



FGD Pond Inflow Design Flood Control System Plan

**Wateree Station
Richland County, South Carolina**

October 2021

Prepared For:

Dominion Energy of South Carolina
142 Wateree Station Road
Eastover, South Carolina 29044

Prepared By:

TRC
50 International Drive, Suite 150
Greenville, South Carolina 29615

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Jonathan Hotstream
Senior Scientist

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Nakia Addison, P.E.
Project Manager



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Revision History

Revision Number	Revision Date	Section Revised	Summary of Revisions
0	07/15/2016		Initial Issue, developed by others
1	10/14/2021	1 through 8	Update for periodic revision

1.0 Background

Dominion Energy of South Carolina (DESC) owns and operates the Wateree Station (Station). The purpose of this Inflow Design Flood Control System Plan (Plan) is to present the flood control features of the Flue Gas Desulfurization (FGD) Pond at the Station as required by the United States Environmental Protection Agency's (USEPA) final coal combustion residual (CCR) rule Title 40 Code of Federal Regulations (40 CFR) Part 257 Subpart D - "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments." The requirements for Inflow Design Flood Control System Plans for surface impoundments are presented in 40 CFR 257.82. The initial Inflow Design Flood Control System Plan was developed and placed in the Station's operating record on October 17, 2016. The periodic inflow design flood control system plan revisions are required every 5 years pursuant to 40 CFR 257.82(c)(4).

This Plan is revised based on review of the initial Plan, review of design documents, and a site visit by TRC to observe existing conditions.

1.1 Existing Conditions

The Station is located on the Wateree River in Richland County, South Carolina, near the Town of Eastover, refer to Figure 1. The FGD Pond was constructed in conformance with the approved construction permit (Permit # 19263-IW) issued by the South Carolina Department of Health and Environmental Control (SC DHEC) on December 7, 2009. The FGD Pond was subsequently placed into operation in accordance with an operation approval issued by the SC DHEC on April 10, 2010. Effluent discharge from the FGD Pond is regulated under the National Pollution Discharge Elimination System (NPDES) Permit #SC0002038. The Station continues to operate under the original NPDES permit while pursuing an application for reissuance of the permit.

The FGD Pond consists of Forebay 1 and 2, a polishing pond, and a volume control pond. Refer to Figure 2 and Appendix A. The Forebays, polishing, and volume control ponds operate in series with decant structures, allowing liquids to flow to downstream components and water elevations decreasing as treatment continues to the downstream component. The FGD Pond is located outside of the 100-year flood plain of the nearby Wateree River (refer to Appendix B). There have not been significant changes to the FGD Pond since the initial Inflow Design Flood Control System Plan.

Forebay 1 and 2 were constructed above existing grade with a footprint of approximately 2.25 acres, refer to Appendix A. The FGD Pond Forebay 1 and 2 have surface areas of approximately 1.15 acres and 1.10 acres, respectively, with average depths of 4.5 feet and provide 1.5 feet of freeboard. Inner slopes range from 4 horizontal to 1 vertical (4H:1V) to 8H:1V. Outer slopes are no steeper than 3H:1V with a maximum height of 12 feet. The top of berm width ranges between 10 to 20 feet and the separation berm top width is 8 feet.

The polishing pond has a surface area of approximately 0.9 acres. The volume control pond has a surface area of approximately 0.4 acres. The inner slopes are 4H:1V and the outer slopes are 3H:1V. The normal operating pool elevation of the polishing and volume control ponds is elevation 129 feet and the top of berm elevation surrounding these ponds is 133 feet. This configuration provides 4 feet of freeboard for the polishing and volume control ponds.

2.0 Federal Regulations

An owner or operator of an existing or new CCR surface impoundment or any lateral expansion must design, construct, operate, and maintain an inflow design flood control system for the CCR surface impoundment to: (1) adequately manage flow into the CCR surface impoundment during and following the peak discharge of the inflow design flood, and (2) adequately manage flow from the CCR unit to collect and control the peak discharge resulting from the inflow design flood. The inflow design flood is based on the hazard potential classification of the unit as required by 40 CFR 257.73. The inflow design floods for specific hazard potential classifications are as follows:

- (1) The probable maximum flood for high hazard potential CCR surface impoundments
- (2) The 1,000-year flood for significant hazard potential CCR surface impoundments
- (3) The 100-year flood for low hazard potential CCR surface impoundments
- (4) The 25-year flood for incised CCR surface impoundments

The FGD Pond at the Station is classified as low hazard potential (TRC, 2021). Therefore, the FGD Pond must adequately manage peak discharge from a 100-year flood.

3.0 Flow into the FGD Pond

The FGD pond was constructed in an area beyond the 100-year floodplain, refer to Appendix B. The crest elevation of the FGD Pond perimeter berm ranges from elevation 133 to 137 feet, while the flood Zone A reaches a maximum elevation of approximately 120 feet in the vicinity of the FGD Pond. Therefore, during a 100-year flood, there will not be surface water inflow into the FGD Pond.

During a 100-year flood event, inflow will be limited to normal operational flows and precipitation that falls within the FGD Pond footprint. The anticipated precipitation for a 100-year, 24-hour storm event is 9.1 inches, refer to Appendix C. Forebay 1 and 2, the polishing pond, and the volume control pond operate with greater than 1 foot of freeboard. Therefore, there is sufficient capacity within the FGD Pond to contain precipitation collected during a 100-year, 24-hour storm event.

4.0 Flow out of the FGD Pond

Water is removed from the FGD Pond by an effluent pump station that is equipped with two submersible pumps. Each pump has a design flow rate of 200 gallons per minute. The effluent pump station discharges through a force main to a downstream receiving management unit in accordance with the facility's NPDES permit. The effluent pump station will remove the excess water and re-establish normal operating water levels in the FGD Pond in a controlled manner. If both pumps were running at 200 gpm, the water levels would be returned to normal after a 100--year, 24-hour storm event within 3 days. Refer to Appendix D for supporting calculations.

Discharge from the FGD Pond is regulated in accordance with an NPDES permit issued by the SC DHEC. The permit grants the Station permission to discharge from the facility to the Wateree River in accordance with effluent limitations, monitoring requirements, and other conditions. The NPDES permit is issued in accordance with the provisions of the Federal Clean Water Act. Therefore, by complying with the NPDES permit, the discharge from the FGD Pond is also being handled in accordance with the applicable surface water requirements.

5.0 Conclusion

The Wateree Station FGD Pond meets the requirements of 40 CFR 257.82 of adequately controlling the inflows and outflows of peak discharge for the following reasons:

- The FGD Pond is constructed outside of the 100-year floodplain.
- The FGD Pond can adequately receive and store normal operational wastewater flows and direct rainfall from a 100-year, 24-hour storm.
- The effluent pump station provides sufficient capacity to discharge the volume of precipitation collected during a 100-year, 24-hour precipitation event in a controlled manner.
- The discharge from the FGD Pond is permitted under a NPDES permit which was issued in accordance with the provisions of the Federal Clean Water Act.

6.0 Amendment and Periodic Plan Revision

This plan has been completed in compliance with the requirements set forth in 40 CFR 257.82. This document will be placed in the Station's CCR operating record, posted to the publicly accessible CCR website, and government notifications will be provided.

A periodic inflow design flood control system plan must be prepared every 5 years from the completion date of this Plan. The next Plan update is required by October 2026.

The Plan must be amended whenever the periodic review period is reached, or if changes in site conditions occur that will substantially affect the current written Plan.

7.0 References

National Flood Insurance Program. 2017. Flood Insurance Rate Map: Richland County, South Carolina Panel 560 of 650. Map Number 45079C0560L. Map Revised December 21, 2017. Federal Emergency Management Agency. Washington, D.C.

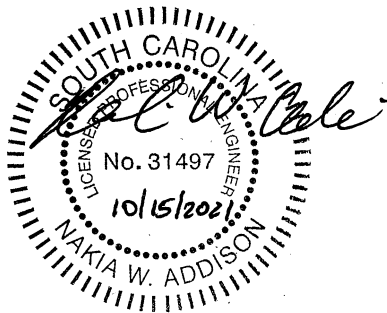
Garrett & Moore. 2016. Inflow Design Flood Control System Plan for the Wateree Station FGD Pond. Richland County, South Carolina. July 2016.

TRC. 2021. Hazard Potential Classification – FGD Pond Wateree Station. October 2021.

8.0 Certification

I, the undersigned South Carolina Professional Engineer, hereby certify that I am familiar with the technical requirements of 40 CFR 257 Subpart D. I also certify that it is my professional opinion that, to the best of my knowledge, information, and belief, that the information in this demonstration is in accordance with current good and accepted engineering practice(s) and standard(s) and meets the requirements of paragraph (c) in 40 CFR 257.82.

For the purpose of this document, “certify” and “certification” shall be interpreted and construed to be a “statement of professional opinion.” The certification is understood and intended to be an expression of my professional opinion as a South Carolina Licensed Professional Engineer, based upon knowledge, information, and belief. The statement(s) of professional opinion are not and shall not be interpreted or construed to be a guarantee or a warranty of the analysis herein.



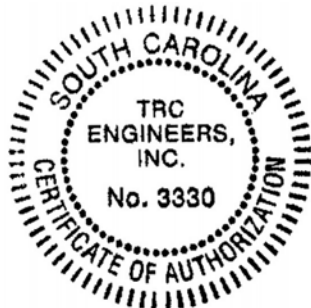
Nakia Addison, P.E.

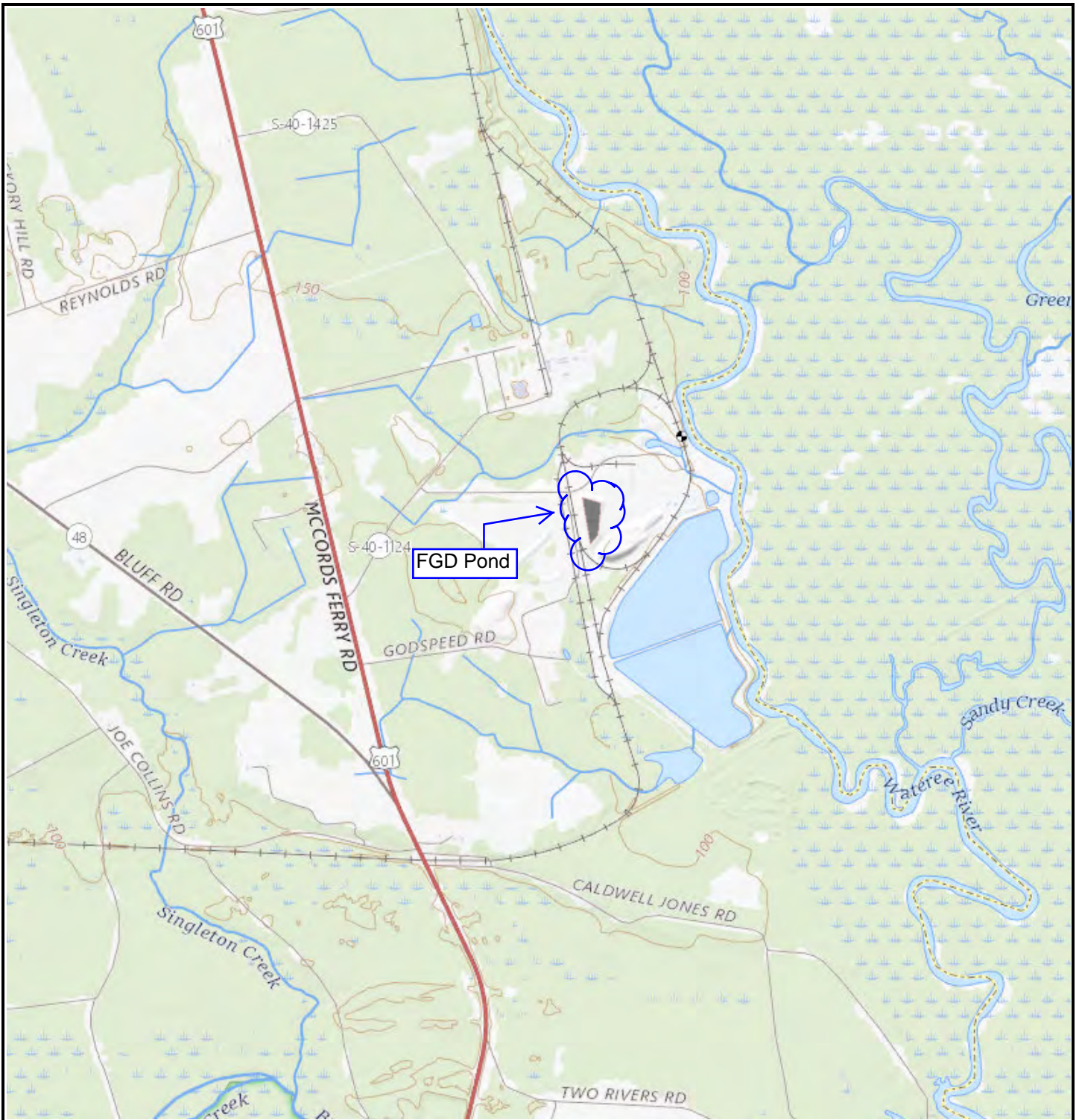
31497
Engineer License Number

Nakia W. Addison

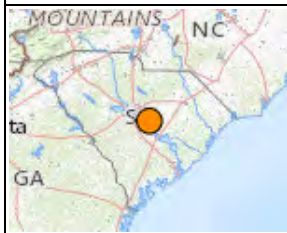
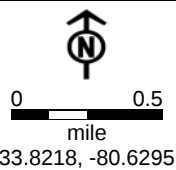
Signature of Professional Engineer

10/15/2021
Date





 POND



**DOMINION
WATEREE STATION**

SITE LOCATION

DRAWN BY: S. EDWARDS | PROJ. NO.: 447435.0000

CHECKED BY: J. HOTSTREAM

APPROVED BY: N. ADDISON

DATE: OCT. 2021

FIGURE 1



50 INTERNATIONAL DRIVE
SUITE 150
GREENVILLE, SOUTH CAROLINA 29615

FILE: 2CA261A7-0947-484C-9FCC-60C09FC02EBF

Base Map: USGS/TNM Topo
Data Sources: TRC, Fulcrum



FGD POND

FOREBAY 1 AND 2

POLISHING POND

VOLUME CONTROL POND



0 1,000

feet

33.8234, -80.6274



**DOMINION
WATER TREATMENT STATION**

SITE OVERVIEW

DRAWN BY: S. EDWARDS	PROJ. NO.: 447435.0000
CHECKED BY: J. HOTSTREAM	
APPROVED BY: N. ADDISON	
DATE: OCT. 2021	

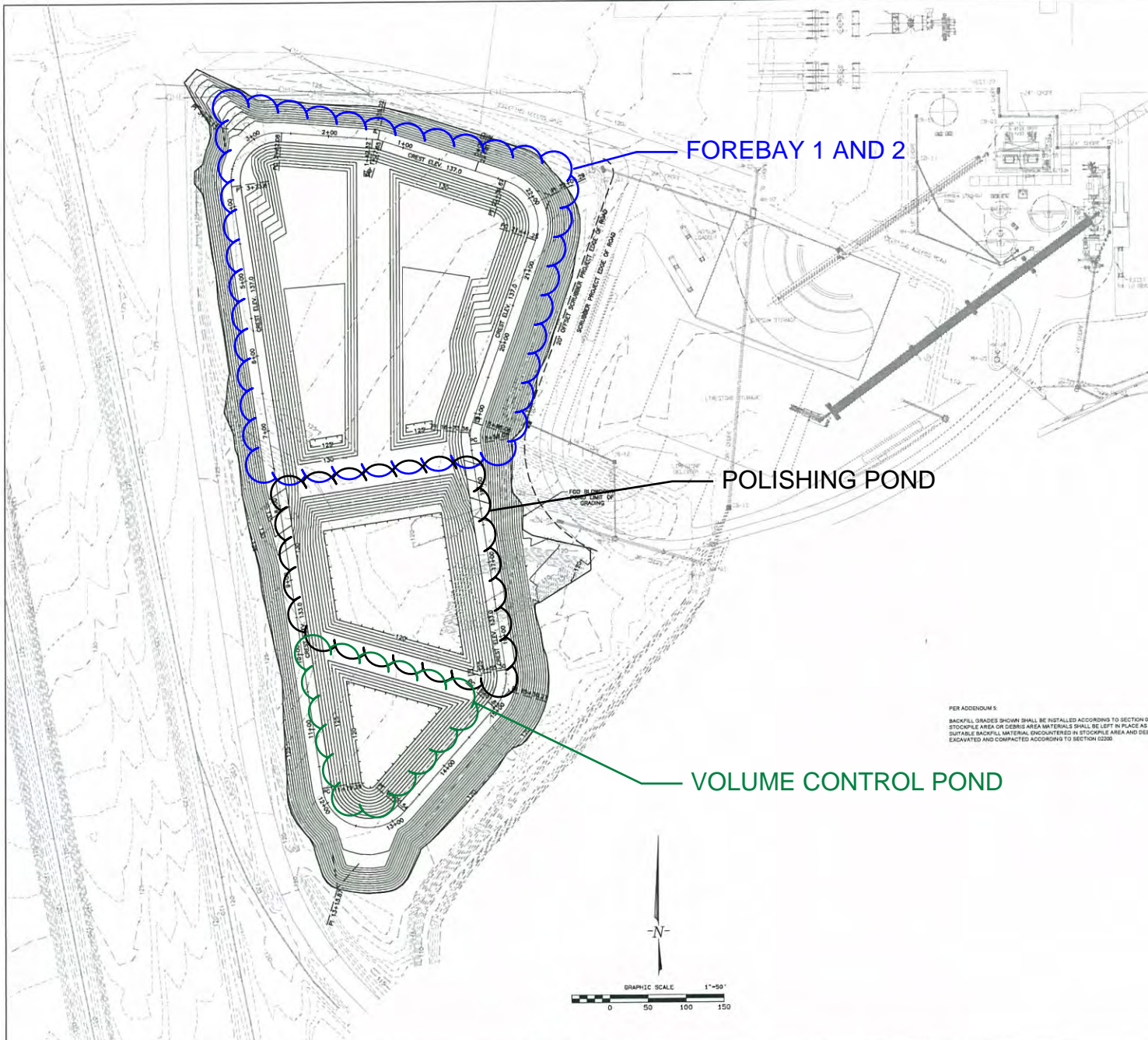
FIGURE 2



50 INTERNATIONAL DRIVE
SUITE 150
GREENVILLE, SOUTH CAROLINA 29615

FILE: 94AE2FE9-6B01-4368-8120-D85D07C7612B

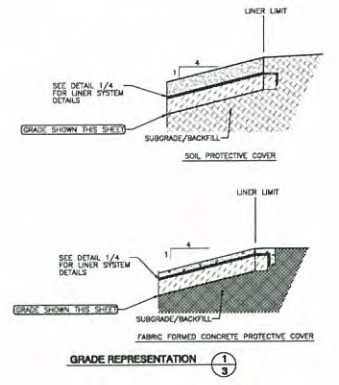
Appendix A: Select Engineering Drawings



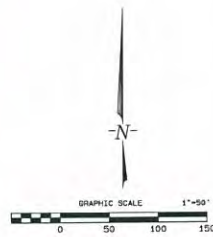
FOREBAY 1 AND 2

POLISHING POND

VOLUME CONTROL POND



PER ADDENDUM 5:
 BACKFILL GRADES SHOWN SHALL BE INSTALLED ACCORDING TO SECTION 0228. NO PORTION OF STOCKPILE AREA OR DEBRIS AREA MATERIALS SHALL BE LEFT IN PLACE AS SUBGRADE BACKFILL. SUITABLE BACKFILL MATERIAL ENCOUNTERED IN STOCKPILE AREA AND DEBRIS AREA SHALL BE EXCAVATED AND COMPACTED ACCORDING TO SECTION 0220.



DATE	REVISION	DATE
September 1, 2008		
DESIGNED BY: LRS	1	
DRAWN BY: LRS/CMF	2	
CHECKED BY: LRS	3	
APPROVED BY: LRS	4	

GARRETT & MOORE, INC.
 Engineering Services for the Power and Waste Industries
1700 W. 10th Street, Suite 200, Columbia, SC 29201
 Phone: 803.733.1000 Fax: 803.733.1001
 www.garrettmoore.com

SCE&G WATEREE STATION
FGD SCRUBBER BLOWDOWN WASTEWATER POND

SUBGRADE PLAN

JOB NUMBER
 SHEET
 3

Path: V:\2008\Waterway\02 - Waterway\0203\Wastw. Expans. Plan Data\Title - Rev. 04. 8.2008 / 10:28:30

Appendix B: Flood Insurance Rate Map

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **Floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Lambert Conformal Conic State Plane South Carolina FIPS 3900. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov/> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at <http://www.ngs.noaa.gov/>.

Base map information shown on this FIRM was provided in digital format by Richland County, South Carolina.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

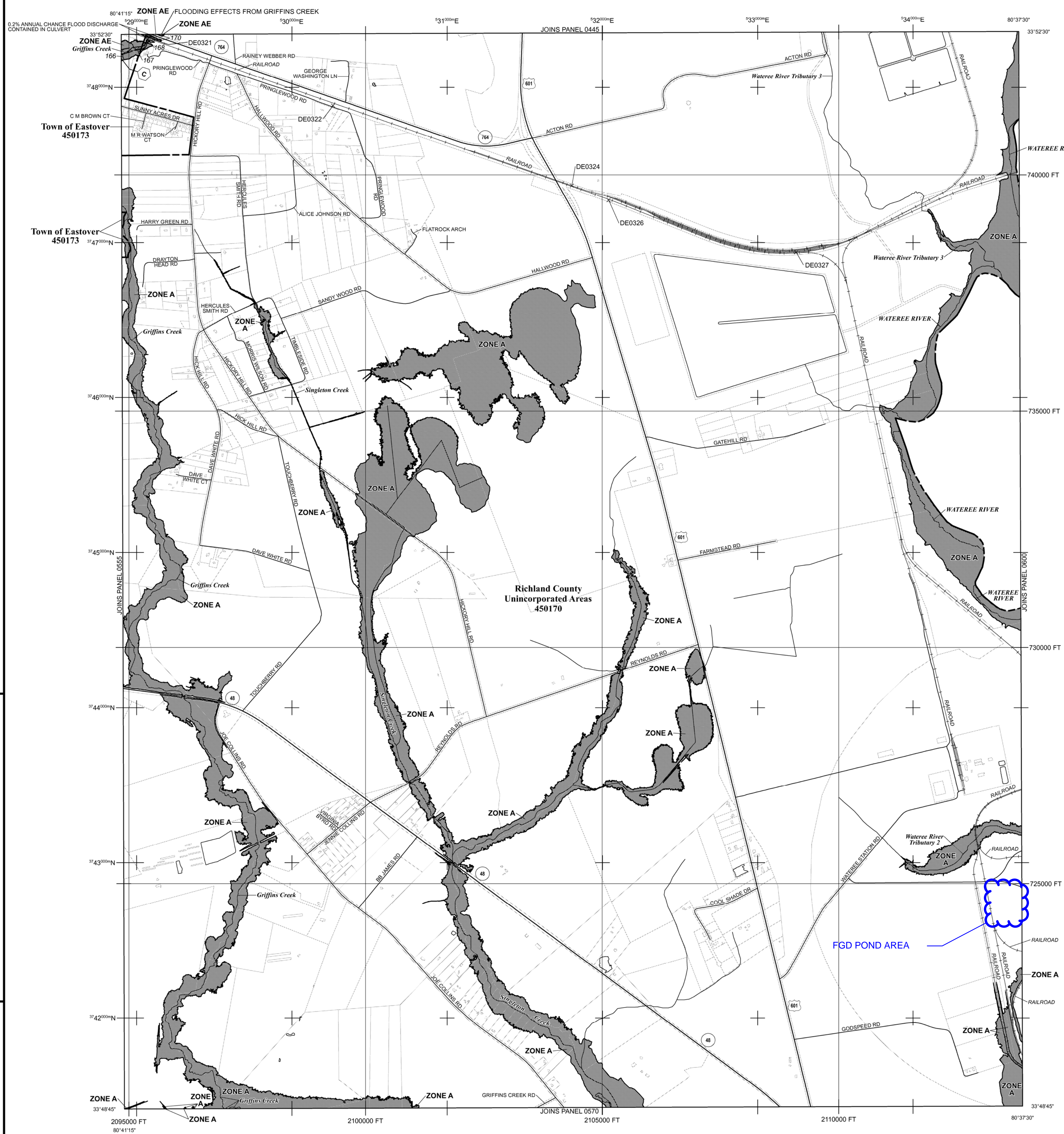
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the **FEMA Mapping Information eXchange** at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service website at <http://www.msc.fema.gov/>. Available products may include previously issued Letters of Map Change, a Flood Insurance Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

The **profile base lines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the profile base line, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of South Carolina and the Federal Emergency Management Agency (FEMA). The State of South Carolina has implemented a long term approach of floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map floodplain areas at the local level. As a part of this effort, the state of South Carolina has joined in a Cooperating Technical State agreement with FEMA to produce and maintain this digital FIRM.

<http://www.dnr.state.sc.us/>



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE
The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

- OTHER FLOOD AREAS**
- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS**
- ZONE Y** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**
- OTHERWISE PROTECTED AREAS (OPAs)**

- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
- 513 (EL 987) Base Flood Elevation line and value; elevation in feet*
Base Flood Elevation value where uniform within zone; elevation in feet*
- * Referenced to the North American Vertical Datum of 1988
- A-A Cross section line
- 97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 47°5'00"E 1000-meter Universal Transverse Mercator grid ticks, zone 17
- 6000000 FT 5000-foot grid values: South Carolina State Plane coordinate system (FIPSZONE = 3900), Lambert projection
- DX5510, X Bench mark (see explanation in Notes to Users section of this FIRM panel)

MAP REPOSITORIES
Refer to Map Repositories List on Map Index

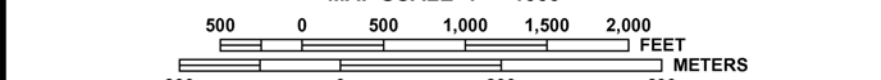
EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
January 19, 1994

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
February 20, 2002
September 25, 2010

December 21, 2017 - To update corporate limits, to change Base Flood Elevations, to add Base Flood Elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to update map format, to add roads and road names, to reflect updated topographic information, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0560L

FIRM
FLOOD INSURANCE RATE MAP
RICHLAND COUNTY,
SOUTH CAROLINA
AND INCORPORATED AREAS

PANEL 560 OF 650
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COMMUNITY	NUMBER	PANEL	SUFFIX
EASTOVER, TOWN OF	450173	0560	L
RICHLAND COUNTY	450170	0560	L

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
45079C0560L

MAP REVISED
DECEMBER 21, 2017

Federal Emergency Management Agency

Appendix C: Design Precipitation Data



NOAA Atlas 14, Volume 2, Version 3
Location name: Eastover, South Carolina, USA*
Latitude: 33.8247°, Longitude: -80.6262°
Elevation: 133.29 ft**
* source: ESRI Maps
** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

G. M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aeriels](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.449 (0.416-0.484)	0.512 (0.476-0.552)	0.577 (0.534-0.621)	0.659 (0.610-0.709)	0.741 (0.682-0.797)	0.818 (0.750-0.879)	0.886 (0.808-0.952)	0.954 (0.862-1.03)	1.03 (0.926-1.12)	1.12 (0.989-1.21)
10-min	0.717 (0.664-0.774)	0.819 (0.761-0.882)	0.924 (0.856-0.994)	1.05 (0.975-1.13)	1.18 (1.09-1.27)	1.30 (1.19-1.40)	1.41 (1.28-1.51)	1.51 (1.37-1.63)	1.64 (1.47-1.76)	1.76 (1.56-1.90)
15-min	0.896 (0.830-0.967)	1.03 (0.956-1.11)	1.17 (1.08-1.26)	1.33 (1.23-1.43)	1.50 (1.38-1.61)	1.65 (1.51-1.77)	1.78 (1.62-1.91)	1.91 (1.72-2.05)	2.06 (1.84-2.22)	2.20 (1.96-2.38)
30-min	1.23 (1.14-1.33)	1.42 (1.32-1.53)	1.66 (1.54-1.79)	1.93 (1.79-2.08)	2.22 (2.04-2.38)	2.48 (2.28-2.67)	2.73 (2.48-2.93)	2.97 (2.68-3.19)	3.28 (2.93-3.53)	3.57 (3.17-3.86)
60-min	1.53 (1.42-1.65)	1.78 (1.66-1.92)	2.13 (1.97-2.29)	2.52 (2.33-2.71)	2.95 (2.72-3.17)	3.37 (3.09-3.62)	3.76 (3.42-4.04)	4.17 (3.76-4.48)	4.70 (4.21-5.07)	5.21 (4.62-5.64)
2-hr	1.73 (1.60-1.88)	2.04 (1.88-2.21)	2.46 (2.27-2.66)	2.95 (2.72-3.19)	3.53 (3.24-3.81)	4.09 (3.73-4.40)	4.64 (4.21-4.99)	5.23 (4.71-5.63)	6.01 (5.36-6.49)	6.77 (5.98-7.34)
3-hr	1.82 (1.67-1.99)	2.15 (1.98-2.35)	2.60 (2.39-2.84)	3.14 (2.89-3.42)	3.80 (3.47-4.13)	4.45 (4.04-4.82)	5.11 (4.59-5.53)	5.82 (5.19-6.30)	6.80 (6.00-7.38)	7.78 (6.77-8.45)
6-hr	2.15 (1.98-2.36)	2.54 (2.35-2.78)	3.08 (2.83-3.36)	3.72 (3.41-4.06)	4.51 (4.12-4.92)	5.30 (4.81-5.76)	6.10 (5.48-6.62)	6.98 (6.21-7.57)	8.20 (7.20-8.91)	9.42 (8.15-10.2)
12-hr	2.52 (2.31-2.78)	2.97 (2.73-3.27)	3.61 (3.31-3.97)	4.39 (4.01-4.81)	5.36 (4.87-5.86)	6.33 (5.71-6.91)	7.33 (6.55-7.99)	8.44 (7.45-9.19)	10.00 (8.69-10.9)	11.6 (9.89-12.6)
24-hr	2.94 (2.71-3.23)	3.54 (3.26-3.89)	4.51 (4.13-4.94)	5.35 (4.90-5.87)	6.66 (6.04-7.29)	7.81 (7.02-8.55)	9.12 (8.10-10.0)	10.6 (9.29-11.7)	12.9 (11.1-14.3)	14.9 (12.6-16.7)
2-day	3.42 (3.15-3.75)	4.11 (3.79-4.50)	5.19 (4.77-5.69)	6.15 (5.63-6.74)	7.62 (6.92-8.36)	8.92 (8.03-9.81)	10.4 (9.25-11.5)	12.1 (10.6-13.4)	14.6 (12.6-16.3)	16.9 (14.2-19.0)
3-day	3.68 (3.40-4.01)	4.41 (4.07-4.81)	5.53 (5.10-6.04)	6.51 (5.99-7.12)	8.00 (7.29-8.74)	9.30 (8.41-10.2)	10.8 (9.62-11.8)	12.4 (10.9-13.7)	14.9 (12.9-16.6)	17.1 (14.5-19.2)
4-day	3.93 (3.64-4.28)	4.71 (4.36-5.13)	5.87 (5.43-6.39)	6.88 (6.34-7.49)	8.38 (7.67-9.13)	9.69 (8.79-10.6)	11.1 (10.00-12.2)	12.7 (11.3-14.0)	15.2 (13.2-16.8)	17.3 (14.8-19.3)
7-day	4.59 (4.27-4.96)	5.48 (5.09-5.93)	6.74 (6.25-7.29)	7.80 (7.22-8.44)	9.33 (8.58-10.1)	10.6 (9.71-11.5)	12.0 (10.9-13.0)	13.5 (12.1-14.7)	15.8 (13.9-17.3)	17.8 (15.6-19.7)
10-day	5.24 (4.90-5.62)	6.23 (5.83-6.69)	7.57 (7.06-8.13)	8.67 (8.08-9.30)	10.2 (9.48-11.0)	11.5 (10.6-12.4)	12.8 (11.8-13.8)	14.3 (13.0-15.4)	16.4 (14.7-17.8)	18.3 (16.2-20.1)
20-day	7.01 (6.56-7.53)	8.29 (7.75-8.91)	9.87 (9.22-10.6)	11.2 (10.4-12.0)	13.0 (12.1-14.0)	14.5 (13.4-15.6)	16.0 (14.7-17.3)	17.6 (16.0-19.1)	19.8 (17.9-21.6)	21.5 (19.2-23.7)
30-day	8.64 (8.11-9.23)	10.2 (9.55-10.9)	11.9 (11.2-12.8)	13.3 (12.5-14.3)	15.2 (14.2-16.3)	16.6 (15.5-17.8)	18.1 (16.7-19.4)	19.5 (18.0-21.0)	21.4 (19.6-23.2)	22.9 (20.8-24.9)
45-day	10.8 (10.2-11.5)	12.7 (11.9-13.5)	14.7 (13.8-15.6)	16.2 (15.2-17.3)	18.3 (17.2-19.5)	19.9 (18.6-21.3)	21.5 (20.0-23.0)	23.1 (21.4-24.7)	25.1 (23.1-27.1)	26.7 (24.4-28.9)
60-day	12.9 (12.2-13.6)	15.1 (14.2-16.0)	17.3 (16.3-18.3)	19.0 (17.9-20.1)	21.2 (19.9-22.5)	22.9 (21.4-24.3)	24.5 (22.9-26.1)	26.1 (24.3-27.8)	28.1 (26.0-30.1)	29.5 (27.2-31.7)

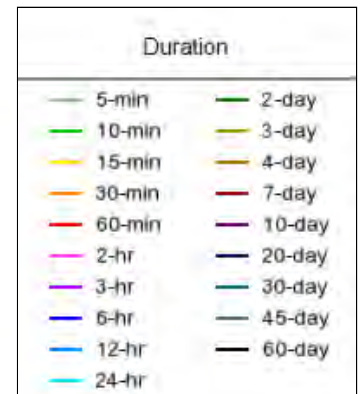
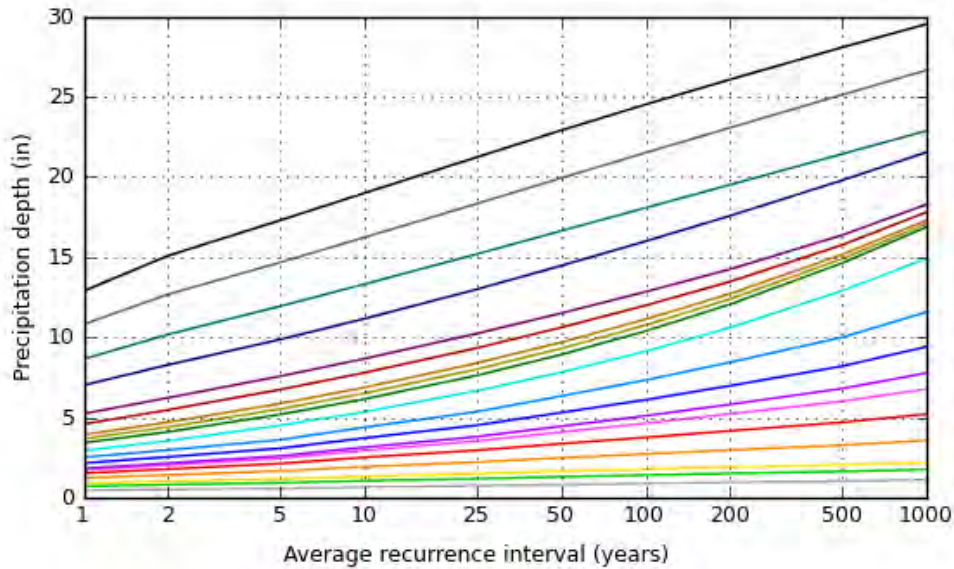
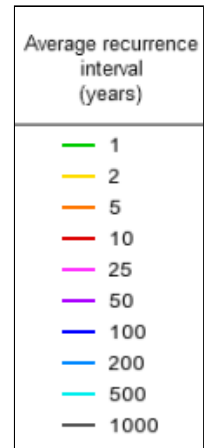
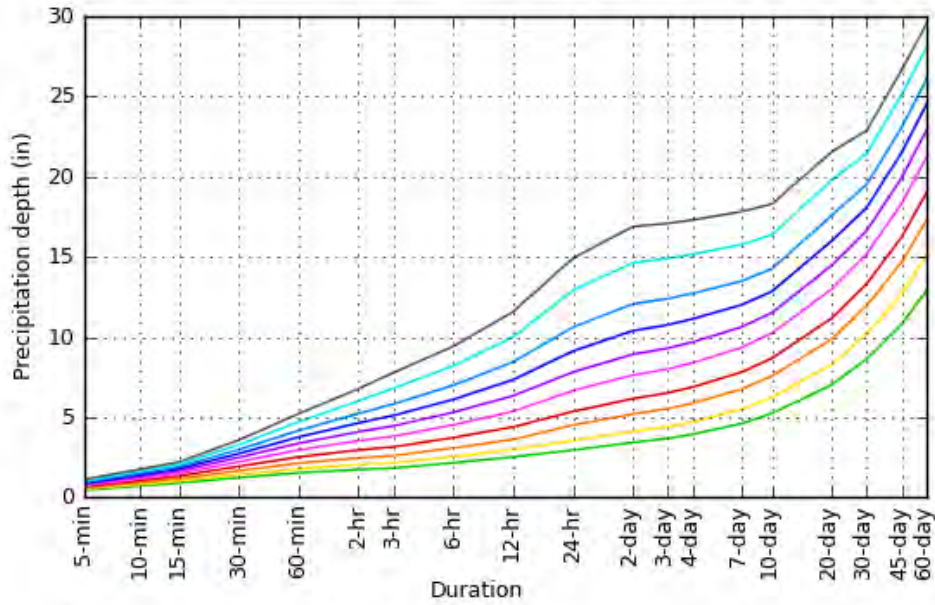
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based depth-duration-frequency (DDF) curves

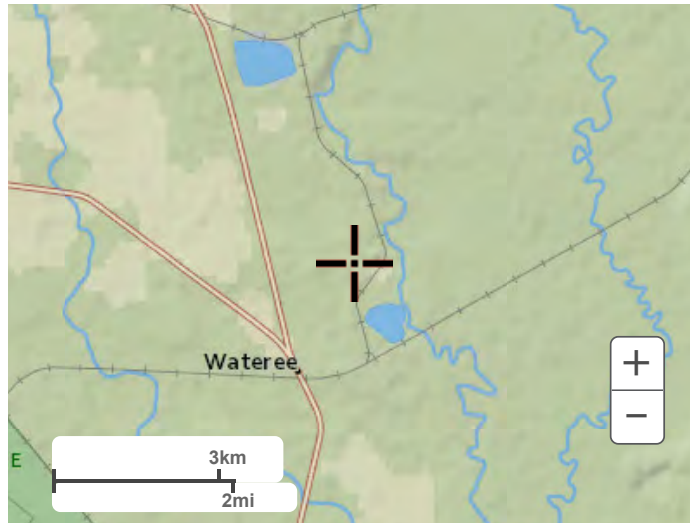
Latitude: 33.8247°, Longitude: -80.6262°



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Maps & aerials

Small scale terrain



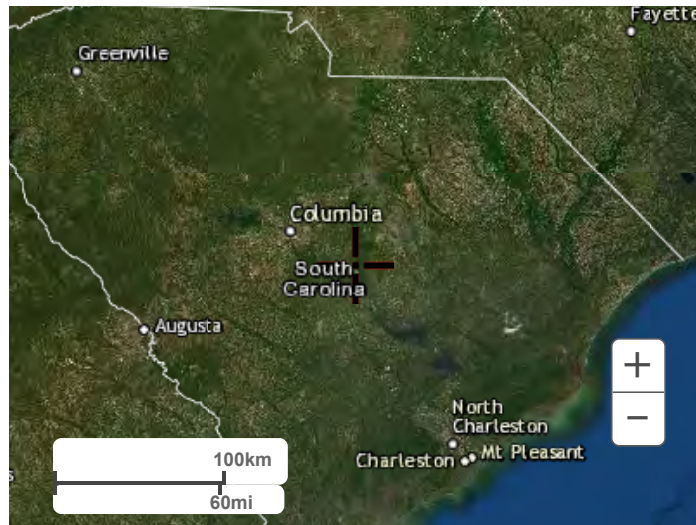
Large scale terrain



Large scale map



Large scale aerial



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Questions?: HDSC.Questions@noaa.gov

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Appendix D: Pump Drawdown Calculations



PROJECT / LOCATION: Wateree Station - Inflow Design Flood Control System Plan		PROJECT / PROPOSAL NO.
SUBJECT: Dewatering Time Estimate		447435.0000.0000
PREPARED BY: J. Hotstream	DATE: 9/9/21	FINAL <input type="checkbox"/>
CHECKED BY: S. Edwards	DATE: 9/9/21	REVISION <input type="checkbox"/>

Purpose is to estimate the time required for the FGD Pond effluent pump station to remove the precipitation collected during a 100-year, 24-hour storm event.

Method: Estimate the area where precipitation is collected. Assume that this area is the overall extent of the outside edge of the perimeter berm. Use the area of the perimeter berm and the design rain fall to estimate the volume of precipitation collected.

Use the assumed pumping rate of two pumps operating at 200 gallons per minute to estimate the time required for the ponds to return back to normal operational levels.

Footprint of the FGD Pond: based on outside edge of the top of the perimeter berm

Area: 272,500 square feet
6.3 acres

Precipitation anticipated for the 100-year, 24-hour storm event

Precipitation: 9.12 inches

Volume of precipitation: Area x Precipitation (assuming no infiltration or other losses)

207,100 cubic feet
1,549,108 gallons

Pump draw down time:

No. of Pumps: 2
Pump Rate: 200 gpm
Removal Rate: 400 gpm

Removal Time: Volume of precipitation / removal rate

3,872.8 Minutes
64.5 Hours
2.7 Days

Results: Based on this calculation, it is anticipated that the precipitation collected in the FGD Pond during a 100-year, 24-hour storm event can be removed within 3 days.