<table>
<tr><td rowspan="5">Planning and Zoning Department
616 Germantown Pike, Lafayette Hill, PA 19444-1821
484-594-2625
www.whitemarshtwp.org</td><td>Subdivision and Land Development Cover Page for SLD # 04-24</td></tr>
<tr><td>Project Name: Brooke Glen Hospital Flood Mitigation Project</td></tr>
<tr><td>Address: 7170 Lafayette Avenue
Ft. Washington, PA 19034</td></tr>
<tr><td>Date: October 07, 2024</td></tr>
<tr><td>Status: Under Review</td></tr>
<tr><td colspan="2">Updates:
Township Engineer Review- 11.22.24
Zoning Ordinance Compliance Review- 11.25.24</td></tr>
</table>

WHITEMARSH TOWNSHIP
LAND DEVELOPMENT WAIVER FOR GRADING PERMIT

Universal Health Services, Inc.
Brooke Glen Behavioral Health Hospital
7170 Lafayette Avenue, Fort Washington, PA

Submitted on behalf of

367 South Gulph Road
King of Prussia, PA 19406

Submitted by

Geosyntec consultants
engineers | scientists | innovators
Engineering Firm Registration No. 1182
930 Harvest Drive, Suite 220
Blue Bell, PA 19422

September 2024

LIST OF APPLICATION ATTACHMENTS

Attachment 1: Whitemarsh Township Checklist

Attachment 2: Whitemarsh Township Application

Attachment 3: Whitemarsh Township Request for Modification (Waiver)

Attachment 4: Whitemarsh Time Waiver Form (Not Applicable)

Attachment 5: Whitemarsh Township Escrow (Not Applicable)

Attachment 6: Montgomery County Planning Commission Municipal Request for Review (Not Applicable)

Attachment 7: Shade Tree Commission Checklist for Compliance with Chapter 55

Attachment 8: Transportation Impact Study (Not Applicable)

Attachment 9: Stormwater Management Plan & Supporting Calculations (Not Applicable)

Attachment 10: Supplemental Documents Applicable to Specific Application

Attachment 11: List of Encumbrances (Not Applicable)

ATTACHMENT 1

Whitemarsh Township Checklist

This Checklist and the following items MUST be submitted to the Township, completed in their entirety, at the time of submission for the Township to accept a subdivision/land development application.

This checklist page must be filled out after printing the completed form starting on page 2 where applicable.

Applicant Initials	Required Items of Submission	Township Receipt
	Whitemarsh Township Checklist	
	Whitemarsh Township Application (Signature MUST Be Original)	
	Whitemarsh Township Request for Modification (Signature MUST Be Original)	
N/A	Whitemarsh Time Waiver Form (Signature MUST Be Original)	
N/A	Whitemarsh Township Escrow (Payable to Whitemarsh Township; credit card payment accepted in person)	
N/A	Montgomery County Planning Commission Municipal Request for Review (County will request fee directly from applicant)	
	Shade Tree Commission Checklist for Compliance with Chapter 55 (attached)	
N/A	Transportation Impact Study [§105-21.B.(9)(c)] (if applicable)	
N/A	Stormwater Management Plan & Supporting Calculations (if applicable)	
	Supplemental Documents Applicable to a Specific Application	
N/A	List of Encumbrances (Book & Page Numbers) (if applicable)	
	Three (3) Complete Sets of All Application Materials	
	PDF or Link to Digital File of Each Component of the Application	

ATTACHMENT 2

Whitemarsh Township Application

WHITEMARSH TOWNSHIP
SUBDIVISION and/or LAND DEVELOPMENT APPLICATION

The applicant, or applicant's authorized agent, for the Township to accept submission of the application, must complete each Application item and each Application Submission Checklist item.

Application Type: (check one)
☐ Minor Subdivision ☐ Minor Land Development
☐ Major Subdivision ☐ Major Land Development
☐ Land Development Waiver

Plan Type:
☐ Sketch ☐ Preliminary ☐ Final

INSERT "N/A" FOR NOT APPLICABLE WHERE APPROPRIATE

Name of Subdivision/Land Development: Brooke Glen Hospital Flood Mitigation Project

Location of Subdivision/Land Development: 7170 Lafayette Avenue, Fort Washington, PA 19034
(Primary Access Roadway Name)

Between: Lafayette Avenue (Roadway Name) and S. Bethlehem Pike (Roadway Name)

Number of Parcels: 1 **Block Number(s):** _____ **Unit Number(s):** _____

Parcel Number(s): 65-00-00868-50-7

Acreage: N/A **Total Lots Proposed:** N./A **Zoning District:** _____

Water Service Proposed: ☐ Public ☐ Private Sewer Service Proposed: ☐ Public ☐ Private

Applicant Name: Universal Health Services, Inc. **Contact Name:** Neil Callahan

Phone #: 215-641-5353 Fax #: 215-641-6815 Email: neil.callahan@uhsinc.com

Address: 367 South Gulph Road, King of Prussia, PA 19406

Owner of Record Name (If Different): BHC Northwest Psychiatric Hospital

Phone #: _____ Fax #: _____ Email: _____

Address: 14400 Metcalf Avenue, Overland Park, KS 66223

Engineer Name: James Barbis, P.E. **Firm Name:** Geosyntec Consultants, Inc.

Phone #: 215-407-2726 Fax #: _____ Email: james.barbis@geosyntec.com

Address: 930 Harvest Drive, Suite 220, Blue Bell, PA 19422

Fees and plans showing all public improvements are submitted with this application. Any additional plan information required by the Township Engineer will be submitted to the Director of Planning and Zoning for distribution. The undersigned applicant agrees to comply with all the provisions of Chapter 105 of the Code of the Township of Whitemarsh, as amended, and agrees to obtain all necessary permits in connection with the proposed subdivision and/or land development.

Whitemarsh Township employees, or township-authorized agents, are hereby granted permission to enter upon the land, if necessary, for site inspections.

Original preliminary and/or original final subdivision and/or land development applications submitted by 4:00pm on the last business day of the month will be reviewed by the Whitemarsh Township Planning Commission at a regular meeting two (2) months following the date of submission or other appropriate meeting date depending upon the results of Township reviews.

I hereby certify, as the undersigned applicant, that I am familiar with the provisions of: [1] Chapter 105, "Subdivision and Land Development", [2] Chapter 58, "Grading, Erosion Control, Stormwater Management and Best Management Practices", and [3] Chapter 55, "Tree Protection Standards" of the Code of the Township of Whitemarsh, as amended, and, to the best of my knowledge and belief, this application and the submitted plans conform to those provisions.

Date of Submission: 5-26-24

Signature: Neil Callahan

(Original Signature must be submitted)

Printed Name: Neil Callahan

I, (name) Neil Callahan **(title)** CEO of

(entity submitting application) Brooke Glen Behavioral Hospital do hereby affirm

that I am authorized by the applicant to affix my signature to this application.

Date: 5-26-24 Signature: N. Callahan

(Original Signature must be submitted)

ATTACHMENT 3

Whitemarsh Township Request for Modification (Waiver)

WHITEMARSH TOWNSHIP
REQUEST FOR MODIFICATION (WAIVER) OF
SUBDIVISION and/or LAND DEVELOPMENT ORDINANCE REQUIREMENTS

Pursuant to § 512.1.(b) of the Pennsylvania Municipalities Planning Code, all requests for a modification shall be in writing and shall accompany and be a part of the application for development. The request shall state in full the grounds and facts of unreasonableness or hardship on which the request is based, the provision or provisions of the ordinance involved and the minimum modification necessary.

Check the appropriate line:

☐ No modification (or waiver) of the Whitemarsh Township Subdivision and Land Development Ordinance is requested

☑ I/we hereby request the following modification[s] (or waiver[s]) of the Whitemarsh Township Subdivision and Land Development Ordinance. (The request must identify the applicable Section[s] of the Ordinance, modification[s] requested, and facts of unreasonableness or hardship upon which the request is made; attach additional sheets if necessary).

N/A

Name of Subdivision and/or Land Development: Brooke Glen Hospital Flood Mitigation Project

Date: 9-26-24 Signature:

(Original Signature must be submitted)

ATTACHMENT 4

Whitemarsh Time Waiver Form

Not Applicable

ATTACHMENT 5

Whitemarsh Township Escrow

Not Applicable

ATTACHMENT 6

Montgomery County Planning Commission Municipal Request for Review

Not Applicable

ATTACHMENT 7

Shade Tree Commission Checklist for Compliance with Chapter 55

Geosyntec Consultants
September 2023

Applicant Name: Neil Callahan; Universal Health Services, Inc.

Development Name: Brooke Glen Hospital Flood Mitigation Project

Location of Property: 7170 Lafayette Ave., Fort Washington, PA 19034

Date: 8/27/2024

PROJECT COVER SHEET – *Approved at June 6, 2023 Shade Tree Commission Meeting*

To verify fulfillment of Chapter 55 Ordinance requirements for:

1. *Maximum Tree Removal – 55-4B*
2. *Tree Replacement – 55-4D(6)(a)*
3. *Substitutions for Replacements – 55-4F*
4. *Replacement Tree Species – 55-4E*
5. *Tree and Shrub requirements for Chapters other than Chapter 55*

Complete the following tables, filling in data for each lettered item, and resolving each Compliance Test. In accordance with 55-4C(4)(e), provide this completed Cover Sheet together with the Landscape Plan.

Citations to Sections of Chapter 55 are provided for the convenience of the Applicant. Other Chapters of the Whitemarsh Township Code and other sections of Chapter 55, such as 55-2 Definitions, may be relevant. In the event of an inconsistency between this Cover Sheet and any provision of the Code, the language of the Code shall be controlling.

1) Calculation of Requirement for Maximum Tree Removal – 55-4B:

A.	***Total of all existing Trees on the lot with DBH of 6" or greater**, per 55-4C(3)(a).*	N/A
B.	*33% of line (A) = **maximum existing Trees which may be Removed.***	N/A
C.	*Provide **number of existing Trees proposed to be Removed by the Applicant,** per 55-4C(3)(a).*	N/A
	***COMPLIANCE TEST:** If Line (C) is greater than Line (B), the Applicant's proposal is not in compliance with the requirement that no more than 33% of trees having a DBH of six inches or greater may be removed.*	

Note: The project does not propose removal or modification to any existing trees. Trees within the proposed Limits of Disturbance will be protected in accordance with Chapter 55 Ordinance requirements.

2) *Calculation of Replacement Requirement for Removed Trees having a DBH of Six Inches or Greater 55-4D(6)(a):*

D.	***Total DBH of all existing Living and Healthy Trees*** *(as determined per 55-4A) having a DBH of 6" or greater* ***that are proposed to be Removed****, per 55-4C(3)(a).*	N/A
E.	***Total DBH of all Living and Healthy Trees*** *(as determined per 55-4A) having a DBH of 6" or greater,* ***removed within five years prior to the submission of application****, per 55-4C(3)(b).*	N/A
F.	*Sum of line (D) and line (E) =* ***Total DBH that must be replaced for all Removed Living and Healthy Trees.***	N/A
G.	***Total Caliper inches of Canopy Replacement Trees proposed to be planted*** *by the Applicant (as shown on the Landscape Plan) per 55-4D(6)(a). Each Canopy Replacement Tree shall have a minimum Caliper of three inches.*	N/A
	COMPLIANCE TEST: *If Line (G) is less than Line (F), the Applicant's proposal is not in compliance with the minimum Canopy Tree Replacement Requirement.* *To comply with this requirement, the Applicant may request a waiver from the Shade Tree Commission to permit limited substitutions per 55-4F. If so, proceed to Substitution calculation (3) below.*	

3) *Calculation of maximum Proposed Substitutions for Replacement Canopy Trees – 554F, subject to certain limitations and approval by the Shade Tree Commission.*

H.	*40% of line (F) (round fractions down to a whole number) =* ***maximum Caliper of required Replacement Canopy Trees that may be substituted*** *with Understory Trees and/or FIL, upon STC approval, per 55-4F.*	N/A
I.	*Line (F) less Line (G) =* ***Shortfall in DBH compliance with the minimum Canopy Tree Replacement Requirement,*** *per 55-4D(6)(a).*	N/A
	COMPLIANCE TEST: *If line (H) is less than line (I), the deficit of minimum Canopy Tree Replacement requirement, per 55-4D(6) cannot be fully compensated with Substitutions, per 55-4F.*	N/A

J.	*Line (I) divided by 3" (round fractions <u>up</u> to a whole number) =* ***Shortfall in the <u>number</u> of required 3" Canopy Replacement Trees.***	N/A
K.	*Provide the* ***total number of substitution Understory Trees proposed to be planted*** *by the Applicant, per 55-4F(1).*	N/A
L.	*Line (K) divided by two =* ***Number of required 3"-cal. Replacement Canopy Trees being substituted with Understory Trees*** *per 55-4F(1).*	N/A
M.	*Line (J) less Line (L) =* ***Number of required 3"-cal. Replacement Canopy Trees proposed by the Applicant to be substituted with payment of in-lieu fees****, per 55-4F(2).* ***NOTE:*** *Review proposed Landscape Plan to ensure that the use of Replacement Understory Tree substitutes has been maximized prior to calculating the number of substitutes via in-lieu fees, per 55-4F(4).*	N/A
N.	*Sum of Line (L) and Line (M) =* ***Total proposed number of Replacement Canopy Trees being substituted per 55-4F.***	N/A
O.	*Line (N) multiplied by 3" =* ***Total shortfall of DBH to be fulfilled with substitutions*** *as proposed by this Landscape Plan.*	N/A
	COMPLIANCE TEST: *If (O) is greater than (H), the Applicant's proposal has exceeded the 40% maximum eligible for consideration for Replacement substitutions, per 55-4F, and is not in compliance.*	
P.	*Sum of Line (O) and (G) =* ***Total Caliper compensation for Removed Trees*** *as provided by this proposed Landscape Plan.*	N/A
	COMPLIANCE TEST: *If (P) is less than (F), the Applicant's proposal is not in compliance with the Tree Replacement Requirement.*	

4) <u>Compliance with Species Requirement of Replacement Trees – 55-4E</u>:

Q.	***Total number of proposed Canopy Replacement Trees,*** *per 55-4C(4)(c).*	N/A

R.	*75% of line (Q) (round fractions up to the next whole number) =* ***Minimum required number of Native Species Replacement Canopy Trees****, per 55-4E.*	N/A
S.	*Provide the* ***number of proposed Native Species Canopy Replacement Trees,*** *per 55-4C(4)(c).*	N/A
	COMPLIANCE TEST: *If Line (S) is less than Line (R), the Applicant's proposal is not in compliance with the 75% Native Species requirement for Replacement Canopy Trees, per 55-4E.*	
T.	*Provide the* ***number of proposed Native Species Understory Trees****.*	N/A
	COMPLIANCE TEST: *If Line (T) is less than line (K), he Applicant's proposal is not in compliance with the 100% Native Species requirement for Replacement Understory Trees.*	

5) Compliance with Landscaping Requirements of Other Code Chapters. Complete the following Tables for each applicable requirement.

REQUIRED TREES: N/A

A	B	C	D*	E	F**
Full Code Citation: Chapter; sub-chapter, etc.	Subject matter as indicated in Code caption	Required # of Trees	Credits for Preserved Trees per 55-4D(5)	Proposed # of Trees	Column (C) less Columns (D) and (E)

NOTE: Column (D) Credits are strictly limited to calculating Chapter 105-52 Buffer yards, in accordance with 55-4D(5).
****NOTE: When the result in Column (F) is greater than zero, the Applicant's proposal is not in compliance with the applicable Code requirement.***

REQUIRED SHRUBS: N/A

A	B	C	D	E*
Full Code Citation: Chapter; sub-chapter, etc.	Subject matter as indicated in Code caption	Required # of Shrubs	Proposed # of Shrubs	Column (C) less Column (D)

NOTE: When the result in Column (E) is greater than zero, the Applicant's proposal is not in compliance with the applicable Code requirement.

ATTACHMENT 8

Transportation Impact Study

Not Applicable

ATTACHMENT 9

Stormwater Management Plan & Supporting Calculations

Not Applicable

ATTACHMENT 10

Supplemental Documents Applicable to Specific Application

1. **FEMA LOMR Application**
2. **HEC-RAS model files (provided electronically)**
3. **Pennsylvania Natural Diversity Inventory Clearance Letter**

LOMC Application

Application ID: R5114504262749

Revision

Revision Review

Project Type

Project Type: LOMR

Payment Total

Fee: $0.00 (LOMR Based Solely on Submission of More Detailed Data)

Project Name/Identifier

Project Name/Identifier: Brooke Glen Hospital Flood Mitigation Project

Community Information

State, District or Territory:	PA
County:	Montgomery County
Community Name:	WHITEMARSH, TOWNSHIP OF
Map Panel Number - Effective Date:	42091C0289G - 03/02/2016
CID:	420712

Flooding

Flooding Source: Sandy Run

Types of Flooding: Riverine

Basis for Request

The basis for this revision request is:	Base Map Changes , Corrections , Hydraulic Analysis , New Topographic Data
Comments for Corrections:	After review of the effective model, discrepancies were found in how the model represented the hospital building and courtyard areas (at 7170 Lafayette Avenue, Fort Washington, PA) through the use of blocked obstructions and ineffective flow areas. When the blocked obstructions and ineffective areas were corrected in the model to represent the existing building alignment and latest terrain information, the resulting impact on the Base Flood Elevation (BFE) resulted in increases greater than 1 foot at some sections.

Does the request involve changes to the effective modeling/mapping?:	Yes

Zone Designation

FEMA Zone designations affected: AE

Revision Structures

The area of revision encompasses the following structures:	Other
Comments for Other Structures:	The area of revision does not encompass the structures listed.

Primary Contact Information

Title:	Mr.
First Name:	James
Last Name:	Barbis
Address 1:	930 HARVEST DRIVE
Address 2:	SUITE 220
City:	BLUE BELL
State, District or Territory:	PA
ZIP Code:	19422
E-mail Address:	obramlet@geosyntec.com
Company/Organization:	Geosyntec Consultants
Phone:	215-407-2726

Community Official Information

Title:	Ms.
First Name:	Krista
Last Name:	Heinrich
Professional Title:	Township Engineer
Community Name:	WHITEMARSH, TOWNSHIP OF
Address 1:	65 E Butler Ave.
City:	New Britain
State, District or Territory:	PA
ZIP Code:	18901
E-mail Address:	kheinrich@gilmore-assoc.com

As the CEO or designee responsible for the 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 requirement 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 request, the applicant has documented Endangered Species Act (ESA) compliance to DHS/FEMA prior to DHS/FEMA's review of the Conditional LOMR application. For LOMR request, I acknowledge that compliance with sections 9 and 10 of the ESA has been achieved independently of DHS/FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44 CFR 65.2(c), and that we have available upon request by DHS/FEMA, all analyses and documentation used to make this determination.

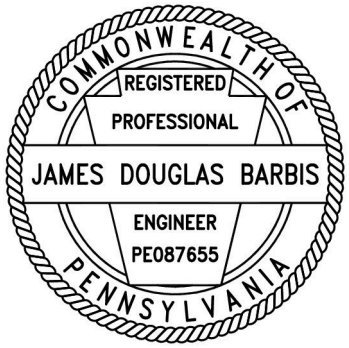
Community Official Signature: _____

Date: _____

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 instruction. 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.

First Name:	James
Last Name:	Barbis
License Number:	PE087655
Expiration Date:	9/30/2025
Company Name:	Geosyntec Consutlants
E-mail Address:	James.Barbis@Geosyntec.com
Telephone Number:	215-407-2726
Fax Number:	
Certifier's Signature:	
Date:	9/25/2024



Geosyntec consultants

engineers | scientists | innovators

FLOOD STUDY TO SUPPORT FEMA LETTER OF MAP REVISION

Brooke Glen Behavioral Hospital

Prepared for:

Universal Health Services, Inc.
UHS of Delaware, Inc.
367 South Gulph Road
King of Prussia, Pennsylvania 19406

Prepared by:

Geosyntec Consultants, Inc.
930 Harvest Drive, Suite 220
Blue Bell, Pennsylvania 19422

TXW9793A

July 12, 2024

Geosyntec consultants

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ATTACHMENTS

1. INTRODUCTION

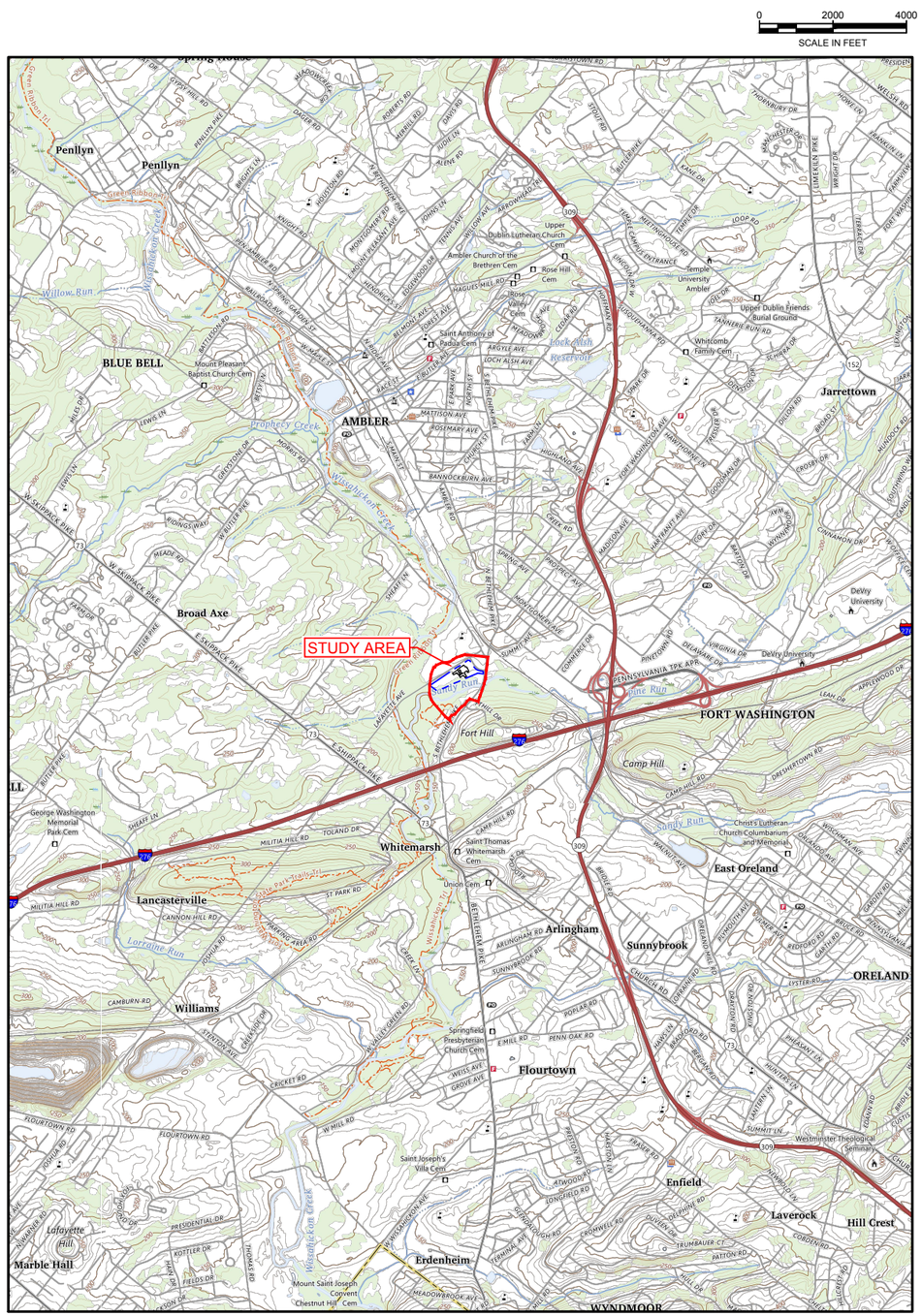
Universal Health Services, Inc. (UHS) retained Geosyntec Consultants, Inc. (Geosyntec) to conduct a flood study for the UHS Brooke Glen Behavioral Hospital in Fort Washington, PA. The purpose of this flood study is to correct the current flood maps based on more detailed data and consider flood mitigation options (see Section 5.7 for proposed options) for the UHS Brooke Glen Behavioral Hospital located at 7170 Lafayette Avenue, Fort Washington, PA (Site) in Whitemarsh Township and Montgomery County. The approximate study location is shown in Figure 1.

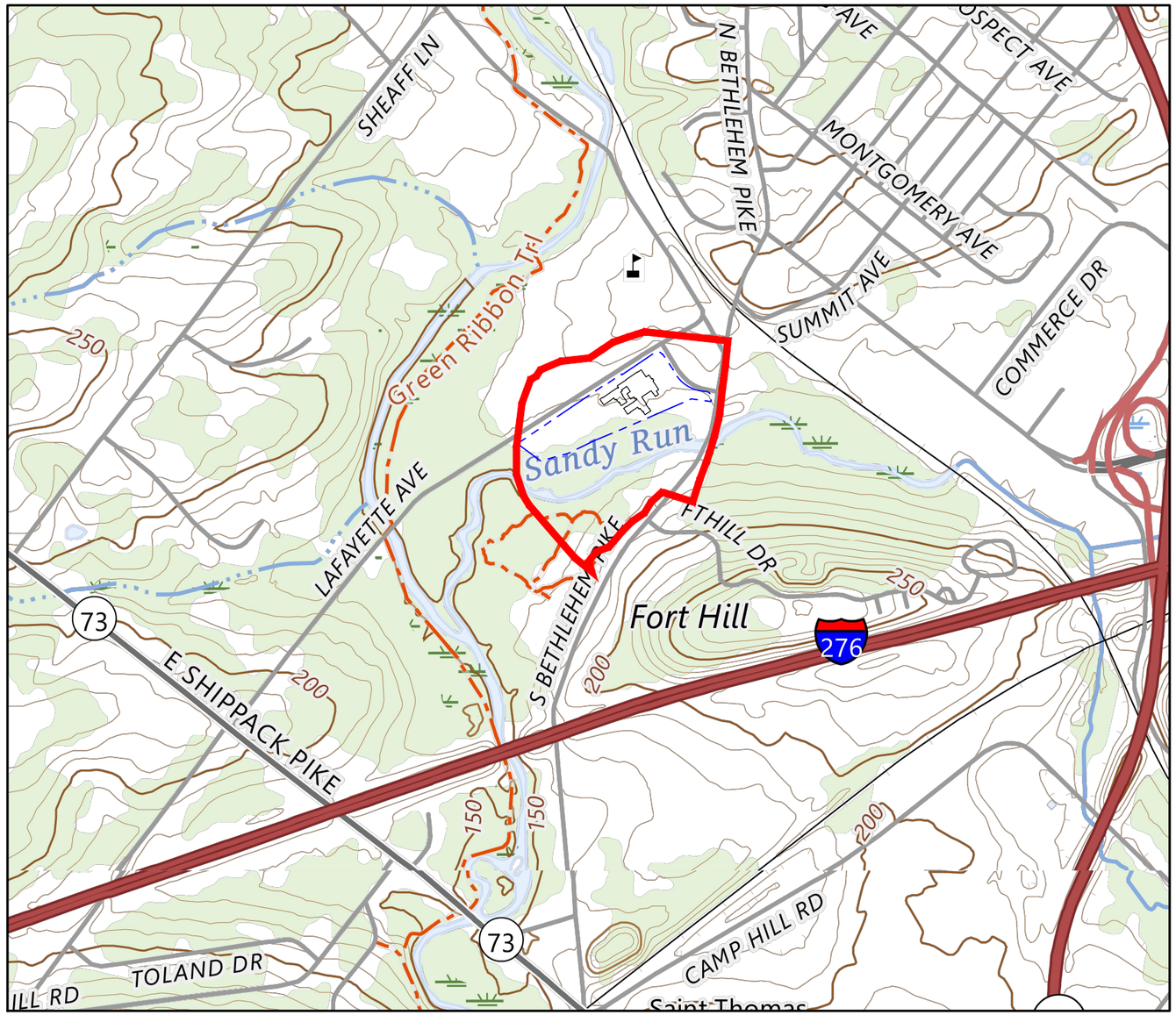
The Site is in Federal Emergency Management Agency (FEMA) Region 3 located in Zone AE as shown in Figure 2, obtained from FEMA's National Flood Hazard Layer (NFHL) Viewer. The property is located along Sandy Run (Reach: Sandy Run Main Stem), upstream of the confluence of Wissahickon Creek and Sandy Run and downstream from any lettered cross-section for Sandy Run. The reach of interest proposed for revision is not located in a floodway.

This Letter of Map Revision (LOMR) was conducted following multiple flooding events experienced at the Site in recent years. Geosyntec requested and reviewed the FEMA effective floodplain model. The effective model was last updated in November 2012, as reflected in the Flood Insurance Rate Map (FIRM) panel 42091C0289G dated 2 March 2016 depicted in Figure 3.

After review of the effective model, discrepancies were found in how the model represented the hospital building and courtyard areas through the use of blocked obstructions and ineffective flow areas. When the blocked obstructions and ineffective areas were corrected in the model to represent the existing building alignment and latest terrain information, the resulting impact on the Base Flood Elevation (BFE) resulted in increases greater than 1 foot at some sections. Geosyntec conducted a hydraulic analysis to correct the effective model to better represent existing conditions at the Site and to simulate the post-project conditions to understand potential impacts and feasibility of flood mitigation options (e.g., building floodplain obstructions).

The project team met with the Whitemarsh Township Floodplain Administrator and other Township representatives on 7 December 2023 and subsequently had a pre-application meeting with FEMA representatives Mr. Bob Pierson (FEMA Region 3) and Mr. Ben Kaiser (FEMA contractor) on 29 April 2024 to discuss the proposed flood mitigation project and verbally agree on the correct National Flood Insurance Program (NFIP) permitting pathway.





N

LEGEND

PROPERTY BOUNDARY

APPROXIMATE STUDY LOCATION

NOTES:

1. IMAGE BASE MAP ARE USGS 7.5 MINUTE DRG QUAD MAPS OF THE AMBLER, GERMANTOWN, LANSDALE, AND NORRISTOWN, PENSYLVANIA AREA.

SITE LOCATION MAP

FORT WASHINGTON, PA

Geosyntec consultants

PROJECT NO: TXW9793A | JULY 2024

FIGURE 1

C:_GEO-ACC\ACCDOCS\GEOSYNTEC\U.H.SVCS_BROOKE GLEN\PROJECT FILES\PERMIT\01_FLOOD MTG\NDWGS\SHEETS\TXW9793AFIG1

Figure 2. NFHL Viewer

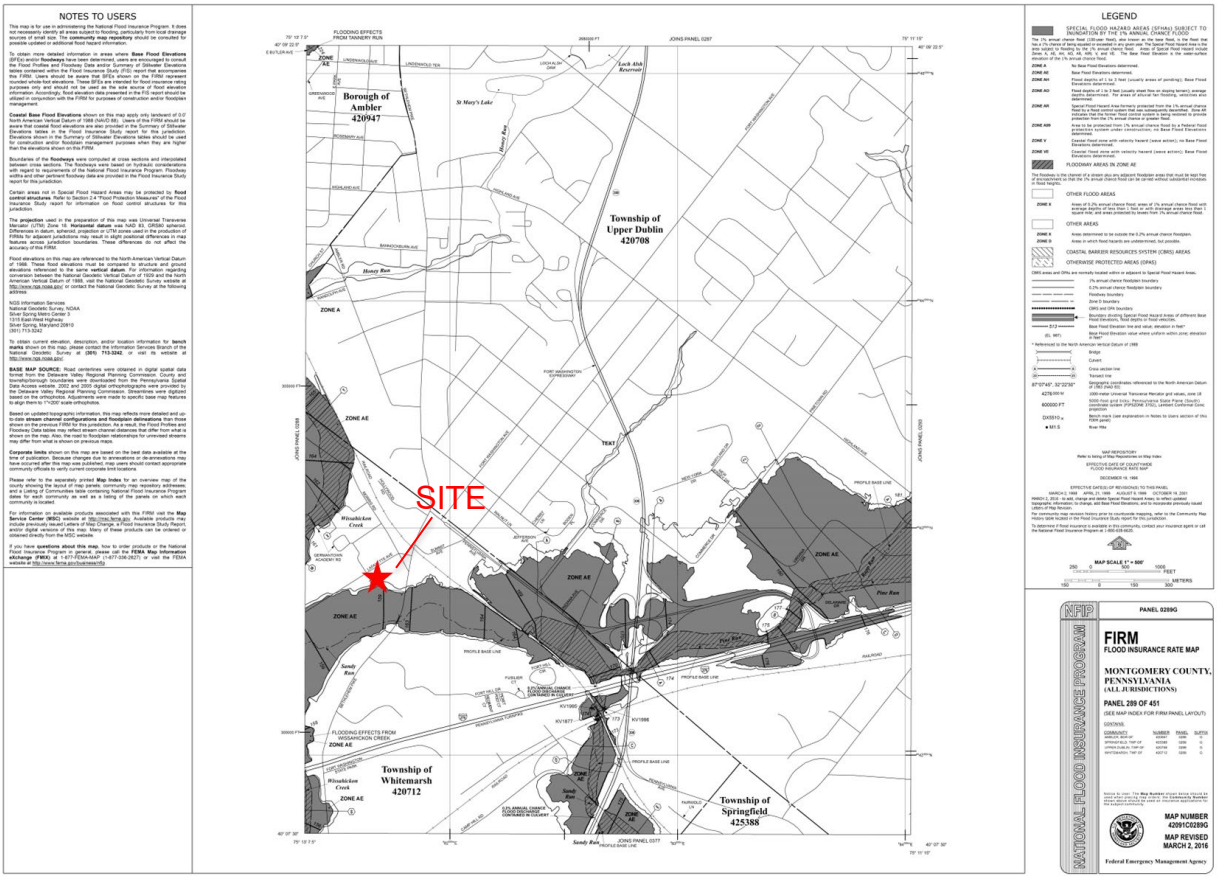


Figure 3. Effective FIRM Panel (2 March 2016)

2. HYDROLOGY

The hydrology of Sandy Run was studied in the Flood Insurance Study (FIS) development and is present in the effective model (FEMA, 2016). The peak flows listed in Table 1 were extracted from the effective model and used for this study. The project's hydrologic impacts are assumed to be negligible, considering its location and extent in comparison to the creek's overall drainage area. Therefore, a hydrologic analysis was not conducted for the project.

Table 1. Effective Model Peak Flows

River	Reach	River Station	10% (10-yr)	2% (50-yr)	1% (100-yr)	0.2% (500-yr)
Pine Run	Pin Main Stem	17966.92	272	562	736	1289
Pine Run	Pin Main Stem	17286.62	385	796	1044	1828
Pine Run	Pin Main Stem	12625.84	990	1960	2523	4364
Pine Run	Pin Main Stem	11022.62	1464	2875	3727	6445
Pine Run	Pin Main Stem	4399.991	2432	4833	6229	10637
Pine Run	Pine Trib	5790.305	196	414	548	980
Rapp Run	Rapp Main Stem	14474.72	230	467	607	1049
Rapp Run	Rapp Main Stem	9803.527	397	781	1013	1725
Rapp Run	Rapp Main Stem	6538.489	534	1039	1341	2282
Rapp Run	Rapp Main Stem	4795.694	1088	1854	2292	3646
Sandy Run	Sandy Main Stem	38835.32	689	1169	1443	2290
Sandy Run	Sandy Main Stem	28902.69	1479	2537	3146	5020
Sandy Run	Sandy Main Stem	26107.58	2016	3442	4317	7013
Sandy Run	Sandy Main Stem	22305.19	2229	3931	4945	8165
Sandy Run	Sandy Main Stem	5508.105	4460	7709	9741	16941
Sandy Run	Sandy Trib2	5046.201	310	560	705	1156
Sandy Run	Sandy Trib1	2320.554	377	622	762	1191

3. HYDRAULICS

The effective Sandy Run floodplain boundary is designated as Zone AE near the Site and is based on an approximate hydraulic model. This LOMR study utilizes Hydrologic Engineering Center—River Analysis System (HEC-RAS) version 6.3.1. A series of one-dimensional (1D) models were developed in support of this hydraulic analysis and LOMR application. The 1D models developed include a duplicate effective model, corrected effective model, and post-project conditions model. These models estimate the BFEs for Sandy Run.

3.1 Effective Model

A copy of the approximate HEC-RAS model was provided by FEMA and was used as the basis for this study.

3.2 Duplicate Effective Model

A duplicate effective model is defined as a "copy of the hydraulic analysis used in the effective FIS, referred to as the effective model" (FEMA, 2018). Geosyntec replicated the effective model input in HEC-RAS to produce the duplicate effective model. The duplicate effective model was evaluated to assess whether it would produce results similar to the effective model.

3.2.1 Geometry

The duplicate effective HEC-RAS model uses geometry data from the effective model.

3.2.2 Flow

The peak flows were extracted from the effective model (Table 1) and applied in the duplicate effective model, corrected effective model, and post-project conditions model.

3.3 Corrected Effective Model

The corrected effective model is defined as "the model that corrects any errors in the duplicate effective model, adds any additional cross sections to the duplicate effective model, or incorporates more detailed topographic information than that used in the current effective model" (FEMA, 2018). Geosyntec developed a corrected effective model incorporating the revisions to the duplicate effective model, as described below.

3.3.1 Geometry

Revisions made in the corrected effective model included the following:

(i) improvements to the blocked obstructions and ineffective flow areas representing existing buildings and courtyard areas within the study area;

(ii) updated terrain data based on more recent and refined United States Geological Survey (USGS) LIDAR data (collected in 2017/2018) supplemented with an on-site topographical field survey taken at the Site by Pennoni Associates, Inc. in September 2023; and

(iii) corrections to the Manning's roughness coefficient values based on current land cover designations.

Attachment 1 presents all geometry updates made to river stations for the corrected effective model and post-project conditions model. Corrections were only made to the Sandy Run Main Stem river stations summarized in Attachment 1. No river station upstream of 2417.391, downstream of 1032, or any river station on any other reach in the model domain were edited in any way.

Eight additional river stations were added within the property boundary to better define the existing building obstructions in the corrected effective model. Attachment 7 depicts the buildings, USGS LIDAR contours, on-site topographical survey data, and all river stations within the property boundary, including the new river stations added to the corrected effective model. To update the station-elevation data, manual edits were made to the corrected effective model geometry file. The river stations in which the station-elevation data were updated and edited are presented in Table 2. No geometry edits were made to any other river station. The river stations were updated with the latest publicly-available USGS LIDAR data and supplemented with the on-site topographic survey data. The table summarizes the station where the on-site topographic survey data were inserted; all other stations used the latest USGS LIDAR elevation data. Attachment 13 provides the detailed station-elevation data for the on-site topographic survey data.

Table 2. River Station Station-Elevation Data Updates

River Sections Modified/Added in Corrected Effective Model	Start Station for Use of On-Site Topographic Survey Data (USGS LIDAR Data Used Elsewhere)	End Station for Use of On-Site Topographic Survey Data (USGS LIDAR Data Used Elsewhere)
2417.391	783.23	954.94
2267	634.37	1134.23
2206	588.19	1089.76
2140	545.13	1038.11
2072.963	576.29	1052.99
1897	631.23	1064.35
1800	708.66	1099.49
1688.606	745.06	112.46
1508	816.02	1168.72
1299.523	897.64	1228.3
1126	914.44	1232.07
1032	989.65	1205.58

Notes:
(1) Italicized river stations indicate those added to improve modeling of the existing building obstructions and ineffective flow areas in the corrected effective model.

The Manning's roughness coefficient values at the Site were reviewed and compared to aerial imagery and the current FIS (see Table 4 of the FIS [FEMA, 2016]). Figure 4 documents the revised Manning's roughness coefficient values and the location of each value along the modified river stations analyzed in the study. Selected Manning's roughness coefficient values fall within the range of those reported in Table 4 of the FIS. The Manning's roughness coefficient values and their corresponding land cover type and reference source are presented in Table 3. Figure 4 also

depicts the stations where revisions to the existing building obstructions and ineffective flow areas are incorporated in the corrected effective model.

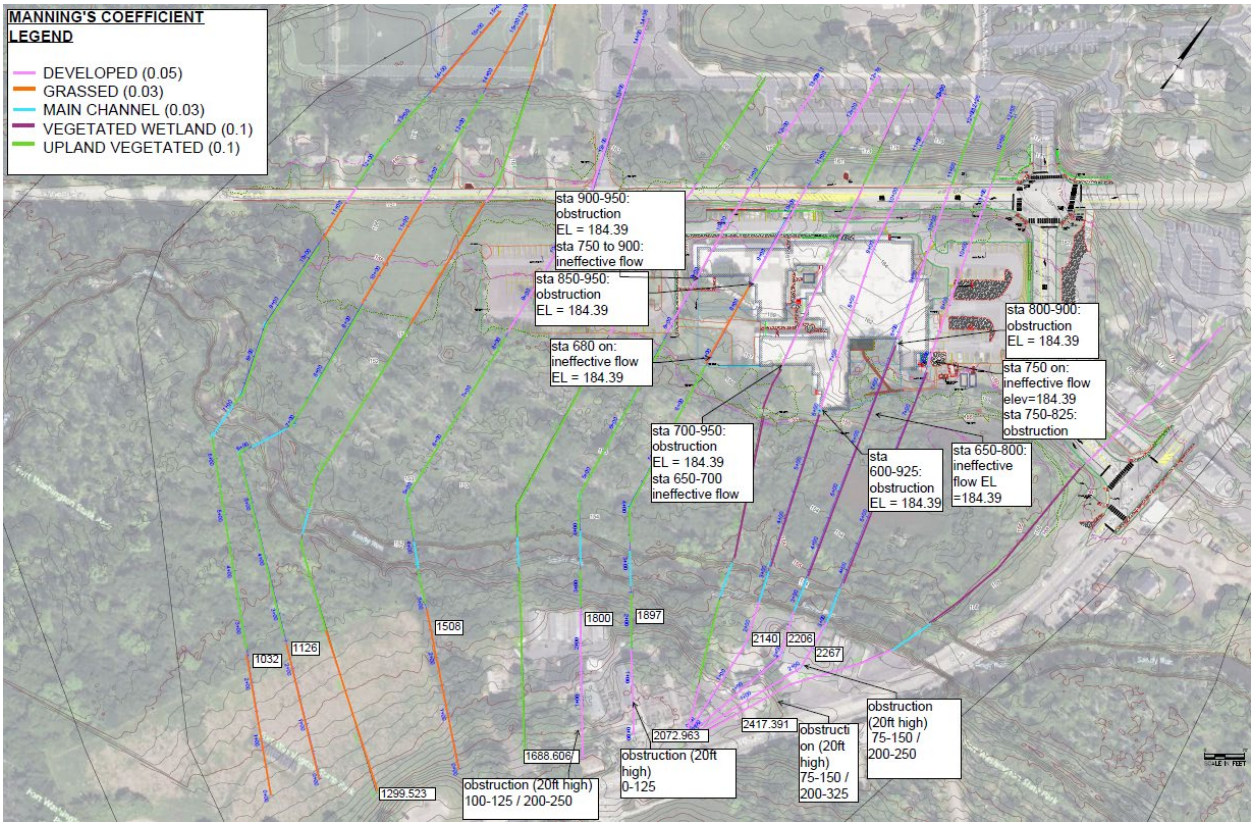


Figure 4. Land Cover Designations and Existing Building Obstructions

Table 3. Manning's Roughness Coefficient Designations

Land Cover Type	Manning's Roughness Coefficient	Reference Source; Description
Channel	0.030	Chow, 1959; clean, straight, full stage
Developed Areas	0.050	Effective Model
Vegetated Wetland Area	0.100	Chow, 1959; medium to dense brush in summer
Upland Vegetated Area	0.100	Chow, 1959; medium to dense brush and trees, in summer
Grassed Area	0.030	Chow, 1959; pasture, short grass

3.3.2 Flow

The peak flows were extracted from the effective model (Table 1) and applied in the duplicate effective model, corrected effective model, and post-project conditions model.

3.4 Existing Conditions Model

An existing conditions model modifies the duplicate effective model or corrected effective model "to produce the pre-project conditions model to reflect any physical modifications that have occurred within the floodplain since the date of the current effective model, but prior to the construction of the project for which the revision is being requested" (FEMA, 2018). No modification has occurred since the date of the current effective model; therefore, the existing conditions model is identical to the corrected effective model. An existing conditions model analysis was not applicable to this study.

3.5 Post-Project Conditions Model

The post-project conditions model incorporates "any physical changes to the floodplain since the current effective model was produced, as well as the effects of the project" (FEMA, 2018). Geosyntec developed a post-project conditions model incorporating the effectives of the flood mitigation project to the corrected effective model, as described below.

3.5.1 Geometry

The levee tool was used to represent the proposed building flood mitigation elements (e.g., floodplain obstruction with a maximum height of 6 feet) in HEC-RAS. Attachment 1 depicts all the modified river station geometries including the proposed floodplain obstructions modeled to represent post-project conditions. Only river stations 2206 and 1897 were modified in the post-project conditions model to represent the proposed floodplain obstruction shown on Attachment 10, the project's proposed plans.

3.5.2 Flow

The peak flows were extracted from the effective model (Table 1) and applied in the duplicate effective model, corrected effective model, and post-project conditions model.

4. RESULTS

4.1 Corrected Effective Model Results

Attachment 2 provides the detailed output table from HEC-RAS with all plan and profile results for the Sandy Run Main Stem Reach study area river stations. Table 4 below presents the 1% Annual Chance water surface elevation results for the effective model, duplicate effective model, and corrected effective model. The table also provides the difference in modeled water surface elevations between the effective model and the corrected effective model. Results are shown between river station 5084.678, which is the river section nearest Sandy Run floodplain cross-section A (upstream of the Site), and river station 143.571, which is located downstream of the Site and outside of the property boundary near the confluence with Wissahickon Creek. The river stations that fall within the Site's property boundary are river stations 2417.391 through 1032. Results indicate that the effective model and duplicate effective model convey the same results.

The 1% Annual Chance (1%) and 0.2% Annual Chance (0.2%) Effective Zone AE boundaries depicted on Attachment 7 were obtained from the current FIS (revised: March 2, 2016) based on the topography used in the effective model last updated in November 2012. The 1% and 0.2% Corrected Effective Zone AE boundaries depicted on Attachment 7 incorporate the use of more recent topographic data and other revisions incorporated in the corrected effective model (as described in Section 3.3.1). Although the water surface elevations for the 1% and 0.2% Corrected Effective Zone AE are generally higher than the Effective Zone AE, the spatial extent of the Zone AE boundaries decreases compared to those used in the effective FIS (FEMA, 2016) due to the change in topographic data sources.

Table 4. 1% Water Surface Elevation for Effective Model, Duplicate Effective Model, and Corrected Effective Model

River Station	Effective Model	Duplicate Effective Model	Corrected Effective Model	Difference Between Effective and Corrected Effective
5084.678	169.05	169.05	169.05	0
5065.378	169.06	169.06	169.06	0
5039.878	168.63	168.63	168.63	0
4865.578	168.67	168.67	168.67	0
4790.088	168.63	168.63	168.63	0
4777.088	168.53	168.53	168.53	0
4685.592	163.53	163.53	163.72	0.19
4327.181	164.33	164.33	164.53	0.2
3964.325	163.80	163.80	164.04	0.24
3515.389	163.59	163.59	163.85	0.26
3004.364	163.31	163.31	163.61	0.3
2590.359	163.09	163.09	163.41	0.32
2417.391*	158.77	158.77	160.34	1.57
*2267**	*#N/A*	*#N/A*	*159.75*	*#N/A*
*2206**	*#N/A*	*#N/A*	*159.59*	*#N/A*
*2140**	*#N/A*	*#N/A*	*159.54*	*#N/A*
2072.963*	158.41	158.41	158.9	0.49
*1897**	*#N/A*	*#N/A*	*158.73*	*#N/A*
*1800**	*#N/A*	*#N/A*	*158.21*	*#N/A*
1688.606*	157.76	157.76	158.19	0.43
*1508**	*#N/A*	*#N/A*	*157.88*	*#N/A*
1299.523*	157.31	157.31	157.43	0.12
*1126**	*#N/A*	*#N/A*	*156.9*	*#N/A*
*1032**	*#N/A*	*#N/A*	*156.89*	*#N/A*
663.061	156.25	156.25	156.25	0
143.571	154.39	154.39	154.39	0

Notes:

(1) Difference is calculated between the corrected effective model and the effective model.

(2) Italicized river stations indicate those added to improve modeling the existing building obstructions and ineffective flow areas in the corrected effective model.

(3) Shaded rows indicate where results from the corrected effective model tie-in to those from the effective model (within 0.5 foot at the downstream and upstream limits of revision).

(4) River stations followed by an asterisk fall within the Site's property boundary.

(5) The boxed sections indicate the project's study area.

(6) Results are shown upstream to the river station nearest the first lettered floodway cross-section A (river station 5084.678).

The corrected effective model produced water surface elevation increases up to 1.57 feet (at river station 2417.391) when compared to the effective model. Results from the corrected effective model tie-in to the effective model (i.e., ties-in to the effective elevations within 0.5 foot at the downstream and upstream limits of revision) upstream at river station 2590.359 and downstream at river station 1688.606. Both tie-in points are not located within the floodway. Therefore, for this analysis, the corrected effective model will be used to represent the current conditions BFE.

4.2 Post-Project Conditions Model Results

The post-project conditions model 1% water surface elevation results are compared to the corrected effective model (representing current conditions) in Table 5. Results indicate that there are no increases in water surface elevation from the project. The results show that the cumulative effect of the proposed project will not increase the BFE at any point, meeting NFIP criteria for the community as prescribed by Article IV §101-17.B.2.a for the Township of Whitemarsh, Pennsylvania.

Table 5. 1% Water Surface Elevation for Post-Project Conditions Model

River Station	Corrected Effective Model	Post-Project Conditions	Difference
5084.678	169.05	169.05	0
5065.378	169.06	169.06	0
5039.878	168.63	168.63	0
4865.578	168.67	168.67	0
4790.088	168.63	168.63	0
4777.088	168.53	168.53	0
4685.592	163.72	163.72	0
4327.181	164.53	164.53	0
3964.325	164.04	164.04	0
3515.389	163.85	163.85	0
3004.364	163.61	163.61	0
2590.359	163.41	163.41	0
2417.391*	160.34	160.34	0
*2267**	*159.75*	*159.75*	*0*
*2206**	*159.59*	*159.59*	*0*
*2140**	*159.54*	*159.54*	*0*
2072.963*	158.9	158.9	0
*1897**	*158.73*	*158.72*	*-0.01*
*1800**	*158.21*	*158.21*	*0*
1688.606*	158.19	158.19	0
*1508**	*157.88*	*157.88*	*0*
1299.523*	157.43	157.43	0
*1126**	*156.90*	*156.90*	*0*
*1032**	*156.89*	*156.89*	*0*
663.061	156.25	156.25	0
143.571	154.39	154.39	0

Notes:

(1) Difference is calculated between the post-project conditions model and corrected effective model.

(2) Italicized river stations indicate those added to improve modeling the existing building obstructions and ineffective flow areas in the corrected effective model.

(3) River stations followed by an asterisk fall within the Site's property boundary.

(4) The boxed sections indicate the project's study area.

(5) Results are shown upstream to the river station nearest the first lettered floodway cross-section A (river station 5084.678).

4.3 QA/QC

The hydraulic model inputs and results were evaluated with FEMA's cHECK-RAS 2.0.1. software. Attachment 3 presents the cHECK-RAS report for all model plans (effective model, duplicate effective model, corrected effective model, and post-project conditions model). The

cHECK-RAS report was run for the entire model domain; however, no revisions were made to river stations upstream of Sandy Run Main Stem 2417.391 or to any other model reach.

5. ADDITIONAL MT-2 REVISION REQUIREMENTS

Attachment 4 presents the completed MT-2 Revision Request Submittal Checklist for the project. Each checklist element is described in detail in the following subsections.

5.1 MT-2 Forms

Table 5 presents the applicable MT-2 application forms for the project. The completed MT-2 Form 1 and MT-2 Form 2 are presented in Attachment 5 and Attachment 6, respectively.

Table 5. MT-2 Form Requirements

MT-2 Form	Required (Y/N)	Comment
Form 1 – Overview & Concurrence Form	Y	See Attachment 5
Form 2 – Riverine Hydrology & Hydraulics Form	Y	See Attachment 6
Form 3 – Riverine Structures Form	N	No channel modifications or addition/revision of bridge, culverts, levee, floodwall, or dam proposed.
Form 4 – Coastal Analysis Form	N	No new or revised costal elevations proposed.
Form 5 – Coastal Structures Form	N	No addition/revision of coastal structure proposed.
Form 6 – Alluvial Fan Flooding Form	N	No flood control measures on alluvial fans proposed.

5.2 Certified Topographic Work Map

Attachment 7 presents the Certified Topographic Work Map that meets the mapping requirements outlined in MT-2 Form 2. The map shows the following: the boundaries of the 1%- and 0.2%-annual-chance floodplains (for detailed Zone AE 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.).

5.3 Annotated FIRM Panel

Attachment 8 presents the Annotated FIRM Panel at the scale of the effective FIRM, which shows the revised boundary of delineation of the base (1-percent-annual-chace) floodplain, 0.2 percent-annual-chance-floodplain. The regulatory floodway is not present in the revised reach.

5.4 Review Fee Payment

Attachment 9 presents the Payment Information Form. The project is submitted as a “LOMR Based Solely on Submission of More Detailed Data” and therefore the form fee is free, or $0.

5.5 Meet 65.10 Requirement

This element is not applicable as the project does not propose a berm/levee/floodwall that reduces the flood hazard.

5.6 Operation and Maintenance Plan

This element is not applicable as the project does not propose a berm, level, floodwall, dam, and/or detention basin.

5.7 Proposed/As-Built Plans

Proposed plans, certified by a registered Professional Engineer, for all project elements for which this applies is provided in Attachment 10. The plans present conceptual details of the proposed project and floodplain obstruction and references to the standards it will be designed to.

5.8 Floodway Notice

The proposed revision does not result in changing or establishing regulatory floodway boundaries; therefore, this element is not applicable.

5.9 Property Owner Notification

Since the proposed revision results in widening the base floodplain in limited areas and increase in the BFE, copies of the draft individual legal notices to be sent to all property owners affected by the increased flood hazards (after FEMA's initial review of this LOMR and concurrence with the proposed floodplain/BFE) are provided in Attachment 11.

5.10 Endangered Species Act Compliance

Documentation of compliance with Endangered Species Act (ESA) requirements is provided in the form of a Pennsylvania Natural Diversity Inventory (PNDI) report in Attachment 12.

5.11 Regulatory Requirements of 44 CFR 65.12

The proposed project does not result in BFE increases between the pre-project (existing) conditions and the proposed post-project conditions of more than 0.00 foot as a result of encroachment within a regulatory floodway or more than 1.0 foot in a Zone AE area that has no regulatory floodway; therefore, this element is not applicable.

5.12 Community Coordination

The project team met with the Whitemarsh Township Floodplain Administrator and other Township representatives on 7 December 2023. The project will coordinate with the Whitemarsh Township further through submittal of a Subdivision and Land Development Application to apply for the Land Development Waiver. An informal review with the Whitemarsh Township will be requested prior to development of a formal application. The project will also submit an application for Chapter 102 Permit Review through the Montgomery County Conservation District.

6. CONCLUSIONS

A detailed hydraulic analysis was conducted at the Site along Sandy Run, upstream of the confluence of Wissahickon Creek and downstream from the floodway in Sandy Run, to correct discrepancies found regarding the blocked obstructions and ineffective flow areas representing the existing buildings at the Site in the effective model. The corrected effective model produced water surface elevation increases up to 1.57 feet when compared to the effective model. Results from the corrected effective model tie-in to the effective model slightly upstream and downstream from the Site's property boundary (i.e., not in the regulated floodway). The results of the LOMR study show that the cumulative effect of the proposed project will not increase the BFE at any point, meeting NFIP criteria for the community as prescribed by Article IV §101-17.B.2.a for the Township of Whitemarsh, Pennsylvania.

7. REFERENCES

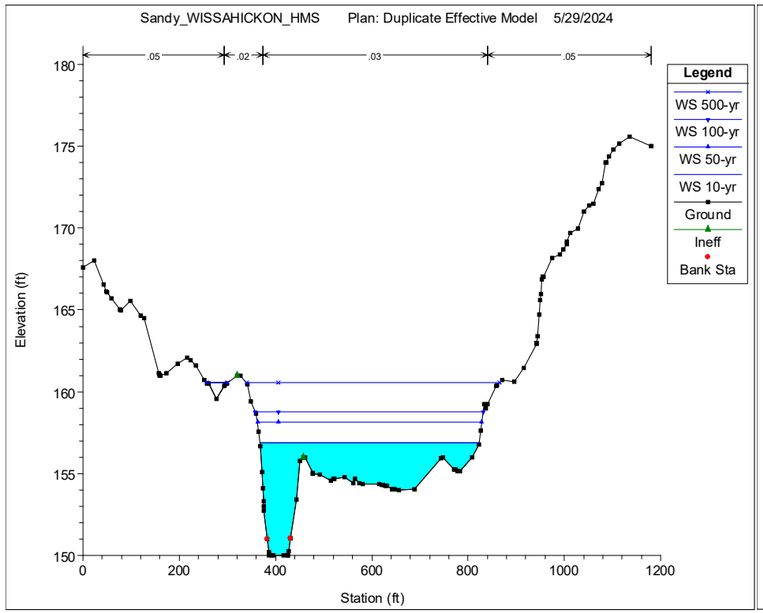
Chow, V.T. (1959). *Open-Channel Hydraulics*. McGraw-Hill, New York.

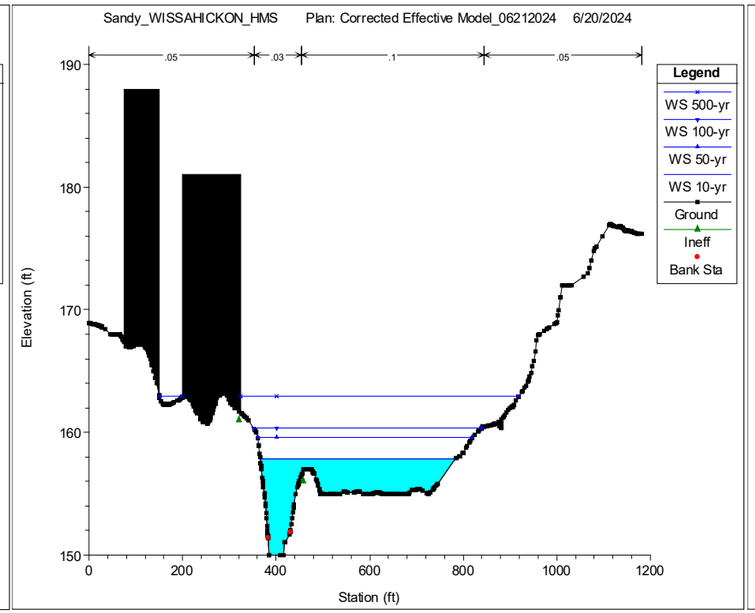
FEMA (2016). *Flood Insurance Study for Montgomery County, Pennsylvania*. Federal Emergency Management Agency, March 2, 2016.

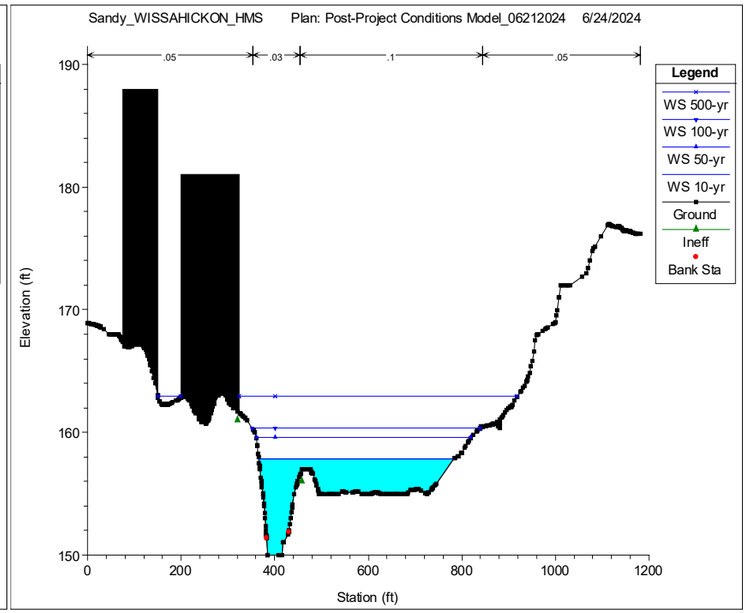
FEMA (2018). *Instruction for Completing the Application Form for Conditional Letter of Map Revision and Letter of Map Revision*, Federal Emergency Management Agency, August 2018.

Attachment 1
HEC-RAS River Station Geometry Comparison

RS 2417.391



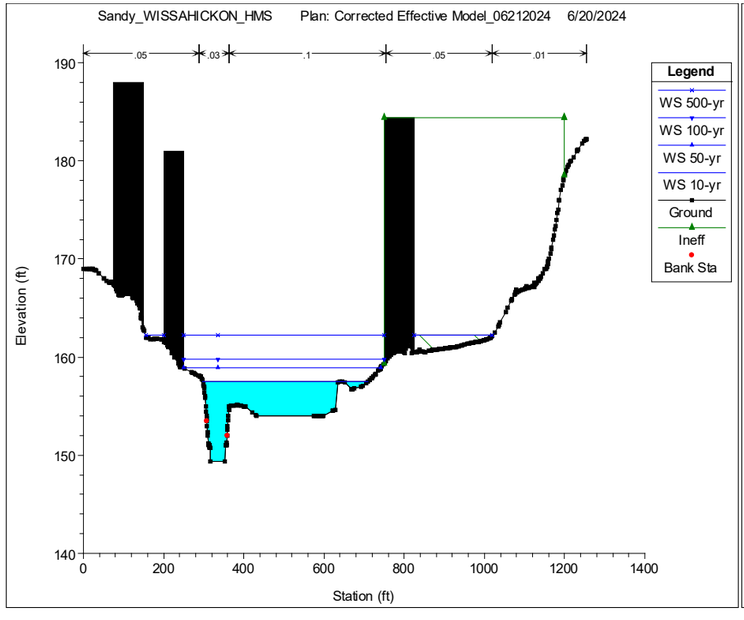


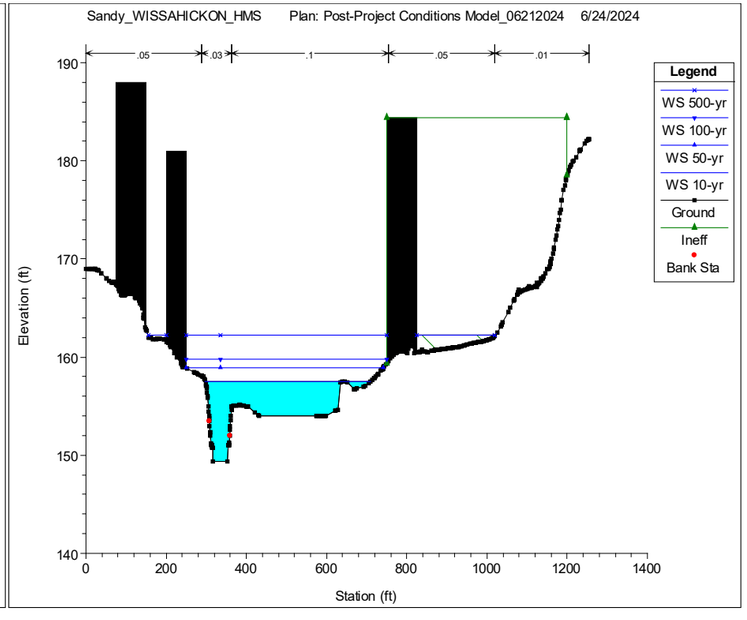


RS 2267 New Section

Plan: Duplicate Effective Model

N/A

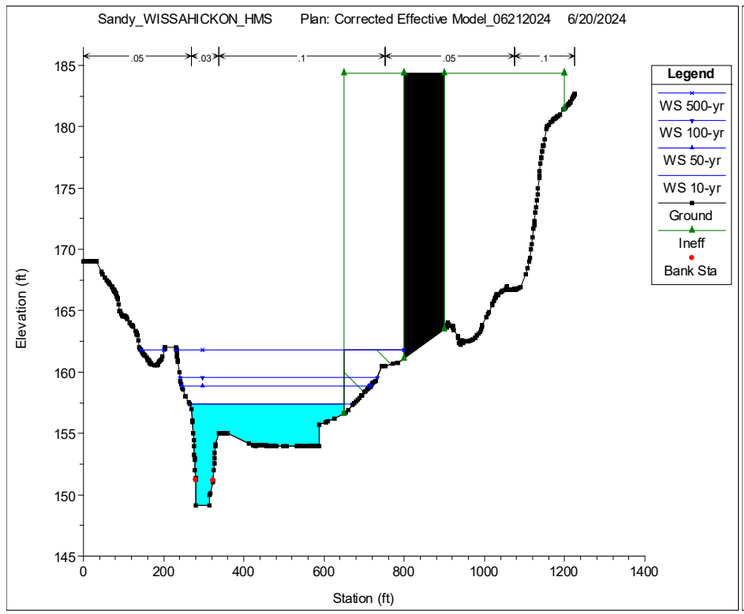


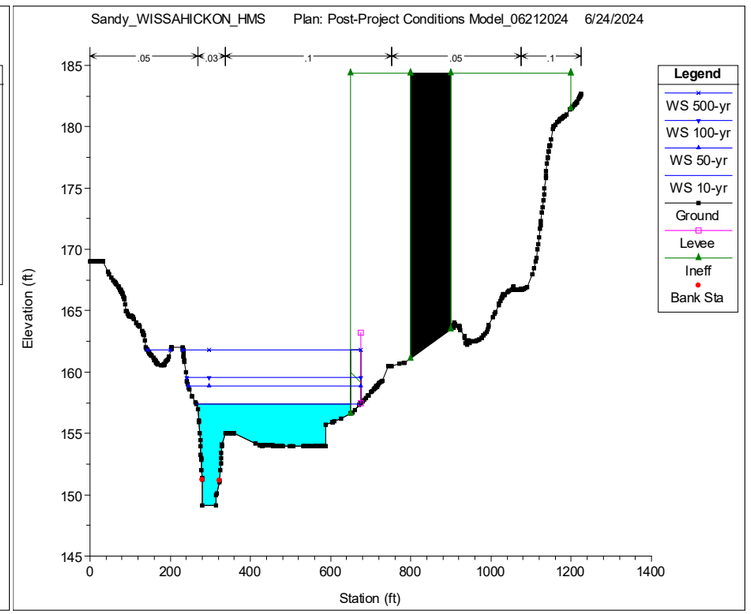


RS 2206 New Section

Plan: Duplicate Effective Model

N/A

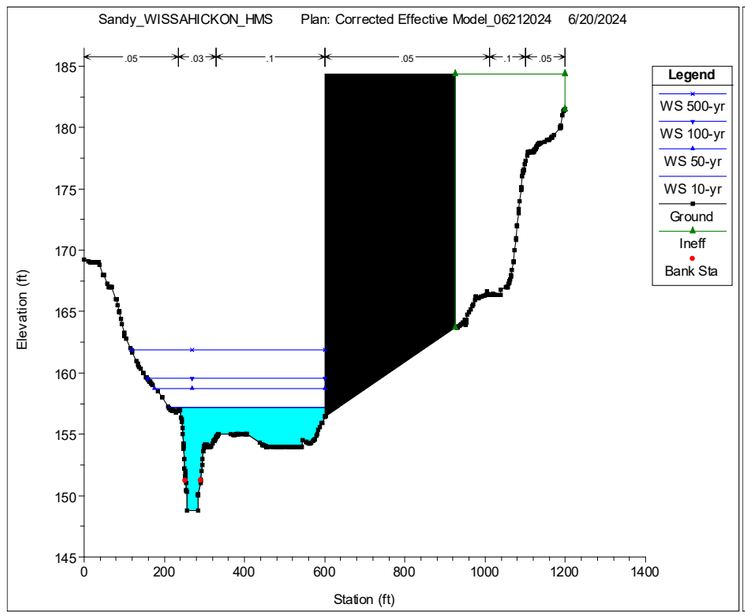


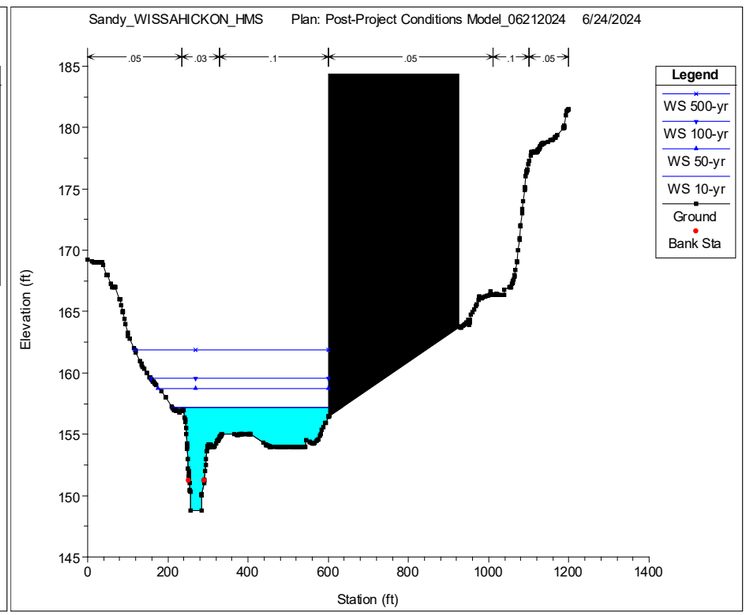


RS 2140 New Section

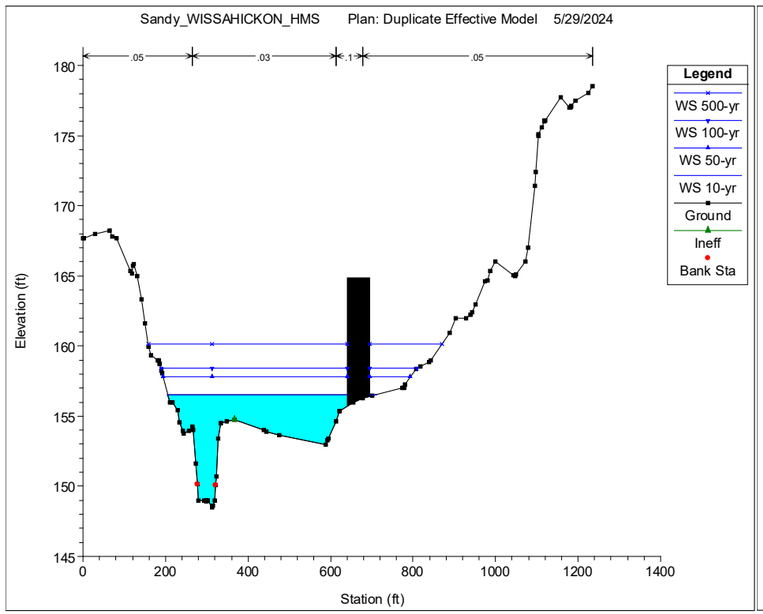
Plan: Duplicate Effective Model

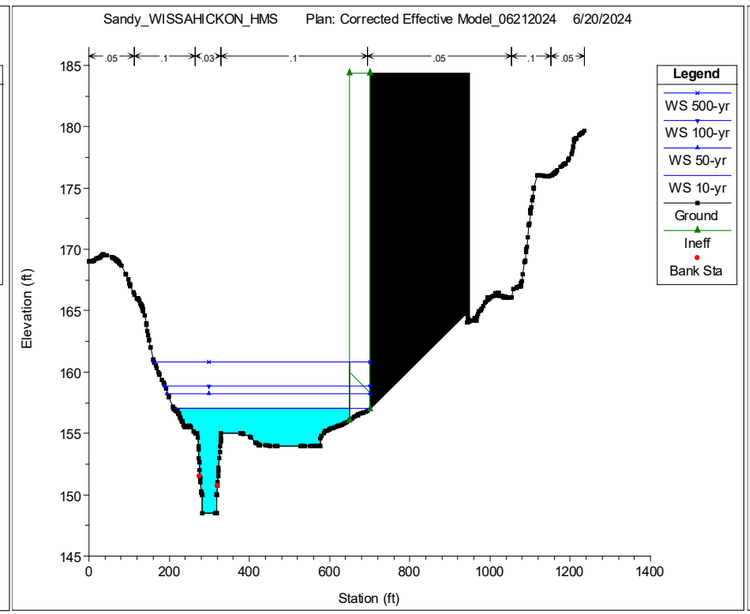
N/A

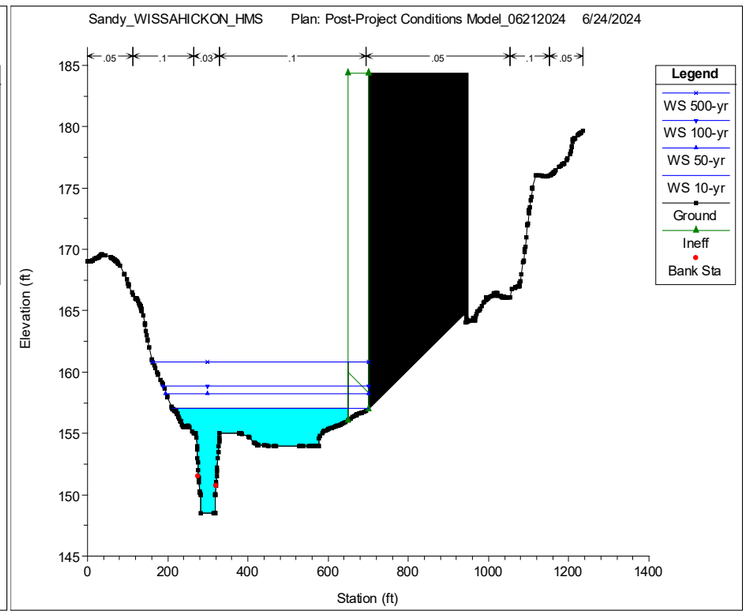




RS 2072.963



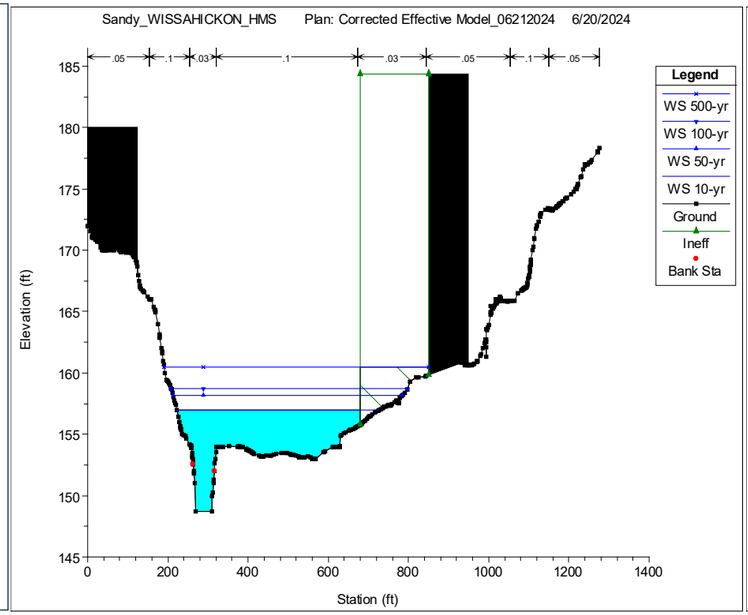


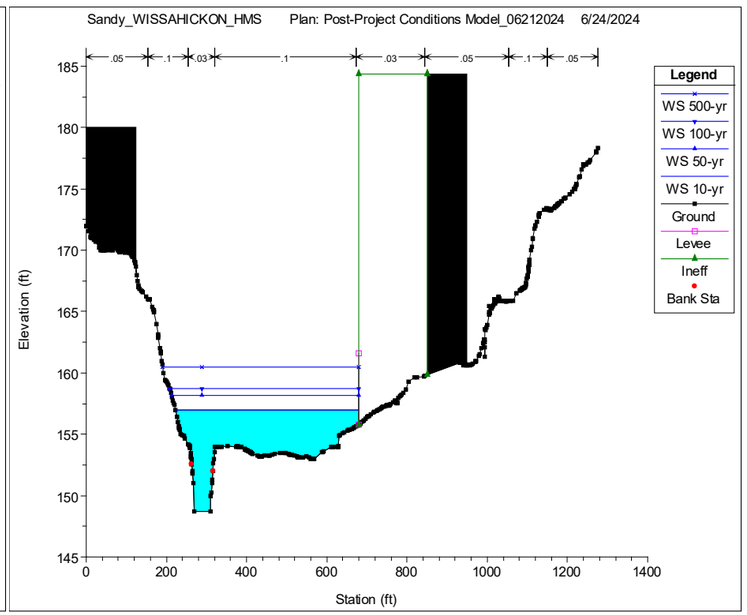


RS 1897 New Section

Plan: Duplicate Effective Model

N/A

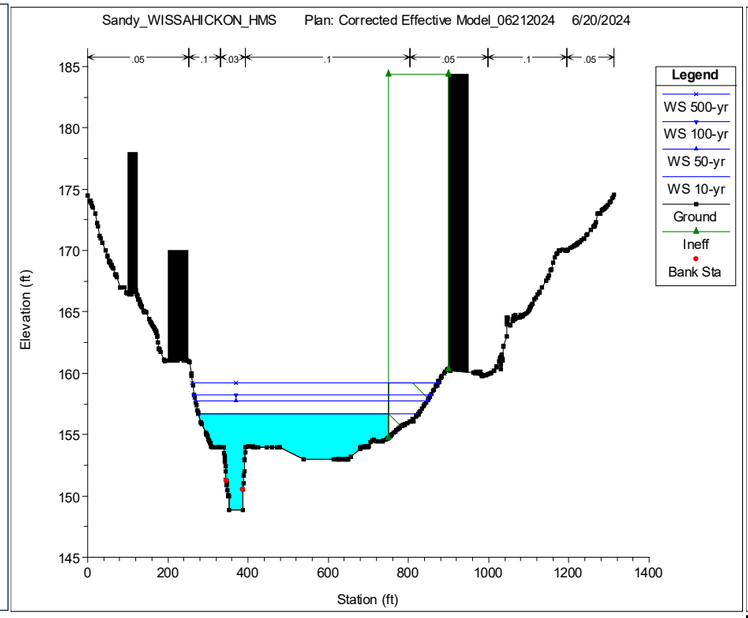


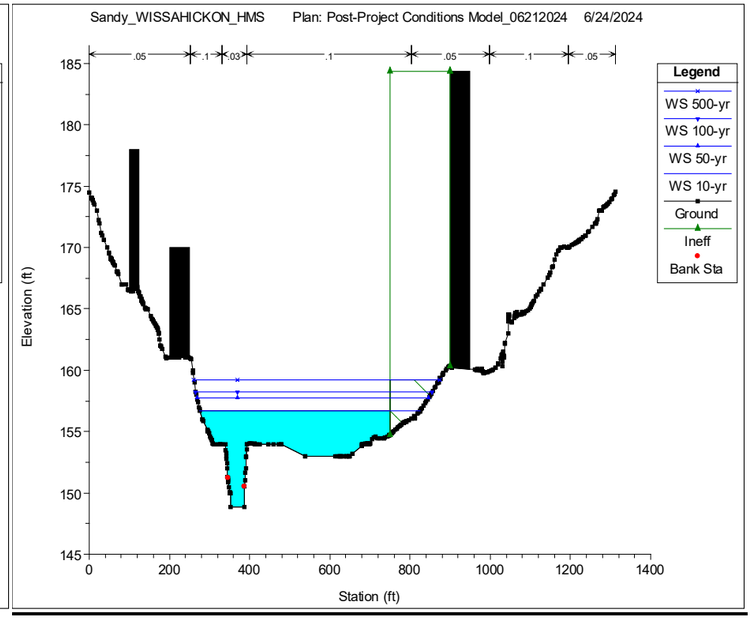


RS 1800 New Section

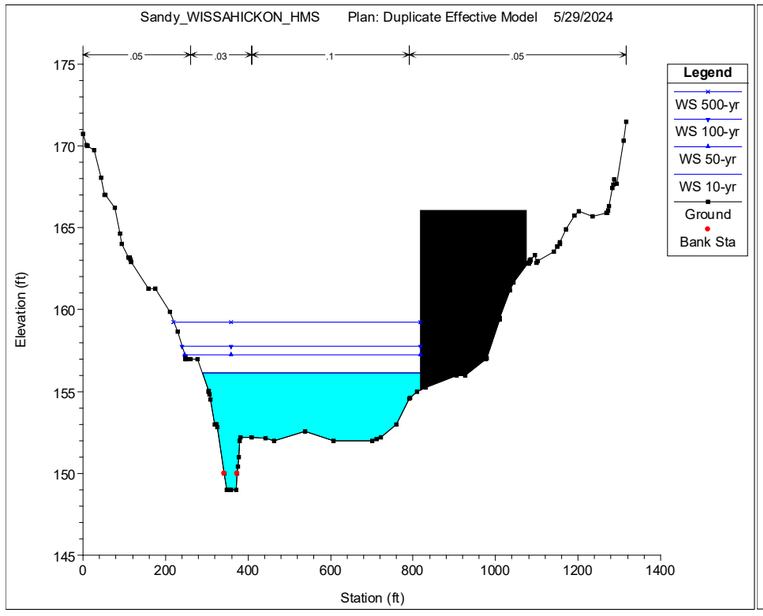
Plan: Duplicate Effective Model

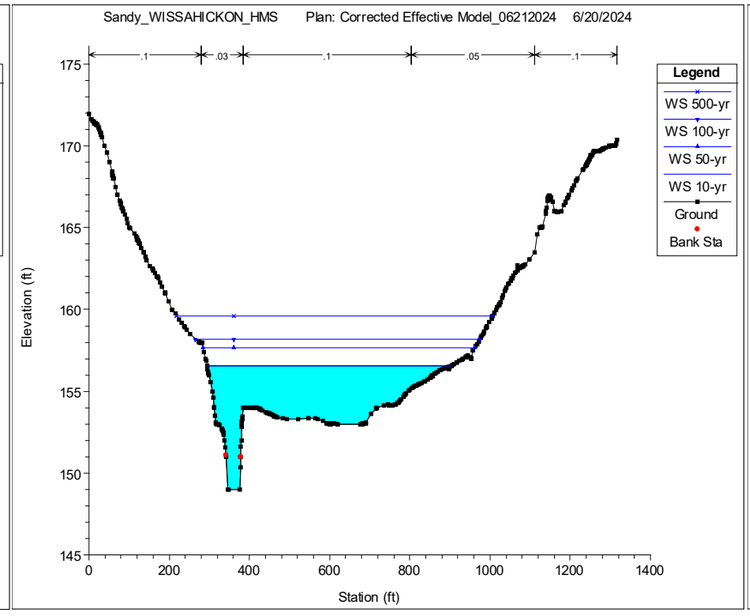
N/A

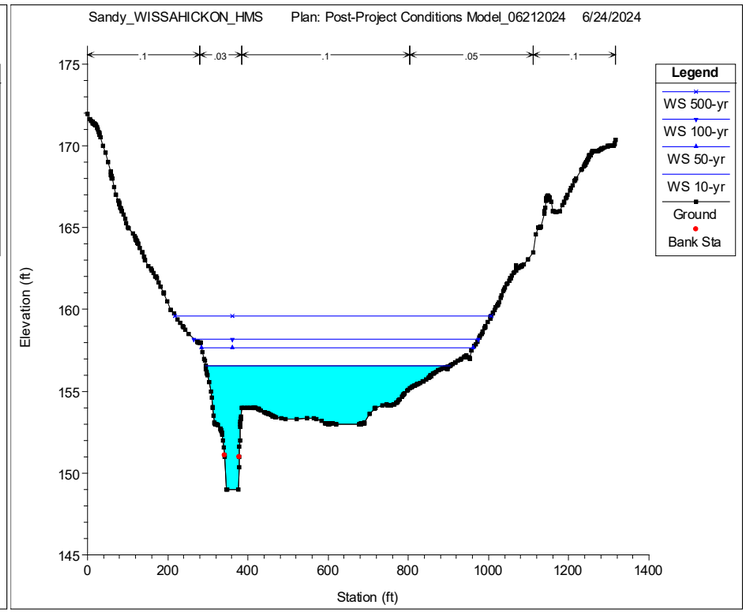




RS 1688.606



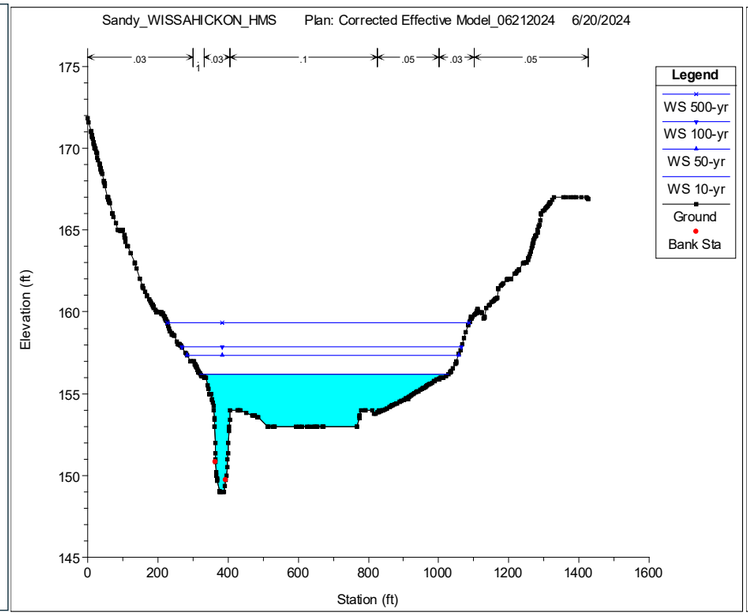


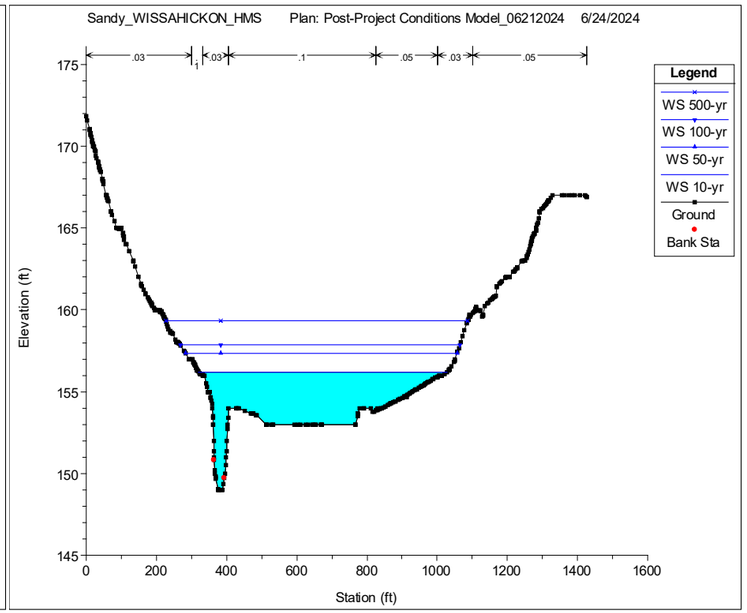


RS 1508 New Section

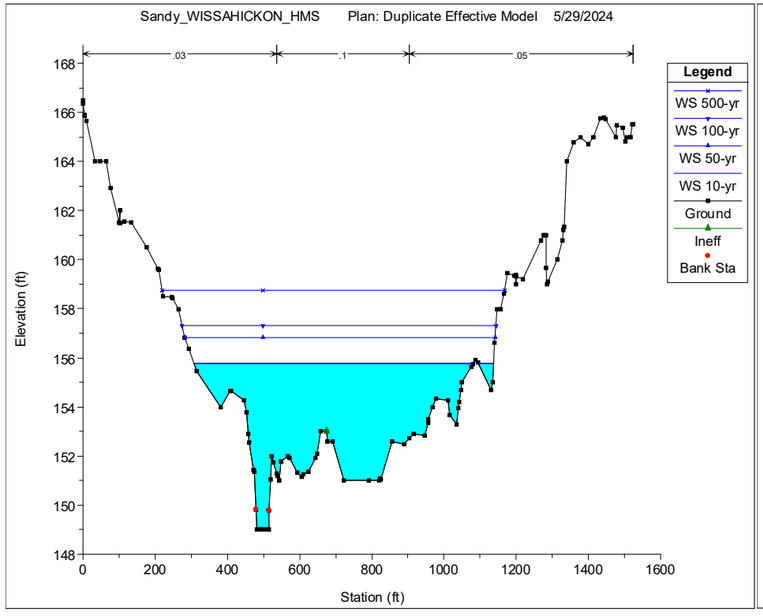
Plan: Duplicate Effective Model

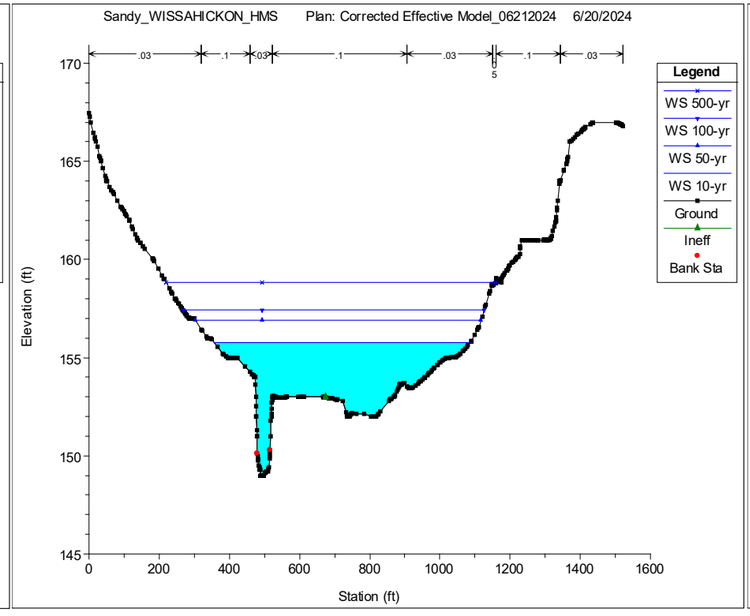
N/A

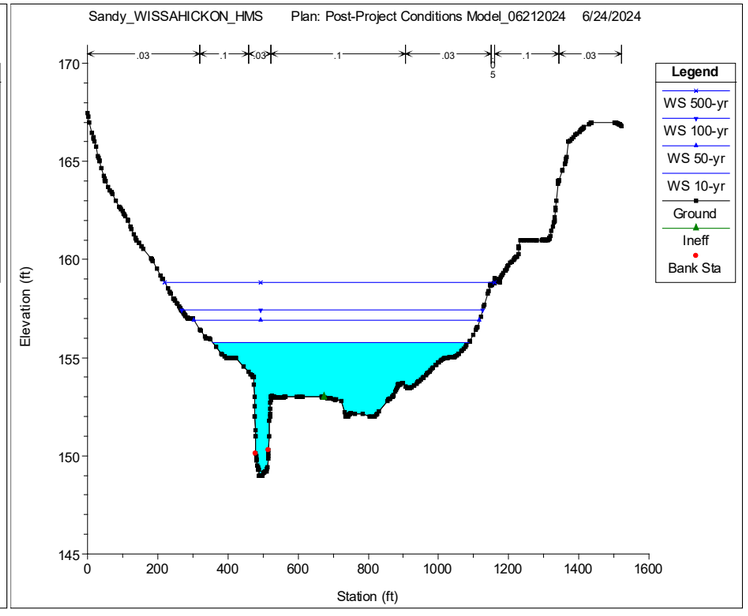




RS 1299.523



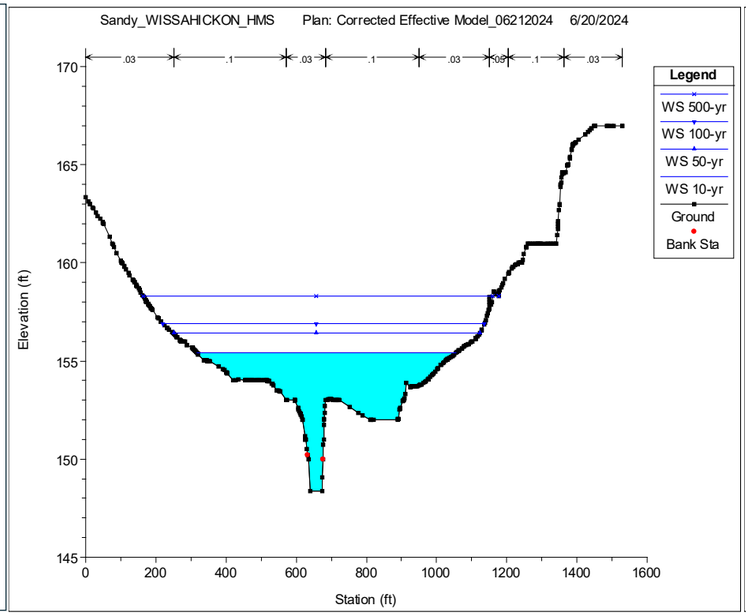


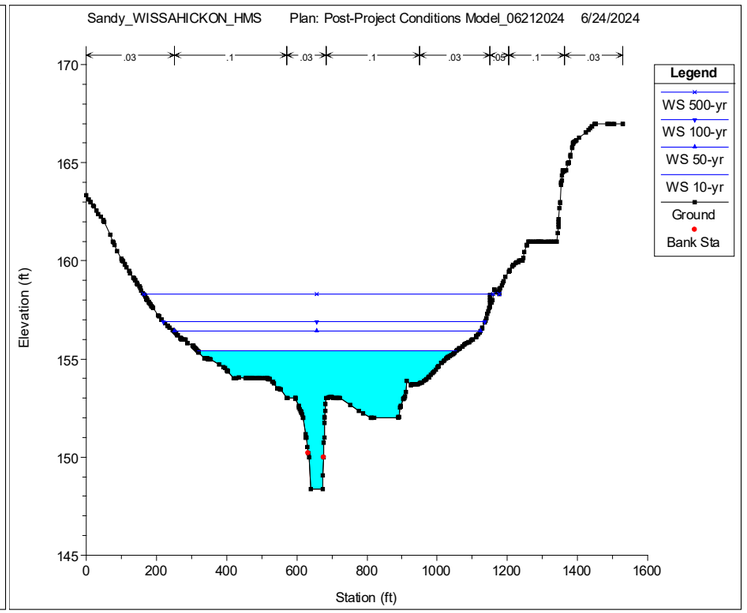


RS 1126 New Section

Plan: Duplicate Effective Model

N/A

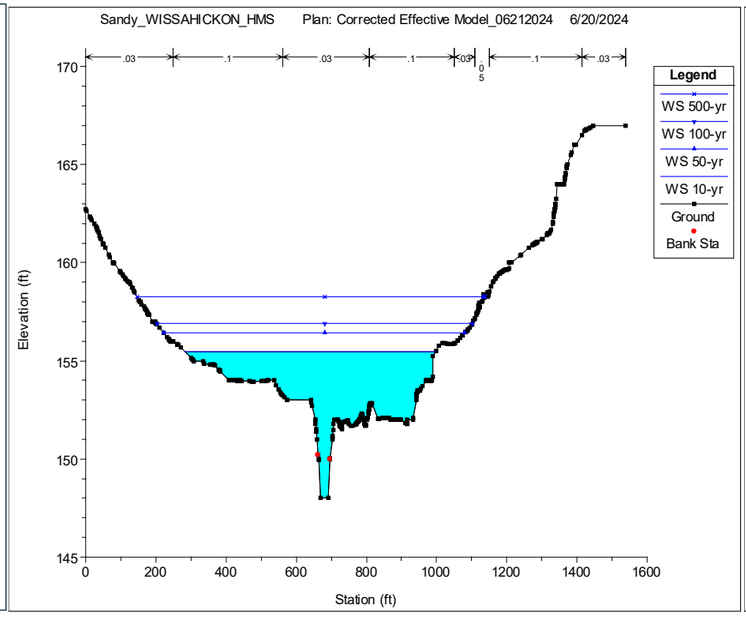


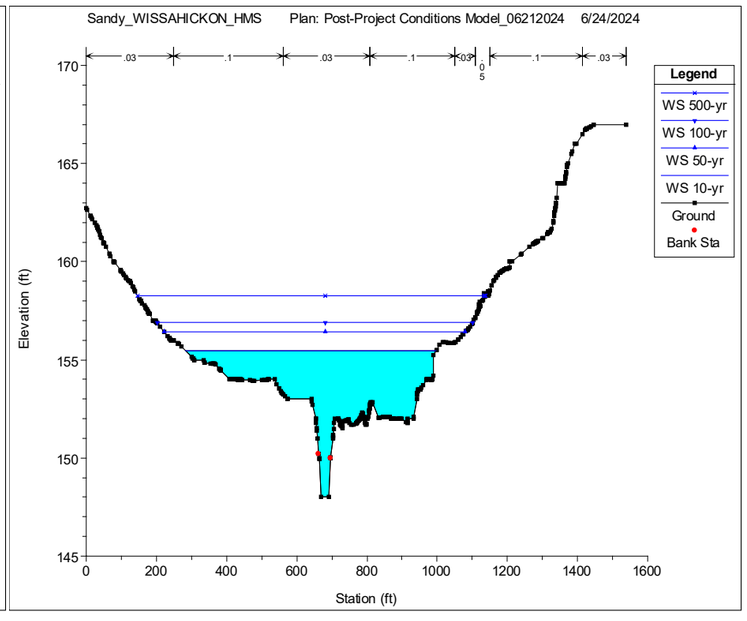


RS 1032 New Section

Plan: Duplicate Effective Model

N/A





Attachment 2
HEC-RAS Detailed Output Results Table for Study Area

HEC-RAS River: Sandy Run Reach: Sandy Main Stem (Continued)

Reach	River Sta	Profile	Plan	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)	
Sandy Main Stem	5084.678	10-yr	As-Built	4460.00	154.00	164.24	163.64	164.94	0.001232	7.87	848.98	561.07	0.44
Sandy Main Stem	5084.678	10-yr	DEM	4460.00	154.00	164.24	163.64	164.94	0.001232	7.87	848.98	561.07	0.44
Sandy Main Stem	5084.678	10-yr	PPCM_06212024	4460.00	154.00	164.24	163.64	164.94	0.001232	7.87	849.01	561.08	0.44
Sandy Main Stem	5084.678	10-yr	CEM_06212024	4460.00	154.00	164.24	163.64	164.94	0.001232	7.87	849.01	561.08	0.44
Sandy Main Stem	5084.678	50-yr	As-Built	7709.00	154.00	167.69	164.79	167.97	0.000382	5.35	2004.89	999.95	0.26
Sandy Main Stem	5084.678	50-yr	DEM	7709.00	154.00	167.69	164.79	167.97	0.000382	5.35	2004.89	999.95	0.26
Sandy Main Stem	5084.678	50-yr	PPCM_06212024	7709.00	154.00	167.69	164.79	167.97	0.000382	5.35	2004.89	999.95	0.26
Sandy Main Stem	5084.678	50-yr	CEM_06212024	7709.00	154.00	167.69	164.79	167.97	0.000382	5.35	2004.89	999.95	0.26
Sandy Main Stem	5084.678	100-yr	As-Built	9741.00	154.00	169.05	165.35	169.15	0.000149	3.57	4428.77	1031.22	0.16
Sandy Main Stem	5084.678	100-yr	DEM	9741.00	154.00	169.05	165.35	169.15	0.000149	3.57	4428.77	1031.22	0.16
Sandy Main Stem	5084.678	100-yr	PPCM_06212024	9741.00	154.00	169.05	165.35	169.15	0.000149	3.57	4428.77	1031.22	0.16
Sandy Main Stem	5084.678	100-yr	CEM_06212024	9741.00	154.00	169.05	165.35	169.15	0.000149	3.57	4428.77	1031.22	0.16
Sandy Main Stem	5084.678	500-yr	As-Built	16941.00	154.00	171.38	166.72	171.48	0.000132	3.70	8088.61	1118.99	0.16
Sandy Main Stem	5084.678	500-yr	DEM	16941.00	154.00	171.38	166.72	171.48	0.000132	3.70	8088.61	1118.99	0.16
Sandy Main Stem	5084.678	500-yr	PPCM_06212024	16941.00	154.00	171.42	166.72	171.52	0.000130	3.68	8138.12	1119.64	0.16
Sandy Main Stem	5084.678	500-yr	CEM_06212024	16941.00	154.00	171.42	166.72	171.52	0.000130	3.68	8137.98	1119.63	0.16
Sandy Main Stem	5065.378	10-yr	As-Built	4460.00	154.25	163.68	163.68	164.86	0.002136	9.59	651.70	495.40	0.57
Sandy Main Stem	5065.378	10-yr	DEM	4460.00	154.25	163.68	163.68	164.86	0.002136	9.59	651.70	495.40	0.57
Sandy Main Stem	5065.378	10-yr	PPCM_06212024	4460.00	154.25	163.68	163.68	164.86	0.002136	9.59	651.70	495.40	0.57
Sandy Main Stem	5065.378	10-yr	CEM_06212024	4460.00	154.25	163.68	163.68	164.86	0.002136	9.59	651.70	495.40	0.57
Sandy Main Stem	5065.378	50-yr	As-Built	7709.00	154.25	167.75	164.95	167.94	0.000258	4.29	2265.14	999.67	0.21
Sandy Main Stem	5065.378	50-yr	DEM	7709.00	154.25	167.75	164.95	167.94	0.000258	4.29	2265.14	999.67	0.21
Sandy Main Stem	5065.378	50-yr	PPCM_06212024	7709.00	154.25	167.75	164.95	167.94	0.000258	4.29	2265.14	999.67	0.21
Sandy Main Stem	5065.378	50-yr	CEM_06212024	7709.00	154.25	167.75	164.95	167.94	0.000258	4.29	2265.14	999.67	0.21
Sandy Main Stem	5065.378	100-yr	As-Built	9741.00	154.25	169.06	165.33	169.14	0.000098	2.83	4409.46	1035.60	0.13
Sandy Main Stem	5065.378	100-yr	DEM	9741.00	154.25	169.06	165.33	169.14	0.000098	2.83	4409.46	1035.60	0.13
Sandy Main Stem	5065.378	100-yr	PPCM_06212024	9741.00	154.25	169.06	165.33	169.14	0.000098	2.83	4409.46	1035.60	0.13
Sandy Main Stem	5065.378	100-yr	CEM_06212024	9741.00	154.25	169.06	165.33	169.14	0.000098	2.83	4409.46	1035.60	0.13
Sandy Main Stem	5065.378	500-yr	As-Built	16941.00	154.25	171.38	166.42	171.47	0.000088	2.97	8004.09	1136.29	0.13
Sandy Main Stem	5065.378	500-yr	DEM	16941.00	154.25	171.38	166.42	171.47	0.000088	2.97	8004.09	1136.29	0.13
Sandy Main Stem	5065.378	500-yr	PPCM_06212024	16941.00	154.25	171.42	166.42	171.52	0.000087	2.94	8054.34	1136.96	0.13
Sandy Main Stem	5065.378	500-yr	CEM_06212024	16941.00	154.25	171.42	166.42	171.52	0.000087	2.94	8054.18	1136.96	0.13
Sandy Main Stem	5039.878	10-yr	As-Built	4460.00	154.25	163.00	161.57	164.51	0.002857	10.48	545.34	579.14	0.65
Sandy Main Stem	5039.878	10-yr	DEM	4460.00	154.25	163.00	161.57	164.51	0.002857	10.48	545.34	579.14	0.65
Sandy Main Stem	5039.878	10-yr	PPCM_06212024	4460.00	154.25	162.94	161.57	164.52	0.002990	10.68	532.52	577.35	0.66
Sandy Main Stem	5039.878	10-yr	CEM_06212024	4460.00	154.25	162.94	161.57	164.52	0.002990	10.68	532.52	577.35	0.66
Sandy Main Stem	5039.878	50-yr	As-Built	7709.00	154.25	167.50	164.45	167.91	0.000485	5.79	1544.09	1005.05	0.29
Sandy Main Stem	5039.878	50-yr	DEM	7709.00	154.25	167.50	164.45	167.91	0.000485	5.79	1544.09	1005.05	0.29
Sandy Main Stem	5039.878	50-yr	PPCM_06212024	7709.00	154.25	167.50	164.45	167.91	0.000485	5.79	1544.09	1005.05	0.29
Sandy Main Stem	5039.878	50-yr	CEM_06212024	7709.00	154.25	167.50	164.45	167.91	0.000485	5.79	1544.09	1005.05	0.29
Sandy Main Stem	5039.878	100-yr	As-Built	9741.00	154.25	168.63	165.01	169.10	0.000474	6.06	1800.48	1239.02	0.29
Sandy Main Stem	5039.878	100-yr	DEM	9741.00	154.25	168.63	165.01	169.10	0.000474	6.06	1800.48	1239.02	0.29
Sandy Main Stem	5039.878	100-yr	PPCM_06212024	9741.00	154.25	168.63	165.01	169.10	0.000474	6.06	1800.48	1239.02	0.29
Sandy Main Stem	5039.878	100-yr	CEM_06212024	9741.00	154.25	168.63	165.01	169.10	0.000474	6.06	1800.48	1239.02	0.29
Sandy Main Stem	5039.878	500-yr	As-Built	16941.00	154.25	171.40	166.63	171.46	0.000054	2.31	10033.22	1560.25	0.10
Sandy Main Stem	5039.878	500-yr	DEM	16941.00	154.25	171.40	166.63	171.46	0.000054	2.31	10033.22	1560.25	0.10
Sandy Main Stem	5039.878	500-yr	PPCM_06212024	16941.00	154.25	171.45	166.63	171.50	0.000053	2.29	10101.78	1561.02	0.10
Sandy Main Stem	5039.878	500-yr	CEM_06212024	16941.00	154.25	171.45	166.63	171.50	0.000053	2.29	10101.56	1561.02	0.10
Sandy Main Stem	4865.578	10-yr	As-Built	4460.00	154.25	163.78	158.85	163.99	0.000338	3.79	1245.52	698.55	0.23
Sandy Main Stem	4865.578	10-yr	DEM	4460.00	154.25	163.78	158.85	163.99	0.000338	3.79	1245.52	698.55	0.23
Sandy Main Stem	4865.578	10-yr	PPCM_06212024	4460.00	154.25	163.77	158.85	163.98	0.000340	3.80	1242.85	697.08	0.23
Sandy Main Stem	4865.578	10-yr	CEM_06212024	4460.00	154.25	163.77	158.85	163.98	0.000340	3.80	1242.85	697.08	0.23
Sandy Main Stem	4865.578	50-yr	As-Built	7709.00	154.25	167.56	160.38	167.80	0.000238	4.06	1979.71	1282.71	0.20
Sandy Main Stem	4865.578	50-yr	DEM	7709.00	154.25	167.56	160.38	167.80	0.000238	4.06	1979.71	1282.71	0.20
Sandy Main Stem	4865.578	50-yr	PPCM_06212024	7709.00	154.25	167.56	160.38	167.80	0.000238	4.06	1979.71	1282.71	0.20
Sandy Main Stem	4865.578	50-yr	CEM_06212024	7709.00	154.25	167.56	160.38	167.80	0.000238	4.06	1979.71	1282.71	0.20
Sandy Main Stem	4865.578	100-yr	As-Built	9741.00	154.25	168.67	161.19	168.99	0.000271	4.59	2202.63	1318.82	0.22
Sandy Main Stem	4865.578	100-yr	DEM	9741.00	154.25	168.67	161.19	168.99	0.000271	4.59	2202.63	1318.82	0.22
Sandy Main Stem	4865.578	100-yr	PPCM_06212024	9741.00	154.25	168.67	161.19	168.99	0.000271	4.59	2202.63	1318.82	0.22
Sandy Main Stem	4865.578	100-yr	CEM_06212024	9741.00	154.25	168.67	161.19	168.99	0.000271	4.59	2202.63	1318.82	0.22
Sandy Main Stem	4865.578	500-yr	As-Built	16941.00	154.25	171.40	163.64	171.45	0.000042	2.05	10893.06	1410.36	0.09
Sandy Main Stem	4865.578	500-yr	DEM	16941.00	154.25	171.40	163.64	171.45	0.000042	2.05	10893.06	1410.36	0.09
Sandy Main Stem	4865.578	500-yr	PPCM_06212024	16941.00	154.25	171.45	163.64	171.49	0.000041	2.04	10955.06	1411.16	0.09
Sandy Main Stem	4865.578	500-yr	CEM_06212024	16941.00	154.25	171.45	163.64	171.49	0.000041	2.04	10954.85	1411.16	0.09
Sandy Main Stem	4790.088	10-yr	As-Built	4460.00	154.00	163.63	161.06	163.95	0.000597	5.17	1191.20	689.70	0.30
Sandy Main Stem	4790.088	10-yr	DEM	4460.00	154.00	163.63	161.06	163.95	0.000597	5.17	1191.20	689.70	0.30
Sandy Main Stem	4790.088	10-yr	PPCM_06212024	4460.00	154.00	163.61	161.06	163.93	0.000603	5.19	1187.22	689.25	0.31
Sandy Main Stem	4790.088	10-yr	CEM_06212024	4460.00	154.00	163.61	161.06	163.93	0.000603	5.19	1187.22	689.25	0.31
Sandy Main Stem	4790.088	50-yr	As-Built	7709.00	154.00	167.51	162.63	167.78	0.000268	4.40	2163.37	1226.06	0.22
Sandy Main Stem	4790.088	50-yr	DEM	7709.00	154.00	167.51	162.63	167.78	0.000268	4.40	2163.37	1226.06	0.22
Sandy Main Stem	4790.088	50-yr	PPCM_06212024	7709.00	154.00	167.51	162.63	167.78	0.000268	4.40	2163.37	1226.06	0.22
Sandy Main Stem	4790.088	50-yr	CEM_06212024	7709.00	154.00	167.51	162.63	167.78	0.000268	4.40	2163.37	1226.06	0.22
Sandy Main Stem	4790.088	100-yr	As-Built	9741.00	154.00	168.63	163.20	168.96	0.000285	4.80	2451.58	1331.95	0.23
Sandy Main Stem	4790.088	100-yr	DEM	9741.00	154.00	168.63	163.20	168.96	0.000285	4.80	2451.58	1331.95	0.23
Sandy Main Stem	4790.088	100-yr	PPCM_06212024	9741.00	154.00	168.63	163.20	168.96	0.000285	4.80	2451.58	1331.95	0.23
Sandy Main Stem	4790.088	100-yr	CEM_06212024	9741.00	154.00	168.63	163.20	168.96	0.000285	4.80	2451.58	1331.95	0.23
Sandy Main Stem	4790.088	500-yr	As-Built	16941.00	154.00	171.39	164.83	171.44	0.000072	2.72	10764.92	1444.20	0.12
Sandy Main Stem	4790.088	500-yr	DEM	16941.00	154.00	171.39	164.83	171.44	0.000072	2.72	10764.92	1444.20	0.12
Sandy Main Stem	4790.088	500-yr	PPCM_06212024	16941.00	154.00	171.43	164.83	171.49	0.000070	2.70	10828.82	1445.02	0.12
Sandy Main Stem	4790.088	500-yr	CEM_06212024	16941.00	154.00	171.43	164.83	171.49	0.000070	2.70	10828.57	1445.01	0.12
Sandy Main Stem	4777.088	10-yr	As-Built	4460.00	154.25	163.61	160.84	163.94	0.000566	5.01	1015.63	917.70	0.30
Sandy Main Stem	4777.088	10-yr	DEM	4460.00	154.25	163.61	160.84	163.94	0.000566	5.01	1015.63	917.70	0.30
Sandy Main Stem	4777.088	10-yr	PPCM_06212024	4460.00	154.25	163.60	160.84	163.93	0.000571	5.03	1012.80	917.22	0.30
Sandy Main Stem	4777.088	10-yr	CEM_06212024	4460.00	154.25	163.60	160.84	163.93	0.000571	5.03	1012.80	917.22	0.30

Note:
As-Built = Effective Model
DEM = Duplicate Effective Model
CEM_06212024 = Corrected Effective Model
PPCM_06212024 = Post-Project Conditions Model

HEC-RAS River: Sandy Run Reach: Sandy Main Stem (Continued)

Reach	River Sta	Profile	Plan	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)	
Sandy Main Stem	4777.088	50-yr	As-Built	7709.00	154.25	167.44	162.18	167.76	0.000314	4.74	1712.03	1372.39	0.23
Sandy Main Stem	4777.088	50-yr	DEM	7709.00	154.25	167.44	162.18	167.76	0.000314	4.74	1712.03	1372.39	0.23
Sandy Main Stem	4777.088	50-yr	PPCM_06212024	7709.00	154.25	167.44	162.18	167.76	0.000314	4.74	1712.03	1372.39	0.23
Sandy Main Stem	4777.088	50-yr	CEM_06212024	7709.00	154.25	167.44	162.18	167.76	0.000314	4.74	1712.03	1372.39	0.23
Sandy Main Stem	4777.088	100-yr	As-Built	9741.00	154.25	168.53	162.83	168.94	0.000349	5.27	1913.87	1397.55	0.25
Sandy Main Stem	4777.088	100-yr	DEM	9741.00	154.25	168.53	162.83	168.94	0.000349	5.27	1913.87	1397.55	0.25
Sandy Main Stem	4777.088	100-yr	PPCM_06212024	9741.00	154.25	168.53	162.83	168.94	0.000349	5.27	1913.87	1397.55	0.25
Sandy Main Stem	4777.088	100-yr	CEM_06212024	9741.00	154.25	168.53	162.83	168.94	0.000349	5.27	1913.87	1397.55	0.25
Sandy Main Stem	4777.088	500-yr	As-Built	16941.00	154.25	171.40	164.76	171.43	0.000027	1.65	12581.67	1496.42	0.07
Sandy Main Stem	4777.088	500-yr	DEM	16941.00	154.25	171.40	164.76	171.43	0.000027	1.65	12581.67	1496.42	0.07
Sandy Main Stem	4777.088	500-yr	PPCM_06212024	16941.00	154.25	171.44	164.76	171.47	0.000026	1.64	12647.63	1496.94	0.07
Sandy Main Stem	4777.088	500-yr	CEM_06212024	16941.00	154.25	171.44	164.76	171.47	0.000026	1.64	12647.38	1496.94	0.07
Sandy Main Stem	4740			Bridge									
Sandy Main Stem	4685.592	10-yr	As-Built	4460.00	154.00	161.51	160.67	162.91	0.003319	10.33	752.20	805.22	0.69
Sandy Main Stem	4685.592	10-yr	DEM	4460.00	154.00	161.51	160.67	162.91	0.003319	10.33	752.20	805.22	0.69
Sandy Main Stem	4685.592	10-yr	PPCM_06212024	4460.00	154.00	161.36	160.67	162.85	0.003613	10.62	725.91	796.05	0.72
Sandy Main Stem	4685.592	10-yr	CEM_06212024	4460.00	154.00	161.36	160.67	162.85	0.003613	10.62	725.91	796.05	0.72
Sandy Main Stem	4685.592	50-yr	As-Built	7709.00	154.00	162.84	162.56	165.35	0.004934	14.17	992.85	827.66	0.87
Sandy Main Stem	4685.592	50-yr	DEM	7709.00	154.00	162.84	162.56	165.35	0.004934	14.17	992.85	827.66	0.87
Sandy Main Stem	4685.592	50-yr	PPCM_06212024	7709.00	154.00	163.12	162.56	165.40	0.004339	13.58	1042.55	830.70	0.82
Sandy Main Stem	4685.592	50-yr	CEM_06212024	7709.00	154.00	163.12	162.56	165.40	0.004338	13.58	1042.57	830.71	0.82
Sandy Main Stem	4685.592	100-yr	As-Built	9741.00	154.00	163.53	163.53	166.72	0.005758	16.15	1117.20	835.28	0.95
Sandy Main Stem	4685.592	100-yr	DEM	9741.00	154.00	163.53	163.53	166.72	0.005758	16.15	1117.20	835.28	0.95
Sandy Main Stem	4685.592	100-yr	PPCM_06212024	9741.00	154.00	163.72	163.53	166.73	0.005318	15.73	1150.51	837.32	0.92
Sandy Main Stem	4685.592	100-yr	CEM_06212024	9741.00	154.00	163.72	163.53	166.73	0.005318	15.73	1150.54	837.32	0.92
Sandy Main Stem	4685.592	500-yr	As-Built	16941.00	154.00	167.22	165.40	167.45	0.000669	6.93	7975.47	892.37	0.34
Sandy Main Stem	4685.592	500-yr	DEM	16941.00	154.00	167.22	165.40	167.45	0.000669	6.93	7975.47	892.37	0.34
Sandy Main Stem	4685.592	500-yr	PPCM_06212024	16941.00	154.00	167.39	165.40	167.61	0.000632	6.79	8126.06	894.42	0.33
Sandy Main Stem	4685.592	500-yr	CEM_06212024	16941.00	154.00	167.39	165.40	167.61	0.000632	6.79	8125.91	894.42	0.33
Sandy Main Stem	4327.181	10-yr	As-Built	4460.00	152.00	161.72		161.86	0.000618	4.76	2621.76	538.59	0.28
Sandy Main Stem	4327.181	10-yr	DEM	4460.00	152.00	161.72		161.86	0.000618	4.76	2621.76	538.59	0.28
Sandy Main Stem	4327.181	10-yr	PPCM_06212024	4460.00	152.00	161.58		161.73	0.000668	4.90	2546.15	537.06	0.29
Sandy Main Stem	4327.181	10-yr	CEM_06212024	4460.00	152.00	161.58		161.73	0.000668	4.90	2546.15	537.06	0.29
Sandy Main Stem	4327.181	50-yr	As-Built	7709.00	152.00	163.43		163.64	0.000802	6.07	3567.59	561.85	0.32
Sandy Main Stem	4327.181	50-yr	DEM	7709.00	152.00	163.43		163.64	0.000802	6.07	3567.59	561.85	0.32
Sandy Main Stem	4327.181	50-yr	PPCM_06212024	7709.00	152.00	163.65		163.85	0.000727	5.86	3695.26	563.91	0.31
Sandy Main Stem	4327.181	50-yr	CEM_06212024	7709.00	152.00	163.65		163.85	0.000727	5.86	3695.31	563.91	0.31
Sandy Main Stem	4327.181	100-yr	As-Built	9741.00	152.00	164.33		164.57	0.000880	6.71	4077.84	570.03	0.34
Sandy Main Stem	4327.181	100-yr	DEM	9741.00	152.00	164.33		164.57	0.000880	6.71	4077.84	570.03	0.34
Sandy Main Stem	4327.181	100-yr	PPCM_06212024	9741.00	152.00	164.53		164.76	0.000815	6.52	4190.21	571.79	0.33
Sandy Main Stem	4327.181	100-yr	CEM_06212024	9741.00	152.00	164.53		164.76	0.000815	6.52	4190.26	571.79	0.33
Sandy Main Stem	4327.181	500-yr	As-Built	16941.00	152.00	166.74		167.12	0.001149	8.66	5488.75	600.93	0.41
Sandy Main Stem	4327.181	500-yr	DEM	16941.00	152.00	166.74		167.12	0.001149	8.66	5488.75	600.93	0.41
Sandy Main Stem	4327.181	500-yr	PPCM_06212024	16941.00	152.00	166.94		167.30	0.001081	8.48	5606.00	602.99	0.39
Sandy Main Stem	4327.181	500-yr	CEM_06212024	16941.00	152.00	166.94		167.30	0.001081	8.48	5605.89	602.99	0.39
Sandy Main Stem	3964.325	10-yr	As-Built	4460.00	152.00	161.44		161.64	0.000593	5.10	2596.87	473.75	0.30
Sandy Main Stem	3964.325	10-yr	DEM	4460.00	152.00	161.44		161.64	0.000593	5.10	2596.87	473.75	0.30
Sandy Main Stem	3964.325	10-yr	PPCM_06212024	4460.00	152.00	161.28		161.49	0.000645	5.25	2519.95	471.35	0.32
Sandy Main Stem	3964.325	10-yr	CEM_06212024	4460.00	152.00	161.28		161.49	0.000645	5.25	2519.95	471.35	0.32
Sandy Main Stem	3964.325	50-yr	As-Built	7709.00	152.00	162.99		163.33	0.000871	6.89	3346.65	493.06	0.38
Sandy Main Stem	3964.325	50-yr	DEM	7709.00	152.00	162.99		163.33	0.000871	6.89	3346.65	493.06	0.38
Sandy Main Stem	3964.325	50-yr	PPCM_06212024	7709.00	152.00	163.26		163.57	0.000784	6.65	3479.85	504.56	0.36
Sandy Main Stem	3964.325	50-yr	CEM_06212024	7709.00	152.00	163.26		163.57	0.000784	6.65	3479.89	504.56	0.36
Sandy Main Stem	3964.325	100-yr	As-Built	9741.00	152.00	163.80		164.22	0.001012	7.81	3760.85	523.01	0.41
Sandy Main Stem	3964.325	100-yr	DEM	9741.00	152.00	163.80		164.22	0.001012	7.81	3760.85	523.01	0.41
Sandy Main Stem	3964.325	100-yr	PPCM_06212024	9741.00	152.00	164.04		164.43	0.000923	7.57	3886.69	526.53	0.40
Sandy Main Stem	3964.325	100-yr	CEM_06212024	9741.00	152.00	164.04		164.43	0.000923	7.57	3886.75	526.53	0.40
Sandy Main Stem	3964.325	500-yr	As-Built	16941.00	152.00	165.93		166.63	0.001450	10.51	4906.00	557.93	0.51
Sandy Main Stem	3964.325	500-yr	DEM	16941.00	152.00	165.93		166.63	0.001450	10.51	4906.00	557.93	0.51
Sandy Main Stem	3964.325	500-yr	PPCM_06212024	16941.00	152.00	166.18		166.84	0.001338	10.22	5047.90	561.40	0.49
Sandy Main Stem	3964.325	500-yr	CEM_06212024	16941.00	152.00	166.18		166.84	0.001338	10.22	5047.77	561.40	0.49
Sandy Main Stem	3515.389	10-yr	As-Built	4460.00	150.35	161.31		161.42	0.000323	4.23	3689.13	621.26	0.23
Sandy Main Stem	3515.389	10-yr	DEM	4460.00	150.35	161.31		161.42	0.000323	4.23	3689.13	621.26	0.23
Sandy Main Stem	3515.389	10-yr	PPCM_06212024	4460.00	150.35	161.14		161.26	0.000350	4.36	3580.65	617.54	0.24
Sandy Main Stem	3515.389	10-yr	CEM_06212024	4460.00	150.35	161.14		161.26	0.000350	4.36	3580.65	617.54	0.24
Sandy Main Stem	3515.389	50-yr	As-Built	7709.00	150.35	162.80		162.99	0.000516	5.84	4645.55	663.54	0.30
Sandy Main Stem	3515.389	50-yr	DEM	7709.00	150.35	162.80		162.99	0.000516	5.84	4645.55	663.54	0.30
Sandy Main Stem	3515.389	50-yr	PPCM_06212024	7709.00	150.35	163.09		163.27	0.000459	5.60	4839.57	666.98	0.28
Sandy Main Stem	3515.389	50-yr	CEM_06212024	7709.00	150.35	163.09		163.27	0.000459	5.60	4839.61	666.98	0.28
Sandy Main Stem	3515.389	100-yr	As-Built	9741.00	150.35	163.59		163.83	0.000607	6.61	5172.71	673.96	0.33
Sandy Main Stem	3515.389	100-yr	DEM	9741.00	150.35	163.59		163.83	0.000607	6.61	5172.71	673.96	0.33
Sandy Main Stem	3515.389	100-yr	PPCM_06212024	9741.00	150.35	163.85		164.07	0.000552	6.39	5350.43	678.71	0.31
Sandy Main Stem	3515.389	100-yr	CEM_06212024	9741.00	150.35	163.85		164.07	0.000552	6.39	5350.52	678.72	0.31
Sandy Main Stem	3515.389	500-yr	As-Built	16941.00	150.35	165.62		166.04	0.000933	9.05	6581.32	715.88	0.41
Sandy Main Stem	3515.389	500-yr	DEM	16941.00	150.35	165.62		166.04	0.000933	9.05	6581.32	715.88	0.41
Sandy Main Stem	3515.389	500-yr	PPCM_06212024	16941.00	150.35	165.90		166.30	0.000856	8.77	6785.80	720.66	0.40
Sandy Main Stem	3515.389	500-yr	CEM_06212024	16941.00	150.35	165.90		166.30	0.000856	8.77	6785.62	720.66	0.40
Sandy Main Stem	3004.364	10-yr	As-Built	4460.00	150.00	161.13	156.74	161.25	0.000333	4.31	3193.54	640.98	0.23
Sandy Main Stem	3004.364	10-yr	DEM	4460.00	150.00	161.13	156.74	161.25	0.000333	4.31	3193.54	640.98	0.23
Sandy Main Stem	3004.364	10-yr	PPCM_06212024	4460.00	150.00	160.94	156.74	161.07	0.000362	4.45	3072.98	620.96	0.24
Sandy Main Stem	3004.364	10-yr	CEM_06212024	4460.00	150.00	160.94	156.74	161.07	0.000362	4.45	3072.98	620.96	0.24
Sandy Main Stem	3004.364	50-yr	As-Built	7709.00	150.00	162.54	158.36	162.73	0.000487	5.67	4160.85	718.72	0.29
Sandy Main Stem	3004.364	50-yr	DEM	7709.00	150.00	162.54	158.36	162.73	0.000487	5.67	4160.85	718.72	0.29

Note:
As-Built = Effective Model
DEM = Duplicate Effective Model
CEM_06212024 = Corrected Effective Model
PPCM_06212024 = Post-Project Conditions Model

HEC-RAS River: Sandy Run Reach: Sandy Main Stem (Continued)

Reach	River Sta	Profile	Plan	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)	
Sandy Main Stem	3004.364	50-yr	PPCM_06212024	7709.00	150.00	162.87	158.36	163.04	0.000412	5.32	4401.47	730.28	0.27
Sandy Main Stem	3004.364	50-yr	CEM_06212024	7709.00	150.00	162.87	158.36	163.04	0.000412	5.32	4401.53	730.29	0.27
Sandy Main Stem	3004.364	100-yr	As-Built	9741.00	150.00	163.31	159.11	163.53	0.000532	6.18	4722.14	740.33	0.31
Sandy Main Stem	3004.364	100-yr	DEM	9741.00	150.00	163.31	159.11	163.53	0.000532	6.18	4722.14	740.33	0.31
Sandy Main Stem	3004.364	100-yr	PPCM_06212024	9741.00	150.00	163.61	159.11	163.80	0.000462	5.85	4946.05	747.75	0.29
Sandy Main Stem	3004.364	100-yr	CEM_06212024	9741.00	150.00	163.61	159.11	163.80	0.000462	5.85	4946.16	747.75	0.29
Sandy Main Stem	3004.364	500-yr	As-Built	16941.00	150.00	165.28	160.90	165.60	0.000675	7.67	6237.80	816.80	0.35
Sandy Main Stem	3004.364	500-yr	DEM	16941.00	150.00	165.28	160.90	165.60	0.000675	7.67	6237.80	816.80	0.35
Sandy Main Stem	3004.364	500-yr	PPCM_06212024	16941.00	150.00	165.61	160.90	165.90	0.000591	7.28	6510.44	831.91	0.33
Sandy Main Stem	3004.364	500-yr	CEM_06212024	16941.00	150.00	165.61	160.90	165.90	0.000591	7.29	6510.20	831.90	0.33
Sandy Main Stem	2590.359	10-yr	As-Built	4460.00	150.00	161.01	156.02	161.12	0.000321	3.54	2128.25	467.74	0.19
Sandy Main Stem	2590.359	10-yr	DEM	4460.00	150.00	161.01	156.02	161.12	0.000321	3.54	2128.25	467.74	0.19
Sandy Main Stem	2590.359	10-yr	PPCM_06212024	4460.00	150.00	160.80	156.02	160.92	0.000365	3.72	1927.86	462.74	0.21
Sandy Main Stem	2590.359	10-yr	CEM_06212024	4460.00	150.00	160.80	156.02	160.92	0.000365	3.72	1927.86	462.74	0.21
Sandy Main Stem	2590.359	50-yr	As-Built	7709.00	150.00	162.36	158.27	162.54	0.000513	4.84	2791.07	529.74	0.25
Sandy Main Stem	2590.359	50-yr	DEM	7709.00	150.00	162.36	158.27	162.54	0.000513	4.84	2791.07	529.74	0.25
Sandy Main Stem	2590.359	50-yr	PPCM_06212024	7709.00	150.00	162.71	158.27	162.88	0.000437	4.56	2982.05	534.21	0.23
Sandy Main Stem	2590.359	50-yr	CEM_06212024	7709.00	150.00	162.71	158.27	162.88	0.000437	4.56	2982.09	534.21	0.23
Sandy Main Stem	2590.359	100-yr	As-Built	9741.00	150.00	163.09	159.46	163.31	0.000595	5.43	3180.76	537.82	0.27
Sandy Main Stem	2590.359	100-yr	DEM	9741.00	150.00	163.09	159.46	163.31	0.000595	5.43	3180.76	537.82	0.27
Sandy Main Stem	2590.359	100-yr	PPCM_06212024	9741.00	150.00	163.41	159.46	163.62	0.000520	5.16	3356.73	541.00	0.25
Sandy Main Stem	2590.359	100-yr	CEM_06212024	9741.00	150.00	163.41	159.46	163.62	0.000519	5.16	3356.82	541.00	0.25
Sandy Main Stem	2590.359	500-yr	As-Built	16941.00	150.00	164.89	160.34	165.29	0.000897	7.30	4168.66	549.94	0.34
Sandy Main Stem	2590.359	500-yr	DEM	16941.00	150.00	164.89	160.34	165.29	0.000897	7.30	4168.66	549.94	0.34
Sandy Main Stem	2590.359	500-yr	PPCM_06212024	16941.00	150.00	165.26	160.34	165.63	0.000788	6.96	4374.34	549.94	0.32
Sandy Main Stem	2590.359	500-yr	CEM_06212024	16941.00	150.00	165.26	160.34	165.63	0.000788	6.96	4374.18	549.94	0.32
Sandy Main Stem	2500			Bridge									
Sandy Main Stem	2417.391	10-yr	As-Built	4460.00	150.00	156.86	156.09	157.19	0.001199	6.12	1188.15	454.78	0.41
Sandy Main Stem	2417.391	10-yr	DEM	4460.00	150.00	156.86	156.09	157.19	0.001199	6.12	1188.15	454.78	0.41
Sandy Main Stem	2417.391	10-yr	PPCM_06212024	4460.00	150.00	157.88	156.93	158.61	0.001989	8.34	1267.33	415.69	0.54
Sandy Main Stem	2417.391	10-yr	CEM_06212024	4460.00	150.00	157.88	156.93	158.61	0.001989	8.34	1267.33	415.69	0.54
Sandy Main Stem	2417.391	50-yr	As-Built	7709.00	150.00	158.15	156.83	158.51	0.001101	6.58	1781.29	466.23	0.41
Sandy Main Stem	2417.391	50-yr	DEM	7709.00	150.00	158.15	156.83	158.51	0.001101	6.58	1781.29	466.23	0.41
Sandy Main Stem	2417.391	50-yr	PPCM_06212024	7709.00	150.00	159.57	158.31	160.44	0.002092	9.80	2014.37	459.06	0.57
Sandy Main Stem	2417.391	50-yr	CEM_06212024	7709.00	150.00	159.57	158.31	160.44	0.002092	9.80	2014.40	459.06	0.57
Sandy Main Stem	2417.391	100-yr	As-Built	9741.00	150.00	158.77	157.19	159.18	0.001111	6.95	2072.37	472.71	0.42
Sandy Main Stem	2417.391	100-yr	DEM	9741.00	150.00	158.77	157.19	159.18	0.001111	6.95	2072.37	472.71	0.42
Sandy Main Stem	2417.391	100-yr	PPCM_06212024	9741.00	150.00	160.34	158.96	161.33	0.002265	10.77	2378.26	486.92	0.60
Sandy Main Stem	2417.391	100-yr	CEM_06212024	9741.00	150.00	160.34	158.96	161.33	0.002265	10.77	2378.33	486.92	0.60
Sandy Main Stem	2417.391	500-yr	As-Built	16941.00	150.00	160.54	158.25	161.11	0.001152	8.01	2957.36	569.09	0.44
Sandy Main Stem	2417.391	500-yr	DEM	16941.00	150.00	160.54	158.25	161.11	0.001152	8.01	2957.36	569.09	0.44
Sandy Main Stem	2417.391	500-yr	PPCM_06212024	16941.00	150.00	162.94	161.00	163.95	0.002021	11.88	3850.08	643.10	0.59
Sandy Main Stem	2417.391	500-yr	CEM_06212024	16941.00	150.00	162.94	161.00	163.95	0.002021	11.88	3850.25	643.10	0.59
Sandy Main Stem	2267	10-yr	PPCM_06212024	4460.00	149.40	157.55		158.31	0.001951	8.25	1336.80	413.29	0.53
Sandy Main Stem	2267	10-yr	CEM_06212024	4460.00	149.40	157.55		158.31	0.001951	8.25	1336.80	413.29	0.53
Sandy Main Stem	2267	50-yr	PPCM_06212024	7709.00	149.40	158.96		160.04	0.002513	10.48	1970.93	492.27	0.62
Sandy Main Stem	2267	50-yr	CEM_06212024	7709.00	149.40	158.96		160.04	0.002513	10.48	1971.00	492.27	0.62
Sandy Main Stem	2267	100-yr	PPCM_06212024	9741.00	149.40	159.75		160.92	0.002592	11.26	2366.59	500.00	0.63
Sandy Main Stem	2267	100-yr	CEM_06212024	9741.00	149.40	159.75		160.92	0.002592	11.26	2366.70	500.00	0.63
Sandy Main Stem	2267	500-yr	PPCM_06212024	16941.00	149.40	162.21		163.52	0.002531	12.91	3613.12	739.79	0.65
Sandy Main Stem	2267	500-yr	CEM_06212024	16941.00	149.40	162.21		163.52	0.002530	12.91	3613.34	739.81	0.65
Sandy Main Stem	2206	10-yr	PPCM_06212024	4460.00	149.10	157.37	156.27	158.14	0.001994	8.50	1295.12	408.97	0.53
Sandy Main Stem	2206	10-yr	CEM_06212024	4460.00	149.10	157.37		158.14	0.001994	8.50	1295.13	408.97	0.53
Sandy Main Stem	2206	50-yr	PPCM_06212024	7709.00	149.10	158.84	157.80	159.87	0.002468	10.59	1877.47	430.01	0.61
Sandy Main Stem	2206	50-yr	CEM_06212024	7709.00	149.10	158.84		159.87	0.002468	10.59	1877.53	470.91	0.61
Sandy Main Stem	2206	100-yr	PPCM_06212024	9741.00	149.10	159.59	158.48	160.75	0.002682	11.61	2180.96	434.53	0.64
Sandy Main Stem	2206	100-yr	CEM_06212024	9741.00	149.10	159.59		160.75	0.002682	11.61	2181.05	491.72	0.64
Sandy Main Stem	2206	500-yr	PPCM_06212024	16941.00	149.10	161.79	160.34	163.32	0.003099	14.22	3137.65	500.81	0.71
Sandy Main Stem	2206	500-yr	CEM_06212024	16941.00	149.10	161.79		163.32	0.003099	14.22	3138.03	625.83	0.71
Sandy Main Stem	2140	10-yr	PPCM_06212024	4460.00	148.80	157.19		157.99	0.002256	9.01	1184.88	389.58	0.56
Sandy Main Stem	2140	10-yr	CEM_06212024	4460.00	148.80	157.19		157.99	0.002256	9.01	1184.88	389.58	0.56
Sandy Main Stem	2140	50-yr	PPCM_06212024	7709.00	148.80	158.76		159.67	0.002429	10.54	1818.77	423.76	0.60
Sandy Main Stem	2140	50-yr	CEM_06212024	7709.00	148.80	158.76		159.67	0.002429	10.54	1818.83	423.77	0.60
Sandy Main Stem	2140	100-yr	PPCM_06212024	9741.00	148.80	159.54		160.53	0.002506	11.29	2159.44	442.22	0.62
Sandy Main Stem	2140	100-yr	CEM_06212024	9741.00	148.80	159.54		160.53	0.002506	11.29	2159.55	442.23	0.62
Sandy Main Stem	2140	500-yr	PPCM_06212024	16941.00	148.80	161.89		163.02	0.002543	13.05	3248.57	482.71	0.65
Sandy Main Stem	2140	500-yr	CEM_06212024	16941.00	148.80	161.89		163.02	0.002543	13.05	3248.88	482.72	0.65
Sandy Main Stem	2072.963	10-yr	As-Built	4460.00	148.51	156.52	155.33	156.79	0.000876	5.60	1311.77	451.38	0.36
Sandy Main Stem	2072.963	10-yr	DEM	4460.00	148.51	156.52	155.33	156.79	0.000876	5.60	1311.77	451.38	0.36
Sandy Main Stem	2072.963	10-yr	PPCM_06212024	4460.00	148.51	157.02		157.84	0.002029	8.64	1268.93	488.09	0.53
Sandy Main Stem	2072.963	10-yr	CEM_06212024	4460.00	148.51	157.02		157.84	0.002029	8.64	1268.94	488.09	0.53
Sandy Main Stem	2072.963	50-yr	As-Built	7709.00	148.51	157.80	156.15	158.13	0.000941	6.44	1967.68	545.43	0.38
Sandy Main Stem	2072.963	50-yr	DEM	7709.00	148.51	157.80	156.15	158.13	0.000941	6.44	1967.68	545.43	0.38
Sandy Main Stem	2072.963	50-yr	PPCM_06212024	7709.00	148.51	158.27		159.47	0.002788	11.14	1829.45	504.88	0.64
Sandy Main Stem	2072.963	50-yr	CEM_06212024	7709.00	148.51	158.27		159.47	0.002788	11.14	1829.53	504.89	0.64
Sandy Main Stem	2072.963	100-yr	As-Built	9741.00	148.51	158.41	156.55	158.78	0.000992	6.92	2305.71	566.67	0.40
Sandy Main Stem	2072.963	100-yr	DEM	9741.00	148.51	158.41	156.55	158.78	0.000992	6.92	2305.71	566.67	0.40
Sandy Main Stem	2072.963	100-yr	PPCM_06212024	9741.00	148.51	158.90		160.30	0.003161	12.38	2117.79	511.50	0.69
Sandy Main Stem	2072.963	100-yr	CEM_06212024	9741.00	148.51	158.90		160.30	0.003160	12.38	2118.06	511.51	0.69
Sandy Main Stem	2072.963	500-yr	As-Built	16941.00	148.51	160.16	157.76	160.66	0.001106	8.18	3396.86	658.94	0.43
Sandy Main Stem	2072.963	500-yr	DEM	16941.00	148.51	160.16	157.76	160.66	0.001106	8.18	3396.86	658.94	0.43
Sandy Main Stem	2072.963	500-yr	PPCM_06212024	16941.00	148.51	160.82		162.73	0.003927	15.50	3028.72	537.13	0.79

Note:
As-Built = Effective Model
DEM = Duplicate Effective Model
CEM_06212024 = Corrected Effective Model
PPCM_06212024 = Post-Project Conditions Model

HEC-RAS River: Sandy Run Reach: Sandy Main Stem (Continued)

Reach	River Sta	Profile	Plan	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)	
Sandy Main Stem	2072.963	500-yr	CEM_06212024	16941.00	148.51	160.82		162.73	0.003924	15.50	3029.65	537.15	0.79
Sandy Main Stem	1897	10-yr	PPCM_06212024	4460.00	148.74	156.96	155.38	157.45	0.001389	6.99	1645.40	457.29	0.44
Sandy Main Stem	1897	10-yr	CEM_06212024	4460.00	148.74	156.96		157.45	0.001387	6.99	1645.75	502.01	0.44
Sandy Main Stem	1897	50-yr	PPCM_06212024	7709.00	148.74	158.14	156.79	158.93	0.002035	9.31	2191.51	466.80	0.55
Sandy Main Stem	1897	50-yr	CEM_06212024	7709.00	148.74	158.15		158.93	0.002022	9.28	2193.95	570.93	0.55
Sandy Main Stem	1897	100-yr	PPCM_06212024	9741.00	148.74	158.72	157.39	159.68	0.002397	10.54	2462.33	472.06	0.60
Sandy Main Stem	1897	100-yr	CEM_06212024	9741.00	148.74	158.73		159.68	0.002374	10.49	2467.03	589.49	0.60
Sandy Main Stem	1897	500-yr	PPCM_06212024	16941.00	148.74	160.48	159.10	161.98	0.003263	13.77	3311.41	488.91	0.72
Sandy Main Stem	1897	500-yr	CEM_06212024	16941.00	148.74	160.51		161.98	0.003190	13.64	3327.46	659.05	0.72
Sandy Main Stem	1800	10-yr	PPCM_06212024	4460.00	148.87	156.71		157.29	0.001837	7.96	1595.97	549.05	0.51
Sandy Main Stem	1800	10-yr	CEM_06212024	4460.00	148.87	156.71		157.29	0.001837	7.96	1595.97	549.05	0.51
Sandy Main Stem	1800	50-yr	PPCM_06212024	7709.00	148.87	157.75		158.68	0.002776	10.67	2093.96	577.27	0.64
Sandy Main Stem	1800	50-yr	CEM_06212024	7709.00	148.87	157.75		158.68	0.002776	10.67	2093.96	577.27	0.64
Sandy Main Stem	1800	100-yr	PPCM_06212024	9741.00	148.87	158.21		159.39	0.003396	12.22	2316.63	588.98	0.72
Sandy Main Stem	1800	100-yr	CEM_06212024	9741.00	148.87	158.21		159.39	0.003396	12.22	2316.63	588.98	0.72
Sandy Main Stem	1800	500-yr	PPCM_06212024	16941.00	148.87	159.20	159.09	161.48	0.006158	17.62	2795.18	612.27	0.98
Sandy Main Stem	1800	500-yr	CEM_06212024	16941.00	148.87	159.20	159.09	161.48	0.006158	17.62	2795.18	612.27	0.98
Sandy Main Stem	1688.606	10-yr	As-Built	4460.00	149.00	156.13		156.38	0.001261	6.41	1992.36	529.60	0.43
Sandy Main Stem	1688.606	10-yr	DEM	4460.00	149.00	156.13		156.38	0.001261	6.41	1992.36	529.60	0.43
Sandy Main Stem	1688.606	10-yr	PPCM_06212024	4460.00	149.00	156.57		157.06	0.001806	7.76	1748.00	609.43	0.50
Sandy Main Stem	1688.606	10-yr	CEM_06212024	4460.00	149.00	156.57		157.06	0.001806	7.76	1748.00	609.43	0.50
Sandy Main Stem	1688.606	50-yr	As-Built	7709.00	149.00	157.23		157.62	0.001800	8.43	2589.91	572.16	0.52
Sandy Main Stem	1688.606	50-yr	DEM	7709.00	149.00	157.23		157.62	0.001800	8.43	2589.91	572.16	0.52
Sandy Main Stem	1688.606	50-yr	PPCM_06212024	7709.00	149.00	157.66		158.31	0.002334	9.68	2458.39	677.01	0.59
Sandy Main Stem	1688.606	50-yr	CEM_06212024	7709.00	149.00	157.66		158.31	0.002334	9.68	2458.39	677.01	0.59
Sandy Main Stem	1688.606	100-yr	As-Built	9741.00	149.00	157.76		158.22	0.002047	9.38	2891.07	578.51	0.56
Sandy Main Stem	1688.606	100-yr	DEM	9741.00	149.00	157.76		158.22	0.002047	9.38	2891.07	578.51	0.56
Sandy Main Stem	1688.606	100-yr	PPCM_06212024	9741.00	149.00	158.19		158.93	0.002604	10.64	2818.59	709.41	0.63
Sandy Main Stem	1688.606	100-yr	CEM_06212024	9741.00	149.00	158.19		158.93	0.002604	10.64	2818.59	709.41	0.63
Sandy Main Stem	1688.606	500-yr	As-Built	16941.00	149.00	159.26		159.99	0.002695	11.97	3773.33	598.89	0.66
Sandy Main Stem	1688.606	500-yr	DEM	16941.00	149.00	159.26		159.99	0.002695	11.97	3773.33	598.89	0.66
Sandy Main Stem	1688.606	500-yr	PPCM_06212024	16941.00	149.00	159.63		160.60	0.003217	13.06	3899.48	788.90	0.71
Sandy Main Stem	1688.606	500-yr	CEM_06212024	16941.00	149.00	159.63		160.60	0.003217	13.06	3899.48	788.90	0.71
Sandy Main Stem	1508	10-yr	PPCM_06212024	4460.00	149.00	156.21		156.68	0.002346	8.63	1774.96	709.02	0.58
Sandy Main Stem	1508	10-yr	CEM_06212024	4460.00	149.00	156.21		156.68	0.002346	8.63	1774.96	709.02	0.58
Sandy Main Stem	1508	50-yr	PPCM_06212024	7709.00	149.00	157.35		157.84	0.002434	9.73	2619.40	773.67	0.61
Sandy Main Stem	1508	50-yr	CEM_06212024	7709.00	149.00	157.35		157.84	0.002434	9.73	2619.40	773.67	0.61
Sandy Main Stem	1508	100-yr	PPCM_06212024	9741.00	149.00	157.88		158.39	0.002542	10.38	3035.61	797.53	0.63
Sandy Main Stem	1508	100-yr	CEM_06212024	9741.00	149.00	157.88		158.39	0.002542	10.38	3035.61	797.53	0.63
Sandy Main Stem	1508	500-yr	PPCM_06212024	16941.00	149.00	159.33		159.95	0.002842	12.18	4239.37	859.69	0.68
Sandy Main Stem	1508	500-yr	CEM_06212024	16941.00	149.00	159.33		159.95	0.002842	12.18	4239.37	859.69	0.68
Sandy Main Stem	1299.523	10-yr	As-Built	4460.00	149.00	155.78	153.98	155.94	0.000957	5.43	2450.25	817.13	0.37
Sandy Main Stem	1299.523	10-yr	DEM	4460.00	149.00	155.78	153.98	155.94	0.000957	5.43	2450.25	817.13	0.37
Sandy Main Stem	1299.523	10-yr	PPCM_06212024	4460.00	149.00	155.78	155.20	156.21	0.002099	7.88	1773.76	730.23	0.54
Sandy Main Stem	1299.523	10-yr	CEM_06212024	4460.00	149.00	155.78	155.20	156.21	0.002099	7.88	1773.76	730.23	0.54
Sandy Main Stem	1299.523	50-yr	As-Built	7709.00	149.00	156.81	155.02	157.02	0.001162	6.58	3323.01	859.86	0.42
Sandy Main Stem	1299.523	50-yr	DEM	7709.00	149.00	156.81	155.02	157.02	0.001162	6.58	3323.01	859.86	0.42
Sandy Main Stem	1299.523	50-yr	PPCM_06212024	7709.00	149.00	156.92	156.05	157.35	0.002097	8.77	2658.48	815.03	0.56
Sandy Main Stem	1299.523	50-yr	CEM_06212024	7709.00	149.00	156.92	156.05	157.35	0.002097	8.77	2658.48	815.03	0.56
Sandy Main Stem	1299.523	100-yr	As-Built	9741.00	149.00	157.31	155.39	157.55	0.001265	7.16	3751.53	869.08	0.44
Sandy Main Stem	1299.523	100-yr	DEM	9741.00	149.00	157.31	155.39	157.55	0.001265	7.16	3751.53	869.08	0.44
Sandy Main Stem	1299.523	100-yr	PPCM_06212024	9741.00	149.00	157.43	156.42	157.88	0.002184	9.34	3088.96	858.69	0.58
Sandy Main Stem	1299.523	100-yr	CEM_06212024	9741.00	149.00	157.43	156.42	157.88	0.002184	9.34	3088.96	858.69	0.58
Sandy Main Stem	1299.523	500-yr	As-Built	16941.00	149.00	158.74	156.48	159.10	0.001574	8.89	5043.04	948.79	0.50
Sandy Main Stem	1299.523	500-yr	DEM	16941.00	149.00	158.74	156.48	159.10	0.001574	8.89	5043.04	948.79	0.50
Sandy Main Stem	1299.523	500-yr	PPCM_06212024	16941.00	149.00	158.84	157.47	159.38	0.002406	10.90	4350.50	940.52	0.62
Sandy Main Stem	1299.523	500-yr	CEM_06212024	16941.00	149.00	158.84	157.47	159.38	0.002406	10.90	4350.50	940.52	0.62
Sandy Main Stem	1126	10-yr	PPCM_06212024	4460.00	148.35	155.41		155.86	0.001815	7.49	1641.78	737.46	0.50
Sandy Main Stem	1126	10-yr	CEM_06212024	4460.00	148.35	155.41		155.86	0.001815	7.49	1641.78	737.46	0.50
Sandy Main Stem	1126	50-yr	PPCM_06212024	7709.00	148.35	156.41		156.96	0.002225	9.08	2447.47	873.19	0.57
Sandy Main Stem	1126	50-yr	CEM_06212024	7709.00	148.35	156.41		156.96	0.002225	9.08	2447.47	873.19	0.57
Sandy Main Stem	1126	100-yr	PPCM_06212024	9741.00	148.35	156.90		157.48	0.002342	9.70	2887.57	916.50	0.59
Sandy Main Stem	1126	100-yr	CEM_06212024	9741.00	148.35	156.90		157.48	0.002342	9.70	2887.57	916.50	0.59
Sandy Main Stem	1126	500-yr	PPCM_06212024	16941.00	148.35	158.32		158.95	0.002465	11.05	4246.33	998.10	0.62
Sandy Main Stem	1126	500-yr	CEM_06212024	16941.00	148.35	158.32		158.95	0.002465	11.05	4246.33	998.10	0.62
Sandy Main Stem	1032	10-yr	PPCM_06212024	4460.00	148.03	155.45		155.66	0.001064	5.86	1755.69	713.64	0.39
Sandy Main Stem	1032	10-yr	CEM_06212024	4460.00	148.03	155.45		155.66	0.001064	5.86	1755.69	713.64	0.39
Sandy Main Stem	1032	50-yr	PPCM_06212024	7709.00	148.03	156.42		156.72	0.001423	7.38	2518.16	857.22	0.46
Sandy Main Stem	1032	50-yr	CEM_06212024	7709.00	148.03	156.42		156.72	0.001423	7.38	2518.16	857.22	0.46
Sandy Main Stem	1032	100-yr	PPCM_06212024	9741.00	148.03	156.89		157.23	0.001577	8.07	2930.58	898.85	0.49
Sandy Main Stem	1032	100-yr	CEM_06212024	9741.00	148.03	156.89		157.23	0.001577	8.07	2930.58	898.85	0.49
Sandy Main Stem	1032	500-yr	PPCM_06212024	16941.00	148.03	158.25		158.69	0.001874	9.71	4216.54	987.90	0.54
Sandy Main Stem	1032	500-yr	CEM_06212024	16941.00	148.03	158.25		158.69	0.001874	9.71	4216.54	987.90	0.54
Sandy Main Stem	663.061	10-yr	As-Built	4460.00	146.71	154.93	154.26	155.22	0.001291	6.89	1960.10	846.23	0.44
Sandy Main Stem	663.061	10-yr	DEM	4460.00	146.71	154.93	154.26	155.22	0.001291	6.89	1960.10	846.23	0.44
Sandy Main Stem	663.061	10-yr	PPCM_06212024	4460.00	146.71	154.93	154.26	155.22	0.001291	6.89	1960.10	846.23	0.44
Sandy Main Stem	663.061	10-yr	CEM_06212024	4460.00	146.71	154.93	154.26	155.22	0.001291	6.89	1960.10	846.23	0.44
Sandy Main Stem	663.061	50-yr	As-Built	7709.00	146.71	155.81	154.95	156.16	0.001578	8.19	2759.15	943.05	0.49
Sandy Main Stem	663.061	50-yr	DEM	7709.00	146.71	155.81	154.95	156.16	0.001578	8.19	2759.15	943.05	0.49
Sandy Main Stem	663.061	50-yr	PPCM_06212024	7709.00	146.71	155.81	154.95	156.16	0.001578	8.19	2759.15	943.05	0.49
Sandy Main Stem	663.061	50-yr	CEM_06212024	7709.00	146.71	155.81	154.95	156.16	0.001578	8.19	2759.15	943.05	0.49

Note:
As-Built = Effective Model
DEM = Duplicate Effective Model
CEM_06212024 = Corrected Effective Model
PPCM_06212024 = Post-Project Conditions Model

HEC-RAS River: Sandy Run Reach: Sandy Main Stem (Continued)

Reach	River Sta	Profile	Plan	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)	
Sandy Main Stem	663.061	100-yr	As-Built	9741.00	146.71	156.25	155.37	156.62	0.001678	8.74	3177.81	958.44	0.51
Sandy Main Stem	663.061	100-yr	DEM	9741.00	146.71	156.25	155.37	156.62	0.001678	8.74	3177.81	958.44	0.51
Sandy Main Stem	663.061	100-yr	PPCM_06212024	9741.00	146.71	156.25	155.37	156.62	0.001678	8.74	3177.81	958.44	0.51
Sandy Main Stem	663.061	100-yr	CEM_06212024	9741.00	146.71	156.25	155.37	156.62	0.001678	8.74	3177.81	958.44	0.51
Sandy Main Stem	663.061	500-yr	As-Built	16941.00	146.71	157.48	156.22	157.97	0.002025	10.46	4405.93	1064.14	0.58
Sandy Main Stem	663.061	500-yr	DEM	16941.00	146.71	157.48	156.22	157.97	0.002025	10.46	4405.93	1064.14	0.58
Sandy Main Stem	663.061	500-yr	PPCM_06212024	16941.00	146.71	157.48	156.22	157.97	0.002025	10.46	4405.93	1064.14	0.58
Sandy Main Stem	663.061	500-yr	CEM_06212024	16941.00	146.71	157.48	156.22	157.97	0.002025	10.46	4405.93	1064.14	0.58
Sandy Main Stem	143.571	10-yr	As-Built	4460.00	147.00	153.67	153.67	154.18	0.003578	10.07	1787.91	1050.67	0.71
Sandy Main Stem	143.571	10-yr	DEM	4460.00	147.00	153.67	153.67	154.18	0.003578	10.07	1787.91	1050.67	0.71
Sandy Main Stem	143.571	10-yr	PPCM_06212024	4460.00	147.00	153.67	153.67	154.18	0.003578	10.07	1787.91	1050.67	0.71
Sandy Main Stem	143.571	10-yr	CEM_06212024	4460.00	147.00	153.67	153.67	154.18	0.003578	10.07	1787.91	1050.67	0.71
Sandy Main Stem	143.571	50-yr	As-Built	7709.00	147.00	154.14	154.14	154.82	0.005016	12.51	2288.19	1075.19	0.85
Sandy Main Stem	143.571	50-yr	DEM	7709.00	147.00	154.14	154.14	154.82	0.005016	12.51	2288.19	1075.19	0.85
Sandy Main Stem	143.571	50-yr	PPCM_06212024	7709.00	147.00	154.14	154.14	154.82	0.005016	12.51	2288.19	1075.19	0.85
Sandy Main Stem	143.571	50-yr	CEM_06212024	7709.00	147.00	154.14	154.14	154.82	0.005016	12.51	2288.19	1075.19	0.85
Sandy Main Stem	143.571	100-yr	As-Built	9741.00	147.00	154.39	154.39	155.16	0.005715	13.67	2556.32	1099.10	0.91
Sandy Main Stem	143.571	100-yr	DEM	9741.00	147.00	154.39	154.39	155.16	0.005715	13.67	2556.32	1099.10	0.91
Sandy Main Stem	143.571	100-yr	PPCM_06212024	9741.00	147.00	154.39	154.39	155.16	0.005715	13.67	2556.32	1099.10	0.91
Sandy Main Stem	143.571	100-yr	CEM_06212024	9741.00	147.00	154.39	154.39	155.16	0.005715	13.67	2556.32	1099.10	0.91
Sandy Main Stem	143.571	500-yr	As-Built	16941.00	147.00	155.10	155.10	156.16	0.007386	16.56	3345.28	1259.04	1.05
Sandy Main Stem	143.571	500-yr	DEM	16941.00	147.00	155.10	155.10	156.16	0.007386	16.56	3345.28	1259.04	1.05
Sandy Main Stem	143.571	500-yr	PPCM_06212024	16941.00	147.00	155.10	155.10	156.16	0.007386	16.56	3345.28	1259.04	1.05
Sandy Main Stem	143.571	500-yr	CEM_06212024	16941.00	147.00	155.10	155.10	156.16	0.007386	16.56	3345.28	1259.04	1.05

Note:
As-Built = Effective Model
DEM = Duplicate Effective Model
CEM_06212024 = Corrected Effective Model
PPCM_06212024 = Post-Project Conditions Model

Attachment 3
cHECK-RAS Reports

PLAN: EFFECTIVE MODEL

cHECk-RAS Report

HEC-RAS Project: *sandy_wissahickon.prj*
Plan File: *sandy_wissahickon.p06*
Geometry File: *sandy_wissahickon.g08*
Flow File: *sandy_wissahickon.f02*
Report Date: *6/7/2024*

Message ID	Message	Cross sections affected	Comments
MP KW 01D	The name of the stream is ($streamname$). The flow regime is subcritical or mixed flow. The downstream starting water-surface elevation, SWSEL, is computed from known water-surface elevation.		
MP SW 01DK	The name of the stream is ($streamname$). The flow regime is subcritical or mixed flow. Starting water-surface elevations are computed from Known WSELs as the downstream boundary condition. Provide backup information on Known water-surface elevations or use same energy slope for all the profiles as the starting boundary condition and rerun the plan.		
MP WS 01	The $profilename1$ WSEL of $wsel1$ is higher than the $profilename2$ WSEL of $wsel2$.	219.88; 365.816; 454.774; 652.351; 862.278; 250.768; 639.854; 1063.591; 211.968; 413.157; 509.06; 1028.873; 1382.218; 1444.139; 1726.006; 2311.558; 205.361	

NT RC 01L	All of the left overbank Manning's "n" values are less than 0.030. The "n" values for the overbank areas are usually larger than 0.030 (Chow, 1959, page 113). The "n" value(s) should be re-evaluated. Follow the procedure outlined to compute the overbank "n" value(s) for a natural floodplain (FHWA, 1984). Or follow the procedure outlined to compute the "n" values for urban development (USGS, 1977). Please submit supporting information on the evaluation of the "n" values.	365.816; 454.774; 500(Bridge-DN); 500(Bridge-UP); 652.351; 862.278; 1291.06; 1771.966; 2199.745; 2592.777; 3075.733; 3336.735; 3400(Bridge-DN); 3400(Bridge-UP); 3474.693; 3644.594; 3675(Bridge-DN); 3675(Bridge-UP); 3706.353; 3972.563; 4399.991; 4839.399; 5192.662; 5625.602; 5650(MultiOpen-DN); 5650(MultiOpen-UP); 5697.475; 6061.115; 6100(Bridge-DN); 6100(Bridge-UP); 6177.298; 6363.44; 6752.426; 7158.174; 7193(Bridge-DN); 7193(Bridge-UP); 7223.838; 7431.106; 7920.096; 8000(Bridge-DN); 8000(Bridge-UP); 8051.898; 8373.149; 8707.044; 8750(Culvert-DN); 8750(Culvert-UP); 8795.098; 9157.356; 9200(Culvert-DN); 9200(Culvert-UP); 9242.619; 11022.62; 11341.88; 11385(Bridge-DN); 11385(Bridge-UP); 11428.92; 11718.89; 11770(Bridge-DN); 11770(Bridge-UP); 11841.24; 12625.84; 1537.296; 2384.711; 3911.306; 4321.881; 5117.957; 5396.729; 5790.305; 250.768; 413.157; 450(Culvert-DN); 450(Culvert-UP); 509.06; 1028.873; 1726.006; 211.968; 2417.391; 4740(Bridge-DN); 4740(Bridge-UP); 4777.088; 4790.088; 4865.578; 5039.878; 5065.378; 5084.678; 5508.105; 6189.177; 6300(MultiOpen-DN); 6300(MultiOpen-UP); 6414.98; 6572.639; 6600(Bridge-DN); 6600(Bridge-UP); 6668.16; 7570.986; 8235.939; 8350(MultiOpen-DN); 8350(MultiOpen-UP); 8504.5; 8975.758; 22305.19; 22719.89; 24042.15; 24085(Bridge-DN); 24085(Bridge-UP); 24129.68; 24402.5; 31828(Culvert-DN); 31828(Culvert-UP); 32009.44; 36000(Culvert-DN); 36000(Culvert-UP); 36275.49	
NT RC 01R	All of the right overbank "n" values are less than 0.030. Manning's "n" values for the overbank areas are usually larger than 0.030 (Chow, 1959, page 113). The "n" value(s) should be re-evaluated. Follow the procedure on pages 17 and 54 of (FHWA, 1984) to compute the overbank "n" value for the natural floodplain. Or follow the procedure in (USGS, 1977) to compute the "n" value for urban development. Please submit supporting information on the evaluation of "n" value.	862.278; 1291.06; 1771.966; 2199.745; 3400(Bridge-UP); 3474.693; 3972.563; 4399.991; 4839.399; 7920.096; 8000(Bridge-DN); 8000(Bridge-UP); 8051.898; 8199.251; 8373.149; 9864.137; 11992.85; 219.88; 413.157; 450(Culvert-UP); 509.06; 211.968; 3004.364; 3515.389; 3964.325; 4327.181; 4685.592; 4740(Bridge-UP); 4777.088; 4790.088; 4865.578; 5039.878; 5065.378; 5084.678; 5508.105; 6189.177; 6300(MultiOpen-UP); 6414.98; 33297.82	
NT RC 05	The left overbank n-value of $nlob$ and the right overbank n-value of $nrob$ are less than or equal to the channel n-value of nch. Follow the procedure in (FHWA, 1984) to compute the n-value for the natural floodplain and the channel. Or follow the procedure in (USGS, 1977) to compute the n-value for urban development. Please submit supporting information on the evaluation of n-values.	4399.991; 8000(Bridge-DN); 8000(Bridge-UP); 8051.898; 5790.305; 4740(Bridge-UP); 4777.088; 4865.578; 5039.878; 5065.378; 1388.275	

NT RS 02BDC	This is the Downstream Bridge Section (BRD). The channel n value of $chldn$ for the downstream internal bridge opening section is equal to or larger than the channel n value of $chl2$ at Section 2. Usually, the channel "n" value of the bridge opening section represents the area below the bridge deck and is less than the channel "n" value of Section 2. The "n" value for Section 2 represents the natural valley channel section roughness for the reach between Section 3 and Section 4. Please change the "n" value of the internal bridge opening section or provide supporting information for the use of the higher "n" value.	8000(Bridge-DN); 1425(Bridge-DN)	
NT RS 02BUC	This is the Upstream Bridge Section (BRU). The channel n value of $chlup$ for the upstream internal bridge opening section is equal to or larger than the channel n value of $chl3$ at Section 3. Usually, the channel "n" value of the bridge opening section represents the area below the bridge deck and is less than the channel "n" value of Section 3. The "n" value for Section 3 represents the natural valley channel section roughness for the reach between Section 3 and Section 4. Please change the "n" value of the internal bridge opening section or provide supporting information for the use of a higher "n" value.	3400(Bridge-UP); 8000(Bridge-UP); 2500(Bridge-UP); 4740(Bridge-UP)	
NT TL 01S2	This is Section2 of a hydraulic structure. The contraction and expansion loss coefficients are cc and ce. They should be equal to 0.3 and 0.5, respectively, for typical structure sections according to page 5-8 of the HEC-RAS Hydraulic Reference Manual (HEC, 2010).	267.15	
NT TL 02	Contraction and expansion loss coefficients are cc and ce, respectively. However, this cross section is not at a hydraulic structure. They should be equal to 0.1 and 0.3 according to page 5-8 of the HEC-RAS Hydraulic Reference Manual (HEC, 2010).	218.96	
XS BO 02L	Multiple Block Obstruction. The Flow Code will be MBL. The block obstruction elevation is higher than the left bank elevation. The ground elevation within the block obstruction is lower than the highest discharge WSEL. The block obstruction is not within the block ineffective flow stations. If it is, the ineffective flow elevation is lower than the highest discharge WSEL. This option is suitable to represent individual buildings within the floodway. Compute appropriate "n" values to represent a group of buildings as outlined in (USGS, 1977) or use the Ineffective Flow option.	509.06; 31476.58; 267.15; 327.782; 604.441	

XS BO 02R	Multiple Block Obstruction. The Flow Code will be "MBR". The block obstruction elevation is higher than the right bank elevation. The ground elevation within the block obstruction is lower than the highest discharge WSEL. The block obstruction is not within the block ineffective flow stations. If it is, the ineffective flow elevation is lower than the highest discharge WSEL. This option is suitable to represent individual buildings within the floodway. Compute appropriate "n" values to represent a group of buildings as outlined in (USGS, 1977) or use the Ineffective Flow option.	211.968; 9342.845; 2590.359; 26877.54; 29148; 29203.58; 31476.58; 35582.96; 36275.49	
XS CD 01	Critical Depth occurs at $assignedname$ flood. Flow Code will be "C". The Ineffective flow option is used. The Ineffective Flow elevation is equal to or higher than the Critical WSEL. Please investigate whether this selection is appropriate.	8199.251; 8373.149; 11341.88; 11718.89; 16751.59; 17672.98; 2035.99; 2727.829; 8379.737; 9243.731; 11258.23; 11729.12; 12146.91; 13448.23; 14040.62; 14474.72; 143.571; 27678.42; 32874.91; 33297.82; 37056.92; 37880.8; 988.112; 1388.275	
XS DC 01	Discharge decreases in the downstream direction for $assignedname$ flood. There are no lateral structures. Documentation of hydrologic analysis is required or provide explanation.	5650(MultiOpen-UP); 5790.305; 6300(MultiOpen-UP); 8350(MultiOpen-UP); 11350(MultiOpen-UP); 12600(MultiOpen-UP); 38835.32; 5046.201	
XS DC 03	Discharge is different between the upstream side and downstream side of the structure for $assignedname$ flood. They should be the same.	5625.602; 6189.177; 8235.939; 11303; 12591.62	
XS DT 01	Both the right overbank distance of rob and the left overbank distance of lob are longer than the channel distance of chl . Please review the creation of left overbank, channel and right overbank distances. The HEC-RAS geometry file may need to be recreated using a GIS program. Please resolve the differences among the distances.	11405.26	
XS DT 02L	The Left overbank distance of lob is greater than the channel distance of chl by more than two times. The Left overbank distance may be in error. Please review the creation of left overbank, channel and right overbank distances. The HEC-RAS geometry file may need to be recreated using a GIS program. Please resolve the differences between the distances.	6709.658	
XS DT 02R	The Right overbank distance of rob is greater than the channel distance of chl by more than two times. The Right overbank distance may be in error. Please review the creation of left overbank, channel and right overbank distances. The HEC-RAS geometry file may need to be recreated using a GIS program. Please resolve the differences between the distances.	11350(MultiOpen-DN); 11405.26	

XS IF 03L	The Left Ineffective Flow Station is within the channel. The Left Ineffective Flow Station of $ineffstal$ is greater than the LeftBankSta of $bankstal$. The Left Ineffective Flow Station or the LeftBankSta should be adjusted.	6003.453	
XS IF 03R	The Right Ineffective Flow Station is within the channel. The Right Ineffective Flow Station of $ineffstar$ is less than the RightBankSta of $bankstar$. The Right Ineffective Flow Station or the RightBankSta should be adjusted.	8051.898; 12648.67	
XS LC 01	LenChl Up/TopWdthAct Dn = $ratioVal$. The ratio is more than 1.1. LenChlUp is more than 500 feet. This cross section is located too far upstream from the critical depth cross section $secnocritical$ for the $Assigned_Name$ flood. The cross section should move closer to the critical depth section, or an additional cross section should be added between the two cross sections. The HEC-RAS geometry file may need to be recreated using a GIS program.	16079.37; 3262.851; 3775.195	

PLAN: DUPLICATE EFFECTIVE MODEL

cHECk-RAS Report

HEC-RAS Project: *sandy_wissahickon.prj*
Plan File: *sandy_wissahickon.p07*
Geometry File: *sandy_wissahickon.g08*
Flow File: *sandy_wissahickon.f02*
Report Date: *6/7/2024*

Message ID	Message	Cross sections affected	Comments
MP KW 01D	The name of the stream is ($streamname$). The flow regime is subcritical or mixed flow. The downstream starting water-surface elevation, SWSEL, is computed from known water-surface elevation.		
MP SW 01DK	The name of the stream is ($streamname$). The flow regime is subcritical or mixed flow. Starting water-surface elevations are computed from Known WSELs as the downstream boundary condition. Provide backup information on Known water-surface elevations or use same energy slope for all the profiles as the starting boundary condition and rerun the plan.		
MP WS 01	The $profilename1$ WSEL of $wsel1$ is higher than the $profilename2$ WSEL of $wsel2$.	219.88; 365.816; 454.774; 652.351; 862.278; 250.768; 639.854; 1063.591; 211.968; 413.157; 509.06; 1028.873; 1382.218; 1444.139; 1726.006; 2311.558; 205.361	

NT RC 01L	All of the left overbank Manning's "n" values are less than 0.030. The "n" values for the overbank areas are usually larger than 0.030 (Chow, 1959, page 113). The "n" value(s) should be re-evaluated. Follow the procedure outlined to compute the overbank "n" value(s) for a natural floodplain (FHWA, 1984). Or follow the procedure outlined to compute the "n" values for urban development (USGS, 1977). Please submit supporting information on the evaluation of the "n" values.	365.816; 454.774; 500(Bridge-DN); 500(Bridge-UP); 652.351; 862.278; 1291.06; 1771.966; 2199.745; 2592.777; 3075.733; 3336.735; 3400(Bridge-DN); 3400(Bridge-UP); 3474.693; 3644.594; 3675(Bridge-DN); 3675(Bridge-UP); 3706.353; 3972.563; 4399.991; 4839.399; 5192.662; 5625.602; 5650(MultiOpen-DN); 5650(MultiOpen-UP); 5697.475; 6061.115; 6100(Bridge-DN); 6100(Bridge-UP); 6177.298; 6363.44; 6752.426; 7158.174; 7193(Bridge-DN); 7193(Bridge-UP); 7223.838; 7431.106; 7920.096; 8000(Bridge-DN); 8000(Bridge-UP); 8051.898; 8373.149; 8707.044; 8750(Culvert-DN); 8750(Culvert-UP); 8795.098; 9157.356; 9200(Culvert-DN); 9200(Culvert-UP); 9242.619; 11022.62; 11341.88; 11385(Bridge-DN); 11385(Bridge-UP); 11428.92; 11718.89; 11770(Bridge-DN); 11770(Bridge-UP); 11841.24; 12625.84; 1537.296; 2384.711; 3911.306; 4321.881; 5117.957; 5396.729; 5790.305; 250.768; 413.157; 450(Culvert-DN); 450(Culvert-UP); 509.06; 1028.873; 1726.006; 211.968; 2417.391; 4740(Bridge-DN); 4740(Bridge-UP); 4777.088; 4790.088; 4865.578; 5039.878; 5065.378; 5084.678; 5508.105; 6189.177; 6300(MultiOpen-DN); 6300(MultiOpen-UP); 6414.98; 6572.639; 6600(Bridge-DN); 6600(Bridge-UP); 6668.16; 7570.986; 8235.939; 8350(MultiOpen-DN); 8350(MultiOpen-UP); 8504.5; 8975.758; 22305.19; 22719.89; 24042.15; 24085(Bridge-DN); 24085(Bridge-UP); 24129.68; 24402.5; 31828(Culvert-DN); 31828(Culvert-UP); 32009.44; 36000(Culvert-DN); 36000(Culvert-UP); 36275.49	
NT RC 01R	All of the right overbank "n" values are less than 0.030. Manning's "n" values for the overbank areas are usually larger than 0.030 (Chow, 1959, page 113). The "n" value(s) should be re-evaluated. Follow the procedure on pages 17 and 54 of (FHWA, 1984) to compute the overbank "n" value for the natural floodplain. Or follow the procedure in (USGS, 1977) to compute the "n" value for urban development. Please submit supporting information on the evaluation of "n" value.	862.278; 1291.06; 1771.966; 2199.745; 3400(Bridge-UP); 3474.693; 3972.563; 4399.991; 4839.399; 7920.096; 8000(Bridge-DN); 8000(Bridge-UP); 8051.898; 8199.251; 8373.149; 9864.137; 11992.85; 219.88; 413.157; 450(Culvert-UP); 509.06; 211.968; 3004.364; 3515.389; 3964.325; 4327.181; 4685.592; 4740(Bridge-UP); 4777.088; 4790.088; 4865.578; 5039.878; 5065.378; 5084.678; 5508.105; 6189.177; 6300(MultiOpen-UP); 6414.98; 33297.82	
NT RC 05	The left overbank n-value of $nlob$ and the right overbank n-value of $nrob$ are less than or equal to the channel n-value of nch. Follow the procedure in (FHWA, 1984) to compute the n-value for the natural floodplain and the channel. Or follow the procedure in (USGS, 1977) to compute the n-value for urban development. Please submit supporting information on the evaluation of n-values.	4399.991; 8000(Bridge-DN); 8000(Bridge-UP); 8051.898; 5790.305; 4740(Bridge-UP); 4777.088; 4865.578; 5039.878; 5065.378; 1388.275	

NT RS 02BDC	This is the Downstream Bridge Section (BRD). The channel n value of $chldn$ for the downstream internal bridge opening section is equal to or larger than the channel n value of $chl2$ at Section 2. Usually, the channel "n" value of the bridge opening section represents the area below the bridge deck and is less than the channel "n" value of Section 2. The "n" value for Section 2 represents the natural valley channel section roughness for the reach between Section 3 and Section 4. Please change the "n" value of the internal bridge opening section or provide supporting information for the use of the higher "n" value.	8000(Bridge-DN); 1425(Bridge-DN)	
NT RS 02BUC	This is the Upstream Bridge Section (BRU). The channel n value of $chlup$ for the upstream internal bridge opening section is equal to or larger than the channel n value of $chl3$ at Section 3. Usually, the channel "n" value of the bridge opening section represents the area below the bridge deck and is less than the channel "n" value of Section 3. The "n" value for Section 3 represents the natural valley channel section roughness for the reach between Section 3 and Section 4. Please change the "n" value of the internal bridge opening section or provide supporting information for the use of a higher "n" value.	3400(Bridge-UP); 8000(Bridge-UP); 2500(Bridge-UP); 4740(Bridge-UP)	
NT TL 01S2	This is Section2 of a hydraulic structure. The contraction and expansion loss coefficients are cc and ce. They should be equal to 0.3 and 0.5, respectively, for typical structure sections according to page 5-8 of the HEC-RAS Hydraulic Reference Manual (HEC, 2010).	267.15	
NT TL 02	Contraction and expansion loss coefficients are cc and ce, respectively. However, this cross section is not at a hydraulic structure. They should be equal to 0.1 and 0.3 according to page 5-8 of the HEC-RAS Hydraulic Reference Manual (HEC, 2010).	218.96	
XS BO 02L	Multiple Block Obstruction. The Flow Code will be MBL. The block obstruction elevation is higher than the left bank elevation. The ground elevation within the block obstruction is lower than the highest discharge WSEL. The block obstruction is not within the block ineffective flow stations. If it is, the ineffective flow elevation is lower than the highest discharge WSEL. This option is suitable to represent individual buildings within the floodway. Compute appropriate "n" values to represent a group of buildings as outlined in (USGS, 1977) or use the Ineffective Flow option.	509.06; 31476.58; 267.15; 327.782; 604.441	

XS BO 02R	Multiple Block Obstruction. The Flow Code will be "MBR". The block obstruction elevation is higher than the right bank elevation. The ground elevation within the block obstruction is lower than the highest discharge WSEL. The block obstruction is not within the block ineffective flow stations. If it is, the ineffective flow elevation is lower than the highest discharge WSEL. This option is suitable to represent individual buildings within the floodway. Compute appropriate "n" values to represent a group of buildings as outlined in (USGS, 1977) or use the Ineffective Flow option.	211.968; 9342.845; 2590.359; 26877.54; 29148; 29203.58; 31476.58; 35582.96; 36275.49	
XS CD 01	Critical Depth occurs at $assignedname$ flood. Flow Code will be "C". The Ineffective flow option is used. The Ineffective Flow elevation is equal to or higher than the Critical WSEL. Please investigate whether this selection is appropriate.	8199.251; 8373.149; 11341.88; 11718.89; 16751.59; 17672.98; 2035.99; 2727.829; 8379.737; 9243.731; 11258.23; 11729.12; 12146.91; 13448.23; 14040.62; 14474.72; 143.571; 27678.42; 32874.91; 33297.82; 37056.92; 37880.8; 988.112; 1388.275	
XS DC 01	Discharge decreases in the downstream direction for $assignedname$ flood. There are no lateral structures. Documentation of hydrologic analysis is required or provide explanation.	5650(MultiOpen-UP); 5790.305; 6300(MultiOpen-UP); 8350(MultiOpen-UP); 11350(MultiOpen-UP); 12600(MultiOpen-UP); 38835.32; 5046.201	
XS DC 03	Discharge is different between the upstream side and downstream side of the structure for $assignedname$ flood. They should be the same.	5625.602; 6189.177; 8235.939; 11303; 12591.62	
XS DT 01	Both the right overbank distance of rob and the left overbank distance of lob are longer than the channel distance of chl . Please review the creation of left overbank, channel and right overbank distances. The HEC-RAS geometry file may need to be recreated using a GIS program. Please resolve the differences among the distances.	11405.26	
XS DT 02L	The Left overbank distance of lob is greater than the channel distance of chl by more than two times. The Left overbank distance may be in error. Please review the creation of left overbank, channel and right overbank distances. The HEC-RAS geometry file may need to be recreated using a GIS program. Please resolve the differences between the distances.	6709.658	
XS DT 02R	The Right overbank distance of rob is greater than the channel distance of chl by more than two times. The Right overbank distance may be in error. Please review the creation of left overbank, channel and right overbank distances. The HEC-RAS geometry file may need to be recreated using a GIS program. Please resolve the differences between the distances.	11350(MultiOpen-DN); 11405.26	

XS IF 03L	The Left Ineffective Flow Station is within the channel. The Left Ineffective Flow Station of $ineffstal$ is greater than the LeftBankSta of $bankstal$. The Left Ineffective Flow Station or the LeftBankSta should be adjusted.	6003.453	
XS IF 03R	The Right Ineffective Flow Station is within the channel. The Right Ineffective Flow Station of $ineffstar$ is less than the RightBankSta of $bankstar$. The Right Ineffective Flow Station or the RightBankSta should be adjusted.	8051.898; 12648.67	
XS LC 01	LenChl Up/TopWdthAct Dn = $ratioVal$. The ratio is more than 1.1. LenChlUp is more than 500 feet. This cross section is located too far upstream from the critical depth cross section $secnocritical$ for the $Assigned_Name$ flood. The cross section should move closer to the critical depth section, or an additional cross section should be added between the two cross sections. The HEC-RAS geometry file may need to be recreated using a GIS program.	16079.37; 3262.851; 3775.195	

PLAN: CORRECTED EFFECTIVE MODEL

cHECk-RAS Report

HEC-RAS Project: *sandy_wissahickon_hms.prj*
Plan File: *sandy_wissahickon_hms.p04*
Geometry File: *sandy_wissahickon_hms.g04*
Flow File: *sandy_wissahickon_hms.f02*
Report Date: *6/25/2024*

Message ID	Message	Cross sections affected	Comments
MP KW 01D	The name of the stream is ($streamname$). The flow regime is subcritical or mixed flow. The downstream starting water-surface elevation, SWSEL, is computed from known water-surface elevation.		
MP SW 01DK	The name of the stream is ($streamname$). The flow regime is subcritical or mixed flow. Starting water-surface elevations are computed from Known WSELs as the downstream boundary condition. Provide backup information on Known water-surface elevations or use same energy slope for all the profiles as the starting boundary condition and rerun the plan.		
MP WS 01	The $profilename1$ WSEL of $wsel1$ is higher than the $profilename2$ WSEL of $wsel2$.	219.88; 365.816; 454.774; 652.351; 862.278; 250.768; 639.854; 1063.591; 211.968; 413.157; 509.06; 1028.873; 1382.218; 1444.139; 1726.006; 2311.558; 205.361	

NT RC 01L	All of the left overbank Manning’s "n" values are less than 0.030. The "n" values for the overbank areas are usually larger than 0.030 (Chow, 1959, page 113). The "n" value(s) should be re-evaluated. Follow the procedure outlined to compute the overbank "n" value(s) for a natural floodplain (FHWA, 1984). Or follow the procedure outlined to compute the "n" values for urban development (USGS, 1977). Please submit supporting information on the evaluation of the "n" values.	365.816; 454.774; 500(Bridge-DN); 500(Bridge-UP); 652.351; 862.278; 1291.06; 1771.966; 2199.745; 2592.777; 3075.733; 3336.735; 3400(Bridge-DN); 3400(Bridge-UP); 3474.693; 3644.594; 3675(Bridge-DN); 3675(Bridge-UP); 3706.353; 3972.563; 4399.991; 4839.399; 5192.662; 5625.602; 5650(MultiOpen-DN); 5650(MultiOpen-UP); 5697.475; 6061.115; 6100(Bridge-DN); 6100(Bridge-UP); 6177.298; 6363.44; 6752.426; 7158.174; 7193(Bridge-DN); 7193(Bridge-UP); 7223.838; 7431.106; 7920.096; 8000(Bridge-DN); 8000(Bridge-UP); 8051.898; 8373.149; 8707.044; 8750(Culvert-DN); 8750(Culvert-UP); 8795.098; 9157.356; 9200(Culvert-DN); 9200(Culvert-UP); 9242.619; 11022.62; 11341.88; 11385(Bridge-DN); 11385(Bridge-UP); 11428.92; 11718.89; 11770(Bridge-DN); 11770(Bridge-UP); 11841.24; 12625.84; 1537.296; 2384.711; 3911.306; 4321.881; 5117.957; 5396.729; 5790.305; 250.768; 413.157; 450(Culvert-DN); 450(Culvert-UP); 509.06; 1028.873; 1726.006; 211.968; 4740(Bridge-DN); 4740(Bridge-UP); 4777.088; 4790.088; 4865.578; 5039.878; 5065.378; 5084.678; 5508.105; 6189.177; 6300(Culvert-DN); 6300(Culvert-UP); 6414.98; 6572.639; 6600(Bridge-DN); 6600(Bridge-UP); 6668.16; 7570.986; 8235.939; 8350(Culvert-DN); 8350(Culvert-UP); 8504.5; 8975.758; 22305.19; 22719.89; 24042.15; 24085(Bridge-DN); 24085(Bridge-UP); 24129.68; 24402.5; 31828(Culvert-DN); 31828(Culvert-UP); 32009.44; 36000(Culvert-DN); 36000(Culvert-UP); 36275.49	
NT RC 01R	All of the right overbank "n" values are less than 0.030. Manning’s "n" values for the overbank areas are usually larger than 0.030 (Chow, 1959, page 113). The "n" value(s) should be re-evaluated. Follow the procedure on pages 17 and 54 of (FHWA, 1984) to compute the overbank "n" value for the natural floodplain. Or follow the procedure in (USGS, 1977) to compute the "n" value for urban development. Please submit supporting information on the evaluation of "n" value.	862.278; 1291.06; 1771.966; 2199.745; 3400(Bridge-UP); 3474.693; 3972.563; 4399.991; 4839.399; 7920.096; 8000(Bridge-DN); 8000(Bridge-UP); 8051.898; 8199.251; 8373.149; 9864.137; 11992.85; 219.88; 413.157; 450(Culvert-UP); 509.06; 211.968; 3004.364; 3515.389; 3964.325; 4327.181; 4685.592; 4740(Bridge-UP); 4777.088; 4790.088; 4865.578; 5039.878; 5065.378; 5084.678; 5508.105; 6189.177; 6300(Culvert-UP); 6414.98; 33297.82	
NT RC 05	The left overbank n-value of $nlob$ and the right overbank n-value of $nrob$ are less than or equal to the channel n-value of nch. Follow the procedure in (FHWA, 1984) to compute the n-value for the natural floodplain and the channel. Or follow the procedure in (USGS, 1977) to compute the n-value for urban development. Please submit supporting information on the evaluation of n-values.	4399.991; 8000(Bridge-DN); 8000(Bridge-UP); 8051.898; 5790.305; 4740(Bridge-UP); 4777.088; 4865.578; 5039.878; 5065.378; 1388.275	

NT RS 02BUC	This is the Upstream Bridge Section (BRU). The channel n value of $chlup$ for the upstream internal bridge opening section is equal to or larger than the channel n value of $chl3$ at Section 3. Usually, the channel "n" value of the bridge opening section represents the area below the bridge deck and is less than the channel "n" value of Section 3. The "n" value for Section 3 represents the natural valley channel section roughness for the reach between Section 3 and Section 4. Please change the "n" value of the internal bridge opening section or provide supporting information for the use of a higher "n" value.	3400(Bridge-UP); 4740(Bridge-UP)	
NT TL 01S2	This is Section2 of a hydraulic structure. The contraction and expansion loss coefficients are cc and ce. They should be equal to 0.3 and 0.5, respectively, for typical structure sections according to page 5-8 of the HEC-RAS Hydraulic Reference Manual (HEC, 2010).	267.15	
NT TL 02	Contraction and expansion loss coefficients are cc and ce, respectively. However, this cross section is not at a hydraulic structure. They should be equal to 0.1 and 0.3 according to page 5-8 of the HEC-RAS Hydraulic Reference Manual (HEC, 2010).	218.96	
XS BO 02L	Multiple Block Obstruction. The Flow Code will be MBL. The block obstruction elevation is higher than the left bank elevation. The ground elevation within the block obstruction is lower than the highest discharge WSEL. The block obstruction is not within the block ineffective flow stations. If it is, the ineffective flow elevation is lower than the highest discharge WSEL. This option is suitable to represent individual buildings within the floodway. Compute appropriate "n" values to represent a group of buildings as outlined in (USGS, 1977) or use the Ineffective Flow option.	509.06; 31476.58; 37056.92; 267.15; 327.782; 604.441	
XS BO 02R	Multiple Block Obstruction. The Flow Code will be "MBR". The block obstruction elevation is higher than the right bank elevation. The ground elevation within the block obstruction is lower than the highest discharge WSEL. The block obstruction is not within the block ineffective flow stations. If it is, the ineffective flow elevation is lower than the highest discharge WSEL. This option is suitable to represent individual buildings within the floodway. Compute appropriate "n" values to represent a group of buildings as outlined in (USGS, 1977) or use the Ineffective Flow option.	211.968; 9342.845; 2590.359; 26877.54; 29148; 29203.58; 31476.58; 35582.96; 36275.49	

XS CD 01	Critical Depth occurs at $assignedname$ flood. Flow Code will be "C". The Ineffective flow option is used. The Ineffective Flow elevation is equal to or higher than the Critical WSEL. Please investigate whether this selection is appropriate.	8373.149; 11341.88; 11718.89; 16751.59; 17672.98; 9243.731; 11258.23; 11729.12; 143.571; 27678.42; 32874.91; 988.112	
XS DC 01	Discharge decreases in the downstream direction for $assignedname$ flood. There are no lateral structures. Documentation of hydrologic analysis is required or provide explanation.	5650(MultiOpen-UP); 5790.305; 11350(MultiOpen-UP); 38835.32; 5046.201	
XS DC 03	Discharge is different between the upstream side and downstream side of the structure for $assignedname$ flood. They should be the same.	5625.602; 11303	
XS DT 01	Both the right overbank distance of rob and the left overbank distance of lob are longer than the channel distance of chl . Please review the creation of left overbank, channel and right overbank distances. The HEC-RAS geometry file may need to be recreated using a GIS program. Please resolve the differences among the distances.	11405.26	
XS DT 02L	The Left overbank distance of lob is greater than the channel distance of chl by more than two times. The Left overbank distance may be in error. Please review the creation of left overbank, channel and right overbank distances. The HEC-RAS geometry file may need to be recreated using a GIS program. Please resolve the differences between the distances.	6709.658	
XS DT 02R	The Right overbank distance of rob is greater than the channel distance of chl by more than two times. The Right overbank distance may be in error. Please review the creation of left overbank, channel and right overbank distances. The HEC-RAS geometry file may need to be recreated using a GIS program. Please resolve the differences between the distances.	11350(MultiOpen-DN); 11405.26	
XS IF 03L	The Left Ineffective Flow Station is within the channel. The Left Ineffective Flow Station of $ineffstal$ is greater than the LeftBankSta of $bankstal$. The Left Ineffective Flow Station or the LeftBankSta should be adjusted.	6003.453	
XS IF 03R	The Right Ineffective Flow Station is within the channel. The Right Ineffective Flow Station of $ineffstar$ is less than the RightBankSta of $bankstar$. The Right Ineffective Flow Station or the RightBankSta should be adjusted.	8051.898; 12648.67	

XS LC 01	LenChl Up/TopWdthAct Dn = $ratioVal$. The ratio is more than 1.1. LenChlUp is more than 500 feet. This cross section is located too far upstream from the critical depth cross section $secnocritical$ for the $Assigned_Name$ flood. The cross section should move closer to the critical depth section, or an additional cross section should be added between the two cross sections. The HEC-RAS geometry file may need to be recreated using a GIS program.	16079.37; 3262.851; 3775.195	

PLAN: POST-PROJECT CONDITIONS MODEL

cHECk-RAS Report

HEC-RAS Project: *sandy_wissahickon_hms.prj*
Plan File: *sandy_wissahickon_hms.p03*
Geometry File: *sandy_wissahickon_hms.g06*
Flow File: *sandy_wissahickon_hms.f02*
Report Date: *6/25/2024*

Message ID	Message	Cross sections affected	Comments
MP KW 01D	The name of the stream is ($streamname$). The flow regime is subcritical or mixed flow. The downstream starting water-surface elevation, SWSEL, is computed from known water-surface elevation.		
MP SW 01DK	The name of the stream is ($streamname$). The flow regime is subcritical or mixed flow. Starting water-surface elevations are computed from Known WSELs as the downstream boundary condition. Provide backup information on Known water-surface elevations or use same energy slope for all the profiles as the starting boundary condition and rerun the plan.		
MP WS 01	The $profilename1$ WSEL of $wsel1$ is higher than the $profilename2$ WSEL of $wsel2$.	219.88; 365.816; 454.774; 652.351; 862.278; 250.768; 639.854; 1063.591; 211.968; 413.157; 509.06; 1028.873; 1382.218; 1444.139; 1726.006; 2311.558; 205.361	

NT RC 01L	All of the left overbank Manning’s "n" values are less than 0.030. The "n" values for the overbank areas are usually larger than 0.030 (Chow, 1959, page 113). The "n" value(s) should be re-evaluated. Follow the procedure outlined to compute the overbank "n" value(s) for a natural floodplain (FHWA, 1984). Or follow the procedure outlined to compute the "n" values for urban development (USGS, 1977). Please submit supporting information on the evaluation of the "n" values.	365.816; 454.774; 500(Bridge-DN); 500(Bridge-UP); 652.351; 862.278; 1291.06; 1771.966; 2199.745; 2592.777; 3075.733; 3336.735; 3400(Bridge-DN); 3400(Bridge-UP); 3474.693; 3644.594; 3675(Bridge-DN); 3675(Bridge-UP); 3706.353; 3972.563; 4399.991; 4839.399; 5192.662; 5625.602; 5650(MultiOpen-DN); 5650(MultiOpen-UP); 5697.475; 6061.115; 6100(Bridge-DN); 6100(Bridge-UP); 6177.298; 6363.44; 6752.426; 7158.174; 7193(Bridge-DN); 7193(Bridge-UP); 7223.838; 7431.106; 7920.096; 8000(Bridge-DN); 8000(Bridge-UP); 8051.898; 8373.149; 8707.044; 8750(Culvert-DN); 8750(Culvert-UP); 8795.098; 9157.356; 9200(Culvert-DN); 9200(Culvert-UP); 9242.619; 11022.62; 11341.88; 11385(Bridge-DN); 11385(Bridge-UP); 11428.92; 11718.89; 11770(Bridge-DN); 11770(Bridge-UP); 11841.24; 12625.84; 1537.296; 2384.711; 3911.306; 4321.881; 5117.957; 5396.729; 5790.305; 250.768; 413.157; 450(Culvert-DN); 450(Culvert-UP); 509.06; 1028.873; 1726.006; 211.968; 4740(Bridge-DN); 4740(Bridge-UP); 4777.088; 4790.088; 4865.578; 5039.878; 5065.378; 5084.678; 5508.105; 6189.177; 6300(Culvert-DN); 6300(Culvert-UP); 6414.98; 6572.639; 6600(Bridge-DN); 6600(Bridge-UP); 6668.16; 7570.986; 8235.939; 8350(Culvert-DN); 8350(Culvert-UP); 8504.5; 8975.758; 22305.19; 22719.89; 24042.15; 24085(Bridge-DN); 24085(Bridge-UP); 24129.68; 24402.5; 31828(Culvert-DN); 31828(Culvert-UP); 32009.44; 36000(Culvert-DN); 36000(Culvert-UP); 36275.49	
NT RC 01R	All of the right overbank "n" values are less than 0.030. Manning’s "n" values for the overbank areas are usually larger than 0.030 (Chow, 1959, page 113). The "n" value(s) should be re-evaluated. Follow the procedure on pages 17 and 54 of (FHWA, 1984) to compute the overbank "n" value for the natural floodplain. Or follow the procedure in (USGS, 1977) to compute the "n" value for urban development. Please submit supporting information on the evaluation of "n" value.	862.278; 1291.06; 1771.966; 2199.745; 3400(Bridge-UP); 3474.693; 3972.563; 4399.991; 4839.399; 7920.096; 8000(Bridge-DN); 8000(Bridge-UP); 8051.898; 8199.251; 8373.149; 9864.137; 11992.85; 219.88; 413.157; 450(Culvert-UP); 509.06; 211.968; 3004.364; 3515.389; 3964.325; 4327.181; 4685.592; 4740(Bridge-UP); 4777.088; 4790.088; 4865.578; 5039.878; 5065.378; 5084.678; 5508.105; 6189.177; 6300(Culvert-UP); 6414.98; 33297.82	
NT RC 05	The left overbank n-value of $nlob$ and the right overbank n-value of $nrob$ are less than or equal to the channel n-value of nch. Follow the procedure in (FHWA, 1984) to compute the n-value for the natural floodplain and the channel. Or follow the procedure in (USGS, 1977) to compute the n-value for urban development. Please submit supporting information on the evaluation of n-values.	4399.991; 8000(Bridge-DN); 8000(Bridge-UP); 8051.898; 5790.305; 4740(Bridge-UP); 4777.088; 4865.578; 5039.878; 5065.378; 1388.275	

NT RS 02BUC	This is the Upstream Bridge Section (BRU). The channel n value of $chlup$ for the upstream internal bridge opening section is equal to or larger than the channel n value of $chl3$ at Section 3. Usually, the channel "n" value of the bridge opening section represents the area below the bridge deck and is less than the channel "n" value of Section 3. The "n" value for Section 3 represents the natural valley channel section roughness for the reach between Section 3 and Section 4. Please change the "n" value of the internal bridge opening section or provide supporting information for the use of a higher "n" value.	3400(Bridge-UP); 4740(Bridge-UP)	
NT TL 01S2	This is Section2 of a hydraulic structure. The contraction and expansion loss coefficients are cc and ce. They should be equal to 0.3 and 0.5, respectively, for typical structure sections according to page 5-8 of the HEC-RAS Hydraulic Reference Manual (HEC, 2010).	267.15	
NT TL 02	Contraction and expansion loss coefficients are cc and ce, respectively. However, this cross section is not at a hydraulic structure. They should be equal to 0.1 and 0.3 according to page 5-8 of the HEC-RAS Hydraulic Reference Manual (HEC, 2010).	218.96	
XS BO 02L	Multiple Block Obstruction. The Flow Code will be MBL. The block obstruction elevation is higher than the left bank elevation. The ground elevation within the block obstruction is lower than the highest discharge WSEL. The block obstruction is not within the block ineffective flow stations. If it is, the ineffective flow elevation is lower than the highest discharge WSEL. This option is suitable to represent individual buildings within the floodway. Compute appropriate "n" values to represent a group of buildings as outlined in (USGS, 1977) or use the Ineffective Flow option.	509.06; 31476.58; 37056.92; 267.15; 327.782; 604.441	
XS BO 02R	Multiple Block Obstruction. The Flow Code will be "MBR". The block obstruction elevation is higher than the right bank elevation. The ground elevation within the block obstruction is lower than the highest discharge WSEL. The block obstruction is not within the block ineffective flow stations. If it is, the ineffective flow elevation is lower than the highest discharge WSEL. This option is suitable to represent individual buildings within the floodway. Compute appropriate "n" values to represent a group of buildings as outlined in (USGS, 1977) or use the Ineffective Flow option.	211.968; 9342.845; 2590.359; 26877.54; 29148; 29203.58; 31476.58; 35582.96; 36275.49	

XS CD 01	Critical Depth occurs at $assignedname$ flood. Flow Code will be "C". The Ineffective flow option is used. The Ineffective Flow elevation is equal to or higher than the Critical WSEL. Please investigate whether this selection is appropriate.	8373.149; 11341.88; 11718.89; 16751.59; 17672.98; 9243.731; 11258.23; 11729.12; 143.571; 27678.42; 32874.91; 988.112	
XS DC 01	Discharge decreases in the downstream direction for $assignedname$ flood. There are no lateral structures. Documentation of hydrologic analysis is required or provide explanation.	5650(MultiOpen-UP); 5790.305; 11350(MultiOpen-UP); 38835.32; 5046.201	
XS DC 03	Discharge is different between the upstream side and downstream side of the structure for $assignedname$ flood. They should be the same.	5625.602; 11303	
XS DT 01	Both the right overbank distance of rob and the left overbank distance of lob are longer than the channel distance of chl . Please review the creation of left overbank, channel and right overbank distances. The HEC-RAS geometry file may need to be recreated using a GIS program. Please resolve the differences among the distances.	11405.26	
XS DT 02L	The Left overbank distance of lob is greater than the channel distance of chl by more than two times. The Left overbank distance may be in error. Please review the creation of left overbank, channel and right overbank distances. The HEC-RAS geometry file may need to be recreated using a GIS program. Please resolve the differences between the distances.	6709.658	
XS DT 02R	The Right overbank distance of rob is greater than the channel distance of chl by more than two times. The Right overbank distance may be in error. Please review the creation of left overbank, channel and right overbank distances. The HEC-RAS geometry file may need to be recreated using a GIS program. Please resolve the differences between the distances.	11350(MultiOpen-DN); 11405.26	
XS IF 03L	The Left Ineffective Flow Station is within the channel. The Left Ineffective Flow Station of $ineffstal$ is greater than the LeftBankSta of $bankstal$. The Left Ineffective Flow Station or the LeftBankSta should be adjusted.	6003.453	
XS IF 03R	The Right Ineffective Flow Station is within the channel. The Right Ineffective Flow Station of $ineffstar$ is less than the RightBankSta of $bankstar$. The Right Ineffective Flow Station or the RightBankSta should be adjusted.	8051.898; 12648.67	

XS LC 01	LenChl Up/TopWdthAct Dn = $ratioVal$. The ratio is more than 1.1. LenChlUp is more than 500 feet. This cross section is located too far upstream from the critical depth cross section $secnocritical$ for the $Assigned_Name$ flood. The cross section should move closer to the critical depth section, or an additional cross section should be added between the two cross sections. The HEC-RAS geometry file may need to be recreated using a GIS program.	16079.37; 3262.851; 3775.195	
XS LV 01R	The Right levee option is used at this river station. It is more than 100 feet from the structure. Freeboard is computed by subtracting 1%-annual-chance WSEl from the levee crest elevation. Right Freeboard of $rfrbrd$ is less than 3 feet. A without-levee analysis needs to be conducted since the freeboard does not satisfy Part 65.10 of the National Flood Insurance Program regulations (FEMA, 1986). Please submit all the required models for levees.	1897	
XS LV 03R	The Right levee option is used at this river station. It is the most upstream cross section on the levee. Freeboard is computed by subtracting 1%-annual-chance WSEl from the levee crest elevation. Right Freeboard of $rfrbrd$ is less than 3.5 feet. A without-levee analysis needs to be conducted since the freeboard does not meet the requirements of Part 65.10 of the National Flood Insurance Program regulations (FEMA, 1986). Please submit all the required models for levees.	2206	
XS LV 05R	The right levee option is used at this river station. The $assignednameMin$ flood overtops the levee. The $assignednameMin$ flood WSEL of $wselMin$ is higher than the levee crest elevation of $grelv$. The input Right Levee Elevation of $leveeelvr$ is higher than the $assignednameMax$ flood WSEL of $wselMax$. The Lateral Structure option or other options should be used to determine the proper With-levee discharge and WSEL.	1897; 2206	

Attachment 4
MT-2 Revision Request Submittal Checklist

MT-2 REVISION REQUEST SUBMITTAL CHECKLIST

PART A: GENERAL REQUIREMENTS

ELEMENTS	Yes	N/A
NARRATIVE: Please provide a written description of the purpose of the request, the scope of the proposed/as-built project, and the methodology used to analyze the project effects.	✓	
MT-2 APPLICATION FORMS: Please provide completed forms applicable to your request. Ensure that MT-2 Form 1 was signed by the requester, certifying engineer, and each community affected by the revision.	✓	
HYDROLOGIC ANALYSIS: If applicable, please provide a FEMA-acceptable hydrologic analysis in digital format, a drainage area map, and associated backup information (e.g., calculations used to determine lag time, CN, and loss values, as well as land use and soil maps). FEMA-acceptable models can be accessed on their website.		✓
HYDRAULIC ANALYSIS: Please provide a FEMA-acceptable hydraulic analysis in digital format. Information on FEMA-acceptable models can be accessed at on their website.	✓	
CERTIFIED TOPOGRAPHIC WORK MAP: Please provide a certified topographic work map that meets the mapping requirements outlined in MT-2 Form 2. If available, please provide spatially referenced Geographic Information System (GIS) data. If GIS data are not available, you may submit digital Computer-Aided Design (CAD) data.	✓	
ANNOTATED FIRM: Please submit a revised Flood Insurance Rate Map (FIRM), at the scale of the effective FIRM, which shows the revised boundary delineation of the base (1-percent-annual-chance) floodplain, 0.2-percent-annual-chance floodplain, and regulatory floodway and how it ties into the boundary delineation shown on the effective FIRM at the downstream and upstream ends of the revised reach.	✓	
REVIEW FEE PAYMENT: Please include the appropriate review fee payment. The current fee schedule is available on the FEMA website at https://www.fema.gov/flood-maps/change-your-flood-zone/status/flood-map-related-fees.	✓	
MEET 65.10 REQUIREMENT: If you intend to show that a berm/levee/floodwall reduces the flood hazard, please submit all the NFIP data requirements outlined in Title 44, Chapter 1, Section 65.10 of the Code of Federal Regulations (44 CFR §65.10).		✓
OPERATION AND MAINTENANCE PLAN: If the request involves a berm, levee, floodwall, dam, and/or detention basin project, please submit an officially adopted operation and maintenance plan.		✓
PROPOSED/AS-BUILT PLANS: Please submit proposed/as-built plans, certified by a registered Professional Engineer, for all project elements for which this applies.		✓
FLOODWAY NOTICE: If the revision results in changing or establishing regulatory floodway boundaries, please provide a floodway public notice or a statement by your community that it has notified all affected property owners, in compliance with the National Flood Insurance Program (NFIP) regulations at 44 CFR §65.7(b)(1).	✓	
PROPERTY OWNER NOTIFICATION: If the revision results in any widening/shifting/establishing of a base floodplain and/or any increasing/establishing of Base Flood Elevations (BFEs), please provide copies of the individual legal notices sent to all property owners affected by increased flood hazards.	✓	

PART B: CONDITIONAL LETTER OF MAP REVISION (CLOMR) - SPECIFIC REQUIREMENTS

ENDANGERED SPECIES ACT (ESA) COMPLIANCE: Please submit documentation of compliance with the ESA requirements. To learn more about ESA compliance, please see page 28 of the MT-2 instructions.	✓	
REGULATORY REQUIREMENTS OF 44 CFR §65.12: If the proposed project results in BFE increases between the pre-project (existing) conditions and the proposed conditions, and they are more than 0.00 foot as a result of encroachment within a regulatory floodway, or more than 1.0 foot in a Zone AE area that has no regulatory floodway, please submit: (a) certification that no structures are affected by the increased BFE; (b) documentation of individual legal notices sent to all affected property owners, explaining the impact of the proposed action on their property; and (c) an evaluation of alternatives that would not result in a BFE increase.		✓

Notes:

- Applicants are encouraged to submit their Letter of Map Change (LOMC) revision request using the Online LOMC tool. To learn more about the Online LOMC tool, please visit the FEMA website at https://hazards.fema.gov/femaportal/onlinelomc/signin.

- The MT-2 Guidance Document has been developed to supplement the information provided in these instructions. The MT-2 Guidance Document explains how the Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA) implements the review and processing of requests to revise Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study (FIS) reports (MT-2 requests).

Attachment 5
MT-2 Form 1 Overview & Concurrence Form

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
420712	Whitemarsh, Township of, Montgomery County, Pennsylvania	PN	42091C	0289G	3/2/2016

2. a. Flooding Source: Sandy Run

   b. Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH)
   ☐ Alluvial Fan ☐ Lakes ☐ Other (Attach Description)

3. Project Name/Identifier: Brooke Glen Hospital Flood Mitigation Project

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: $ 0

☐ 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: Mr. Neil Callahan	Company: Universal Health Services, Inc.
Mailing Address: 367 South Gulph Road King of Prussia, Pennsylvania 19406	Daytime Telephone: 215-641-5353 Fax No.: 215-641-6811
	E-mail Address: neil.callahan@uhsinc.com
	Date: 7-16-21
Signature of Requestor (required): Neil Callahan	

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: Krista Heinrich, Township Engineer	
Mailing Address: 65 E. Butler Ave. New Britain, PA 18901	Community Name: Whitemarsh Township
	Daytime Telephone: 610-825-3535 Fax No.:
	E-mail Address: kheinrich@gilmore-assoc.com
Community Official's Signature (required):	Date:

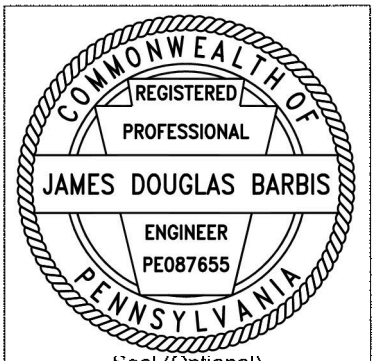
3. CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

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: Mr. James Barbis, PE		License No.:	Expiration Date:
Company Name: Geosyntec Consultants, Inc.		Mailing Address: 930 Harvest Drive, Suite 220 Blue Bell, Pennsylvania 19422	
Telephone No.: 215-407-2726	Fax No.:		
E-mail Address: james.barbis@geosyntec.com			
Signature:		Date: 7/25/2024	

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)

Attachment 6
MT-2 Form Riverine Hydrology & Hydraulic Form

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: Sandy Run

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*	Sandy Run	RS 1688.606	157.76	158.19
Upstream Limit*	Sandy Run	RS 2590.359	163.09	163.41

*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: HEC-RAS version 6.3.1

☒ 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:	
	Sandy_Wissahickon	DEM	N/A	N/A	NAD_1983_StatePla
Corrected Effective Model*	File Name:	Plan Name:	File Name:	Plan Name:	
	Sandy_Wissahickon	CEM_06212024	N/A	N/A	NAD_1983_StatePla
Existing or Pre-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	
	N/A	N/A	N/A	N/A	N/A
Revised or Post-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	
	Sandy_Wissahickon	PPCM_06212024	N/A	N/A	NAD_1983_StatePla
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	
	N/A	N/A	N/A	N/A	N/A

* 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: U.S. Geological Survey, 20221115, USGS 1/3 Arc Second n41w076 2022111 Date: 11/15/2022 (publication date)

Vertical Datum: North American Vertical Datum of 1988 (NAVD 88) Spatial Projection: NSRS11.PA-SF

Accuracy: 1/3 arc second

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

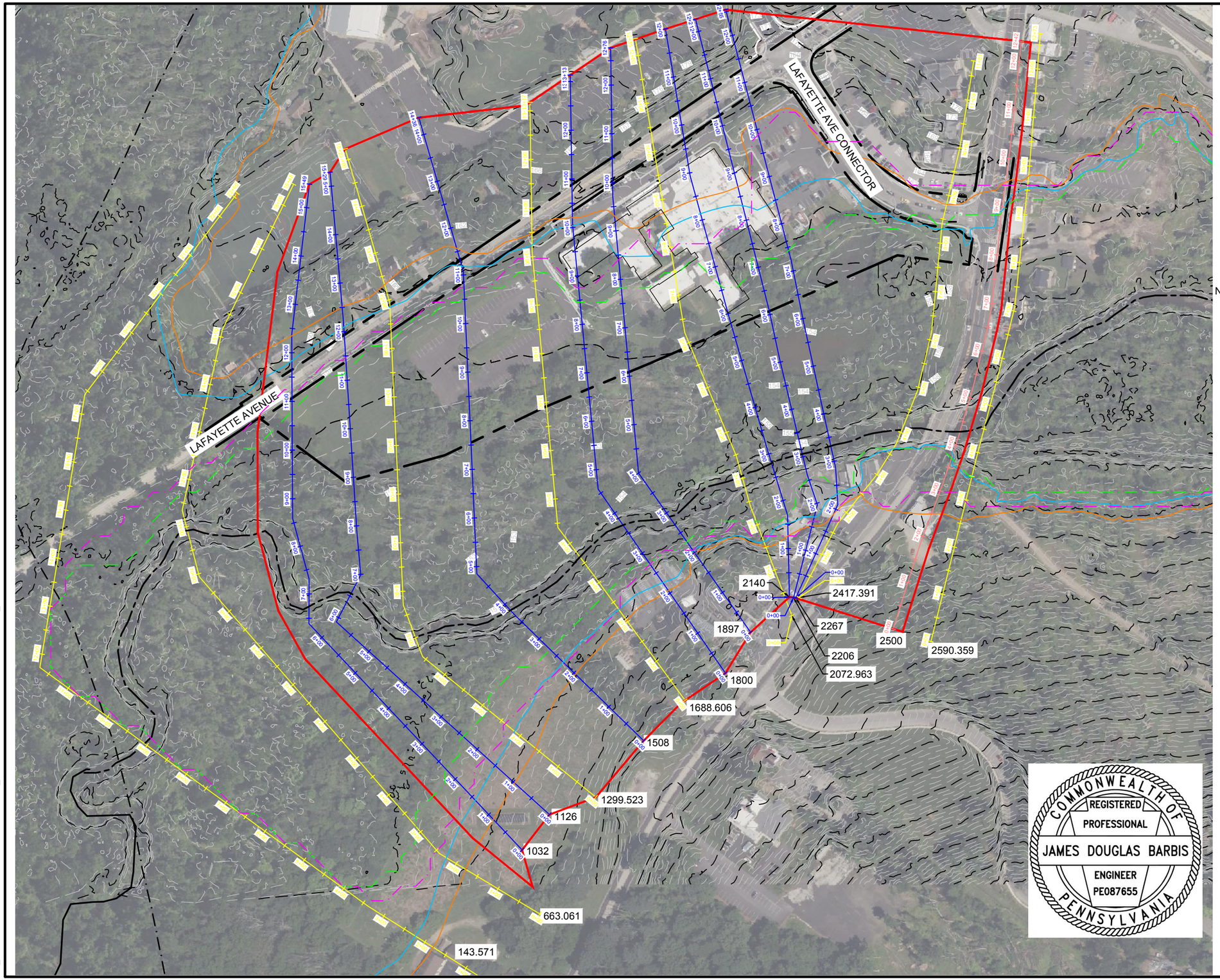
   If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set 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.

Attachment 7
Certified Topographic Work Map



LEGEND

- PROPERTY BOUNDARY
- EXISTING BUILDING
- 1.0% EFFECTIVE ZONE AE
- 0.2% EFFECTIVE ZONE AE
- 1.0% CORRECTED EFFECTIVE ZONE AE
- 0.2% CORRECTED EFFECTIVE ZONE AE
- CREEK CENTERLINE
- ADDED CROSS SECTION
- EXISTING BRIDGE CROSS SECTION
- EXISTING CROSS SECTION
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- STUDY AREA

NOTES:

1. EXISTING CONTOURS IS COMPLIED FROM USGS LIDAR DATA (DATA COLLECTED IN 2017/2018 AND METADATA UPDATED ON NOVEMBER 15, 2022). THIS INFORMATION WAS SUPPLEMENTED WITH AN ON-SITE TOPOGRAPHICAL FIELD SURVEY PERFORMED BY PENNONI ASSOCIATES INC. IN SEPTEMBER 2023.
2. THE STUDY AREA IS ENTIRELY LOCATED WITHIN THE CITY LIMITS OF FORT WASHINGTON PENNSYLVANIA, WHITEMARSH TOWNSHIP, AND MONTGOMERY COUNTY.
3. THE 1% ANNUAL CHANCE (1%) AND 0.2% ANNUAL CHNACE (0.2%) EFFECTIVE ZONE AE BOUNDARIES WERE OBTAINED FROM THE CURRENT FIS (REVISED: MARCH 2, 2016) BASED ON THE TOPOGRAPHY USED IN THE EFFECTIVE MODEL LAST UPDATED IN NOVEMBER 2012. THE 1% AND 0.2% CORRECTED EFFECTIVE ZONE AE BOUNDARIES INCORPORATE THE USE OF MORE RECENT TOPOGRAPHIC DATA AND OTHER REVISIONS INCORPORATED IN THE CORRECTED EFFECTIVE MODEL (AS DESCRIBED IN SECTION 3.3.1 OF THE CLOMR REPORT). ALTHOUGH THE WATER SURFACE ELEVATIONS FOR THE 1% AND 0.2% CORRECTED EFFECTIVE ZONE AE ARE GENERALLY HIGHER THAN THE EFFECTIVE ZONE AE, THE SPATIAL EXTENT OF THE ZONE AE BOUNDARIES DECREASES COMPARED TO THOSE USED IN THE EFFECTIVE FIS (FEMA, 2016) DUE TO THE CHANGE IN TOPOGRAPHIC DATA SOURCES.
4. THE REFERENCED VERTICAL DATUM IS NORTH AMERICAN DATUM OF 1988 (NAVD 88).

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
JAMES DOUGLAS BARBIS
ENGINEER
PE087655

0 100 200
SCALE IN FEET

CERTIFIED TOPOGRAPHIC WORK MAP

FORT WASHINGTON, PA

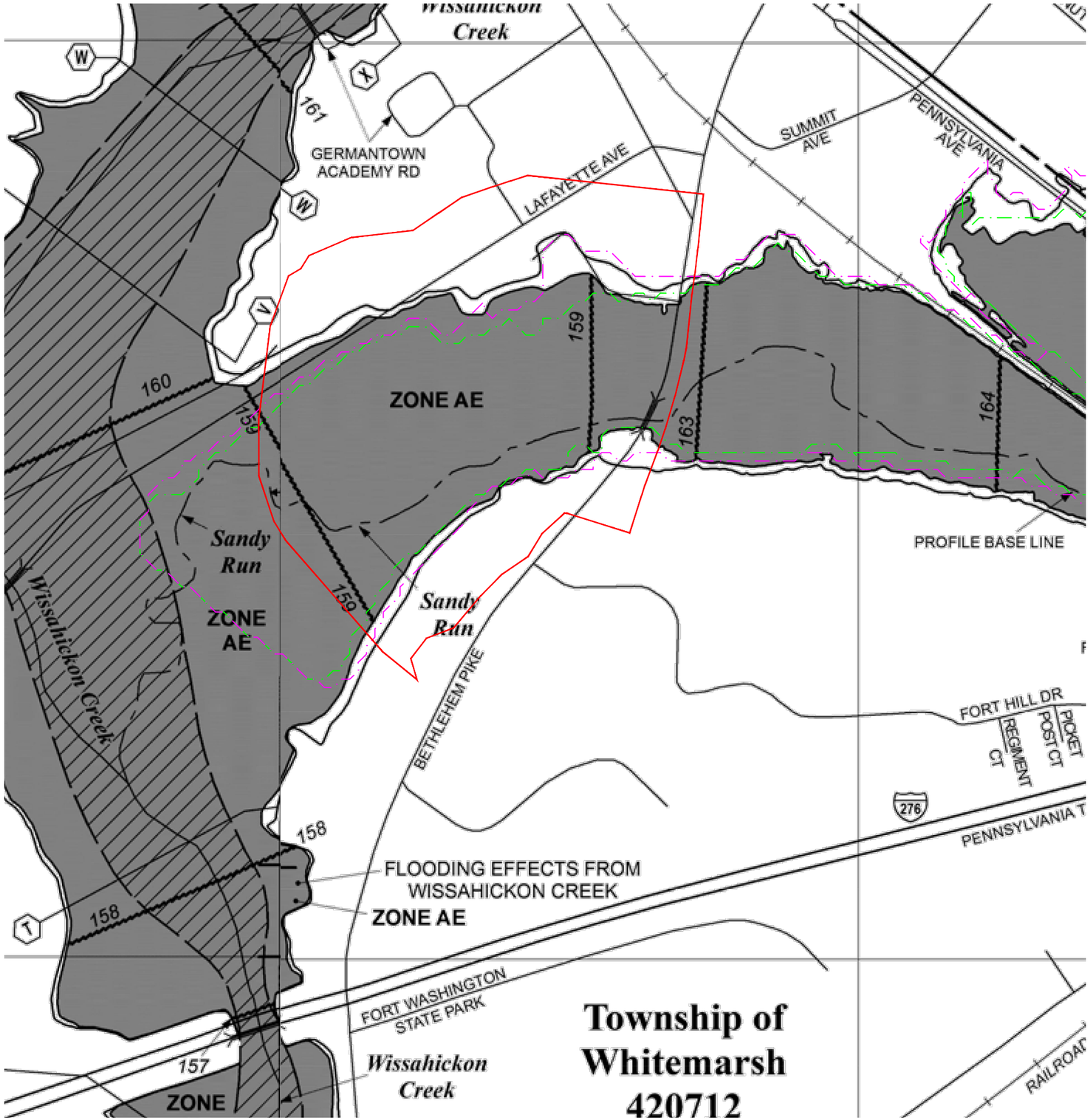
Geosyntec consultants

ATTACHMENT 7

PROJECT NO: TXW9793A | JULY 2024

C:_GEO-ACC\ACCDOCS\GEOSYNTECUJH.SVCS_BROOKE GLEN\PROJECT FILES\PERMIT\01_FLOOD MTGNDWGS\SHEETS\TXW9793AFIG2

Attachment 8
Annotated FIRM Panel



LEGEND

- 1.0% EFFECTIVE ZONE AE
- 0.2% EFFECTIVE ZONE AE
- FLOODWAYS IN ZONE AE
- 1.0% CORRECTED EFFECTIVE ZONE AE
- 0.2% CORRECTED EFFECTIVE ZONE AE
- STUDY AREA

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0289G

FIRM
FLOOD INSURANCE RATE MAP

MONTGOMERY COUNTY, PENNSYLVANIA
(ALL JURISDICTIONS)

PANEL 289 OF 451

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
AMBLER, BOR OF	420947	0289	G
SPRINGFIELD, TWP OF	425388	0289	G
UPPER DUBLIN, TWP OF	420708	0289	G
WHITEMARSH, TWP OF	420712	0289	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
42091C0289G

MAP REVISED
MARCH 2, 2016

Federal Emergency Management Agency

Attachment 9
Review Fee Payment Form

FEDERAL EMERGENCY MANAGEMENT AGENCY

PAYMENT INFORMATION FORM

Community Name:

Project Identifier: Brooke Glen Hospital Flood Mitigation Project

THIS FORM MUST BE MAILED, ALONG WITH THE APPROPRIATE FEE, TO THE ADDRESS BELOW OR E-MAILED TO THE E-MAIL ADDRESS BELOW.

Please make check or money order payable to the National Flood Insurance Program.

Type of Request:

☐ MT-1 application
☒ MT-2 application

LOMC Clearinghouse
3601 Eisenhower Ave. Suite 500 Alexandria, VA
22304-6426
Attn.: LOMC Manager

☐ EDR application

FEMA Project Library
3601 Eisenhower Ave. Suite 500 Alexandria, VA
22304-6426
E-mail: FEMA-EngineeringLibrary@fema.dhs.gov

Request No. (if known): _____ **Check No.:** _____ **Amount:** 0

☐ INITIAL FEE* ☒ FINAL FEE ☐ FEE BALANCE** ☐ MASTER CARD ☐ VISA ☐ CHECK ☐ MONEY ORDER

*Note: Check only for EDR and/or Alluvial Fan requests (as appropriate).

****Note: Check only if submitting a corrected fee for an ongoing request.**

COMPLETE THIS SECTION *ONLY* IF PAYING BY CREDIT CARD

CARD NUMBER EXP. DATE

				–				–				–					–		
1	2	3	4		5	6	7	8	9	10	11	12	13	14	15	16	Month		Year

_____ _____
Date Signature

NAME *(AS IT APPEARS ON CARD)*: _____
(please print or type)

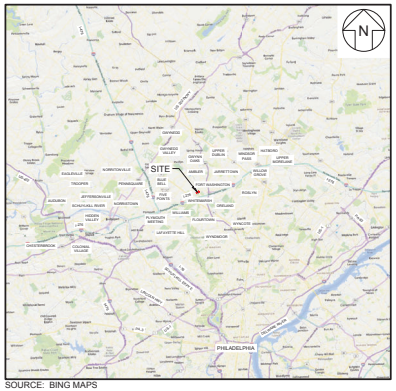
ADDRESS: _____
(*for your credit card receipt-please print or type*) _____

DAYTIME PHONE: _____

Attachment 10
Proposed Plans

BROOKE GLEN BEHAVIORAL HOSPITAL
UNIVERSAL HEALTH SERVICES FLOOD MITIGATION
7170 LAFAYETTE AVE
FORT WASHINGTON, PENNSYLVANIA

PROJECT NO. TXW9793A
JULY 2024



SOURCE: BING MAPS

VICINITY MAP

0 5 10

SCALE IN MILES

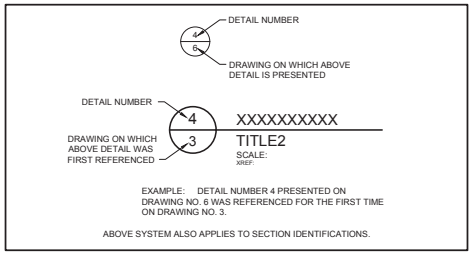
DRAWING LIST TABLE		
DRAWING NUMBER	DRAWING TITLE	LATEST REVISION
1	COVER SHEET	0
2	EXISTING CONDITIONS	0
3	PROPOSED CONDITIONS	0
4	EROSION AND SEDIMENT CONTROL PLAN	0
5	DETAILS (SHEET 1 OF 2)	0
6	DETAILS (SHEET 2 OF 2)	0

SOURCE: BING MAPS

LOCATION MAP

0 1000 2000

SCALE IN FEET



DETAIL IDENTIFICATION LEGEND

PREPARED FOR:

UNIVERSAL HEALTH SERVICES, INC.
367 SOUTH GULPH ROAD,
KING OF PRUSSIA
PENNSYLVANIA, 19406, USA

PREPARED BY:

GEOSYNTEC CONSULTANTS, INC.
930 HARVEST DRIVE, SUITE 220
BLUE BELL, PENNSYLVANIA, 19422
PHONE: 512.451.4003

PERMIT DRAWING, NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

UNIVERSAL HEALTH SERVICES, INC.
367 SOUTH GULPH ROAD KING OF PRUSSIA,
PENNSYLVANNIA, 19406, USA

GEOSYNTEC CONSULTANTS, INC.
930 HARVEST DRIVE, SUITE 220
BLUE BELL, PENNSYLVANIA, 19422
PHONE: 512.451.4003

TITLE: COVER SHEET

PROJECT: UNIVERSAL HEALTH SERVICES FLOOD MITIGATION

SITE: BROOKE GLEN BEHAVIORAL HOSPITAL

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

Digitally signed by James D. Barbis
Date: 2024.07.25 10:30:19 -04'00'

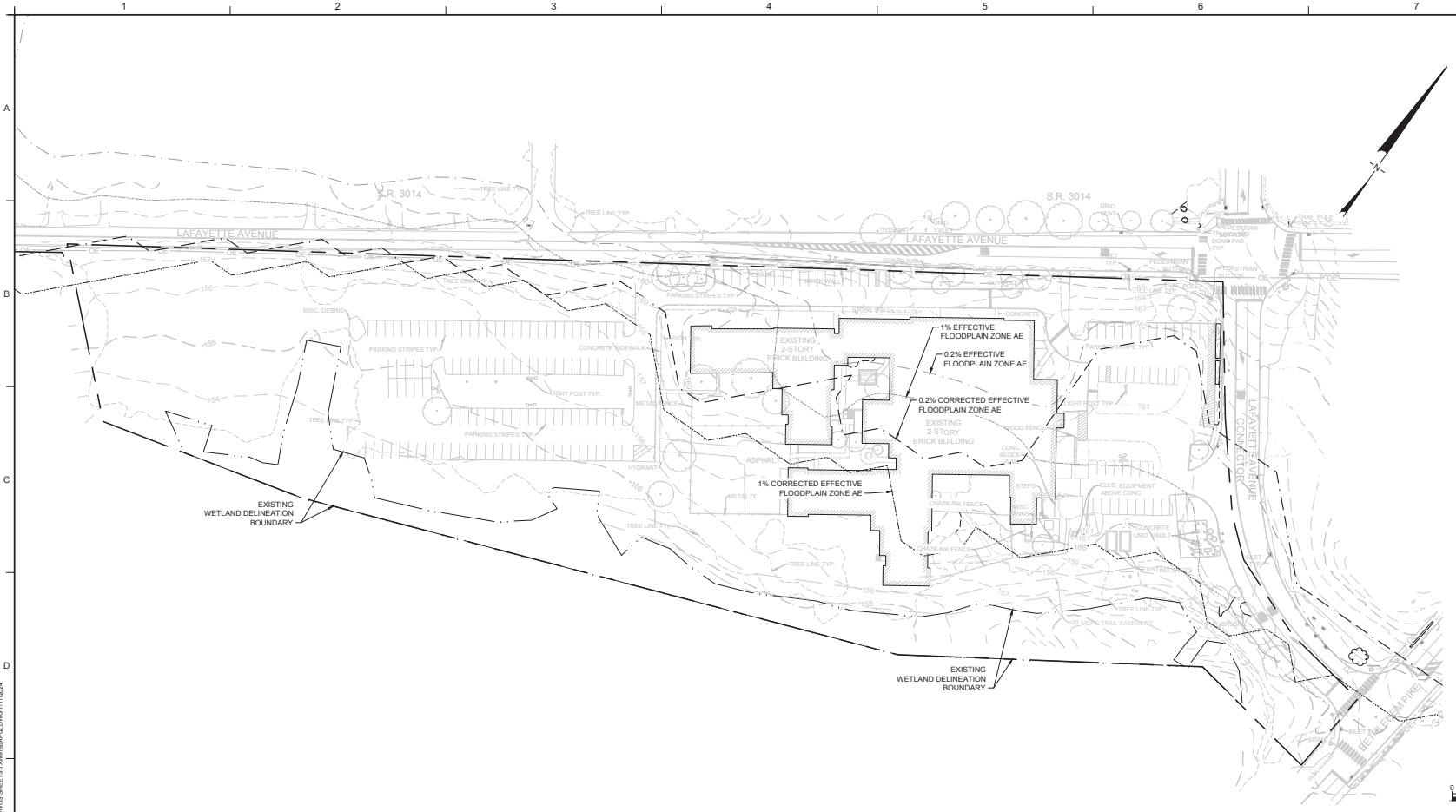
SIGNATURE

07/17/2024
DATE

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
JAMES DOUGLAS BARBIS
PE087655

DESIGN BY:	NH/OB	DATE:	JULY 2024
DRAWN BY:	AM	PROJECT NO.:	TXW9793A
CHECKED BY:	BK	FILE:	TXW9793AP01
REVIEWED BY:	JB	DRAWING NO.:	
APPROVED BY:	JB		1 OF 6

C:_GEO-ACCACCOUNTS\GEOSYNTEC\UHS\VOL\BROOKE GLEN\PROJECT FILES\PERMIT\01_FLOOD MITIGATION\GIS\SHEETS\TXW9793AP01.DWG 7/17/2024



LEGEND

- EXISTING GROUND MAJOR CONTOUR (5') (NOTE 1)
- EXISTING GROUND MINOR CONTOUR (1') (NOTE 1)
- PROPERTY BOUNDARY
- EXISTING SITE ACCESS ROAD
- EXISTING FENCE
- EXISTING WETLAND DELINEATION (NOTE 5)
- 0.2% EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 1% EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 0.2% CORRECTED EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 1% CORRECTED EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- EXISTING TREE

NOTES:

1. EXISTING CONTOURS ARE BASED ON AN ON-SITE TOPOGRAPHICAL FIELD SURVEY PERFORMED BY PENNONI ASSOCIATES INC. IN SEPTEMBER 2023.
2. THE STUDY AREA IS ENTIRELY LOCATED WITHIN THE CITY LIMITS OF FORT WASHINGTON, PENNSYLVANIA AND MONTGOMERY COUNTY.
3. THE 1% ANNUAL CHANCE (1%) AND 0.2% ANNUAL CHANCE (0.2%) EFFECTIVE ZONE AE BOUNDARIES WERE OBTAINED FROM THE CURRENT FIS (REVISED: MARCH 2, 2016) BASED ON THE TOPOGRAPHY USED IN THE EFFECTIVE MODEL LAST UPDATED IN NOVEMBER 2012. THE 1% AND 0.2% CORRECTED EFFECTIVE ZONE AE BOUNDARIES INCORPORATE THE USE OF MORE RECENT TOPOGRAPHIC DATA AND OTHER REVISIONS INCORPORATED IN THE CORRECTED EFFECTIVE MODEL. ALTHOUGH THE WATER SURFACE ELEVATIONS FOR THE 1% AND 0.2% CORRECTED EFFECTIVE ZONE AE ARE GENERALLY HIGHER THAN THE EFFECTIVE ZONE AE, THE SPATIAL EXTENT OF THE ZONE AE BOUNDARIES DECREASES COMPARED TO THOSE USED IN THE EFFECTIVE FIS (FEMA, 2016) DUE TO THE CHANGE IN TOPOGRAPHIC DATA SOURCES.
4. THE REFERENCED VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
5. WETLAND DELINEATION BASED ON SITE INVESTIGATION CONDUCTED BY GEOSYNTEC CONSULTANTS, INC ON 27 JULY 2023.
6. LOCATION OF THE MONTGOMERY COUNTY PLANNING COMMISSION TRAIL EASEMENT IS APPROXIMATE BASED ON RECORD PLAN DRAWING (SHEET 2 OF 5) PREPARED BY WOODROW & ASSOCIATES, INC REVISION 2, DATED 15 OCTOBER 2009.

0 60 120
SCALE IN FEET

REV	DATE	DESCRIPTION	DRN	APP

UNIVERSAL HEALTH SERVICES, INC.
367 SOUTH GULPH ROAD KING OF PRUSSIA,
PENNSYLVANNIA, 19406, USA

GEOSYNTEC CONSULTANTS, INC.
930 HARVEST DRIVE, SUITE 220
BLUE BELL, PENNSYLVANIA, 19422
PHONE: 512.451.4003

TITLE: EXISTING CONDITIONS

PROJECT: UNIVERSAL HEALTH SERVICES FLOOD MITIGATION

SITE: BROOKE GLEN BEHAVIORAL HOSPITAL

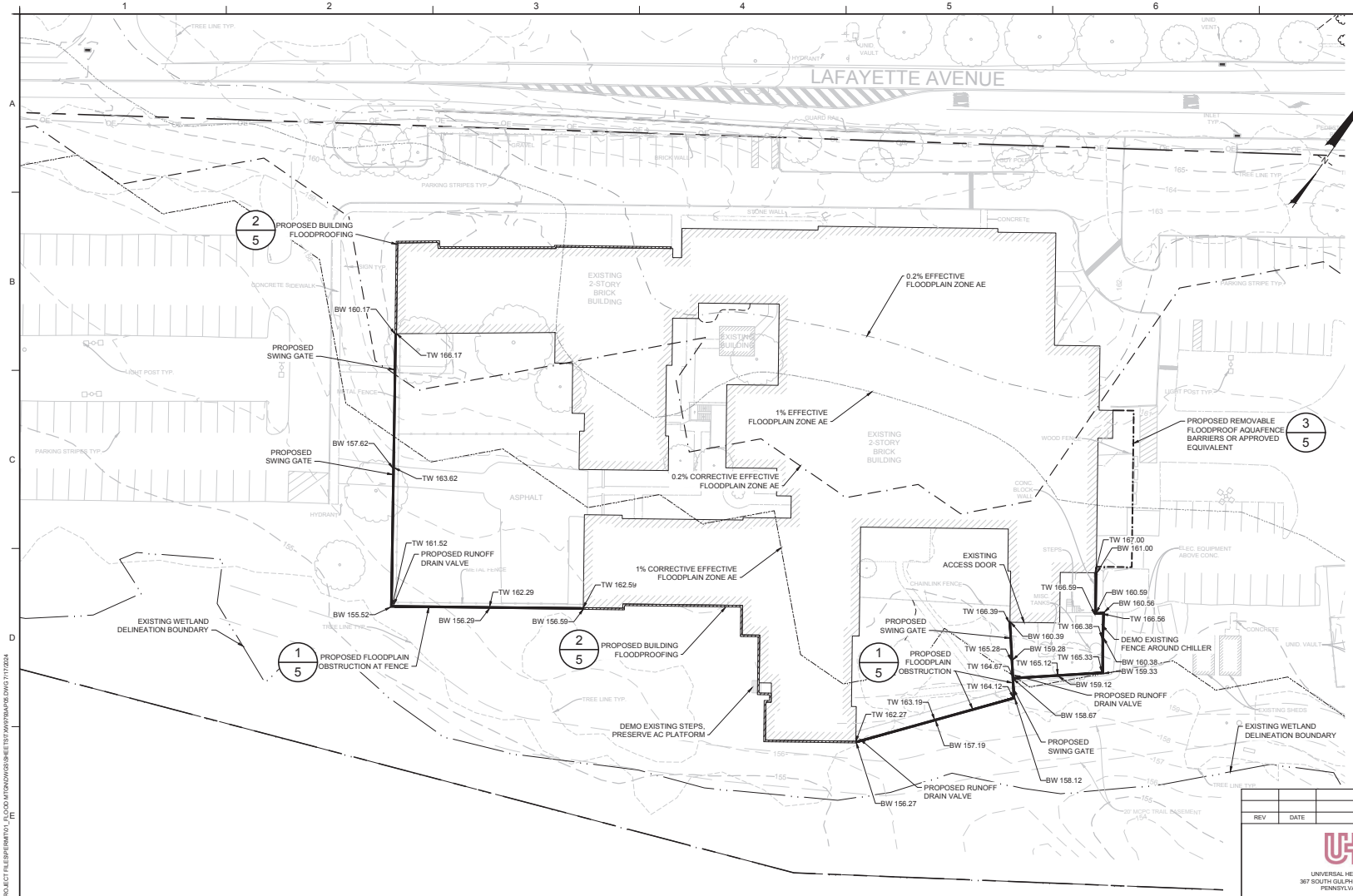
THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.
Digitally signed by James D. Barbis
Date: 2024.07.25 10:43:19 -04'00'
SIGNATURE
07/17/2024
DATE

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
JAMES DOUGLAS BARBIS
ENGINEER
PE087655

DESIGN BY:	OB	DATE:	JULY 2024
DRAWN BY:	AM	PROJECT NO.:	TXW9793A
CHECKED BY:	BK	FILE:	TXW9793AP02
REVIEWED BY:	JB	DRAWING NO.:	
APPROVED BY:	JB		2 OF 6

PERMIT DRAWING, NOT FOR CONSTRUCTION

C:_GEO-ACCACCOUNCS\GEOSYNTEC\UHS\CS_BROOKE GLEN\PROJECT FILES\PERMIT\01_FLOOD MITIGATION\GIS\SHEETS\TXW9793AP02.DWG 7/17/2024



LEGEND

- 355 — EXISTING GROUND MAJOR CONTOUR (5') (NOTE 1)
- EXISTING GROUND MINOR CONTOUR (1') (NOTE 1)
- PROPERTY BOUNDARY
- EXISTING SITE ACCESS ROAD
- EXISTING FENCE
- PROPOSED FLOODPLAIN OBSTRUCTION
- PROPOSED FLOODPROOFING FACILITY
- PROPOSED AQUAFENCE BARRIERS
- 0.2% EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 1% EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 0.2% CORRECTED EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 1% CORRECTED EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- TW XXX.XX — TOP OF WALL ELEVATION
- BW XXX.XX — BOTTOM OF WALL ELEVATION
- EXISTING TREE

NOTES:

1. EXISTING CONTOURS ARE BASED ON AN ON-SITE TOPOGRAPHICAL FIELD SURVEY PERFORMED BY PENNONI ASSOCIATES INC. IN SEPTEMBER 2023.
2. THE STUDY AREA IS ENTIRELY LOCATED WITHIN THE CITY LIMITS OF FORT WASHINGTON, PENNSYLVANIA AND MONTGOMERY COUNTY.
3. THE 1% ANNUAL CHANCE (1%) AND 0.2% ANNUAL CHANCE (0.2%) EFFECTIVE ZONE AE BOUNDARIES WERE OBTAINED FROM THE CURRENT FIS (REVISED: MARCH 2, 2016) BASED ON THE TOPOGRAPHY USED IN THE EFFECTIVE MODEL LAST UPDATED IN NOVEMBER 2012. THE 1% AND 0.2% CORRECTED EFFECTIVE ZONE AE BOUNDARIES INCORPORATE THE USE OF MORE RECENT TOPOGRAPHIC DATA AND OTHER REVISIONS INCORPORATED IN THE CORRECTED EFFECTIVE MODEL. ALTHOUGH THE WATER SURFACE ELEVATIONS FOR THE 1% AND 0.2% CORRECTED EFFECTIVE ZONE AE ARE GENERALLY HIGHER THAN THE EFFECTIVE ZONE AE, THE SPATIAL EXTENT OF THE ZONE AE BOUNDARIES DECREASES COMPARED TO THOSE USED IN THE EFFECTIVE FIS (FEMA, 2016) DUE TO THE CHANGE IN TOPOGRAPHIC DATA SOURCES.
4. THE REFERENCED VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
5. WETLAND DELINEATION BASED ON SITE INVESTIGATION CONDUCTED BY GEOSYNTEC CONSULTANTS, INC ON 27 JULY 2023.

0 30 60
SCALE IN FEET

PERMIT DRAWING, NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

UNIVERSAL HEALTH SERVICES, INC.
367 SOUTH GULPH ROAD KING OF PRUSSIA,
PENNSYLVANNIA, 19406, USA

GEOSYNTEC CONSULTANTS, INC.
930 HARVEST DRIVE, SUITE 220
BLUE BELL, PENNSYLVANIA, 19422
PHONE: 512.451.4003

TITLE: PROPOSED CONDITIONS

PROJECT: UNIVERSAL HEALTH SERVICES FLOOD MITIGATION

SITE: BROOKE GLEN BEHAVIORAL HOSPITAL

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

Digitally signed by James D. Barbis
Date: 2024.07.21 11:46:28 -04'00'

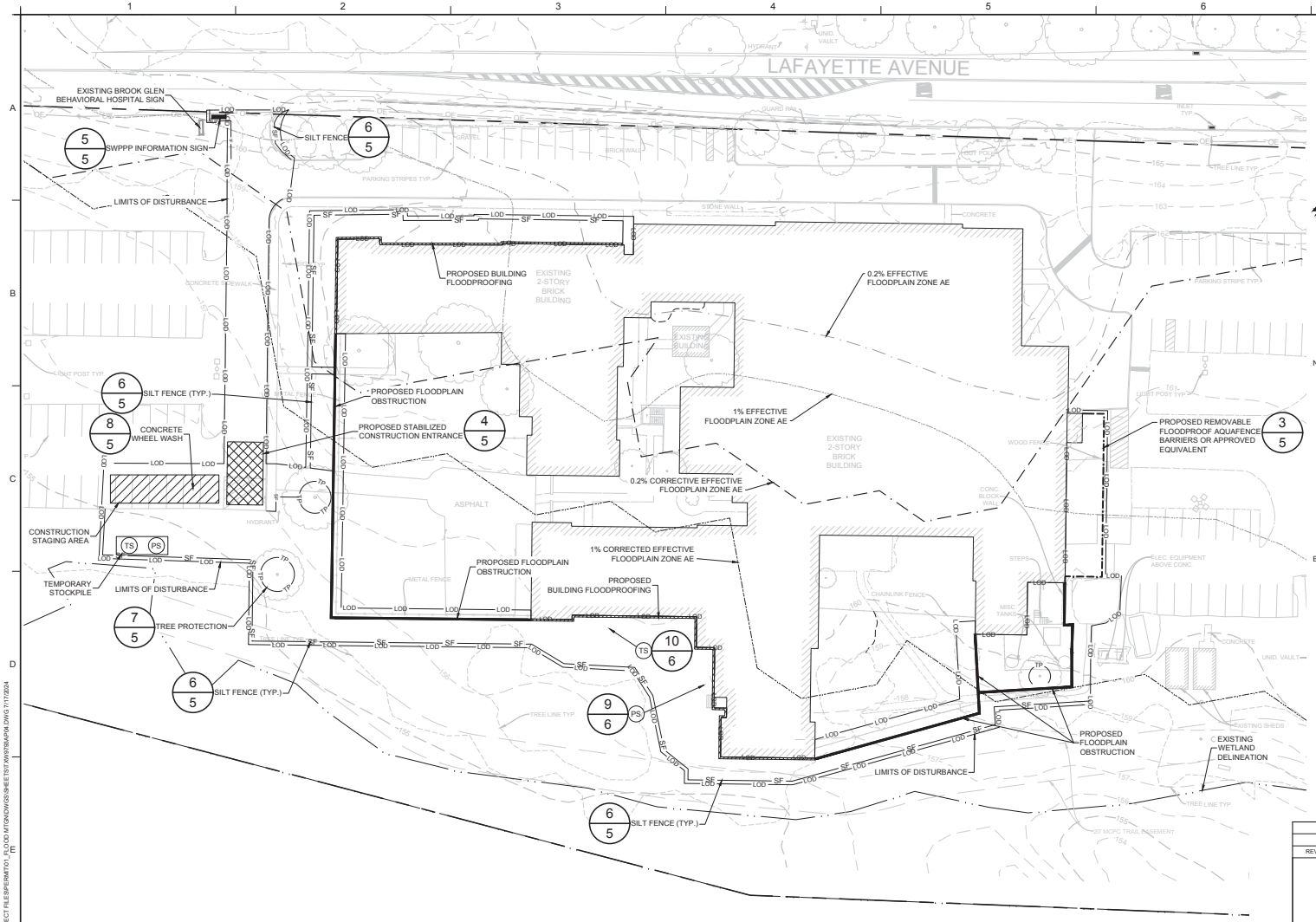
SIGNATURE

07/17/2024
DATE

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — JAMES DOUGLAS BARBIS — ENGINEER — PE087655

DESIGN BY:	NH	DATE:	JULY 2024
DRAWN BY:	AM	PROJECT NO.:	TXW9793A
CHECKED BY:	BK	FILE:	TXW9793AP05
REVIEWED BY:	JB	DRAWING NO.:	
APPROVED BY:	JB		3 OF 6

C:_GEO-ACCACCOUNCS\GEOSYNTEC\UHS\CS_BROOKE GLEN\PROJECT FILES\PERMIT\01_FLOOD MITIGATION\GIS\SHEETS\TXW9793AP05.DWG 7/17/2024



LEGEND

- EXISTING GROUND MAJOR CONTOUR (5') (NOTE 1)
- EXISTING GROUND MINOR CONTOUR (1') (NOTE 1)
- PROPERTY BOUNDARY
- EXISTING SITE ACCESS ROAD
- EXISTING FENCE
- LOD — LIMITS OF DISTURBANCE
- SF — SILT FENCE
- 0.2% EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 1% EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 0.2% CORRECTED EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 1% CORRECTED EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- SWPPP INFORMATION SIGN
- PS — PERMANENT STABILIZATION (9/6)
- TS — TEMPORARY STABILIZATION (10/6)
- EXISTING TREE

NOTES:

1. EXISTING CONTOURS ARE BASED ON AN ON-SITE TOPOGRAPHICAL FIELD SURVEY PERFORMED BY PENNONI ASSOCIATES INC. IN SEPTEMBER 2023.
2. THE STUDY AREA IS ENTIRELY LOCATED WITHIN THE CITY LIMITS OF FORT WASHINGTON, PENNSYLVANIA AND MONTGOMERY COUNTY.
3. THE 1% ANNUAL CHANCE (1%) AND 0.2% ANNUAL CHANCE (0.2%) EFFECTIVE ZONE AE BOUNDARIES WERE OBTAINED FROM THE CURRENT FIS (REVISED: MARCH 2, 2016) BASED ON THE TOPOGRAPHY USED IN THE EFFECTIVE MODEL LAST UPDATED IN NOVEMBER 2012. THE 1% AND 0.2% CORRECTED EFFECTIVE ZONE AE BOUNDARIES INCORPORATE THE USE OF MORE RECENT TOPOGRAPHIC DATA AND OTHER REVISIONS INCORPORATED IN THE CORRECTED EFFECTIVE MODEL. ALTHOUGH THE WATER SURFACE ELEVATIONS FOR THE 1% AND 0.2% CORRECTED EFFECTIVE ZONE AE ARE GENERALLY HIGHER THAN THE EFFECTIVE ZONE AE, THE SPATIAL EXTENT OF THE ZONE AE BOUNDARIES DECREASES COMPARED TO THOSE USED IN THE EFFECTIVE FIS (FEMA, 2016) DUE TO THE CHANGE IN TOPOGRAPHIC DATA SOURCES.
4. THE REFERENCED VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
5. WETLAND DELINEATION BASED ON SITE INVESTIGATION CONDUCTED BY GEOSYNTEC CONSULTANTS, INC ON 27 JULY 2023.

EROSION AND SEDIMENT CONTROL NOTES:

1. THE IMPLEMENTATION OF THIS ESC PLAN AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC BMPS IS THE RESPONSIBILITY OF THE APPLICANT UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.
2. CLEARLY FLAG THE BOUNDARIES OF THE LIMITS OF DISTURBANCE SHOWN ON THIS PLAN IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE FLAGGED CLEARING LIMITS SHALL BE PERMITTED. THE FLAGGING SHALL BE MAINTAINED BY THE APPLICANT FOR THE DURATION OF CONSTRUCTION.
3. CONSTRUCTION ENTRANCE AS WELL AS CONTRACTOR'S FACILITIES, MATERIAL STOCKPILES AND LAYDOWN, AND STAGING AREAS ARE CONCEPTUAL AND SHALL BE LOCATED ONLY IN AREAS APPROVED BY THE OWNER.
4. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL AREAS DURING CONSTRUCTION AND FOR CLEANUP/RESTORATION OF ALL SUCH AREAS TO THEIR ORIGINAL CONDITION AFTER CONSTRUCTION.
5. CONSTRUCTION VEHICLES SHALL ENTER AND EXIT THE SITE VIA THE CONSTRUCTION EXIT. TRUCKS SHALL BE PROPERLY DECONTAMINATED (E.G., TIRE WASHOUT INSPECTION) PRIOR TO LEAVING THE SITE.
6. TOTAL COMBINED DISTURBED AREA AT THE SITE (I.E. LIMITS OF DISTURBANCE) IS 0.84 ACRES.

0 30 60
SCALE IN FEET

SWPPP PHASE I ACTIVITIES:

1. PRIOR TO ANY WORK INCLUDING DEMOLITION, CLEARING, GRADING OR INSTALLATION OF SEDIMENT CONTROL MEASURES, THE APPLICANT MUST SCHEDULE A PRE-CONSTRUCTION MEETING ON-SITE WITH THE ASSIGNED INSPECTOR FROM THE MONTOGOMERY COUNTY CONSERVATION DISTRICT. THE INSPECTOR'S CONTACT INFORMATION WILL BE FOUND ON THE PERMIT.
2. ONCE THE INSPECTOR HAS DETERMINED THE MEASURES ARE PROPERLY INSTALLED, CONSTRUCTION MAY BEGIN. MOST PLANS REQUIRE ADDITIONAL INSPECTIONS THAT MUST BE SCHEDULED BY THE APPLICANT IN ACCORDANCE WITH THE PLAN, PERMIT, AND GUIDANCE GIVEN AT THE PRE-CONSTRUCTION MEETING.
3. POST REQUIRED CONSTRUCTION SITE NOTICE AT THE ENTRANCE TO THE PROJECT SITE PRIOR TO EARTH DISTURBING ACTIVITIES.
2. BEFORE CONSTRUCTION ACTIVITIES COMMENCE, INSTALL REQUIRED PERIMETER CONTROL SILT FENCE ALONG THE DOWN GRADIENT PERIMETER OF THE SITE AS REQUIRED PRIOR TO EARTH DISTURBING ACTIVITIES.
3. INSTALL STABILIZED CONSTRUCTION ENTRANCE AS REQUIRED PRIOR TO EARTH DISTURBING ACTIVITIES.
4. CONDUCT PROPOSED DEMOLITIONS. STOCKPILE SOIL ON-SITE AS NEEDED AND PROVIDE PERIMETER CONTROLS AROUND STOCKPILE AREAS AND STABILIZE THE STOCKPILED MATERIAL.

SWPPP PHASE II ACTIVITIES:

5. CONSTRUCT PROPOSED FLOODPLAIN OBSTRUCTION, BUILDING FLOODPROOFING, AND FLOODPROOF BARRIER ELEMENTS. AS WORK PROGRESSES, ENSURE THAT ADEQUATE DOWN GRADIENT PROTECTIVE MEASURES ARE PROPERLY INSTALLED BEFORE SOIL IS DISTURBED.
6. TEMPORARILY SEED OR STABILIZE, THROUGHOUT CONSTRUCTION, DENUDED AREAS THAT WILL BE INACTIVE FOR 14 DAYS OR MORE.
7. PERMANENTLY STABILIZE AREAS TO BE VEGETATED AS THEY ARE BROUGHT TO FINAL GRADE.
8. REMOVE TEMPORARY CONSTRUCTION PARKING/STAGING AREA AND PERMANENTLY STABILIZE THE AREA.
9. REMOVE ALL OTHER STORMWATER BMPS AND EROSION/SEDIMENTATION CONTROLS UPON PERMANENT FINAL STABILIZATION OF THE SITE.
10. ONCE THE APPLICANT BELIEVES THE PROJECT IS COMPLETE AND ALL DISTURBED AREAS HAVE BEEN STABILIZED, A FINAL INSPECTION MUST BE SCHEDULED WITH THE MONTOGOMERY COUNTY CONSERVATION DISTRICT. INSPECTION STAFF WILL NOT PASS THE FINAL INSPECTION UNTIL ALL AREAS ARE COMPLIANT. ONCE COMPLIANT, THE PERMIT WILL BE FINALIZED AND CLOSED.

PERMIT DRAWING, NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

UNIVERSAL HEALTH SERVICES, INC.
367 SOUTH GULPH ROAD KING OF PRUSSIA, PENNSYLVANNIA, 19406, USA

GEOSYNTEC CONSULTANTS, INC.
930 HARVEST DRIVE, SUITE 220
BLUE BELL, PENNSYLVANIA, 19422
PHONE: 512.451.4003

TITLE: EROSION AND SEDIMENT CONTROL PLAN

PROJECT: UNIVERSAL HEALTH SERVICES FLOOD MITIGATION

SITE: BROOKE GLEN BEHAVIORAL HOSPITAL

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

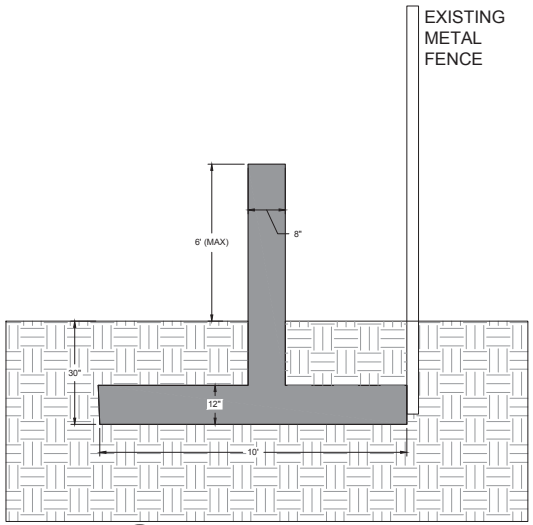
SIGNATURE

07/17/2024
DATE

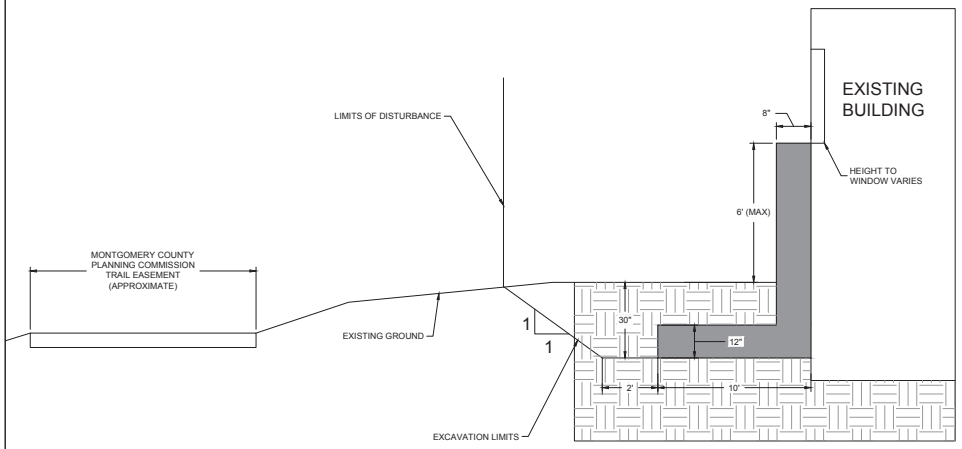
COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — JAMES DOUGLAS BARBIS — ENGINEER — PE087655

DESIGN BY:	OB	DATE:	JULY 2024
DRAWN BY:	AM	PROJECT NO.:	TXW9793A
CHECKED BY:	BK	FILE:	TXW9793AP04
REVIEWED BY:	JB	DRAWING NO.:	4 OF 6
APPROVED BY:	JB		

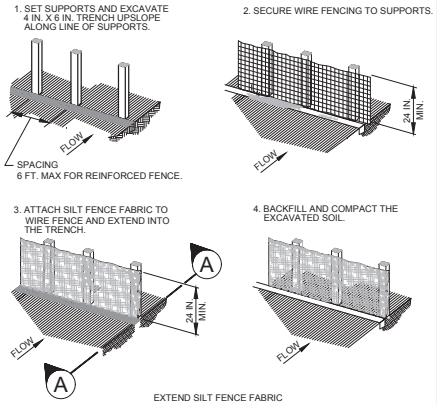
C:_GEO-ACCACDOCS\GEOSYNTEC\UHSVCS_BROOKE GLEN\PROJECT FILES\PERMIT\01_FLOOD MITIGATION\GIS\SHEETS\TXW9793AP04.DWG 7/17/2024



1/3 DETAIL
FLOODPLAIN OBSTRUCTION



2/3 DETAIL
BUILDING FLOODPROOFING



A SECTION

NOTE:
1. SEE SPECIFICATION SECTION NO. 02361-SILT FENCES.

SF — SF — SILT FENCE
SYMBOL

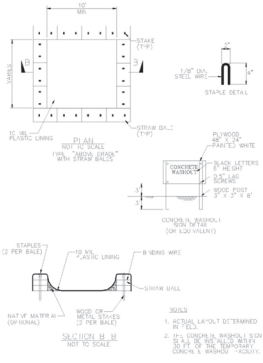
6/4 DETAIL
SILT FENCE

NOTE:
THE PROPOSED AQUAFENCE FLOOD BARRIER IS A FEMA COMPLIANT NON-RESIDENTIAL DRY FLOODPROOFING SOLUTION OPTION. APPROVED EQUIVALENT ALTERNATIVE MAY BE USED,IF NEEDED. APPROXIMATE HEIGHT OF 2.5 FT RECOMMENDED.

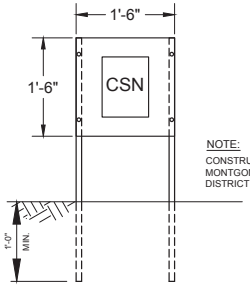
3/3 DETAIL
AQUAFENCE FLOOD BARRIER

NOTE:
PRE-CONSTRUCTED RUMBLE PAD MUST BE INSTALLED IN ACCORDANCE WITH MANUFACTURE'S RECOMMENDATIONS. ACCUMULATED MATERIALS SHOULD BE CLEANED FROM THE PAD DAILY (OR MORE OFTEN, IF NECESSARY) AND PROPERLY DISPOSED.

4/4 DETAIL
PROPOSED CONSTRUCTION ENTRANCE

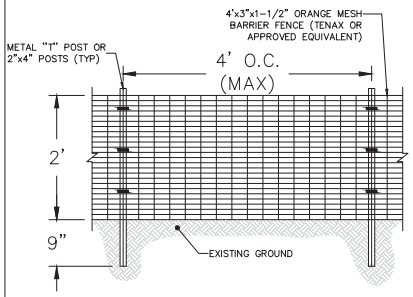


8/4 DETAIL
CONCRETE WHEEL
WASH



NOTE:
CONSTRUCT IN ACCORDANCE WITH MONTGOMERY COUNTY CONSERVATION DISTRICT REQUIREMENTS

5/4 DETAIL
SWPPP
INFORMATION SIGN



7/4 DETAIL
TREE PROTECTION

PERMIT DRAWING, NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

UHS
UNIVERSAL HEALTH SERVICES, INC.
367 SOUTH GULPH ROAD KING OF PRUSSIA,
PENNSYLVANNIA, 19406, USA

Geosyntec consultants
GEOSYNTEC CONSULTANTS, INC.
930 HARVEST DRIVE, SUITE 220
BLUE BELL, PENNSYLVANIA, 19422
PHONE: 512.451.4003

TITLE: DETAILS (SHEET 1 OF 2)

PROJECT: UNIVERSAL HEALTH SERVICES FLOOD MITIGATION

SITE: BROOKE GLEN BEHAVIORAL HOSPITAL

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.
Digitally signed by James D. Barbis
Date: 2024.07.25 11:54:51 -04'00'
SIGNATURE
07/17/2024
DATE

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
JAMES DOUGLAS BARBIS
ENGINEER
PE087655

DESIGN BY:	OB	DATE:	JULY 2024
DRAWN BY:	AM	PROJECT NO.:	TXW9793A
CHECKED BY:	BK	FILE:	TXW9793AP03
REVIEWED BY:	JB	DRAWING NO.:	5 OF 6
APPROVED BY:	JB		

C:_GEO-ACCACDOCS\GEOSYNTEC\UHSVCS_BROOKE GLEN\PROJECT FILES\PERMIT\01_FLOOD MITIGATION\GIS\SHEETS\TXW9793AP05.DWG 7/17/2024

SEEDING/VEGETATION REQUIREMENTS NOTES:

1. CONSIDERATION MUST BE GIVEN TO ANTICIPATED CLIMATE AND SEASONAL CONDITIONS WHEN PLANTING SEED.
2. SEED SHALL BE FREE OF WEEDY SPECIES AND APPROPRIATE FOR SITE SOILS AND REGIONAL CLIMATE. SEED AND MULCH IMMEDIATELY AFTER TOPSOIL IS APPLIED AND FINAL GRADE IS REACHED.
3. THE SITE HAS ACHIEVED FINAL STABILIZATION ONCE ALL AREAS ARE COVERED WITH A STAND OF GRASS WITH A MINIMUM OF 70 PERCENT DENSITY OVER THE ENTIRE VEGETATED AREA, OR GREATER IN ACCORDANCE WITH THE GENERAL PERMIT REQUIREMENTS.
4. VEGETATED AREAS MUST BE WATERED, FERTILIZED, AND RESEEDED AS NEEDED TO ACHIEVE THIS REQUIREMENT.
5. THE VEGETATIVE DENSITY MUST BE MAINTAINED THROUGH PROJECT COMPLETION TO BE CONSIDERED STABILIZED. AREAS PROTECTED BY EROSION CONTROL BLANKETS ARE NOT PERMANENTLY STABILIZED UNTIL THE APPLICABLE GENERAL PERMIT REQUIREMENT FOR FINAL VEGETATIVE DENSITY IS ACHIEVED.
6. RIP-RAP , MULCH, GRAVEL, DECOMPOSED GRANITE OR OTHER EQUIVALENT PERMANENT STABILIZATION MEASURES MAY BE EMPLOYED IN LIEU OR VEGETATION BASED ON SITE-SPECIFIC CONDITIONS, DESIGN AND GOVERNING AUTHORITY APPROVAL.
7. ALL SEEDED AREAS SHALL BE INSPECTED REGULARLY TO CONFIRM THAT A HEALTHY STAND OF GRASS IS MAINTAINED.

PERMANENT SEEDING, SOD OR MULCHING NOTES:

1. PERMANENT STABILIZATION SHALL BE ACCOMPLISHED IN ALL DISTURBED AREAS BY COVERING THE SOIL WITH PAVEMENT, VEGETATION, OR OTHER FORMS OF SOIL STABILIZATION.
2. THE CONTRACTOR IS REQUIRED TO INITIATE PERMANENT SOIL STABILIZATION MEASURES IMMEDIATELY UPON REACHING FINAL GRADE. FOR THOSE AREAS NOT AT FINAL GRADE THAT WILL NOT BE DISTURBED FOR GREATER THAN 14 DAYS, THE CONTRACTOR SHOULD INITIATE TEMPORARY STABILIZATION PER THE TEMPORARY SEEDING OR STABILIZATION NOTES.
3. THE CONTRACTOR HAS 7 DAYS FROM INITIATION OF STABILIZATION TO COMPLETE SOIL PREPARATION, SEEDING, MULCHING, AND ANY OTHER REQUIRED ACTIVITIES RELATED TO THE PLANTING AND ESTABLISHMENT OF VEGETATION. THE CONTRACTOR ALSO HAS 7 DAYS FROM INITIATION OF STABILIZATION TO COMPLETELY INSTALL NON-VEGETATED MEASURES, IF UTILIZED.
4. SOILS MUST BE PREPARED BEFORE INSTALLATION OF SOD OR SEED.
5. AT THE COMPLETION OF GROUND-DISTURBING ACTIVITIES, THE ENTIRE SITE MUST HAVE PERMANENT VEGETATIVE COVER MEETING VEGETATIVE DENSITY REQUIREMENTS IN THE GENERAL PERMIT, IN ALL AREAS NOT COVERED BY HARDSCAPE (STONE, PAVEMENT, ETC.).
6. SEEDED AREAS SHALL BE PROTECTED WITH STRAW MULCH, HYDRAULIC MULCH OR A ROLLED EROSION CONTROL PRODUCT. STRAW MULCH MUST BE TACKIFIED OR CRIMPED BY DISC OR OTHER MACHINERY, AND ROLLED EROSION CONTROL PRODUCTS MUST BE INSTALLED PER MANUFACTURER RECOMMENDATIONS.
7. FINAL SITE STABILIZATION IS ACHIEVED WHEN PERENNIAL VEGETATIVE COVER PROVIDES PERMANENT STABILIZATION WITH A UNIFORM DENSITY GREATER THAN 70 PERCENT OVER THE ENTIRE AREA TO BE STABILIZED BY VEGETATIVE COVER. THIS AREA IS EXCLUSIVE OF AREAS THAT ARE COVERED WITH ROCK (CRUSHED GRANITE, GRAVEL, ETC.).

9/4 DETAIL
PERMANENT STABILIZATION (PS)

TEMPORARY SEEDING OR STABILIZATION NOTES:

1. THE CONTRACTOR IS REQUIRED TO, AT A MINIMUM, INITIATE SOIL STABILIZATION MEASURES IMMEDIATELY WHENEVER ANY CLEARING, GRADING, EXCAVATING OR OTHER EARTH DISTURBING ACTIVITIES HAVE PERMANENTLY CEASED ON ANY PORTION OF THE SITE, OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE AND WILL NOT LIKELY RESUME FOR A PERIOD EXCEEDING 14 CALENDAR DAYS.
2. THE CONTRACTOR HAS 7 DAYS FROM INITIATION OF STABILIZATION TO COMPLETE SOIL PREPARATION, SEEDING, MULCHING, AND ANY OTHER REQUIRED ACTIVITIES RELATED TO THE PLANTING AND ESTABLISHMENT OF VEGETATION. THE CONTRACTOR ALSO HAS 7 DAYS FROM INITIATION OF STABILIZATION TO COMPLETELY INSTALL NON-VEGETATED MEASURES, IF UTILIZED.
3. ALL DISTURBED AREAS MUST BE STABILIZED TEMPORARILY WITH THE USE OF FAST-GERMINATING ANNUAL GRASS/GRAIN VARIETIES APPROPRIATE FOR SITE SOIL AND CLIMATE CONDITIONS. MULCH IS REQUIRED FOR ALL SEEDING APPLICATIONS AND MUST INCLUDE A SUITABLE FORM OF MULCH ANCHORING TO MINIMIZE MOVEMENT OF MULCH BY WIND OR WATER.
4. ALTERNATIVE STABILIZATION MEASURES TO SEEDING, SUCH AS ANCHORED MULCH APPLICATION (WITHOUT SEEDING), MAY BE UTILIZED DURING PERIODS WHEN VEGETATIVE GROWTH IS UNLIKELY (E.G. WINTER MONTHS).
5. IT IS NOT ACCEPTABLE TO ALLOW BARE SOIL TO REMAIN EXPOSED AT ANY TIME DURING THE YEAR, REGARDLESS OF WEATHER/TEMPERATURE/SITE CONDITIONS.
6. ALTERNATIVE STABILIZATION MEASURES INCLUDE, BUT ARE NOT LIMITED TO: ANCHORED STRAW/HAY MULCH, WOOD CELLULOSE FIBER MULCH, SPRAY-ON SOIL GLUES/BINDERS, AND ROLLED EROSION CONTROL PRODUCTS.
7. ROLLED EROSION CONTROL PRODUCTS (NETS, BLANKETS, TURF REINFORCED MATS) AND VEGETATED AREAS NOT MEETING REQUIRED VEGETATIVE DENSITIES FOR FINAL STABILIZATION MUST BE INSPECTED WEEKLY. RILING, RUTTING AND OTHER SIGNS OF EROSION INDICATE THE SPECIFIED EROSION CONTROL DEVICE IS NOT FUNCTIONING OR INSTALLED PROPERLY AND/OR ADDITIONAL EROSION CONTROL DEVICES ARE WARRANTED.

10/4 DETAIL
TEMPORARY STABILIZATION (TS)

PERMIT DRAWING, NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

UNIVERSAL HEALTH SERVICES, INC.
367 SOUTH GULPH ROAD KING OF PRUSSIA,
PENNSYLVANNIA, 19406, USA

GEOSYNTEC CONSULTANTS, INC.
930 HARVEST DRIVE, SUITE 220
BLUE BELL, PENNSYLVANIA, 19422
PHONE: 512.451.4003

TITLE: DETAILS (SHEET 2 OF 2)

PROJECT: UNIVERSAL HEALTH SERVICES FLOOD MITIGATION

SITE: BROOKE GLEN BEHAVIORAL HOSPITAL

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

Digitally signed by James D. Barbis
Date: 2024.07.25 11:56:33 -04'00'

SIGNATURE

07/17/2024
DATE

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
JAMES DOUGLAS BARBIS
ENGINEER
PE087655

DESIGN BY: OB	DATE: JULY 2024
DRAWN BY: AM	PROJECT NO.: TXW9793A
CHECKED BY: BK	FILE: TXW9793AP03
REVIEWED BY: JB	DRAWING NO.: 6 OF 6
APPROVED BY: JB	

C:_GEO-ACCACCOUNCS\GEOSYNTEC\UHS\VCS_BROOKE GLEN\PROJECT FILES\PERMIT\01_FLOOD MITIGATION\SHEETS\TXW9793AP03.DWG 7/17/2024

Attachment 11
Property Owner Notification

BROOKE GLEN
BEHAVIORAL HOSPITAL

Marano Joanne C Trust
488 Bethlehem Pike
Fort Washington, PA 19034

Re: Notification of Flood Hazard Revisions

Dear Marano Joanne C Trust:

The Flood Insurance Rate Map (FIRM) for a community depicts the floodplain, the area that has been determined to be subject to a 1-percent or greater chance of flooding in any given year. The regulatory floodway is the portion of the floodplain that includes the channel of a river or other watercourse and the adjacent land area that must be reserved in order to discharge the base (1-percent-annual-chance) flood without cumulatively increasing the water-surface elevation by more than a designated height. The FIRM is used to determine flood insurance rates and to help the community with floodplain management.

Universal Health Services, Inc. (UHS) is applying for a Letter of Map Revision (LOMR) from the Federal Emergency Management Agency (FEMA) to revise FIRM 42091C0289G revised 2 March 2016 for Montgomery County, Pennsylvania and Whitemarsh Township along Sandy Run. UHS is proposing to revise the FIRM to better reflect existing conditions in terms of recent topographic ground elevations and existing building obstructions.

Because of improved understanding of the terrain (i.e., ground surface) and existing building obstructions, the LOMR will result in increases in the 1-percent-annual-chance water-surface elevations and also result in widening and narrowing of the 1-percent-annual-chance floodplain.

This letter is to inform you of flood hazard revisions on your property at 488 S Bethlehem Pike, Fort Washington, PA 19034.

Maps and a detailed analysis of the flood hazard revision can be reviewed at the Gilmore & Associates, Inc. offices at 65 E. Butler Ave, Suite 100, New Britain, PA 18901. If you have any questions or concerns, you may contact Krista Heinrich, Township Engineer, of Whitemarsh Township at 610-825-3535 ext 2626 from 9:00am to 3:00pm, Monday through Friday.

Sincerely,

Universal Health Services, Inc.
930 Harvest Drive, Suite 220
Blue Bell, Pennsylvania 19422

BROOKE GLEN
BEHAVIORAL HOSPITAL

Northwestern Properties Company
620 Germantown Pike
Lafayette Hill, PA 19444

Re: Notification of Flood Hazard Revisions

Dear Northwestern Properties Company:

The Flood Insurance Rate Map (FIRM) for a community depicts the floodplain, the area that has been determined to be subject to a 1-percent or greater chance of flooding in any given year. The regulatory floodway is the portion of the floodplain that includes the channel of a river or other watercourse and the adjacent land area that must be reserved in order to discharge the base (1-percent-annual-chance) flood without cumulatively increasing the water-surface elevation by more than a designated height. The FIRM is used to determine flood insurance rates and to help the community with floodplain management.

Universal Health Services, Inc. (UHS) is applying for a Letter of Map Revision (LOMR) from the Federal Emergency Management Agency (FEMA) to revise FIRM 42091C0289G revised 2 March 2016 for Montgomery County, Pennsylvania and Whitemarsh Township along Sandy Run. UHS is proposing to revise the FIRM to better reflect existing conditions in terms of recent topographic ground elevations and existing building obstructions.

Because of improved understanding of the terrain (i.e., ground surface) and existing building obstructions, the LOMR will result in increases in the 1-percent-annual-chance water-surface elevations and also result in widening and narrowing of the 1-percent-annual-chance floodplain.

This letter is to inform you of flood hazard revisions on your property at 478 S Bethlehem Pike, Fort Washington, PA 19034.

Maps and a detailed analysis of the flood hazard revision can be reviewed at the Gilmore & Associates, Inc. offices at 65 E. Butler Ave, Suite 100, New Britain, PA 18901. If you have any questions or concerns, you may contact Krista Heinrich, Township Engineer, of Whitemarsh Township at 610-825-3535 ext 2626 from 9:00am to 3:00pm, Monday through Friday.

Sincerely,

Universal Health Services, Inc.
930 Harvest Drive, Suite 220
Blue Bell, Pennsylvania 19422

BROOKE GLEN
BEHAVIORAL HOSPITAL

Mr. John P. Schnauffer
355 E Conestoga Rd
Wayne, PA 19087

Re: Notification of Flood Hazard Revisions

Dear Mr. John P. Schnauffer:

The Flood Insurance Rate Map (FIRM) for a community depicts the floodplain, the area that has been determined to be subject to a 1-percent or greater chance of flooding in any given year. The regulatory floodway is the portion of the floodplain that includes the channel of a river or other watercourse and the adjacent land area that must be reserved in order to discharge the base (1-percent-annual-chance) flood without cumulatively increasing the water-surface elevation by more than a designated height. The FIRM is used to determine flood insurance rates and to help the community with floodplain management.

Universal Health Services, Inc. (UHS) is applying for a Letter of Map Revision (LOMR) from the Federal Emergency Management Agency (FEMA) to revise FIRM 42091C0289G revised 2 March 2016 for Montgomery County, Pennsylvania and Whitemarsh Township along Sandy Run. UHS is proposing to revise the FIRM to better reflect existing conditions in terms of recent topographic ground elevations and existing building obstructions.

Because of improved understanding of the terrain (i.e., ground surface) and existing building obstructions, the LOMR will result in increases in the 1-percent-annual-chance water-surface elevations and also result in widening and narrowing of the 1-percent-annual-chance floodplain.

This letter is to inform you of flood hazard revisions on your property at 470 S Bethlehem Pike, Fort Washington, PA 19034.

Maps and a detailed analysis of the flood hazard revision can be reviewed at the Gilmore & Associates, Inc. offices at 65 E. Butler Ave, Suite 100, New Britain, PA 18901. If you have any questions or concerns, you may contact Krista Heinrich, Township Engineer, of Whitemarsh Township at 610-825-3535 ext 2626 from 9:00am to 3:00pm, Monday through Friday.

Sincerely,

Universal Health Services, Inc.
930 Harvest Drive, Suite 220
Blue Bell, Pennsylvania 19422

Attachment 12

Endangered Species Act Compliance

Note that a response from PA Fish and Boat Commission is still pending. The project will not start until clearance is obtained.

1. PROJECT INFORMATION

Project Name: **Brooke Glen Hospital Flood Mitigation Project**
Date of Review: **7/10/2024 01:58:20 PM**
Project Category: **Development, Additions/maintenance to existing development facilities**
Project Area: **2.75 acres**
County(s): **Montgomery**
Township/Municipality(s): **WHITEMARSH TOWNSHIP**
ZIP Code:
Quadrangle Name(s): **AMBLER**
Watersheds HUC 8: **Schuylkill**
Watersheds HUC 12: **Lower Wissahickon Creek**
Decimal Degrees: **40.134254, -75.216629**
Degrees Minutes Seconds: **40° 8' 3.3141" N, 75° 12' 59.8634" W**

2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

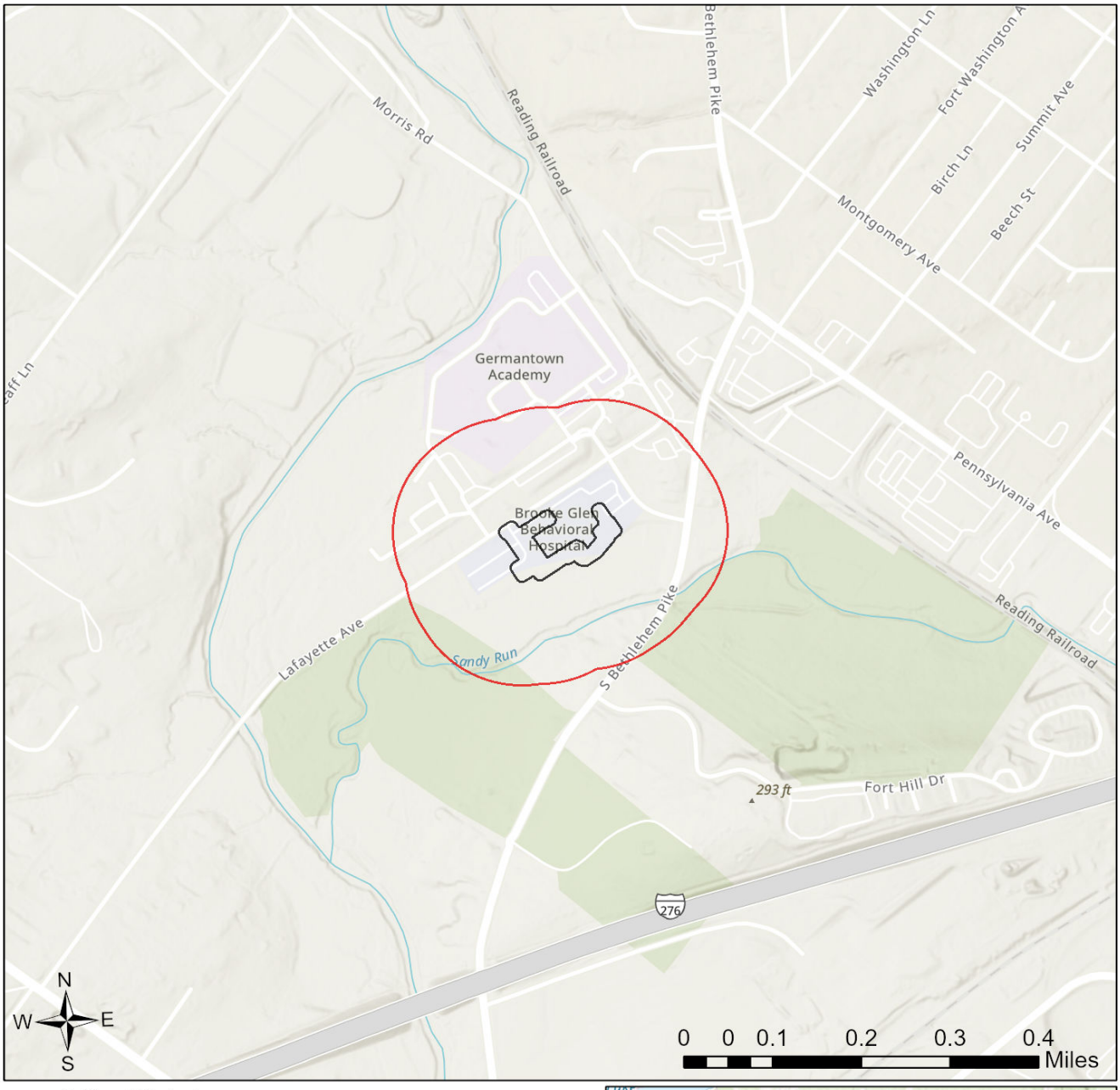
Brooke Glen Hospital Flood Mitigation Project

Buffered Project Boundary

Project Boundary

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

Brooke Glen Hospital Flood Mitigation Project



Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

RESPONSE TO QUESTION(S) ASKED

Q1: Accurately describe what is known about wetland presence in the project area or on the land parcel. "Project" includes all features of the project (including buildings, roads, utility lines, outfall and intake structures, wells, stormwater retention/detention basins, parking lots, driveways, lawns, etc.), as well as all associated impacts (e.g., temporary staging areas, work areas, temporary road crossings, areas subject to grading or clearing, etc.). Include all areas that will be permanently or temporarily affected -- either directly or indirectly -- by any type of disturbance (e.g., land clearing, grading, tree removal, flooding, etc.). Land parcel = the lot(s) on which some type of project(s) or activity(s) are proposed to occur.
Your answer is: Someone qualified to identify and delineate wetlands (holding a natural resource degree or equivalent work experience) has investigated the site, and determined that wetlands ARE located in or within 300 feet of the project area. (A written report from the wetland specialist, and detailed project maps should document this.)

Q2: Aquatic habitat (stream, river, lake, pond, etc.) is located on or adjacent to the subject property and project activities (including discharge) may occur within 300 feet of these habitats?
Your answer is: Yes

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission
RESPONSE:
Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

PFBC Species: (Note: The Pennsylvania Conservation Explorer tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below.)

Scientific Name	Common Name	Current Status
Sensitive Species**		Threatened

U.S. Fish and Wildlife Service
RESPONSE:

No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

* Special Concern Species or Resource - Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.
** Sensitive Species - Species identified by the jurisdictional agency as collectible, having economic value, or being susceptible to decline as a result of visitation.

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, upload* or email the following information to the agency(s) (see AGENCY CONTACT INFORMATION). Instructions for uploading project materials can be found here. This option provides the applicant with the convenience of sending project materials to a single location accessible to all three state agencies (but not USFWS).
*If information was requested by USFWS, applicants must email, or mail, project information to IR1_ESPenn@fws.gov to initiate a review. USFWS will not accept uploaded project materials.

Check-list of Minimum Materials to be submitted:
____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
____A map with the project boundary and/or a basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
In addition to the materials listed above, USFWS REQUIRES the following
____**SIGNED** copy of a Final Project Environmental Review Receipt

The inclusion of the following information may expedite the review process.
____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, PA 17105-8552
Email: RA-HeritageReview@pa.gov

U.S. Fish and Wildlife Service
Pennsylvania Field Office
Endangered Species Section
110 Radnor Rd; Suite 101
State College, PA 16801
Email: IR1_ESPenn@fws.gov
NO Faxes Please

PA Fish and Boat Commission
Division of Environmental Services
595 E. Rolling Ridge Dr., Bellefonte, PA 16823
Email: RA-FBPACENOTIFY@pa.gov

PA Game Commission
Bureau of Wildlife Management
Division of Environmental Review
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov
NO Faxes Please

7. PROJECT CONTACT INFORMATION

Name:_____
Company/Business Name:_____
Address:_____
City, State, Zip:_____
Phone:(_____)_____Fax:(_____)_____
Email:_____

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

_____ _____
applicant/project proponent signature date

Attachment 13
On-Site Survey Station-Elevation Data

2417.39

Sta (ft)	Elev (ft)
783.23	157.95
785.89	157.94
791.82	158.04
793.46	158.08
798.74	158.31
799.49	158.34
800	158.37
805.68	158.73
808.1	158.91
813.14	159.21
815.49	159.34
818.52	159.52
823.58	159.76
825.06	159.83
831.31	160.07
832.12	160.11
833.29	160.15
838.26	160.3
839.07	160.37
840.58	160.46
840.93	160.48
844.02	160.45
844.86	160.44
848.6	160.49
851.62	160.53
853.55	160.55
858.45	160.59
862.37	160.62
865.08	160.64
865.85	160.67
866.81	160.73
867.45	160.71
869.63	160.73
872.41	160.75
875.5	160.85
878.22	160.49
880.34	160.51
880.74	160.38
880.86	160.4
881.69	160.82
881.77	161.04
884.51	161.2
886.09	161.29
888.61	161.42
892.01	161.61
896.41	161.84
899.06	161.97
902.39	162.13
904.62	162.07
907.05	162.19
907.14	162.14
908.18	162.23
911.84	162.61
917.05	162.88
917.77	162.91
917.82	162.92
924.56	163.28
926.29	163.37
930.95	163.65
933.68	163.81
938.36	164.15
938.39	164.16
938.41	164.16
940.45	164.21
940.52	164.26
942.57	164.6
944.45	164.85
947.98	165.39
950.23	165.81
954.94	166.63

2267

Sta (ft)	Elev (ft)
634.37	157.451
639.9	157.529
645.16	157.512
651.24	157.389
669.31	156.75
669.48	156.725
669.61	156.712
669.79	156.708
670.17	156.713
675.32	156.784
691.96	156.971
693.22	157.009
695.78	157.09
704.92	157.367
709.88	157.535
713.5	157.655
719.08	157.86
719.81	157.887
722.55	158
727.37	158.199
728.12	158.234
729.05	158.282
736.13	158.629
737.96	158.729
739.32	158.772
741.09	158.785
741.27	158.846
741.81	158.896
742.57	158.996
744.24	159.113
744.4	159.07
744.47	159.079
747.57	159.248
752.65	159.527
754.59	159.625
759.35	159.878
763.53	160.071
767.19	160.235
772.86	160.415
774.54	160.471
776.63	160.506
781.33	160.597
782.25	160.672
785.24	160.813
787.02	160.787
787.56	160.787
791.13	160.61
796.98	160.539
800.28	160.463
801.4	160.446
802.99	160.868
804.48	160.94
810.32	161.102
811.92	162.018
812.1	162.152
813	161.737
818.44	160.442
821.47	160.459
825.8	160.485
831.7	160.518
832.32	160.522
832.48	160.523
832.65	160.551
837.46	160.72
842.1	160.563
846.22	160.579
851	160.47
851.38	160.469
853.59	160.51
861.02	160.65
866.97	160.687
870.4	160.711
873.92	160.732
875.97	160.743
880.87	160.775
883.81	160.793
886.98	160.812
887.81	160.818
889.23	160.827
894.73	160.859
897.95	160.877
901.66	160.897
907.97	160.927
908.58	160.93
908.94	160.932
910.31	160.938
914.28	160.981
914.86	161.021
915.51	160.963
919.93	160.988
922.44	161.001
926.72	161.029
929.37	161.048
930.92	161.063
936.26	161.107
936.98	161.114
941.86	161.165
943.08	161.175
945.06	161.195
949.63	161.245
952.09	161.273
958.21	161.336
959.44	161.349
962.89	161.382
966.14	161.413
967.27	161.424
972.68	161.47
977.79	161.51
978.46	161.515
978.9	161.518
984.87	161.567
988.61	161.599
991.85	161.628
998.23	161.693
998.68	161.698
999.67	161.711
1005.1	161.782
1007.62	161.824
1011.51	161.9
1015.17	161.936
1015.68	161.945
1015.85	161.945
1016.22	161.98
1016.96	162.024
1019.19	162.18
1025.47	162.5
1033.92	163.096
1036.29	163.262
1037.22	163.321
1039.69	163.516
1053.97	164.641
1058.26	165.025
1067.22	165.78
1068.18	165.861
1068.89	165.913
1075.46	166.337
1076.83	166.416
1077.74	166.594
1078.61	166.868
1081.34	166.654
1082.55	166.651
1085.38	166.711
1089.65	166.829
1093.82	166.901
1095.43	166.923
1101.19	167.001
1101.57	167.007
1101.74	167.008
1103.57	167.057
1105.27	167.182
1105.93	167.249
1105.97	167.091
1106.48	167.059
1109.61	167.084
1110.51	167.093
1115.58	167.145
1119.14	167.202
1120.92	167.232
1121.22	167.239
1124.43	167.155
1124.55	167.189
1124.82	167.305
1125.16	167.599
1126.3	167.438
1126.44	167.405
1128.36	167.481
1131.49	167.626
1134.23	167.796

2206

Sta (ft)	Elev (ft)
588.19	155.708
604.75	155.936
604.77	155.937
604.8	155.937
604.85	155.937
605.09	155.942
610.03	156
627.07	156.195
649.05	156.615
653.85	156.721
659.72	156.941
672.13	157.339
675.05	157.453
679.98	157.633
683.76	157.764
687.48	157.898
693.55	158.109
693.8	158.118
693.92	158.123
700.41	158.359
702.68	158.447
707.21	158.606
709.2	158.649
710.53	158.657
711.99	158.742
714.06	158.846
714.68	158.867
714.74	158.779
715.71	158.798
718.62	158.948
720.9	159.067
722.27	159.128
727.25	159.255
727.93	159.272
743.76	160.447
752.91	160.508
770.62	160.702
782.02	160.75
785.45	160.754
905.6	163.625
906.62	163.793
907.23	163.821
907.76	164.041
910.74	163.932
915.05	163.74
920.14	163.759
920.58	163.747
921.1	163.71
921.66	163.663
921.87	163.675
923.06	163.393
933.01	162.962
933.99	162.801
937.21	162.394
937.76	162.34
938.48	162.351
940.03	162.229
941.21	162.456
942.47	162.611
943.89	162.587
946.7	162.381
949.81	162.494
954.2	162.489
957.55	162.485
961.14	162.519
964.9	162.564
966.76	162.595
969.47	162.65
971.26	162.686
975.87	162.806
976.69	162.827
981.34	162.97
982.08	162.994
985.37	163.126
989.07	163.301
992.1	163.497
992.91	163.706
992.95	163.827
1005.25	164.489
1009.61	164.758
1011.11	164.878
1018.52	165.461
1020.11	165.585
1023.12	165.784
1026.75	166.022
1028.43	166.112
1028.82	166.14
1029.49	166.34
1029.57	166.261
1030.08	166.266
1033.15	166.318
1033.2	166.318
1033.29	166.321
1033.64	166.331
1040.12	166.515
1043.41	166.572
1045.99	166.618
1052.29	166.689
1053.02	166.697
1053.8	166.735
1056.36	166.923
1056.65	166.949
1056.71	166.974
1056.93	166.884
1058.96	166.733
1059.83	166.735
1064.22	166.744
1066.54	166.743
1071.54	166.74
1073.12	166.739
1073.74	166.74
1073.82	166.741
1073.84	166.743
1074.96	166.782
1075	166.794
1075	166.791
1075.17	166.786
1075.69	166.788
1077.09	166.749
1077.44	166.749
1077.72	166.748
1079.52	166.759
1080.55	166.769
1081.8	166.792
1085.6	166.845
1089.76	166.953

2140

Sta (ft)	Elev (ft)
545.13	154.515
552.8	154.384
554.18	154.365
556.34	154.323
561.05	154.271
564.72	154.279
567.07	154.302
571.27	154.459
572.42	154.502
574.08	154.609
578.2	154.882
580.31	155.038
584.3	155.34
587.3	155.553
592.68	155.928
593.23	155.961
599.87	156.397
601.59	156.47
601.86	156.481
927.97	163.757
928.86	163.765
929.13	163.769
929.2	163.761
929.63	163.809
930.05	163.728
930.79	163.736
931.17	163.724
932	163.745
936.72	163.867
937.42	163.884
940.19	163.966
943.77	164.072
944.79	164.118
949.52	164.338
950.83	164.164
952.14	163.942
952.74	164.146
954.11	164.345
955.98	164.724
959.68	164.96
963.1	165.183
967.83	165.472
969.73	165.577
974.03	165.954
976.83	166.174
977.21	166.204
977.35	166.226
977.7	166.203
983.95	166.095
985.62	166.128
989.62	166.198
991.96	166.225
995.92	166.278
999.1	166.311
1002.27	166.333
1004.25	166.348
1005.23	166.355
1005.37	166.391
1005.58	166.654
1006.71	166.416
1007.64	166.373
1008.41	166.371
1009.22	166.369
1011.08	166.373
1015.19	166.381
1019.06	166.385
1019.7	166.385
1019.79	166.387
1020.28	166.415
1020.3	166.42
1020.31	166.407
1020.63	166.398
1021	166.388
1024.64	166.39
1027.17	166.394
1038.11	166.394

2072.96

Sta (ft)	Elev (ft)
576.29	154.62
579.98	154.8
585.61	155.04
587.97	155.14
590.51	155.21
593.45	155.26
597.79	155.33
599.88	155.35
600.85	155.37
604.36	155.41
608.32	155.46
609.63	155.47
613.19	155.51
617.55	155.56
620.21	155.59
621.97	155.62
625.21	155.65
629.83	155.72
634.65	155.79
639.37	155.88
643.13	155.96
650.19	156.1
652.58	156.15
656.79	156.24
660.97	156.34
663.9	156.4
668.2	156.47
670.36	156.51
671.99	156.54
676.99	156.61
683.01	156.69
683.56	156.7
683.64	156.7
683.75	156.7
690.39	156.77
695.2	156.82
939.95	164.77
942.2	164.06
943.97	164.02
944.18	164.24
944.94	164.29
945	164.3
945.1	164.28
945.22	164.28
945.33	164.3
946.38	164.27
946.91	164.21
948.48	164.09
953.3	164.16
955.06	164.19
961.39	164.39
962.88	164.43
964.18	164.27
964.78	164.22
965.99	164.21
966.36	164.18
966.39	164.26
966.59	164.33
968.44	164.57
969.98	164.74
973.46	164.93
976.34	165.07
978.34	165.18
982.94	165.42
988.36	165.67
989.88	165.74
993.54	165.87
993.95	165.92
994.24	166.09
994.3	165.98
994.78	165.97
995.52	165.93
997.52	165.99
998.22	166.02
999.91	166.06
1003.88	166.14
1009.58	166.22
1013.2	166.4
1013.76	166.43
1014.54	166.41
1016.2	166.26
1020.48	166.45
1020.55	166.45
1020.57	166.45
1020.58	166.45
1020.58	166.45
1020.58	166.45
1020.6	166.45
1020.63	166.45
1020.64	166.45
1021.01	166.44
1024.61	166.24
1026.68	166.24
1030.4	166.21
1032.49	166.19
1033.14	166.17
1034.22	166.14
1035.05	166.11
1035.14	166.09
1035.81	166.13
1038.38	166.13
1038.54	166.13
1039	166.12
1042.67	166.09
1044.94	166.08
1046.03	166.08
1049.65	166.09
1052.99	166.07

1897

Sta (ft)	Elev (ft)
631.23	154.904
633.55	154.957
638.41	155.055
643.88	155.151
652.01	155.298
654.37	155.345
656.21	155.371
662.93	155.462
667.77	155.529
669.9	155.56
672.83	155.624
676.97	155.707
680.75	155.809
683.61	155.891
687.08	156
690.29	156.098
692.88	156.173
696.99	156.297
702.03	156.435
703.66	156.479
705.04	156.513
710.14	156.64
715.21	156.756
716.17	156.777
718.02	156.817
723.85	156.94
726.78	157.004
730.92	157.082
735.11	157.149
737.49	157.194
740.29	157.239
744.17	157.292
747.45	157.332
750.88	157.381
754.04	157.339
755.36	157.4
756	157.399
756.02	157.402
756.65	157.421
758.61	157.459
764.34	157.592
769.86	157.717
771.28	157.748
774.61	157.563
774.87	157.563
775.11	157.556
775.15	157.586
777.81	157.934
782.83	158.098
784.2	158.151
786.43	158.241
790.72	158.393
796.74	158.679
804.46	159.302
818.55	159.645
825.5	159.627
841.92	159.738
844.6	159.76
932.49	160.836
932.71	160.842
938.45	160.831
938.93	160.823
940.88	160.74
941.02	160.641
941.04	160.659
941.07	160.683
943.96	160.719
945.29	160.681
947.5	160.602
948.05	160.634
949.5	160.658
951.98	160.648
956.55	160.651
958.77	160.666
962.1	160.716
964.97	160.755
969.68	160.898
970.58	160.926
971.45	160.947
972.27	160.983
978.65	161.366
981.01	161.54
985.82	162.021
989.18	162.413
991.33	162.709
993.19	162.059
993.63	161.311
993.77	162.502
994.54	162.719
994.93	163.539
995.58	163.461
997.94	163.669
999.92	163.939
1004.22	164.744
1004.38	165.455
1005.36	164.937
1007.29	164.872
1010.93	165.221
1012.75	165.363
1014.76	165.5
1016.47	165.678
1018.31	166.032
1018.38	165.842
1018.5	165.679
1019.93	165.729
1021.62	165.771
1026.28	165.848
1027.43	165.865
1027.5	166.13
1027.89	166.154
1028.26	166.223
1029.31	166.086
1033.89	165.884
1035.89	165.881
1040.38	165.867
1040.69	165.863
1041.04	165.859
1041.32	165.859
1042.29	165.863
1042.41	165.854
1042.54	165.862
1042.81	165.863
1046.71	165.844
1048.23	165.839
1054.64	165.844
1058.36	165.851
1064.35	165.843

1800

Sta (ft)	Elev (ft)
708.66	154.502
714.66	154.582
718.08	154.49
723.42	154.459
727.05	154.441
734.85	154.481
735.69	154.487
737.11	154.512
743.16	154.601
747.46	154.7
748.8	154.734
754.84	154.899
756.28	154.941
758.33	155.003
762.89	155.138
766.62	155.248
769.79	155.34
773.68	155.445
776.63	155.528
779.01	155.587
783.27	155.685
784.55	155.7
784.99	155.745
786.09	155.787
787.36	155.777
789.96	155.819
791.17	155.845
796.77	155.947
803.41	156.082
803.51	156.084
803.52	156.084
803.53	156.084
810.22	156.254
812.21	156.104
812.24	156.098
812.25	156.098
812.27	156.099
812.35	156.104
818.41	156.514
821.6	156.566
824.22	156.671
824.66	156.661
825.25	156.699
827.37	156.811
828.7	156.921
833.36	157.122
837.1	157.299
840.26	157.459
843.5	157.613
847.61	157.824
850.25	157.964
852.43	158.085
857.14	158.339
861.53	158.584
863.53	158.695
867.42	158.916
869.02	158.982
871.62	159.025
874.98	159.332
875.12	159.348
875.13	159.344
875.43	159.282
881.39	159.669
882.09	159.724
883.01	159.77
888.84	160.022
890.78	160.097
896.27	160.278
898.16	160.326
900.62	160.362
904.65	160.222
960.77	160.036
964.7	160.053
965.83	160.021
967.28	160.105
975.37	160.002
976.63	159.969
978.06	160.101
978.41	160.061
979.96	159.998
981.51	159.918
983.03	159.834
983.64	159.774
984.23	159.797
984.43	159.784
984.69	159.884
986.46	159.879
987.56	159.877
991.56	159.869
992.96	159.875
997.9	159.904
1003.03	159.984
1005.11	160.011
1006.62	160.052
1012.1	160.2
1012.15	160.201
1012.54	160.219
1018.95	160.508
1019.84	160.576
1025.63	160.967
1028.7	161.246
1029.43	161.301
1030.12	160.704
1030.34	160.37
1031.32	161.448
1031.34	161.51
1033.49	161.181
1034.49	161.036
1034.5	161.025
1034.54	161.049
1034.65	161.084
1037.14	162.189
1037.31	162.209
1044.14	163.038
1044.72	163.957
1045.56	164.296
1045.87	164.576
1046.3	164.514
1047.51	164.386
1052.95	163.91
1053.17	163.924
1053.9	163.965
1059.24	164.277
1060.21	164.385
1061.56	164.562
1061.93	164.662
1063.02	164.574
1063.97	164.427
1065.08	164.46
1065.22	164.617
1065.59	164.727
1066.45	164.475
1066.61	164.474
1073.75	164.534
1076.76	164.562
1079.29	164.61
1079.6	164.738
1080.51	164.755
1081.59	164.731
1082.77	164.695
1083.73	164.626
1086.61	164.693
1090.48	164.79
1094.28	164.922
1099.49	165.057

1688.61

Sta (ft)	Elev (ft)
745.06	154.17
748.23	154.16
751.09	154.13
752.6	154.13
757.14	154.14
757.36	154.14
757.55	154.14
763.53	154.2
765.01	154.22
769.26	154.29
770.72	154.32
772.86	154.37
776.46	154.46
777.44	154.49
783.38	154.66
783.85	154.67
786.28	154.78
788.31	154.84
788.33	154.84
788.6	154.83
789.42	154.83
791.79	154.9
796.89	155.03
799.42	155.08
803.4	155.17
806.9	155.23
810.44	155.28
814.24	155.33
817.23	155.37
821.43	155.42
823.59	155.45
825.35	155.47
830.23	155.53
836.22	155.62
836.93	155.63
837.52	155.63
843.65	155.73
843.8	155.73
849.81	155.83
850.37	155.84
853.27	155.89
854.15	155.91
854.48	155.96
854.78	155.93
856.17	155.94
856.47	155.96
857.06	155.97
861.99	156.07
863.65	156.1
865.61	156.13
870	156.21
873.32	156.27
877.18	156.31
881.67	156.36
884.6	156.39
888.48	156.41
890.97	156.44
893.08	156.46
895.2	156.47
896.87	156.42
897.19	156.37
898.36	156.48
899.14	156.52
904.26	156.58
905.28	156.59
910.98	156.68
916.47	156.76
917.58	156.77
917.68	156.78
917.8	156.78
924.32	156.87
929.85	156.95
930.86	156.97
931.89	156.98
938.86	157.09
941.41	157.13
945.27	157.2
947.47	157.06
950.68	157.11
952.55	157
952.7	157.01
958.2	157.52
958.24	157.53
958.28	157.53
964.58	157.76
968.14	157.88
971.95	158.04
977.08	158.28
979.7	158.38
982.25	158.52
984.52	158.63
984.99	158.65
989.76	158.86
991.24	158.92
991.8	158.94
992	158.95
998.66	159.24
1003.94	159.46
1005.35	159.53
1007.12	159.61
1010.76	159.77
1011.6	159.81
1015.11	159.97
1018.27	160.12
1022.27	160.24
1023.74	160.3
1024.69	160.36
1027.01	160.47
1030.93	160.7
1032.61	160.87
1036.86	161.12
1039.29	161.24
1041.71	161.35
1045.83	161.56
1048.33	161.62
1052.03	161.78
1054.01	161.9
1055.45	161.92
1055.75	161.93
1058.81	162.09
1063.24	162.23
1064.15	162.26
1068.07	162.37
1068.69	162.4
1069.29	162.6
1069.65	162.68
1069.76	162.49
1073.49	162.54
1075.11	162.53
1079.03	162.61
1081.16	162.65
1081.38	162.66
1081.41	162.63
1082.39	162.65
1083.28	162.63
1083.31	162.68
1084.07	162.7
1088.21	162.78
1099.57	163.08
1099.57	163.08
1099.57	163.08
1112.46	163.49

1508

Sta (ft)	Elev (ft)
816.02	153.757
820.62	153.793
825.23	153.856
826.22	153.87
827.45	153.878
829.63	153.889
830.13	153.935
830.39	153.982
830.47	153.915
830.48	153.914
830.89	153.917
834.89	153.946
839.45	153.978
841.09	153.987
842.96	154.001
847.01	154.035
852.36	154.093
853.02	154.1
853.82	154.11
860.14	154.189
865.6	154.255
867.43	154.278
868.92	154.295
873.99	154.35
879.9	154.412
880.45	154.418
880.89	154.423
889.39	154.511
889.64	154.514
893.06	154.55
895	154.57
900.67	154.632
901.07	154.636
901.52	154.64
907.38	154.709
907.96	154.715
908.64	154.723
912	154.683
913.56	154.654
914.55	154.796
914.81	154.803
918.45	154.855
921.54	154.899
922.32	154.911
927.38	154.991
929.59	155.025
934.75	155.092
936.87	155.121
940.37	155.119
942.12	155.123
947.06	155.221
952.12	155.272
954.56	155.331
957.39	155.366
961.27	155.412
964.55	155.453
968.35	155.502
973.08	155.567
974.74	155.59
976.15	155.61
980.9	155.679
985.87	155.745
987.92	155.773
989.83	155.795
995.2	155.852
1001.45	155.901
1001.47	155.902
1001.49	155.902
1005.32	155.968
1005.6	155.978
1005.63	155.979
1006.05	155.985
1007.72	155.989
1010.24	155.966
1014.31	155.997
1021.58	156.078
1021.7	156.079
1021.81	156.08
1027.76	156.176
1033.06	156.296
1034.29	156.325
1034.69	156.339
1036.08	156.381
1041.69	156.557
1047.75	156.819
1049.19	156.884
1049.53	156.904
1050.44	156.96
1058.56	157.444
1062.15	157.679
1067.08	158.021
1072.08	158.381
1078.24	158.773
1084.67	159.18
1085.77	159.245
1088.47	159.406
1089.35	159.473
1091.53	159.735
1092.39	159.625
1093.49	159.605
1094.12	159.628
1096.93	159.711
1101.58	159.842
1103.82	159.877
1107.26	159.926
1107.92	159.934
1108.23	159.97
1109.72	160.071
1110.38	160.199
1110.53	160.11
1111.74	160.036
1113.35	159.962
1118.86	159.973
1119.51	159.976
1120.9	159.982
1124.01	159.999
1124.59	159.914
1127.95	159.609
1128.44	159.626
1130.62	159.633
1130.7	159.644
1131.33	159.696
1136.56	160.22
1142.48	160.375
1143.73	160.407
1145.11	160.442
1150.97	160.589
1154.45	160.665
1158.39	160.735
1160.48	160.771
1163.19	160.809
1165.17	160.835
1168.72	160.877

1299.52

Sta (ft)	Elev (ft)
897.64	153.73
897.77	153.73
905.64	153.52
911.02	153.48
911.74	153.47
912.39	153.47
917.72	153.47
922.6	153.51
922.82	153.51
929.99	153.59
930.1	153.59
930.36	153.59
937.75	153.69
941.62	153.75
944.07	153.79
946.43	153.82
949.58	153.87
954.82	153.96
956.36	153.98
958.38	154.02
963.77	154.11
968.1	154.18
970.77	154.23
973.84	154.29
978.18	154.37
981.94	154.45
985.27	154.51
991.12	154.62
991.65	154.63
993	154.65
998.73	154.75
1000.33	154.78
1005.79	154.86
1008.66	154.9
1012.59	154.94
1016.87	154.97
1018.54	154.98
1021.45	154.99
1025	155
1026.9	155
1031.35	155.01
1036.08	155.01
1037.91	155.01
1043.46	155.03
1045.45	155.04
1045.91	155.04
1047.18	155.05
1052.29	155.11
1057.64	155.19
1057.95	155.2
1058.91	155.21
1064.42	155.33
1066.42	155.36
1071.52	155.47
1076.75	155.56
1079.43	155.62
1088.54	155.82
1090.33	155.87
1098.86	156.17
1107.02	156.43
1108.43	156.47
1109.49	156.5
1110.98	156.58
1120.4	157.1
1129.48	157.59
1131.38	157.7
1141.66	158.28
1143.93	158.38
1148.2	158.66
1148.78	158.7
1148.8	158.73
1148.97	158.71
1149.33	158.72
1149.84	158.73
1151.03	158.7
1153.67	158.71
1158.23	158.79
1159.28	158.81
1159.8	158.85
1160.41	159.07
1160.56	158.98
1162.87	158.92
1164.56	158.89
1171.39	159
1171.67	159
1171.77	159
1171.84	159
1174.58	158.85
1174.89	158.97
1176.71	159.1
1179.2	159.17
1181.62	159.22
1185.22	159.32
1189.62	159.44
1190.91	159.47
1193.7	159.53
1193.76	159.53
1197.49	159.65
1199.65	159.7
1205.2	159.85
1208.1	159.88
1209.4	159.88
1214.97	159.99
1215.9	160.03
1216.95	160.07
1219.17	160.12
1220.98	160.15
1222.65	160.15
1223.88	160.16
1228.3	160.29

1126

Sta (ft)	Elev (ft)
914.44	153.897
926.21	153.69
926.38	153.689
926.64	153.689
927.29	153.691
928.87	153.694
931.84	153.696
932.74	153.697
934.09	153.7
937.72	153.706
941.4	153.721
943.77	153.725
946.56	153.734
949.65	153.754
953.22	153.783
955.75	153.799
957.76	153.82
963.65	153.884
966.17	153.92
970.3	153.973
975.31	154.049
976.63	154.072
977.91	154.098
983.08	154.187
987.88	154.281
989.6	154.317
992.56	154.38
995.97	154.454
1002.37	154.595
1003.24	154.615
1004	154.633
1011.36	154.786
1012.79	154.816
1018.06	154.908
1020.17	154.947
1024.98	155.01
1028.8	155.065
1030.42	155.084
1031.83	155.1
1036.3	155.157
1040.25	155.209
1044.35	155.26
1047.36	155.303
1050.16	155.341
1054.55	155.411
1057.36	155.449
1061.6	155.512
1063.81	155.546
1065.31	155.567
1071.5	155.651
1072.09	155.659
1077.4	155.722
1080.1	155.752
1084.22	155.795
1089.77	155.852
1090.63	155.862
1091.33	155.869
1096.84	155.932
1099.84	155.971
1102.25	156.004
1102.5	156.007
1110.62	156.129
1111.29	156.141
1112.17	156.161
1117.54	156.256
1121.51	156.34
1124.1	156.414
1129.1	156.571
1129.73	156.595
1135.79	156.863
1137.16	156.935
1140.13	157.099
1144.07	157.312
1146.36	157.444
1149.21	157.602
1150.34	157.672
1150.77	157.876
1151.27	158.153
1151.39	158.25
1151.44	157.989
1153.72	157.938
1154.82	157.882
1158.19	158.017
1162.84	158.526
1163.04	158.529
1163.04	158.543
1163.06	158.538
1163.22	158.536
1170.95	158.382
1172.57	158.419
1175.51	158.436
1176.55	158.31
1176.89	158.422
1177.53	158.538
1178.6	158.574
1180.41	158.624
1184.44	158.76
1187.41	158.86
1190.8	158.988
1195.31	159.165
1203.72	159.448
1205.53	159.514
1206.61	159.545
1213.67	159.7
1217.27	159.784
1217.6	159.79
1217.86	159.791
1223.85	159.875
1226.55	159.913
1232.07	159.94

1032

Sta (ft)	Elev (ft)
989.65	155.254
999.55	155.527
1006.89	155.751
1015.21	155.894
1018.45	155.883
1026.22	155.914
1031.71	155.877
1034.01	155.871
1041.17	155.849
1041.18	155.849
1041.18	155.849
1041.21	155.849
1046.79	155.866
1051.19	155.91
1052.1	155.92
1059.36	156.027
1059.47	156.028
1059.61	156.031
1066.32	156.15
1073.09	156.282
1073.88	156.297
1074.48	156.308
1082.28	156.462
1082.66	156.469
1085.98	156.535
1088.83	156.591
1089.38	156.604
1094.16	156.709
1098.76	156.826
1100.78	156.884
1104.77	157.021
1108.1	157.135
1109.16	157.175
1113.73	157.367
1115.08	157.425
1116.53	157.496
1118	157.572
1118.72	157.622
1119.97	157.819
1120.47	157.956
1120.49	157.765
1120.86	157.718
1121.32	157.73
1122.19	157.75
1122.63	157.752
1128.88	157.989
1128.89	157.989
1131.22	158.064
1133.02	158.209
1133.08	158.379
1133.1	158.292
1135.82	158.237
1136.35	158.223
1140.25	158.335
1145.12	158.485
1145.86	158.506
1146	158.496
1146.24	158.262
1147.15	158.363
1150.25	158.532
1154.64	158.797
1154.71	158.803
1154.85	158.807
1161.14	159.018
1161.72	159.036
1166.55	159.177
1167.12	159.194
1168.58	159.229
1173.13	159.333
1178.5	159.427
1179.11	159.438
1181.83	159.479
1185.93	159.538
1186.66	159.544
1190.78	159.593
1192.38	159.613
1192.94	159.62
1196.87	159.657
1199.1	159.635
1203.33	159.669
1205.58	159.704

pennsylvania
FISH AND BOAT COMMISSION

July 29, 2024

IN REPLY REFER TO
SIR# 60084

Geosyntec Consultants
Hue Quan
650 Bloomfield Avenue
Bloomfield, New Jersey 07071

RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species
PNDI Search No. 818250_1
Brooke Glen Hospital Flood Mitigation Project
Whitemarsh Township: MONTGOMERY County

Dear Hue Quan:

This responds to your inquiry about a Pennsylvania Natural Diversity Inventory (PNDI) Internet Database search "potential conflict" or a threatened and endangered species impact review. These projects are screened for potential conflicts with rare, candidate, threatened or endangered species under Pennsylvania Fish and Boat Commission jurisdiction (fish, reptiles, amphibians, aquatic invertebrates only) using the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files. These species of special concern are listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, and the Pennsylvania Fish and Boat Code (Chapter 75), or the Wildlife Code.

Per my request, you supplied additional information and project plans for the project site. According to the additional information, the project will not impact waterways or wetlands that are consistent with those known to support Northern Red-bellied Cooter (*Pseudemys rubriventris*). Therefore, I conclude that the project site habitat is not suitable for the species of concern and I do not foresee the proposed project resulting in adverse impacts to the Northern Red-bellied Cooter.

This response represents the most up-to-date summary of the PNDI data and our files and is valid for two (2) years from the date of this letter. An absence of recorded species information does not necessarily imply species absence. Our data files and the PNDI system are continuously being updated with species occurrence information. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered, and consultation shall be re-initiated.

If you have any questions regarding this review, please contact Kathy Gipe at 814-359-5186 or c-kgipe@pa.gov and refer to the SIR # 60084. Thank you for your cooperation and attention to this important matter of species conservation and habitat protection.

Sincerely,

Christopher A. Urban, Chief
Natural Diversity Section

CAU/KDG/dn

ATTACHMENT 11

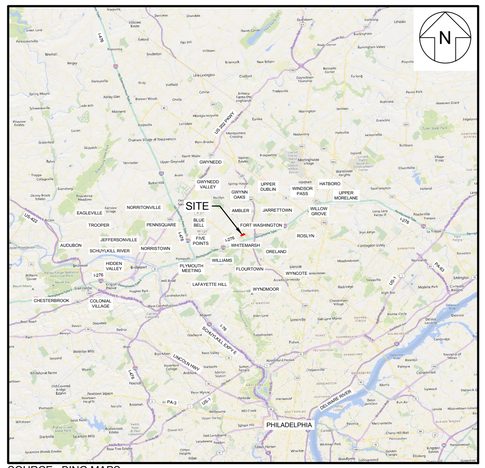
List of Encumbrances

Not Applicable

BROOKE GLEN BEHAVIORAL HOSPITAL
UNIVERSAL HEALTH SERVICES FLOOD MITIGATION
7170 LAFAYETTE AVE
FORT WASHINGTON, PENNSYLVANIA

PROJECT NO. TXW9793A

JULY 2024



SOURCE: BING MAPS

VICINITY MAP

0 5 10

SCALE IN MILES

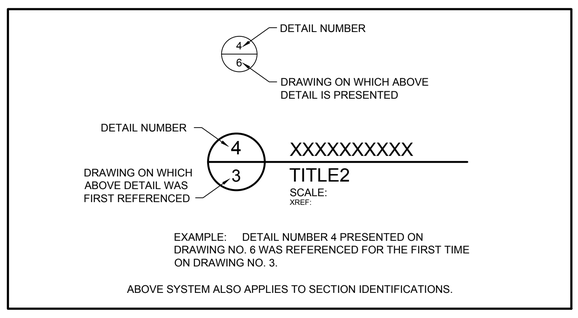
DRAWING LIST TABLE		
DRAWING NUMBER	DRAWING TITLE	LATEST REVISION
1	COVER SHEET	0
2	EXISTING CONDITIONS	0
3	PROPOSED CONDITIONS	0
4	EROSION AND SEDIMENT CONTROL PLAN	0
5	DETAILS (SHEET 1 OF 2)	0
6	DETAILS (SHEET 2 OF 2)	0

SOURCE: BING MAPS

LOCATION MAP

0 1000 2000

SCALE IN FEET



DETAIL IDENTIFICATION LEGEND

PREPARED FOR:

UNIVERSAL HEALTH SERVICES, INC.
367 SOUTH GULPH ROAD,
KING OF PRUSSIA
PENNSYLVANIA, 19406, USA

PREPARED BY:

GEOSYNTEC CONSULTANTS, INC.
930 HARVEST DRIVE, SUITE 220
BLUE BELL, PENNSYLVANIA, 19422
PHONE: 512.451.4003

PERMIT DRAWING, NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

UNIVERSAL HEALTH SERVICES, INC.
367 SOUTH GULPH ROAD KING OF PRUSSIA,
PENNSYLVANIA, 19406, USA

GEOSYNTEC CONSULTANTS, INC.
930 HARVEST DRIVE, SUITE 220
BLUE BELL, PENNSYLVANIA, 19422
PHONE: 512.451.4003

TITLE: COVER SHEET

PROJECT: UNIVERSAL HEALTH SERVICES FLOOD MITIGATION

SITE: BROOKE GLEN BEHAVIORAL HOSPITAL

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

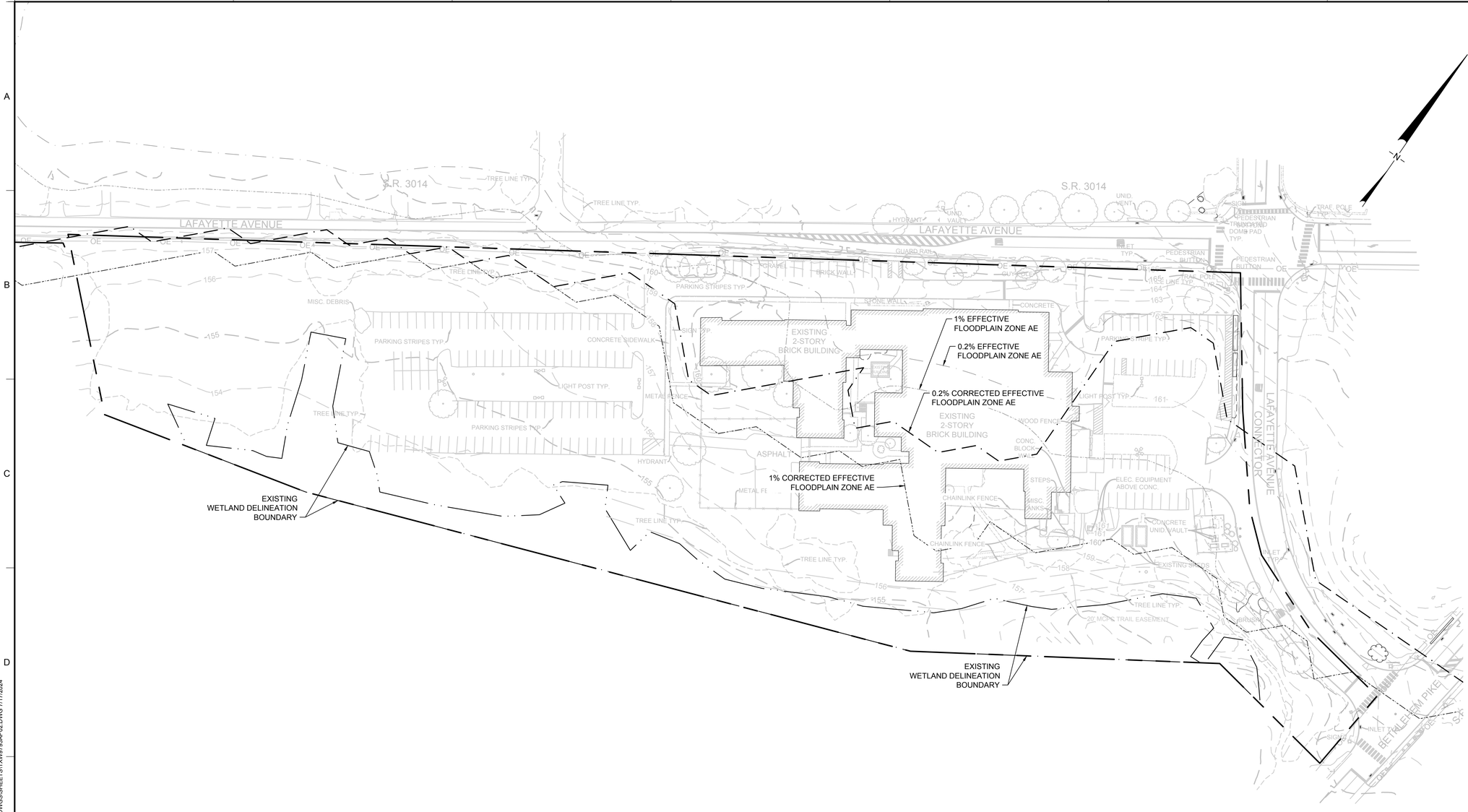
SIGNATURE

07/17/2024
DATE

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
JAMES DOUGLAS BARBIS
ENGINEER
PE087655

DESIGN BY:	NH/OB	DATE:	JULY 2024
DRAWN BY:	AM	PROJECT NO.:	TXW9793A
CHECKED BY:	BK	FILE:	TXW9793AP01
REVIEWED BY:	JB	DRAWING NO.:	1 OF 6
APPROVED BY:	JB		

C:_GEO-ACCACDOCS\GEOSYNTEC\UHS\CS_BROOKE GLEN\PROJECT FILES\PERMIT\01_FLOOD MTG\NDWGS\SHEETS\TXW9793AP01.DWG 7/17/2024



LEGEND

- EXISTING GROUND MAJOR CONTOUR (5') (NOTE 1)
- EXISTING GROUND MINOR CONTOUR (1') (NOTE 1)
- PROPERTY BOUNDARY
- EXISTING SITE ACCESS ROAD
- EXISTING FENCE
- EXISTING WETLAND DELINEATION (NOTE 5)
- 0.2% EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 1% EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 0.2% CORRECTED EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 1% CORRECTED EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- EXISTING TREE

NOTES:

1. EXISTING CONTOURS ARE BASED ON AN ON-SITE TOPOGRAPHICAL FIELD SURVEY PERFORMED BY PENNONI ASSOCIATES INC. IN SEPTEMBER 2023.
2. THE STUDY AREA IS ENTIRELY LOCATED WITHIN THE CITY LIMITS OF FORT WASHINGTON, PENNSYLVANIA AND MONTGOMERY COUNTY.
3. THE 1% ANNUAL CHANCE (1%) AND 0.2% ANNUAL CHANCE (0.2%) EFFECTIVE ZONE AE BOUNDARIES WERE OBTAINED FROM THE CURRENT FIS (REVISED: MARCH 2, 2016) BASED ON THE TOPOGRAPHY USED IN THE EFFECTIVE MODEL LAST UPDATED IN NOVEMBER 2012. THE 1% AND 0.2% CORRECTED EFFECTIVE ZONE AE BOUNDARIES INCORPORATE THE USE OF MORE RECENT TOPOGRAPHIC DATA AND OTHER REVISIONS INCORPORATED IN THE CORRECTED EFFECTIVE MODEL. ALTHOUGH THE WATER SURFACE ELEVATIONS FOR THE 1% AND 0.2% CORRECTED EFFECTIVE ZONE AE ARE GENERALLY HIGHER THAN THE EFFECTIVE ZONE AE, THE SPATIAL EXTENT OF THE ZONE AE BOUNDARIES DECREASES COMPARED TO THOSE USED IN THE EFFECTIVE FIS (FEMA, 2016) DUE TO THE CHANGE IN TOPOGRAPHIC DATA SOURCES.
4. THE REFERENCED VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
5. WETLAND DELINEATION BASED ON SITE INVESTIGATION CONDUCTED BY GEOSYNTEC CONSULTANTS, INC ON 27 JULY 2023.
6. LOCATION OF THE MONTGOMERY COUNTY PLANNING COMMISSION TRAIL EASEMENT IS APPROXIMATE BASED ON RECORD PLAN DRAWING (SHEET 2 OF 5) PREPARED BY WOODROW & ASSOCIATES, INC REVISION 2, DATED 15 OCTOBER 2009.

0 60 120
SCALE IN FEET

REV	DATE	DESCRIPTION	DRN	APP

UNIVERSAL HEALTH SERVICES, INC.
367 SOUTH GULPH ROAD KING OF PRUSSIA,
PENNSYLVANNIA, 19406, USA

Geosyntec consultants
GEOSYNTEC CONSULTANTS, INC.
930 HARVEST DRIVE, SUITE 220
BLUE BELL, PENNSYLVANIA, 19422
PHONE: 512.451.4003

TITLE: EXISTING CONDITIONS

PROJECT: UNIVERSAL HEALTH SERVICES FLOOD MITIGATION

SITE: BROOKE GLEN BEHAVIORAL HOSPITAL

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE

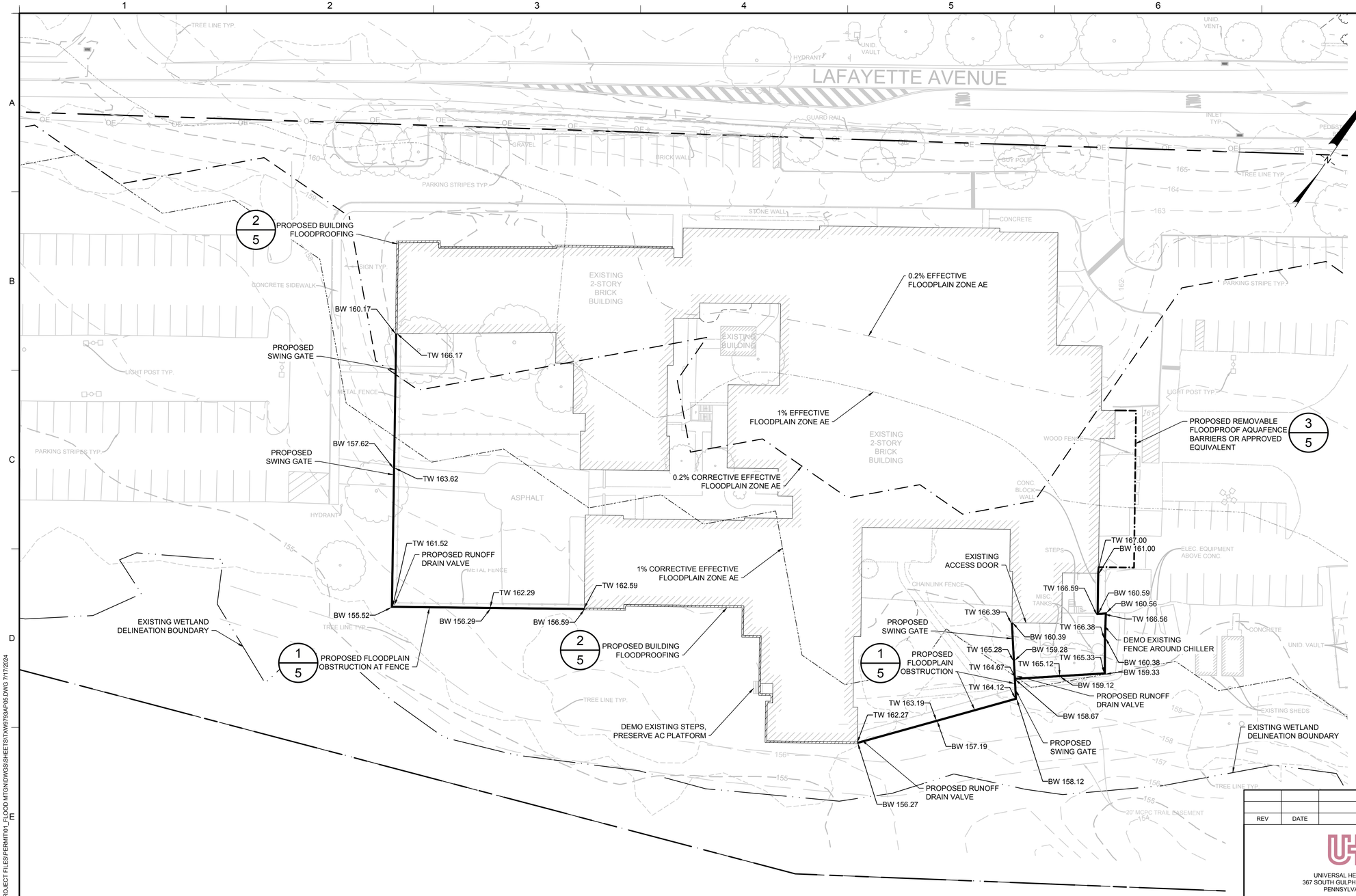
07/17/2024
DATE

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — JAMES DOUGLAS BARBIS — ENGINEER — PE087655

DESIGN BY: OB	DATE: JULY 2024
DRAWN BY: AM	PROJECT NO.: TXW9793A
CHECKED BY: BK	FILE: TXW9793AP02
REVIEWED BY: JB	DRAWING NO.: 2 OF 6
APPROVED BY: JB	

PERMIT DRAWING, NOT FOR CONSTRUCTION

C:_GEO-ACCACCDOCS\GEOSYNTECUH.SVCS_BROOKE GLEN\PROJECT FILES\PERMIT\01_FLOOD MTGN\DWGS\SHEETS\TXW9793AP02.DWG 7/17/2024



LEGEND

- EXISTING GROUND MAJOR CONTOUR (5') (NOTE 1)
- EXISTING GROUND MINOR CONTOUR (1') (NOTE 1)
- PROPERTY BOUNDARY
- EXISTING SITE ACCESS ROAD
- EXISTING FENCE
- PROPOSED FLOODPLAIN OBSTRUCTION
- PROPOSED FLOODPROOFING FACILITY
- PROPOSED AQUAFENCE BARRIERS
- 0.2% EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 1% EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 0.2% CORRECTED EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 1% CORRECTED EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- TW XXX.XX — TOP OF WALL ELEVATION
- BW XXX.XX — BOTTOM OF WALL ELEVATION
- EXISTING TREE

NOTES:

1. EXISTING CONTOURS ARE BASED ON AN ON-SITE TOPOGRAPHICAL FIELD SURVEY PERFORMED BY PENNONI ASSOCIATES INC. IN SEPTEMBER 2023.
2. THE STUDY AREA IS ENTIRELY LOCATED WITHIN THE CITY LIMITS OF FORT WASHINGTON, PENNSYLVANIA AND MONTGOMERY COUNTY.
3. THE 1% ANNUAL CHANCE (1%) AND 0.2% ANNUAL CHANCE (0.2%) EFFECTIVE ZONE AE BOUNDARIES WERE OBTAINED FROM THE CURRENT FIS (REVISED: MARCH 2, 2016) BASED ON THE TOPOGRAPHY USED IN THE EFFECTIVE MODEL LAST UPDATED IN NOVEMBER 2012. THE 1% AND 0.2% CORRECTED EFFECTIVE ZONE AE BOUNDARIES INCORPORATE THE USE OF MORE RECENT TOPOGRAPHIC DATA AND OTHER REVISIONS INCORPORATED IN THE CORRECTED EFFECTIVE MODEL. ALTHOUGH THE WATER SURFACE ELEVATIONS FOR THE 1% AND 0.2% CORRECTED EFFECTIVE ZONE AE ARE GENERALLY HIGHER THAN THE EFFECTIVE ZONE AE, THE SPATIAL EXTENT OF THE ZONE AE BOUNDARIES DECREASES COMPARED TO THOSE USED IN THE EFFECTIVE FIS (FEMA, 2016) DUE TO THE CHANGE IN TOPOGRAPHIC DATA SOURCES.
4. THE REFERENCED VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
5. WETLAND DELINEATION BASED ON SITE INVESTIGATION CONDUCTED BY GEOSYNTEC CONSULTANTS, INC ON 27 JULY 2023.

0 30 60
SCALE IN FEET

PERMIT DRAWING, NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

UNIVERSAL HEALTH SERVICES, INC.
367 SOUTH GULPH ROAD KING OF PRUSSIA,
PENNSYLVANNIA, 19406, USA

Geosyntec consultants
GEOSYNTEC CONSULTANTS, INC.
930 HARVEST DRIVE, SUITE 220
BLUE BELL, PENNSYLVANIA, 19422
PHONE: 512.451.4003

TITLE: PROPOSED CONDITIONS

PROJECT: UNIVERSAL HEALTH SERVICES FLOOD MITIGATION

SITE: BROOKE GLEN BEHAVIORAL HOSPITAL

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

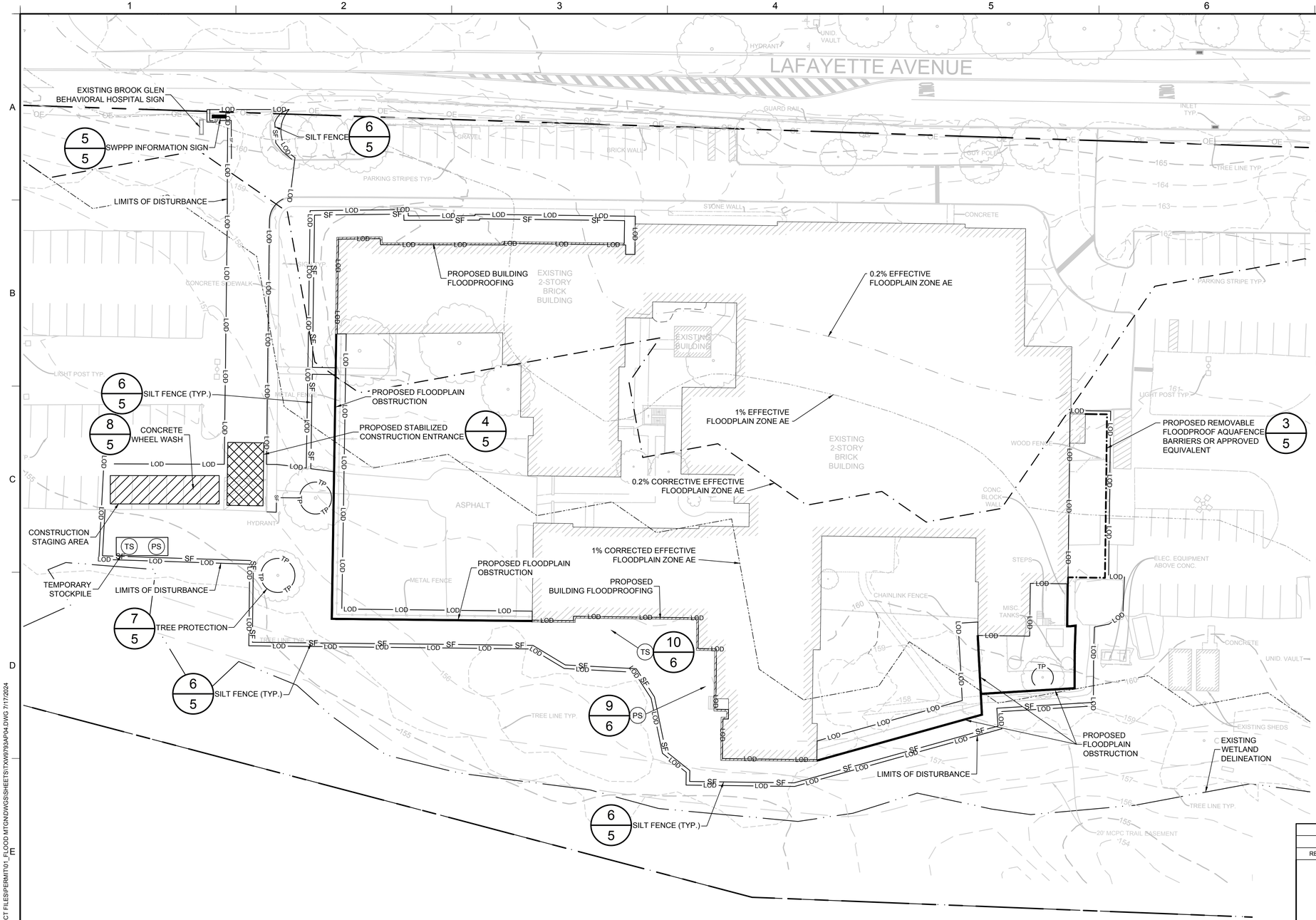
SIGNATURE

07/17/2024
DATE

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — JAMES DOUGLAS BARBIS — ENGINEER — PE087655

DESIGN BY: NH	DATE: JULY 2024
DRAWN BY: AM	PROJECT NO.: TXW9793A
CHECKED BY: BK	FILE: TXW9793AP05
REVIEWED BY: JB	DRAWING NO.: 3 OF 6
APPROVED BY: JB	

C:_GEO-ACCACDOCSGEOSYNTECUHS\VCS_BROOKE GLEN\PROJECT FILES\PERMIT\01_FLOOD MTG\NDWGS\SHEETS\TXW9793AP05.DWG 7/17/2024



LEGEND

- EXISTING GROUND MAJOR CONTOUR (5') (NOTE 1)
- EXISTING GROUND MINOR CONTOUR (1') (NOTE 1)
- PROPERTY BOUNDARY
- EXISTING SITE ACCESS ROAD
- EXISTING FENCE
- LOD — LIMITS OF DISTURBANCE
- SF — SILT FENCE
- 0.2% EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 1% EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 0.2% CORRECTED EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- 1% CORRECTED EFFECTIVE FLOODPLAIN ZONE AE (NOTE 3)
- SWPPP INFORMATION SIGN
- PS — PERMANENT STABILIZATION (9/6)
- TS — TEMPORARY STABILIZATION (10/6)
- EXISTING TREE

NOTES:

1. EXISTING CONTOURS ARE BASED ON AN ON-SITE TOPOGRAPHICAL FIELD SURVEY PERFORMED BY PENNONI ASSOCIATES INC. IN SEPTEMBER 2023.
2. THE STUDY AREA IS ENTIRELY LOCATED WITHIN THE CITY LIMITS OF FORT WASHINGTON, PENNSYLVANIA AND MONTGOMERY COUNTY.
3. THE 1% ANNUAL CHANCE (1%) AND 0.2% ANNUAL CHANCE (0.2%) EFFECTIVE ZONE AE BOUNDARIES WERE OBTAINED FROM THE CURRENT FIS (REVISED: MARCH 2, 2016) BASED ON THE TOPOGRAPHY USED IN THE EFFECTIVE MODEL LAST UPDATED IN NOVEMBER 2012. THE 1% AND 0.2% CORRECTED EFFECTIVE ZONE AE BOUNDARIES INCORPORATE THE USE OF MORE RECENT TOPOGRAPHIC DATA AND OTHER REVISIONS INCORPORATED IN THE CORRECTED EFFECTIVE MODEL. ALTHOUGH THE WATER SURFACE ELEVATIONS FOR THE 1% AND 0.2% CORRECTED EFFECTIVE ZONE AE ARE GENERALLY HIGHER THAN THE EFFECTIVE ZONE AE, THE SPATIAL EXTENT OF THE ZONE AE BOUNDARIES DECREASES COMPARED TO THOSE USED IN THE EFFECTIVE FIS (FEMA, 2016) DUE TO THE CHANGE IN TOPOGRAPHIC DATA SOURCES.
4. THE REFERENCED VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
5. WETLAND DELINEATION BASED ON SITE INVESTIGATION CONDUCTED BY GEOSYNTEC CONSULTANTS, INC ON 27 JULY 2023.

EROSION AND SEDIMENT CONTROL NOTES:

1. THE IMPLEMENTATION OF THIS ESC PLAN AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC BMPS IS THE RESPONSIBILITY OF THE APPLICANT UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.
2. CLEARLY FLAG THE BOUNDARIES OF THE LIMITS OF DISTURBANCE SHOWN ON THIS PLAN IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE FLAGGED CLEARING LIMITS SHALL BE PERMITTED. THE FLAGGING SHALL BE MAINTAINED BY THE APPLICANT FOR THE DURATION OF CONSTRUCTION.
3. CONSTRUCTION ENTRANCE AS WELL AS CONTRACTOR'S FACILITIES, MATERIAL STOCKPILES AND LAYDOWN, AND STAGING AREAS ARE CONCEPTUAL AND SHALL BE LOCATED ONLY IN AREAS APPROVED BY THE OWNER.
4. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL AREAS DURING CONSTRUCTION AND FOR CLEANUP/RESTORATION OF ALL SUCH AREAS TO THEIR ORIGINAL CONDITION AFTER CONSTRUCTION.
5. CONSTRUCTION VEHICLES SHALL ENTER AND EXIT THE SITE VIA THE CONSTRUCTION EXIT. TRUCKS SHALL BE PROPERLY DECONTAMINATED (E.G., TIRE WASHOUT INSPECTION) PRIOR TO LEAVING THE SITE.
6. TOTAL COMBINED DISTURBED AREA AT THE SITE (I.E. LIMITS OF DISTURBANCE) IS 0.84 ACRES.

0 30 60
SCALE IN FEET

SWPPP PHASE I ACTIVITIES:

1. PRIOR TO ANY WORK INCLUDING DEMOLITION, CLEARING, GRADING OR INSTALLATION OF SEDIMENT CONTROL MEASURES, THE APPLICANT MUST SCHEDULE A PRE-CONSTRUCTION MEETING ON-SITE WITH THE ASSIGNED INSPECTOR FROM THE MONTOGOMERY COUNTY CONSERVATION DISTRICT. THE INSPECTOR'S CONTACT INFORMATION WILL BE FOUND ON THE PERMIT.
2. ONCE THE INSPECTOR HAS DETERMINED THE MEASURES ARE PROPERLY INSTALLED, CONSTRUCTION MAY BEGIN. MOST PLANS REQUIRE ADDITIONAL INSPECTIONS THAT MUST BE SCHEDULED BY THE APPLICANT IN ACCORDANCE WITH THE PLAN, PERMIT, AND GUIDANCE GIVEN AT THE PRE-CONSTRUCTION MEETING.
3. POST REQUIRED CONSTRUCTION SITE NOTICE AT THE ENTRANCE TO THE PROJECT SITE PRIOR TO EARTH DISTURBING ACTIVITIES.
2. BEFORE CONSTRUCTION ACTIVITIES COMMENCE, INSTALL REQUIRED PERIMETER CONTROL SILT FENCE ALONG THE DOWN GRADIENT PERIMETER OF THE SITE AS REQUIRED PRIOR TO EARTH DISTURBING ACTIVITIES.
3. INSTALL STABILIZED CONSTRUCTION ENTRANCE AS REQUIRED PRIOR TO EARTH DISTURBING ACTIVITIES.
4. CONDUCT PROPOSED DEMOLITIONS. STOCKPILE SOIL ON-SITE AS NEEDED AND PROVIDE PERIMETER CONTROLS AROUND STOCKPILE AREAS AND STABILIZE THE STOCKPILED MATERIAL.

SWPPP PHASE II ACTIVITIES:

5. CONSTRUCT PROPOSED FLOODPLAIN OBSTRUCTION, BUILDING FLOODPROOFING, AND FLOODPROOF BARRIER ELEMENTS. AS WORK PROGRESSES, ENSURE THAT ADEQUATE DOWN GRADIENT PROTECTIVE MEASURES ARE PROPERLY INSTALLED BEFORE SOIL IS DISTURBED.
6. TEMPORARILY SEED OR STABILIZE, THROUGHOUT CONSTRUCTION, DENUDED AREAS THAT WILL BE INACTIVE FOR 14 DAYS OR MORE.
7. PERMANENTLY STABILIZE AREAS TO BE VEGETATED AS THEY ARE BROUGHT TO FINAL GRADE.
8. REMOVE TEMPORARY CONSTRUCTION PARKING/STAGING AREA AND PERMANENTLY STABILIZE THE AREA.
9. REMOVE ALL OTHER STORMWATER BMPS AND EROSION/SEDIMENTATION CONTROLS UPON PERMANENT FINAL STABILIZATION OF THE SITE.
10. ONCE THE APPLICANT BELIEVES THE PROJECT IS COMPLETE AND ALL DISTURBED AREAS HAVE BEEN STABILIZED, A FINAL INSPECTION MUST BE SCHEDULED WITH THE MONTOGOMERY COUNTY CONSERVATION DISTRICT. INSPECTION STAFF WILL NOT PASS THE FINAL INSPECTION UNTIL ALL AREAS ARE COMPLIANT. ONCE COMPLIANT, THE PERMIT WILL BE FINALIZED AND CLOSED.

PERMIT DRAWING, NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

UNIVERSAL HEALTH SERVICES, INC.
367 SOUTH GULPH ROAD KING OF PRUSSIA,
PENNSYLVANNIA, 19406, USA

Geosyntec consultants
GEOSYNTEC CONSULTANTS, INC.
930 HARVEST DRIVE, SUITE 220
BLUE BELL, PENNSYLVANIA, 19422
PHONE: 512.451.4003

TITLE: EROSION AND SEDIMENT CONTROL PLAN

PROJECT: UNIVERSAL HEALTH SERVICES FLOOD MITIGATION

SITE: BROOKE GLEN BEHAVIORAL HOSPITAL

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

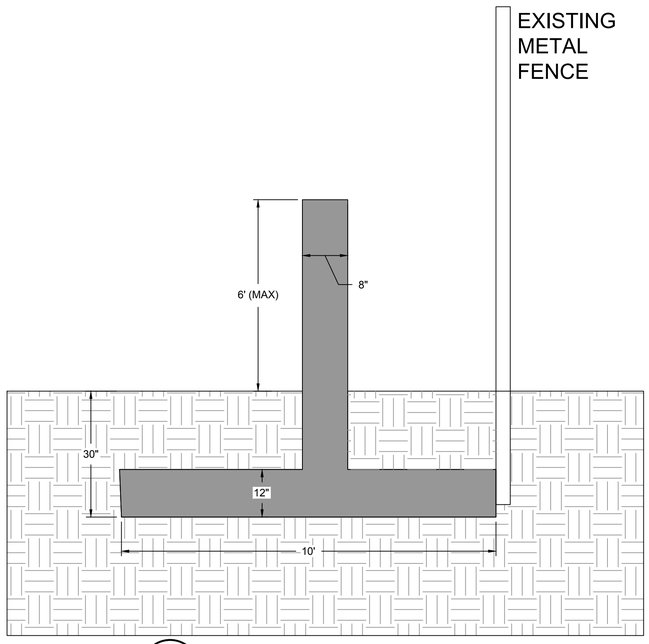
SIGNATURE

07/17/2024
DATE

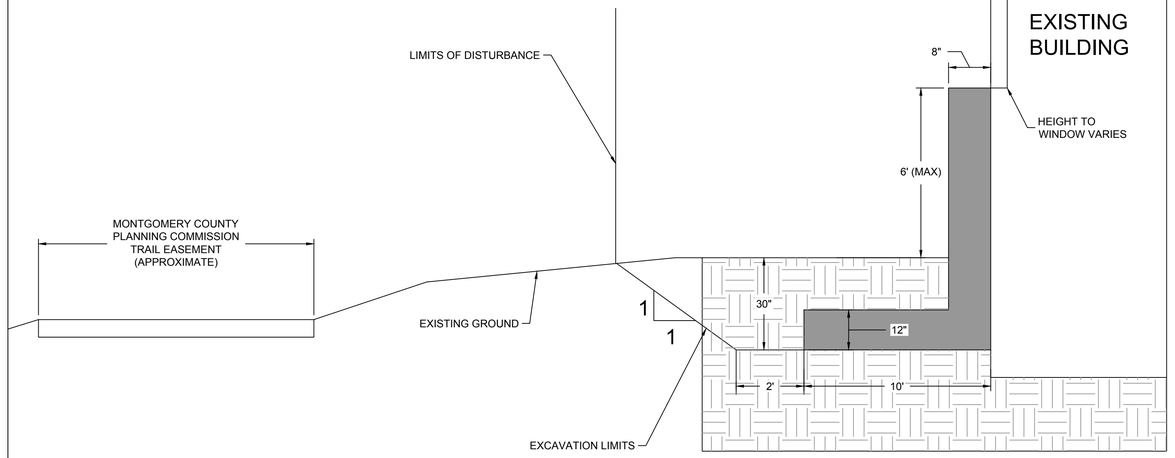
COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — JAMES DOUGLAS BARBIS — ENGINEER — PE087655

DESIGN BY: OB	DATE: JULY 2024
DRAWN BY: AM	PROJECT NO.: TXW9793A
CHECKED BY: BK	FILE: TXW9793AP04
REVIEWED BY: JB	DRAWING NO.: 4 OF 6
APPROVED BY: JB	

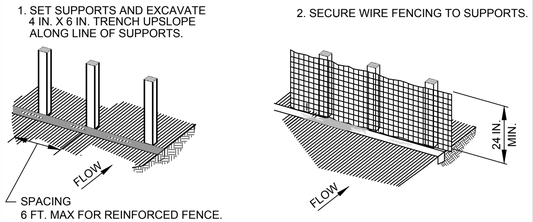
C:_GEO-ACCACCDOCS\GEOSYNTEC\UHS\VCS_BROOKE GLEN\PROJECT FILES\PERMIT\01_FLOOD MTG\NDWGS\SHEETS\TXW9793AP04.DWG 7/17/2024

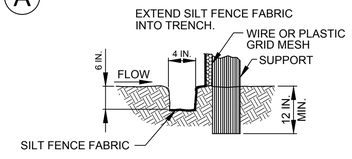


1/3 DETAIL
FLOODPLAIN OBSTRUCTION



2/3 DETAIL
BUILDING FLOODPROOFING





A SECTION

NOTE:
1. SEE SPECIFICATION SECTION NO. 02361-SILT FENCES.

SF — SF — SILT FENCE
SYMBOL

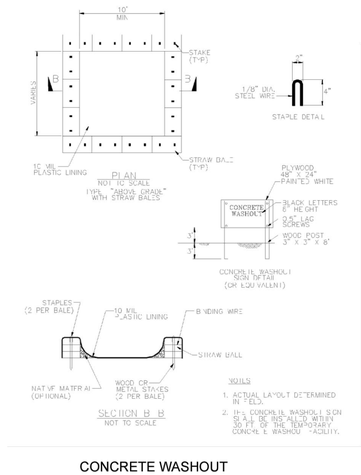
6/4 DETAIL
SILT FENCE

NOTE:
THE PROPOSED AQUAFENCE FLOOD BARRIER IS A FEMA COMPLIANT NON-RESIDENTIAL DRY FLOODPROOFING SOLUTION OPTION. APPROVED EQUIVALENT ALTERNATIVE MAY BE USED,IF NEEDED. APPROXIMATE HEIGHT OF 2.5 FT RECOMMENDED.

3/3 DETAIL
AQUAFENCE FLOOD BARRIER

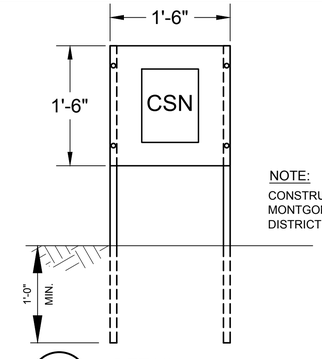
NOTE:
PRE-CONSTRUCTED RUMBLE PAD MUST BE INSTALLED IN ACCORDANCE WITH MANUFACTURE'S RECOMMENDATIONS. ACCUMULATED MATERIALS SHOULD BE CLEANED FROM THE PAD DAILY (OR MORE OFTEN, IF NECESSARY) AND PROPERLY DISPOSED.

4/4 DETAIL
PROPOSED CONSTRUCTION ENTRANCE



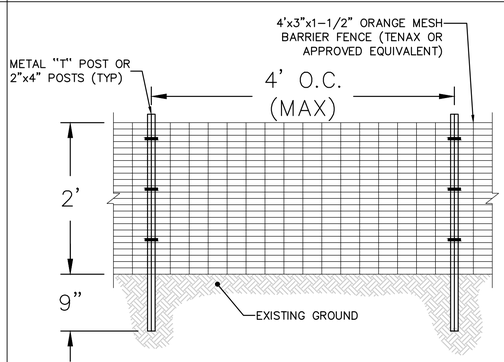
CONCRETE WASHOUT
Note: If portable concrete washout unit is used, manufacturer details will be added to the SWPPP.

8/4 DETAIL
CONCRETE WHEEL
WASH



NOTE:
CONSTRUCT IN ACCORDANCE WITH MONTGOMERY COUNTY CONSERVATION DISTRICT REQUIREMENTS

5/4 DETAIL
SWPPP
INFORMATION SIGN



7/4 DETAIL
TREE PROTECTION

PERMIT DRAWING, NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

UHS
UNIVERSAL HEALTH SERVICES, INC.
367 SOUTH GULPH ROAD KING OF PRUSSIA,
PENNSYLVANNIA, 19406, USA

Geosyntec consultants
GEOSYNTEC CONSULTANTS, INC.
930 HARVEST DRIVE, SUITE 220
BLUE BELL, PENNSYLVANIA, 19422
PHONE: 512.451.4003

TITLE: DETAILS (SHEET 1 OF 2)

PROJECT: UNIVERSAL HEALTH SERVICES FLOOD MITIGATION

SITE: BROOKE GLEN BEHAVIORAL HOSPITAL

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE
07/17/2024
DATE

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
JAMES DOUGLAS BARBIS
ENGINEER
PE087655

DESIGN BY: OB	DATE: JULY 2024
DRAWN BY: AM	PROJECT NO.: TXW9793A
CHECKED BY: BK	FILE: TXW9793AP03
REVIEWED BY: JB	DRAWING NO.: 5 OF 6
APPROVED BY: JB	

C:_GEO-ACCACDOCS\GEOSYNTEC\UHS\VCS_BROOKE GLEN\PROJECT FILES\PERMIT\01_FLOOD MITGN\DWGS\SHEETS\TXW9793AP03.DWG 7/17/2024

SEEDING/VEGETATION REQUIREMENTS NOTES:

1. CONSIDERATION MUST BE GIVEN TO ANTICIPATED CLIMATE AND SEASONAL CONDITIONS WHEN PLANTING SEED.
2. SEED SHALL BE FREE OF WEEDY SPECIES AND APPROPRIATE FOR SITE SOILS AND REGIONAL CLIMATE. SEED AND MULCH IMMEDIATELY AFTER TOPSOIL IS APPLIED AND FINAL GRADE IS REACHED.
3. THE SITE HAS ACHIEVED FINAL STABILIZATION ONCE ALL AREAS ARE COVERED WITH A STAND OF GRASS WITH A MINIMUM OF 70 PERCENT DENSITY OVER THE ENTIRE VEGETATED AREA, OR GREATER IN ACCORDANCE WITH THE GENERAL PERMIT REQUIREMENTS.
4. VEGETATED AREAS MUST BE WATERED, FERTILIZED, AND RESEEDED AS NEEDED TO ACHIEVE THIS REQUIREMENT.
5. THE VEGETATIVE DENSITY MUST BE MAINTAINED THROUGH PROJECT COMPLETION TO BE CONSIDERED STABILIZED. AREAS PROTECTED BY EROSION CONTROL BLANKETS ARE NOT PERMANENTLY STABILIZED UNTIL THE APPLICABLE GENERAL PERMIT REQUIREMENT FOR FINAL VEGETATIVE DENSITY IS ACHIEVED.
6. RIP-RAP , MULCH, GRAVEL, DECOMPOSED GRANITE OR OTHER EQUIVALENT PERMANENT STABILIZATION MEASURES MAY BE EMPLOYED IN LIEU OR VEGETATION BASED ON SITE-SPECIFIC CONDITIONS, DESIGN AND GOVERNING AUTHORITY APPROVAL.
7. ALL SEEDED AREAS SHALL BE INSPECTED REGULARLY TO CONFIRM THAT A HEALTHY STAND OF GRASS IS MAINTAINED.

PERMANENT SEEDING, SOD OR MULCHING NOTES:

1. PERMANENT STABILIZATION SHALL BE ACCOMPLISHED IN ALL DISTURBED AREAS BY COVERING THE SOIL WITH PAVEMENT, VEGETATION, OR OTHER FORMS OF SOIL STABILIZATION.
2. THE CONTRACTOR IS REQUIRED TO INITIATE PERMANENT SOIL STABILIZATION MEASURES IMMEDIATELY UPON REACHING FINAL GRADE. FOR THOSE AREAS NOT AT FINAL GRADE THAT WILL NOT BE DISTURBED FOR GREATER THAN 14 DAYS, THE CONTRACTOR SHOULD INITIATE TEMPORARY STABILIZATION PER THE TEMPORARY SEEDING OR STABILIZATION NOTES.
3. THE CONTRACTOR HAS 7 DAYS FROM INITIATION OF STABILIZATION TO COMPLETE SOIL PREPARATION, SEEDING, MULCHING, AND ANY OTHER REQUIRED ACTIVITIES RELATED TO THE PLANTING AND ESTABLISHMENT OF VEGETATION. THE CONTRACTOR ALSO HAS 7 DAYS FROM INITIATION OF STABILIZATION TO COMPLETELY INSTALL NON-VEGETATED MEASURES, IF UTILIZED.
4. SOILS MUST BE PREPARED BEFORE INSTALLATION OF SOD OR SEED.
5. AT THE COMPLETION OF GROUND-DISTURBING ACTIVITIES, THE ENTIRE SITE MUST HAVE PERMANENT VEGETATIVE COVER MEETING VEGETATIVE DENSITY REQUIREMENTS IN THE GENERAL PERMIT, IN ALL AREAS NOT COVERED BY HARDSCAPE (STONE, PAVEMENT, ETC.).
6. SEEDED AREAS SHALL BE PROTECTED WITH STRAW MULCH, HYDRAULIC MULCH OR A ROLLED EROSION CONTROL PRODUCT. STRAW MULCH MUST BE TACKIFIED OR CRIMPED BY DISC OR OTHER MACHINERY, AND ROLLED EROSION CONTROL PRODUCTS MUST BE INSTALLED PER MANUFACTURER RECOMMENDATIONS.
7. FINAL SITE STABILIZATION IS ACHIEVED WHEN PERENNIAL VEGETATIVE COVER PROVIDES PERMANENT STABILIZATION WITH A UNIFORM DENSITY GREATER THAN 70 PERCENT OVER THE ENTIRE AREA TO BE STABILIZED BY VEGETATIVE COVER. THIS AREA IS EXCLUSIVE OF AREAS THAT ARE COVERED WITH ROCK (CRUSHED GRANITE, GRAVEL, ETC.).

9/4 DETAIL
PERMANENT STABILIZATION (PS)

TEMPORARY SEEDING OR STABILIZATION NOTES:

1. THE CONTRACTOR IS REQUIRED TO, AT A MINIMUM, INITIATE SOIL STABILIZATION MEASURES IMMEDIATELY WHENEVER ANY CLEARING, GRADING, EXCAVATING OR OTHER EARTH DISTURBING ACTIVITIES HAVE PERMANENTLY CEASED ON ANY PORTION OF THE SITE, OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE AND WILL NOT LIKELY RESUME FOR A PERIOD EXCEEDING 14 CALENDAR DAYS.
2. THE CONTRACTOR HAS 7 DAYS FROM INITIATION OF STABILIZATION TO COMPLETE SOIL PREPARATION, SEEDING, MULCHING, AND ANY OTHER REQUIRED ACTIVITIES RELATED TO THE PLANTING AND ESTABLISHMENT OF VEGETATION. THE CONTRACTOR ALSO HAS 7 DAYS FROM INITIATION OF STABILIZATION TO COMPLETELY INSTALL NON-VEGETATED MEASURES, IF UTILIZED.
3. ALL DISTURBED AREAS MUST BE STABILIZED TEMPORARILY WITH THE USE OF FAST-GERMINATING ANNUAL GRASS/GRAIN VARIETIES APPROPRIATE FOR SITE SOIL AND CLIMATE CONDITIONS. MULCH IS REQUIRED FOR ALL SEEDING APPLICATIONS AND MUST INCLUDE A SUITABLE FORM OF MULCH ANCHORING TO MINIMIZE MOVEMENT OF MULCH BY WIND OR WATER.
4. ALTERNATIVE STABILIZATION MEASURES TO SEEDING, SUCH AS ANCHORED MULCH APPLICATION (WITHOUT SEEDING), MAY BE UTILIZED DURING PERIODS WHEN VEGETATIVE GROWTH IS UNLIKELY (E.G. WINTER MONTHS).
5. IT IS NOT ACCEPTABLE TO ALLOW BARE SOIL TO REMAIN EXPOSED AT ANY TIME DURING THE YEAR, REGARDLESS OF WEATHER/TEMPERATURE/SITE CONDITIONS.
6. ALTERNATIVE STABILIZATION MEASURES INCLUDE, BUT ARE NOT LIMITED TO: ANCHORED STRAW/HAY MULCH, WOOD CELLULOSE FIBER MULCH, SPRAY-ON SOIL GLUES/BINDERS, AND ROLLED EROSION CONTROL PRODUCTS.
7. ROLLED EROSION CONTROL PRODUCTS (NETS, BLANKETS, TURF REINFORCED MATS) AND VEGETATED AREAS NOT MEETING REQUIRED VEGETATIVE DENSITIES FOR FINAL STABILIZATION MUST BE INSPECTED WEEKLY. RILING, RUTTING AND OTHER SIGNS OF EROSION INDICATE THE SPECIFIED EROSION CONTROL DEVICE IS NOT FUNCTIONING OR INSTALLED PROPERLY AND/OR ADDITIONAL EROSION CONTROL DEVICES ARE WARRANTED.

10/4 DETAIL
TEMPORARY STABILIZATION (TS)

PERMIT DRAWING, NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

UHS
UNIVERSAL HEALTH SERVICES, INC.
367 SOUTH GULPH ROAD KING OF PRUSSIA,
PENNSYLVANNIA, 19406, USA

Geosyntec consultants
GEOSYNTEC CONSULTANTS, INC.
930 HARVEST DRIVE, SUITE 220
BLUE BELL, PENNSYLVANIA, 19422
PHONE: 512.451.4003

TITLE: DETAILS (SHEET 2 OF 2)

PROJECT: UNIVERSAL HEALTH SERVICES FLOOD MITIGATION

SITE: BROOKE GLEN BEHAVIORAL HOSPITAL

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE

07/17/2024
DATE

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — JAMES DOUGLAS BARBIS — ENGINEER — PE087655

DESIGN BY: OB	DATE: JULY 2024
DRAWN BY: AM	PROJECT NO.: TXW9793A
CHECKED BY: BK	FILE: TXW9793AP03
REVIEWED BY: JB	DRAWING NO.: 6 OF 6
APPROVED BY: JB	

C:_GEO-ACCACCDOCS\GEOSYNTECOU.H.SVCS_BROOKE GLEN\PROJECT FILES\PERMIT\01_FLOOD MTG\NDWGS\SHEETS\TXW9793AP03.DWG 7/17/2024

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

November 22, 2024

File No. 2024-01093

Mr. Craig T. McAnally, Township Manager
Whitemarsh Township Municipal Building
616 Germantown Pike
Lafayette Hill, PA 19444

Reference: Request for Waiver of Land Development
Brooke Glen Hospital
7170 Lafayette Avenue
Whitemarsh Township, Montgomery County, Pennsylvania
SLD #04-24

Dear Mr. McAnally:

We are in receipt of an application including plans dated July 2024, prepared by Geosyntec Consultants, Inc., regarding the above referenced project, requesting that the Township consider granting a waiver of Land Development for the proposed project. As requested, we have reviewed the plans for the property submitted by the applicant, which show the proposed site work. Following a cursory technical review of the above-mentioned documents, we recommend the granting of a waiver of the Land Development process. The plans will be reviewed for compliance with Chapter 58, 'Grading, Erosion Control and Stormwater Management' and Chapter 101: 'Floodplain Management' as part of the Earth Disturbance Permit Application. Should you have any questions regarding this matter, please do not hesitate to contact me at this office.

Sincerely,

Krista Heinrich, P.E.
Township Engineer
Gilmore & Associates, Inc.

KH/sl

cc: Mr. Charles L. Guttenplan, AICP – Director of Planning and Zoning
Mr. Sean Kilkenny, Esq.; The Law Offices of Sean Kilkenny, LLC – Township Solicitor *(via email)*

O:\MUNICIPL\2024\2401093-WshT_7170 Lafayette Avenue-SLD 04-24\correspondence\SLD Waiver Req.doc

Whitemarsh TOWNSHIP
616 GERMANTOWN PIKE - LAFAYETTE HILL, PA 19444-1821
TEL: 610-825-3535 FAX: 610-825-9416
www.whitemarshtwp.org

November 25, 2024

Neil Callahan
Universal Health Services, Inc.
367 South Gulph Road
King of Prussia, PA 19406

RE: SLD#04-24: Brooke Glen Hospital Flood Mitigation Project
Land Development Waiver for Flood Mitigation Improvements
7170 Lafayette Avenue, Fort Washington, PA 19034
Zoning Ordinance Compliance Review Letter

Dear Mr. Callahan:

Please accept this as a review of the Zoning Ordinance Compliance issues for your above referenced Land Development Waiver Plan, prepared by Geosyntec Consultants, Inc., dated July 2024, with no noted revisions. The application proposes to construct flood prevention improvements; the property is zoned in the B-Residential District with an Institutional Overlay District (the latter of which governs given the use of the property). Portions of the proposed lot are in the Floodplain Conservation Overlay District and the Riparian Corridor Conservation Overlay District (RCCD).

If compliance cannot be shown for any of these provisions, a modification to the plan must be made or a variance from the Zoning Hearing Board would have to be secured, whether or not specifically noted.

1. §116-33.D. Structures shall not be permitted in the Ultimate Right-of-Way except where a property owner executes, and the Board of Supervisors approves, a Hold-Harmless Agreement and it is recorded against the property. The Ultimate Right-of-Way must be clearly shown on the plan to determine if any part of the proposed improvements are within said area.

2. §116-164.C. In the Floodplain Conservation District, no development shall be permitted except where the effect of such development on flood heights is fully offset by accompanying improvements which have been approved by all appropriate local, state and federal authorities as required. Additionally, compliance is required with Chapter 101 of the Whitemarsh Township Code, 'Floodplain Management'.

3. §116-165.B. This section allows certain uses in the Floodplain Conservation District provided they do not require structures. We understand that the applicant will seek a variance to allow the construction of structures within the Floodplain Conservation District.

4. §116-176. This section lists the dimensional requirements in the Institutional Overlay District. A zoning compliance chart shall be added to the plans to show these requirements and what the existing conditions are.

5. §116-204.A. & B. These sections discuss how floodproofing requirements apply depending upon what percentage the improvements are of the market value of the property. The appropriate requirements shall be met for the proposed improvements, including if applicable, the provisions of Chapter 101, Floodplain Management.

6. §116-258.A.(1). The Riparian Corridor Conservation District is an overlay district that applies to the streams, wetlands, and water bodies, and the land adjacent to them. The plan should be revised to clearly outline the outer edge of Zone 1 and Zone 2 as described below:

Water Feature Surface	**Minimum Corridor Width**
Perennial streams. All perennial streams identified in the Soil Survey (Perennial streams are shown as solid lines on the Soil Survey maps.)	Zone 1: Minimum width of 25 feet from each defined edge of the watercourse at bank full flow, measured perpendicular to the edge of the watercourse. Zone 2: Minimum width of 50 feet from the outer edge of Zone 1, measured perpendicular to the edge of Zone 1, or equal to the extent of the one-hundred-year floodplain, or 25 feet beyond the outer edge of a wetland along the stream, whichever is greater. (Total minimum width of Zones 1 and 2 = 150 feet plus the width of the stream.)

7. §116-259. §116-260. Any use or activity not authorized within §116-259. is prohibited within the Riparian Corridor Conservation District. A variance is required for the proposed improvements.

8. §116-259.A. This section requires a setback equal to at least ½ of the setback applicable on the specific portion on the lot on which it's located. Verification shall be provided that this setback has been met for all proposed improvements.

Should you have any questions, please do not hesitate to contact me.

Very truly yours,

Charles L. Guttenplan, AICP
Director of Planning and Zoning/Zoning Officer

cc: Craig T. McAnally, Township Manager
Robert A. Sztubinski, B.C.O., Director of Building and Codes
Andrew Thomas, Fire Marshal
Sean P. Kilkenny, Esq., Township Solicitor
Krista Heinrich, P.E., Township Engineer
BHC Northwest Psychiatric Hospital, Property Owner
James Barbis, P.E., Geosyntec Consultants, Inc., Applicant's Engineer