Clark County Stormwater Manual

Batch 2 of Proposed Updates

Limited Review Draft - related to Geotechnical Investigations

Includes excerpts of Book 1 and Book 2.
Submitted to DEAB March 2025

Clark County Stormwater Manual

Book 1 – Applicability, BMP Selection, and Submittals

~~July 2021~~

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Limited Review Draft - Excerpts related to Geotechnical Investigations

Ongoing Revisions Continuing from November 2024 Draft Submitted to DEAB.

Chapter 4 Flow Control

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Clark County Code 40.410 CARA

The county's Critical Aquifer Recharge Area (CARA) regulation, CCC 40.410, allows Class V stormwater injection wells that meet Clark County Stormwater Manual requirements.

4.3.1.2 Site Characterization Study

One of the first steps in siting and designing infiltration facilities is to conduct a site characterization study. This study must include the following steps.

Step 1: Surface Features Characterization

1. Gather information on the following site features:
    - Topography within 500 feet of the proposed facility.
    - Location of water supply wells within 500 feet of proposed facility.
    - Location of CARAs regulated under Chapter 40.410 within 500 feet of the proposed facility.
    - A description of local site geology, including soil or rock units likely to be encountered, the groundwater regime, and geologic history of the site.
2. Review the following site suitability criteria. When a site investigation reveals that any of the criteria in this section cannot be met, consider appropriate measures such as relocation or resizing so that the infiltration facility will not pose a threat to safety, health, and the environment and meet the requirements in this section.
    a. Setback Criteria: Setback requirements are listed in Table 4.1.

Table 4.1: Stormwater Infiltration Facility Setbacks

Stormwater infiltration facility setback from:	Distance
Drinking water wells	100 feet minimum
Building foundations	20 feet minimum from the downslope side of foundations 100 feet minimum from the upslope side of foundations These setbacks may be increased or decreased based on engineering analysis that shows the performance of the building's foundation system will not be adversely affected by the presence of the stormwater facility
Slopes equal to or greater than 15%	50 feet minimum from the crests of slopes. This setback may be increased or decreased based on engineering analysis that shows the stability of the slope will not be adversely affected by the presence of the stormwater facility.
Property lines	20 feet from any property line. However, if an infiltration trench is a common system shared by the two or more adjacent lots and contained within an easement for maintenance given to owners of all lots draining to the system, then the setback from the property line(s) shared by the adjacent lots may be waived.

b. Critical Aquifer Recharge Areas (CARA): Review Section 4.3.1.1 and CCC 40.410 for regulation regarding installation of infiltration facilities within CARA sites.

c. High Vehicle Traffic Areas: An infiltration BMP can be used in areas of industrial activity and the high vehicle traffic areas described below. For such applications, provide sufficient pollutant removal (including oil removal) upstream of the infiltration facility to ensure that groundwater quality standards will not be violated and that the infiltration facility will not be adversely affected. High Vehicle Traffic Areas are:

- Commercial or industrial sites subject to an expected average daily traffic count (ADT) ≥100 vehicles/1,000 ft^2 gross building area (trip generation).
- Road intersections with an ADT of ≥ 25,000 on the main roadway and ≥ 15,000 on any intersecting roadway.

Step 2: Subsurface Characterization

1. Subsurface explorations (test holes, wells, or test pits) for site characterization and/or infiltration tests should include:

a. For drywells, at least one exploration/infiltration test per drywell(s) location.

b. For infiltration basins, at least one exploration/infiltration test per 5,000 ft^2 of basin infiltrating surface (in no case less than two per basin).

c. For infiltration trenches, at least one exploration/infiltration test per 200 feet of trench length (in no case less than two per trench).

d. For bioretention and permeable pavement, follow the required minimum number of explorations/infiltration tests for projects subject to Minimum Requirements #1 - #9 or Meeting LID Performance Standard per Section 2.3.4.

e. For infiltration systems proposed in closed depressions, follow the minimum number of tests outlined in Book 2, Section 1.3.6.1.

NOTE: Ideally, explorations and infiltration tests should be conducted at the proposed depth(s) and location(s) of the final infiltration facility(ies); however, final locations are often no known or accessible during the field exploration and testing program All reasonable attempts shall be made to conduct the explorations/infiltration tests in the general vicinity of the future system(s) and in soil conditions similar to those into which infiltration systems will discharge. The depth and number of explorations/infiltration tests, and samples can be adjusted, if in the judgment of an engineer with geotechnical expertise (P.E.), a geologist, engineering geologist, or hydrogeologist licensed in the State of Washington that the conditions are such that the changes still provide enough data to accurately estimate the performance of the infiltration system. Written justification for deviating from the standard ~~proof~~ shall be provided in the Soils Report (Section 1.8.3). Supplemental explorations and/or testing may be required if the Responsible Official deems the quantity and/or locations of the explorations/infiltration tests are inadequate or non-representative of conditions at or below the proposed infiltration facility(ies).

2. Subsurface explorations to a depth below the base of the infiltration facility of at least 5 times the maximum design depth of ponded water proposed for the infiltration facility, but not less than 10 feet below the base of the facility. At sites with shallow groundwater (less than 15 feet from the estimated base of facility), and where a groundwater mounding analysis is necessary, determine the thickness of the saturated zone. In high water table sites, the subsurface exploration sampling need not be conducted lower than two (2) feet below the groundwater table.

3. Continuous sampling (representative samples from each soil type and/or unit within the infiltration receptor) to a depth below the base of the infiltration facility of 2.5 times the maximum design ponded water depth, but not less than 10 feet. For large infiltration facilities serving drainage areas of 10 acres or more, sampling up to 50 or more feet may be required.

4. If using the soil grain size analysis method for estimating infiltration rates: laboratory testing as necessary to establish the soil gradation characteristics and other properties as necessary,

to complete the infiltration facility design. At a minimum, conduct one grain size analysis per soil stratum in each test hole within 2.5 times the maximum design water depth, but not less than 10 feet. When assessing the soil characteristics of the site, soil layers at greater depths must be considered if the licensed professional conducting the investigation determines that deeper layers will influence the rate of infiltration for the facility, requiring soil gradation/classification testing for layers deeper than indicated above.

5. Prepare detailed logs for each test pit or test hole and a map showing the location of the test pits or test holes. Logs must include at a minimum, depth of pit or hole, soil descriptions, depth to water, presence of stratification. NOTE: Logs must substantiate whether stratification does or does not exist. The licensed professional may consider additional methods of analysis to substantiate the presence of stratification that will significantly impact the design of the infiltration facility.

6. Soil characterization for each soil unit (soils of the same texture, color, density, compaction, consolidation, and permeability) encountered should include:
   - Grain size distribution (ASTM D422 or equivalent AASHTO specification), if using the soil grain size analysis method to estimate infiltration rates;
   - Visual grain size classification;
   - Percent clay content (include type of clay, if known);
   - Color/mottling;
   - Variations and nature of stratification.

7. Locate the groundwater table and establish its gradient, direction of flow, and seasonal variations, considering the water table aquifer (defined as the uppermost aquifer in open conditions). Groundwater monitoring wells shall be installed to monitor variations in groundwater level through at least one wet season (October 1 through April 30).

8. For facilities serving a drainage area of one acre or over, one groundwater monitoring well shall be installed in each proposed infiltration facility location, unless:
   - GIS groundwater data from Clark County and available field information describing water table elevations within 500 feet of the site indicates that the seasonal high groundwater elevation is at least 15 feet below the base of the proposed facility. Examples of field information that can be used include public well records and groundwater monitoring reports from other development sites.; OR
   - The seasonal high groundwater elevation has been found to be at least 15 feet below the facility base from monitoring wells installed at the site where monitoring was conducted during at least one wet season in the preceding three years.

9. For facilities serving a drainage area less than one acre, establish that the depth to groundwater or other hydraulic restriction layer will be at least 10 feet below the base of the

facility. This can be determined through the use groundwater monitoring wells as described above, through subsurface explorations or through information from nearby wells (500 feet or closer).

Step 3: Soil Testing

1. Field measured infiltration test to determine the coefficient of permeability must be conducted using one of the methods listed in Section 4.3.1.3.

2. If the infiltration facility will provide treatment the soil characterization must also include:
   - Cation exchange capacity (CEC) and organic matter content for each soil type and strata where distinct changes in soil properties occur, to a depth below the base of the facility of at least 2.5 times the maximum design water depth, but not less than 6 feet.

4.3.1.3 Coefficient of Permeability

Field-measured coefficient of permeability rates (also termed infiltration rates) can be determined using one of the three in-situ field measurements, or, if the site has unconsolidated and uncemented sediments, by a correlation to grain size distribution from soil samples. The latter method uses the ASTM soil size distribution test procedure (ASTM D422), which considers the full range of soil particle sizes, to develop soil size distribution curves.

Once the coefficient of permeability has been measured in the field, the design rate needs to be determined. This section discusses the procedures for adjusting the field-determined rate for use in designing facilities.

Field Measurements

Select one of the four methods described below to measure the field coefficient of permeability rate at the site. Use the field-measured coefficient of permeability to determine the design (long-term) infiltration rate. Then use the design (long-term) rate for routing and sizing the infiltration facility, and for checking for compliance with the maximum drawdown time of 48 hours. A detailed description of these test methods can be found in Appendix 1-C.

1. Modified Single-Ring Falling Head Test

This test was developed by local (Clark County) geotechnical engineers and was approved for use by Ecology in Clark County's 2009 *Stormwater Manual*. More information on this test method can be found in ASCE 2009 and the methodology associated with this test is described in Appendix 1-C.

2. Large-Scale Pilot Infiltration Test (PIT)

The Pilot Infiltration Test (PIT) is a field procedure for estimating the measured coefficient of permeability of the soil profile beneath the proposed infiltration facility. More information on this method can be found in Appendix 1-C.

3. Small-Scale Pilot Infiltration Test

A small-scale PIT can be substituted for the large-scale PIT in any of the following instances:

- The drainage area to the infiltration site is less than one acre.
- The testing is for the LID BMPs of bioretention or permeable pavement that either serve small drainage areas (less than an acre) and /or are widely dispersed throughout a project site.
- The site has a high infiltration rate, making a full-scale PIT difficult, and the site geotechnical investigation suggests uniform subsurface characteristics.
- Site accessibility or safety concerns impede the ability to conduct a large-scale PIT.

4. Soil Grain Size Analysis Method

If the site has unconsolidated or uncemented sediments, then measured coefficient of permeability rates can be determined by a correlation to grain size distribution from soil samples. This method uses the ASTM soil size distribution test procedure (ASTM D422), which considers the full range of soil particle sizes, to develop soil size distribution curves.

Correction Factors / Design Infiltration Rate

The coefficient of permeability obtained from the field tests or from the grain size analysis are considered initial infiltration rates ~~above is a measured rate~~. ~~This rate~~ These rates must be reduced through correction factors ~~that are appropriate for the design situation~~ to produce a design infiltration rate.

Infiltration test c~~C~~orrection factors account for site variability, number of tests conducted, uncertainty of the test method, and the potential for long-term clogging due to siltation and bio-buildup. Table 4.2 summarizes the typical range of correction factors to account for these issues. The specific correction factors used shall be determined based on the professional judgment of the licensed engineer considering all issues that may affect the infiltration rate over the long term, subject to the approval of Clark County.

The correction factors in Table 4.2 shall be used to establish the ~~allowable~~ design infiltration rate for ~~both~~ the PIT test ~~and~~ the single-ring falling head test, and soil grain size analysis test. The safety factor for a sacrificial system can be reduced if the system is designed to infiltrate runoff for a design event with a 2-year return period.

Table 4.2: Infiltration Rate Correction Factors

Base Correction Factor	
The base correction factor is meant to account for soil variability and long-term system degradation due to siltation, crusting, or other factors.	2
Soils Correction Factor	
Additive correction factor recommended by geotechnical professional as a result of soil or groundwater conditions.	Minimum value of 2, or greater as recommended by the geotechnical engineer
System Design Correction Factors	
If the infiltration facility serves a basin with an impervious area greater than 2 acres.	Add ½
If the infiltration facility serves a basin with an impervious area greater than 5 acres.	Add 1
Infiltration facilities in closed depressions.	Add 2
If a sacrificial system is provided and left operational following permanent site stabilization.	Subtract ½

Site Analysis Issue or Method	Partial Correction Factor
Site variability and number of locations tested, CF_v	0.33 to 1.0*
Test Method, CF_t	
- Large Scale PIT	0.75
- Small-scale PIT	0.5
- Other small-scale (e.g. Double ring, falling head)	0.4
- Soil Grain Size Analysis (Massmann, 2008)	
- Percent Passing the U.S. No. 200 Sieve is >10	0.4
- Percent Passing the U.S. No. 200 Sieve is <10 but >5	0.5
- Percent Passing the U.S. No. 200 Sieve is <5	0.75
Degree of influent control to prevent Siltation and bio-buildup, CF_m	0.9 for all BMPs other than bioretention and permeable pavement 1.0 for bioretention and permeable pavement

Quality of pavement aggregate base material, CF_b	0.9 to 1.0 for permeable pavement 1.0 for all BMPs other than permeable pavement
* Note: A CF_v value of 1.0 may only be used if the number and locations of explorations or infiltration tests meets the standards outlined in Section 4.3.1.2 (Step 2); otherwise, a maximum value of 0.9 may be used.	

The partial infiltration test correction factors from Table 4.2 are multiplied and inverted to determine the total infiltration test correction factor, CF_{in}:

$$CF_{in} = 1 / (CF_V \times CF_t \times CF_m \times CF_b)$$

The system design correction factors in Table 4.3 shall be used when siting or design thresholds are met to account for the greater risks associated with the performance of large systems, systems in closed depressions, and sacrificial systems used as part of permanent systems. System design correction factors are additive to the total infiltration rate correction factor.

Table 4.3: System Design Correction Factors

Siting or Design Threshold	**System Design Correction Factor**
If the infiltration facility serves a basin with an impervious area greater than 2 acres, CF_{SD1}.	Add ½
If the infiltration facility serves a basin with an impervious area greater than 5 acres, CF_{SD2}.	Add 1
Infiltration facilities in closed depressions CF_{SD3}.	Add 2
If a sacrificial system is provided and left operational following permanent site stabilization, CF_{SD4}.	Subtract ½

The Total Correction Factor, CF_T, is the sum of the infiltration test correction factor and the system design correction factors.

$$CF_T = CF_{in} + CF_{SD1} + CF_{SD2} + CF_{SD3} + CF_{SD4}$$

The design infiltration rate (K_{sat}design) is calculated by dividing the initial K_{sat} by the total correction factor:

$$K_{sat}\text{design} = K_{sat}\text{initial} / CF_T$$

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Book 2 – BMP Design

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Chapter 1 Hydrologic Computation and Analysis

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The regulatory strategy for wetlands is to simply try to match the pre-project surface and groundwater inputs that drive the water surface elevations in wetlands. Estimates of what should be done to match inputs require the use of a continuous flow model.

Projects shall comply with Minimum Requirement #8 and Appendix 1 H, *Wetland Protection Guidelines*. The hydrologic analysis shall use the existing land cover condition to determine the existing hydrologic conditions unless directed otherwise by a regulatory agency with jurisdiction.

Appendix 1-H, *Wetland Protection* shall be used for discharges to natural wetlands and wetlands constructed as mitigation. While it is always necessary to pre-treat stormwater prior to discharge to a wetland, there are limited circumstances where wetlands may be used for additional treatment and detention of stormwater. These situations are considered in Appendix 1-H.

Note that if selective runoff bypass is an alternative being considered to maintain the hydroperiod, the hydrologic analysis must consider the impacts of the bypassed flow. For instance, if the bypassed flow is eventually directed to a stream, the flow duration standard, Minimum Requirement #7, applies to the bypassed flow.

1.3.6 Closed Depression Analysis

Perform a closed depression analysis for a site that contains a closed depression as defined in Appendix 1-A.

This analysis applies to discharges to any low-lying areas which have no outlet, or such a limited surface outlet that in most storm events the area acts as a retention basin holding water for infiltration or evaporation (hereafter referred to as closed depression). Where the entire project site is located within a closed depression, Clark County may waive the requirement for a route for the 100-year overflow, provided the facility is sized to fully infiltrate the 100-year event and the facility does not have berms on any side.

Closed depressions generally facilitate infiltration of runoff. If there is an outflow to surface water (such as a creek), then the flow from this depression must also meet Minimum Requirement #7 for flow control. If a closed depression is classified as a wetland, then Minimum Requirement #8 for wetlands applies.

The analysis of closed depressions requires careful assessment of the existing hydrologic performance in order to evaluate the impacts a proposed project will have. An approved continuous flow model must be used for closed depression analysis and design of stormwater facilities. If a closed depression is not classified as a wetland, model the ponding area at the bottom of the closed depression as an infiltration pond using an approved continuous flow model.

1.3.6.1 Analysis and Design Criteria

The infiltration rates used in the analysis of closed depressions shall be determined according to the procedures in Book 1, Section 4.3.1.3. For closed depressions that currently contain or historically contained ~~containing~~ standing water, soil texture tests must be performed on dry land adjacent to, and on opposite sides of the depression (as is feasible). A minimum of two tests must be performed to estimate an average surface infiltration rate.

At a minimum, the County's 1996 infrared flood imagery shall be reviewed to identify if standing water was present at that time. Review of other historical information that may document signs of past standing water is encouraged.

Wet-season water level fluctuations, measured using a datalogger, are also useful in estimating infiltration rates, especially if the depression currently receives runoff. If the seasonal high groundwater table is determined to be less than 15 feet from a proposed infiltration facility bottom, then groundwater mounding analysis shall be completed in accordance with Section 5.1.1.2.

Projects proposing to modify or compensate for replacement storage in a closed depression must meet the design criteria for detention ponds as described in this section.

Method of Analysis

Closed depressions are analyzed using an approved continuous flow model. In assessing the impacts of a proposed project on the performance of a closed depression there are three cases that dictate different approaches to meeting Minimum Requirement #7. Note that where there is a flooding potential, concern about rising groundwater levels, property rights/ownership/use issues, or where the county's critical areas regulations may be violated, this analysis may not be sufficient and the county may require more stringent analysis and impose more stringent requirements.

Case 1 – No Pre-Development Overflow from Closed Depression

Using an approved continuous flow model, the 100-year storm flow from the TDA is routed into the closed depression, using only infiltration as outflow. Under this scenario, there is no overflow from the closed depression. Determine the pre-development (existing conditions) high water level. The post-development high water level, assuming full build-out of the contributing watershed, shall be no more than 0.1 feet higher than the pre-development level, unless the development has acquired ownership or discharge rights to the closed depression. Absent ownership or discharge rights, excavate additional storage volume in the closed depression (subject to all applicable requirements, for example, access rights and providing a defined overflow system) or in an upland area, as needed to achieve the development's contribution to the 0.1-foot maximum water level increase standard.

Case 2 – Pre-Development Overflow from Closed Depression

Using an approved continuous flow model, the 100-year storm flow from the TDA is routed into the closed depression, using only infiltration as outflow. Under this scenario, pre-development runoff causes overflows from closed depression. For this scenario, the performance objective can be met by excavating additional storage volume in the closed depression such that no overflows occur, subject to all applicable requirements. Alternatively, an appropriately designed flow control and overflow structure can be provided, meeting the standards of Minimum Requirement #7.

Case 3 – Pre and Post-Development Overflow from Closed Depression

The 100-year recurrence interval storm runoff from an approved continuous hydrologic model from the TDA to the closed depression is routed into the closed depression using only infiltration as outflow, and both pre-developed and developed conditions cause overflow to occur. The closed depression must then be analyzed as a detention/infiltration pond. The required performance, therefore, is to meet the runoff duration standard specified in Minimum Requirement #7 (Book 1, Section 1.5.7), using an approved continuous flow model. This will require a control structure, emergency overflow spillway, access road, and other design criteria. Also, depending on who will maintain the system, it will require placing the closed depression in a tract dedicated to the responsible party.

- The base of all infiltration basins or trench systems shall be greater than or equal to five feet above the seasonal high-water mark, bedrock (or hardpan) or other low permeability layer. A separation down to three feet may be considered if the groundwater mounding analysis, volumetric receptor capacity, and the design of the overflow and/or bypass structures are judged by the site professional to be adequate to prevent overtopping.
- Reference BMP D6.10, in Section 6.2 for Overflow and Emergency Overflow design criteria.
- Reference BMP D6.10 and BMP D6.20 for landscape requirements at stormwater facilities.

5.1.1.1 Setbacks

Infiltration facility setbacks shall be per Table 5.1.

Table 5.1: Stormwater Infiltration Facility Setbacks

Stormwater infiltration facility setback from:	Distance
Drinking water wells	100 feet minimum
Building foundations	20 feet minimum from the downslope side of foundations 100 feet minimum from the upslope side of foundations These setbacks may be increased or decreased based on engineering analysis that shows the performance of the building's foundation system will not be adversely affected by the presence of the stormwater facility
Slopes equal to or greater than 15%	50 feet minimum from the crests of slopes. This setback may be increased or decreased based on engineering analysis that shows the stability of the slope will not be adversely affected by the presence of the stormwater facility.
Property lines	20 feet from any property line. However, if an infiltration trench is a common system shared by the two or more adjacent lots and contained within an easement for maintenance given to owners of all lots draining to the system, then the setback from the property line(s) shared by the adjacent lots may be waived.

5.1.1.2 Groundwater Mounding Analysis

Groundwater mounding occurs under infiltration areas where the infiltration of stormwater causes the water under the infiltration facility to "mound up" before dispersing into the ground. This can occur where groundwater or a low permeability soil layer is near the surface. Groundwater mounding can reduce infiltration rates and cause the failure of infiltration facilities.

A groundwater mounding analysis shall be conducted at all sites where the following occurs:

- The depth to either the seasonal high groundwater table or a low permeability soil stratum is less than 10 five feet from the infiltration facility bottom; or
- The depth to the seasonal high groundwater table or low permeability stratum is less than 15 feet from the infiltration facility bottom, and the effective impervious area contributing runoff to the infiltration facility is greater than one acre; or
- The system is located in a closed depression and the depth to the seasonal high groundwater table or low permeability soil stratum is less than 15 feet from the infiltration facility bottom.

The Responsible Official may require a groundwater mounding analysis when the potential for mounding to adversely affect the performance of proposed infiltration facilities can be inferred from site conditions.

Groundwater modeling (mounding analysis) of the proposed infiltration facility shall be done using the design infiltration rate and the estimated maximum groundwater elevation determined for the proposed facility location.

The design infiltration rate determined above can be used as input to an approved continuous flow model to do an initial sizing. Then complete the groundwater modeling (mounding analysis) of the proposed infiltration facility. Use MODRET or an equivalent model.

Export the full output hydrograph of the developed condition and use it as model input. Note that an iterative process may be required beginning with an estimated design rate, WWHM (or MGSFlood) sizing, then groundwater model testing.

The mounding analysis shall demonstrate the groundwater does not mound above the bottom of the infiltration facility at any point during the continuous flow model.

5.1.1.3 Pretreatment Facility Design Criteria

Pretreatment of stormwater influent for suspended solids is required for each infiltration facility. Use either an option under the basic treatment facility menu or the pretreatment menu (See Book 1, Chapter 3 for menus). Pretreatment is important in preserving the life of the facility. The lower the influent suspended solids loading to the infiltration facility, the longer the infiltration facility can infiltrate the designed amount of stormwater.

5.1.1.4 Construction Criteria

This information must be included on the construction drawings for all infiltration facilities.

- Conduct initial basin excavation to within 1-foot of the final elevation of the basin floor. For open infiltration systems, rough excavating using heavy equipment shall only be allowed down to 3 feet above the proposed bottom elevation. The remainder of excavation shall be done from the sides or above. Excavate infiltration trenches and basins to final grade only after all disturbed areas in the up gradient project drainage area have been permanently stabilized. The final phase of excavation should remove all accumulation of silt in the infiltration facility before putting it in service.

- Do not use infiltration facilities as temporary sediment traps during construction.
- Traffic Control – Relatively light-tracked equipment is required for this operation to avoid compaction of the basin floor. Consider the use of draglines and trackhoes for constructing infiltration basins. Flag or mark the infiltration area to keep heavy equipment away.
- No permanent infiltration systems shall be allowed into service until the entire contributing drainage area has received final stabilization (to avoid clogging of the facility by eroded soil), and permanent county-approved water quality BMPs are in place. Final grading of the infiltration facility shall occur only after the contributing drainage areas are fully stabilized. Final grading should be performed using equipment positioned along the sides of the facility and not on the bottom of the facility. The infiltration facility must be flagged or cordoned off to prevent equipment from compacting soil in infiltration area.

5.1.2 Infiltration Facility Testing

During construction of the infiltration facility, a qualified professional who performed the infiltration testing, or an alternate qualified professional, shall observe the excavation and confirm that the soils are consistent with those tests on which the design was based. This observation shall take place prior to the placement of any filter fabric or drain rock specified on the plans and be included in a stamped letter from the qualified professional.

The constructed facility must be tested to demonstrate that the facility performs as designed. Use the same test method for coefficient of permeability as used in the design stages so that results are comparable. Perform the testing after the sites have been excavated and the infiltration soils have been exposed. Submit the results and comparisons to the pre-project measured and design rates to Clark County in a written memorandum signed and stamped by an appropriate professional licensed in the state of Washington.

If the tested coefficient of permeability determined at the time of construction is at least 95 percent of the uncorrected coefficient of permeability used to determine the design rate, construction may proceed. If the tested rate does not meet this requirement, the Applicant shall submit a plan to Clark County that follows the requirements in Book 1, Section 1.8.5. This plan shall address steps to correct the problem, including additional testing and/or resizing of the facility to ensure that the system will meet the minimum requirements of this manual.