CLARKE COUNTY PLANNING COMMISSION
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Clarke County Planning Commission

AGENDA – Work Session
Tuesday, July 3, 2018 – 3:00PM
Berryville/Clarke County Government Center– A/B Meeting Room

1. **Approval of Work Session Agenda**
2. **Review of Agenda Items for July 6, 2018 Business Meeting**
3. **Old Business Items**
    a. **Progress Report, Ordinance Update Project**
4. **New Business Items**
    a. **Review of 2018 Project Priorities**
5. **Other Business**
6. **Adjourn**

ZONING AND SUBDIVISION ORDINANCE UPDATE PROJECT
PROGRESS REPORT (JULY 2018)

- Work Plan Items Completed to Date:

    - Step 1 – Adopt Work Plan, Project Policies and Timeline

- Work Plan Items in Process: Issues reviewed or completed since the June report include:

    - Develop Framework of Zoning and Subdivision Ordinances (Step 3). Detailed outlines for the revised Zoning and Subdivision Ordinances are complete and will be presented to the Ordinances Committee for review once all of the Policy and Technical Issues have gone through an initial review.

    - Evaluate the definition of "restaurant" and how it relates to businesses with food service as accessory uses (e.g., Sheetz, HandyMart) and businesses with commercial kitchens (e.g,. caterers) (T12). The Committee discussed differentiating between traditional restaurants and food service uses such as caterers, mobile food vendors, and restaurants accessory to convenience stores. Also discussed was the current distinction between restaurants with and without "entertainment, nightclubs, taverns and bars." Direction was provided on developing clearer regulations for the separate uses rather than treating them all under the common umbrella of "restaurants."

    - Evaluate "agriculture" as a special use in the Rural Residential District; clarify the "residential" requirements for livestock/animal units limits in 3-C-2-r (P25). The Committee discussed the merits of continuing to allow agriculture by special use permit in the RR District. Direction was provided to allow residential cultivation by right as "home gardens" and to prohibit the keeping of livestock in the RR District. The Committee also discussed the applicability of livestock limits on parcels less than 2 acres in size to the AOC and FOC Districts only.

    - Determine whether to consolidate/refine regulations for temporary uses and structures; evaluate the need for separate definition and regulations for "temporary structures," e.g., canopies and storage containers used as buildings (P23). The Committee discussed establishing a clearer and more detailed classification of "temporary uses and structures" including new definitions and supplementary regulations. Issues discussed included regulations for temporary vendors, regulation of shipping containers used as structures, and advisory provisions for the different ways in which the County regulates temporary events.

    - Compare and evaluate the regulations for allocation of dwelling unit rights (DURs) in the subdivision regulations versus boundary line adjustment regulations (P29). The Committee discussed the merits of whether to make the regulations for the transfer of dwelling unit rights (DURs) uniform for boundary line adjustments, mergers, and subdivisions. Currently there are no limitation on

the allocation of DURs when subdividing a parcel but there are limitations on the transfer of DURs through boundary line adjustment and reallocation when a merger occurs.

- Upcoming Meetings Scheduled:
    - #15, Wednesday, July 11 (2:00PM)
    - #16, Tuesday, July 24 (2:00PM)
    - #17, Monday, July 30 (11:00AM – extended work session)
    - #18, Thursday, August 16 (2:00PM)
    - #19, Friday, September 7 (following Commission Business Meeting)
- Other Staff Items In Process:
    - County Attorney review of previous policy issues
    - Initial development of the Guidance Manual outline

2018 PROJECT PRIORITIES – PLANNING COMMISSION
(Adopted January 3, 2018) – VERSION 2 DRAFT

The list is intended to aid the Commission and Staff to ensure that work on critical projects is prioritized and completed in a timely fashion. Project start dates and priorities may be affected by the Commission's zoning case load (e.g., SUPs, rezoning, site plans, subdivisions), text amendments, or other special projects requested by the Board of Supervisors.

1. Comprehensive review and update of the Zoning and Subdivision Ordinances

UNDERWAY – Project tasks are scheduled throughout 2018 with estimated completion in late 2019.

2a. Revise the Water Resources Plans (Groundwater Resources Plan and Surface Water Resources Plan)

UNDERWAY – **Planning Commission Public Hearing scheduled for July 6, 2018.**

2b. Revise the Historic Resources Plan

COMPLETE – Adopted by Board of Supervisors on June 19, 2018.

3. Five-Year Review of Comprehensive Plan (due March 18, 2019)

INCOMPLETE – Schedule Comprehensive Plan Committee review in **October** 2018.

4. Five-Year Review of Transportation Plan (due March 18, 2019)

INCOMPLETE – Schedule Comprehensive Plan Committee review in **October** 2018.

5. Five-Year Review of Economic Development Strategic Plan (due October 21, 2019)

INCOMPLETE – Schedule Comprehensive Plan Committee review in **October** 2018.

Updated June 20, 2018

COMPREHENSIVE PLAN/COMPONENT PLAN REVIEW SCHEDULE

Plan	Last Adoption Date	Next Review Deadline	Begin Next Review By
Comprehensive Plan	March 18, 2014	March 18, 2019	March 2018
Transportation Plan	March 18, 2014	March 18, 2019	March 2018
Economic Development Strategic Plan	October 21, 2014	October 21, 2019	October 2018
Recreation Component Plan	August 18, 2015	August 18, 2020	August 2019
Berryville Area Plan	May 10/17, 2016	May 2021	May 2020
Double Tollgate Area Plan	December 20, 2016	December 20, 2021	December 2020
Waterloo Area Plan	December 20, 2016	December 20, 2021	December 2020
Agricultural Land Plan	February 21, 2017	February 21, 2022	February 2021
Historic Resources Plan	June 19, 2018	June 19, 2023	June 2022
Water Resources Plans:			
Groundwater Resources Plan	October 20, 1998	Not scheduled	Underway
Surface Water Resources Plan	December 7, 1999	Not scheduled	Underway
Mountain Land Plan	June 21, 2005	Not scheduled	Not scheduled
Village Component Plan -- NEW	Not started	Not started	Not started

Clarke County Planning Commission

AGENDA – Business Meeting
Friday, July 6, 2018 – 9:00AM
Berryville/Clarke County Government Center – Main Meeting Room

1. **Approval of Agenda**

2. **Approval of Minutes**

   a. **May 29, 2018 Work Session**
   b. **June 1, 2018 Business Meeting**

Public Hearing

3. **SUP-18-01/SP-18-01, Juliana MacDowell/The Kentland Foundation, Inc. (owner).** Request approval of a special use permit (SUP) and site development plan to operate an event venue as a public assembly, minor commercial use in the Agricultural-Open Space-Conservation (AOC) District per §3-A-1-a-3-m of the Zoning Ordinance. Property is located at 834 Kentland Lane, reference Tax Map #15-A-12, in the Buckmarsh Election District.

4. **Revised 2018 Water Resources Plan**

Board/Committee Reports

5. **Board of Supervisors (Mary Daniel)**
6. **Board of Septic & Well Appeals (George Ohrstrom, II)**
7. **Board of Zoning Appeals (Anne Caldwell)**
8. **Historic Preservation Commission (Doug Kruhm)**
9. **Conservation Easement Authority (George Ohrstrom, II)**
10. **Broadband Implementation Committee (Mary Daniel)**

Other Business

11. **Discussion with Piedmont Environmental Council (PEC) Fellowship Program participants**

Adjourn

UPCOMING MEETINGS

Ordinances Committee Meeting – Wednesday, July 11 (2:00PM)
Commission Work Session – Tuesday, September 4 (3:00PM)
Commission Business Meeting – Friday, September 7 (9:00AM)

Clarke County

PLANNING COMMISSION
WORK SESSION MINUTES -- DRAFT
TUESDAY, MAY 29, 2018

A work session of the Planning Commission of Clarke County, Virginia, was held at the Berryville/Clarke County Government Center, Berryville, Virginia, on Tuesday, May 29, 2018.

ATTENDANCE

Present: Robina Bouffault; Randy Buckley (Vice-Chair); Anne Caldwell; Mary Daniel; Bob Glover; Scott Kreider; Douglas Kruhm; Frank Lee; Cliff Nelson; and George L. Ohrstrom, II (Chair).

Absent: Gwendolyn Malone

Staff Present: Brandon Stidham, Planning Director; Ryan Fincham, Senior Planner/Zoning Administrator; Alison Teetor, Natural Resources Planner

CALLED TO ORDER
Mr. Stidham called the meeting to order at 3:02PM.

AGENDA
The members approved the agenda by consensus as presented.

REVIEW OF AGENDA ITEMS FOR JUNE 1, 2018 BUSINESS MEETING
Mr. Stidham noted the draft minutes for the May Commission meetings in the packet for review. He also noted that the applicant in the Hitchen major subdivision request (S-17-01) has requested an additional one month deferral and therefore the request is not on the agenda for the June 1 meeting.

Mr. Fincham provided an overview of the special use permit and site development plan request from Juliana MacDowell for a public assembly minor commercial use (SUP-18-01/SP-18-01) to develop an event venue at Kentlands. He noted that the maximum attendance per event would be 149 which is also the maximum attendance allowed by the Zoning Ordinance. He also commented on the status of agency and departmental reviews. He indicated that the Building Department's review of the application raised concerns that caused the applicant to request a postponement last month for the scheduling of public hearing. He said the issue related to fire safety, the floor area of the house proposed for use, and the proposed type of use. He added that the applicant retained an architect to resolve these issues with the Building Official. He noted that the applicant will only be using one wing of the existing house and they will be limiting their use and occupancy of the wing below the threshold for sprinkler system installation. Ms. Bouffault asked what the floor area of the wing is and Mr. Fincham replied 2,315 total square feet on the first and second floors. Mr. Kruhm asked if the wing to be used is on the same end of the house as the parking lot and Mr. Fincham replied yes. Mr.

Fincham added that in order for the application to be ready for the Commission to schedule public hearing, the applicant needed to have a plan that addresses the major building code issues that would affect the proposed use. He noted that the house will only be used for the bridal parties to prepare for the wedding and for restrooms. He added that at no time can there be more than 99 people in the house unless there is a life safety issue during an event such as a dangerous storm. The applicant will also have to ensure that fire separation is established between this wing and the balance of the home.

Mr. Nelson asked if this existing septic system has excess capacity and Mr. Fincham replied that it has enough capacity for what they are proposing. Mr. Fincham added that no one currently lives in the house. Mr. Lee said that VDH will typically require a timed dose system for uses like this. Mr. Fincham corrected an earlier statement that the wing to be used is the one that will be closest to the tent area.

Mr. Kruhm said that the Parshall Road access is posted for no trespassing and he asked whether the Route 7 access could be used if he wants to view the property. Mr. Fincham replied that he would ask the applicant. Mr. Stidham noted that Staff will likely recommend a condition to prohibit event traffic from using the Parshall Road access. Mr. Kruhm also asked if a noise test could be done in conjunction with this application and noted that a similar test was done years ago when the former golf course proposed having weddings and events. Mr. Stidham said that he did not know what the process was for the golf course but his initial response is that noise complaints should be enforced through the noise ordinance. Ms. Caldwell said that the issue in the golf course case was that the Monastery on the opposite side of the river would be adversely impacted by noise from the weddings and events. She added that there were limits placed on hours for music and location of bands. Mr. Kruhm briefly described the residences that are close to the subject property.

Regarding the road access, Ms. Caldwell said that the access road is a through road and will show as such on GPS maps. She said there should be a requirement that the Parshall Road access be locked during events and Mr. Kruhm noted that there is no gate currently on the property. Mr. Stidham said that they could be required to barricade that route during the event. Mr. Kruhm said that the barricade could be set up at the manor house so that event traffic would be blocked but the other residences that use the road would not be impacted. Regarding the noise issue, Mr. Stidham said that they will get the applicant to provide information on when they propose to cut off amplified music for events so the Commission can discuss whether it is reasonable.

Chair Ohrstrom asked whether we are only setting public hearing for this case on Friday and Mr. Fincham replied yes. Mr. Fincham also said that Staff will have draft conditions in the next staff report.

OLD BUSINESS ITEMS

Progress Report, Ordinance Update Project
Mr. Stidham briefly reviewed the progress report on the Ordinance Update Project.

NEW BUSINESS ITEMS
None

OTHER BUSINESS

Mr. Stidham noted that the Comprehensive Plan Committee will meet immediately following this meeting to review new changes to the draft Water Resources Plan discussed last month. He invited Commissioners to stay for this meeting.

The meeting was adjourned by consensus at 3:22PM.

George L. Ohrstrom, II (Chair)

Brandon Stidham, Planning Director

Clarke County

PLANNING COMMISSION
BUSINESS MEETING MINUTES - DRAFT
FRIDAY, JUNE 1, 2018

A regular meeting of the Planning Commission of Clarke County, Virginia, was held at the Berryville/Clarke County Government Center, Berryville, Virginia, on Friday, June 1, 2018.

Attendance
Present: George L. Ohrstrom, II, Chair; Randy Buckley, Vice Chair; Robina Bouffault; Anne Caldwell, Bob Glover, Scott Kreider, Doug Kruhm, Mary Daniel; Frank Lee; and Cliff Nelson.

Absent: Gwendolyn Malone

Staff Present: Brandon Stidham, Planning Director; Ryan Fincham, Senior Planner/Zoning Administrator; and Debbie Bean, Recording Secretary.

Called to Order
Chair Ohrstrom called the meeting to order at 9:03 a.m.

Approval of Agenda
The Commission voted to approve the agenda.
Yes: Bouffault, Buckley, Caldwell, Daniel, Glover, Kreider (seconded), Kruhm (moved), Lee, Nelson and Ohrstrom
No: No one
Absent: Malone

Approval of Minutes
The Commission voted to approve the Planning Commission Work Session Meeting minutes of May 1, 2018.
Yes: Bouffault (seconded), Buckley, Caldwell (moved), Daniel, Glover, Kreider, Kruhm, Lee, Nelson and Ohrstrom
No: No one
Absent: Malone

The Commission voted to approve the Planning Commission Business Meeting minutes of May 4, 2018.
Yes: Bouffault (seconded), Buckley, Caldwell (moved), Daniel, Kruhm, Lee, Nelson and Ohrstrom
No: No one
Absent: Malone
Abstained: Glover and Kreider

Set Public Hearing

SUP-18-01/SP-18-01, Juliana MacDowell/The Kentland Foundation, Inc. (owner).

Mr. Fincham stated that the applicant is requesting approval of a Special Use Permit (SUP) and Site Plan (SP) to establish a public assembly, minor commercial use event venue on a portion of the subject property. He said that the subject property is located on the south side of Harry Byrd Highway also with frontage on Parshall Road. He stated that the applicant has proposed utilizing a fenced in 10 acre area for the facility on the 343.8 acre parcel. He stated the majority of the subject property is currently used as a farm and open space, however the proposed area for the event venue is located around the existing manor house and out-buildings and landscaped lawn. He said that that all documentation has been provided by the applicant to constitute a complete Special Use Permit and Site Plan application. He stated that there are no outstanding concerns regarding the proposed use to warrant a delay at this time in scheduling a Public Hearing. After discussion with Staff and the Commission, Chair Ohrstrom called for a motion.

The Commission voted to set public hearing on this request for the July 6, 2018 Planning Commission Business meeting.

Yes: Bouffault, Buckley, Caldwell (moved), Daniel, Glover, Kreider, Kruhm (seconded) Lee, Nelson and Ohrstrom

No: No one

Absent: Malone

Board/Committee Reports

Board of Supervisors (Mary Daniel)

Commissioner Daniel stated the Board of Supervisors (BOS) received their annual report from People Incorporated which is one of the positive things we get to hear about. She said the Historic Resources Plan was presented and is set for public hearing for the next BOS meeting on June 19, 2018. She said that she and Terri Catlett met with the Chief and Assistant Chief of the Blue Ridge Volunteer Fire Department on the billing changes for emergency services. She said the only change is that bills will go out for patients treated but not transported. She stated that Josephine Museum is getting a new roof with help from a civil rights grant that Alison Teetor applied for. She stated that she hopes everyone is aware that July 14th is Lloyd Williams's day in the county and there are plans being made for that date. She said that Mr. Williams was the man the VFW is named after. She said that Angie Jones with the Department of Social Services is retiring in August. She stated that taking in the Kohn property as a new park is also underway. She said that the six-year plan is in place with VDOT. Commissioner Kruhm asked how the convenience center is progressing. Commissioner Daniel stated that the construction has started but delayed by the weather and a number of other things. She said that the target date is now the end of September.

Board of Septic & Well Appeals (George Ohrstrom, II)

Chair Ohrstrom stated that the BSA approved a septic variance on May 17, 2018. Mr. Fincham stated that the existing house had a septic system with no record and the only place they could find a septic system was in the back of the lot. He said that the applicants want to tear down the smaller house and build a larger house but it was more than 400 feet from the septic to the house which is the County requirement so they had to get a variance to go 600 feet which was granted.

Board of Zoning Appeals (Anne Caldwell)

No report.

Historic Preservation Commission (Doug Kruhm)
Commisioner Kruhm stated that the annual awards luncheon was held on May 16, 2018. He said that at an earlier meeting he had mentioned a house that was scheduled to be razed in White Post. He stated that the house is now totally demolished.

Conservation Easement Authority (George Ohrstrom, II)
Vice Chair Buckley stated that the summer interns have starting doing inspections.

Broadband Implementation Committee (Mary Daniel)
Commission Daniel stated that a round table meeting is scheduled for June 20, 2018 at 2:00 p.m.
Mr. Stidham stated that we have invited all five of the WISP providers that service the county, two tower companies and Comcast, Verizon and Shentel. He said that three of the WISP providers have confirmed they will be attending. He said we have also received confirmation from Verizon and Shentel. He stated that Comcast is a maybe for attending. He said that the goal is to get them in a round table discussion and see if they start to develop solutions, directives or even talk amongst themselves and develop their own partnerships.

Commissioner Bouffault stated she wanted to comment on broadband. She said she has been in contact with Viasat about their new Viasat-2 and when it will be available in our area. She said that she was told that it will be operational this month.

Other Business
Commissioner Caldwell stated that she was in Waterloo at the red light the other day and happened to glance over at the McDonald's and it is quite clear they have not finished the changes to the building. Commissioner Caldwell asked the Chair if we could get an update from Commissioner Bouffault who has some photos of the McDonald's building and also Mr. Fincham who has the most updated information of the changes that are supposed to be done. Commissioner Bouffault shared a copy of the approved Certificate of Appropriateness rendering. Mr. Fincham stated that he had emailed Jen Adams, Agent for McDonald's Corporation, on May 30th to alert her that it appeared all of the requirements of the approved rendering had not been completed. He said that he made notes on the rendering and circled and put arrows on the discrepancies. He said that the stone veneer is not there, paint colors are not correct, and the bump up on the drive thru side of the building is not there. He stated that the horizontal window next to the drive thru window is not installed but it was not required by Maral Kalbian or the committee so that component is at McDonald's discretion. She replied that this was news to her as the details of approval were sent to McDonald's. She thanked him for sending over the information and said that a detailed message had been sent to McDonald's and the contractor noting the discrepancies from the approved plans. He said she emailed again yesterday and reported that she had spoken with the area construction manager of McDonald's and he said that the contractor still has work to do on site and they are going to coordinate further and that she will provide me with an update when she receives it.

Adjourn
On motion by Commissioner Daniel and seconded by Vice Chair Buckley the meeting was adjourned at 9:25 a.m.

George L. Ohrstrom, II, Chair

Brandon Stidham, Director of Planning

Minutes prepared by Debbie Bean, Recording Secretary

SPECIAL USE PERMIT/SITE PLAN (SUP-18-01/SP-18-01)
Juliana MacDowell / Kentlands Foundation, Inc.
July 6, 2018 Planning Commission Meeting – PUBLIC HEARING
STAFF REPORT– Department of Planning

The purpose of this staff report is to provide information to the Planning Commission and Board of Supervisors to assist them in reviewing this proposed land use request. It may be useful to members of the general public interested in this request.

Case Summary

Applicant:
Juliana MacDowell

Property Owner:
The Kentland Foundation, Inc.

Location:
- 834 Kentland Lane, Berryville, VA
- Tax Map #15-A-12
- Buckmarsh Election District: Scott Kreider/Douglas Kruhm (Planning Commission); David Weiss (Board of Supervisors)

Parcel Size/Project Area: 343.8 acres / Proposed 10 acre area for special use

Request:
Request approval of a Special Use Permit (SUP) and Site Development Plan to operate an event venue as a public assembly, minor commercial use in the Agricultural-Open Space-Conservation (AOC) District per §3-A-1-a-3-m of the Zoning Ordinance.

Staff Recommendation:
Conduct advertised public hearing and provide a formal recommendation to the Board of Supervisors on the application. Staff recommends approval with conditions of the request for a special use permit and site plan for the proposed public assembly, minor commercial use.

Case Update:
Since the June 1, 2018 Commission meeting, all review agencies have reviewed and approved the revised plans. The public hearing has been advertised. A site visit was made to the property June 26, 2018 by Staff and Commissioner Kruhm and a tour was provided by the Applicant.

Facts:
The Applicant is requesting approval of a Special Use Permit (SUP) and Site Plan (SP) to establish a public assembly, minor commercial use event venue on a portion of the subject property. Detailed information on the proposed use, property characteristics, and review elements are outlined below.

Subject Property
The subject property is located on the south side of Harry Byrd Highway (State Primary Highway Route 7) also with frontage on Parshall Road (Rt. 608). The Applicant has proposed utilizing a fenced-in 10 acre area for the facility on the 343.8 acre parcel. The majority of the subject property is currently used as a farm and open space, however the proposed area for the event venue is located around the existing manor house and out-buildings and landscaped lawn.

Proposed Facility/Operations
The Applicant has provided a complete site plan from their engineer John Lewis (Painter-Lewis, P.L.C.) that includes various aspects of the subject property and proposal. Also provided is the proposed use narrative. These items are available for review in the Planning Office.

The proposed facility is designed to use the manor house and grounds for events such as weddings on a seasonal basis and on weekends. No new construction is proposed. A tent will be utilized on a grass pad area. The maximum number of persons and staff which will attend a single event on any day is 149, which is the maximum allowable for public assembly, minor commercial uses by the Zoning Ordinance. The facility will be accessed via the existing Kentland's entrance on Rt. 7, and the site plan includes an entrance improvement plan and traffic information. A proposed gravel parking area will be constructed near the manor house to accommodate room for 50 vehicles including 2 ADA spaces. An existing well is to be used for the water supply at events less than 60 days out of the year. An existing onsite sewage disposal system is proposed to be used to service the facility with proposed minor improvements. Low voltage lighting will be installed to illuminate the proposed path from the parking lot to the manor house and from the manor house to the proposed tent area. No additional landscaping is proposed. No additional external signage is proposed. The owner will contract with a licensed private trash hauler for the regular removal of trash.

Site Plan
The Applicant has submitted a Site Development Plan containing all of the required elements to constitute a complete submission per §6-E of the Zoning Ordinance. A Planning Commission Plans Review Committee meeting may be scheduled once further information is obtained through the review process. The site plan has been routed to the following agencies for review and comment:

- Virginia Department of Transportation (Bobby Boyce)
- Clarke County Health Department (Jim Davis)
- Hurt & Proffitt (County Engineering Consultant)
- Building Department (Jamie Royston)
- Clarke County Emergency Management (Brian Lichty)

The following setback and buffering requirements apply to the project and are depicted on the site plan:

- Edge of primary highway (Rt. 7): 125 feet
- Centerline of a secondary scenic byway road (Parshall Rd): 150 feet
- Edge of private access easement: 75 feet

- Side and rear yard setbacks: 75 feet
- From sinkholes, streams, and springs: 100 feet

Access and Traffic
As noted above, the Applicant proposes to use the existing entrance as shown on the plan as the main entrance. Parshall Road entrance will not be utilized for the proposed use. A copy of the site plan was routed to VDOT for review and comment on the use of the existing entrance and improvements and potential traffic implications for the facility. VDOT provided comments May 8, 2018. The Applicant's engineer submitted a revised plan May 24, 2018, which will be routed to VDOT for comment.

Update: On June 15, 2018, Bobby Boyce (VDOT) emailed Staff acknowledging that the revised plans for the entrance were approved. The Applicant must work directly with VDOT for permitting and construction as outlined in Draft Condition #5. Also, Draft Note #10 states that on event days Cedar Hall Lane shall be blocked off west of the parking area and signage provided at the Parshall Road entrance directing traffic to the Kentland Lane entrance.

Erosion & Sediment Control (E&S) / Stormwater
The site plan provides a complete E&S plan with notes and details. The plan was reviewed by the County engineering consultant and their comments were forwarded to the Applicant and their engineer for comments and revisions. The Applicant's engineer submitted a revised plan May 24, 2018, which will be routed to Hurt & Proffitt for comment. E&S permitting and inspecting will be handled by the Clarke County Building Department.

Applicants are required to work directly with the Department of Environmental Quality (DEQ) for stormwater management compliance. It does not appear that the Applicant will be required to obtain plan approval from DEQ for compliance with State stormwater management regulations since the total disturbed land area is under one acre in size. There were no comments provided by the County engineering consultant regarding the need for DEQ review.

Update: On June 14, 2018 Keith Boyd (Hurt & Proffitt) provided comments regarding the revised plans. John Lewis (Applicant's Engineer) contacted Staff by phone to address those comments. All remaining comments were a VDOT and/or Building Department concern, and those Department's will handle the review and permitting of those items.

Water Supply and Waste Water Disposal
The facility will be supplied with water by the existing active private well shown on the site plan. The existing septic system shown on the site plan will serve the proposed use with proposed improvements. The Health Department has provided comments, which were forwarded to the Applicant and their engineer for comments and revisions. The Applicant's engineer submitted a revised plan May 24, 2018, which will be routed to the Health Department for comment.

Update: On June 11, 2018 Jim Davis (VDH) emailed Staff that the revisions were satisfactory. The septic system will be altered by adding a second septic tank and a pump tank. The proposed design accounts for 149 maximum persons per event and for the current intermittent use by the family members of the Kentland Foundation. The Applicant must work directly with VDH for

permitting and construction. Also, Draft Condition #13 specifies that there shall be no overnight accommodations or food preparation on site for events per Health Department comment.

Karst Plan
There is no karst plan required since there are no proposed septic systems for this project and no facilities proposed near any karst features.

Lighting and Signage
The Applicant is proposing only low voltage lighting for walkways. Temporary lighting may be used for events by the event clients but will only be on during operating hours when needed and the ten acre event area is located in the middle of the large farm. Lighting must comply with Chapter 189 of the Code of Clarke County. No new external signage is proposed.

Update: Draft Condition #9 specifies that all lighting shall adhere to the County's outdoor lighting regulations.

Parking
§4-J of the Zoning Ordinance (Off-Street Parking) does not include a required parking calculation for public assembly, minor commercial uses, and event venue is not a specified use. Therefore, the engineer provided one parking space per four event attendee as a best practice measurement and has provided area for 50 parking spaces (unmarked gravel) with 2 ADA spaces. The proposed gravel parking area is shown on the site plan.

Landscaping
Buffer areas per §6-H-10-c are required to run the length of adjacent property boundaries and public rights of way, however, the 10 acre portion of the property to be utilized for the proposal cannot be seen from adjacent properties or public right if ways. No new landscaping is proposed.

Building Department
James Royston, Clarke County Building Code Official, provided both verbal and email comments to the Applicant. He also made a site visit to the property. There are building code issues regarding fire and safety in relation to square footage of proposed use and type of use, which the Applicant has addressed with an architect. Mr. Royston provided an email on May 24, 2018 outlining the Applicant's planned approach for the use of the manor house which will satisfy building code requirements.

Update: Specifically, only the East Wing of the manor house will be utilized for events encompassing a total of 2,315 square feet (1,285 square feet on the main level and 1,100 square feet on the upper level). The use of the wing for wedding events will be for the bride and groom parties to prepare and it will provide some general circulation and restroom facilities for all events. A new handicap lift will be added near the east wing of the house. The Applicant must work directly with the Building Department for permitting, construction, and certificate of occupancy.

Staff Analysis – Special Use Permit Review Criteria (§5-B-5)

Evaluation of the special use permit request includes an in-depth analysis of 19 criteria listed below as set forth in §5-B-4 of the Zoning Ordinance. Staff has provided a detailed analysis of the proposed facility's compliance with each of these criteria as listed below. The Applicant's engineer has also provided a narrative responding to these criteria.

a. Will be consistent with the Comprehensive Plan of the County.

Applicant Response: The parcel contains 344 acres. All but 10 acres in an agricultural use. The proposed use will occur within the 10 acre, fenced area which contains the manor house. The existing agricultural use will be preserved.

Staff Comment: "Public Assemblies, Minor Commercial" has been an allowable special use in the AOC District since 2010 and the use itself is in general accord with the Comprehensive Plan by virtue of its inclusion in the Zoning Ordinance.

Objective 1 of the Comprehensive Plan provides guidance regarding preserving land for the continued production of crops and livestock through the Comprehensive Plan policies as well as the Agricultural Land Plan. It also notes that to the maximum extent possible, nonagricultural land uses should be separated from agricultural lands and operations. Where nonagricultural operations are adjacent to agricultural operations, the nonagricultural operations should provide buffering in the form of fencing, landscaping, and open space.

Objective 10 of the Comprehensive Plan encourages economic growth that is compatible with the County's environmental quality, rural character, and residential neighborhoods, and that provides a healthy ba-lance between revenues from residential and agricultural uses, and those from commercial and industrial uses. It promote types of economic development that are consistent with the County's existing uses and character

The location of the proposed event venue in the center of a 10 acre portion of a very large property allows for the current agricultural operations on the property to continue and also not impact surrounding agricultural operations. The environmental quality and rural character of the property will remain consistent with the Plan as well.

The location, character, and extent of the proposed event venue is in general accord with the County's Comprehensive Plan subject to compliance with the Zoning Ordinance's regulations.

b. Is consistent with Purpose and Intent of the Zoning Ordinance.

Applicant Response: The proposed components which make up this proposal will conform to the design and performance standards of the Zoning Ordinance.

Staff Comment: The Purposes and Intent of the Zoning Ordinance are found in §1-B. Staff has identified no provisions of this section that would result in a conflict with the proposed use.

c. Will not have an undue adverse impact on the short-term and long-term fiscal resources of the County for education, water, sewage, fire, police, rescue, solid waste disposal or

other services, and will be consistent with the capital improvement goals and objectives of the Comprehensive Plan, to the end that growth of the community will be consonant with the efficient and economic use of public funds.

Applicant Response: The proposed use will result in no additional school children. Water and sewer service will be provided by private, on-site facilities. No additional permanent structures are proposed which would require fire service. Additional police service is not anticipated. The proposed use may occasionally require rescue service due to the increased number of users at the property. The amount of solid waste will increase as a result of the proposed use, however, it is not anticipated that a dumpster will be required to handle the waste. Solid waste generated by the proposed use will be handled by the property staff.

Staff Comment: There will be no impact to the school system. The proposed facility will not require public water or public sewer. The Fire and EMS Director reviewed the plans and had no comment. Draft condition #4 specifies that access for emergency service and law enforcement shall be permitted in conjunction with all events. Solid waste must be collected and disposed of properly by the operator. The proposed use requires no public funds.

d. Will not cause an undue adverse effect on neighboring property values without furthering the goals of the Comprehensive Plan to the benefit of the County.

Applicant Response: Activities associated with the proposed use will be confined to the 10 acre, fenced area which is located away from the exterior property lines. No adverse impacts to neighboring property values is anticipated.

Staff Comment: As noted in previous special use permit requests, Planning Staff has a concern with this criterion recommending an evaluation of a project's impact on property values. It is Staff's opinion that the use of property values alone as an evaluation criterion can produce very subjective outcomes depending on the perspective of the particular appraiser or advocate. Property values can vary due to a wide variety of elements and can be a very subjective determination that a proposed use is the sole source of a potential negative impact on property values. Staff instead recommends evaluating the overall effect of tangible impacts such as noise, traffic, odor, safety, light pollution, and visual appearance to determine impacts on surrounding properties.

e. Will not cause an undue adverse effect on the preservation of agricultural or forestal land.

Applicant Response: The proposed use will occur within the 10 acre, fenced area which contains the manor house. The existing agricultural use will be preserved.

Staff Comment: Staff has not identified any issues associated with this request that would affect the preservation of agricultural or forestal land. The subject property does not adjoin any existing conservation easement properties and will not have any adverse impact on nearby properties in agricultural use.

f. Will not cause unreasonable traffic congestion or unsafe conditions on existing or proposed public roads and has adequate road access.

Applicant Response: Access to the site is from Route 7. The owner is proposing to upgrade the entrance to meet current VDOT standards. VDOT will review and approve the entrance improvement proposal.

Staff Comment: VDOT has approved the site plan. The Applicant will be responsible for obtaining construction approval from VDOT for the entrance. Any required improvements must be completed or bonded before the facility will be allowed to operate. VDOT did not identify any traffic congestion concerns in their comments. Draft conditions #4, #5, and #10 address the entrance, Kentland Lane, and traffic concerns.

g. Will not cause destruction of or encroachment upon historic or archeological sites, particularly properties under historic easement.

Applicant Response: There are no historic or archeological sites which will be disturbed by the proposed use.

Staff Comment: The site plan does not identify specifically listed historic or archaeological sites that would be destroyed or encroached upon by this project. There are also no historic easements in proximity to the subject 10 acre property.

h. Will not cause an undue adverse effect on rare or irreplaceable natural areas, areas of outstanding natural beauty, state-designated scenic byways or scenic rivers or properties under open space easement.

Applicant Response: Improvements to the site will occur only within the 10 acre, fenced area on the property. No impacts to natural resources are anticipated.

Staff Comment: Staff has not identified any of these referenced features adjacent to or in close proximity to the subject 10 acre property.

i. Will not cause an undue adverse effect on wildlife and plant habitats.

Applicant Response: Improvements to the site will occur only within the 10 acre, fenced area on the property. The total disturbed area is about ½ acre and will occur in the existing lawn of the manor house. No impacts to wildlife or plants are anticipated.

Staff Comment: Staff has not been notified of any adverse impact on wildlife and plant habitats that could result from the construction of this project.

j. Will have sufficient water available for its foreseeable needs.

Applicant Response: The existing well will provide sufficient water for the proposed use. No additional water sources will be required.

Staff Comment: This project will be served by an existing drilled private well. Per Zoning Ordinance §3-A-1-e, the use shall not result in the installation of a waterworks.

k. Will not cause unreasonable depletion of or other undue adverse effect on the water water source(s) serving existing development(s) in adjacent areas.

Applicant Response: The existing well will provide sufficient water for the proposed use. No additional water sources will be required.

Staff Comment: There is no evidence that the well will cause unreasonable depletion or adverse effects on water sources. Water use will primarily be for wastewater disposal, hand washing, and cleaning.

l. Will not cause undue surface or subsurface water pollution.

Applicant Response: Nothing proposed, that is, gravel parking, grass tent area, gravel pathway, will create a pollution source.

Staff Comment: Karst review was not necessary for the proposed use.

m. Will not cause an undue adverse effect on existing or proposed septic systems in adjacent areas.

Applicant Response: The existing septic system will not be expanded from its current capacity. No impacts to septic systems on adjacent properties is anticipated.

Staff Comment: The Health Department has reviewed and approved the proposed sewage disposal system to serve this facility, which includes a review of adjacent areas.

n. Will not cause unreasonable soil erosion.

Applicant Response: The proposed improvements and activities will be fully stable. No long-term disturbance to soils on the property is anticipated.

Staff Comment: The erosion and sediment control plan has been reviewed by the County's engineering consultant and comments addressed.

o. Will have adequate facilities to provide safety from flooding, both with respect to proposed structures and to downhill/downstream properties.

Applicant Response: The site is at the high point of the local topography. No flooding or significant increase in runoff will occur as a result of the proposed use.

Staff Comment: DEQ review was not necessary for the proposed use.

p. Will not cause undue air pollution.

Applicant Response: The activities and improvements associated with the proposed use are recreational in nature and will not result in undue air pollution.

Staff Comment: No undue air pollution is expected by operating this facility.

q. Will not cause undue noise, light or glare, dust, odor, fumes, or vibration.

Applicant Response: The activities and improvements associated with the proposed use are recreational in nature and will not result in undue noise, light, or air-borne pollution.

Staff Comment: Draft notes #8 and #9 require the proposed use to adhere to County regulations regarding noise and light.

r. If in the AOC or FOC zoning districts, will not result in scale or intensity of land uses significantly greater than that allowed under the permitted uses for these districts.

Applicant Response: The proposed is similar to uses permitted in the AOC district such as breweries and wineries.

Staff Comment: The proposed facility is consistent with the Zoning Ordinance regulations.

s. Will not cause a detrimental visual impact.

Applicant Response: Activities associated with the proposed use will be confined to the 10 acre, fenced area which is located away from the exterior property lines. No adverse visual impacts to neighboring properties is anticipated.

Staff Comment: No further comment.

Special Use Permit Conditions:

Staff has provided the following list of Special Use Permit Conditions to address the various issues with this request discussed in this report and in previous Staff Reports. These are draft conditions for the Commission to consider and may be amended, added to, or deleted.

1. Special Use Permit purpose; nontransferable. This Special Use Permit is issued for the subject property for operation of an "event venue" solely by the Applicant, Juliana MacDowell and Property Owner [The Kentland Foundation, Inc.] The Special Use Permit shall not be transferable to any other person or entity without prior approval of the Board of Supervisors as an amendment to the approved Special Use Permit conditions, such approval not to be unreasonably withheld.

2. Applicant and Property Owner ("Owner") to sign list of adopted permit conditions. The Applicant and the Owner shall sign the list of adopted conditions to indicate receipt of the conditions and the intention to comply fully with the conditions for the life of the Special Use Permit. A signed copy of the conditions shall be provided to Planning

Department Staff ("Staff") within thirty (30) days of the Applicant's and Owner's receipt of the adopted conditions.

3. **Access for inspections required.** Staff and other County officials shall have access to the property with 24 hour notice to the Applicant in order to conduct periodic compliance inspections of the facility and the subject property throughout the life of the permit.

4. **Ongoing maintenance of site features.** The following site features shall be properly maintained throughout the life of the permit:

   - Property entrance shall be maintained consistent with VDOT regulations.
   - Kentland Lane shall be maintained to provide a safe thoroughfare.
   - The proposed gravel parking lot shall be maintained for safe travel and parking.
   - The well and septic system shall be maintained consistent with VDH regulations.
   - Access for emergency service and law enforcement shall be permitted in conjunction with all events.

5. **Entrance requirements.** The following conditions shall apply to the property entrance.

   - **VDOT permitting required.** The Applicant shall obtain all required permits from VDOT and complete all required improvements to the property entrance prior to issuance of a building certificate of occupancy.

6. **State and Federal permits.** The Applicant shall provide copies of all applicable State and Federal permits to Staff prior to issuance of a building certificate of occupancy.

7. **Business license.** The Applicant must maintain a valid Clarke County business license for the event venue for the life of the Special Use Permit

8. **Noise.** All event activities shall adhere to Clarke County Code Chapter 120 in order to limit noise impacts on adjacent and nearby properties.

9. **Lighting and temporary lighting for events.** Lighting shall adhere to the County's outdoor lighting regulations in order to limit impacts on adjacent and nearby properties.

10. **Traffic.** In order to prevent access via Parshall Road for events without impeding residential traffic on Cedar Lane, the Applicant shall block off Cedar Hall Lane west of the event parking lot entry and provide signage at the entrance on Parshall Road directing event traffic to the Harry Byrd Highway (Route 7) Kentland Lane entrance on all event days.

11. **Not open to general public.** The facility owner or manager shall ensure that the facility is not advertised or publicized as being open to the general public.

12. **Event limits.** The maximum allowable persons (participants, spectators, staff, etc.) on site for an event is 149. All event activity is limited to the designated 10 acre area shown on the approved site development plan.

13. **No lodging or food preparation on site.** Per VDH comment, there shall be no overnight accommodations or food preparation on site (other than minimal preparation by licensed Caterer's).

14. **Special Events.** The Applicant shall adhere to Clarke County Code Chapter 57 for any special events exceeding the scope of this special use permit.

Staff Recommendation:
Conduct advertised public hearing and provide a formal recommendation to the Board of Supervisors on the application. Staff recommends approval with conditions of the request for a special use permit and site plan for the proposed public assembly, minor commercial use.

History:

March 23, 2018	**Pre-Application meeting held with Planning Staff.**
April 6 2018	**Special Use Permit and Site Plan Applications filed by the applicant.**
May 3, 2018	**Request voluntarily deferred by the Applicant.**
June 1, 2018	**Planning Commission voted 10-0-1 (Malone absent) to schedule Public Hearing for the Commission's July 6, 2018 meeting.**
July 6, 2018	**Placed on the Commission's meeting agenda for Public hearing and advertised.**

Kentland - Event Venue
Tax Map# 15-A-12

100 50 0 100 Feet

Clarke County GIS
June 29, 2018

Legend

- Parcel Boundary
- Roads
- Drainfield
- Well

Location Map

PAINTER-LEWIS, P.L.C.
CONSULTING ENGINEERS
817 Cedar Creek Grade, Suite 120
Winchester, VA 22601
tel.: (540)662-5792
fax: (540)662-5793
email: office@painterlewis.com

May 23, 2018

Mr. Ryan Fincham
Clarke County Department of Planning and Zoning
101 Chalmers Court, Suite B
Berryville, VA 22611

RE: **SITE PLAN KENTLAND EVENT VENUE**

Dear Ryan:

The comments contained in correspondence dated April 25, 2018 have been addressed as follows:

1. The water features have been added to Sheet 1.
2. The lanes have been added to Sheet 1.
3. The setback from Parshall Road has been changed to 150'.
4. The agency contact names have been revised on Sheet 1.
5. The parking reference numbers have been revised.
6. The disturbed area has been added to Sheet 1 and the nutrient credit note has been removed.
7. The signature block has been updated.
8. The owner name has been updated.

Attached you will find a set of the revised plans.

Let me know if you need any additional information.

Sincerely:

John C. Lewis, P.E., L.L.A.

PAINTER-LEWIS, P.L.C.
CONSULTING ENGINEERS
817 Cedar Creek Grade, Suite 120
Winchester, VA 22601
tel.: (540)662-5792
fax: (540)662-5793
email: office@painterlewis.com

May 22, 2018

Mr. Bobby Boyce
Virginia Department of Transportation
14031 Old Valley Pike
Edinburg, VA 22824

RE: **SITE PLAN KENTLAND EVENT VENUE**

Dear Bobby:

The comments contained in correspondence dated May 8, 2018 have been addressed as follows:

- The western taper has been enlarged to 200' with an ending width of 12'. The eastern radius has been changed to 50'.
- There are no other driveways near this entrance. The distances to the next state roads have been shown.
- Added to the entrance plan are the route number, classification, right of way width is variable, speed limit, edges of pavement, pavement markings, there is no signage, no known utilities, and the ADT.
- The entrance type has been labeled.
- The sight distance has been labeled.
- An entrance profile has been added.
- Drainage arrows and spot elevation are shown.
- A typical section at the taper has been added.
- Signs have been added to the plans.
- The area of disturbance should be less than 10,000 sf.

Attached you will find two sets of revised plans.

Let me know if you need any additional information.

Sincerely:

John C. Lewis, P.E., L.L.A.

PAINTER-LEWIS, P.L.C.
CONSULTING ENGINEERS
817 Cedar Creek Grade, Suite 120
Winchester, VA 22601
tel.: (540)662-5792
fax: (540)662-5793
email: office@painterlewis.com

May 23, 2018

Mr. Jim Davis
Clarke County Health Department
100 North Buckmarsh Street
Berryville, VA 22611

RE: **SITE PLAN KENTLAND EVENT VENUE**

Dear Jim:

The comments contained in correspondence dated April 12, 2018 have been addressed as follows:

1. The tax map number is 15-A-12.
2. A new storage tank has been added to the plans to provide additional storage.
3. The construction plans are contained in this site plan. Along with this letter you will find a construction permit application.
4. The notes on Sheet 6 include instructions to replace defective components.
5. Noted.

Attached you will find a set of the revised plans.

Let me know if you need any additional information.

Sincerely:

John C. Lewis, P.E., L.L.A.

PAINTER-LEWIS, P.L.C.
CONSULTING ENGINEERS
817 Cedar Creek Grade, Suite 120
Winchester, VA 22601
tel.: (540)662-5792
fax: (540)662-5793
email: office@painterlewis.com

May 23, 2018

Mr. Keith Boyd
Hurt & Proffitt
1861 Pratt Drive, Suite 1100
Blacksburg, VA 24060

RE: **SITE PLAN KENTLAND EVENT VENUE**

Dear Keith:

The comments contained in correspondence dated April 24, 2018 have been addressed as follows:

General

1. The ADA spaces, path, and lift have been added to Sheet 2.
2. VDH is reviewing the septic plan.

E&S

1. The nutrient purchase note has been removed from Sheet 1.
2. No E&S measures will be necessary in this small area of disturbance which is surrounded by stable grass areas.
3. VDOT has reviewed the plan for the entrance improvements.
4. The total disturbed area at the manor house is 0.52 acres. There is an additional 0.2 acres of disturbance at the Route 7 entrance.
5. A note limiting the area of disturbance has been added to the sequence on Sheet 3.
6. The silt fence has been extended.
7. The CE will stabilize the area and the note added to the sequence that only an area that can be stabilized with stone in one day should be sufficient to meet E&S control.
8. This is a linear path consisting of about 155'. No E&S measures will be necessary.
9. All of the silt fence will be wire reinforced.
10. The phase 2 measures narrative addresses top soil and mulch.
11. The symbol has been reproduced on the E&S plan.
12. The LOD has been revised.
13. The narrative and analysis will remain.
14. VDOT is reviewing this portion of the plans.

Attached you will find a set of the revised plans.

Sincerely:

John C. Lewis, P.E., L.L.A.

June 14, 2018

HURT & PROFFITT
Inspired | Responsive | Trusted

Mr. Ryan Fincham
Zoning Administrator/Senior Planner
Clarke County Planning Department
101 Chalmers Court
Berryville, VA 22611

Re: Kentland Event Venue
Site Development Plan
Erosion and Sediment Control Plan Review (2nd Submittal)
H&P JN 20180615

Dear Ryan:

Thank you for the opportunity to provide plan review services to Clarke County. Following are review comments related to the review of the plan titled "Kentland Event Venue Site Development Plan, Clarke County Virginia, dated March 16, 2018, latest revision May 23, 2018 by Painter – Lewis P.L.C.

General (SUP Related comments)

1. It appears as though most of the previous comments regarding the handicapped parking spaces have been addressed. However, no specific ADA routing is shown on the plan, except for the note immediately beside the tent area which says "Paved ADA Path to Tent". This note points to an added section of pavement between the driveway and the tent area. It is unclear what the intended ADA path is from the northwestern HC parking spaces (to the house and to the tent).

   On the eastern end of the structure a "New Lift" is designated. There is no detail to show what this installation entails, and we assume that this will need to be coordinated with the county Building Official.

Erosion and Sediment Control Review

1. Erosion and Sediment Control is not addressed at the following (previously noted) locations:
   a. At location of septic system improvements
   b. At location of gravel path construction

   The designer noted in his response letter that no ESC measures are necessary in these areas due to small size of disturbance and because it is surrounded by stable grass (for septic system improvements), and because of the linear nature of the path work. A silt fence should be provided (along with topsoil, permanent seeding, and mulching) at the septic work area. A silt fence should also be provided along the gravel path construction area (along with topsoil, permanent seeding, and mulching).

2. The designer indicates that all silt fences will be wire reinforced. This should be noted on the Erosion and Sediment Control Key or in the ESC Phasing Notes.

1861 PRATT DRIVE, SUITE 1100
BLACKSBURG, VA 24060
800-242-4906 TOLL FREE
540-552-5592 MAIN
540-552-5729 FAX
www.HandP.com

3. As previously noted, there is not an ESC plan for the entrance work in the public right-of-way. In the response comments, the designer has indicated that VDOT has or is reviewing the entrance plans. As noted previously, we assume that VDOT will flag the necessary ESC Controls, since this work is under their control.

This is the extent of our comments at this time. Please do not hesitate to contact either of us with questions.

Sincerely,
HURT & PROFFITT, INC.

Keith Boyd, PE
Director - Land Development

Mark T. Cline
Senior Project Manager

From: "Arthur Boyce" <bobby.boyce@vdot.virginia.gov>
To: "John C. Lewis" <jclewis@painterlewis.com>
Cc: "Ryan Fincham" <rfincham@clarkecounty.gov>, "Rhonda Funkhouser" <rhonda.funkhouser@vdot.virginia.gov>, "Matthew Smith" <matthew.smith@vdot.virginia.gov>
Sent: Friday, June 15, 2018 11:38:25 AM
Subject: Clarke - Route 7 - Kentland Event Venue

DEPARTMENT OF TRANSPORTATION

Staunton/Edinburg Land Development

14031 Old Valley Pike

Edinburg, VA 22824

Dear Mr. Lewis:

This is to acknowledge receipt of your revised plans dated May 23, 2018 for the subject commercial entrance. The plans appear satisfactory and are approved. Please advise the developer accordingly.

I offer the following comments:

- Our review and comments are general in nature. Should details be overlooked during plan review or conditions in the field exist such that additional measures are warranted, such measures shall be completed to the satisfaction of the Department.
- Materials used and methods of construction shall adhere to the current observed VDOT *Road and Bridge Specifications, Standards, Manual on Uniform Traffic Control Devises,* and Land Use Permit Special Provisions.
- Any construction related changes to the approved plan must come through the design engineer to VDOT for approval. Please allow a minimum of 5 business days for VDOT review.
- A Land Use Permit shall be obtained before any work is performed on the State's right-of-way. The permit is issued by this office and will require a $250 application fee and $10,000 surety bond coverage. Once satisfactory application has been made, a permit will normally take 20-30 days to process and issue.

If you have any questions or need further information, please do not hesitate to give me a call at (540) 984-5631.

Sincerely,

Bobby Boyce

Bobby Boyce
VODT Land Development Engineer
Clarke, Frederick, Shenandoah, & Warren Counties
14031 Old Valley Pike
Edinburg, VA 22824
(540) 984-5631

From: "Jim Davis" <jim.davis@vdh.virginia.gov>
To: "Ryan Fincham" <rfincham@clarkecounty.gov>
Sent: Monday, June 11, 2018 9:04:48 AM
Subject: Re: Kentland

Good Morning Ryan,

I found the revised plans in the front office. They were being held until payment was received for a construction permit. An application for a permit was attached. The revisions look fine. We will hold the application until payment is received. I don't think Ms. McDowell plan to submit the permit fee until she knows the proposal is approved.

Thanks

Jim

Jim Davis, REHS

Environmental Health Supervisor

Clarke, Page & Warren Offices

Direct Line: 540.551.8434

jim.davis@vdh.virginia.gov

On Wed, Jun 6, 2018 at 2:42 PM, Ryan Fincham <rfincham@clarkecounty.gov> wrote:

John Lewis informed me that he sent you a revised plan directly for comment. Please confirm and let me know when you may issue comments. Thank you!

Ryan Fincham,
Senior Planner & Zoning Administrator
Clarke County, Virginia
(540) 955 - 5131

Commonwealth of Virginia

Application for: ☐ **Sewage System** ☐ **Water Supply**

VDH Use Only
Health Department ID# _____
Due Date _____

Owner THE KENTLAND FOUNDATION — Phone 703-431-2575
Mailing Address P.O. BOX 879 — Phone _____
BERRYVILLE, VA 22611 — Fax _____
Agent PAINTER-LEWIS, P.L.C. — Phone 540-662-5792
Mailing Address 817 CEDAR CREEK GRADE #120 — Phone _____
WINCHESTER VA 22601 — Fax _____
Site Address KENTLAND LANE
Email _____
Directions to Property: RT 7 EAST FROM BERRYVILLE, RIGHT ON KENTLAN LANE
Subdivision _____ Section _____ Block _____ Lot _____
Tax Map 15-A-12 Other Property Identification _____ Dimension/Acreage of Property 343AC

Sewage System (New Construction)

Construction permits are valid for 18-months. Owners are advised to apply for a construction permit if they intend to build within 18 months of completing this application. Certification letters do not expire, may be recorded in the land records, and transfer with a property sale. For which are you applying? ☐ Certification Letter ☒ Construction Permit

Sewage System (Existing Construction)

Check all that apply: ☐ Repair ☒ Modification ☐ Expansion ☐ Replacement ☐ Upgrade

Do you wish to apply for a betterment loan eligibility letter? _____ If yes, there is a $50.00 fee for determination of eligibility.

Sewage System (New or Existing Construction)

☐ Single Family Home (**Number of Bedrooms** ___) ☐ Multi-Family Dwelling (**Total Number of Bedrooms** ___)

☒ Other (describe) EVENT VENUE

Basement? Yes/(No) (circle one). Walk-out Basement? Yes/(No) (circle one) Fixtures in Basement? Yes/(No) (circle one).

Conditional permit desired? Yes/(No) (circle one). If yes, which conditions do you want?

☐ Reduced water flow ☐ Limited occupancy ☐ Intermittent of seasonal use ☐ Seasonal or temporary use not to exceed 1 year

Water Supply

Will the water supply be Public or (Private) (circle one). Is the water supply (Existing) or Proposed (circle one).

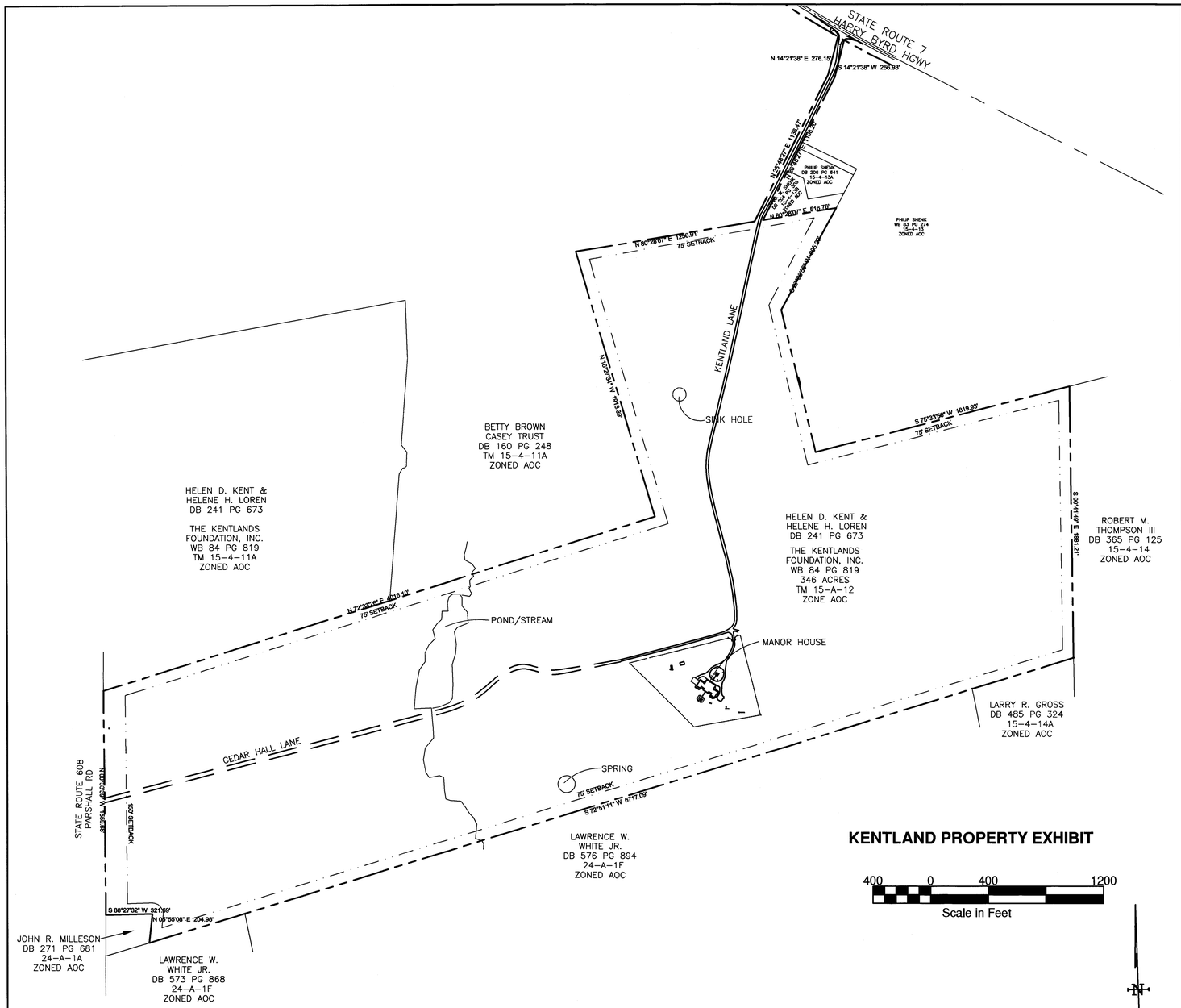
If proposed, is this a replacement well? Yes/No (circle one). Will the old well be abandoned? Yes/No (circle one).

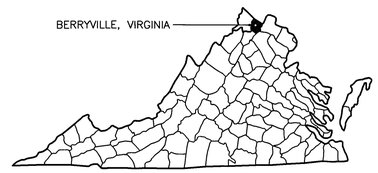
Will any buildings within 50' of the proposed well be termite treated? Yes/(No) (circle one).

Note: For sewage systems, a plat of the property may be required and a site sketch is always expected. For water supplies, a plat of the property is not required and a site sketch is always expected. The site sketch should show your property lines, actual and/or proposed buildings and the desired location of your well and/or sewage system. Your property lines, building location and the proposed well and sewage system sites must be clearly marked and sufficiently visible to see the topography.

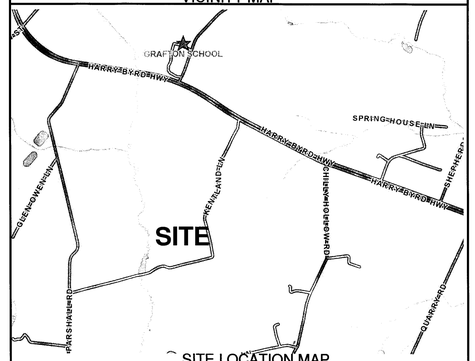
I give permission to the Virginia Department of Health to enter onto the property during normal business hours for the purpose of processing this application and to perform quality assurance checks of evaluations and designs until an operation permit is approved.

_____ 5-23-18
Signature of Owner/Agent Date





VICINITY MAP



SITE LOCATION MAP

GENERAL NOTES:

OWNER:
TM# 15-A-12
The Kentland Foundation, Inc.
P. O. Box 879
Berryville, VA 22611

Contact: Ms. Julianna McDowell
Tel: 703-431-2575

ENGINEER/LANDSCAPE ARCHITECT:

Painter-Lewis, PLC
817 Cedar Creek Grade, Suite 120
Winchester, Virginia 22601

Contact: John C. Lewis, P.E.,L.L.A.
Tel: 540-662-5792

PROJECT NARRATIVE:
The existing manor house is situated within a 10 acre, fenced area. The owner intends to provide an event venue within the fenced area using the manor house and grounds. Most events will be weddings and similar events and will occur on a seasonal basis on weekends. The maximum number of persons and staff which will attend a single event on any day is 149. Access to the site will be from the existing Kentlands entrance on Route 7. A gravel parking area will be constructed. Improvements will be made to the existing septic disposal system to accommodate the anticipated increase in septage. The existing well will provide water for use at the events. The well will operate at events less that 60 days out of the year. Low voltage lighting will be installed to illuminate the proposed path from the parking lot to the manor house and from the manor house to the proposed tent pad area.

EXISTING PARCEL DATA:

Existing Zoning:	AOC-Agricultural/Open Space/Conservation
Lot Area:	343.8 ac.(PARCEL METES & BOUNDS ARE FROM DEED)
Existing Use:	Residential/Agriculture
Proposed Use:	Public Assembly, Minor Commercial/Agriculture

Building Restriction Lines for Parcels with 20 acres and greater:

From Edge of Private Access Easement:	Required-75'
From scenic byway/secondary road:	Required-150'
From centerline of secondary highway:	Required-100'
From edge of primary highway:	Required-125'
From all property lines:	Required-75'
From intermittent streams:	Required-50'
From perennial streams, springs & sinkholes:	Required-100'

Maximum Structure Height: 35'

Parking Requirements:
Parking Spaces Required: None
Section 4-J-1 applies to building construction. No building is proposed.
Section 4-J-10 does not list event venue as a specific use.

Parking Spaces Provided: 50 spaces Including 2 ADA spaces

Trash Removal: The owner will contract with a licensed, private trash hauler for the regular removal of trash.

Environmental Features:
Wetlands - No wetlands have been identified within the construction area.
Flood plains - FIRM Map Nos. 51043C0064D and 51043C0152D show that the parcel is outside the 0.2% annual chance floodplain.

The total area of disturbance will be 0.52 acres.

Stormwater will be conveyed from the site by adequate channel.

ABBREVIATIONS

ASSY.	ASSEMBLY
B.F.	BASEMENT FLOOR
BLK.	BLOCK
BC	BOTTOM OF CURB
BML	BUILDING MOUNTED LIGHT
BP	BREAK POINT
CG-2	VDOT CURB
CG-6	VDOT CURB & GUTTER
CIP	CAST IN PLACE CONCRETE
CL	CLASS
CMF	CONCRETE MONUMENT FOUND
CPP	CORRUGATED POLYETHYLENE PIPE
CMP	CORRUGATED METAL PIPE
CMPA	CORRUGATED METAL PIPE ARCH
CO	CLEAN OUT
DIA.	DIAMETER
DS	DOWNSPOUT
EOP	EDGE OF PAVEMENT
EOG	EDGE OF GRAVEL
ESMT.	EASEMENT
EX.	EXISTING
F.F.	FIRST FLOOR
F.F.E.	FINISHED FLOOR ELEVATION
FDC	FIRE DEPARTMENT CONNECTION
FH	FIRE HYDRANT
F.L.S.	FIRE LANE SIGN
F.LT.	FLOOD LIGHT
Ga.	GAUGE
GM	GAS METER
GV	GAS VALVE or GATE VALVE
HCR	HANDICAP RAMP
HB	HOSE BIB
HDR CURB	6" HEADER CURB
HP	HIGH POINT
INC	INCREASER
INV	INVERT
IPF	IRON PIPE FOUND
IPS	IRON PIPE SET
LP	LOW POINT
LT.	LIGHT
MLP	METAL LIGHT POLE
MPD	MULTI-PRODUCT DISPENSER
MP	METAL POST
MH	MANHOLE
NDC	NOSE DOWN CURB
N.P.S.	NO PARKING SIGN
NLT	NO LEFT TURN
NRT	NO RIGHT TURN
N.T.S.	NOT TO SCALE
OHE	OVERHEAD ELECTRIC
OHT	OVERHEAD TELEPHONE
PIV	POST INDICATOR VALVE
PL	PROPERTY LINE
PP	POWER POLE
PROP.	PROPOSED
PVMT	PAVEMENT
RCP	REINFORCED CONCRETE PIPE
R.D.	ROOF DRAIN
RED.	REDUCER
R.O.	ROCK OUTCROP
SAN.	SANITARY
SEW.	SEWER
STD.	STANDARD
T.B.D.	TO BE DEMOLISHED
T.B.R.	TO BE REMOVED
T.B.P.	TO BE PRESERVED or PROTECTED
TB or T.B.	THRUST BLOCK
TC	TOP OF CURB
TEL.	TELEPHONE
TRB	TELEPHONE RISER BOX
TVRB	TELEVISION RISER BOX
TYP or TYP.	TYPICAL
UGE	UNDERGROUND ELECTRIC
UGG	UNDERGROUND GAS
UG CATV	UNDERGROUND CABLE T.V.
UGT	UNDERGROUND TELEPHONE
XFMR	ELECTRIC TRANSFORMER
WL	WATERLINE
WM	WATER METER
WPP	WOOD POWER POLE
WTP	WOOD TELEPHONE POLE
WV	WATER VALVE
25'R	RADIUS IN FEET
*00.00	PROPOSED SPOT ELEVATION
x(00.00)	EXISTING SPOT ELEVATION

HATCHING INDICATES REVERSED PITCH IN THE GUTTER PAN: PITCH TO BE 1/2" PER FOOT. TRANSITION THE GUTTER OVER A 10' LENGTH (TYP).

LIST OF DRAWINGS:

COMMONWEALTH OF VIRGINIA
JOHN C. LEWIS
Lic. No. 021681
PROFESSIONAL ENGINEER
5-23-18

TRAFFIC IMPACT:

VDOT 2017 Jurisdiction Report 21
Route 7, Berryville Pike AADT=25,000

Data Source: ITE Manual, Ninth Edition
Land Use 560: Church (similar to wedding event venue)
Trips based on seats: 149 seats

Weekday:	0.61x149=91 trips (50% entering, 50% exiting)
Saturday:	0.90x149=134 trips (50 entering, 50% exiting)
Saturday Peak Hour:	0.60x149=89 trips (43% entering, 57% exiting)
Sunday:	1.85x149=275 trips (50 entering, 50% exiting)
Sunday Peak Hour:	0.61x149=91 trips (50% entering, 50% exiting)

Right turns into the site at peak hour=46 trips. Total approach vehicles per hour=1320 vehicles. Per Figure 3-27 of Road Design Manual, a taper is required at the entrance.

UTILITY AND REGULATORY CONTACTS:

WATER AND SEWER SERVICE
Clarke County Health Department
100 North Buckmarsh Street
Berryville, VA 22611
540-955-1033

BUILDING INSPECTIONS
Clarke County Building Department
101 Chalmers Ct., Suite B
Berryville, VA 22611
540-955-5112

EROSION AND SEDIMENT CONTROL
Clarke County Building Department
101 Chalmers Ct., Suite B
Berryville, VA 22611
540-955-5112

PUBLIC ROAD IMPROVEMENTS
Virginia Department of Transportation
14031 Old Valley Pike
Edinburg, VA 22824
540-984-5631

NATURAL GAS
Washington Gas
350 Hillandale Lane
Winchester, VA 22602
540-868-7923

ELECTRIC SERVICE
Shenandoah Valley Electric Cooperative
3463 Valley Pike
Winchester, VA 22602
540-450-0111

TELEPHONE SERVICE
Verizon
404 Hillandale Lane
Winchester, VA 22602
540-665-3156

RESPONSIBLE LAND DISTURBER

NAME: _____

CERTIFICATION #: _____

DATE: _____

THE RESPONSIBLE LAND DISTURBER IS THE PARTY RESPONSIBLE FOR CONSTRUCTION & MAINTENANCE OF ALL THE LAND DISTURBING ACTIVITIES AS SET FORTH IN THESE PLANS.

THE KENTLAND FOUNDATION, INC.
EVENT VENUE
SITE DEVELOPMENT PLAN
CLARKE COUNTY, VIRGINIA

CHAIRMAN OF BOARD OF SUPERVISORS DATE

ZONING ADMINISTRATOR DATE

PROPERTY OWNER DATE
CLARKE COUNTY, VIRGINA

SITE PLAN EXPIRES FIVE (5) YEARS FROM DATE OF APPROVAL

CONSULTING ENGINEERS

PAINTER-LEWIS, P.L.C.
817 Cedar Creek Grade, Suite 120
Winchester, Virginia 22601
Telephone (540) 662-5792
Facsimile (540) 662-5793
Email: office@painterlewis.com

JOB NO.: 1709035
March 16, 2018
Latest Revision Date: May 23, 2018

SHEET: 1/6

30 0 30 90

Scale in Feet

N

REMOVE FENCE & INSTALL NEW ENTRANCE WITH 10' CHAMFERS

PROPOSED GRAVEL PARKING LOT AND ACCESS:
8"-VDOT 21B ON COMPACTED SUBGRADE(TYP)
INSTALL TO LINES AND EXISTING GRADE GENERALLY AS SHOWN
PROVIDE 9' X 18' PARKING STALLS
STRIPING IS FOR ILLUSTRATION PURPOSES ONLY

24.00'

21.00'

60.00'

235.00'

6' WIDE GRAVEL PATH
5" VDOT 21B ON COMPACTED SUBGRADE
INSTALL TO LINES GENERALLY AS SHOWN

LIMITS OF CLEARING AND GRADING

EX. DRAINFIELD

NEW PUMP TANK

EX. SEPTIC TANK

NEW LIFT

PAVED ADA PATH TO TENT

80.00'

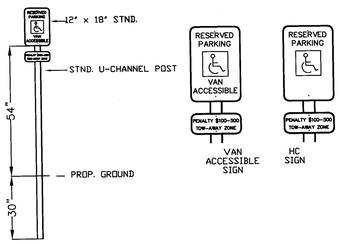
PROPOSED TENT AREA

ACTIVE WELL

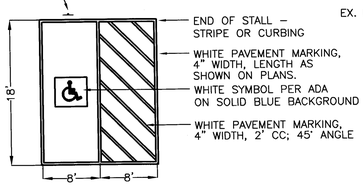
INASTIVE WELL

EX. FENCE

DENSE VEG.



HANDICAP SIGN DETAIL
NOT TO SCALE



NOTE:
ALL CONSTRUCTION SHALL CONFORM TO ADA ACCESSIBILITY GUIDELINES FOR BUILDINGS AND FACILITIES.
PAINT: NO-REFLECTORIZED, ACRYLIC LATEX TYPE 442XX TRAFFIC MARKING PAINT BY DEVOE, LOUISVILLE, KY OR EQUAL
PLEASE REFER TO THE SITE PLAN FOR THE PROPOSED LAYOUT AND ORIENTATION OF THE ACCESSIBLE PARKING AREA.

PARKING LOT STRIPING DETAIL
NOT TO SCALE

REVISIONS

NO.	DATE	DESCRIPTION	BY
1	5/21/18	AGENCY COMMENTS	P-L

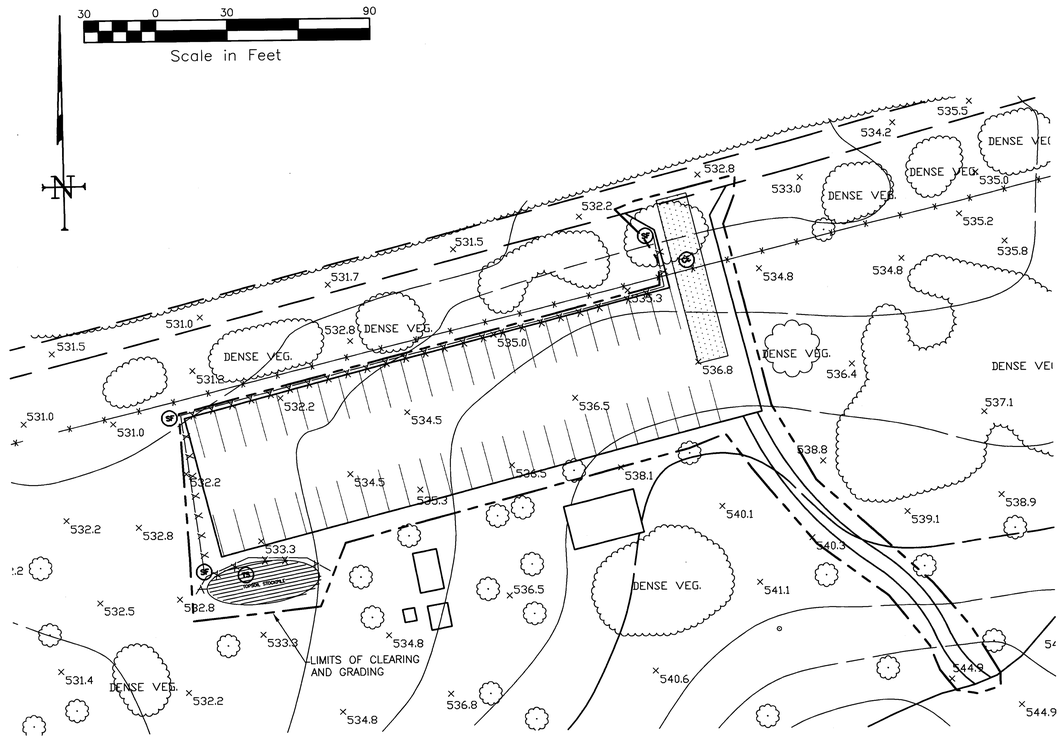
TITLE: SITE PLAN
ENTRANCE IMPROVEMENT PLAN

PROJECT: KENTLAND
EVENT VENUE
SITE DEVELOPMENT PLAN
CLARKE COUNTY, VIRGINIA

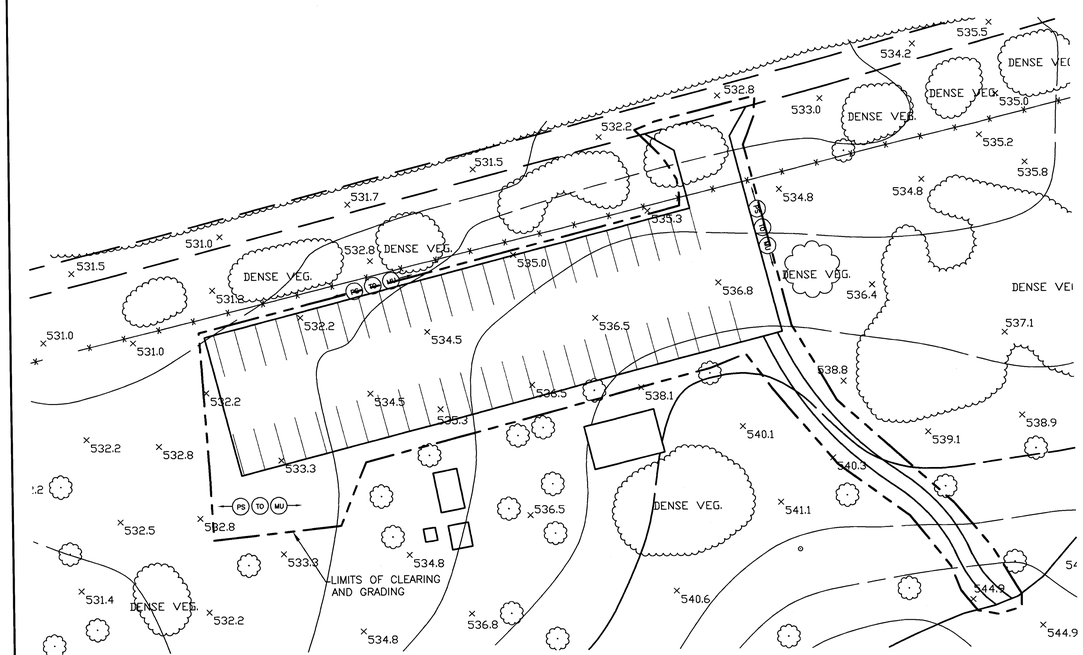
PAINTER-LEWIS, P.L.C.
CONSULTING ENGINEERS
817 Cedar Creek Grade, Suite 120
Winchester, Virginia 22601
Telephone (540) 662-5792
Facsimile (540) 662-5793
Email office@painterlewis.com

COMMONWEALTH OF VIRGINIA
JOHN C. LEWIS
LIC. No. 021621
PROFESSIONAL ENGINEER

SURVEY: P-L	C.I.: 2'
DRAWN BY: P-L	JOB NO.: 1709035
SCALE: SHOWN	DATE: 3/16/18
SHEET:	2/6



PHASE 1 EROSION & SEDIMENT CONTROL PLAN
SCALE: 1"=30'



PHASE 2 EROSION & SEDIMENT CONTROL PLAN
SCALE: 1"=30'

EROSION AND SEDIMENT CONTROL NARRATIVE:

Project Description
The property delineated on this plan is located on the south side of Route 7 about one mile east of Berryville. The site contains an existing building which is proposed for use as an event venue. The property owner proposes to provide parking for and access to the building. There will be an increase in impervious area 0.37 acres. No increase in impervious area due to the proposed improvements will occur at the Route 7 entrance.

Existing Site Conditions
The existing site is generally open field/lawn with intermittent shade trees and landscaped areas. The site drains to the northwest into Dog Run which is a tributary to the Shenandoah River.

Soils
The USGS Soils map shows the predominant soil types on the site are:

38B POPLIMENTO–WEBBTOWN COMPLEX, 3 TO 8 PERCENT SLOPES, K=0.43

51B TIMBERVILLE SILT LOAM, 0 TO 7 PERCENT SLOPES, K=0.43

Mapping Unit Name	Mapping Unit Number	Hydrologic Class	Hydric
Poplimento–Webbtown Complex	38B	C	no
Timberville silt loam	51B	B	no

Adjacent Areas
The construction site is located within a 10 acre, fenced area within the 383 acres parcel. The adjacent areas are used for agriculture.

Off–site Areas
No off–site areas will be disturbed with the exception of improvements to the entrance from Route 7.

Critical Areas
There are no critical areas.

All perimeter sediment control devices shall be erected prior to any land disturbing activities and shall remain in place until the site is fully stabilized.

The contractor shall perform overlot grading to provide positive drainage and preclude ponding of water.

Cut and fill slopes shall be graded at a maximum of 3 horizontal to 1 vertical unless otherwise noted.

The total area of disturbance associated with this project is approximately 0.72 acres. The work shown on these plans will begin in the summer of 2018. The length of time for construction is about one month.

PHASE 1 Erosion and Sediment Control Measures
3.01 Where silt fence or earth berms are not present to delineate the limits of disturbance, install orange safety fence as required to prevent unauthorized disturbance. Inspect the fencing weekly and make repairs as necessary.

3.02 A 12'w by 70'l temporary stone construction entrance will be constructed at the entrance to the new parking lot and shall be maintained in a condition which will prevent tracking or flow of mud onto the public rights–of–way. This may require periodic top dressing with additional stone or the washing and reworking of existing stone as conditions demand and repair and/or cleanout of any structures used to trap sediment. The southern entrance to the dumpster area is asphalt. No additional stone will be place at this location, however it shall be maintained in a condition which will prevent tracking or flow of mud onto the public rights–of–way.. All materials spilled, dropped, washed, or tracked from vehicles onto roadways or into storm drains must be removed immediately. The use of water trucks to remove materials dropped, washed, or tracked onto roadways will not be permitted under any circumstances.

3.05 Silt fence will be installed in selected locations downstream from the construction areas as a first measure of construction. Silt fence will be installed around the downstream side of topsoil stockpiles. Silt fences shall be inspected after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately. Damaged, decomposed or otherwise ineffective silt fence shall be replaced. Sediment deposits shoould be removed after each storm event. They must be removed when deposits reach approximately one–half the height of the barrier. Any sediment deposits remaining in place after the silt fence is no longer needed shall be dressed to conform with the existing grade and stabilized.

3.31 Temporary seeding in accordance with the E & S Std & Spec 3.31 will be applied to the topsoil stock pile and all areas which will not be brought to final grade within 14 days. Embankment or excavated slopes denuded for a period of greater than 30 days shall be temporarily seeded and mulched. All temporary seeding areas will be mulched in accordance with the schedule included herein.

Temporary Seeding SEED TYPE	RATE	MIN. PURITY(%)	MIN. GERM.(%)
Sept 1 – Feb 15:			
Annual Ryegrass	75 lb/ac	98	85
Winter Rye	75 lb/ac	98	85
May 1 – Aug 31:			
German Millet	75 lb/ac	98	85
or			
Feb 16 – Apr 30:			
Annual ryegrass	75 lb/ac	98	85
Mulch: 1.5 ton/ac small grain straw & Fertilizer:			1000 lb/ac 10–10–10

PHASE II EROSION AND SEDIMENT CONTROL MEASURES

3.05 If required, silt fence will be maintained from Phase 1 or installed in selected locations downstream from the construction stabilization or after the temporary measures are no longer needed, unless otherwise authorized by the VESCP. Trapped sediment and the disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.

3.30 Replacement of topsoil will generally occur throughout the work site where vegetation is to be reestablished. Topsoil will be uniformly spread and rolled to a minimum depth of 6". Topsoil shall not be placed while in a frozen of wet condition.

3.32 All disturbed areas will be stabilized by permanent seeding in accordance with the schedule included herein. The anticipated time for construction is June 2018 to July 2018.

3.35 All seeded areas will be mulched in accordance with the schedule included herein.

Permanent Stabilization
Permanent soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year. The contractor shall establish vegetation on all areas not otherwise stabilized according the following specification:

Seedbed Preparation:
a. Scarify top 1" to 2" of soil after final grades have been achieved.
b. Add 3 tons per acre pulverized agricultural limestone(140lb/1000sf)

SEED TYPE	RATE	MIN. PURITY(%)	MIN. GERM.(%)
Tall fescue	120 lb./ac	97	85
Red clover	8 lb./ac	95	65
Ladino clover	8 lb./ac	95	65
Nurse Grass–(season dependent)			
Sept 1 – Feb 15:			
Annual Ryegrass	12 lb./ac	98	85
Winter Rye	12 lb./ac	98	85
May 1 – Aug 31:			
German Millet	12 lb./ac	98	85
or			
Feb 16 – Apr 30:			
Annual ryegrass	12 lb./ac	98	85
Mulch: 1.5 ton/ac small grain straw & Fertilizer:			1000 lb/ac 10–10–10

PHASE 1 EROSION AND SEDIMENT CONTROLS SEQUENCE OF CONSTRUCTION
1. Install temporary construction entrance.
2. Install silt fence fence around construction area as required.
3. Disturb only that area of the parking lot that will be stabilized with stone in the same day.
4. Clear and grub existing vegetation in the proposed construction area.
5. Strip, stockpile, and stabilize topsoil.
6. Perform rough grading of site.
7. Install improvements.

PHASE 2 EROSION AND SEDIMENT CONTROLS SEQUENCE OF CONSTRUCTION
1. Perform final grading.
2. Apply permanent seeding on all disturbed areas.
3. Remove all temporary E&S controls after all areas are stabilized.

EROSION & SEDIMENT CONTROL KEY

3.02 TEMPORARY STONE CONSTRUCTION ENTRANCE	CE
3.05 SILT FENCE	SF
3.30 TOPSOILING	TO
3.31 TEMPORARY SEEDING	TS
3.32 PERMANENT SEEDING	PS
3.35 MULCHING	MU

9VAC25–840–40. MINIMUM STANDARDS 1–19:
A VESCP must be consistent with the following criteria, techniques and methods:

1. Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant for longer than 14 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.

2. During construction of the project, soil stockpiles and borrow areas shall be stabilized or protected with sediment trapping measures. The applicant is responsible for the temporary protection and permanent stabilization of all soil stockpiles on site as well as borrow areas and soil intentionally transported from the project site.

3. A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion.

4. Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment shall be constructed as a first step in any land–disturbing activity and shall be made functional before upslope land disturbance takes place.

5. Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation.

6. Sediment traps and sediment basins shall be designed and constructed based upon the total drainage area to be served by the trap or basin.

a. The minimum storage capacity of a sediment trap shall be 134 cubic yards per acre of drainage area and the trap shall only control drainage areas less than three acres.
b. Surface runoff from disturbed areas that is comprised of flow from drainage areas greater than or equal to three acres shall be controlled by a sediment basin. The minimum storage capacity of a sediment basin shall be 134 cubic yards per acre of drainage area. The outfall system shall, at a minimum, maintain the structural integrity of the basin during a 25–year storm of 24–hour duration. Runoff coefficients used in runoff calculations shall correspond to a bare earth condition or those conditions expected to exist while the sediment basin is utilized.

7. Cut and fill slopes shall be designed and constructed in a manner that will minimize erosion. Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilizing measures until the problem is corrected.

8. Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume or slope drain structure.

9. Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.
10. All storm sewer inlets that are made operable during construction shall be protected so that sediment–laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.

10. All storm sewer inlets that are made operable during construction shall be protected so that sediment–laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.

11. Before newly constructed stormwater conveyance channels or pipes are made operational, adequate outlet protection and any required temporary or permanent channel lining shall be installed in both the conveyance channel and receiving channel.

12. When work in a live watercourse is performed, precautions shall be taken to minimize encroachment, control sediment transport and stabilize the work area to the greatest extent possible during construction. Nonerodible material shall be used for the construction of causeways and cofferdams. Earthen fill may be used for these structures if armored by nonerodible cover materials.

13. When a live watercourse must be crossed by construction vehicles more than twice in any six–month period, a temporary vehicular stream crossing constructed of nonerodible material shall be provided.

14. All applicable federal, state and local regulations pertaining to working in or crossing live watercourses shall be met.

15. The bed and banks of a watercourse shall be stabilized immediately after work in the watercourse is completed.

16. Underground utility lines shall be installed in accordance with the following standards in addition to other applicable criteria:

a. No more than 500 linear feet of trench may be opened at one time.
b. Excavated material shall be placed on the uphill side of trenches.
c. Effluent from dewatering operations shall be filtered or passed through an approved sediment trapping device, or both, and discharged in a manner that does not adversely affect flowing streams or off–site property.
d. Material used for backfilling trenches shall be properly compacted in order to minimize erosion and promote stabilization.
e. Restabilization shall be accomplished in accordance with these regulations.
f. Applicable safety regulations shall be complied with.

17. Where construction vehicle access routes intersect paved or public roads, provisions shall be made to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment is transported onto a paved or public road surface, the road surface shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed in this manner. This provision shall apply to individual development lots as well as to larger land–disturbing activities.

18. All temporary erosion and sediment control measures shall be removed within 30 days after final site

19. Properties and waterways downstream from development sites shall be protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of stormwater runoff for the stated frequency storm of 24–hour duration in accordance with the following standards and criteria. Stream restoration and relocation projects that incorporate natural channel design concepts are not man–made channels and shall be exempt from any flow rate capacity and velocity requirements for natural or man–made channels:

a. Concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or man–made receiving channel, pipe or storm sewer system. For those sites where runoff is discharged into a pipe or pipe system, downstream stability analyses at the outfall of the pipe or pipe system shall be performed.
b. Adequacy of all channels and pipes shall be verified in the following manner:
(1) The applicant shall demonstrate that the total drainage area to the point of analysis within the channel is one hundred times greater than the contributing drainage area of the project in question; or
(2) (a) Natural channels shall be analyzed by the use of a two–year storm to verify that stormwater will not overtop channel banks nor cause erosion of channel bed or banks.
(b) All previously constructed man–made channels shall be analyzed by the use of a ten–year storm to verify that stormwater will not overtop its banks and by the use of a two–year storm to demonstrate that stormwater will not cause erosion of channel bed or banks; and
(c) Pipes and storm sewer systems shall be analyzed by the use of a ten–year storm to verify that stormwater will be contained within the pipe or system.
c. If existing natural receiving channels or previously constructed man–made channels or pipes are not adequate, the applicant shall:
(1) Improve the channels to a condition where a ten–year storm will not overtop the banks and a two–year storm will not cause erosion to the channel bed or banks; or
(2) Improve the pipe or pipe system to a condition where the ten–year storm is contained within the appurtenances;
(3) Develop a site design that will not cause the pre–development peak runoff rate from a two–year storm to increase when runoff outfalls into a natural channel or will not cause the pre–development peak runoff rate from a ten–year storm to increase when runoff outfalls into a man–made channel; or
(4) Provide a combination of channel improvement, stormwater detention or other measures which is satisfactory to the VESCP authority to prevent downstream erosion.
d. The applicant shall provide evidence of permission to make the improvements.
e. All hydrologic analyses shall be based on the existing watershed characteristics and the ultimate development of the subject project.
f. If the applicant chooses an option that includes stormwater detention, he shall obtain approval from the VESCP of a plan for maintenance of the detention facilities. The plan shall set forth the maintenance requirements of the facility and the person responsible for performing the maintenance.
g. Outfall from a detention facility shall be discharged to a receiving channel, and energy dissipaters shall be placed at the outfall of all detention facilities as necessary to provide a stabilized transition from the facility to the receiving channel.
h. All on–site channels must be verified to be adequate.
i. Increased volumes of sheet flows that may cause erosion or sedimentation on adjacent property shall be diverted
to a stable outlet, adequate channel, pipe or pipe system, or to a detention facility.
j. In applying these stormwater management criteria, individual lots or parcels in a residential, commercial or industrial development shall not be considered to be separate development projects. Instead, the development, as a
whole, shall be considered to be a single development project. Hydrologic parameters that reflect the ultimate development condition shall be used in all engineering calculations.
k. All measures used to protect properties and waterways shall be employed in a manner which minimizes impacts
on the physical, chemical and biological integrity of rivers, streams and other waters of the state.
l. Any plan approved prior to July 1, 2014, that provides for stormwater management that addresses any flow rate capacity and velocity requirements for natural or man–made channels shall satisfy the flow rate capacity and velocity requirements for natural or man–made channels if the practices are designed to (i) detain the water quality volume and to release it over 48 hours; (ii) detain and release over a 24–hour period the expected rainfall resulting from the one year, 24–hour storm; and (iii) reduce the allowable peak flow rate resulting from the 1.5, 2, and 10–year, 24–hour storms to a level that is less than or equal to the peak flow rate from the site assuming it was in a good forested condition, achieved through multiplication of the forested peak flow rate by a reduction factor that is equal to the runoff volume from the site when it was in a good forested condition divided by the runoff volume from the site in its proposed condition, and shall be exempt from any flow rate capacity and velocity requirements for natural or man–made channels as defined in any regulations promulgated pursuant to 62.1–44.15:54 or 62.1–44.15:65 of the Act.
m. For plans approved on and after July 1, 2014, the flow rate capacity and velocity requirements of 62.1–44–15:52A of the Act and this subsection shall be satisfied by compliance with water quantity requirements in the Stormwater Management Act (62.1–44.15:24 et seq. of the Code of Virginia) and attendant regulations, unless such land disturbing activities are in accordance with 9VAC25–870–48 of the Virginia Stormwater Management Program (VSMP) Regulations.
n. Compliance with the water quality standards set out in 9VAC25–870–66 of the Virginia Stormwater Management Program (VSMP) Regulations shall be deemed to satisfy the requirements of subdivision 19 of this subsection.

REVISIONS

NO.	DATE	DESCRIPTION	BY
1	5/21/18	AGENCY COMMENTS	P–L

TITLE:
EROSION & SEDIMENT CONTROL NOTES
PHASE 1 E&S PLAN
PHASE 2 E&S PLAN

PROJECT:
KENTLAND EVENT VENUE
SITE DEVELOPMENT PLAN
CLARKE COUNTY, VIRGINIA

PAINTER–LEWIS, P.L.C.
817 Cedar Creek Grade, Suite 120
Winchester, Virginia 22601
Telephone (540) 662–5792
Facsimile (540) 662–5793
Email office@painterlewis.com
CONSULTING ENGINEERS

COMMONWEALTH OF VIRGINIA
JOHN C. LEWIS
Lic. No. 021621
PROFESSIONAL ENGINEER

SURVEY: P–L	C.I.: 2'
DRAWN BY: P–L	JOB NO.: 1709035
SCALE: SHOWN	DATE: 3/16/18
SHEET:	3/6

Construction Notes:

1. All work and materials shall conform to the current standards of Clarke County, Virginia, the regulations of the Americans with Disabilities Act, where applicable, the Virginia Department of Transportation, and all applicable codes.

2. Erosion and sediment control shall conform to the standards and specifications of the Commonwealth of Virginia, where applicable.

3. It shall be the responsibility of the Contractor to notify "Miss Utility" at 811 at least five (5) working days, but not more than ten (10) days prior to commencement of any land disturbing activity.

4. Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant for longer than 14 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.

5. All existing utilities have been shown based upon the best available information. However, there may be existing utilities which are not shown and should be located. Therefore, it will be the responsibility of the Contractor to verify the location of all existing utilities prior to construction. Any discrepancies between these plans and the actual field conditions shall be reported immediately to the Engineer, the owner, and the appropriate utility company.

6. All proposed utilities shall be installed underground.

7. It shall be the responsibility of the Contractor to obtain all permits necessary for construction prior to the commencement of work. An approved set of construction documents shall be present on the site at all times.

8. Topographic information was derived from an aerial survey coordinated by Painter–Lewis, P.L.C. The field survey has been based on U.S.C. and G.S. datum and a contour interval of two (2) feet has been established for this project. Contact Painter–Lewis, P.L.C. at 540–662–5792 to establish vertical control for project construction. Boundary information is derived from deeds of record and has not been verified by field survey.

9. No geotechnical report has been prepared for this project by Triad Engineering.

10. All radii designations indicate face of curb, edge of pavement, or edge of stone pavement, where applicable.

11. The Contractor shall coordinate the relocation of and the connection to the existing utilities with the appropriate utility company, where applicable.

12. The Contractor shall provide all AS BUILT documents and plans to the regulatory agency requiring such.

13. The approval of these plans shall in no way relieve the owner of complying with other applicable local, State and Federal requirements. All applicable state and federal permits shall be obtained prior to disturbances within and jurisdictional waters and wetlands.

Erosion and Sediment Control:
1. All Erosion and Sediment Control measures shall be installed prior to any land disturbing activities. All work shall be done in accordance with the current edition of the of Commonwealth of Virginia Erosion and Sediment Control Handbook.

2. All work shall be confined to the designated Limits of Construction.

3. The Contractor shall be responsible for the installation and maintenance of all Erosion and Sediment Control measures. All Measures shall be inspected daily and after each significant rainfall by the site superintendent or his representative. Any damaged structures shall be repaired or replaced be the end of that work day.

4. Upon completion of construction, all permanent erosion and sediment control measures shall be installed. After stabilization, the temporary Erosion Control devices shall be removed, as approved by the Local Inspection Authority. All vegetative cover shall be checked regularly and any damaged areas shall be repaired, fertilized, replanted, and mulched, as needed.

5. The Contractor shall provide adequate means of cleaning trucks and other construction equipment prior to entering the public R–O–W. If necessary, a trash rack shall be used as part of the Construction Entrance to help in the control of potential mud generated as part of the development of this site. If it is determined that this is not sufficient, then a wash rack shall be installed, as needed. It is the responsibility of the Contractor to maintain clean streets and to allay dust at all times.

Paving and Concrete:
1. The proposed public roads, main drive aisles, and parking areas shall receive the minimum pavement sections, as detailed on the plans. All points of connection with the existing pavement sections shall be graded as required to provide a smooth transition between the pavement sections.

2. All concrete shall be VDOT classification A–3. All work shall be done in accordance with standard practices.

Excavation and Grading:
1. Test pits shall be excavated to determine the depths and locations of all of the existing utilities. If conflicts exist, then the existing utilities shall be lowered or moved to promote the construction of the proposed development.

2. All deleterious materials, demolished debris, and cleared and grubbed materials shall be removed and properly disposed of off–site.

3. All topsoil or vegetative cover shall be excavated to its full depth and stockpiled on–site, if applicable, in the areas as directed by the Owner's representative for future finish grading.

4. All borrow fill material, if necessary, shall be obtained by the Contractor and approved by a Certified Geo–Technical Engineer. All fill material shall be placed in lifts of 8" or less and shall be compacted to 95% of ASTM D–698 Maximum Dry Density, or as directed by the Geo–Technical Engineer.

5. No blasting shall be permitted within 25 feet of existing utilities or structures without permission of the Owner.

6. All landscaped islands, slopes, and lawn areas shall receive a minimum of 4" topsoil obtained off–site or from the topsoil stockpile on site. The topsoil shall be graded and raked, prior to application of permanent vegetative cover.

7. All disturbed lawn areas shall be stabilized by the establishment of permanent turf grass installed in accordance with generally accepted practices.

Septic System Improvements
1. All sanitary sewer and water supply construction shall conform to the current standards of the Virginia Department of Health and Clarke County. The CONTRACTOR shall be responsible for obtaining all necessary permits for the installation of sewerage facilities.

2. Obtain a valid permit from the Health Department prior to construction of the system.

3. Install a 1000 gallon concrete pump tank from Winchester Building Supply, or equal.
chamber capacity: 1000 gallons
liquid volume per inch: 20 gallons/inch

4. Furnish and install a complete pumping system with a ZOELLER CO. Effluent Series Model 153. 1/2 HP, Septic Tank Effluent Pump (or equal). Provide controls to provide pump deactivate switch, pump activate switch, and high water alarm. Place the alarm and pump on separate circuits. Adjust the ball valve on the supply line so that the pump delivers 20 gallons per minute to the drainfield.

PUMP TANK

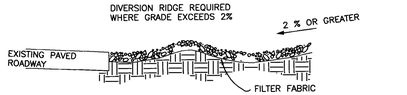
drawdown per pump cycle:	5"
pump head:	23 ft. +/–
delivery rate:	15 gpm
pump spec.:	ZOELLER CO. Model 153, 1/2 HP Centrifugal Pump

Item	Distance From Top of Pump Tank
pump on switch:	37"
pump off switch:	42"
high water alarm:	23"
reserve volume(above alarm):	23" = 360 gallons

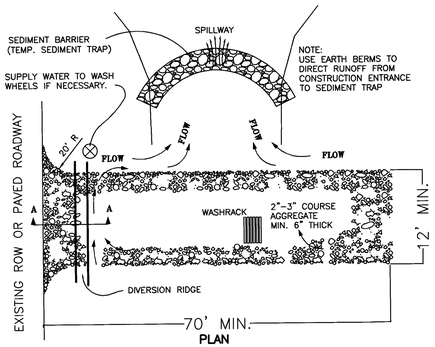
5. Control Panel
Install control panel. The control panel needs to be able to accommodate a 120V pump, proposed float system, and alarm. Use a CSI Fusion Control Panel or equal. The control panel must provide a timer mechanism which will insure that a maximum of 600 gallons of septage is conveyed to the drainfield each 24 hours. Set the timer mechanism to run the pump as follows:
pump run time: 5 minutes
pump rest time: 235 minutes

6. Install the pump tank between the existing septic tank and the drainfield. Reconfigure the septic tank discharge line to empty into the pump tank. Connect the force main from the pump tank into the existing line to the drainfield. Expose the existing distribution box and insure that it is working properly. If required, install a D–6 surge box before the distribution box to insure quiescent flow conditions.

7. Retrofit the existing septic tank with a plastic manhole riser and Zable filter on the outlet side.



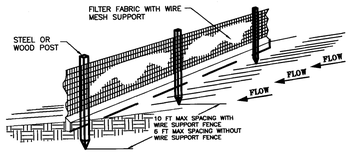
SECTION A – A

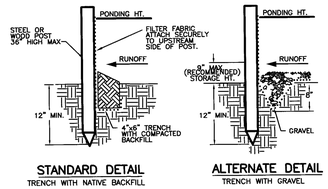


PLAN

NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT–OF–WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
4. INSTALL CATTLE GUARD IF REQUIRED.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE
NOT TO SCALE | VA EROSION AND SEDIMENT CONTROL HANDBOOK | 1992 | 3.02–1



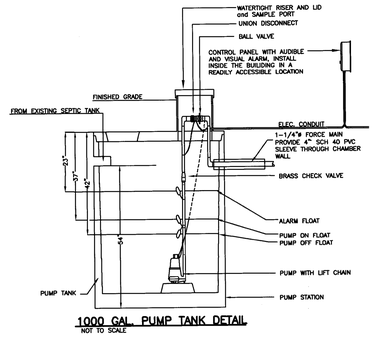


STANDARD DETAIL
TRENCH WITH NATIVE BACKFILL

ALTERNATE DETAIL
TRENCH WITH GRAVEL

NOTE:
1. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN NECESSARY.
2. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF–SITE AND CAN BE PERMANENTLY STABILIZED.
3. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.

SILT FENCE WITH WIRE SUPPORT
NOT TO SCALE | VA EROSION AND SEDIMENT CONTROL HANDBOOK | 1992 | 3.05–1



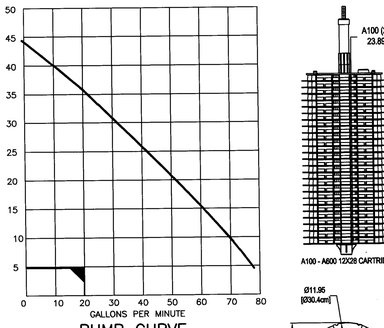
1000 GAL. PUMP TANK DETAIL
NOT TO SCALE

PROJECT: KENTLAND PROPERTY
PUMP TANK DOSING TO EXISTING DRAINFIELD

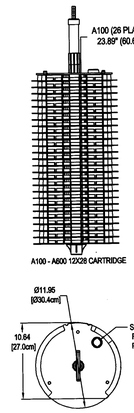
PUMP HEAD WORKSHEET

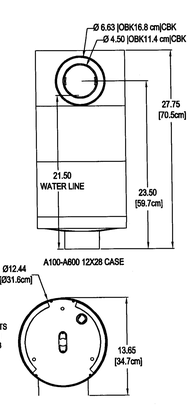
A PUMP	B PUMP ELEV.	C DISCHARGE ELEV.	D ELEV. HEAD (ft)	E LINE DIA. (in)	F FLOW (GPM)	G LINE VEL. (fps)	H LINE LENGTH (ft)	I FRICT. LOSS (ft)	J MINOR LOSSES (ft)	K SYSTEM HEAD (ft)	L PUMP HEAD (ft)	M PUMP HEAD (psi)
1	535.0	541.0	6	1.6	20.00	3.19	15	0.38	5.00	0.00	11.38	4.93

COLUMN	REMARKS
A	pump ID
B	pump invert elevation
C	elevation at d box
D	C – B
E	discharge line diameter
F	delivery pipe flow
G	=(F x 0.002228)/(3.14 x (E/24)^2)
H	delivery pipe length
I	=H x (F/(0.281 x 150 x E^2.63))^1.85
J	estimate
K	operating head of 0 psi
L	=D + I + K + J
M	pump head in psi



PUMP CURVE
Zoeller Model 153 – 1/2 HP





POLYLOK™ Inc.
Zabel A Division of Polylok Inc.

SEPTAGE DISPOSAL PLAN

Existing Facilities Design Basis:

dwelling size:	5 bedrooms
design flow/bedroom:	150 gallons
drain field total design flow:	750 gallons
volume of existing septic tank:	1500 gallons
volume of second septic tank:	1000 gallons
length of existing trenches:	100 feet
width of existing trenches:	3 feet
trench spacing provided:	10 feet
number of trenches:	8
trench area provided:	8x3ftx100ft=2400 sf

Proposed Design Basis:

number of daily employees:	4
design flow/employee:	15 gallons
max. number of events/week:	4
max. persons/event:	149
design flow/person:	5 gallons
peak flow /day:	805 gallons
max. flow/week:	3,400 gallons
proposed static storage volume:	2,500 gallons
design flow rate to drain fields:	20 gpm
design dose volume:	100 gallons
dosing duration:	5 min. by timer
design number of dosing events:	700/100=7
average time between dosing events:	[24 hrs–(7x5min)]/7=200 min.

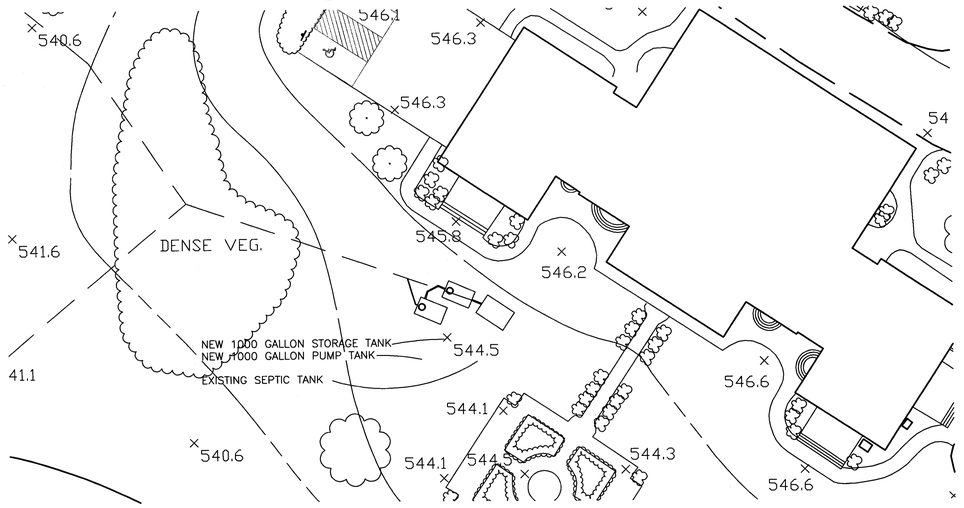
SYSTEM COMPONENT DESCRIPTION
A. Gravity Sewer and Pipes
Gravity sewer pipe and fittings called for on the plans shall be SCH 40 ASTM D 1784 with solvent cement joints assembled in accordance with ASTM D 2855. No bends greater than 45 degrees shall be used in the gravity sewer line.

The pipe trench bottom should be constructed to provide a firm, stable and uniform support for the full length of the pipe. Any part of the trench bottom excavated below embedment grade should be backfilled and compacted. Concrete thrust blocking should be provided at each change of direction of the force main. All pipe shall be installed with proper bedding providing uniform longitudinal support under the pipe.

Provide a minimum depth of bury of 36 inches. Install the pipe by placing the initial backfill material to a minimum depth of six inches over the top of the pipe and compacted. All pipe embedment material should be selected and placed carefully, avoiding stones over 1–1/2 inches in size, frozen lumps and debris. Sharp stones should be excluded from the embedment material.

B. Septic Tank
Install a new 1000 gallon concrete storage tank in series with the existing 1500 gallon tank. Use a concrete tank by Winchester Building Supply, or equal. The tank should be water tight. Install a Tuf–Tite complete riser system in the new storage tank. Install a Polylok–Zabel A100 filter in the discharge end of the tank. Any pipes entering or leaving the tank should be sealed by grout or rubber boot.

C. Pump Chamber
The pump chamber should be a 1000 gallon precast unit from Winchester Building Supply or equivalent. The tank should be water tight. All pipes entering or leaving the tank should be sealed by grout or rubber boot. The pump chamber will house a Zoller effluent pipe system. Coordinate with tank manufacturer to ensure fit.



SEPTIC SYSTEM IMPROVEMENT PLAN
SCALE: 1"=20'

1. LOCATE EXISTING SEPTIC TANK AND DISTRIBUTION BOX. INSPECT AND CONFIRM THAT THESE COMPONENTS ARE IN GOOD WORKING ORDER. REPORT THEIR CONDITION TO THE OWNER. REPLACE ANY COMPONENTS FOUND TO BE IN POOR CONDITION.
2. INSTALL THE NEW STORAGE TANK AND PUMP TANK GENERALLY AS SHOWN.
3. DIVERT FLOW FROM THE SEPTIC TANK TO THE NEW STORAGE TANK AND THE NEW STORAGE TANK TO THE NEW PUMP TANK USING SCH 40 PVC PIPING. INSURE A 2% MINIMUM SLOPE IN THE PIPING TO THE PUMP TANK. USE 45° MAXIMUM BENDS.
4. CONNECT THE DISCHARGE LINE FROM THE PUMP TANK TO THE EXISTING GRAVITY LINE TO THE DRAINFIELD WITH WATERTIGHT EXPANDERS AS REQUIRED.
5. INSTALL A PLASTIC MANHOLE RISER TO THE SURFACE ON THE OUTLET SIDE OF THE NE 1000 GALLON STORAGE TANK TO PROVIDE ACCESS TO A NEW ZABLE A100 FILTER. USE TUF–TIE CRS 24 X 14, OR EQUAL.

NO.	DATE	REVISIONS / DESCRIPTION	BY
1	5/21/18	AGENCY COMMENTS	P–L

TITLE: CONSTRUCTION NOES E&S DETAILS SEPTIC SYSTEM IMPROVEMENT PLAN

PROJECT: KENTLAND EVENT VENUE SITE DEVELOPMENT CLARKE COUNTY, VIRGINIA

PAINTER-LEWIS, P.L.C.
817 Cedar Creek Grade, Suite 120
Winchester, Virginia 22601
Telephone (540) 662–5792
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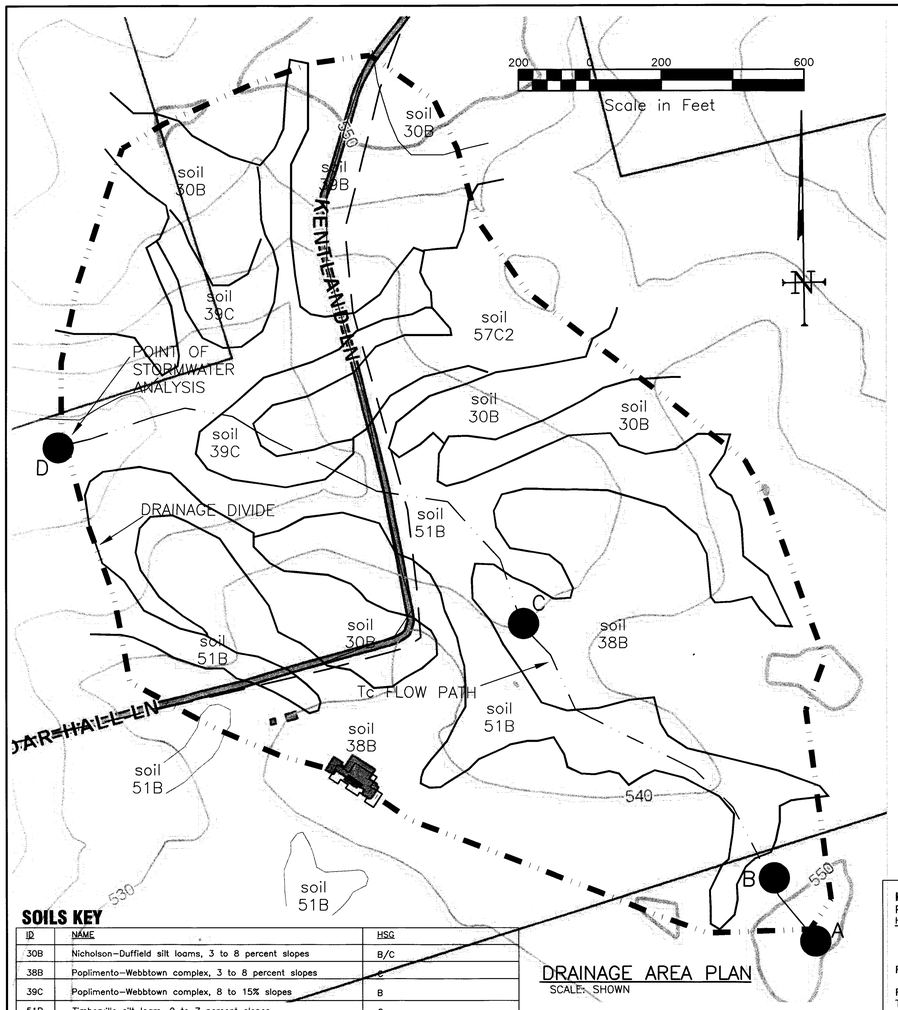
Email office@painterlewis.com
CONSULTING ENGINEERS

COMMONWEALTH OF VIRGINIA
JOHN C. LEWIS
Lic. No. 021621
PROFESSIONAL ENGINEER

SURVEY: P–L	C.I.: 2'
DRAWN BY: P–L	JOB NO.: 1709035
SCALE: SHOWN	DATE: 3/16/18
SHEET:	4/6



SOILS KEY

ID	NAME	HSG
30B	Nicholson–Duffield silt loams, 3 to 8 percent slopes	B/C
38B	Poplimento–Webbtown complex, 3 to 8 percent slopes	C
39C	Poplimento–Webbtown complex, 8 to 15% slopes	B
51B	Timberville silt loam, 0 to 7 percent slopes	C
57C2	Webbtown–Poplimento–rock outcrop	C

DRAINAGE AREA PLAN
SCALE: SHOWN

STORMWATER MANAGEMENT NARRATIVE

Water Quality
This construction site is 0.52 acres around the manor house and 0.20 acres at the Route 7 entrance, less than 1 acre. No VSMP construction permit is required.

Water Quantity
Runoff from the disturbed area from the manor house site discharges onto and across the existing driveway in the form of sheet flow. There are no defined drainage channels which receive runoff directly from the disturbed area. An analysis of the total contributing drainage area to a point where runoff leaves the Kentland property was completed. The increase in impervious area was attributed to the post development condition. No increase in peak runoff for the 10 year storm.
Predevelopment Runoff Analysis: Q10=69.21 cfs

Post development Runoff Analysis: Q10=69.21 cfs

The disturbed area, 0.52 acres, is less than 1% of the total contributing watershed, 77.0 acres, at the point of analysis.

Channel Protection
Section 9VAC25–870–66.B.4.a
Based on land area, the site's contributing drainage area is less than or equal to 1.0% or the total watershed.

Flood Protection
Section 9VAC25–870–66.C
There is no stormwater conveyance system.

DRAINAGE AREA DESCRIPTION	AC	IMPERVIOUS	TURF
PRE DEV LIMITS OF DISTURBANCE			
TOTAL	0.520	0.000	0.520
B SOILS	0.100	0.000	0.100
C SOILS	0.420	0.000	0.420
POST DEV LIMITS OF DISTURBANCE			
TOTAL	0.520	0.360	0.160
B SOILS	0.100	0.100	0.000
C SOILS	0.420	0.260	0.160
PRE DEV DRAINAGE AREA OF ANALYSIS	77.000	1.220	75.780
TO OUTFALL CROSS SECTION			
B SOILS	39.000	0.620	38.380
C SOILS	38.000	0.600	37.400
POST DEV DRAINAGE AREA OF ANALYSIS	77.000	1.590	75.410
TO OUTFALL CROSS SECTION			
B SOILS	39.000	0.720	38.280
C SOILS	38.000	0.870	37.130

Temporary Traffic Control Plan for Route 7

General Notes

1. This project is classified as a Traffic Management Category I project. Work during the project will include (1) the closure of the outside east lane to permit the construction of a moderate volume, private street entrance and mill and overlay operations. Temporary Traffic Controls for the closure of the lanes will generally conform to TTC 16.1.

2. The project is located on Route 7 about a mile east of Berryville in Clarke County. Route 7 is a arterial road with >5% trucks, a traffic volume of 25,000 vehicles per day, and a posted speed limit of 55 mph. The existing road at the site consists of two eastbound lanes.

3. The work consists of the reconfiguration and paving of an existing private street entrance.

4. The work zone will be approximately 1 mile in length.

5. The work zone will consist of a temporary lane closure of the outside eastbound lane to allow the contractor to sawcut and mill the existing asphalt. Work will be in accordance with the requirements of the Virginia Work Area Protection Manual (VWAPM) and the Manual of Uniform Traffic Control Devices (MUTCD). Eastbound traffic will be directed to the inside eastbound lane using signs and channeling devices. Accommodation for right turns will be provided using breaks in the channelizing devices.

6. VDOT Lane Closure Work Hours

Shoulder Closure:
Monday to Thursday: 9:30 AM to 3:00 PM; 10:00 PM to 5:00 AM
Friday: 9:30 AM to 2:00 PM
Friday to Saturday: 10:00 PM to 9:00 AM
Saturday to Sunday: 10:00 PM to 8:00 AM
Sunday to Monday: 10:00 PM to 5:00 AM

Lane Closure:
Monday to Thursday: 10:00 PM to 5:00 AM
Friday: Not allowed until 11:00 PM
Friday to Saturday: 11:00 PM to 5:00 AM
Saturday to Sunday: 11:00 PM to 6:00 AM
Sunday to Monday: 11:00 PM to 5:00 AM

The work hours may be extended to insure that excavations are made safe at the end of the work day.

7. The contractor shall provide an intermediate level Work Zone Safety Coordinator to develop the work zone and at least a basic level Work Zone Safety Coordinator to monitor and maintain the work zone.

8. The lane closure will generally follow a modified version of the Temporary Traffic Control Plan shown on these plans. The lane will be reopened each day. W20–1, W9–3R, W9–2LK, R4–V7L, G20–2, and W4–2R signs will be covered. Channelizing devices will be rearranged as required to restore movement.

9. The contractor shall maintain adequate access and sight distance to all properties. Emergency Vehicles and Postal Vehicles shall have access to properties at all times. Appropriate barriers will be installed along the edge of the lane as required.

9. All equipment and material storage shall be located outside of the clear zone. The clear zone for this project is 20' beyond the edge of the existing pavement, between the existing edge of pavement and the right of way lane.

10. Public Communications Plan

a. The Contractor shall notify the VDOT Project Manager/Residency Administrator of scheduled work plans and traffic delays a minimum of seven (7) days prior implementation of the work. VDOT will provide project information to the District Public Affairs in advance of the start of construction and weekly updates by noon on Thursday for the following week's work. Changes in the work plans shall be made immediately known to VDOT.

b. The Contractor shall notify the VDOT Project Manager/Residency Administrator of any unscheduled traffic delays immediately upon knowing the change to the work schedule.

SEQUENCE OF CONSTRUCTION

1. TTC–16.1 Outside Lane Closure on a Four–Lane Highway
Perform entrance work including:
–grading to proposed pavement subbase
–sawcutting existing pavement
–milling existing pavement
–installation of new asphalt pavement section
–replacement of existing pavement markings

KENTLAND SWM *Type II 24-hr 10-Year Rainfall=4.30"*
Prepared by Painter-Lewis, P.L.C. Printed 3/26/2018
HydroCAD® 10.00-15 s/n 08684 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 1S: PRE DEV

Runoff = 69.21 cfs @ 12.42 hrs, Volume= 7.963 af, Depth> 1.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=4.30"

Area (ac)	CN	Description
37.400	74	>75% Grass cover, Good, HSG C
0.600	98	Unconnected pavement, HSG C
38.380	61	>75% Grass cover, Good, HSG B
0.620	98	Unconnected pavement, HSG B
77.000	68	Weighted Average
75.780		98.42% Pervious Area
1.220		1.58% Impervious Area
1.220		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	150	0.0330	0.15		**Sheet Flow, SEGMENT AB** Grass: Dense n= 0.240 P2= 2.90"
17.7	1,000	0.0180	0.94		**Shallow Concentrated Flow, SEGMENT BC** Short Grass Pasture Kv= 7.0 fps
6.7	1,605		4.00		**Direct Entry, SEGMENT CD**
41.4	2,755	Total			

KENTLAND SWM *Type II 24-hr 10-Year Rainfall=4.30"*
Prepared by Painter-Lewis, P.L.C. Printed 3/26/2018
HydroCAD® 10.00-15 s/n 08684 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 4S: POST DEV

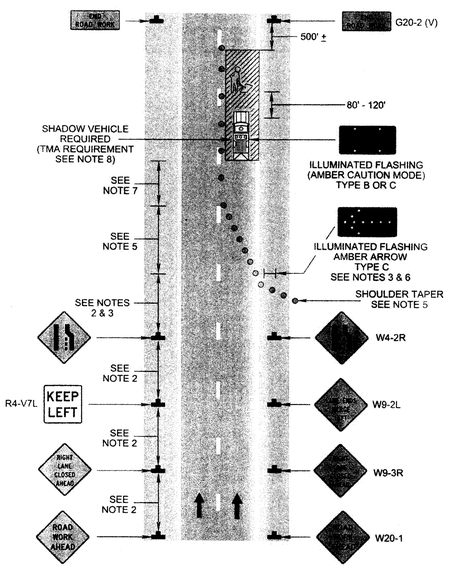
Runoff = 69.21 cfs @ 12.42 hrs, Volume= 7.963 af, Depth> 1.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=4.30"

Area (ac)	CN	Description
37.130	74	>75% Grass cover, Good, HSG C
0.870	98	Unconnected pavement, HSG C
38.280	61	>75% Grass cover, Good, HSG B
0.720	98	Unconnected pavement, HSG B
77.000	68	Weighted Average
75.410		97.94% Pervious Area
1.590		2.06% Impervious Area
1.590		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	150	0.0330	0.15		**Sheet Flow, SEGMENT AB** Grass: Dense n= 0.240 P2= 2.90"
17.7	1,000	0.0180	0.94		**Shallow Concentrated Flow, SEGMENT BC** Short Grass Pasture Kv= 7.0 fps
6.7	1,605		4.00		**Direct Entry, SEGMENT CD**
41.4	2,755	Total			

Outside Lane Closure Operation on a Four-Lane Roadway
(Figure TTC-16.1)



Typical Traffic Control
Outside Lane Closure Operation on a Four-Lane Roadway
(Figure TTC-16.1)
NOTES

Standard:

1. **On divided highways having a median wider than 8', right and left sign assemblies shall be required.**

Guidance:

2. *Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.*
3. *Care should be exercised when establishing the limits of the work zone to insure maximum possible sight distance in advance of the transition, based on the posted speed limit and at least equal to or greater than the values in Table 6H-3. For Limited Access highways a minimum of 1000' is desired.*
4. *All vehicles, equipment, workers, and their activities should be restricted to one side of the pavement.*

Standard:

5. **Taper Length (L) and Channelizing Device Spacing shall be:**

Taper Length (L)				
Speed Limit (mph)	Lane Width (Feet)			
	9	10	11	12
25	95	105	115	125
30	135	150	165	180
35	185	205	225	245
40	240	270	295	320
45	405	450	495	540
50	450	500	550	600
55	495	550	605	660
60	540	600	660	720
65	585	650	715	780
70	630	700	770	840
Minimum taper lengths for Limited Access highways shall be 1000 feet.				
Shoulder Taper = ⅓ L Minimum				

Channelizing Device Spacing		
Location	Speed Limit (mph)	
	0 - 35	36 +
Transition Spacing	20'	40'
Travelway Spacing	40'	80'
Construction Access*	80'	120'
* Spacing may be increased to this distance, but shall not exceed one access per ¼ mile.		

On roadways with paved shoulders having a width of 8 feet or more, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.

6. **An arrow board shall be used when a lane is closed. When more than one lane is closed, a separate arrow board shall be used for each closed lane (see Figure TTC-18).**
7. **The buffer space length shall be shown in Table 6H-3 on Page 6H-5 for the posted speed limit.**
8. **A shadow vehicle with either a Type B or C arrow board operating in the caution mode, or at least one high intensity amber rotating, flashing, or oscillating light shall be parked 80'-120' in advance of the first work crew. When the posted speed limit is 45 mph or greater, a truck-mounted attenuator shall be used.**
9. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, or oscillating lights but can be used to supplement the amber rotating, flashing, or oscillating lights.**
10. **When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed as needed.**

1: Revision 1 – 4/1/2015

REVISIONS			
NO.	DATE	DESCRIPTION	BY
1	5/21/18	AGENCY COMMENTS	P–L

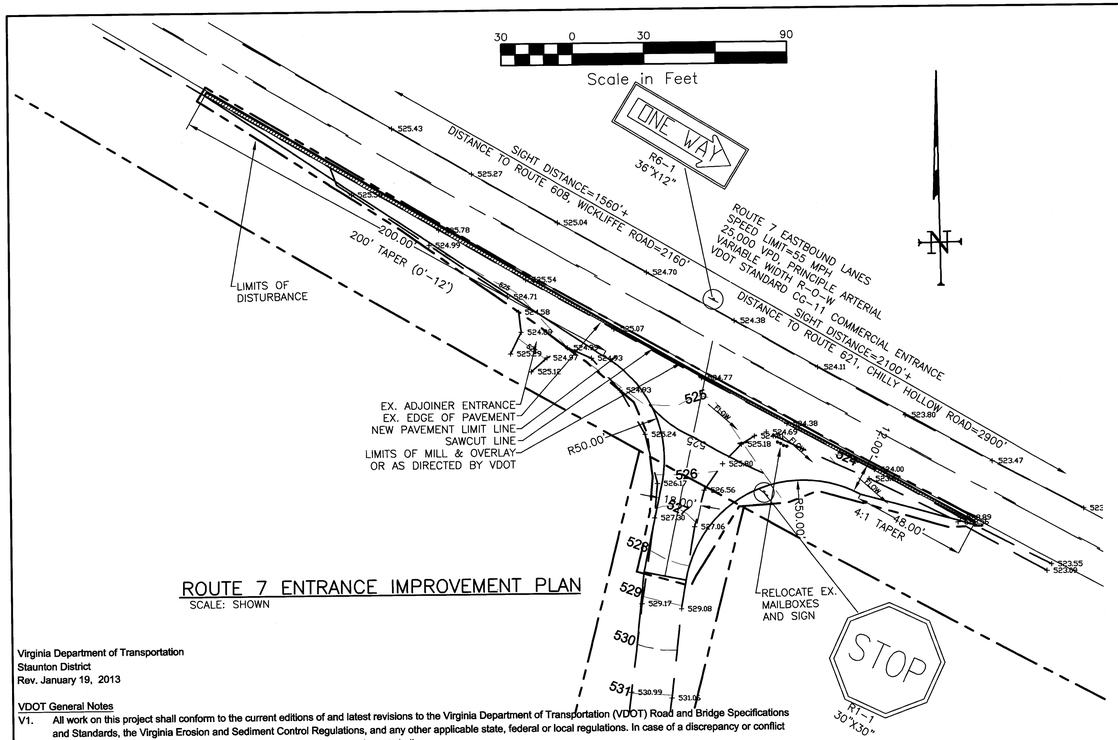
TITLE: STORMWATER MANAGEMENT PLAN
MAINTENANCE OF TRAFFIC PLAN

PROJECT: KENTLAND
EVENT VENUE
SITE DEVELOPMENT PLAN
CLARKE COUNTY, VIRGINIA

PAINTER-LEWIS, P.L.C.
817 Cedar Creek Grade, Suite 120
Winchester, Virginia 22601
Telephone (540) 662–5792
Facsimile (540) 662–5793
Email office@painterlewis.com
CONSULTING ENGINEERS

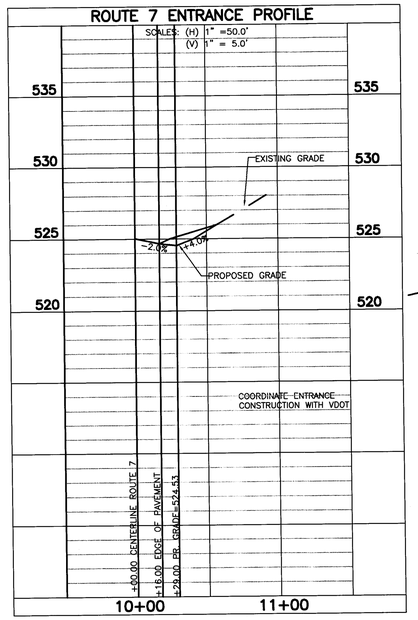
COMMONWEALTH OF VIRGINIA
JOHN C. LEWIS
Lic. No. 021621
PROFESSIONAL ENGINEER

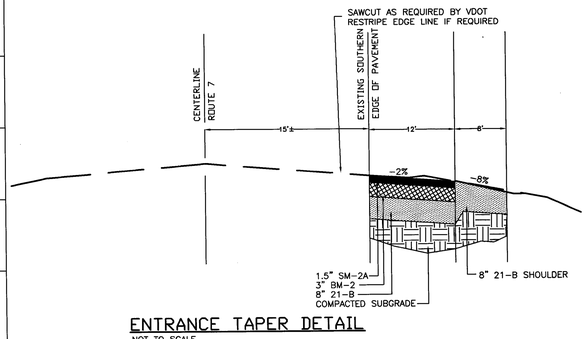
SURVEY: P–L	C.I.: 2'
DRAWN BY: P–L	JOB NO.: 1709035
SCALE: SHOWN	DATE: 3/16/18
SHEET:	5/6



ROUTE 7 ENTRANCE IMPROVEMENT PLAN

SCALE: SHOWN





ENTRANCE TAPER DETAIL

NOT TO SCALE

Virginia Department of Transportation
Staunton District
Rev. January 19, 2013

VDOT General Notes

V1. All work on this project shall conform to the current editions of and latest revisions to the Virginia Department of Transportation (VDOT) Road and Bridge Specifications and Standards, the Virginia Erosion and Sediment Control Regulations, and any other applicable state, federal or local regulations. In case of a discrepancy or conflict between the Standards or Specifications and Regulations, the most stringent shall govern.

V2. All construction shall comply with the latest U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), and Virginia Occupational Safety & Health (VOSH) Rules and Regulations.

V3. When working within VDOT right-of-way, all traffic control, whether permanent or temporary, shall be in accordance with the current edition of VDOT's Work Area Protection Manual. A transportation management plan needs to be submitted for approval and land use permit issued prior to any execution of work within the VDOT right of way.

V4 The developer shall be responsible for relocating, at his expense, any and all utilities, including traffic signal poles, junction boxes, controllers, etc., owned by VDOT or private / public utility companies. It is the sole responsibility of the developer to locate and identify utility facilities or items that may be in conflict with the proposed construction activity. VDOT approval of these plans does not indemnify the developer from this responsibility.

V5. Design features relating to field construction, regulations, and control or safety of traffic may be subject to change as deemed necessary by VDOT. Any additional expense incurred as a result of any field revision shall be the responsibility of the developer.

V6. If required by the local VDOT Land Development Office, a pre-construction conference shall be arranged and held by the engineer and/or developer with the attendance of the contractor (s), various County agencies, utility companies and VDOT prior to initiation of work.

V7. The contractor shall notify the local VDOT Land Development Office when work is to begin or cease for any undetermined length of time. VDOT requires and shall receive 48 hours advance notice prior to any required or requested inspection.

V8. The contractor shall notify the Traffic Operations Center at ()540) 332-9500 for any traffic control plan that impacts a VDOT maintained interstate or Primary roadway to provide notification of the installation and removal of the work zone.

V9. The contractor shall be responsible for maintaining a CVDOT permitted temporary construction entrance(s) in accordance with Section 3.02 of the Virginia Erosion and Sediment Control Handbook. Furthermore, access to other properties affected by this project shall be maintained through construction.

V10. Contractor shall ensure adequate drainage is achieved and maintained on the site during and at the end of construction.

V11. All water and sewer lines within existing or proposed VDOT right-of-way shall have a minimum thirty-six (36) inches cover and when possible shall be installed under roadway drainage facilities at conflict points.

V12. Any unusual subsurface conditions (e.g., unsuitable soils, springs, sinkholes, voids, caves, etc.) encountered during the course of construction shall be immediately brought to the attention of the engineer and VDOT. Work shall cease in that vicinity until an adequate design can be determined by the engineer and approved by VDOT.

V13. All fill areas, borrow material and undercut areas shall be inspected and approved by a VDOT representative prior to placement and fill. Where CBR testing is required, a VDOT representative shall be present to insure the sample obtained is representative of the location. When soil samples are submitted to private laboratories for testing, the samples shall be clearly identified and labeled as belonging to a project to be accepted by VDOT and that testing shall be performed in accordance with all applicable VDOT standards and procedures.

V14. All roadway fill, base, subgrade material, and backfill in utility/storm sewer trenches shall be compacted in six (6) inch lifts to 95% of theoretical maximum density as determined by AASHTO T-99 Method A, within plus or minus 2% of optimum moisture for the full width of any dedicated street right-of-way. At the direction of VDOT, density tests shall be performed by a qualified independent agency in accordance with VDOT Road and Bridge Specifications. Certified copies of test reports shall be submitted to VDOT daily, unless specified otherwise.

V15. VDOT Standard CD and UD under drains shall be installed where indicated on these plans and/or as specified by VDOT.

V16. A post installation visual/video camera inspection shall be conducted by the Contractor on all pipes identified on the plans as storm sewer pipe and a select number of pipe culverts. For pipe culverts, a minimum of one pipe installation for each size of each material type will be inspected or ten percent of the total amount for each size and material type summarized. All pipe installations on the plans not identified as storm sewer pipe shall be considered as culvert pipe for inspection purposes. Additional testing may be required as directed by the Area Land Use Engineer or their representative.

V17. The installation of any entrances and mailboxes within any dedicated street right-of-way shall meet VDOT minimum design standards and is the responsibility of the developer.

V18. Prior to VDOT acceptance of any streets, all required street signage and/or pavement markings shall be installed by the developer or, at VDOT's discretion, by VDOT on an account receivable basis following the Manual On Uniform Traffic Control Devices.

V19. The developer shall provide the VDOT Land Development Office with a list of all material sources prior to the start of construction. Copies of all invoices for materials utilized within any dedicated street right-of-way must be provided to the local VDOT Land Development Office prior to acceptance of the work. Unit and total prices may be obscured.

V20. Aggregate base and subbase materials shall be placed on subgrade by means of a mechanical spreader. Density will be determined using the density control strip in accordance with Section 304 of the VDOT Road and Bridge Specifications and VTM-10. A certified compaction technician shall perform these tests. Certified copies of test reports shall be submitted to VDOT daily, unless specified otherwise. In addition to checking stone depths, a VDOT representative shall be notified and given the opportunity to be present during the construction and testing of the density control strip.

V21. Asphalt concrete pavements shall be placed in accordance with Section 315 of the VDOT Road and Bridge Specifications. Density shall be determined using the density control strip as specified in Section 315 and VTM-76. A certified compaction technician shall perform these tests. Certified copies of test reports shall be submitted to VDOT daily, unless specified otherwise. A VDOT representative shall be notified and given the opportunity to be present during the construction and testing of the control strip.

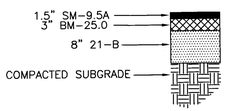
V22. In accordance with Section 302.03, the foundations for pipe culverts thirty-six (36) inches and larger shall be explored below the bottom of the excavation to determine the type and condition of the foundation. The contractor shall report findings of foundation exploration to the engineer and VDOT for approval prior to placing pipe. Foundation designs shall comply with VDOT Road and Bridge Standard PB-1. Where soft, yielding, or otherwise unsuitable foundation is encountered, the foundation design and/or need for foundation stabilization shall be determined by the engineer and approved by VDOT.

V23. VDOT Standard Guardrail shall be installed where warranted and/or as proposed on these plans in accordance with VDOT's installation criteria. Final approval of the guardrail layout to be given by VDOT after grading is mostly complete.

V24. Approval of these plans shall expire three (3) years from the date of the approval letter.

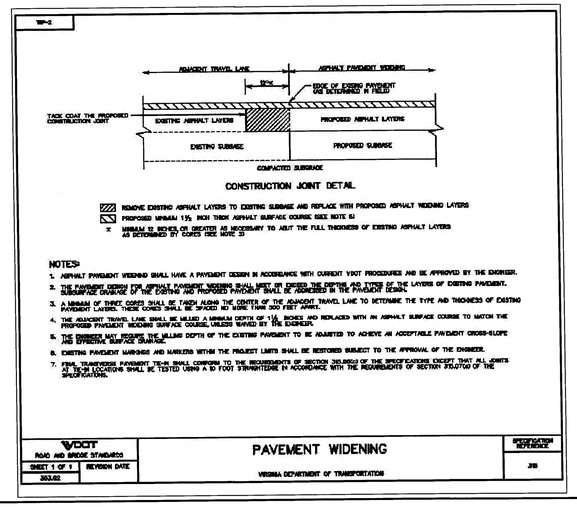
V25. VDOT Standard CG-12 Curb Ramps shall be installed where indicated on these plans and/or as specified by VDOT.

V26. The foundations for all box culverts shall be investigated by means of exploratory borings advanced below proposed foundation elevation to determine the type and condition of the foundation. The contractor shall submit copies of borehole logs and report findings of foundation exploration to the engineer and VDOT for approval prior to constructing box. Foundation designs shall comply with VDOT Road and Bridge Standard PB-1. Contrary to the Standard, where rock is encountered and cast-in-place box is proposed, the thickness of bedding shall be six (6) inches. Where soft, yielding, or otherwise unsuitable foundation is encountered, the foundation design and/or need for foundation stabilization shall be determined by the engineer and approved by VDOT.



ENTRANCE PAVEMENT SECTION

NOT TO SCALE



REVISIONS

NO.	DATE	DESCRIPTION	BY
1	5/17/18	AGENCY COMMENTS	P-L

TITLE:
ROUTE 7 ENTRANCE
IMPROVEMENT PLAN
VDOT GENERAL NOTES

PROJECT:
KENTLAND
EVENT VENUE
SITE DEVELOPMENT PLAN
CLARKE COUNTY, VIRGINIA

PAINTER-LEWIS, P.L.C.
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CONSULTING ENGINEERS

COMMONWEALTH OF VIRGINIA
JOHN C. LEWIS
Lic. No. 021621
PROFESSIONAL ENGINEER

SURVEY: P-L	C.I.: 2'
DRAWN BY: P-L	JOB NO.: 1709035
SCALE: SHOWN	DATE: 3/16/18
SHEET:	6/6

Clarke County Planning Department
101 Chalmers Court, Suite B
Berryville, Virginia 22611
(540) 955-5132
www.clarkecounty.gov

TO: **Planning Commission**

FROM: **Alison Teetor, Natural Resources Planner**
Brandon Stidham, Planning Director

RE: **Revised Draft 2018 Water Resources Plan – Public Hearing**

DATE: **July 6, 2018**

Enclosed for your review is the revised draft of the 2018 Water Resources Plan. The Planning Commission has set public hearing for the July 6 Business Meeting at the May 4th Business meeting, but was informed that additional revisions may be forthcoming. The Comprehensive Plan committee met May 29th and reviewed comments received from Bud Nagelvoort. The Committee is comfortable with the revisions and recommended it for consideration at the July 6 Public Hearing.

The Plan revision includes combining the Groundwater Resources Plan and Surface Water Resources Plan into one document to reduce redundancy and recognize the interrelationship of ground and surface waters. The content includes a summary of the prior plan, revised goals objectives and policies with short-term (5-year) recommendations. A background section describes the issues related to ground and surface water contamination and summarizes Federal, State, regional, and local projects related to water resources that the County has participated in. Several appendices describe the status of implementation of the 1999 Water Resource Plan, a summary of programs and grant projects, and the guidance sections from the Comprehensive Plan.

Similar to our recent efforts to revise the Comprehensive Plan and component plans, the purpose of the revision was to update the County's water protection efforts since the Plan was last updated in 1999 and to modernize the Plan's recommended goals and objectives. The revised Plan is also recommended to be placed on a five-year schedule for review and potential revisions.

If the Planning Commission is comfortable with the draft they can recommend approval to the Board of Supervisors to set public hearing at their July 19th Business meeting.

If you have questions in advance of the meeting, please do not hesitate to contact us.

Water Resources Plan

Clarke County Comprehensive Plan
Implementing Component Plan

Planning Commission
Public Hearing
Draft - July 6, 2018

ACKNOWLEDGEMENTS

CLARKE COUNTY PLANNING COMMISSION
George L. Ohrstrom, II, Chair (Russell Election District)
Anne Caldwell, Vice Chair (Millwood Election District)
Frank Lee (Berrville Election District)
Gwendolyn Malone (Berryville Election District)
Scott Kreider (Buckmarsh Election District)
Douglas Kruhm (Buckmarsh Election District)
Bob Glover (Millwood Election District)
Cliff Nelson (Russell Election District)
Randy Buckley (White Post Election District)
Robina Bouffault (White Post Election District)
Mary L.C. Daniel (Board of Supervisors representative)

COMPREHENSIVE PLAN SUBCOMMITTEE
Robina Bouffault (White Post Election District)
Douglas Kruhm (Buckmarsh Election District)
Cliff Nelson (Russell Election District)
Bob Glover (Millwood Election District)

CLARKE COUNTY BOARD OF SUPERVISORS
David Weiss, Chair (Buckmarsh Election District)
Beverly B. McKay, Vice-Chair (White Post Election District)
Terri T. Catlett (Millwood Election District)
Barbara Byrd (Russell Election District)
Mary L.C. Daniel (Berryville Election District)

CLARKE COUNTY PLANNING DEPARTMENT
Brandon Stidham, Planning Director
Ryan Fincham, Senior Planner/Zoning Administrator
Alison Teetor, Natural Resource Planner
Debbie Bean, Administrative Assistant

Clarke County Planning Department
101 Chalmers Court, Suite B
Berryville, VA 22611
540-955-5132

DATE OF PLANNING COMMISSION PUBLIC HEARING AND ADOPTION:
July 6, 2018

DATE OF BOARD OF SUPERVISORS PUBLIC HEARING AND ADOPTION:
To be determined

2018 WATER RESOURCES PLAN – DRAFT
(PLANNING COMMISSION PUBLIC HEARING – JULY 6, 2018)

Table of Contents

FIGURES

TABLES

2018 WATER RESOURCES PLAN – DRAFT
(PLANNING COMMISSION PUBLIC HEARING – JULY 6, 2018)

GENERAL INFORMATION

Description of Resources

Clarke County is located in the northern Shenandoah Valley and consists of approximately 114,021 acres. Clarke's location at the junction of two distinct geologic regions - the Valley & Ridge and the Blue Ridge Physiographic Provinces (Figure 1) - creates two different hydro-geologic areas, underlain by characteristic bedrock types. Differences in resistance to weathering are also shown by the extent of bedrock openings where groundwater occurs and moves.

In the Blue Ridge bedrock, water occurs in fractures in the rock, joints, faults, and bedding plane separations.

In the Valley area, the carbonate bedrock is more easily dissolved by water, and many fractures can become enlarged into solution channels. The Valley section of the county encompasses two major basins within the Potomac River Watershed: Opequon Creek to the west and the Shenandoah River on the east. The drainage divide between these two basins is present in an area of the county that is frequently referred to as the Limestone Ridge. Formal definition of this area is necessary because of its importance to the underlying groundwater flow systems.

In North America elevations are given using either Sea Level Datum of 1929, also called the National Geodetic Vertical Datum (NGVD) of 1929. The Limestone Ridge is delineated as the area higher than the contour for 630 ft above NGVD 1929 (Figure 2) (Nelms, et. al., 2010). Clarke County was divided into nine groundwater areas based on surface-water basin boundaries (Figure 3).

Figure 1

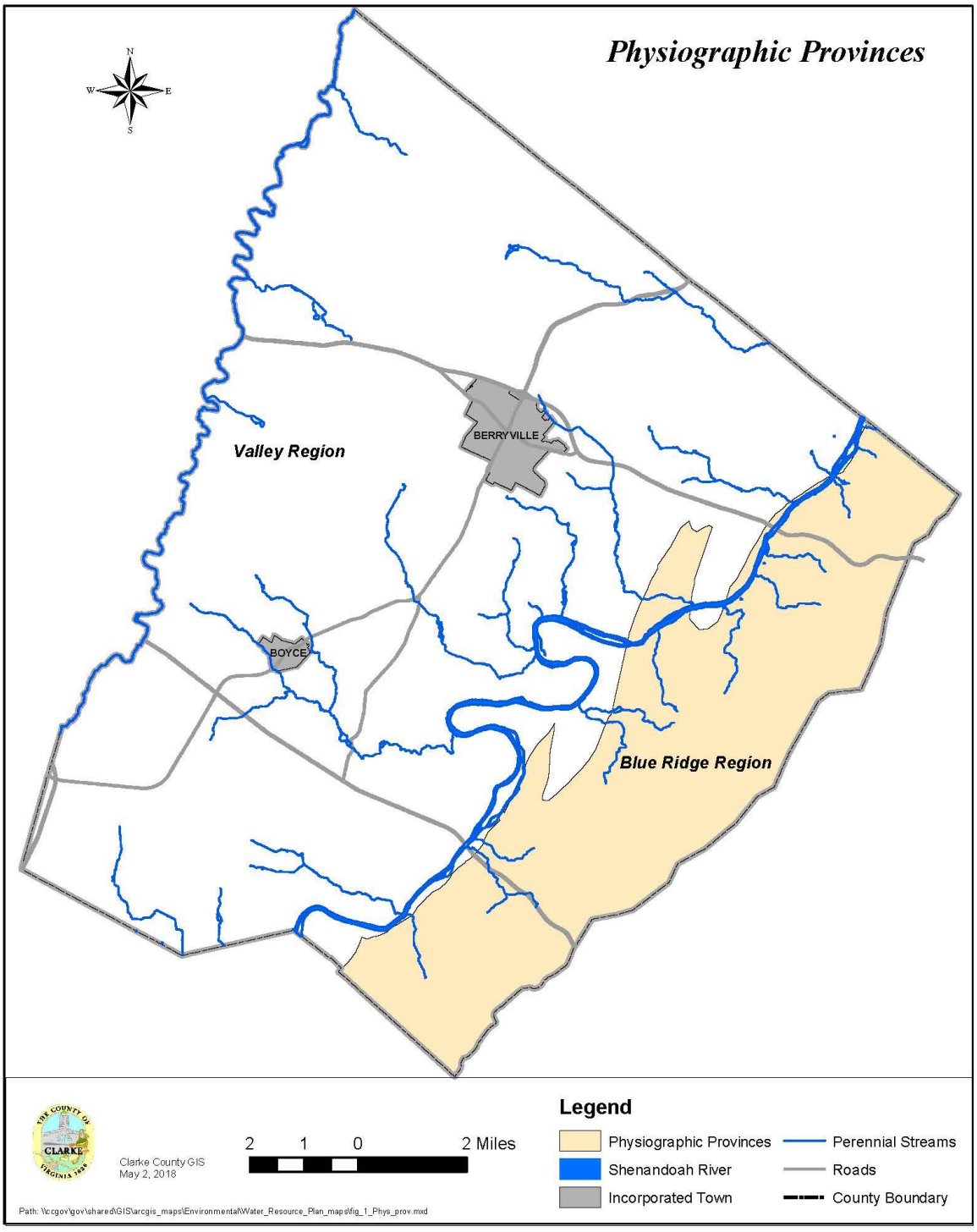

Physiographic Provinces
N
W
E
S
BERRYVILLE
BOYCE
Valley Region
Blue Ridge Region
Clarke County GIS
May 2, 2018
2 1 0 2 Miles
Legend
Physiographic Provinces
Shenandoah River
Incorporated Town
Perennial Streams
Roads
County Boundary
Path: \\ccgov\gov\shared\GIS\arcgis_maps\Environmental\Water_Resource_Plan_maps\fig_1_Phys_prov.mxd

Figure 2

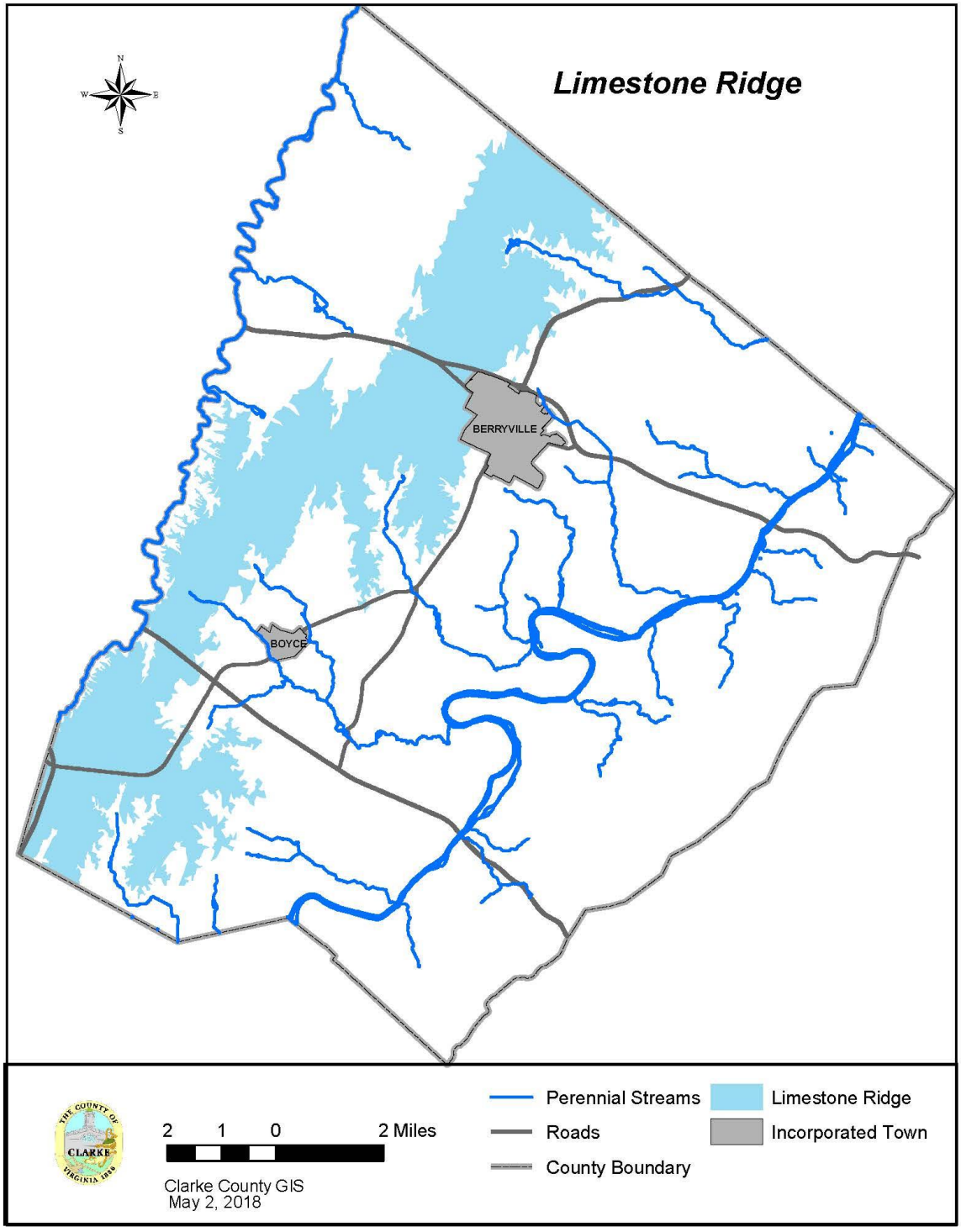
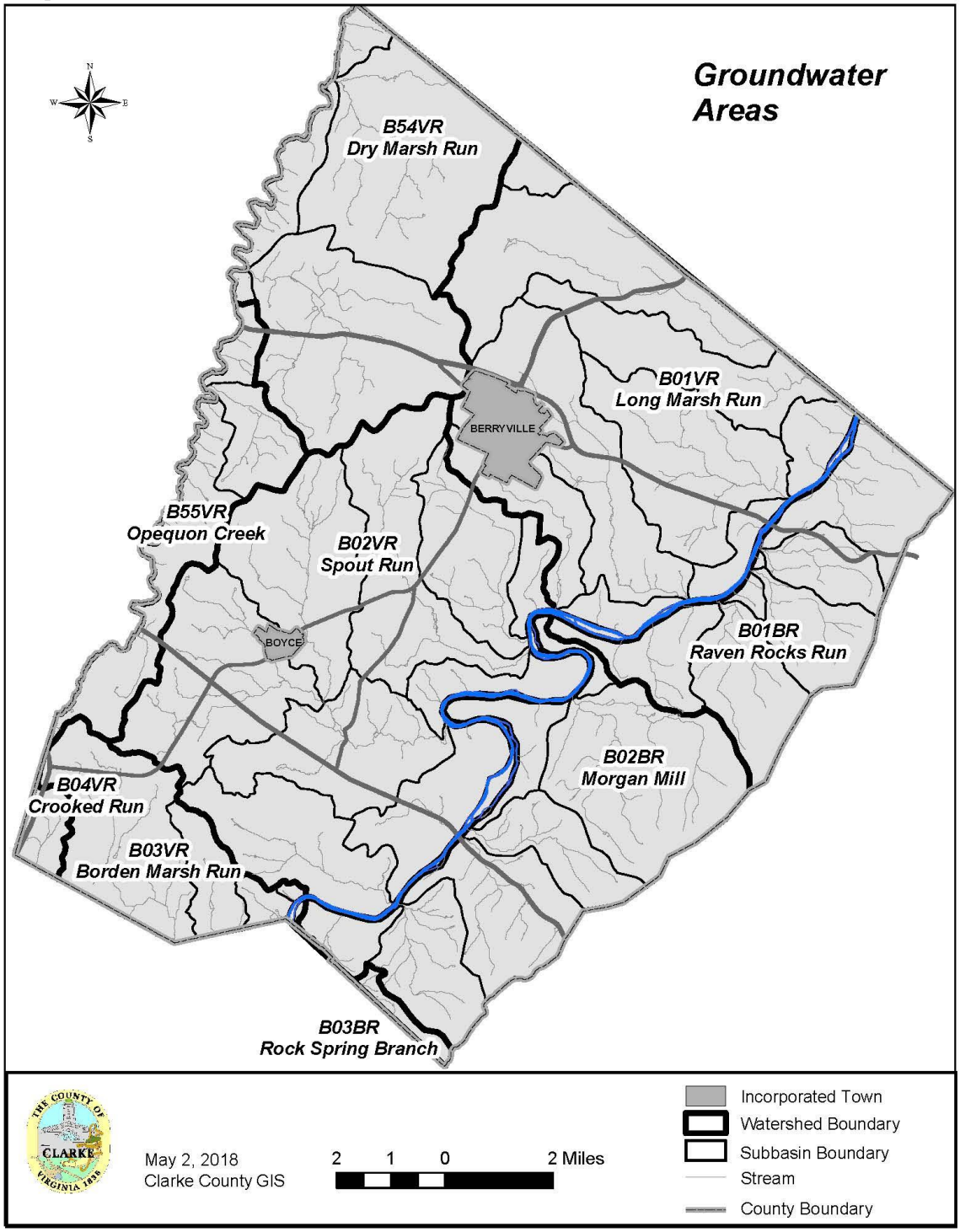

Limestone Ridge
BERRYVILLE
BOYCE
N
W
E
S
2 1 0 2 Miles
Clarke County GIS
May 2, 2018
Perennial Streams
Roads
County Boundary
Limestone Ridge
Incorporated Town

Figure 3


Groundwater Areas
B54VR
Dry Marsh Run
B01VR
Long Marsh Run
BERRYVILLE
B55VR
Opequon Creek
B02VR
Spout Run
BOYCE
B01BR
Raven Rocks Run
B02BR
Morgan Mill
B04VR
Crooked Run
B03VR
Borden Marsh Run
B03BR
Rock Spring Branch
May 2, 2018
Clarke County GIS
2 1 0 2 Miles
Incorporated Town
Watershed Boundary
Subbasin Boundary
Stream
County Boundary

Delineation of these groundwater areas could assist future water- management activities because each area contains similar physical, geologic, and hydrologic characteristics (Nelms, et. al., 2010).

In the Blue Ridge Section of the county, the boundaries of the three groundwater areas may mimic the boundaries of the individual groundwater flow systems because the conceptual model for this part of the county assumes groundwater divides generally are closely related to the surface-water divides.

In the Great Valley Section of the county, the groundwater areas only represent areas with similar characteristics and not necessarily groundwater boundaries because flow beneath surface-water divides has been observed (Jones, 1987).

Details of these two sections are described in Chapter III below. Additional details can also be found in the 2010 USGS report (Nelms, et. al., 2010).

STATEMENT OF PURPOSE, SCOPE AND PLAN APPLICATION

Purpose and Scope

The Comprehensive Plan establishes basic land use policy for the County. The critical nature of water resources to public health as well as the overall environment warrants the Water Resources Plan to implement the Goals, Objectives, and Policies of the County Comprehensive Plan, specifically Objective 3 in the Comprehensive Plan, which states: "Protect natural resources, including soil, water, air, scenery, night sky, wildlife habitats, and fragile ecosystems through the following policies, the Water Resources Plan, and other adopted policies."

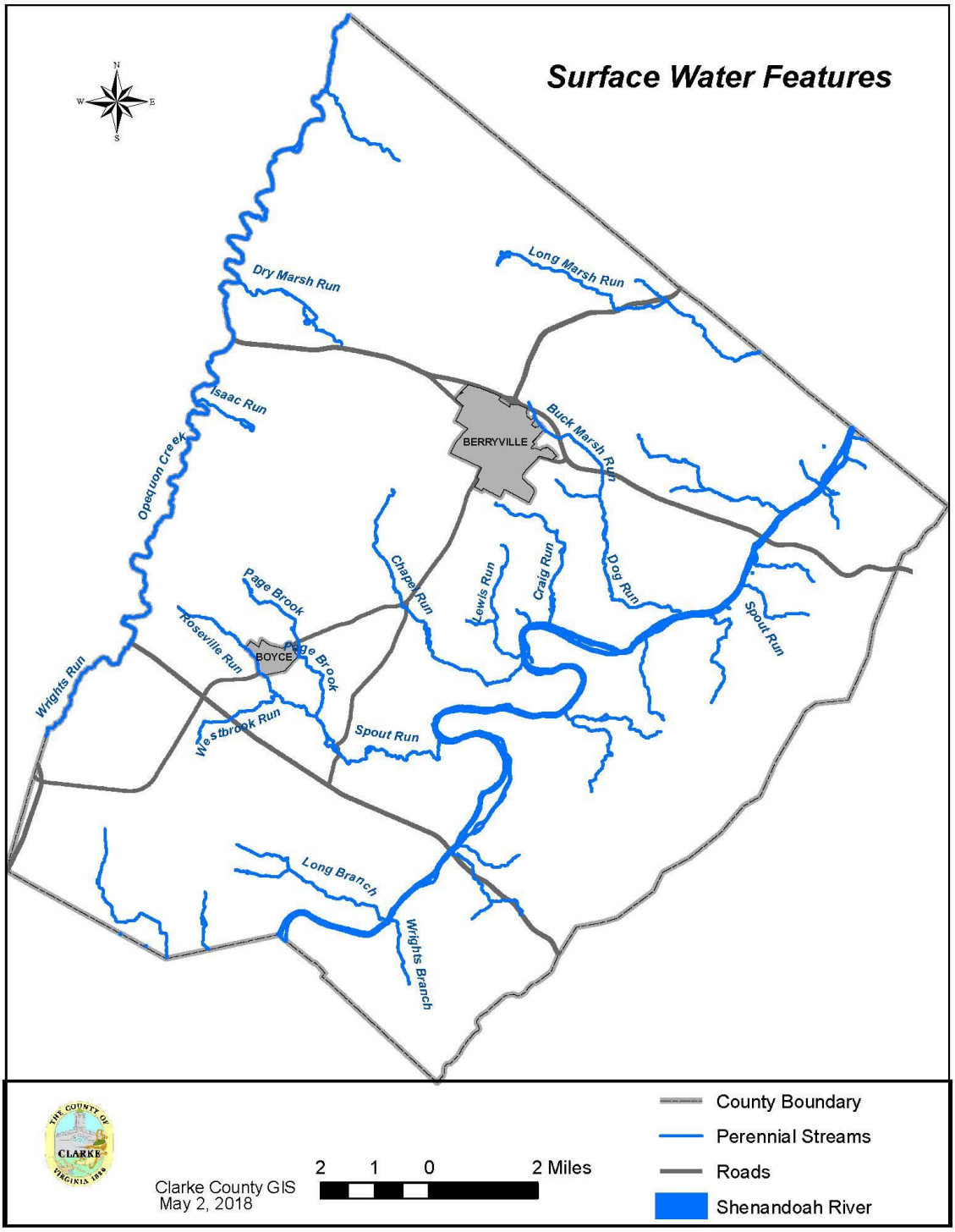
Water resources are significant for many reasons. Groundwater provides the primary source of potable water for more than 75% of the County residents and provides 80-90% of the base flow for surface water (Nelms, et.al. 2010). The Shenandoah River is a designated State Scenic River and is a major recreational attraction. The 21 perennial secondary streams provide water for livestock and a few are large enough for swimming and fishing (Figure 4).

A clean adequate water supply is a reflection of the overall health of the County's natural environment. Therefore, the ability to maintain the availability and enhance the quality of our water resources is integral to our quality of life.

Water resources include both ground and surface waters. These water features are integrally linked together by the hydrologic cycle, where water moves from the atmosphere to the surface as rain. Rain then percolates through the soil to groundwater and is discharged at springs to streams, becomes surface water, and evaporates back to the atmosphere.

Land use practices have an impact on the quality and quantity of these water features. The groundwater resources of Clarke County are particularly susceptible to contamination resulting from human activities because of the sensitive nature of the aquifers, found in carbonate rocks underling the Valley region of the County.

Figure 4


Surface Water Features
N
W
E
S
Dry Marsh Run
Long Marsh Run
Isaac Run
Opequon Creek
BERRYVILLE
Buck Marsh Run
Chapel Run
Lewis Run
Craig Run
Dog Run
Spout Run
Page Brook
Roseville Run
BOYCE
Page Brook
Wrights Run
Westbrook Run
Spout Run
Long Branch
Wrights Branch
THE COUNTY OF CLARKE VIRGINIA 1836
Clarke County GIS
May 2, 2018
2 1 0 2 Miles
County Boundary
Perennial Streams
Roads
Shenandoah River

Groundwater protection and management problems are generally greater in areas that are underlain by carbonate rocks, such as limestone and dolostone, than in areas underlain by most other rock types because of the presence of solution-enlarged sinkholes, conduits, and caves.

These geologic features characterize what is called karst terrane. The generally high permeability of these rocks facilitates the infiltration and transport of contaminants from the land surface to the groundwater reservoir. The primary threats to surface water quality within our County come from point source discharge of sewage treatment facilities, non-point agricultural and urban runoff, and failing septic systems.

Table 1. Contamination threats to water resources associated with principal land uses in Clarke County, Virginia.

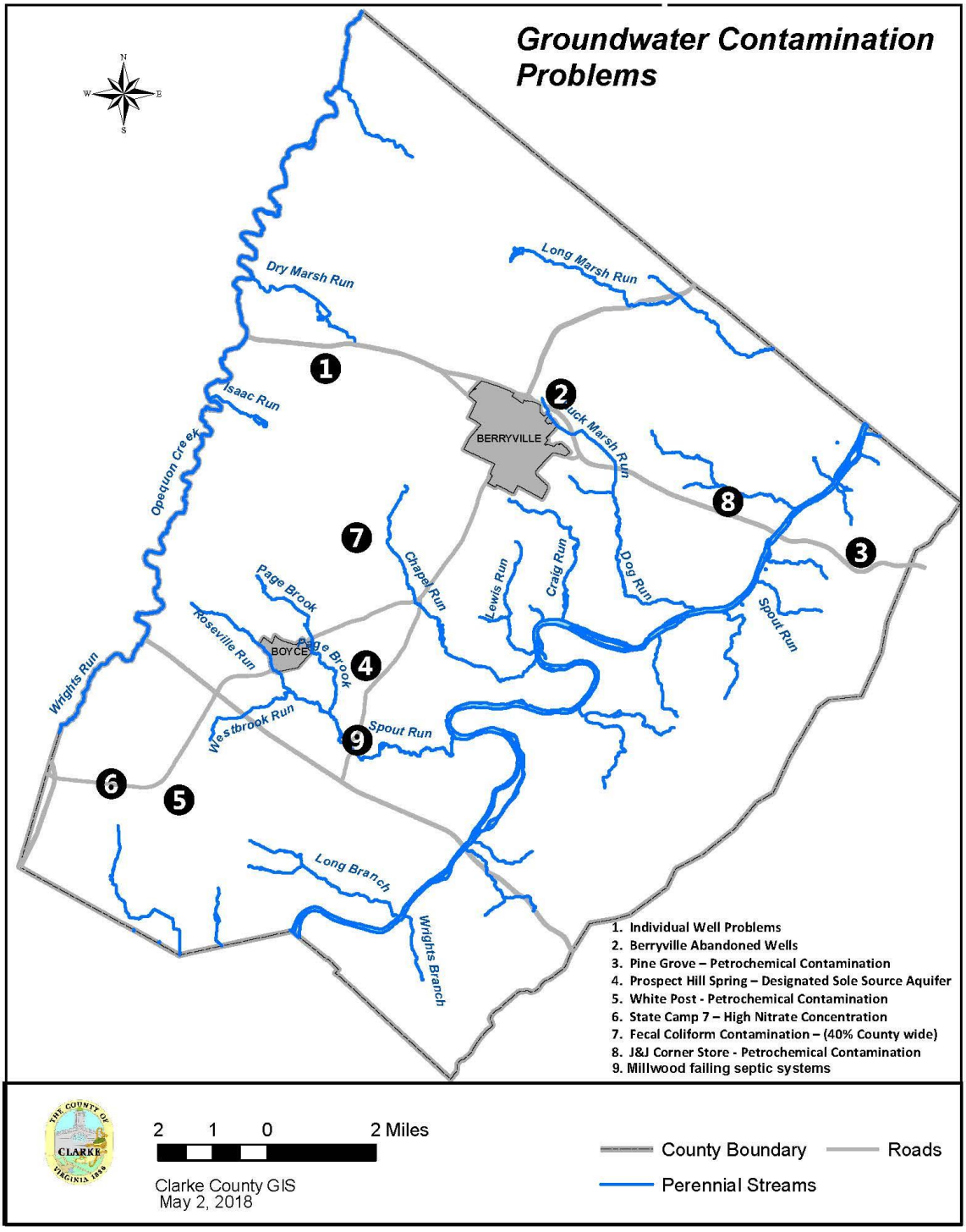
LAND USE	LAND USE ACTIVITY	TYPE OF CONTAMINATION
Agriculture	Animal Feed Lots Manure spreading & pits Chemical Application Chemical Storage Areas	Coliform bacteria, pesticides, fungicides, fertilizers - nitrates
Residential	Septic systems Hazardous household products (paints, cleaning products) Lawn chemicals, fertilizers Underground storage tanks	Coliform bacteria, chemicals, nitrates, petroleum
Commercial and Industrial	Auto repair Construction areas Car washes Gas stations Paint shops Road deicing operations Storage tanks Storm Water Runoff	Petroleum, chemicals, detergents, salts
Other uses	Transportation - railroad - trucking	Petroleum, chemicals, variety of contaminants

From: Wellhead Protection Programs: Tools for Local Government, 1989

Problems with water contamination have occurred throughout the County, and are well documented in the previous Plan. Examples include:

- Groundwater Contamination (Figure 5)
    - In the 1960's, well contamination in the Boyce-Millwood area led to the creation of the Clarke County Sanitary Authority in 1968 (LFPDC 1987). By the mid-1970s, the authority began supplying water to more than 200 residences and businesses from the high-yielding Prospect Hill Spring.
    - Water samples collected by the Clarke County office of the State Health Department from 1980 to1998 indicated approximately 40% of wells sampled were contaminated by fecal coliform.
    - In 1981, the Berryville public water supply wells became contaminated by a combination of nitrates, phenols, and herbicides, requiring construction of a $1.3 million water treatment plant using the Shenandoah River as the water source.
    - In 1986, 10 wells in the village of Pine Grove were contaminated by petroleum believed to have leaked from underground storage tanks.
    - In 1987 a survey conducted by the Lord Fairfax Health District identified 46% of the sewage disposal systems in Millwood did not meet the standards of the Health Department causing eventual construction of public sewer to the Village of Millwood in 2002.
    - A groundwater study completed in 1990 by the USGS identified 40% well contamination rates countywide.
    - A 1991 a water testing program conducted by the Agricultural Extension Office showed that 40% of sampled wells were contaminated by fecal coliform.
    - In 1992, the groundwater supply for the community of White Post was contaminated by petroleum products necessitating the expenditure of more than $2 million by the State Water Control Board to bring potable water from Prospect Hill Spring to White Post.

Figure 5


Groundwater Contamination Problems
N
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S
Dry Marsh Run
Long Marsh Run
Isaac Run
Opequon Creek
Buck Marsh Run
BERRYVILLE
Chapel Run
Lewis Run
Craig Run
Dog Run
Spout Run
Page Brook
Roseville Run
BOYCE
Wrights Run
Westbrook Run
Long Branch
Wrights Branch
1
2
3
4
5
6
7
8
9
1. Individual Well Problems
2. Berryville Abandoned Wells
3. Pine Grove – Petrochemical Contamination
4. Prospect Hill Spring – Designated Sole Source Aquifer
5. White Post - Petrochemical Contamination
6. State Camp 7 – High Nitrate Concentration
7. Fecal Coliform Contamination – (40% County wide)
8. J&J Corner Store - Petrochemical Contamination
9. Millwood failing septic systems
2 1 0 2 Miles
Clarke County GIS
May 2, 2018
County Boundary
Roads
Perennial Streams

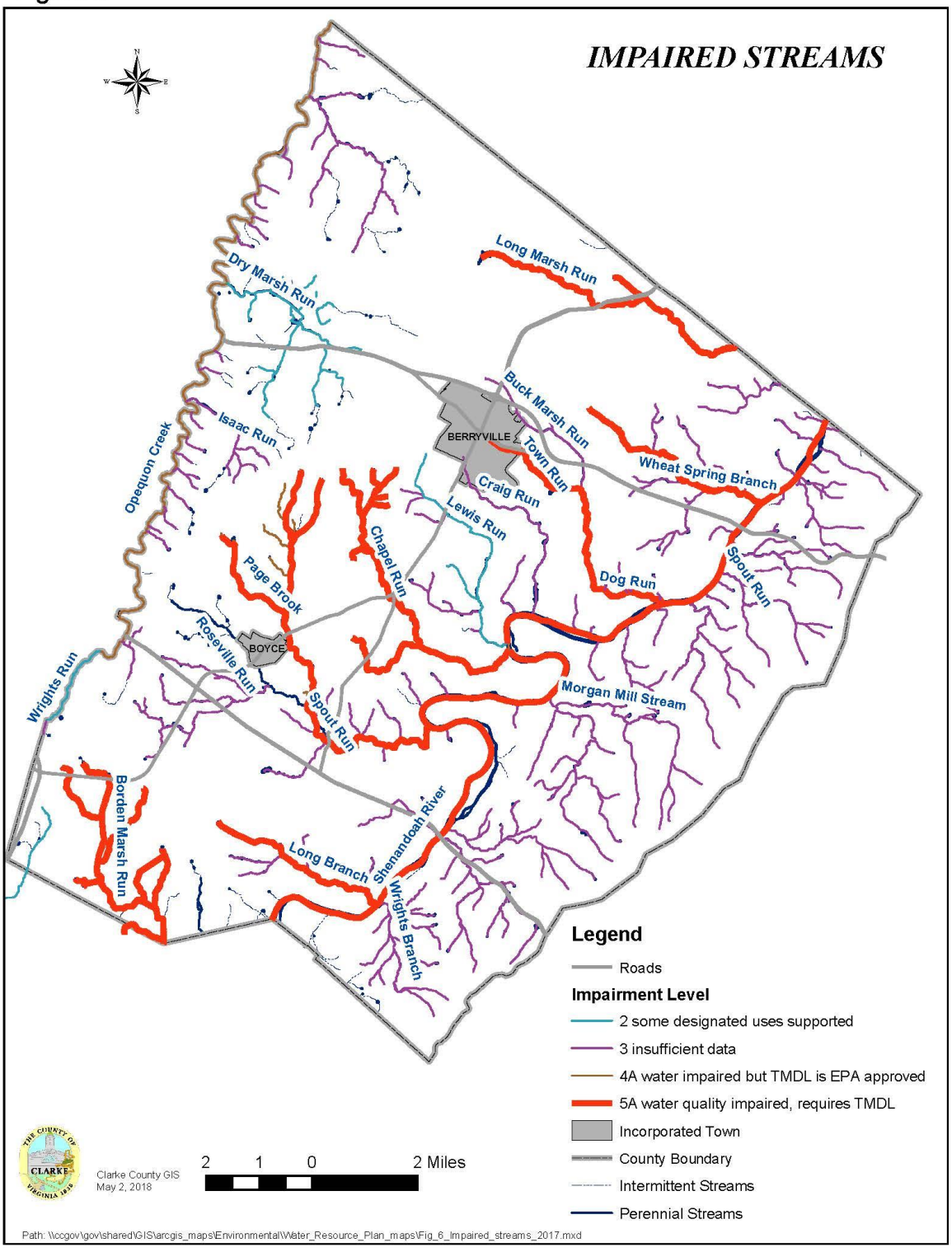
- In 1995 the Town of Boyce constructed a sewage treatment plant due to the high number of failing septic systems. Approximately 185 homes and business were connected initially. Currently 278 homes/businesses are connected to sewer in Boyce.
- In 2010, petroleum leaked from an underground storage tank at J&J Corner Store at the intersection of Harry Byrd Highway (Route 7) and Shepherds Mill Road (Route 612) causing well contamination issues for approximately 20 households.

- Surface water Contamination (Figure 6)

  - Of the 21 perennial secondary streams, 11 are designated as impaired waterways not meeting water quality standards primarily e. coli and sediment.
  - The Shenandoah River is contaminated by mercury and PCB's from industrial sources. Mercury was used by Du Pont Co. in Waynesboro as a catalyst in fiber production between 1929 and 1950. During that time, strict storage and disposal regulations did not exist, and mercury made its way to the South River. A serious contamination problem was discovered in the 1970s. The Health Department advisory extends from Waynesboro to Front Royal. The Clarke County section is contaminated with PCB's from the Avtex Fibers plant in Front Royal.

In summary, these issues prompted the goals, objectives and strategies outlined in this plan. This Plan will describe the resource, the work that was done prior to 1999 to understand and protect the resource, the work that has been completed since the previous plan, and provide strategies to correct current problems and protect and maintain these resources for the future.

Figure 6


IMPAIRED STREAMS
Long Marsh Run
Dry Marsh Run
Buck Marsh Run
Isaac Run
Opequon Creek
BERRYVILLE
Town Run
Wheat Spring Branch
Craig Run
Lewis Run
Chapel Run
Page Brook
Dog Run
Spout Run
Roseville Run
BOYCE
Wrights Run
Morgan Mill Stream
Spout Run
Borden Marsh Run
Long Branch
Shenandoah River
Wrights Branch
Legend
Roads
Impairment Level
2 some designated uses supported
3 insufficient data
4A water impaired but TMDL is EPA approved
5A water quality impaired, requires TMDL
Incorporated Town
County Boundary
Intermittent Streams
Perennial Streams
Clarke County GIS
May 2, 2018
2 1 0 2 Miles
Path: \\ccgov\gov\shared\GIS\arcgis_maps\Environmental\Water_Resource_Plan_maps\Fig_6_Impaired_streams_2017.mxd

Summary of Prior Plan

The previous Water Resource Plan (1999) laid the groundwork for efforts to protect County water quality. These efforts included:

- Adoption of the Septic Ordinance (County Code Section 143)
- Adoption of the Well Ordinance (County Code Section 180)
- Adoption of the Sinkhole Ordinance (County Code Section 180)
- Completion of a 1990 USGS Report "Ground-Water Hydrology and Quality in the Valley & Ridge and Blue Ridge Physiographic Provinces of Clarke County, Virginia."
- Completion of 3 grant-funded water quality improvement projects for the Spout Run watershed
- Establishment of the EPA sole source aquifer for Prospect Hill Spring
- Adoption of the Spring Conservation Overlay District (Zoning Ordinance Section 3-E-2)
- Adoption of the Stream Overlay Protection District (Zoning Ordinance Section 3-E-5)
- Investigation into Surface Water Management Area designation
- Participation in Tributary Strategy's effort

Summary of Recent Activities

- Continued update and strengthening of Septic Ordinance, well ordinance, and stream overlay protection district regulations
- Completion of a 6-year USGS Report entitled "Hydrogeology and groundwater availability in Clarke County, Virginia"
- Establishment of a real-time monitoring network consisting of 3 wells and 2 stream gages
- Completion of four Minimum Instream Flow Studies for the North Fork, South Fork, and Main Stem of the Shenandoah River
- Completion and adoption of a Drought Response Plan
- Participation in the update of the State Water Supply Plan
- Completion of 2 grant funded water quality improvement projects for the Spout Run watershed
- Participation in Chesapeake Bay TMDL cleanup effort

Details of the above summaries for the 1999 Water Resource Plan and Implementation Status can be found in Appendix I attached.

Plan Application

The Plan should be used by property owners, elected and appointed officials, and other interested stakeholders to understand the County's approach to protecting water resources. The Plan should also be applied in tandem with the recommendations found in the County's Comprehensive Plan, Agricultural Land Plan, Mountain Land Plan, and other relevant component plans. Examples of some of the ways that this Plan can be used include:

- Determining how the County should protect water resources both quality and quantity to insure adequate clean supply's for County residents.
- Balancing water quality and availability with the desire to accommodate current and future growth and economic development.
- Evaluating land development applications and proposed changes to the Zoning and Subdivision Ordinances.
- Reviewing and updating the County's Comprehensive Plan and component plans.

Chapter I contains the Plan's revised list of Goals, Objectives, and Strategies – collectively these items describe the County's program for protecting water resources.

Chapter II details the short term implementation goals.

Chapter III describes the Valley and Blue Ridge regions that are geologically different. Also described are the groundwater areas that could assist future water- management activities because such areas contain similar physical, geologic, and hydrologic characteristics.

Chapter IV Provides background information on water quality and quantity protection efforts.

Chapter V describes the process for reviewing and updating the Plan on a regular basis.

CHAPTER I

PLAN GOALS, OBJECTIVES, AND STRATEGIES

2018 WATER RESOURCES PLAN – DRAFT
(PLANNING COMMISSION PUBLIC HEAING – JULY 6, 2018)

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CHAPTER I -- PLAN GOALS, OBJECTIVES, AND STRATEGIES

This Chapter contains the Water Resources Plan's Goals, Objectives, and Strategies. The Goals Statement depicts the purpose and long-term expectations of the Plan in general terms. The Objectives describe the specific topics to be addressed in furtherance of the Goals Statement. Strategies are detailed action items to be followed to implement the Plan's Goals and Objectives.

A. Goals Statement

The Goals of the 2018 Water Resources Plan are as follows:

1. **Protect and enhance water quality.**
2. **Protect and maintain water availability.**
3. **Engage and educate individuals, communities and governments in watershed stewardship.**

Section B below lists the Objectives associated with each of the three Goals and the recommended implementation Strategies for each Objective.

B. Plan Objectives and Strategies

GOAL 1: Protect and enhance water quality

Objective 1. **Protect groundwater resources from contamination and reduce contamination where present**

Strategy (a). Continue to review and update the County ordinances related to groundwater protection.

I) Evaluate the Spring Conservation Overlay District (regulations in the County Zoning Ordinance) protecting Prospect Hill Spring to update septic system requirements and consider expansion to include EPA sole source aquifer boundaries.

II) Septic Ordinance (County Code Chapter 143):

a. Implement regular maintenance, monitoring, and reporting of all septic system components including drain lines, distribution boxes, and septic tanks. Included in the maintenance is a regular pump-out schedule as recommended by the Virginia

Department of Health (VDH). A mandatory pump-out has been adopted in the County Code but never implemented due to lack of administrative capabilities.

b. Utilize VDH staffing resources to ensure annual operation and maintenance inspections of alternative septic systems and identification of substandard systems. Provide County funding if necessary to ensure VDH resources remain available and capable to manage this program.

c. Identify grant opportunities and other funding sources to replace inadequate systems with those meeting current standards.

d. Continue to require resistivity testing to ensure drainfields are located away from karst features.

III) Sinkhole Ordinance (County Code Chapter 180, Article II): Develop educational information to increase awareness of sinkholes and the potential threat to groundwater. Other approaches include direct mailing to affected landowners, adding information to County website, brochures, and press releases.

IV) Karst Plans (Zoning Ordinance Section 6-H-15): Continue to require karst plans for all site plans in karst soils to insure protection of karst features from potential contamination threats.

Strategy (b). Continue to work with state agencies and the legislature to insure the County has sufficient authority to protect water resources through local ordinances and land use controls.

Strategy (c). Continue to work with The Virginia Department of Health (VDH) Office of Drinking Water (ODW) and the Department of Environmental Quality to obtain grants for the development of Wellhead Protection Plans for public wells throughout the County, including those serving Shenandoah Retreat, Pine Grove and River Park.

Strategy (d). Groundwater database development

I) Develop a database of all existing well and septic permits on file in cooperation with the Health Department. Homes with systems not on file should be surveyed to determine the type and location of water source and sewage disposal. Consider permanent funding for a part-time employee to GPS well and septic locations.

II) Work with VDH to share data collected by state employees regarding well and septic systems throughout the County.

III) Compile a clearinghouse of past, present, and future water resource studies to insure that data remains available to future planners for continued protection of water resources.

Strategy (e). Work with Lord Fairfax Soil and Water Conservation District (LFSWCD) to minimize levels of nitrate leading to groundwater from cultivated crops by encouraging use of Best Management Practices (BMPs).

Strategy (f). Establish a well water test program with FOSR, or others, to measure groundwater levels of nitrate and other contaminants and track such contaminant levels.

Objective 2. Protect surface water resources from contamination

Strategy (a). Cooperate with and encourage use of the programs administered by the Lord Fairfax Soil and Water Conservation District and other agencies involved in developing Best Management Practices (BMPs) to reduce non-point source pollution.

Strategy (b). Encourage development of comprehensive Resource Management Plans, which are designed to create a comprehensive approach for installing all available BMPs for a particular property to maximize water resource protection for agricultural and urban land uses. These plans could be a requirement to qualify for land use taxation.

Strategy (c). Continue to work cooperatively with DEQ and all partners to generate TMDLs and Implementation plans for impaired waters. Secure regular updates on status of implementation of such plans.

Strategy (d). Continue to support Friends of the Shenandoah River (FOSR) monitoring in the Shenandoah River and area streams in order to identify changes in water quality. Secure annual reports from FOSR indicating level and trends in collected data.

Strategy (e). Work with DEQ to reevaluate TMDLs to take into consideration natural sediment levels in marl streams, as identified by FOSR, when establishing impairment levels.

Strategy (f). Support and encourage use of all available grant funding sources to implement water quality improvement efforts and provide in-kind or monetary match to insure viability of grant applications.

Strategy (g). Protect wetlands for their hydrologic and ecological functions, and pursue opportunities to mitigate, restore or create wetlands.

Strategy (h). Continue to participate in and support the Chesapeake Bay TMDL water quality improvement efforts through the Regional Commission and LFSWCD.

Strategy (i). Consider development of a real-time water quality monitoring network to provide timely water-quality information in order to assess total maximum daily loads (TMDLs) and the effects of urbanization and agriculture on the water supply. Incorporate related FOSR data and well water testing conducted by County Extension in an annual report.

GOAL 2. Protect and maintain water availability

Objective 1. **Protect water availability through regulatory action**

Strategy (a). Protect and enhance ground water recharge and quality by evaluating the petitioning the State Water Control Board to designate the County as a groundwater management area in accordance with State law.

Strategy (b) Encourage Conservation Easements, appropriate LFSWCD BMPs installations, limit contamination sources, impervious surfaces, and high water users within the limestone ridge area identified in the 2010 USGS report as the designated recharge area for the County, to protect groundwater availability.

Strategy (c) Evaluate and consider establishing regulation requiring hydrogeologic studies (such as drawdown tests) for water users greater than 10,000 gallons per day, to insure adequate water availability and to minimize impact to existing wells.

Strategy (d). Establish minimum well construction depth to protect water availability during drought based on the base-level altitude values as developed in the 2010 USGS study.

Strategy (e). Protect aquifers and stream base flows from unnecessary withdrawals by municipalities, industry, agriculture, or residents during periods of low flow and drought events by reducing water use, particularly in the Shenandoah River watershed by incorporating data collected from the Minimum Instream flow studies.

Strategy (f). Continue to work with the Northern Shenandoah Valley Regional Commission and state agencies to update the Water Supply Plan to insure that adequate water resources are available for Clarke County residents. Specifically, encourage off-stream storage of river water during high flows to avoid supplementing water supplies with groundwater or interbasin transfer.

Strategy (g). Work with State agencies and legislature to recognize the interrelationship between ground and surface water in the Shenandoah Valley when considering permitting of municipal water supplies and how groundwater withdrawals may impact surface water flow.

Strategy (h). Work with the Town of Berryville to consider utilizing Berryville Waste Water Treatment Facility effluent for crop irrigation and other non-potable usage.

Strategy (i). Consider impoundments in streams where appropriate for groundwater recharge, crop irrigation, and public water supply.

Objective 2. Protect water availability through programmatic action

Strategy (a). Begin to look at developing sustainable yields for groundwater withdrawals as discussed in the 2010 USGS report.

Strategy (b). Protect and maintain natural stream flows during low flow and drought periods though water conservation and reuse.

Strategy (c). Continue to fund USGS real-time network to provide timely water-quantity information to resource managers and others to make informed decisions about floods and water availability.

Strategy (d). Consider reinstating the real-time well at the Chet Hobert Park which was discontinued in 2013. This well represents the Dry Marsh groundwater area that experienced the most impact during the 1999-2000 drought.

Strategy (e). Add a streamflow gage on the Blue Ridge as no streamflow data is measured on the mountain.

Strategy (f). Continue to support USGS research efforts to enhance the County's understanding of water resources.

Strategy (g). Establish permanent funding for water resources studies including but not limited to the real-time monitoring network and groundwater quality network.

GOAL 3. Engage and educate individuals, communities and governments in watershed stewardship

Strategy (a). Engage the public at all levels to implement watershed stewardship and "good housekeeping" practices within the County.

Strategy (b). Expand and sustain public education at all levels to achieve widespread public understanding of the inter-relationship of human activities and natural resources, and the economic, public health, environmental, and community benefits of preserving the integrity of the natural watershed ecosystems.

Strategy (c). Engage governments at all levels to implement all appropriate goals and strategies in their regulations, programs and activities.

Strategy (d). Utilize the internet, websites, and social media to promote water quality and quantity awareness and the importance of stewardship.

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CHAPTER II

RECOMMENDATIONS

2018 WATER RESOURCES PLAN – DRAFT
(PLANNING COMMISSION PUBLIC HEAING – JULY 6, 2018)

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CHAPTER II—RECOMMENDATIONS

Project Priorities

Based on the Objectives and Strategies outlined in the previous section. The following strategies are recommended for short-term implementation (< 5 years).

1. Implement regular maintenance, monitoring, and reporting of all septic system components including drain lines, distribution boxes, and septic tanks. Included in the maintenance is a regular pump-out schedule as recommended by the Virginia Department of Health (VDH).
2. Develop a database of all existing well and septic permits on file in cooperation with the Health Department. Homes with systems not on file should be surveyed to determine the type and location of water source and sewage disposal. Consider permanent funding for a part-time employee to GPS well and septic locations.
3. Work with VDH to share data collected by state employees regarding well and septic systems throughout the County.
4. Consider development of a real-time water quality monitoring network to provide timely water-quality information in order to assess total maximum daily loads (TMDLs) and the effects of urbanization and agriculture on water supply.
5. Protect and enhance ground water recharge and quality by evaluating the petitioning of the State Water Control Board to designate the County as a groundwater management area in accordance with State law. At a minimum a groundwater management area should be established for the limestone ridge area identified in the 2010 USGS report as the designated recharge area for the County.
6. Encourage Conservation Easements, appropriate LFSWCD BMPs installations, limit contamination sources, impervious surfaces, and high water users within this area to protect groundwater availability.
7. Establish minimum well construction depths, to protect water availability during drought, based on the base-level altitude values, as developed in the 2010 USGS study.

8. Consider reinstating the real-time well at the Park which was discontinued in 2013. This well represents the Dry Marsh groundwater area that experienced the most impact during the 1999-2000 drought.
9. Add a streamflow gage on the Blue Ridge as no streamflow data is measured on the mountain.
10. Engage the public at all levels to implement watershed stewardship and "good housekeeping" practices on private, commercial, industrial, institutional, and public lands and roads.

CHAPTER III

DESCRIPTION OF BLUE RIDGE AND GREAT VALLEY REGIONS

2018 WATER RESOURCES PLAN – DRAFT
(PLANNING COMMISSION PUBLIC HEARING – JULY 6, 2018)

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CHAPTER III – DESCRIPTION OF THE BLUE RIDGE AND GREAT VALLEY REGIONS

The eastern third of the County consists of the western slope of the Blue Ridge Mountains. This region is primarily forested. The Shenandoah River divides the mountain from the valley portion of the County. Approximately twenty-two miles of the main stem of the Shenandoah River run through the County. The western two-thirds of the County are in the northern Shenandoah Valley and are primarily open land in agricultural use.

The Blue Ridge area is characterized by elevations greater than 1,400 ft., steep slopes, low sinkhole density, high stream density, mean annual precipitation 40 in/yr.

In contrast, the Valley region has low elevation, generally less than 350 ft., gentle slopes, high sinkhole density, low stream density, mean annual precipitation 39 in/yr. Rainfall is the primary source of recharge with approximately 1 inch of rain covering 1 sq. mile equates to 17.4 million gallons of water. Groundwater is the dominant source of streamflow, especially in droughts. Differences in resistance to weathering are also shown by the extent of bedrock openings where groundwater occurs and moves.

In the Blue Ridge bedrock, water occurs in fractures in the rock, joints, faults, and bedding plane separations.

In the Valley area, the carbonate bedrock is more easily dissolved by water, and many fractures can become enlarged into solution channels.

Clarke County was divided into nine groundwater areas based on surface-water basin boundaries (Figure 3). These areas are described below.

Long Marsh Run (B01VR)

- Land area: 23% (25,922 acres)
- Land cover is 66% agriculture, 20% forested and 13% urban.
- Urban areas: Berryville
- Perennial tributaries include Long Marsh, Wheat Spring Branch, and Dog Run
- Sampling points:
    - DEQ – 4 sites
    - FOSR – 5 sites

- Contamination Issues: This area includes 3 impaired waterways, Wheat Spring Branch, Dog Run, and Long Marsh Run. Craig Run is listed as Category 3A meaning that no data are available within the data window of the current assessment to determine if any designated use is attained and the water was not previously listed as impaired.

Raven Rocks Run (B01BR)

- Land area: 10% (10,986 acres)
- Land cover is 87% forested, 7% agriculture and 6% urban.
- Urban areas: Shenandoah Retreat, Pine Grove
- Perennial tributaries include Raven Rocks Run and Spout Run (mountain), and numerous unnamed tributaries.
- Sampling points:
    - DEQ – 0 sites
    - FOSR – 0 sites
- Contamination Issues: All streams in the area are classified as Category 3A meaning that no data are available within the data window of the current assessment to determine if any designated use is attained and the water was not previously listed as impaired. In the early 1986, 10 wells in the village of Pine Grove were contaminated by petroleum believed to have leaked from underground storage tanks.

Shenandoah River/Spout Run (B02VR)

- Land area: 27% (31,367 acres)
- Land cover is 64% agriculture, 27% forested and 7% urban.
- Urban areas: Boyce, Millwood, and Waterloo
- Perennial tributaries include Long Branch, Lewis Run, Chapel Run, Page Brook, Roseville Run, West Brook, and Spout Run in the valley
- Sampling points:
    - DEQ – 5 sites
    - FOSR – 8 sites
- Contamination Issues: Spout Run and Long Branch are impaired based on high fecal coliform counts and sediment. A TMDL was developed in 2012 for Spout Run and 2015 for Long Branch. The TMDL for Long Branch also includes other tributaries including Borden Marsh Run and Crooked Run, along with several in Warren County.

Morgan Mill (B02BR)

- Land area: 14% (15,955 acres)
- Land cover is 91% forested, 5% agriculture and 4% urban.

- Urban areas: Calmes Neck and Carefree Acres
- Perennial tributaries include Morgan Mill Stream and several unnamed waterways
- Sampling points:
    - DEQ – 0 sites
    - FOSR – 0 sites
- Contamination Issues: All streams in the area are classified as Category 3A meaning that no data are available within the data window of the current assessment to determine if any designated use is attained and the water was not previously listed as impaired.

Rock Spring Branch (B03BR)

- Land area: 0% (448 acres)
- Land cover is 98% forested and 2% urban.
- Urban areas: Shenandoah Farms
- Perennial tributaries include the headwaters for Rock Spring Branch
- Sampling points:
    - DEQ – 0 sites
    - FOSR – 0 sites
- Contamination Issues: This is a very small section of the County with the majority of the basin in Warren County. No known contamination issues.

Borden Marsh Run (B03VR)

- Land area: 6% (6,413 acres)
- Land cover is 76% agricultural, 17% forested, and 6% urban.
- Urban areas: White Post and Double Toll Gate
- Perennial tributaries include Borden Marsh Run and Wolfe Marsh Run
- Sampling points:
    - DEQ – 0 sites
    - FOSR – 0 sites

- Contamination Issues: Borden Marsh Run is classified as impaired due to high e.coli levels, a TMDL was developed and approved in 2015. In 1992 the groundwater supply for the community of White Post was contaminated by petroleum products that necessitated the expenditure of more than 2 million dollars by the State Water Control Board to bring potable water from Prospect Hill Spring to White Post residents.

Crooked Run (B04VR)

- Land area: 1% (787 acres)
- Land cover is 81% agricultural, 7% forested, and 12% urban.
- Urban areas: southern Double Toll Gate
- Perennial tributaries include Crooked Run
- Sampling points:
    - DEQ – 0 sites
    - FOSR – 1 sites
- Contamination Issues: Crooked Run is classified as impaired due to high e.coli levels, a TMDL was developed and approved in 2015.

Dry Marsh Run (B054VR)

- Land area: 14% (16,488 acres)
- Land cover is 62% agriculture, 30% forested and 8% urban.
- Urban areas: scattered development
- Perennial tributaries include Dry Marsh Run and several unnamed waterways
- Sampling points:
    - DEQ – 0 sites
    - FOSR – 0 sites
- Contamination Issues: Dry Marsh Run is considered fully supporting and not contaminated. Unnamed tributaries of Opequon Creek are classified as Category 3A meaning that no data are available within the data window of the current assessment to determine if any designated use is attained and the water was not previously listed as impaired.

Opequon Creek (B055VR)

- Land area: 5% (5,578 acres)
- Land cover is 64% agriculture, 30% forested and 5% urban.

- Urban areas: scattered development
- Perennial tributaries include Isaac Run and several unnamed waterways
- Sampling points:
    - DEQ – 0 sites
    - FOSR – 0 sites
- Contamination Issues: Isaac Run and numerous unnamed tributaries of Opequon Creek are classified as Category 3A meaning that no data are available within the data window of the current assessment to determine if any designated use is attained and the water was not previously listed as impaired.

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CHAPTER IV

BACKGROUND INFORMATION

2018 WATER RESOURCES PLAN – DRAFT
(PLANNING COMMISSION PUBLIC HEARING – JULY 6, 2018)

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CHAPTER IV – BACKGROUND INFORMATION

A. Interrelationship between Ground and Surface Waters

The 2010 USGS study evaluated ground-water availability in Dry Marsh Run and Spout Run. These drainages were selected as representative of distinct geologic regions in the County and the watershed boundary is completely within the County. These real-time stream gages were placed in the lower reaches of these waterways and the data collected were used in the water budget equation.

Dry Marsh Run effective recharge ranged from 6.4 to 22.5 with an average of 11.6 in/yr. Baseflow of streams is 81-93% ground-water.

Spout Run Basin effective recharge ranged from 6.7-23.0 in/yr with an average of 11.9 in/yr. The baseflow 80-97% mean streamflow.

This high baseflow index indicates that ground-water is the dominant source of stream flow.

Another finding was that on average approximately 30% of precipitation reaches the water table as effective recharge; therefore, only 3-4% of precipitation becomes runoff and therefore ground-water flow systems are extremely vulnerable to climatic conditions.

Below average recharge causes water level declines, effective recharge increases as precipitation increases but lack on snow during critical recharge periods (Nov-Apr) dramatically impacts amount of recharge. Water availability can be based on the amount of effective recharge.

Of principle concern is the fact that groundwater is the dominant source of streamflow. Too much water withdrawn without enough recharge can adversely affect aquatic systems.

B. Public Water and Sewer

In Clarke County public water and sewer is administered by the Clarke County Sanitary Authority (CCSA). The sewer system consists of the Boyce Wastewater Treatment Plant (BWWTP) that serves the residents and businesses in designated exclusive sewer service areas for the Town of Boyce, the Waterloo Business Area, and the Village of Millwood

(County Code Section 180 Article V, VI, and VII). Public water comes from Prospect Hill Spring that serves Millwood, Boyce, Waterloo and White Post.

The Town of Berryville provides separate water and sewer for the residents of Berryville. The waste water treatment facility is located on Parshall Road; the treatment capacity is 0.7 MGD. Public water comes from the Shenandoah River; the treatment plant is on Springsbury Road and is permitted to withdraw up to 0.864 MGD (Figure 7).

The remaining areas of the County utilize private wells and septic systems. The County does not have a septage disposal facility so it has entered into a long term contract with the Frederick-Winchester Service Authority (FWSA) to utilize the Opequon Water Reclamation Facility, located in Frederick County, for septage disposal and treatment. This facility is permitted to treat up to 12 MGD and is located on the south side of Route 7 on the Frederick/Clarke County line (Figure 7).

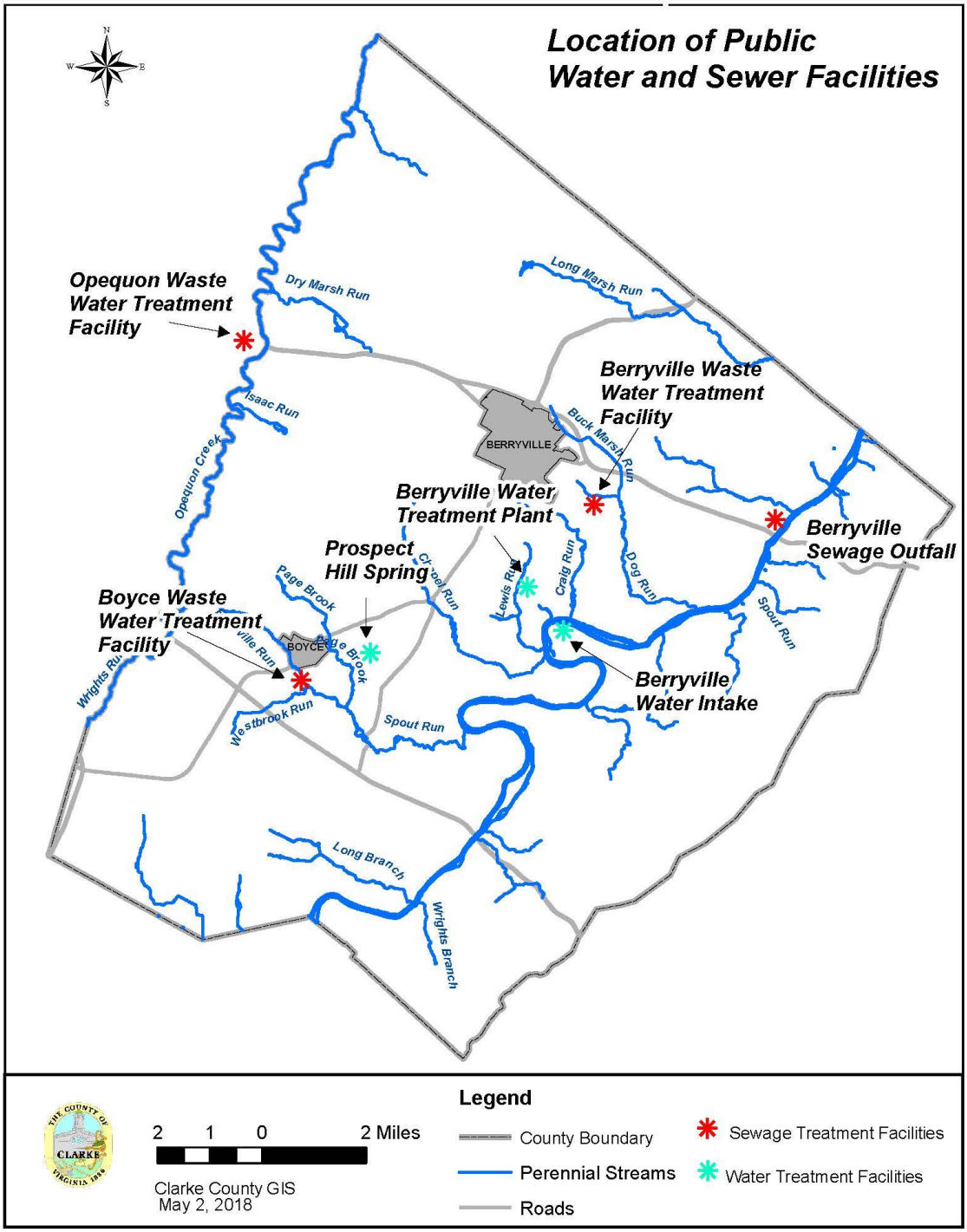
Other regional facilities utilizing water from the Shenandoah include Winchester, Frederick County, and Front Royal.

The current State Water Resources Plan (2015) states that, through careful planning and conservation efforts, there will be sufficient water to support the majority of needs through the year 2040.

However, based on current supply, a deficit of 0.81 MGD is anticipated to occur in Frederick County by 2030. The Frederick County Sanitation Authority alternatives include quarry expansion and groundwater well improvements, and adding a water withdraw from the Opequon Creek at the northern section of the stream on the Clarke/Fredrick County border.

Concerns regarding water supply for Clarke residents based on excessive use in Frederick County and the City of Winchester stem from interbasin transfer from the North Fork of the Shenandoah that is treated and released into the Opequon Creek, bypassing the main stem of the Shenandoah River.

Figure 7


Location of Public
Water and Sewer Facilities
Opequon Waste
Water Treatment
Facility
Dry Marsh Run
Long Marsh Run
Isaac Run
Opequon Creek
Berryville Waste
Water Treatment
Facility
Buck Marsh Run
BERRYVILLE
Berryville Water
Treatment Plant
Berryville
Sewage Outfall
Prospect
Hill Spring
Page Brook
Crooked Run
Lewis Run
Craig Run
Dog Run
Spout Run
Boyce Waste
Water Treatment
Facility
BOYCE
Wrights Run
Westbrook Run
Berryville
Water Intake
Long Branch
Wrights Branch
Legend
County Boundary
Perennial Streams
Roads
Sewage Treatment Facilities
Water Treatment Facilities
2 1 0 2 Miles
Clarke County GIS
May 2, 2018

C. Water Quality

Water quality refers to the chemical and biological constituents of water.

Natural groundwater quality depends primarily on bedrock composition. Groundwater in the Valley area has generally higher concentrations of total dissolved minerals, because the rocks of the Valley are more soluble than those of the Blue Ridge.

Water from Valley wells and springs has relatively high calcium, low magnesium, and very low sodium and potassium. Except where onsite sewage disposal systems add water softener sodium, a growing problem.

Water in the Blue Ridge has variable amounts of calcium, low magnesium, and variable (but often high) sodium and potassium. Total hardness ranges from 89-422 milligrams per liter as calcium carbonate (mg/l) in the Valley, compared to 4-242 mg/1 in the Blue Ridge. Valley area groundwater is classified as very hard (Wright, 1990).

Unnatural groundwater quality or contaminated groundwater is caused primarily by human land uses.

D. Water Quality Impacts – Point and Non-point sources

Due to the environmental concerns caused by excessive nutrient discharges, state and federal regulatory agencies are implementing stringent limitations on both point source and non-point source nutrient discharges. “Point source” is defined by the U.S. Environmental Protection Agency as “a source of pollution that can be attributed to a specific physical location – usually an identifiable, "end-of-pipe point."

Specifically, sewage treatment facilities, stormwater discharge, and large animal feeding operations all are regulated and require permits from DEQ.

The positive outcome of these regulatory requirements is that water quality is improved where voluntary measures are not as effective.

E. Point Source – Regulated discharge

Sewage Treatment Facility upgrades.

Wastewater discharged from sewage treatment plants is the second largest source of surface water nitrogen pollution to the Chesapeake Bay.

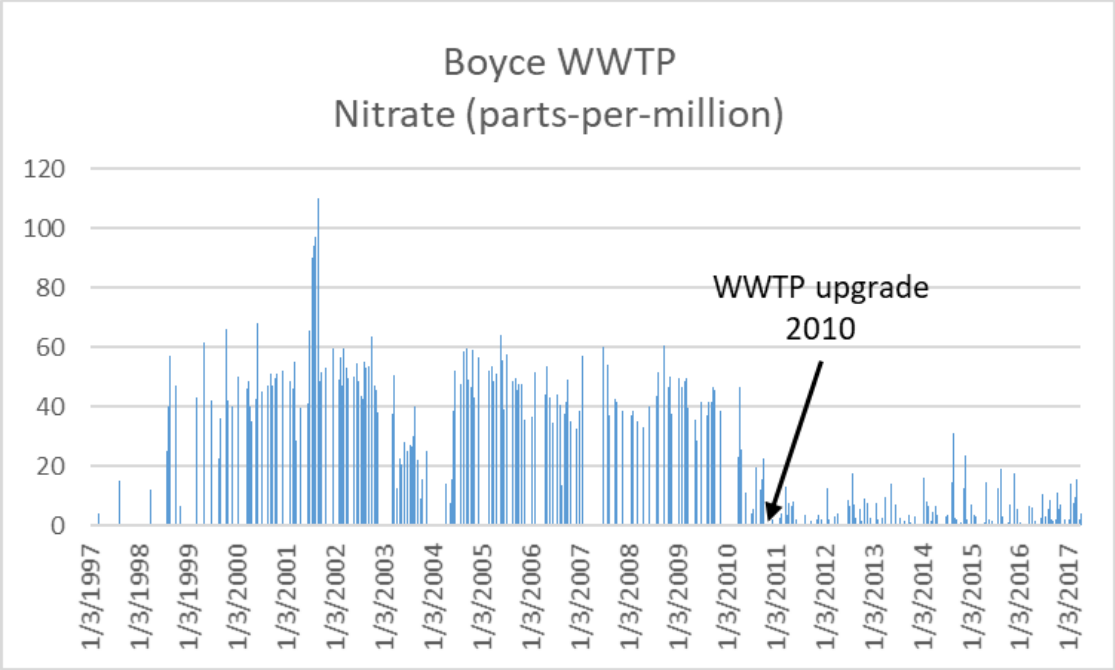
Agriculture contributes 42% of the nitrogen loading and is the largest source of nitrogen pollution to the Bay.

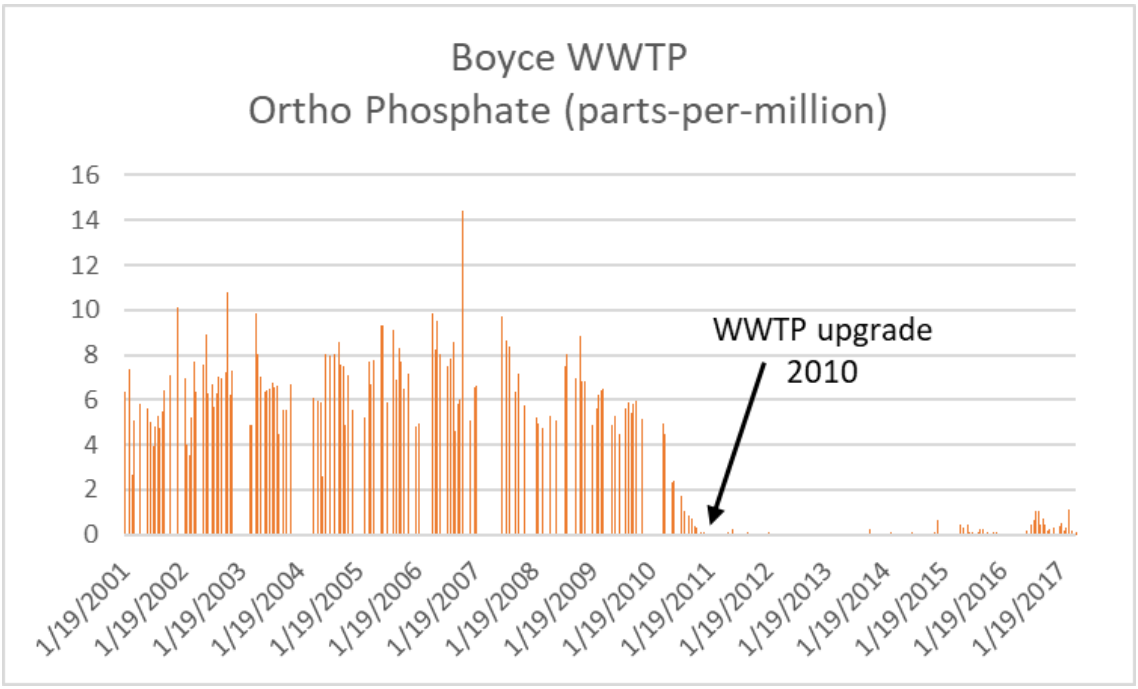
When approximately 12 million of the 16 million residents of the watershed flush their toilets, the wastewater goes to Sewage Treatment Plants (STP), which discharge into the Chesapeake Bay and its tributaries.

There are 304 “significant” STPs in the watershed, which discharge 1.5 billion gallons of wastewater each day. These plants contribute about 52 million pounds of nitrogen pollution annually to the Bay and its tributaries (Chesapeake Bay Foundation, 2003).

For wastewater treatment plants in Virginia nutrient discharge limitations require upgrading existing treatment systems to provide some form of biological nutrient removal (BNR). These systems provide the biological steps necessary to remove nutrients (nitrogen and phosphorus) from the wastewater.

The Berryville, Boyce and Opequon Waste Water Treatment facilities have all completed the required upgrades (DEQ, 2018 Wastewater Assistance & Training Nutrient Removal website).





FOSR data (2017)

According to DEQ, point source pollutant loads have been significantly reduced due to waste water treatment plant upgrades, but these reductions will level off as growth occurs in the service areas of these plants.

Agricultural and urban source sectors have benefitted from overachievement of nutrient reductions from waste water treatment plants. Although sediment loads from agricultural activities have decreased, these loads remain a primary source of sediment and further reductions are needed.

In addition, there is an additional need to address nutrient and sediment loads from urban sources.

F. Urban

Stormwater runoff from streets, lawns, parking lots, construction sites, industrial facilities and other impervious surfaces occurs as a result of precipitation events (for example, rain water or melted snow). The stormwater runoff may enter surface waters directly or through natural and constructed channel systems.

Activities occurring in developed and urban areas contaminate stormwater runoff with pollutants such as automobile oil, grease, metals, sediment, bacteria from animal waste, nutrients and pesticides from lawns, as well as deposits from airborne pollutants.

Unmanaged stormwater can cause erosion and flooding. It also can carry excess nutrients, sediment and other contaminants into rivers and streams.

Properly managed stormwater can recharge groundwater and protect land and streams from erosion, flooding and pollutants.

DEQ is currently the lead agency for developing and implementing statewide stormwater management and nonpoint source pollution control programs to protect the Common-wealth's water quality and quantity.

In 2010 the County updated its own stormwater regulations in an attempt to reduce the discharge limits for phosphorous from state levels of 0.45 lbs/ac/yr depended on site size and location to 0.28 most sites. In addition, the pollutant load was computed based on impervious surface and “managed turf” areas, like residential lawns, and additional BMPs and site design

techniques were permitted. Beginning in 2014 phosphorous is excluded from lawn fertilizer in Virginia.

The County also developed a Stormwater Design Manual that contains technical plan requirements; methods, design tools and details for engineers; easements, inspections and maintenance enforcement.

In June 2016, the Virginia Department of Environmental Quality (DEQ) notified County Planning Department Staff that the County is not authorized to enforce its more stringent local stormwater regulations and that the County's stormwater ordinance is "null and void."

State law only authorizes localities to have more stringent regulations if they are a Virginia Stormwater Management Program (VSMP) Authority responsible for issuing the State permits – also referred to as an "opt in" locality. Localities such as Clarke County that have "opted out" of accepting responsibility of managing the VSMP process are prohibited under State law from applying more stringent regulations. Those counties that have "opted in" and are VSMP Authorities can only have more stringent regulations if they are approved by the State to have such regulations.

The County Attorney reviewed DEQ's position and concurred, ultimately resulting in action by the Board of Supervisors to repeal the County's stormwater ordinance.

As authorized under the State Water Control Law and the federal Clean Water Act, the Virginia Pollutant Discharge Elimination System (VPDES) permitting program, administered by DEQ, regulates point source pollution. This includes stormwater discharges from construction. The total phosphorus load of new development projects shall not exceed 0.41 pounds per acre per year, as calculated pursuant to 9VAC25-870-65 (DEQ, 2018, Stormwater management website).

G. Agriculture

The DEQ animal waste program is regulated under both the Virginia Pollution Abatement (VPA) Permit Regulation (9VAC25-32) and the Virginia Pollutant Discharge Elimination System (VPDES) Permit Regulation (9VAC25-31).

In Clarke County there are 3 facilities, all dairy farms, operating with a VPA General Permit, Mercer Vu Farms (former White Post Dairy), Harvue Farms, and Riggs and Stiles Inc. These farms are required to have a nutrient management plan, a manure storage facility, and may require water quality monitoring (Figure 8) (9VAC25-192-70).

All other agricultural operations in the County are considered non-point sources and installation of Best Management Practices (BMPs) is strictly voluntary with cost-share for some practices available from LFSWCD..

H. Non-point Source

Best Management Practice Installation.

Reductions in nonpoint source (NPS) pollution can be attained by reducing activities that produce NPS pollutants, reducing the amount of pollutants generated by an existing activity and reducing the negative effects these pollutants can have by controlling their dispersal.

To that end, NPS (BMPs) are important tools in controlling NPS pollution and its impact on the environment.

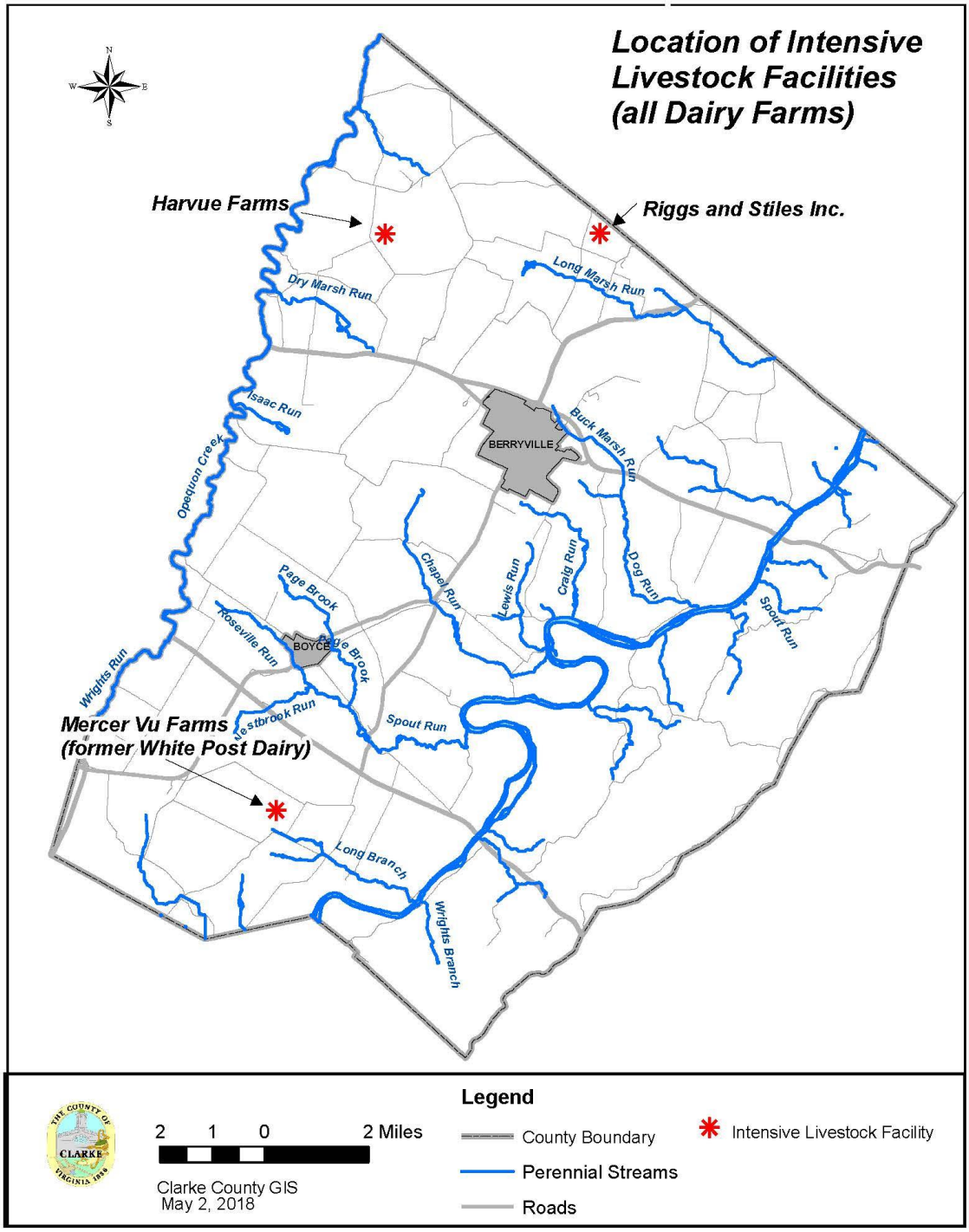
While there are many sources of NPS pollution, agriculture is among the most significant in Clarke County because the majority of land use is devoted to farming.

For example, one EPA study estimates that 27 percent of the phosphorus and 60 percent of the nitrogen entering the Chesapeake Bay originate from cropland. These pollutants need to be controlled to protect the environment.

The Department of Conservation and Recreation (DCR) administers programs through local soil and water conservation districts (SWCDs) to improve or maintain water quality in the state's streams, lakes and bays through the installation or implementation of agricultural BMPs (DCR. 2018. BMP cost-share program).

Through these programs, financial and technical assistance are offered as incentives to carry out construction or implementation of selected BMPs.

Figure 8


Location of Intensive Livestock Facilities (all Dairy Farms)
Harvue Farms
Riggs and Stiles Inc.
Mercer Vu Farms (former White Post Dairy)
Dry Marsh Run
Long Marsh Run
Isaac Run
Opequon Creek
Buck Marsh Run
BERRYVILLE
Page Brook
Chapel Run
Lewis Run
Craig Run
Dog Run
Spout Run
Roseville Run
BOYCE
Wrights Run
Westbrook Run
Long Branch
Wrights Branch
Legend
County Boundary
Perennial Streams
Roads
Intensive Livestock Facility
2 1 0 2 Miles
Clarke County GIS
May 2, 2018

The state provides funds to SWCDs for targeted priority hydrologic units. Areas with the greatest pollution potential receive the greatest funding.

Clarke County is within the Lord Fairfax Soil and Water Conservation District (LFSWCD).

The cost-share program supports the use of various practices in conservation planning to treat cropland, pastureland, hay land and forested land. Some are paid for at a flat rate or straight per-acre rate. Others are cost-shared on a percentage basis up to 80 percent.

In some cases, the United States Department of Agriculture (USDA) also pays a percentage. The cost-share program's practices can often be funded by a combination of state and federal funds, reducing the landowner‘s expense to less than 30 percent of the total cost.

A 100% cost-share was provided by the LFSWCD in 2015 and 2016 for livestock exclusion from streams (SL-6). Current cost share for that practice is 80%. Landowners are responsible for the maintenance of BMPs.

Data is available at the DCR website which details the extent of BMP’s installed in watershed across the Commonwealth since 1998.

In Clarke County, the farming community has installed 486 practices over this time period. A variety of BMPs have been installed including CREP Riparian Forest Buffer Planting (CRFR-3, N=23), Harvestable Cover Crop (SL-8H, N=49), Manure Application to Corn Using

Pre-app. Nitrate Test (NM-3B, N=37), Nutrient Management Plan Writing and Revision (NM-1, N=22), Riparian Buffer Rent (CP-22, N=22), Small Grain and Mixed Cover Crop for Nutrient Management and Residue Management (SL-8B, N=87), Stream Exclusion With Grazing Land Management (SL-6, N=86), Streambank protection (fencing) (WP-2, N=19).

These practices have resulted in 216,171 linear feet of stream fencing, creating over 49,000 acres of riparian buffer in the County. This shows a deliberate effort on the part of farmers to maintain and improve water quality (DCR. 2018. Website Virginia Agricultural BMP and CREP Database Query Form).

Stream Fencing

Stream Crossing

Waterer

Another state program is the Virginia Resource Management Planning program that provides a voluntary way to promote the use of conservation practices that improve farming operations and water quality. Resource management plans can help farm owners and operators take advantage of all the conservation measures at their disposal.

The plans are designed to encourage farmers, either the farm owner or operator, to use a high level of best management practices (BMPs) that reduce runoff pollution to local waters and, in many cases, improve the farmer's financial bottom line.

In return for full implementation, the plan holder can be assured that he or she is in compliance with any new state nutrient, sediment and water quality standards; in particular, regulations related to the Chesapeake Bay and all local stream segment TMDLs.

The certificate of safe harbor is valid for nine years provided the farmer continues to implement the RMP. Participation in the program is completely voluntary.

This could be tied to qualifying for use value taxation in Clarke County as an incentive.

I. Biosolids

The Virginia Department of Environmental Quality (DEQ) regulates oversight of all land application of treated sewage sludge, commonly referred to as biosolids.

A total of 11,125 acres are permitted for biosolids application in the County -- proportionately more than many other counties in the area -- and averaging 18,000 wet tons per year.

Biosolids contain about 5-8 pounds of nitrogen per ton. There is interest and concern about the effect of biosolids application on the quality of ground water in Clarke County.

In order to address this concern, the County applied for and received two grants in 2013, totaling $16,000, to monitor 10 springs in northern Shenandoah Valley for discharge, TN, TP, ammonia, ortho phosphate, nitrate-nitrite, E. coli, flow, and general water chemistry. Springs are located in Karst areas.

The purpose is to identify contribution of contamination from springs to surface waters to assist in:

1) Determining appropriate BMP's on agricultural lands, and

2) Determining the impact of biosolids applications on water quality as compared to other fertilizer sources (Webb W., et. al. 2014).

J. Improvement Programs- Federal, State, Regional, Local

Total Maximum Daily Load (TMDL) Watershed Restoration

Since 1998, DEQ has developed plans, with public input, to restore and maintain the water quality for impaired waters. These plans establish "total maximum daily loads" or TMDLs. TMDL is a term that represents the total pollutant a water body can assimilate and still meet standards.

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Efforts to improve surface water quality throughout the region have been driven by the need to improve water quality in the Chesapeake Bay. Water quality degradation caused by nutrient over-enrichment has played a key role in the decline of the living resources of the Chesapeake Bay and its tributaries.

The need to reduce the nutrient flow from tributaries into the Chesapeake Bay prompted states, including Virginia, to enter into the Chesapeake Bay Agreement in 1987.

This agreement included a commitment to reduce and maintain the controllable loads of phosphorus and nitrogen entering the Bay by 40% by the year 2000 by developing tributary-specific strategies for each of the Bay's major tributaries.

Virginia's strategy for the Shenandoah and Potomac River Basin was completed in 1996 (Tributary Strategy Plan, 1996).

Despite extensive restoration efforts, including implementation of the Tributary Strategy Plans during the prior 25 years, the U.S. Environmental Protection Agency established a new Chesapeake Bay Total Maximum Daily Load (TMDL), a historic and comprehensive “pollution diet”, in 2010.

This TMDL includes accountability features to guide sweeping actions to restore clean water in the Chesapeake Bay and the region’s streams, creeks and rivers. The TMDL is designed to ensure that all pollution control measures needed to fully restore the Bay and its tidal rivers are in place that are expected to achieve 60 percent of the nutrient and sediment pollution load reductions necessary to achieve applicable water quality standards as compared to 2009 levels by 2017.

By 2025, the goal is to have all practices and controls installed to achieve the Bay's dissolved oxygen, water clarity/submerged aquatic vegetation and chlorophyll a standard as articulated in the Chesapeake Bay TMDL document. Scientific evidence shows that many of the pollution-reducing practices we are placing on the ground now may take years to show visible improvements in water quality. This is sometimes referred to as "lag" time.

French and Canadian researchers tracked the movement of fertilizer through a plot of land over the course of three decades. While more than half of the fertilizer applied to the land in 1982 was absorbed by agricultural crops like wheat and sugar beets, 12 to 15 percent remained in the soil. The researchers predicted it would take an additional 50 years before the fertilizer fully disappeared from the environment (DiPasquale, 2013).

Watershed Implementation Plans (WIPs) are the roadmap indicating how Bay jurisdictions, in partnership with federal and local governments, will achieve the Chesapeake Bay TMDL allocations by 2025.

Bay jurisdictions include Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia and the District of Columbia.

There are three phases of WIPs developed by the Bay jurisdictions. Phase I and Phase II WIPs were developed and submitted to EPA in 2010 and 2012, respectively. Both Phase I and Phase II WIPs describe actions and controls to be implemented by 2017 and 2025 to achieve applicable water quality standards.

The Phase II WIPs build on the initial Phase I WIPs by providing more specific local actions. Phase III WIPs will be developed by jurisdictions based on a midpoint assessment of progress and scientific analyses was through 2017.

Phase III WIPs will provide information on actions the Bay jurisdictions intend to implement between 2018 and 2025 to meet the Bay restoration goals.

The County participates in development of the WIP's through the Northern Shenandoah Valley Regional Commission (EPA Chesapeake Bay TMDL, website).

Beyond the requirements for the Chesapeake Bay TMDL, specific sections of the 1972 Federal Clean Water Act relevant to water quality improvement efforts include Section 303(d) and 305(b).

Section 303(d) requires States to submit a list of impaired and threatened waters, those not meeting water quality standards, for EPA approval every two years. For each water on the list, the state identifies the pollutant causing the impairment, when known. In addition, the state assigns a priority for development of Total Maximum Daily Loads (TMDL) based on the severity of the pollution and the sensitivity of the uses to be made of the waters, among other factors (40 C.F.R. §130.7(b)(4)).

In addition to section 303(d), lists of impaired waters, states are required to submit section 305(b) water quality reports to EPA. Section 305(b) reports provide information on the water quality status of all waters in the state, not just impaired or threatened waters.

In Virginia the agency responsible for monitoring and developing the 303(d) list is the Department of Environmental Quality (DEQ. 2016. Impaired Waters Fact Sheet).

Determining the amount of contamination a stream can assimilate without degrading water quality below the state water quality standards is the purpose of establishing TMDLs.

Water quality standards consist of statements that describe water quality requirements. They also contain numeric limits for specific physical, chemical, biological or radiological characteristics of water. These statements and numeric limits describe water quality necessary to meet and maintain uses such as swimming, fishing, and other water-based recreation, public water supply, and the propagation and growth of aquatic life (DEQ, 1998).

Those streams whose water quality currently does not meet minimum standards are declared “impaired” waterways. This designation or “priority ranking” is important to localities for targeting limited resources for stream pollution reduction improvements.

K. Impaired Waters

DEQ extensively tests Virginia's rivers, lakes and tidal waters for pollutants. More than 130 pollutants are monitored annually to determine whether the waters can be used for swimming, fishing and drinking. Waters that do not meet standards are reported to the citizens of Virginia and the U.S. Environmental Protection Agency in the Virginia Water Quality Assessment 305(b)/303(d) Integrated Report.

DEQ has developed lists of impaired waters in every even year since 1992. This impaired waters list individually describes segments of streams, lakes and estuaries that exhibit violations of water quality standards. The report details the pollutant responsible for the violations, and the suspected cause and source of the pollutant.

DEQ currently has 7 active TDML monitoring sites in Clarke County. In addition, the Friends of the Shenandoah River (FOSR) has semi-monthly monitoring on 12 sites since 1997 (Figure 9). FOSR has been monitoring water quality in the Shenandoah and its tributaries since 1989. The Lab was certified by EPA in 1997 certified lab at Shenandoah University has analyzed over 40,000 surface water samples, resulting in over 249,000 individual measurements for a range of physio-chemical and biological parameters.

The FOSR citizen monitoring data is included in the Integrated Report on Water quality that is put together and submitted to EPA.

DEQ regularly coordinates with citizen monitoring groups to plan for monitoring of priority implementation areas (BMP installation) or before TMDL development begins or at other times, too.

Figure 9

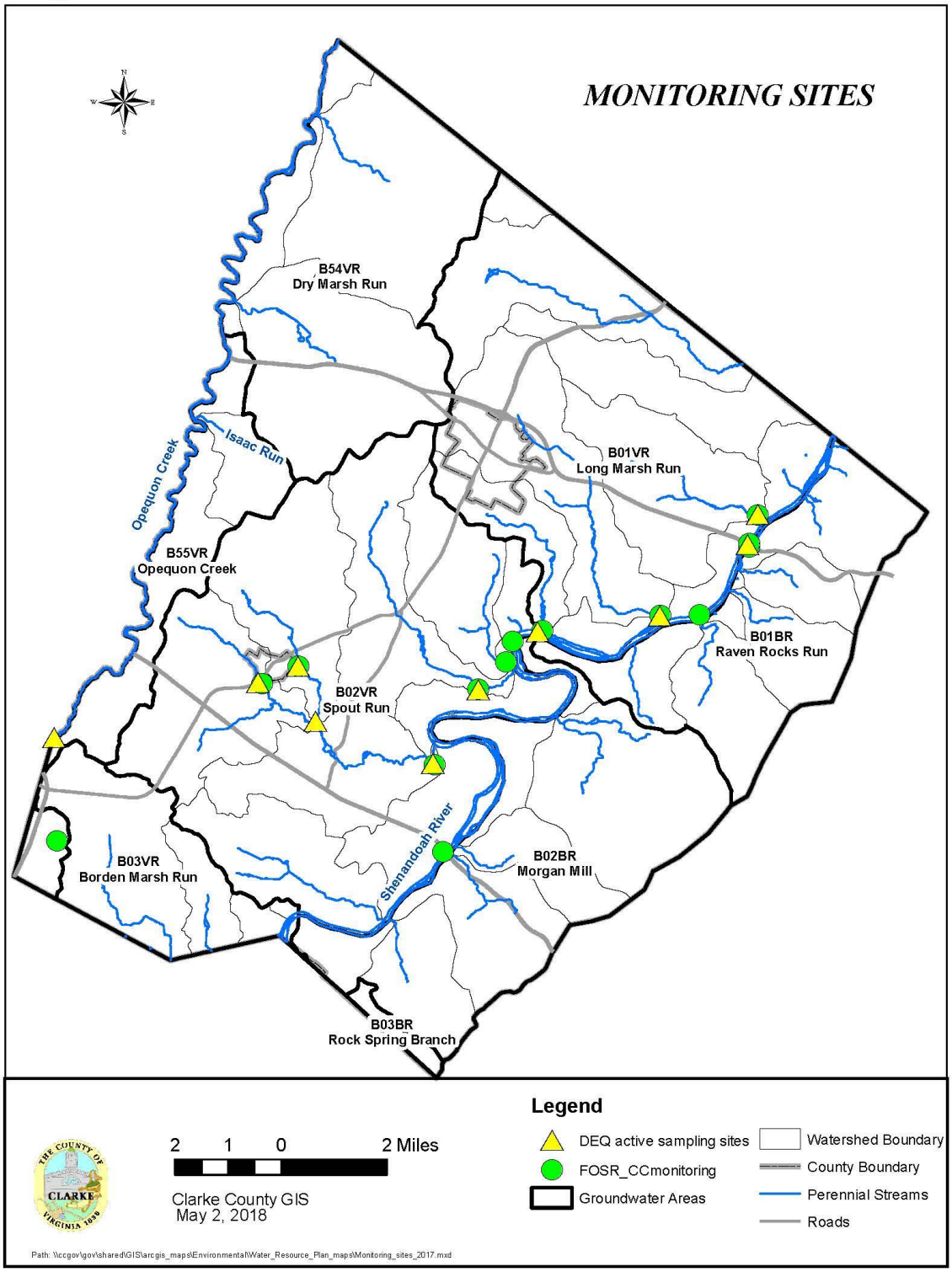

MONITORING SITES
B54VR
Dry Marsh Run
Opequon Creek
Isaac Run
B01VR
Long Marsh Run
B55VR
Opequon Creek
B01BR
Raven Rocks Run
B02VR
Spout Run
Shenandoah River
B03VR
Borden Marsh Run
B02BR
Morgan Mill
B03BR
Rock Spring Branch
Legend
DEQ active sampling sites
FOSR_CCmonitoring
Groundwater Areas
Watershed Boundary
County Boundary
Perennial Streams
Roads
2 1 0 2 Miles
Clarke County GIS
May 2, 2018
Path: \\ccgov\gov\shared\GIS\arcgis_maps\Environmental\Water_Resource_Plan_maps\Monitoring_sites_2017.mxd

Table 2. EPA ASSESSMENT CATEGORIES and VIRGINIA SUBCATEGORIES

FULLY SUPPORTING	Waters are supporting one or more designated uses
EPA Category 1	Attaining all associated designated uses and no designated use is threatened
EPA Category 2	Available data and/or other information indicate that some, but not all of the designated uses are supported.
INDETERMINATE	Waters needing additional information
EPA Category 3	Insufficient data and/or information to determine whether any designated uses are met
IMPAIRED	Waters are impaired or threatened but a TMDL is not required.
EPA Category 4A	Water is impaired or threatened for one or more designated uses but does not require a TMDL because the TMDL for specific pollutant(s) is complete and US EPA approved.
IMPAIRED	Waters are impaired or threatened and require a TMDL
EPA Category 5	Waters are impaired or threatened and a TMDL is needed
Va. Category 5A	A water quality standard is not attained. The water is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (303d list).

Currently, 636 waters are impaired statewide, 11 are in Clarke County. Most impaired waters require TMDLs. Then a TMDL Implementation Plan will be developed to bring the impaired water body up to standards. Implementation Plans include a schedule of actions, costs, and monitoring. Implementation Plan development typically starts within a year of EPA approval of the TMDL Study. Virginia state law requires the development of an Implementation Plan. The following watersheds are listed as impaired and scheduled for TMDL development and implementation planning. Several watersheds in the County must also complete the TMDL process.

Table 3. Impaired waters Clarke County, VA (Figure 3)

Waterbody Name	Cause of Impairment	Category	TMDL Schedule
Shenandoah River	PCB/Mercury e. coli	4A 5A	2002 2024
Borden Marsh Run	e. coli	4A	2018
Page Brook/Spout Run	e. coli/benthic	4A	2016
Long Branch	e. coli	4A	2016
Chapel Run	e. coli/benthic	5A	2020
Roseville	e. coli	4A	2022
Dog Run	e.coli	5A	2020
Wheat Spring Branch	e. coli	5A	2020
Long Marsh Run	e. coli	5A	2024

The majority of work to improve water quality has occurred in the Spout Run watershed.

When a watershed is identified as impaired and has a TMDL developed multiple grant opportunities are available to assist landowners financially with BMP installation.

All of the grants, to date, related to water quality improvement projects in Clarke County have been in the Spout Run Watershed (Figure 10), contained in the EPA Sole Source Aquifer (Figure 11)

A complete list of past and current watershed Programs and Grant Projects for Clarke County is detailed in Appendix II.

Figure 10

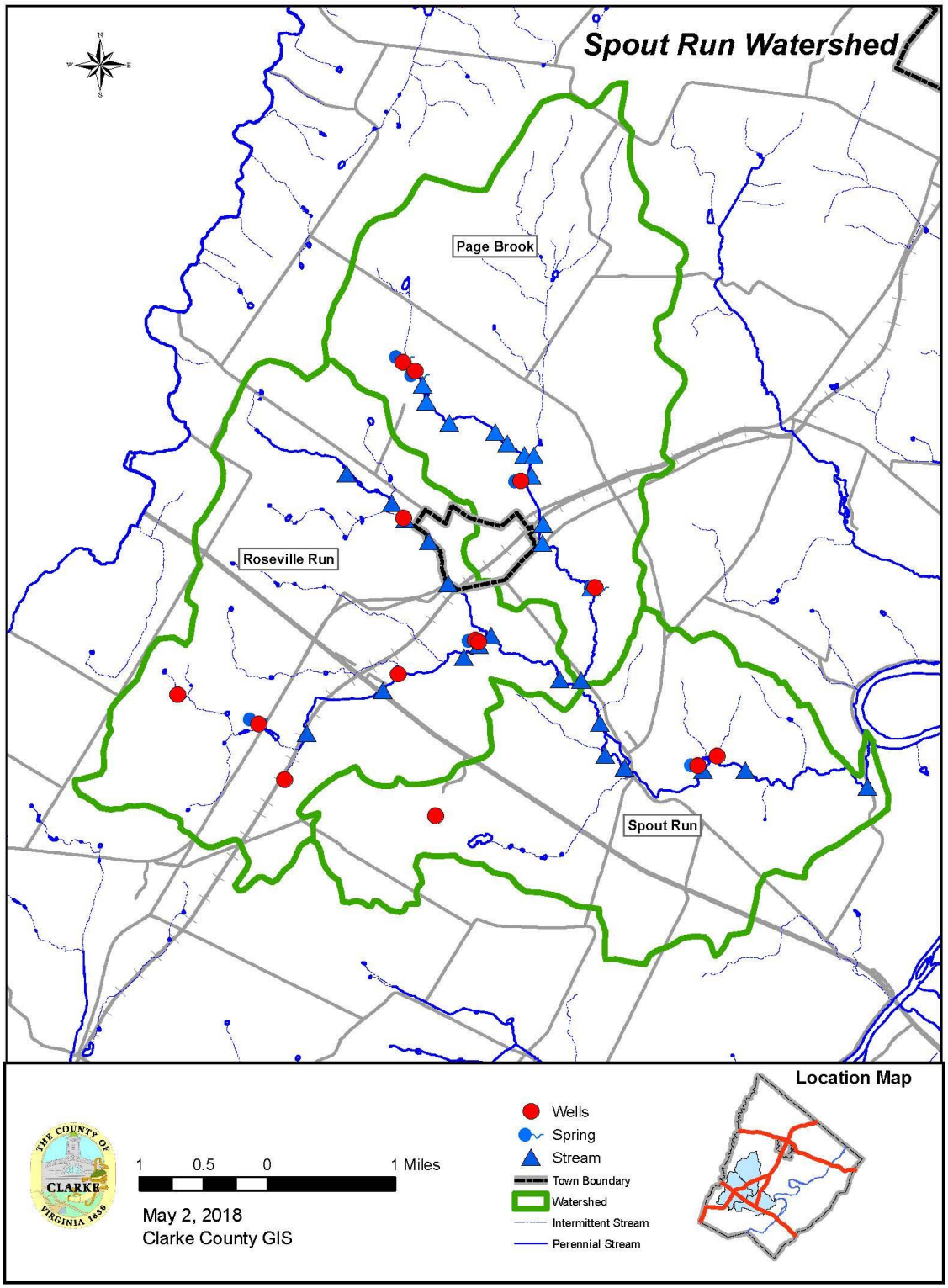
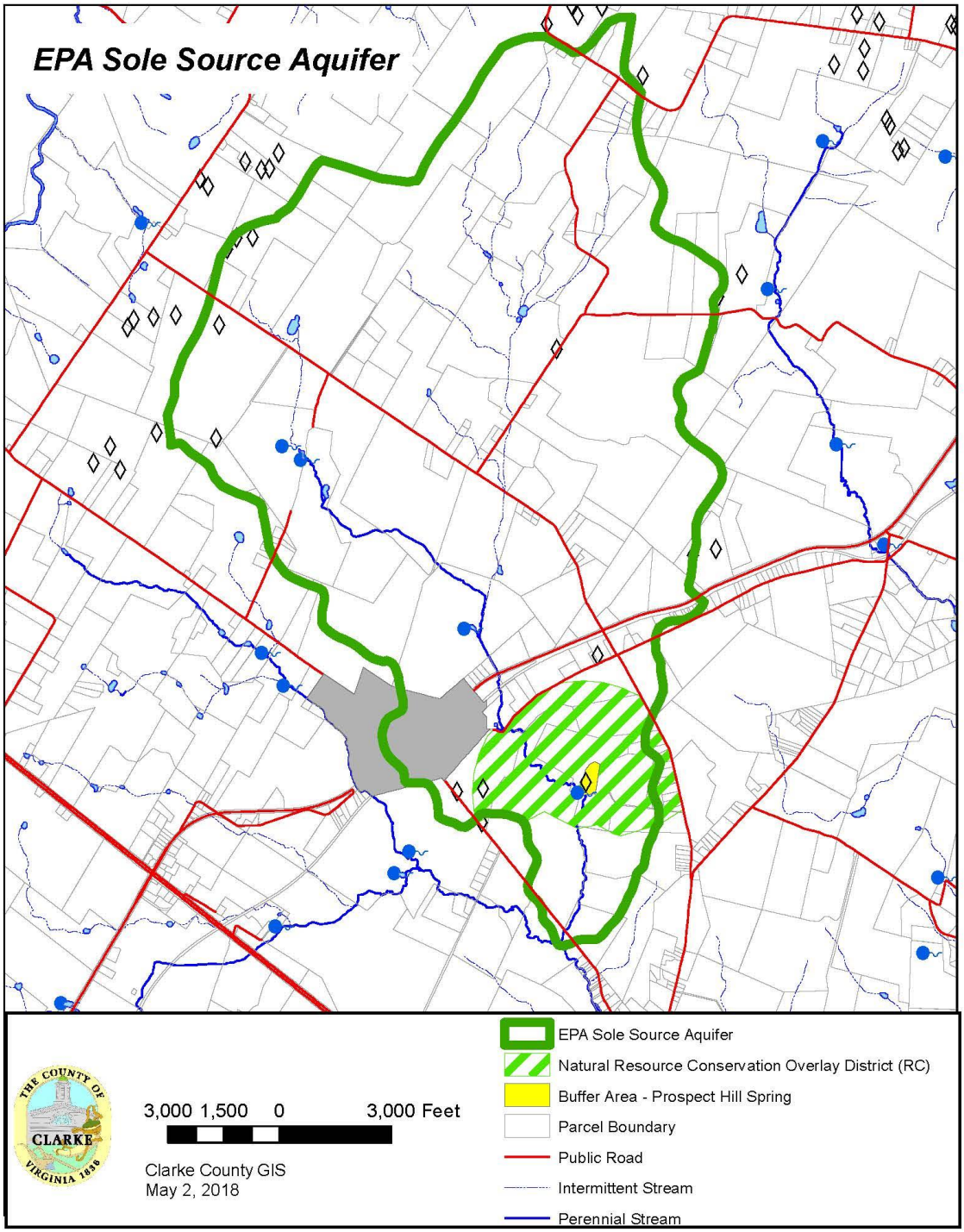

Spout Run Watershed
Page Brook
Roseville Run
Spout Run
Location Map
Wells
Spring
Stream
Town Boundary
Watershed
Intermittent Stream
Perennial Stream
1 0.5 0 1 Miles
May 2, 2018
Clarke County GIS

Figure 11


EPA Sole Source Aquifer
THE COUNTY OF CLARKE VIRGINIA 1836
3,000 1,500 0 3,000 Feet
Clarke County GIS
May 2, 2018
EPA Sole Source Aquifer
Natural Resource Conservation Overlay District (RC)
Buffer Area - Prospect Hill Spring
Parcel Boundary
Public Road
Intermittent Stream
Perennial Stream

L. Water Supply Planning

The Department of Environmental Quality oversees the Commonwealth's water supply planning efforts. This includes development of a state plan, assisting with local and regional plans, and implementing the Virginia Water Withdrawal Permitting Program. The regulation affecting the development of water supply plans in the Commonwealth is the Local and Regional Water Supply Planning Regulation (9VAC25-780), which became effective on November 2, 2005.

The purpose of this regulation is to establish a comprehensive water supply planning process for the development of local, regional, and state water supply plans. This process shall be designed to (i) ensure that adequate and safe drinking water is available to all citizens of the Commonwealth; (ii) encourage, promote, and protect all other beneficial uses of the Commonwealth's water resources; and (iii) encourage, promote, and develop incentives for alternative water sources, including but not limited to desalinization.

In addition, the regulation requires that all counties, cities, and towns in the Commonwealth of Virginia submit a local water supply plan or participate in a regional planning unit in the submittal of a regional water supply plan to the State Water Control Board. The most recent State Water Resources Plan was published in 2015 (DEQ, 2015). The State Plan was developed based on information provided by Virginia's counties, cities, and towns in response to the Water Supply Planning Regulation (9 VAC 25-780). The local and regional water supply plans include information about existing water use and sources of supply, future projections of population and water demand, anticipated water supply deficits, potential sources of future water supply, and current efforts to use water efficiently.

In addition to information from the local plans, the State Plan includes an analysis of how meeting future water needs may affect key water uses such as pollution assimilation, fish and wildlife habitat, and other existing downstream users. The Plan takes an extensive look at surface water and groundwater sources and includes an assessment of the capacity of these sources to meet the projected water demand in 2040. The Plan will be subject to incremental revision at five-year intervals as DEQ, localities, and other stakeholders provide input through ongoing water supply planning efforts.

Clarke County and the Towns of Berryville and Boyce worked with other localities in the Valley including Frederick County and the Towns of Middletown and Stephens City; Page County and the Towns of Luray, Shenandoah, and Stanley; Shenandoah County and the Towns of Edinburg, Mt. Jackson, New Market, Strasburg, Toms Brook, and Woodstock; Warren County and the Town of Front Royal; City of Winchester, to develop a regional plan coordinated by the Northern Shenandoah Valley Regional Commission. The plan states that, through careful planning and conservation efforts, there will be sufficient water to support the majority of needs through the year 2040.

Based on current supply, a deficit of 0.81 MGD is anticipated to occur in Frederick County by 2030. Frederick County Sanitation Authority alternatives include quarry expansion and groundwater well improvements, and adding a water withdraw from the Opequon Creek at the northern section of the stream on the Clarke/Frederick County border. They have established the Opequon Water Supply Plan (OWSP) initiative, designed to ensure a safe and reliable, and sustainable supply of water to help meet the community's projected water needs.

By 2035, Frederick Water's water customers may require up to twelve million gallons of water every day, more than doubling from today's average of 5.6 million gallons per day. A detailed report is available on their website.

M. Drought Response Plan

In addition to providing alternate water sources, the water supply regulations require localities to develop drought response plans.

Clarke adopted a Plan and Ordinance in 2008. The purpose of the plan is to describe a low flow/drought response plan for the Shenandoah river basin. This plan utilizes the Virginia Drought Assessment and Response Plan developed by the Commonwealths Drought Response Technical Advisory Committee as a framework and incorporates the data collected and recommendations made in the final MIF report.

Clarke County receives an average of 36 inches of rainfall annually, spread fairly evenly throughout the year. In most years, rainfall is adequate to maintain and replenish our ground and surface water supplies.

However, the occurrence of droughts is a normal part of the weather cycle and should be expected. In the Shenandoah Valley drought is a cyclical phenomenon with a historical pattern of extreme drought occurring every thirty years with less severe droughts occurring roughly every decade.

During droughts, water available from our streams, rivers, and wells can be severely diminished. In addition, water use can increase drastically. The statewide Drought Assessment and Response Plan was used as a framework for this Drought Response Plan. Important differences between the State Drought Assessment and Response Plan and this local plan include:

1) Drought onset and stage declarations shall be made by the County staff under advisement from, but responsive to, USGS and the State Drought Monitoring Task Force.
2) Local data available from the USGS Groundwater Study, regional stream gages, and precipitation data will be utilized in drought stage declarations.

In order to monitor potential drought, the County will use the three drought indicators; precipitation, stream flows, and ground water levels; as the initial indicators to be considered when advising the Board of Supervisors regarding the declaration of a particular drought stage.

The drought stages are watch, warning, and emergency. When two indicators exceed the threshold for stage determination, this advisement may be to declare a specific drought stage or may include an explanation of why the particular drought stage should not be declared at that time.

In Drought Watch responses are generally intended to increase awareness, in the public and private sector, to climatic conditions that are likely to precede the occurrence of a significant drought event. During this drought stage, the primary activities that are suggested are to prepare for the onset of a drought event.

The response phase in this stage is voluntary conservation. Voluntary conservation involves the reduction of non-essential uses, fixing leaks, installing water saving devices, and a general increase in awareness to conserve water. It is unlikely that significant water use

reductions will occur at this stage although it is possible that the increased public awareness of water conservation activities may reduce water use up to 5%.

During a Drought Warning responses are generally responses that are required when the onset of a significant drought event is imminent. Water conservation and contingency plans that have been prepared during a drought watch stage would begin to be implemented.

From the perspective of the Commonwealth, water conservation activities at this stage would generally be voluntary. Voluntary water conservation activities generally result in reductions in water use of 5-10%. In this stage all water users would be encouraged to spread out water use. For example, rather than filling large livestock water troughs once a day, consider installing automatic waterers that respond to demand by livestock throughout the day.

For a Drought Emergency responses are generally responses that are required during the height of a significant drought event. During these times, it is likely that some water supplies will not provide the quantity of water needed by all users. Non-essential uses of water should be eliminated. Mandatory water conservation requirements contained in water conservation and contingency plans should be initiated at this stage. Mandatory water conservation activities generally result in water use reductions of 10-15%.

The Town of Berryville has adopted its own Drought Response Plan (Code of Ordinances Chapter 17 - Water, Sewers and Sewage Disposal Article II. - Water Generally Sec. 17-25. - Drought response ordinance).

The Town of Boyce water supply is administered by the Clarke County Sanitary Authority (CCSA). The CCSA has opted to follow the County's Plan.

N. Groundwater Availability

In 2002, as a result of a prolonged and serious drought, the County initiated a second USGS study of groundwater. The first was conducted in the late 1980's and published in 1990 (Wright, 1990). This study focused primarily on groundwater quality. The second USGS study was a 6-year ground-water study with the United States Geological Survey (USGS). The primary objective of this study was to enhance the County's understanding of the quantity and sustainability of our ground-water resources. A report entitled "Hydrogeology and Ground-

Water Availability in Clarke County, Virginia" details the results of the 6-year study. The report describes the methodology used to describe the groundwater flow patterns that ultimately determine how groundwater is recharged.

Understanding how water gets into the system explains water availability and the potential for contamination. A summary of the report and description of how the data will be used to protect ground-water resources and reduce future impacts of drought follows. A PowerPoint presentation with graphics is available on the County website.

As a result of this study the County now has some data in which begin to evaluate its groundwater resources. Including numbers that detail when low groundwater recharge levels will begin to impact streams and aquatic systems; how changes in zoning and land use may impact groundwater resources; how groundwater volume is distributed in the County; where contamination is more likely to occur; and where recharge occurs.

Continued minimum monitoring of established real-time gage stations and wells will add to this body of knowledge and allow for refinement of management strategies.

2018 WATER RESOURCES PLAN – DRAFT
(PLANNING COMMISSION PUBLIC HEAING – JULY 6, 2018)

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CHAPTER V

CONCLUSION

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CHAPTER V -- CONCLUSION

A land use plan is only as good as the degree in which it is implemented so it is critical to work towards researching, evaluating, and pursuing the recommendations set forth in this Plan. Likewise, a land use plan is only effective if it is kept up to date and reflects the community's current conditions, needs, and impacts.

It is recommended that the Plan be reviewed on a five-year review schedule according to the following process:

1. On a five-year schedule from the adoption date of the current Water Resources Plan, the Planning Commission shall adopt a resolution addressing the status of the Plan, whether it should be updated, and to what degree it should be updated. This resolution may come in one of the following forms:

- A finding that the current Plan recommendations are sufficient and that no amendment is necessary.

- A finding that changes in the community warrants a comprehensive review and update of the Plan. An example would be the release of decennial Census data and growth projections.

- A finding that the Plan does not address, or inadequately addresses, a specific topic area or areas warranting a focused update of the Plan. While the update may have a specific purpose, the review should remain comprehensive to ensure that all impacts are carefully evaluated.

2. It is recommended that at the beginning of year four in the five-year schedule, the Commission should begin work evaluating the Plan status. This can be accomplished as a committee of the whole or by designating a special subcommittee. If the Board of Supervisors has established an agricultural advisory committee, the Planning Commission should include this committee's input on the Plan evaluation either by joint meetings with the committee or including representatives from its membership on a special subcommittee with Commission members.

Plan status should be evaluated by considering factors including, but not limited to:

- Recent release of updated data concerning TMDL implementation or water supply planning.

- Recent updates to the County Comprehensive Plan or related component plans.

- Changes to State law impacting water resources.

- Any other subject not addressed or inadequately addressed by the current Plan.

While not recommended, a proposal may be considered to amend the Plan outside of the scope of the Plan's five-year review cycle. Frequent, piecemeal changes to the Plan can result in the document becoming fragmented and inconsistent. It can also devalue the importance of the document as a long-range planning guideline. For these reasons, interim amendments are strongly discouraged.

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APPENDICES

APPENDIX I
Status of Implementation 1999 Water Resources Plan

APPENDIX II
Programs and Grant Projects

APPENDIX III
Guidance from Comprehensive Plan

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Appendix I – Status of Implementation 1999 Water Resources Plan

Policy	Description	Objective	Implementation Status	Comments	Impediments
Policy 1. Review and Update of County Ordinances related to groundwater protection	**A. Septic Ordinance:**				
	i. Phase out of non-standard waste disposal systems such as pit privies	eliminate significant threat to public health and groundwater quality	partially implemented	ongoing effot with HD	Problems in implementation are lack of funding sources for replacement of non-standard systems.
	ii. Implement regular maintenance, cleaning, and reporting of septic systems	Septic systems fail if they are not properly maintained by pumping approximately every five years.	not implemented		Need to develop administrative component
	iii. Identify acceptable alternatives to septic systems, when failed or inadequate systems are identified.	In 2010, the Virginia General Assembly passed regulations stating that a locality shall not prohibit the use of alternative onsite sewage systems	fully implemented	Installation and use of alternative systems should be accompanied by a maintenance schedule that is regulated by the Clarke County Sanitation Authority.	
	B. Sinkhole Ordinance: Amend the ordinance to require vegetative buffering of all Class 1 sinkholes which are subject to contamination.	sinkholes are direct pathways for surface contaminants to enter the groundwater	partially implemented	No specific action has been taken to send educational material, however setbacks to the discernable edge of sinkholes has been added to the Zoning Ordinance for structures and wells.	as with stream fencing there has not been the poitical will to require buffering
	C. Underground Storage Tank Ordinance: Create a database of the locations of all UST's in the County, and develop a County ordinance that will serve to regulate UST with less than 1,000 capacity that are used for petroleum or chemical storage.	The potential for groundwater contamination of leaking tanks exists for all UST.	not implemented	Underground Storage Tanks (UST) with greater than 1,000 gallon's capacity for petroleum products are regulated by DEQ.	No database has been developed for tanks < 1000
	D. Stormwater Resources Ordinance: Revise the ordinance to better address both runoff quantity and quality so as to protect surface and groundwater from contamination.	Stormwater Resources addresses the runoff from new development. In 2010 a Stormwater Ordinance was passed by the Board of Supervisors to require increased standards for water quality discharge.	void	Due to changes in State law in 2016, DEQ administers stormwater management for Clarke County.	
	E. Natural Resources Overlay District: Consider enlarging to incorporate all available data that delineates the groundwater recharge area for the spring	Enlarge the overlay district to match the boundaries of the EPA designated Sole Source Aquifer to add additional protection to Prospect Hill Spring	not implemented	Attempts to expand area were thwarted by residents stating not enough data exists to justify expansion of the Overlay District.	

Appendix I (cont.)

Policy	Description	Objective	Implementation Status	Comments	Impediments
Policy 2. Public awareness and education: Designate the Clarke County Natural Resource Planner as the County official responsible for Public education concerning protection and conservation of groundwater resources.		Public education is an essential component of any attempt to protect and conserve groundwater resources.	partially implemented	ongoing	
Policy 3. Non-point pollution: Cooperate with and encourage use of the programs administered by the Agricultural Extension Office and other agencies involved in developing Best Resources Practices (BMPs).		Non-point pollution is the single largest contributor to groundwater pollution in Clarke County.	partially implemented	ongoing	
Policy 4. Well Testing: Establish a County-wide well monitoring network to effectively monitor changes in water quality over time. This would include routine testing of specific wells for coliform and water chemistry.		Well monitoring is a fundamental way to track groundwater quality.	partially implemented	Establishing a long term groundwater quality monitoring network is still needed.	
Policy 5. Groundwater database development	**A. Develop a database of all existing well and septic permits on file in cooperation with the Health Department. Homes with systems not on file should be surveyed to determine the type and location of water source and sewage disposal.**	Identifying the types and locations of well and septic systems is important for documenting groundwater contamination. Septic systems are a known contamination source.	partially implemented	The County Planning Department compiled permit data from the 70's thru 2001, approximately 3,675 records, but this database does not have GPS location information. GPS data was collected from 2011 to 2015 but changes in Health Department personnel have caused this data collection to be discontinued.	Staffing shortages have delayed full implementation
	B. Compile existing data from all previously conducted groundwater studies	Analyzing this data in total can provide the County with valuable insight into trends relating to groundwater contamination.	partially implemented	ongoing	
	C. Use the GIS to identify and map areas sensitive to groundwater contamination. Utilize this information to prioritize areas in need of increased protection measures.	The GIS is a tool that can best serve County officials by identifying and mapping areas sensitive to groundwater contamination.	partially implemented	Due to lapses in GPS data collection and the lack of a long term groundwater quality monitoring network, mapping trends in groundwater contamination is not possible at this time.	
Policy 6. Establish a Stream Protection Overlay District and adopt regulations to protect those designated areas.		The intent of this district is to provide stream buffers for the purposes of filtering nonpoint source pollution from runoff, preventing erosion, moderating stream temperature, and providing for the ecological integrity of stream corridors and networks.	fully implemented	The Stream Overlay Protection District was adopted in 1999, Zoning Ordinance Section 3-E-5.	

Appendix I (cont.)

Policy	Description	Objective	Implementation Status	Comments	Impediments
Policy 7. Amend the Zoning Ordinance to require 100' building setbacks from perennial streams and 50' building setbacks from intermittent streams, as identified on the 7.5' USGS topographical maps, in the Agricultural-Open Space (AOC) District.		Preserving stream and river riparian corridor zones is essential for protecting water quality. Building setbacks from streams have been in place in the FOC zoning district since 1994. Requiring these same setbacks in AOC will serve to protect stream corridors in the Valley portion of the County.	fully implemented	Adopted in 2003, Zoning Ordinance Section 3-A-1-c. All other zoning districts have setback requirements as well.	
Policy 8. Establish a Countywide surface water monitoring network to effectively monitor changes in water quality overtime. This would include routine testing of and reporting for all perennial streams for coliform and water chemistry.		Several streams in the County are currently monitored but most are not. Identifying which streams are contaminated is necessary in order to allocate limited resources effectively.	partially implemented	DEQ currently has 7 active monitoring sites in Clarke County in addition the Friends of the Shenandoah River (FOSR) have been conducting bimonthly monitoring on 14 sites since 1997. The County provides annual funding to FOSR to support their sampling efforts.	Determine if monitored streams are adequately representating water quality in all streams
Policy 9. Encourage upgrading of sewage treatment plants to reduce nutrients discharging into surface waters.		wastewater treatment plants contribute a significant amount of nutrients to State waters	fully implemented	The Chesapeake Bay TMDL was established in 2010 requiring waste water treatment plant upgrades. The Berryville, Boyce and Opequon Waste Water Treatment facilities have all completed the required upgrades.	Regulatory
Policy 10. Encourage installation of Best Management Practices (BMPs) to reduce access of livestock to riparian buffer zones.		installation of BMP's protects riparian buffers	partially implemented	Extensive cooperative projects funded through grants in the Spout Run watershed have been completed in an effort to have the waterway removed from the EPA impaired waters list	Voluntary
Policy 11. Identify locations of individual onsite sewage disposal systems discharging into State waterways and replace with conventional septic systems where possible.		Straight pipes are not permitted, but some may exist that were installed before the adoption of the Septic Ordinance. Identifying the type and location of all sewage disposal systems in the County is a priority outlined in the Groundwater Resources Plan. These systems can be upgraded to eliminate sources of contamination.	partially implemented	Ongoing The County continues to work with the Health Department to identify and eliminate these substandard systems.	
Policy 12. Consider adopting a Shenandoah River Recreation Plan.		Efforts are underway to develop a recreational use plan for the Shenandoah River. These could include sections relating to the scenic river designation, protection of aesthetic values, and establishment of vegetated riparian buffers.	fully implemented	In 2006, a plan entitled "Shenandoah Valley River Use - Floating and Fishing: An Action Plan for Recreational Access to and Stewardship of Water Resources" was developed through the Regional Commission. In 2015 an implementing component of the Comprehensive Plan Recreation Plan, was adopted that details protection efforts for the River.	

Appendix I (cont.)

Policy	Description	Objective	Implementation Status	Comments	Impediments
Policy 13. Increase funding to multijurisdictional Minimum Instream Flow study in order that the data necessary to declare a Surface Water Management Area is available as soon as possible.		As currently funded, a complete MIF study will take 10 years. Requests for increased funding are necessary in order to complete this work in a timelier manner. This information is essential to designating the Shenandoah River a SWMA, for which Clarke County petitioned the State in 1990.	fully implemented	Minimum Instream Flow studies have been completed for the North Fork, South Fork, and Main Stem of the Shenandoah River.	
Policy 14. Conduct a comprehensive study in cooperation with the USGS to fully characterize tributary stream flow patterns, discharge rates, and floodplains.		Determining surface water flow patterns and discharge rates provides invaluable data as to the amount of water available for instream and offstream uses. Healthy stream habitats depend on adequate flow to assimilate pollutants from sources impacting surface waters. Baseline data can be incorporated into determining TMDL rankings for all County tributaries, not just those selected by the State. Once ranked, resources can be allocated to those streams with the highest potential for degradation.	fully implemented	A USGS study entitled Nelms, D.L., and Moberg, R.M., Jr., 2010, Hydrogeology and groundwater availability in Clarke County, Virginia: U.S. Geological Survey Scientific Investigations Report 2010–5112, 119 p. was completed in 2010.	
Policy 15. Update the 1988 Water Supply Plan to insure adequate water resources are available for Clarke County residents.		The 1988 Water Supply Plan outlined water supply needs and projected shortfalls through 2030. To date, no update has been completed or is planned. Periodic update of the section pertaining to Clarke County may be needed to prevent water deficits in the future.	fully implemented	The most recent Plan was completed in 2015 with updates proposed every five years. The County participates in these efforts through the Regional Commission.	
Policy 16. Conduct additional dye tracing studies to increase understanding of the interrelationship between ground and surface waters in the County.		The groundwater/surface water interrelationship is a complicated matter, requiring more technical information than is currently available.	fully implemented	Dye tracing studies were conducted in 1987, 1992, and 1998. The tests indicated that groundwater in this area can move two miles or more from recharge points, in as little as five months. No additional tracer studies have been conducted or are planned at this time. The 2010 USGS study did study ground and surface water flows and has provided detailed information on the contribution of groundwater to the base flow of surface waters.	

2018 WATER RESOURCES PLAN – DRAFT
(PLANNING COMMISSION PUBLIC HEARING – JULY 6, 2018)
Appendix II – Programs and Grant Projects

CLARKE COUNTY - WATER RESOURCES PLAN					
PROGRAMS and GRANT PROJECTS - PAST AND CURRENT					
NAME	PROGRAM/GRANT ENTITY	DATE	Grant Amount	OBJECTIVE	COMMENTS
Prospect Hill Spring - Public Water Supply Permit	State Health Department	1977		Supply Boyce, Millwood, White Post and the Waterloo commercial district	
Prospect Hill - Honkala Report - Schnabel Report	Clarke County	1980 & 1983		Determine land use policies to protect the water quality of Prospect Hill	Resulted in the 400 acre Natural Resource Overlay District (RC) being established in 1983
Page Brook 4,900 acre drainage basin declared a sole-source aquifer (includes Prospect Hill)	EPA	1987		Protection of the Prospect Hill Spring from contamination creating a public health hazard	No Federal assistance allowed for any project that might contaminate that aquifer.
Groundwater Protection Plan	PDC	1987			
USGS Study - Wright	USGS	1990	$60,000	Characterize the ground water flow systems using hydrologic and water chemistry data and map the potentiometric surface; establish a monitoring network of wells and springs; assess the overall groundwater quality of the County.	
Prospect Hill Spring found with high bacterial levels	State Health Department	1994		County required to provide disinfection and filtration of the water	Cattle grazing around a sinkhole 500' above the spring were contributing to the contamination.
Millwood	Virginia Dept. of Health	1994		Sewage disposal systems (septic tanks) were found deficient, and constituted a public health hazard	Studies determine that up to 24% of the fecal bacteria found in the water was human in origin.
Statewide NonPoint Source Pollution / Impaired Waters Listing / Natural Heritage Priority Ranking		1996		Spout Run Watershed. Verification of Impaired Waters and TMDL Status	Source of impairment listed as NPS-Agriculture
Page Brook Watershed Restoration Project	EPA Section 319	1996	$75,000	Page Brook watershed. Study BMP installation possibilities.	2.5 miles of fencing were installed on four farms in the watershed. Water samples analysed monthly.
County condemnation of 7 acres around contaminated sinkhole close to Prospect Hill	Clarke County	1997	$60,000	Area fenced off and planted with vegetated buffers to decrease contamination	Substantial decrease in coliform bacteria present in Prospect Hill Spring
Roseville Run (tributary of Spout Run)	EPA	1998	$65,250	Installation of BMPs to protect the run.	

2018 WATER RESOURCES PLAN – DRAFT
(PLANNING COMMISSION PUBLIC HEARING – JULY 6, 2018)

Appendix 2 (cont.)

NAME	PROGRAM/GRANT ENTITY	DATE	Grant Amount	OBJECTIVE	COMMENTS
Spout Run Main Stem	WQIF	1998	$45,150	BMP installation and verification of impact of sewage treatment plants and failing septic systems on water quality	
Wellhead Protection Program	VDH Office of Drinking Water	1999		Assess quality of drinking water sources	By 2003, all existing drinking water sources were assessed.
Millwood Sewer Construction Project	Clarke County	2002 - 2004	$1,101,850	Eliminate high levels of human fecal bacteria contaminating the Spout Run watershed	Public water and sewer lines were extended from Boyce to Millwood, replacing failing septic systems. 40 homes hooked to public
Wellhead Protection Plan Grant	VDH-ODW / DEQ	2006		Local wellhead protection implementation projects to prevent contamination and maintain good quality drinking water supplies.	Mostly implemented with the Spring Overlay District Ordinance. A few other public wells in small communities still in need.
Drought Response Plan	Clarke County	2008		Guides drought monitoring, evaluation and response in the County	
2010 Hydrology Report	USGS	2002-2008	$1,005,500	Enhance the County's understanding of the quantity and sustainability of our ground-water resources	
Spout Run TMDL	DEQ	2010		When state waters are assessed to be impaired, Total Maximum Daily Loads (TMDLs) are developed by DEQ to determine the total amount of a pollutant that a waterbody can handle without resulting in the impaired status of that waterbody.	
Spout Run Implementation Plan	DCR	2012		The goal of TMDL implementation is to restore water quality in impaired watersheds. To gage progress toward this goal, DEQ tracks Best Management Practice (BMP) installations and continues to monitor water quality in the impaired watersheds.	
Spout Run Implementation Grant	DEQ	2012-2014	$292,666 with $216,718 match	Significant number of streambanks were fenced, and streambank restoration was completed, reducing erosion.	Major participation and fund matching by various private groups. Disappointing participation with many landowners uninterested in participating. $85,250 returned due to lack of landowner participation.
National Fish & Wildlife Foundation Grant	NFWF	2013-2015	$141,600 with $87,822 match.		
Minimum Instream Flow Studies					
Main Stem Shenandoah River	Virginia Environmental Endowment, DEQ, USGS, and local government	1995-1998	$280,000	Provide the counties and communities in the Shenandoah Basin a better knowledge of: 1) the water resources in the basin; 2) the regional hydraulic system; 3) the effect of withdrawals and conservation measures on the ecology, agriculture, industry, and water supply.	
North Fork Shenandoah River		1998-2004	$400,000		
South Fork Shenandoah River		2004-2011	$700,000		
Main Stem Shenandoah River (model update)		2011-2013	$54,000		
Drought Response Plan	DEQ	2003		Guides drought monitoring, evaluation and response in the Commonwealth of Virginia	

Appendix III – Guidance from Comprehensive Plan

Guidance from the 2013 Comprehensive Plan and Related Component Plans

This section is a compilation of language and recommendations from the Comprehensive Plan and related component plans that support the revised Goals, Objectives, and Strategies of the Water Resources Plan. This section organizes the relevant language and recommendations into four categories: General Guidance from the Comprehensive Plan, Protect and Enhance water quality, Protect and Maintain Water Availability, and Engage and educate individuals, communities and governments in watershed stewardship. The latter three categories correspond to the three recommended Goals that are discussed in Chapter I.

While this is not intended to be a complete listing of all plan references pertinent to the Water Resources Plan, it is a compilation of references that bear direct relationship to the Plan's revised Goals, Objectives, and Strategies in the most concise manner. Quoted text is noted in italics.

General Guidelines from the Comprehensive Plan

- COMPREHENSIVE PLAN, Summary Statement of Purpose (p. ii):

  The County shall strive to support concepts, programs, projects, and regulations that ensure environmental sustainability. Clarke County's fundamental goal is to protect our natural resources so that we may pass them on to future generations. We seek to accomplish this through efforts that manage surface water and groundwater, protect and restore stream and river corridors, and preserve the integrity of our natural environment.

- COMPREHENSIVE PLAN, Chapter III Water Resources Plan (pp. III-12-15)

  The Water Resources Plan is comprised of two sections, one addressing groundwater resources and the other addressing surface water resources. The Board of Supervisors adopted the groundwater section on October 20, 1998, and the surface water section on December 21, 1999. The following is an overview of these two sections.

2018 WATER RESOURCES PLAN – DRAFT
(PLANNING COMMISSION PUBLIC HEARING – JULY 6, 2018)

1. Summary

A. Groundwater Resources

The groundwater resources section of the Water Resources Plan covers issues relating to groundwater, including groundwater contamination from non-point sources, protection of the Prospect Hill Spring water supply, and enhanced public education of the sensitive nature of limestone geology. This section is designed to accomplish Comprehensive Plan's Natural Resources Objective that states: "Protect natural resources, including soil, water, air, scenery, night sky, wildlife resources, and fragile ecosystems."

The groundwater resources of Clarke County are particularly susceptible to contamination resulting from human activities because of the sensitive nature of the aquifers found in carbonate rocks underling the Valley region of the County. Groundwater protection and resource problems are generally greater in areas that are underlain by carbonate rocks, such as limestone and dolostone, than in areas underlain by most other rock types, because of the presence of solution-enlarged sinkholes, conduits, and caves. These geologic features characterize what is called karst terrane. The generally high permeability of these rocks facilitates the infiltration and transport of contaminants from the land surface to the groundwater reservoir.

Three-fourths of the people in Clarke County depend on groundwater as the source of their drinking water. Protecting groundwater from pollution, therefore, has been of primary importance in the County for many years. The urgency and economic necessity for doing so was highlighted in 1981, when the Town of Berryville had to abandon the wells that provided its public water supply. The wells had been contaminated by a combination of nitrates, phenols, and herbicides, none of which could be traced to a single point source. Because new wells might later become contaminated, the Town decided to draw its water from the Shenandoah River and to construct a $1.3 million plant to treat the river water.

Pollution of private wells was recognized as a problem in the 1960s. Pollution sources included improperly installed and maintained septic systems, underground storage tanks, and materials placed on the soil surface, including pesticides, herbicides, and human and

animal wastes. Improper well installation was also a factor in these incidences of groundwater contamination.

The need for potable water in the Boyce-Millwood area led to the creation of the Clarke County Sanitary Authority in 1968. By the mid-1970s, the Authority began supplying water to more than 200 residences and businesses from the high-yielding Prospect Hill Spring. The recharge area of the Spring is now protected by a natural resource conservation overlay district, in which no development may occur that would adversely affect the quantity or quality of the Spring water. In addition, the County has applied for federal designation of the Prospect Hill Spring as a sole-source aquifer.

To minimize the effects of future growth and development, the Planning Commission established a Water Study Committee in 1985. This Committee directs plans and studies aimed at protecting the water resources of the County. Accomplishments of this Committee include the creation of the Clarke County Groundwater Protection Plan (1987), which, in addition to describing the sensitivity of Clarke groundwater, proposed a) an ordinance that limits land use around sinkholes, b) septic system installation guidelines, and c) water-well construction regulations. The Groundwater Protection Plan is a precursor to the groundwater resources section of the Water Resources Plan. The Committee also contracted with the U.S. Geological Survey (USGS) to conduct an in-depth study on the hydrology and quality of groundwater to assist in land use and planning decisions made in the County. This study produced the Water Resources Investigation Report 90-4134 entitled "Ground-Water Hydrology and Quality in the Valley & Ridge and Blue Ridge Physiographic Provinces of Clarke County, Virginia" (Wright, 1990).

B. Surface Water Resources

Surface waters include secondary streams or tributaries, such as the Shenandoah River, the Opequon Creek, and Spout Run (a state-designated trout stream). The surface water resources section of the Water Resources Plan addresses related issues including surface water contamination from point and non-point sources, off-stream water use, such as domestic supply and irrigation, and recreational uses. Point-source pollution comes from

specific, identifiable sources. Non-point source pollution is caused by diffuse sources such as erosion, runoff, precipitation, percolation, and direct deposition from livestock and wildlife.

The 2000 Bay agreement establishes a cap on the total amount of nitrogen and phosphorus that may be discharged from wastewater treatment facilities in Virginia. The cap is set at the level of those pollutants that the Bay can tolerate in order to correct its degradation. Most larger wastewater treatment facilities must upgrade their treatment facilities to achieve much lower discharges of such pollutants under individual caps placed on those facilities by the Commonwealth. In any expansion of smaller facilities (Boyce, for example) substantial reductions in the discharge of nitrogen and phosphorus are required.

Under the coordination of the Department of Conservation and Recreation there is substantial new focus on old programs and the initiation of new programs to achieve the overall non-point source reductions goals which are being carried out by the County and the Lord Fairfax Soil and Water Conservation District. These efforts are focused in the County on (1) Acceleration of Agricultural Best Management Practices; (2) Expansion of Nutrient Management Planning and Implementation Efforts; (3) Consolidation and Strengthening of the Local Stormwater Management Program; (4) Enhancing Implementation of the Local Erosion and Sediment Control Program; (5) Enhancing Outreach, Media and Education Efforts to Reduce Pollution Producing Behaviors. Nitrogen, phosphorus and sediment non-point source reduction goals have also been set for the entire Shenandoah River watershed and tributaries including Spout Run.

The Federal Total Maximum Daily Load (TMDL) Program is currently being carried out by the Lord Fairfax Soil and Water Conservation District in the Abrams/Opequon watershed where an Implementation Plan has been developed to correct the fecal and sediment impairments in the watershed. Further TMDL Program-related efforts are anticipated shortly in the Wheat Spring Branch, Dog Run and other watersheds in the County. It has not been possible to develop a plan to correct the PCB impairment of the main stem of the Shenandoah River in the County where PCBs are concentrated in river sediments. The River continues under a Health Department Advisory against consuming fish caught in the River

because of PCBs. The TMDL-related fecal impairment of Spout Run has been dealt with, at least in part, by the installation of sewer lines in Millwood.

Major fish kills have taken place in the Shenandoah River watershed in 2004-2006 with a dramatic reduction evident in the numbers of small-mouth bass and red-breasted sunfish. The State has established a fish-kill task force and a major effort is underway to determine the cause and find a solution to this serious environmental problem.

2. Priorities for the Next Few Years

A complete review and update of the Water Resources Plan should begin shortly after the adoption of the revised Comprehensive Plan. The update should focus on adding information and policies for the following items:

1. Impact of recent changes to the State's water quality regulations and stormwater management requirements.
2. Maintaining and expanding the County's water quality and quantity programs and infrastructure.
3. Additions or changes to policies that may be impacted through the update of or development of new implementing component plans.

Protect and Enhance water quality

- COMPREHENSIVE PLAN, Objective 3 – Natural Resources (pp. II-6-8)

Policy 6. Apply best management practices to protect local and regional water resources and environmentally sensitive areas such as the Shenandoah River, Opequon Creek, perennial streams, floodplains, wetlands, steep slopes, slippage soils, and highly erodible soils. Establish specific water quality performance guidelines to include Chesapeake Bay Resource Protection and Resource Management Areas when considering land use and development related activities.

Policy 11. Encourage and expand support for the Conservation Easement Purchase Program, both philosophically and financially, to protect natural resources

important to preserving soils, watersheds, water quality, scenery, natural habitats, and air quality.

Policy 15. Take all appropriate steps to protect public water sources, such as the Shenandoah River serving the Town of Berryville, and the Prospect Hill Spring serving the Town of Boyce and the communities of Millwood, Waterloo, and White Post.

Policy 16. Support Shenandoah Basin regional water planning efforts including creation of surface water management areas, and programs to study and address low flow issues. Oppose efforts to establish new interbasin transfers within the Shenandoah River watershed.

Policy 17. Utilize USGS Groundwater Study findings when evaluating proposed changes in land use and continue to support ongoing water resource monitoring efforts.

Policy 18. Establish and maintain a long term water quality monitoring network and real-time water quantity monitoring network, in cooperation with the USGS, to track changes and better assess impacts to our water resources.

Policy 19. Revise and implement the adopted County ordinance requiring pump out of septic systems per State requirements.

Policy 20. Recognize that karst terrane underlies the majority of the Shenandoah Valley, making groundwater in these areas is highly susceptible to contamination. Steps should be taken to protect groundwater and prevent contamination whenever possible.

Policy 21. Strengthen and develop site design features that protect the environment by minimizing new stormwater runoff and that provide the most effective measure of protection for onsite disposal of sewage. Factor in cost-effectiveness and ongoing maintenance requirements for current and future property owners.

Policy 22. Adopt the most stringent regulations for alternative onsite sewage treatment systems permitted by State law to protect the County's vulnerable surface and groundwater resources. Implement an onsite treatment system monitoring program including enforcement of mandatory pump-out requirements for septic

systems. For new development and re-development projects that require a land use change, ensure use of the onsite sewage treatment method that provides the maximum protection to surface/groundwater resources and Karst terrane.

- COMPREHENSIVE PLAN, Objective 1 – Agriculture (pp. II-2-4)

  Policy 5. Encourage the use of best management practices as outlined in the Chesapeake Bay Regulations and as determined by the Federal Total Maximum Daily Load (TMDL) program to improve water quality by the following methods.

  a. Making technical assistance available.

  b. Promoting public awareness on the benefits of, and necessity for, best management practices, erosion and sedimentation controls, storm water management and Chesapeake Bay Preservation Regulations.

  c. Assisting in the establishment of conservation plans for all farms adjacent to perennial streams.

  d. Encouraging the participation of all landowners engaged in agricultural activities to use the assistance of the Virginia Cooperative Extension Service, the Natural Resource Conservation Service, the Lord Fairfax Soil and Water Conservation District, and other public agencies.

- COMPREHENSIVE PLAN, Objective 2 – Mountain Resources (pp. II-4-5)

  Policy 1. Promote multiple uses of forested land that are non-intensive and compatible, such as outdoor recreation, wildlife habitats, watershed protection, and forest management.

  Policy 2. Ensure that timber harvesting is conducted in accordance with Virginia Department of Forestry and Chesapeake Bay protection standards and an approved forest management plan for each site so that sedimentation of streams and other environmental impacts are minimized.

Policy 3. Encourage the use of best management practices as outlined in the Chesapeake Bay Regulations and as determined by the Federal Total Maximum Daily Load (TMDL) program to improve water quality through the following methods.

a) Making technical assistance available.
b) Promoting public awareness on the benefits of, and necessity for, best management practices, erosion and sedimentation controls, stormwater management and Chesapeake Bay Preservation Regulations.
c) Assisting in the establishment of conservation plans for all farms adjacent to perennial streams.
d) Encouraging the participation of all landowners engaged in forestal activities to use the assistance of the Virginia Department of Forestry, the Natural Resources Conservation Service, the Lord Fairfax Soil and Water Conservation District, and other public agencies.
e) Supporting these and other innovative efforts to ensure continued water quality improvements in the future.

- COMPREHENSIVE PLAN, Objective 5 – Conservation Easements (pp. II-10-11)

Policy 3. Encourage and support the goals of the Conservation Easement Program to protect and preserve:

b. Forested areas for their value as natural habitat and recreation, ability to enhance air and water quality, prevent soil erosion, and as a source of renewable wood products.
d. All water resources with particular emphasis on land adjacent to the Shenandoah River and other perennial streams and the limestone ridge/groundwater recharge area to protect water quantity and quality (Figure 5, Groundwater Recharge Area).
f. Land with environmentally sensitive areas important to air and water quality, plant life, and wildlife.

- COMPREHENSIVE PLAN, Objective 7 – Energy Conservation and Sustainability (pp. II-12-13).

Policy 8. Encourage use of Low Impact Development (LID) techniques that help manage stormwater in an environmentally sensitive manner.

Policy 9. Establish water quality performance standards that include retention of vegetation, minimal site disturbance, and reduction of nutrients and sediment in post-development stormwater.

Policy 10. Coordinate with the Town of Berryville, the Town of Boyce, and the Clarke County School District on joint sustainable community practices such as energy efficiency and alternative transportation.

Policy 11. Encourage the use of cisterns and other water reuse applications in new residential and commercial developments.

- COMPREHENSIVE PLAN, Objective 8 – Village Plans (Millwood, Pine Grove, White Post) (pp. II-13).

Policy 2. Enhance the identity and appearance of established villages, such as Millwood, Pine Grove, and White Post.

- COMPREHENSIVE PLAN, Objective 9 – Designated Growth Areas for Development (pp. II-13-15).

Policy 7. Encourage the use of best management practices as outlined in the Chesapeake Bay Regulations and as determined by federal TMDL program to improve water quality and minimize runoff impacts that could be caused by development of the Berryville Growth Area and at primary highway intersections.