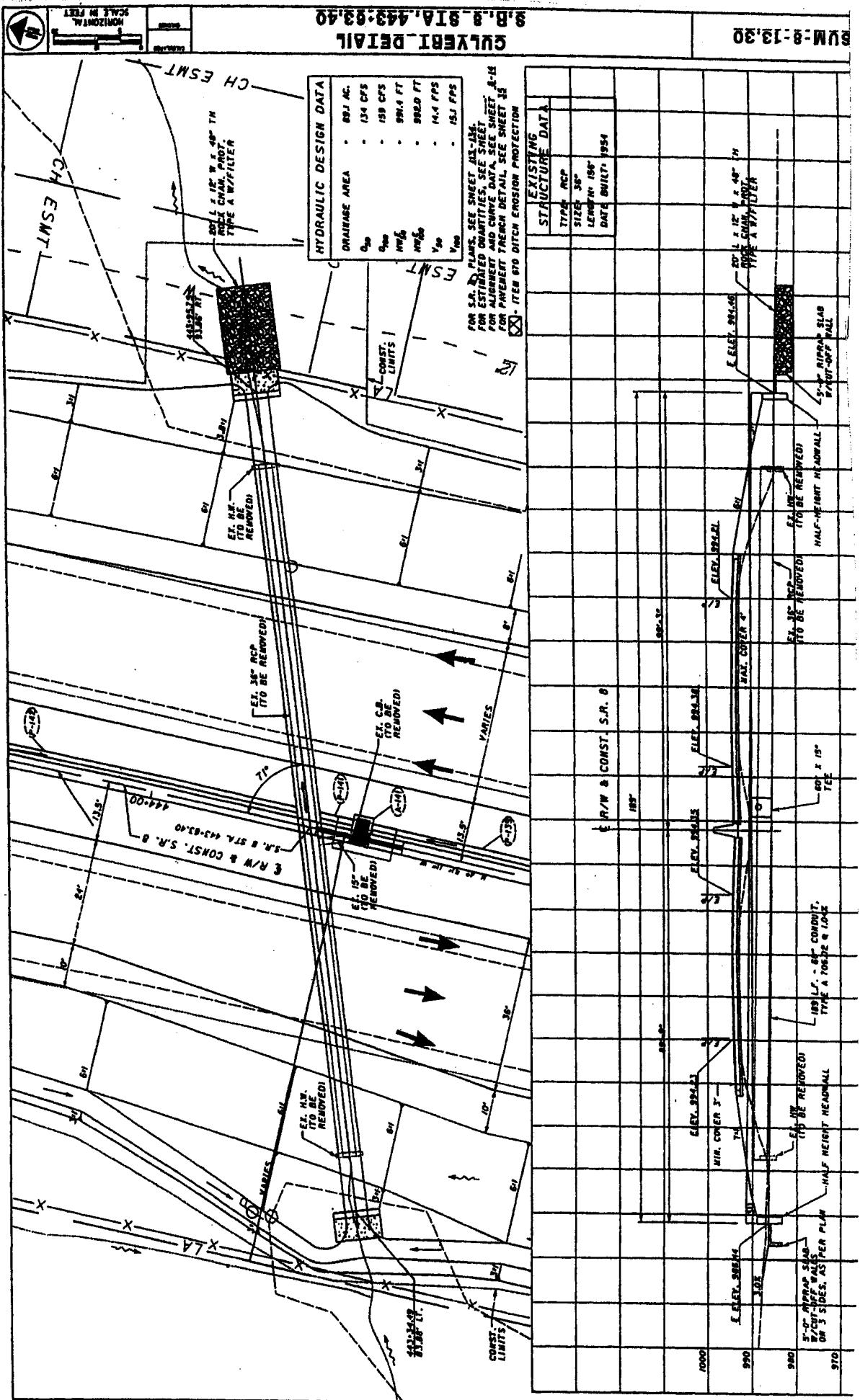
S.R. 8 STA. 438+78.91

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Figure 14j-2
Section for Stream 99-11a/b

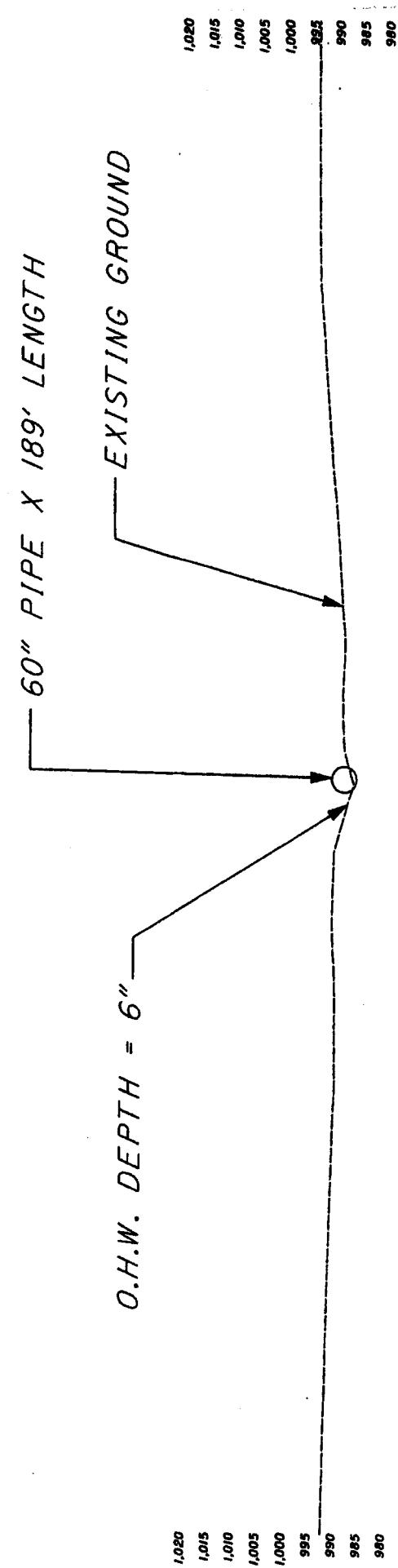
URS



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Figure 14j-3
Profile for Stream 99-110a/b

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S.R. 8 STA. 443+63.40

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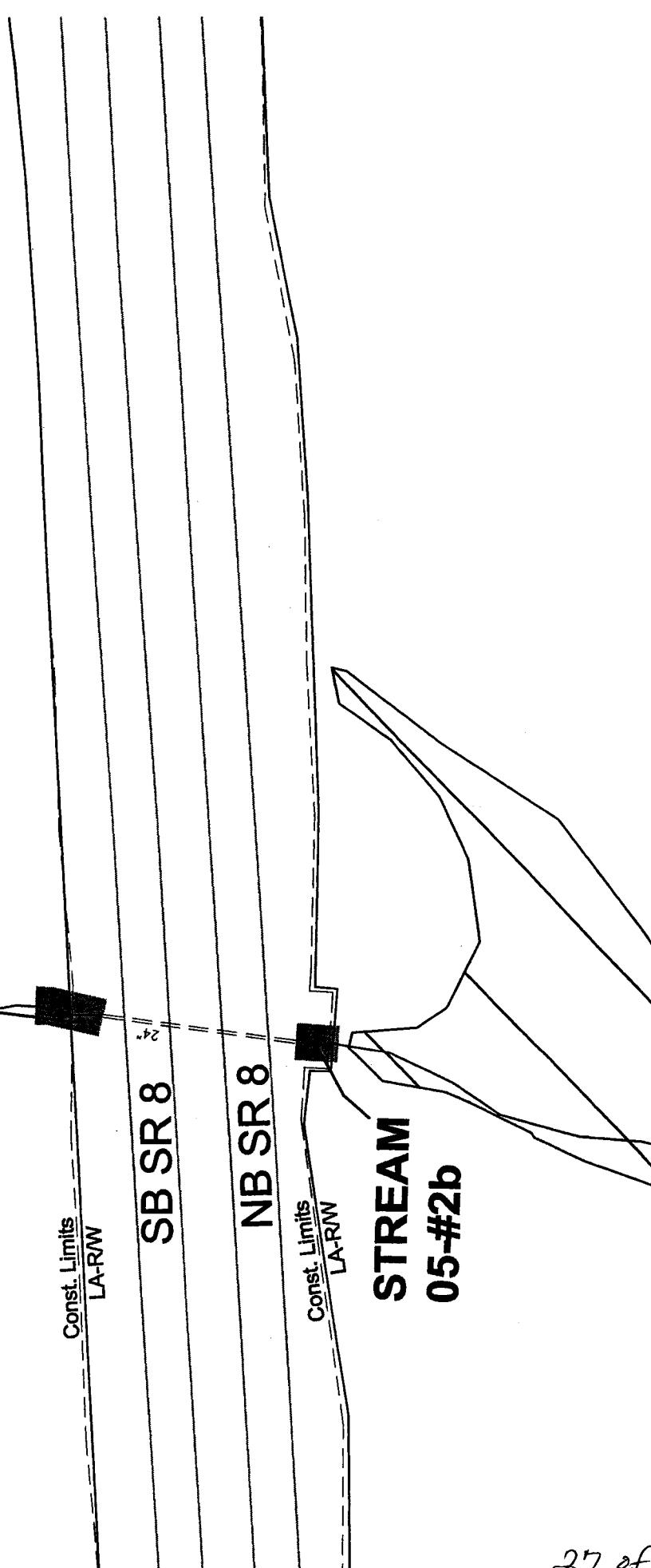
Figure 14j-4
Section for Stream 99-10a/b

URS

STREAM 05-#2a

Const. Limits
LA-RW

SB SR 8



Stream 05-#2a (Perennial)
Linear ft within ROW: (45)
■ Linear ft Impact proposed: (45)

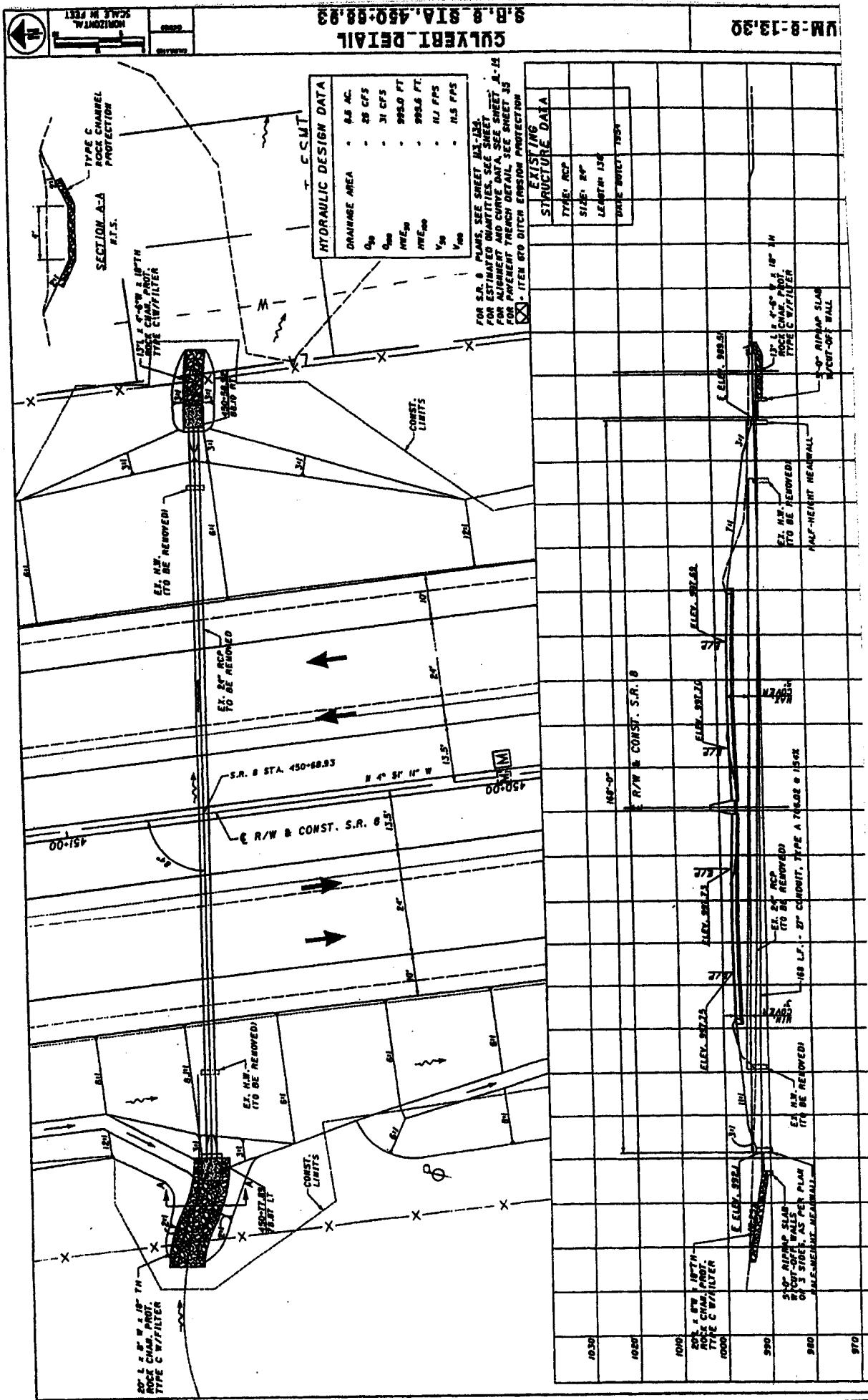
Stream 05-#2b (Perennial)
Linear ft within ROW: (24)
■ Linear ft Impact proposed: (27)

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Figure 14K
Impacts to Streams 05-#2a and 05-#2b

0 100'
SCALE 1" = 100'

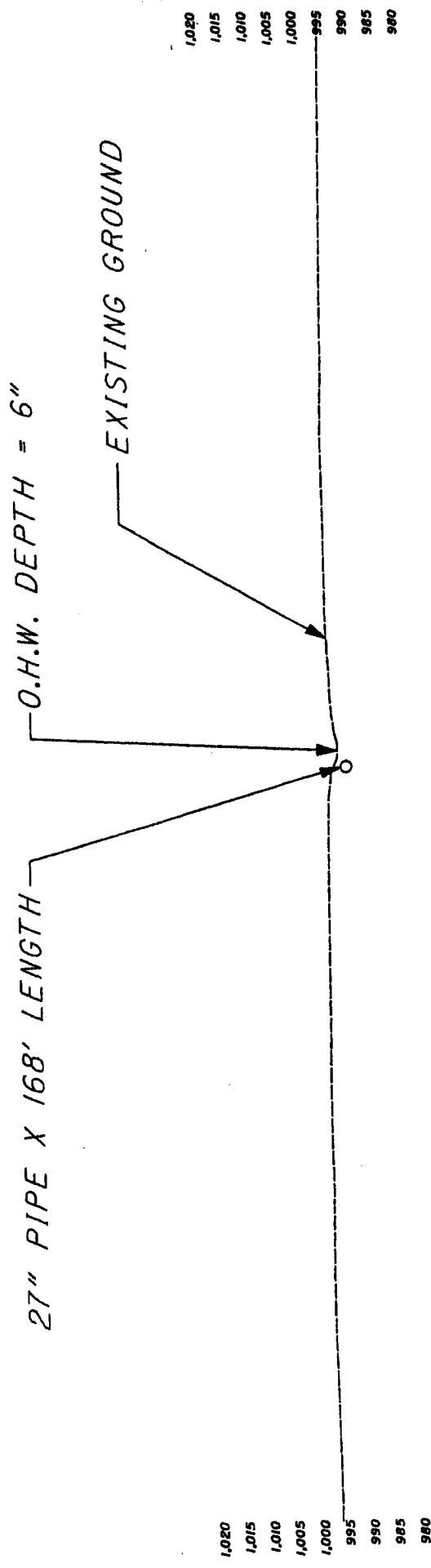
URS



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Figure 14k-1
Profile for Stream 05-#2a/b

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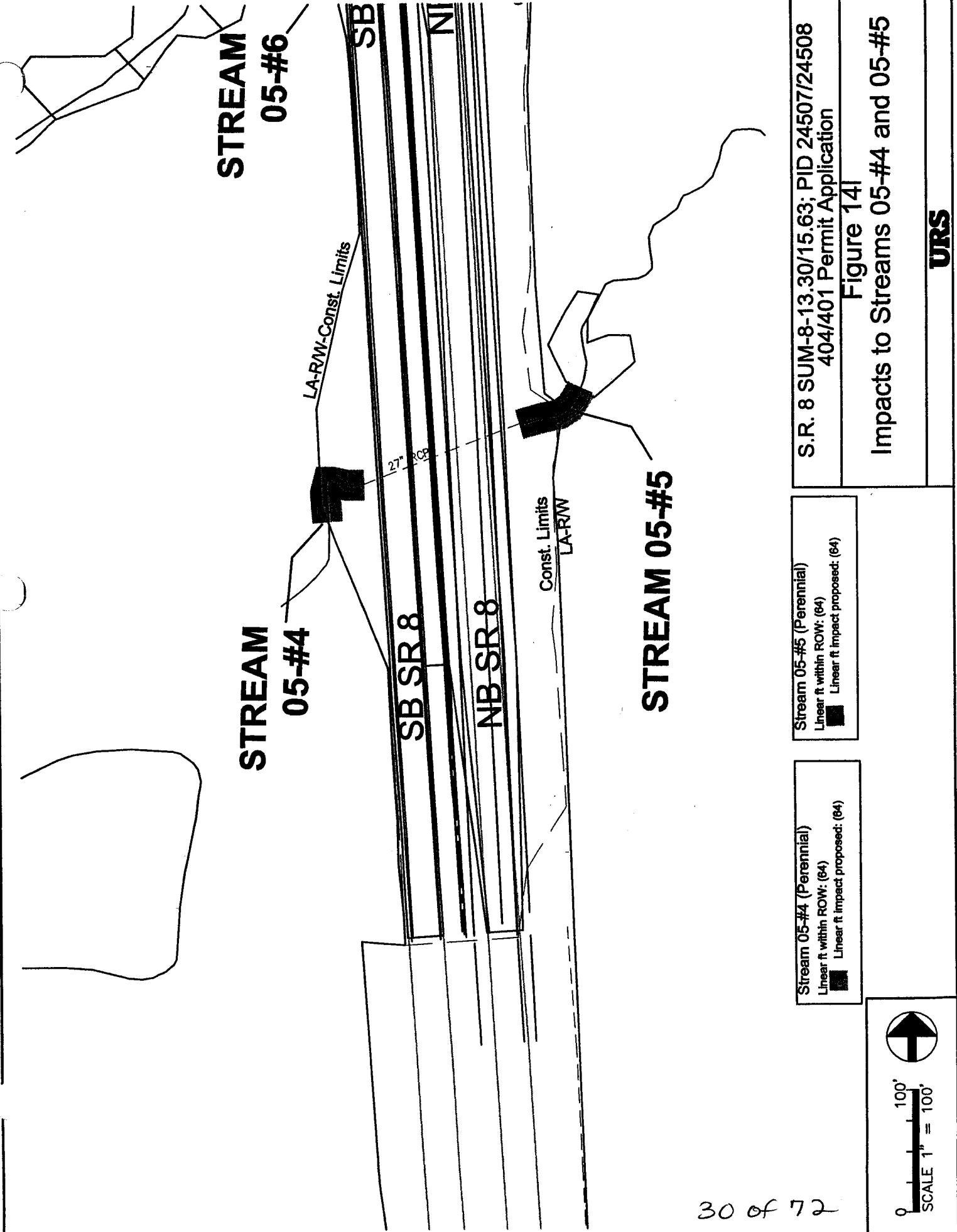
S.R. 8 STA. 450+68.93

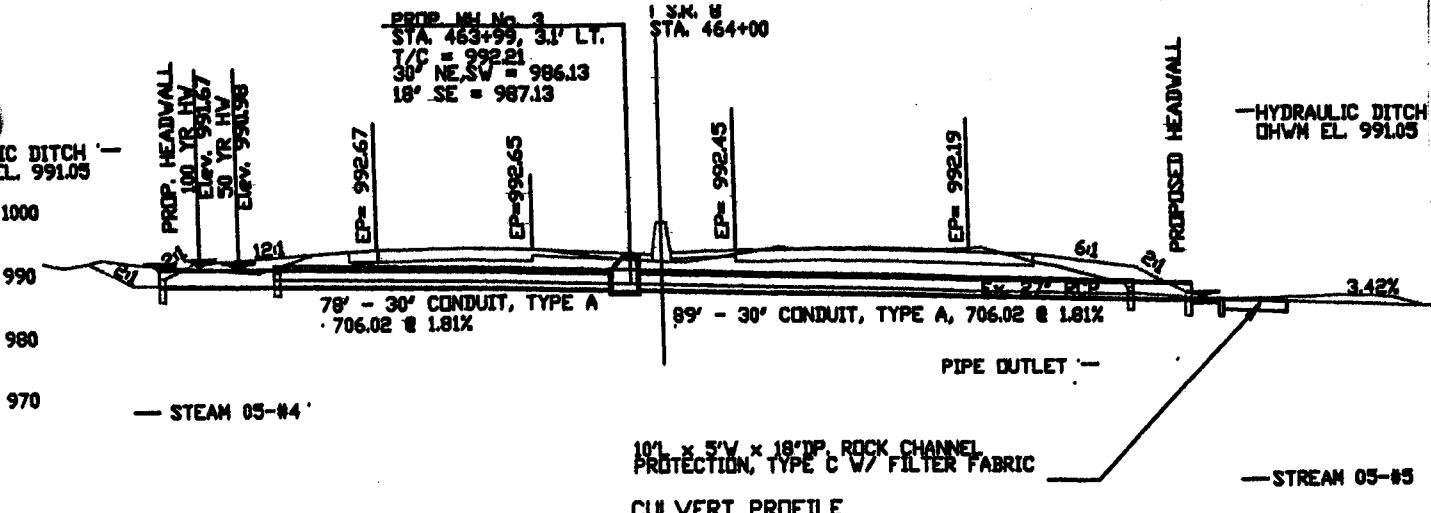
29 of 72

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Figure 14k-2
Section for Stream 05-#2a/b

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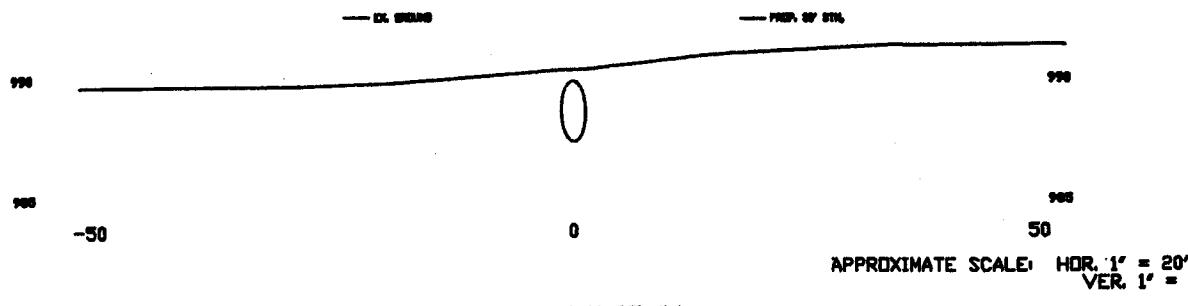




CHANNEL DISTURBANCE (BELOW OHWM)

Length of Channel Disturbed:	64 LINEAR FEET
Excavation Below OHWM:	9 CUBIC YARDS
FILL Below OHWM:	1 CUBIC YARDS
Standard Roadfill:	1 CUBIC YARDS
Rock Channel Protection:	0 CUBIC YARDS

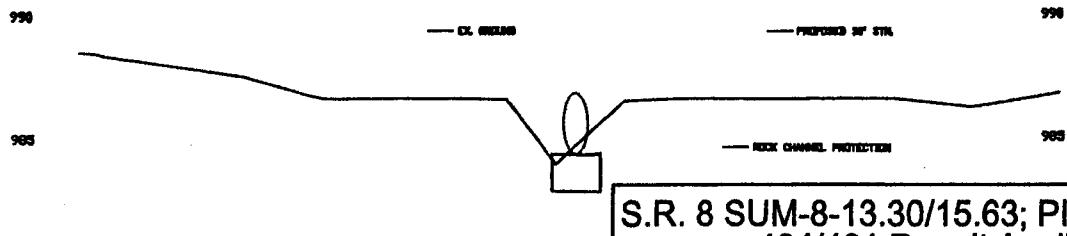
APPROXIMATE SCALE: 1' = 20'



CROSS SECTION STREAM 05-#4
SHOWING PIPE PLACEMENT

CHANNEL DISTURBANCE (BELOW OHWM)

Length of Channel Disturbed:	64 LINEAR FEET
Excavation Below OHWM:	1 CUBIC YARDS
FILL Below OHWM:	7 CUBIC YARDS
Standard Roadfill:	4 CUBIC YARDS
Rock Channel Protection:	3 CUBIC YARDS



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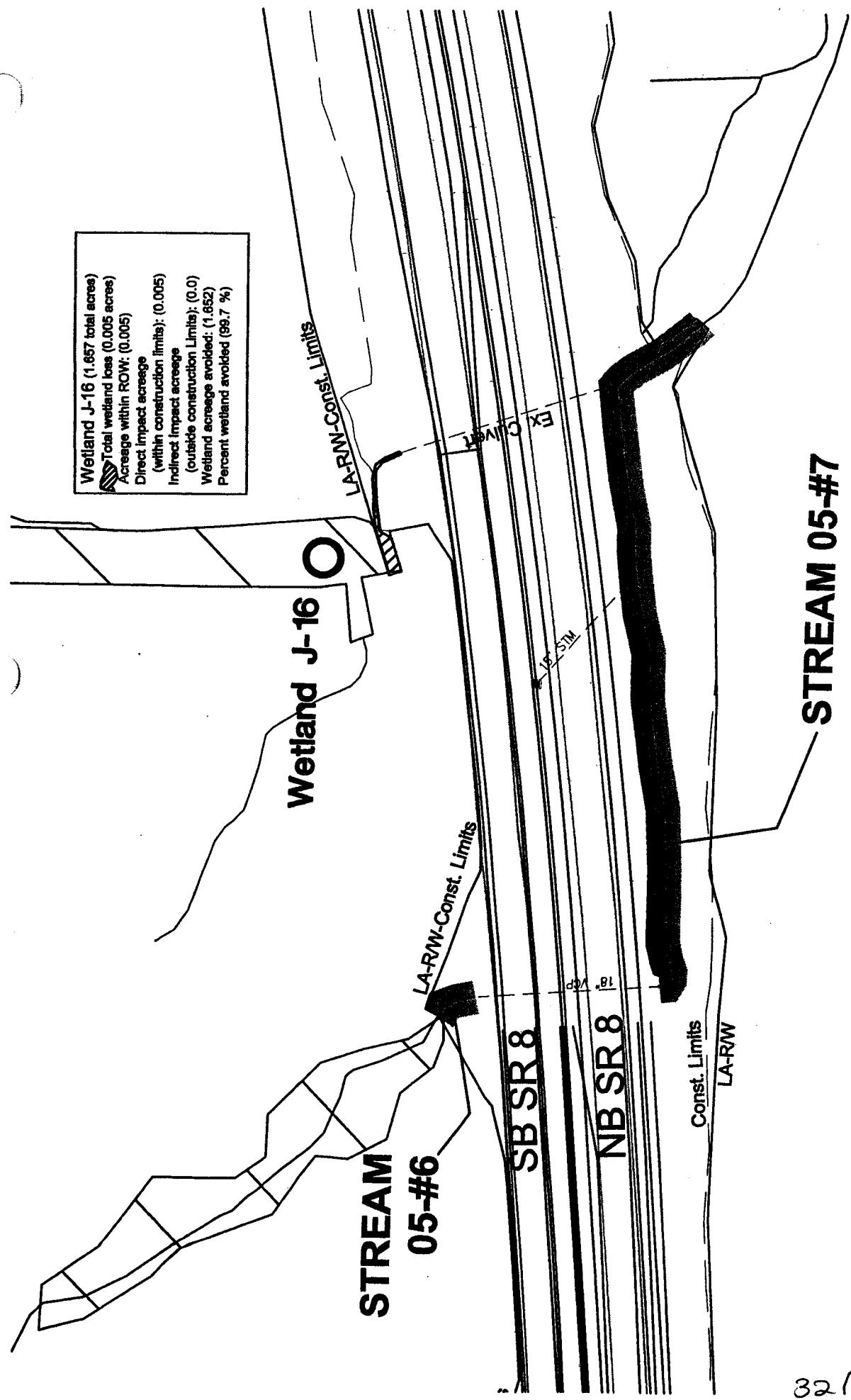
Figure 14I-1

Profile for Stream 05-#5 31 of 72

URS

APPROXIMATE SCALE: HORIZONTAL 1' = 20'
VERTICAL 1' = 8'

CROSS SECTION STREAM 05-#5
SHOWING PIPE PLACEMENT



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Stream 05-#6 (Perennial)
Linear ft. within ROW: (34)
Linear ft impact proposed: (34)

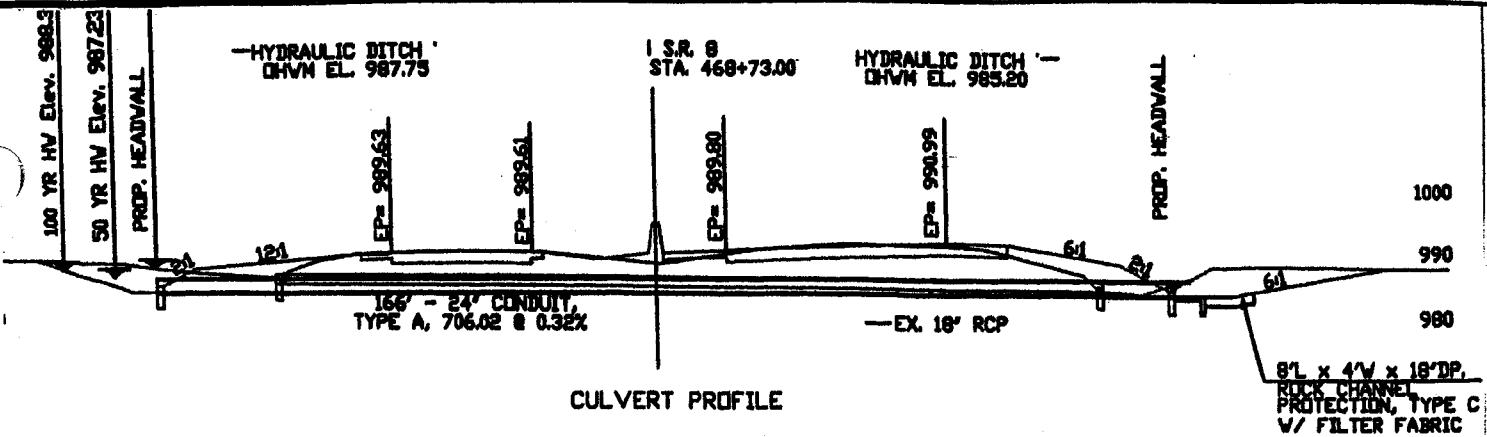
Stream 05-#7 (Perennial)

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Figure 14m
Impacts to Wetland J-16

Figure 14m

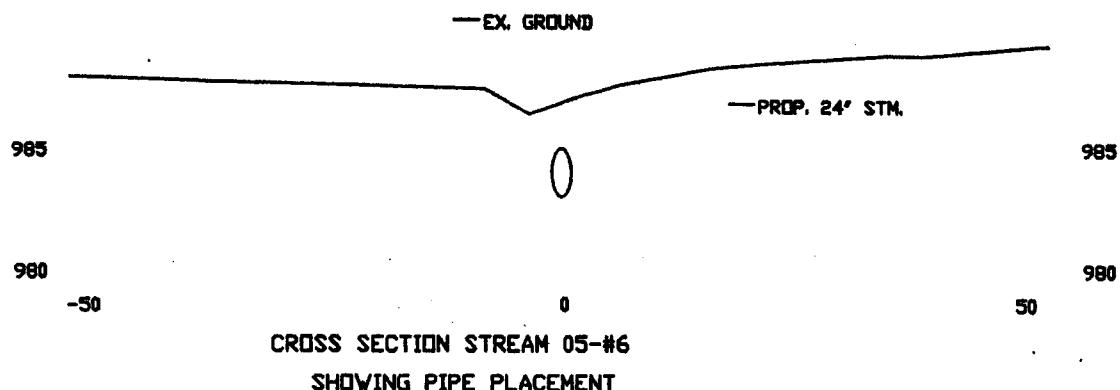
1



CHANNEL DISTURBANCE (BELOW DHWMD)

Length of Channel Disturbed:	34 LINEAR FEET
Excavation Below DHWMD:	9 CUBIC YARDS
FILL Below DHWMD:	1 CUBIC YARDS
Standard Roadfill:	1 CUBIC YARDS
Rock Channel Protection:	0 CUBIC YARDS

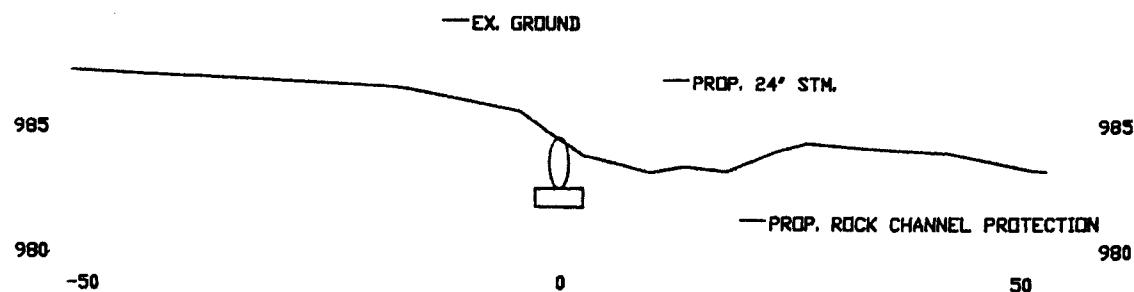
APPROXIMATE SCALE: 1' = 20'



APPROXIMATE SCALE: HOR. 1' = 20'
VER. 1' = 8'

CHANNEL DISTURBANCE (BELOW DHWMD)

Length of Channel Disturbed:	533 LINEAR FEET
Excavation Below DHWMD:	11 CUBIC YARDS
FILL Below DHWMD:	29 CUBIC YARDS
Standard Roadfill:	27 CUBIC YARDS
Rock Channel Protection:	2 CUBIC YARDS



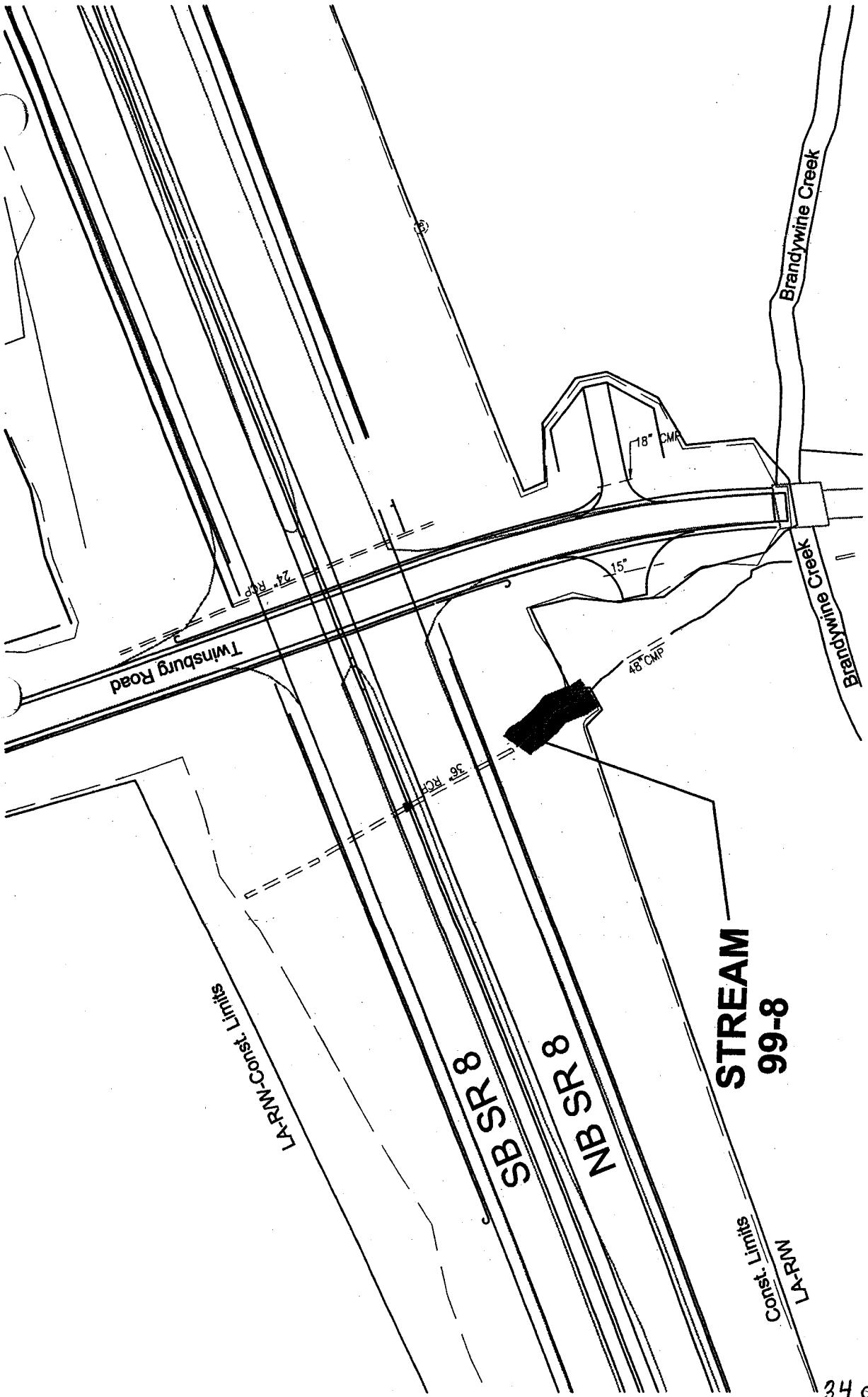
CROSS SECTION STREAM 05-#7
SHOWING PIPE PLACEMENT

APPROXIMATE SCALE: HOR. 1' = 20'
VER. 1' = 8'

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Figure 14m-1
Profile for Stream 05-#7 33 of 72

URS

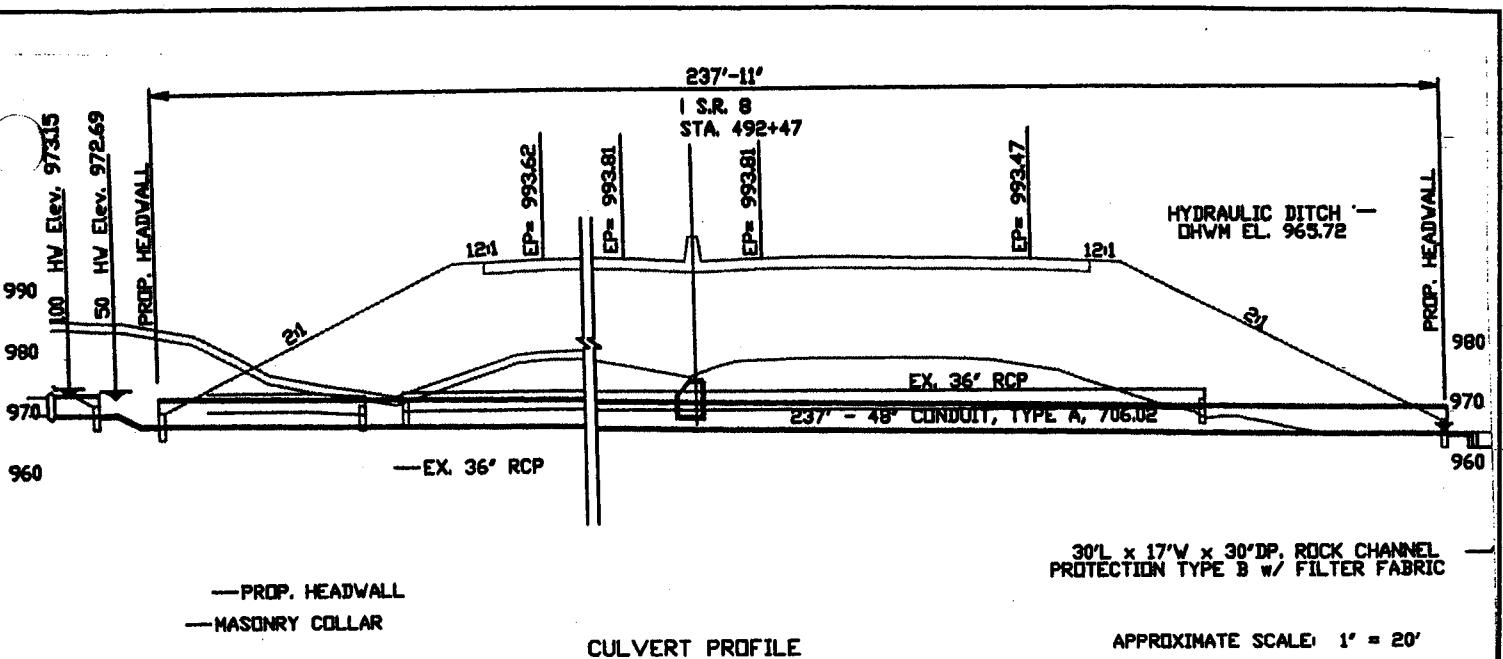


Stream 99-8 (Perennial)
Linear ft within ROW: (69)
■ Linear ft Impact proposed: (69)

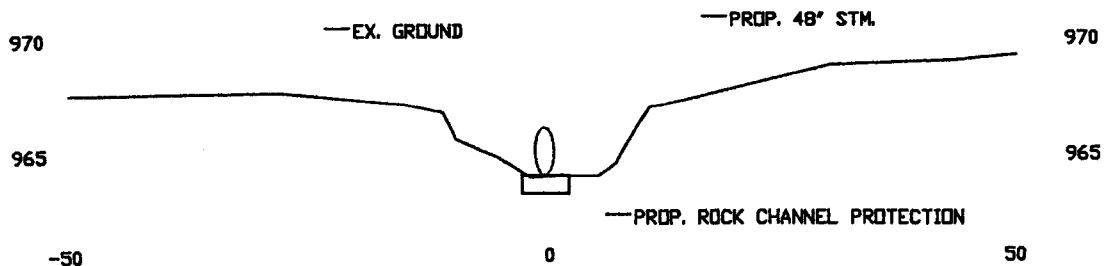
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Figure 14n
Impacts to Stream 99-8

100'
SCALE 1" = 100'



CHANNEL DISTURBANCE (BELOW DHWM)	
Length of Channel Disturbed	69 LINEAR FEET
Excavation Below DHWM	109 CUBIC YARDS
Fill Below DHWM	56 CUBIC YARDS
Standard Roadfill	9 CUBIC YARDS
Rock Channel Protection	47 CUBIC YARDS



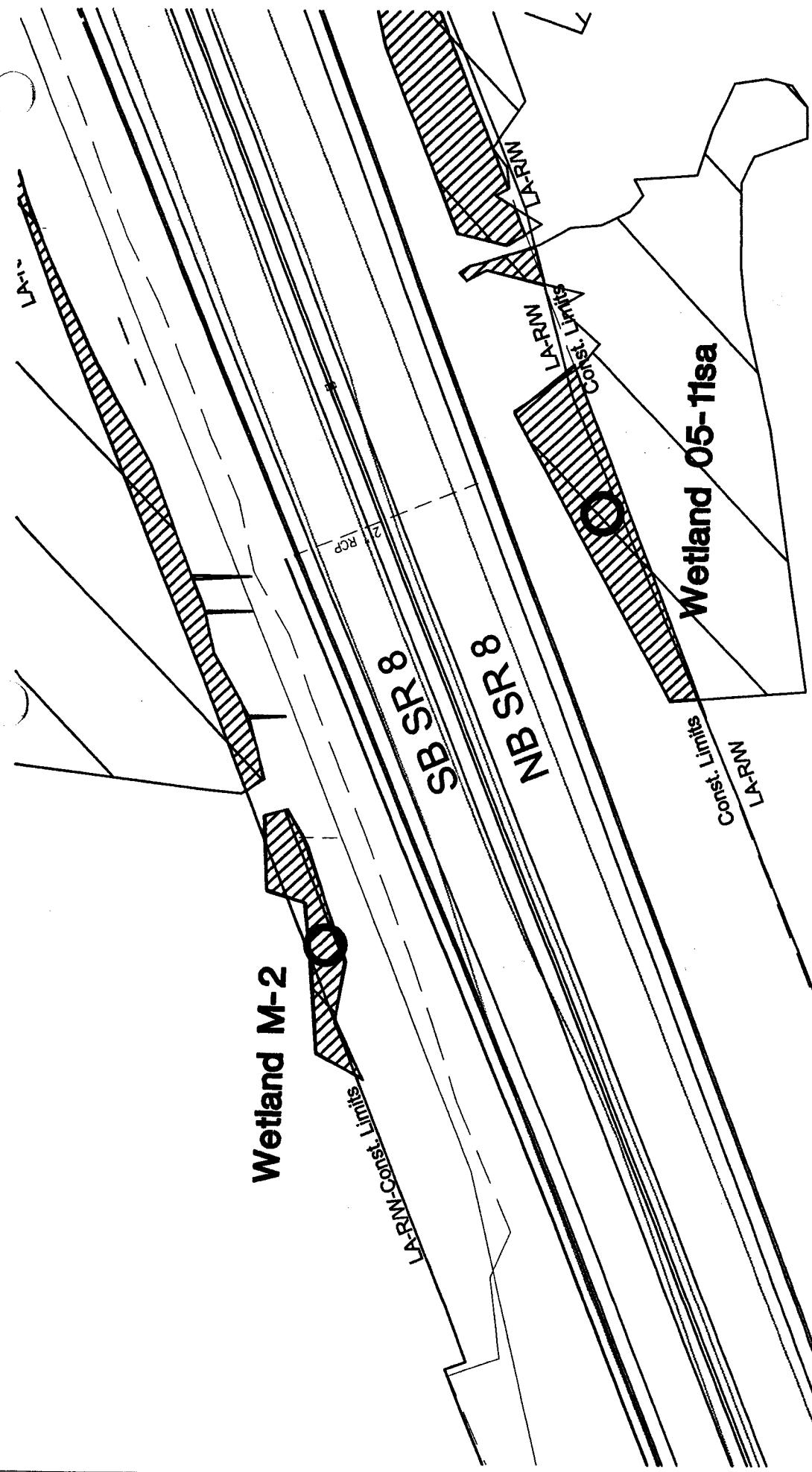
CROSS SECTION STREAM 99-8
SHOWING PIPE PLACEMENT

APPROXIMATE SCALE: HOR. 1' = 20'
VER. 1' = 8'

S.R. 8 SUM-8-13.30/15.63; PID 24507/24508
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Figure 14n-1
Profile for Stream 99-8 35 of 72

URS



**S.R. 8 SUM-8-13.30/15.63; PID 24507/24508
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Figure 14o
Impacts to Wetlands M-2 and 05-11sa

URS

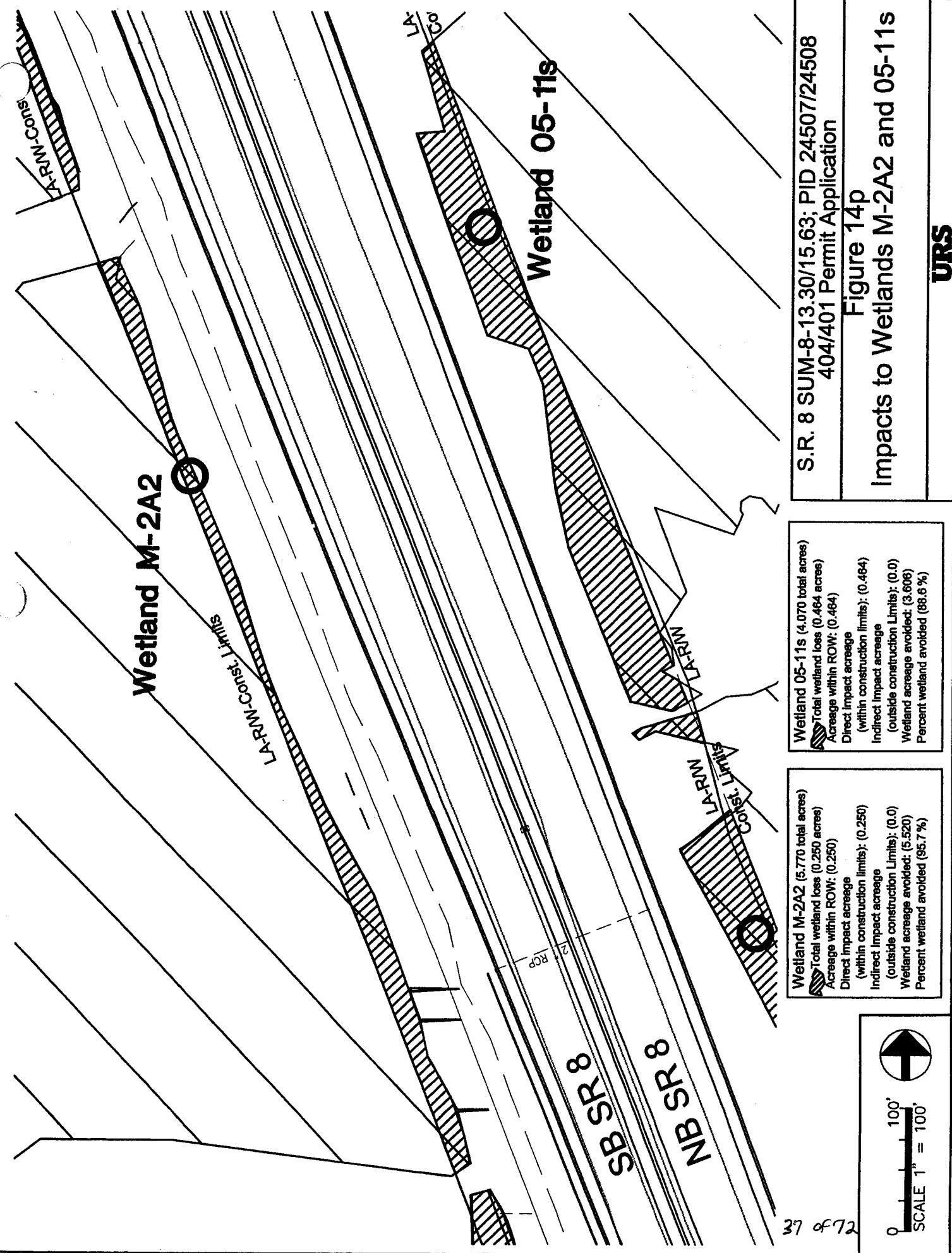
Wetland 05-11sa (1.186 total acres)
 Total wetland loss (0.198 acres)
 Acresage within ROW: (0.171)
 Direct Impact acreage
 (within construction limits): (0.198)
 Indirect Impact acreage
 (outside construction Limits): (0.000)
 Wetland acreage avoided: (0.982)
 Percent wetland avoided (83.2 %)

Wetland M-2 (0.080 total acres)
 Total wetland loss (0.090 acres)
 Acreage within ROW: (0.080)
 Direct Impact acreage
 (within construction limits): (0.060)
 Indirect Impact acreage
 (outside construction Limits): (0.030)
 Wetland acreage avoided: (0.0)
 Percent wetland avoided (0.0 %)



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SCALE 1" = 100'



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Figure 14p
Impacts to Wetlands M-2A2 and 05-11e

- 1 -

URS

Wetland 05-11s (4,070 total acres)
 **Total wetland loss (0.454 acres)**
Acreage within ROW: (0.454)
Direct Impact acreage
(within construction limits): (0.454)
Indirect Impact acreage
(outside construction limits): (0.0)
Wetland acreage avoided: (3.606)
Percent wetland avoided (88.6 %)

Wetland M-2A2 (5,770 total acres)
 **Total wetland loss:** (0.250 acres)
Acresge within ROW: (0.250)
Direct impact acreage
(within construction limits): (0.250)
Indirect Impact acreage
(outside construction Limits): (0.0)
Wetland acreage avoided: (5.520)
Percent wetland avoided: (95.7%)



100'
100'
SCALE 1" =

**STREAM
05-#11a**

Wetland M-2A1

O

A-RW Const. Limits

SB SR 8

NB SR 8

STREAM 05-#11b

LA-RNN

Const. Limits

Wetland M-2A1 (2.904 total acres)
Total wetland loss (0.099 acres)
Acreage within ROW: (0.099)
Direct impact acreage
(within construction limits): (0.098)
Indirect impact acreage
(outside construction limits): (0.0)
Wetland acreage avoided: (2.805)
Percent wetland avoided (98.6%)

Stream 05-#11a (Perennial)
Linear ft. within ROW: (87)
Linear ft. Impact proposed: (87)

Stream 05-#11b (Perennial)
Linear ft. within ROW: (95)
Linear ft. Impact proposed: (95)

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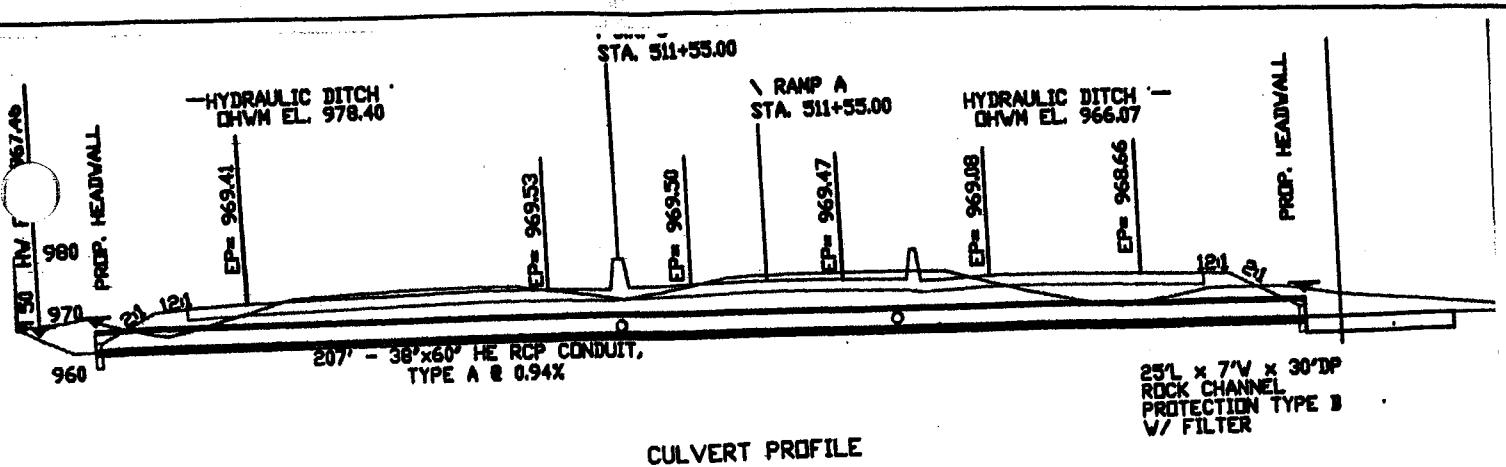
100'
SCALE 1" = 100'

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Figure 14q

Impacts to Wetland M-2A1
And Streams 05-#11a and 05-#11b

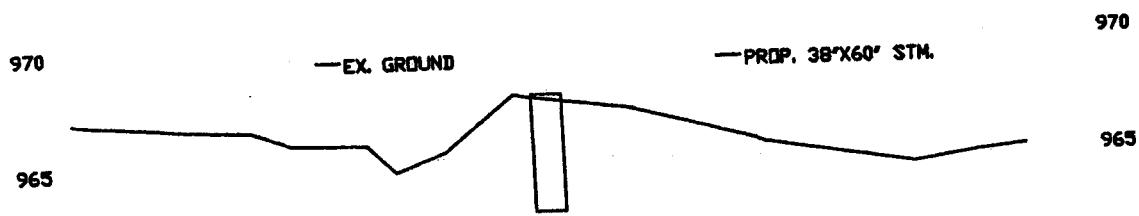
URS



CHANNEL DISTURBANCE (BELOW OHWM)

Length of Channel Disturbed Excavation Below DHVM	87 LINEAR FEET
FILL Below DHVM	1 CUBIC YARDS
Standard Roadfill	2 CUBIC YARDS
Rock Channel Protection	2 CUBIC YARDS
	0 CUBIC YARDS

APPROXIMATE SCALE: 1" = 20'

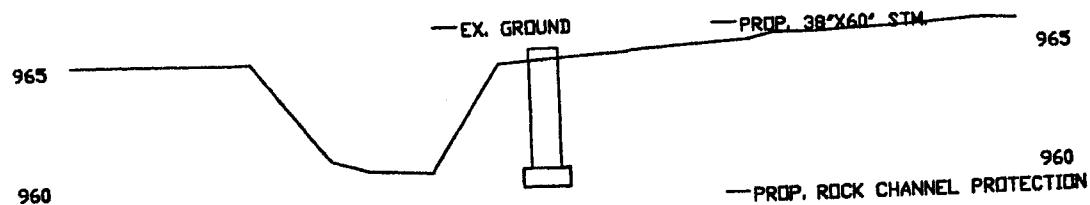


CROSS SECTION STREAM 05-#11A
SHOWING PIPE PLACEMENT

APPROXIMATE SCALE: HOR. 1' = 20' VER. 1' = 8'

CHANNEL DISTURBANCE (BELOW OHWM)

Length of Channel Disturbed	95 LINEAR FEET
Excavation Below DHWM	12 CUBIC YARDS
Fill Below DHWM	37 CUBIC YARDS
Standard Roadfills	21 CUBIC YARDS
Rock Channel Protection	16 CUBIC YARDS



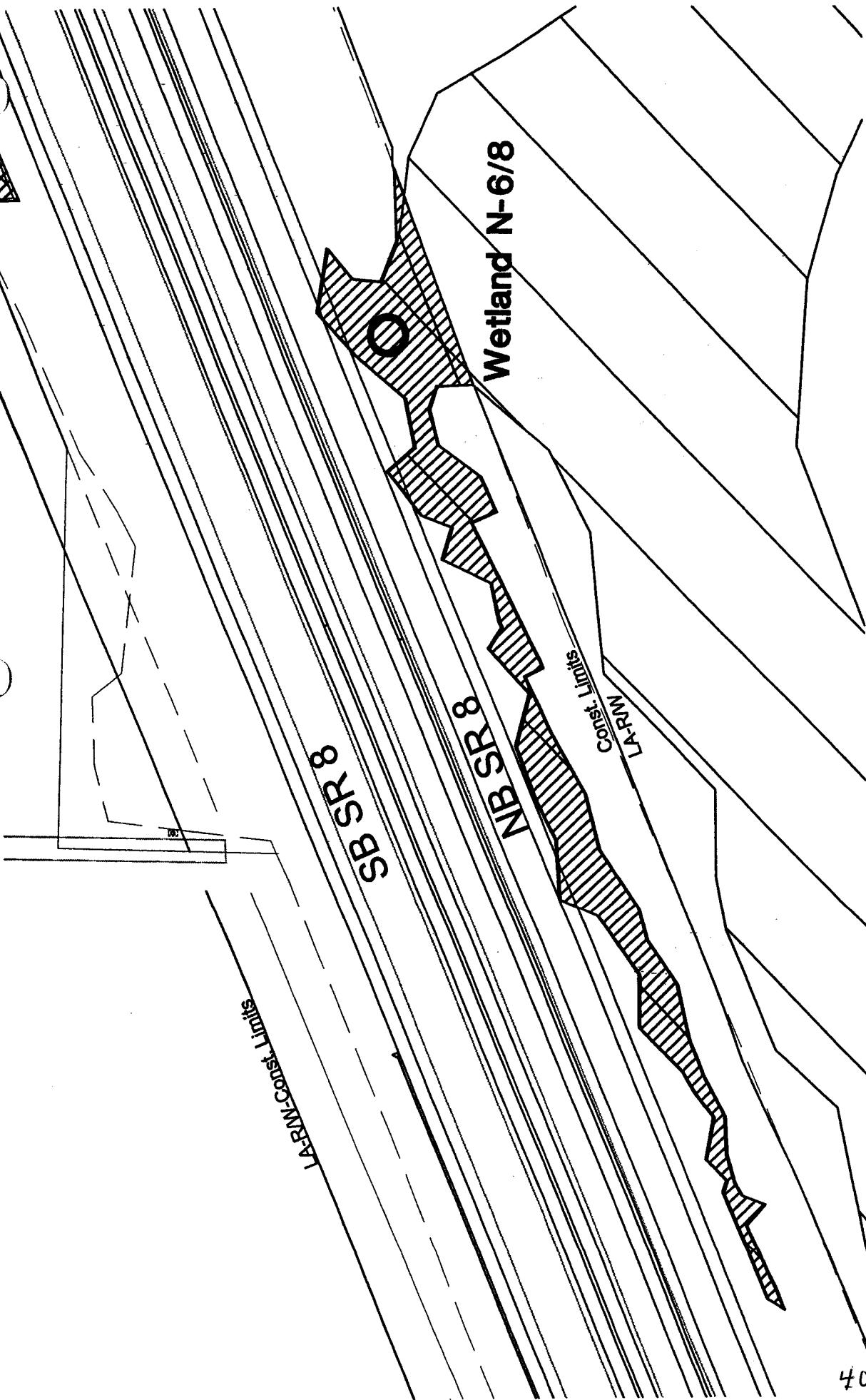
CROSS SECTION STREAM 05-#11B
SHOWING PIPE PLACEMENT

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Figure 14q-1
Profile for Stream 05-#11b

URS

APPROXIMATE SCALE: HOR. 1' = 20'
VER. 1' = 8'

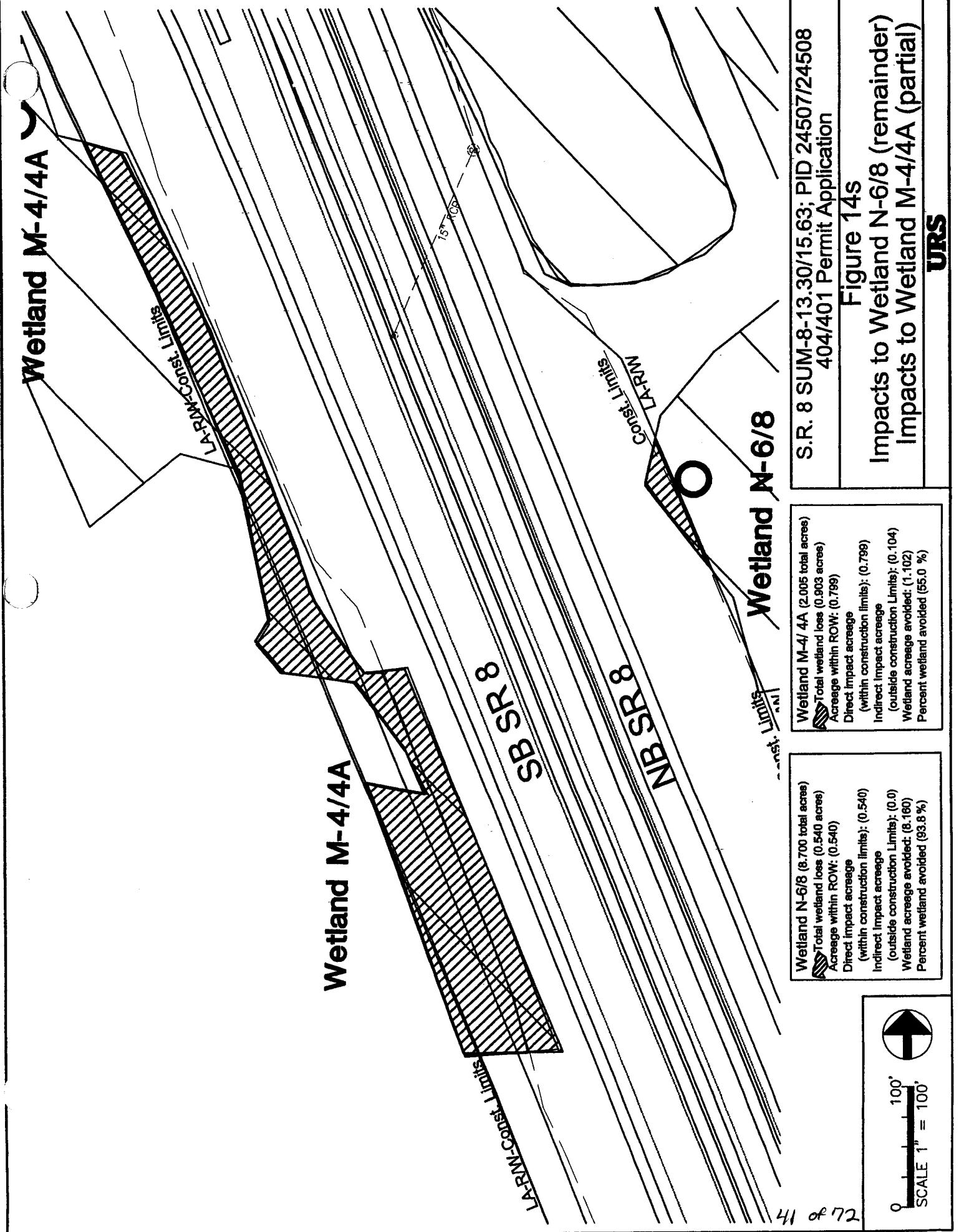


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Figure 14r
 Impacts to Wetland N-6/8 (partial)

URS





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**STREAM
99-6b/c**

Wetland M-4/4A

M-4/4A

LA-BRN-Const. Limits

Perm B

EX. STN

EX. STN

LA-BRN
Const. Limits

SB SR 8
NB SR 8

S.R. 8 SUM-8-13, 30/15.63; PID 24507/24508
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Figure 14f
Impacts to Wetland M-4/4A (remainder)
And Stream 99-6b/c (partial)

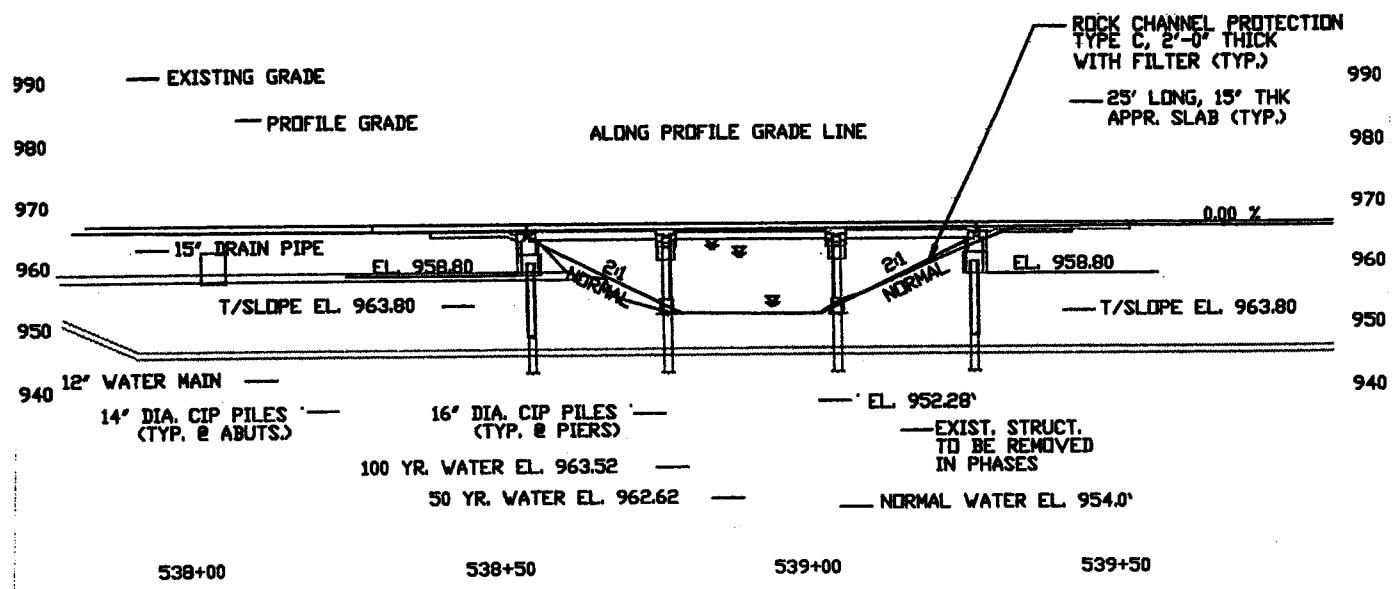
URS

Stream 99-6b/c (Perennial)
Linear ft within ROW: (689)
Linear ft impact proposed: (689)

Wetland M-4/4A (2.005 total acres)
Total wetland loss (0.903 acres)
Acreage within ROW: (0.789)
Direct impact acreage
(within construction limits): (0.789)
Indirect impact acreage
(outside construction limits): (0.104)
Wetland acreage avoided: (1.102)
Percent wetland avoided (55.0 %)



100'
SCALE 1" = 100'



CROSS SECTION STREAM 099-6B/C

APPROXIMATE SCALE: 1' = 20'

CHANNEL DISTURBANCE (BELOW DHWM)

Length of Channel Disturbed:	689 LINEAR FEET
Excavation Below DHWM:	26 CUBIC YARDS
Fill Below DHWM:	14 CUBIC YARDS
Standard Roadfill:	0 CUBIC YARDS
Rock Channel Protection:	14 CUBIC YARDS

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Figure 14t/u-1
Profile for Stream 99-6b/c

URS

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Wetland M-5/6

**STREAM
99-6b/c**

W-Const. Limits

Const. Limits

LA-RW
Const. Limits

Ramp C

LA-RW-Const. Limits

Const. Limits

Ramp B

Wetland M-5/ 6 (12.970 total acres)
Total wetland loss (5.387 acres)
Acreage within ROW: (7.053)
Direct Impact acreage
(within construction limits): (5.387)
Indirect Impact acreage
(outside construction limits): (0.0)
Wetland acreage avoided: (7.383)
Percent wetland avoided (58.5 %)

Stream 99-6b/c (Perennial)
Linear ft within ROW: (889)
Linear ft impact proposed: (889)

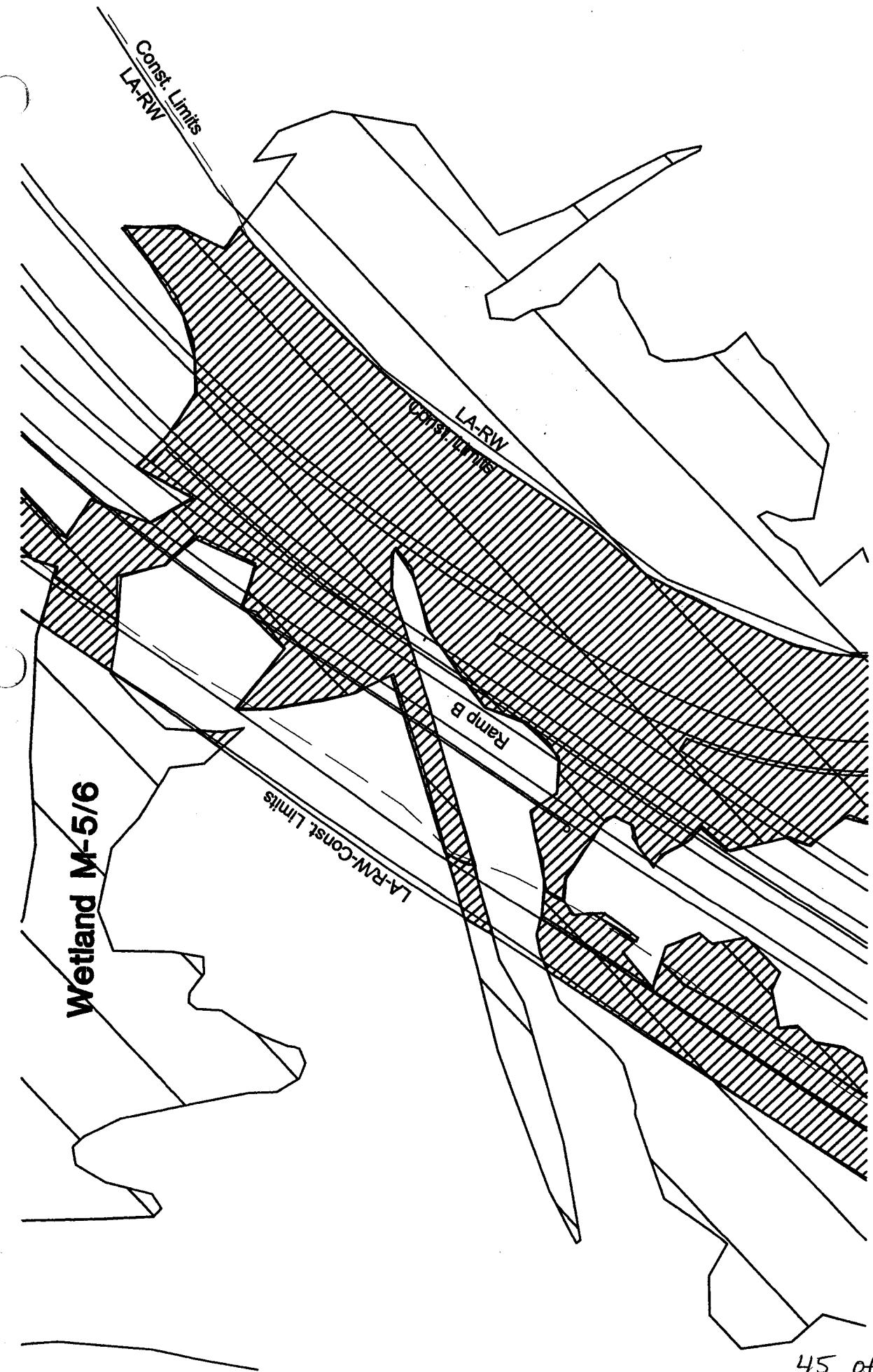


0' 100'
SCALE 1" = 100'

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Figure 14u
Impacts to Wetland M-5/6 (partial)
And Stream 99-6b/c (remainder)

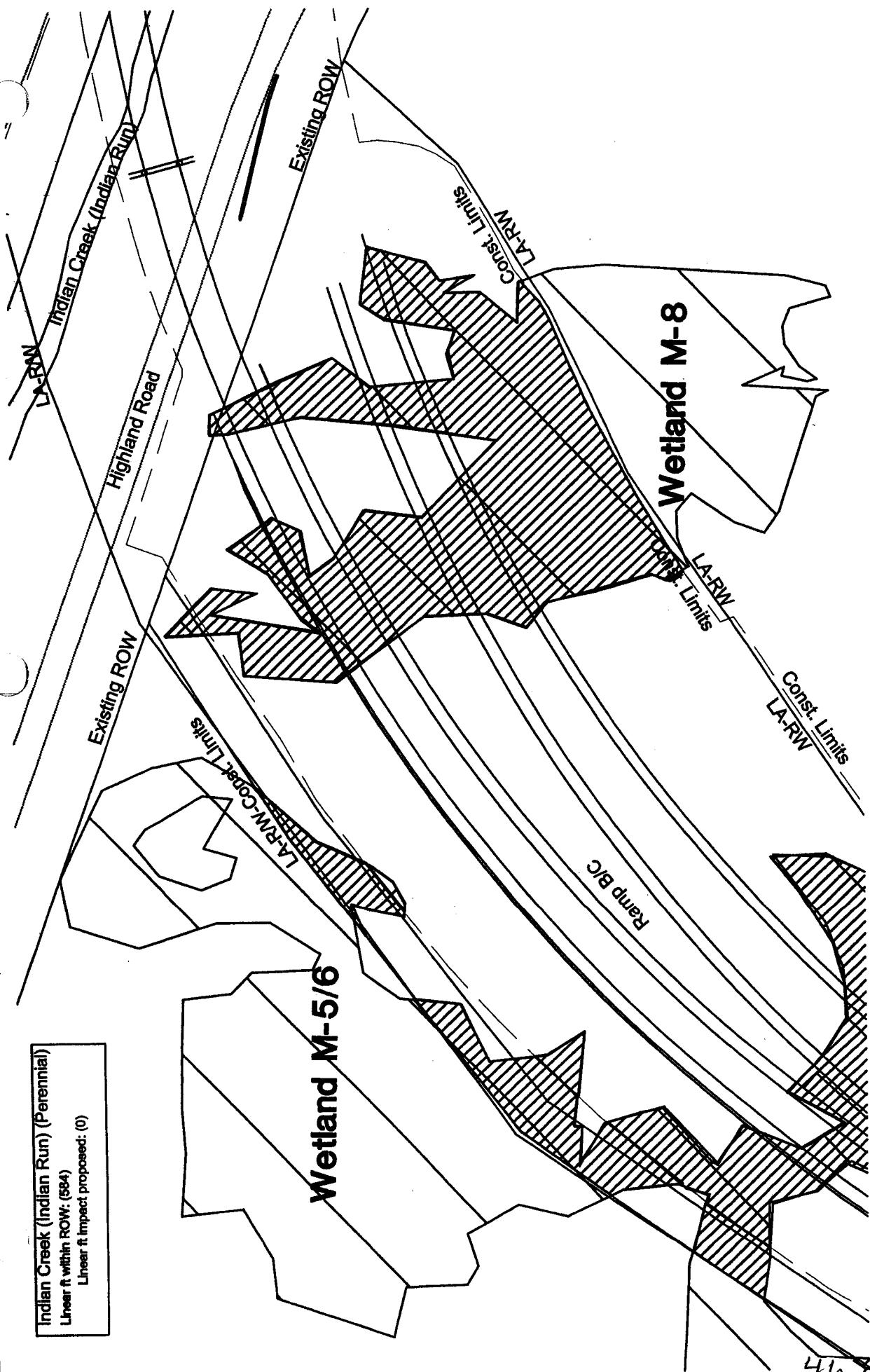
URS



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Figure 14V
Impacts to Wetland M-5/6 (continued)

URS



Indian Creek (Indian Run) (Perennial)
Linear ft within ROW: (584)
Linear ft Impact proposed: (0)

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Figure 14W
Impacts to Wetlands M-5/6 (remainder)
And M-8

URS

Wetland M-8 (3,290 total acres)
 Total wetland loss (1,171 acres)
 Agreee within ROW: (1,183)
 Direct impact acreage
 (within construction limits): (1,171)
 Indirect Impact acreage
 (outside construction limits): (0,0)
 Wetland acreage avoided: (2,119)
 Percent wetland avoided (84.4 %)

Wetland M-5/ 6 (12,970 total acres)
 **Total wetland loss (5,387 acres)**
 Increase within ROW: (7,053)
 Direct Impact acreage
 (within construction limits): (5,387)
 Indirect Impact acreage
 (outside construction Limits): (0.0)
 Wetland acreage avoided: (7,583)
 Percent wetland avoided (56.5%)

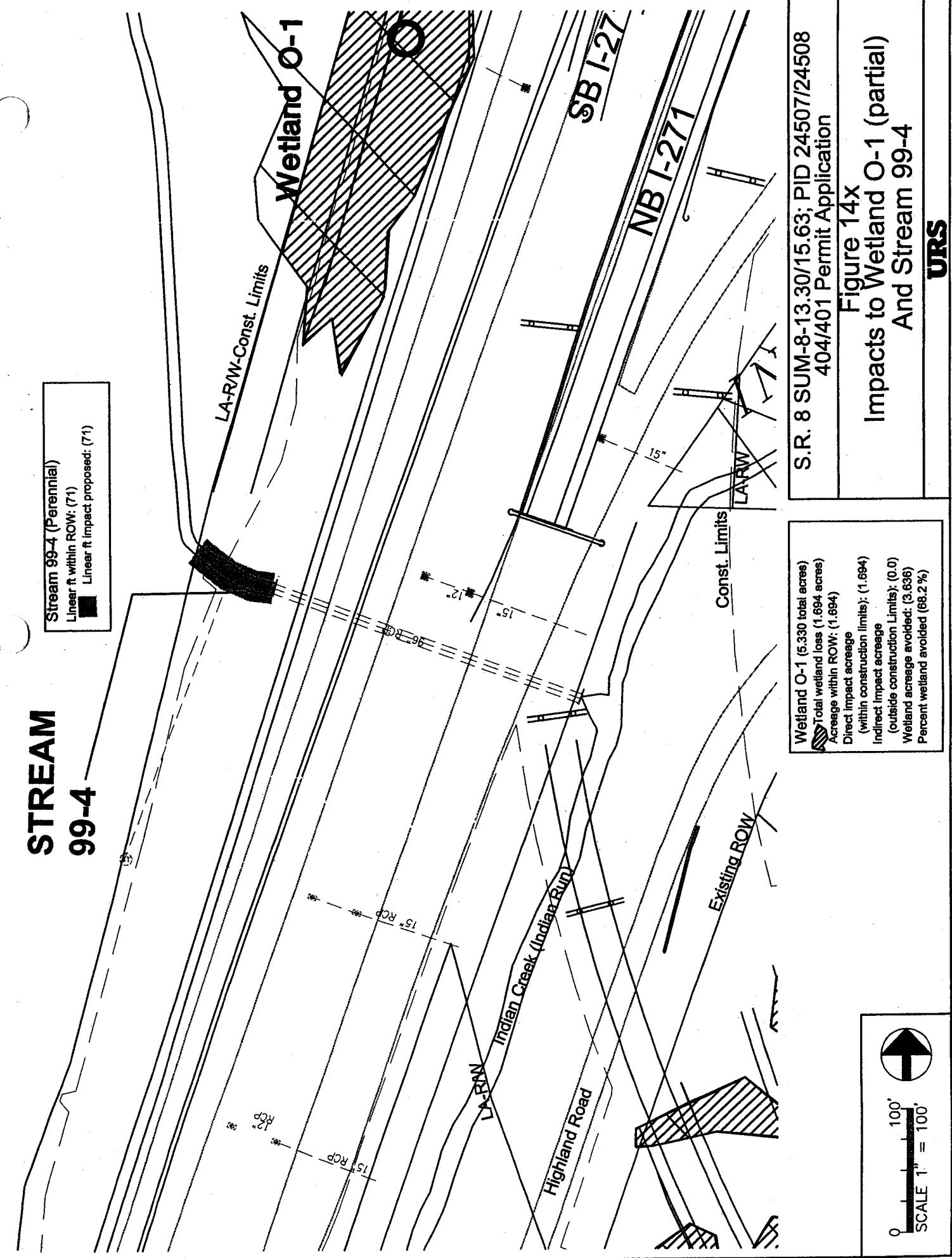


100'
100'
SCALE 1" = 100'

STREAM
99-4

Stream 99-4 (Perennial)
Linear f1 within ROW: (71)

Linear fit within ROW: (71)



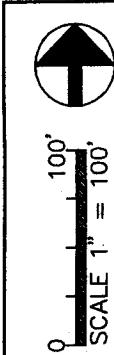
**S.R. 8 SUM-8-13.30/15.63; PID 24507/24508
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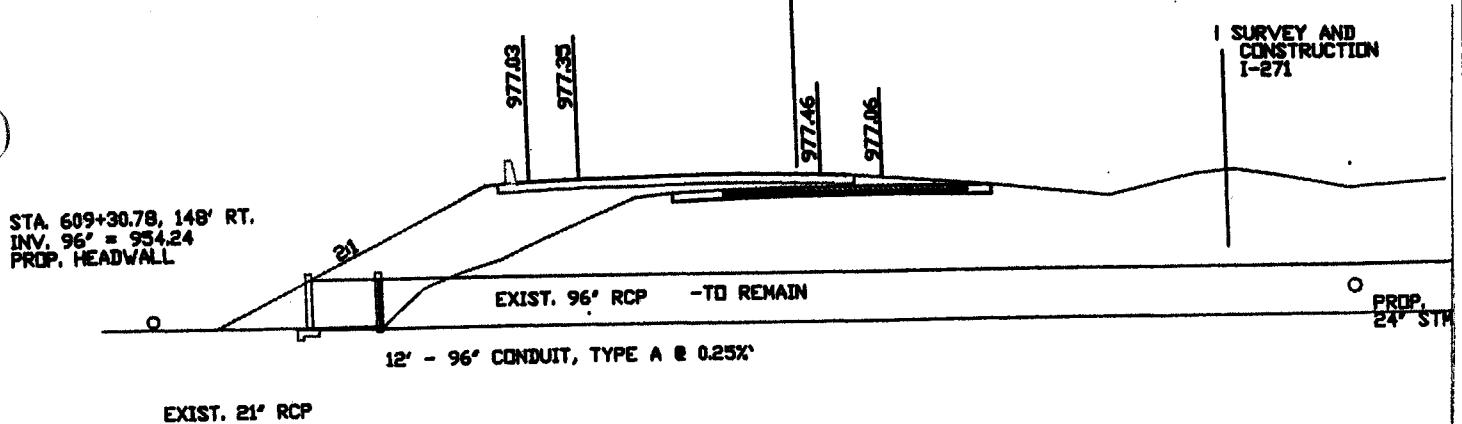
JM-8-13.30/15.63; PID 24507/24508
404/401 Permit Application

Figure 14x
Impacts to Wetland O-1 (partial)

URS

Wetland O-1 (5,330 total acres)
Total wetland loss (1,694 acres)
Acreage within ROW: (1,694)
Direct Impact acreage
(within construction limits): (1,694)
Indirect Impact acreages
(outside construction limits): (0.0)
Wetland acreage avoided: (3,636)
Percent wetland avoided (68.2 %)

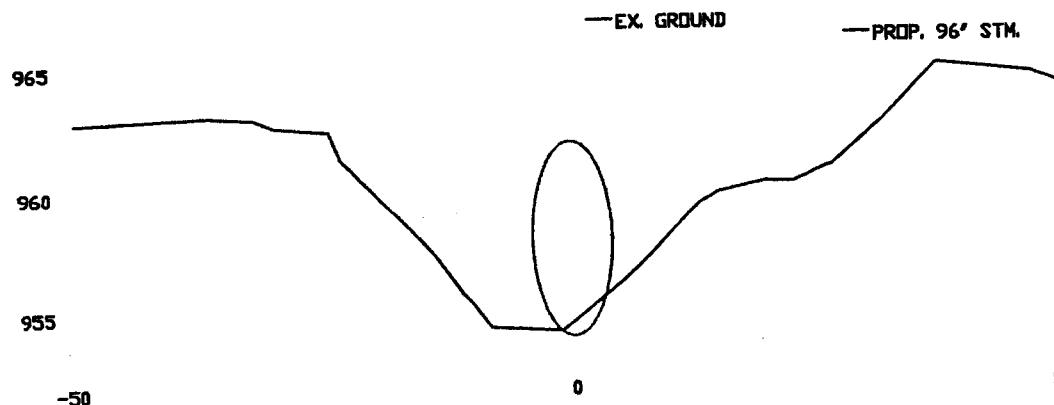




CULVERT PROFILE

APPROXIMATE SCALE: 1' = 20'

CHANNEL DISTURBANCE (BELOW DHWM)	
Length of Channel Disturbed:	32 LINEAR FEET
Excavation Below DHWM:	4 CUBIC YARDS
Fill Below DHWM:	23 CUBIC YARDS
Standard Roadfill:	23 CUBIC YARDS
Rock Channel Protection:	0 CUBIC YARDS

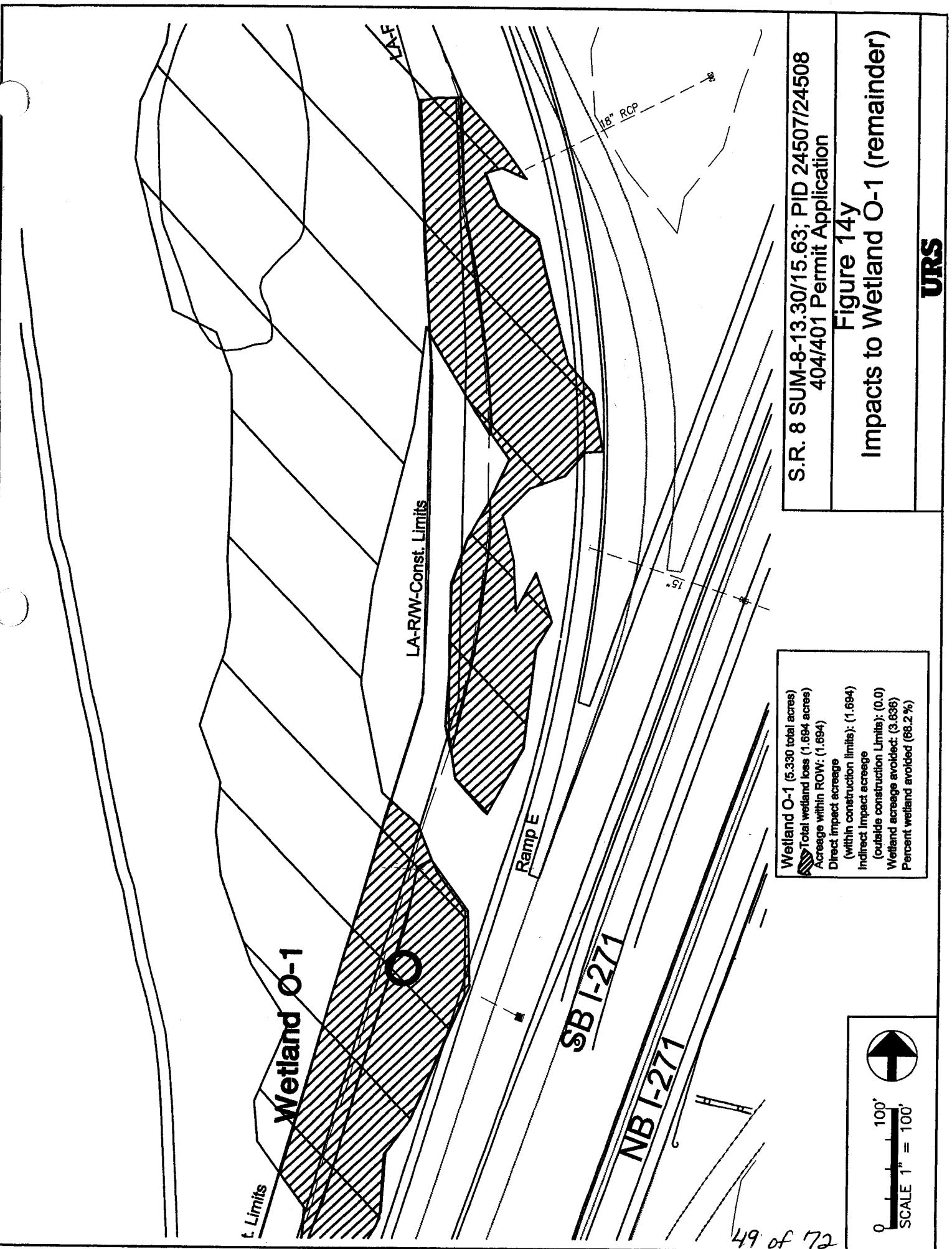


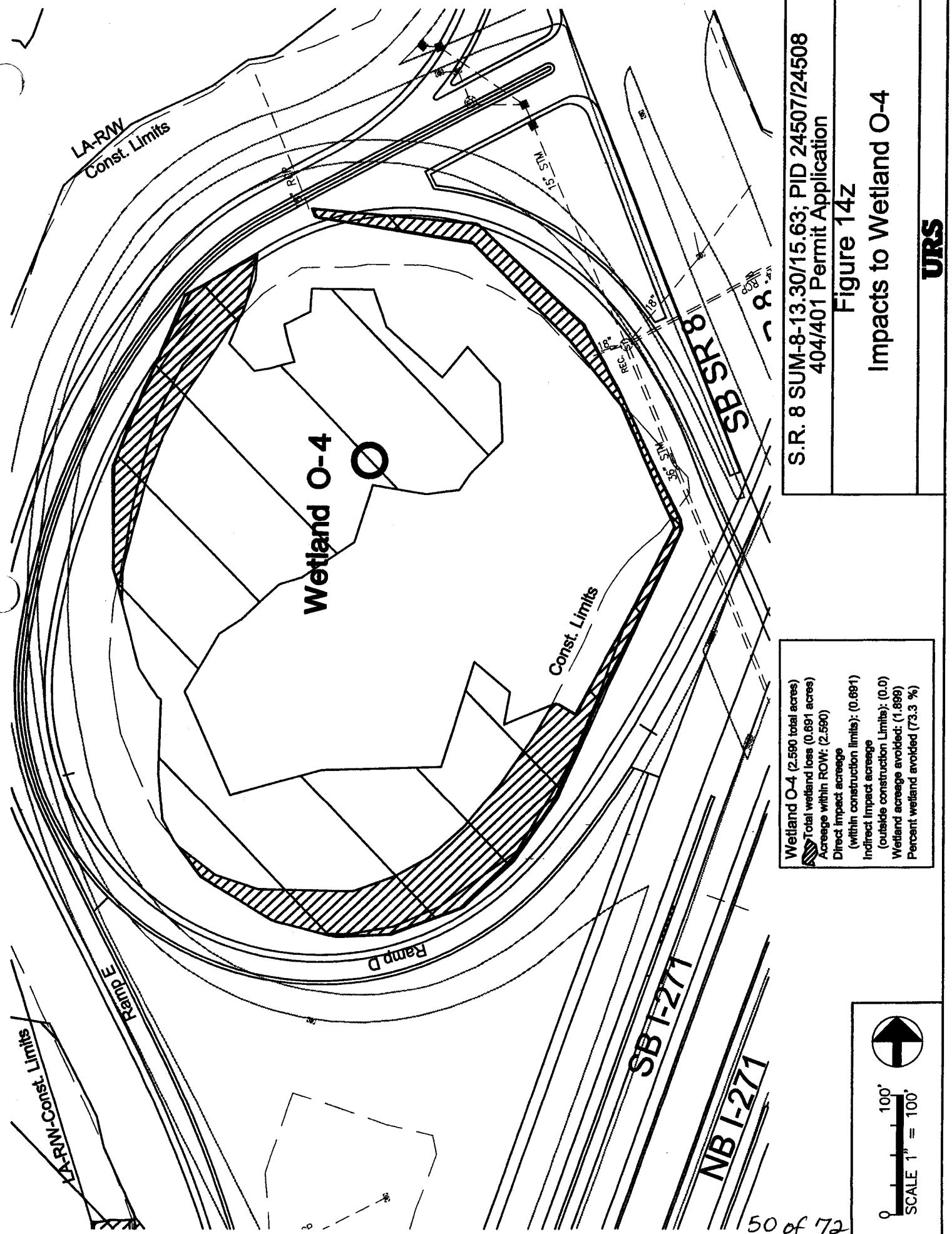
APPROXIMATE SCALE: HOR. 1' = 20'
VER. 1' = 8'

CROSS SECTION STREAM 99-4 SHOWING PIPE PLACEMENT

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Figure 14x-1
Profile for Stream 99-4



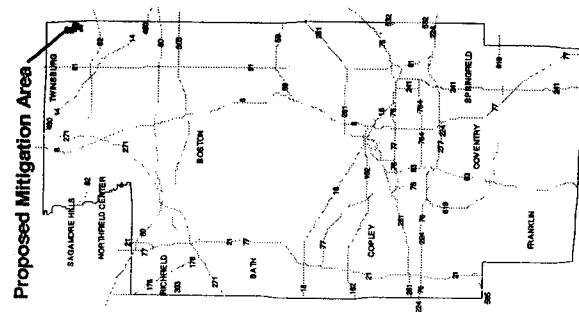


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Figure 14z

Impacts to Wetland O-4

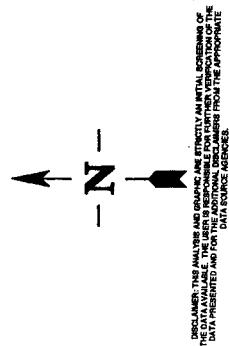
URS



Location of the Proposed Mitigation Site in
Summit County.



Location of Summit County, Ohio.



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THE OHIO DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENTAL SERVICES
1800 W. BROAD ST.
COLUMBUS, OH 43223
PRODUCED WITH GEOMEDIA PROFESSIONAL SOFTWARE
CREATED BY: M. RAYMOND
DATE CREATED: 08/31/05



ProposedWetlandCells

Location of the proposed Pond Brook mitigation area on 7.5 minute USGS topographic mapping
(Twinsburg and Aurora Quadrangles).

USACE 404 Permit and OEPA 401 Water Quality Certification Application
State Route 8 Improvements
SUM 8 - 13,30/15.63; PID 24507/24508
July 21, 2005

404/401 Table A. Streams Affected by the Proposed Project

Stream Number	Location	Description	Flow	Water Quality	Impacted
Stream 05-15 Tributary to Brandywine Creek	041°14'59.48"N 081°29'56.12"W	Intermittent stream 3'x 6" Silty stream with no pools located in an old field. 58' impacted - new 48" culvert	Cuyahoga River (4110002040) 0.3	Brandywine Creek 1.4	90.4 HHEI 18 PHWH Class 1
Stream 99-13 Tributary to Brandywine Creek	041°15'08.79"N 081°29'56.94"W	Perennial stream 4' x 12". Silty substrate, sinuous, in forested area. 495' impacted - relocate culvert/stream. Replace 36" pipe with 48" culvert	Cuyahoga River (4110002040) 0.9	Brandywine Creek 1.2	62.1 HHEI 65 WWH Mature forest, wetland
Stream 05-F Tributary to Brandywine Creek	041°15'26.54"N 081°30'15.07"W	Perennial stream, 3' x 6" channel. Gravel/boulder substrate. Located in forested wetland area. 337' impacted - new 24" culvert/channel	Cuyahoga River (4110002040) 0.7	Brandywine Creek 0.8	23.9 HHEI 29 PHWH Class 1
Stream 99-12c Tributary to Brandywine Creek	041°15'56.63"N 081°30'10.45"W	Perennial stream, mud/leaf litter. Located next to a golf course. 2.5' x 6" channel. 312' impacted - fill/relocate captured stream	Cuyahoga River (4110002040) 0.1	Brandywine Creek 0.6	122 HHEI 13 PHWH Class 1
Stream 99-14a/b Tributary to Brandywine Creek	041°16'01.91"N 081°29'56.12"W	Perennial stream, cobble/gravel substrate 10' x 6" channel. 508' impacted - fill/relocate meandering stream along service road	Cuyahoga River (4110002040) 0.8	Brandywine Creek 0.2	200 HHEI 72 PHWH Class III

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404/401 Table A. Streams Affected by the Proposed Project

Stream Feature	USGS coordinate	Description and Length Impacted	Length (miles)	Receiving Stream	Distance from Stream (miles)	Off-Site Off-Pipe Damage	Off-Site Off-Pipe Score	Description of Off-Site Impact	Off-Site Off-Pipe Score
Stream 99-14c Tributary to Brandywine Creek	041°16'04.39"N 081°29'56.53"W	Perennial stream, receiving water from retention facility. Located in wooded area. 2.5'x 8" channel-138' impacted - fill/relocate headwater stream	0.1 (4110002040)	Brandywine Creek	0.2	5.2	HHEI 35 PHWH Class II modified	Immature forest, shrub, old field, commercial area to the west	
Stream 99-11b Tributary to Brandywine Creek	041°16'05.44"N 081°30'09.55"W	Perennial stream, cobble/gravel substrate. Located in shrub/wetland area. 3.5'x 12" channel. 77' impacted - replace 65"x 40" pipe w/longer 60"x 38" pipe	0.7 (4110002040)	Brandywine Creek	0.7	67	HHEI 65 PHWH Class II	Mature forest, wetland, shrub	
Stream 99-11a Tributary to Brandywine Creek	041°16'05.57"N 081°30'11.27"W	Perennial stream, silt/gravel substrate. 2x 12" channel. 76' impacted - replace 65"x 40" pipe w/longer 60"x 38" pipe	0.3 (4110002040)	Brandywine Creek	0.7	67	HHEI 59 PHWH Class II modified	Immature forest, wetland, shrub	
Stream 99-10a Tributary to Brandywine Creek	041°16'10.65"N 081°30'10.04"W	Perennial stream, sinuous, silt, leaf pack/woody debris, gravel. Channel flows through a wetland. 78' impacted-Replace 24" culvert with longer 27" pipe.	0.3 (4110002040)	Brandywine Creek	1	89.1	HHEI 29 PHWH Class II	Mature forest, wetland	

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404/401 Table A. Streams Affected by the Proposed Project

Stream Number	USGS coordinate	Description of stream length impacted	Length impacted (m)	Flowing into	Flow direction	Flow velocity (m/s)	HHEI	PHWH	Wetland Class
Stream 99-10b Tributary to Brandywine Creek	041°16'10.65"N 081°30'10.04"W	Perennial stream, sinuous, boulder channel flowing into a wetland. 52' impacted - culvert extension	Cuyahoga River (4110002040)	0.6	Brandywine Creek	1	89.1	HHEI 50 PHWH	Immature forest, wetland
Stream 05-10a Tributary to Brandywine Creek	041°16'09.97"N 081°30'11.60"W	Perennial stream, sinuous, sand/gravel channel in a wetland. Gravel/leaf debris substrate. 4x 6" channel. 20' impacted - culvert extension	Cuyahoga River (4110002040)	0.021	Brandywine Creek	1	89.1	HHEI 39	Immature forest, wetland, shrub, old field
Stream 05-10b Tributary to Brandywine Creek	041°16'10.78"N 081°30'11.52"W	Perennial stream, 3.5' x 6" channel. 134' impacted - relocate	Cuyahoga River (4110002040)	0.023	Brandywine Creek	1	89.1	HHEI 36 PHWH	Immature forest, shrub, old field, wetland
Stream 05-#2a Tributary to Brandywine Creek	041°16'22.63"N 081°30'12.66"W	Perennial stream, clay/gravel substrate. Redirected natural stream. 2x 6" channel. 45' impacted - culvert extension	Cuyahoga River (4110002040)	0.1	Brandywine Creek	1	8.6	HHEI 23 PHWH	Immature forest, shrub, old field
Stream 05-#2b Tributary to Brandywine Creek	041°16'23.00"N 081°30'11.60"W	Perennial stream, gravel/clay substrate. 2.5x 6" channel. 27' impacted - culvert extension	Cuyahoga River (4110002040)	0.3	Brandywine Creek	1	8.6	HHEI 24 PHWH	Immature forest, shrub, old field

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404/401 Table A. Streams Affected by the Proposed Project

Site/Feature	USGS Coordinate	Description of Stream	Total Length Impacted (miles)	Impacted Stream Miles	Brandywine Creek	HHEI 20 PHWH Class I	GHBI Score for Use Determination of HHEI Score
Stream 05-#4 Tributary to Brandywine Creek	041°16'28.84"N 081°30'13.40"W	Perennial stream, silt channel flowing alongside of highway into a wetland. 3'x 6" channel. 64' impacted - replace 27" culvert with longer 30" pipe	Cuyahoga River (4110002040)	0.053		30.1	Immature forest, shrub, old field
Stream 05-#5 Tributary to Brandywine Creek	041°16'29.40"N 081°30'11.93"W	Perennial stream, sinuous gravel channel. 5'x 12" channel. 64' impacted - replace 27" culvert with longer 30" pipe	Cuyahoga River (4110002040)	0.2	Brandywine Creek	1.1	30.6
Stream 05-#6 Tributary to Brandywine Creek	041°16'34.67"N 081°30'14.22"W	Perennial stream, sprawling stream through a forest. 2'x 6" channel. 34' impacted - replace 18" culvert with longer 24/30" pipe	Cuyahoga River (4110002040)	0.1	Brandywine Creek	1.4	17.9
Stream 05-#7 Tributary to Brandywine Creek	041°16'35.66"N 081°30'12.66"W	Perennial stream, gravel channel draining from SR8 into a wetland. 2.5'x 6" channel. 533' impacted - relocate captured stream; replace/extend culverts (24"/30" pipes)	Cuyahoga River (4110002040)	1.4	Brandywine Creek	1.2	17.9
							HHEI 50 PHWH Class II Modified
							Mature forest

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Stream Number	Latitude Longitude	Description of Stream Being Impacted	Total Length Impacted	Mean Annual Flow (cfs)	Mean Annual Discharge (MWH)	Mean Annual Suspended Sediment (tonnes/yr)	Mean Annual Dissolved Solids (mg/l)	Mean Annual TDS (mg/l)	Mean Annual TSS (mg/l)	Mean Annual Dissolved Oxygen (mg/l)	Mean Annual Specific Conductance (µmho/cm)	Mean Annual pH	Mean Annual Dissolved Oxygen (mg/l)	Mean Annual Specific Conductance (µmho/cm)	Mean Annual pH	Mean Annual Dissolved Oxygen (mg/l)	Mean Annual Specific Conductance (µmho/cm)	Mean Annual pH
Stream 99-8 Brandywine Creek	041°16'56.88"N 081°30'19.05"W	Perennial stream, cobble channel next to junkyard. 4.5'x16" channel. 69' impacted - replace 36" culvert with longer 48" pipe	Cuyahoga River (4110002040)	0.6	Brandywine Creek	0.037	76.8	HHEI 56 PHWH Class II modified	Commercial lawn and industrial use									
Stream 05-#11a Tributary to Brandywine Creek	041°17'18.54"N 081°30'34.38"W	Perennial stream next to utility access. 1.5'x 6" channel. 87' impacted - replace 38"x 60" culvert with longer 72" x 44" pipe	Cuyahoga River (4110002040)	0.121	Brandywine Creek	0.095	147	HHEI 15 PHWH Class I	SR 8 ROW, urban, wetland									
Stream 05-#11b Tributary to Brandywine Creek	041°17'17.42"N 081°30'31.18"W	Perennial stream, cobble channel in wooded wetland. 5'x12" channel. 95' impacted - replace 38" x 60" culvert with longer 72" x 44" pipe	Cuyahoga River (4110002040)	0.133	Brandywine Creek	0.057	149	HHEI 66 PHWH Class III	Mature forest, wetland									
Stream 99-6/b/c Brandywine Creek	041°17'39.64"N 081°30'43.55"W	Perennial stream, Brandywine Creek. 23x 30" channel. 689' impacted - Channelized urban stream. Bridge/bridge extension; bank stabilization	Cuyahoga River (4110002040)	8.5	Cuyahoga River	4.1	11456	QHEI 47/44.5 MWH	Forested and shrub area									
Stream 99-4 Tributary to Indian Creek (Indian Run Creek)	041°18'00.58"N 081°31'03.80"W	Perennial stream, 12x 24" channel. 71' impacted - extend 96" culvert; bank stabilization	Cuyahoga River (4110002040)	1.8	Indian Creek (Indian Run Creek)	0.038	128012	QHEI 30.5 MWH	Shrub field and residential lawn									

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404/401 Table B. Wetlands Affected by the Proposed Project

Site/ Feature Number	USGS Coordinate coordinate	Drainage Basin	Wetland Description	Covariance at 1979 Classification		OTI Category	Adjacent Land Use(s)
				OTI Score	OTI Category		
C-15W1	041°15'09.90"N 081°30'01.04"W	Cuyahoga River (4110002040)	Emergent wetland depression with scrub-shrub margin, adjacent	PEM	39.5	Mod 2	0.49 (0.384) Scrub-shrub, young second growth forest, SR 8 ROW
F-2W1	041°15'27.34"N 081°30'16.39"W	Cuyahoga River (4110002040)	Emergent wetland depression, adjacent	PEM	16	1	0.028 (0.028) Forested area with small wetlands surrounded by scrub- shrub and residential/commercial/ disturbed areas
F-2W2	041°15'27.41"N 081°30'17.62"W	Cuyahoga River (4110002040)	Emergent wetland depression, adjacent	PEM	20	1	0.237 (0.054) Forested area with small wetlands surrounded by scrub- shrub and residential/commercial/ disturbed areas
J-1	041°16'01.84"N 081°30'11.11"W	Cuyahoga River (4110002040)	Emergent riverine wetland, adjacent	PEM	18.5	1	0.24 (0.114) Residential/commercial /disturbed area with highway to the east
J-2	041°16'01.84"N 081°30'11.11"W	Cuyahoga River (4110002040)	Scrub-shrub riverine wetland, adjacent	PSS	18.5	1/2	0.209 (0.209) Residential/commercial /disturbed area with highway to the east
							Immediately adjacent north of Stream 99- 12c

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404/401 Table B. Wetlands Affected by the Proposed Project

Site Number	USCE Coordinates	Wetland Type	Covered by Stream	Length (ft)	Width (ft)	Area (acres)	Description
J-4	041°16'05.19"N 081°30'11.68"W	Cuyahoga River (4110002040)	Scrub-shrub riverine wetland, adjacent	PSS	32.5	1/2	0.93 (0.040) Small wetlands with forested area to the north, residential/commercial/ disturbed area to the south and west, and highway to the east
J-5	041°16'09.41"N 081°30'11.84"W	Cuyahoga River (4110002040)	Scrub-shrub riverine wetland, adjacent	PSS	59	2	1.34 (0.117) Small wetlands with forested area to the east, residential/commercial/ disturbed area to the west and north, and highway to the south
J-16	041°16'36.53"N 081°30'15.23"W	Cuyahoga River (4110002040)	Emergent wetland depression, adjacent	PIM	18	1	1.657 (0.005) Forested area to the south, residential/commercial/ disturbed area to the north and west and highway to the east
M-2	041°17'08.36"N 081°30'29.13"W	Cuyahoga River (4110002040)	Scrub-shrub depressional wetland, adjacent	PSS	28	1	0.09 (0.09) Scrub-shrub to the north and otherwise surrounded by residential/commercial/ disturbed areas
M-2A2	041°17'12.89"N 081°30'31.50"W	Cuyahoga River (4110002040)	Forested depressional wetland, adjacent	PFO	44	2	5.77 (0.250) Scrub-shrub to the north and otherwise surrounded by residential/commercial/ disturbed areas
							Centered between Wetlands M2 and M2-A1

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404/401 Table B. Wetlands Affected by the Proposed Project

Line	USGS Coordinate	Wetland Type/Location	Wetland Classification	Area Acres	Length ft.	Width ft.	Description
05-11sa	041°17'13.14"N 081°30'29.21"W	Cuyahoga River (4110002040)	Palustrine emergent depressional wetland, adjacent	PEM	24	1	1.18 (0.198) Forested area with small wetlands, residential/commercial/ disturbed areas to the north and south with highway to the west
05-11s	041°17'16.68"N 081°30'30.93"W	Cuyahoga River (4110002040)	Palustrine emergent depressional wetland, adjacent	PEM	29	1	4.07 (0.464) Forested area with small wetlands, residential/commercial/ disturbed areas to the east and south with highway to the west
05-C12	041°14'59.48"N 081°29'56.12"W	Cuyahoga River (4110002040)	Wet depression, adjacent	PSS/PEM	29	1	0.136 (0.136) Scrub-shrub, young forested area, SR 8
C-15W2	041°14'54.57"N 081°29'54.32"W	Cuyahoga River (4110002040)	Scrub-shrub swale, wet depression, adjacent	PSS	33	Mod 2	0.100 (0.100) Scrub-shrub and forested area surrounded by residential/commercial/ disturbed areas
D-13	041°15'08.60"N 081°29'54.98"W	Cuyahoga River (4110002040)	Large wetland complex, wet depression, adjacent	PFO/PSS/PEM	56	2	21.02 (1.130) Wetland area with highway to the west and residential/commercial/ disturbed area to the east
F-4	041°15'26.75"N 081°29'11.11"W	Cuyahoga River (4110002040)	Small emergent wetland depression, adjacent	PEM	15	1	0.100 (0.100) Residential/commercial /disturbed area with forested areas to the north, south, and east
							50' SE of Stream 05-F

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404/401 Table B. Wetlands Affected by the Proposed Project

Site	Site Number	Location	Description	PSS/PEM/PFO	Area (ha)	Area (acres)	Description
K-1A	041°15'51.98"N 081°30'15.29"W	Cuyahoga River (4110002040)	Large wetland complex, riverine, adjacent		59	2	28.29 (0.030) Forested area with small wetlands interspersed with residential/commercial/ disturbed areas
K-3	041°5'44.16"N 081°29'46.90"W	Cuyahoga River (4110002040)	Forested wetland, riverine, adjacent	PFO	44	2	0.44 (0.096) Forested area with residential/commercial/ disturbed area to the south
K-5	041°16'10.65"N 081°30'10.05"W	Cuyahoga River (4110002040)	Large scrub-shrub wetland, riverine, adjacent	PSS	48	2	65.42 (0.063) Forested area
K-10	041°16'06.62"N 081°29'58.20"W	Cuyahoga River (4110002040)	Small, forested wetland, riverine, adjacent	PFO	42.5	Mod 2	0.49 (0.070) Forested area with residential/commercial/ disturbed area to the west
K-12	041°16'06.25"N 081°29'52.14"W	Cuyahoga River (4110002040)	Forested depressional wetland, adjacent	PFO	25.5	1	0.09 (0.008) Forested area with residential/commercial/ disturbed area to the west

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404/401 Table B. Wetlands Affected by the Proposed Project

Site# Feature	USGS Coordinate	Drainage Basin	Wetland Description	Covering Classification	Open Water Surface Area (Acres)	Open Water Surface Area (Hectares)	Wetland Surface Area (Acres)	Wetland Surface Area (Hectares)	Wetland Surface Area (Acres)	Wetland Surface Area (Hectares)
M-2A1	041°17'17.11"N 081°30'34.13"W	Cuyahoga River (4110002040)	Scrub-shrub depressional wetland, adjacent	PSS	25.5	1	2.90 (0.099)	Scrub-shrub to the east and otherwise surrounded by residential/commercial/ disturbed areas	20' S of Wetland M2- A2, Wetland 05-11sa is 200' east across SR8	
N-6/8	041°17'21.08"N 081°30'32.98"W	Cuyahoga River (4110002040)	Forested depressional wetland complex, adjacent	PFO	41	2	8.70 (0.540)	Wetland areas with forest to the south and east and residential/commercial/ disturbed area/highway to the west	Adjacent to Brandywine Creek on the east, Stream 05-#11b is 100' S	
M-4/4A	041°17'34.05"N 081°30'43.55"W	Cuyahoga River (4110002040)	Emergent depressional wetland, adjacent	PEM	19.5	1	2.01 (0.903)	Interspersed scrub, forest, and residential/commercial/ disturbed areas	350' W of Stream 99-6b	
M-5/6	041°17'42.33"N 081°30'50.77"W	Cuyahoga River (4110002040)	Forested depressional wetland, adjacent	PFO	44	Mod 2	12.97 (5.387)	Forested/wetland area surrounded by residential/commercial/ disturbed areas	50' E of Stream 99-6c	
M8	041°17'52.33"N 081°31'05.03"W	Cuyahoga River (4110002040)	Forested depressional wetland, adjacent	PFO	39	Mod 2	3.29 (1.171)	Forested/wetland area surrounded by residential/commercial/ disturbed areas	400' SE of Indian Creek (Indian Run Creek)	
O-1	041°18'01.46"N 081°31'11.92"W	Cuyahoga River (4110002040)	Forested floodplain wetland	PFO	52	2	5.33 (1.694)	Small area of interspersed forest and wetlands surrounded by residential/commercial/ disturbed area	100' east of Stream 99-4	

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404/401 Table B. Wetlands Affected by the Proposed Project

Site #	WCS Location	Description	Location Reference	Wetland Type	Area (acres)	Owner	Other Information	Adjacency Comments
F-3W3	041°15'26.66"N 081°30'14.40"W	Cuyahoga River (4110002040)	Small vegetated drainage ditch, adjacent	PEM	26	1	0.230 (0.230)	Forested area with small wetlands surrounded by scrub- shrub and residential/commercial/ disturbed areas
05-1	041°16'12.20"N 081°30'12.27"W	Cuyahoga River (4110002040)	Scrub-shrub wet depression, adjacent	PEM	26.5	1	0.045 (0.045)	Small wetlands with forested area to the north, commercial area to the south and west, and highway to the east
O-4	041°18'13.33"N 081°31'07.68"W	Cuyahoga River (4110002040)	Depressional palustrine emergent wetland, adjacent	PEM	16	1	2.59 (0.691)	Mown field in the center of a highway loop

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404/401 Table C. Nature of Proposed Activities by Impacted Feature for the Preferred Alternative

Site/ Feature	Station/ Centreline Loc.	Approximate Station location	Proposed Structure or Action	Existing Channel/Stream Structure/Type/Location			Proposed Channel/Stream Structure/Type/Location			
				Length of Channel/ Ditchbed	Volume CFS	Acre-ft	Length of Channel/ Ditchbed	Volume CFS	Acre-ft	
Stream 05-15 Tributary to Brandywine Creek	369+00	041°14'59.48"N 081°29'56.12"W	New 48" culvert	58	1	4	Standard Roadfill: 6.6 Rock Channel Protection: 0.3	20	0	0
Stream 99-13 Tributary to Brandywine Creek	380+50	041°15'08.79"N 081°29'56.94"W	Relocate culvert/stream. Replace 36" pipe with 48" culvert	495	0	0	Standard Roadfill: 73.3	225	0	0
Stream 05-F Tributary to Brandywine Creek	upper road 33+90	041°15'26.54"N 081°30'15.07"W	New 24" culvert/channel	337	0	0	Standard Roadfill: 14.5	115	0	0
Stream 99-12c Tributary to Brandywine Creek	upper road 55+00	041°15'56.63"N 081°30'10.45"W	Fill/relocate captured stream	312	0	0	Standard Roadfill: 14.4	90	0	0
Stream 99-14a/b Tributary to Brandywine Creek	lower access 14+70	041°16'01.91"N 081°29'56.12"W	Fill/relocate meandering stream along service road	508	14	5	Standard Roadfill: 93.2 Rock Channel Protection: 0.8	85	0	0

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404/401 Table C. Nature of Proposed Activities by Impacted Feature for the Preferred Alternative

Stream Number	Location	Existing Stream Name	Proposed Stream Name	Activity	Length (ft)	Width (ft)	Depth (ft)	Volume (cu ft)	Duration (days)	Standard Roadfill (ft)	Rock Channel Protection (ft)	Notes
Stream 99-14c	lower access 17+50	041°16'04.39"N 081°29'56.53"W	Fill/relocate headwater stream	138	3	5			35	0	0	
Tributary to Brandywine Creek												
Stream 99-11b	439+00	041°06'05.44"N 081°30'09.55"W	Replace 65"x40" pipe w/longer 60"x38" pipe	77	3	4			Standard Roadfill: 7.8 Rock Channel Protection: 0.7	20	0	
Tributary to Brandywine Creek												
Stream 99-11a	438+70	041°16'05.57"N 081°30'11.27"W	Replace 65"x40" pipe w/longer 60"x38" pipe	76	1	6			Standard Roadfill: 8.2 Rock Channel Protection: 1.8	20	0	
Tributary to Brandywine Creek												
Stream 99-10a	443+50	041°16'10.57"N 081°30'10.16"W	Replace 24" culvert with 27" pipe	78	12	52			Standard Roadfill: 5.6	20	0	
Tributary to Brandywine Creek												
Stream 99-10b	443+50	041°16'10.65"N 081°30'10.04"W	Culvert extension	52	1	6			Standard Roadfill: 2.2 Rock Channel Protection: 0.7	4	0	
Tributary to Brandywine Creek												

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404/401 Table C. Nature of Proposed Activities by Impacted Feature for the Preferred Alternative

Stream	Site Feature	Centerline loc.	Approximate Section Location	Proposed Feature Action	Existing Channel Configuration & Condition	Existing Channel Configuration & Condition	Existing Channel Configuration & Condition
				Excavation below 0 ft	0 ft below CHW	Length of Channel Disrupted	Length of Channel Disrupted
				Volume (cu yd)	Volume (cu yd)	Width (ft)	Width (ft)
				Yardage (cu yd)	Yardage (cu yd)	Length (ft)	Length (ft)
				20	12	11	10
Stream 5-10a Tributary to Brandywine Creek	442+10	041°16'09.97"N 081°30'11.60"W	Culvert extension			Standard Roadfill: 2.2	
Stream 5-10b Tributary to Brandywine Creek	433+50	041°16'10.78"N 081°30'11.52"W	Relocate	134	0	0	0
Stream 5-#2a Tributary to Brandywine Creek	450+50	041°16'22.63"N 081°30'12.66"W	Culvert extension	45	3	6	Standard Roadfill: 8.7
Stream 5-#2b Tributary to Brandywine Creek	450+40	041°16'23.00"N 081°30'11.60"W	Culvert extension	27	2	5	Standard Roadfill: 1.8 Rock Channel Protection: 0.7
Stream 5-#4 Tributary to Brandywine Creek	463+90	041°16'28.84"N 081°30'13.40"W	Replace 27" culvert with longer 30" pipe	64	9	0	Standard Roadfill: 2.0 Rock Channel Protection: 0.7
						11	0

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404/401 Table C. Nature of Proposed Activities by Impacted Feature for the Preferred Alternative

Site Number	Location	Proposed Activity	Number of Impacted Features	Length of Impacted Features (ft)	Roadfill (ft)	Rock Channel Protection (ft)	Standard Roadfill (ft)	Standard Roadfill (ft)	Standard Roadfill (ft)
Stream 05-#5 Tributary to Brandywine Creek	464+10	041°16'29.40"N 081°30'11.93"W	Replace 27" culvert with longer 30" pipe	64	1	3	Standard Roadfill: 10.0 Rock Channel Protection: 1.8	21	0
Stream 05-#6 Tributary to Brandywine Creek	468+40	041°16'34.67"N 081°30'14.22"W	Replace 18" culvert with longer 24/30" pipe	34	9	0	Standard Roadfill: 1.1	6	0
Stream 05-#7 Tributary to Brandywine Creek	468+40	041°16'35.66"N 081°30'12.66"W	Relocate captured stream; replace/extend culverts (24/730" pipes)	533	11	2	Standard Roadfill: 22.9 Rock Channel Protection: 1.8	5	0
Stream 99-8 Brandywine Creek		041°16'56.88"N 081°30'19.05"W	Replace 36" culvert with longer 48" pipe	69	109	17	Standard Roadfill: 10.3 Rock Channel Protection: 4.1	30	0
Stream 05#11a Tributary to Brandywine Creek		041°17'18.54"N 081°30'34.38"W	Replace 38"x60" culvert with longer 72"x44" pipe	87	87	1	Standard Roadfill: 2.6 Rock Channel Protection: 0.3	2	0

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Stream	Stream Name	Approximate Section Location	Existing Structure Condition	Proposed Structure Condition	Excavation Depth (ft.)	Fill Depth (ft.)	Bank Protection	Volume (cu. yds.)	Volume (cu. yds.)	Wadings
Stream 05#11b Tributary to Brandywine Creek		041°17'17.42"N 081°30'31.18"W	Replace 38"x60" culvert with longer 72"x44" pipe	95	95	12	Standard Roadfill: 17.2 Rock Channel Protection: 0.4	37	0	0
Stream 99-6b/c Brandywine Creek		041°17'39.64"N 081°30'43.55"W	Bridge/bridge bank extension; bank stabilization	689	689	26	Standard Roadfill: 0.0 Rock Channel Protection: 51.0	14	0	0
Stream 99-4 Tributary to Indian Creek (Indian Run Creek)		041°18'00.58"N 081°31'03.80"W	Extend 96" culvert; bank stabilization	71	32	4	Standard Roadfill: 0.9 Rock Channel Protection: 8.9	23	0	0

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Affected Feature		Description	Total Area Impacted	Proposed Duration	Direct Impacts on Water Quality	Indirect Impacts on Water Quality
05-C12	041°14'59.48""N 081°29'56.12""W	Wet depression, adjacent	0.136	Road embankment drainage with rock protection	0	104.9
C-15W1	041°15'09.90""N 081°30'01.04""W	Emergent wetland depression with scrub-shrub margin, adjacent	0.384	Fill for highway embankment	16	587.3
C-15W2	041°14'54.57""N 081°29'54.32""W	Scrub-shrub swale, wet depression, adjacent	0.100	Fill for highway embankment	0	156.5
D-13	041°15'08.60""N 081°29'54.98""W	Large wetland complex, wet depression, adjacent	1.130	Fill for highway embankment	0	1,310.0
F2-W1	041°15'27.34""N 081°30'16.39""W	Emergent wetland depression, adjacent	0.028	Fill for highway embankment	0	14.5
F2-W2	041°15'27.41""N 081°30'17.62""W	Emergent wetland depression, adjacent	0.054	Fill for highway embankment	0	87.1
F-3W3	041°15'26.66""N 081°30'14.40""W	Small vegetated drainage ditch, adjacent	0.230	Fill for highway embankment	0	0
F-4	041°15'26.78""N 081°30'11.11""W	Small emergent wetland depression, adjacent	0.100	Fill for highway embankment	0	114.5

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Wetlands	Location	Description of Impacted Action	Estimated Volume (Acres)	Estimated Volume (Cubic Yards)	Estimated Volume (Cubic Yards) (minus) areas
J-1	041°16'01.84"N 081°30'11.11"W	Emergent riverine wetland, adjacent	0.114	Fill for highway embankment	0
J-2	041°16'01.84"N 081°30'11.11"W	Scrub-shrub riverine wetland, adjacent	0.209	Fill for highway embankment	0
K-1A	041°15'51.98"N 081°30'15.29"W	Large wetland complex, riverine, adjacent	0.030	Fill for highway embankment	0
05-1	041°16'12.20"N 081°30'12.27"W	Scrub-shrub wet depression, adjacent	0.045	Fill for highway embankment	1,547
J-4	041°16'05.19"N 081°30'11.68"W	Scrub-shrub riverine wetland, adjacent	0.040	Fill for highway embankment	0
J-5	041°16'09.41"N 081°30'11.84"W	Scrub-shrub riverine wetland, adjacent	0.117	Fill for highway embankment	0
K3	041°15'44.16"N 081°29'46.90"W	Forested wetland, riverine, adjacent	0.096	Fill for highway embankment	0
K5	041°16'10.65"N 081°30'10.05"W	Large scrub/shrub wetland, riverine, adjacent	0.063	Fill for highway embankment	0

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Location	Description	Area (ha)	Volume (m³)	Chalk mined (t/ha)	Chalk mined (t/ha)
K-10	041°16'06.62"N 081°29'58.20"W	Small, forested wetland, riverine, adjacent	0.070	Fill for highway embankment	0
K-12	041°16'06.25"N 081°29'52.14"W	Forested depressional wetland, adjacent	0.008	Fill for highway embankment	0
J-16	041°16'36.53"N 081°30'15.23"W	Emergent wetland depression, adjacent	0.005	Fill for highway embankment	0
M-2	041°17'08.36"N 081°30'29.13"W	Scrub-shrub depressional wetland, adjacent	0.090	Fill for highway embankment	0
05-11sa	041°17'13.14"N 081°30'29.21"W	Palustrine emergent depressional wetland, adjacent	0.198	Fill for highway embankment	0
M-2A2	041°17'12.89"N 081°30'31.50"W	Forested depressional wetland, adjacent	0.250	Fill for highway embankment	0
05-11s	041°17'16.68"N 081°30'30.93"W	Palustrine emergent depressional wetland, adjacent	0.464	Fill for highway embankment	0
M-2A1	041°17'17.11"N 081°30'34.13"W	Scrub-shrub depressional wetland, adjacent	0.099	Fill for highway embankment	0

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Feature Number	Location	Description of Impact	Type of Proposed Action	Impacted Watershed		Construction Limits		Excluded Watershed		Construction Limits	
				Volume Estimated Filled (cu. yds.)							
N-6/8	041°17'21.08"N 081°30'32.98"W	Forested depressional wetland complex, adjacent	0.540 Fill for highway embankment	0	871.2	0.540	0	0	0	0	93.8
M-4/4A	041°17'34.05"N 081°30'43.55"W	Emergent depressional wetland, adjacent	0.903 Fill for highway embankment	0	1,289.1	0.799	0.104	0.104	0	0	55.0
M-5/6	041°17'42.33"N 081°30'50.77"W	Forested depressional wetland, adjacent	5.387 Fill for highway embankment	595	8,691.0	5.387	0	0	0	0	58.5
M-8	041°17'52.33"N 081°31'05.03"W	Forested depressional wetland, adjacent	1.171 Fill for highway embankment	20	1,889.2	1.171	0	0	0	0	64.4
O-1	041°18'01.46"N 081°31'11.92"W	Forested floodplain wetland	1.694 Fill for highway embankment	0	2,733.0	1.694	0	0	0	0	68.2
O-4	041°18'13.33"N 081°31'07.68"W	Depressional palustrine emergent wetland, adjacent	0.691 Fill for highway embankment	80	1,114.8	0.691	0	0	0	0	73.3

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Table C: Nature of Proposed Activities by Impacted Feature for the Preferred Alternative

* The figures quoted for the area of stream filled, the area of wetland filled, and the area of total fill include the area quantifies quoted under examination (IBS 9/8/05).