

Attachment 1: BMP Treatment Descriptions

The following descriptions explain the BMP Treatments recommended for your property. Each recommended BMP treatment is labeled on your BMP Site Evaluation Treatments Form and BMP Site Plan, which correlates to the labeled descriptions below.

The Nevada Tahoe Conservation District (NTCD) uses the Natural Resources Conservation Service (NRCS) Soil Survey to determine the soil type for your property. We then use this information to recommend the Best Management Practices. The subsoil at *property address* has a *rapid* permeability rate of *13"/hour*. The soil type *Elimira (EcE)* is *well drained*. The soil type *Elimira (EcE)* is susceptible to moderate to high erosion potential. Root structure is able to penetrate to a depth of 50 to 70 inches with no issues concerning depth to bedrock or high ground water table.

State water quality regulations prohibit BMPs from being installed within one foot of the seasonal high water table. All treatment recommendations are made with this restriction in mind.

BMP treatment systems must be installed within the property boundary limits. The Nevada Tahoe Conservation District Site Evaluator does not establish property boundary lines. Before any BMP installation, confirm property boundary lines.

Materials and Maintenance Considerations

Many of the treatments recommended in your evaluation call for the installation of drain rock. The District recommends the use of ¾" to 1½" washed drain rock; however you can use any kind of larger diameter rock you would like to achieve desired aesthetic and use characteristics. The dimensions for each drain rock installation are indicated on your BMP Retrofit Treatment Form.

If available, consider using existing rock found on your property to create a more natural look and to reduce the cost of your BMP installation. The District strongly recommends bordering all drain rock installations and installing filter fabric to reduce maintenance by keeping the rock from spreading across your yard and preventing sediment from filling in the system. The most economical borders utilize used lumber, logs, or cobble sized rock found on site. You can also use pressure treated wood, landscape edging and/or one of the many recycled composite products available.

It is recommended that you visually check your BMPs after major storms, in the spring, and just before winter. Over time infiltration systems will fill in with sediment and fail to work properly; therefore, maintenance is required to keep these systems functioning.

10 → Bare Soil Areas ←

11 → Vegetate and mulch bare soil areas

12 → Mulch bare soil areas

13 → Mulch bare soil areas around vegetation

14 → Restore compacted bare soil areas

There are areas around the yard that need to be vegetated or mulched to cover bare soil. If any of these areas have been compacted by vehicles or foot traffic the soil should be covered with 2” of compost & then tilled to a depth of 6-8”. This will greatly increase the survival rates for any vegetation you purchase. A combination of native or adapted vegetation and organic mulch produces a low maintenance landscape that is highly effective at preventing erosion. There are many native and adapted grasses, plants, shrubs, and trees that can be used. Please review the recommended plant list in Chapter 7 of the *Home Landscaping Guide for Lake Tahoe and Vicinity* to help you identify species to suit your individual property and landscaping goals.

Mulching is one of the simplest and most beneficial conservation practices you can use in your yard. Mulching protects soil from erosion, reduces compaction from the impact of heavy rains, conserves moisture, reduces the need for frequent watering, maintains a more even soil temperature, prevents weed growth, and provides a finished look to your yard. Possible mulches include pine needles, woodchips, redwood or cedar bark, and drain rock.

One easy mulching method is to let the pine needles accumulate by not raking them up. Maintaining pine needles at a depth of 1-2” maximum is recommended to minimize the potential for soil erosion and does not pose a wildfire threat. In areas of high fire hazard, fire districts recommend inorganic mulch five feet out from the foundation. Refer to the *Fire Safe Landscaping Handout* for more information on protecting your home from a wildfire.

15 → Maintain existing vegetation and mulch

There are areas on your property which have sufficient **vegetation and/or mulch** to be considered a BMP for the soil. The **vegetation and/or mulch** is stabilizing the underlying soil and slowing down the runoff which flows over this area. The **vegetated and/or mulched** areas noted on the Site Plan need to be maintained in order to stay in compliance with the BMP ordinance.

20 → Drip Lines ←

21 → Armor bare soil under drip line with a 3” layer of drain rock and border system

Storm water coming directly from the roof onto bare soil can lead to noticeable erosion. Pursuant to Chapter 25 of the TRPA Code of Ordinances, storm water coming off your roof must be captured and infiltrated on your property. Where indicated on your site plan, it is recommended that you install drain rock or cobble directly under the roof eaves to meet this requirement. This will act as armor for the soil, reducing the erosive impact of runoff coming from your roof, and allowing it to disperse and infiltrate into the soil. Before applying drain rock under your drip lines, it is important to break up the existing soil with a hard rake or shovel. This will increase the ability of the soil to infiltrate water.

For all installations, this treatment must extend a minimum of 6” inside of the drip line, and extend a minimum of 12” beyond the drip line of a single story roof, 18” beyond the drip line of a two-story roof, and 24” beyond the drip line of a three-story roof. The minimum

dimensions and materials required for this treatment are noted on your BMP Site Evaluation Treatment Form. It is recommended that the system be bordered to retain the material and exclude adjacent soil.

Fire districts recommend inorganic mulch five feet out from the foundation. To treat the bare soil between the drip line treatment and the foundation wall, a surface layer of drain rock or inorganic mulch should be installed in this area. Drain rock quantities for this area are not included on your BMP Site Evaluation Treatments Form.

22 → Install drain rock infiltration trench under drip line and border

23 → Install terraced/baffled drain rock infiltration trench under drip line with border

Storm water coming directly from the roof onto bare soil can lead to noticeable erosion. Pursuant to Chapter 25 of the TRPA Code of Ordinances, this water must be captured and infiltrated on the property. Installing a drain rock infiltration trench under the drip line will accomplish this goal. The bottom of all infiltration systems must be installed level to ensure even water dispersion throughout the holding area and promote infiltration rather than conveyance. For all installations, this treatment must extend a minimum of 6” inside of the drip line, and extend a minimum of 12” beyond the drip line of a single story roof, 18” beyond the drip line of a two-story roof, and 24” beyond the drip line of a three-story roof. The minimum dimensions and materials required for this treatment are noted on your BMP Site Evaluation Treatments Form. It is recommended that the system be bordered to retain the material and exclude adjacent soil.

Fire districts recommend nonflammable mulch five feet out from the foundation. To treat the bare soil between the drip line treatment and the foundation wall, a surface layer of drain rock or inorganic mulch should be installed in this area. Drain rock quantities for this area are not included on your BMP Site Evaluation Treatments Form.

24 → Install prefabricated infiltration trench under drip line with border

Storm water coming directly from the roof onto bare soil can lead to noticeable erosion. Pursuant to the TRPA ordinance, this water must be captured and infiltrated on the property. Installing a prefabricated infiltration trench under the drip line will accomplish this goal. The bottom of all infiltration systems must be installed level to ensure even water dispersion throughout the holding area and promote infiltration rather than conveyance. For all installations, this treatment must extend a minimum of 6” inside of the drip line, and extend a minimum of 12” beyond the drip line of a single story roof, 18” beyond the drip line of a two-story roof, and 24” beyond the drip line of a three-story roof. The minimum dimensions and materials required for this treatment are noted on your BMP Site Evaluation Treatments Form. Included are *Installation Instructions* for the recommended prefabricated product. It is recommended that the system be bordered to retain the material and exclude adjacent soil.

Fire districts recommend inorganic mulch five feet out from the foundation. To treat the bare soil between the drip line treatment and the foundation wall, a surface layer of drain

rock or inorganic mulch should be installed in this area. Drain rock quantities for this area are not included on your BMP Site Evaluation Treatments Form.

25 → Maintain existing vegetation/turf under drip line

The existing vegetation/turf under your drip line armors the soil from the initial impact of the concentrated runoff coming from your roof and promotes infiltration of the storm water into the soil. Maintain the existing vegetation/turf in this area. If this condition changes an alternate treatment may need to be established. Contact the district for appropriate sizing of alternative treatments.

30 → Conveyance Systems General Use ←

31 → Install vegetated or rock lined swale

A vegetated or rock lined swale is a depression that collects runoff above ground and transports it to a desired location. Refer to the *Vegetated and Rock Lined Swales Handout* for more information.

32 → Install subsurface drain

Refer to the *Subsurface Conveyance Handout* for more information.

33 → Install rain gutter

34 → Install gutter downspout

The recommendations for this treatment depend on the product you decide to purchase, please refer to product specifications.

35 → Install energy dissipater under downspout

There are many options to dissipate water flow under your downspout. Possible options include splash pads/blocks, gravel, and rock.

36 → Install drain inlet with sediment trap

A drain inlet captures concentrated flows from a conveyance system and directs the partially treated flows to the infiltration system. Drain inlets with sediment traps are recommended to reduce maintenance of the adjacent infiltration systems.

37 → Install level spreader

A level spreader is a conveyance system that allows concentrated runoff to evenly disperse across an infiltration area.

40 → Driveway BMPs ←

41 → Install swale in driveway (< 5% slope driveways)

Pursuant to Chapter 25 of the TRPA Code of Ordinances, homeowners are required to capture and infiltrate all runoff coming from their property before it enters the right of way. The location of the right of way boundary is estimated by the Nevada Tahoe Conservation District Site Evaluator. In order to bring your driveway into compliance you will need to

install a conveyance device (41) that intercepts runoff and directs it to an infiltration system (Treatment Label) installed within your property boundary. The most economical option is to install an asphalt swale (depression) across the driveway. Another option is to install a slotted channel drain which is installed flush with the driveway surface. A slotted channel drain is a metal-grated conveyance structure that transports water underground to a sediment trap and infiltration system. At your request, I can send further information regarding the slotted channel drain option.

42 → Install slotted channel drain in driveway (> 5% slope driveways)

Pursuant to Chapter 25 of the TRPA Code of Ordinances, homeowners are required to capture and infiltrate all runoff coming from their property before it enters the right of way. In order to bring your driveway into compliance you will need to install a conveyance device (42) that intercepts runoff and directs it to an infiltration system (Treatment Label) installed within your property boundary. The best option for your driveway is to install a slotted channel drain. This type of conveyance structure is a metal-grated drain that transports water to a drop inlet and infiltration system

43 → Install drain rock infiltration trench along driveway edge

A drain rock infiltration trench captures and infiltrates runoff created by your driveway surface. The bottom of all infiltration systems must be installed level to ensure even water spreading throughout the holding area and infiltration rather than conveyance. On the outside edge of the trench, border the drain rock to retain the material and exclude adjacent soil. If you install a border along the driveway edge (to protect the asphalt) or if a border is already installed along the driveway edge, ensure that it is slightly below the surface of the driveway to allow runoff to flow into the infiltration system. The system should be installed depth of system, inches away from the edge of the pavement to avoid destabilizing the driveway's sub-base. In the set back area, install three inches of drain rock to armor the soil and allow the runoff to enter into the system. The minimum dimensions required for the set back area and treatment are noted on your BMP Site Evaluation Treatments Form.

44 → Install parking barriers

Driving on bare soil areas compacts the soil and makes it nearly impermeable. It also produces dust and loose dirt that is carried out onto the streets. To bring this area into compliance, there are two primary options:

Option 1: Restore the compacted area to the point where it is able to sustain vegetation. To do this successfully, you will need to aerate (till), amend (compost), and seed or plant the area. In order to prevent future soil degradation parking barriers should be installed along the edge of the existing driveway. Parking barriers can be made from a variety of materials such as split rail fencing, boulders, wood posts, or shrubs.

Option 2: Pave the compacted area. Contact your local jurisdiction for information on permits and regulations regarding the process. Refer to Enclosure: Paving Residential Dirt Driveways for more information on who to contact.

45 → Pave driveway pursuant to regulations of applicable jurisdiction with an appropriate system to satisfy BMP requirements

Driving on an unpaved surface compacts the soil, making it nearly impermeable and resulting in contaminated storm water runoff. It also produces dust and loose dirt that is carried out onto the streets. For these reasons, all property owners are required to pave approved roads, driveways and parking areas. Because driveways connect to the public right of way, you will need to contact your local jurisdiction (**Jurisdiction – Phone Number**) for information on required permits and local regulations. Refer to Enclosure: Paving Residential Dirt Driveways for more information on who to contact. In addition, an infiltration system will need to be installed to capture runoff generated by the newly paved area(s).

50 → Infiltration Systems ←

51 → Install vegetated or rock lined swale

A vegetated or rock lined swale is a depression that collects runoff above ground and conveys it to another location to be infiltrated. The minimum dimensions required for this treatment are noted on your BMP Site Evaluation Treatments Form. Refer to the *Vegetated and Rock Lined Swales Handout* for more information.

52 → Install filter strip

Do not use at this time.

53 → Install drain rock infiltration trench

Pursuant to Chapter 25 of the TRPA Code of Ordinances, this water must be captured and infiltrated on the property. Installing a drain rock infiltration trench will accomplish this goal. The bottom of all infiltration systems must be installed level to ensure even water dispersion throughout the holding area and promote infiltration rather than conveyance. It is recommended that the system is bordered to retain the material and exclude adjacent soil. The minimum dimensions required for this treatment are noted on your BMP Site Evaluation Treatments Form.

54 → Install prefabricated infiltration system

Pursuant to Chapter 25 of the TRPA Code of Ordinances, this water must be captured and infiltrated on the property. Installing a prefabricated infiltration system will accomplish this goal. The bottom of all infiltration systems must be installed level to ensure even water dispersion throughout the holding area and promote infiltration rather than conveyance. The minimum dimensions and materials required for this treatment are noted on your BMP Site Evaluation Treatments Form. Included are *Installation Instructions* for the recommended product.

55 → Install drain rock infiltration system

Pursuant to Chapter 25 of the TRPA Code of Ordinances, this water must be captured and infiltrated on the property. Installing a drain rock infiltration system will accomplish this goal. The bottom of all infiltration systems must be installed level to ensure even water spreading throughout the holding area and infiltration rather than conveyance. The minimum dimensions required for this treatment are noted on your BMP Site Evaluation

Treatments Form. To install: Dig a hole to the required dimensions, line it with filter fabric and fill it with drain rock. Before installing the last 3” of rock cover the top of the rock with another layer of filter fabric and place the last 3” of rock on top to secure the filter fabric. Drain rock infiltration systems need to be maintained as sediment fills the system. Maintenance requires removing the drain rock, cleaning the filter fabric, sifting the drain rock and reinstalling the system.

56 → Install vegetated or rock lined berm

A vegetated or rock lined berm is a water spreading structure which distributes concentrated runoff evenly across an infiltration area. When the runoff coming down a slope intercepts the berm, the water is captured and retained throughout a designated infiltration area.

57 → Install infiltration basin

Do not use at this time. Language in review.

60 → Decks / Stairs / Walkways ←

61 → Install drain rock under elevated structures (decks/stairs/walkways)

Pursuant to Chapter 25 of the TRPA Code of Ordinances, homeowners are responsible for stabilizing bare soil under elevated structures (decks/stairs/walkways). To protect the soil under these structures from water and wind erosion, install a three-inch layer of drain rock under the entire footprint of the structure and extend one foot past the edge of the structure. The minimum dimensions required for this treatment are noted on your BMP Site Evaluation Treatments Form. Installing a border to contain drain rock will reduce maintenance and increase effectiveness of the system.

62 → Install drain rock around perimeter of low elevated structures (decks/stairs/walkways)

Pursuant to Chapter 25 of the TRPA Code of Ordinances, homeowners are responsible for stabilizing bare soil under elevated structures (decks/stairs/walkways). Bare soil under decks/stairs/walkways is usually armored with a three-inch layer of drain rock. Since the area below your deck/stairs/walkways is inaccessible, you need to install a drain rock border around the perimeter of the deck/stairs/walkways. This treatment will dissipate runoff velocity and prevent erosion. The minimum dimensions required for this treatment are noted on your BMP Site Evaluation Treatments Form.

63 → Install terracing or rock slope protection (riprap) under elevated structures

Pursuant to Chapter 25 of the TRPA Code of Ordinances, homeowners are responsible for stabilizing slopes under elevated structures to prevent erosion. Your decision on how to accomplish this will depend on a variety of factors such as the steepness of the slope, soil type, and aesthetic preference. Slopes that exist under elevated structures can be stabilized with rip rap or terracing constructed from boulders, rock, concrete blocks or wood products, and back filled with drain rock or fill material suitable for establishing vegetation. If manufactured products are utilized follow the manufacturer’s specifications for proper installation.

64 → Enclose area below covered deck with lattice panels

Do not use at this time.

70 → Slope Stabilization ←

71 → Install rock slope protection (riprap)

Pursuant to Chapter 25 of the TRPA Code of Ordinances, homeowners must stabilize slopes to prevent erosion. Due to factors such as the steepness of the slope, soil type, and aesthetic appeal, it is recommended to install riprap in order to stabilize this slope. It is good practice to spread native or adapted seed on the slope prior to rock placement, and provide spaces between the rocks for interplanting vegetation. Rock slope protection works best when integrated with vegetation. Gentler slopes can be stabilized with vegetation, mulch and/or erosion control blanket.

72 → Install retaining wall to stabilize slope

Pursuant to Chapter 25 of the TRPA Code of Ordinances, homeowners must stabilize slopes to prevent erosion. Due to factors such as the steepness of the slope, soil type, and aesthetic appeal it is recommended to install a retaining wall to stabilize the slope. Gentler slopes can be stabilized with vegetation, mulch and/or erosion control blanket. Retaining walls can be constructed from boulders, rock, concrete blocks or wood products. A building permit is required for constructing retaining walls that are over 4 feet in height measured from the bottom of the footing to the top of the wall. Large projects and walls higher than 4 feet require professional engineering expertise. If manufactured products are utilized follow the manufacturer's specifications for proper installation.

73 → Install terracing along contour to stabilize slope

Terracing is one of the best options for treating erosion-prone slopes. Terraces prevent erosion by shortening the long slope into a series of shorter, more level steps. This allows for heavy rains to soak into the soil rather than run off, causing erosion. Terraces can be constructed from boulders, rocks, concrete blocks or wood products. Contact your local jurisdiction to verify when building codes for terraces exist. Large projects and walls higher than 4 feet measured from the bottom of the footing to the top of the wall require professional engineering expertise.

74 → Install erosion control blanket and establish vegetation to stabilize slope

75 → Install appropriate vegetation and mulch to stabilize slope

76 → Install rock slope protection (riprap), terracing, and/or appropriate vegetation and mulch to stabilize slope

Pursuant to Chapter 25 of the TRPA Code of Ordinances, homeowners must stabilize slopes to prevent erosion. Your decision on how to accomplish this will depend on a variety of factors such as the steepness of the slope, soil type, and aesthetic preference. Gentle slopes can be stabilized with vegetation, mulch and/or erosion control blanket. Steep slopes may require the use of terracing, rip rap, or retaining walls constructed from boulders, rock, concrete blocks or wood products. A building permit is required for

constructing retaining walls that are over 4 feet in height measured from the bottom of the footing to the top of the wall. Large projects and walls higher than 4 feet require professional engineering expertise. If manufactured products are utilized follow the manufacturer's specifications for proper installation.

80 → Maintenance ←

81 → Maintain existing vegetation and mulch

82 → Maintain existing infiltration system

83 → Maintain existing drain rock under drip line

84 → Maintain existing drain rock/rock slope protection under elevated structures

85 → Maintain existing drain rock/vegetation around perimeter of low elevated structures (decks/stairs/walkways)

Maintaining Drain Rock Systems:

Visual inspections can sometimes reveal problems with your BMPs. It is best to test the system after major storms, in the spring, and just before winter to make sure they are functioning properly. To test the system, run a garden hose on the impervious surface to be tested (your driveway for example) for at least 10 minutes and monitor the flow of water. Confirm that it is being captured by the associated BMP.

Infiltration systems should be covered by a layer of filter fabric and rock. As designed, this surface layer collects sediment rather than allowing it to enter the infiltration system. In even one season enough sediment can collect to clog the top layer forcing water to run over the surface rather than infiltrate.

For maintenance of infiltration systems, follow these steps:

- Remove pine needles and any other matter that has collected on top of the system
- Remove drain rock from the system and sift with a ½" mesh to remove sediment
- Rinse drain rock
- Replace or rinse filter fabric
- Refill with sifted, clean gravel
- Place recovered fine sediments in bordered flower bed or other contained area and mulch
- Discard dirty water and sediment in a contained area on your property such as a planting bed

Maintaining vegetated and/or mulched areas:

There are areas on your property which have sufficient **vegetation and/or mulch** to be considered a BMP for the soil. The **vegetation and/or mulch** is stabilizing the underlying soil and slowing down the runoff which flows over this area. The **vegetated and/or mulched** areas noted on the Site Plan need to be maintained in order to stay in compliance with the BMP ordinance.

86→ Maintain existing vegetation/turf under drip line

The existing vegetation/turf under your drip line armors the soil from the initial impact of the concentrated runoff coming from your roof and promotes infiltration of the storm water into the soil. Maintain the existing vegetation/turf in this area. If this condition changes an alternate treatment may need to be established. Contact the district for appropriate sizing of alternative treatments.

87 → Maintain existing vegetated or rock lined swale

Visual inspections can sometimes reveal problems with your BMPs. It is best to test the system after major storms, in the spring, and just before winter to make sure they are functioning properly. To test the system, run a garden hose on the impervious surface to be tested (your driveway for example) for at least 10 minutes and monitor the flow of water. Confirm that it is being captured by the associated BMP. Above ground BMPs such as basins and swales are vegetated and/or cobble lined depressions that collect runoff above ground and allow it to naturally infiltrate into the soil. Over time fine soil particles deposited in open swales may reduce the volume and conveyance capacity. Appropriate maintenance may include removal of accumulated sediment, tilling, and/or revegetating. Other maintenance needs include repairing containment structures and cleaning out the associated infiltration system.

88 → Maintain existing conveyance system

Visual inspections can sometimes reveal problems with your BMPs. It is best to test the system after major storms, in the spring, and just before winter to make sure they are functioning properly. To test the system, run a garden hose on the impervious surface to be tested (your driveway for example) for at least 10 minutes and monitor the flow of water. Confirm that it is being conveyed to the infiltration system. If the conveyance system is filled with sediment and debris, clean out the system in order for it to function properly.

89 → Maintain vegetation in water spreading area

Maintain vegetation in the vegetated/turf area noted on your Site Plan. This vegetation/turf needs to be maintained in order to infiltrate the runoff generated from the impervious surface.

90 → Finalization ←

91 → All BMPs in place. Maintain systems as necessary to remain in compliance with TRPA ordinances.

92 → Site Constraint – See Attached Site Constraint Memorandum and Tracking Form

Due to the site constraints on the subject property, a qualified BMP site evaluator has determined that it is not feasible at this time to fully implement BMPs on your property in order to meet the requirements of Chapter 25 of TRPA’s Code of Ordinances.

93 → Contact jurisdiction to obtain an encroachment permit allowing the driveway runoff conveyance and infiltration system to be installed in the right of way

Pursuant to Chapter 25 of the TRPA Code of Ordinances, homeowners are required to capture and infiltrate all runoff coming from their property before it enters the right of way. In your case, infiltrating the runoff from your driveway is not possible because of the **SITE CONSTRAINT**. I contacted **PERSON** from **JURISDICTION** about your property. **He/She** approved the installation of the infiltration system in the right of way. However, before any installation occurs, you will need to contact **PERSON** at **JURISDICTION (PHONE#)** to obtain an encroachment permit which will permit the installation of the infiltration system in the right of way. Infiltrating the driveway runoff in this area will ensure the runoff does not enter the **JURISDICTION** storm water collection system. The **JURISDICTION** storm water collection system is not designed to handle runoff coming off of residential properties.

94 → Contact **jurisdiction to obtain permission to install the driveway runoff conveyance and infiltration system in the right of way**

Pursuant to Chapter 25 of the TRPA Code of Ordinances, homeowners are required to capture and infiltrate all runoff coming from their property before it enters the right of way. In your case, infiltrating the runoff from your driveway is not possible because of the **SITE CONSTRAINT**. I contacted **PERSON** from **JURISDICTION** about your property. **He/She** approved the installation of the infiltration system in the right of way. However, before any installation occurs, you will need to contact **PERSON** at **JURISDICTION (PHONE#)** to obtain permission to install the driveway runoff conveyance and infiltration system in the right of way. Infiltrating the driveway runoff in this area will ensure the runoff does not enter the **JURISDICTION** storm water collection system. The **JURISDICTION** storm water collection system is not designed to handle runoff coming off of residential properties.