TOWN OF HERNDON, VIRGINIA
WORK SESSION AGENDA
HERNDON POLICE DEPARTMENT – COMMUNITY ROOM
397 HERNDON PARKWAY
January 18, 2022
7:00 PM

CALL TO ORDER

1. Roll Call & Determination of Quorum

PUBLIC HEARINGS

2. Ordinance 22-O-03, to amend and reenact Chapter 42 (MOTOR VEHICLES AND TRAFFIC), Article I (Definitions), Article IV (Stopping, Standing, Parking), and Article V (Vehicles), with regard to parking on town streets and towing
3. Resolution 22-G-03, to consider Special Exception application SE #21-03, 1315 and 1317 Monroe Street, to allow the placement of fill in order to construct two new single-family dwellings on two existing single-family lots within the FPO, Floodplain Overlay District

GENERAL

4. Resolution 22-G-04, to provide to the Town Manager, Town Council Guidance on the FY 2023 Budget
5. Resolution 22-G-05, to Award a Contract for Planning, Architectural and Engineering Services for the planning of the Transit-Related Small Area Plan, RFP #22-05
6. Resolution 22-G-06, authorizing an application to the Regional Jurisdiction and Agency Coordinating Committee (RJACC) of the Northern Virginia Transportation Authority (NVTA) for federal Regional Surface Transportation Program (RSTP) transportation funding for fiscal year 2028
7. Resolution 22-G-07, to award Contract #B-22-06, Herndon Parkway & Van Buren Street Intersection Improvement Project

CONSENT

8. Resolution 22-G-08, to reappoint Jeffrey J. Fairfield as the Town of Herndon representative to the Phase II Dulles Rail Transportation Improvements Tax District Advisory Board
9. Resolution 22-G-09, to ratify an Extension of Sublicense pursuant to Ordinance 20-O-23 Continuity of Governmental Operations, as amended, between Town of Herndon and Arts Herndon, Inc., to extend the expiration date to June 30, 2022

10. Resolution 22-G-10, to ratify a Lease Agreement pursuant to Ordinance 20-O-23, Continuity of Governmental Operations, as amended, between the Town and the Honorable Irene Shin, Member of the House of Delegates, for space at 397 Herndon Parkway
11. Resolution 22-G-11, to ratify an Extension of Sublicense pursuant to Ordinance 20-O-23 Continuity of Governmental Operations, as amended, between Town of Herndon and The Elden Street Players to extend the expiration date to June 30, 2022

DISCUSSION

12. Town of Herndon Diversity, Equity, and Inclusion Committee – Town Manager

ROUNDTABLE

TOWN OF Herndon
OFFICE OF THE TOWN ATTORNEY

STAFF REPORT

Town Council – Work Session
January 18, 2022

Title:

Ordinance, to amend and reenact Chapter 42 (MOTOR VEHICLES AND TRAFFIC), Article I (Definitions), Article IV (Stopping, Standing, Parking), and Article V (Vehicles), with regard to parking on town streets and towing.

Staff Contact:

Maggie A. DeBoard, Chief of Police
(703) 435-6895
Maggie.deboard@herndon-va.gov

Lesa J. Yeatts, Town Attorney
(703) 787-7370
lesa.yeatts@herndon-va.gov

Background:

Parking issues and concerns in the Town have grown over the past several years resulting in quality-of-life complaints and safety concerns. The Town has taken action beginning in 2017 to address some of these concerns:

Recent Amendments to Town Parking Ordinances

- §42-63 Parking Enforcement Program 2017
  - Parking Enforcement Official
  - Ticketing Device
- §42-209 Residential Parking Permit Program 2017-2018
- §42-152 Proposed Amendment to Chapter 42 regarding parking too close to driveways August 2021 (Tabled)

It became apparent around the same time that many provisions of the Town parking code needed to be updated to address now significant disparities between the ordinances of the Town and the two adjourning counties, resulting in a significant number of long-term parking, abandoned vehicles and commercial vehicles being parked on our streets that are illegal to park in our neighboring jurisdictions.

In 2019 the Town undertook study and evaluation of parking issues in the town:

Study and Evaluation of Parking Issues

- Information gathered 2019 – early 2020
- Covid 19 postponed effort
- Resumed study and discussion in early 2021
- Issues and solutions identified for amendment April 2021 (Memorandum provided to Council)
- Strategic Planning Meeting Item brought by Councilmember Regan on December 2, 2021
- Parking Improvements Discussion for direction - December 7, 2021 Work Session

Description:

The proposed amendments in the draft Ordinance presented are intended to address the parking issues identified by Staff and as discussed with Town Council and to address other necessary housekeeping amendments in Chapter 42.

Both Fairfax and Loudoun County have placed restrictions on the type of vehicle that can park in residential areas and on public streets, as well as identifying specific locations where vehicles are restricted from parking. In addition, lack of town code language effectively addressing abandoned and inoperable vehicles, parking a sufficient distance from private driveways, and blocking curb ramps have created unsafe conditions for both drivers and pedestrians.

The recommended amendments will make the Town's parking code more consistent with both Fairfax and Loudoun County. This will not only address safety issues but prevent both residents and non-residents from using our public streets to park vehicles here that are illegal to park elsewhere.

- 42.1(b) Amends and clarifies the definition of a commercial vehicle and defines a utility trailer.
- 42-152(b) Prohibits parking in front of or within 10 feet of a driveway
- 42-152(b) Prohibits parking so as to prevent the use of curb ramps.
- 42-160 Adds and prohibits the parking of recreational vehicles in residential zones.
- Article V. Amendments address the definition of an abandoned or inoperable motor vehicle, procedures for removal, and payment of fines.

Fiscal Impact:

None identified.

Staff Recommendation:

The Mayor and Town Council approve the draft ordinance as proposed.

Attachments:

1. Ordinance.
2. April 26, 2021 Memo

Prepared and Approved by:

Maggie DeBoard
Maggie A. DeBoard, Chief of Police

Lesa J. Yeatts
Lesa J. Yeatts, Town Attorney

TOWN OF HERNDON, VIRGINIA

ORDINANCE

JANUARY 25, 2022

Ordinance – to amend and reenact Chapter 42 (MOTOR VEHICLES AND TRAFFIC), Article I (Definitions), Article IV (Stopping, Standing, Parking), and Article V (Vehicles), with regard to parking on town streets and towing.

BE IT ORDAINED by the Town Council of the Town of Herndon, Virginia, that:

1. The following sections or provisions of the Herndon Town Code (2000), are amended and reenacted as follows:

CHAPTER 42 (MOTOR VEHICLES AND TRAFFIC)

Article I. In General

Sec. 42-1. Definitions.

***

(b) These terms shall convey these respective meanings.

Areas zoned for residential use. All areas of the town which have been zoned to a zoning classification which permits one or more residential dwelling units. The zoning boundaries shall be used in the enforcement of the requirements of this chapter. However, in any case in which a street serves as the boundary between an area zoned for residential use and an area zoned for another use, then the centerline of that street shall be considered as the boundary between the area zoned for residential use and the area zoned for another use.

Commercial vehicle.

(1) Any solid waste collection vehicle, tractor truck or tractor truck/semitrailer or tractor truck/trailer combination (or any part thereof), dump truck, concrete mixer truck, towing and recovery vehicle, box type truck, flatbed truck **with a registered gross weight of 12,000 pounds or more**, ~~or~~ **and any** heavy construction equipment, whether located on private property or on a truck, trailer, or semitrailer;

(2) Any trailer, semitrailer, or other vehicle in which food or beverages are stored or sold;

(3) Any trailer or semitrailer used for transporting landscaping or lawn-care equipment whether or not such trailer or semitrailer is attached to another vehicle;

(4) Any taxicab;

(5) Any motor vehicle licensed by the Commonwealth for use as a common or contract carrier or as a limousine;

(6) Any ~~truck with a registered gross weight, or gross vehicle weight rating as defined in § 46.2-341.4, Code of Virginia, of 10,000 or more pounds;~~ **vehicle more than 21 feet in length or more than eight feet in height including appurtenances attached to the vehicle, or with a width of 102 inches or more, or with a gross weight of 12,000 or more pounds, other than: commercial vehicles used by a public service company, as defined in the Code of Virginia § 56-1 or by others working on its behalf; boat and recreational vehicles as defined in Code of Virginia § 46.2; school buses used on a current and regular basis to transport students; clearly marked privately owned vehicles displaying accessible parking placards or license plates, not for hire, driven by or used for transport of persons with disabilities; commercial vehicles used in the provision of cable television service as defined in the Code of Virginia § 15.2-2108.1; moving vehicles, within 48 hours of execution of the leasing contract; or commercial vehicles used in the provision of propane gas service;**

(7) Any other trailer, ~~or~~ semitrailer, ~~used for commercial purposes;~~ **or double axle utility trailer, regardless of whether a state safety inspection is required, except those designed to be used as a camper trailer or boat trailer or a single axle utility trailer, regardless of whether such trailer or semitrailer is attached to another vehicle; and**

(8) ~~Any motor vehicle or vehicle not described above, used for commercial purposes, and bearing on its exterior a commercial sign; and~~ **Any vehicle with three or more axles.**

~~(9) Any pick-up truck, panel truck, or truck with attached, external ladder or equipment racks utilize for commercial purposes.~~

Highway. This term refers to public streets as defined in § 46.2-100, Va. Code. The Town Council may by ordinance specifically designate private streets as "highways" for the purpose of this chapter.

***Utility trailer*. A small non-motorized trailer which is generally pulled by a motorized vehicle and features an open-top rear cargo area.**

Sec. 42-3. - Adoption of state law.

(a) Pursuant to Code of Virginia, §§ 46.2-1313 and ~~1-13.39:2~~**1-220**, the provisions contained in Code of Virginia, title 46.2, **as amended,** and ~~in Code of Virginia,~~ **of Article 2 (**§ 18.2-266 et seq**.) of Chapter 7 of Title 18.2 and in effect on January 1, 2022**, including all procedural, substantive and penalty provisions relating to the operation of vehicles in this commonwealth are adopted~~,~~ **and** incorporated in this chapter by reference, made a part of this chapter as fully as if set forth in this section, and are made applicable within the town. **References therein to highway shall be deemed to refer to those ways or places defined as "Highway" in §46.2-100 of the Code of Virginia 1950, as amended whenever such ways or places are located in the town.** The incorporation by reference of these statutes shall not apply to those provisions, the violation of which constitutes a felony, or those provisions which are expressly inapplicable to towns.

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Article IV. Stopping, Standing, Parking

Division 1. Generally

Sec. 42-152. Parking prohibited; fines imposed.

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(b) Parking in the following manner or manners is unlawful:

(1) On or blocking a sidewalk $50.00

(2) ~~Blocking~~ **In front of, or within 10 feet to either side of** a public or private driveway 50.00

(3) Within an intersection or within 20 feet of an intersection 50.00

(4) Within 15 feet of a fire hydrant 50.00

(5) On or across a pedestrian crosswalk 50.00

(6) Within 20 feet of a crosswalk at an intersection 50.00

(7) Within 30 feet of the approach to any flashing beacon, stop sign or traffic control signal located at the side of a street 50.00

(8) Within 15 feet of the driveway entrance to any fire station or on the side of a street opposite the entrance to any fire station within 75 feet of the entrance when properly signposted 50.00

(9) On the roadway side of any vehicle parked at the edge or curb of a street, this violation being known as double parking 50.00

(10) In a restricted zone where such zone is marked by official signs 50.00

(11) In a marked fire lane 50.00

(12) At any place where town signs prohibit parking 50.00

(13) In any location or manner which operates to obstruct traffic, in violation of section 42-156(a) 50.00

(14) On the wrong side of the street (left wheel to curb) 50.00

(15) Across marked lines of a parking space 50.00

(16) Over or on top of the curb 50.00

(17) Within 15 feet on either side of a sign designating a bus stop 50.00

(18) Beyond the posted time or time allowed by a parking meter, or by other sign or device, this violation being known as overtime parking 50.00

(19) On any highway, or public street, or public alley, or on any publicly owned place open to the public for purposes of vehicular travel, without the display of a valid state license plate or valid state license plates, as required by law 50.00

(20) On any highway, or public street, or public alley, or on any publicly owned place open to the public for purposes of vehicular travel, without the display of a valid state vehicle safety inspection sticker, if required by law 50.00

(21) On any highway or public street or public alley or on publicly owned property, an inoperable motor vehicle 50.00

(22) Blocking a public or private alley 50.00

~~(23) For the purpose of selling any automobile, truck, trailer, or other vehicle, or for advertisement purposes, in violation of section 42-154 .....50.00~~ *(Repealed by Ordinance 19-O-19)*

~~(24)~~**(23)** A trailer, semitrailer, or both in any area of town zoned for residential use in violation of section 42-160 .....50.00

~~(25)~~**(24)** In a park in a manner inconsistent with posted signs or other than in designated parking areas in violation of section 50-49 .....50.00

~~(26)~~**(25)** In a park during other than daylight hours in violation of section 50-107 .....50.00

~~(27)~~**(26)** A commercial vehicle in an area zoned for residential use in violation of section 42-161 .....50.00

~~(28)~~**(27)** In a residential permit parking zone in violation of section 42-222 .....100.00

(28) So as to prevent the use of curb ramps located on public property or on privately owned property open to the public 50.00

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Sec. 42-160. Parking of trailers, semitrailers ~~or~~, boats or recreational vehicles in residential zones.

(a) No person shall park a trailer, semitrailer ~~or~~, boat **or recreational vehicle** on or alongside the roads, highways and streets in any area of the town zoned residential use; provided, however, that a trailer, semitrailer ~~or~~, a boat while on a trailer**, or recreational vehicle** may be parked on such street for the purpose of loading or unloading; ~~provided further, that~~ **but in no event shall** such trailer, semitrailer ~~or~~, boat while on a trailer ~~may~~**, or recreational vehicle** be temporarily parked for ~~necessary repairs for~~ a period ~~not to exceed~~ of **more than** 72 hours.

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Sec. 42-161. Parking commercial vehicles in areas zoned for residential use.

(a) ~~Except as provided below in this section,~~ ~~n~~**N**o person shall park any commercial vehicle on the roads, highways, or streets (street) in areas zoned for residential use in the town for a continuous period of more than two hours.

(b) One resident of each single-family detached or attached, multiple-family, ~~garden court,~~ or two-family dwelling unit in areas zoned for residential use may park per dwelling unit on the street with respect to and adjoining or adjacent to the dwelling unit of the resident one vehicle licensed as a taxicab or limousine ~~or one vehicle described in subparagraph (8), or one vehicle described in subparagraph (9) of the definition of commercial vehicle found in section 42-1~~, provided in all such cases other vehicles are permitted to park there.

(c) The use of the term "per dwelling unit" in this section means that the parking of commercial vehicles under this section shall not be aggregated with the parking of commercial vehicles on private property under the Zoning Ordinance [chapter 78].

(d) The provisions of this section shall not apply to a commercial vehicle ~~(i) when picking up or discharging passengers, (ii)~~**(i)** when temporarily parked pursuant to the performance of work or service at a particular location, or ~~(iii)~~**(ii)** when parked in a commercial office~~;~~**,** planned development, mixed use~~;~~**,** or neighborhood commercial zoning district**,** ~~with respect to and~~ adjoining or adjacent to a commercial use.

Article V. Vehicles

Division 2. Abandoned, Unattended or Immobile Vehicles

Subdivision II. Abandoned Vehicles

Sec. 42-261. Definitions.

The following words, terms and phrases, when used in this subdivision, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Abandoned motor vehicle means a motor vehicle, trailer or semitrailer that:

(1) **Weighs at least 75 pounds; and**

(2) Is left unattended on public property for more than 48 hours in violation of a state law or ~~local~~ **town** ordinance; or

(3) Has remained for more than 48 hours on private property without the consent of the property's owner, regardless of whether it was brought onto the private property with the consent of the owner or person in control of the private property; or

(4) Is left unattended on the shoulder of a highway for more than 48 hours.

Inoperable abandoned motor vehicle **as used in Sec. 42-265** means an abandoned motor vehicle which is inoperable and whose fair market value, as determined by the director of finance using the county assessment records and information, is less than the cost of its restoration to an operable condition.

Sec. 42-262. Abandoning motor vehicles **prohibited.**

No person shall cause any motor vehicle to become an abandoned motor vehicle as defined in section 42-261.

Sec. 42-263. - Notice to owner of vehicle taken into custody.

(a) ~~The town when it takes an abandoned motor vehicle into custody shall, within 15 days, by registered or certified mail, return receipt requested, notify the owner of record of the motor vehicle and all persons having security interests in the vehicle of record, that it has been taken into custody.~~

Any uniformed authorized law enforcement personnel finding an abandoned motor vehicle may remove it or have it removed.

(b) The town when it takes an abandoned motor vehicle into custody shall, within 15 days, by registered or certified mail, return receipt requested, notify the owner of record of the motor vehicle and all persons having security interests in the vehicle of record, that it has been taken into custody.

~~(b)~~**(c)** The notice shall:

(1) State the year, make, model, and serial number of the abandoned motor vehicle;

(2) Set forth the location of the facility where it is being held; and

(3) Inform the owner and any persons having security interests of their right to reclaim it within 15 days after the date of the notice after payment of all towing, preservation and storage charges resulting from placing the vehicle in custody.

~~(c)~~**(d)** The notice shall state that the failure of the owner or persons having security interests to reclaim the vehicle within the time provided shall constitute a waiver by the owner and all persons having any security interests of all right, title and interest in the vehicle and consent to the sale of the abandoned motor vehicle at a public auction.

~~(d)~~**(e)** If records of the state department of motor vehicles contain no address for the owner or no address of any person shown by the department's records to have a security interest, or if the identity and addresses of the owner and all persons having security interests cannot be determined with reasonable certainty, notice by publication once in a newspaper of general circulation in the area where the motor vehicle was abandoned shall be sufficient to meet all requirements of notice pursuant to this subdivision as to any person who cannot be notified pursuant to the foregoing provisions of this section. Notice by publication may contain multiple listings of abandoned motor vehicles. Any notice of this kind shall be within the time requirements prescribed by this section for notice by mail and shall have the same contents required for a notice by mail.

~~(e)~~**(f)** The consequences of failure to reclaim an abandoned motor vehicle shall be as set forth in a notice given in accordance with and pursuant to this section.

Subdivision III. Immobilized and Unattended Vehicles

Sec. 42-281. Definitions.

The following words, terms and phrases, when used in this subdivision, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Immobilized or unattended vehicles means a motor vehicle, trailer, semitrailer, or part thereof **weighing more than 75 pounds**, which is:

(1) Left unattended on a public highway or other public property and constitutes a traffic hazard;

(2) Illegally parked;

(3) Left unattended for more than ten days either on public property or on private property without the permission of the property owner, lessee or occupant;

(4) Immobilized on a public roadway by weather conditions or other emergency situation.

Sec. 42-282. ~~General regulations~~ Immobilized or unattended vehicles, prohibited; removal.

~~(a) No person shall leave any motor vehicle, trailer, semitrailer, or part or combination thereof, unattended on or adjacent to any roadway if it constitutes a hazard in the use of the highway.~~

~~(b) Any law enforcement officer may remove it or have it removed to a storage area for safekeeping and shall report the removal to the state department of motor vehicles and to the owner of the motor vehicle, trailer, semitrailer, or combination, as promptly as possible.~~

~~(c) Before obtaining possession of the motor vehicle, trailer, semitrailer, or combination, its owner shall pay to the parties entitled thereto all costs incidental to its removal or storage.~~

~~(d) In any violation of this section the owner of such motor vehicle, trailer, semitrailer, or part or combination of a motor vehicle, trailer or semitrailer shall be presumed to be the person committing the violation; however, this presumption shall be rebuttable by competent evidence.~~

~~(e) If any person convicted of violating this section fails or refuses to pay these costs or if the identity or whereabouts of the owner is unknown and unascertainable after a diligent search has been made or after notice to the owner at his address as indicated by the records of the state department of motor vehicles and to the holder of any lien of record with the department, against the motor vehicle, trailer, semitrailer or combination, the town may, after 30 days and after having the value of such motor vehicle, trailer, semitrailer, or combination, determined by three disinterested dealers, dispose of it by public or private sale.~~

~~(f) The proceeds from the sale shall be forthwith paid by him into the town treasury.~~

~~(g) If after the sale or other disposition of the motor vehicle, trailer, semitrailer, or combination, the ownership of a motor vehicle, trailer or semitrailer at the time of its removal is established satisfactorily to the town by the person claiming its ownership, the town shall pay him so much of the proceeds from the sale or other disposition of the motor vehicle, trailer, semitrailer, or combination, as remains after paying the costs of removal, storage, investigation of ownership, appraisal and sale.~~

(a) No person shall cause any motor vehicle, trailer, semitrailer, or part or combination thereof to be immobilized or unattended.

(b) Removal of immobilized or unattended vehicles as defined in 42-281 shall be carried out by or under the direction of a law enforcement officer, or other uniformed authorized law enforcement personnel.

(c) The removal of motor vehicles, trailers, semitrailers, and parts thereof, from private property shall only be upon the written request of the owner, lessee or occupant of the premises.

(d) The person at whose request the motor vehicle, trailer, semitrailer, or part of a motor vehicle, trailer or semitrailer, is removed from private property shall indemnify the town against any loss or expense incurred by reason of removal, storage or sale thereof.

(e) It shall be presumed that such motor vehicle, trailer, semitrailer, or part thereof is abandoned if it (i) lacks either a current license plate; or a current county, city or town license plate or sticker; or a valid state safety inspection certificate or sticker; and (ii) it has been in a specific location for four days without being moved. As promptly as possible, each removal shall be reported to Herndon Police Department Dispatch and to the owner of the motor vehicle, trailer, or semitrailer.

(f) As promptly as possible, each removal shall be reported to Herndon Police Department Dispatch and to the owner of the motor vehicle, trailer, or semitrailer.

(g) Before obtaining possession of the motor vehicle, trailer, semitrailer, or part thereof, the owner shall pay to the parties entitled thereto all costs incidental to its removal and storage and locating the owner. If the owner fails or refuses to pay the cost or if his identity or whereabouts is unknown and unascertainable after a diligent search has been made, and after notice to him at his last known address and to the holder of any lien of record with the office of the state department of motor vehicles against the motor vehicle, trailer, semitrailer, or part of a motor vehicle, trailer or semitrailer, the vehicle shall be treated as an abandoned vehicle under the provisions of subdivision II of this division.

~~**Sec. 42-283. Removal.**~~

~~(a) Removal of vehicles as defined in section 42-263 shall be carried out by or under the direction of a law enforcement officer.~~

~~(b) The removal of motor vehicles, trailers, semitrailers, and parts thereof, from private property shall only be upon the written request of the owner, lessee or occupant of the premises.~~

~~(c) The person at whose request the motor vehicle, trailer, semitrailer, or part of a motor vehicle, trailer or semitrailer, is removed from private property shall indemnify the town against any loss or expense incurred by reason of removal, storage or sale thereof.~~

~~(d) It shall be presumed that such motor vehicle, trailer, semitrailer, or part thereof is abandoned if it (i) lacks either a current license plate; or a current~~

~~county, city or town license plate or sticker; or a valid state safety inspection certificate or sticker; and (ii) it has been in a specific location for four days without being moved. As promptly as possible, each removal shall be reported to a local governmental office to be designated in the ordinance and to the owner of the motor vehicle, trailer, or semitrailer.~~

~~(e) As promptly as possible, each removal shall be reported to a local governmental office to be designated in the ordinance and to the owner of the motor vehicle, trailer, or semitrailer.~~

~~(f) Before obtaining possession of the motor vehicle, trailer, semitrailer, or part thereof, the owner shall pay to the parties entitled thereto all costs incidental to its removal and storage and locating the owner. If the owner fails or refuses to pay the cost or if his identity or whereabouts is unknown and unascertainable after a diligent search has been made, and after notice to him at his last known address and to the holder of any lien of record with the office of the state department of motor vehicles against the motor vehicle, trailer, semitrailer, or part of a motor vehicle, trailer or semitrailer, the vehicle shall be treated as an abandoned vehicle under the provisions of subdivision II of this division.~~

Division 3. Removal or Immobilization for Outstanding or Unpaid Parking Violations

Sec. 42-301. Conditions warranting removal.

Whenever there is found any motor vehicle, vehicle, or trailer parked upon a public street or highway or other public ground within the town against which there are three or more outstanding unpaid or otherwise unsettled parking violation notices, such motor vehicle, vehicle, or trailer may, under the direction of a ~~town police officer~~ **authorized law enforcement personnel**, be removed or conveyed, by towing or otherwise, to a place within the town or in an adjacent locality, designated by the police chief for the temporary storage of such motor vehicle, vehicle, or trailer. Alternatively, such motor vehicle, vehicle, or trailer may be immobilized in such manner as to prevent its removal or operation except by authorized ~~officers or members of the police department~~ **authorized law enforcement personnel.**

Sec. 42-302. Notice of immobilization.

It shall be the duty of the ~~police officer~~ **uniformed authorized law enforcement personnel** removing or immobilizing such motor vehicle, vehicle, or trailer or under whose direction such motor vehicle, vehicle, or trailer is removed or immobilized, to inform as soon as practicable the owner of record of the removed or immobilized motor vehicle, vehicle, or trailer of the nature and circumstances of the prior unsettled parking violation notices for which~~, or on account of which,~~ such motor vehicle, vehicle, or trailer was removed or immobilized. In any case involving immobilization of a motor vehicle, vehicle, or trailer under this division, there shall be placed on such motor vehicle, vehicle, or

trailer, in a conspicuous manner, a notice warning that such motor vehicle, vehicle, or trailer has been immobilized and that any attempt to move such motor vehicle, vehicle, or trailer might damage it.

Sec. 42-303. Repossession or release.

The owner of an immobilized motor vehicle, vehicle, or trailer, or other duly authorized person, shall be allowed 24 hours from the time of immobilization to repossess or secure the release of the motor vehicle, vehicle, or trailer. Failure to repossess or secure the release of the motor vehicle, vehicle, or trailer within this period may result in the removal of such motor vehicle, vehicle, or trailer to a storage area for safekeeping **under the direction of uniformed authorized law enforcement personnel.**

Sec. 42-304. - Payment of fines and costs.

The owner of such removed or immobilized motor vehicle, vehicle, or trailer or other duly authorized person, shall be permitted to repossess or to secure the release of such motor vehicle, vehicle, or trailer by payment of outstanding parking violation notices for which the motor vehicle, vehicle, or trailer was removed or immobilized, all reasonable costs incidental **to the** immobilization, removal and storage of the motor vehicle, vehicle, or trailer, and all reasonable costs incident to efforts to locate the owner of the motor vehicle, vehicle, or trailer. Should the owner fail or refuse to pay such fines and costs, or should the identity or whereabouts of the owner be unknown and unascertainable, the motor vehicle, vehicle, or trailer ~~maybe~~ **may be** sold in accordance with the procedures set forth in ~~subdivision II of division 2 of this article.~~**in Section 46.2-1213 of the Code of Virginia.**

2. This ordinance shall be effective on and after the date of its adoption.

TOWN OF
Herndon
OFFICE OF THE TOWN ATTORNEY

MEMORANDUM

To: Bill Ashton, Town Manager

From: Lesa J. Yeatts, Town Attorney LJY

Date: April 26, 2021

Subject: Council Initiative #14 – **Street Parking Issues**

As you know, the Herndon Police Department and the Town Attorney's office have been working on a comprehensive set of proposed town code amendments to address parking issues identified by the current and previous town Parking Enforcement Official which they had hoped to bring forward last year, but due to COVID-19, this was postponed until 2021.

The Town identified the need for a dedicated Parking Enforcement Official and in 2017 brought forward amendments to the town code to provide for such a position. After getting up to speed regarding job duties and becoming familiar with parking in the town, the Town's first Parking Enforcement Official invested a good deal of time into documenting parking related issues that he observed and felt could be improved or eliminated entirely by Town Code amendments. Internal HPD review of this information took place and an initial memo was presented to the Town Attorney in late 2019 in preparation for a meeting to discuss the advancement of proposed town code amendments.

The first meeting addressing these parking issues was held in March 2020. However, before any meaningful review and drafting could occur, the COVID-19 shutdowns began, and priorities were shifted town-wide. Also, during this time, the former Parking Enforcement Official retired, and a new Parking Enforcement Official came onboard. It was felt that feedback from the new official regarding the already identified issues and any others he observed would be optimal. The new Parking Enforcement official provided his written comments to the already existing evaluation and the second parking meeting was able to be held in February 2021.

HPD staff and the Town Attorney's office have now identified a comprehensive set of proposed Town Code amendments that they plan to bring forward for Town Council approval in the next few months addressing issues identified including:

- Vehicles with out of state license plates routinely parking on residential streets

Mailing: 777 Lynn Street, Herndon, VA 20170-4602 | Physical: 730 Elden Street, Herndon, VA 20170
Office Telephone: (703) 787-7370 | Email: lesa.yeatts@herndon-va.gov

- Vehicles blocking curb ramps
- Vehicles parking too close to driveways and obstructing vision
- Vehicles parking too close to intersections and obstructing vision
- Oversized Commercial vehicles parked on the streets
- Motor Homes parking on public streets
- Vehicles parked on town streets without moving for long periods of time.

Please let me know if you have any questions.

TOWN OF Herndon VIRGINIA

STAFF REPORT

Town Council
January 18, 2022

Title:

Resolution, to consider Special Exception application **SE #21-03, 1315 and 1317 Monroe Street**, to allow the placement of fill in order to construct two new single-family dwellings on two existing single-family lots within the FPO, Floodplain Overlay District.

Synopsis*

- Subject property - two existing lots at the north end of Monroe Street.
- Both lots contain FEMA designated floodplain.
- Owners wish to fill portions of the floodplain on both lots to build a new house in lieu of the existing house on one lot and build a new house on the second lot that is currently vacant.
- The activity of placing fill within the floodplain requires a special exception, which requires a flood study performed by a qualified engineer.
- The flood study evaluates the impact of flood waters caused by proposed fill.
- The flood study submitted with this special exception application (SE #21-03) shows that the amount and location of the proposed fill will not expand the floodplain or increase flood impacts on adjacent properties.
- Town's professional engineering staff has reviewed the application and do not dispute the findings.
- If this special exception is approved, additional engineering reviews will occur during future phases of the project, including final review and approval by FEMA prior to commencement of construction as well as following construction.

Anticipated Impacts on Adjacent Properties:

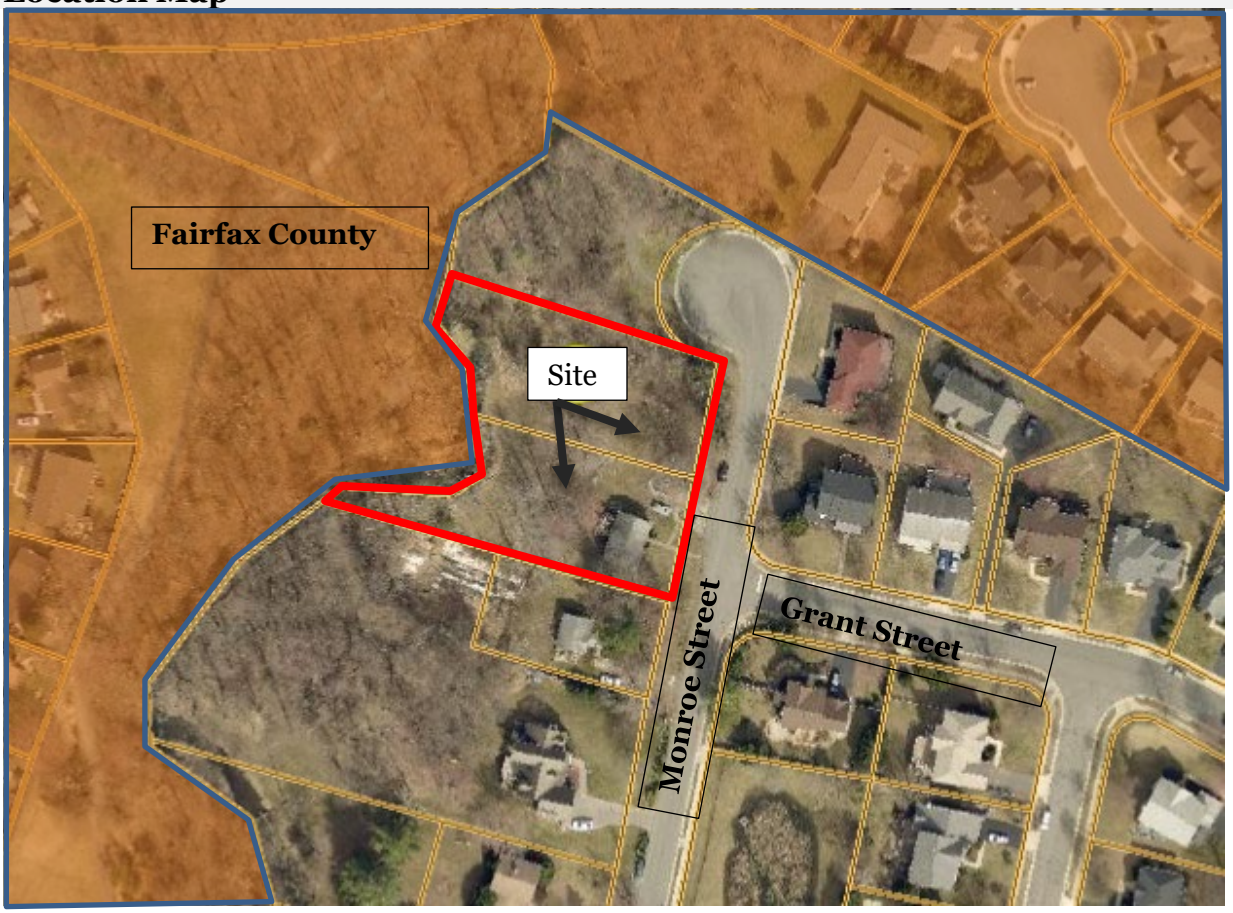
This application, as proposed and with conditions recommended by staff, would not adversely impact adjacent properties per review by qualified professional engineers. After construction and prior to occupancy, as-built plans must be reviewed by the town and FEMA to ensure any changes made during construction still do not impact the floodplain and adjacent properties.

Recommendations

Planning Commission Recommendation	Approval with conditions
Staff Recommendation	Approval with conditions

*Detailed information including site location map, description of the proposal, background information, applicable regulations, analysis, findings and proposed conditions can be found on pages 2 through 8 of this report.

Location Map



Summary Information

Applicant Request	Place fill within the FPO, Floodplain Overlay district, in order to construct two new houses. An existing single family residence on 1317 Monroe Street will be demolished. 1315 Monroe Street is undeveloped.
Address	1315 & 1317 Monroe Street, Herndon, VA
Fairfax County Tax Map Numbers	0102 02 0001B and 0102 02 0001C
Owners/Applicant	Dina Abdel-Hamid and David Hawa
Agent	Anwar Maharmeh, P.E. MTES Engineering Services
Existing Zoning	R-10, Single Family Residential & FPO, Floodplain Overlay
Land Use Designation	Neighborhood Conservation
Flood Map Effective Date	September 17, 2010
Community Flood Number	510052
Flood Map Panel	51059C0110E

Total Site Area	1.06 acres (1317 Monroe – 0.53 acres & 1315 Monroe – 0.53 acres
Existing Building Footprint	Approximately 925 square feet
Proposed Building Footprints	Approximately 2,100 square feet and 2,945 square feet

Site Description

The two lots have existed within the Town of Herndon since at least 1960, which predates the establishment of the first flood map for the Town of Herndon in February 1979. Each respective lot is 0.53 acres for a total site area of 1.06 acres. There is an existing house on 1317 Monroe Street that was built in 1970. The Special Flood Hazard Area (identified as Zone AE) runs across both properties and a portion of the existing house. This flood area is associated with Folly Lick Branch.

The existing floodplain is shown in attachment 3.

Proposal

The applicant is proposing to demolish the existing home at 1317 Monroe Street and then use fill to regrade the front of each lot in order to construct two new single family dwellings, one on each lot. The proposed grading and placement of fill on the front of the two lots will create building pads that are located outside of the floodplain. The rear portions of the lots, closer to Folly Lick Branch, will not be altered.

Flood Regulations

The National Flood Insurance Program (NFIP) is managed by the Federal Emergency Management Agency (FEMA). A community must have a locally adopted floodplain ordinance that complies with the Code of Federal Regulations (44 CFR parts 60, 65, and 72) in order for any property located within that community to be eligible for flood insurance.

Any proposed development in the floodplain that may have an impact on the floodplain must first have a Conditional Letter of Map Revision (CLOMR) submitted and reviewed by FEMA. This review includes whether the proposed development will result in an increase in the Base Flood Elevation (BFE) or an increase in the extent of the floodplain. Following completion of a project, an as-built plan must be submitted with a Letter of Map Revision (LOMR) that is endorsed by the community's floodplain administrator. The floodplain will be officially revised at that point.

Staff Analysis

Zoning Ordinance Compliance

The floodplain has two components: A floodway, which is an area that must be reserved in order to adequately discharge the 1 percent annual flood, and the flood fringe, which is

an area between the floodway and limit of the regulatory flood, where velocities and flood levels are generally less severe.

FEMA issues all of the legal flood maps for communities in the United States. In some communities, the FEMA-issued flood map delineates the floodway and the flood fringe. Property owners are allowed to develop in the flood fringe without FEMA review or public hearings as long as the other requirements of the flood district are met.

In other communities, such as the Town of Herndon, the floodway is not delineated and every proposed activity in the floodplain must be evaluated through the submission and review of a hydraulic and hydrologic floodplain study. This study is required at the special exception phase to evaluate for impacts and again at the administrative application (single lot development plan) in order to re-evaluate impacts caused by final site engineering.

The flood insurance study submitted by the applicant's professional engineer shows that the placement of fill on these two lots will not increase the base flood elevation and will not result in changes to the extent of the floodplain on adjacent lots. Town engineering staff have reviewed the study and do not dispute the findings. The study will then need to be reviewed by FEMA if this special exception is approved.

The study is shown in attachment 6.

A portion of the property is within the CBPAO, Chesapeake Bay Preservation Area Overlay district. The proposed fill and construction of the two houses appears to be outside of the approximated 100 foot Resource Protection Area (RPA) boundary. A site-specific delineation of the RPA is required for submission of the single lot development plan.

Staff evaluated the criteria for review of special exceptions found in Zoning Ordinance Section 78-153.3(e)(1) and the additional criteria for development in a floodplain in Section 78-153.3(e)(2):

Criteria from Section 78-153.3(e)	**Meets or Does Not Meet**	**Why the application meets or does not meet the criteria of Section 78-153.3(e)**
Is consistent with the Comprehensive Plan	Meets	Approval of the placement of fill will remove an existing structure from the floodplain while allowing new development that does not adversely impact adjacent properties.
Is free of conflict with any provision of this chapter and related regulations or any other applicable local, state, or federal laws and regulations	Meets with conditions	Approval of the special exception will allow the applicant to submit a CLOMR to FEMA. There is a condition requiring the applicant to resubmit their application if the limits of the project are altered due to impacts to the RPA component of the CBPAO.

Does not adversely affect the health or safety of persons residing or working in the neighborhood of the proposed use.	Meets	The proposed development will not increase the BFE or the extent of the floodplain. See attachment #5
Minimizes adverse visual impact of the proposed use on adjacent lands	Meets	The proposed use is two single family residences on two single family lots in a single family neighborhood.
Contributes to a logical and orderly development pattern consistent with accepted or emerging planning practices	Meets	The proposed development is located on two lots that have existed since at least 1960 and have frontage on an existing public street.
Minimizes adverse impact on surrounding lands regarding service delivery, parking and loading, odors, noise, glare, and vibration, and should not create a nuisance.	Meets	The proposed development is located on two lots that have existed since at least 1960 and have frontage on an existing public street.
Avoids significant adverse impacts on the property values of surrounding lands or substantially and permanently injures the use of neighboring property for those uses that are permitted in the zoning district	Meets	The proposed development does not alter the floodplain on adjacent properties. The construction of two new homes located outside of the floodplain will not adversely impact the value of surrounding lands or injure the use of adjacent property..
Does not significantly and adversely impact the natural environment, including but not limited to, air, noise, stormwater management, wildlife, vegetation, wetlands, and the natural functioning of the environment	Meets with conditions	The proposed development must comply with the CBPAO and the state stormwater requirements.
Results in development that is adequately served by transportation facilities, including whether or not a substantial deterioration of the level of service on the town's transportation network would occur and whether or not the proposed use is designed to ensure safe ingress and egress onto the site and safe road conditions on and around the site	Meets	Public transportation facilities that currently service the neighborhood are adequate for the proposed use. The proposed use will not create any additional demand on these services.

Results in development that is adequately served by public facilities (roads, potable water and sewage, schools, parks, police, and fire and emergency medical facilities)	Meets	The net increase of one single family residence on an existing public street is adequately served by existing utilities.
If infill and redevelopment is consistent with the redevelopment criteria and other applicable guidelines as stated in the Herndon 2030 Comprehensive Plan (adopted August 12, 2008), as amended.	Not Applicable	This proposal is on two residential lots that were legally platted and have existed since at least 1960.
If located in the floodplain overlay district, meets floodplain overlay standards.		See below
Shall not result in any increase in the established 100-year flood levels in the flood insurance study.	Meets with conditions	The initial flood study indicates no increases in flood levels. Another flood study will be required during the single lot development plan to capture any changes during final design and ensure there are still no increases in flood levels.
Shall not result in other unacceptable or prohibited increases in flood heights.	Meets with conditions	The initial flood study indicates no increases in flood levels. Another flood study will be required during the single lot development plan to capture any changes during final design and ensure there are still no increases in flood levels.
Shall not result in additional threats to public safety.	Meets	This development will result in two single family homes located completely outside of the special flood hazard area.
Shall not result in extraordinary public expense.	Meets	This development will result in two single family homes located completely outside of the special flood hazard area.
Shall not result in creation of a nuisance.	Meets	This development will result in two single family homes located completely outside of the special flood hazard area.
Shall not result in fraud or victimization of the public	Meets	This development will result in two single family homes located completely outside of the special flood hazard area.
Shall not result in conflict with other town, state, or federal laws and regulations.	Meets with conditions	Approval of the special exception will allow the applicant to submit a CLOMR to FEMA. There is a condition requiring the applicant to resubmit their application if the limits of the project are altered due to impacts to the RPA component of the CBPAO.

Analysis of Conditions

Staff is recommending three conditions for this special exception. Those conditions are listed in the following conditions analysis table. Staff believes these conditions provide reasonable ways in which the proposed use can properly mitigate and manage impacts.

#	Condition	Covered by language in the Zoning Code	Reason for Condition
1	Substantial conformance with the submitted plan	No	This condition is what gives the town the authority to ensure the proposed use is developed in the way that is presented to the Planning Commission and the Town Council.
2	Compliance with the Chesapeake Bay Preservation Area Overlay	Partially	The Town's Zoning Ordinance already requires the submission of a site specific delineation of the RPA and limits encroachments into the RPA. This condition clarifies that approval of this special exception does not permit any encroachment into the RPA that would not be otherwise be approved.
3	Use of new FEMA maps	No	FEMA has issued a draft flood insurance rate map (FIRM) that contains more accurate flood information than the current FIRM. The applicant will be required to use this information in their flood modeling during the single lot development plan even if the revised FIRM has not been adopted by the town at that time.

Planning Commission Recommendation

The planning commission first heard this case at the December 6, 2021 work session and then passed a resolution recommending approval at the December 13, 2021 public hearing. The vote was four "aye", one "nay" and two absent. One member of the public spoke at the public hearing.

The commission had a number of questions regarding how the placement of fill could result in no impacts to the floodplain. Town engineering staff and the applicant's engineer explained how the outer edges of a floodplain have little flood capacity and low velocity of moving water and that small amounts of fill do not impact the overall dynamics of the flood channel.

Staff Recommendation

Staff is recommending approval of Special Exception, SE #21-03 in accordance with Alternative #2 for the following reasons:

- Approval will not result in an increase in flood heights or an increase in the floodplain and thus will not adversely impact adjacent properties.

- Approval will allow the demolition of a house that is partially located within the special flood hazard area.
- Approval will allow for the construction of two, new single-family dwellings on lots that meet the R-10 requirements of the zoning ordinance and are located on an existing public street.

Town Council Alternatives

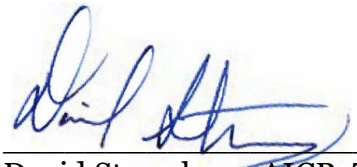
The following alternatives are available to the town council for its decision on Special Exception #21-03:

1. Approval with conditions as recommended by staff.
2. Approval with revisions to the staff recommended conditions.
3. Denial based on failure to meet applicable criteria.
4. Continuance of the application to the next Town Council public hearing if additional information and / or time for review is necessary.

Attachments

1. Draft Town Council Resolution
2. Planning Commission Resolution
3. Existing Floodplain
4. Proposed Development
5. Proposed Conditional Map Amendment
6. Flood Plain Study

Staff Signature



David Stromberg, AICP, Zoning Administrator

TOWN OF HERNDON, VIRGINIA

RESOLUTION

January 25, 2022

Resolution- Resolution, to consider Special Exception application SE #21-03, 1315 and 1317 Monroe Street, to allow the placement of fill in order to construct two new single-family dwellings on two existing single-family lots within the FPO, Floodplain Overlay District.

WHEREAS, the applicants, Dina Abdel-Hamid and David Hawa, have submitted an associated application, special exception SE #21-03, proposing to place fill in the floodplain to allow the for the construction of two new single family dwellings on two existing single family lots at 1317 Monroe and 1315 Monroe and identified as Fairfax County Tax Map Reference Numbers: 0102 02 0001C and 0102 02 0001B; and

WHEREAS, any development within the floodplain requires a special exception to be approved by the town council; and

WHEREAS, the applicant is proposing certain improvements and alterations to the grade within the floodplain; and

WHEREAS, the applicant has demonstrated through hydraulic and hydrologic modeling analysis that the proposed improvements and grade changes will not result in an increase in flood heights or an increase in the extent of the floodplain; and

WHEREAS the applicant will incorporate the most recently issued FEMA flood maps-available and rerun the modeling analysis at the time of site plan final engineering; and

WHEREAS following the public hearing, the Planning Commission has recommended that the application for the special exception be approved with conditions based upon the finding that the proposed use meets the purpose and intent of the Zoning Ordinance; and

WHEREAS, the Town Council has reviewed this application and has held a public hearing in accordance with the provisions of §15.2-2204 of the State Code; and

WHEREAS, the Town Council finds that the proposed development meets the purpose and intent of the Zoning Ordinance, in particular Section 78-155.3 Special

exception and Section 78-60.2 Floodplain Overlay district, including the allowances and criteria found therein; and

NOW, THEREFORE, BE IT RESOLVED by the Town Council of the Town of Herndon, Virginia, hereby:

Approves Special Exception Application #21-03, that shall run with the land and not be voided or extinguished from a change in ownership in accordance with the conditions set forth below to achieve compliance with the standards found in Zoning Ordinance Section 78-60.2 and 78-155.3;

1. The proposed development shall be in substantial conformance with the "TOPOGRAPHIC SURVEY, FLOOD ELEVATION, AND LOT STUDY" located in Appendix A of the Flood Plain Study for The Estate James Edward Waters, Jr. & Nancy A. Waters and dated October 25, 2021.

2. A site specific delineation of the Resource Protection Area component of the Chesapeake Bay Preservation Area Overlay shall be provided concurrent with the submission of the Single Lot Development Plan and approval of this special exception does not approve any unauthorized encroachment into the RPA as outlined in Section 78-60.4 of the zoning ordinance.

3. The applicant shall perform new hydraulic and hydrodynamic analysis using the most recent flood insurance rate map issued by FEMA. In the event the draft FIRMs have not yet been finalized by FEMA and adopted by the town, the applicant shall use the draft FIRM.

TOWN OF HERNDON, VIRGINIA

PLANNING COMMISSION

RESOLUTION

December 13, 2021

Resolution- to recommend approval with conditions of Special Exception SE #21-03 to the Town Council to allow the placement of fill to construct two new single family residences on two existing single family lots within the FPO, Floodplain Overlay district.

WHEREAS, the applicants, Dina Abdel-Hamid and David Hawa, have submitted an associated application, special exception SE #21-03, proposing to place fill in the floodplain to allow the for the construction of two new single family dwellings on two existing single family lots at 1317 Monroe and 1315 Monroe and identified as Fairfax County Tax Map Reference Numbers: 0102 02 0001C and 0102 02 0001B; and

WHEREAS, any development within the floodplain requires a special exception to be approved by the town council; and

WHEREAS, the applicant is proposing certain improvements and alterations to the grade within the floodplain; and

WHEREAS, the applicant has demonstrated through hydraulic and hydrologic modeling analysis that the proposed improvements and grade changes will not result in an increase in flood heights or an increase in the extent of the floodplain; and

WHEREAS the applicant will incorporate the most recently issued FEMA flood maps-available and rerun the modeling analysis at the time of site plan final engineering; and

WHEREAS, the Planning Commission has reviewed this application and has held a public hearing in accordance with the provisions of §15.2-2204 of the State Code; and

WHEREAS, the Planning Commission finds that the proposed development meets the purpose and intent of the Zoning Ordinance, in particular Section 78-155.3 Special exception and Section 78-60.2 Floodplain Overlay district, including the allowances and criteria found therein; and

NOW, THEREFORE, BE IT RESOLVED by the Planning Commission of the Town of Herndon, Virginia, hereby recommends that the Town Council approve Special Exception SE #21-03, in accordance with the conditions set forth below to achieve compliance with the standards found in Section 78-155.3 and Section 78-60.4.

1. The proposed development shall be in substantial conformance with the "TOPOGRAPHIC SURVEY, FLOOD ELEVATION, AND LOT STUDY" located in Appendix A of the Flood Plain Study for The Estate James Edward Waters, Jr. & Nancy A. Waters and dated October 25, 2021.
2. A site specific delineation of the Resource Protection Area component of the Chesapeake Bay Preservation Area Overlay shall be provided concurrent with the submission of the Single Lot Development Plan and approval of this special exception does not approve any unauthorized encroachment into the RPA as outlined in Section 78-60.4 of the zoning ordinance.
3. The applicant shall perform new hydraulic and hydrodynamic analysis using the most recent flood insurance rate map issued by FEMA. In the event the draft FIRMs have not yet been finalized by FEMA and adopted by the town, the applicant shall use the draft FIRM.

This is certified to be a true and accurate copy of the resolution associated with Special Exception Application SE #21-03, adopted at a legally convened meeting of the Town of Herndon Planning Commission on December 13, 2021.

Erika Villalaz
_____
Clerk of Boards & Commissions

Attachment #3

NOTES:

1. MAP# 10-2-02-0001B & 0001C
2. OWNER: THE ESTATE OF JAMES EDWARD WATERS, JR.
   D.B. 2757, PG. 440 (MAP# 10-2-02-0001B)
   NANCY A. WATERS
   D.B. 7892, PG. 184 (MAP# 10-2-02-0001C)
3. ZONE: R-10
   SETBACKS: FRONT: 35' / SIDE: 10' / REAR: 25'
4. TITLE REPORT PROVIDED BY FIRST AMERICAN TITLE INSURANCE COMPANY FILE NO. FE-VA21-0015, EFFECTIVE DATE: JANUARY 25, 2021 AT 12:08 P..M. (SEE SCHEDULE B – SECTION 2 EXCEPTIONS BELOW)
5. F.E.M.A. / F.I.R.M. FLOOD DATA: COMMUNITY NO: 51059C
   H & I PANEL NO: 0110 E
   FLOOD ZONE: X, X "SHADED" AND AE
   EFFECTIVE: SEPTEMBER 17, 2010
6. VERTICAL DATUM = NGVD 29 TIED TO TOWN OF HERNDON AS-BUILT SANITARY SEWER FOR DOMINION RIDGE SUBDIVISION, AND FAIRFAX COUNTY AS-BUILT SANITARY SEWER FOR 21" TRUNK SEWER LINE ALONG FOLLY LICK BRANCH
7. TOPOGRAPHIC SURVEY FIELD RUN BY THIS OFFICE JANUARY 2021
8. FLOOD PLAIN LIMIT DETERMINED BY ELEVATION INTERPOLATION AT 0.1' INTERVALS BETWEEN 296 / 297 / 298 FLOOD ELEVATION LINES PER FEMA / FIRM FLOOD MAP.
9. BOUNDARY / LOT LINES SHOWN ARE APPROXIMATE BASED ON COMPUTATIONS OF SITE AND ADJOINING DEEDS, AND ARE ORIENTED TO EXISTING MONUMENTATION ON SURROUNDING PROPERTIES FOUND DURING THE COURSE OF THE TOPOGRAPHIC SURVEY

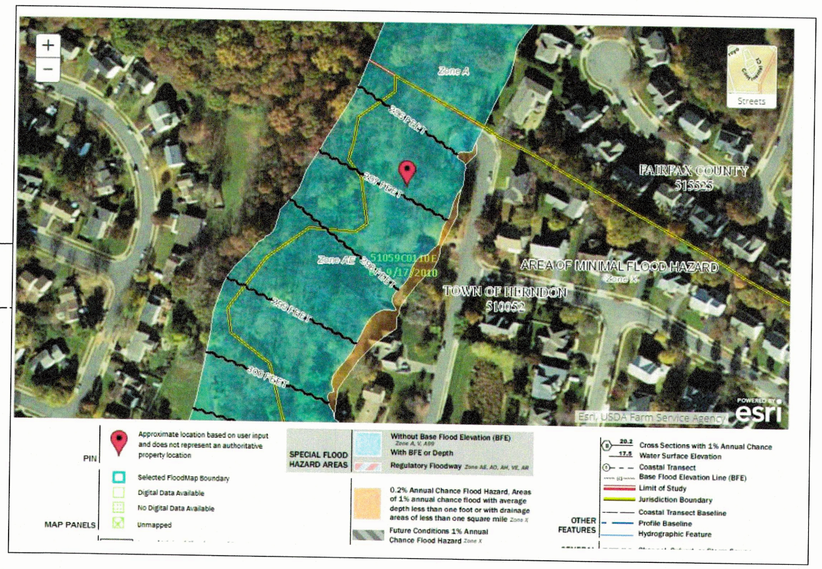
SCHEDULE B – SECTION 2 EXCEPTIONS:

11. ESM'T(S) AND MATTERS AS SHOWN ON AND/OR NOTED ON RECORD PLAT (NONE)
12. MINERALS OF WHATSOEVER KIND, SUBSURFACE AND SURFACE SUBSTANCES, INCLUDING BUT NOT LIMITED TO COAL, LIGNITE, OIL, GAS, URANIUM, CLAY, ROCK, SAND AND GRAVEL IN, ON, UNDER AND THAT MAY BE PRODUCED FROM THE LAND, TOGETHER WITH ALL RIGHTS, PRIVILEGES, AND IMMUNITIES RELATING THERETO, WHETHER OR NOT APPEARING IN THE PUBLIC RECORDS OR LISTED IN SCHEDULE B. THE COMPANY MAKES NO REPRESENTATION AS TO THE PRESENT OWNERSHIP OF ANY SUCH INTERESTS. THERE MAY BE LEASES, GRANTS, EXCEPTIONS OR RESERVATIONS OF INTERESTS THAT ARE NOT LISTED. (NO COMMENT)
13. TERMS, PROVISIONS AND ESM'T(S) D.B. 3253, PG. 684 (SANITARY SEWER EASEMENT SHOWN)

LEGEND

- ELECTRIC METER
- MAIL BOX
- LIGHT POLE
- GUY WIRE
- POWER POLE
- WATER METER
- SANITARY MANHOLE
- FENCE
- OHE — OVERHEAD ELECTRIC
- W — WATERLINE
- CURB
- CURB & GUTTER

COMMONWEALTH OF VIRGINIA
2/5/21
DAVID T. CURRIN
Lic. No. 1998
LAND SURVEYOR



TRI-TEK ENGINEERING

CIVIL
ENVIRONMENTAL
LAND PLANNING
SURVEYING

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Herndon, Virginia 20170
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F: (703) 481-5901
info@tritekinc.com

PROPERTY OF
THE ESTATE OF
JAMES EDWARD WATERS, JR.
D.B. 2257, PG. 440 (MAP# 10-2-02-0001B)
AND
NANCY A. WATERS
D.B. 7892, PG. 184 (MAP# 10-2-02-0001C)
TOWN OF HERNDON FAIRFAX COUNTY, VIRGINIA

TOPOGRAPHIC SURVEY, FLOOD ELEVATION AND LOT STUDY

REVISION	DATE

PM: DTC SCALE: 1"=20'
PE: XXX DATE: 2-5-21
CO: SMK SHEET 1 OF 1

F-3372

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S:\Drawing\F-3372\3372-TOPO.dwg, 4/23/2021 5:44:23 AM, DCurrin, HP PageWide XL 5100PS MFP HPGL2.pc3, 1:1, TRI-TEK Engineering, Inc.

Attachment #4

DEED NORTH D.B. 2253, PG. 1981

MICHAEL E. & IRENE K. HILL
D.B. 11238, PG. 1845
MAP# 10-2-02-0001D
ZONE: R-10

PARCEL D – SECTION 1
KINGSTON CHASE
D.B. 3794, PG. 428

FAIRFAX COUNTY PARK AUTHORITY
D.B. 3794, PG. 450
MAP# 10-2-04-D
ZONE: R-3C

PARCEL J – SECTION 4
HIDDENBROOK
D.B. 3943, PG. 69

FAIRFAX COUNTY PARK AUTHORITY
D.B. 3943, PG. 69
MAP# 10-2-03-J
ZONE: R-3C

FOLLY LICK BRANCH

STONE HILL

PROPERTY OF
NANCY A. WATERS
(MAP# 10-2-02-0001C)
APPROX. 0.53 AC.
#1317

PROPERTY OF
THE ESTATE OF JAMES EDWARD WATERS, JR.
(MAP# 10-2-02-0001B)
APPROX. 0.53 AC.
#1315
VACANT LAND

LOT 1A
DOMINION RIDGE
D.B. 9363, PG. 1981

THE TOWN OF HERNDON
MAP# 10-2-17-0001A
ZONE: R-10

MARK F. ZAHURANEC
D.B. 21498, PG. 1978
MAP# 10-2-02-0001E
ZONE: R-10

25' B.R.L.
10' B.R.L.
CONC.
APPROX. LOC. 21" SAN. SEW.
EX. 24" SAN. SEW. ESM'T. D.B. 3253, PG. 684
6' CHAIN LINK FENCE
4' WIRE FENCE
FEMA FLOOD ZONE AE
FEMA FLOOD ZONE X
WOOD DECK OVER CONC. PATIO
Proposed House FF=309' BF=299.5'
EF= 297.7 1 STORY FRAME FF= 305.03
PORCH
W/M
CONC. WALK
CONC. DRIVE
E/M
CONC.
FEMA ZONE AE FLOOD PLAIN LIMIT (SEE NOTE 8)
Proposed House FF=308' BF=298'
TOP=295.63 INV.IN=287.58 (FR.SE) INV.IN=282.72 (FR.SW) INV.OUT=282.44
24"-6" SAN. SEW.
21.5'-8" SAN. SEW.
TOP=300.66 INV.IN=291.66 INV.OUT=291.47
285.0'-8" SAN. SEW. @ 0.96%
181.2'-8" SAN. SEW. @ 3.88%
I.P.F.
EDGE OF PVMT.
R/W CENTERLINE PER DOMINION RIDGE SUBD DEED BOOK 9363; PAGE 1981 (SURVEY LOCATION)
APPROX. LOC. 6" WATERLINE
TOP=306.03 INV.IN=298.98 (FR.SE) INV.IN=298.93 (FR.SW) INV.OUT=298.69
MONROE STREET – ROUTE #666
R/W VARIES
GRANT STREET
50' R/W
29.6'-8" SAN. SEW. @ 1.91%
APPROX. LOC. 8" WATERLINE
TOP=308.79 INV.IN=301.77 INV.OUT=300.50
8" SAN. SEW.
DOMINION RIDGE LOT 9 DB 9363; PG 1981
DOMINION RIDGE LOT 10 DB 9363; PG 1981
DOMINION RIDGE LOT 11 DB 9363; PG 1981

NOTES:

1. MAP# 10-2-02-0001B & 0001C
2. OWNER: THE ESTATE OF JAMES EDWARD WATERS, JR.
   D.B. 2757, PG. 440 (MAP# 10-2-02-0001B)
   NANCY A. WATERS
   D.B. 7892, PG. 184 (MAP# 10-2-02-0001C)
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   SETBACKS: FRONT: 35' / SIDE: 10' / REAR: 25'
4. TITLE REPORT PROVIDED BY FIRST AMERICAN TITLE INSURANCE COMPANY FILE NO. FE-VA21-0015, EFFECTIVE DATE: JANUARY 25, 2021 AT 12:08 P..M. (SEE SCHEDULE B – SECTION 2 EXCEPTIONS BELOW)
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   FLOOD ZONE: X, X "SHADED" AND AE
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13. TERMS, PROVISIONS AND ESM'T(S)
    D.B. 3253, PG. 684 (SANITARY SEWER EASEMENT SHOWN)

LEGEND

- ELECTRIC METER
- MAIL BOX
- LIGHT POLE
- GUY WIRE
- POWER POLE
- WATER METER
- SANITARY MANHOLE
- FENCE
- OHE — OVERHEAD ELECTRIC
- W — WATERLINE
- CURB
- CURB & GUTTER
- PROPOSED GRADING

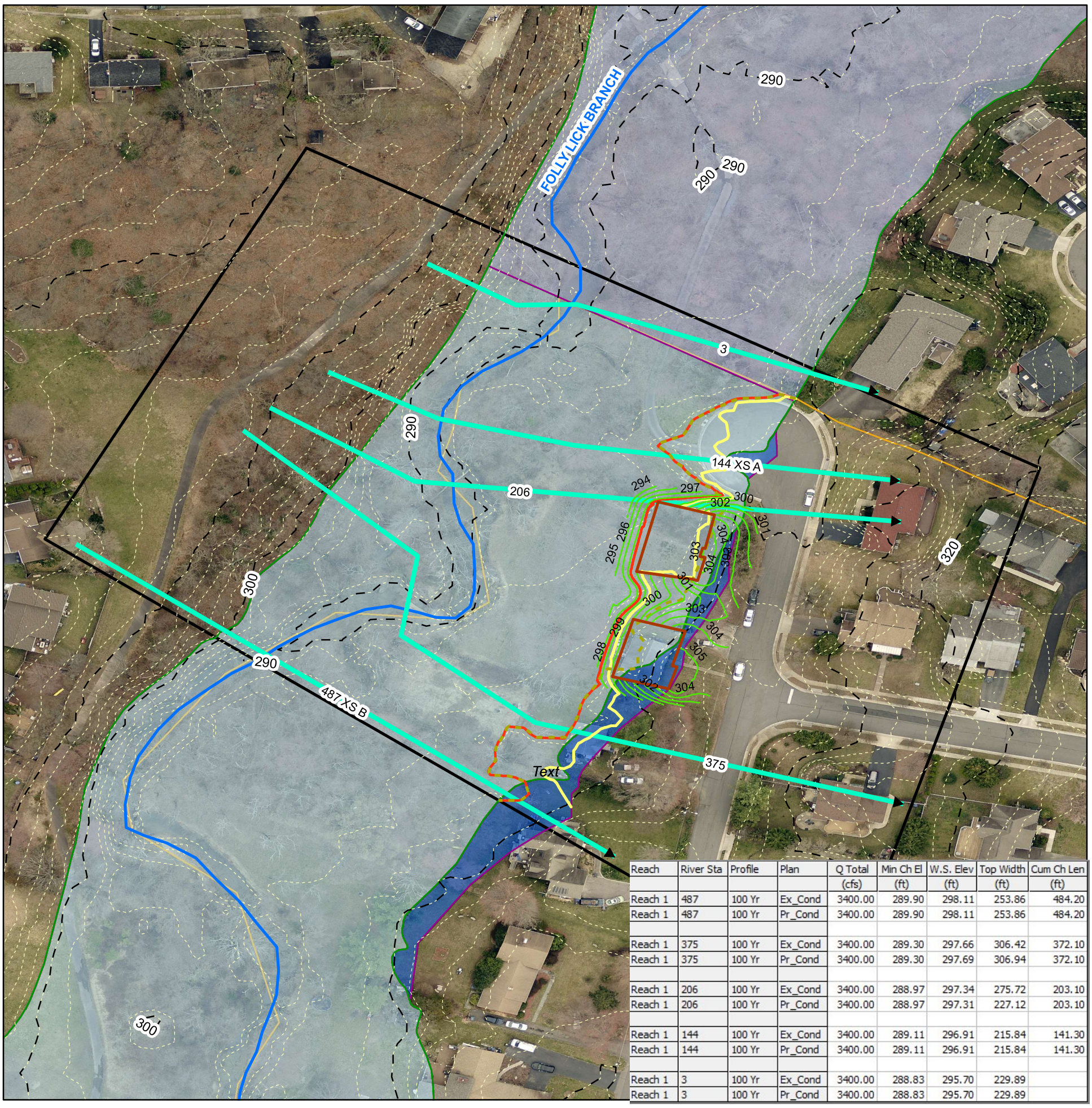
PROPERTY OF
THE ESTATE OF
JAMES EDWARD WATERS, JR.
D.B. 2257, PG. 440 (MAP# 10-2-02-0001B)
AND
NANCY A. WATERS
D.B. 7892, PG. 184 (MAP# 10-2-02-0001C)
TOWN OF HERNDON — FAIRFAX COUNTY, VIRGINIA

PRELIMINARY / REVIEW ISSUE
TOPOGRAPHIC SURVEY,
FLOOD ELEVATION
AND LOT STUDY

DATE	REVISION

PM: IB SCALE: 1"=20'
PE: IB DATE: June 1, 2021
CO: SMK SHEET 1 OF 1

Topographic Workmap



Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Top Width	Cum Ch Len
				(cfs)	(ft)	(ft)	(ft)	(ft)
Reach 1	487	100 Yr	Ex_Cond	3400.00	289.90	298.11	253.86	484.20
Reach 1	487	100 Yr	Pr_Cond	3400.00	289.90	298.11	253.86	484.20
Reach 1	375	100 Yr	Ex_Cond	3400.00	289.30	297.66	306.42	372.10
Reach 1	375	100 Yr	Pr_Cond	3400.00	289.30	297.69	306.94	372.10
Reach 1	206	100 Yr	Ex_Cond	3400.00	288.97	297.34	275.72	203.10
Reach 1	206	100 Yr	Pr_Cond	3400.00	288.97	297.31	227.12	203.10
Reach 1	144	100 Yr	Ex_Cond	3400.00	289.11	296.91	215.84	141.30
Reach 1	144	100 Yr	Pr_Cond	3400.00	289.11	296.91	215.84	141.30
Reach 1	3	100 Yr	Ex_Cond	3400.00	288.83	295.70	229.89	
Reach 1	3	100 Yr	Pr_Cond	3400.00	288.83	295.70	229.89	

Legend

- Proposed Building
- contours_prop
- Existing 100 Yr
- Proposed_500YR
- Proposed_100YR
- Cross_Sections
- Flooding Source
- Existing Contours - 10 ft
- Existing Contours - 2 ft
- A
- AE
- X

**Elevations are in NAVD 88*

N

100 50 0 100 Feet

1. Cover Page

Final
Flood Plain Study for The Estate James Edward Waters, Jr. & Nancy A. Waters

1315 MONROE ST (Map #0102 02 0001B) & 1317 MONROE ST (Map #0102 02 0001C)

Town of Herndon, Virginia

Prepared for:

Dina Abdel-Hamid

Prepared by:

Omnium Infrastructure Solutions

October 25, 2021

Federal Emergency Management Agency

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6. CONCLUSIONS **10**

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Table 2: 1-Percent-Annual-Chance Flood Water Surface Elevations

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Appendix B: Effective Hydraulic Model
Appendix C: Existing & Proposed Hydraulic Model
Appendix D: Certified Topographic Work Map and Annotated FIRM Figures
Appendix E: ESA Compliance
Appendix F: MT-2 Forms

List of Abbreviations

1D	one-dimensional
cfs	cubic feet per second
FEMA	Federal Emergency Management Agency
FIS	Flood Insurance Study
BFE	Base Flood Elevation
HEC	Hydrologic Engineering Center
HEC-RAS	Hydrologic Engineering Center's River Analysis System
LiDAR	Light Detection and Ranging
N/A	not applicable or not available
NAVD88	North American Vertical Datum of 1988
NGVD29	National Geodetic Vertical Datum of 1929
USACE	U.S. Army Corps of Engineers
WSEL	water surface elevation
NFIP	National Flood Insurance Program
ESA	Endangered Species Act

3. Introduction

The Estate James Edward Waters, Jr. & Nancy A. Waters lots are located in Dranesville District in the Town of Herndon. It is bordered to the north and west by the Folly Lick Branch, to the east by Monroe Street as shown on Figure 1. The limit of the proposed fill placement work for both lots is contained entirely within town of Herndon along the right overbank along Folly Lick Branch from approximately 375 feet upstream of limit of detailed study (Town of Herndon Corporate Limit) to approximately 200 upstream of limit of detailed study (Town of Herndon Corporate Limit).

The site is within the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel No. 51059C0110E. The current FIRM Panel is dated effective on September 17, 2010. Folly Lick Branch floodplain is mapped as FEMA Zone AE and Zone X (Shaded) within Town of Herndon and Fairfax County. The effective FIRM can be found in Appendix A.

The final grades range from approximately 298.0' to 306.0' feet NGVD 29. The final preliminary grading plan can be found in Appendix A.

A Conditional Letter of Map Revision (CLOMR) is a requirement of the National Flood Insurance Program (NFIP) managed by FEMA (44 CFR parts 60, 65, and 72). A CLOMR is necessary in the event that the construction of the proposed project affects the hydrologic or hydraulic characteristics of a flooding source, altering the 1-percent-annual-chance floodplain.

The objective of this floodplain alteration is to determine the limits to which the site can be filled to recover developable land from the currently mapped floodplain limits, without increasing the 100-year floodplain elevation of Folly Lick Branch.

To comply with the state's stormwater quality and quantity requirements, Proprietary/ Nonproprietary Best Management Practices (BMPs) listed in subsection 9VAC25-870-65 of the Virginia Stormwater Management Program (VSMP) regulation will be evaluate to the site. The assigned TP removal rates will be computed by using with the Virginia Runoff Reduction Method (VRRM) spreadsheets to show compliance with water quality requirements.

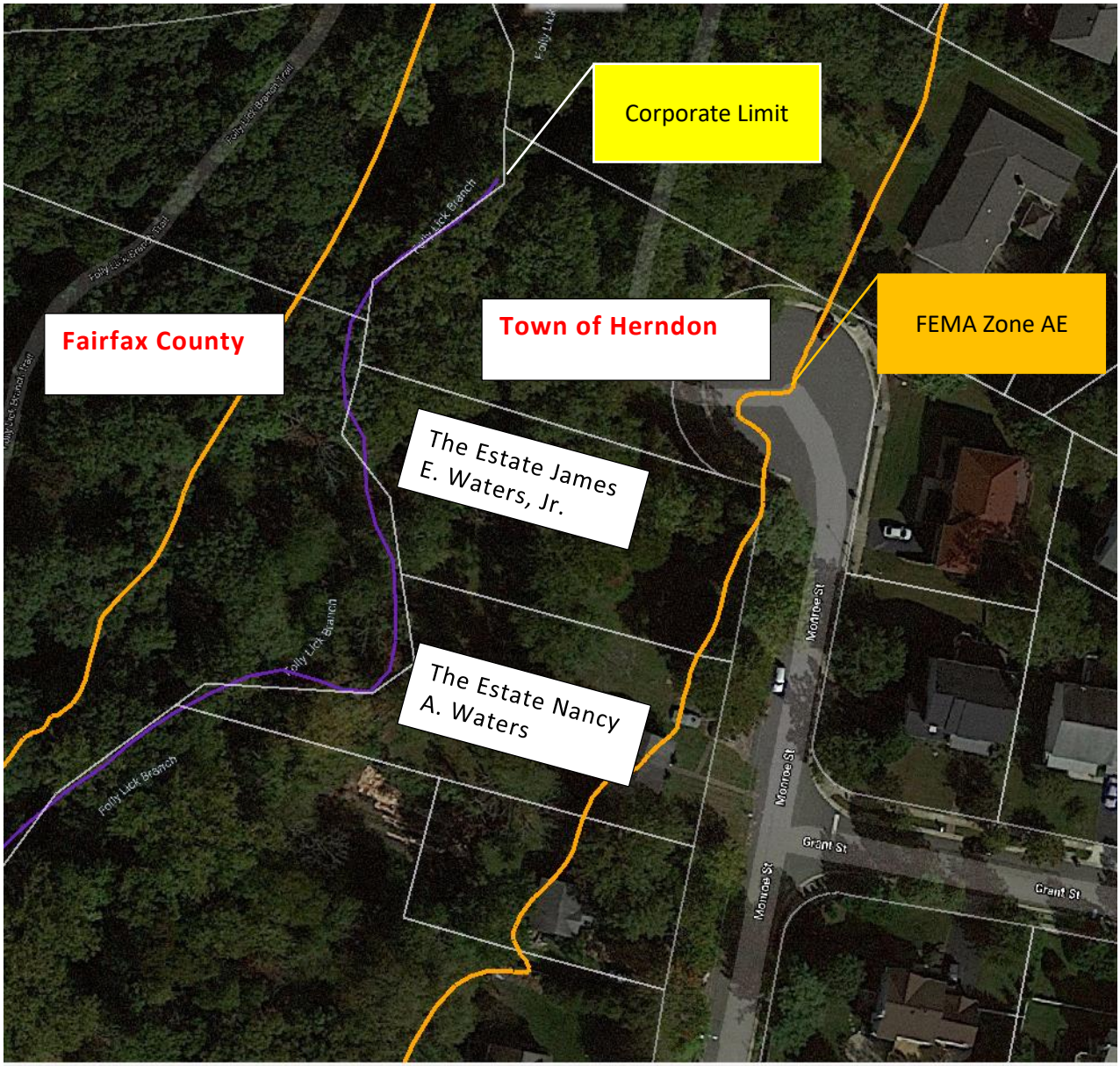

Figure 1: Site Location

4. Hydrologic and Hydraulic Analysis

Hydrology:

The flow data was provided in the HEC-RAS models obtained from FEMA and the Fairfax County and is per the Flood Insurance Study Number 51059CV000A, dated February 17, 2017 as shown in Table 1.

Table 1: FEMA Discharge Values

Flooding Source and Location	Drainage Area (Square Miles)	10-Year Discharge (cfs)	50-Year Discharge (cfs)	100-Year Discharge (cfs)	500-Year Discharge (cfs)
FOLLY LICK BRANCH At downstream corporate limit	2.05	1,800	2,900	3,400	4,700

Hydraulics:

The Effective model was requested and obtained from FEMA library, it can be found in Appendix B. The effective hydraulic model for Folly Lick Branch was performed using USGS Step-backwater program version 76.170 dated in 1977. There's no electronic copy for it, pdf version was provided by FEMA library.

Existing and proposed hydraulic calculations were performed using the U.S. Army Corps of Engineers HEC-RAS Version 5.0.7, software.

Existing Conditions Model was created using the survey data that was performed by Tri-Tek Engineering in February 2021 (NGVD 29 Vertical Datum) along the right overbank on Folly Lick Branch. Topographic LiDAR ((NAVD 88 Vertical Datum) and Imagery data was used elsewhere where survey data was not available. The HEC-RAS Model schematic diagram for the existing condition model is shown below.

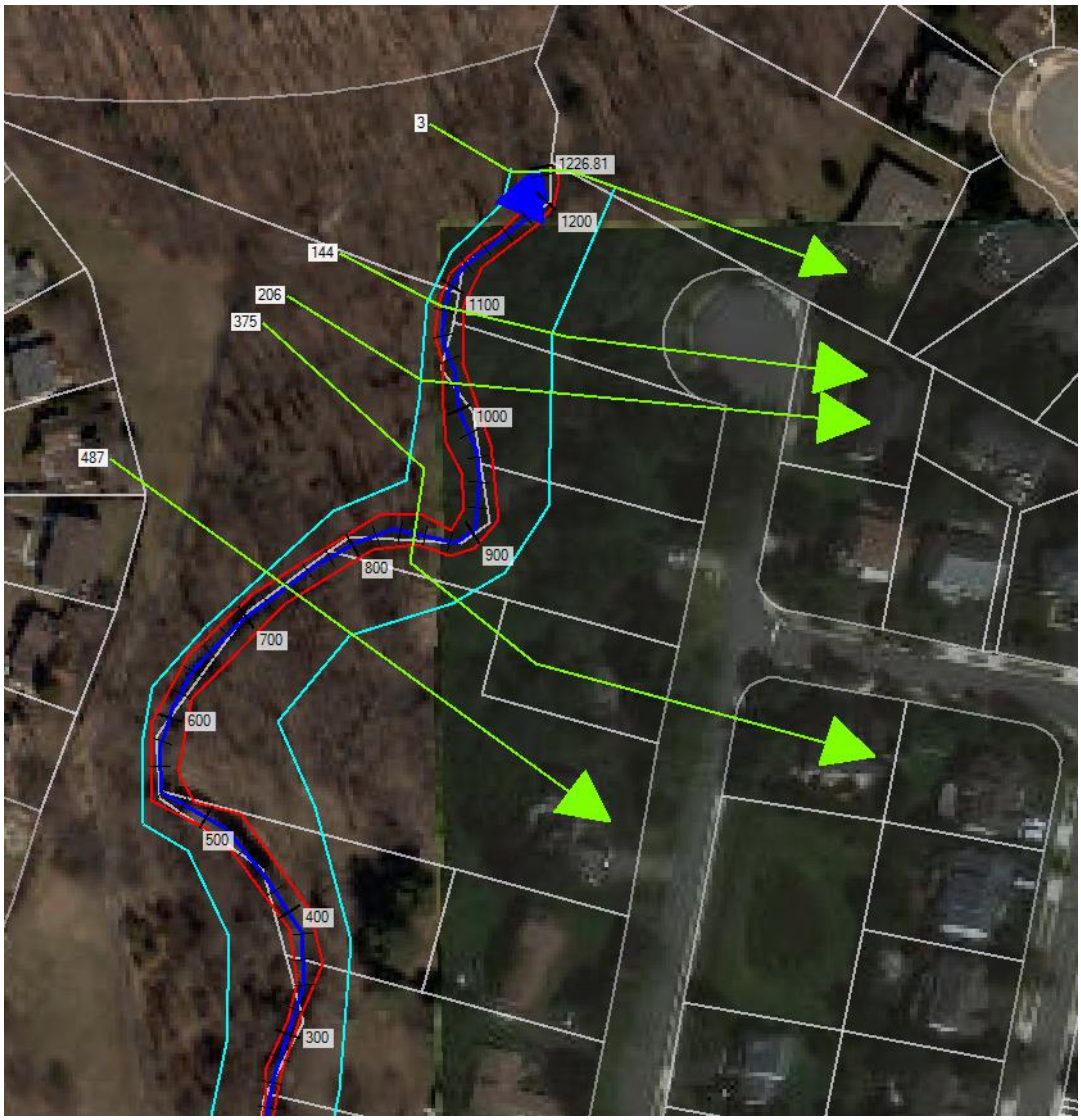

Figure 2: HEC-RAS Model schematic

Based on the National Geodetic Survey website at www.ngs.noaa.gov, the following conversions were used:

NGVD29 = NAVD88 + 0.71'

Channel and overbanks roughness coefficients (Manning's "n" values) for the Existing and Proposed Conditions Model were selected based on the Manning's "n" values Table 5 of the FIS report as shown below.

Table 5 - Manning's 'n' Values

Stream Name	Roughness Coefficients Channel	Over banks
Cameron Run	0.025 to 0.058	0.015 to 0.120
Dogue Creek	0.040 to 0.050	0.050 to 0.090
Folly Lick Branch	0.050 to 0.080	0.030 to 0.220
Holmes Run	0.020 to 0.060	0.020 to 0.110

A Known Water Surface Elevation at Cross Section 3 (@ limit of detailed study/Corporate Limit of the Town) was applied as the downstream boundary condition. These values were obtained from the effective profile no. 07P from the effective FIS report along Folly Lick Branch at the Corporate Limit.

The Proposed Conditions Model was created by modifying the Cross Section 206 that is affected due to the proposed fill placement along the left overbank.

Table 2 below presents the comparison of effective, existing and proposed water surface elevations. The Hydraulic models can be found in Appendix C.

Table 2: **Percent-Annual-Chance-Flood Water Surface Elevations**

X-SECT	EFFECTIVE Profile no. 07 NGVD29	EXISTING (HEC-RAS) NAVD88	PROPOSED (HEC-RAS) NAVD88	EXISTING NGVD29	PROPOSED NGVD29	Effective Letter XS
SECNO	BFE	BFE	BFE	BFE	BFE	
487	298.7	298.11	298.11	298.82	298.82	B
375		297.67	297.67	298.38	298.38	
206		297.34	297.33	298.05	298.04	
144	297.0	296.91	296.91	297.62	297.62	A
3	296.4	295.70	295.70	296.41	296.41	CORPORATE LIMITS
BFE = 100year (natural) Water Surface Elevation/ NGVD29 = NAVD88 +0.71'						

Effective Letter XS	X-SECT	Effective NGVD29	Existing Condition NGVD29	Proposed Condition NGVD29	EXIST - EFF	PROP - EFF	PROP - EXIST
B	487	298.7	298.82	298.82	0.12	0.12	0.00
	375		298.38	298.38			0.00
	206		298.05	298.04			-0.01
A	144	297.0	297.62	297.62	0.62	0.62	0.00
CORPORATE LIMITS	3	296.4	296.41	296.41	0.00	0.00	0.00

There are increases in the Base Flood Elevations (BFEs) between the existing and effective conditions and these increases are solely due to the updated topographic data and updated hydraulic modeling software. Both the existing and proposed condition models tie-into effective profile at upstream and downstream on the revision reach along Folly Lick Branch.

5. Endangered Species Act (ESA) and FEMA Forms

FEMA ESA Compliance document can be found in Appendix E and FEMA MT-2 Forms can be found in Appendix F.

6. Conclusions

The results of the hydraulic analyses comparing the based flood elevations during Effective, Existing and Proposed conditions are shown in Table 2. The results reveal that there is no increase in the 100-year base flood elevations during the proposed conditions comparing with the existing conditions. The additional fill to the proposed two lots will not adversely impact the surrounding neighborhood as shown on the Topographic workmap in App D.

The proposed limits of the 100-year flood plain are shown on the FEMA Topographic Workmap in App D. The proposed 100-year floodplain limits (Zone AE) and changes to the 500 year (Zone X) are shown on the Annotated FIRM Map.

Appendix A: Topographic Survey/Proposed Grading Plan & Effective FIRM

DEED NORTH D.B. 9363, PG. 1981

PARCEL D - SECTION I
KINGSTON CHASE
D.B. 3794, PG. 428

FAIRFAX COUNTY PARK AUTHORITY
D.B. 3794, PG. 450
MAP# 10-2-04-D
ZONE: R-3C

PARCEL J - SECTION 4
HIDDENBROOK
D.B. 3943, PG. 69

FAIRFAX COUNTY PARK AUTHORITY
D.B. 3943, PG. 69
MAP# 10-2-03-J
ZONE: R-3C

MICHAEL E. & IRENE K. HILL
D.B. 11238, PG. 1845
MAP# 10-2-02-0203D
ZONE: R-10

MARK F. TAHURANEC
D.B. 9498, PG. 1978
MAP# 10-2-02-0203E
ZONE: R-10

LOT 1A
DOMINION RIDGE
D.B. 9363, PG. 1981
THE TOWN OF HERNDON
MAP# 10-2-17-0203A
ZONE: R-10

PROPERTY OF
NANCY A. WATERS
(MAP# 10-2-02-0001C)
APPROX. 0.53 AC.
±1,317
VACANT LAND

PROPERTY OF
THE ESTATE OF JAMES EDWARD WATERS, JR.
(MAP# 10-2-02-0001B)
APPROX. 0.53 AC.
±1,175
VACANT LAND

FOLLY LICK BRANCH

STONE WALL

6' CHAIN LINK FENCE

4' WIRE FENCE

APPROX. LOC. 21" SAN. SEW.

EX. 25' SAN. SEW. ESM'T D.B. 3253, PG. 684

EX. 25' SAN. SEW. ESM'T D.B. 3194, PG. 373

TOP=295.63
INV.IN=287.58 (FR.SE)
INV.IN=282.72 (FR.SW)
INV.OUT=282.44

64'+-8" SAN. SEW.

10' B.R.L.

25' B.R.L.

35' B.R.L.

FEMA FLOOD ZONE AE

FEMA FLOOD ZONE X

FEMA ZONE AE FLOOD PLAIN LIMIT (SEE NOTE 8)

WOOD DECK

WOOD DECK OVER CONC. PATIO

CONC. PATIO

1 STORY FRAME
FF=305.03
BF=297.7

CONC. DRIVE

CONC. WALK

ZONE WALL

PORCH

E/M

W/M

CONC.

I.P.F.

TOP=300.66
INV.IN=291.66
INV.OUT=291.47

285.0'-8" SAN. SEW. @ 0.96%

181.2'-8" SAN. SEW. @ 3.88%

EDGE OF PVMT.

R/W CENTERLINE PER DOMINION RIDGE SUBD DEED BOOK 9363; PAGE 1981 (SURVEY LOCATION)

APPROX. LOC. 6" WATERLINE

MONROE STREET - ROUTE #666
R/W VARIES

TOP=306.03
INV.IN=298.98 (FR.SE)
INV.IN=298.83 (FR.SW)
INV.OUT=298.69

GRANT STREET
50' R/W

70.6'-8" SAN. SEW. @ 1.91%

APPROX. LOC. 8" WATERLINE

TOP=309.79
INV.IN=300.77
INV.OUT=300.50

8" SAN. SEW.

DOMINION RIDGE
LOT 9
DB 9363; PG 1981

DOMINION RIDGE
LOT 10
DB 9363; PG 1981

DOMINION RIDGE
LOT 11
DB 9363; PG 1981

NOTES:

1. MAP# 10-2-02-0001B & 0001C
2. OWNER: THE ESTATE OF JAMES EDWARD WATERS, JR.
   D.B. 2757, PG. 440 (MAP# 10-2-02-0001B)
   NANCY A. WATERS
   D.B. 7892, PG. 184 (MAP# 10-2-02-0001C)
3. ZONE: R-10
   SETBACKS: FRONT: 35' / SIDE: 10' / REAR: 25'
4. TITLE REPORT PROVIDED BY FIRST AMERICAN TITLE INSURANCE COMPANY FILE NO. FE-VA21-0015, EFFECTIVE DATE: JANUARY 25, 2021 AT 12:08 P..M. (SEE SCHEDULE B - SECTION 2 EXCEPTIONS BELOW)
5. F.E.M.A. / F.I.R.M. FLOOD DATA: COMMUNITY NO: 51059C
   H & I PANEL NO: 0110 E
   FLOOD ZONE: X, X "SHADED" AND AE
   EFFECTIVE: SEPTEMBER 17, 2010
6. VERTICAL DATUM = NGVD 29 TIED TO TOWN OF HERNDON AS-BUILT SANITARY SEWER FOR DOMINION RIDGE SUBDIVISION, AND FAIRFAX COUNTY AS-BUILT SANITARY SEWER FOR 21" TRUNK SEWER LINE ALONG FOLLY LICK BRANCH
7. TOPOGRAPHIC SURVEY FIELD RUN BY THIS OFFICE JANUARY 2021
8. FLOOD PLAIN LIMIT DETERMINED BY ELEVATION INTERPOLATION AT 0.1' INTERVALS BETWEEN 296 / 297 / 298 FLOOD ELEVATION LINES PER FEMA / FIRM FLOOD MAP.
9. BOUNDARY / LOT LINES SHOWN ARE APPROXIMATE BASED ON COMPUTATIONS OF SITE AND ADJOINING DEEDS, AND ARE ORIENTED TO EXISTING MONUMENTATION ON SURROUNDING PROPERTIES FOUND DURING THE COURSE OF THE TOPOGRAPHIC SURVEY

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- CURB
- CURB & GUTTER

COMMONWEALTH OF VIRGINIA
2/5/21
DAVID T. CURRIN
Lic. No. 1998
LAND SURVEYOR

TRI-TEK ENGINEERING

CIVIL
ENVIRONMENTAL
LAND PLANNING
SURVEYING

690 Center Street
Suite 300
Herndon, Virginia 20170
V: (703) 481-5900
F: (703) 481-5901
info@tritekinc.com

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TOWN OF HERNDON FAIRFAX COUNTY, VIRGINIA

TOPOGRAPHIC SURVEY, FLOOD ELEVATION AND LOT STUDY

DATE	REVISION

PM: DTC SCALE: 1"=20'
PE: XXX DATE: 2-5-21
CO: SMK SHEET 1 OF 1

F-3372

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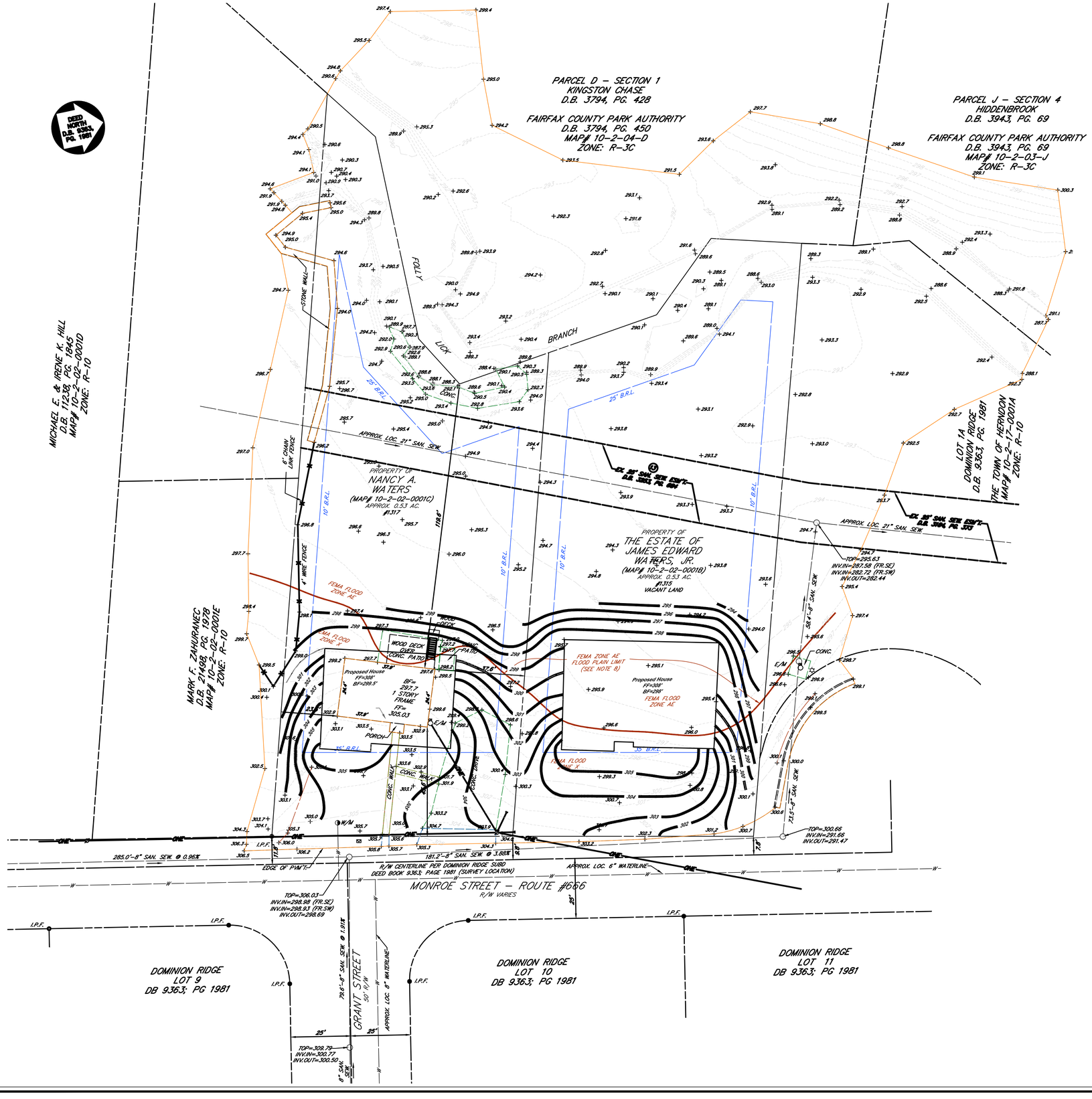

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PRELIMINARY / REVIEW ISSUE
TOPOGRAPHIC SURVEY, FLOOD ELEVATION AND LOT STUDY

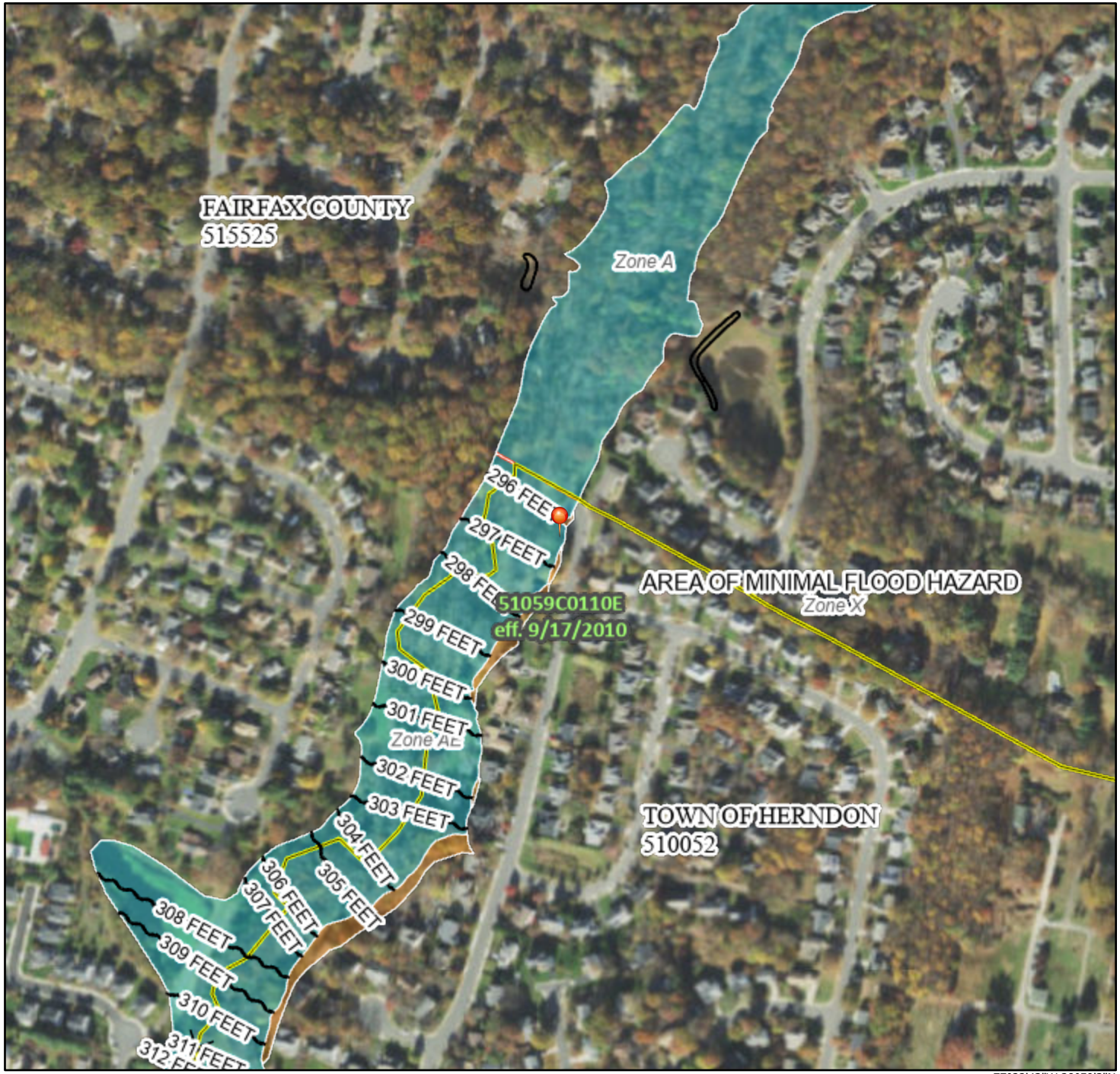
DATE	REVISION

PM: IB SCALE: 1"=20'
PE: IB DATE: June 1, 2021
CO: SMK SHEET 1 OF 1

National Flood Hazard Layer FIRMette

FEMA

77°23'20"W 38°59'31"N



77°22'43"W 38°59'3"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/1/2021 at 10:05 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix B: Effective Hydraulic Model from FEMA Library

From: Inmar Badwan
Sent: Tuesday, April 20, 2021 1:15 PM
To: 'libraryrequest@riskmapcds.com' <libraryrequest@riskmapcds.com>
Subject: FIS Data Request

Good afternoon,

We would like to place FIS date request. Attached please find completed form along with payment information form and map information.

We appreciate considering this as an urgent request. Any expedition for obtaining the requested data would be greatly appreciated.

Please let us know if you need further information.

Thanks,

Inmar Badwan, PhD, PE, CMQ/OE

1140 3rd St NE

2nd Floor

Washington, DC 20002

inmar@omniuminfra.com

703-507-6531

From: DO-NOT-REPLY@riskmapcds.com <DO-NOT-REPLY@riskmapcds.com>
Sent: Thursday, May 6, 2021 11:46 AM
To: Inmar Badwan <inmar@omniuminfra.com>
Subject: Floodmaps File eXchange (FFX): FEMA Data Request B2103122

A file has been uploaded to the Floodmaps File eXchange (FFX) site for you by susan.greene@mbakerintl.com. To download, select the link below. You have 7 days to download the file before it's deleted from the server. NOTE: .ZZZ files must have their extensions changed to .ZIP, and .z must be changed to .7z before opening. Filenames with the character # will have it removed before opening.

Select this link to download the file.

If the above link does not work, go to https://floodmaps.fema.gov/ffx/download.php and enter the following filename:

829812_739714_Folly_Lick_Branch2.pdf

Message from the user: Please find the attached effective model for Folly Lick branch

1 - Folly Convergence

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 1 DATE= 2/18/77

*** INPUT CARD PRINTOUT ***

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      1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

1   -93 FOLLY LICK BRANCH AT HERNDON SEC 321-338          18 12 05 05 15   STARTING ELEVATIONS
2   -92  28260  28290  28320  28370  28400  28430  28410  28440  28470  28490
2   -91  28520  28550
3   -90   321 1  22  3  278     3458 99 99
4   -89  1900   1900   1900  3000   3000   3000   3600   3600   3600   4900
4   -88  4900   4900
5   -87     0  1  2960   15  1  2940   23  1  2920   33  1  2900   94  1  2840
5   -86   133  1  2813  151  1  2810  179  1  2784  190  1  2788  203  1  2787
5   -85   212  2  2779  223  2  2748  230  2  2745  232  2  2748  239  3  2798
5   -84   252  3  2800  265  3  2809  273  3  2820  313  3  2840  337  3  2900
5   -83   354  3  2940  377  3  2980
6   -82  2  4 130 080  1  2 070 070  2  4 200 120
3   -79   322 0  24  3  279     3621 99 99
5   -78     0  1  2980   33  1  2960   69  1  2920  132  1  2860  168  1  2840
5   -77   176  1  2811  209  1  2804  222  2  2790  237  2  2769  244  2  2761
5   -76   249  2  2766  249  3  2802  256  3  2808  271  3  2800  287  3  2807
5   -75   316  3  2802  334  3  2794  346  3  2797  360  3  2828  366  3  2840
5   -74   382  3  2880  399  3  2900  412  3  2940  427  3  2980
6   -73  2  4 140 080  1  2 065 065  2  4 200 120
3   -69   323 0  19  3  281     3778 99 99
5   -68     0  1  3000   32  1  2960   99  1  2900  112  1  2860  126  1  2840
5   -67   182  1  2820  191  1  2800  202  1  2800  212  1  2820  218  1  2820
5   -66   228  2  2800  232  2  2780  245  2  2780  250  3  2800  253  3  2820
5   -65   317  3  2840  341  3  2880  371  3  2940  403  3  3000
6   -64  2  4 120 080  1  2 065 065  1  3 200 120
3   -59   324 0  20  3  282     3943 99 99
5   -58     0  1  3000   67  1  2900   96  1  2870  105  1  2869  122  1  2847
5   -57   138  1  2840  154  2  2834  154  2  2793  157  2  2783  161  2  2782
5   -56   174  3  2822  194  3  2830  202  3  2822  218  3  2834  234  3  2837
5   -55   249  3  2840  259  3  2860  273  3  2920  277  3  2940  294  3  3000
6   -54  2  4 110 080  1  2 065 065  2  4 200 120
3   -49   325 0  16  3  284     4093 99 99
5   -48     0  1  3020   23  1  3000   50  1  2960   71  1  2920  112  1  2880
5   -47   138  1  2840  205  2  2840  210  2  2820  212  2  2800  226  2  2800
5   -46   228  2  2820  233  3  2840  285  3  2860  298  3  2920  311  3  2940
5   -45   331  3  3020
6   -44  2  4 110 080  1  2 070 070  1  3 200 120
3   -39   326 0  21  3  285     4279 99 99
5   -38     0  1  3020   12  1  3000   70  1  2919   83  1  2900   98  1  2889
5   -37   127  1  2895  140  1  2874  164  2  2862  167  2  2822  174  2  2821
5   -36   182  2  2823  192  3  2852  212  3  2857  249  3  2864  275  3  2863
5   -35   282  3  2860  297  3  2880  303  3  2900  323  3  2980  332  3  3000
5   -34   357  3  3020
6   -33  2  4 180 120  1  2 065 065  2  4 140 180
```

Note: See May 12, '77, RUN for final changes at Sec #336

F1-1

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
3   -29   327 0  17  3  286     4458 99 99
5   -28     0  1  3040    7  1  3020   45  1  2940   71  1  2900   99  1  2880
5   -27   250  2  2860  253  2  2840  254  2  2830  268  2  2830  278  3  2860
5   -26   340  3  2880  356  3  2900  371  3  2940  382  3  2980  395  3  3000
5   -25   397  3  3020  410  3  3040
6   -24  1  3 140 100   1  2 065 065  1  3 140 090
3   -19   328 0  19  3  288     4665 99 99
5   -18     0  1  3060   37  1  3000   86  1  2940  111  1  2920  162  1  2900
5   -17   200  1  2888  261  1  2882  294  1  2884  326  1  2884  337  2  2875
5   -16   347  2  2849  352  2  2842  360  3  2886  373  3  2906  396  3  2926
5   -15   424  3  2940  449  3  2960  468  3  2980  530  3  3060
6   -14  2  4 140 090  1  2 070 070  1  2 110 110
3    -9   329 1  19  3  290     4978 99 99
4    -8  1800    1800    1800  2900    2900    2900  3400    3400    3400    4700
4    -7  4700    4700
5    -6     0  1  3080    7  1  3060   27  1  3020   52  1  2960   65  1  2920
5    -5    80  1  2900  143  1  2900  154  2  2880  157  2  2860  170  2  2860
5    -4   173  3  2880  178  3  2900  312  3  2920  341  3  2940  401  3  2960
5    -3   426  3  2980  495  3  3020  515  3  3040  548  3  3080
6    -2  2  4 180 120  1  2 080 080  1  3 110 080
3     3   330 0  21  2  290     5220 99 99
5     4     0  1  3080    7  1  3060   12  1  3040   25  1  3000   30  1  2982
5     5    36  1  2947   42  1  2906   5   1  2893   52  1  2873   58  1  2868
5     6    65  1  2873   68  2  2902   85  2  2913  117  2  2910  142  2  2906
5     7   255  2  2920  299  2  2960  308  2  2980  333  2  3000  387  2  3060
5     8   400  2  3080
6     9  1  2 065 065  1  3 160 100
3    20   331 0  21  3  292     5491 99 99
5    21     0  1  3100   42  1  3040   72  1  2980   90  1  2940  110  2  2920
5    22   115  2  2900  118  2  2880  131  2  2880  132  2  2900  135  3  2920
5    23   218  3  2920  307  3  2940  312  3  2943  312  3  3100  329  3  3100
5    24   329  3  2952  341  3  2960  370  3  3000  391  3  3020  402  3  3080
5    25   427  3  3100
6    26  1  2 120 120  1  2 070 070  2  4 140 080
3    30   332 0  18  3  294     5768 99 99
5    31     0  1  3120   40  1  3040   48  1  3019   60  1  2979   71  2  2949
5    32    73  2  2916   80  2  2915   88  2  2916   91  3  2948  104  3  2941
5    33   132  3  2950  153  3  2940  262  3  2960  357  3  3000  419  3  3020
5    34   498  3  3060  559  3  3100  598  3  3120
6    35  1  2 120 120  1  2 065 065  2  4 200 100
3    40   333 0  20  3  296     6025 99 99
5    41     0  1  3140   95  1  3120  122  1  3100  154  1  3040  183  1  2980
5    42   322  1  2960  327  2  2940  330  2  2920  340  2  2920  342  2  2940
5    43   347  3  2960  410  3  2968  422  3  2960  441  3  3000  460  3  3020
5    44   491  3  3040  573  3  3100  621  3  3100  629  3  3120  711  3  3140
```

*** INPUT CARD PRINTOUT ***

```
         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

6    45  1  3 200 100  1  2 070 070  2  4 110 080
3    50   334 0  23  3  299    6282 99 99
5    51      0  1  3160  137  1  3120  197  1  3080  240  1  3060  265  1  3040
5    52    273  1  3031  320  1  2994  395  1  2995  415  1  2993  419  2  2988
5    53    419  2  2944  428  2  2940  437  2  2948  437  2  2950  441  2  2964
5    54    441  3  2993  469  3  2996  479  3  2989  541  3  3000  579  3  3020
5    55    643  3  3080  683  3  3120  727  3  3160
6    56  1  3 160 090  1  2 065 065  2  4 130 080
3    60   335 0  16  3  298    6500 99 99
5    61      0  1  3180   66  1  3140  143  1  3120  174  1  3100  203  1  3060
5    62    242  1  3020  289  1  3000  360  2  2987  375  2  2950  385  2  2950
5    63    391  3  3000  522  3  3060  548  3  3080  577  3  3100  609  3  3140
5    64    651  3  3180
6    65  2  4 180 080  1  2 070 070  1  2 080 080
3    70   336 0  23  3  302    6770 99 99
5    71      0  1  3180   40  1  3160   56  1  3120   67  1  3100   77  1  3060
5    72     80  1  3052   86  1  3031  128  1  3027  163  1  3028  197  1  3033
5    73    230  2  3025  231  2  2990  236  2  2989  241  2  2976  246  2  2976
5    74    246  2  2991  257  3  3036  314  3  3059  347  3  3080  397  3  3100
5    75    477  3  3160  511  3  3180  546  3  3200
6    76  1  3 140 080  1  2 065 065  1  3 160 100
3    80   337 1  21  3  304    6970 99 99
4    81  1400   1400   1400   2300   2300   2300   2800   2800   2800   3800
4    82  3800   3800
5    83      0  1  3160   43  1  3140   73  1  3120  127  1  3120  135  1  3103
5    84    148  1  3075  171  1  3063  192  1  3050  200  2  3041  206  2  3008
5    85    214  2  3008  218  3  3040  279  3  3055  317  3  3061  352  3  3080
5    86    368  3  3100  393  3  3140  417  3  3160  456  3  3180  531  3  3200
5    87    584  3  3220
6    88  2  4 160 090  1  2 055 055  2  4 140 095
3    90   338 0  19  3  306    7148 99 99
5    91      0  1  3160   14  1  3146   16  1  3114   21  1  3121   31  1  3114
5    92     39  1  3116   46  1  3100   61  1  3068   71  1  3052   79  2  3030
5    93     86  2  3030  101  2  3061  126  3  3076  181  3  3076  202  3  3080
5    94    256  3  3100  287  3  3120  322  3  3140  354  3  3160
6    95  1  2 100 100  1  2 065 065  2  4 140 085
```

F 1

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 4.DATE= 2/18/77

PAGE 1 OF EDITING NOTES FOR: FOLLY LICK BRANCH AT HERNDON

SECID	ERROR SEVERITY	FIRST VARIABLE	NO.	ERROR MESSAGE	SECOND VARIABLE	NO.	VALUE ASSUMED
321	WARNING	N1	3	HIGH			
322	WARNING	N1	3	HIGH			
323	WARNING	N1	3	HIGH			
324	WARNING	N1	3	HIGH			
325	WARNING	N1	3	HIGH			
332	WARNING	N1	3	HIGH			
333	WARNING	N1	1	HIGH			

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 5.DATE= 2/18/77

INPUT SUMMARY FOR: FOLLY LICK BRANCH AT HERNDON

18 CROSS SECTIONS SPECIFIED (OR ASSUMED)

FOUND 18 TYPE 3 CARDS

KEPT 18 CROSS SECTIONS FOR EDITING

18 " " VALID FOR PROPERTY COMPUTATIONS

18 " " " " PROFILE "

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 321 AT DISTANCE= 3458 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
278.0	56	1959	1.00	26	27	211	236	463
278.5	70	2693	1.06	36	37	178	237	542
279.0	97	3601	1.32	65	67	173	238	580
279.5	131	4783	1.53	71	73	167	239	811
280.0	169	6239	1.68	90	92	162	252	1016
280.5	218	8029	1.87	103	105	156	259	1314
281.0	272	10108	2.02	115	117	151	266	1670
281.5	337	12260	2.32	139	142	130	269	1952
282.0	409	15217	2.35	150	152	123	273	2499
282.5	489	18734	2.33	167	170	116	283	3103
283.0	577	22916	2.27	185	187	108	293	3838
283.5	673	27884	2.18	202	204	101	303	4720
284.0	778	33857	2.07	219	221	94	313	5787
284.5	890	41859	1.85	226	229	89	315	7355
285.0	1004	50906	1.69	233	236	84	317	9093
285.5	1123	59479	1.62	240	243	79	319	10831
286.0	1245	69176	1.53	247	250	74	321	12804
286.5	1370	79198	1.48	254	257	69	323	14820
287.0	1499	89412	1.46	262	264	64	325	16855
287.5	1632	100275	1.44	269	272	58	327	19011
288.0	1768	111792	1.42	276	279	53	329	21287
288.5	1907	123968	1.41	283	286	48	331	23684
289.0	2050	136811	1.39	290	293	43	333	26201
289.5	2197	150327	1.38	297	300	38	335	28839
290.0	2347	164523	1.37	304	308	33	337	31599
290.5	2501	180228	1.36	309	312	31	339	34667
291.0	2656	196605	1.34	313	317	28	341	37847
291.5	2814	213653	1.33	318	322	26	343	41136
292.0	2974	231371	1.32	323	326	23	346	44534
292.5	3136	249984	1.31	327	331	21	348	48088
293.0	3300	269267	1.31	331	335	19	350	51747
293.5	3467	289216	1.30	335	339	17	352	55512
294.0	3635	309831	1.29	339	343	15	354	59380
294.5	3807	329816	1.29	346	350	11	357	63040
295.0	3981	350495	1.29	352	357	8	360	66814
295.5	4159	371874	1.29	359	364	4	363	70706
296.0	4340	393962	1.29	366	370	0	366	74715
296.5	4523	419145	1.28	368	374	0	368	79316
297.0	4708	445005	1.28	371	377	0	371	84010
297.5	4895	471536	1.28	374	380	0	374	88797
298.0	5082	498732	1.28	377	384	0	377	93676

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 7 DATE= 2/18/77

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 322 AT DISTANCE= 3621 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
279.0	47	1440	1.00	27	30	222	249	346
279.5	61	2183	1.04	38	41	217	338	435
280.0	88	3088	1.34	63	67	213	347	508
280.5	131	4212	1.93	120	124	204	350	561
281.0	208	5783	2.88	171	175	181	352	764
281.5	296	7941	3.32	179	183	175	354	1185
282.0	387	10542	3.41	183	187	174	356	1727
282.5	479	13661	3.29	187	191	172	359	2401
283.0	573	17730	2.90	190	195	171	361	3316
283.5	669	22807	2.47	194	199	169	364	4482
284.0	767	29177	2.07	198	203	168	366	5952
284.5	869	36009	1.84	209	214	159	368	7413
285.0	976	42387	1.78	220	225	150	370	8737
285.5	1089	49268	1.74	231	236	141	372	10159
286.0	1207	56967	1.70	242	247	132	374	11742
286.5	1330	66615	1.60	249	255	127	376	13779
287.0	1456	76813	1.54	257	262	122	378	15887
287.5	1587	86648	1.51	264	269	116	380	17955
288.0	1720	97105	1.49	271	277	111	382	20140
288.5	1858	107749	1.48	281	286	106	386	22280
289.0	2001	119044	1.48	290	296	101	391	24541
289.5	2148	131005	1.47	300	305	95	395	26926
290.0	2300	143645	1.46	309	315	90	399	29436
290.5	2456	157639	1.45	316	322	85	401	32316
291.0	2616	172320	1.43	323	329	80	402	35322
291.5	2779	187694	1.42	330	336	74	404	38454
292.0	2946	203770	1.40	337	343	69	406	41712
292.5	3116	220774	1.39	343	349	65	407	45166
293.0	3288	238481	1.38	349	355	60	409	48744
293.5	3464	256896	1.37	355	361	56	410	52447
294.0	3643	276024	1.36	361	368	51	412	56275
294.5	3825	295762	1.35	367	374	47	414	60191
295.0	4011	316225	1.35	374	381	42	416	64234
295.5	4199	337420	1.34	380	387	38	418	68404
296.0	4391	359352	1.33	387	393	33	420	72700
296.5	4587	380250	1.33	397	404	25	421	76639
297.0	4787	402027	1.33	407	414	17	423	80732
297.5	4993	424695	1.33	417	424	8	425	84982
298.0	5204	448266	1.33	427	434	0	427	89391

P. 95-96

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 323 AT DISTANCE= 3778 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
281.0	76	2586	1.43	49	50	187	252	449
281.5	103	3638	1.60	57	59	184	252	617
282.0	133	4897	1.74	65	67	182	253	819
282.5	176	6314	2.10	101	103	168	269	910
283.0	234	8149	2.45	131	133	154	285	1133
283.5	307	10385	2.80	161	163	140	301	1437
284.0	395	13083	3.09	191	193	126	317	1832
284.5	492	17065	2.87	198	200	123	320	2601
285.0	593	22045	2.54	204	206	119	323	3592
285.5	696	28205	2.21	211	213	116	326	4834
286.0	803	35842	1.90	217	219	112	329	6357
286.5	913	45275	1.65	222	224	110	332	8167
287.0	1025	53270	1.60	226	229	109	335	9763
287.5	1139	61864	1.57	231	234	107	338	11467
288.0	1256	71046	1.53	236	238	106	341	13275
288.5	1374	80857	1.51	240	243	104	344	15208
289.0	1495	91243	1.48	244	247	102	346	17241
289.5	1618	102201	1.47	248	251	101	349	19370
290.0	1743	113724	1.45	252	255	99	351	21595
290.5	1871	124608	1.45	260	264	93	354	23663
291.0	2003	136114	1.44	268	272	88	356	25841
291.5	2139	148250	1.44	276	280	82	359	28131
292.0	2279	161029	1.44	284	288	77	361	30534
292.5	2424	174461	1.43	292	296	71	364	33052
293.0	2572	188556	1.43	301	304	66	366	35687
293.5	2724	203326	1.43	309	313	60	369	38440
294.0	2880	218782	1.42	317	321	54	371	41314
294.5	3041	234887	1.42	325	329	49	374	44289
295.0	3205	251701	1.42	333	337	43	376	47387
295.5	3374	269234	1.41	341	346	38	379	50611
296.0	3547	287499	1.41	350	354	32	382	53962
296.5	3723	307324	1.40	356	361	28	384	57616
297.0	3903	327865	1.40	363	367	24	387	61391
297.5	4086	349129	1.39	370	374	20	390	65286
298.0	4273	371122	1.39	376	381	16	392	69303
298.5	4463	393851	1.38	383	388	12	395	73443
299.0	4656	417324	1.38	390	394	8	398	77707
299.5	4852	441547	1.38	396	401	4	400	82095
300.0	5052	466528	1.37	403	408	0	403	86609

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 324 AT DISTANCE= 3943

PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
282.0	48	1812	1.00	19	23	154	173	430
282.5	60	2401	1.07	35	38	154	206	436
283.0	83	3144	1.42	59	63	154	213	474
283.5	115	4056	1.83	72	77	151	223	608
284.0	161	5187	2.46	111	116	138	249	699
284.5	220	6723	2.93	125	130	127	252	966
285.0	285	8604	3.16	134	139	120	254	1324
285.5	354	10945	3.12	141	146	116	257	1801
286.0	426	13852	2.89	147	152	112	259	2417
286.5	500	17469	2.56	152	157	108	260	3218
287.0	578	22032	2.19	157	163	104	261	4243
287.5	658	27576	1.88	164	169	99	263	5465
288.0	741	32468	1.80	170	176	93	264	6529
288.5	828	37792	1.75	178	184	87	265	7666
289.0	919	43668	1.69	186	192	80	266	8918
289.5	1014	50146	1.64	194	200	74	267	10291
290.0	1113	57284	1.58	201	208	67	268	11791
290.5	1215	65839	1.51	206	212	64	270	13634
291.0	1319	74035	1.47	210	217	60	271	15424
291.5	1425	82717	1.45	215	222	57	272	17307
292.0	1534	91886	1.42	219	226	54	273	19283
292.5	1644	101581	1.40	224	231	50	274	21363
293.0	1757	111766	1.38	228	235	47	275	23534
293.5	1873	122444	1.37	232	240	44	276	25795
294.0	1990	133616	1.35	237	244	40	277	28146
294.5	2109	145155	1.34	242	249	37	278	30542
295.0	2231	157197	1.33	246	254	34	280	33028
295.5	2356	169746	1.32	251	259	30	281	35604
296.0	2482	182808	1.31	256	264	27	283	38272
296.5	2612	196386	1.31	261	269	23	284	41031
297.0	2743	210485	1.30	265	274	20	286	43882
297.5	2877	225110	1.29	270	278	17	287	46826
298.0	3013	240266	1.29	275	283	13	288	49862
298.5	3152	255958	1.28	280	288	10	290	52993
299.0	3293	272190	1.28	284	293	7	291	56217
299.5	3436	288968	1.27	289	298	3	293	59536
300.0	3582	306296	1.27	294	303	0	294	62951

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 325 AT DISTANCE= 4093

WS	A	K	ALPHA	B	P	LEW	REW	QC
284.0	78	3110	1.00	28	30	205	233	738
284.5	130	4392	1.61	111	114	135	246	625
285.0	189	6169	1.92	128	130	132	259	944
285.5	257	8386	2.08	144	146	128	272	1353
286.0	333	11034	2.17	160	163	125	285	1849
286.5	414	14404	2.09	164	167	122	286	2576
287.0	497	18582	1.93	169	172	119	287	3491
287.5	583	23638	1.74	173	176	115	288	4597
288.0	670	29764	1.56	177	181	112	289	5917
288.5	761	36334	1.46	184	187	107	290	7265
289.0	854	43428	1.40	190	193	102	292	8675
289.5	950	50299	1.38	196	200	97	293	10087
290.0	1050	57694	1.37	202	206	92	294	11597
290.5	1152	65620	1.36	208	212	86	295	13205
291.0	1258	74081	1.34	215	219	81	296	14910
291.5	1367	83085	1.33	221	225	76	297	16712
292.0	1479	92638	1.32	227	231	71	298	18613
292.5	1594	102967	1.32	233	237	68	301	20605
293.0	1712	113858	1.31	239	243	66	305	22687
293.5	1833	125314	1.31	245	249	63	308	24860
294.0	1957	137338	1.31	251	255	61	311	27126
294.5	2083	150323	1.30	254	259	58	312	29673
295.0	2211	163860	1.29	258	263	55	314	32312
295.5	2341	177950	1.28	262	267	53	315	35043
296.0	2473	192592	1.28	266	271	50	316	37865
296.5	2607	207455	1.27	271	276	47	317	40706
297.0	2744	222881	1.27	275	281	43	319	43642
297.5	2882	238875	1.26	280	285	40	320	46672
298.0	3024	255440	1.26	285	290	37	321	49797
298.5	3167	272580	1.26	289	295	33	322	53017
299.0	3313	290298	1.25	294	300	30	324	56333
299.5	3461	308600	1.25	298	305	26	325	59744
300.0	3611	327489	1.25	303	309	23	326	63252
300.5	3764	345400	1.25	310	316	17	327	66537
301.0	3921	363988	1.25	317	324	12	329	69935
301.5	4081	383260	1.25	324	331	6	330	73446
302.0	4245	403225	1.25	331	338	0	331	77073

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 326 AT DISTANCE= 4279 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
285.0	58	2142	1.00	26	28	165	191	486
285.5	73	2956	1.05	39	42	165	204	553
286.0	99	3982	1.27	64	66	164	228	619
286.5	145	5301	1.80	128	130	158	286	653
287.0	212	7220	2.28	142	144	148	290	978
287.5	287	9584	2.53	154	156	139	293	1393
288.0	365	12380	2.64	161	163	136	297	1923
288.5	447	15417	2.73	165	168	133	299	2520
289.0	531	18531	2.89	176	179	97	300	3075
289.5	628	21758	3.17	212	215	90	302	3442
290.0	736	25539	3.37	220	223	83	303	4159
290.5	847	29791	3.46	225	228	80	304	5011
291.0	960	34943	3.37	229	233	76	306	6072
291.5	1076	40666	3.24	234	238	73	307	7267
292.0	1194	47026	3.10	239	242	69	308	8612
292.5	1315	54099	2.93	244	247	66	309	10119
293.0	1438	62014	2.76	248	252	62	311	11815
293.5	1563	69700	2.69	253	257	59	312	13445
294.0	1691	77652	2.63	258	262	55	313	15128
294.5	1821	86023	2.59	263	267	51	314	16899
295.0	1954	94814	2.55	268	272	48	316	18756
295.5	2089	104023	2.51	273	277	44	317	20699
296.0	2227	113653	2.48	277	282	41	318	22727
296.5	2366	123702	2.45	282	287	37	319	24839
297.0	2509	134174	2.42	287	292	33	321	27035
297.5	2653	145068	2.40	292	297	30	322	29314
298.0	2801	156386	2.37	297	302	26	323	31677
298.5	2950	167872	2.36	303	308	23	325	34008
299.0	3103	179791	2.35	308	314	19	328	36421
299.5	3259	192146	2.34	314	320	16	330	38917
300.0	3417	204942	2.33	320	326	12	332	41498
300.5	3580	217089	2.35	329	335	9	338	43674
301.0	3746	229765	2.37	339	344	6	345	45952
301.5	3918	242972	2.38	348	354	3	351	48333
302.0	4094	256711	2.39	357	363	0	357	50817

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 327 AT DISTANCE= 4458 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
286.0	63	2365	1.00	28	29	250	278	530
286.5	90	3369	1.31	81	83	212	294	468
287.0	144	4.	2.00	135	136	175	309	596

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 327 AT DISTANCE= 4458 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
287.5	224	6624	2.76	188	189	137	325	838
288.0	332	9137	3.36	241	243	99	340	1202
288.5	455	12960	3.16	252	254	92	344	1949
289.0	584	17880	2.76	263	265	85	348	2965
289.5	718	24074	2.36	274	276	78	352	4288
290.0	858	31782	2.01	285	287	71	356	5951
290.5	1001	41460	1.71	290	292	68	358	8071
291.0	1148	50501	1.62	295	297	65	360	10085
291.5	1297	60342	1.55	300	302	61	362	12267
292.0	1448	70963	1.50	306	308	58	364	14608
292.5	1602	82352	1.46	311	313	55	365	17100
293.0	1759	94497	1.42	316	318	52	367	19737
293.5	1918	107389	1.39	321	323	48	369	22515
294.0	2080	121020	1.37	326	329	45	371	25431
294.5	2243	135658	1.35	330	332	43	372	28572
295.0	2409	151023	1.33	334	336	40	374	31845
295.5	2577	167108	1.31	337	340	38	375	35247
296.0	2747	183905	1.30	341	344	36	377	38774
296.5	2918	201409	1.29	345	348	33	378	42426
297.0	3091	219615	1.28	349	352	31	379	46200
297.5	3266	238517	1.27	352	356	28	381	50094
298.0	3444	258112	1.26	356	360	26	382	54108
298.5	3623	277642	1.26	362	365	24	385	58029
299.0	3805	297891	1.25	367	371	21	389	62072
299.5	3990	318861	1.25	373	377	19	392	66235
300.0	4178	340555	1.25	379	383	17	395	70521
300.5	4368	364234	1.24	381	386	14	396	75303
301.0	4559	388606	1.23	384	389	12	396	80200
301.5	4752	413665	1.23	387	392	9	397	85209
302.0	4947	439407	1.22	390	395	7	397	90331
302.5	5143	464590	1.22	395	400	5	400	95227
303.0	5342	490503	1.22	400	405	4	404	100240
303.5	5543	517148	1.22	405	410	2	407	105369
304.0	5747	544527	1.22	410	415	0	410	110617

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 328 AT DISTANCE= 4665 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
288.0	50	1684	1.05	28	29	331	359	368
288.5	80	2377	1.64	129	131	230	360	278
289.0	157	3716	2.77	169	171	194	363	514
289.5	246	5689	3.03	188	190	178	366	916

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 328 AT DISTANCE= 4665 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
290.0	345	8218	2.98	207	209	162	369	1460
290.5	452	11340	2.83	223	225	149	372	2170
291.0	568	15220	2.60	241	243	137	378	3066
291.5	693	20298	2.28	260	261	124	383	4258
292.0	828	26567	2.00	278	280	111	389	5728
292.5	970	35023	1.70	290	292	105	395	7722
293.0	1118	45589	1.48	306	307	99	404	9989
293.5	1275	58044	1.34	322	324	92	414	12424
294.0	1440	68580	1.33	338	340	86	424	14636
294.5	1612	80433	1.31	348	350	82	430	17208
295.0	1789	93193	1.29	359	361	78	437	19948
295.5	1970	106860	1.28	369	371	74	443	22854
296.0	2158	121437	1.27	379	381	70	449	25926
296.5	2349	137014	1.26	388	390	66	454	29240
297.0	2546	153497	1.25	397	399	62	459	32720
297.5	2746	170884	1.24	406	408	57	463	36365
298.0	2952	189178	1.24	415	417	53	468	40175
298.5	3161	208473	1.23	423	425	49	472	44216
299.0	3374	228676	1.22	431	433	45	476	48421
299.5	3591	249785	1.22	439	441	41	480	52791
300.0	3813	271805	1.22	447	449	37	484	57326
300.5	4038	295182	1.21	453	456	34	487	62107
301.0	4266	319473	1.21	460	463	31	491	67047
301.5	4498	344680	1.20	467	470	28	495	72146
302.0	4734	370803	1.20	474	477	25	499	77405
302.5	4972	397844	1.20	481	484	22	503	82822
303.0	5215	425804	1.20	488	491	19	507	88398
303.5	5461	454686	1.19	495	498	15	511	94133
304.0	5710	484493	1.19	502	505	12	515	100027
304.5	5963	515227	1.19	509	512	9	518	106081
305.0	6219	546891	1.19	516	519	6	522	112294
305.5	6479	579490	1.19	523	526	3	526	118667
306.0	6742	613025	1.19	530	534	0	530	125200

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 329 AT DISTANCE= 4978 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
290.0	86	3139	1.30	35	37	143	178	670
290.5	140	4080	2.30	128	130	84	212	548
291.0	214	5572	2.97	168	169	78	245	795
291.5	307	7614	3.30	207	209	71	279	1169
292.0	421	10315	3.34	247	249	65	312	1706

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 329 AT DISTANCE= 4978 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
292.5	547	14452	2.76	256	258	63	319	2726
293.0	677	19853	2.23	265	267	62	327	4111
293.5	811	26678	1.83	274	276	60	334	5861
294.0	951	35211	1.54	283	285	59	341	7964
294.5	1096	44599	1.39	299	301	57	356	10108
295.0	1250	53446	1.34	316	318	55	371	12183
295.5	1412	63108	1.31	332	335	54	386	14443
296.0	1582	73728	1.28	349	352	52	401	16905
296.5	1759	86220	1.24	357	360	50	407	19840
297.0	1939	99649	1.22	366	368	48	414	22946
297.5	2124	114011	1.20	374	377	46	420	26221
298.0	2313	129304	1.18	382	385	44	426	29663
298.5	2507	145066	1.17	393	396	42	435	33161
299.0	2706	161779	1.16	404	407	40	443	36837
299.5	2911	179456	1.16	414	418	37	452	40693
300.0	3121	198108	1.15	425	428	35	461	44729
300.5	3336	217747	1.14	436	439	33	469	48948
301.0	3557	238387	1.14	447	450	31	478	53350
301.5	3783	260041	1.13	457	461	29	486	57938
302.0	4014	282722	1.13	468	471	27	495	62713
302.5	4250	307631	1.13	476	479	25	500	67887
303.0	4490	333561	1.12	483	487	22	505	73228
303.5	4733	360514	1.12	491	494	20	510	78737
304.0	4980	388492	1.12	498	502	17	515	84415
304.5	5231	417933	1.12	505	508	15	519	90336
305.0	5485	448400	1.12	511	515	12	523	96420
305.5	5742	479896	1.12	518	522	10	527	102668
306.0	6003	512422	1.11	525	529	7	532	109079
306.5	6266	546352	1.11	530	535	5	536	115791
307.0	6533	581305	1.11	536	541	4	540	122667
307.5	6802	617283	1.11	542	547	2	544	129707
308.0	7075	654286	1.11	548	552	0	548	136911

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 330 AT DISTANCE= 5220 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
290.0	46	1596	1.00	22	24	46	68	374
290.5	58	2126	1.02	30	32	43	73	453
291.0	87	2955	1.43	96	99	41	174	390
291.5	158	4241	2.56	174	177	41	215	533
292.0	255	6120	3.34	215	218	40	255	863
292.5	364	8911	3.19	221	224	39	261	1485

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 330 AT DISTANCE= 5220 PART 2 OF 2

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WS	A	K	ALPHA	B	P	LEW	REW	QC
293.0	477	12697	2.67	228	231	38	266	2394
293.5	592	17656	2.16	234	237	38	272	3637
294.0	710	24119	1.74	240	244	37	277	5259
294.5	832	32106	1.46	246	250	36	283	7185
295.0	957	39249	1.39	253	257	35	288	8962
295.5	1084	47046	1.34	259	263	35	294	10892
296.0	1215	55501	1.30	265	270	34	299	12967
296.5	1349	64975	1.25	268	273	33	301	15316
297.0	1484	75101	1.22	271	276	32	304	17799
297.5	1620	85867	1.20	275	280	31	306	20411
298.0	1758	97262	1.18	278	283	30	308	23148
298.5	1899	108366	1.16	285	290	29	314	25777
299.0	2043	120030	1.15	293	298	28	321	28550
299.5	2192	132340	1.14	300	306	26	327	31452
300.0	2344	145305	1.13	308	314	25	333	34485
300.5	2499	159316	1.12	314	320	23	338	37806
301.0	2658	173997	1.11	320	326	22	342	41252
301.5	2820	189350	1.10	326	332	20	347	44821
302.0	2984	205381	1.09	333	339	19	351	48516
302.5	3152	222095	1.09	339	345	17	356	52335
303.0	3323	239496	1.08	345	351	15	360	56281
303.5	3497	257589	1.08	351	357	14	365	60353
304.0	3674	276380	1.07	357	363	12	369	64553
304.5	3854	296089	1.07	363	369	11	374	68861
305.0	4036	316492	1.07	369	375	10	378	73297
305.5	4222	337595	1.07	374	381	8	383	77863
306.0	4411	359401	1.07	380	387	7	387	82557
306.5	4602	382307	1.06	385	392	5	390	87583
307.0	4796	405942	1.06	390	397	4	394	92732
307.5	4992	430308	1.05	395	402	2	397	98007
308.0	5191	455409	1.05	400	407	0	400	103406

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 331 AT DISTANCE= 5491 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
292.0	72	2888	1.00	25	28	110	135	693
292.5	133	4070	1.97	135	138	105	240	532
293.0	207	5771	2.56	163	165	100	263	830
293.5	295	7981	2.85	190	193	95	285	1237
294.0	397	10731	2.97	217	220	90	307	1766
294.5	508	14312	2.81	224	227	88	312	2586
295.0	621	19382	2.32	227	230	86	312	3824

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 331 AT DISTANCE= 5491 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
295.5	735	25625	1.94	233	238	83	334	5316
296.0	854	33163	1.67	243	249	81	341	7037
296.5	977	43569	1.40	249	256	79	345	9264
297.0	1103	55902	1.26	255	263	77	348	11607
297.5	1232	65584	1.24	261	270	74	352	13653
298.0	1364	75951	1.22	267	277	72	356	15820
298.5	1498	86980	1.21	273	284	70	359	18096
299.0	1636	98682	1.20	279	291	67	363	20489
299.5	1777	111053	1.20	285	298	65	366	23000
300.0	1921	124089	1.19	291	305	62	370	25626
300.5	2068	137373	1.19	299	314	60	375	28274
301.0	2220	151339	1.19	307	323	57	381	31045
301.5	2375	165992	1.19	314	332	55	386	33939
302.0	2534	181339	1.19	322	341	52	391	36959
302.5	2696	198855	1.19	325	345	50	392	40424
303.0	2859	217039	1.18	329	350	47	393	43998
303.5	3025	235881	1.18	332	354	45	394	47678
304.0	3192	255372	1.18	336	359	42	395	51463
304.5	3361	275326	1.18	340	365	39	396	55233
305.0	3532	295932	1.18	345	370	35	397	59106
305.5	3705	317184	1.18	349	376	32	397	63081
306.0	3881	339080	1.18	353	381	28	398	67160
306.5	4058	361613	1.18	358	387	25	399	71340
307.0	4238	384781	1.18	362	393	21	400	75622
307.5	4421	408579	1.18	367	398	18	401	80006
308.0	4605	433007	1.19	371	404	14	402	84492
308.5	4793	454038	1.19	381	415	11	408	88386
309.0	4986	475859	1.20	391	425	7	415	92424
309.5	5183	498483	1.20	400	436	4	421	96607
310.0	5386	521920	1.20	410	447	0	427	100938

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 332 AT DISTANCE= 5768 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
294.0	41	1475	1.00	19	21	72	90	347
294.5	64	2046	1.51	77	80	71	180	270
295.0	118	2903	2.84	137	140	71	208	369
295.5	194	4223	3.94	166	169	69	235	599
296.0	284	5926	4.58	195	199	67	262	909
296.5	385	8130	4.67	209	212	65	274	1373
297.0	493	10730	4.59	222	226	63	286	1941
297.5	608	14325	3.98	236	240	61	298	2771

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 332 AT DISTANCE= 5768 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
298.0	729	18939	3.32	250	254	60	310	3878
298.5	857	24840	2.71	263	267	58	321	5327
299.0	992	32458	2.20	277	281	57	333	7193
299.5	1134	42467	1.78	290	294	55	345	9545
300.0	1282	55075	1.49	303	307	54	357	12264
300.5	1438	63927	1.47	320	325	52	373	14248
301.0	1602	73586	1.46	337	342	51	388	16410
301.5	1775	84078	1.44	354	359	49	404	18756
302.0	1957	95424	1.43	371	376	48	419	21287
302.5	2145	108454	1.41	383	388	46	429	24271
303.0	2340	122342	1.39	395	400	44	439	27434
303.5	2540	137098	1.37	407	411	42	449	30778
304.0	2747	152732	1.35	419	423	40	459	34302
304.5	2959	169204	1.34	431	436	38	468	37972
305.0	3177	186585	1.33	443	448	35	478	41828
305.5	3402	204888	1.32	456	461	33	488	45872
306.0	3633	224126	1.31	468	473	30	498	50106
306.5	3870	244973	1.30	478	483	28	506	54720
307.0	4111	266762	1.29	488	493	25	513	59520
307.5	4358	289498	1.28	498	504	23	521	64505
308.0	4610	313188	1.28	509	514	20	529	69676
308.5	4866	337840	1.27	519	524	18	536	75035
309.0	5128	363462	1.26	529	534	15	544	80583
309.5	5395	390061	1.26	539	544	13	551	86320
310.0	5667	417646	1.25	549	555	10	559	92249
310.5	5945	445186	1.25	561	567	8	569	98109
311.0	6228	473758	1.25	574	579	5	579	104175
311.5	6518	503374	1.25	586	592	3	588	110449
312.0	6814	534048	1.24	598	604	0	598	116935

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 333 AT DISTANCE= 6025 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
296.0	65	2542	1.13	25	27	322	347	560
296.5	99	3373	1.76	109	111	287	424	401
297.0	172	4739	2.90	174	177	253	427	570
297.5	269	6765	3.50	211	214	218	429	917
298.0	384	9419	3.71	249	251	183	432	1403
298.5	509	13174	3.28	253	256	181	434	2258
299.0	637	18344	2.63	258	261	178	436	3501
299.5	767	25271	2.04	263	266	176	439	5204
300.0	900	34766	1.57	268	271	173	441	7455

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 333 AT DISTANCE= 6025 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
300.5	1035	43771	1.44	275	278	171	446	9514
301.0	1175	53536	1.36	282	285	169	451	11671
301.5	1317	63495	1.31	289	292	166	455	13916
302.0	1464	73982	1.28	296	300	164	460	16294
302.5	1614	84801	1.26	307	310	161	468	18711
303.0	1770	96443	1.24	317	320	159	476	21284
303.5	1931	108917	1.23	327	330	156	483	24013
304.0	2097	122234	1.22	337	340	154	491	26900
304.5	2268	136528	1.21	346	350	151	498	29978
305.0	2444	151671	1.20	356	360	149	505	33213
305.5	2624	167671	1.19	366	369	146	512	36607
306.0	2809	184541	1.18	375	379	143	518	40160
306.5	2999	202292	1.17	384	388	141	525	43875
307.0	3194	220936	1.17	394	398	138	532	47753
307.5	3393	240483	1.16	403	407	135	539	51795
308.0	3597	260947	1.16	413	417	133	546	56002
308.5	3806	282338	1.15	423	427	130	553	60377
309.0	4020	304669	1.15	432	436	127	559	64920
309.5	4238	327951	1.14	441	446	125	566	69634
310.0	4461	352197	1.14	451	455	122	573	74520
310.5	4713	361353	1.18	508	512	115	623	75105
311.0	4969	388956	1.17	517	521	109	625	80870
311.5	5229	417747	1.16	525	530	102	627	86805
312.0	5494	447725	1.16	534	539	95	629	92911
312.5	5772	461967	1.18	578	583	71	650	95041
313.0	6072	479545	1.21	623	627	48	670	97814
313.5	6395	500218	1.23	667	671	24	691	101210
314.0	6739	523828	1.25	711	716	0	711	105212

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 334 AT DISTANCE= 6282 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
299.0	98	4987	1.01	31	38	417	485	993
299.5	131	5993	1.39	183	191	319	513	532
300.0	236	7769	2.78	229	236	312	541	816
300.5	354	10368	3.45	244	252	306	551	1302
301.0	481	13856	3.44	260	268	300	560	1997
301.5	615	18305	3.13	276	284	293	570	2942
302.0	757	24042	2.68	292	300	287	579	4219
302.5	906	31915	2.15	304	312	281	584	6046
303.0	1061	42127	1.74	315	323	274	590	8366
303.5	1221	52703	1.54	326	334	269	595	10802

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 334 AT DISTANCE= 6282 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
304.0	1386	65321	1.39	335	344	265	600	13573
304.5	1557	79362	1.29	347	355	259	606	16454
305.0	1733	92240	1.26	359	367	253	611	19251
305.5	1915	106110	1.23	370	378	246	616	22236
306.0	2103	120980	1.21	382	390	240	622	25407
306.5	2298	136137	1.21	398	406	229	627	28528
307.0	2501	152387	1.20	414	422	219	632	31852
307.5	2712	169752	1.19	430	438	208	638	35384
308.0	2931	188258	1.19	446	455	197	643	39127
308.5	3157	208692	1.18	459	467	190	648	43328
309.0	3389	230256	1.17	471	480	182	653	47734
309.5	3628	252963	1.16	484	492	175	658	52347
310.0	3873	276831	1.15	496	505	167	663	57169
310.5	4124	301873	1.15	509	517	160	668	62201
311.0	4381	328106	1.14	521	530	152	673	67447
311.5	4645	355544	1.14	534	542	145	678	72909
312.0	4915	384205	1.13	546	555	137	683	78588
312.5	5193	410464	1.14	569	577	120	689	83414
313.0	5483	438318	1.14	591	600	103	694	88531
313.5	5785	467783	1.15	614	623	86	700	93944
314.0	6097	498880	1.15	637	645	69	705	99658
314.5	6421	531630	1.16	659	668	51	711	105681
315.0	6756	566058	1.16	682	691	34	716	112015
315.5	7103	602192	1.16	704	713	17	722	118668
316.0	7461	640059	1.16	727	736	0	727	125644

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 335 AT DISTANCE= 6500 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
298.0	54	1795	1.00	26	27	363	389	439
298.5	67	2443	1.00	28	30	361	389	586
299.0	84	3285	1.06	46	48	344	390	629
299.5	114	4353	1.32	74	76	316	390	702
300.0	158	5663	1.71	102	104	289	391	857
300.5	215	7400	2.08	125	127	277	402	1111
301.0	283	9512	2.40	147	150	266	413	1436
301.5	362	12056	2.64	170	172	254	424	1846
302.0	453	15083	2.81	193	195	242	435	2352
302.5	553	19310	2.62	208	211	237	446	3158
303.0	662	24673	2.34	224	227	232	457	4216
303.5	778	31543	2.01	240	243	227	467	5593
304.0	902	40537	1.70	256	258	223	478	7367

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 335 AT DISTANCE= 6500 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
304.5	1033	52763	1.43	272	274	218	489	9571
305.0	1173	63321	1.37	287	290	213	500	11484
305.5	1321	73844	1.35	303	306	208	511	13451
306.0	1476	85335	1.33	319	322	203	522	15593
306.5	1638	98370	1.31	329	332	199	529	18131
307.0	1806	112376	1.28	339	342	196	535	20841
307.5	1978	127359	1.27	349	352	192	542	23722
308.0	2155	143327	1.25	360	362	189	548	26772
308.5	2337	160185	1.24	370	373	185	555	29948
309.0	2525	178054	1.23	381	384	181	563	33295
309.5	2719	196949	1.22	392	395	178	570	36817
310.0	2917	216882	1.21	403	406	174	577	40514
310.5	3122	236994	1.20	415	418	166	581	44360
311.0	3332	258233	1.19	427	430	159	585	48393
311.5	3548	280612	1.18	438	441	151	589	52613
312.0	3770	304143	1.18	450	453	143	593	57023
312.5	4001	324069	1.18	473	477	124	597	60628
313.0	4244	345895	1.19	497	500	105	601	64488
313.5	4498	369564	1.20	520	523	85	605	68616
314.0	4763	395042	1.20	543	546	66	609	73022
314.5	5038	426014	1.19	557	560	58	614	78688
315.0	5320	458346	1.19	570	573	50	620	84584
315.5	5608	492057	1.18	584	587	41	625	90710
316.0	5903	527167	1.18	597	601	33	630	97071
316.5	6205	563697	1.17	611	614	25	635	103668
317.0	6514	601665	1.17	624	628	17	641	110504
317.5	6829	641092	1.16	638	641	8	646	117581
318.0	7151	681997	1.16	651	655	0	651	124903

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 336 AT DISTANCE= 6770 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
302.0	68	2824	1.00	23	27	230	253	658
302.5	79	3537	1.00	24	29	230	254	814
303.0	112	4452	1.41	126	131	96	256	502
303.5	192	5971	2.36	172	177	85	257	747
304.0	280	8308	2.67	183	189	83	267	1201
304.5	375	11632	2.48	197	203	82	279	1864
305.0	477	16134	2.12	211	217	81	292	2794
305.5	586	22219	1.77	225	231	79	304	4036
306.0	703	30619	1.48	239	244	77	316	5619
306.5	824	37961	1.45	248	254	76	323	7094

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 336 AT DISTANCE= 6770 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
307.0	950	46141	1.41	257	263	75	331	8718
307.5	1081	55201	1.39	266	272	73	339	10500
308.0	1216	65203	1.36	275	281	72	347	12450
308.5	1357	75853	1.35	289	295	71	360	14383
309.0	1505	87547	1.33	303	309	70	372	16495
309.5	1660	100390	1.31	316	323	68	385	18805
310.0	1821	113588	1.32	330	337	67	397	21135
310.5	1989	127643	1.31	339	346	64	404	23823
311.0	2161	142556	1.31	349	356	62	410	26665
311.5	2337	158334	1.30	358	365	59	417	29658
312.0	2519	174981	1.30	368	375	56	424	32805
312.5	2705	192803	1.29	376	383	54	430	36143
313.0	2895	211507	1.29	385	392	52	437	39631
313.5	3090	231096	1.29	394	401	50	444	43269
314.0	3289	251576	1.28	402	410	48	450	47056
314.5	3492	272954	1.28	411	418	46	457	50994
315.0	3700	295236	1.28	420	427	44	464	55084
315.5	3912	318429	1.28	428	436	42	470	59327
316.0	4128	342539	1.28	437	444	40	477	63723
316.5	4351	361758	1.28	456	463	30	486	67494
317.0	4584	382317	1.28	474	482	20	494	71486
317.5	4825	404222	1.28	493	500	10	503	75707
318.0	5076	427480	1.28	511	519	0	511	80161
318.5	5334	458410	1.28	520	528	0	520	85664
319.0	5596	490418	1.28	529	537	0	529	91327
319.5	5862	523508	1.28	537	546	0	537	97151
320.0	6133	557684	1.28	546	556	0	546	103135

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 337 AT DISTANCE= 6970 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
304.0	41	1830	1.00	18	20	200	218	357
304.5	56	2547	1.21	42	44	196	238	335
305.0	83	3475	1.72	67	69	192	259	403
305.5	124	4666	2.40	95	97	184	279	517
306.0	181	6162	3.24	135	137	176	311	661
306.5	255	8204	3.81	157	159	167	324	944
307.0	338	10707	4.09	176	178	158	334	1316
307.5	431	13664	4.22	195	197	148	343	1771
308.0	531	17510	3.96	206	209	146	352	2430
308.5	636	22556	3.43	213	215	143	356	3371
309.0	744	28800	2.89	219	221	141	360	4572

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 337 AT DISTANCE= 6970 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
309.5	855	36483	2.42	225	228	139	364	6071
310.0	969	45986	2.02	232	234	136	368	7908
310.5	1086	55102	1.85	237	240	134	371	9700
311.0	1206	64588	1.74	243	245	132	374	11551
311.5	1329	74090	1.69	248	251	129	377	13410
312.0	1454	84207	1.65	254	256	127	381	15383
312.5	1611	86592	2.04	318	321	66	384	14386
313.0	1772	99291	1.93	329	332	58	387	16787
313.5	1939	113697	1.82	339	342	51	390	19518
314.0	2112	129343	1.72	350	353	43	393	22460
314.5	2291	142918	1.71	367	370	32	399	24852
315.0	2479	157436	1.70	384	387	22	405	27423
315.5	2674	172926	1.69	400	404	11	411	30179
316.0	2879	189416	1.68	417	420	0	417	33126
316.5	3090	207317	1.65	427	431	0	427	36688
317.0	3306	226304	1.63	437	441	0	437	40444
317.5	3526	246371	1.60	446	451	0	446	44390
318.0	3752	267514	1.58	456	461	0	456	48523
318.5	3984	286563	1.59	475	481	0	475	51959
319.0	4227	307145	1.59	494	500	0	494	55630
319.5	4478	329219	1.59	512	519	0	512	59535
320.0	4739	352763	1.59	531	538	0	531	63678
320.5	5008	379608	1.57	544	552	0	544	68652
321.0	5283	407677	1.56	558	566	0	558	73833
321.5	5565	436977	1.55	571	580	0	571	79221
322.0	5854	467519	1.54	584	593	0	584	84818

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 338 AT DISTANCE= 7148 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
306.0	60	1839	1.20	35	35	66	101	409
306.5	80	2411	1.16	45	46	63	108	558
307.0	105	3239	1.13	56	57	60	116	767
307.5	135	4390	1.10	67	67	58	124	1044
308.0	196	6334	1.39	147	148	55	202	1091
308.5	274	8977	1.64	162	163	53	216	1571
309.0	359	12178	1.80	178	179	51	229	2150
309.5	452	15933	1.91	194	195	48	243	2826
310.0	553	20247	2.00	210	211	46	256	3599
310.5	660	25431	1.99	220	221	44	264	4597
311.0	773	31678	1.91	230	231	42	272	5813
311.5	891	38431	1.86	246	247	16	279	7053

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BRANCH AT HERNDON
SECID= 338 AT DISTANCE= 7148 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
312.0	1020	46312	1.80	269	271	16	287	8397
312.5	1158	56603	1.66	280	283	15	296	10355
313.0	1301	68898	1.52	290	292	15	305	12671
313.5	1448	81194	1.46	299	301	15	313	14960
314.0	1599	93223	1.44	308	311	14	322	17215
314.5	1755	106195	1.43	316	319	14	330	19648
315.0	1916	119455	1.42	328	331	10	338	22008
315.5	2083	133482	1.43	341	344	5	346	24462
316.0	2257	148435	1.43	354	357	0	354	27069

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PAGE 1 OF PROFILE NOTES FOR: FOLLY L CK BRANCH AT HERNDON
INITIAL VALUES ARE: Q = 1900. H = 282.60

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

322,	KU/KD < 0.7 OR > 1.4		,USED COMPUTED WSU
323,	KU/KD < 0.7 OR > 1.4		,USED COMPUTED WSU
325,	KU/KD < 0.7 OR > 1.4		,USED COMPUTED WSU
326,	KU/KD < 0.7 OR > 1.4		,USED COMPUTED WSU
327,	KU/KD < 0.7 OR > 1.4		,USED COMPUTED WSU
328,	KU/KD < 0.7 OR > 1.4		,USED COMPUTED WSU
329,	KU/KD < 0.7 OR > 1.4		,USED COMPUTED WSU
332,	KU/KD < 0.7 OR > 1.4		,USED COMPUTED WSU
333,	KU/KD < 0.7 OR > 1.4		,USED COMPUTED WSU
334,	KU/KD < 0.7 OR > 1.4		,USED COMPUTED WSU
335,	KU/KD < 0.7 OR > 1.4		,USED COMPUTED WSU
336,	KU/KD < 0.7 OR > 1.4		,USED COMPUTED WSU

X-Sec, 321-338

SECID. KU/KD

322/321 → 28,830/19,513 = 1.47

323/322 → 20,015/29,451 = .68

324/323 → 17,317/20,015 = .87

325/321 → 23,970/19,317 = 1.67

326/325 → 18,559/28,970 = .64

327/326 → 29,944/14,558 = 2.10

328/327 → 18,250/29,744 = .87

329/328 → 29,153/18,250 = 1.54

333/329 → 31,999/28,153 = 1.14

SECID KU/KD

321/339 → 25,498/31,997 = .80

332/321 → 15,856/25,498 = .61

333/332 → 31,059/15,856 = 1.95

334/333 → 16,156/30,259 = .54

335/334 → 29,213/16,156 = 1.68

336/335 → 16,517/27,212 = .61

337/336 → 16,582/21,562 = .76

338/337 → 16,535/12,583 = 1.32

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 25,DATE= 2/18/77

Q10

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON
PAGE 1 OF 2

SECID AT WS ELEV	DISTANCE/ HV	LENGTH/ HF	DISCHARGE/ HE	AREA / EG	CONVEYANCE/ V	ALPHA/ FN	LEW / ACC	REW *ID*
321 AT	3458 /	0 /	1900. /	505. /	19513. /	2.32 /	114. /	285.
282.60 /	0.51 /		/	283.11 /	3.76 /	0.48/		*IS*
322 AT	3621 /	163 /	1900. /	760. /	28630. /	2.10 /	168. /	366.
283.96 /	0.20 /	1.05 /	0.0 /	284.17 /	2.50 /	0.34 /	0.003	*XS*
323 AT	3778 /	157 /	1900. /	554. /	20015. /	2.67 /	120. /	322.
284.81 /	0.49 /	0.99 /	0.14 /	285.30 /	3.43 /	0.51 /	0.000	*XS*
324 AT	3943 /	165 /	1900. /	497. /	17317. /	2.57 /	108. /	260.
286.48 /	0.58 /	1.72 /	0.05 /	287.06 /	3.82 /	0.53 /	0.000	*XS*
325 AT	4093 /	150 /	1900. /	660. /	28970. /	1.58 /	112. /	289.
287.94 /	0.20 /	1.08 /	0.0 /	288.14 /	2.88 /	0.32 /	0.000	*XS*
326 AT	4279 /	186 /	1900. /	532. /	18558. /	2.89 /	97. /	300.
289.00 /	0.57 /	1.25 /	0.19 /	289.58 /	3.57 /	0.53 /	0.000	*XS*
327 AT	4458 /	179 /	1900. /	963. /	39044. /	1.75 /	69. /	357.
290.37 /	0.11 /	0.89 /	0.0 /	290.48 /	1.97 /	0.15 /	0.004	*XS*
328 AT	4665 /	207 /	1900. /	645. /	18250. /	2.39 /	129. /	381.
291.31 /	0.32 /	1.05 /	0.11 /	291.63 /	2.95 /	0.24 /	0.001	*XS*
329 AT	4978 /	313 /	1800. /	837. /	28153. /	1.77 /	60. /	335.
293.59 /	0.13 /	2.08 /	0.0 /	293.72 /	2.15 /	0.22 /	0.002	*XS*
330 AT	5220 /	242 /	1800. /	830. /	31977. /	1.46 /	36. /	282.
294.49 /	0.11 /	0.87 /	0.0 /	294.60 /	2.17 /	0.18 /	0.004	*XS*
331 AT	5491 /	271 /	1800. /	733. /	25498. /	1.94 /	83. /	333.
295.49 /	0.18 /	1.08 /	0.04 /	295.67 /	2.46 /	0.19 /	-0.039	*XS*
332 AT	5768 /	277 /	1800. /	639. /	15436. /	3.80 /	61. /	301.
297.63 /	0.47 /	2.28 /	0.14 /	298.10 /	2.82 /	0.20 /	0.004	*XS*
333 AT	6025 /	257 /	1800. /	839. /	30059. /	1.77 /	174. /	440.
299.77 /	0.13 /	1.79 /	0.0 /	299.90 /	2.15 /	0.16 /	0.004	*XS*
334 AT	6282 /	257 /	1800. /	553. /	16156. /	3.29 /	296. /	565.
301.27 /	0.54 /	1.71 /	0.21 /	301.81 /	3.26 /	0.51 /	-0.007	*XS*
335 AT	6500 /	218 /	1800. /	707. /	27212. /	2.21 /	230. /	461.
303.20 /	0.22 /	1.61 /	0.0 /	303.42 /	2.55 /	0.33 /	0.001	*XS*

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F1-5

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON
PAGE 2 OF 2

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW								
WS ELEV / HV / HF / HE / EG / V / FN / ACC *ID*								
336 AT	6770 /	270 /	1800. /	485. /	16517. /	2.10 /	80. /	293.
305.04 /	0.45 /	1.95 /	0.11 /	305.49 /	3.71 /	0.52 /	0.003	*XS*
337 AT	6970 /	200 /	1400. /	397. /	12568. /	4.19 /	151. /	340.
307.32 /	0.81 /	2.47 /	0.18 /	308.13 /	3.52 /	0.66 /	0.[illegible]	*XS*
338 AT	7148 /	178 /	1400. /	466. /	16535. /	1.93 /	48. /	244.
309.57 /	0.27 /	1.68 /	0.0 /	309.84 /	3.00 /	0.43 /	0.033	*XS*

END OF THIS PROFILE

Remove this X-sec

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 27,DATE= 2/18/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK BRANCH AT HERNDON
INITIAL VALUES ARE: Q = 1900. H = 282.90

SECID	ERROR OR WARNING MESSAGE	INTERMEDIATE RESULTS(IF ANY)	ACTION TAKEN
323	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
325	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
326	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
327	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
328	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
329	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
332	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
333	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
334	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
335	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
336	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON
PAGE 1 OF 2

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
321 AT	3458	0	1900.	558.	22020.	2.28	110.	291.
282.90	0.41			283.31	3.40	0.42		*IS*
322 AT	3621	163	1900.	772.	29489.	2.06	168.	366.
284.03	0.19	0.91	0.0	284.22	2.46	0.33	0.002	*XS*
323 AT	3778	157	1900.	559.	20263.	2.65	120.	322.
284.83	0.48	0.95	0.14	285.31	3.40	0.50	-0.000	*XS*
324 AT	3943	165	1900.	497.	17304.	2.57	108.	260.
286.48	0.58	1.70	0.05	287.06	3.82	0.53	0.000	*XS*
325 AT	4093	150	1900.	660.	28970.	1.58	112.	289.
287.94	0.20	1.08	0.0	288.14	2.88	0.32	0.000	*XS*
326 AT	4279	186	1900.	532.	18558.	2.89	97.	300.
289.00	0.57	1.25	0.19	289.58	3.57	0.53	0.000	*XS*
327 AT	4458	179	1900.	963.	39044.	1.75	69.	357.
290.37	0.11	0.89	0.0	290.48	1.97	0.15	0.004	*XS*
328 AT	4665	207	1900.	645.	18250.	2.39	129.	381.
291.31	0.32	1.05	0.11	291.63	2 95	0.24	0.001	*XS*
329 AT	4978	313	1800.	837.	28153.	1.77	60.	335.
293.59	0.13	2.08	0.0	293.72	2.15	0.22	0.002	*XS*
330 AT	5220	242	1800.	830.	31977.	1.46	36.	282.
294.49	0.11	0.87	0.0	294.60	2.17	0.18	0.004	*XS*
331 AT	5491	271	1800.	733.	25498.	1.94	83.	333.
295.49	0.18	1.08	0.04	295.67	2.46	0.19	-0.039	*XS*
332 AT	5768	277	1800.	639.	15436.	3.80	61.	301.
297.63	0.47	2.28	0.14	298.10	2.82	0.20	0.004	*XS*
333 AT	6025	257	1800.	839.	30059.	1.77	174.	440.
299.77	0.13	1.79	0.0	299.90	2.15	0.16	0.004	*XS*
334 AT	6282	257	1800.	553.	16156.	3.29	296.	565.
301.27	0.54	1.71	0.21	301.81	3.26	0.51	-0.007	*XS*
335 AT	6500	218	1800.	707.	27212.	2.21	230.	461.
303.20	0.22	1.61	0.0	303.42	2.55	0.33	0.001	*XS*

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW *ID*
336 AT	6770	270	1800.	485.	16517.	2.10	80.	293.
305.04	0.45	1.95	0.11	305.49	3.71	0.52	0.003	*XS*
337 AT	6970	200	1400.	397.	12568.	4.19	151.	340.
307.32	0.81	2.47	0.18	308.13	3.52	0.66	0.001	*XS*
338 AT	7148	178	1400.	466.	16535.	1.93	48.	244.
309.57	0.27	1.68	0.0	309.84	3.00	0.43	0.033	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 30.DATE= 2/18/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK BRANCH AT HERNDON
INITIAL VALUES ARE: Q = 1900. H = 283.20

SECID	ERROR OR WARNING MESSAGE	INTERMEDIATE RESULTS(IF ANY)	ACTION TAKEN
323	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
325	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
326	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
327	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
328	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
329	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
332	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
333	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
334	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
335	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
336	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON
PAGE 1 OF 2

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
321 AT	3458	0	1900.	614.	24801.	2.24	106.	297.
283.20	0.33			283.53	3.09	0.38		*IS*
322 AT	3621	163	1900.	792.	30726.	2.02	166.	367.
284.13	0.18	0.77	0.0	284.31	2.40	0.32	0.000	*XS*
323 AT	3778	157	1900.	567.	20702.	2.63	120.	322.
284.88	0.46	0.89	0.14	285.33	3.35	0.49	-0.002	*XS*
324 AT	3943	165	1900.	497.	17286.	2.57	108.	260.
286.48	0.59	1.66	0.06	287.06	3.82	0.53	0.001	*XS*
325 AT	4093	150	1900.	666.	29456.	1.57	112.	289.
287.98	0.20	1.06	0.0	288.18	2.85	0.31	0.049	*XS*
326 AT	4279	186	1900.	527.	18395.	2.88	97.	300.
288.98	0.58	1.24	0.19	289.56	3.61	0.53	-0.048	*XS*
327 AT	4458	179	1900.	961.	38877.	1.76	69.	357.
290.36	0.11	0.90	0.0	290.47	1.98	0.15	0.004	*XS*
328 AT	4665	207	1900.	644.	18219.	2.40	129.	381.
291.31	0.32	1.05	0.11	291.63	2.95	0.24	0.001	*XS*
329 AT	4978	313	1800.	838.	28165.	1.77	60.	335.
293.60	0.13	2.09	0.0	293.72	2.15	0.22	0.002	*XS*
330 AT	5220	242	1800.	830.	31980.	1.46	36.	282.
294.49	0.11	0.87	0.0	294.60	2.17	0.18	0.005	*XS*
331 AT	5491	271	1800.	733.	25501.	1.94	83.	333.
295.49	0.18	1.08	0.04	295.67	2.46	0.19	-0.039	*XS*
332 AT	5768	277	1800.	639.	15433.	3.80	61.	301.
297.63	0.47	2.28	0.14	298.10	2.82	0.20	0.004	*XS*
333 AT	6025	257	1800.	839.	30059.	1.77	174.	440.
299.77	0.13	1.79	0.0	299.90	2.15	0.16	0.004	*XS*
334 AT	6282	257	1800.	553.	16156.	3.29	296.	565.
301.27	0.54	1.71	0.21	301.81	3.26	0.51	-0.007	*XS*
335 AT	6500	218	1800.	707.	27212.	2.21	230.	461.
303.20	0.22	1.61	0.0	303.42	2.55	0.33	0.001	*XS*

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW
WS ELEV / HV / HF / HE / EG / V / FN / ACC / *ID*
336 AT 6770 / 270 / 1800. / 485. / 16517. / 2.10 / 80. / 293.
305.04 / 0.45 / 1.95 / 0.11 / 305.49 / 3.71 / 0.52 / 0.003 *XS*
337 AT 6970 / 200 / 1400. / 397. / 12568. / 4.19 / 151. / 340.
307.32 / 0.81 / 2.47 / 0.18 / 308.13 / 3.52 / 0.66 / 0.001 *XS*
338 AT 7148 / 178 / 1400. / 466. / 16535. / 1.93 / 48. / 244.
309.57 / 0.27 / 1.68 / 0.0 / 309.84 / 3.00 / 0.43 / 0.033 *XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 33,DATE= 2/18/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK BRANCH AT HERNDON
INITIAL VALUES ARE: Q = 3000. H = 283.70

SECID	ERROR OR WARNING MESSAGE	INTERMEDIATE RESULTS(IF ANY)	ACTION TAKEN
322	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
325	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
326	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
327	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
328	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
332	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
333	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
334	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
335	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
336	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
337	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
338	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU

Q50

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON
PAGE 1 OF 2

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
321 AT	3458 /	0 /	3000. /	714. /	30136. /	2.14 /	98. /	307.
283.70 /	0.59 /		/	284.29 /	4.20 /	0.50/		*IS*
322 AT	3621 /	163 /	3000. /	1008. /	44278. /	1.77 /	147. /	371.
285.14 /	0.24 /	1.10 /	0.0 /	285.39 /	2.98 /	0.19 /	-0.000	*XS*
323 AT	3778 /	157 /	3000. /	794. /	35159. /	1.92 /	112. /	329.
285.96 /	0.43 /	0.91 /	0.09 /	286.39 /	3.78 /	0.31 /	-0.000	*XS*
324 AT	3943 /	165 /	3000. /	651. /	27196. /	1.88 /	99. /	262.
287.46 /	0.62 /	1.55 /	0.10 /	288.08 /	4.61 /	0.54 /	0.044	*XS*
325 AT	4093 /	150 /	3000. /	846. /	42894. /	1.40 /	102. /	291.
288.96 /	0.27 /	1.16 /	0.0 /	289.23 /	3.55 /	0.29 /	-0.004	*XS*
326 AT	4279 /	186 /	3000. /	769. /	26755. /	3.41 /	82. /	303.
290.15 /	0.81 /	1.46 /	0.27 /	290.96 /	3.90 /	0.60 /	0.000	*XS*
327 AT	4458 /	179 /	3000. /	1376. /	65831. /	1.52 /	60. /	363.
291.76 /	0.11 /	0.91 /	0.0 /	291.88 /	2.18 /	0.15 /	0.001	*XS*
328 AT	4665 /	207 /	3000. /	974. /	35268. /	1.69 /	105. /	395.
292.51 /	0.25 /	0.80 /	0.07 /	292.76 /	3.08 /	0.25 /	0.016	*XS*
329 AT	4978 /	313 /	2900. /	1069. /	42938. /	1.40 /	57. /	353.
294.41 /	0.16 /	1.80 /	0.0 /	294.57 /	2.71 /	0.26 /	0.008	*XS*
330 AT	5220 /	242 /	2900. /	1061. /	45577. /	1.34 /	35. /	292.
295.41 /	0.16 /	1.04 /	0.0 /	295.56 /	2.73 /	0.21 /	-0.044	*XS*
331 AT	5491 /	271 /	2900. /	984. /	44197. /	1.39 /	79. /	345.
296.53 /	0.19 /	1.13 /	0.02 /	296.71 /	2.95 /	0.24 /	0.002	*XS*
332 AT	5768 /	277 /	2900. /	864. /	25191. /	2.68 /	58. /	322.
298.53 /	0.47 /	2.09 /	0.14 /	299.00 /	3.36 /	0.25 /	0.048	*XS*
333 AT	6025 /	257 /	2900. /	1082. /	46944. /	1.41 /	170. /	447.
300.67 /	0.16 /	1.83 /	0.0 /	300.83 /	2.68 /	0.20 /	0.002	*XS*
334 AT	6282 /	257 /	2900. /	818. /	27089. /	2.45 /	284. /	581.
302.21 /	0.48 /	1.70 /	0.16 /	302.69 /	3.54 /	0.50 /	0.001	*XS*
335 AT	6500 /	218 /	2900. /	915. /	41658. /	1.67 /	222. /	479.
304.05 /	0.26 /	1.62 /	0.0 /	304.31 /	3.17 /	0.35 /	0.001	*XS*

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WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON
PAGE 2 OF 2

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
336 AT 6770 / 305.89	270 / 0.44	2900. / 1.92	676. / 0.09	28451. / 306.33	1.54 / 4.29	77. / 0.38	314. / 0.008	*XS*
337 AT 6970 / 308.14	200 / 1.01	2300. / 2.53	560. / 0.28	18763. / 309.14	3.83 / 4.11	145. / 0.74	353. / -0.000	*XS*
338 AT 7148 / 310.64	178 / 0.34	2300. / 1.86	691. / 0.0	27043. / 310.98	1.97 / 3.33	43. / 0.45	266. / -0.022	*XS*

END OF THIS PROFILE

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK BRANCH AT HERNDON
INITIAL VALUES ARE: Q = 3000. H = 284.00

SECID	ERROR OR WARNING MESSAGE	INTERMEDIATE RESULTS (IF ANY)	ACTION TAKEN
325	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
326	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
327	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
328	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
332	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
333	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
334	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
335	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
336	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
337	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
338	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON
PAGE 1 OF 2

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
321 AT	3458	0	3000.	778.	33857.	2.07	94.	313.
284.00	0.48			284.48	3.85	0.45		*IS*
322 AT	3621	163	3000.	1021.	45076.	1.77	146.	371.
285.20	0.24	0.96	0.0	285.44	2.94	0.19	-0.000	*XS*
323 AT	3778	157	3000.	793.	35037.	1.93	112.	329.
285.95	0.43	0.89	0.10	286.38	3.78	0.31	-0.049	*XS*
324 AT	3943	165	3000.	650.	27128.	1.88	99.	262.
287.45	0.62	1.56	0.10	288.08	4.61	0.54	0.035	*XS*
325 AT	4093	150	3000.	845.	4[illegible]98.	1.40	102.	291.
288.95	0.28	1.16	0.0	289.23	3.55	0.29	-0.011	*XS*
326 AT	4279	186	3000.	769.	26731.	3.41	82.	303.
290.15	0.81	1.46	0.27	290.96	3.90	0.60	-0.000	*XS*
327 AT	4458	179	3000.	1376.	65815.	1.52	60.	363.
291.76	0.11	0.92	0.0	291.87	2.18	0.15	0.001	*XS*
328 AT	4665	207	3000.	973.	35255.	1.69	105.	395.
292.51	0.25	0.80	0.07	292.76	3.08	0.25	0.015	*XS*
329 AT	4978	313	2900.	1069.	42934.	1.40	57.	353.
294.41	0.16	1.80	0.0	294.57	2.71	0.26	0.007	*XS*
330 AT	5220	242	2900.	1061.	45573.	1.34	35.	292.
295.41	0.16	1.04	0.0	295.56	2.73	0.21	-0.045	*XS*
331 AT	5491	271	2900.	984.	44197.	1.39	79.	345.
296.53	0.19	1.13	0.02	296.71	2.95	0.24	0.002	*XS*
332 AT	5768	277	2900.	864.	25191.	2.68	58.	322.
298.53	0.47	2.09	0.14	299.00	3.36	0.25	0.048	*XS*
333 AT	6025	257	2900.	1082.	46944.	1.41	170.	447.
300.67	0.16	1.83	0.0	300.83	2.68	0.20	0.002	*XS*
334 AT	6282	257	2900.	818.	27089.	2.45	284.	581.
302.21	0.48	1.70	0.16	302.69	3.54	0.50	0.001	*XS*
335 AT	6500	218	2900.	915.	41658.	1.67	222.	479.
304.05	0.26	1.62	0.0	304.31	3.17	0.35	0.001	*XS*

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON
PAGE 2 OF 2

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
336 AT	6770	270	2900.	676.	28451.	1.54	77.	314.
305.89	0.44	1.92	0.09	306.33	4.29	0.38	0.008	*XS*
337 AT	6970	200	2300.	560.	18763.	3.83	145.	353.
308.14	1.01	2.53	0.28	309.14	4.11	0.74	-0.000	*XS*
338 AT	7148	178	2300.	691.	27043.	1.97	43.	266.
310.64	0.34	1.86	0.0	310.98	3.33	0.45	-0.022	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 39.DATE= 2/18/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK BRANCH AT HERNDON
INITIAL VALUES ARE: Q = 3000. H = 284.30

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

325	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
326	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
327	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
328	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
332	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
333	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
334	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
335	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
336	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
337	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
338	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU

Q 50

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
321 AT 3458 / 284.30	0 / 0.38	3000. /	845. / 284.68	38453. / 3.55	1.94 / 0.40	91. /	314.	*IS*
322 AT 3621 / 285.30	163 / 0.23	3000. / 0.82	1043. / 0.0	46420. / 285.53	1.76 / 2.88	145. / 0.18	371. / 0.024	*XS*
323 AT 3778 / 286.05	157 / 0.39	3000. / 0.83	814. / 0.08	36738. / 286.44	1.87 / 3.69	112. / 0.30	329. / 0.005	*XS*
324 AT 3943 / 287.44	165 / 0.63	3000. / 1.50	648. / 0.12	26953. / 288.07	1.89 / 4.63	100. / 0.55	262. / 0.006	*XS*
325 AT 4093 / 288.94	150 / 0.28	3000. / 1.18	842. / 0.0	42606. / 289.21	1.40 / 3.56	102. / 0.29	291. / -0.030	*XS*
326 AT 4279 / 290.14	186 / 0.81	3000. / 1.47	767. / 0.27	26684. / 290.95	3.41 / 3.91	82. / 0.60	303. / -0.000	*XS*
327 AT 4458 / 291.76	179 / 0.11	3000. / 0.92	1375. / 0.0	65779. / 291.87	1.52 / 2.18	60. / 0.15	363. / 0.001	*XS*
328 AT 4665 / 292.51	207 / 0.25	3000. / 0.80	973. / 0.07	35222. / 292.76	1.69 / 3.08	105. / 0.25	395. / 0.014	*XS*
329 AT 4978 / 294.41	313 / 0.16	2900. / 1.80	1069. / 0.0	42938. / 294.57	1.40 / 2.71	57. / 0.26	353. / 0.007	*XS*
330 AT 5220 / 295.41	242 / 0.16	2900. / 1.04	1061. / 0.0	45577. / 295.56	1.34 / 2.73	35. / 0.21	292. / -0.044	*XS*
331 AT 5491 / 296.53	271 / 0.19	2900. / 1.13	984. / 0.02	44197. / 296.71	1.39 / 2.95	79. / 0.24	345. / 0.002	*XS*
332 AT 5768 / 298.53	277 / 0.47	2900. / 2.09	864. / 0.14	25191. / 299.00	2.68 / 3.36	58. / 0.25	322. / 0.048	*XS*
333 AT 6025 / 300.67	257 / 0.16	2900. / 1.83	1082. / 0.0	46944. / 300.83	1.41 / 2.68	170. / 0.20	447. / 0.002	*XS*
334 AT 6282 / 302.21	257 / 0.48	2900. / 1.70	818. / 0.16	27089. / 302.69	2.45 / 3.54	284. / 0.50	581. / 0.001	*XS*
335 AT 6500 / 304.05	218 / 0.26	2900. / 1.62	915. / 0.0	41658. / 304.31	1.67 / 3.17	222. / 0.35	479. / 0.001	*XS*

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	V	ALPHA / FN	LEW / ACC	REW / *ID*
336 AT 6770 / 305.89	270 / 0.44	2900. / 1.92	676. / 0.09	28451. / 306.33	1.54 / 4.29	77. / 0.38	314. / 0.008	*XS*
337 AT 6970 / 308.14	200 / 1.01	2300. / 2.53	560. / 0.28	18763. / 309.14	3.83 / 4.11	145. / 0.74	353. / -0.000	*XS*
338 AT 7148 / 310.64	178 / 0.34	2300. / 1.86	691. / 0.0	27043. / 310.98	1.97 / 3.33	43. / 0.45	266. / -0.022	*XS*

END OF THIS PROFILE

P50

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 42,DATE= 2/18/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK BRANCH AT HERNDON
INITIAL VALUES ARE: Q = 3600. H = 284.10

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

322,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
324,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
325,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
326,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
327,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
328,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
332,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
333,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
334,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
335,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
337,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
338,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 43•DATE= 2/18/77

Q 100

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON
PAGE 1 OF 2

SECID AT WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW *ID*
321 AT	3458 /	0 /	3600. /	800. /	35325. /	2.03 /	93. /	313.
284.10 /	0.64 /			284.74 /	4.50 /	0.52/		*IS*
322 AT	3621 /	163 /	3600. /	1112. /	50738. /	1.73 /	139. /	372.
285.60 /	0.28 /	1.18 /	0.0 /	285.88 /	3.24 /	0.20 /	-0.034	*XS*
323 AT	3778 /	157 /	3600. /	900. /	44350. /	1.66 /	111. /	332.
286.44 /	0.41 /	0.90 /	0.07 /	286.86 /	4.00 /	0.33 /	0.004	*XS*
324 AT	3943 /	165 /	3600. /	1.6. /	30966. /	1.82 /	95. /	263.
287.85 /	0.72 /	1.56 /	0.15 /	288.57 /	5.03 /	0.58 /	0.001	*XS*
325 AT	4093 /	150 /	3600. /	95.. /	50369. /	1.38 /	97. /	293.
289.50 /	0.31 /	1.25 /	0.0 /	289.81 /	3.78 /	0.30 /	0.000	*XS*
326 AT	4279 /	186 /	3600. /	904. /	32349. /	3.42 /	78. /	305.
290.75 /	0.84 /	1.48 /	0.27 /	291.60 /	3.98 /	0.60 /	0.037	*XS*
327 AT	4458 /	179 /	3600. /	1565. /	79530. /	1.47 /	56. /	365.
292.38 /	0.12 /	0.90 /	0.0 /	292.50 /	2.30 /	0.15 /	0.000	*XS*
328 AT	4665 /	207 /	3600. /	1133. /	46736. /	1.46 /	98. /	405.
293.05 /	0.23 /	0.72 /	0.05 /	293.28 /	3.18 /	0.26 /	0.001	*XS*
329 AT	4978 /	313 /	3400. /	1186. /	49805. /	1.36 /	56. /	365.
294.80 /	0.17 /	1.65 /	0.0 /	294.97 /	2.87 /	0.27 /	0.047	*XS*
330 AT	5220 /	242 /	3400. /	1179. /	53090. /	1.31 /	34. /	297.
295.86 /	0.17 /	1.06 /	0.0 /	296.03 /	2.88 /	0.21 /	0.001	*XS*
331 AT	5491 /	271 /	3400. /	1086. /	54650. /	1.26 /	77. /	348.
296.93 /	0.19 /	1.08 /	0.01 /	297.12 /	3.13 /	0.25 /	0.003	*XS*
332 AT	5768 /	277 /	3400. /	937. /	29128. /	2.39 /	57. /	328.
298.80 /	0.49 /	2.01 /	0.15 /	299.29 /	3.63 /	0.27 /	0.002	*XS*
333 AT	6025 /	257 /	3400. /	1178. /	53764. /	1.36 /	168. /	451.
301.01 /	0.18 /	1.90 /	0.0 /	301.19 /	2.89 /	0.21 /	0.001	*XS*
334 AT	6282 /	257 /	3400. /	923. /	32938. /	2.10 /	280. /	585.
302.56 /	0.44 /	1.68 /	0.13 /	303.00 /	3.68 /	0.48 /	0.001	*XS*
335 AT	6500 /	218 /	3400. /	981. /	47534. /	1.52 /	220. /	485.
304.31 /	0.28 /	1.61 /	0.0 /	304.59 /	3.46 /	0.26 /	-0.019	*XS*

Converged here

B100

271

271

283

305

265
good to here

F1 - 11

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON
PAGE 2 OF 2

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW								
WS ELEV / HV / HF / HE / EG / V / FN / ACC *ID*								
336 AT	6770 /	270 /	3400. /	748. /	33289. /	1.47 /	77. /	319.
306.19 /	0.47 /	1.97 /	0.09 /	306.66 /	4.55 /	0.41 /	0.003	*XS*
337 AT	6970 /	200 /	2800. /	632. /	22356. /	3.45 /	143. /	356.
308.48 /	1.05 /	2.58 /	0.29 /	309.53 /	4.43 /	0.77 /	0.001	*XS*
338 AT	7148 /	178 /	2800. /	790. /	32685. /	1.90 /	41. /	273.
311.07 /	0.37 /	1.91 /	0.0 /	311.44 /	3.54 /	0.46 /	0.001	*XS*

END OF THIS PROFILE

B

Resurveyed this x-sec

CF

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 45,DATE= 2/18/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK BRANCH AT HERNDON
INITIAL VALUES ARE: Q = 3600. H = 284.40

SECID	ERROR OR WARNING MESSAGE	INTERMEDIATE RESULTS(IF ANY)	ACTION TAKEN
324	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
325	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
326	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
327	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
328	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
332	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
333	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
334	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
335	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
337	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
338	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON

Q 100

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
321 AT	3458 /	0 /	3600. /	867. /	40120. /	1.89 /	90. /	315.
284.40 /	0.51 /		/	284.91 /	4.15 /	0.46/		*IS*
322 AT	3621 /	163 /	3600. /	1124. /	51486. /	1.73 /	138. /	373.
285.65 /	0.28 /	1.02 /	0.0 /	285.93 /	3.20 /	0.20 /	-0.005	*XS*
323 AT	3778 /	157 /	3600. /	906. /	44806. /	1.66 /	110. /	332.
286.47 /	0.41 /	0.88 /	0.07 /	286.88 /	3.97 /	0.33 /	0.003	*XS*
324 AT	3943 /	165 /	3600. /	717. /	31024. /	1.82 /	95. /	263.
287.86 /	0.71 /	1.54 /	0.15 /	288.57 /	5.02 /	0.58 /	0.001	*XS*
325 AT	4093 /	150 /	3600. /	951. /	50382. /	1.38 /	97. /	293.
289.51 /	0.31 /	1.24 /	0.0 /	289.81 /	3.78 /	0.30 /	0.000	*XS*
326 AT	4279 /	186 /	3600. /	905. /	32359. /	3.42 /	78. /	305.
290.76 /	0.84 /	1.48 /	0.27 /	291.60 /	3.98 /	0.60 /	0.038	*XS*
327 AT	4458 /	179 /	3600. /	1565. /	79541. /	1.47 /	56. /	365.
292.38 /	0.12 /	0.90 /	0.0 /	292.50 /	2.30 /	0.15 /	0.001	*XS*
328 AT	4665 /	207 /	3600. /	1133. /	46742. /	1.46 /	98. /	405.
293.05 /	0.23 /	0.72 /	0.05 /	293.28 /	3.18 /	0.26 /	0.001	*XS*
329 AT	4978 /	313 /	3400. /	1187. /	49809. /	1.36 /	56. /	365.
294.80 /	0.17 /	1.65 /	0.0 /	294.97 /	2.87 /	0.27 /	0.047	*XS*
330 AT	5220 /	242 /	3400. /	1179. /	53090. /	1.31 /	34. /	297.
295.86 /	0.17 /	1.06 /	0.0 /	296.03 /	2.88 /	0.21 /	0.001	*XS*
331 AT	5491 /	271 /	3400. /	1086. /	54650. /	1.26 /	77. /	348.
296.93 /	0.19 /	1.08 /	0.01 /	297.12 /	3.13 /	0.25 /	0.003	*XS*
332 AT	5768 /	277 /	3400. /	937. /	29128. /	2.39 /	57. /	328.
298.80 /	0.49 /	2.01 /	0.15 /	299.29 /	3.63 /	0.27 /	0.002	*XS*
333 AT	6025 /	257 /	3400. /	1178. /	53764. /	1.36 /	168. /	451.
301.01 /	0.18 /	1.90 /	0.0 /	301.19 /	2.89 /	0.21 /	0.001	*XS*
334 AT	6282 /	257 /	3400. /	923. /	32938. /	2.10 /	280. /	585.
302.56 /	0.44 /	1.68 /	0.13 /	303.00 /	3.68 /	0.48 /	0.001	*XS*
335 AT	6500 /	218 /	3400. /	981. /	47534. /	1.52 /	220. /	485.
304.31 /	0.28 /	1.61 /	0.0 /	304.59 /	3.46 /	0.26 /	-0.019	*XS*

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
336 AT	6770	270	3400.	748.	33289.	1.47	77.	319.
306.19	0.47	1.97	0.09	306.66	4.55	0.41	0.003	*XS*
337 AT	6970	200	2800.	632.	22356.	3.45	143.	356.
308.48	1.05	2.58	0.29	309.53	4.43	0.77	0.001	*XS*
338 AT	7148	178	2800.	790.	32685.	1.90	41.	273.
311.07	0.37	1.91	0.0	311.44	3.54	0.46	0.001	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 48,DATE= 2/18/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK BRANCH AT HERNDON
INITIAL VALUES ARE: Q = 3600. H = 284.70

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

324	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
325	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
326	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
327	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
328	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
332	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
333	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
334	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
335	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
337	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
338	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU

Q 100

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
321 AT	3458 /	0 /	3600. /	935. /	45565. /	1.77 /	87. /	316.
284.70 /	0.41 /		/ 285.11 /	3.85 /	0.32/			*IS*
322 AT	3621 /	163 /	3600. /	1136. /	52244. /	1.72 /	137. /	373.
285.70 /	0.27 /	0.89 /	0.0 /	285.97 /	3.17 /	0.20 /	-0.026	*XS*
323 AT	3778 /	157 /	3600. /	912. /	45218. /	1.65 /	110. /	332.
286.50 /	0.40 /	0.86 /	0.07 /	286.90 /	3.95 /	0.33 /	0.001	*XS*
324 AT	3943 /	165 /	3600. /	718. /	31093. /	1.82 /	95. /	263.
287.86 /	0.71 /	1.52 /	0.16 /	288.57 /	5.01 /	0.58 /	0.001	*XS*
325 AT	4093 /	150 /	3600. /	952. /	50403. /	1.38 /	97. /	293.
289.51 /	0.31 /	1.24 /	0.0 /	289.82 /	3.78 /	0.30 /	0.000	*XS*
326 AT	4270 /	185 /	3600. /	905. /	32374. /	3.42 /	78. /	305.
290.76 /	0.84 /	1.48 /	0.27 /	291.60 /	3.98 /	0.60 /	0.039	*XS*
327 AT	4458 /	179 /	3600. /	1565. /	79547. /	1.47 /	56. /	365.
292.38 /	0.12 /	0.90 /	0.0 /	292.50 /	2.30 /	0.15 /	0.001	*XS*
328 AT	4665 /	207 /	3600. /	1133. /	46742. /	1.46 /	98. /	405.
293.05 /	0.23 /	0.72 /	0.05 /	293.28 /	3.18 /	0.26 /	0.001	*XS*
329 AT	4978 /	313 /	3400. /	1187. /	49809. /	1.36 /	56. /	365.
294.80 /	0.17 /	1.65 /	0.0 /	294.97 /	2.87 /	0.27 /	0.047	*XS*
330 AT	5220 /	242 /	3400. /	1179. /	53090. /	1.31 /	34. /	297.
295.86 /	0.17 /	1.06 /	0.0 /	296.03 /	2.88 /	0.21 /	0.001	*XS*
331 AT	5491 /	271 /	3400. /	1086. /	54650. /	1.26 /	77. /	348.
296.93 /	0.19 /	1.08 /	0.01 /	297.12 /	3.13 /	0.25 /	0.003	*XS*
332 AT	5768 /	277 /	3400. /	937. /	29128. /	2.39 /	57. /	328.
298.80 /	0.49 /	2.01 /	0.15 /	299.29 /	3.63 /	0.27 /	0.002	*XS*
333 AT	6025 /	257 /	3400. /	1178. /	53764. /	1.36 /	168. /	451.
301.01 /	0.18 /	1.90 /	0.0 /	301.19 /	2.89 /	0.21 /	0.001	*XS*
334 AT	6282 /	257 /	3400. /	923. /	32938. /	2.10 /	280. /	585.
302.56 /	0.44 /	1.68 /	0.13 /	303.00 /	3.68 /	0.48 /	0.001	*XS*
335 AT	6500 /	218 /	3400. /	981. /	47534. /	1.52 /	220. /	485.
304.31 /	0.28 /	1.61 /	0.0 /	304.59 /	3.46 /	0.26 /	-0.019	*XS*

Q 100

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON
PAGE 2 OF 2

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
336 AT	6770	270	3400.	748.	33289.	1.47	77.	319.
306.19	0.47	1.97	0.09	306.66	4.55	0.41	0.003	*XS*
337 AT	6970	200	2800.	632.	22356.	3.45	143.	356.
308.48	1.05	2.58	0.29	309.53	4.43	0.77	0.001	*XS*
338 AT	7148	178	2800.	790.	32685.	1.90	41.	273.
311.07	0.37	1.91	0.0	311.44	3.54	0.46	0.001	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 51,DATE= 2/18/77

Q 500

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK BRANCH AT HERNDON
INITIAL VALUES ARE: Q = 4900. H = 284.90

SECID	ERROR OR WARNING MESSAGE	INTERMEDIATE RESULTS(IF ANY)	ACTION TAKEN
325	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
326	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
327	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
328	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
332	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
333	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 52 DATE= 2/18/77

Q 500

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON
PAGE 1 OF 2

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
321 AT 3458 / 284.90	0 / 0.66	4900.	981. /	49308. / 285.56	1.70 / 4.99	85. / 0.41	317.	*IS*
322 AT 3621 / 286.40	163 / 0.35	4900. / 1.23	1305. / 0.0	64576. / 286.75	1.62 / 3.75	128. / 0.22	376. / -0.036	*XS*
323 AT 3778 / 287.33	157 / 0.49	4900. / 0.99	1099. / 0.07	58813. / 287.81	1.58 / 4.46	108. / 0.35	337. / 0.000	*XS*
324 AT 3943 / 288.83	165 / 0.81	4900. / 1.62	887. / 0.16	41562. / 289.64	1.71 / 5.52	82. / 0.34	266. / 0.040	*XS*
325 AT 4093 / 290.58	150 / 0.37	4900. / 1.30	1168. / 0.0	66878. / 290.95	1.35 / 4.19	86. / 0.31	295. / 0.013	*XS*
326 AT 4279 / 291.83	186 / 0.88	4900. / 1.49	1153. / 0.26	44742. / 292.71	3.15 / 4.25	71. / 0.60	308. / 0.014	*XS*
327 AT 4458 / 293.47	179 / 0.14	4900. / 0.90	1908. / 0.0	106581. / 293.61	1.40 / 2.57	48. / 0.16	369. / 0.000	*XS*
328 AT 4665 / 294.09	207 / 0.23	4900. / 0.66	1470. / 0.04	70598. / 294.32	1.32 / 3.33	85. / 0.26	425. / 0.000	*XS*
329 AT 4978 / 295.65	313 / 0.21	4700. / 1.54	1462. / 0.0	66226. / 295.86	1.30 / 3.21	53. / 0.29	391. / 0.001	*XS*
330 AT 5220 / 296.79	242 / 0.21	4700. / 1.14	1428. / 0.0	70865. / 297.00	1.23 / 3.29	32. / 0.23	303. / 0.003	*XS*
331 AT 5491 / 297.92	271 / 0.23	4700. / 1.14	1342. / 0.01	74255. / 298.15	1.22 / 3.50	72. / 0.26	355. / 0.001	*XS*
332 AT 5768 / 299.63	277 / 0.42	4700. / 1.80	1173. / 0.09	45663. / 300.05	1.68 / 4.01	55. / 0.31	348. / 0.001	*XS*
333 AT 6025 / 301.67	257 / 0.24	4700. / 1.86	1367. / 0.0	66983. / 301.91	1.30 / 3.44	165. / 0.24	457. / 0.001	*XS*
334 AT 6282 / 303.33	257 / 0.41	4700. / 1.74	1164. / 0.08	48798. / 303.73	1.61 / 4.04	271. / 0.34	593. / 0.002	*XS*
335 AT 6500 / 304.96	218 / 0.35	4700. / 1.58	1162. / 0.0	62559. / 305.31	1.37 / 4.04	213. / 0.31	499. / 0.001	*XS*

Converged here

B 500

CA 283

CB 293

CC 292

CD 322

CE 286

F1 - 14

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON
PAGE 2 OF 2

SECID AT DIST / WS ELEV	ICE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*	
336 AT 6770 / 306.96	/ 0.55	/ 270 / 2.10	/ 4700. / 0.10	/ 941. / 307.51	/ 45487. / 5.00	/ 1.42 / 0.42	/ 75. / 0.004	/ 331. *XS*	Resurveyed this xsec
337 AT 6970 / 309.21	/ 0.96	/ 200 / 2.49	/ 3800. / 0.21	/ 791. / 310.18	/ 31861. / 4.81	/ 2.68 / 0.35	/ 140. / -0.036	/ 362. *XS*	
338 AT 7148 / 311.67	/ 0.48	/ 178 / 1.98	/ 3800. / 0.0	/ 935. / 312.15	/ 40775. / 4.07	/ 1.86 / 0.51	/ 16. / -0.002	/ 282. *XS*	

CF

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 54,DATE= 2/18/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK BRANCH AT HERNDON
INITIAL VALUES ARE: Q = 4900. H = 285.20

SECID	ERROR OR WARNING MESSAGE	INTERMEDIATE RESULTS(IF ANY)	ACTION TAKEN
324	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
325	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
326	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
327	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
328	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
332	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
333	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU

Q 500

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
321 AT	3458 /	0 /	4900. /	1051. /	54212. /	1.66 /	82. /	318.
285.20 /	0.56 /		/	285.76 /	4.66 /	0.38/		*IS*
322 AT	3621 /	163 /	4900. /	1332. /	66751. /	1.60 /	127. /	376.
286.51 /	0.34 /	1.08 /	0.0 /	286.84 /	3.68 /	0.21 /	-0.000	*XS*
323 AT	3778 /	157 /	4900. /	1112. /	59788. /	1.57 /	108. /	337.
287.38 /	0.48 /	0.94 /	0.07 /	287.86 /	4.41 /	0.35 /	0.000	*XS*
324 AT	3943 /	165 /	4900. /	885. /	41399. /	1.71 /	83. /	266.
288.81 /	0.82 /	1.60 /	0.17 /	289.63 /	5.54 /	0.34 /	0.000	*XS*
325 AT	4093 /	150 /	4900. /	1166. /	66652. /	1.35 /	86. /	295.
290.56 /	0.37 /	1.31 /	0.0 /	290.93 /	4.20 /	0.31 /	-0.000	*XS*
326 AT	4279 /	186 /	4900. /	1150. /	44566. /	3.15 /	71. /	308.
291.81 /	0.89 /	1.50 /	0.26 /	292.70 /	4.26 /	0.60 /	0.005	*XS*
327 AT	4458 /	179 /	4900. /	1907. /	106490. /	1.40 /	48. /	369.
293.47 /	0.14 /	0.91 /	0.0 /	293.61 /	2.57 /	0.16 /	0.000	*XS*
328 AT	4665 /	207 /	4900. /	1469. /	70542. /	1.32 /	85. /	425.
294.09 /	0.23 /	0.66 /	0.04 /	294.31 /	3.34 /	0.26 /	0.000	*XS*
329 AT	4978 /	313 /	4700. /	1462. /	66210. /	1.30 /	53. /	391.
295.65 /	0.21 /	1.54 /	0.0 /	295.86 /	3.21 /	0.2? /	0.001	*XS*
330 AT	5220 /	242 /	4700. /	1428. /	70855. /	1.23 /	32. /	303.
296.79 /	0.21 /	1.14 /	0.0 /	297.00 /	3.29 /	0.23 /	0.003	*XS*
331 AT	5491 /	271 /	4700. /	1342. /	74255. /	1.22 /	72. /	355.
297.92 /	0.23 /	1.14 /	0.01 /	298.15 /	3.50 /	0.26 /	0.001	*XS*
332 AT	5768 /	277 /	4700. /	1173. /	45663. /	1.68 /	55. /	348.
299.63 /	0.42 /	1.80 /	0.09 /	300.05 /	4.01 /	0.31 /	0.001	*XS*
333 AT	6025 /	257 /	4700. /	1367. /	66983. /	1.30 /	165. /	457.
301.67 /	0.24 /	1.86 /	0.0 /	301.91 /	3.44 /	0.24 /	0.001	*XS*
334 AT	6282 /	257 /	4700. /	1164. /	48798. /	1.61 /	271. /	593.
303.33 /	0.41 /	1.74 /	0.08 /	303.73 /	4.04 /	0.34 /	0.002	*XS*
335 AT	6500 /	218 /	4700. /	1162. /	62559. /	1.37 /	213. /	499.
304.96 /	0.35 /	1.58 /	0.0 /	305.31 /	4.04 /	0.31 /	0.001	*XS*

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON
PAGE 2 OF 2

SECID AT WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW *ID*
336 AT	6770 /	270 /	4700. /	941. /	45487. /	1.42 /	75. /	331.
306.96 /	0.55 /	2.10 /	0.10 /	307.51 /	5.00 /	0.42 /	0.004	*XS*
337 AT	6970 /	200 /	3800. /	791. /	31861. /	2.68 /	140. /	362.
309.21 /	0.96 /	2.49 /	0.21 /	310.18 /	4.81 /	0.35 /	-0.036	*XS*
338 AT	7148 /	178 /	3800. /	935. /	40775. /	1.86 /	16. /	282.
311.67 /	0.48 /	1.98 /	0.0 /	312.15 /	4.07 /	0.51 /	-0.002	*XS*

END OF THIS PROFILE

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK BRANCH AT HERNDON
INITIAL VALUES ARE: Q = 4900. H = 285.50

SECID	ERROR OR WARNING MESSAGE	INTERMEDIATE RESULTS(IF ANY)	ACTION TAKEN
324	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
325	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
326	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
327	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
328	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
332	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
333	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU

Q 500

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW								
WS ELEV	HV	HF	HE	EG	V	FN	ACC	*ID*
321 AT 3458	0	4900.	1123.	59479.	1.62	79.	319.	
285.50	0.48			285.98	4.36	0.35		*IS*
322 AT 3621	163	4900.	1358.	68988.	1.58	126.	376.	
286.61	0.32	0.95	0.0	286.93	3.61	0.21	-0.000	*XS*
323 AT 3778	157	4900.	1125.	60809.	1.57	107.	338.	
287.44	0.46	0.90	0.07	287.90	4.35	0.34	0.000	*XS*
324 AT 3943	165	4900.	888.	41638.	1.71	82.	266.	
288.83	0.81	1.56	0.17	289.64	5.52	0.34	0.000	*XS*
325 AT 4093	150	4900.	1170.	66983.	1.35	86.	295.	
290.58	0.37	1.29	0.0	290.95	4.19	0.31	0.019	*XS*
326 AT 4279	186	4900.	1155.	44824.	3.15	70.	308.	
291.83	0.88	1.49	0.26	292.71	4.24	0.60	0.018	*XS*
327 AT 4458	179	4900.	1909.	106626.	1.40	48.	369.	
293.47	0.14	0.90	0.0	293.61	2.57	0.16	0.000	*XS*
328 AT 4665	207	4900.	1470.	70626.	1.32	85.	425.	
294.09	0.23	0.66	0.04	294.32	3.33	0.26	0.000	*XS*
329 AT 4978	313	4700.	1463.	66236.	1.30	53.	391.	
295.65	0.21	1.54	0.0	295.86	3.21	0.29	0.001	*XS*
330 AT 5220	242	4700.	1428.	70870.	1.23	32.	303.	
296.79	0.21	1.14	0.0	297.00	3.29	0.23	0.004	*XS*
331 AT 5491	271	4700.	1342.	74261.	1.22	72.	355.	
297.92	0.23	1.14	0.01	298.15	3.50	0.26	0.001	*XS*
332 AT 5768	277	4700.	1173.	45663.	1.68	55.	348.	
299.63	0.42	1.80	0.09	300.05	4.01	0.31	0.001	*XS*
333 AT 6025	257	4700.	1367.	66983.	1.30	165.	457.	
301.67	0.24	1.86	0.0	301.91	3.44	0.24	0.001	*XS*
334 AT 6282	257	4700.	1164.	48798.	1.61	271.	593.	
303.33	0.41	1.74	0.08	303.73	4.04	0.34	0.002	*XS*
335 AT 6500	218	4700.	1162.	62559.	1.37	213.	499.	
304.96	0.35	1.58	0.0	305.31	4.04	0.31	0.001	*XS*

WATER-SURFACE PROFILE FOR: FOLLY LICK BRANCH AT HERNDON
PAGE 2 OF 2

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW								
WS ELEV / HV / HF / HE / EG / V / FN / ACC *ID*								
336 AT	6770 /	270 /	4700. /	941. /	45487. /	1.42 /	75. /	331.
306.96 /	0.35 /	2.10 /	0.10 /	307.51 /	5.00 /	0.42 /	0.004	*XS*
337 AT	6970 /	200 /	3800. /	791. /	31861. /	2.68 /	140. /	362.
309.21 /	0.96 /	2.49 /	0.21 /	310.18 /	4.81 /	0.35 /	-0.036	*XS*
338 AT	7148 /	178 /	3800. /	935. /	40775. /	1.86 /	16. /	282.
311.67 /	0.48 /	1.98 /	0.0 /	312.15 /	4.07 /	0.51 /	-0.002	*XS*

END OF THIS PROFILE

Q 5-00

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 1 DATE= 5/12/77

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

    57 FOLLY LICK BR HERNDON SEC 335 TO 338                    5 04 05 05 15
    58  30320  30405  30431  30496
    60   335 0  16  3  298     6500 99 99
    61   1800   2900   3400   4700
    62        0  1  3180   66  1  3140  143  1  3120  174  1  3100  203  1  3060
    63      242  1  3020  289  1  3000  360  2  2987  375  2  2950  385  2  2950
    64      391  3  3000  522  3  3060  548  3  3080  577  3  3100  609  3  3140
    65      651  3  3180
    66  2  4 180 080  1  2 070 070  1  2 080 080
    70 RE336 0  20  6  302     6770 99 99
    71        0  1  3180   40  1  3160   50  1  3140  100  1  3129  150  1  3119
    72      180  2  3114  185  2  3036  197  2  3033  230  3  3025  231  3  2990
    73      236  3  2989  241  3  2976  246  3  2976  246  3  2991  257  4  3036
    74      300  5  3054  347  5  3080  375  6  3091  477  6  3160  511  6  3180
    75  1  2 035 035  1  3 140 080  1  2 065 065  1  3 160 100  1  2 120 060
    76  1  2 100 100
    80   337 1  21  3  304     6970 99 99
    81   1400   2300   2800   3800
    83        0  1  3160   43  1  3140   73  1  3120  127  1  3120  135  1  3103
    84      148  1  3075  171  1  3063  192  1  3050  200  2  3041  206  2  3008
    85      214  2  3008  218  3  3040  279  3  3055  317  3  3061  352  3  3080
    86      368  3  3100  393  3  3140  417  3  3160  456  3  3180  531  3  3200
    87      584  3  3220
    88  2  4 160 090  1  2 055 055  2  4 140 095
    90   338 0  19  3  306     7148 99 99
    91        0  1  3160   14  1  3146   16  1  3114   21  1  3121   31  1  3114
    92       39  1  3116   46  1  3100   61  1  3068   71  1  3052   79  2  3030
    93       86  2  3030  101  2  3061  125  3  3076  181  3  3076  202  3  3080
    94      256  3  3100  287  3  3120  322  3  3140  354  3  3160
    95  1  2 100 100  1  2 065 065  2  4 140 085
```

FINAL to Sec 338 (with Sec 336 corrected)

MAY 12 RUN

FINAL

Starting elevations at 338 for Br. Situation at Young Ave

(1) X-Sec 336 was Revised on left bank whereas correction in ELEV. of +1.6' was required.

(2) X-Sec 335, Sec ~~No~~ changed.

12 - Folio

F2-1

F 2

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 2,DATE= 5/12/77

PAGE 1 OF EDITING NOTES FOR: FOLLY LICK BR HERNDON SEC 335 TO 338

SECID	ERROR SEVERITY	FIRST VARIABLE	NO.	ERROR MESSAGE	SECOND VARIABLE	NO.	VALUE ASSUMED
335	WARNING	TYPE		WRONG			1

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 3,DATE= 5/12/77

INPUT SUMMARY FOR: FOLLY LICK BR HERNDON SEC 335 TO 338

5 CROSS SECTIONS SPECIFIED (OR ASSUMED)

FOUND 4 TYPE 3 CARDS

KEPT 4 CROSS SECTIONS FOR EDITING

4 " " VALID FOR PROPERTY COMPUTATIONS

4 " " " " PROFILE "

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BR HERNDON SEC 335 TO 338
SECID= 335 AT DISTANCE= 6500 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
298.0	54	1795	1.00	26	27	363	389	439
298.5	67	2443	1.00	28	30	361	389	586
299.0	84	3285	1.06	46	48	344	390	629
299.5	114	4353	1.32	74	76	316	390	702
300.0	158	5663	1.71	102	104	289	391	857
300.5	215	7400	2.08	125	127	277	402	1111
301.0	283	9512	2.40	147	150	266	413	1436
301.5	362	12056	2.64	170	172	254	424	1846
302.0	453	15083	2.81	193	195	242	435	2352
302.5	553	19310	2.62	208	211	237	446	3158
303.0	662	24673	2.34	224	227	232	457	4216
303.5	778	31543	2.01	240	243	227	467	5593
304.0	902	40537	1.70	256	258	223	478	7367
304.5	1033	52763	1.43	272	274	218	489	9571
305.0	1173	63321	1.37	287	290	213	500	11484
305.5	1321	73844	1.35	303	306	208	511	13451
306.0	1476	85335	1.33	319	322	203	522	15593
306.5	1638	98370	1.31	329	332	199	529	18131
307.0	1806	112376	1.28	339	342	196	535	20841
307.5	1978	127359	1.27	349	352	192	542	23722
308.0	2155	143327	1.25	360	362	189	548	26772
308.5	2337	160185	1.24	370	373	185	555	29948
309.0	2525	178054	1.23	381	384	181	563	33295
309.5	2719	196949	1.22	392	395	178	570	36817
310.0	2917	216882	1.21	403	406	174	577	40514
310.5	3122	236994	1.20	415	418	166	581	44360
311.0	3332	258233	1.19	427	430	159	585	48393
311.5	3548	280612	1.18	438	441	151	589	52613
312.0	3770	304143	1.18	450	453	143	593	57023
312.5	4001	324069	1.18	473	477	124	597	60628
313.0	4244	345895	1.19	497	500	105	601	64488
313.5	4498	369564	1.20	520	523	85	605	68616
314.0	4763	395042	1.20	543	546	66	609	73022
314.5	5038	426014	1.19	557	560	58	614	78688
315.0	5320	458346	1.19	570	573	50	620	84584
315.5	5608	492057	1.18	584	587	41	625	90710
316.0	5903	527167	1.18	597	601	33	630	97071
316.5	6205	563697	1.17	611	614	25	635	103668
317.0	6514	601665	1.17	624	628	17	641	110504
317.5	6829	641092	1.16	638	641	8	646	117581
318.0	7151	681997	1.16	651	655	0	651	124903

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BR HERNDON SEC 335 TO 338
SECID=RE336 AT DISTANCE= 6770 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
302.0	68	2824	1.00	23	27	230	253	658
302.5	79	3537	1.00	24	29	230	254	814
303.0	97	4402	1.10	46	51	209	256	761
303.5	126	5454	1.33	68	73	189	257	842
304.0	163	6913	1.56	82	87	185	267	1047
304.5	207	8772	1.71	94	100	184	279	1334
305.0	257	11082	1.78	106	112	184	290	1704
305.5	314	13980	1.76	118	124	184	302	2186
306.0	375	17799	1.64	127	134	183	311	2847
306.5	441	21850	1.60	137	144	183	320	3546
307.0	512	26324	1.57	146	153	183	329	4328
307.5	587	31565	1.52	155	163	182	338	5247
308.0	667	37015	1.51	165	173	182	347	6195
308.5	753	43021	1.50	178	186	182	360	7169
309.0	845	49881	1.47	191	199	182	372	8304
309.5	943	59013	1.36	200	208	181	381	9955
310.0	1045	67928	1.33	207	216	181	388	11543
310.5	1150	77571	1.30	215	224	181	396	13232
311.0	1260	87939	1.28	223	232	180	403	15013
311.5	1373	99073	1.27	236	246	174	410	16676
312.0	1501	111310	1.27	273	283	145	418	17732
312.5	1645	124891	1.27	305	315	120	425	19193
313.0	1806	140069	1.28	337	347	95	433	20950
313.5	1982	157070	1.28	367	377	73	440	23057
314.0	2174	176030	1.28	397	407	50	447	25456
314.5	2375	198026	1.27	407	417	48	455	28910
315.0	2581	222022	1.25	417	427	45	462	32562
315.5	2792	247947	1.24	427	437	43	470	36373
316.0	3008	275754	1.23	437	447	40	477	40316
316.5	3231	303887	1.23	456	466	30	486	43944
317.0	3463	333966	1.24	474	484	20	494	47767
317.5	3705	366049	1.24	493	503	10	503	51787
318.0	3956	400192	1.24	511	521	0	511	56008

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BR HERNDON SEC 335 TO 338
SECID= 337 AT DISTANCE= 6970 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
304.0	41	1830	1.00	18	20	200	218	357
304.5	56	2547	1.21	42	44	196	238	335
305.0	83	3475	1.72	67	69	192	259	403
305.5	124	4666	2.40	95	97	184	279	517
306.0	181	6162	3.24	135	137	176	311	661

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BR HERNDON SEC 335 TO 338
SECID= 337 AT DISTANCE= 6970 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
306.5	255	8204	3.81	157	159	167	324	944
307.0	338	10707	4.09	176	178	158	334	1316
307.5	431	13664	4.22	195	197	148	343	1771
308.0	531	17510	3.96	206	209	146	352	2430
308.5	636	22556	3.43	213	215	143	356	3371
309.0	744	28800	2.89	219	221	141	360	4572
309.5	855	36483	2.42	225	228	139	364	6071
310.0	969	45986	2.02	232	234	136	368	7908
310.5	1086	55102	1.85	237	240	134	371	9700
311.0	1206	64588	1.74	243	245	132	374	11551
311.5	1329	74090	1.69	248	251	129	377	13410
312.0	1454	84207	1.65	254	256	127	381	15383
312.5	1611	86592	2.04	318	321	66	384	14386
313.0	1772	99291	1.93	329	332	58	387	16787
313.5	1939	113697	1.82	339	342	51	390	19518
314.0	2112	129343	1.72	350	353	43	393	22460
314.5	2291	142918	1.71	367	370	32	399	24852
315.0	2479	157436	1.70	384	387	22	405	27423
315.5	2674	172926	1.69	400	404	11	411	30179
316.0	2879	189416	1.68	417	420	0	417	33126
316.5	3090	207317	1.65	427	431	0	427	36688
317.0	3306	226304	1.63	437	441	0	437	40444
317.5	3526	246371	1.60	446	451	0	446	44390
318.0	3752	267514	1.58	456	461	0	456	48523
318.5	3984	286563	1.59	475	481	0	475	51959
319.0	4227	307145	1.59	494	500	0	494	55630
319.5	4478	329219	1.59	512	519	0	512	59535
320.0	4739	352763	1.59	531	538	0	531	63678
320.5	5008	379608	1.57	544	552	0	544	68652
321.0	5283	407677	1.56	558	566	0	558	73833
321.5	5565	436977	1.55	571	580	0	571	79221
322.0	5854	467519	1.54	584	593	0	584	84818

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BR HERNDON SEC 335 TO 338
SECID= 338 AT DISTANCE= 7148 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
306.0	60	1839	1.20	35	35	66	101	409
306.5	80	2411	1.16	45	46	63	108	558
307.0	105	3239	1.13	56	57	60	116	767
307.5	135	4390	1.10	67	67	58	124	1044
308.0	196	6334	1.39	147	148	55	202	1091
308.5	274	8977	1.64	162	163	53	216	1571

CROSS-SECTION PROPERTIES FOR: FOLLY LICK BR HERNDON SEC 335 TO 338
SECID= 338 AT DISTANCE= 7148 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
309.0	359	12178	1.80	178	179	51	229	2150
309.5	452	15933	1.91	194	195	48	243	2826
310.0	553	20247	2.00	210	211	46	256	3599
310.5	660	25431	1.99	220	221	44	264	4597
311.0	773	31678	1.91	230	231	42	272	5813
311.5	891	38431	1.86	246	247	16	279	7053
312.0	1020	46312	1.80	269	271	16	287	8397
312.5	1158	56603	1.66	280	283	15	296	10355
313.0	1301	68898	1.52	290	292	15	305	12671
313.5	1448	81194	1.46	299	301	15	313	14960
314.0	1599	93223	1.44	308	311	14	322	17215
314.5	1755	106195	1.43	316	319	14	330	19648
315.0	1916	119455	1.42	328	331	10	338	22008
315.5	2083	133482	1.43	341	344	5	346	24462
316.0	2257	148435	1.43	354	357	0	354	27069

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 8.DATE= 5/12/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK BR HERNDON SEC 335 TO 338
INITIAL VALUES ARE: Q = 1800. H = 303.20

SECID.ERROR OR WARNING MESSAGE.INTERMEDIATE RESULTS(IF ANY).ACTION TAKEN

RE336.KU/KD < 0.7 OR > 1.4 .USED COMPUTED WSU
337.KU/KD < 0.7 OR > 1.4 .USED COMPUTED WSU

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 9.DATE= 5/12/77

WATER-SURFACE PROFILE FOR: FOLLY LICK BR HERNDON SEC 335 TO 338

PAGE 1 OF 1

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	/ HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW *ID*
335 AT 6500 / 303.20	0 / 0.22	1800. /		707. / 303.42	27212. / 2.55	2.21 / 0.33	230. /	461. *IS*
RE336 AT 6770 / 305.30	270 / 1.06	1800. / 2.52	0.42	291. / 306.36	12755. / 6.19	1.78 / 0.68	184. / 0.001	298. *XS*
337 AT 6970 / 306.13	200 / 0.37	1400. / 2.14	0.0	559. / 308.51	18725. / 2.51	3.83 / 0.45	145. / 0.001	353. *XS*
338 AT 7148 / 309.42	178 / 0.30	1400. / 1.22	0.0	437. / 309.73	15309. / 3.21	1.90 / 0.46	49. / 0.001	240. *XS*

END OF THIS PROFILE

Q10

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USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 10,DATE= 5/12/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK BR HERNDON SEC 335 TO 338
INITIAL VALUES ARE: Q = 2900. H = 304.05

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

RE336,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
337,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU

WATER-SURFACE PROFILE FOR: FOLLY LICK BR HERNDON SEC 335 TO 338
PAGE 1 OF 1

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
335 AT	6500	0	2900.	914.	41585.	1.67	222.	479.
304.05	0.26			304.31	3.17	0.35		*IS*
RE336 AT	6770	270	2900.	414.	20236.	1.61	183.	316.
306.30	1.23	2.70	0.48	307.53	7.01	0.71	0.035	*XS*
337 AT	6970	200	2300.	799.	32415.	2.65	140.	362.
309.25	0.34	2.06	0.0	309.59	2.88	0.21	0.001	*XS*
338 AT	7148	178	2300.	641.	24407.	2.01	44.	262.
310.41	0.40	1.19	0.03	310.81	3.59	0.49	0.001	*XS*

END OF THIS PROFILE

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USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 12,DATE= 5/12/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK BR HERNDON SEC 335 TO 338
INITIAL VALUES ARE: Q = 3400. H = 304.31

SECID	ERROR OR WARNING MESSAGE	INTERMEDIATE RESULTS(IF ANY)	ACTION TAKEN
RE336	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
337	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 13,DATE= 5/12/77

WATER-SURFACE PROFILE FOR: FOLLY LICK BR HERNDON SEC 335 TO 338
PAGE 1 OF 1

SECID AT WS ELEV	DISTANCE/ HV	LENGTH/ HF	DISCHARGE/ HE	AREA/ EG	CONVEYANCE/ V	ALPHA/ FN	LEW/ ACC	REW *ID*
335 AT	6500	0	3400.	982.	47626.	1.52	219.	485.
304.31	0.28			304.59	3.46	0.26		*IS*
RE336 AT	6770	270	3400.	459.	22930.	1.60	183.	322.
306.63	1.37	2.86	0.54	307.99	7.41	0.74	0.001	*XS*
337 AT	6970	200	2800.	907.	40609.	2.23	138.	366.
309.73	0.33	2.06	0.0	310.06	3.09	0.23	0.001	*XS*
338 AT	7148	178	2800.	736.	29579.	1.94	42.	269.
310.84	0.44	1.16	0.05	311.28	3.80	0.50	0.001	*XS*

END OF THIS PROFILE

CE CF CG CH

B100 139 228 227

F2 - 7

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 14.DATE= 5/12/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK BR HERNDON SEC 335 TO 338
INITIAL VALUES ARE: Q = 4700. H = 304.96

SECID	ERROR OR WARNING MESSAGE	INTERMEDIATE RESULTS(IF ANY)	ACTION TAKEN
RE336	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
337	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
338	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU

WATER-SURFACE PROFILE FOR: FOLLY LICK BR HERNDON SEC 335 TO 338

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
335 AT	6500	0	4700.	1162.	62520.	1.37	213.	499.
304.96	0.35			305.31	4.05	0.31		*IS*
RE336 AT	6770	270	4700.	581.	31109.	1.53	183.	337.
307.46	1.55	3.07	0.60	309.01	8.09	0.77	0.036	*XS*
337 AT	6970	200	3800.	1136.	59320.	1.78	133.	372.
310.71	0.31	1.96	0.0	311.02	3.34	0.23	0.048	*XS*
338 AT	7148	178	3800.	944.	41344.	1.86	16.	283.
311.71	0.47	1.05	0.08	312.18	4.03	0.50	0.031	*XS*

END OF THIS PROFILE

F2-9

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 1 DATE= [redacted]

*** INPUT CARD PRINTOUT ***

FINAL
Young St.
Bridge

"SAVE"
MAY 27, 1977
X-Sec's 338-341
+ 1341

3 - Folly

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     1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0
1     7 [redacted]                                          6  4 05 05 15
2     8  30942  31041  31084  31171
3     9   338 1   19  3   306     7148 99 99
4    10   1400    2300    2800    3800
5    11       0  1  3160   14  1  3146   16  1  3114   21  1  3121   31  1  3114
5    12      39  1  3116   46  1  3100   61  1  3068   71  1  3052   79  2  3030
5    13      86  2  3030  101  2  3061  126  3  3076  181  3  3076  202  3  3080
5    14     256  3  3100  287  3  3120  322  3  3140  354  3  3160
6    17  1  2 100 100  1  2 065 065  2  4 140 085
3    19 ES339 0   25  4   306     7184 99 99
5    21       0  1  3150   40  1  3116   45  1  3103   55  1  3086   65  1  3072
5    22      70  1  3068   75  1  3060   77  2  3065   79  2  3040   81  2  3036
5    23      83  2  3035   85  2  3033   87  2  3035   89  2  3031   91  2  3027
5    24      93  2  3041   95  2  3061  105  3  3072  125  3  3078  145  3  3086
5    25     165  4  3091  195  4  3095  230  4  3100  295  4  3120  330  4  3140
6    27  1  2 100 050  1  2 050 050  1  2 080 040  1  2 150 100
3    29 BRIDG 2   8  1  305     7184         0  3078 3 0
5    31      75  1  3078   75  1  3034   77  1  3025   80  1  3029   82  1  3026
5    32      84  1  3034   84  1  3078   75 -9  3078
6    37  3  4 075 075
3    39 RG340 4   14  4    12              2  3            2 1 1 2                2
5    41       0  1  3150   25  1  3115   35  1  3108   45  1  3102   55  1  3096
5    42      65  1  3091   74  2  3087   80  3  3087   85  4  3087  105  4  3090
5    43     125  4  3091  145  4  3092  157  4  3093  157  4  3155
3    49 AS341 5   24  3   308     7204  1  3   corrected
5    51       0  1  3150   35  1  3116   40  1  3108   50  1  3094   60  1  3077
5    52      65  1  3071   70  1  3059   74  1  3056   76  1  3047   77  2  3037
5    53      78  2  3027   80  2  3027   82  2  3028   84  2  3030   86  3  3031
5    54      88  3  3040   90  3  3049   92  3  3055   96  3  3074  100  3  3079
5    55     105  3  3085  120  3  3085  140  3  3090  160  3  3091  160  3  3155
                                                                    UUU  U  UUUU
6    57  4  5 120 060  1  2 060 060  1  2 040 040
3    59  1341 0   26  3   308     7265 99 99
5    61       0  1  3177   30  1  3150   54  1  3140   74  1  3135   84  1  3110
5    62      92  1  3097   99  1  3079  111  1  3056  113  2  3044  114  2  3036
5    63     116  2  3026  119  2  3026  120  2  3031  122  2  3036  124  2  3052
5    64     127  3  3062  146  3  3079  150  3  3083  150  3  3173  174  3  3173
5    65     174  3  3091  216  3  3095  216  3  3155  273  3  3155  273  3  3146
5    66     334  3  3162
6    67  2  4 160 080  2  4 050 050  2  4 030 030
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ERROR(S)

F3-1

F3

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 2•DATE= 5/27/77

PAGE 1 OF EDITING NOTES FOR: FOLLY LICK YOUNG ST BRIDGE SEC 338-341

SECID	ERROR SEVERITY	FIRST VARIABLE	NO.	ERROR MESSAGE	SECOND VARIABLE	NO.	VALUE ASSUMED
BRIDG	WARNING	STATION	8	IS LESS THAN	STATION	7	
AS341	WARNING	NPTS		WRONG			25

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 3.DATE= 5/27/77

INPUT SUMMARY FOR: FOLLY LICK YOUNG ST BRIDGE SEC 338-341

6 CROSS SECTIONS SPECIFIED (OR ASSUMED)

FOUND 6 TYPE 3 CARDS

KEPT 6 CROSS SECTIONS FOR EDITING

6 " " VALID FOR PROPERTY COMPUTATIONS

6 " " " " PROFILE "

CROSS-SECTION PROPERTIES FOR: FOLLY LICK YOUNG ST BRIDGE SEC 338-341
SECID= 338 AT DISTANCE= 7148 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
306.0	60	1839	1.20	35	35	66	101	409
306.5	80	2411	1.16	45	46	63	108	558
307.0	105	3239	1.13	56	57	60	116	767
307.5	135	4390	1.10	67	67	58	124	1044
308.0	196	6334	1.39	147	148	55	202	1091
308.5	274	8977	1.64	162	163	53	216	1571
309.0	359	12178	1.80	178	179	51	229	2150
309.5	452	15933	1.91	194	195	48	243	2826
310.0	553	20247	2.00	210	211	46	256	3599
310.5	660	25431	1.99	220	221	44	264	4597
311.0	773	31678	1.91	230	231	42	272	5813
311.5	891	38431	1.86	246	247	16	279	7053
312.0	1020	46312	1.80	269	271	16	287	8397
312.5	1158	56603	1.66	280	283	15	296	10355
313.0	1301	68898	1.52	290	292	15	305	12671
313.5	1448	81194	1.46	299	301	15	313	14960
314.0	1599	93223	1.44	308	311	14	322	17215
314.5	1755	106195	1.43	316	319	14	330	19648
315.0	1916	119455	1.42	328	331	10	338	22008
315.5	2083	133482	1.43	341	344	5	346	24462
316.0	2257	148435	1.43	354	357	0	354	27069

CROSS-SECTION PROPERTIES FOR: FOLLY LICK YOUNG ST BRIDGE SEC 338-341
SECID=ES339 AT DISTANCE= 7184 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
306.0	40	1896	1.00	18	20	77	95	342
306.5	51	2382	1.04	27	29	72	99	389
307.0	66	3079	1.11	36	38	67	103	485
307.5	88	4226	1.22	52	55	63	115	582
308.0	119	5834	1.43	71	74	59	130	730
308.5	158	7918	1.58	87	90	56	143	962
309.0	206	10600	1.67	108	111	53	161	1250
309.5	269	14724	1.58	145	148	50	195	1655
310.0	351	20887	1.44	183	186	47	230	2301
310.5	448	28442	1.45	202	205	44	246	3143
311.0	553	36172	1.53	220	223	42	263	4016
311.5	668	45135	1.60	238	242	40	279	5014
312.0	792	55066	1.66	260	263	35	295	6092
312.5	926	66794	1.67	274	278	29	304	7465
313.0	1067	79192	1.72	289	292	24	313	8869
313.5	1215	92840	1.76	304	307	18	321	10394
314.0	1370	107748	1.79	318	322	12	330	12043

CROSS-SECTION PROPERTIES FOR: FOLLY LICK YOUNG ST BRIDGE SEC 338-341
SECID=ES339 AT DISTANCE= 7184 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
314.5	1531	124486	1.80	324	328	6	330	14075
315.0	1694	142494	1.80	330	334	0	330	16247

CROSS-SECTION PROPERTIES FOR: FOLLY LICK YOUNG ST BRIDGE SEC 338-341
SECID=BRIDG AT DISTANCE= 7184 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
305.0	20	518	1.00	9	13	75	84	163
305.5	24	696	1.00	9	14	75	84	222
306.0	29	885	1.00	9	15	75	84	288
306.5	33	1081	1.00	9	16	75	84	358
307.0	38	1283	1.00	9	17	75	84	434
307.5	42	1490	1.00	9	18	75	84	515
307.8	45	1237	1.00	0	27	75	84	0

CROSS-SECTION PROPERTIES FOR: FOLLY LICK YOUNG ST BRIDGE SEC 338-341
SECID=AS341 AT DISTANCE= 7204 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
308.0	105	5405	1.53	43	45	58	101	751
308.5	128	6693	1.59	50	52	55	105	918
309.0	166	7778	1.91	88	90	52	140	936
309.5	219	10585	1.82	111	113	49	160	1298
310.0	275	14647	1.62	114	118	46	160	1907
310.5	334	19416	1.52	118	122	42	160	2582
311.0	393	24847	1.47	121	126	39	160	3310
311.5	455	30903	1.46	124	129	36	160	4088
312.0	518	37458	1.46	129	135	31	160	4864
312.5	584	44573	1.48	134	140	26	160	5670
313.0	652	52254	1.51	139	146	21	160	6517
313.5	723	60486	1.54	145	152	15	160	7406
314.0	797	69341	1.56	150	157	10	160	8350
314.5	873	79722	1.53	155	163	5	160	9498
315.0	952	91334	1.49	160	169	0	160	10793
315.5	1032	110459	1.25	160	170	0	160	13286

CROSS-SECTION PROPERTIES FOR: FOLLY LICK YOUNG ST BRIDGE SEC 338-341
SECID= 1341 AT DISTANCE= 7265 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
308.0	98	5332	1.52	48	50	99	147	638
308.5	123	7187	1.52	53	56	97	150	864
309.0	151	9509	1.51	55	58	95	150	1148
309.5	187	10713	1.78	99	103	93	216	1093
310.0	237	14953	1.58	102	107	90	216	1634
310.5	289	20000	1.48	105	112	87	216	2236
311.0	342	25802	1.43	108	117	84	216	2890
311.5	397	32456	1.39	110	120	82	216	3630
312.0	452	39871	1.35	112	124	80	216	4436
312.5	509	48100	1.31	114	127	78	216	5318
313.0	566	57102	1.28	116	131	76	216	6274
313.5	625	65982	1.29	118	134	74	216	7184
314.0	689	71551	1.51	138	156	54	216	7103
314.5	761	80510	1.59	150	169	42	216	7718
315.0	842	84315	1.62	177	198	30	288	8178
315.5	937	90979	1.58	202	225	24	307	9089
316.0	1072	93162	1.56	283	308	19	326	9473
316.5	1218	113358	1.45	297	322	13	334	11641
317.0	1368	134979	1.42	302	329	8	334	13856
317.5	1525	152181	1.41	332	360	2	334	15633
317.7	1592	162553	1.40	334	362	0	334	16656

```
USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT=    7,DATE= 5/27/77

PAGE  1 OF PROFILE NOTES FOR: FOLLY LICK YOUNG ST BRIDGE SEC 338-341
     INITIAL VALUES ARE:  Q =    1400.  H =  309.42

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

AS341,H1N TOO LOW                                          ,ASSUMED H1N=WSD+0.01
AS341,MAX QBO < QT (3)                                     ,CHECKED QRD
```

F3-2

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 8,DATE= 5/27/77

WATER-SURFACE PROFILE FOR: FOLLY LICK YOUNG ST BRIDGE SEC 338-341
PAGE 1 OF 1

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW									
WS ELEV / HV / HF / HE / EG / V / FN / ACC									*ID*
338 AT	7148 /	0 /	1400. /	436. /	15294. /	1.90 /	49. /	240.	
309.42 /	0.30 /		/ 309.72 /	3.21 /	0.46 /				*IS*
ES339 AT	7184 /	36 /	1400. /	279. /	15414. /	1.55 /	49. /	199.	
309.56 /	0.61 /	0.30 /	0.15 /	310.17 /	5.03 /	0.58 /	-0.003		*XS*
BEGIN BRIDGE ANALYSIS									
BRIDG AT	7184 /	/	370. /	45. /	1237. /	1.00 /	75. /	84.	
307.80 /	1.06 /		...3...	(-.001)	/ 8.27 /	0.65 /			*BO*
ROAD OVERFLOW (CFS) / LEFT			297. / RIGHT		727. /				*RG*
AS341 AT	7204 /	20 /	1400. /	227. /	1130. /	1.78 /	49. /	160.	
309.57 /	1.05 /	0.23 /	0.23 /	310.62 /	6.16 /	0.73 /	-0.011		*AS*
M = **** / E = **** / K* = **** /				383. /	23880. /	1.48 /	39. /	160.	
310.92 /	0.31 /		/ 311.22 /	3.65 /	0.44 /				*AS*
END BRIDGE ANALYSIS									
1341 AT	7265 /	61 /	1400. /	351. /	26811. /	1.42 /	84. /	216.	
311.08 /	0.35 /	0.19 /	0.02 /	311.43 /	3.99 /	0.50 /	-0.000		*XS*

END OF THIS PROFILE

KU/KD

Q_{10}

—

1.00

0.72

1.54

1.12

May 27

F3-3

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 9.DATE= 5/27/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK YOUNG ST BRIDGE SEC 338-341
INITIAL VALUES ARE: Q = 2300. H = 310.41

SECID.ERROR OR WARNING MESSAGE.INTERMEDIATE RESULTS(IF ANY).ACTION TAKEN

AS341.H1N TOO LOW .ASSUMED H1N=WSD+0.01
AS341.KU/KD < 0.7 OR > 1.4 .USED COMPUTED WSU
AS341.MAX QBO < QT (3) .CHECKED QRD

WATER-SURFACE PROFILE FOR: FOLLY LICK YOUNG ST BRIDGE SEC 338-341
PAGE 1 OF 1

SECID AT DISTANCE / LENGTH / DISCHARG / AREA / CONVEYANCE / ALPHA / LEW / REW									
WS ELEV / HV / HF / HE / EG / V / FN / ACC / *ID*									
338 AT	7148 /	0 /	2300. /	641. /	24407. /	2.01 /	44. /	262.	
310.41 /	0.40 /		/	310.81 /	3.59 /	0.49 /		*IS*	
FS339 AT	7184 /	36 /	230 /	467. /	29837. /	1.46 /	44. /	249.	
310.60 /	0.55 /	0.26 /	8 /	311.15 /	4.92 /	0.51 /	-0.001	*XS*	
BEGIN BRIDGE ANALYSIS									
BRIDG AT	7184 /	/	364. /	45. /	1237. /	1.00 /	5. /	84.	
307.80 /	1.03 /	...3...	(-.001)	/	8.14 /	0.64 /		*BO*	
ROAD OVERFLOW (CFS) / LEFT		614. / RIGHT		1291. /				*RG*	
AS341 AT	7204 /	20 /	2300. /	346. /	20509. /	1.51 /	41. /	160.	
310.61 /	1.04 /	0.17 /	0.33 /	311.64 /	6.65 /	0.83 /	-0.011	*AS*	
M = **** / E = **** / K* = **** /				477. /	33158. /	1.46 /	3[illegible]. /	160.	
311.68 /	0.53 /		/	312.20 /	4.82 /	0.54 /		*[illegible]*	
END BRIDGE ANALYSIS									
1341 AT	7265 /	61 /	2300. /	444. /	38724. /	1.36 /	80. /	216.	
311.93 /	0.57 /	0.25 /	0.02 /	312.49 /	5.18 /	0.58 /	0.018	*XS*	

END OF THIS PROFILE

May 27

Q50

F3-5

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 11,DATE= 5/27/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK YOUNG ST BRIDGE SEC 338-341
INITIAL VALUES ARE: Q = 2800. H = 310.84

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

AS341,H1N TOO LOW ,ASSUMED H1N=WSD+0.01
AS341,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
AS341,MAX OBO < OT (3) ,CHECKED QRD

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 12•DATE= 5/27/77

Q100

WATER-SURFACE PROFILE FOR: FOLLY LICK YOUNG ST BRIDGE SEC 338-341
PAGE 1 OF 1

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW									
WS ELEV / V / HF / HE / EG / V / FN / ACC									*ID*
338 AT	7148 /	0 /	2800. /	736. /	29569. /	1.94 /	42. /	269.	
310.84 /	0.44 /		/	311.28 /	3.80 /	0.50 /			*IS*
FS339 AT	7184 /	36 /	2800. /	557. /	36466. /	1.54 /	42. /	263.	
311.02 /	0.60 /	0.26 /	0.08 /	311.62 /	5.03 /	0.51 /	-0.001		*XS*
BEGIN BRIDGE ANALYSIS									
BRIDG AT	7184 /	/	369. /	45. /	1237. /	1.00 /	75. /	84.	
307.80 /	1.06 /		...3...	(-.001) /	8.25 /	0.65 /			*BO*
ROAD OVERFLOW (CFS) / LEFT			805. / RIGHT		1598. /				*RG*
AS341 AT	7204 /	20 /	2800. /	397. /	25162. /	1.47 /	39. /	160.	
311.03 /	1.14 /	0.17 /	0.39 /	312.17 /	7.06 /	0.85 /	-0.011		*AS*
M = **** / E = **** / K* = **** /				519. /	37535. /	1.46 /	31. /	160.	
312.01 /	0.66 /		/	312.67 /	5.40 /	0.59 /			*AS*
END BRIDGE ANALYSIS									
1341 AT	7265 /	61 /	2800. /	481. /	43971. /	1.33 /	79. /	216.	
312.26 /	0.70 /	0.29 /	0.02 /	312.96 /	5.82 /	0.63 /	-0.021		*XS*

END OF THIS PROFILE

309.18 — Elev. of lower NAIL
+1.6
310.78 — Elev. of NAIL with RIBBON

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 13,DATE= 5/27/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK YOUNG ST BRIDGE SEC 338-341
INITIAL VALUES ARE: Q = 3800. H = 311.71

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

AS341,H1N TOO LOW ,ASSUMED H1N=WSD+0.01
AS341,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
AS341,MAX QBO < QT (3) ,CHECKED QRD

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 14.DATE= 5/27/77

WATER-SURFACE PROFILE FOR: FOLLY LICK YOUNG ST BRIDGE SEC 338-341
PAGE 1 OF 1

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW									
WS ELEV / HV / HF / HE / EG / V / FN / ACC									*ID*
338 AT	7148 /	0 /	3800. /	944. /	41344. /	1.86 /	16. /	283.	
311.71 /	0.47 /		/	312.18 /	4.03 /	0.50 /			*IS*
ES339 AT	7184 /	36 /	3800. /	757. /	52190. /	1.65 /	37. /	291.	
311.86 /	0.65 /	0.24 /	0.09 /	312.51 /	5.02 /	0.50 /	-0.001		*XS*
BEGIN BRIDGE ANALYSIS									
BRIDG AT	7184 /	/	368. /	45. /	1237. /	1.00 /	75. /	84.	
307.80 /	1.05 /	...3...	(-.001)	/	8.24 /	0.65 /			*BO*
ROAD OVERFLOW (CFS) / LEFT		1207. /	RIGHT	2204. /					*RG*
AS341 AT	7204 /	20 /	3800. /	502. /	35724. /	1.46 /	32. /	160.	
311.87 /	1.30 /	0.15 /	0.52 /	313.17 /	7.58 /	0.84 /	-0.011		*AS*
M = **** / E = **** / K* = **** /				591. /	45342. /	1.49 /	25. /	160.	
312.55 /	0.96 /		/	313.51 /	6.43 /	0.68 /			*AS*
END BRIDGE ANALYSIS									
1341 AT	7265 /	61 /	3800. /	559. /	56005. /	1.28 /	76. /	216.	
312.94 /	0.92 /	0.35 /	0.0 /	313.85 /	6.80 /	0.68 /	0.000		*XS*

END OF THIS PROFILE

F3-9

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 1.DATE= 6/ 8/77

*** INPUT CARD PRINTOUT ***

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        1       2       3       4       5       6       7       8
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1     57 FOLLY LICK HERNDON SEC 1341 TO 345RE                  6  4 05 05 15
2     58  31108  31193  31226  31294
3     59  1341 1  26  3  308    7265 99 99
4     60   1400    2300    2800    3800
5     61       0  1  3177   30  1  3150   54  1  3140   74  1  3131   84  1  3110
5     62      92  1  3097   99  1  3079  111  1  3056  113  2  3044  114  2  3036
5     63     115  2  3026  119  2  3026  120  2  3031  122  2  3036  124  2  3052
5     64     127  3  3062  146  3  3079  150  3  3083  150  3  3173  174  3  3173
5     65     174  3  3091  216  3  3095  216  3  3155  273  3  3155  273  3  3146
5     66     334  3  3162
6     67  2  4 160 080  2  4 050 050  2  4 030 030
3     69  2341 0  27  3  308    7370 99 99
5     71       0  1  3178   27  1  3159   50  1  3137   70  1  3129   93  1  3109
5     72     102  1  3069  107  2  3073  110  2  3043  112  2  3037  114  2  3041
5     73     118  2  3042  120  2  3040  123  2  3043  126  2  3053  133  3  3068
5     74     148  3  3080  170  3  3095  171  3  3095  171  3  3105  184  3  3105
5     75     184  3  3117  272  3  3130  272  3  3098  276  3  3098  314  3  3112
5     76     388  3  3158  393  3  3160
6     77  2  4 200 120  2  4 060 060  2  4 060 060
3 00169 00342 0 027 05 0308 0007475 99 99
5 00171    0000 01 03160 0016 01 03150 0056 02 03126 0066 02 03114 0076 02 03099
5 00172    0086 02 03089 0096 02 03090 0100 02 03090 0106 02 03087 0114 02 03087
5 00173    0116 03 03087 0118 03 03080 0120 03 03060 0122 03 03050 0124 03 03054
5 00174    0126 03 03059 0128 03 03058 0130 03 03044 0132 03 03040 0134 03 03046
5 00175    0135 03 03058 0136 03 03068 0141 04 03080 0174 04 03100 0211 05 03120
5 00176    0286 05 03140 0324 05 03160
6 00177 01 02 120 120 01 02 160 080 01 02 060 060 01 02 120 060 01 02 200 200
3 00179 00343 0 034 04 0310 0007785 99 99
5 00181    0000 01 03200 0030 01 03156 0034 01 03150 0038 01 03139 0042 01 03124
5 00182    0046 01 03108 0050 01 03104 0056 01 03105 0060 01 03107 0064 01 03109
5 00183    0068 01 03107 0072 01 03108 0076 01 03109 0080 01 03108 0082 01 03108
5 00184    0084 01 03106 0086 02 03103 0087 02 03075 0088 02 03062 0090 02 03061
5 00185    0092 02 03062 0094 02 03061 0096 02 03060 0098 02 03062 0099 02 03070
5 00186    0100 03 03098 0102 03 03100 0104 03 03102 0160 04 03110 0218 04 03120
5 00187    0285 04 03140 0318 04 03160 0365 04 03180 0390 04 03200
6 00188 01 02 160 080 01 02 050 050 02 03 120 060 01 02 160 080
3 00189 00344 1 039 03 0312 0008040 99 99
4 00190 001320 002170 002640 003590
5 00191    0000 01 03200 0015 01 03166 0025 01 03160 0035 01 03154 0041 01 03151
5 00192    0045 01 03148 0049 01 03143 0051 01 03143 0053 01 03142 0055 01 03140
5 00193    0057 01 03134 0059 01 03131 0061 01 03131 0063 01 03118 0065 02 03121
5 00194    0066 02 03107 0067 02 03102 0068 02 03095 0069 02 03079 0071 02 03077
5 00195    0073 02 03074 0075 02 03071 0077 02 03070 0079 02 03069 0081 02 03069
5 00196    0083 02 03071 0084 02 03102 0085 03 03118 0087 03 03122 0089 03 03123
```

(AM) ✓

To obtain Folly Lick at 345RE, start at 341

Keep

4-Folly

Q	Elevations	Discharge
10 year	317.04	750
50 yr	317.62	1240
100 yr	317.96	1510
500 year	318.58	2040

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 2 DATE= 6/ 8/77

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
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5 00197     0091 03 03122 0093 03 03127 0095 03 03131 0097 03 03131 0099 03 03131
5 00198     0237 03 03140 0285 03 03160 0325 03 03180 0380 03 03200
6 00199 01  02 160 160 01 02 080 080 01 02 120 060
3   209 345BE 1  21  6  314    8410 99 99
4   210    750   1240   1510   2040
5   211      0  1  3200   10  1  3190   20  1  3180   57  1  3170   81  1  3160
5   212    102  1  3150  110  2  3148  119  2  3145  126  3  3130  127  3  3120
5   213    121  3  3110  130  3  3100  132  3  3095  142  3  3105  148  4  3130
5   214    152  4  3145  180  5  3148  240  6  3155  287  6  3160  317  6  3180
5   215    357  6  3200
6   217  1  2 120 060  2  3 160 080  1  2 080 080  2  3 160 080  1  2 120 060
6   218  1  2 180 090
```

F4 - 2

F4

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 3.DATE= 6/ 8/77

PAGE 1 OF EDITING NOTES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE

SECID	ERROR SEVERITY	FIRST VARIABLE	NO.	ERROR MESSAGE	SECOND VARIABLE	NO.	VALUE ASSUMED
2341	WARNING	N1	1	HIGH			
00342	WARNING	N1	5	HIGH			
00342	WARNING	N3	5	HI			

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 4 DATE= 6/ 8/77

INPUT SUMMARY FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE

6 CROSS SECTIONS SPECIFIED (OR ASSUMED)

FOUND 6 TYPE 3 CARDS

KEPT 6 CROSS SECTIONS FOR EDITING

6 " " VALID FOR PROPERTY COMPUTATIONS

6 " " " " PROFILE "

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID= 1341 AT DISTANCE= 7265 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
308.0	98	5332	1.52	48	50	99	147	638
308.5	123	7187	1.52	53	56	97	150	864
309.0	151	9509	1.51	55	58	95	150	1148
309.5	187	10713	1.78	99	103	93	216	1093
310.0	237	14953	1.58	102	107	90	216	1634
310.5	289	20000	1.48	105	112	87	216	2236
311.0	342	25802	1.43	108	117	84	216	2890
311.5	397	32456	1.39	110	120	82	216	3630
312.0	452	39871	1.35	112	124	80	216	4436
312.5	509	48100	1.31	114	127	78	216	5318
313.0	566	57102	1.28	116	131	76	216	6274
313.5	625	65982	1.29	118	134	74	216	7184
314.0	689	71551	1.51	138	156	54	216	7103
314.5	741	80510	1.59	150	169	42	216	7718
315.0	842	84315	1.62	177	198	30	288	8178
315.5	937	90979	1.58	202	225	24	307	9089
316.0	1072	93162	1.56	283	308	19	326	9473
316.5	1218	113358	1.45	297	322	13	334	11641
317.0	1368	134979	1.42	302	329	8	334	13856
317.5	1525	152181	1.41	333	360	2	334	15633
317.7	1592	162553	1.40	334	362	0	334	16656

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID= 2341 AT DISTANCE= 7370 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
308.0	97	4298	1.26	51	53	97	148	677
308.5	125	5748	1.37	61	63	94	155	869
309.0	158	7503	1.47	71	73	92	163	1107
309.5	196	9595	1.54	80	82	90	170	1396
310.0	238	11935	1.63	93	96	87	281	1693
310.5	289	14693	1.72	109	113	85	295	2035
311.0	354	17911	1.85	139	143	82	309	2364
311.5	427	22242	1.83	152	158	79	319	3004
312.0	509	26502	1.92	183	190	76	327	3468
312.5	612	31565	2.02	228	236	73	335	3989
313.0	737	37965	2.08	275	283	67	343	4742
313.5	880	46936	1.99	294	304	55	351	6107
314.0	1033	57609	1.87	312	320	47	359	7797
314.5	1192	69801	1.75	325	333	42	367	9774
315.0	1358	83370	1.66	339	347	36	375	11971
315.5	1531	98377	1.58	352	360	31	383	14392
316.0	1710	114530	1.52	367	376	26	393	16958

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID= 2341 AT DISTANCE= 7370 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
316.5	1896	133533	1.46	375	383	18	393	20012
317.0	2085	153410	1.43	382	391	11	393	23135
317.5	2277	174558	1.40	389	398	4	393	26398
317.8	2395	187836	1.39	393	403	0	393	28419

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID=00342 AT DISTANCE= 7475 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
308.0	52	2033	1.00	23	26	118	141	437
308.5	65	2775	1.05	33	35	117	149	511
309.0	89	3750	1.28	69	71	85	158	504
309.5	128	5066	1.72	86	89	80	166	676
310.0	174	6691	2.07	99	102	75	174	914
310.5	227	8903	2.13	111	114	72	183	1259
311.0	285	12005	1.93	124	127	69	193	1768
311.5	351	16181	1.67	137	140	65	202	2463
312.0	422	21114	1.51	150	153	61	211	3268
312.5	503	26915	1.43	173	176	57	230	4075
313.0	596	33386	1.41	199	202	49	249	4923
313.5	702	40681	1.43	226	229	41	267	5859
314.0	822	48773	1.49	253	257	33	286	6892
314.5	953	57724	1.54	271	274	24	296	8159
315.0	1093	67491	1.60	289	292	16	305	9525
315.5	1242	78084	1.66	307	310	8	315	10997
316.0	1400	89506	1.72	324	327	0	324	12569

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID=00343 AT DISTANCE= 7785 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
310.0	48	2701	1.01	16	21	86	102	475
310.5	61	3371	1.19	47	52	49	125	357
311.0	101	4329	2.23	115	120	45	160	360
311.5	166	5844	3.38	145	150	44	189	547
312.0	246	7948	3.98	175	180	43	218	828
312.5	338	10976	3.80	193	198	42	235	1300
313.0	439	15995	2.86	211	217	40	252	2122
313.5	549	23619	2.13	229	235	39	268	3302
314.0	668	31247	1.92	247	253	38	285	4498
314.5	794	40879	1.64	257	263	36	293	6176

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID=00343 AT DISTANCE= 7785 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
315.0	925	50177	1.58	268	273	34	302	7767
315.5	1062	60287	1.54	279	285	31	310	9466
316.0	1204	71373	1.51	291	297	27	318	11311
316.5	1354	83172	1.50	306	312	24	330	13187
317.0	1510	96013	1.49	321	327	20	342	15213
317.5	1675	109920	1.49	336	342	17	353	17395
318.0	1847	124920	1.48	351	357	14	365	19735
318.5	2025	141757	1.46	361	367	10	371	22505
319.0	2208	159680	1.44	371	377	7	378	25431
319.5	2395	178694	1.43	380	387	3	384	28515
320.0	2588	198805	1.42	390	396	0	390	31754

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID=00344 AT DISTANCE= 8040 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
312.0	79	3163	1.01	23	28	63	86	839
312.5	93	3865	1.07	30	36	62	92	889
313.0	108	4676	1.14	33	39	61	95	1040
313.5	141	5591	1.49	104	109	57	160	760
314.0	212	7023	2.24	182	188	55	237	868
314.5	308	9280	2.63	202	207	47	249	1330
315.0	413	13144	2.19	219	225	42	261	2173
315.5	527	19758	1.56	240	246	33	273	3555
316.0	652	28884	1.28	260	266	25	285	5185
316.5	787	37149	1.24	278	284	17	295	6730
317.0	930	46629	1.22	292	298	13	305	8519
317.5	1079	57264	1.21	304	310	11	315	10495
318.0	1234	69037	1.20	316	322	9	325	12638
318.5	1396	81441	1.19	332	338	7	339	14870
319.0	1566	95054	1.19	348	354	4	353	17289
319.5	1744	109911	1.18	364	370	2	366	19898
320.0	1930	126045	1.18	380	386	0	380	22702

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID=345RE AT DISTANCE= 8410 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
314.0	77	2901	1.08	29	31	121	151	677
314.5	92	3701	1.15	33	35	119	152	817
315.0	124	4647	1.52	95	97	102	197	653

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID=345RE AT DISTANCE= 8410 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
315.5	185	6034	2.15	149	151	92	240	799
316.0	274	8044	2.69	206	208	81	287	1091
316.5	382	11055	2.71	226	228	69	295	1710
317.0	499	16505	2.05	245	247	57	302	2826
317.5	628	24223	1.66	271	273	39	310	4214
318.0	770	32065	1.54	297	299	20	317	5678
318.5	923	43022	1.32	312	314	15	327	7829
319.0	1082	54678	1.25	327	329	10	337	9970
319.5	1250	66876	1.24	342	344	5	347	12176
320.0	1424	80368	1.23	357	359	0	357	14557

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 9,DATE= 6/ 8/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
INITIAL VALUES ARE: Q = 1400. H = 311.08

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

00344,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU

WATER-SURFACE PROFILE FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
1341 AT	7265 /	0 /	1400. /	351. /	26814. /	1.42 /	84. /	216.
311.08 /	0.35 /		/	311.43 /	3.99 /	0.50/		*IS*
2341 AT	7370 /	105 /	1400. /	422. /	21936. /	1.83 /	79. /	318.
311.47 /	0.31 /	0.35 /	0.0 /	311.78 /	3.32 /	0.37 /	-0.001	*XS*
00342 AT	7475 /	105 /	1400. /	417. /	20744. /	1.52 /	61. /	210.
311.97 /	0.27 /	0.45 /	0.0 /	312.23 /	3.35 /	0.37 /	0.001	*XS*
00343 AT	7785 /	310 /	1400. /	519. /	21152. /	2.30 /	39. /	264.
313.37 /	0.26 /	1.38 /	0.0 /	313.63 /	2.70 /	0.39 /	0.010	*XS*
00344 AT	8040 /	255 /	1320. /	415. /	13253. /	2.18 /	42. /	261.
315.01 /	0.34 /	1.68 /	0.04 /	315.35 /	3.18 /	0.39 /	0.001	*XS*
345RE AT	8410 /	370 /	750. /	509. /	17112. /	1.99 /	56. /	303.
317.04 /	0.07 /	1.75 /	0.0 /	317.11 /	1.47 /	0.19 /	0.006	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 11.DATE= 6/ 8/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
INITIAL VALUES ARE: Q = 2300. H = 311.93

SECID.ERROR OR WARNING MESSAGE.INTERMEDIATE RESULTS(IF ANY).ACTION TAKEN

00344.KU/KD < 0.7 OR > 1.4 .USED COMPUTED WSU

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 12•DATE= 6/ 8/77

WATER-SURFACE PROFILE FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
PAGE 1 OF 1

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW								
WS ELEV / HV / HF / HE / EG / V / FN / ACC *ID*								
1341 AT	7265 /	0 /	2300. /	444. /	38785. /	1.36 /	80. /	216.
311.93 /	0.56 /		/	312.49 /	5.18 /	0.58/		*IS*
2341 AT	7370 /	105 /	2300. /	612. /	31596. /	2.03 /	73. /	335.
312.50 /	0.44 /	0.45 /	0.0 /	312.95 /	3.76 /	0.43 /	-0.001	*XS*
00342 AT	7475 /	105 /	2300. /	625. /	35436. /	1.41 /	47. /	254.
313.15 /	0.30 /	0.50 /	0.0 /	313.44 /	3.68 /	0.37 /	-0.000	*XS*
00343 AT	7785 /	310 /	2300. /	767. /	39050. /	1.66 /	36. /	292.
314.40 /	0.23 /	1.19 /	0.0 /	314.63 /	3.00 /	0.32 /	-0.001	*XS*
00344 AT	8040 /	255 /	2170. /	583. /	24415. /	1.34 /	30. /	278.
315.73 /	0.29 /	1.34 /	0.03 /	316.01 /	3.72 /	0.42 /	0.022	*XS*
345RE AT	8410 /	370 /	1240. /	662. /	26092. /	1.62 /	34. /	311.
317.62 /	0.09 /	1.69 /	0.0 /	317.71 /	1.87 /	0.21 /	0.010	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 13.DATE= 6/ 8/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
INITIAL VALUES ARE: Q = 2800. H = 312.26

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

00344,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 14.DATE= 6/ 8/77

Q 100

WATER-SURFACE PROFILE FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
PAGE 1 OF 1

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
1341 AT	7265	0	2800.	481.	44039.	1.33	79.	216.
312.26	0.70			312.96	5.82	0.63		*IS*
2341 AT	7370	105	2800.	740.	38125.	2.08	67.	343.
313.01	0.46	0.49	0.0	313.47	3.78	0.44	0.022	*XS*
00342 AT	7475	105	2800.	737.	43015.	1.45	39.	273.
313.65	0.33	0.50	0.0	313.97	3.80	0.37	-0.001	*XS*
00343 AT	7785	310	2800.	899.	48229.	1.59	34.	300.
314.90	0.24	1.17	0.0	315.14	3.12	0.32	-0.007	*XS*
00344 AT	8040	255	2640.	692.	31234.	1.26	23.	288.
316.15	0.29	1.25	0.02	316.44	3.82	0.42	0.021	*XS*
345RE AT	8410	370	1510.	760.	31437.	1.55	21.	316.
317.96	0.09	1.62	0.0	318.06	1.99	0.21	0.000	*XS*

END OF THIS PROFILE

CJ CK CL CM CN CO

B(100)
137
276
334
266
265
295

F4 - 8

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 15.DATE= 6/ 8/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
INITIAL VALUES ARE: Q = 3800. H = 312.94

SECID.ERROR OR WARNING MESSAGE.INTERMEDIATE RESULTS(IF ANY).ACTION TAKEN

00344.KU/KD < 0.7 OR > 1.4 .USED COMPUTED WSU

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 16•DATE= 6/ 8/77

Q 500

WATER-SURFACE PROFILE FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
PAGE 1 OF 1

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	V	ALPHA / FN	LEW / ACC	REW *ID*
1341 AT 7265 / 312.94	0 / 0.92	3800. /	559. / 313.86	56068. / 6.79	1.28 / 0.68	76. /		216. *IS*
2341 AT 7370 / 313.94	105 / 0.41	3800. / 0.48	1014. / 0.0	56235. / 314.35	1.88 / 3.75	47. / 0.34		358. 0.012 *XS*
00342 AT 7475 / 314.44	105 / 0.39	3800. / 0.48	937. / 0.0	56606. / 314.83	1.54 / 4.06	25. / 0.38		294. 0.005 *XS*
00343 AT 7785 / 315.77	310 / 0.26	3800. / 1.20	1137. / 0.0	66060. / 316.03	1.52 / 3.34	29. / 0.33		314. 0.000 *XS*
00344 AT 8040 / 316.92	255 / 0.30	3590. / 1.17	907. / 0.02	45051. / 317.22	1.22 / 3.96	14. / 0.42		303. 0.002 *XS*
345RE AT 8410 / 318.58	370 / 0.09	2040. / 1.45	947. / 0.0	44947. / 318.67	1.30 / 2.15	14. / 0.20		329. 0.004 *XS*

END OF THIS PROFILE

CJ CK CL CM CN CO

Q=3800 sooyr flood

B(SOC)

140 311 269 285 289 315

F4 - 10

5- Folly

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 1 DATE= 7/19/77 AT X-SEC. 353

*** INPUT CARD PRINTOUT ***

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1   201 [redacted] SEC 345 TO 353                                  9  4 05 05 15
2   202  31704  31762  31796  31858
3   209 345RE 1  21  6  314    8410 99 99
4   210    750   1240   1510   2040
5   211      0  1  3200   10  1  3190   20  1  3180   57  1  3170   81  1  3160
5   212    102  1  3150  110  2  3148  119  2  3145  126  3  3130  127  3  3120
5   213    128  3  3110  130  3  3100  132  3  3095  142  3  3105  148  4  3130
5   214    152  4  3145  180  5  3148  240  6  3155  287  6  3160  317  6  3180
5   215    357  6  3200
6   217  1  2 120 060  2  3 160 080  1  2 080 080  2  3 160 080  1  2 120 060
6   218  1  2 180 090
3 00229 00346 0 036 05 0315 0008535 99 99
5 00231    0000 01 03232 0010 01 03230 0020 01 03226 0030 01 03224 0040 01 03214
5 00232    0050 01 03200 0060 01 03196 0070 01 03182 0080 01 03176 0088 01 03170
5 00233    0090 02 03165 0092 02 03165 0094 02 03163 0096 02 03154 0098 02 03150
5 00234    0100 02 03145 0102 02 03141 0104 02 03138 0106 03 03102 0108 03 03102
5 00235    0110 03 03103 0112 03 03106 0114 03 03107 0116 03 03111 0118 03 03114
5 00236    0119 03 03136 0120 04 03145 0122 04 03147 0124 04 03150 0126 04 03152
5 00237    0128 04 03154 0130 05 03155 0245 05 03160 0280 05 03180 0315 05 03200
5 00238    0345 05 03220
6 00239 01 02 120  60 03 04 160 100 01 02 100 100 03 04 160 100 01 02 120 060
3 00249 00347 0 025 04 0317 0008955 99 99
5   251      0  1  3260   13  1  3240   30  1  3220   55  1  3200   80  1  3180
5   252     90  1  3172   92  1  3171   94  1  3174   96  2  3179   98  2  3170
5   253    100  2  3162  101  2  3158  102  2  3148  104  2  3145  106  2  3142
5   254    108  2  3142  110  2  3145  111  2  3181  112  3  3189  140  4  3186
5   255    190  4  3180  230  4  3200  320  4  3220  395  4  3240  470  4  3260
6 00256 01 02 180 180 01 02 100 100 01 02 220 220 02 03 100 050
3 00259 00348 1 027 03 0320 0009390 99 99
4 00260 000670 001090 001330 001810
5 00261    0000 01 03280 0065 01 03260 0125 01 03240 0150 01 03220 0175 01 03200
5 00262    0187 01 03223 0189 01 03223 0191 01 03224 0193 01 03223 0195 01 03221
5 00263    0197 02 03211 0198 02 03204 0199 02 03192 0201 02 03179 0203 02 03179
5 00264    0205 03 03180 0207 03 03186 0208 03 03197 0209 03 03206 0211 03 03214
5 00265    0213 03 03216 0215 03 03215 0219 03 03211 0225 03 03220 0290 03 03240
5 00266    0320 03 03260 0335 03 03280
6 00267 01 02 200 200 01 02 080 080 01 02 200 200
3 00279 00349 0 024 03 0326 0009810 99 99
5 00281    0000 01 03340 0010 01 03320 0030 01 03300 0045 01 03280 0085 01 03266
5 00282    0087 01 03268 0089 01 03266 0091 01 03262 0093 01 03254 0095 02 03255
5 00283    0097 02 03233 0099 02 03231 0101 02 03234 0103 02 03235 0105 03 03251
5 00284    0107 03 03262 0109 03 03268 0111 03 03272 0113 03 03274 0115 03 03276
5 00285    0119 03 03280 0145 03 03300 0180 03 03320 0205 03 03340
6 00286 02 03 120 080 05 07 100 060 01 02 120 080
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Q_{10} = 500 cfs E_{10} = 345.50

Q_{50} = 820 cfs E_{50} = 346.17

Q_{100} = 1,000 cfs E_{100} = 346.40

Q_{500} = 1,350 cfs E_{500} = 346.71

F5 - 1

*** INPUT CARD PRINTOUT ***

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5 00292     0087 01 03316 0089 01 03317 0091 01 03315 0093 01 03314 0095 02 03306
5 00293     0096 02 03292 0097 02 03273 0099 02 03267 0101 02 03266 0103 02 03267
5 00294     0105 02 03267 0107 02 03274 0108 02 03294 0109 02 03308 0111 03 03316
5 00295     0113 03 03320 0115 03 03321 0119 03 03324 0125 04 03325 0195 04 03340
5 00296     0230 04 03360 0255 04 03380
6 00297 02 03 150 080 01 02 080 080 02 03 120 080 01 02 100 050
3 00299 00351 1 024 05 0333 0010495 99 99
4 00300 000530 000880 001070 001450
5 00301     0000 01 03420 0045 01 03400 0095 01 03380 0130 02 03360 0140 02 03340
5 00302     0145 02 03334 0147 02 03336 0149 02 03338 0151 02 03338 0153 03 03338
5 00303     0155 03 03336 0157 03 03317 0159 03 03312 0161 03 03310 0163 03 03312
5 00304     0165 03 03312 0167 04 03335 0169 04 03341 0175 04 03352 0185 05 03354
5 00305     0210 05 03360 0235 05 03380 0290 05 03400 0325 05 03420
6 00306 01 02 050 050 02 03 160 080 04 06 100 050 01 02 120 060 01 02 100 050
3 00309 00352 0 030 03 0339 0010845 99 99
5 00311     0000 01 03440 0025 01 03420 0070 01 03400 0120 01 03394 0122 01 03394
5 00312     0124 01 03392 0126 01 03390 0128 01 03390 0130 02 03390 0131 02 03366
5 00313     0132 02 03358 0133 02 03356 0134 02 03348 0136 02 03344 0138 02 03344
5 00314     0140 02 03340 0142 02 03348 0143 02 03354 0144 02 03372 0145 02 03380
5 00315     0146 02 03388 0148 02 03390 0150 03 03394 0152 03 03394 0156 03 03392
5 00316     0160 03 03394 0164 03 03394 0190 03 03400 0240 03 03420 0395 03 03440
6 00317 01 02 080 050 06 08 070 050 01 02 080 050
3 00319 00353 1 023 03 0343 0011205 99 99
4 00320 000500 000820 001000 001350
5 00321     0000 01 03490 0100 01 03477 0125 01 03466 0147 01 03454 0170 01 03445
5 00322     0180 01 03438 0186 02 03438 0187 02 03434 0188 02 03414 0190 02 03406
5 00323     0192 02 03415 0194 02 03408 0196 02 03403 0197 02 03418 0198 02 03433
5 00324     0200 03 03438 0220 03 03445 0240 03 03454 0265 03 03461 0300 03 03463
5 00325     0400 03 03470 0570 03 03480 0660 03 03490
6 00326 01 02 080 050 04 06 070 050 01 02 080 050
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USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 3.DATE= 7/19/77

PAGE 1 OF EDITING NOTES FOR: FOLLY LICK HERNDON SEC 345 TO 353

SECID	ERROR SEVERITY	FIRST VARIABLE	NO.	ERROR MESSAGE	SECOND VARIABLE	NO.	VALUE ASSUMED
00347	WARNING	N1	3	HIGH			
00347	WARNING	N3	3	HIGH			
00348	WARNING	N1	1	HIGH			
00348	WARNING	N3	1	HIGH			
00348	WARNING	N1	3	HIGH			
00348	WARNING	N3	3	HIGH			

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 4.DATE= 7/19/77

INPUT SUMMARY FOR: FOLLY LICK HERNDON SEC 345 TO 353

9 CROSS SECTIONS SPECIFIED (OR ASSUMED)

FOUND 9 TYPE 3 CARDS

KEPT 9 CROSS SECTIONS FOR EDITING

9 " " VALID FOR PROPERTY COMPUTATIONS

9 " " " " PROFILE "

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 345 TO 353
SECID=345RE AT DISTANCE= 8410 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
314.0	77	2901	1.08	29	31	121	151	677
314.5	92	3701	1.15	33	35	119	152	817
315.0	124	4647	1.52	95	97	102	197	653
315.5	185	6034	2.15	149	151	92	240	799
316.0	274	8044	2.69	206	208	81	287	1091
316.5	382	11055	2.71	226	228	69	295	1710
317.0	499	16505	2.05	245	247	57	302	2826
317.5	628	24223	1.66	271	273	39	310	4214
318.0	770	32065	1.54	297	299	20	317	5678
318.5	923	43022	1.32	312	314	15	327	7829
319.0	1082	54678	1.25	327	329	10	337	9970
319.5	1250	66876	1.24	342	344	5	347	12176
320.0	1424	80368	1.23	357	359	0	357	14557

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 345 TO 353
SECID=00346 AT DISTANCE= 8535 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
315.0	67	2034	1.25	26	30	98	124	548
315.5	82	2533	1.37	34	38	96	130	615
316.0	128	3276	2.14	150	155	95	245	459
316.5	206	4673	2.57	162	166	92	254	822
317.0	291	6817	2.25	175	179	88	263	1416
317.5	382	10608	1.59	190	194	81	271	2434
318.0	481	17476	1.22	207	211	73	280	3762
318.5	588	24351	1.15	221	225	68	289	5081
319.0	701	32149	1.09	233	238	64	298	6602
319.5	821	40532	1.08	246	250	61	306	8205
320.0	948	49620	1.09	265	270	50	315	9765
320.5	1084	60802	1.06	276	281	46	323	11828
321.0	1224	73007	1.05	287	292	43	330	14010
321.5	1371	86040	1.05	299	303	39	338	16296
322.0	1523	100138	1.04	311	316	34	345	18705
322.5	1680	116608	1.05	320	325	25	345	21265
323.0	1844	134009	1.07	335	341	10	345	23730
323.2	1912	141047	1.08	345	351	0	345	24568

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 345 TO 353
SECID=00347 AT DISTANCE= 8955 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
317.0	25	526	1.00	13	15	98	111	202
317.5	34	728	1.09	22	25	86	111	226
318.0	47	1003	1.28	31	35	80	111	292
318.5	77	1458	1.77	89	93	74	200	306
319.0	137	2375	2.02	143	147	68	210	535
319.5	212	3835	1.91	159	163	61	220	1007
320.0	296	5771	1.75	175	179	55	230	1647
320.5	390	8011	1.69	204	208	49	253	2360
321.0	499	10848	1.61	233	237	43	275	3272
321.5	623	14340	1.54	261	266	36	298	4398
322.0	761	19612	1.42	290	294	30	320	5861
322.5	911	27699	1.35	313	317	26	339	7602
323.0	1074	39518	1.37	336	340	22	358	9312
323.5	1247	57898	1.48	359	363	17	376	10853
324.0	1433	71017	1.47	382	386	13	395	12971
324.5	1629	85483	1.46	404	408	10	414	15352
325.0	1837	101598	1.45	426	431	7	433	17959
325.5	2055	119428	1.44	448	453	3	451	20797
326.0	2285	139038	1.43	470	475	0	470	23873

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 345 TO 353
SECID=00348 AT DISTANCE= 9390 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
320.0	16	319	1.37	10	11	198	208	96
320.5	23	476	1.64	20	22	169	209	111
321.0	36	683	2.11	31	33	163	210	151
321.5	55	975	2.97	49	52	156	222	193
322.0	84	1436	3.56	65	68	150	225	289
322.5	125	1995	4.43	98	100	144	241	381
323.0	179	2845	4.61	120	123	138	258	579
323.5	245	3937	4.57	143	145	131	274	852
324.0	322	5295	4.43	165	168	125	290	1211
324.5	410	6890	4.32	188	191	110	298	1653
325.0	509	8818	4.14	210	213	95	305	2210
325.5	620	11095	3.94	233	236	80	313	2893
326.0	742	13741	3.74	255	258	65	320	3711
326.5	874	16849	3.51	275	278	49	324	4718
327.0	1017	20364	3.31	295	298	33	328	5861
327.5	1169	24301	3.14	315	318	16	331	7205
328.0	1332	28673	3.00	335	338	0	335	8699

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 345 TO 353
SECID=00349 AT DISTANCE= 9810 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
326.0	25	550	1.11	15	17	91	107	174
326.5	33	794	1.19	19	21	89	108	233
327.0	47	1093	1.48	36	39	74	110	248
327.5	69	1549	1.77	55	57	59	114	334
328.0	102	2211	1.94	74	76	45	119	485
328.5	141	3189	1.84	84	87	41	126	765
329.0	186	4586	1.80	95	97	38	132	1103
329.5	236	6616	1.82	105	107	34	139	1488
330.0	291	9709	1.73	115	117	30	145	1992
330.5	352	13803	1.76	129	131	25	154	2487
331.0	419	18640	1.66	143	145	20	163	3168
331.5	494	22742	1.62	156	159	15	171	3916
332.0	576	27417	1.58	170	173	10	180	4778
332.5	663	33076	1.52	179	181	8	186	5830
333.0	754	39319	1.46	188	190	5	193	7092
333.5	850	46159	1.42	196	199	3	199	8416
334.0	951	53609	1.39	205	208	0	205	9852

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 345 TO 353
SECID=00350 AT DISTANCE= 10215 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
331.0	50	1761	1.01	16	20	94	110	500
331.5	58	2136	1.03	20	24	91	111	554
332.0	77	2680	1.32	58	62	55	113	435
332.5	109	3471	1.75	75	79	50	125	564
333.0	154	4546	2.13	103	108	45	148	729
333.5	212	5991	2.39	132	136	40	172	991
334.0	285	7887	2.49	160	165	35	195	1369
334.5	369	10783	2.17	174	178	30	204	2067
335.0	459	15565	1.62	188	192	25	213	3204
335.5	556	23036	1.23	201	206	20	221	4730
336.0	660	31980	1.10	215	220	15	230	6248
336.5	770	40101	1.09	225	230	11	236	7759
337.0	885	49202	1.08	235	240	8	243	9392
337.5	1005	59293	1.07	245	250	4	249	11151
338.0	1130	70389	1.07	255	260	0	255	13038

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 345 TO 353
SECID=00351 AT DISTANCE= 10495 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
333.0	17	301	1.00	11	12	156	167	116
333.5	22	459	1.01	14	16	144	167	162
334.0	33	660	1.22	29	31	140	169	184
334.5	49	1015	1.39	34	36	138	171	282
335.0	67	1471	1.48	39	41	135	174	408
335.5	90	2023	1.63	57	59	133	189	501
336.0	124	2864	1.75	80	82	130	210	661
336.5	168	4674	1.68	95	97	121	216	974
337.0	219	7970	1.50	110	112	113	223	1427
337.5	278	12453	1.51	125	127	104	229	1908
338.0	344	18035	1.67	140	142	95	235	2364
338.5	420	22393	1.64	166	169	83	249	2963
339.0	510	29290	1.54	193	195	70	263	3789
339.5	613	37296	1.45	219	221	58	276	4833
340.0	729	45990	1.42	245	248	45	290	5992
340.5	856	56565	1.36	265	268	34	299	7477
341.0	994	68602	1.32	285	288	23	308	9160
341.5	1141	82174	1.28	305	308	11	316	11047
342.0	1299	97351	1.26	325	328	0	325	13144

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 345 TO 353
SECID=00352 AT DISTANCE= 10845 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
339.0	57	2254	1.00	18	22	130	148	571
339.5	73	2796	1.15	57	61	112	168	434
340.0	117	3899	1.68	120	124	70	190	503
340.5	183	5800	1.87	144	148	59	203	855
341.0	260	8574	1.74	168	172	48	215	1397
341.5	350	12918	1.43	191	196	36	228	2246
342.0	452	19395	1.20	215	219	25	240	3394
342.5	570	27030	1.23	260	264	19	279	4314
343.0	712	36487	1.28	305	309	13	318	5450
343.5	875	48953	1.30	350	354	6	356	6901
344.0	1062	65374	1.29	395	399	0	395	8699

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 345 TO 353
SECID=00353 AT DISTANCE= 11205 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
343.0	20	532	1.00	11	14	187	198	151
343.5	25	738	1.00	12	15	187	199	205
344.0	34	1018	1.10	29	32	177	206	199
344.5	54	1557	1.41	50	54	170	220	265
345.0	84	2389	1.64	74	77	157	231	400
345.5	127	3626	1.71	98	102	145	244	630
346.0	183	5587	1.68	125	129	136	261	970
346.5	263	8256	1.96	202	205	127	329	1218
347.0	385	12737	2.12	284	288	116	400	1743
347.5	551	19733	2.21	380	384	105	485	2531
348.0	768	27879	2.18	493	497	77	570	3681
348.5	1035	41886	1.69	577	580	38	615	6059
349.0	1344	64573	1.33	660	664	0	660	9447

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 10,DATE= 7/19/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK HERNDON SEC 345 TO 353
INITIAL VALUES ARE: Q = 750. H = 317.04

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

00346,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU

WATER-SURFACE PROFILE FOR: FOLLY LICK HERNDON SEC 345 TO 353
PAGE 1 OF 1

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
345RE AT 8410 / 317.04	0 / 0.07	750. /	509. /	17109. / 317.11	1.99 / 1.47	56. / 0.19	303.	*IS*
00346 AT 8535 / 317.43	125 / 0.11	750. / 0.41	369. / 0.02	9972. / 317.54	1.67 / 2.03	82. / 0.24	270. / 0.000	*XS*
00347 AT 8955 / 320.47	420 / 0.10	750. / 3.02	383. / 0.0	7839. / 320.57	1.69 / 1.96	49. / 0.27	251. / 0.004	*XS*
00348 AT 9390 / 324.50	435 / 0.18	670. / 4.07	409. / 0.04	6878. / 324.68	4.32 / 1.64	110. / 0.39	297. / 0.004	*XS*
00349 AT 9810 / 329.29	420 / 0.28	670. / 4.85	215. / 0.05	5657. / 329.57	1.84 / 3.12	35. / 0.42	136. / 0.001	*XS*
00350 AT 10215 / 333.82	405 / 0.26	670. / 4.50	257. / 0.0	7143. / 334.08	2.47 / 2.60	37. / 0.35	187. / 0.007	*XS*
00351 AT 10495 / 336.59	280 / 0.23	530. / 2.74	176. / 0.0	5154. / 336.82	1.64 / 3.00	120. / 0.38	217. / 0.005	*XS*
00352 AT 10845 / 340.33	350 / 0.32	530. / 3.77	159. / 0.05	5065. / 340.65	1.85 / 3.34	63. / 0.44	198. / 0.014	*XS*
00353 AT 11205 / 345.50	360 / 0.41	500. / 5.20	127. / 0.04	3626. / 345.91	1.71 / 3.92	145. / 0.56	244. / 0.017	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 12,DATE= 7/19/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK HERNDON SEC 345 TO 353
INITIAL VALUES ARE: Q = 1240. H = 317.62

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

00346,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
00347,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU

WATER-SURFACE PROFILE FOR: FOLLY LICK HERNDON SEC 345 TO 353
PAGE 1 OF 1

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
345RE AT 8410 / 317.62	0 / 0.09	1240. /	661. / 317.71	26029. / 1.88	1.62 / 0.21	34. /	311.	*IS*
00346 AT 8535 / 318.02	125 / 0.12	1240. / 0.41	486. / 0.02 / 318.15	17927. / 2.55	1.21 / 0.33	73. / 0.008	280.	*XS*
00347 AT 8955 / 321.12	420 / 0.14	1240. / 3.10	528. / 0.01 / 321.26	11638. / 2.35	1.59 / 0.31	41. / 0.010	280.	*XS*
00348 AT 9390 / 325.56	435 / 0.18	1090. / 4.45	634. / 0.02 / 325.74	11392. / 1.72	3.91 / 0.15	78. / 0.006	313.	*XS*
00349 AT 9810 / 330.00	420 / 0.38	1090. / 4.51	291. / 0.10 / 330.38	9709. / 3.75	1.73 / 0.34	30. / 0.028	145.	*XS*
00350 AT 10215 / 334.55	405 / 0.27	1090. / 4.44	377. / 0.0 / 334.82	11163. / 2.89	2.12 / 0.38	30. / 0.005	205.	*XS*
00351 AT 10495 / 337.16	280 / 0.32	880. / 2.61	237. / 0.02 / 337.47	9332. / 3.72	1.47 / 0.43	110. / 0.022	224.	*XS*
00352 AT 10845 / 340.88	350 / 0.38	880. / 3.74	240. / 0.03 / 341.26	7760. / 3.66	1.81 / 0.48	50. / 0.007	212.	*XS*
00353 AT 11205 / 346.17	360 / 0.44	820. / 5.29	206. / 0.03 / 346.61	6336. / 3.99	1.77 / 0.57	133. / 0.030	277.	*XS*

END OF THIS PROFILE

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 14 DATE= 7/19/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK HERNDON SEC 345 TO 353
INITIAL VALUES ARE: Q = 1510. H = 317.96

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

00347,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 15,DATE= 7/19/77

WATER-SURFACE PROFILE FOR: FOLLY LICK HERNDON SEC 345 TO 353
PAGE 1 OF 1

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW									
WS ELEV / HV / HF / HE / EG / V / FN / ACC / *ID*									
345RE AT	8410 /	0 /	1510. /	758. /	31370. /	1.55 /	21. /	316.	
317.96 /	0.10 /		/	318.06 /	1.99 /	0.21/		*IS*	
00346 AT	8535 /	125 /	1510. /	555. /	22272. /	1.17 /	69. /	286.	
318.35 /	0.13 /	0.41 /	0.02 /	318.48 /	2.72 /	0.34 /	0.001	*XS*	
00347 AT	8955 /	420 /	1510. /	608. /	13895. /	1.55 /	37. /	295.	
321.44 /	0.15 /	3.09 /	0.01 /	321.59 /	2.49 /	0.32 /	0.004	*XS*	
00348 AT	9390 /	435 /	1330. /	744. /	13781. /	3.73 /	65. /	320.	
326.01 /	0.19 /	4.58 /	0.02 /	326.19 /	1.79 /	0.15 /	0.003	*XS*	
00349 AT	9810 /	420 /	1330. /	329. /	12168. /	1.74 /	27. /	151.	
330.32 /	0.44 /	4.43 /	0.13 /	330.76 /	4.04 /	0.36 /	0.012	*XS*	
00350 AT	10215 /	405 /	1330. /	426. /	13616. /	1.80 /	27. /	209.	
334.82 /	0.27 /	4.32 /	0.0 /	335.10 /	3.12 /	0.38 /	0.007	*XS*	
00351 AT	10495 /	280 /	1070. /	263. /	11368. /	1.48 /	106. /	227.	
337.38 /	0.38 /	2.60 /	0.05 /	337.76 /	4.07 /	0.47 /	0.007	*XS*	
00352 AT	10845 /	350 /	1070. /	282. /	9512. /	1.66 /	45. /	218.	
341.13 /	0.37 /	3.71 /	0.0 /	341.50 /	3.79 /	0.48 /	0.030	*XS*	
00353 AT	11205 /	360 /	1000. /	245. /	7603. /	1.93 /	129. /	315.	
346.40 /	0.50 /	5.33 /	0.06 /	346.90 /	4.08 /	0.61 /	0.010	*XS*	

END OF THIS PROFILE

F5-8

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 16,DATE= 7/19/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK HERNDON SEC 345 TO 353
INITIAL VALUES ARE: Q = 2040. H = 318.58

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

00346,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
00347,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU

WATER-SURFACE PROFILE FOR: FOLLY LICK HERNDON SEC 345 TO 353
PAGE 1 OF 1

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW								
WS ELEV / HV / HF / HE / EG / V / FN / ACC								*ID*
345RE AT	8410 /	0 /	2040. /	948. /	45010. /	1.30 /	14. /	329.
318.58 /	0.09 /		/ 318.67 /	2.15 /	0.20/			*IS*
00346 AT	8535 /	125 /	2040. /	684. /	30942. /	1.10 /	65. /	296.
318.93 /	0.15 /	0.37 /	0.03 /	319.08 /	2.98 /	0.34 /	0.001	*XS*
00347 AT	8955 /	420 /	2040. /	739. /	18695. /	1.44 /	31. /	317.
321.93 /	0.17 /	3.02 /	0.01 /	322.10 /	2.76 /	0.35 /	-0.013	*XS*
00348 AT	9390 /	435 /	1810. /	923. /	18033. /	3.44 /	43. /	325.
326.66 /	0.21 /	4.78 /	0.02 /	326.88 /	1.96 /	0.16 /	-0.014	*XS*
00349 AT	9810 /	420 /	1810. /	402. /	17632. /	1.68 /	21. /	160.
330.87 /	0.53 /	4.33 /	0.16 /	331.40 /	4.51 /	0.40 /	0.034	*XS*
00350 AT	10215 /	405 /	1810. /	500. /	18385. /	1.42 /	23. /	216.
335.21 /	0.29 /	4.09 /	0.0 /	335.50 /	3.62 /	0.39 /	0.005	*XS*
00351 AT	10495 /	280 /	1450. /	311. /	15188. /	1.61 /	99. /	232.
337.76 /	0.54 /	2.66 /	0.13 /	338.30 /	4.66 /	0.57 /	0.008	*XS*
00352 AT	10845 /	350 /	1450. /	360. /	13477. /	1.40 /	35. /	229.
341.55 /	0.35 /	3.60 /	0.0 /	341.91 /	4.03 /	0.47 /	0.008	*XS*
00353 AT	11205 /	360 /	1350. /	310. /	9932. /	2.04 /	122. /	359.
346.71 /	0.60 /	5.27 /	0.12 /	347.31 /	4.35 /	0.67 /	0.014	*XS*

END OF THIS PROFILE

FS-10

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 1 •DATE= 6/ 8/77 (PM)

*** INPUT CARD PRINTOUT ***

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3    59  1341  1  26  3  308     7265 99 99
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5    66      334  3  3162
6    67  2  4 160 080  2  4 050 050  2  4 030 030
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5    75      184  3  3117  272  3  3130  272  3  3098  276  3  3098  314  3  3112
5    76      388  3  3158  393  3  3160
6    77  2  4 200 120  2  4 060 060  2  4 060 060
3 00169 00342  0  027 05 0308 0007475 99 99
5 00171     0000 01 03160 0016 01 03150 0056 02 03126 0066 02 03114 0076 02 03099
5 00172     0086 02 03089 0096 02 03090 0100 02 03090 0106 02 03087 0114 02 03087
5 00173     0116 03 03087 0118 03 03080 0120 03 03060 0122 03 03050 0124 03 03054
5 00174     0126 03 03059 0128 03 03050 0130 03 03044 0132 03 03040 0134 03 03046
5 00175     0135 03 03058 0136 03 03068 0141 04 03080 0174 04 03100 0211 05 03120
5 00176     0286 05 03140 0324 05 03160
6 00177 01 02 120 120 01 02 160 080 01 02 060 060 01 02 120 060 01 02 200 200
3 00179 00343  0  034 04 0310 0007785 99 99
5 00181     0000 01 03200 0030 01 03156 0034 01 03150 0038 01 03139 0042 01 03124
5 00182     0046 01 03108 0050 01 03104 0056 01 03105 0060 01 03107 0064 01 0  09
5 00183     0068 01 03107 0072 01 03108 0076 01 03109 0080 01 03108 0082 01 0  08
5 00184     0084 01 03106 0086 02 03103 0087 02 03075 0088 02 03062 0090 02 03061
5 00185     0092 02 03062 0094 02 03061 0096 02 03060 0098 02 03062 0099 02 03070
5 00186     0100 03 03098 0102 03 03100 0104 03 03102 0160 04 03110 0218 04 03120
5 00187     0285 04 03140 0318 04 03160 0365 04 03180 0390 04 03200
6 00188 01 02 160 080 01 02 050 050 02 03 120 060 01 02 160 080
3 00189 00344  1  039 03 0312 0008040 99 99
4 00190 001320 002170 002640 003590
5 00191     0000 01 03200 0015 01 03166 0025 01 03160 0035 01 03154 0041 01 03151
5 00192     0045 01 03148 0049 01 03143 0051 01 03143 0053 01 03142 0055 01 03140
5 00193     0057 01 03134 0059 01 03131 0061 01 03131 0063 01 03118 0065 02 03121
5 00194     0066 02 03107 0067 02 03102 0068 02 03095 0069 02 03079 0071 02 03077
5 00195     0073 02 03074 0075 02 03071 0077 02 03070 0079 02 03069 0081 02 03069
5 00196     0083 02 03071 0084 02 03102 0085 03 03118 0087 03 03122 0089 03 03123
```

1-Spring

Keep + to obtain Spring Br.

Up Folly Lick to 1st Section on Spring Branch (375)

1341	Folly Lick
2341	" "
342	" "
343	" "
344	" "

SP1-1

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 2 DATE= 6/ 8/77

*** INPUT CARD PRINTOUT ***

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         1         2         3         4         5         6         7         8
....5....0....5....0....5....0....5....0....5....0....5....0....5....0....5....0

5 00197    0091 03 03122 0093 03 03127 0095 03 03131 0097 03 03131 0099 03 03131
5 00198    0237 03 03140 0285 03 03160 0325 03 03180 0380 03 03200
6 00199 01 02 160 160 01 02 080 080 01 02 120 060
3   209 3758F 1  15  5  315    8440 99 99
4   210    570    930   1140   1540
5   211      0  1 3200   30  1 3180   70  1 3160  140  2 3161  187  2 3161
5   212    195  3 3169  203  4 3155  205  4 3132  210  4 3112  219  4 3122
5   213    222  5 3155  234  5 3152  240  5 3160  250  5 3180  295  5 3200
6   215  2 3 140 070  1  2 080 040  2  3 160 080  1  2 060 060  2  3 140 070
```

SP1-2

SP1

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 3 DATE= 6/ 8/77

PAGE 1 OF EDITING NOTES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE

SECID	ERROR SEVERITY	FIRST VARIABLE	NO.	ERROR MESSAGE	SECOND VARIABLE	NO.	VALUE ASSUMED
2341	WARNING	N1	1	HIGH			
00342	WARNING	N1	5	HIGH			
00342	WARNING	N3	5	HIGH			

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 4•DATE= 6/ 8/77

INPUT SUMMARY FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE

6 CROSS SECTIONS SPECIFIED (OR ASSUMED)

FOUND 6 TYPE 3 CARDS

KEPT 6 CROSS SECTIONS FOR EDITING

6 " " VALID FOR PROPERTY COMPUTATIONS

6 " " " " PROFILE "

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID= 1341 AT DISTANCE= 7265 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
308.0	98	5332	1.52	48	50	99	147	638
308.5	123	7187	1.52	53	56	97	150	864
309.0	151	9509	1.51	55	58	95	150	1148
309.5	187	10713	1.78	99	103	93	216	1093
310.0	237	14953	1.58	102	107	90	216	1634
310.5	289	20000	1.48	105	112	87	216	2236
311.0	342	25802	1.43	108	117	84	216	2890
311.5	397	32456	1.39	110	120	82	216	3630
312.0	452	39871	1.35	112	124	80	216	4436
312.5	509	48100	1.31	114	127	78	216	5318
313.0	566	57102	1.28	116	131	76	216	6274
313.5	625	65982	1.29	118	134	74	216	7184
314.0	689	71551	1.51	138	156	54	216	7103
314.5	761	80510	1.59	150	169	42	216	7718
315.0	842	84315	1.62	177	198	30	288	8178
315.5	937	90979	1.58	202	225	24	307	9089
316.0	1072	93162	1.56	283	308	19	326	9473
316.5	1218	113358	1.45	297	322	13	334	11641
317.0	1368	134979	1.42	302	329	8	334	13856
317.5	1525	152181	1.41	332	360	2	334	15633
317.7	1592	162553	1.40	334	362	0	334	16656

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID= 2341 AT DISTANCE= 7370 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
308.0	97	4298	1.26	51	53	97	148	677
308.5	125	5748	1.37	61	63	94	155	869
309.0	158	7503	1.47	71	73	92	163	1107
309.5	196	9595	1.54	80	82	90	170	1396
310.0	238	11935	1.63	93	96	87	281	1693
310.5	289	14693	1.72	109	113	85	295	2035
311.0	354	17911	1.85	138	143	82	309	2364
311.5	434	22242	1.83	152	158	79	319	3004
312.0	526	26502	1.92	183	190	76	327	3468
312.5	612	31565	2.02	228	236	73	335	3989
313.0	737	37965	2.08	275	283	67	343	4742
313.5	880	46936	1.99	296	304	55	351	6107
314.0	1033	57609	1.87	312	320	47	359	7797
314.5	1199	69801	1.75	325	333	42	367	9774
315.0	1358	83370	1.66	339	347	36	375	11971
315.5	1531	98377	1.58	352	360	31	383	14392
316.0	1710	114530	1.52	367	376	26	393	16958

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID= 2341 AT DISTANCE= 7370 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
316.5	1896	133533	1.46	375	383	18	393	20012
317.0	2085	153410	1.43	382	391	11	393	23135
317.5	2277	174558	1.40	389	398	4	393	26398
317.8	2395	187836	1.39	393	403	0	393	28419

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID=00342 AT DISTANCE= 7475 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
308.0	52	2033	1.00	23	26	118	141	437
308.5	65	2775	1.05	33	35	117	149	511
309.0	89	3750	1.28	69	71	85	158	504
309.5	128	5066	1.72	86	89	80	166	676
310.0	174	6691	2.07	99	102	75	174	914
310.5	227	8903	2.13	111	114	72	183	1259
311.0	285	12005	1.93	124	127	69	193	1768
311.5	351	16181	1.67	137	140	65	202	2463
312.0	422	21114	1.51	150	153	61	211	3268
312.5	503	26915	1.43	173	176	57	230	4075
313.0	596	33386	1.41	199	202	49	249	4923
313.5	702	40681	1.43	226	229	41	267	5859
314.0	822	48773	1.49	253	257	33	286	6892
314.5	953	57724	1.54	271	274	24	296	8159
315.0	1093	67491	1.60	289	292	16	305	9525
315.5	1242	78084	1.66	307	310	8	315	10997
316.0	1400	89506	1.72	324	327	0	324	12569

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID=00343 AT DISTANCE= 7785 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
310.0	48	2701	1.01	16	21	86	102	475
310.5	61	3371	1.19	47	52	49	125	357
311.0	101	4329	2.23	115	120	45	160	360
311.5	166	5844	3.38	145	150	44	189	547
312.0	246	7948	3.98	175	180	43	218	828
312.5	338	10976	3.80	193	198	42	235	1300
313.0	439	15995	2.86	211	217	40	252	2122
313.5	549	23619	2.13	229	235	39	268	3302
314.0	668	31247	1.92	247	253	38	285	4498
314.5	794	40879	1.64	257	263	36	293	6176

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID=00343 AT DISTANCE= 7785 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
315.0	925	50177	1.58	268	273	34	302	7767
315.5	1062	60287	1.54	279	285	31	310	9466
316.0	1204	71373	1.51	291	297	27	318	11311
316.5	1354	83172	1.50	306	312	24	330	13187
317.0	1510	96013	1.49	321	327	20	342	15213
317.5	1675	109920	1.49	336	342	17	353	17395
318.0	1847	124920	1.48	351	357	14	365	19735
318.5	2025	141757	1.46	361	367	10	371	22505
319.0	2208	159680	1.44	371	377	7	378	25431
319.5	2395	178694	1.43	380	387	3	384	28515
320.0	2589	198805	1.42	390	396	0	390	31754

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID=00344 AT DISTANCE= 8040 PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
312.0	79	3163	1.01	23	28	63	86	839
312.5	93	3865	1.07	30	36	62	92	889
313.0	108	4676	1.14	33	39	61	95	1040
313.5	141	5591	1.49	104	109	57	160	760
314.0	212	7023	2.24	182	188	55	237	868
314.5	308	9280	2.63	202	207	47	249	1330
315.0	413	13144	2.19	219	225	42	261	2173
315.5	527	19758	1.56	240	246	33	273	3555
316.0	652	28884	1.28	260	266	25	285	5185
316.5	787	37149	1.24	278	284	17	295	6730
317.0	930	46629	1.22	292	298	13	305	8519
317.5	1079	57264	1.21	304	310	11	315	10495
318.0	1234	69037	1.20	316	322	9	325	12638
318.5	1396	81441	1.19	332	338	7	339	14870
319.0	1566	95054	1.19	348	354	4	353	17289
319.5	1744	109911	1.18	364	370	2	366	19898
320.0	1930	126045	1.18	380	386	0	380	22702

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID=375RE AT DISTANCE= 8440 PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
315.0	49	2144	1.00	18	21	203	222	453
315.5	60	2756	1.07	33	36	203	236	443
316.0	78	3617	1.27	40	43	200	240	554

CROSS-SECTION PROPERTIES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
SECID=375RE AT DISTANCE= 8440 PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
316.5	153	5030	2.68	176	179	60	243	495
317.0	246	7299	3.26	195	198	50	245	870
317.5	347	10665	2.98	208	211	40	248	1476
318.0	454	16071	2.46	220	223	30	250	2358
318.5	569	22508	2.45	239	242	23	261	3182
319.0	693	30449	2.23	258	261	15	273	4319
319.5	826	40995	1.95	276	280	8	284	5809
320.0	969	55199	1.66	295	299	0	295	7738

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 9•DATE= 6/ 8/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
INITIAL VALUES ARE: Q = 1400. H = 311.08

SECID•ERROR OR WARNING MESSAGE•INTERMEDIATE RESULTS(IF ANY)•ACTION TAKEN

00344•KU/KD < 0.7 OR > 1.4 •USED COMPUTED WSU

SP1-3

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 10•DATE= 6/ 8/77

WATER-SURFACE PROFILE FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
PAGE 1 OF 1

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW									
WS ELEV /	HV /	HF /	HE /	EG /	V /	EN /	ACC	*ID*	
1341 AT	7265 /	0 /	1400. /	351. /	26814. /	1.42 /	84. /	216.	
311.08 /	0.35 /			/ 311.43 /	3.99 /	0.50/		*IS*	
2341 AT	7370 /	105 /	1400. /	422. /	21936. /	1.83 /	79. /	318.	
311.47 /	0.31 /	0.35 /	0.0 /	311.78 /	3.32 /	0.37 /	-0.001	*XS*	
00342 AT	7475 /	105 /	1400. /	417. /	20744. /	1.52 /	61. /	210.	
311.97 /	0.27 /	0.45 /	0.0 /	312.23 /	3.35 /	0.37 /	0.001	*XS*	
00343 AT	7785 /	310 /	1400. /	519. /	21152. /	2.30 /	39. /	264.	
313.37 /	0.26 /	1.38 /	0.0 /	313.63 /	2.70 /	0.39 /	0.010	*XS*	
00344 AT	8040 /	255 /	1320. /	415. /	13253. /	2.18 /	42. /	261.	
315.01 /	0.34 /	1.68 /	0.04 /	315.35 /	3.18 /	0.39 /	0.001	*XS*	
345RE AT	8440 /	400 /	570. /	367. /	11501. /	2.87 /	38. /	248.	
317.60 /	0.11 /	2.34 /	0.0 /	317.70 /	1.55 /	0.26 /	0.006	*XS*	

END OF THIS PROFILE

SP1 - 4

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 11,DATE= 6/ 8/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
INITIAL VALUES ARE: Q = 2300. H = 311.93

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

00344,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU

SP1-5

WATER-SURFACE PROFILE FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
PAGE 1 OF 1

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
1341 AT	7265	0	2300.	444.	38785.	1.36	80.	216.
311.93	0.56			312.49	5.18	0.58		*IS*
2341 AT	7370	105	2300.	612.	31596.	2.03	73.	335.
312.50	0.44	0.45	0.0	312.95	3.76	0.43	-0.001	*XS*
00342 AT	7475	105	2300.	625.	35436.	1.41	47.	254.
313.15	0.30	0.50	0.0	313.44	3.68	0.37	-0.000	*XS*
00343 AT	7785	310	2300.	767.	39050.	1.66	36.	292.
314.40	0.23	1.19	0.0	314.63	3.00	0.32	-0.001	*XS*
00344 AT	8040	255	2170.	583.	24415.	1.34	30.	278.
315.73	0.29	1.34	0.03	316.01	3.72	0.42	0.022	*XS*
345RE AT	8440	400	930.	480.	17797.	2.42	28.	253.
318.12	0.14	2.21	0.0	318.26	1.94	0.28	0.031	*XS*

END OF THIS PROFILE

SP1-6

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 13.DATE= 6/ 8/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
INITIAL VALUES ARE: Q = 2800. H = 312.26

SECID.ERROR OR WARNING MESSAGE.INTERMEDIATE RESULTS(IF ANY).ACTION TAKEN

00344.KU/KD < 0.7 OR > 1.4 .USED COMPUTED WSU
375RE.KU/KD < 0.7 OR > 1.4 .USED COMPUTED WSU

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 14,DATE= 6/ 8/77

Q 100

WATER-SURFACE PROFILE FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
PAGE 1 OF 1

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
1341 AT 7265	/ 0	/ 2800.	/ 481.	/ 44039.	/ 1.33	/ 79.	/ 216.	
312.26	/ 0.70	/	/ 312.96	/ 5.82	/ 0.63	/		*IS*
2341 AT 7370	/ 105	/ 2800.	/ 740.	/ 38125.	/ 2.08	/ 67.	/ 343.	
313.01	/ 0.46	/ 0.49	/ 0.0	/ 313.47	/ 3.78	/ 0.44	/ 0.022	*XS*
00342 AT 7475	/ 105	/ 2800.	/ 737.	/ 43015.	/ 1.45	/ 39.	/ 273.	
313.65	/ 0.33	/ 0.50	/ 0.0	/ 313.97	/ 3.80	/ 0.37	/ -0.001	*XS*
00343 AT 7785	/ 310	/ 2800.	/ 899.	/ 48229.	/ 1.59	/ 34.	/ 300.	
314.90	/ 0.24	/ 1.17	/ 0.0	/ 315.14	/ 3.12	/ 0.32	/ -0.007	*XS*
00344 AT 8040	/ 255	/ 2640.	/ 692.	/ 31234.	/ 1.26	/ 23.	/ 288.	
316.15	/ 0.29	/ 1.25	/ 0.02	/ 316.44	/ 3.82	/ 0.42	/ 0.021	*XS*
375RE AT 8440	/ 400	/ 1140.	/ 545.	/ 21281.	/ 2.44	/ 24.	/ 259.	
318.40	/ 0.17	/ 2.15	/ 0.0	/ 318.57	/ 2.09	/ 0.29	/ -0.020	*XS*

END OF THIS PROFILE

Q=2800
100 yr flood

B(100)
/ 137 ✓
276 ✓
284 ✓
266 ✓
265 ✓
335 ✓

Folly Lick
Spring

SP1-8

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 15,DATE= 6/ 8/77

PAGE 1 OF PROFILE NOTES FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE
INITIAL VALUES ARE: Q = 3800. H = 312.94

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

00344,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
375RE,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 16.DATE= 6/ 8/77

Q 500

WATER-SURFACE PROFILE FOR: FOLLY LICK HERNDON SEC 1341 TO 345RE

SECID AT / WS ELEV	DISTANCE / HV	LENGTH / HF	DISCHARGE / HE	AREA / EG	CONVEYANCE / V	ALPHA / FN	LEW / ACC	REW / *ID*
1341 AT	7265 /	0 /	3800. /	559. /	56068. /	1.28 /	76. /	216.
312.94 /	0.92 /		/	313.86 /	6.79 /	0.68/		*IS*
2341 AT	7370 /	105 /	3800. /	1014. /	56235. /	1.88 /	47. /	358.
313.94 /	0.41 /	0.48 /	0.0 /	314.35 /	3.75 /	0.34 /	0.012	*XS*
00342 AT	7475 /	105 /	3800. /	937. /	56606. /	1.54 /	25. /	294.
314.44 /	0.39 /	0.48 /	0.0 /	314.83 /	4.06 /	0.38 /	0.005	*XS*
00343 AT	7785 /	310 /	3800. /	1137. /	66060. /	1.52 /	29. /	314.
315.77 /	0.26 /	1.20 /	0.0 /	316.03 /	3.34 /	0.33 /	0.000	*XS*
00344 AT	8040 /	255 /	3590. /	907. /	45051. /	1.22 /	14. /	303.
316.92 /	0.30 /	1.17 /	0.02 /	317.22 /	3.96 /	0.42 /	0.002	*XS*
375RE AT	8440 /	400 /	1540. /	689. /	30172. /	2.23 /	15. /	272.
318.98 /	0.17 /	1.94 /	0.0 /	319.16 /	2.24 /	0.40 /	0.003	*XS*

END OF THIS PROFILE

Folly Lick Spring

SP1-10

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 1 DATE= 6/16/77

*** INPUT CARD PRINTOUT ***

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    7 SPRING BRANCH SEC 375E TO 378                                4  4 05 05 15
    8  31760  31812  31840  31898
    9 375RE 1  15  5  315      400 99 99
   10    570    930   1140   1540
   11        0  1  3200   30  1  3180   70  1  3160  140  2  3161  187  2  3161
   12      195  3  3169  203  4  3155  205  4  3132  210  4  3112  219  4  3122
   13      222  5  3155  234  5  3152  240  5  3160  250  5  3180  295  5  3200
   17  2  3 140 070  1  2 080 040  2  3 160 080  1  2 060 060  2  3 140 070
   19   376 0  27  5  315      519 99 99
   21        0  1  3240   50  1  3220   90  1  3200  125  1  3180  180  1  3160
   22      210  2  3160  240  2  3160  260  3  3170  262  3  3169  264  3  3169
   23      266  3  3171  268  3  3172  270  4  3168  272  4  3131  274  4  3133
   24      276  4  3136  278  5  3166  280  5  3166  282  5  3167  284  5  3166
   25      286  5  3170  288  5  3177  290  5  3181  294  5  3184  325  5  3200
   26      375  5  3220  415  5  3240
   27  2  3 140 070 01  2 080 040  2  3 160 080  1  2 060 060  2  3 140 070
   29   377 0  29  5  319      866 99 99
   31        0  1  3280  120  1  3260  145  1  3240  175  1  3220  200  1  3200
   32      300  2  3201  350  3  3201  352  3  3201  354  3  3202  356  3  3202
   33      358  3  3201  360  4  3196  362  4  3169  364  4  3173  366  4  3175
   34      368  4  3176  370  4  3174  372  4  3173  373  4  3183  374  5  3211
   35      378  5  3215  380  5  3214  382  5  3215  386  5  3215  430  5  3200
   36      450  5  3220  460  5  3240  510  5  3260  540  5  3280
   37  2  3 160 080  1  2 080 040  2  3 220 110  1  2 070 070  2  3 200 100
   39   378 0  30  4  320      977 99 99
   41        0  1  3300   20  1  3280   40  1  3260   60  1  3240   95  1  3220
   42      125  1  3200  180  1  3194  200  1  3199  220  2  3211  240  2  3215
   43      260  2  3215  270  3  3212  272  3  3193  274  3  3184  276  3  3181
   44      278  3  3181  280  3  3183  282  3  3183  284  3  3181  286  3  3184
   45      288  3  3203  290  4  3213  292  4  3219  295  4  3226  300  4  3232
   46      320  4  3242  345  4  3254  360  4  3263  405  4  3280  420  4  3300
   47  2  3 140 070  1  2 050 030  1  2 040 040  2  3 200 100
```

Exit in 3rd

2 - Spring

RUN of June 16, '77 with 2 fb corrections

((to get 3rd ST Tributary flows))

Sec 375 to 378

SP2-1

SP 2.

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 2.DATE= 6/16/77

PAGE 1 OF EDITING NOTES FOR: SPRING BRANCH SEC 375E TO 378

SECID	ERROR SEVERITY	FIRST VARIABLE	NO.	ERROR MESSAGE	SECOND VARIABLE	NO.	VALUE ASSUMED
377	WARNING	N1	3	HIGH			
377	WARNING	N1	5	HIGH			
378	WARNING	N1	4	HIGH			

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 3.DATE= 6/16/77

INPUT SUMMARY FOR: SPRING BRANCH SEC 375E TO 378

4 CROSS SECTIONS SPECIFIED (OR ASSUMED)

FOUND 4 TYPE 3 CARDS

KEPT 4 CROSS SECTIONS FOR EDITING

4 " " VALID FOR PROPERTY COMPUTATIONS

4 " " " " PROFILE "

CROSS-SECTION PROPERTIES FOR: SPRING BRANCH SEC 375E TO 378
SECID=375RE AT DISTANCE= 400

PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
315.0	49	2144	1.00	18	21	203	222	453
315.5	60	2756	1.07	33	36	203	236	443
316.0	78	3617	1.27	40	43	200	240	554
316.5	153	5030	2.68	176	179	60	243	495
317.0	246	7299	3.26	195	198	50	245	870
317.5	347	10665	2.98	208	211	40	248	1476
318.0	454	16071	2.46	220	223	30	250	2358
318.5	569	22508	2.45	239	242	23	261	3182
319.0	693	30449	2.23	258	261	15	273	4319
319.5	826	40995	1.95	276	280	8	284	5809
320.0	969	55199	1.66	295	299	0	295	7738

CROSS-SECTION PROPERTIES FOR: SPRING BRANCH SEC 375E TO 378
SECID= 376 AT DISTANCE= 519

PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
315.0	8	215	1.00	6	8	271	277	56
315.5	11	333	1.00	7	9	271	277	86
316.0	15	476	1.00	7	10	270	278	122
316.5	55	941	2.83	92	95	166	278	142
317.0	109	1907	2.51	130	133	153	286	360
317.5	179	3761	2.01	149	153	139	287	789
318.0	258	7285	2.08	165	169	125	290	1268
318.5	343	12035	2.47	180	184	116	296	1713
319.0	438	16740	2.62	198	202	108	306	2280
319.5	542	23261	2.44	217	221	99	315	3109
320.0	655	32010	2.14	235	239	90	325	4235
320.5	778	43140	1.88	258	262	80	338	5592
321.0	912	53886	1.87	280	284	70	350	6819
321.5	1058	64820	1.95	303	307	60	363	8039
322.0	1215	77274	1.99	325	329	50	375	9448
322.5	1383	91388	1.99	348	352	38	385	11080
323.0	1562	107872	1.95	370	374	25	395	13026
323.5	1753	127838	1.85	393	397	13	405	15430
324.0	1955	146808	1.86	415	419	0	415	17617

CROSS-SECTION PROPERTIES FOR: SPRING BRANCH SEC 375E TO 378
SECID= 377 AT DISTANCE= 866

PART 1 OF 1

WS	A	K	ALPHA	B	P	LEW	REW	QC
319.0	19	482	1.00	13	15	360	373	133
319.5	26	749	1.00	13	16	360	373	202
320.0	33	1077	1.02	15	18	358	374	270
320.5	115	1933	3.67	200	203	194	435	258
321.0	221	3674	3.30	226	230	188	440	684
321.5	342	6567	2.70	260	264	181	445	1352
322.0	476	11648	2.95	275	279	175	450	2069
322.5	618	17767	3.16	290	294	168	458	2875
323.0	766	25838	2.74	305	309	160	465	4160
323.5	923	37227	2.23	320	324	153	473	5945
324.0	1086	49863	2.01	335	339	145	480	7833
324.5	1257	63011	1.91	349	353	139	488	9809
325.0	1435	77950	1.82	363	367	133	495	12013
325.5	1620	92581	1.84	376	381	126	503	14056
326.0	1811	108423	1.86	390	394	120	510	16236
326.5	2016	122121	1.99	428	432	90	518	17619
327.0	2239	137824	2.09	465	469	60	525	19274
327.5	2481	155476	2.18	503	507	30	533	21194
328.0	2741	175070	2.25	540	544	0	540	23377

CROSS-SECTION PROPERTIES FOR: SPRING BRANCH SEC 375E TO 378
SECID= 378 AT DISTANCE= 977

PART 1 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
320.0	49	1316	2.84	93	94	145	288	119
320.5	100	2394	3.95	110	112	118	288	271
321.0	159	3873	4.11	128	129	110	289	497
321.5	231	5968	4.09	168	170	103	291	761
322.0	328	9143	3.91	197	200	95	292	1211
322.5	429	14016	3.08	208	211	86	295	1992
323.0	536	22189	2.15	221	223	78	298	3232
323.5	651	35330	1.64	237	240	69	306	4767
324.0	774	47301	1.57	256	258	60	316	6089
324.5	906	59404	1.62	271	274	55	326	7375
325.0	1045	72761	1.68	287	289	50	337	8732
325.5	1192	87361	1.75	302	304	45	347	10174
326.0	1346	103202	1.81	315	318	40	355	11726
326.5	1508	120232	1.88	330	333	35	365	13315
327.0	1677	138639	1.95	349	351	30	379	14951
327.5	1856	158533	2.01	367	369	25	392	16708
328.0	2044	180088	2.06	385	388	20	405	18612
328.5	2239	205612	2.03	394	397	15	409	21236
329.0	2438	230957	2.06	403	405	10	413	23736

CROSS-SECTION PROPERTIES FOR: SPRING BRANCH SEC 375E TO 378
SECID= 378 AT DISTANCE= 977

PART 2 OF 2

WS	A	K	ALPHA	B	P	LEW	REW	QC
329.5	2641	257180	2.09	411	414	5	416	26273
330.0	2849	284768	2.12	420	423	0	420	28919

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 7,DATE= 6/16/77

PAGE 1 OF PROFILE NOTES FOR: SPRING BRANCH SEC 375E TO 378
INITIAL VALUES ARE: Q = 570. H = 317.60

SECID	ERROR OR WARNING MESSAGE	INTERMEDIATE RESULTS(IF ANY)	ACTION TAKEN
376	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
377	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
378	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU

WATER-SURFACE PROFILE FOR: SPRING BRANCH SEC 375E TO 378

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
375RE AT 400	0	570.	368.	11539.	2.86	38.	248.	
317.60	0.11		317.71	1.55	0.26			*IS*
376 AT 519	119	570.	262.	7525.	2.11	125.	290.	
318.02	0.16	0.45	0.02	318.18	2.18	0.47	0.003	*XS*
377 AT 866	347	570.	270.	4687.	3.00	185.	442.	
321.21	0.21	3.20	0.03	321.42	2.11	0.48	0.015	*XS*
378 AT 977	111	570.	338.	9542.	3.87	94.	293.	
322.05	0.17	0.81	0.0	322.22	1.68	0.45	0.001	*XS*

END OF THIS PROFILE

SP2-3

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 9,DATE= 6/16/77

PAGE 1 OF PROFILE NOTES FOR: SPRING BRANCH SEC 375E TO 378
INITIAL VALUES ARE: Q = 930. H = 318.12

SECID	ERROR OR WARNING MESSAGE	INTERMEDIATE RESULTS(IF ANY)	ACTION TAKEN
376	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
377	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
378	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU

SP2 - 4

WATER-SURFACE PROFILE FOR: SPRING BRANCH SEC 375E TO 378

SECID AT DISTANCE / WS ELEV	LENGTH / HV	DISCHARGE / HF	AREA / HE	CONVEYANCE / EG	ALPHA / V	LEW / FN	REW / ACC	*ID*
375RE AT 400	0	930.	481.	17869.	2.42	28.	253.	
318.12	0.14		318.26	1.94	0.28			*IS*
376 AT 519	119	930.	348.	12245.	2.48	116.	296.	
318.52	0.28	0.47	0.07	318.80	2.67	0.57	0.001	*XS*
377 AT 866	347	930.	386.	7957.	2.65	179.	447.	
321.67	0.24	3.08	0.0	321.91	2.41	0.58	0.027	*XS*
378 AT 977	111	930.	436.	14471.	3.00	86.	295.	
322.53	0.21	0.83	0.0	322.75	2.13	0.16	0.006	*XS*

END OF THIS PROFILE

SP2-5

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 11•DATE= 6/16/77

PAGE 1 OF PROFILE NOTES FOR: SPRING BRANCH SEC 375E TO 378
INITIAL VALUES ARE: Q = 1140. H = 318.40

SECID	ERROR OR WARNING MESSAGE	INTERMEDIATE RESULTS(IF ANY)	ACTION TAKEN
376	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
377	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU
378	KU/KD < 0.7 OR > 1.4		USED COMPUTED WSU

SP2-6

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 12,DATE= 6/16/77

Q 100

WATER-SURFACE PROFILE FOR: SPRING BRANCH SEC 375E TO 378
PAGE 1 OF 1

SECID AT DISTANCE / LENGTH / DISCHARGE / AREA / CONVEYANCE / ALPHA / LEW / REW								
*S ELEV /	HV /	HF /	HE /	EG /	V /	FN /	ACC	*ID*
D.A 375RE AT 400 /	0 /	1140. /	545. /	21287. /	2.44 /	24. /	259.	
318.40 /	0.17 /		/ 318.57 /	2.09 /	0.29/			*IS*
D.B 376 AT 519 /	119 /	1140. /	401. /	14838. /	2.59 /	111. /	302.	
318.81 /	0.32 /	0.49 /	0.08 / 319.14 /	2.84 /	0.59 /	0.001		*XS*
D.C 377 AT 866 /	347 /	1140. /	443. /	10108. /	2.76 /	177. /	449.	
321.88 /	0.28 /	3.01 /	0.0 / 322.16 /	2.57 /	0.67 /	0.019		*XS*
D.D 378 AT 977 /	111 /	1140. /	482. /	17610. /	2.56 /	82. /	296.	
322.75 /	0.22 /	0.81 /	0.0 / 322.97 /	2.37 /	0.18 /	-0.000		*XS*

END OF THIS PROFILE

Q=1140
100 yr. flood

B(100)

335 ✓

191 ✓

272 ✓

214 ✓

SP2-7

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 13.DATE= 6/16/77

PAGE 1 OF PROFILE NOTES FOR: SPRING BRANCH SEC 375E TO 378
INITIAL VALUES ARE: Q = 1540. H = 318.98

SECID,ERROR OR WARNING MESSAGE,INTERMEDIATE RESULTS(IF ANY),ACTION TAKEN

376,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
377,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU
378,KU/KD < 0.7 OR > 1.4 ,USED COMPUTED WSU

SP2-B

USGS STEP-BACKWATER PROGRAM - VERSION 76.170 *** PAGE COUNT= 14,DATE= 6/16/77

Q=1540
500 yr. flood

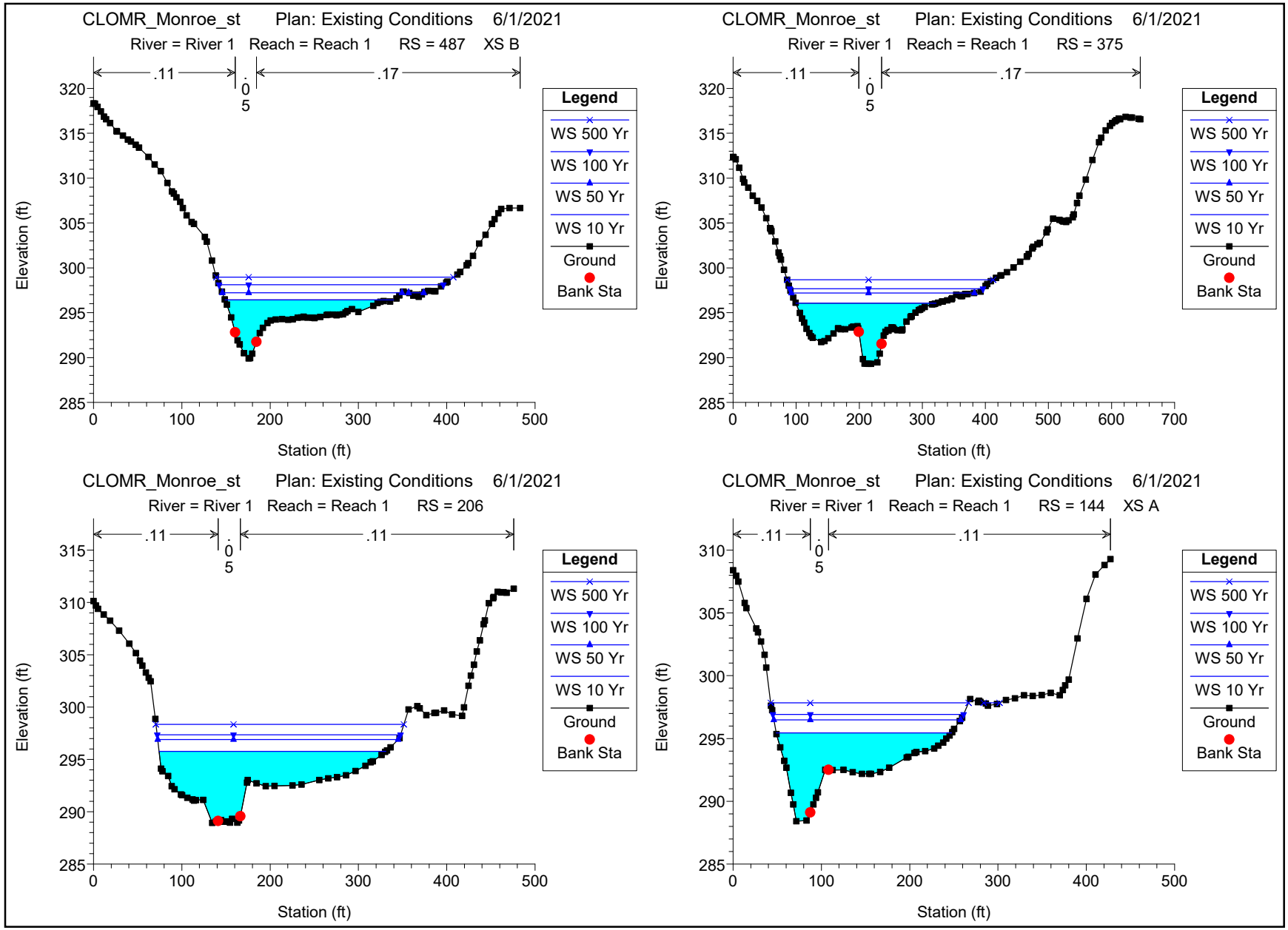
WATER-SURFACE PROFILE FOR: SPRING BRANCH SEC 375E TO 378
PAGE 1 OF 1

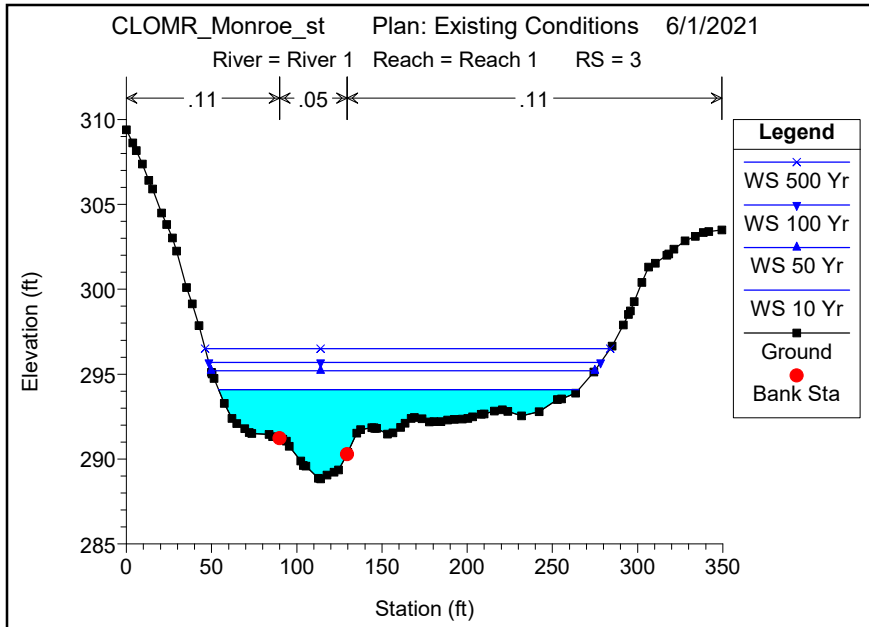
SECID #S	AT DISTANCE / ELEV	LENGTH/ HV	HF	DISCHARGE/ HE	AREA EG	/CONVEYANCE/ V	ALPHA/ FN	LEW / ACC	REW *ID*
375RE	AT 400 / 318.98	0 / 0.17	1540.	687. / 319.15	30083.	2.24 / 2.24	0.40	15.	272. *IS*
376	AT 519 / 319.34	119 / 0.36	1540. / 0.45	0.09 / 506. / 319.70	20919.	2.51 / 3.04	102. / 0.58	0.000	312. *XS*
377	AT 866 / 322.17	347 / 0.43	1540. / 2.84	0.04 / 524. / 322.61	13828.	3.23 / 2.94	172. / 0.83	0.026	453. *XS*
378	AT 977 / 323.13	111 / 0.23	1540. / 0.76	0.0 / 566. / 323.36	25164.	1.98 / 2.72	75. / 0.20	-0.000	299. *XS*

END OF THIS PROFILE

SP2 - 9

Appendix C: Existing & Proposed Hydraulic Model


CLOMR_Monroe_st Plan: Existing Conditions 6/1/2021
River = River 1 Reach = Reach 1 RS = 487 XS B
.11
.05
.17
Elevation (ft)
Station (ft)
Legend
WS 500 Yr
WS 100 Yr
WS 50 Yr
WS 10 Yr
Ground
Bank Sta
CLOMR_Monroe_st Plan: Existing Conditions 6/1/2021
River = River 1 Reach = Reach 1 RS = 375
.11
.05
.17
Elevation (ft)
Station (ft)
Legend
WS 500 Yr
WS 100 Yr
WS 50 Yr
WS 10 Yr
Ground
Bank Sta
CLOMR_Monroe_st Plan: Existing Conditions 6/1/2021
River = River 1 Reach = Reach 1 RS = 206
.11
.05
.11
Elevation (ft)
Station (ft)
Legend
WS 500 Yr
WS 100 Yr
WS 50 Yr
WS 10 Yr
Ground
Bank Sta
CLOMR_Monroe_st Plan: Existing Conditions 6/1/2021
River = River 1 Reach = Reach 1 RS = 144 XS A
.11
.05
.11
Elevation (ft)
Station (ft)
Legend
WS 500 Yr
WS 100 Yr
WS 50 Yr
WS 10 Yr
Ground
Bank Sta


CLOMR_Monroe_st
Plan: Existing Conditions
6/1/2021
River = River 1
Reach = Reach 1
RS = 3
.11
.05
.11
Elevation (ft)
310
305
300
295
290
285
0
50
100
150
200
250
300
350
Station (ft)
Legend
WS 500 Yr
WS 100 Yr
WS 50 Yr
WS 10 Yr
Ground
Bank Sta

Cross Section 487	
Station	Elevation
0	318.35
1.7	318.32
4.5	317.93
8.2	317.43
11.7	316.85
14.2	316.56
18.9	316.14
26.1	315.25
26.6	315.2
33.3	314.74
39	314.31
42.5	314.09
47.7	313.72
51.5	313.39
62.1	312.38
69.3	311.52
76.3	310.79
83.7	309.47
88.7	308.52
90.9	308.28
93.9	307.85
98.1	307.35
101.2	306.68
105.3	305.84
111.1	305.11
113.6	304.91
126	303.44
128.2	302.93
134.2	300.8
138.5	299.14
141.4	298.31
145.4	297.34
148.6	296.48
150.9	295.89
155.8	294.48
160.5	292.8089
163	291.92
165.4	291.46
170.2	290.5
175.7	289.9
177.4	289.94
179.7	290.43
184.6	291.75
188.2	292.73
191.8	293.32
196.8	293.84
200.6	294.12
206.2	294.24
213.4	294.29
220.6	294.21
225.5	294.27
231.1	294.45
235	294.47
237.9	294.56
242.2	294.44
248.2	294.45
249.4	294.41
250.3	294.39
256.7	294.52
263.9	294.74
265.4	294.78
271.1	294.78
275.2	294.71

Cross Section 375	
Station	Elevation
0	312.36
0.7	312.33
4.3	312.1
9.7	311.17
15.7	309.91
17.8	309.51
23.9	308.94
31.1	308.05
38.2	307.47
44.9	306.72
52.4	305.53
58.5	304.44
59.6	304.29
60.8	304.08
66.7	302.94
72	301.72
73.8	301.32
75.8	300.92
80.9	299.79
85.5	298.67
88.1	298.02
90.9	297.46
95.2	296.7
99.1	296.12
105.9	294.97
109.4	294.34
112.6	293.89
116.6	293.21
120.9	292.73
123.7	292.37
126.2	292.2
139.7	291.73
145.1	291.84
151	292.15
159.3	292.68
166.4	293.23
166.8	293.25
170.8	293.16
177.7	293.15
187.9	293.33
190.3	293.45
197.1	293.5
198.1	293.25
199.5	292.87
205.9	289.82
208.3	289.32
211.5	289.32
214.7	289.3
218.4	289.31
228.6	289.47
232.4	290.44
235.4	291.51
238.8	292.45
241.3	292.87
244.9	293.09
246.4	293
251.3	293.38
253.6	293.33
255.4	293.16
260.7	293.05
267.3	293.03
267.9	293.09
268.4	293.14

Cross Section 206	
Station	Elevation
0	310.14
2.7	309.7
5.1	309.38
11.5	308.84
18.8	308.25
28.9	307.31
40.4	306.07
48	305.16
52.7	304.44
55.3	303.95
59.3	303.3
62.6	302.8
64.6	302.47
69.9	298.88
76.5	294.12
78.1	293.88
84.4	293.41
88.4	292.45
91.7	292.16
99	291.65
100.3	291.59
106.3	291.34
112.2	291.18
113.6	291.06
115.8	291.11
124.1	291.12
134.3	288.93
138.5	289.05
140.4	289.09
141.2	289.112
144.4	289.2
147.7	289.06
151.5	289.07
154.5	288.97
156.9	289.31
162.7	288.97
164.6	289.17
166.2	289.58
173.9	292.79
174.7	293.03
184.6	292.72
194.9	292.45
205	292.46
225.3	292.52
235.4	292.61
255.6	293.04
265.7	293.18
275.8	293.3
285.9	293.49
296.7	293.89
307.9	294.4
313.9	294.72
316.2	294.82
326.3	295.44
330.2	295.72
332.4	295.85
336.4	296.16
346.6	297.03
356.7	299.77
366.8	300.09
369.3	299.88
376.9	299.22
386.1	299.43

Cross Section 144	
Station	Elevation
0	308.39
3.5	307.97
5.8	307.5
13.2	305.8
14.9	305.38
26.2	303.75
28.1	303.46
31.7	302.72
35.6	301.66
37.6	300.65
43	297.61
44.2	297.26
49	295.36
53.3	294.29
57.9	293.22
60.3	292.68
65.4	290.67
68.1	289.75
71.7	288.42
83.1	288.46
87.5	289.1104
87.7	289.14
91	289.75
94	290.27
95.9	290.71
104.4	292.5
108	292.4956
112.6	292.49
125.1	292.5
135.4	292.32
145.8	292.19
154.3	292.18
156.1	292.19
166.5	292.34
176.8	292.67
196.5	293.48
198.5	293.55
205.4	293.85
207.5	293.91
217.6	293.99
227.8	294.21
232.4	294.43
237.9	294.67
241.4	294.99
245.1	295.24
248.1	295.51
250.4	295.76
256.8	296.39
259.4	296.66
268.4	298.15
277.3	297.89
278.5	298.01
280.1	297.92
286.3	297.78
288.7	297.62
298.8	297.75
309	298.06
319.1	298.19
329.3	298.44
339.4	298.38
349.6	298.47
359.7	298.64
369.8	298.45

Cross Section 3	
Station	Elevation
0	309.4
3.7	308.63
5.8	308.18
9.4	307.38
13.2	306.41
15.4	305.9
20.6	304.5
23.6	303.82
27	303.03
29.5	302.26
35.3	300.1
38.7	299.14
42.6	297.86
50	295.1
50.3	295.01
51.4	294.75
57.4	293.28
61.9	292.39
64.7	292.09
69.5	291.78
72.1	291.56
73.6	291.51
83.7	291.44
85.8	291.32
90	291.2167
91.9	291.17
93.8	291.06
95.6	290.75
102.3	289.89
103.9	289.62
105.4	289.58
112.7	288.87
113.9	288.83
117.7	289.05
121.8	289.22
124.4	289.35
129.6	290.28
130	290.39
135.1	291.53
137.5	291.74
144	291.85
145.3	291.84
145.8	291.81
146.8	291.8
153.2	291.46
156.5	291.55
161	291.86
163.6	292.1
167.2	292.39
168.9	292.45
173.5	292.37
177.9	292.19
180.4	292.21
184.6	292.21
188.6	292.29
192.5	292.33
197.2	292.36
200.3	292.39
203.1	292.49
208.2	292.63
210	292.66
216	292.82
220.7	292.9

278.3	294.78
282.5	294.81
285.5	295.02
287.6	295.19
292.7	295.41
300	295.09
316.8	295.77
321.5	296.09
324.9	296.21
328.7	296.3
335.9	296.24
343.1	296.59
346.2	296.92
350.3	297.33
351.1	297.35
357.5	297.2
362.2	296.91
364.7	297
368.3	296.77
371.9	297.04
374.6	297.29
379.1	297.44
385.4	297.4
386.4	297.37
387	297.39
393.6	297.94
399.5	298.35
400.8	298.47
411.9	299.26
415.2	299.54
422.4	300.27
424.3	300.52
429.6	301.33
436.8	302.7
444	303.7
451.2	304.89
454	305.44
458.4	306.1
461.6	306.56
471.1	306.66
483	306.66

275	293.99
281.3	294.51
282.2	294.57
283.3	294.61
289.3	295.01
294.3	295.29
296.5	295.35
299.3	295.49
303.7	295.64
315.3	295.92
318	295.95
320.2	296.01
325.1	296.12
331.2	296.25
332.3	296.25
339.4	296.37
346.1	296.52
346.6	296.54
347.2	296.61
353.7	297.01
359	296.97
360.9	296.86
363.2	296.84
368.1	297.09
370.4	297.1
371.6	297.09
382.1	297.19
392.5	297.35
400.5	297.99
402.9	298.21
408.7	298.51
416.9	298.88
423.8	299.14
425.1	299.17
434.2	299.51
444.6	300.05
455.1	300.68
465.5	301.22
466.1	301.29
468.5	301.55
474.3	302.16
475.9	302.35
482.5	302.64
486.3	302.79
496.8	303.95
498.9	304.3
507.2	305.47
517.6	305.34
521.6	305.24
523.5	305.17
528.1	305.1
531.7	305.31
538.5	305.65
539.9	305.96
545.3	307.22
548.9	308.03
559.3	309.84
569.8	312.03
580.2	314
583.7	314.5
590.6	315.33
597.3	315.84
601	316.14
605.5	316.32
607.5	316.45
611.5	316.66

387.8	299.46
397.1	299.69
406.2	299.3
417.3	299.16
419.6	299.98
424.7	302.04
427.4	303.02
430.7	304.05
433.9	305.32
437.5	306.37
441.9	307.92
443.1	308.27
447.6	309.93
452.4	310.41
453.1	310.51
457.7	311.01
461.6	310.94
464.2	310.97
467.9	310.93
475.9	311.32

373.3	298.86
376.2	299.24
380	299.69
390.1	302.97
400.3	306.12
410.4	308.06
420.6	308.81
427.4	309.29

223.9	292.81
231.8	292.54
242.2	292.78
252.9	293.5
255.3	293.54
263.6	293.88
274.3	295.12
285	296.66
291.6	297.9
294.6	298.51
295.7	298.72
298	299.28
302.5	300.41
306.4	301.31
310.3	301.54
317.1	302.01
318.2	302.09
321.2	302.36
327.8	302.86
333.9	303.12
338.5	303.34
341.7	303.4
349.5	303.5

613.7	316.57
622.1	316.84
630.1	316.76
632.3	316.76
642.8	316.63
645.6	316.57

HEC-RAS HEC-RAS 6.0.0 May 2021
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: CLOMR_Monroe_st
Project File : CLOMR_Monroe_st.prj
Run Date and Time: 10/24/2021 3:53:01 PM

Project in English units

PLAN DATA

Plan Title: Existing Conditions
Plan File :
C:\Users\hammoudah.hammoudah\Desktop\Onboarding\HH\Model_Updated_1\Model_Truncated\Model_Truncated\CLOMR_Monroe_st.p01

Geometry Title: River
Geometry File :
C:\Users\hammoudah.hammoudah\Desktop\Onboarding\HH\Model_Updated_1\Model_Truncated\Model_Truncated\CLOMR_Monroe_st.g01

Flow Title : Existing Steady Flow
Flow File :
C:\Users\hammoudah.hammoudah\Desktop\Onboarding\HH\Model_Updated_1\Model_Truncated\Model_Truncated\CLOMR_Monroe_st.f01

Plan Summary Information:

Number of:	Cross Sections	= 5	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	0

Computational Information
    Water surface calculation tolerance = 0.01
    Critical depth calculation tolerance = 0.01
    Maximum number of iterations   = 20
    Maximum difference tolerance   = 0.3
    Flow tolerance factor   = 0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method: Average Conveyance
    Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Existing Steady Flow
Flow File :
C:\Users\hammoudah.hammoudah\Desktop\Onboarding\HH\Model_Updated_1\Model_Truncated\M
odel_Truncated\CLOMR_Monroe_st.f01

Flow Data (cfs)

River	Reach	RS	10 Yr	50 Yr	100 Yr	500 Yr
River 1	Reach 1	487	1800	2900	3400	4700

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
River 1	Reach 1	10 Yr	Known WS = 294.095	
River 1	Reach 1	50 Yr	Known WS = 295.195	
River 1	Reach 1	100 Yr	Known WS = 295.695	
River 1	Reach 1	500 Yr	Known WS = 296.495	

GEOMETRY DATA

Geometry Title: River
Geometry File :
C:\Users\hammoudah.hammoudah\Desktop\Onboarding\HH\Model_Updated_1\Model_Truncated\Model_Truncated\CLOMR_Monroe_st.g01

CROSS SECTION

RIVER: River 1
REACH: Reach 1 RS: 487

INPUT
Description: XS B
Station Elevation Data num= 104

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	318.35	1.7	318.32	4.5	317.93	8.2	317.43	11.7	316.85
14.2	316.56	18.9	316.14	26.1	315.25	26.6	315.2	33.3	314.74
39	314.31	42.5	314.09	47.7	313.72	51.5	313.39	62.1	312.38
69.3	311.52	76.3	310.79	83.7	309.47	88.7	308.52	90.9	308.28
93.9	307.85	98.1	307.35	101.2	306.68	105.3	305.84	111.1	305.11
113.6	304.91	126	303.44	128.2	302.93	134.2	300.8	138.5	299.14
141.4	298.31	145.4	297.34	148.6	296.48	150.9	295.89	155.8	294.48
160.5	292.8089	163	291.92	165.4	291.46	170.2	290.5	175.7	289.9
177.4	289.94	179.7	290.43	184.6	291.75	188.2	292.73	191.8	293.32
196.8	293.84	200.6	294.12	206.2	294.24	213.4	294.29	220.6	294.21
225.5	294.27	231.1	294.45	235	294.47	237.9	294.56	242.2	294.44
248.2	294.45	249.4	294.41	250.3	294.39	256.7	294.52	263.9	294.74
265.4	294.78	271.1	294.78	275.2	294.71	278.3	294.78	282.5	294.81
285.5	295.02	287.6	295.19	292.7	295.41	300	295.09	316.8	295.77
321.5	296.09	324.9	296.21	328.7	296.3	335.9	296.24	343.1	296.59
346.2	296.92	350.3	297.33	351.1	297.35	357.5	297.2	362.2	296.91
364.7	297	368.3	296.77	371.9	297.04	374.6	297.29	379.1	297.44
385.4	297.4	386.4	297.37	387	297.39	393.6	297.94	399.5	298.35
400.8	298.47	411.9	299.26	415.2	299.54	422.4	300.27	424.3	300.52
429.6	301.33	436.8	302.7	444	303.7	451.2	304.89	454	305.44
458.4	306.1	461.6	306.56	471.1	306.66	483	306.66		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.11	160.5	.05	184.6	.17

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
160.5	184.6	152.3	112.1	85.7	.1	.3

CROSS SECTION OUTPUT Profile #10 Yr

E.G. Elev (ft)	297.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.33	Wt. n-Val.	0.110	0.050	0.170
W.S. Elev (ft)	296.44	Reach Len. (ft)	152.30	112.10	85.70
Crit W.S. (ft)	296.44	Flow Area (sq ft)	19.87	133.78	256.67
E.G. Slope (ft/ft)	0.013016	Area (sq ft)	19.87	133.78	256.67
Q Total (cfs)	1800.00	Flow (cfs)	42.15	1400.65	357.20
Top Width (ft)	191.23	Top Width (ft)	11.74	24.10	155.39
Vel Total (ft/s)	4.39	Avg. Vel. (ft/s)	2.12	10.47	1.39
Max Chl Dpth (ft)	6.54	Hydr. Depth (ft)	1.69	5.55	1.65
Conv. Total (cfs)	15777.5	Conv. (cfs)	369.5	12277.1	3130.9
Length Wtd. (ft)	114.78	Wetted Per. (ft)	12.30	24.65	155.68
Min Ch El (ft)	289.90	Shear (lb/sq ft)	1.31	4.41	1.34
Alpha	4.46	Stream Power (lb/ft s)	2.79	46.17	1.86
Frctn Loss (ft)	0.62	Cum Volume (acre-ft)	1.68	1.81	2.87
C & E Loss (ft)	0.31	Cum SA (acres)	0.49	0.33	1.35

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is

not a valid subcritical answer. The
         program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50 Yr

E.G. Elev (ft)	299.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.96	Wt. n-Val.	0.110	0.050	0.170
W.S. Elev (ft)	297.22	Reach Len. (ft)	152.30	112.10	85.70
Crit W.S. (ft)	297.22	Flow Area (sq ft)	30.11	152.50	385.33
E.G. Slope (ft/ft)	0.017768	Area (sq ft)	30.11	152.50	385.33
Q Total (cfs)	2900.00	Flow (cfs)	85.18	2035.78	779.05
Top Width (ft)	220.27	Top Width (ft)	14.64	24.10	181.53
Vel Total (ft/s)	5.11	Avg. Vel. (ft/s)	2.83	13.35	2.02
Max Chl Dpth (ft)	7.32	Hydr. Depth (ft)	2.06	6.33	2.12
Conv. Total (cfs)	21755.8	Conv. (cfs)	639.0	15272.4	5844.4
Length Wtd. (ft)	114.43	Wetted Per. (ft)	15.30	24.65	181.89
Min Ch El (ft)	289.90	Shear (lb/sq ft)	2.18	6.86	2.35
Alpha	4.85	Stream Power (lb/ft s)	6.18	91.61	4.75
Frctn Loss (ft)	0.77	Cum Volume (acre-ft)	2.24	2.17	4.47
C & E Loss (ft)	0.47	Cum SA (acres)	0.53	0.33	1.65

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical
         depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
         sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and

previous cross section. This may indicate
         the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
         water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
         program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100 Yr

E.G. Elev (ft)	299.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.59	Wt. n-Val.	0.110	0.050	0.170
W.S. Elev (ft)	298.11	Reach Len. (ft)	152.30	112.10	85.70
Crit W.S. (ft)	298.11	Flow Area (sq ft)	44.85	174.10	567.13
E.G. Slope (ft/ft)	0.013128	Area (sq ft)	44.85	174.10	567.13
Q Total (cfs)	3400.00	Flow (cfs)	122.85	2182.25	1094.91
Top Width (ft)	253.86	Top Width (ft)	18.28	24.10	211.48
Vel Total (ft/s)	4.33	Avg. Vel. (ft/s)	2.74	12.53	1.93
Max Chl Dpth (ft)	8.21	Hydr. Depth (ft)	2.45	7.22	2.68
Conv. Total (cfs)	29674.6	Conv. (cfs)	1072.2	19046.3	9556.1
Length Wtd. (ft)	113.80	Wetted Per. (ft)	19.05	24.65	211.89
Min Ch El (ft)	289.90	Shear (lb/sq ft)	1.93	5.79	2.19
Alpha	5.47	Stream Power (lb/ft s)	5.28	72.55	4.24
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)	2.50	2.33	5.33
C & E Loss (ft)	0.34	Cum SA (acres)	0.55	0.33	1.74

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical
         depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
         sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #500 Yr

E.G. Elev (ft)	300.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.84	Wt. n-Val.	0.110	0.050	0.170
W.S. Elev (ft)	298.95	Reach Len. (ft)	152.30	112.10	85.70
Crit W.S. (ft)	298.95	Flow Area (sq ft)	61.56	194.37	749.82
E.G. Slope (ft/ft)	0.014365	Area (sq ft)	61.56	194.37	749.82
Q Total (cfs)	4700.00	Flow (cfs)	196.54	2742.70	1760.76
Top Width (ft)	268.44	Top Width (ft)	21.35	24.10	222.99
Vel Total (ft/s)	4.67	Avg. Vel. (ft/s)	3.19	14.11	2.35
Max Chl Dpth (ft)	9.05	Hydr. Depth (ft)	2.88	8.07	3.36
Conv. Total (cfs)	39214.5	Conv. (cfs)	1639.9	22883.7	14691.0
Length Wtd. (ft)	112.99	Wetted Per. (ft)	22.23	24.65	223.43
Min Ch El (ft)	289.90	Shear (lb/sq ft)	2.48	7.07	3.01
Alpha	5.43	Stream Power (lb/ft s)	7.93	99.78	7.07
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)	3.04	2.64	7.03
C & E Loss (ft)	0.40	Cum SA (acres)	0.57	0.33	1.87

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical

depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.

Profile #10 Yr

Pos		Left Sta	Right Sta	Flow	Area	W.P.	Percent	Hydr	Velocity	Shear	Power
		(ft)	(ft)	(cfs)	(sq ft)	(ft)					
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)							
1	LOB	128.40	160.50	42.15	19.87	12.30					
2.34	1.69	2.12	1.31	2.79							
2	Chan	160.50	165.32	185.69	21.19	5.02					
10.32	4.40	8.76	3.43	30.08							
3	Chan	165.32	170.14	268.92	26.24	4.92					
14.94	5.44	10.25	4.34	44.46							
4	Chan	170.14	174.96	336.50	29.86	4.85					
18.69	6.20	11.27	5.00	56.38							
5	Chan	174.96	179.78	352.01	30.75	4.88					
19.56	6.38	11.45	5.12	58.62							
6	Chan	179.78	184.60	257.53	25.73	4.99					
14.31	5.34	10.01	4.19	41.92							
7	ROB	184.60	244.28	229.83	143.31	59.90					
12.77	2.40	1.60	1.94	3.12							
8	ROB	244.28	303.96	117.57	95.74	59.72					
6.53	1.60	1.23	1.30	1.60							
9	ROB	303.96	363.64	9.80	17.62	36.06					
0.54	0.49	0.56	0.40	0.22							

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical
depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.

Profile #50 Yr

Pos	Left Sta	Right Sta	Flow	Area	W.P.	Percent	Hydr	Velocity	Shear	Power
	(ft)	(ft)	(cfs)	(sq ft)	(ft)					
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)						
1	LOB	128.40	160.50	85.18	30.11	15.30				
2.94	2.06	2.83	2.18	6.18						
2	Chan	160.50	165.32	285.22	24.93	5.02				
9.84	5.17	11.44	5.51	63.08						
3	Chan	165.32	170.14	393.32	29.99	4.92				
13.56	6.22	13.12	6.77	88.76						
4	Chan	170.14	174.96	479.81	33.61	4.85				
16.55	6.97	14.28	7.69	109.75						
5	Chan	174.96	179.78	499.22	34.50	4.88				
17.21	7.16	14.47	7.84	113.49						
6	Chan	179.78	184.60	378.22	29.47	4.99				
13.04	6.12	12.83	6.55	84.05						
7	ROB	184.60	244.28	446.63	189.68	59.90				
15.40	3.18	2.35	3.51	8.27						
8	ROB	244.28	303.96	276.58	142.10	59.72				
9.54	2.38	1.95	2.64	5.14						
9	ROB	303.96	363.64	54.60	50.82	52.09				
1.88	0.98	1.07	1.08	1.16						
10	ROB	363.64	423.32	1.24	2.73	10.18				
0.04	0.27	0.45	0.30	0.13						

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical
depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)

is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.

Profile #100 Yr

Conv	Pos Hydr	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	LOB	128.40	160.50	122.85	44.85	19.05	3.61	2.45	2.74	1.93	5.28
2	Chan	160.50	165.32	320.57	29.25	5.02	9.43	6.07	10.96	4.78	52.38
3	Chan	165.32	170.14	423.86	34.31	4.92	12.47	7.12	12.35	5.72	70.67
4	Chan	170.14	174.96	505.44	37.93	4.85	14.87	7.87	13.33	6.41	85.42
5	Chan	174.96	179.78	523.30	38.82	4.88	15.39	8.05	13.48	6.52	87.90
6	Chan	179.78	184.60	409.08	33.80	4.99	12.03	7.01	12.10	5.55	67.16
7	ROB	184.60	244.28	555.12	243.18	59.90	16.33	4.07	2.28	3.33	7.59
8	ROB	244.28	303.96	387.00	195.60	59.72	11.38	3.28	1.98	2.68	5.31
9	ROB	303.96	363.64	134.49	103.78	59.76	3.96	1.74	1.30	1.42	1.84
10	ROB	363.64	423.32	18.30	24.58	32.50	0.54	0.76	0.74	0.62	0.46

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical
depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.

Profile #500 Yr

	Pos	Left Sta	Right Sta	Flow	Area	W.P.	Percent	Hydr	Velocity	Shear	Power
		(ft)	(ft)	(cfs)	(sq ft)	(ft)					
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)							
1	LOB	128.40	160.50	196.54	61.56	22.23					
4.18	2.88	3.19	2.48	7.93							
2	Chan	160.50	165.32	416.81	33.31	5.02					
8.87	6.91	12.51	5.96	74.53							
3	Chan	165.32	170.14	534.73	38.36	4.92					
11.38	7.96	13.94	7.00	97.56							
4	Chan	170.14	174.96	626.97	41.98	4.85					
13.34	8.71	14.93	7.76	115.94							
5	Chan	174.96	179.78	646.72	42.87	4.88					
13.76	8.90	15.08	7.88	118.86							
6	Chan	179.78	184.60	517.47	37.85	4.99					
11.01	7.85	13.67	6.80	92.96							
7	ROB	184.60	244.28	812.37	293.37	59.90					
17.28	4.92	2.77	4.39	12.16							
8	ROB	244.28	303.96	606.16	245.80	59.72					
12.90	4.12	2.47	3.69	9.10							
9	ROB	303.96	363.64	277.85	153.97	59.76					
5.91	2.58	1.80	2.31	4.17							
10	ROB	363.64	423.32	64.39	56.68	44.04					
1.37	1.29	1.14	1.15	1.31							

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical
depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate

the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.

CROSS SECTION

RIVER: River 1
REACH: Reach 1 RS: 375

INPUT
Description:
Station Elevation Data num= 135

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	312.36	.7	312.33	4.3	312.1	9.7	311.17	15.7	309.91
17.8	309.51	23.9	308.94	31.1	308.05	38.2	307.47	44.9	306.72
52.4	305.53	58.5	304.44	59.6	304.29	60.8	304.08	66.7	302.94
72	301.72	73.8	301.32	75.8	300.92	80.9	299.79	85.5	298.67
88.1	298.02	90.9	297.46	95.2	296.7	99.1	296.12	105.9	294.97
109.4	294.34	112.6	293.89	116.6	293.21	120.9	292.73	123.7	292.37
126.2	292.2	139.7	291.73	145.1	291.84	151	292.15	159.3	292.68
166.4	293.23	166.8	293.25	170.8	293.16	177.7	293.15	187.9	293.33
190.3	293.45	197.1	293.5	198.1	293.25	199.5	292.87	205.9	289.82
208.3	289.32	211.5	289.32	214.7	289.3	218.4	289.31	228.6	289.47
232.4	290.44	235.4	291.51	238.8	292.45	241.3	292.87	244.9	293.09
246.4	293	251.3	293.38	253.6	293.33	255.4	293.16	260.7	293.05
267.3	293.03	267.9	293.09	268.4	293.14	275	293.99	281.3	294.51
282.2	294.57	283.3	294.61	289.3	295.01	294.3	295.29	296.5	295.35
299.3	295.49	303.7	295.64	315.3	295.92	318	295.95	320.2	296.01
325.1	296.12	331.2	296.25	332.3	296.25	339.4	296.37	346.1	296.52
346.6	296.54	347.2	296.61	353.7	297.01	359	296.97	360.9	296.86
363.2	296.84	368.1	297.09	370.4	297.1	371.6	297.09	382.1	297.19
392.5	297.35	400.5	297.99	402.9	298.21	408.7	298.51	416.9	298.88
423.8	299.14	425.1	299.17	434.2	299.51	444.6	300.05	455.1	300.68
465.5	301.22	466.1	301.29	468.5	301.55	474.3	302.16	475.9	302.35
482.5	302.64	486.3	302.79	496.8	303.95	498.9	304.3	507.2	305.47
517.6	305.34	521.6	305.24	523.5	305.17	528.1	305.1	531.7	305.31
538.5	305.65	539.9	305.96	545.3	307.22	548.9	308.03	559.3	309.84
569.8	312.03	580.2	314	583.7	314.5	590.6	315.33	597.3	315.84
601	316.14	605.5	316.32	607.5	316.45	611.5	316.66	613.7	316.57
622.1	316.84	630.1	316.76	632.3	316.76	642.8	316.63	645.6	316.57

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	199.5	.05	235.4	.15

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

199.5 235.4 59.8 169 194.2 .1 .3

CROSS SECTION OUTPUT Profile #10 Yr

E.G. Elev (ft)	296.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.	0.100	0.050	0.150
W.S. Elev (ft)	296.06	Reach Len. (ft)	59.80	169.00	194.20
Crit W.S. (ft)		Flow Area (sq ft)	303.79	220.28	154.23
E.G. Slope (ft/ft)	0.002940	Area (sq ft)	303.79	220.28	154.23
Q Total (cfs)	1800.00	Flow (cfs)	511.81	1167.03	121.16
Top Width (ft)	222.80	Top Width (ft)	100.03	35.90	86.88
Vel Total (ft/s)	2.65	Avg. Vel. (ft/s)	1.68	5.30	0.79
Max Chl Dpth (ft)	6.76	Hydr. Depth (ft)	3.04	6.14	1.78
Conv. Total (cfs)	33197.3	Conv. (cfs)	9439.4	21523.4	2234.5
Length Wtd. (ft)	143.38	Wetted Per. (ft)	100.46	36.95	87.19
Min Ch El (ft)	289.30	Shear (lb/sq ft)	0.56	1.09	0.32
Alpha	2.70	Stream Power (lb/ft s)	0.94	5.80	0.26
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	1.11	1.36	2.46
C & E Loss (ft)	0.03	Cum SA (acres)	0.30	0.25	1.12

CROSS SECTION OUTPUT Profile #50 Yr

E.G. Elev (ft)	297.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.100	0.050	0.150
W.S. Elev (ft)	297.22	Reach Len. (ft)	59.80	169.00	194.20
Crit W.S. (ft)		Flow Area (sq ft)	423.99	261.87	285.42
E.G. Slope (ft/ft)	0.003534	Area (sq ft)	423.99	261.87	

285.42					
Q Total (cfs)	2900.00	Flow (cfs)	933.47	1706.93	
259.60					
Top Width (ft)	291.45	Top Width (ft)	107.22	35.90	
148.34					
Vel Total (ft/s)	2.99	Avg. Vel. (ft/s)	2.20	6.52	
0.91					
Max Chl Dpth (ft)	7.92	Hydr. Depth (ft)	3.95	7.29	
1.92					
Conv. Total (cfs)	48785.2	Conv. (cfs)	15703.3	28714.8	
4367.1					
Length Wtd. (ft)	142.52	Wetted Per. (ft)	107.74	36.95	
148.68					
Min Ch El (ft)	289.30	Shear (lb/sq ft)	0.87	1.56	
0.42					
Alpha	2.99	Stream Power (lb/ft s)	1.91	10.19	
0.39					
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	1.45	1.63	
3.81					
C & E Loss (ft)	0.05	Cum SA (acres)	0.32	0.25	
1.33					

CROSS SECTION OUTPUT Profile #100 Yr

E.G. Elev (ft)	298.12	Element	Left OB	Channel	
Right OB					
Vel Head (ft)	0.45	Wt. n-Val.	0.100	0.050	
0.150					
W.S. Elev (ft)	297.67	Reach Len. (ft)	59.80	169.00	
194.20					
Crit W.S. (ft)		Flow Area (sq ft)	473.74	278.34	
357.53					
E.G. Slope (ft/ft)	0.003633	Area (sq ft)	473.74	278.34	
357.53					
Q Total (cfs)	3400.00	Flow (cfs)	1121.50	1915.90	
362.60					
Top Width (ft)	306.72	Top Width (ft)	109.67	35.90	
161.15					
Vel Total (ft/s)	3.06	Avg. Vel. (ft/s)	2.37	6.88	
1.01					
Max Chl Dpth (ft)	8.37	Hydr. Depth (ft)	4.32	7.75	
2.22					
Conv. Total (cfs)	56408.8	Conv. (cfs)	18606.6	31786.4	
6015.9					
Length Wtd. (ft)	142.68	Wetted Per. (ft)	110.24	36.95	
161.51					
Min Ch El (ft)	289.30	Shear (lb/sq ft)	0.97	1.71	

0.50					
Alpha	3.05	Stream Power (lb/ft s)	2.31	11.76	
0.51					
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	1.60	1.75	
4.42					
C & E Loss (ft)	0.05	Cum SA (acres)	0.32	0.25	
1.37					

CROSS SECTION OUTPUT Profile #500 Yr

E.G. Elev (ft)	299.21	Element	Left OB	Channel	
Right OB					
Vel Head (ft)	0.51	Wt. n-Val.	0.100	0.050	
0.150					
W.S. Elev (ft)	298.70	Reach Len. (ft)	59.80	169.00	
194.20					
Crit W.S. (ft)		Flow Area (sq ft)	588.57	315.14	
529.97					
E.G. Slope (ft/ft)	0.003828	Area (sq ft)	588.57	315.14	
529.97					
Q Total (cfs)	4700.00	Flow (cfs)	1608.70	2418.79	
672.51					
Top Width (ft)	327.51	Top Width (ft)	114.12	35.90	
177.49					
Vel Total (ft/s)	3.28	Avg. Vel. (ft/s)	2.73	7.68	
1.27					
Max Chl Dpth (ft)	9.40	Hydr. Depth (ft)	5.16	8.78	
2.99					
Conv. Total (cfs)	75968.2	Conv. (cfs)	26002.2	39096.0	
10870.0					
Length Wtd. (ft)	143.21	Wetted Per. (ft)	114.81	36.95	
177.88					
Min Ch El (ft)	289.30	Shear (lb/sq ft)	1.23	2.04	
0.71					
Alpha	3.08	Stream Power (lb/ft s)	3.35	15.64	
0.90					
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	1.91	1.98	
5.77					
C & E Loss (ft)	0.05	Cum SA (acres)	0.34	0.25	
1.47					

Profile #10 Yr

Pos	Left Sta	Right Sta	Flow	Area	W.P.

Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)	(cfs)	(sq ft)	(ft)
1	LOB	79.80	119.70		36.78	34.00	20.48
2.04	1.68	1.08	0.30	0.33			
2	LOB	119.70	159.60		300.49	156.66	39.97
16.69	3.93	1.92	0.72	1.38			
3	LOB	159.60	199.50		174.55	113.13	40.01
9.70	2.84	1.54	0.52	0.80			
4	Chan	199.50	206.68		150.88	35.08	7.89
8.38	4.89	4.30	0.82	3.51			
5	Chan	206.68	213.86		271.04	48.11	7.21
15.06	6.70	5.63	1.22	6.90			
6	Chan	213.86	221.04		274.72	48.41	7.18
15.26	6.74	5.67	1.24	7.02			
7	Chan	221.04	228.22		268.38	47.74	7.18
14.91	6.65	5.62	1.22	6.86			
8	Chan	228.22	235.40		202.01	40.93	7.49
11.22	5.70	4.93	1.00	4.95			
9	ROB	235.40	317.44		121.14	153.95	82.35
6.73	1.88	0.79	0.34	0.27			
10	ROB	317.44	399.48		0.02	0.28	4.84
0.00	0.06	0.08	0.01	0.00			

Profile #50 Yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta Shear (lb/sq ft)	Power (lb/ft s)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	79.80	119.70		88.88	61.74	27.76
3.06	2.25	1.44	0.49	0.71			
2	LOB	119.70	159.60		506.28	202.89	39.97
17.46	5.08	2.50	1.12	2.79			
3	LOB	159.60	199.50		338.31	159.36	40.01
11.67	3.99	2.12	0.88	1.87			
4	Chan	199.50	206.68		236.55	43.40	7.89
8.16	6.04	5.45	1.21	6.62			
5	Chan	206.68	213.86		388.80	56.43	7.21
13.41	7.86	6.89	1.73	11.89			
6	Chan	213.86	221.04		393.48	56.73	7.18
13.57	7.90	6.94	1.74	12.09			
7	Chan	221.04	228.22		385.73	56.06	7.18
13.30	7.81	6.88	1.72	11.85			
8	Chan	228.22	235.40		302.37	49.25	7.49
10.43	6.86	6.14	1.45	8.91			
9	ROB	235.40	317.44		247.97	249.00	82.35

8.55	3.04	1.00	0.67	0.66			
10	ROB	317.44	399.48		11.63	36.42	66.33
0.40	0.55	0.32	0.12	0.04			

Profile #100 Yr

Percent	Pos Hydr	Left Sta Velocity	Right Sta Shear	Power	Flow	Area	W.P.
		(ft)	(ft)		(cfs)	(sq ft)	(ft)
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)			
1	LOB	79.80	119.70		117.41	74.90	30.26
3.45	2.51	1.57	0.56	0.88			
2	LOB	119.70	159.60		592.88	221.19	39.97
17.44	5.54	2.68	1.26	3.36			
3	LOB	159.60	199.50		411.21	177.65	40.01
12.09	4.45	2.31	1.01	2.33			
4	Chan	199.50	206.68		271.18	46.69	7.89
7.98	6.50	5.81	1.34	7.80			
5	Chan	206.68	213.86		433.69	59.72	7.21
12.76	8.32	7.26	1.88	13.63			
6	Chan	213.86	221.04		438.70	60.02	7.18
12.90	8.36	7.31	1.90	13.86			
7	Chan	221.04	228.22		430.53	59.35	7.18
12.66	8.27	7.25	1.87	13.60			
8	Chan	228.22	235.40		341.80	52.55	7.49
10.05	7.32	6.50	1.59	10.35			
9	ROB	235.40	317.44		329.61	286.62	82.35
9.69	3.49	1.15	0.79	0.91			
10	ROB	317.44	399.48		32.99	70.91	79.16
0.97	0.90	0.47	0.20	0.09			

Profile #500 Yr

Percent	Pos Hydr	Left Sta Velocity	Right Sta Shear	Power	Flow	Area	W.P.
		(ft)	(ft)		(cfs)	(sq ft)	(ft)
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)			
1	LOB	79.80	119.70		202.12	107.92	34.83
4.30	3.14	1.87	0.74	1.39			
2	LOB	119.70	159.60		809.15	262.09	39.97
17.22	6.57	3.09	1.57	4.84			
3	LOB	159.60	199.50		597.43	218.56	40.01
12.71	5.48	2.73	1.31	3.57			
4	Chan	199.50	206.68		355.80	54.05	7.89

```
 7.57       7.53       6.58       1.64      10.78
 5           Chan        206.68      213.86        541.13      67.09       7.21
11.51       9.34       8.07       2.22      17.92
 6           Chan        213.86      221.04        546.88      67.38       7.18
11.64       9.38       8.12       2.24      18.20
 7           Chan        221.04      228.22        537.80      66.71       7.18
11.44       9.29       8.06       2.22      17.90
 8           Chan        228.22      235.40        437.19      59.91       7.49
 9.30       8.34       7.30       1.91      13.95
 9           ROB         235.40      317.44        544.26     370.73      82.35
11.58       4.52       1.47       1.08       1.58
 10          ROB         317.44      399.48        127.05     154.67      82.10
 2.70       1.89       0.82       0.45       0.37
 11          ROB         399.48      481.52          1.20       4.56      13.43
 0.03       0.34       0.26       0.08       0.02
```

CROSS SECTION

RIVER: River 1
REACH: Reach 1 RS: 206

INPUT
Description:
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	310.14	2.7	309.7	5.1	309.38	11.5	308.84	18.8	308.25
28.9	307.31	40.4	306.07	48	305.16	52.7	304.44	55.3	303.95
59.3	303.3	62.6	302.8	64.6	302.47	69.9	298.88	76.5	294.12
78.1	293.88	84.4	293.41	88.4	292.45	91.7	292.16	99	291.65
100.3	291.59	106.3	291.34	112.2	291.18	113.6	291.06	115.8	291.11
124.1	291.12	134.3	288.93	138.5	289.05	140.4	289.09	141.2	289.112
144.4	289.2	147.7	289.06	151.5	289.07	154.5	288.97	156.9	289.31
162.7	288.97	164.6	289.17	166.2	289.58	173.9	292.79	174.7	293.03
184.6	292.72	194.9	292.45	205	292.46	225.3	292.52	235.4	292.61
255.6	293.04	265.7	293.18	275.8	293.3	285.9	293.49	296.7	293.89
307.9	294.4	313.9	294.72	316.2	294.82	326.3	295.44	330.2	295.72
332.4	295.85	336.4	296.16	346.6	297.03	356.7	299.77	366.8	300.09
369.3	299.88	376.9	299.22	386.1	299.43	387.8	299.46	397.1	299.69
406.2	299.3	417.3	299.16	419.6	299.98	424.7	302.04	427.4	303.02
430.7	304.05	433.9	305.32	437.5	306.37	441.9	307.92	443.1	308.27
447.6	309.93	452.4	310.41	453.1	310.51	457.7	311.01	461.6	310.94
464.2	310.97	467.9	310.93	475.9	311.32				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.11	141.2	.05	166.2	.11

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         141.2   166.2              63.7    61.8    46.9             .1       .3

CROSS SECTION OUTPUT  Profile #10 Yr


  E.G. Elev (ft)            295.96    Element                   Left OB    Channel
Right OB
  Vel Head (ft)               0.19    Wt. n-Val.                 0.110      0.050
  0.110
  W.S. Elev (ft)            295.77    Reach Len. (ft)            63.70      61.80
  46.90
  Crit W.S. (ft)                      Flow Area (sq ft)         287.42     166.09
 424.55
  E.G. Slope (ft/ft)      0.002209    Area (sq ft)              287.42     166.09
 424.55
  Q Total (cfs)             1800.00   Flow (cfs)                477.33     817.68
 504.99
  Top Width (ft)             256.80   Top Width (ft)             66.99      25.00
 164.82
  Vel Total (ft/s)            2.05    Avg. Vel. (ft/s)           1.66       4.92
   1.19
  Max Chl Dpth (ft)           6.84    Hydr. Depth (ft)           4.29       6.64
   2.58
  Conv. Total (cfs)         38295.5   Conv. (cfs)              10155.4    17396.3
10743.8
  Length Wtd. (ft)           57.64    Wetted Per. (ft)           67.95      25.10
 165.57
  Min Ch El (ft)             288.97   Shear (lb/sq ft)           0.58       0.91
   0.35
  Alpha                       2.89    Stream Power (lb/ft s)     0.97       4.49
   0.42
  Frctn Loss (ft)             0.21    Cum Volume (acre-ft)       0.71       0.61
   1.17
  C & E Loss (ft)             0.01    Cum SA (acres)             0.18       0.13
   0.55



Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50 Yr


  E.G. Elev (ft)            297.15    Element                   Left OB    Channel
Right OB
  Vel Head (ft)               0.25    Wt. n-Val.                 0.110      0.050
  0.110
```

W.S. Elev (ft)	296.89	Reach Len. (ft)	63.70	61.80	46.90
Crit W.S. (ft)		Flow Area (sq ft)	363.73	194.24	618.34
E.G. Slope (ft/ft)	0.002645	Area (sq ft)	363.73	194.24	618.34
Q Total (cfs)	2900.00	Flow (cfs)	759.03	1161.48	979.49
Top Width (ft)	272.35	Top Width (ft)	68.55	25.00	178.81
Vel Total (ft/s)	2.47	Avg. Vel. (ft/s)	2.09	5.98	1.58
Max Chl Dpth (ft)	7.96	Hydr. Depth (ft)	5.31	7.77	3.46
Conv. Total (cfs)	56384.9	Conv. (cfs)	14757.9	22582.8	19044.2
Length Wtd. (ft)	56.70	Wetted Per. (ft)	69.87	25.10	179.61
Min Ch El (ft)	288.97	Shear (lb/sq ft)	0.86	1.28	0.57
Alpha	2.68	Stream Power (lb/ft s)	1.79	7.64	0.90
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	0.91	0.75	1.80
C & E Loss (ft)	0.02	Cum SA (acres)	0.19	0.13	0.60

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100 Yr

E.G. Elev (ft)	297.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	297.34	Reach Len. (ft)	63.70	61.80	46.90
Crit W.S. (ft)		Flow Area (sq ft)	394.59	205.44	699.27
E.G. Slope (ft/ft)	0.002760	Area (sq ft)	394.59	205.44	699.27
Q Total (cfs)	3400.00	Flow (cfs)	881.65	1302.71	1215.64
Top Width (ft)	275.72	Top Width (ft)	69.17	25.00	181.55

Vel Total (ft/s)	2.62	Avg. Vel. (ft/s)	2.23	6.34	1.74
Max Chl Dpth (ft)	8.41	Hydr. Depth (ft)	5.70	8.22	3.85
Conv. Total (cfs)	64715.2	Conv. (cfs)	16781.2	24795.7	23138.4
Length Wtd. (ft)	56.39	Wetted Per. (ft)	70.64	25.10	182.40
Min Ch El (ft)	288.97	Shear (lb/sq ft)	0.96	1.41	0.66
Alpha	2.60	Stream Power (lb/ft s)	2.15	8.94	1.15
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	1.00	0.81	2.07
C & E Loss (ft)	0.02	Cum SA (acres)	0.20	0.13	0.61

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500 Yr

E.G. Elev (ft)	298.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	298.34	Reach Len. (ft)	63.70	61.80	46.90
Crit W.S. (ft)		Flow Area (sq ft)	464.10	230.32	881.74
E.G. Slope (ft/ft)	0.003041	Area (sq ft)	464.10	230.32	881.74
Q Total (cfs)	4700.00	Flow (cfs)	1193.62	1654.23	1852.16
Top Width (ft)	280.77	Top Width (ft)	70.55	25.00	185.22
Vel Total (ft/s)	2.98	Avg. Vel. (ft/s)	2.57	7.18	2.10
Max Chl Dpth (ft)	9.41	Hydr. Depth (ft)	6.58	9.21	4.76
Conv. Total (cfs)	85232.6	Conv. (cfs)	21645.7	29998.7	33588.1
Length Wtd. (ft)	55.84	Wetted Per. (ft)	72.34	25.10	186.20
Min Ch El (ft)	288.97	Shear (lb/sq ft)	1.22	1.74	0.90

Alpha	2.43	Stream Power (lb/ft s)	3.13	12.51	1.89
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	1.18	0.92	2.63
C & E Loss (ft)	0.02	Cum SA (acres)	0.21	0.13	0.66

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

Profile #10 Yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta Shear (ft) (lb/sq ft)	Power (lb/ft s)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	56.48	84.72		16.14	18.86	11.08
0.90	1.79	0.86	0.23	0.20			
2	LOB	84.72	112.96		166.82	111.54	28.39
9.27	3.95	1.50	0.54	0.81			
3	LOB	112.96	141.20		294.38	157.03	28.48
16.35	5.56	1.87	0.76	1.43			
4	Chan	141.20	146.20		162.53	33.05	5.00
9.03	6.61	4.92	0.91	4.48			
5	Chan	146.20	151.20		166.08	33.48	5.00
9.23	6.70	4.96	0.92	4.58			
6	Chan	151.20	156.20		166.77	33.61	5.02
9.26	6.72	4.96	0.92	4.58			
7	Chan	156.20	161.20		160.79	32.87	5.01
8.93	6.57	4.89	0.90	4.42			
8	Chan	161.20	166.20		161.50	33.09	5.06
8.97	6.62	4.88	0.90	4.40			
9	ROB	166.20	228.14		277.28	208.21	62.63
15.40	3.36	1.33	0.46	0.61			
10	ROB	228.14	290.08		195.64	168.17	61.95
10.87	2.72	1.16	0.37	0.44			
11	ROB	290.08	352.02		32.07	48.17	40.99
1.78	1.18	0.67	0.16	0.11			

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

Profile #50 Yr

Percent	Pos Hydr	Left Sta Velocity (ft)	Right Sta Shear (ft)	Power	Flow (cfs)	Area (sq ft)	W.P. (ft)
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)			
1	LOB	56.48	84.72		37.77	31.56	13.01
1.30	2.62	1.20	0.40	0.48			
2	LOB	84.72	112.96		279.58	143.34	28.39
9.64	5.08	1.95	0.83	1.63			
3	LOB	112.96	141.20		441.68	188.83	28.48
15.23	6.69	2.34	1.10	2.56			
4	Chan	141.20	146.20		231.16	38.68	5.00
7.97	7.74	5.98	1.28	7.63			
5	Chan	146.20	151.20		235.47	39.11	5.00
8.12	7.82	6.02	1.29	7.78			
6	Chan	151.20	156.20		236.23	39.24	5.02
8.15	7.85	6.02	1.29	7.77			
7	Chan	156.20	161.20		228.99	38.50	5.01
7.90	7.70	5.95	1.27	7.54			
8	Chan	161.20	166.20		229.63	38.72	5.06
7.92	7.74	5.93	1.26	7.49			
9	ROB	166.20	228.14		493.72	277.95	62.63
17.02	4.49	1.78	0.73	1.30			
10	ROB	228.14	290.08		383.74	237.91	61.95
13.23	3.84	1.61	0.63	1.02			
11	ROB	290.08	352.02		102.03	102.48	55.03
3.52	1.87	1.00	0.31	0.31			

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

Profile #100 Yr

Percent	Pos Hydr	Left Sta Velocity (ft)	Right Sta Shear (ft)	Power	Flow (cfs)	Area (sq ft)	W.P. (ft)
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)			
1	LOB	56.48	84.72		48.73	37.11	13.77
1.43	2.92	1.31	0.46	0.61			
2	LOB	84.72	112.96		329.40	155.99	28.39
9.69	5.52	2.11	0.95	2.00			
3	LOB	112.96	141.20		503.52	201.49	28.48
14.81	7.13	2.50	1.22	3.05			
4	Chan	141.20	146.20		259.37	40.92	5.00
7.63	8.18	6.34	1.41	8.93			

5	Chan	146.20	151.20		263.95	41.35	5.00
7.76	8.27	6.38	1.42	9.09			
6	Chan	151.20	156.20		264.71	41.48	5.02
7.79	8.30	6.38	1.42	9.09			
7	Chan	156.20	161.20		257.05	40.74	5.01
7.56	8.15	6.31	1.40	8.83			
8	Chan	161.20	166.20		257.64	40.96	5.06
7.58	8.19	6.29	1.39	8.77			
9	ROB	166.20	228.14		594.77	305.71	62.63
17.49	4.94	1.95	0.84	1.64			
10	ROB	228.14	290.08		474.11	265.67	61.95
13.94	4.29	1.78	0.74	1.32			
11	ROB	290.08	352.02		146.77	127.89	57.82
4.32	2.22	1.15	0.38	0.44			

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

Profile #500 Yr

	Pos	Left Sta	Right Sta		Flow	Area	W.P.
Percent	Hydr	Velocity	Shear	Power			
		(ft)	(ft)		(cfs)	(sq ft)	(ft)
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)			
1	LOB	56.48	84.72		79.02	50.42	15.47
1.68	3.58	1.57	0.62	0.97			
2	LOB	84.72	112.96		456.46	184.09	28.39
9.71	6.52	2.48	1.23	3.05			
3	LOB	112.96	141.20		658.14	229.58	28.48
14.00	8.13	2.87	1.53	4.39			
4	Chan	141.20	146.20		329.60	45.90	5.00
7.01	9.18	7.18	1.74	12.51			
5	Chan	146.20	151.20		334.79	46.32	5.00
7.12	9.26	7.23	1.76	12.71			
6	Chan	151.20	156.20		335.58	46.45	5.02
7.14	9.29	7.22	1.76	12.69			
7	Chan	156.20	161.20		326.91	45.71	5.01
6.96	9.14	7.15	1.73	12.38			
8	Chan	161.20	166.20		327.34	45.93	5.06
6.96	9.19	7.13	1.72	12.27			
9	ROB	166.20	228.14		857.74	367.34	62.63
18.25	5.93	2.33	1.11	2.60			
10	ROB	228.14	290.08		712.79	327.30	61.95
15.17	5.28	2.18	1.00	2.18			
11	ROB	290.08	352.02		281.63	187.09	61.62
5.99	3.05	1.51	0.58	0.87			

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: River 1
REACH: Reach 1 RS: 144

INPUT
Description: XS A
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	308.39	3.5	307.97	5.8	307.5	13.2	305.8	14.9	305.38
26.2	303.75	28.1	303.46	31.7	302.72	35.6	301.66	37.6	300.65
43	297.61	44.2	297.26	49	295.36	53.3	294.29	57.9	293.22
60.3	292.68	65.4	290.67	68.1	289.75	71.7	288.42	83.1	288.46
87.5	289.1104	87.7	289.14	91	289.75	94	290.27	95.9	290.71
104.4	292.5	108	292.4956	112.6	292.49	125.1	292.5	135.4	292.32
145.8	292.19	154.3	292.18	156.1	292.19	166.5	292.34	176.8	292.67
196.5	293.48	198.5	293.55	205.4	293.85	207.5	293.91	217.6	293.99
227.8	294.21	232.4	294.43	237.9	294.67	241.4	294.99	245.1	295.24
248.1	295.51	250.4	295.76	256.8	296.39	259.4	296.66	268.4	298.15
277.3	297.89	278.5	298.01	280.1	297.92	286.3	297.78	288.7	297.62
298.8	297.75	309	298.06	319.1	298.19	329.3	298.44	339.4	298.38
349.6	298.47	359.7	298.64	369.8	298.45	373.3	298.86	376.2	299.24
380	299.69	390.1	302.97	400.3	306.12	410.4	308.06	420.6	308.81
427.4	309.29								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.11	87.5	.05	108	.11

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
87.5	108	122.3	141.3	123.8	.1	.3

CROSS SECTION OUTPUT Profile #10 Yr

E.G. Elev (ft)	295.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	295.44	Reach Len. (ft)	122.30	141.30	123.80
Crit W.S. (ft)		Flow Area (sq ft)	181.56	89.88	

319.16
 E.G. Slope (ft/ft) 0.007136 Area (sq ft) 181.56 89.88
319.16
 Q Total (cfs) 1800.00 Flow (cfs) 569.44 597.82
632.74
 Top Width (ft) 198.49 Top Width (ft) 38.70 20.50
139.29
 Vel Total (ft/s) 3.05 Avg. Vel. (ft/s) 3.14 6.65
 1.98
 Max Chl Dpth (ft) 7.02 Hydr. Depth (ft) 4.69 4.38
 2.29
 Conv. Total (cfs) 21308.6 Conv. (cfs) 6741.1 7077.1
7490.5
 Length Wtd. (ft) 132.49 Wetted Per. (ft) 39.84 20.84
139.37
 Min Ch El (ft) 289.11 Shear (lb/sq ft) 2.03 1.92
 1.02
 Alpha 2.07 Stream Power (lb/ft s) 6.37 12.78
 2.02
 Frctn Loss (ft) 1.03 Cum Volume (acre-ft) 0.36 0.43
 0.77
 C & E Loss (ft) 0.03 Cum SA (acres) 0.10 0.10
 0.39

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50 Yr

 E.G. Elev (ft) 296.89 Element Left OB Channel
Right OB
 Vel Head (ft) 0.40 Wt. n-Val. 0.110 0.050
 0.110
 W.S. Elev (ft) 296.49 Reach Len. (ft) 122.30 141.30
123.80
 Crit W.S. (ft) Flow Area (sq ft) 223.61 111.42
470.99
 E.G. Slope (ft/ft) 0.007778 Area (sq ft) 223.61 111.42
470.99
 Q Total (cfs) 2900.00 Flow (cfs) 803.35 892.84
1203.80
 Top Width (ft) 211.59 Top Width (ft) 41.35 20.50
149.74
 Vel Total (ft/s) 3.60 Avg. Vel. (ft/s) 3.59 8.01
 2.56
 Max Chl Dpth (ft) 8.07 Hydr. Depth (ft) 5.41 5.43

3.15					
Conv. Total (cfs)	32883.3	Conv. (cfs)	9109.3	10124.0	13650.0
Length Wtd. (ft)	131.49	Wetted Per. (ft)	42.70	20.84	149.88
Min Ch El (ft)	289.11	Shear (lb/sq ft)	2.54	2.60	1.53
Alpha	2.01	Stream Power (lb/ft s)	9.14	20.80	3.90
Frctn Loss (ft)	1.02	Cum Volume (acre-ft)	0.48	0.53	1.21
C & E Loss (ft)	0.02	Cum SA (acres)	0.11	0.10	0.42

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100 Yr

E.G. Elev (ft)	297.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	296.91	Reach Len. (ft)	122.30	141.30	123.80
Crit W.S. (ft)		Flow Area (sq ft)	241.36	120.10	535.19
E.G. Slope (ft/ft)	0.007885	Area (sq ft)	241.36	120.10	535.19
Q Total (cfs)	3400.00	Flow (cfs)	902.51	1018.78	1478.72
Top Width (ft)	215.84	Top Width (ft)	42.42	20.50	152.92
Vel Total (ft/s)	3.79	Avg. Vel. (ft/s)	3.74	8.48	2.76
Max Chl Dpth (ft)	8.49	Hydr. Depth (ft)	5.69	5.86	3.50
Conv. Total (cfs)	38290.4	Conv. (cfs)	10163.9	11473.3	16653.1
Length Wtd. (ft)	131.16	Wetted Per. (ft)	43.85	20.84	153.08
Min Ch El (ft)	289.11	Shear (lb/sq ft)	2.71	2.84	1.72
Alpha	1.99	Stream Power (lb/ft s)	10.13	24.06	4.75
Frctn Loss (ft)	0.99	Cum Volume (acre-ft)	0.53	0.58	

1.40					
C & E Loss (ft)	0.02	Cum SA (acres)	0.12	0.10	
0.43					

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500 Yr

E.G. Elev (ft)	298.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	297.84	Reach Len. (ft)	122.30	141.30	123.80
Crit W.S. (ft)		Flow Area (sq ft)	281.80	139.07	681.34
E.G. Slope (ft/ft)	0.008331	Area (sq ft)	281.80	139.07	681.34
Q Total (cfs)	4700.00	Flow (cfs)	1154.78	1337.16	2208.06
Top Width (ft)	241.81	Top Width (ft)	44.90	20.50	176.41
Vel Total (ft/s)	4.26	Avg. Vel. (ft/s)	4.10	9.61	3.24
Max Chl Dpth (ft)	9.42	Hydr. Depth (ft)	6.28	6.78	3.86
Conv. Total (cfs)	51492.8	Conv. (cfs)	12651.7	14649.9	24191.3
Length Wtd. (ft)	130.72	Wetted Per. (ft)	46.51	20.84	176.65
Min Ch El (ft)	289.11	Shear (lb/sq ft)	3.15	3.47	2.01
Alpha	1.94	Stream Power (lb/ft s)	12.91	33.37	6.50
Frctn Loss (ft)	1.06	Cum Volume (acre-ft)	0.64	0.66	1.78
C & E Loss (ft)	0.03	Cum SA (acres)	0.12	0.10	0.47

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

Profile #10 Yr

Percent	Pos Hydr	Left Sta	Right Sta	Flow	Area	W.P.
		Velocity (ft)	Shear (ft)	Power		
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)	(cfs)	(sq ft)	(ft)
1	LOB	35.00	52.50		1.10	1.80	3.82
0.06	0.49	0.61	0.21	0.13			
2	LOB	52.50	70.00		130.91	59.32	18.37
7.27	3.39	2.21	1.44	3.18			
3	LOB	70.00	87.50		437.42	120.44	17.66
24.30	6.88	3.63	3.04	11.03			
4	Chan	87.50	91.60		192.65	24.42	4.17
10.70	5.96	7.89	2.61	20.60			
5	Chan	91.60	95.70		153.69	21.35	4.18
8.54	5.21	7.20	2.28	16.38			
6	Chan	95.70	99.80		113.16	17.79	4.19
6.29	4.34	6.36	1.89	12.03			
7	Chan	99.80	103.90		78.18	14.25	4.19
4.34	3.47	5.49	1.51	8.31			
8	Chan	103.90	108.00		60.14	12.08	4.11
3.34	2.95	4.98	1.31	6.52			
9	ROB	108.00	171.88		444.51	197.30	63.89
24.69	3.09	2.25	1.38	3.10			
10	ROB	171.88	235.76		184.91	116.59	63.92
10.27	1.83	1.59	0.81	1.29			
11	ROB	235.76	299.64		3.32	5.28	11.57
0.18	0.46	0.63	0.20	0.13			

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

Profile #50 Yr

Percent	Pos Hydr	Left Sta	Right Sta	Flow	Area	W.P.
		Velocity (ft)	Shear (ft)	Power		
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)	(cfs)	(sq ft)	(ft)
1	LOB	35.00	52.50		7.79	7.08	6.67
0.27	1.11	1.10	0.52	0.57			
2	LOB	52.50	70.00		215.03	77.71	18.37
7.41	4.44	2.77	2.05	5.68			
3	LOB	70.00	87.50		580.54	138.82	17.66
20.02	7.93	4.18	3.82	15.96			

4	Chan	87.50	91.60		266.80	28.73	4.17
9.20	7.01	9.29	3.35	31.09			
5	Chan	91.60	95.70		220.54	25.66	4.18
7.60	6.26	8.60	2.98	25.61			
6	Chan	95.70	99.80		171.60	22.09	4.19
5.92	5.39	7.77	2.56	19.88			
7	Chan	99.80	103.90		128.28	18.55	4.19
4.42	4.53	6.91	2.15	14.87			
8	Chan	103.90	108.00		105.62	16.39	4.11
3.64	4.00	6.45	1.94	12.47			
9	ROB	108.00	171.88		762.30	264.42	63.89
26.29	4.14	2.88	2.01	5.79			
10	ROB	171.88	235.76		415.32	183.71	63.92
14.32	2.88	2.26	1.40	3.15			
11	ROB	235.76	299.64		26.18	22.87	22.07
0.90	1.04	1.15	0.50	0.58			

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

Profile #100 Yr

	Pos	Left Sta	Right Sta		Flow	Area	W.P.
Percent	Hydr	Velocity	Shear	Power			
		(ft)	(ft)		(cfs)	(sq ft)	(ft)
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)			
1	LOB	35.00	52.50		12.55	10.00	7.82
0.37	1.35	1.25	0.63	0.79			
2	LOB	52.50	70.00		252.15	85.12	18.37
7.42	4.86	2.96	2.28	6.76			
3	LOB	70.00	87.50		637.81	146.24	17.66
18.76	8.36	4.36	4.08	17.78			
4	Chan	87.50	91.60		297.16	30.46	4.17
8.74	7.43	9.75	3.60	35.10			
5	Chan	91.60	95.70		248.44	27.40	4.18
7.31	6.68	9.07	3.23	29.25			
6	Chan	95.70	99.80		196.61	23.83	4.19
5.78	5.81	8.25	2.80	23.09			
7	Chan	99.80	103.90		150.40	20.29	4.19
4.42	4.95	7.41	2.38	17.67			
8	Chan	103.90	108.00		126.18	18.12	4.11
3.71	4.42	6.96	2.17	15.11			
9	ROB	108.00	171.88		906.44	291.48	63.89
26.66	4.56	3.11	2.25	6.98			
10	ROB	171.88	235.76		527.87	210.77	63.92
15.53	3.30	2.50	1.62	4.07			

11	ROB	235.76	299.64	44.41	32.93	25.28	
1.31	1.31	1.35	0.64	0.86			

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

Profile #500 Yr

	Pos	Left Sta	Right Sta	Flow	Area	W.P.	Percent
	Hydr	Velocity	Shear	Power			
		(ft)	(ft)	(cfs)	(sq ft)	(ft)	
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)			
1	LOB	35.00	52.50	28.38	18.05	10.48	
0.60	1.82	1.57	0.90	1.41			
2	LOB	52.50	70.00	346.13	101.32	18.37	
7.36	5.79	3.42	2.87	9.80			
3	LOB	70.00	87.50	780.27	162.43	17.66	
16.60	9.28	4.80	4.78	22.98			
4	Chan	87.50	91.60	373.25	34.26	4.17	
7.94	8.36	10.90	4.28	46.59			
5	Chan	91.60	95.70	318.53	31.19	4.18	
6.78	7.61	10.21	3.88	39.63			
6	Chan	95.70	99.80	259.77	27.62	4.19	
5.53	6.74	9.40	3.43	32.24			
7	Chan	99.80	103.90	206.71	24.08	4.19	
4.40	5.87	8.58	2.99	25.66			
8	Chan	103.90	108.00	178.90	21.92	4.11	
3.81	5.35	8.16	2.77	22.63			
9	ROB	108.00	171.88	1289.22	350.59	63.89	
27.43	5.49	3.68	2.85	10.50			
10	ROB	171.88	235.76	833.30	269.88	63.92	
17.73	4.22	3.09	2.20	6.78			
11	ROB	235.76	299.64	85.54	60.80	46.82	
1.82	1.30	1.41	0.68	0.95			
12	ROB	299.64	363.52	0.01	0.06	2.03	
0.00	0.03	0.12	0.02	0.00			

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: River 1
REACH: Reach 1 RS: 3

INPUT
Description:
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	309.4	3.7	308.63	5.8	308.18	9.4	307.38	13.2	306.41
15.4	305.9	20.6	304.5	23.6	303.82	27	303.03	29.5	302.26
35.3	300.1	38.7	299.14	42.6	297.86	50	295.1	50.3	295.01
51.4	294.75	57.4	293.28	61.9	292.39	64.7	292.09	69.5	291.78
72.1	291.56	73.6	291.51	83.7	291.44	85.8	291.32	90	291.2167
91.9	291.17	93.8	291.06	95.6	290.75	102.3	289.89	103.9	289.62
105.4	289.58	112.7	288.87	113.9	288.83	117.7	289.05	121.8	289.22
124.4	289.35	129.6	290.28	130	290.39	135.1	291.53	137.5	291.74
144	291.85	145.3	291.84	145.8	291.81	146.8	291.8	153.2	291.46
156.5	291.55	161	291.86	163.6	292.1	167.2	292.39	168.9	292.45
173.5	292.37	177.9	292.19	180.4	292.21	184.6	292.21	188.6	292.29
192.5	292.33	197.2	292.36	200.3	292.39	203.1	292.49	208.2	292.63
210	292.66	216	292.82	220.7	292.9	223.9	292.81	231.8	292.54
242.2	292.78	252.9	293.5	255.3	293.54	263.6	293.88	274.3	295.12
285	296.66	291.6	297.9	294.6	298.51	295.7	298.72	298	299.28
302.5	300.41	306.4	301.31	310.3	301.54	317.1	302.01	318.2	302.09
321.2	302.36	327.8	302.86	333.9	303.12	338.5	303.34	341.7	303.4
349.5	303.5								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.11	90	.05	129.6	.11

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	129.6	123.8	141.3	122.3	.1	.3

CROSS SECTION OUTPUT Profile #10 Yr

E.G. Elev (ft)	294.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	294.10	Reach Len. (ft)			
Crit W.S. (ft)	293.50	Flow Area (sq ft)	76.77	172.43	225.18
E.G. Slope (ft/ft)	0.008454	Area (sq ft)	76.77	172.43	225.18
Q Total (cfs)	1800.00	Flow (cfs)	157.52	1251.28	391.21
Top Width (ft)	211.38	Top Width (ft)	35.93	39.60	

135.86					
Vel Total (ft/s)	3.79	Avg. Vel. (ft/s)	2.05	7.26	1.74
Max Chl Dpth (ft)	5.27	Hydr. Depth (ft)	2.14	4.35	1.66
Conv. Total (cfs)	19577.2	Conv. (cfs)	1713.2	13609.2	4254.8
Length Wtd. (ft)		Wetted Per. (ft)	36.15	39.84	136.12
Min Ch El (ft)	288.83	Shear (lb/sq ft)	1.12	2.28	0.87
Alpha	2.61	Stream Power (lb/ft s)	2.30	16.58	1.52
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #50 Yr

E.G. Elev (ft)	295.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	295.20	Reach Len. (ft)			
Crit W.S. (ft)	294.35	Flow Area (sq ft)	118.75	215.99	379.84
E.G. Slope (ft/ft)	0.007810	Area (sq ft)	118.75	215.99	379.84
Q Total (cfs)	2900.00	Flow (cfs)	289.85	1750.63	859.52
Top Width (ft)	225.08	Top Width (ft)	40.25	39.60	145.22
Vel Total (ft/s)	4.06	Avg. Vel. (ft/s)	2.44	8.11	2.26
Max Chl Dpth (ft)	6.37	Hydr. Depth (ft)	2.95	5.45	2.62
Conv. Total (cfs)	32815.1	Conv. (cfs)	3279.8	19809.3	9726.0
Length Wtd. (ft)		Wetted Per. (ft)	40.62	39.84	145.55
Min Ch El (ft)	288.83	Shear (lb/sq ft)	1.43	2.64	1.27
Alpha	2.54	Stream Power (lb/ft s)	3.48	21.43	2.88
Frctn Loss (ft)		Cum Volume (acre-ft)			

C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #100 Yr

E.G. Elev (ft)	296.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	295.70	Reach Len. (ft)			
Crit W.S. (ft)	294.65	Flow Area (sq ft)	139.22	235.79	453.32
E.G. Slope (ft/ft)	0.007240	Area (sq ft)	139.22	235.79	453.32
Q Total (cfs)	3400.00	Flow (cfs)	355.43	1950.85	1093.72
Top Width (ft)	229.89	Top Width (ft)	41.60	39.60	148.70
Vel Total (ft/s)	4.10	Avg. Vel. (ft/s)	2.55	8.27	2.41
Max Chl Dpth (ft)	6.87	Hydr. Depth (ft)	3.35	5.95	3.05
Conv. Total (cfs)	39958.8	Conv. (cfs)	4177.3	22927.5	12854.0
Length Wtd. (ft)		Wetted Per. (ft)	42.05	39.84	149.06
Min Ch El (ft)	288.83	Shear (lb/sq ft)	1.50	2.68	1.37
Alpha	2.48	Stream Power (lb/ft s)	3.82	22.13	3.32
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #500 Yr

E.G. Elev (ft)	297.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.80	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	296.50	Reach Len. (ft)			

Crit W.S. (ft)	295.33	Flow Area (sq ft)	173.35	267.47	574.50
E.G. Slope (ft/ft)	0.007950	Area (sq ft)	173.35	267.47	574.50
Q Total (cfs)	4700.00	Flow (cfs)	518.15	2522.28	1659.56
Top Width (ft)	237.59	Top Width (ft)	43.74	39.60	154.25
Vel Total (ft/s)	4.63	Avg. Vel. (ft/s)	2.99	9.43	2.89
Max Chl Dpth (ft)	7.67	Hydr. Depth (ft)	3.96	6.75	3.72
Conv. Total (cfs)	52712.0	Conv. (cfs)	5811.2	28288.2	18612.5
Length Wtd. (ft)		Wetted Per. (ft)	44.34	39.84	154.67
Min Ch El (ft)	288.83	Shear (lb/sq ft)	1.94	3.33	1.84
Alpha	2.41	Stream Power (lb/ft s)	5.80	31.42	5.33
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Profile #10 Yr

Conv	Pos Hydr Depth(ft)	Left Sta (ft) Velocity (ft/s)	Right Sta (ft) Shear (lb/sq ft)	Flow (cfs) Power (lb/ft s)	Area (sq ft)	W.P. (ft)	Percent
1	LOB	54.00	72.00	46.50	28.64	18.15	2.58
	1.60	1.62	0.83	1.35			
2	LOB	72.00	90.00	111.02	48.13	18.01	6.17
	2.67	2.31	1.41	3.25			
3	Chan	90.00	97.92	144.58	25.02	7.97	8.03
	3.16	5.78	1.66	9.57			
4	Chan	97.92	105.84	227.56	32.87	7.98	12.64
	4.15	6.92	2.17	15.05			
5	Chan	105.84	113.76	304.78	39.11	7.95	16.93
	4.94	7.79	2.60	20.23			
6	Chan	113.76	121.68	318.02	40.08	7.93	17.67
	5.06	7.94	2.67	21.17			
7	Chan	121.68	129.60	256.34	35.35	8.01	14.24
	4.46	7.25	2.33	16.90			
8	ROB	129.60	173.58	210.20	102.67	44.18	

11.68	2.33	2.05	1.23	2.51			
9	ROB	173.58	217.56		120.96	73.57	43.99
6.72	1.67	1.64	0.88	1.45			
10	ROB	217.56	261.54		59.77	48.21	44.02
3.32	1.10	1.24	0.58	0.72			
11	ROB	261.54	305.52		0.28	0.73	3.93
0.02	0.19	0.38	0.10	0.04			

Profile #50 Yr

Percent	Pos Hydr	Left Sta Velocity (ft)	Right Sta Shear (ft)	Power	Flow (cfs)	Area (sq ft)	W.P. (ft)
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)			
1	LOB	36.00	54.00		1.78	2.39	4.39
0.06	0.56	0.74	0.26	0.20			
2	LOB	54.00	72.00		103.96	48.44	18.22
3.58	2.69	2.15	1.30	2.78			
3	LOB	72.00	90.00		184.11	67.93	18.01
6.35	3.77	2.71	1.84	4.99			
4	Chan	90.00	97.92		229.79	33.73	7.97
7.92	4.26	6.81	2.06	14.06			
5	Chan	97.92	105.84		325.28	41.58	7.98
11.22	5.25	7.82	2.54	19.87			
6	Chan	105.84	113.76		411.66	47.82	7.95
14.20	6.04	8.61	2.93	25.24			
7	Chan	113.76	121.68		426.41	48.79	7.93
14.70	6.16	8.74	3.00	26.22			
8	Chan	121.68	129.60		357.49	44.06	8.01
12.33	5.56	8.11	2.68	21.77			
9	ROB	129.60	173.58		390.19	151.05	44.18
13.45	3.43	2.58	1.67	4.31			
10	ROB	173.58	217.56		273.91	121.95	43.99
9.45	2.77	2.25	1.35	3.04			
11	ROB	217.56	261.54		185.64	96.59	44.02
6.40	2.20	1.92	1.07	2.06			
12	ROB	261.54	305.52		9.78	10.25	13.36
0.34	0.77	0.95	0.37	0.36			

Profile #100 Yr

Percent	Pos Hydr	Left Sta Velocity (ft)	Right Sta Shear (ft)	Power	Flow (cfs)	Area (sq ft)	W.P. (ft)

Conv	Depth(ft)		(ft/s)	(lb/sq ft)	(lb/ft s)			
1		LOB	36.00	54.00		4.62	4.85	5.82
0.14	0.87		0.95	0.38	0.36			
2		LOB	54.00	72.00		132.87	57.44	18.22
3.91	3.19		2.31	1.42	3.30			
3		LOB	72.00	90.00		217.95	76.93	18.01
6.41	4.27		2.83	1.93	5.47			
4		Chan	90.00	97.92		266.58	37.69	7.97
7.84	4.76		7.07	2.14	15.12			
5		Chan	97.92	105.84		364.98	45.54	7.98
10.73	5.75		8.01	2.58	20.67			
6		Chan	105.84	113.76		453.19	51.78	7.95
13.33	6.54		8.75	2.94	25.76			
7		Chan	113.76	121.68		468.25	52.75	7.93
13.77	6.66		8.88	3.01	26.69			
8		Chan	121.68	129.60		397.85	48.02	8.01
11.70	6.06		8.29	2.71	22.46			
9		ROB	129.60	173.58		472.55	173.04	44.18
13.90	3.93		2.73	1.77	4.83			
10		ROB	173.58	217.56		348.66	143.94	43.99
10.25	3.27		2.42	1.48	3.58			
11		ROB	217.56	261.54		252.31	118.58	44.02
7.42	2.70		2.13	1.22	2.59			
12		ROB	261.54	305.52		20.20	17.76	16.87
0.59	1.06		1.14	0.48	0.54			

Profile #500 Yr

Percent	Pos Hydr	Left Sta	Velocity (ft)	Right Sta	Shear (ft)	Power	Flow (cfs)	Area (sq ft)	W.P. (ft)
Conv	Depth(ft)		(ft/s)	(lb/sq ft)		(lb/ft s)			
1		LOB	36.00	54.00			13.32	10.18	8.11
0.28	1.32		1.31	0.62	0.82				
2		LOB	54.00	72.00			201.62	71.84	18.22
4.29	3.99		2.81	1.96	5.49				
3		LOB	72.00	90.00			303.21	91.33	18.01
6.45	5.07		3.32	2.52	8.36				
4		Chan	90.00	97.92			362.51	44.03	7.97
7.71	5.56		8.23	2.74	22.58				
5		Chan	97.92	105.84			475.98	51.88	7.98
10.13	6.55		9.18	3.23	29.60				
6		Chan	105.84	113.76			576.59	58.12	7.95
12.27	7.34		9.92	3.63	35.98				
7		Chan	113.76	121.68			593.77	59.08	7.93
12.63	7.46		10.05	3.70	37.16				
8		Chan	121.68	129.60			513.42	54.36	8.01

10.92	6.86	9.45	3.37	31.83			
9	ROB	129.60	173.58		674.81	208.22	44.18
14.36	4.73	3.24	2.34	7.58			
10	ROB	173.58	217.56		526.56	179.12	43.99
11.20	4.07	2.94	2.02	5.94			
11	ROB	217.56	261.54		408.09	153.76	44.02
8.68	3.50	2.65	1.73	4.60			
12	ROB	261.54	305.52		50.10	33.39	22.49
1.07	1.50	1.50	0.74	1.11			

SUMMARY OF MANNING'S N VALUES

River:River 1

Reach	River Sta.	n1	n2	n3
Reach 1	487	.11	.05	.17
Reach 1	375	.1	.05	.15
Reach 1	206	.11	.05	.11
Reach 1	144	.11	.05	.11
Reach 1	3	.11	.05	.11

SUMMARY OF REACH LENGTHS

River: River 1

Reach	River Sta.	Left	Channel	Right
Reach 1	487	152.3	112.1	85.7
Reach 1	375	59.8	169	194.2
Reach 1	206	63.7	61.8	46.9
Reach 1	144	122.3	141.3	123.8
Reach 1	3	123.8	141.3	122.3

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: River 1

Reach	River Sta.	Contr.	Expan.

Reach 1	487	.1	.3
Reach 1	375	.1	.3
Reach 1	206	.1	.3
Reach 1	144	.1	.3
Reach 1	3	.1	.3

Profile Output Table - Standard Table 1

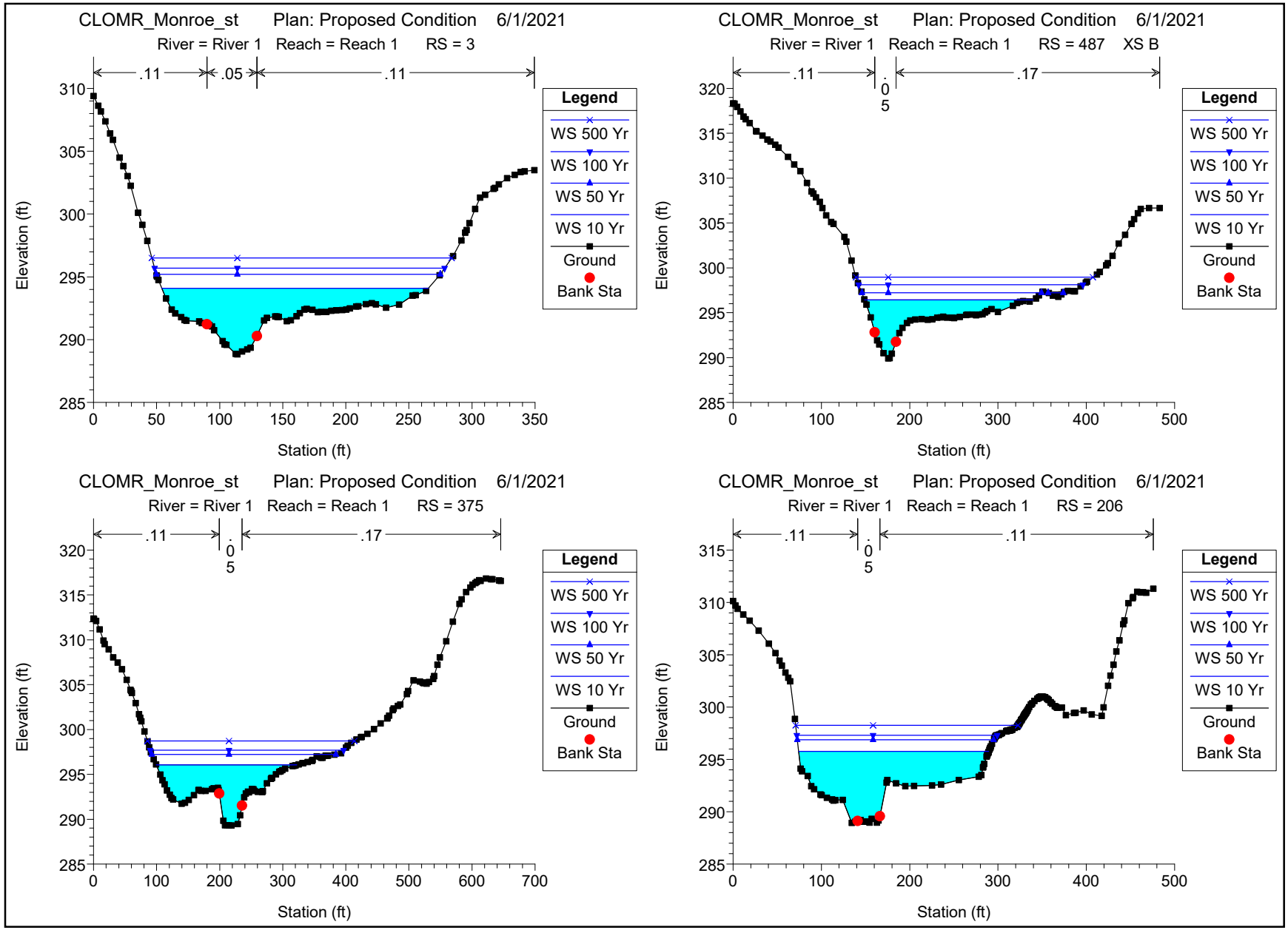
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.
E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	
			(cfs)	(ft)	(ft)	(ft)
(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		
Reach 1	487	10 Yr	1800.00	289.90	296.44	296.44
297.77	0.013016	10.47	410.31	191.23	0.78	
Reach 1	487	50 Yr	2900.00	289.90	297.22	297.22
299.18	0.017768	13.35	567.94	220.27	0.94	
Reach 1	487	100 Yr	3400.00	289.90	298.11	298.11
299.70	0.013128	12.53	786.08	253.86	0.82	
Reach 1	487	500 Yr	4700.00	289.90	298.95	298.95
300.80	0.014365	14.11	1005.75	268.44	0.88	
Reach 1	375	10 Yr	1800.00	289.30	296.06	
296.35	0.002940	5.30	678.29	222.80	0.38	
Reach 1	375	50 Yr	2900.00	289.30	297.22	
297.63	0.003534	6.52	971.28	291.45	0.43	
Reach 1	375	100 Yr	3400.00	289.30	297.67	
298.12	0.003633	6.88	1109.61	306.72	0.44	
Reach 1	375	500 Yr	4700.00	289.30	298.70	
299.21	0.003828	7.68	1433.68	327.51	0.46	
Reach 1	206	10 Yr	1800.00	288.97	295.77	
295.96	0.002209	4.92	878.06	256.80	0.34	
Reach 1	206	50 Yr	2900.00	288.97	296.89	
297.15	0.002645	5.98	1176.30	272.35	0.38	
Reach 1	206	100 Yr	3400.00	288.97	297.34	
297.62	0.002760	6.34	1299.31	275.72	0.39	
Reach 1	206	500 Yr	4700.00	288.97	298.34	
298.67	0.003041	7.18	1576.16	280.77	0.42	
Reach 1	144	10 Yr	1800.00	289.11	295.44	
295.74	0.007136	6.65	590.60	198.49	0.56	
Reach 1	144	50 Yr	2900.00	289.11	296.49	
296.89	0.007778	8.01	806.02	211.59	0.61	

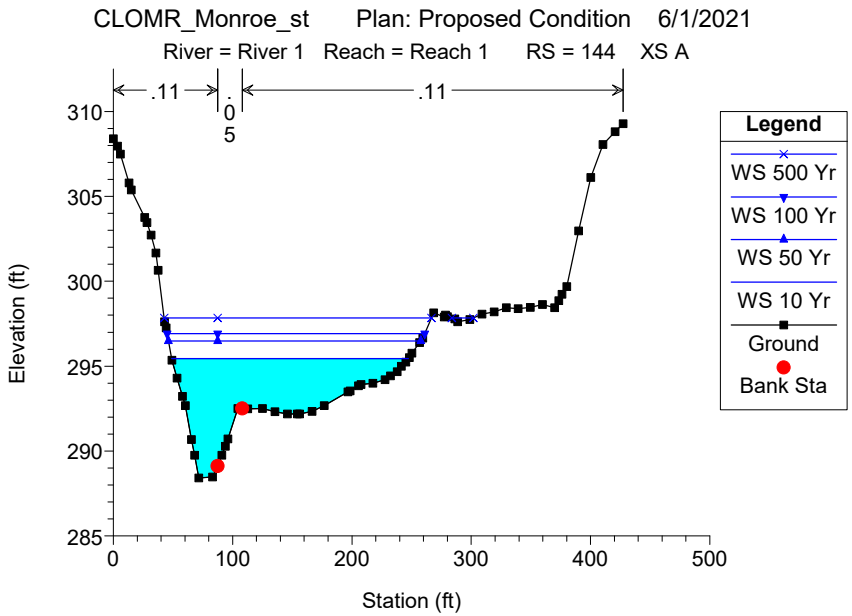
Reach 1	144	100 Yr	3400.00	289.11	296.91		
297.36	0.007885	8.48	896.65	215.84	0.62		
Reach 1	144	500 Yr	4700.00	289.11	297.84		
298.39	0.008331	9.61	1102.21	241.81	0.65		
Reach 1	3	10 Yr	1800.00	288.83	294.10	293.50	
294.68	0.008454	7.26	474.38	211.38	0.61		
Reach 1	3	50 Yr	2900.00	288.83	295.20	294.35	
295.84	0.007810	8.11	714.58	225.08	0.61		
Reach 1	3	100 Yr	3400.00	288.83	295.70	294.65	
296.35	0.007240	8.27	828.32	229.89	0.60		
Reach 1	3	500 Yr	4700.00	288.83	296.50	295.33	
297.30	0.007950	9.43	1015.31	237.59	0.64		

Profile Output Table - Standard Table 2

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Vel Head	Frctn		
Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width			
				(ft)	(ft)	(ft)		
(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)			
Reach 1	487	10 Yr	297.77	296.44	1.33			
0.62	0.31	42.15	1400.65	357.20	191.23			
Reach 1	487	50 Yr	299.18	297.22	1.96			
0.77	0.47	85.18	2035.78	779.05	220.27			
Reach 1	487	100 Yr	299.70	298.11	1.59			
0.71	0.34	122.85	2182.25	1094.91	253.86			
Reach 1	487	500 Yr	300.80	298.95	1.84			
0.75	0.40	196.54	2742.70	1760.76	268.44			
Reach 1	375	10 Yr	296.35	296.06	0.30			
0.36	0.03	511.81	1167.03	121.16	222.80			
Reach 1	375	50 Yr	297.63	297.22	0.41			
0.43	0.05	933.47	1706.93	259.60	291.45			
Reach 1	375	100 Yr	298.12	297.67	0.45			
0.45	0.05	1121.50	1915.90	362.60	306.72			
Reach 1	375	500 Yr	299.21	298.70	0.51			
0.49	0.05	1608.70	2418.79	672.51	327.51			
Reach 1	206	10 Yr	295.96	295.77	0.19			
0.21	0.01	477.33	817.68	504.99	256.80			
Reach 1	206	50 Yr	297.15	296.89	0.25			
0.24	0.02	759.03	1161.48	979.49	272.35			

Reach 1	206		100 Yr	297.62	297.34	0.28			
0.25	0.02	881.65	1302.71	1215.64	275.72				
Reach 1	206		500 Yr	298.67	298.34	0.34			
0.26	0.02	1193.62	1654.23	1852.16	280.77				
Reach 1	144		10 Yr	295.74	295.44	0.30			
1.03	0.03	569.44	597.82	632.74	198.49				
Reach 1	144		50 Yr	296.89	296.49	0.40			
1.02	0.02	803.35	892.84	1203.80	211.59				
Reach 1	144		100 Yr	297.36	296.91	0.44			
0.99	0.02	902.51	1018.78	1478.72	215.84				
Reach 1	144		500 Yr	298.39	297.84	0.55			
1.06	0.03	1154.78	1337.16	2208.06	241.81				
Reach 1	3		10 Yr	294.68	294.10	0.58			
	157.52	1251.28	391.21	211.38					
Reach 1	3		50 Yr	295.84	295.20	0.65			
	289.85	1750.63	859.52	225.08					
Reach 1	3		100 Yr	296.35	295.70	0.65			
	355.43	1950.85	1093.72	229.89					
Reach 1	3		500 Yr	297.30	296.50	0.80			
	518.15	2522.28	1659.56	237.59					


CLOMR_Monroe_st Plan: Proposed Condition 6/1/2021
River = River 1 Reach = Reach 1 RS = 3
.11
.05
.11
Elevation (ft)
Station (ft)
Legend
WS 500 Yr
WS 100 Yr
WS 50 Yr
WS 10 Yr
Ground
Bank Sta
CLOMR_Monroe_st Plan: Proposed Condition 6/1/2021
River = River 1 Reach = Reach 1 RS = 487 XS B
.11
.05
.17
Elevation (ft)
Station (ft)
Legend
WS 500 Yr
WS 100 Yr
WS 50 Yr
WS 10 Yr
Ground
Bank Sta
CLOMR_Monroe_st Plan: Proposed Condition 6/1/2021
River = River 1 Reach = Reach 1 RS = 375
.11
.05
.17
Elevation (ft)
Station (ft)
Legend
WS 500 Yr
WS 100 Yr
WS 50 Yr
WS 10 Yr
Ground
Bank Sta
CLOMR_Monroe_st Plan: Proposed Condition 6/1/2021
River = River 1 Reach = Reach 1 RS = 206
.11
.05
.11
Elevation (ft)
Station (ft)
Legend
WS 500 Yr
WS 100 Yr
WS 50 Yr
WS 10 Yr
Ground
Bank Sta


CLOMR_Monroe_st Plan: Proposed Condition 6/1/2021
River = River 1 Reach = Reach 1 RS = 144 XS A
.11
.05
.11
Elevation (ft)
310
305
300
295
290
285
0
100
200
300
400
500
Station (ft)
Legend
WS 500 Yr
WS 100 Yr
WS 50 Yr
WS 10 Yr
Ground
Bank Sta

Cross Section 487	
Station	Elevation
0	318.35
1.7	318.32
4.5	317.93
8.2	317.43
11.7	316.85
14.2	316.56
18.9	316.14
26.1	315.25
26.6	315.2
33.3	314.74
39	314.31
42.5	314.09
47.7	313.72
51.5	313.39
62.1	312.38
69.3	311.52
76.3	310.79
83.7	309.47
88.7	308.52
90.9	308.28
93.9	307.85
98.1	307.35
101.2	306.68
105.3	305.84
111.1	305.11
113.6	304.91
126	303.44
128.2	302.93
134.2	300.8
138.5	299.14
141.4	298.31
145.4	297.34
148.6	296.48
150.9	295.89
155.8	294.48
160.5	292.8089
163	291.92
165.4	291.46
170.2	290.5
175.7	289.9
177.4	289.94
179.7	290.43
184.6	291.75
188.2	292.73
191.8	293.32
196.8	293.84
200.6	294.12
206.2	294.24
213.4	294.29
220.6	294.21
225.5	294.27
231.1	294.45
235	294.47
237.9	294.56
242.2	294.44
248.2	294.45
249.4	294.41
250.3	294.39
256.7	294.52
263.9	294.74
265.4	294.78
271.1	294.78
275.2	294.71

Cross Section 375	
Station	Elevation
0	312.36
0.7	312.33
4.3	312.1
9.7	311.17
15.7	309.91
17.8	309.51
23.9	308.94
31.1	308.05
38.2	307.47
44.9	306.72
52.4	305.53
58.5	304.44
59.6	304.29
60.8	304.08
66.7	302.94
72	301.72
73.8	301.32
75.8	300.92
80.9	299.79
85.5	298.67
88.1	298.02
90.9	297.46
95.2	296.7
99.1	296.12
105.9	294.97
109.4	294.34
112.6	293.89
116.6	293.21
120.9	292.73
123.7	292.37
126.2	292.2
139.7	291.73
145.1	291.84
151	292.15
159.3	292.68
166.4	293.23
166.8	293.25
170.8	293.16
177.7	293.15
187.9	293.33
190.3	293.45
197.1	293.5
198.1	293.25
199.5	292.87
205.9	289.82
208.3	289.32
211.5	289.32
214.7	289.3
218.4	289.31
228.6	289.47
232.4	290.44
235.4	291.51
238.8	292.45
241.3	292.87
244.9	293.09
246.4	293
251.3	293.38
253.6	293.33
255.4	293.16
260.7	293.05
267.3	293.03
267.9	293.09
268.4	293.14

Cross Section 206	
Station	Elevation
0	310.14
2.7	309.7
5.1	309.38
11.5	308.84
18.8	308.25
28.9	307.31
40.4	306.07
48	305.16
52.7	304.44
55.3	303.95
59.3	303.3
62.6	302.8
64.6	302.47
69.9	298.88
76.5	294.12
78.1	293.88
84.4	293.41
88.4	292.45
91.7	292.16
99	291.65
100.3	291.59
106.3	291.34
112.2	291.18
113.6	291.06
115.8	291.11
124.1	291.12
134.3	288.93
138.5	289.05
140.4	289.09
141.2	289.112
144.4	289.2
147.7	289.06
151.5	289.07
154.5	288.97
156.9	289.31
162.7	288.97
164.6	289.17
166.2	289.58
173.9	292.79
174.7	293.03
184.6	292.72
194.9	292.45
205	292.46
225.3	292.52
235.4	292.61
255.6	293.04
278.2	293.34
281.1	293.5
283.1	294.22
283.3	294.27
284.4	294.58
287.1	295.27
287.5	295.36
287.7	295.41
288.1	295.49
288.8	295.62
289.1	295.68
289.4	295.73
290.3	295.93
291.1	296.08
291.2	296.09
291.9	296.25
293.1	296.49

Cross Section 144	
Station	Elevation
0	308.39
3.5	307.97
5.8	307.5
13.2	305.8
14.9	305.38
26.2	303.75
28.1	303.46
31.7	302.72
35.6	301.66
37.6	300.65
43	297.61
44.2	297.26
49	295.36
53.3	294.29
57.9	293.22
60.3	292.68
65.4	290.67
68.1	289.75
71.7	288.42
83.1	288.46
87.5	289.1104
87.7	289.14
91	289.75
94	290.27
95.9	290.71
104.4	292.5
108	292.4956
112.6	292.49
125.1	292.5
135.4	292.32
145.8	292.19
154.3	292.18
156.1	292.19
166.5	292.34
176.8	292.67
196.5	293.48
198.5	293.55
205.4	293.85
207.5	293.91
217.6	293.99
227.8	294.21
232.4	294.43
237.9	294.67
241.4	294.99
245.1	295.24
248.1	295.51
250.4	295.76
256.8	296.39
259.4	296.66
268.4	298.15
277.3	297.89
278.5	298.01
280.1	297.92
286.3	297.78
288.7	297.62
298.8	297.75
309	298.06
319.1	298.19
329.3	298.44
339.4	298.38
349.6	298.47
359.7	298.64
369.8	298.45

Cross Section 3	
Station	Elevation
0	309.4
3.7	308.63
5.8	308.18
9.4	307.38
13.2	306.41
15.4	305.9
20.6	304.5
23.6	303.82
27	303.03
29.5	302.26
35.3	300.1
38.7	299.14
42.6	297.86
50	295.1
50.3	295.01
51.4	294.75
57.4	293.28
61.9	292.39
64.7	292.09
69.5	291.78
72.1	291.56
73.6	291.51
83.7	291.44
85.8	291.32
90	291.2167
91.9	291.17
93.8	291.06
95.6	290.75
102.3	289.89
103.9	289.62
105.4	289.58
112.7	288.87
113.9	288.83
117.7	289.05
121.8	289.22
124.4	289.35
129.6	290.28
130	290.39
135.1	291.53
137.5	291.74
144	291.85
145.3	291.84
145.8	291.81
146.8	291.8
153.2	291.46
156.5	291.55
161	291.86
163.6	292.1
167.2	292.39
168.9	292.45
173.5	292.37
177.9	292.19
180.4	292.21
184.6	292.21
188.6	292.29
192.5	292.33
197.2	292.36
200.3	292.39
203.1	292.49
208.2	292.63
210	292.66
216	292.82
220.7	292.9

278.3	294.78
282.5	294.81
285.5	295.02
287.6	295.19
292.7	295.41
300	295.09
316.8	295.77
321.5	296.09
324.9	296.21
328.7	296.3
335.9	296.24
343.1	296.59
346.2	296.92
350.3	297.33
351.1	297.35
357.5	297.2
362.2	296.91
364.7	297
368.3	296.77
371.9	297.04
374.6	297.29
379.1	297.44
385.4	297.4
386.4	297.37
387	297.39
393.6	297.94
399.5	298.35
400.8	298.47
411.9	299.26
415.2	299.54
422.4	300.27
424.3	300.52
429.6	301.33
436.8	302.7
444	303.7
451.2	304.89
454	305.44
458.4	306.1
461.6	306.56
471.1	306.66
483	306.66

275	293.99
281.3	294.51
282.2	294.57
283.3	294.61
289.3	295.01
294.3	295.29
296.5	295.35
299.3	295.49
303.7	295.64
315.3	295.92
318	295.95
320.2	296.01
325.1	296.12
331.2	296.25
332.3	296.25
339.4	296.37
346.1	296.52
346.6	296.54
347.2	296.61
353.7	297.01
359	296.97
360.9	296.86
363.2	296.84
368.1	297.09
370.4	297.1
371.6	297.09
382.1	297.19
392.5	297.35
400.5	297.99
402.9	298.21
408.7	298.51
416.9	298.88
423.8	299.14
425.1	299.17
434.2	299.51
444.6	300.05
455.1	300.68
465.5	301.22
466.1	301.29
468.5	301.55
474.3	302.16
475.9	302.35
482.5	302.64
486.3	302.79
496.8	303.95
498.9	304.3
507.2	305.47
517.6	305.34
521.6	305.24
523.5	305.17
528.1	305.1
531.7	305.31
538.5	305.65
539.9	305.96
545.3	307.22
548.9	308.03
559.3	309.84
569.8	312.03
580.2	314
583.7	314.5
590.6	315.33
597.3	315.84
601	316.14
605.5	316.32
607.5	316.45
611.5	316.66

295.5	296.93
295.8	296.99
296.1	297.06
296.6	297.13
296.7	297.15
297.1	297.22
297.6	297.25
297.7	297.26
298.2	297.29
298.5	297.3
300.4	297.32
301	297.36
301.2	297.37
303.2	297.44
304.4	297.51
309.2	297.7
309.5	297.71
309.9	297.71
310.2	297.72
311	297.73
311.2	297.73
311.4	297.73
312.2	297.77
313.1	297.78
313.2	297.78
314.1	297.79
314.2	297.79
314.3	297.8
315	297.83
315.4	297.84
316	297.84
316.2	297.85
318.8	298.01
321.3	298.09
321.5	298.11
322.1	298.2
322.3	298.22
322.4	298.23
323.2	298.33
323.3	298.33
323.3	298.34
323.7	298.4
324.2	298.47
324.3	298.48
325.1	298.58
326.1	298.72
326.3	298.75
326.5	298.78
327	298.83
327.3	298.87
328.3	299.01
328.8	299.09
329.3	299.16
329.7	299.21
329.9	299.23
330.3	299.28
330.6	299.33
331	299.37
331.3	299.41
331.6	299.44
332.1	299.5
332.3	299.52
333.2	299.65
333.4	299.68
334.3	299.84
335.3	299.99

373.3	298.86
376.2	299.24
380	299.69
390.1	302.97
400.3	306.12
410.4	308.06
420.6	308.81
427.4	309.29

223.9	292.81
231.8	292.54
242.2	292.78
252.9	293.5
255.3	293.54
263.6	293.88
274.3	295.12
285	296.66
291.6	297.9
294.6	298.51
295.7	298.72
298	299.28
302.5	300.41
306.4	301.31
310.3	301.54
317.1	302.01
318.2	302.09
321.2	302.36
327.8	302.86
333.9	303.12
338.5	303.34
341.7	303.4
349.5	303.5

613.7	316.57
622.1	316.84
630.1	316.76
632.3	316.76
642.8	316.63
645.6	316.57

337.3	300.24
337.6	300.26
338.8	300.36
341.3	300.58
344.4	300.79
345.4	300.83
346.2	300.89
346.4	300.9
346.5	300.91
347.2	300.95
347.4	300.96
348.1	300.98
348.4	300.99
348.7	300.99
349	301
349.4	301
349.9	301
350.4	300.99
350.8	300.98
351	300.97
351.7	300.96
352.1	300.96
352.4	300.96
352.7	300.95
353.6	300.93
355.4	300.81
356.3	300.75
357.4	300.68
359.4	300.47
359.8	300.44
361.4	300.31
364.4	300.1
365.5	300.05
366.5	299.98
367.3	299.96
367.5	299.95
367.6	299.95
372.3	299.96
376.9	299.22
386.1	299.43
387.8	299.46
397.1	299.69
406.2	299.3
417.3	299.16
419.6	299.98
424.7	302.04
427.4	303.02
430.7	304.05
433.9	305.32
437.5	306.37
441.9	307.92
443.1	308.27
447.6	309.93
452.4	310.41
453.1	310.51
457.7	311.01
461.6	310.94
464.2	310.97
467.9	310.93
475.9	311.32

HEC-RAS HEC-RAS 6.0.0 May 2021
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: CLOMR_Monroe_st
Project File : CLOMR_Monroe_st.prj
Run Date and Time: 10/24/2021 3:50:09 PM

Project in English units

PLAN DATA

Plan Title: Proposed Condition
Plan File :
C:\Users\hammoudah.hammoudah\Desktop\Onboarding\HH\Model_Updated_1\Model_Truncated\Model_Truncated\CLOMR_Monroe_st.p02

Geometry Title: Proposed
Geometry File :
C:\Users\hammoudah.hammoudah\Desktop\Onboarding\HH\Model_Updated_1\Model_Truncated\Model_Truncated\CLOMR_Monroe_st.g02

Flow Title : Existing Steady Flow
Flow File :
C:\Users\hammoudah.hammoudah\Desktop\Onboarding\HH\Model_Updated_1\Model_Truncated\Model_Truncated\CLOMR_Monroe_st.f01

Plan Summary Information:

Number of:	Cross Sections	= 5	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	0

Computational Information
    Water surface calculation tolerance = 0.01
    Critical depth calculation tolerance = 0.01
    Maximum number of iterations   = 20
    Maximum difference tolerance   = 0.3
    Flow tolerance factor   = 0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method: Average Conveyance
    Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Existing Steady Flow
Flow File :
C:\Users\hammoudah.hammoudah\Desktop\Onboarding\HH\Model_Updated_1\Model_Truncated\M
odel_Truncated\CLOMR_Monroe_st.f01

Flow Data (cfs)

River	Reach	RS	10 Yr	50 Yr	100 Yr	500 Yr
River 1	Reach 1	487	1800	2900	3400	4700

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
River 1	Reach 1	10 Yr	Known WS = 294.095	
River 1	Reach 1	50 Yr	Known WS = 295.195	
River 1	Reach 1	100 Yr	Known WS = 295.695	
River 1	Reach 1	500 Yr	Known WS = 296.495	

GEOMETRY DATA

Geometry Title: Proposed
Geometry File :
C:\Users\hammoudah.hammoudah\Desktop\Onboarding\HH\Model_Updated_1\Model_Truncated\Model_Truncated\CLOMR_Monroe_st.g02

CROSS SECTION

RIVER: River 1
REACH: Reach 1 RS: 487

INPUT
Description: XS B
Station Elevation Data num= 104

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	318.35	1.7	318.32	4.5	317.93	8.2	317.43	11.7	316.85
14.2	316.56	18.9	316.14	26.1	315.25	26.6	315.2	33.3	314.74
39	314.31	42.5	314.09	47.7	313.72	51.5	313.39	62.1	312.38
69.3	311.52	76.3	310.79	83.7	309.47	88.7	308.52	90.9	308.28
93.9	307.85	98.1	307.35	101.2	306.68	105.3	305.84	111.1	305.11
113.6	304.91	126	303.44	128.2	302.93	134.2	300.8	138.5	299.14
141.4	298.31	145.4	297.34	148.6	296.48	150.9	295.89	155.8	294.48
160.5	292.8089	163	291.92	165.4	291.46	170.2	290.5	175.7	289.9
177.4	289.94	179.7	290.43	184.6	291.75	188.2	292.73	191.8	293.32
196.8	293.84	200.6	294.12	206.2	294.24	213.4	294.29	220.6	294.21
225.5	294.27	231.1	294.45	235	294.47	237.9	294.56	242.2	294.44
248.2	294.45	249.4	294.41	250.3	294.39	256.7	294.52	263.9	294.74
265.4	294.78	271.1	294.78	275.2	294.71	278.3	294.78	282.5	294.81
285.5	295.02	287.6	295.19	292.7	295.41	300	295.09	316.8	295.77
321.5	296.09	324.9	296.21	328.7	296.3	335.9	296.24	343.1	296.59
346.2	296.92	350.3	297.33	351.1	297.35	357.5	297.2	362.2	296.91
364.7	297	368.3	296.77	371.9	297.04	374.6	297.29	379.1	297.44
385.4	297.4	386.4	297.37	387	297.39	393.6	297.94	399.5	298.35
400.8	298.47	411.9	299.26	415.2	299.54	422.4	300.27	424.3	300.52
429.6	301.33	436.8	302.7	444	303.7	451.2	304.89	454	305.44
458.4	306.1	461.6	306.56	471.1	306.66	483	306.66		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.11	160.5	.05	184.6	.17

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
160.5	184.6	152.3	112.1	85.7	.1	.3

CROSS SECTION OUTPUT Profile #10 Yr

E.G. Elev (ft)	297.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.33	Wt. n-Val.	0.110	0.050	0.170
W.S. Elev (ft)	296.44	Reach Len. (ft)	152.30	112.10	85.70
Crit W.S. (ft)	296.44	Flow Area (sq ft)	19.87	133.78	256.67
E.G. Slope (ft/ft)	0.013016	Area (sq ft)	19.87	133.78	256.67
Q Total (cfs)	1800.00	Flow (cfs)	42.15	1400.65	357.20
Top Width (ft)	191.23	Top Width (ft)	11.74	24.10	155.39
Vel Total (ft/s)	4.39	Avg. Vel. (ft/s)	2.12	10.47	1.39
Max Chl Dpth (ft)	6.54	Hydr. Depth (ft)	1.69	5.55	1.65
Conv. Total (cfs)	15777.5	Conv. (cfs)	369.5	12277.1	3130.9
Length Wtd. (ft)	115.02	Wetted Per. (ft)	12.30	24.65	155.68
Min Ch El (ft)	289.90	Shear (lb/sq ft)	1.31	4.41	1.34
Alpha	4.46	Stream Power (lb/ft s)	2.79	46.17	1.86
Frctn Loss (ft)	0.64	Cum Volume (acre-ft)	1.67	1.81	2.70
C & E Loss (ft)	0.31	Cum SA (acres)	0.49	0.33	1.24

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is

not a valid subcritical answer. The
         program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50 Yr

E.G. Elev (ft)	299.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.96	Wt. n-Val.	0.110	0.050	0.170
W.S. Elev (ft)	297.22	Reach Len. (ft)	152.30	112.10	85.70
Crit W.S. (ft)	297.22	Flow Area (sq ft)	30.11	152.50	385.33
E.G. Slope (ft/ft)	0.017768	Area (sq ft)	30.11	152.50	385.33
Q Total (cfs)	2900.00	Flow (cfs)	85.18	2035.78	779.05
Top Width (ft)	220.27	Top Width (ft)	14.64	24.10	181.53
Vel Total (ft/s)	5.11	Avg. Vel. (ft/s)	2.83	13.35	2.02
Max Chl Dpth (ft)	7.32	Hydr. Depth (ft)	2.06	6.33	2.12
Conv. Total (cfs)	21755.8	Conv. (cfs)	639.0	15272.4	5844.4
Length Wtd. (ft)	114.52	Wetted Per. (ft)	15.30	24.65	181.89
Min Ch El (ft)	289.90	Shear (lb/sq ft)	2.18	6.86	2.35
Alpha	4.85	Stream Power (lb/ft s)	6.18	91.61	4.75
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)	2.24	2.16	4.15
C & E Loss (ft)	0.46	Cum SA (acres)	0.53	0.33	1.51

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical
         depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
         sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and

previous cross section. This may indicate
         the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
         water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
         program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100 Yr

E.G. Elev (ft)	299.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.59	Wt. n-Val.	0.110	0.050	0.170
W.S. Elev (ft)	298.11	Reach Len. (ft)	152.30	112.10	85.70
Crit W.S. (ft)	298.11	Flow Area (sq ft)	44.85	174.10	567.13
E.G. Slope (ft/ft)	0.013128	Area (sq ft)	44.85	174.10	567.13
Q Total (cfs)	3400.00	Flow (cfs)	122.85	2182.25	1094.91
Top Width (ft)	253.86	Top Width (ft)	18.28	24.10	211.48
Vel Total (ft/s)	4.33	Avg. Vel. (ft/s)	2.74	12.53	1.93
Max Chl Dpth (ft)	8.21	Hydr. Depth (ft)	2.45	7.22	2.68
Conv. Total (cfs)	29674.6	Conv. (cfs)	1072.2	19046.3	9556.1
Length Wtd. (ft)	113.89	Wetted Per. (ft)	19.05	24.65	211.89
Min Ch El (ft)	289.90	Shear (lb/sq ft)	1.93	5.79	2.19
Alpha	5.47	Stream Power (lb/ft s)	5.28	72.55	4.24
Frctn Loss (ft)	0.72	Cum Volume (acre-ft)	2.50	2.33	4.96
C & E Loss (ft)	0.34	Cum SA (acres)	0.55	0.33	1.61

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical
         depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
         sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #500 Yr

E.G. Elev (ft)	300.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.84	Wt. n-Val.	0.110	0.050	0.170
W.S. Elev (ft)	298.95	Reach Len. (ft)	152.30	112.10	85.70
Crit W.S. (ft)	298.95	Flow Area (sq ft)	61.56	194.37	749.82
E.G. Slope (ft/ft)	0.014365	Area (sq ft)	61.56	194.37	749.82
Q Total (cfs)	4700.00	Flow (cfs)	196.54	2742.70	1760.76
Top Width (ft)	268.44	Top Width (ft)	21.35	24.10	222.99
Vel Total (ft/s)	4.67	Avg. Vel. (ft/s)	3.19	14.11	2.35
Max Chl Dpth (ft)	9.05	Hydr. Depth (ft)	2.88	8.07	3.36
Conv. Total (cfs)	39214.5	Conv. (cfs)	1639.9	22883.7	14691.0
Length Wtd. (ft)	113.05	Wetted Per. (ft)	22.23	24.65	223.43
Min Ch El (ft)	289.90	Shear (lb/sq ft)	2.48	7.07	3.01
Alpha	5.43	Stream Power (lb/ft s)	7.93	99.78	7.07
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)	3.04	2.63	6.55
C & E Loss (ft)	0.40	Cum SA (acres)	0.57	0.33	1.79

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical

depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.

Profile #10 Yr

Pos		Left Sta	Right Sta	Flow	Area	W.P.	Percent	Hydr	Velocity	Shear	Power
		(ft)	(ft)	(cfs)	(sq ft)	(ft)					
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)							
1	LOB	128.40	160.50	42.15	19.87	12.30					
2.34	1.69	2.12	1.31	2.79							
2	Chan	160.50	165.32	185.69	21.19	5.02					
10.32	4.40	8.76	3.43	30.08							
3	Chan	165.32	170.14	268.92	26.24	4.92					
14.94	5.44	10.25	4.34	44.46							
4	Chan	170.14	174.96	336.50	29.86	4.85					
18.69	6.20	11.27	5.00	56.38							
5	Chan	174.96	179.78	352.01	30.75	4.88					
19.56	6.38	11.45	5.12	58.62							
6	Chan	179.78	184.60	257.53	25.73	4.99					
14.31	5.34	10.01	4.19	41.92							
7	ROB	184.60	244.28	229.83	143.31	59.90					
12.77	2.40	1.60	1.94	3.12							
8	ROB	244.28	303.96	117.57	95.74	59.72					
6.53	1.60	1.23	1.30	1.60							
9	ROB	303.96	363.64	9.80	17.62	36.06					
0.54	0.49	0.56	0.40	0.22							

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical
depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.

Profile #50 Yr

Pos	Left Sta	Right Sta	Flow	Area	W.P.	Percent	Hydr	Velocity	Shear	Power
	(ft)	(ft)	(cfs)	(sq ft)	(ft)					
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)						
1	LOB	128.40	160.50	85.18	30.11	15.30				
2.94	2.06	2.83	2.18	6.18						
2	Chan	160.50	165.32	285.22	24.93	5.02				
9.84	5.17	11.44	5.51	63.08						
3	Chan	165.32	170.14	393.32	29.99	4.92				
13.56	6.22	13.12	6.77	88.76						
4	Chan	170.14	174.96	479.81	33.61	4.85				
16.55	6.97	14.28	7.69	109.75						
5	Chan	174.96	179.78	499.22	34.50	4.88				
17.21	7.16	14.47	7.84	113.49						
6	Chan	179.78	184.60	378.22	29.47	4.99				
13.04	6.12	12.83	6.55	84.05						
7	ROB	184.60	244.28	446.63	189.68	59.90				
15.40	3.18	2.35	3.51	8.27						
8	ROB	244.28	303.96	276.58	142.10	59.72				
9.54	2.38	1.95	2.64	5.14						
9	ROB	303.96	363.64	54.60	50.82	52.09				
1.88	0.98	1.07	1.08	1.16						
10	ROB	363.64	423.32	1.24	2.73	10.18				
0.04	0.27	0.45	0.30	0.13						

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical
depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)

is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.

Profile #100 Yr

Conv	Pos Hydr	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	LOB	128.40	160.50	122.85	44.85	19.05	3.61	2.45	2.74	1.93	5.28
2	Chan	160.50	165.32	320.57	29.25	5.02	9.43	6.07	10.96	4.78	52.38
3	Chan	165.32	170.14	423.86	34.31	4.92	12.47	7.12	12.35	5.72	70.67
4	Chan	170.14	174.96	505.44	37.93	4.85	14.87	7.87	13.33	6.41	85.42
5	Chan	174.96	179.78	523.30	38.82	4.88	15.39	8.05	13.48	6.52	87.90
6	Chan	179.78	184.60	409.08	33.80	4.99	12.03	7.01	12.10	5.55	67.16
7	ROB	184.60	244.28	555.12	243.18	59.90	16.33	4.07	2.28	3.33	7.59
8	ROB	244.28	303.96	387.00	195.60	59.72	11.38	3.28	1.98	2.68	5.31
9	ROB	303.96	363.64	134.49	103.78	59.76	3.96	1.74	1.30	1.42	1.84
10	ROB	363.64	423.32	18.30	24.58	32.50	0.54	0.76	0.74	0.62	0.46

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical
depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.

Profile #500 Yr

	Pos	Left Sta	Right Sta	Flow	Area	W.P.	Percent	Hydr	Velocity	Shear	Power
		(ft)	(ft)	(cfs)	(sq ft)	(ft)					
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)							
1	LOB	128.40	160.50	196.54	61.56	22.23					
4.18	2.88	3.19	2.48	7.93							
2	Chan	160.50	165.32	416.81	33.31	5.02					
8.87	6.91	12.51	5.96	74.53							
3	Chan	165.32	170.14	534.73	38.36	4.92					
11.38	7.96	13.94	7.00	97.56							
4	Chan	170.14	174.96	626.97	41.98	4.85					
13.34	8.71	14.93	7.76	115.94							
5	Chan	174.96	179.78	646.72	42.87	4.88					
13.76	8.90	15.08	7.88	118.86							
6	Chan	179.78	184.60	517.47	37.85	4.99					
11.01	7.85	13.67	6.80	92.96							
7	ROB	184.60	244.28	812.37	293.37	59.90					
17.28	4.92	2.77	4.39	12.16							
8	ROB	244.28	303.96	606.16	245.80	59.72					
12.90	4.12	2.47	3.69	9.10							
9	ROB	303.96	363.64	277.85	153.97	59.76					
5.91	2.58	1.80	2.31	4.17							
10	ROB	363.64	423.32	64.39	56.68	44.04					
1.37	1.29	1.14	1.15	1.31							

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical
depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate

the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.

CROSS SECTION

RIVER: River 1
REACH: Reach 1 RS: 375

INPUT
Description:
Station Elevation Data num= 135

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	312.36	.7	312.33	4.3	312.1	9.7	311.17	15.7	309.91
17.8	309.51	23.9	308.94	31.1	308.05	38.2	307.47	44.9	306.72
52.4	305.53	58.5	304.44	59.6	304.29	60.8	304.08	66.7	302.94
72	301.72	73.8	301.32	75.8	300.92	80.9	299.79	85.5	298.67
88.1	298.02	90.9	297.46	95.2	296.7	99.1	296.12	105.9	294.97
109.4	294.34	112.6	293.89	116.6	293.21	120.9	292.73	123.7	292.37
126.2	292.2	139.7	291.73	145.1	291.84	151	292.15	159.3	292.68
166.4	293.23	166.8	293.25	170.8	293.16	177.7	293.15	187.9	293.33
190.3	293.45	197.1	293.5	198.1	293.25	199.5	292.87	205.9	289.82
208.3	289.32	211.5	289.32	214.7	289.3	218.4	289.31	228.6	289.47
232.4	290.44	235.4	291.51	238.8	292.45	241.3	292.87	244.9	293.09
246.4	293	251.3	293.38	253.6	293.33	255.4	293.16	260.7	293.05
267.3	293.03	267.9	293.09	268.4	293.14	275	293.99	281.3	294.51
282.2	294.57	283.3	294.61	289.3	295.01	294.3	295.29	296.5	295.35
299.3	295.49	303.7	295.64	315.3	295.92	318	295.95	320.2	296.01
325.1	296.12	331.2	296.25	332.3	296.25	339.4	296.37	346.1	296.52
346.6	296.54	347.2	296.61	353.7	297.01	359	296.97	360.9	296.86
363.2	296.84	368.1	297.09	370.4	297.1	371.6	297.09	382.1	297.19
392.5	297.35	400.5	297.99	402.9	298.21	408.7	298.51	416.9	298.88
423.8	299.14	425.1	299.17	434.2	299.51	444.6	300.05	455.1	300.68
465.5	301.22	466.1	301.29	468.5	301.55	474.3	302.16	475.9	302.35
482.5	302.64	486.3	302.79	496.8	303.95	498.9	304.3	507.2	305.47
517.6	305.34	521.6	305.24	523.5	305.17	528.1	305.1	531.7	305.31
538.5	305.65	539.9	305.96	545.3	307.22	548.9	308.03	559.3	309.84
569.8	312.03	580.2	314	583.7	314.5	590.6	315.33	597.3	315.84
601	316.14	605.5	316.32	607.5	316.45	611.5	316.66	613.7	316.57
622.1	316.84	630.1	316.76	632.3	316.76	642.8	316.63	645.6	316.57

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	199.5	.05	235.4	.22	299.3	.11

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

199.5 235.4 59.8 169 194.2 .1 .3

CROSS SECTION OUTPUT Profile #10 Yr

E.G. Elev (ft)	296.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.100	0.050	0.218
W.S. Elev (ft)	296.04	Reach Len. (ft)	59.80	169.00	194.20
Crit W.S. (ft)		Flow Area (sq ft)	302.42	219.79	153.04
E.G. Slope (ft/ft)	0.003052	Area (sq ft)	302.42	219.79	153.04
Q Total (cfs)	1800.00	Flow (cfs)	517.88	1184.70	97.42
Top Width (ft)	222.11	Top Width (ft)	99.94	35.90	86.27
Vel Total (ft/s)	2.67	Avg. Vel. (ft/s)	1.71	5.39	0.64
Max Chl Dpth (ft)	6.74	Hydr. Depth (ft)	3.03	6.12	1.77
Conv. Total (cfs)	32580.7	Conv. (cfs)	9373.8	21443.6	1763.3
Length Wtd. (ft)	143.44	Wetted Per. (ft)	100.38	36.95	86.58
Min Ch El (ft)	289.30	Shear (lb/sq ft)	0.57	1.13	0.34
Alpha	2.81	Stream Power (lb/ft s)	0.98	6.11	0.21
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	1.11	1.36	2.30
C & E Loss (ft)	0.04	Cum SA (acres)	0.30	0.25	1.00

CROSS SECTION OUTPUT Profile #50 Yr

E.G. Elev (ft)	297.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.	0.100	0.050	0.201
W.S. Elev (ft)	297.21	Reach Len. (ft)	59.80	169.00	194.20
Crit W.S. (ft)		Flow Area (sq ft)	423.28	261.64	284.44
E.G. Slope (ft/ft)	0.003582	Area (sq ft)	423.28	261.64	

284.44					
Q Total (cfs)	2900.00	Flow (cfs)	937.44	1715.98	
246.57					
Top Width (ft)	290.99	Top Width (ft)	107.18	35.90	
147.91					
Vel Total (ft/s)	2.99	Avg. Vel. (ft/s)	2.21	6.56	
0.87					
Max Chl Dpth (ft)	7.91	Hydr. Depth (ft)	3.95	7.29	
1.92					
Conv. Total (cfs)	48454.8	Conv. (cfs)	15663.3	28671.6	
4119.9					
Length Wtd. (ft)	142.50	Wetted Per. (ft)	107.71	36.95	
148.26					
Min Ch El (ft)	289.30	Shear (lb/sq ft)	0.88	1.58	
0.43					
Alpha	3.03	Stream Power (lb/ft s)	1.95	10.39	
0.37					
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	1.45	1.63	
3.50					
C & E Loss (ft)	0.05	Cum SA (acres)	0.32	0.25	
1.19					

CROSS SECTION OUTPUT Profile #100 Yr

E.G. Elev (ft)	298.13	Element	Left OB	Channel	
Right OB					
Vel Head (ft)	0.45	Wt. n-Val.	0.100	0.050	
0.191					
W.S. Elev (ft)	297.67	Reach Len. (ft)	59.80	169.00	
194.20					
Crit W.S. (ft)		Flow Area (sq ft)	473.66	278.31	
357.42					
E.G. Slope (ft/ft)	0.003671	Area (sq ft)	473.66	278.31	
357.42					
Q Total (cfs)	3400.00	Flow (cfs)	1127.01	1925.50	
347.49					
Top Width (ft)	306.70	Top Width (ft)	109.67	35.90	
161.14					
Vel Total (ft/s)	3.06	Avg. Vel. (ft/s)	2.38	6.92	
0.97					
Max Chl Dpth (ft)	8.37	Hydr. Depth (ft)	4.32	7.75	
2.22					
Conv. Total (cfs)	56119.1	Conv. (cfs)	18601.9	31781.6	
5735.6					
Length Wtd. (ft)	142.37	Wetted Per. (ft)	110.24	36.95	
161.50					
Min Ch El (ft)	289.30	Shear (lb/sq ft)	0.98	1.73	

0.51					
Alpha	3.10	Stream Power (lb/ft s)	2.34	11.94	
0.49					
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	1.59	1.75	
4.05					
C & E Loss (ft)	0.05	Cum SA (acres)	0.32	0.25	
1.24					

CROSS SECTION OUTPUT Profile #500 Yr

E.G. Elev (ft)	299.23	Element	Left OB	Channel	
Right OB					
Vel Head (ft)	0.52	Wt. n-Val.	0.100	0.050	
0.174					
W.S. Elev (ft)	298.71	Reach Len. (ft)	59.80	169.00	
194.20					
Crit W.S. (ft)		Flow Area (sq ft)	590.16	315.64	
532.45					
E.G. Slope (ft/ft)	0.003828	Area (sq ft)	590.16	315.64	
532.45					
Q Total (cfs)	4700.00	Flow (cfs)	1615.47	2425.28	
659.25					
Top Width (ft)	327.88	Top Width (ft)	114.18	35.90	
177.80					
Vel Total (ft/s)	3.27	Avg. Vel. (ft/s)	2.74	7.68	
1.24					
Max Chl Dpth (ft)	9.41	Hydr. Depth (ft)	5.17	8.79	
2.99					
Conv. Total (cfs)	75966.1	Conv. (cfs)	26110.8	39199.8	
10655.4					
Length Wtd. (ft)	142.33	Wetted Per. (ft)	114.87	36.95	
178.19					
Min Ch El (ft)	289.30	Shear (lb/sq ft)	1.23	2.04	
0.71					
Alpha	3.11	Stream Power (lb/ft s)	3.36	15.69	
0.88					
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	1.90	1.98	
5.29					
C & E Loss (ft)	0.04	Cum SA (acres)	0.34	0.25	
1.40					

Profile #10 Yr

Pos	Left Sta	Right Sta	Flow	Area	W.P.

Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)	(cfs)	(sq ft)	(ft)
1	LOB	79.80	119.70		37.06	33.72	20.40
2.06	1.67	1.10	0.32	0.35			
2	LOB	119.70	159.60		304.39	156.12	39.97
16.91	3.91	1.95	0.74	1.45			
3	LOB	159.60	199.50		176.42	112.58	40.01
9.80	2.82	1.57	0.54	0.84			
4	Chan	199.50	206.68		153.02	34.98	7.89
8.50	4.87	4.37	0.85	3.70			
5	Chan	206.68	213.86		275.22	48.01	7.21
15.29	6.69	5.73	1.27	7.27			
6	Chan	213.86	221.04		278.96	48.31	7.18
15.50	6.73	5.77	1.28	7.40			
7	Chan	221.04	228.22		272.51	47.64	7.18
15.14	6.64	5.72	1.26	7.23			
8	Chan	228.22	235.40		205.00	40.84	7.49
11.39	5.69	5.02	1.04	5.22			
9	ROB	235.40	317.44		97.40	152.83	82.35
5.41	1.86	0.64	0.35	0.23			
10	ROB	317.44	399.48		0.02	0.22	4.23
0.00	0.05	0.10	0.01	0.00			

Profile #50 Yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta Shear (lb/sq ft)	Power (lb/ft s)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	79.80	119.70		89.13	61.56	27.73
3.07	2.25	1.45	0.50	0.72			
2	LOB	119.70	159.60		508.64	202.63	39.97
17.54	5.08	2.51	1.13	2.85			
3	LOB	159.60	199.50		339.68	159.09	40.01
11.71	3.99	2.14	0.89	1.90			
4	Chan	199.50	206.68		237.73	43.35	7.89
8.20	6.04	5.48	1.23	6.74			
5	Chan	206.68	213.86		390.90	56.38	7.21
13.48	7.85	6.93	1.75	12.12			
6	Chan	213.86	221.04		395.61	56.68	7.18
13.64	7.89	6.98	1.77	12.32			
7	Chan	221.04	228.22		387.81	56.01	7.18
13.37	7.80	6.92	1.74	12.08			
8	Chan	228.22	235.40		303.94	49.21	7.49
10.48	6.85	6.18	1.47	9.08			
9	ROB	235.40	317.44		227.57	248.46	82.35

7.85	3.03	0.92	0.67	0.62			
10	ROB	317.44	399.48		19.00	35.98	65.90
0.66	0.55	0.53	0.12	0.06			

Profile #100 Yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta Shear (lb/sq ft)	Power (lb/ft s)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	79.80	119.70		117.97	74.88	30.26
3.47	2.51	1.58	0.57	0.89			
2	LOB	119.70	159.60		595.81	221.16	39.97
17.52	5.54	2.69	1.27	3.42			
3	LOB	159.60	199.50		413.22	177.63	40.01
12.15	4.45	2.33	1.02	2.37			
4	Chan	199.50	206.68		272.53	46.69	7.89
8.02	6.50	5.84	1.36	7.92			
5	Chan	206.68	213.86		435.87	59.72	7.21
12.82	8.32	7.30	1.90	13.84			
6	Chan	213.86	221.04		440.90	60.02	7.18
12.97	8.36	7.35	1.92	14.07			
7	Chan	221.04	228.22		432.69	59.35	7.18
12.73	8.27	7.29	1.89	13.81			
8	Chan	228.22	235.40		343.51	52.54	7.49
10.10	7.32	6.54	1.61	10.51			
9	ROB	235.40	317.44		294.63	286.57	82.35
8.67	3.49	1.03	0.80	0.82			
10	ROB	317.44	399.48		52.86	70.85	79.15
1.55	0.90	0.75	0.21	0.15			

Profile #500 Yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta Shear (lb/sq ft)	Power (lb/ft s)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	79.80	119.70		203.40	108.40	34.89
4.33	3.15	1.88	0.74	1.39			
2	LOB	119.70	159.60		812.06	262.65	39.97
17.28	6.58	3.09	1.57	4.85			
3	LOB	159.60	199.50		600.00	219.12	40.01
12.77	5.49	2.74	1.31	3.58			
4	Chan	199.50	206.68		356.92	54.16	7.89

7.59	7.54	6.59	1.64	10.82				
5	Chan	206.68	213.86		542.50	67.19	7.21	
11.54	9.36	8.07	2.23	17.97				
6	Chan	213.86	221.04		548.26	67.48	7.18	
11.67	9.40	8.12	2.25	18.25				
7	Chan	221.04	228.22		539.17	66.81	7.18	
11.47	9.31	8.07	2.22	17.94				
8	Chan	228.22	235.40		438.43	60.01	7.49	
9.33	8.36	7.31	1.92	13.99				
9	ROB	235.40	317.44		464.01	371.88	82.35	
9.87	4.53	1.25	1.08	1.35				
10	ROB	317.44	399.48		193.35	155.82	82.10	
4.11	1.90	1.24	0.45	0.56				
11	ROB	399.48	481.52		1.90	4.75	13.74	
0.04	0.35	0.40	0.08	0.03				

CROSS SECTION

RIVER: River 1
REACH: Reach 1 RS: 206

INPUT
Description:
Station Elevation Data num= 189

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	310.14	2.7	309.7	5.1	309.38	11.5	308.84	18.8	308.25
28.9	307.31	40.4	306.07	48	305.16	52.7	304.44	55.3	303.95
59.3	303.3	62.6	302.8	64.6	302.47	69.9	298.88	76.5	294.12
78.1	293.88	84.4	293.41	88.4	292.45	91.7	292.16	99	291.65
100.3	291.59	106.3	291.34	112.2	291.18	113.6	291.06	115.8	291.11
124.1	291.12	134.3	288.93	138.5	289.05	140.4	289.09	141.2	289.112
144.4	289.2	147.7	289.06	151.5	289.07	154.5	288.97	156.9	289.31
162.7	288.97	164.6	289.17	166.2	289.58	173.9	292.79	174.7	293.03
184.6	292.72	194.9	292.45	205	292.46	225.3	292.52	235.4	292.61
255.6	293.04	278.2	293.34	281.1	293.5	283.1	294.22	283.3	294.27
284.4	294.58	287.1	295.27	287.5	295.36	287.7	295.41	288.1	295.49
288.8	295.62	289.1	295.68	289.4	295.73	290.3	295.93	291.1	296.08
291.2	296.09	291.9	296.25	293.1	296.49	295.5	296.93	295.8	296.99
296.1	297.06	296.6	297.13	296.7	297.15	297.1	297.22	297.6	297.25
297.7	297.26	298.2	297.29	298.5	297.3	300.4	297.32	301	297.36
301.2	297.37	303.2	297.44	304.4	297.51	309.2	297.7	309.5	297.71
309.9	297.71	310.2	297.72	311	297.73	311.2	297.73	311.4	297.73
312.2	297.77	313.1	297.78	313.2	297.78	314.1	297.79	314.2	297.79
314.3	297.8	315	297.83	315.4	297.84	316	297.84	316.2	297.85
318.8	298.01	321.3	298.09	321.5	298.11	322.1	298.2	322.3	298.22
322.4	298.23	323.2	298.33	323.3	298.33	323.3	298.34	323.7	298.4
324.2	298.47	324.3	298.48	325.1	298.58	326.1	298.72	326.3	298.75

326.5	298.78	327	298.83	327.3	298.87	328.3	299.01	328.8	299.09
329.3	299.16	329.7	299.21	329.9	299.23	330.3	299.28	330.6	299.33
331	299.37	331.3	299.41	331.6	299.44	332.1	299.5	332.3	299.52
333.2	299.65	333.4	299.68	334.3	299.84	335.3	299.99	337.3	300.24
337.6	300.26	338.8	300.36	341.3	300.58	344.4	300.79	345.4	300.83
346.2	300.89	346.4	300.9	346.5	300.91	347.2	300.95	347.4	300.96
348.1	300.98	348.4	300.99	348.7	300.99	349	301	349.4	301
349.9	301	350.4	300.99	350.8	300.98	351	300.97	351.7	300.96
352.1	300.96	352.4	300.96	352.7	300.95	353.6	300.93	355.4	300.81
356.3	300.75	357.4	300.68	359.4	300.47	359.8	300.44	361.4	300.31
364.4	300.1	365.5	300.05	366.5	299.98	367.3	299.96	367.5	299.95
367.6	299.95	372.3	299.96	376.9	299.22	386.1	299.43	387.8	299.46
397.1	299.69	406.2	299.3	417.3	299.16	419.6	299.98	424.7	302.04
427.4	303.02	430.7	304.05	433.9	305.32	437.5	306.37	441.9	307.92
443.1	308.27	447.6	309.93	452.4	310.41	453.1	310.51	457.7	311.01
461.6	310.94	464.2	310.97	467.9	310.93	475.9	311.32		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.11	141.2	.05	166.2	.11	235.4	.08

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
141.2	166.2	63.7	61.8	46.9	.1	.3

CROSS SECTION OUTPUT Profile #10 Yr

E.G. Elev (ft)	295.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.110	0.050	0.098
W.S. Elev (ft)	295.77	Reach Len. (ft)	63.70	61.80	46.90
Crit W.S. (ft)		Flow Area (sq ft)	287.53	166.13	364.56
E.G. Slope (ft/ft)	0.002131	Area (sq ft)	287.53	166.13	364.56
Q Total (cfs)	1800.00	Flow (cfs)	469.05	803.33	527.62
Top Width (ft)	215.37	Top Width (ft)	66.99	25.00	123.38
Vel Total (ft/s)	2.20	Avg. Vel. (ft/s)	1.63	4.84	1.45
Max Chl Dpth (ft)	6.84	Hydr. Depth (ft)	4.29	6.65	2.95
Conv. Total (cfs)	38994.6	Conv. (cfs)	10161.3	17403.1	11430.3
Length Wtd. (ft)	57.55	Wetted Per. (ft)	67.95	25.10	124.39
Min Ch El (ft)	288.97	Shear (lb/sq ft)	0.56	0.88	

0.39					
Alpha	2.43	Stream Power (lb/ft s)	0.92	4.26	
0.56					
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	0.71	0.61	
1.14					
C & E Loss (ft)	0.01	Cum SA (acres)	0.18	0.13	
0.53					

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50 Yr

E.G. Elev (ft)	297.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.	0.110	0.050	0.097
W.S. Elev (ft)	296.89	Reach Len. (ft)	63.70	61.80	46.90
Crit W.S. (ft)		Flow Area (sq ft)	363.33	194.10	505.68
E.G. Slope (ft/ft)	0.002628	Area (sq ft)	363.33	194.10	505.68
Q Total (cfs)	2900.00	Flow (cfs)	755.30	1156.32	988.37
Top Width (ft)	222.61	Top Width (ft)	68.54	25.00	129.07
Vel Total (ft/s)	2.73	Avg. Vel. (ft/s)	2.08	5.96	1.95
Max Chl Dpth (ft)	7.96	Hydr. Depth (ft)	5.30	7.76	3.92
Conv. Total (cfs)	56567.1	Conv. (cfs)	14732.9	22555.1	19279.1
Length Wtd. (ft)	56.68	Wetted Per. (ft)	69.86	25.10	130.19
Min Ch El (ft)	288.97	Shear (lb/sq ft)	0.85	1.27	0.64
Alpha	2.23	Stream Power (lb/ft s)	1.77	7.56	1.25
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	0.91	0.75	1.73
C & E Loss (ft)	0.01	Cum SA (acres)	0.19	0.13	0.57

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100 Yr

E.G. Elev (ft)	297.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.	0.110	0.050	0.097
W.S. Elev (ft)	297.33	Reach Len. (ft)	63.70	61.80	46.90
Crit W.S. (ft)		Flow Area (sq ft)	393.67	205.11	563.18
E.G. Slope (ft/ft)	0.002821	Area (sq ft)	393.67	205.11	563.18
Q Total (cfs)	3400.00	Flow (cfs)	888.02	1313.41	1198.56
Top Width (ft)	228.49	Top Width (ft)	69.15	25.00	134.34
Vel Total (ft/s)	2.93	Avg. Vel. (ft/s)	2.26	6.40	2.13
Max Chl Dpth (ft)	8.40	Hydr. Depth (ft)	5.69	8.20	4.19
Conv. Total (cfs)	64015.2	Conv. (cfs)	16719.7	24728.9	22566.5
Length Wtd. (ft)	56.43	Wetted Per. (ft)	70.62	25.10	135.49
Min Ch El (ft)	288.97	Shear (lb/sq ft)	0.98	1.44	0.73
Alpha	2.19	Stream Power (lb/ft s)	2.21	9.21	1.56
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	1.00	0.81	2.00
C & E Loss (ft)	0.02	Cum SA (acres)	0.20	0.13	0.58

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500 Yr

E.G. Elev (ft)	298.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.	0.110	0.050	

0.098					
W.S. Elev (ft)	298.30	Reach Len. (ft)	63.70	61.80	46.90
Crit W.S. (ft)		Flow Area (sq ft)	461.48	229.39	705.84
E.G. Slope (ft/ft)	0.003319	Area (sq ft)	461.48	229.39	705.84
Q Total (cfs)	4700.00	Flow (cfs)	1236.03	1716.64	1747.33
Top Width (ft)	252.26	Top Width (ft)	70.50	25.00	156.76
Vel Total (ft/s)	3.37	Avg. Vel. (ft/s)	2.68	7.48	2.48
Max Chl Dpth (ft)	9.37	Hydr. Depth (ft)	6.55	9.18	4.50
Conv. Total (cfs)	81582.2	Conv. (cfs)	21454.9	29797.3	30330.1
Length Wtd. (ft)	56.01	Wetted Per. (ft)	72.28	25.10	157.95
Min Ch El (ft)	288.97	Shear (lb/sq ft)	1.32	1.89	0.93
Alpha	2.17	Stream Power (lb/ft s)	3.54	14.17	2.29
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	1.18	0.92	2.53
C & E Loss (ft)	0.02	Cum SA (acres)	0.21	0.13	0.65

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

Profile #10 Yr

	Pos	Left Sta	Right Sta	Flow	Area	W.P.	Percent	Hydr	Velocity	Shear	Power
		(ft)	(ft)	(cfs)	(sq ft)	(ft)					
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)							
1	LOB	56.48	84.72	15.87	18.87	11.08	0.88	1.80	0.84	0.23	0.19
2	LOB	84.72	112.96	163.93	111.58	28.39	9.11	3.95	1.47	0.52	0.77
3	LOB	112.96	141.20	289.24	157.07	28.48	16.07	5.56	1.84	0.73	1.35
4	Chan	141.20	146.20	159.68	33.06	5.00	8.87	6.61	4.83	0.88	4.25
5	Chan	146.20	151.20	163.16	33.49	5.00					

9.06	6.70	4.87	0.89	4.34			
6	Chan	151.20	156.20		163.84	33.61	5.02
9.10	6.72	4.87	0.89	4.34			
7	Chan	156.20	161.20		157.97	32.88	5.01
8.78	6.58	4.81	0.87	4.19			
8	Chan	161.20	166.20		158.67	33.09	5.06
8.82	6.62	4.79	0.87	4.17			
9	ROB	166.20	228.14		289.41	208.30	62.63
16.08	3.36	1.39	0.44	0.61			
10	ROB	228.14	290.08		238.22	156.26	61.76
13.23	2.54	1.52	0.34	0.51			

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

Profile #50 Yr

	Pos	Left Sta	Right Sta		Flow	Area	W.P.
Percent	Hydr	Velocity	Shear	Power			
		(ft)	(ft)		(cfs)	(sq ft)	(ft)
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)			
1	LOB	56.48	84.72		37.53	31.49	13.00
1.29	2.61	1.19	0.40	0.47			
2	LOB	84.72	112.96		278.16	143.17	28.39
9.59	5.07	1.94	0.83	1.61			
3	LOB	112.96	141.20		439.62	188.67	28.48
15.16	6.68	2.33	1.09	2.53			
4	Chan	141.20	146.20		230.13	38.65	5.00
7.94	7.73	5.95	1.27	7.55			
5	Chan	146.20	151.20		234.43	39.08	5.00
8.08	7.82	6.00	1.28	7.69			
6	Chan	151.20	156.20		235.18	39.21	5.02
8.11	7.84	6.00	1.28	7.69			
7	Chan	156.20	161.20		227.97	38.47	5.01
7.86	7.69	5.93	1.26	7.46			
8	Chan	161.20	166.20		228.61	38.69	5.06
7.88	7.74	5.91	1.25	7.41			
9	ROB	166.20	228.14		509.42	277.60	62.63
17.57	4.48	1.84	0.73	1.33			
10	ROB	228.14	290.08		477.47	225.52	62.28
16.46	3.64	2.12	0.59	1.26			
11	ROB	290.08	352.02		1.48	2.56	5.29
0.05	0.49	0.58	0.08	0.05			

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

Profile #100 Yr

Pos		Left Sta	Right Sta	Flow	Area	W.P.	Percent
Hydr	Velocity	Shear	Power				
	(ft)	(ft)		(cfs)	(sq ft)	(ft)	
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)			
1	LOB	56.48	84.72	48.94	36.94	13.75	
1.44	2.92	1.32	0.47	0.63			
2	LOB	84.72	112.96	331.65	155.62	28.39	
9.75	5.51	2.13	0.97	2.06			
3	LOB	112.96	141.20	507.43	201.11	28.48	
14.92	7.12	2.52	1.24	3.14			
4	Chan	141.20	146.20	261.50	40.86	5.00	
7.69	8.17	6.40	1.44	9.21			
5	Chan	146.20	151.20	266.12	41.28	5.00	
7.83	8.26	6.45	1.45	9.37			
6	Chan	151.20	156.20	266.89	41.41	5.02	
7.85	8.28	6.44	1.45	9.37			
7	Chan	156.20	161.20	259.15	40.67	5.01	
7.62	8.13	6.37	1.43	9.10			
8	Chan	161.20	166.20	259.75	40.89	5.06	
7.64	8.18	6.35	1.42	9.03			
9	ROB	166.20	228.14	606.56	304.89	62.63	
17.84	4.92	1.99	0.86	1.71			
10	ROB	228.14	290.08	588.65	252.82	62.28	
17.31	4.08	2.33	0.71	1.66			
11	ROB	290.08	352.02	3.35	5.47	10.59	
0.10	0.52	0.61	0.09	0.06			

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

Profile #500 Yr

Pos		Left Sta	Right Sta	Flow	Area	W.P.	Percent
Hydr	Velocity	Shear	Power				
	(ft)	(ft)		(cfs)	(sq ft)	(ft)	
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)			
1	LOB	56.48	84.72	81.35	49.90	15.41	
1.73	3.56	1.63	0.67	1.09			
2	LOB	84.72	112.96	472.35	183.04	28.39	

10.05	6.48	2.58	1.34	3.45			
3	LOB	112.96	141.20		682.33	228.53	28.48
14.52	8.09	2.99	1.66	4.96			
4	Chan	141.20	146.20		342.03	45.71	5.00
7.28	9.14	7.48	1.89	14.17			
5	Chan	146.20	151.20		347.43	46.14	5.00
7.39	9.23	7.53	1.91	14.39			
6	Chan	151.20	156.20		348.26	46.27	5.02
7.41	9.25	7.53	1.91	14.38			
7	Chan	156.20	161.20		339.23	45.53	5.01
7.22	9.11	7.45	1.88	14.02			
8	Chan	161.20	166.20		339.69	45.75	5.06
7.23	9.15	7.43	1.87	13.90			
9	ROB	166.20	228.14		849.84	365.04	62.63
18.08	5.89	2.33	1.21	2.81			
10	ROB	228.14	290.08		872.96	312.97	62.28
18.57	5.05	2.79	1.04	2.90			
11	ROB	290.08	352.02		24.54	27.83	33.04
0.52	0.85	0.88	0.17	0.15			

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: River 1
REACH: Reach 1 RS: 144

INPUT
Description: XS A
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	308.39	3.5	307.97	5.8	307.5	13.2	305.8	14.9	305.38
26.2	303.75	28.1	303.46	31.7	302.72	35.6	301.66	37.6	300.65
43	297.61	44.2	297.26	49	295.36	53.3	294.29	57.9	293.22
60.3	292.68	65.4	290.67	68.1	289.75	71.7	288.42	83.1	288.46
87.5	289.1	104	87.7	289.14	91	289.75	94	290.27	95.9	290.71
104.4	292.5	108	292.49	56	112.6	292.49	125.1	292.5	135.4	292.32
145.8	292.19	154.3	292.18	156.1	292.19	166.5	292.34	176.8	292.67
196.5	293.48	198.5	293.55	205.4	293.85	207.5	293.91	217.6	293.99
227.8	294.21	232.4	294.43	237.9	294.67	241.4	294.99	245.1	295.24
248.1	295.51	250.4	295.76	256.8	296.39	259.4	296.66	268.4	298.15
277.3	297.89	278.5	298.01	280.1	297.92	286.3	297.78	288.7	297.62
298.8	297.75	309	298.06	319.1	298.19	329.3	298.44	339.4	298.38
349.6	298.47	359.7	298.64	369.8	298.45	373.3	298.86	376.2	299.24
380	299.69	390.1	302.97	400.3	306.12	410.4	308.06	420.6	308.81

427.4 309.29

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.11	87.5	.05	108	.11

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
87.5	108	122.3	141.3	123.8	.1	.3

CROSS SECTION OUTPUT Profile #10 Yr

E.G. Elev (ft)	295.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	295.44	Reach Len. (ft)	122.30	141.30	123.80
Crit W.S. (ft)		Flow Area (sq ft)	181.56	89.88	319.16
E.G. Slope (ft/ft)	0.007136	Area (sq ft)	181.56	89.88	319.16
Q Total (cfs)	1800.00	Flow (cfs)	569.44	597.82	632.74
Top Width (ft)	198.49	Top Width (ft)	38.70	20.50	139.29
Vel Total (ft/s)	3.05	Avg. Vel. (ft/s)	3.14	6.65	1.98
Max Chl Dpth (ft)	7.02	Hydr. Depth (ft)	4.69	4.38	2.29
Conv. Total (cfs)	21308.6	Conv. (cfs)	6741.1	7077.1	7490.5
Length Wtd. (ft)	132.49	Wetted Per. (ft)	39.84	20.84	139.37
Min Ch El (ft)	289.11	Shear (lb/sq ft)	2.03	1.92	1.02
Alpha	2.07	Stream Power (lb/ft s)	6.37	12.78	2.02
Frctn Loss (ft)	1.03	Cum Volume (acre-ft)	0.36	0.43	0.77
C & E Loss (ft)	0.03	Cum SA (acres)	0.10	0.10	0.39

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50 Yr

E.G. Elev (ft)	296.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	296.49	Reach Len. (ft)	122.30	141.30	123.80
Crit W.S. (ft)		Flow Area (sq ft)	223.61	111.42	470.99
E.G. Slope (ft/ft)	0.007777	Area (sq ft)	223.61	111.42	470.99
Q Total (cfs)	2900.00	Flow (cfs)	803.35	892.84	1203.81
Top Width (ft)	211.59	Top Width (ft)	41.35	20.50	149.74
Vel Total (ft/s)	3.60	Avg. Vel. (ft/s)	3.59	8.01	2.56
Max Chl Dpth (ft)	8.07	Hydr. Depth (ft)	5.41	5.44	3.15
Conv. Total (cfs)	32883.6	Conv. (cfs)	9109.4	10124.1	13650.2
Length Wtd. (ft)	131.49	Wetted Per. (ft)	42.70	20.84	149.88
Min Ch El (ft)	289.11	Shear (lb/sq ft)	2.54	2.60	1.53
Alpha	2.01	Stream Power (lb/ft s)	9.14	20.80	3.90
Frctn Loss (ft)	1.02	Cum Volume (acre-ft)	0.48	0.53	1.21
C & E Loss (ft)	0.02	Cum SA (acres)	0.11	0.10	0.42

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100 Yr

E.G. Elev (ft)	297.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	296.91	Reach Len. (ft)	122.30	141.30	123.80
Crit W.S. (ft)		Flow Area (sq ft)	241.36	120.10	535.19

E.G. Slope (ft/ft)	0.007884	Area (sq ft)	241.36	120.10	535.19
Q Total (cfs)	3400.00	Flow (cfs)	902.51	1018.77	1478.72
Top Width (ft)	215.84	Top Width (ft)	42.42	20.50	152.92
Vel Total (ft/s)	3.79	Avg. Vel. (ft/s)	3.74	8.48	2.76
Max Chl Dpth (ft)	8.49	Hydr. Depth (ft)	5.69	5.86	3.50
Conv. Total (cfs)	38290.8	Conv. (cfs)	10164.0	11473.4	16653.4
Length Wtd. (ft)	131.16	Wetted Per. (ft)	43.85	20.84	153.08
Min Ch El (ft)	289.11	Shear (lb/sq ft)	2.71	2.84	1.72
Alpha	1.99	Stream Power (lb/ft s)	10.13	24.06	4.75
Frctn Loss (ft)	0.99	Cum Volume (acre-ft)	0.53	0.58	1.40
C & E Loss (ft)	0.02	Cum SA (acres)	0.12	0.10	0.43

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500 Yr

E.G. Elev (ft)	298.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	297.84	Reach Len. (ft)	122.30	141.30	123.80
Crit W.S. (ft)		Flow Area (sq ft)	281.80	139.07	681.34
E.G. Slope (ft/ft)	0.008331	Area (sq ft)	281.80	139.07	681.34
Q Total (cfs)	4700.00	Flow (cfs)	1154.78	1337.16	2208.06
Top Width (ft)	241.81	Top Width (ft)	44.90	20.50	176.41
Vel Total (ft/s)	4.26	Avg. Vel. (ft/s)	4.10	9.61	3.24
Max Chl Dpth (ft)	9.42	Hydr. Depth (ft)	6.28	6.78	3.86

Conv. Total (cfs)	51492.8	Conv. (cfs)	12651.7	14649.9	24191.3
Length Wtd. (ft)	130.72	Wetted Per. (ft)	46.51	20.84	176.65
Min Ch El (ft)	289.11	Shear (lb/sq ft)	3.15	3.47	2.01
Alpha	1.94	Stream Power (lb/ft s)	12.91	33.37	6.50
Frctn Loss (ft)	1.06	Cum Volume (acre-ft)	0.64	0.66	1.78
C & E Loss (ft)	0.03	Cum SA (acres)	0.12	0.10	0.47

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

Profile #10 Yr

Conv	Pos Depth(ft)	Hydr	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	LOB		35.00	52.50	1.10	1.80	3.82	0.06	0.49	0.61	0.21	0.13
2	LOB		52.50	70.00	130.91	59.32	18.37	7.27	3.39	2.21	1.44	3.18
3	LOB		70.00	87.50	437.42	120.44	17.66	24.30	6.88	3.63	3.04	11.03
4	Chan		87.50	91.60	192.65	24.42	4.17	10.70	5.96	7.89	2.61	20.60
5	Chan		91.60	95.70	153.69	21.35	4.18	8.54	5.21	7.20	2.28	16.38
6	Chan		95.70	99.80	113.16	17.79	4.19	6.29	4.34	6.36	1.89	12.03
7	Chan		99.80	103.90	78.18	14.25	4.19	4.34	3.47	5.49	1.51	8.31
8	Chan		103.90	108.00	60.14	12.08	4.11	3.34	2.95	4.98	1.31	6.52
9	ROB		108.00	171.88	444.51	197.30	63.89	24.69	3.09	2.25	1.38	3.10
10	ROB		171.88	235.76	184.91	116.59	63.92	10.27	1.83	1.59	0.81	1.29
11	ROB		235.76	299.64	3.32	5.28	11.57	0.18	0.46	0.63	0.20	0.13

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

Profile #50 Yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta Shear (lb/sq ft)	Power (lb/ft s)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	35.00	52.50		7.79	7.08	6.67
0.27	1.11	1.10	0.52	0.57			
2	LOB	52.50	70.00		215.03	77.71	18.37
7.41	4.44	2.77	2.05	5.68			
3	LOB	70.00	87.50		580.53	138.82	17.66
20.02	7.93	4.18	3.82	15.96			
4	Chan	87.50	91.60		266.80	28.73	4.17
9.20	7.01	9.29	3.35	31.09			
5	Chan	91.60	95.70		220.54	25.66	4.18
7.60	6.26	8.60	2.98	25.61			
6	Chan	95.70	99.80		171.60	22.09	4.19
5.92	5.39	7.77	2.56	19.88			
7	Chan	99.80	103.90		128.28	18.55	4.19
4.42	4.53	6.91	2.15	14.87			
8	Chan	103.90	108.00		105.62	16.39	4.11
3.64	4.00	6.45	1.94	12.47			
9	ROB	108.00	171.88		762.30	264.42	63.89
26.29	4.14	2.88	2.01	5.79			
10	ROB	171.88	235.76		415.32	183.71	63.92
14.32	2.88	2.26	1.40	3.15			
11	ROB	235.76	299.64		26.18	22.87	22.07
0.90	1.04	1.15	0.50	0.58			

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

Profile #100 Yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta Shear (lb/sq ft)	Power (lb/ft s)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	35.00	52.50		12.55	10.00	7.82

0.37	1.35	1.25	0.63	0.79			
2	LOB	52.50	70.00		252.15	85.12	18.37
7.42	4.86	2.96	2.28	6.76			
3	LOB	70.00	87.50		637.81	146.24	17.66
18.76	8.36	4.36	4.08	17.78			
4	Chan	87.50	91.60		297.16	30.46	4.17
8.74	7.43	9.75	3.60	35.10			
5	Chan	91.60	95.70		248.43	27.40	4.18
7.31	6.68	9.07	3.23	29.25			
6	Chan	95.70	99.80		196.61	23.83	4.19
5.78	5.81	8.25	2.80	23.09			
7	Chan	99.80	103.90		150.40	20.29	4.19
4.42	4.95	7.41	2.38	17.67			
8	Chan	103.90	108.00		126.18	18.12	4.11
3.71	4.42	6.96	2.17	15.11			
9	ROB	108.00	171.88		906.44	291.48	63.89
26.66	4.56	3.11	2.25	6.98			
10	ROB	171.88	235.76		527.88	210.78	63.92
15.53	3.30	2.50	1.62	4.07			
11	ROB	235.76	299.64		44.41	32.93	25.28
1.31	1.31	1.35	0.64	0.86			

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

Profile #500 Yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta Shear (lb/sq ft)	Power (lb/ft s)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	35.00	52.50		28.38	18.05	10.48
0.60	1.82	1.57	0.90	1.41			
2	LOB	52.50	70.00		346.13	101.32	18.37
7.36	5.79	3.42	2.87	9.80			
3	LOB	70.00	87.50		780.27	162.43	17.66
16.60	9.28	4.80	4.78	22.98			
4	Chan	87.50	91.60		373.25	34.26	4.17
7.94	8.36	10.90	4.28	46.59			
5	Chan	91.60	95.70		318.53	31.19	4.18
6.78	7.61	10.21	3.88	39.63			
6	Chan	95.70	99.80		259.77	27.62	4.19
5.53	6.74	9.40	3.43	32.24			
7	Chan	99.80	103.90		206.71	24.08	4.19
4.40	5.87	8.58	2.99	25.66			
8	Chan	103.90	108.00		178.90	21.92	4.11

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  3.81       5.35       8.16       2.77      22.63
  9           ROB         108.00      171.88       1289.22     350.59      63.89
 27.43       5.49       3.68       2.85      10.50
  10          ROB         171.88      235.76        833.30     269.88      63.92
 17.73       4.22       3.09       2.20       6.78
  11          ROB         235.76      299.64         85.54      60.80      46.82
  1.82       1.30       1.41       0.68       0.95
  12          ROB         299.64      363.52          0.01       0.06       2.03
  0.00       0.03       0.12       0.02       0.00



Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and
previous cross section.  This may indicate
         the need for additional cross sections.

CROSS SECTION


RIVER: River 1
REACH: Reach 1            RS: 3

INPUT
Description:
Station Elevation Data    num=      86
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   309.4     3.7  308.63     5.8  308.18     9.4  307.38    13.2  306.41
    15.4   305.9    20.6   304.5    23.6  303.82      27  303.03    29.5  302.26
    35.3   300.1    38.7  299.14    42.6  297.86      50   295.1    50.3  295.01
    51.4  294.75    57.4  293.28    61.9  292.39    64.7  292.09    69.5  291.78
    72.1  291.56    73.6  291.51    83.7  291.44    85.8  291.32      90291.2167
    91.9  291.17    93.8  291.06    95.6  290.75   102.3  289.89   103.9  289.62
   105.4  289.58   112.7  288.87   113.9  288.83   117.7  289.05   121.8  289.22
   124.4  289.35   129.6  290.28     130  290.39   135.1  291.53   137.5  291.74
     144  291.85   145.3  291.84   145.8  291.81   146.8   291.8   153.2  291.46
   156.5  291.55     161  291.86   163.6   292.1   167.2  292.39   168.9  292.45
   173.5  292.37   177.9  292.19   180.4  292.21   184.6  292.21   188.6  292.29
   192.5  292.33   197.2  292.36   200.3  292.39   203.1  292.49   208.2  292.63
     210  292.66     216  292.82   220.7   292.9   223.9  292.81   231.8  292.54
   242.2  292.78   252.9   293.5   255.3  293.54   263.6  293.88   274.3  295.12
     285  296.66   291.6   297.9   294.6  298.51   295.7  298.72     298  299.28
   302.5  300.41   306.4  301.31   310.3  301.54   317.1  302.01   318.2  302.09
   321.2  302.36   327.8  302.86   333.9  303.12   338.5  303.34   341.7   303.4
   349.5   303.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .11      90     .05   129.6     .11
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Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	129.6	123.8	141.3	122.3	.1	.3

CROSS SECTION OUTPUT Profile #10 Yr

E.G. Elev (ft)	294.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	294.10	Reach Len. (ft)			
Crit W.S. (ft)	293.50	Flow Area (sq ft)	76.77	172.43	225.18
E.G. Slope (ft/ft)	0.008454	Area (sq ft)	76.77	172.43	225.18
Q Total (cfs)	1800.00	Flow (cfs)	157.52	1251.28	391.21
Top Width (ft)	211.38	Top Width (ft)	35.93	39.60	135.86
Vel Total (ft/s)	3.79	Avg. Vel. (ft/s)	2.05	7.26	1.74
Max Chl Dpth (ft)	5.27	Hydr. Depth (ft)	2.14	4.35	1.66
Conv. Total (cfs)	19577.2	Conv. (cfs)	1713.2	13609.2	4254.8
Length Wtd. (ft)		Wetted Per. (ft)	36.15	39.84	136.12
Min Ch El (ft)	288.83	Shear (lb/sq ft)	1.12	2.28	0.87
Alpha	2.61	Stream Power (lb/ft s)	2.30	16.58	1.52
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #50 Yr

E.G. Elev (ft)	295.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	295.20	Reach Len. (ft)			
Crit W.S. (ft)	294.35	Flow Area (sq ft)	118.75	215.99	379.84

E.G. Slope (ft/ft)	0.007810	Area (sq ft)	118.75	215.99	379.84
Q Total (cfs)	2900.00	Flow (cfs)	289.85	1750.63	859.52
Top Width (ft)	225.08	Top Width (ft)	40.25	39.60	145.22
Vel Total (ft/s)	4.06	Avg. Vel. (ft/s)	2.44	8.11	2.26
Max Chl Dpth (ft)	6.37	Hydr. Depth (ft)	2.95	5.45	2.62
Conv. Total (cfs)	32815.1	Conv. (cfs)	3279.8	19809.3	9726.0
Length Wtd. (ft)		Wetted Per. (ft)	40.62	39.84	145.55
Min Ch El (ft)	288.83	Shear (lb/sq ft)	1.43	2.64	1.27
Alpha	2.54	Stream Power (lb/ft s)	3.48	21.43	2.88
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #100 Yr

E.G. Elev (ft)	296.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	295.70	Reach Len. (ft)			
Crit W.S. (ft)	294.65	Flow Area (sq ft)	139.22	235.79	453.32
E.G. Slope (ft/ft)	0.007240	Area (sq ft)	139.22	235.79	453.32
Q Total (cfs)	3400.00	Flow (cfs)	355.43	1950.85	1093.72
Top Width (ft)	229.89	Top Width (ft)	41.60	39.60	148.70
Vel Total (ft/s)	4.10	Avg. Vel. (ft/s)	2.55	8.27	2.41
Max Chl Dpth (ft)	6.87	Hydr. Depth (ft)	3.35	5.95	3.05
Conv. Total (cfs)	39958.8	Conv. (cfs)	4177.3	22927.5	12854.0
Length Wtd. (ft)		Wetted Per. (ft)	42.05	39.84	149.06

Min Ch El (ft)	288.83	Shear (lb/sq ft)	1.50	2.68	1.37
Alpha	2.48	Stream Power (lb/ft s)	3.82	22.13	3.32
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #500 Yr

E.G. Elev (ft)	297.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.80	Wt. n-Val.	0.110	0.050	0.110
W.S. Elev (ft)	296.50	Reach Len. (ft)			
Crit W.S. (ft)	295.33	Flow Area (sq ft)	173.35	267.47	574.50
E.G. Slope (ft/ft)	0.007950	Area (sq ft)	173.35	267.47	574.50
Q Total (cfs)	4700.00	Flow (cfs)	518.15	2522.28	1659.56
Top Width (ft)	237.59	Top Width (ft)	43.74	39.60	154.25
Vel Total (ft/s)	4.63	Avg. Vel. (ft/s)	2.99	9.43	2.89
Max Chl Dpth (ft)	7.67	Hydr. Depth (ft)	3.96	6.75	3.72
Conv. Total (cfs)	52712.0	Conv. (cfs)	5811.2	28288.2	18612.5
Length Wtd. (ft)		Wetted Per. (ft)	44.34	39.84	154.67
Min Ch El (ft)	288.83	Shear (lb/sq ft)	1.94	3.33	1.84
Alpha	2.41	Stream Power (lb/ft s)	5.80	31.42	5.33
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Profile #10 Yr

Conv	Depth(ft)	Pos Hydr	Left Sta Velocity (ft/s)	Right Sta Shear (lb/sq ft)	Power (lb/ft s)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent
1		LOB	54.00	72.00		46.50	28.64	18.15	
2.58	1.60		1.62	0.83	1.35				
2		LOB	72.00	90.00		111.02	48.13	18.01	
6.17	2.67		2.31	1.41	3.25				
3		Chan	90.00	97.92		144.58	25.02	7.97	
8.03	3.16		5.78	1.66	9.57				
4		Chan	97.92	105.84		227.56	32.87	7.98	
12.64	4.15		6.92	2.17	15.05				
5		Chan	105.84	113.76		304.78	39.11	7.95	
16.93	4.94		7.79	2.60	20.23				
6		Chan	113.76	121.68		318.02	40.08	7.93	
17.67	5.06		7.94	2.67	21.17				
7		Chan	121.68	129.60		256.34	35.35	8.01	
14.24	4.46		7.25	2.33	16.90				
8		ROB	129.60	173.58		210.20	102.67	44.18	
11.68	2.33		2.05	1.23	2.51				
9		ROB	173.58	217.56		120.96	73.57	43.99	
6.72	1.67		1.64	0.88	1.45				
10		ROB	217.56	261.54		59.77	48.21	44.02	
3.32	1.10		1.24	0.58	0.72				
11		ROB	261.54	305.52		0.28	0.73	3.93	
0.02	0.19		0.38	0.10	0.04				

Profile #50 Yr

Conv	Depth(ft)	Pos Hydr	Left Sta Velocity (ft/s)	Right Sta Shear (lb/sq ft)	Power (lb/ft s)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent
1		LOB	36.00	54.00		1.78	2.39	4.39	
0.06	0.56		0.74	0.26	0.20				
2		LOB	54.00	72.00		103.96	48.44	18.22	
3.58	2.69		2.15	1.30	2.78				
3		LOB	72.00	90.00		184.11	67.93	18.01	
6.35	3.77		2.71	1.84	4.99				
4		Chan	90.00	97.92		229.79	33.73	7.97	
7.92	4.26		6.81	2.06	14.06				
5		Chan	97.92	105.84		325.28	41.58	7.98	
11.22	5.25		7.82	2.54	19.87				
6		Chan	105.84	113.76		411.66	47.82	7.95	
14.20	6.04		8.61	2.93	25.24				
7		Chan	113.76	121.68		426.41	48.79	7.93	
14.70	6.16		8.74	3.00	26.22				

8	Chan	121.68	129.60	357.49	44.06	8.01	
12.33	5.56	8.11	2.68	21.77			
9	ROB	129.60	173.58	390.19	151.05	44.18	
13.45	3.43	2.58	1.67	4.31			
10	ROB	173.58	217.56	273.91	121.95	43.99	
9.45	2.77	2.25	1.35	3.04			
11	ROB	217.56	261.54	185.64	96.59	44.02	
6.40	2.20	1.92	1.07	2.06			
12	ROB	261.54	305.52	9.78	10.25	13.36	
0.34	0.77	0.95	0.37	0.36			

Profile #100 Yr

Pos		Left Sta	Right Sta	Flow	Area	W.P.	Percent
Hydr	Velocity	Shear	Power				
	(ft)	(ft)		(cfs)	(sq ft)	(ft)	
Conv	Depth(ft)	(ft/s)	(lb/sq ft)	(lb/ft s)			
1	LOB	36.00	54.00	4.62	4.85	5.82	
0.14	0.87	0.95	0.38	0.36			
2	LOB	54.00	72.00	132.87	57.44	18.22	
3.91	3.19	2.31	1.42	3.30			
3	LOB	72.00	90.00	217.95	76.93	18.01	
6.41	4.27	2.83	1.93	5.47			
4	Chan	90.00	97.92	266.58	37.69	7.97	
7.84	4.76	7.07	2.14	15.12			
5	Chan	97.92	105.84	364.98	45.54	7.98	
10.73	5.75	8.01	2.58	20.67			
6	Chan	105.84	113.76	453.19	51.78	7.95	
13.33	6.54	8.75	2.94	25.76			
7	Chan	113.76	121.68	468.25	52.75	7.93	
13.77	6.66	8.88	3.01	26.69			
8	Chan	121.68	129.60	397.85	48.02	8.01	
11.70	6.06	8.29	2.71	22.46			
9	ROB	129.60	173.58	472.55	173.04	44.18	
13.90	3.93	2.73	1.77	4.83			
10	ROB	173.58	217.56	348.66	143.94	43.99	
10.25	3.27	2.42	1.48	3.58			
11	ROB	217.56	261.54	252.31	118.58	44.02	
7.42	2.70	2.13	1.22	2.59			
12	ROB	261.54	305.52	20.20	17.76	16.87	
0.59	1.06	1.14	0.48	0.54			

Profile #500 Yr

Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta Shear (lb/sq ft)	Power (lb/ft s)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent
1	LOB	36.00	54.00		13.32	10.18	8.11	
0.28	1.32	1.31	0.62	0.82				
2	LOB	54.00	72.00		201.62	71.84	18.22	
4.29	3.99	2.81	1.96	5.49				
3	LOB	72.00	90.00		303.21	91.33	18.01	
6.45	5.07	3.32	2.52	8.36				
4	Chan	90.00	97.92		362.51	44.03	7.97	
7.71	5.56	8.23	2.74	22.58				
5	Chan	97.92	105.84		475.98	51.88	7.98	
10.13	6.55	9.18	3.23	29.60				
6	Chan	105.84	113.76		576.59	58.12	7.95	
12.27	7.34	9.92	3.63	35.98				
7	Chan	113.76	121.68		593.77	59.08	7.93	
12.63	7.46	10.05	3.70	37.16				
8	Chan	121.68	129.60		513.42	54.36	8.01	
10.92	6.86	9.45	3.37	31.83				
9	ROB	129.60	173.58		674.81	208.22	44.18	
14.36	4.73	3.24	2.34	7.58				
10	ROB	173.58	217.56		526.56	179.12	43.99	
11.20	4.07	2.94	2.02	5.94				
11	ROB	217.56	261.54		408.09	153.76	44.02	
8.68	3.50	2.65	1.73	4.60				
12	ROB	261.54	305.52		50.10	33.39	22.49	
1.07	1.50	1.50	0.74	1.11				

SUMMARY OF MANNING'S N VALUES

River:River 1

Reach	River Sta.	n1	n2	n3	n4
Reach 1	487	.11	.05	.17	
Reach 1	375	.1	.05	.22	.11
Reach 1	206	.11	.05	.11	.08
Reach 1	144	.11	.05	.11	
Reach 1	3	.11	.05	.11	

SUMMARY OF REACH LENGTHS

River: River 1

Reach	River Sta.	Left	Channel	Right
Reach 1	487	152.3	112.1	85.7
Reach 1	375	59.8	169	194.2
Reach 1	206	63.7	61.8	46.9
Reach 1	144	122.3	141.3	123.8
Reach 1	3	123.8	141.3	122.3

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: River 1

Reach	River Sta.	Contr.	Expan.
Reach 1	487	.1	.3
Reach 1	375	.1	.3
Reach 1	206	.1	.3
Reach 1	144	.1	.3
Reach 1	3	.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.
E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	
			(cfs)	(ft)	(ft)	(ft)
(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		
Reach 1	487	10 Yr	1800.00	289.90	296.44	296.44
297.77	0.013016	10.47	410.31	191.23	0.78	
Reach 1	487	50 Yr	2900.00	289.90	297.22	297.22
299.18	0.017768	13.35	567.94	220.27	0.94	
Reach 1	487	100 Yr	3400.00	289.90	298.11	298.11
299.70	0.013128	12.53	786.08	253.86	0.82	
Reach 1	487	500 Yr	4700.00	289.90	298.95	298.95
300.80	0.014365	14.11	1005.75	268.44	0.88	
Reach 1	375	10 Yr	1800.00	289.30	296.04	
296.35	0.003052	5.39	675.25	222.11	0.38	
Reach 1	375	50 Yr	2900.00	289.30	297.21	
297.63	0.003582	6.56	969.36	290.99	0.43	
Reach 1	375	100 Yr	3400.00	289.30	297.67	

298.13	0.003671	6.92	1109.39	306.70	0.44	
Reach 1	375	500 Yr	4700.00	289.30	298.71	
299.23	0.003828	7.68	1438.26	327.88	0.46	
Reach 1	206	10 Yr	1800.00	288.97	295.77	
295.95	0.002131	4.84	818.22	215.37	0.33	
Reach 1	206	50 Yr	2900.00	288.97	296.89	
297.15	0.002628	5.96	1063.11	222.61	0.38	
Reach 1	206	100 Yr	3400.00	288.97	297.33	
297.62	0.002821	6.40	1161.96	228.49	0.39	
Reach 1	206	500 Yr	4700.00	288.97	298.30	
298.68	0.003319	7.48	1396.71	252.26	0.44	
Reach 1	144	10 Yr	1800.00	289.11	295.44	
295.74	0.007136	6.65	590.60	198.49	0.56	
Reach 1	144	50 Yr	2900.00	289.11	296.49	
296.89	0.007777	8.01	806.03	211.59	0.61	
Reach 1	144	100 Yr	3400.00	289.11	296.91	
297.36	0.007884	8.48	896.66	215.84	0.62	
Reach 1	144	500 Yr	4700.00	289.11	297.84	
298.39	0.008331	9.61	1102.21	241.81	0.65	
Reach 1	3	10 Yr	1800.00	288.83	294.10	293.50
294.68	0.008454	7.26	474.38	211.38	0.61	
Reach 1	3	50 Yr	2900.00	288.83	295.20	294.35
295.84	0.007810	8.11	714.58	225.08	0.61	
Reach 1	3	100 Yr	3400.00	288.83	295.70	294.65
296.35	0.007240	8.27	828.32	229.89	0.60	
Reach 1	3	500 Yr	4700.00	288.83	296.50	295.33
297.30	0.007950	9.43	1015.31	237.59	0.64	

Profile Output Table - Standard Table 2

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width			
				(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)		
Reach 1	487	10 Yr	297.77	296.44	1.33	0.64	0.31	42.15	1400.65	357.20	191.23			
Reach 1	487	50 Yr	299.18	297.22	1.96	0.78	0.46	85.18	2035.78	779.05	220.27			
Reach 1	487	100 Yr	299.70	298.11	1.59									

```
0.72          0.34    122.85     2182.25   1094.91      253.86
  Reach 1       487           500 Yr       300.80      298.95       1.84
0.75          0.40    196.54     2742.70   1760.76      268.44


  Reach 1       375           10 Yr        296.35      296.04       0.31
0.36          0.04    517.88     1184.70     97.42      222.11
  Reach 1       375           50 Yr        297.63      297.21       0.42
0.43          0.05    937.44     1715.98    246.57      290.99
  Reach 1       375           100 Yr       298.13      297.67       0.45
0.46          0.05   1127.01     1925.50    347.49      306.70
  Reach 1       375           500 Yr       299.23      298.71       0.52
0.51          0.04   1615.47     2425.28    659.25      327.88

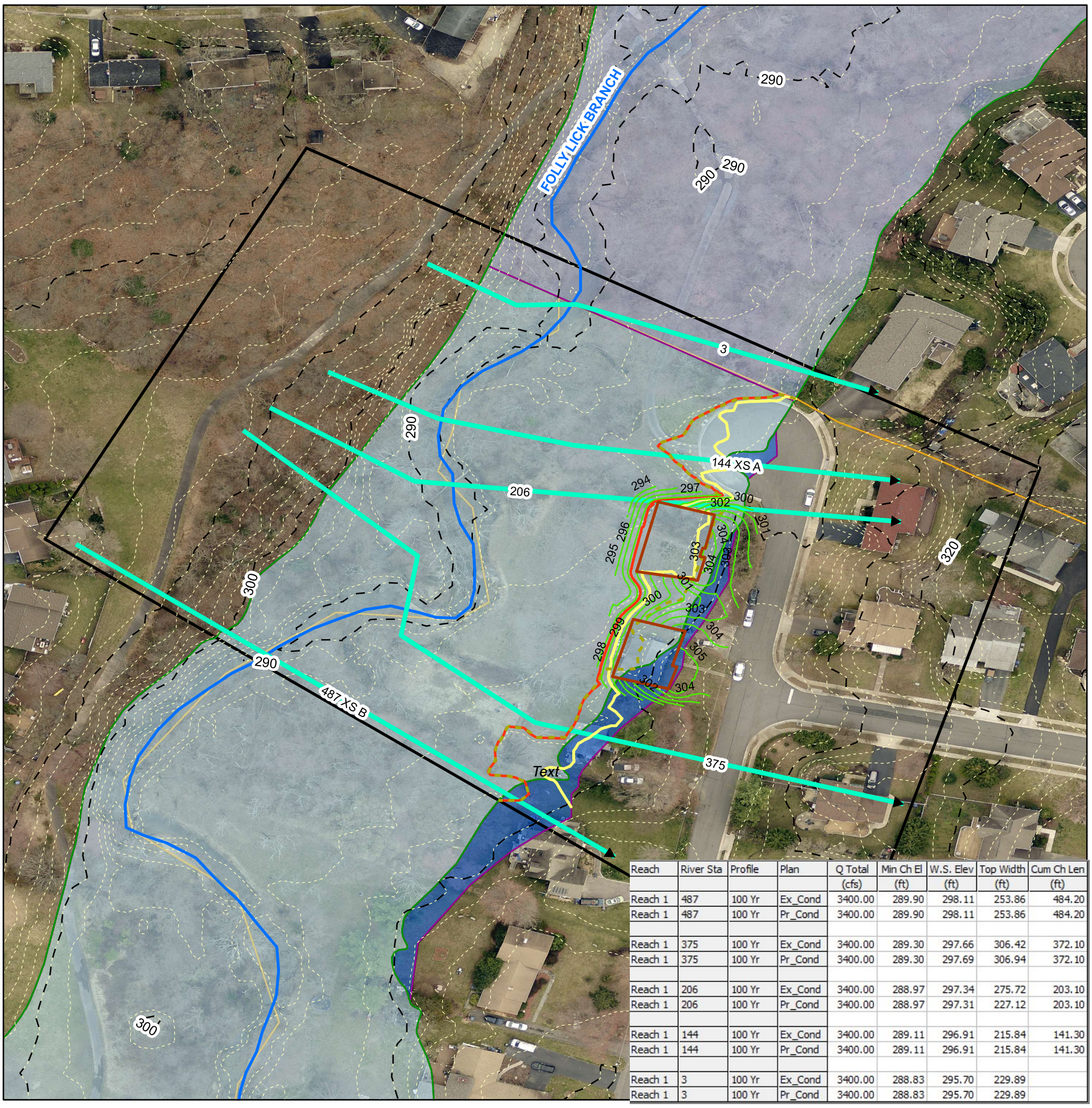

  Reach 1       206           10 Yr        295.95      295.77       0.18
0.21          0.01    469.05      803.33    527.62      215.37
  Reach 1       206           50 Yr        297.15      296.89       0.26
0.24          0.01    755.30     1156.32    988.37      222.61
  Reach 1       206           100 Yr       297.62      297.33       0.29
0.25          0.02    888.02     1313.41   1198.56      228.49
  Reach 1       206           500 Yr       298.68      298.30       0.38
0.28          0.02   1236.03     1716.64   1747.33      252.26


  Reach 1       144           10 Yr        295.74      295.44       0.30
1.03          0.03    569.44      597.82    632.74      198.49
  Reach 1       144           50 Yr        296.89      296.49       0.40
1.02          0.02    803.35      892.84   1203.81      211.59
  Reach 1       144           100 Yr       297.36      296.91       0.44
0.99          0.02    902.51     1018.77   1478.72      215.84
  Reach 1       144           500 Yr       298.39      297.84       0.55
1.06          0.03   1154.78     1337.16   2208.06      241.81


  Reach 1       3             10 Yr        294.68      294.10       0.58
                 157.52     1251.28    391.21      211.38
  Reach 1       3             50 Yr        295.84      295.20       0.65
                 289.85     1750.63    859.52      225.08
  Reach 1       3             100 Yr       296.35      295.70       0.65
                 355.43     1950.85   1093.72      229.89
  Reach 1       3             500 Yr       297.30      296.50       0.80
                 518.15     2522.28   1659.56      237.59
```

Appendix D: Certified Topographic Work Map and Annotated FIRM Figures

Topographic Workmap



Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Top Width	Cum Ch Len
				(cfs)	(ft)	(ft)	(ft)	(ft)
Reach 1	487	100 Yr	Ex_Cond	3400.00	289.90	298.11	253.86	484.20
Reach 1	487	100 Yr	Pr_Cond	3400.00	289.90	298.11	253.86	484.20
Reach 1	375	100 Yr	Ex_Cond	3400.00	289.30	297.66	306.42	372.10
Reach 1	375	100 Yr	Pr_Cond	3400.00	289.30	297.69	306.94	372.10
Reach 1	206	100 Yr	Ex_Cond	3400.00	288.97	297.34	275.72	203.10
Reach 1	206	100 Yr	Pr_Cond	3400.00	288.97	297.31	227.12	203.10
Reach 1	144	100 Yr	Ex_Cond	3400.00	289.11	296.91	215.84	141.30
Reach 1	144	100 Yr	Pr_Cond	3400.00	289.11	296.91	215.84	141.30
Reach 1	3	100 Yr	Ex_Cond	3400.00	288.83	295.70	229.89	
Reach 1	3	100 Yr	Pr_Cond	3400.00	288.83	295.70	229.89	

Legend

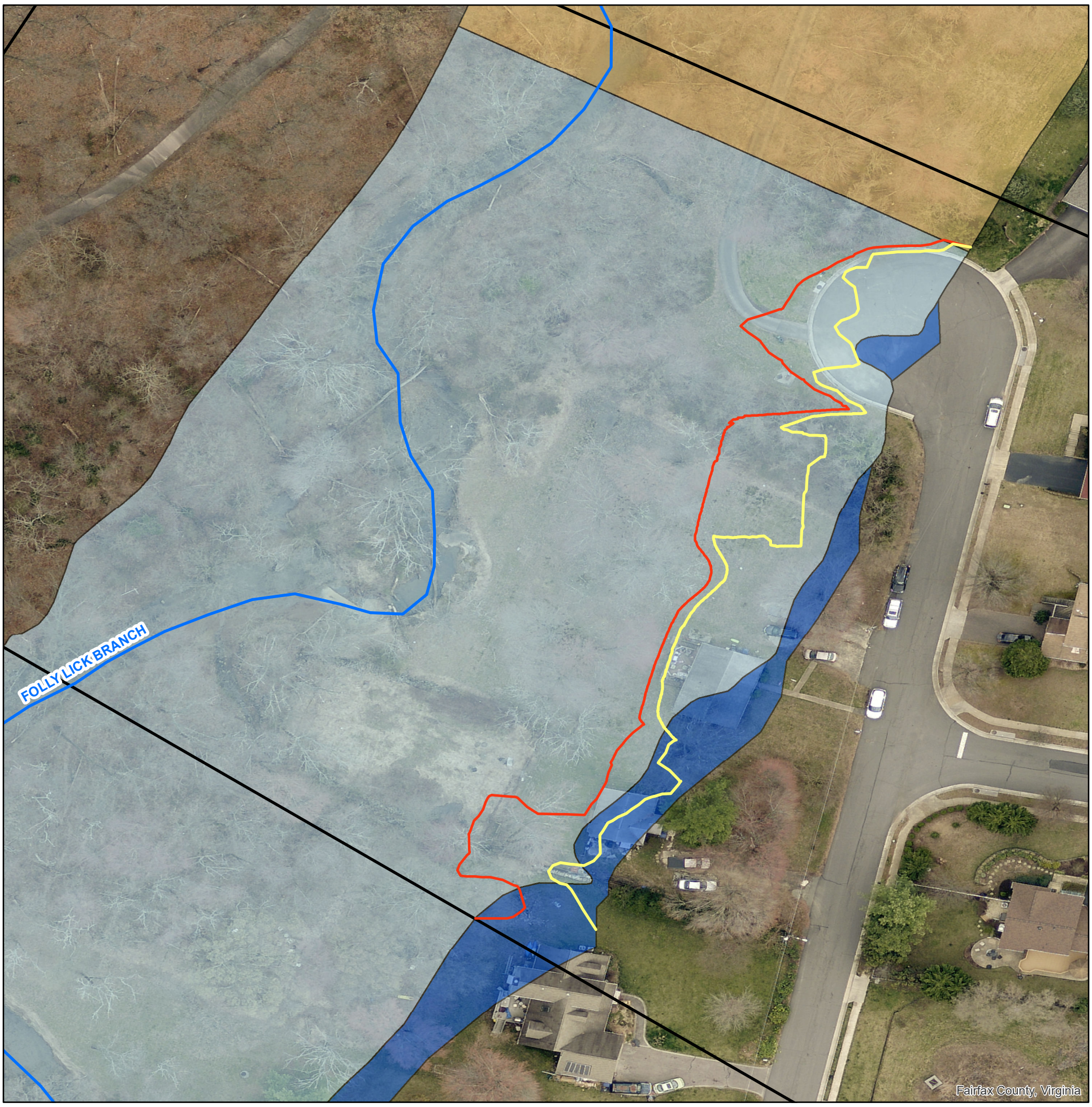
- Proposed Building
- contours_prop
- Existing 100 Yr
- Proposed_500YR
- Proposed_100YR
- Cross_Sections
- Flooding Source
- Existing Contours - 10 ft
- Existing Contours - 2 ft
- A
- AE
- X

N

100 50 0 100 Feet

**Elevations are in NAVD 88*

Annotated FIRM



Legend

- Proposed_500YR
- Proposed_100YR
- Flooding Source
- A
- AE
- X

N

60 30 0 60

Feet

Questions concerning the VERTCON process may be mailed to NGS

Latitude: 38.986

Longitude: 077.382

NGVD 29 height: 0001.00 FT

Datum shift(NAVD 88 minus NGVD 29): -0.705 feet

Converted to NAVD 88 height: 0.295 feet

Appendix E: ESA Compliance

Omnium Infrastructure Solutions, LLC.

1140 3rd St NE 2nd Floor
Washington, DC 20002
June 03 2021

FEMA
3601 Eisenhower Avenue, Suite 500
Alexandria, VA 22304-6426

RE: CLOMR Case for 1315 MONROE ST (Map # 0102 02 0001B) & 1317 MONROE ST (Map # 0102 02 0001C), Town of Herndon, Virginia

No Take Statement

To Whom It May Concern:

A "take", meaning to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct, has no potential to occur to threatened or endangered species as a result of the proposed project stated above.

Respectfully,
Inmar Badwan, PhD, PE, CMQ/OE
Principal
Omnium Infrastructure Solutions, LLC.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Virginia Ecological Services Field Office
6669 Short Lane
Gloucester, VA 23061-4410
Phone: (804) 693-6694 Fax: (804) 693-9032
http://www.fws.gov/northeast/virginiafield/

IPaC Record Locator: 807-101877607 May 06, 2021

Subject: Consistency letter for the 'DINA PROJECT' project indicating that any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o).

Dear INMAR BADWAN:

The U.S. Fish and Wildlife Service (Service) received on May 06, 2021 your effects determination for the 'DINA PROJECT' (the Action) using the northern long-eared bat (*Myotis septentrionalis*) key within the Information for Planning and Consultation (IPaC) system. You indicated that no Federal agencies are involved in funding or authorizing this Action. This IPaC key assists users in determining whether a non-Federal action may cause "take"[1] of the northern long-eared bat that is prohibited under the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.).

Based upon your IPaC submission, any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o). Unless the Service advises you within 30 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the Action is not likely to result in unauthorized take of the northern long-eared bat.

Please report to our office any changes to the information about the Action that you entered into IPaC, the results of any bat surveys conducted in the Action area, and any dead, injured, or sick northern long-eared bats that are found during Action implementation.

If your Action proceeds as described and no additional information about the Action's effects on species protected under the ESA becomes available, no further coordination with the Service is required with respect to the northern long-eared bat.

---

[1]Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct [ESA Section 3(19)].

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

DINA PROJECT

2. Description

The following description was provided for the project 'DINA PROJECT':

LAND AQUISITION AND CLOMAR APPLICATION

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.98794325,-77.38399275979425,14z

Determination Key Result

This non-Federal Action may affect the northern long-eared bat; however, any take of this species that may occur incidental to this Action is not prohibited under the final 4(d) rule at 50 CFR §17.40(o).

Determination Key Description: Northern Long-eared Bat 4(d) Rule
This key was last updated in IPaC on **May 15, 2017**. Keys are subject to periodic revision.

This key is intended for actions that may affect the threatened northern long-eared bat.

The purpose of the key for non-Federal actions is to assist determinations as to whether proposed actions are excepted from take prohibitions under the northern long-eared bat 4(d) rule.

If a non-Federal action may cause prohibited take of northern long-eared bats or other ESA-listed animal species, we recommend that you coordinate with the Service.

Determination Key Result

Based upon your IPaC submission, any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o).

Qualification Interview

1. Is the action authorized, funded, or being carried out by a Federal agency?

   No

2. Will your activity purposefully **Take** northern long-eared bats?

   No

3. [Semantic] Is the project action area located wholly outside the White-nose Syndrome Zone?

   Automatically answered
   No

4. Have you contacted the appropriate agency to determine if your project is near a known hibernaculum or maternity roost tree?

   Location information for northern long-eared bat hibernacula is generally kept in state Natural Heritage Inventory databases – the availability of this data varies state-by-state. Many states provide online access to their data, either directly by providing maps or by providing the opportunity to make a data request. In some cases, to protect those resources, access to the information may be limited. A web page with links to state Natural Heritage Inventory databases and other sources of information on the locations of northern long-eared bat roost trees and hibernacula is available at www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html.

   Yes

5. Will the action affect a cave or mine where northern long-eared bats are known to hibernate (i.e., hibernaculum) or could it alter the entrance or the environment (physical or other alteration) of a hibernaculum?

   No

6. Will the action involve Tree Removal?

   Yes

7. Will the action only remove hazardous trees for the protection of human life or property?

   No

8. Will the action remove trees within 0.25 miles of a known northern long-eared bat hibernaculum at any time of year?

   No

9. Will the action remove a known occupied northern long-eared bat maternity roost tree or any trees within 150 feet of a known occupied maternity roost tree from June 1 through July 31?

   No

Project Questionnaire

If the project includes forest conversion, report the appropriate acreages below. Otherwise, type '0' in questions 1-3.

1. Estimated total acres of forest conversion:

0

2. If known, estimated acres of forest conversion from April 1 to October 31

0

3. If known, estimated acres of forest conversion from June 1 to July 31

0

If the project includes timber harvest, report the appropriate acreages below. Otherwise, type '0' in questions 4-6.

4. Estimated total acres of timber harvest

0

5. If known, estimated acres of timber harvest from April 1 to October 31

0

6. If known, estimated acres of timber harvest from June 1 to July 31

0

If the project includes prescribed fire, report the appropriate acreages below. Otherwise, type '0' in questions 7-9.

7. Estimated total acres of prescribed fire

0

8. If known, estimated acres of prescribed fire from April 1 to October 31

0

9. If known, estimated acres of prescribed fire from June 1 to July 31

0

If the project includes new wind turbines, report the megawatts of wind capacity below. Otherwise, type '0' in question 10.

10. What is the estimated wind capacity (in megawatts) of the new turbine(s)?

0

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Virginia Ecological Services Field Office
6669 Short Lane
Gloucester, VA 23061-4410
Phone: (804) 693-6694 Fax: (804) 693-9032
http://www.fws.gov/northeast/virginiafield/

In Reply Refer To: May 06, 2021
Consultation Code: 05E2VA00-2021-SLI-3576
Event Code: 05E2VA00-2021-E-10379
Project Name: DINA PROJECT

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered

species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Virginia Ecological Services Field Office
6669 Short Lane
Gloucester, VA 23061-4410
(804) 693-6694

Project Summary

Consultation Code: 05E2VA00-2021-SLI-3576
Event Code: 05E2VA00-2021-E-10379
Project Name: DINA PROJECT
Project Type: LAND - ACQUISITION
Project Description: LAND AQUISITION AND CLOMAR APPLICATION
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.98794325,-77.38399275979425,14z

Counties: Fairfax County, Virginia

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis*	Threatened

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9045

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Appendix F: MT-2 Forms

- OVERVIEW & CONCURRENCE FORM MT-2 Form 1
- RIVERINE HYDROLOGY & HYDRAULICS FORM (FORM 2)

DEPARTMENT OF HOMELAND SECURITY

Federal Emergency Management Agency

OVERVIEW & CONCURRENCE FORM

OMB Control Number: 1660-0016
Expiration: 1/31/2024

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington, DC 20472 , Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.
PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).
ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.
DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

☒ CLOMR: A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72). All CLOMRs require documentation of compliance with the Endangered Species Act. Refer to the Instructions for details.

☐ LOMR: A letter from DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72).

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Example: 480301; 480287	City of Katy; Harris County	TX; TX	48473C; 48201C	0005D; 0220G	Inmar Badwan, PhD, PE,
Inmar Badwan, PhD, PE, CMQ/OE	Town of Herndon	VA	Inmar Badwan,	Inmar Badwan,	09/17/2010
515525	Inmar Badwan, PhD, PE, CMQ/OE	VA	Inmar Badwan,	Inmar Badwan,	

2. a. Flooding Source: Frolly Lick Branch

b. Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH) ☐ Alluvial Fan ☐ Lakes ☐ Other (Attach Description)

3. Project Name/Identifier: The Estate James Edward Waters, Jr. & Nancy A. Waters

4. FEMA zone designations (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

a. Effective: AE

b. Revised: AE

5. Basis for Request and Type of Revision:

a. The basis for this revision request is (check all that apply)

☐ Physical Change	☐ Improved Methodology/Data	☐ Regulatory Floodway Revision	☐ Base Map Changes
☐ Coastal Analysis	☒ Hydraulic Analysis	☐ Hydrologic Analysis	☐ Corrections
☐ Weir-Dam Changes	☐ Levee Certification	☐ Alluvial Fan Analysis	☐ Natural Changes
☒ New Topographic Data	☐ Other (Attach Description)		

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following structures (check all that apply)

Structures:	☐ Channelization	☐ Levee/Floodwall	☐ Bridge/Culvert
	☐ Dam	☐ Fill	☐ Other (Attach Description)

6. ☒ Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $ 6,500

☐ No, Attach Explanation

- **Please see the DHS-FEMA Web site at http://www.fema.gov/forms-documents-and-software/flood-map-related-fees for Fee Amounts and Exemptions.**

D. SIGNATURES

1. REQUESTOR'S SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: Inmar Badwan, PhD, PE, CMQ/OE	Company: Omnium Infrastrcture Solutions	
Mailing Address: 1140 3rd St NE 2nd Floor Washington, DC 20002	Daytime Telephone: 7035076531	Fax No.:
	E-mail Address: inmar@omniuminfra.com	
	Date: 06/03/2021	

Signature of Requestor (required):

2. COMMUNITY CONCURRENCE

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title:

Mailing Address:	Community Name:	
	Daytime Telephone:	Fax No.:
	E-mail Address:	
Community Official's Signature (required):	Date:	

3. CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Inmar Badwan, , PhD, PE, CMQ/OE		License No.: 0402046203	Expiration Date: 05/31/2022
Company Name: Omnium Infrastrcture Solutions		Mailing Address: 1140 3rd St NE 2nd Floor Washington, DC 20002	
Telephone No.: 7035076531	Fax No.:		
E-mail Address: inmar.b@omniuminfra.com			
Signature:		Date: 06/03/2021	

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)	Required if …
☒ Riverine Hydrology and Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☐ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans

Seal (Optional)

DEPARTMENT OF HOMELAND SECURITY

Federal Emergency Management Agency

RIVERINE HYDROLOGY & HYDRAULICS FORM (FORM 2)

OMB Control Number: 1660-0016
Expiration: 1/31/2024

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington, DC 20472 , Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.
PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).
ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.
DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

Flooding Source: Frolly Lick Branch

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply):

☒ Not revised (skip to section B) ☐ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)

3. Methodology for New Hydrologic Analysis (check all that apply)

☐ Precipitation/Runoff Model → Specify Model: _____ Duration: _____ Rainfall Amount: _____

☐ Statistical Analysis of Gage Records

☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review. 4. HEC-RAS File Description**:

5. Impacts of Sediment Transport on Hydrology

Is the hydrology for the revised flooding source(s) affected by sediment transport? ☐ Yes ☐ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevation (ft.)	
			Effective	Proposed/Revised
Downstream Limit*	@ limit of detailed study	3	296.4	296.4
Upstream Limit*	~375' u/s of limit of detailed	487	298.7	298.8

*Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used: _____

☒ Steady State ☐ Unsteady State ☒ One-Dimensional ☐ Two-Dimentional

3. Pre-Submittal Review of Hydraulic Models*

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4. HEC-RAS File Description**:

Models Submitted	Natural Run		Floodway Run		Datum
Duplicate Effective Model*	File Name:	Plan Name:	File Name:	Plan Name:	
Corrected Effective Model*	File Name:	Plan Name:	File Name:	Plan Name:	
Existing or Pre-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	
	CLOMR_Monroe_st	Existing Conditions			NAVD 88
Revised or Post-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	
	CLOMR_Monroe_st	Proposed Condition			NAVD 88
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	

* For details, refer to the corresponding section of the instructions.
**See instructions for information about modeling other then HEC-RAS. ☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

A **certified topographic work map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Topographic Information: ☒ Digital Mapping (GIS/CADD) Data Submitted (preferred)

Source: Fairfax County LiDAR & survey data within the lots | Date: 2021-01-20

Vertical Datum: NAVD 88 | Spatial Projection:

Accuracy:

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM**, at the same scale as the original, annotated to show the boundaries of the revised 1%-and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%-and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area on revision.

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR requests, do Base Flood Elevations (BFEs) or Special Flood Hazard Areas (SFHAs) increase compared to the effective BFEs? ☒ Yes ☐ No

   If Yes, please attach **proof of property owner notification**. Examples of property owner notifications can be found in the MT-2 Form 2 Instructions.

2. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations**:

   - The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
   - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-project conditions.

3. Does the request involve the placement or proposed placement of fill? ☒ Yes ☐ No

   If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(A)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

4. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

   If Yes, attach **evidence of regulatory floodway revision notification**. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.

5. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA). For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see the MT-2 instructions for more detail.

TOWN OF Herndon VIRGINIA

STAFF REPORT

Town Council
January 18, 2022

Title: Resolution, to Provide to the Town Manager Town Council Guidance on the FY2023 Budget

Staff Contact:

Robert Tang, Director of Finance
Telephone: (703) 435-6898
E-mail: Robert.Tang@herndon-va.gov

Description:

This resolution provides budget guidance parameters, as decided upon by the Town Council, to guide staff in their preparation of the FY 2023 Budget. It represents the starting point for the annual budget process.

Recommendation:

Staff recommends the Mayor and Town Council adopt the attached resolution.

Attachments:

- Resolution – To provide to the Town Manager Town Council Guidance on the FY 2023 Budget
- FY2023 Budget Timeline

Staff:

Robert Tang

Robert Tang
Director of Finance
Town of Herndon, VA

TOWN OF HERNDON, VIRGINIA

RESOLUTION

JANUARY 25, 2022

Resolution- to provide to the Town Manager Town Council Guidance on the FY 2023 Budget.

WHEREAS, the Town Council is committed to providing the core services expected of a municipal government, providing quality services and facilities for residents and businesses of the town and continuously improving town government effectiveness and efficiency; and

WHEREAS, the Town Council is committed to maintaining the town's fiscal integrity; and

WHEREAS, the Town Council recognizes the FY 2023 budget priorities for funding must be set.

NOW, THEREFORE, BE IT RESOLVED that the Town Council of the Town of Herndon, Virginia, hereby directs the Town Manager to use the following guidance in preparing the FY 2023 budget:

Continue efforts to develop and maintain a strong fiscal position, to include:

- At Council's direction, preparing a balanced annual budget at current revenues using the current tax rates.
- At Council's direction, preparing a balanced annual budget that addresses the rising costs associated with maintaining competitive workforce, rising fuel cost, continuing funding for the town-wide service delivery and capital projects along with the additional revenue appropriations needed to meet them.
- Include in both options: Market-driven compensation analysis and retention forecast and Cost containment and cost redirection measures
- Continuing forward looking budget preparation in anticipation of future impacts associated with the ongoing pandemic, supply chain challenges, and downtown redevelopment project.
- Emphasizing the funding of life cycle maintenance that provides a comprehensive assessment of the town's overall exposure along with the revenue stream needed to properly maintain town assets.

Town of Herndon
FY2023 Budget Process Timeline

January 2022:

- Town Council Provides Budget Guidance to Town Manager for Proposed Budget
- Budget Team meets with Departments

February 2022:

- Public Hearing for Citizens to comment on creation of Proposed Budget
- Town Council individual Budget meetings
- Department meetings with Budget Team
- CIP Draft to Planning Commission

March 2022:

- Town Council Budget Work Sessions
- Advertise Proposed Tax Rates
- Planning Commission Recommendation for CIP
- Proposed FY2023 Budget and CIP Released

April 2022:

- Town Council work session and proposed Budget and CIP
- Town Council Public Hearings for Proposed Budget April 12 & Adoption of Budget - April 26

May 2022:

- Town Council Public Hearings for CIP Budget Adoption – May 10

TOWN OF Herndon VIRGINIA

STAFF REPORT

Town Council
January 18, 2022

Title: **Resolution, To Award a Contract for a Small Area Plan for the Transit-Related Small Area, RFP number #22-05, to Skidmore, Owings & Merrill, LLP.**

Staff Contact:

Ahmad Zeki, Lead Planner / Long-range Planning, Department of Community Development,
703-787-7380
ahmad.zaki@hemdon-va.gov

Background:

The Transit Related Growth Small Area (TRG) is comprised of approximately 94 acres of land that extends along the northside of the Herndon Parkway from Van Buren Street to Spring Street and on the southeast side of the Herndon Parkway from the northern boundary of the Fairbrook property to Spring Street. The planning effort for the TRG is called for in the Metrorail Station Area Plan, which was adopted in 2012 and incorporated into the Town's 2030 Comprehensive Plan. The Town's comprehensive plan classifies the TRG plan area as Regional Corridor Mixed-Use, but the existing zoning is limited to non-residential uses with a maximum by-right FAR of 0.4 to 0.7 with additional density potential through legislative action in some cases.

To develop a small area plan reflecting the vision of the comprehensive plan, the Town of Herndon solicited proposals from qualified firms to assist the Town with the development of a small area plan. Request for Proposal (RFP) #22-05 was issued on October 12, 2021, with a deadline of November 12, 2021, for responses. The RFP elaborated on all the required steps and phases to plan redevelopment of the TRG into a new mixed-use and vibrant center, integrated with and complementing the Herndon Transit-Oriented Core.

The request for proposal solicited services for an initial 18-month contract period with an option of four (4) one-year mutual optional renewals. On November 12, 2021, eleven proposals (11) were received from eleven (11) vendors. All were deemed responsive. An evaluation of the proposals ranked the vendors as follows:

1. SOM
2. SmithGroup, Inc.
3. Cunningham | Quill Architects
4. NBBJ
5. WDG Architecture
6. FXCollaborative Architects, LLP
7. Design Collective
8. Perkins Eastman Architects
9. Stantec Consulting Services, Inc.
10. Rummel, Klepper & Kahl, LLP
11. Streetsense Consulting, LLC

Fiscal Impact:

The required budget for the contract implementation is provided by certain owners of properties located in the Transit-Related Growth Area based on a Funding Agreement for Consulting Services (the "Agreement") between the Town of Herndon and these owners, for an amount up to $500,000. The agreement was presented at the Town Council Work Session on October 19, 2021 and approved by the Town Council on October 26, 2021.

Staff Recommendation:

The staff recommends that the contract be awarded to Skidmore, Owings & Merrill, LLP (SOM) in the amount of $466,250.00, and any customary reimbursables for the solicited services.

Attached Documents:

1. Draft Town Council Resolution dated January 25, 2022

Prepared and Reviewed By:

Ahmad Zaki, Lead Planner/Comprehensive Planning

Gerald W. Amacker, Purchasing Agent

Approved

Elizabeth M. Gilleran, AICP, Director of Community Development

TOWN OF HERNDON, VIRGINIA

RESOLUTION

JANUARY 25, 2022

Resolution - to Award a Contract for Transit Related Small Area Planning, RFP #22-05

WHEREAS, the Town of Herndon advertised a Request for Proposals for the Transit Related Small Area Plan; and

WHEREAS, the Request for Proposal solicited services for an initial 18-months contract with an option of four (4) one-year mutual optional renewals; and

WHEREAS, the Request for Proposal was posted on October 12, 2021, on the eVA Commonwealth of Virginia procurement website and Town's website to maximize fullest competition; and

WHEREAS, eleven (11) proposals that were received from eleven (11) qualified vendors on November 12, 2021; and

WHEREAS, the Evaluation Committee assessed the proposals based on the criteria stated within the RFP with the results as follows:

1. SOM
2. SmithGroup, Inc.
3. Cunningham | Quill Architects
4. NBBJ
5. WDG Architecture
6. FXCollaborative Architects, LLP
7. Design Collective
8. Perkins Eastman Architects
9. Stantec Consulting Services, Inc.
10. Rummel, Klepper & Kahl, LLP
11. Streetsense Consulting, LLC

WHEREAS, it is staff's recommendation to award the contract to the top-ranked firm based upon the scope of services and criteria established within the RFP; and

WHEREAS, the budget for the contract implementation is provided by certain owners of properties located in the Transit-Related Growth Area based on a Funding

Agreement for Consulting Services (the "Agreement") between the Town of Herndon and these owners, up to $500,000. The agreement was presented to and approved by the Town Council on October 26, 2021.

NOW, THEREFORE, BE IT RESOLVED by the Town Council of the Town of Herndon, Virginia, that a contract in the amount of $466,250.00, and any customary reimbursables for the solicited services;

BE IT FURTHER RESOLVED by the Town Council of the Town of Herndon, Virginia, that the Mayor of the Town of Herndon, Virginia is authorized to sign and deliver the appropriate contract documents on such form approved by the Town Attorney and any other instrument necessary to evidence or effectuate the contract and authorizes the Town Manager to take the necessary actions to implement the contract.

STAFF REPORT

Town Council
January 18, 2022

Title:

Resolution authorizing an application to the Regional Jurisdiction and Agency Coordinating Committee (RJACC) of the Northern Virginia Transportation Authority (NVTA) for federal Regional Surface Transportation Program (RSTP) transportation funding for fiscal year 2028.

Staff Contact:

Jaleh Moslehi, PE - Capital Projects Planner/Engineer
e-mail: jaleh.moslehi@herndon-va.gov

Mark Duceman, MBA, AICP - Transportation Program Manager/Senior Planner
e-mail: mark.duceman@herndon-va.gov

Summary:

A resolution directing staff to submit a project application to the RJACC of the NVTA for RSTP funding for federal fiscal year 2028 (Attachment #1). This application is in addition to the RSTP/CMAQ resolution approved by the Town Council on December 14, 2021. Since that date, the Virginia Department of Transportation (VDOT) has recommended that the Town seek additional RSTP funding in the amount of $1,600,000 **for the East Elden Street Project** (CIP Project #3). Current funding considerations and project details are provided below.

There is no local match requirement or town contribution needed under the RSTP funding program.

Project Description (RSTP funding):

VDOT has informed town staff that a shortfall in funding exists for the **Spring Street project** that is now underway (CIP Project #4). Since potential funding sources are currently awarding funds for fiscal years beyond the anticipated completion date of the Spring Street Project, additional funds for this project must be sought through alternative means. Therefore, VDOT staff has suggested that the town apply, under the FY2028 RSTP funding program, for the **East Elden Street project** and then transfer the applicable RSTP funds to the **East Spring Street project**.

VDOT has recommended that the Town seek additional FY2028 RSTP funds, in the amount of $1,600,000, for the **East Elden Street project**. The completion date of the East Elden Street project extends beyond that of the Spring Street Project, and funding sources are still coincident with the **East Elden Street project** timeline.

The additional RSTP funds, if they are awarded, provides the Town the ability to request that the NVTA transfer up to $1,600,000 of existing **East Elden Street** funding to the **Spring Street project**. The **East Elden Street project** budget will then be backfilled with up to $1,600,000 in FY2028 RSTP funding, that is the subject of the currently proposed application and resolution.

Fiscal Impact:

If approved, this resolution will permit staff to apply for federal funds as an alternative to the use of town general funds for capital improvement projects. There is no local match requirement.

Recommendation:

That the Town Council approve the resolution as proposed.

Attachment:

Proposed Resolution, dated January 25, 2022

Staff:

Jaleh Moslehi

Jaleh Moslehi, PE - Capital Projects Planner/Engineer

Mark Duceman

Mark Duceman, MBA, AICP - Transportation Program Manager

Elizabeth M. Gilleran

Elizabeth M. Gilleran, AICP - Director of Community Development

Attachment 1

TOWN OF HERNDON, VIRGINIA

RESOLUTION

JANUARY 25, 2022

Resolution- Authorizing one application to the Regional Jurisdiction and Agency Coordinating Committee (RJACC) of the Northern Virginia Transportation Authority (NVTA) for federal Regional Surface Transportation Program (RSTP) transportation funding for fiscal year 2028.

WHEREAS, the town's RSTP project priority, titled *'East Elden Street Improvements and Widening'* (UPC 50100), is supported by the Northern Virginia Transportation Authority (NVTA), the Transportation Planning Board of the Metropolitan Washington Council of Governments, and the Commonwealth Transportation Board of Virginia; and

WHEREAS, the East Elden Street project is included in VDOT's Six-Year Improvement Program and Washington Council of Governments - Transportation Planning Board's Constrained Long-Range Plan; and

WHEREAS, the Town of Herndon 2030 Comprehensive Plan, adopted August 12, 2008 and as amended through February 26, 2019, advises the improvement of East Elden Street; and

WHEREAS, the above capital improvement project is included in the town's adopted FY2020-FY2025 Capital Improvement Program; and

WHEREAS, on October 13, 1998, the Town Council adopted a resolution to provide guidance on the design for improvements to East Elden Street, between the eastern town line and the Monroe Street intersection; and

WHEREAS, on October 23, 2018, the Town Council adopted a resolution to update the prior Town Council resolutions (dated March 18, 2014 and October 13, 1998) in order to provide final guidance on the engineering design of roadway improvements along Elden Street, between the eastern town line and Monroe Street, to include bike lanes, cycle tracks and to address intermittent, localized flooding of Sugarland Run onto the roadway; and

NOW, THEREFORE, BE IT RESOLVED that the Town Council of the Town of Herndon, Virginia, does hereby authorize the Town Manager to submit one application to the Northern Virginia Transportation Authority, through the Virginia Department of Transportation, for FY2028 federal funding for the following project:

a) an allocation funding request of up to $1,600,000 in Regional Surface Transportation Program (RSTP) funding for the *East Elden Street Improvements and Widening* project - UPC 50100 (Monroe Street to Fairfax County Parkway).

TOWN OF Herndon
DEPARTMENT OF PUBLIC WORKS

STAFF REPORT

Town Council
January 18, 2022

Title:

Resolution, to award Contract #B-22-06, Herndon Parkway & Van Buren Street Intersection Improvement Project.

Staff Contact:

John Irish, Deputy Director of Public Works
(phone) 703-435-6853
(e-mail) john.irish@herndon-va.gov

Background:

Herndon Parkway & Van Buren Street Intersection Improvement is a project in the Capital Improvements Program. The project consists of reconstruction of the existing intersection to provide significant transportation improvements to relieve congestion and improve safety. The project adds turn lanes, improves pedestrian facilities at the intersection by revising the crosswalks and adding pedestrian signals, and also improves drainage of stormwater runoff within the intersection.

On November 9, 2021, Contract #B-22-06, Herndon Parkway & Van Buren Street Intersection Improvement Project, was advertised. A pre-bid conference was held on November 29, 2021, and was attended by one firm. On December 16, 2021, a public bid opening was held, and the following bids were received:

Contractor	Bid
A&M Construction Corporation	$3,564,211.30
Sagres Construction Corporation	$4,480,961.55
Fort Myer Construction Corporation	$4,999,104.55
Anchor Construction Corporation	$6,230,497.09

The apparent lowest bidder, A&M Construction Corporation, has been found to be responsive and responsible.

Fiscal Impact:

Funds to support this contract are available in the Capital Projects Account #015-0886-491740. Reimbursement of funds up to $3,564,211.30 or 100% of total construction costs, including contingency costs, are available through a combination of agreements that the Town of Herndon holds with the Virginia Department of Transportation (VDOT), and the Northern Virginia Transportation Authority (NVTA).

Staff recommends Contract #B-22-06, Herndon Parkway & Van Buren Street Intersection Improvement Project, be awarded to A&M Construction Corporation for $3,564,211.30. Staff also recommends a $713,000 contingency, which is approximately 20% of the contract amount, be authorized.

Staff Recommendation:

Staff recommends that the Town Council:

1. Award Contract #B-22-06, Herndon Parkway & Van Buren Street Intersection Improvement Project, to A&M Construction Corporation for $3,564,211.30.

2. Authorize a contingency of $713,000.

Attachment:

Draft Resolution

Staff:

John Irish
Deputy Director of Public Works

TOWN OF HERNDON, VIRGINIA

RESOLUTION

January 25, 2022

Resolution- to award Contract #B-22-06, Herndon Parkway & Van Buren Street Intersection Improvement Project.

WHEREAS, the Herndon Parkway & Van Buren Street Intersection Improvement Project is in the Capital Improvement Program; and

WHEREAS, Contract #B-22-06, Herndon Parkway & Van Buren Street Intersection Improvement, was advertised on November 9, 2021; and

WHEREAS, a pre-bid conference was held on November 29, 2021 and was attended by one firm; and

WHEREAS, the following bids were received and opened on December 16, 2021 at a public bid opening:

Contractor	Bid
A&M Construction Corporation	$3,564,211.30
Sagres Construction Corporation	$4,480,961.55
Fort Myer Construction Corporation	$4,999,104.55
Anchor Construction Corporation	$6,230,497.09

WHEREAS, the A&M Construction Corporation submitted the lowest bid which was found to be responsive and responsible; and

WHEREAS, staff recommends in addition to the contract that a contingency of $713,000, which is approximately 20 percent of the bid, be authorized; and

WHEREAS, funds to support this contract are available in the Capital Projects Account Number #015-0886-491740; and

WHEREAS, reimbursement of funds up to $3,564,211.30 or 100% of total construction costs, including contingency costs, are available through a combination of agreements that the Town of Herndon holds with the Virginia Department of Transportation (VDOT) and the Northern Virginia Transportation Authority (NVTA).

NOW, THEREFORE, BE IT RESOLVED that the Town Council of the Town of Herndon, Virginia, hereby awards Contract #B-22-06, Herndon Parkway

& Van Buren Street Intersection Improvement, to A&M Construction Corporation, in the amount of $3,564,211.30.

BE IT FURTHER RESOLVED that the Town Council of the Town of Herndon, Virginia hereby authorizes a contingency of $713,000.

BE IT FURTHER RESOLVED that the Town Council of the Town of Herndon, Virginia, hereby authorizes the Town Manager's designee to approve contract modifications (change orders) that increase project scope and costs, utilizing the project contingency.

STAFF REPORT

Town Council
January 18, 2022

Title:

Resolution, to reappoint Jeffrey J. Fairfield as the Town of Herndon representative to the Phase II Dulles Rail Transportation Improvements Tax District Advisory Board

Staff Contact:

Viki Wellershaus, Town Clerk
(phone) 703.435.6804
(email) viki.wellershaus@herndon-va.gov

Background:

The Code of Virginia created the Phase II Dulles Rail Transportation Improvements Tax District Advisory Board and included requirements that members shall own or represent the owners of real property in the Phase II District zoned or used for commercial or industrial purposes; and that advisory board shall nominate successors for members for appointment by the Fairfax County Board of Supervisors and the Herndon Town Council. Three of the six members appointed by the Board of Supervisors are chosen from nominations submitted by the Petitioners. ***One of the two members appointed by the Town Council are chosen from the nominations submitted by the Petitioners***.

Mr. Fairfield serves as one of the town's representatives to the Phase II District Advisory Board. His term expires January 31, 2022. Mr. Fairfield has been unanimously supported and nominated by the advisory board members "Petitioners." (Attachment 2)

Fiscal Impact:

None

Staff Recommendation:

Staff recommends the Council reappoint Jeffrey J. Fairfield as the Town of Herndon representative to the Phase II Dulles Rail Transportation Improvements Tax District Advisory Board chosen from the nominations submitted by the petitioners for a four-year term ending January 31, 2026.

Attachments:

Attachment 1: Draft Resolution
Attachment 2: Nomination letters from the Petitioners

Prepared and Approved by:

Viki Wellershaus, Town Clerk

TOWN OF HERNDON, VIRGINIA

RESOLUTION

JANUARY 25, 2022

Resolution- to reappoint Jeffrey J. Fairfield as the Town of Herndon representative to the Phase II Dulles Rail Transportation Improvements Tax District Advisory Board.

NOW, THEREFORE, BE IT RESOLVED that the Town Council of the Town of Herndon, Virginia, hereby reappoints **Jeffrey J. Fairfield** as the Town of Herndon representative to the Phase II Dulles Rail Transportation Improvements Tax District Advisory Board chosen from the nominations submitted by the petitioners for a four-year term ending January 31, 2026.

PHASE II DULLES RAIL TRANSPORTATION IMPROVEMENTS TAX DISTRICT ADVISORY BOARD

21 December 2021

The Honorable Viki Wellershaus
Clerk, Herndon Town Council
777 Lynn Street
Herndon, Virginia 20170

BY EMAIL ONLY TO Town.Clerk@herndon-va.gov

Re: Phase II Dulles Rail Transportation Improvements Tax District Advisory Board

Dear Ms. Wellershaus:

We, the undersigned members of the Phase II Dulles Rail Transportation Improvements Tax District Advisory Board ("Advisory Board"), endorse and recommend the re-appointment of Jeffrey J. Fairfield as a member of the Advisory Board. We respectfully request that the Herndon Town Council act to re-appoint Mr. Fairfield, who serves as the Chair of the Advisory Board, for a four (4) year term ending on 31 January 2026.

Sincerely yours,

Michael J Cooper

Michael J. Cooper, Member Advisory Board

Andrew J. Czekaj, III, Member, Advisory Board

Kevin Dougherty, Member, Advisory Board

Michael R. F Rocks, Member, Advisory Board

Frederick Rothmeijer, Member, Advisory Board

cc: Martha Elena Coello, Fairfax County Department of Transportation

PHASE II DULLES RAIL TRANSPORTATION IMPROVEMENTS TAX DISTRICT ADVISORY BOARD

21 December 2021

The Honorable Viki Wellershaus
Clerk, Herndon Town Council
777 Lynn Street
Herndon, Virginia 20170

BY EMAIL ONLY TO Town.Clerk@herndon-va.gov

Re: Phase II Dulles Rail Transportation Improvements Tax District Advisory Board

Dear Ms. Wellershaus:

We, the undersigned members of the Phase II Dulles Rail Transportation Improvements Tax District Advisory Board ("Advisory Board"), endorse and recommend the re-appointment of Jeffrey J. Fairfield as a member of the Advisory Board. We respectfully request that the Herndon Town Council act to re-appoint Mr. Fairfield, who serves as the Chair of the Advisory Board, for a four (4) year term ending on 31 January 2026.

Sincerely yours,

Michael J. Cooper, Member Advisory Board

Andrew J. Czekaj, III, Member, Advisory Board

Kevin Dougherty, Member, Advisory Board

Michael R. F Rocks, Member, Advisory Board

Frederick Rothmeijer, Member, Advisory Board

cc: Martha Elena Coello, Fairfax County Department of Transportation

PHASE II DULLES RAIL TRANSPORTATION IMPROVEMENTS TAX DISTRICT ADVISORY BOARD

21 December 2021

The Honorable Viki Wellershaus
Clerk, Herndon Town Council
777 Lynn Street
Herndon, Virginia 20170

BY EMAIL ONLY TO Town.Clerk@herndon-va.gov

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Andrew J. Czekaj, III, Member, Advisory Board

/s/ Kevin Dougherty by: Jeffrey Fairfield with permission

Kevin Dougherty, Member, Advisory Board

Michael R. F Rocks, Member, Advisory Board

Frederick Rothmeijer, Member, Advisory Board

cc: Martha Elena Coello, Fairfax County Department of Transportation

Jeffrey J. Fairfield

From: Kevin Dougherty [redacted]
Sent: Saturday, December 18, 2021 11:08 AM
To: Jeffrey J. Fairfield
Subject: Re: [External] Re: FW: Re-Appointment to the Phase II Dulles Rail Transportation Improvements Tax District

Yes, please do.

On Fri, Dec 17, 2021 at 2:08 PM Jeffrey J. Fairfield [redacted] wrote:

> Thanks for your support, Kevin.
>
> Do I have your permission to sign your name to the letter? If you reply to this email with "Yes", we should be all set.
>
> Jeff Fairfield

From: Kevin Dougherty [redacted]
Sent: Friday, December 17, 2021 12:05 PM
To: Jeffrey J. Fairfield [redacted]
Subject: Re: [External] Re: FW: Re-Appointment to the Phase II Dulles Rail Transportation Improvements Tax District

Of course, I support your renomination.

Allow me to say that our committee wouldn't be where it is without your stewardship. Thank you so much for your guidance.

Best, Kevin

R .Kevin Dougherty

PHASE II DULLES RAIL TRANSPORTATION IMPROVEMENTS TAX DISTRICT ADVISORY BOARD

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Frederick Rothmeijer, Member, Advisory Board

cc: Martha Elena Coello, Fairfax County Department of Transportation

TOWN OF HERNDON, VIRGINIA

RESOLUTION

JANUARY 25, 2022

Resolution - to ratify an Extension of Sublicense pursuant to Ordinance 20-O-23 Continuity of Governmental Operations, as amended, between Town of Herndon and Arts Herndon, Inc., to extend the expiration date to June 30, 2022.

WHEREAS, the parties entered into a Sublicense Agreement dated December 18, 2020 for the use of property licensed to the Town at 750 Center Street; and

WHEREAS, the Sublicense Agreement would have expired on December 31, 2021; and

WHEREAS, Town and Arts Herndon desired to extend the term of the Agreement to expire on June 30, 2022; and

WHEREAS, the Extension of License was signed by the Town Manager pursuant to Ordinance 20-O-23 Continuity of Governmental Operations, as amended.

NOW, THEREFORE, BE IT RESOLVED that the Town Council of the Town of Herndon, Virginia hereby ratifies the Extension of Sublicense dated December 27, 2021 signed by the Town Manager between the Town of Herndon and Arts Herndon, Inc., in order to extend the Sublicense expiration date to June 30, 2022.

Extension of Sublicense Pursuant to Ordinance 20-O-23 Continuity of Governmental Operations

Pursuant to the powers conferred upon the Town Manager by Ordinance 20-O-23, as amended, this Extension of Sublicense dated December 27, 2021, hereby extends the December 31, 2021 termination date of the existing Sublicense between the Town of Herndon, a Virginia municipal corporation (Town) and Arts Herndon, Inc., a Virginia non-profit, charitable corporation (Sublicensee), dated December 18, 2020 for approximately 3,210 square feet of building space, outside lawn area, and gravel parking spaces located at 750 Center Street (the Sublicense) for a period of 6 months (the Extension).

THEREFORE, for the consideration stated in the Sublicense and herein, the parties agree as follows:

1. The Sublicense is incorporated by reference.
2. The Sublicense shall terminate on **June 30, 2022.**
3. In all other respects, the Sublicense is confirmed.

TOWN OF HERNDON, VIRGINIA

By: _____

Name: William H. Ashton II

Title: Town Manager

ARTS HERNDON, INC

By: _____

Name: JOANNA ORMESHER

Title: PRESIDENT & CEO

APPROVED AS TO FORM

By: _____

Name: Lesa J. Yeatts

Title: Town Attorney

TOWN OF HERNDON, VIRGINIA

RESOLUTION

JANUARY 25, 2022

Resolution- to ratify a Lease Agreement pursuant to Ordinance 20-O-23, Continuity of Governmental Operations, as amended, between the Town and the Honorable Irene Shin, Member of the House of Delegates, for space at 397 Herndon Parkway.

WHEREAS, the parties entered into a Lease Agreement dated December 27, 2021 for office space in the Town owned building located at 397 Herndon Parkway to be used for constituent services; and

WHEREAS, the rent shall be $1.00 per term beginning January 1, 2022 and will expire on December 31, 2023.

WHEREAS, the Lease Agreement was signed by the Town Manager pursuant to Ordinance 20-O-23 Continuity of Governmental Operations, as amended.

NOW, THEREFORE, BE IT RESOLVED that the Town Council of the Town of Herndon, Virginia hereby ratifies the Lease Agreement dated December 27, 2021 signed by the Town Manager between the Town of Herndon and the Honorable Irene Shin, Member of the House of Delegates, for space at 397 Herndon Parkway in Herndon, Virginia.

LEASE AGREEMENT

THIS LEASE made on the 27th day of December 2021, by and between the TOWN OF HERNDON, a municipal corporation (Landlord) and the Honorable IRENE SHIN, Member of the House of Delegates (Tenant).

Recitals

Landlord is the owner of a building and premises located at 397 Herndon Parkway, Herndon, Virginia (the building).

Landlord and Tenant have agreed that Tenant will lease from Landlord, in consideration of the rent and other benefits, and under the terms and conditions specified here, a portion of the premises commonly known as part of the building at 397 Herndon Parkway, (as shown on Exhibit A, attached and incorporated by reference).

THEREFORE, the parties agree as follows:

1. Commencement and Ending Date of Term. Beginning January 1, 2022, Landlord leases the leased premises to Tenant according to the terms of this lease. The Tenant may possess the leased premises with the Tenant having the right to terminate the Lease upon 30 days prior written notice to the Landlord, and the Landlord having the right to terminate the Lease upon 90 days prior written notice to the Tenant. The term of this lease shall expire December 31, 2023.

2. Rent. Tenant shall pay Landlord on demand $1.00 rent for the entire term.

3. Use of Premises. Tenant shall use the leased premises solely for an office for constituent services. Tenant shall have access to and from the leased premises and to the restrooms. Landlord retains for itself and its employees, agents, and invitees, a right of access through the leased premises to and from spaces. Tenant certifies to Landlord that uses of this space are consistent with the Town of Herndon Zoning Ordinance and architectural guidelines or ordinances of the Herndon Town Code.

4. Policy Compliance. Tenant shall comply with all policies regarding the use of Town buildings, including the prohibition of alcohol and the use of recreational drugs or tobacco, as well as the Town building key policy.

5. Utility Charges. Landlord shall maintain and pay the cost of all utilities (except telecommunications) on the leased premises.

6. Liability Insurance. Tenant shall keep in effect a General Liability insurance policy with respect to the leased premises with a minimum limit of $1,000,000.00 of coverage. The policy shall name the Town of Herndon as an additional insured. Satisfactory proof of insurance will be required. Town reserves the right to require additional insurance.

7. Hold Harmless of Landlord. Tenant shall hold harmless Landlord, its officers, agents, and employees from any and all claims, actions, damages, liability and expense, in connection with loss of life, personal injury or damage to property arising from any occurrence in, upon, or at the leased premises through the occupancy or use by Tenant.

8. Default. Tenant shall be in default upon failure to perform any term of this lease for more than five days after written notice of such failure shall have been given to Tenant or after Tenant's abandonment of the leased premises.

9. Rights and Remedies on Default. Landlord shall have the following rights on default of Tenant, which shall be cumulative, none excluding any other right allowed by this lease or by law.

a. Landlord may enter the leased premises and repossess the leased premises and remove Tenant and any others who may be occupying the leased premises and remove any property.

b. Landlord may seize, remove and sell all of the personal property and fixtures of Tenant on the leased premises or remove and store such property at the cost of and for the account of Tenant.

10. Custodial. Landlord shall provide custodial services, consisting of emptying trash and vacuuming, once a week for the leased premises.

11. Waste or Nuisance. Tenant shall not commit any waste or nuisance upon the leased premises.

12. Maintenance by Tenant. Tenant accepts the leased premises including the improvements and any furnishings and equipment in the leased premises in their existing condition. Tenant shall at all times keep the leased premises in good order, condition, and repair. Tenant shall maintain the leased premises in a clean and sanitary condition. If Landlord is required to make any repairs by reason of Tenant's negligent or intentional act or omission, Tenant shall pay to Landlord the cost of the repairs as additional rent within ten days after written notice. Landlord shall be responsible for roof, structural integrity of the building, and replacement and repair of utility systems related to the leased premises. Except as provided in paragraph 15, Tenant shall return the leased premises to its original condition prior to Tenant's vacation of the premises, normal wear and tear excepted.

13. Notification of Hazard. Tenant and Landlord shall give immediate notice to the other in case of fire, accident, or defect in the leased premises or in any fixtures or personal property comprising the leased premises.

14. Alterations and Improvements. Except as provided in this paragraph, Tenant shall not make or cause to be made any alterations to the leased premises without first obtaining Landlord's written consent.

15. Removal of Improvements and Restoration by Tenant. All alterations except lighting not necessary for normal use of the building or conformance with the Virginia Uniform Statewide Building Code made by Tenant shall remain the property of Landlord at the expiration or termination of the lease. This property will remain part of the leased premises and Tenant shall not have any obligation to remove it.

16. Loss and Damage. Landlord shall not be liable for any loss or damage to property of Tenant located on the leased premises. Landlord shall not be liable for any injury, death, or damage to persons or property associated with Tenant resulting from fire, explosion, falling plaster, steam, gas, electricity, water, rain, snow, or leaks from any part of the leased premises. Landlord shall not be liable for any latent defect in the leased premises or in the building of which they form a part. All property of Tenant or its subtenants kept or stored on the leased premises shall be so kept or stored at the risk of Tenant or subtenants and Tenant shall hold Landlord harmless from any claims arising out of damage to the same, including subrogation claims by Tenant's insurance carrier.

17. Right of Entry. In addition to Landlord's right of access as described in paragraph 3, Landlord, its contractors, agents, or prospective purchasers or lessees, shall have the right to enter the leased premises during normal business hours to examine the same upon reasonable notice, either oral or written.

18. Quiet Enjoyment. Upon the observance of all Tenant's obligations of this lease, Tenant shall peaceably and quietly hold and enjoy the leased premises.

19. Surrender of Premises. At the expiration or termination of the term of this lease, Tenant shall surrender the leased premises in the same condition that the leased premises were in at the commencement of this lease, except as provided in paragraph 15, reasonable wear and tear

excepted, and shall surrender all keys for the leased premises to Landlord.

20. Assignment and Subletting. Tenant may not assign this lease without prior written consent of Landlord. This prohibition against assigning or subletting shall be construed to include a prohibition against any assignment or subletting by operation of law.

21. Binding on Successors/Assigns. All of the terms of this lease shall bind the successors and assigns of Landlord and Tenant, except where the assignment is ineffective due to lack of Landlord's consent.

Irene Shin
Member House of Delegates

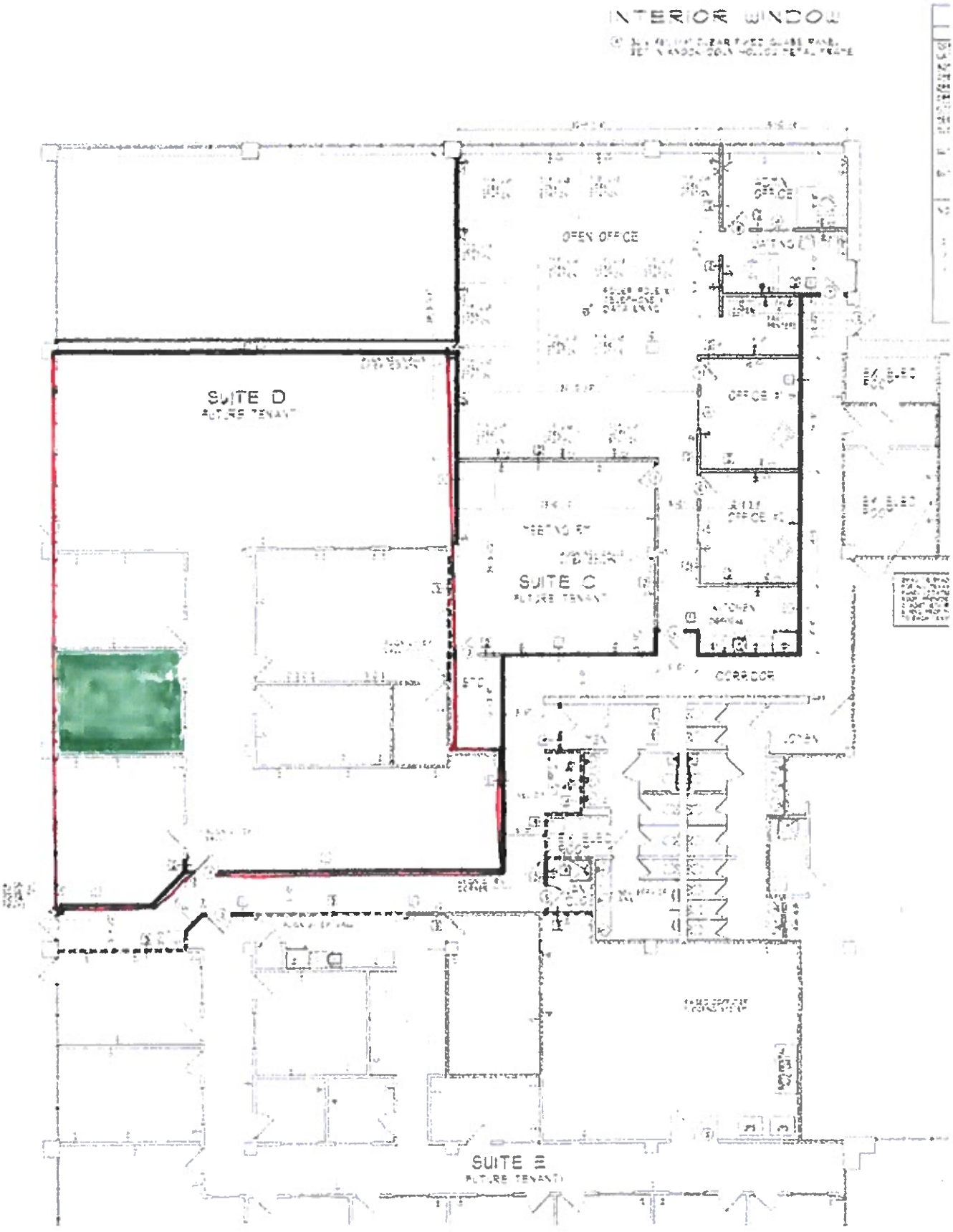
TOWN OF HERNDON, VIRGINIA

Bill Ashton, Town Manager

APPROVED AS TO FORM:

Lesa J. Yeatts, Town Attorney

Exhibit A


INTERIOR WINDOW
OPEN OFFICE
SUITE D
FUTURE TENANT
SUITE C
FUTURE TENANT
CORRIDOR
SUITE E
FUTURE TENANT

TOWN OF HERNDON, VIRGINIA

RESOLUTION

JANUARY 25, 2022

Resolution - to ratify an Extension of Sublicense pursuant to Ordinance 20-O-23 Continuity of Governmental Operations, as amended, between Town of Herndon and The Elden Street Players to extend the expiration date to June 30, 2022.

WHEREAS, the parties entered into a Sublicense Agreement dated December 28, 2020 for the use of property licensed to the Town at 750 Center Street; and

WHEREAS, the Sublicense Agreement would have expired on December 31, 2021; and

WHEREAS, Town and The Elden Street Players desired to extend the term of the Agreement to expire on June 30, 2022; and

WHEREAS, the Extension of Sublicense was signed by the Town Manager pursuant to Ordinance 20-O-23 Continuity of Governmental Operations, as amended.

NOW, THEREFORE, BE IT RESOLVED that the Town Council of the Town of Herndon, Virginia hereby ratifies the Extension of Sublicense dated December 27, 2021 signed by the Town Manager between the Town of Herndon and The Elden Street Players in order to extend the Sublicense expiration date to June 30, 2022.

Extension of Sublicense Pursuant to Ordinance 20-O-23 Continuity of Governmental Operations

Pursuant to the powers conferred upon the Town Manager by Ordinance 20-O-23, as amended, this Extension of Sublicense dated December 27, 2021, hereby extends the December 31, 2021 termination date of the existing Sublicense between the Town of Herndon, a Virginia municipal corporation (Town) and The Elden Street Players (Sublicensee), dated December 28, 2020 for approximately 2,790 square foot of space located at 750 Center Street (the Sublicense) for a period of 6 months (the Extension).

THEREFORE, for the consideration stated in the Sublicense and herein, the parties agree as follows:

1. The Sublicense is incorporated by reference.
2. The Sublicense shall terminate on **June 30, 2022.**
3. In all other respects, the Sublicense is confirmed.

TOWN OF HERNDON, VIRGINIA		**THE ELDEN STREET PLAYERS**
By:		By:
Name:	William H. Ashton II	Name: Melody Fetske
Title:	Town Manager	Title: President

APPROVED AS TO FORM

By:

Name: Lesa J. Yeatts

Title: Town Attorney