

### Section 3.9 Infiltration (IF)



Infiltration practices provide temporary surface and/or subsurface storage of stormwater runoff until it seeps into the ground. Infiltration is a non-vegetative practice that provides runoff reduction. Surface infiltration trenches or basins may utilize a berm to pond runoff; subsurface trenches or basins store runoff in a gravel reservoir, open-bottomed chamber, or perforated chamber. Infiltration does not convey runoff like a French Drain.

#### A. Purpose

- This practice treats concentrated or dispersed flows from larger drainage areas such as parking lots, multiple lots, and/or commercial rooftops.
- Infiltration should be located in common areas or within drainage easements, to treat a combination of roadway and lot (pervious or impervious).

#### B. Site Criteria

- Impervious drainage area shall be  $\geq 2,500$  square feet. Total drainage area (impervious + pervious areas) shall be  $\leq 2$  acres. Drainage area must include impervious surfaces.
- Infiltration used on individual residential lots (drainage area  $< 2,500$  square feet) is more often addressed by a Dry Well (Practice 3.4).
- Cannot be placed on wetland soils.
- Cannot be placed within the areas designated as the FEMA 100-year flood plain, 1% annual chance flood plain, or by the locality as within the 100-year flood plain, whichever is most stringent.
- Depth to water table and bedrock should be greater than 2 feet below the bottom of the practice. If the seasonal high water table is identified as a potential concern based on field or desktop analysis, it should be verified by a professional soil scientist (Contact Extension, NRCS, or Society of Professional Soil Scientists for local providers).
- The site must have soils capable of infiltrating stormwater runoff ( $> 0.5$  inches/hour). An infiltration test must be performed.
- Shall not be appropriate where high pollutant or sediment loading is anticipated due to potential clogging contamination of the groundwater.
- Shall be located at least 10 feet from building foundations (includes basement and crawl space walls, slabs on grade), greater if upgradient. May not be appropriate near buildings where there is significant risk for basement seepage.
- Impact on septic drain fields should be evaluated prior to application submission. Consult local setback requirements.

### C. Design Criteria

- Level 1 design, as detailed in the Virginia Stormwater Management Handbook, is considered a baseline design. Infiltration rate must be at least 0.5 inch per hour for a level 1 or baseline design. The decision to choose Level 1 or Level 2 design will depend on the infiltration rate of the underlying native soils:
  - Infiltration rate > 0.5 inches/hour for Level 1 design
  - Infiltration rate > 1.0 inches/hour for Level 2 design
- Infiltration shall be sized to capture a 1-inch storm. This shall be based on the contributing drainage area, corresponding runoff value and storage depth. (See Appendix A.1 for Calculations). For Level 2 design criteria, refer to the Virginia Stormwater Handbook.
- Practice should drain within 48 hours.
- Gravel reservoir should be composed of clean and washed graded stone meeting the specifications for one of the following mixes: VDOT #1, #3, #5 or #57. Surface infiltration may use a 3-inch layer of washed river stone or pea gravel (VDOT #8).
- Nonwoven geotextile fabric may be used on the sides of the reservoir. No fabric can be placed on the bottom of the practice. Woven geotextile fabric is prohibited.
- Observation wells are required for Infiltration trenches and maintenance ports are required for underground chamber systems.
- Bottomless or perforated chamber systems shall be designed to support the appropriate structural loads. See manufacturer's specifications for minimum and maximum cover.
- Appropriate pretreatment practices for each inlet shall be provided, particularly when the practice treats sheet flow over a pervious surface. Typical pretreatment for this practice includes gravel diaphragm, external leaf screens or forebay. See Appendix B for other acceptable pretreatment measures.
- The outlet should be located as far from the inlet as possible. The outlet should be sized to accommodate the 10-year peak flow rate. See Calculations in Appendix A.2.
- A stabilized stormwater overflow or bypass route must be provided with an elevated under drain or pop-up emitters.

### D. Design Plan Components

- A design plan with a professional seal must be submitted by the applicant; or a waiver of liability may be accepted on a case-by-case basis (Form 5). The district must be notified of any proposed changes to the approved design. Changes to the approved design may jeopardize cost share reimbursement. The Steering Committee has discretion to approve or deny cost share reimbursement in the event of design changes. Information required in the design plan includes (see VCAP Submission Checklist for a comprehensive list):
  - Soil map and/or a soil assessment indicating water table and bedrock depths and other limiting factors.
  - Infiltration test results.
  - Sizing calculations.
  - A statement regarding compliance with any permitting requirements or local codes.
  - Other information as requested by the local District.
- Verification by a licensed professional may be required by the District to confirm practice installation per the approved design.
- It is the participant's responsibility to ensure that any contractors meet all local codes and responsibilities.

## E. Operation and Maintenance

- Routine Maintenance
  - All vegetated areas that drain to the practice must be maintained in full vegetative cover with no scour areas.
  - Surface infiltration may need the following maintenance: erosion repair, and removal of trash and debris.
  - Underground Infiltration may need removal of trash and debris.
  - Removal of trees, shrubs and invasive species from the practice footprint.
- Confirm the practice drains within 48 hours of rainfall.
- No parking or vehicular traffic over the infiltration practice is permitted.

## F. Cost-Share Rates/Incentives

- See **District Guide to VCAP** for practice cost-share rates and caps.
- Eligible costs may include: excavation, grading, installation costs (backfilling), gravel, observation ports, geotextile fabric, pre-treatment costs, outlet structures, erosion and sediment control when necessary.

## G. Technical References

- Virginia Stormwater Management Handbook, Version 1.0. 2024. Virginia Department of Environmental Quality.