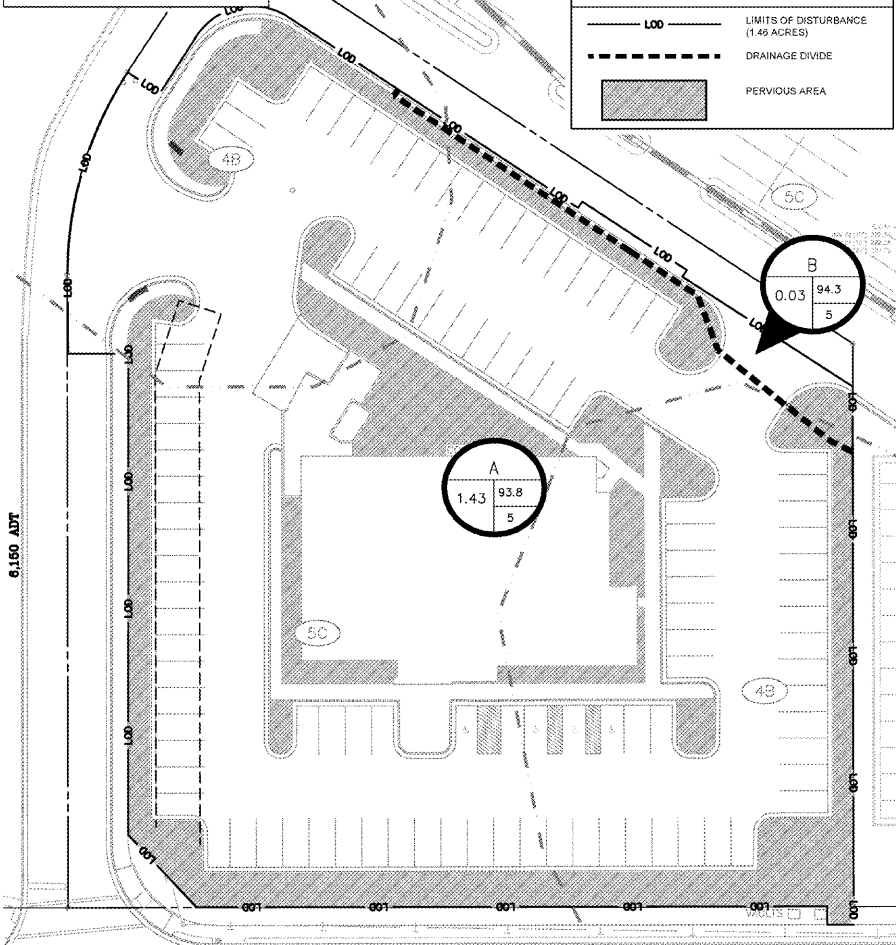
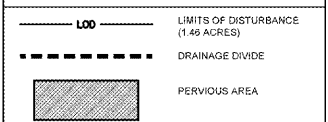


PRE-DEVELOPMENT

LEGEND



CHANNEL PROTECTION NARRATIVE

IN ORDER TO MEET VIRGINIA DEQ CHANNEL PROTECTION REQUIREMENTS, THIS PROJECT PROPOSES TO MEET SECTION 9VAC25-870-66 B.1.a. WHICH STATES:
 THE MANMADE STORMWATER CONVEYANCE SYSTEM SHALL CONVEY THE POSTDEVELOPMENT PEAK FLOW RATE FROM THE TWO-YEAR 24-HOUR STORM EVENT WITHOUT CAUSING EROSION OF THE SYSTEM. DETENTION OF STORMWATER OR DOWNSTREAM IMPROVEMENTS MAY BE INCORPORATED INTO THE APPROVED LAND-DISTURBING ACTIVITY TO MEET THIS CRITERION, AT THE DISCRETION OF THE VSMP AUTHORITY.

BELOW ARE THE PRE AND POST DEVELOPMENT PEAK FLOWS, CALCULATED USING THE TR-55 METHOD WITH HYDRAFLOW HYDROGRAPHS EXTENSION FOR AUTODESK 2018. AS SEEN IN THE TABLE, THE PEAK DISCHARGE DECREASES FOR DRAINAGE AREA A AND DECREASES FOR DRAINAGE AREA B.

2-Year Peak Runoff Rates (cfs)

| | A | B |
|------------------|------|------|
| Pre-Development | 5.37 | 0.11 |
| Post-Development | 5.24 | 0.31 |

DRAINAGE AREA A
 IN THE EXISTING CONDITION, INLET EX-3 COLLECTS STORMWATER FROM THE SUBJECT PARCEL AND THE NORTHBOUND LANES OF SUDLEY ROAD. THIS RUNOFF IS THEN CONVEYED ACROSS DAVIDSON PLACE TO INLET EX-2 AND FROM THERE, ANOTHER 70 FEET NORTH TO STRUCTURE EX-1 WHERE IT IS DISCHARGED INTO THE REGIONAL BASIN, AS SHOWN ON SHEET C-421. THE PIPES CONNECTING THESE STRUCTURES ARE OVERSIZED. ADDITIONALLY, THERE IS NO EROSION AT THE DISCHARGE POINT, EX-1 SINCE THE PROPOSED DISCHARGE THROUGH STRUCTURE EX-1 IS LESS THAN EXISTING, AND THERE IS NO EROSION IN THE EXISTING CONDITION. PROPOSED DRAINAGE AREA A IS IN COMPLIANCE WITH VA DEQ CHANNEL PROTECTION REQUIREMENTS.

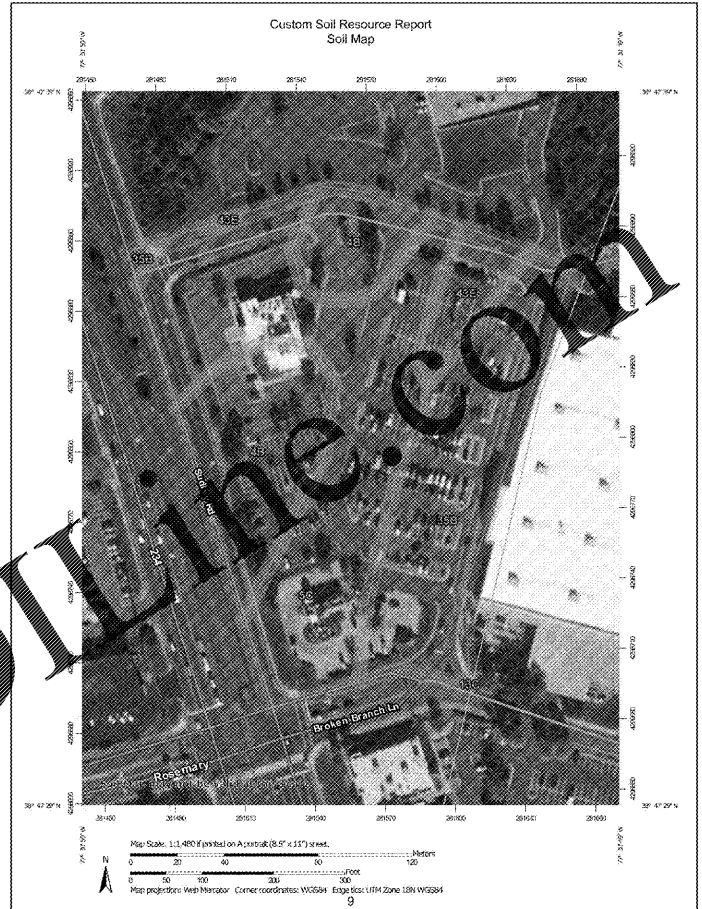
DRAINAGE AREA B
 IN THE EXISTING CONDITION, DRAINAGE AREA B SHEET FLOWS TO INLET 14 IN THE LOWE'S PARKING LOT. THIS RUNOFF TRAVELS NORTH THROUGH THE LOWE'S PARKING LOT VIA A PIPE NETWORK BEFORE ULTIMATELY DISCHARGING INTO A REGIONAL BASIN APPROXIMATELY 500 FEET NORTH OF THE SITE. AS SHOWN ON SHEET C-421, THE PIPES CONNECTING THESE STRUCTURES ARE UNDER CAPACITY. ADDITIONALLY, THERE IS NO EROSION AT THE ULTIMATE DISCHARGE POINT.

AS SEEN ON SHEET C-421, THE TOTAL AREA DISCHARGING TO INLET 14 IS 0.79 ACRES, 0.03 OF WHICH COMES FROM AREA B. IN THE PROPOSED CONDITION, THE TOTAL DISCHARGE TO INLET 14 INCREASES TO 0.83 ACRES, 0.08 OF WHICH COMES FROM AREA B. THIS INCREASE IN AREA CONSTITUTES AN INCREASE OF 0.20 CFS IN THE TWO YEAR STORM EVENT, WHICH CAN BE CONSIDERED INSIGNIFICANT GIVEN THE MAGNITUDE OF STORMWATER DISCHARGING TO THE BASIN. SINCE THE PROPOSED INCREASED DISCHARGE IS INSIGNIFICANT, AND THERE IS NO EROSION IN THE EXISTING CONDITION, PROPOSED DRAINAGE AREA B IS IN COMPLIANCE WITH VA DEQ CHANNEL PROTECTION REQUIREMENTS.

Drainage Area Calculations for SCS Method

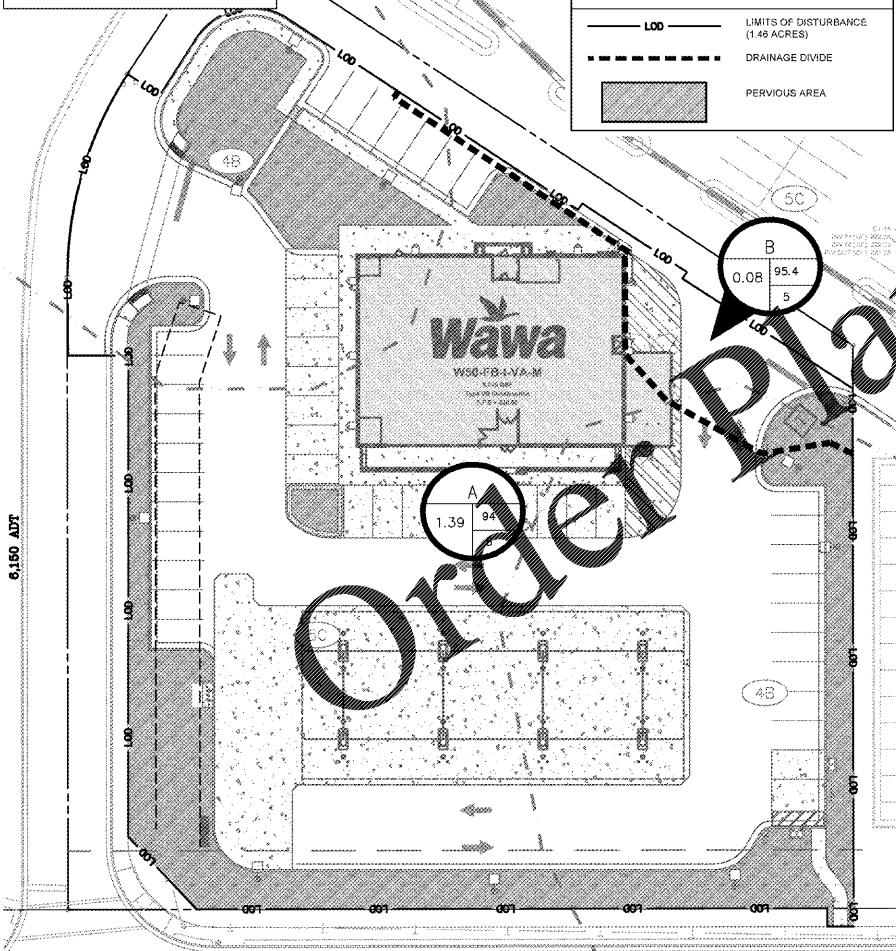
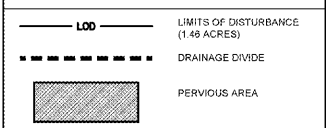
Project: Wawa - Sudley Road Date: 09/07/18 Initials: CMH

| Drainage Area | Total Area (sf) | Impervious | | | | Open Space (good) | | | | Total Area | Curve Number |
|---------------|-----------------|---------------|-------------|--------------|-------------|-------------------|-------------|--------------|-------------|-------------|--------------|
| | | HSG C | | HSG D | | HSG C | | HSG D | | | |
| | | Curve Number | Area (sf) | Curve Number | Area (sf) | Curve Number | Area (sf) | Curve Number | Area (sf) | | |
| A | 62,250 | 25,190 | 0.58 | 6,400 | 0.15 | 24,530 | 0.55 | 4,730 | 0.11 | 1.43 | 93.8 |
| B | 1,450 | | | | | 1,150 | 0.03 | 40 | 0.01 | 0.03 | 94.3 |
| Total | 63,700 | 25,190 | 0.58 | 6,400 | 0.15 | 24,585 | 0.59 | 4,825 | 0.12 | 1.46 | 93.8 |



POST-DEVELOPMENT

LEGEND



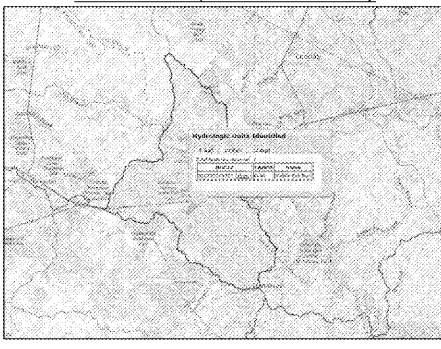
Hydrograph Return Period Recap

| Hyd. No. | Hydrograph Type | Inflow Hyd(s) | Peak Outflow (cfs) | | | | | | | | Hydrograph Description | |
|----------|-----------------|---------------|--------------------|-------|------|------|-------|-------|-------|--------|------------------------|--------|
| | | | 1-yr | 2-yr | 3-yr | 5-yr | 10-yr | 25-yr | 50-yr | 100-yr | | |
| 1 | SCS Runoff | --- | 4,276 | 5,365 | --- | --- | 8,675 | --- | --- | --- | --- | PRE-A |
| 2 | SCS Runoff | --- | 0,091 | 0,114 | --- | --- | 0,183 | --- | --- | --- | --- | PRE-B |
| 3 | SCS Runoff | --- | 4,186 | 5,243 | --- | --- | 8,457 | --- | --- | --- | --- | POST-A |
| 4 | SCS Runoff | --- | 0,252 | 0,313 | --- | --- | 0,496 | --- | --- | --- | --- | POST-B |

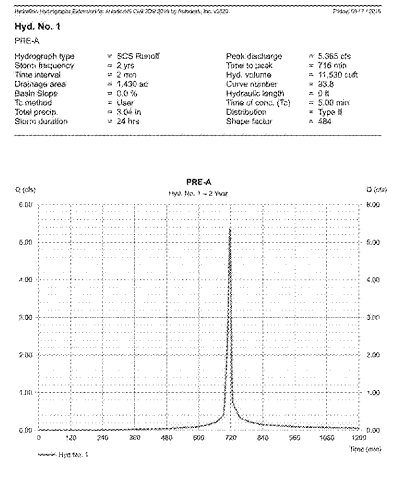
SOILS LEGEND

| SYMBOL | NAME | HSG |
|--------|--|-----|
| 4B | ARCOLA SILT LOAM, 2-7% SLOPES | C |
| 5C | ARCOLA-NESTORIA COMPLEX, 7-15% SLOPES | C/D |
| 13C | CATLETT-SYCOLINE COMPLEX, 7-15% SLOPES | C/D |
| 35B | MANASSAS SILT LOAM, 2-7% SLOPES | B |
| 43E | NESTORIA GRAVELLY SILT LOAM, 25-50% SLOPES | D |

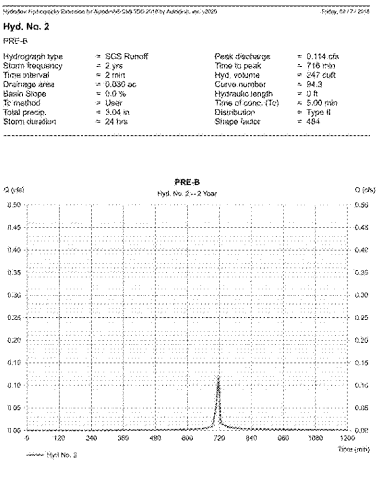
HUC MAP (020700100703)



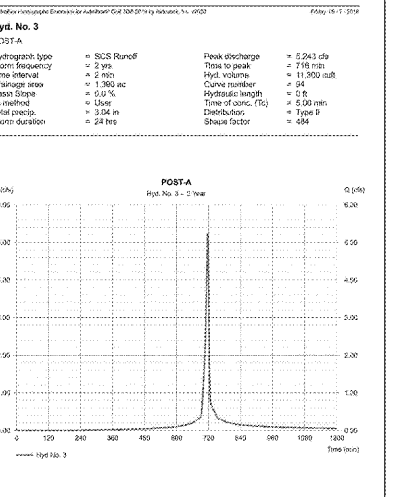
Hydrograph Report



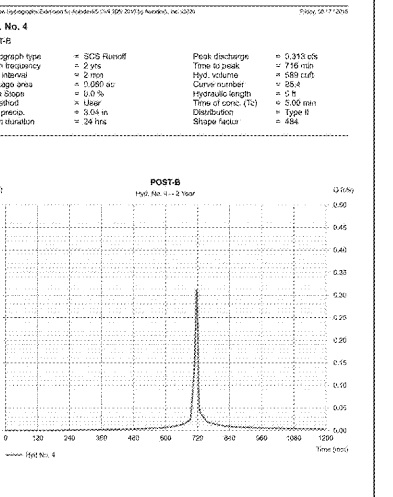
Hydrograph Report



Hydrograph Report



Hydrograph Report



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 11400 COMMERCE PARK DR., SUITE 400, RESTON, VA 20191
 PHONE: 703-674-1300 FAX: 703-674-1300
 WWW.KIMLEY-HORN.COM

ROSS STEVENS
 Lic. No. 047498
 PROFESSIONAL ENGINEER

CHANNEL PROTECTION CALCULATIONS

WAWA - SUDLEY ROAD ROAD PREPARED FOR FRONTIER DEVELOPMENT PRINCE WILLIAM COUNTY VA

| NO. | DATE | REVISIONS | BY |
|-----|------------|-----------|----|
| 1 | 09/10/2018 | CAH | |
| 2 | 11/02/2018 | CAH | |
| 3 | 02/06/2019 | CAH | |
| 4 | 07/23/2019 | CAH | |

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 SHEET NUMBER C-420