
Guidance Manual for Runoff Control:

Preventing Erosion, Sedimentation, and Pollution of Receiving Waters in American Samoa

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American Samoa Government
Environmental Protection Agency



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SECTION 1

AMERICAN SAMOA RUNOFF CONTROL PROGRAM OVERVIEW

1.0 INTRODUCTION - PURPOSE OF THE MANUAL

This manual is written to explain the purpose of American Samoa's Runoff Control Program and to provide guidance for development of site-specific Erosion/Sediment Control Plans (ESCP) to help prevent the discharge of pollutants to receiving waters resulting from storm water runoff. This manual provides guidance for property owners, developers, industry owners and operators, construction contractors, design consultants, government agencies, and others who are responsible for activities that could result in polluting American Samoa's surface and ground waters resources via storm water runoff.

1.2 THE NEED FOR RUNOFF CONTROL IN AMERICAN SAMOA

A wide variety of pollutants are transported to American Samoa's streams, coastal waters, and groundwater through storm water runoff. In this manual, "runoff" and "storm water" are used interchangeably. Examples of pollutants collected and transported by storm water runoff on the islands of American Samoa are: sediment from development and new construction; oil, grease, and toxic chemicals from automobiles, roadways, and industrial activities; nutrients and pesticides from agricultural activities and gardening; viruses and bacteria from failing septic systems and animal pens; and heavy metals from undetermined sources. Among these pollutants, sediments from erosion, and nutrients and microbial contamination from improper waste disposal, generally constitute the largest quantity of pollutant loads to receiving waters and ground water.

Runoff that drains into receiving waters carries pollutants with it, ^{Receiving water} and is defined as the body of water into which a stream flows. The receiving water is the ultimate destination for the portion of rainwater called "runoff". Runoff is the water left over after rainwater percolates into the soil, is taken up by plants, or is released back to the atmosphere via evaporation. Liquid water is an excellent transport medium, and will dissolve or carry in suspension all of the pollutants discussed above.

Polluted runoff in American Samoa is usually released directly into the water without any treatment. Small amounts of pollutants distributed over large areas of land, or dispersed in large bodies of water, are often readily absorbed and rendered harmless through the actions of sunlight, natural chemical oxidation, or biological activity. In American Samoa, however, there is very little habitable land, and the human population density is rapidly increasing. Human activity on the land has

resulted in markedly increased pollutant loads to receiving waters and ground water during the past ten years. Increased pollutant loads will contaminate or kill fish and wildlife populations, kill native vegetation, foul drinking water supplies, and make recreational areas unsafe due to elevated levels of pathogenic (disease-causing) microorganisms. The primary concerns for coastal waters are the effects on fish populations and on the coral reefs, especially within Pago Pago Harbor. The near-coastal waters within the harbor are also used extensively for recreation. Groundwater contamination of the aquifer on the Tafuna-Leone Plain, the largest and most important ground water reserves on the island of Tutuila, is another important concern. Each of these concerns is chronic in American Samoa at this time. Many are acute. All are subjects of study and mitigative efforts by American Samoa's environmental and planning agencies.

To slow the rapid degradation of water quality and the loss of the islands' limited soil resources, the American Samoa Environmental Protection Agency (ASEPA), and the American Samoa Coastal Management Program (ASCMP), wish to promote runoff control through the use of erosion/sediment control plans for all types of development and land use activities. An ESCP includes an array of management practices, siting and civil engineering and site design criteria, and structural and vegetative control measures to reduce pollutant sources, divert and contain runoff flows, treat runoff water, and prevent pollutant discharges via storm water runoff. (USEPA 1996) The complexity and the amount of detail required for an ESCP will depend on the type and scope of each particular project.

Agencies' jurisdictions and legal mandates for runoff control, and specific suggestions and requirements for preparation of an ESCP, are discussed in the sections that follow.

1.3 ADMINISTRATION AND LEGAL MANDATE

The American Samoa Government (ASG) is responsible for compliance with the National Environmental Policy Act (NEPA) and the Clean Water Act of 1972 (CWA). By authority of the Territorial Environmental Quality Act (Title 24 ASCA), the ASG Environmental Quality Commission (EQC) sets government policy concerning water use and water quality protection. The American Samoa Environmental Protection Agency was established under this same authority to carry out the mandates of the EQC. The ASEPA is the agency responsible for administering American Samoa's Runoff Control Program, under its Non-Point Source Pollution Prevention Program. Similarly, the ASCMP administers a non-point source pollution prevention program through the Project Notification and Review System (PNRS) Board, which regulates land use activities in the Territory.

1.4 EXISTING REGULATIONS

Existing regulations, described in the following sections, are established under the Territorial Environmental Quality Act (Title 24, ASCA). Title 24 requires property owners and developers to prepare runoff control plans for construction activities, other land uses, or facility operations that could result in harmful pollutant discharges in storm water runoff. To protect American Samoa's water resources and meet the regulatory objectives of Title 24, the ASEPA works cooperatively with developers and property owners to develop runoff control measures for new projects and modifications to existing development.

1.4.1 Runoff Control

Existing Runoff Control Policy in American Samoa is set forth in ASCA Section 24.0208, Pollution Control:

To prevent negative impacts to receiving waters and ground waters as a result of disruption in natural drainage patterns caused by development, the following standards shall be required to control storm water and other runoff for all new development projects and new or modified land uses:

(1) A runoff control plan shall be completed for any construction activity of temporary or permanent development determined by ASEPA to have a potential significant impact on receiving water quality or ground water quantity or quality. Such activities include, but are not limited to, confined animal facilities, construction project staging areas, highways, bridges, parking lots, structures, and facilities utilizing hazardous materials, pesticides, fertilizers or manure. The runoff control plan required by this section shall be submitted to ASEPA and approved in writing prior to commencement of any construction activity for a new project, and by the date specified by ASEPA for existing land uses. The runoff control plan shall include the following:

(A) an estimate of the volume of runoff to be controlled, an assessment of the potential impacts of the runoff to be addressed, the design of BMPs and/or runoff controls, including a location map for the controls at the site, and a full description of the designs for the runoff controls.

(B) for nonstructural BMPs, a description of the management measures or methods to be used at the site to prevent the escape of pollutants to the receiving waters or ground waters via transport by runoff. Nonstructural BMPs used in the plan shall be those contained in the document (g) Guidance or

guidance from the ASEPA, the Natural Resources Conservation Service, or other source as approved by ASEPA

(2) For the planning, development, and maintenance of new, modified, and existing land uses, avoidance and prevention of water quality impacts is required. The methods to be utilized include, but are not limited to, BMPs such as site planning, proper use, storage, and disposal of hazardous materials, avoidance of sensitive areas, and proper preparation and maintenance of drainage structures, or others as required by ASEPA.

1.4.2 Standards of Water Quality for Territorial Surface Waters and Ground Water

American Samoa Water Quality Standards (ASWQS) were developed to comply with the U.S. Clean Water Act of 1972, as amended. The ASWQS are specific as to parameters and allowable levels of contaminants, and were developed as part of the ASEPA Water Programs. The ASWQS are subject to periodic review and revision. General water quality standards are established under ASCA Section 24.0206 for all territorial surface waters and ground waters:

General Standards of Water Quality:

- Waters shall be substantially free from materials attributable to sewage, industrial wastes, or other activities of man that will produce objectionable color, odor, or taste, either of itself or in combinations, or in the biota;
- Waters shall be substantially free from visible floating materials, grease, oil, scum, foam, and other floating material attributable to sewage, industrial wastes, or other activities of man;
- Waters shall be substantially free from materials attributable to sewage, industrial wastes, or other activities of man that will produce visible turbidity or settle to form objectionable deposits; and
- Waters shall be substantially free from substances and conditions, or combinations thereof attributable to sewage, industrial wastes, or other activities of man that may be toxic to humans, other animals, plants, and aquatic life or produce undesirable aquatic life.

The following is an excerpt from the ASWQS Section 24.0208, Pollution Control (1999) addressing the following:

- Land disturbing activities
- On site disposal
- Animal waste control
- Storm water control
- Hydromodification
- Hazardous materials and chemical control

“(a) General

Any private or public development which would constitute a source of pollution to the waters of American Samoa shall provide the degree of waste treatment and/or operational and management practices necessary to preserve the quality of these waters.

“(b) Land Disturbing Activities

Soil particles resulting from erosion on land involved in earth work, such as the construction of public works, highways, subdivisions, private developments, and recreational, commercial, or industrial developments, or the cultivation and management of agricultural lands, shall be prevented from entering any waters of American Samoa by application of management practices and standards adopted by ASEPA and implemented by the person(s) responsible. These practices include, but are not limited to:

(1) Best management practices (BMPs) for cultivated agricultural lands. The responsible person(s) shall implement BMPs to assure removal of settleable solids originating from the cultivated area. In so doing, the responsible person(s) shall:

(A) Utilize guidelines established by ASEPA and the erosion component of the Conservation Management System as defined in the Field Office Technical Guide of the US Department of Agriculture, the Natural Resources Conservation Service and/or guidance from ASEPA. In the alternative, the responsible person(s) may design and install a combination of management and physical practices to remove the settleable solids and associated pollutants in runoff delivered from the contributing area for storms up to and including a ten year, 24 hour frequency.

(B) For cultivated areas in excess of one acre and/or within 100 feet of a surface water or such other areas as ASEPA may specify, prepare and submit an erosion and sediment control plan to the ASEPA for approval. The ASEPA shall either approve, conditionally approve or disapprove the plan. Cultivation activities ongoing as of the effective date of these standards may not proceed for more than 90 days in the absence of an approved plan. No new activity may commence until such time as ASEPA has approved the plan.

(2) BMPs for construction sites. The responsible person(s) implementing BMPs at construction sites shall:

(A) Assure that the annual total suspended solids loading from a construction site is no greater than the average annual loading prior to construction or after construction is complete and the site is permanently stabilized;

(B) Reduce annual average suspended solids loading by 80 percent based on total suspended solids loading from storms less than or equal to the 2 year/24 hour storm;

(C) For construction activities disturbing in excess of one acre or occurring within 100 feet of a surface water, ensure that the standards set forth in subdivisions (A) and (B) are met, or, in the alternative, prepare and submit a construction and post-construction erosion and sediment control plan for approval by ASEPA. For approval, the BMPs to be included in the plan must be those provided by the (g) Guidance document, guidance received from ASEPA or the Natural Resources Conservation Service, or other references, as approved by ASEPA. For construction activities disturbing in excess of one acre or within 100 feet of a surface water that are initiated after the effective date of these standards, the plan shall include measures to retain sediment on the site.

“(c) On Site Disposal Systems

(1) No person may site, construct, or operate an on site disposal system except in accordance with public health rules, building codes, water quality standards, and sewer use regulations of the Territory. Failure to do so shall constitute a violation of these standards.

- (2) *Installation of on site disposal systems that reduce total nitrogen loading by 50 percent to ground water that is closely hydrologically connected to surface water will be required if conditions indicate that nitrogen limited surface waters may be adversely affected by excess nitrogen loading.*

“(d) Animal Waste Control

Improper waste disposal and contaminated runoff from confined animal facilities contribute nutrients, bacteria, viruses, other microorganisms, and sediment to streams, near shore and ground waters that lead to eutrophication, fish kills, and unsafe drinking water. In order to prevent these impacts, owners of confined animal facilities shall:

- (1) *Utilize animal waste control facilities that provide waste treatment, such as septic tanks and leach fields, waste storage ponds, waste storage structures, application of manure or runoff water to agricultural land, waste utilization, burial, or any other method determined to be environmentally acceptable by the Director of ASEPA;*
- (2) *Locate such facilities and their waste treatment facilities at least 50 feet from any water body or stream;*
- (3) *Control all waste such that it will not contaminate near shore waters, streams, or ground waters; and*
- (4) *Continuously operate and maintain animal waste control facilities to ensure effective treatment.*

“(e) Storm Water Control

To prevent negative impacts to receiving waters and ground waters as a result of disruption in natural drainage patterns caused by development, the following standards shall be required to control storm water for all new development projects and new or modified land uses:

- (1) *A storm water control plan shall be completed for any construction activity or temporary or permanent development determined by ASEPA to have a potential significant impact on receiving water quality or ground water quantity or quality. Such activities include, but are not limited to, confined animal facilities, construction project staging areas, highways, bridges, parking lots, structures, and facilities*

utilizing hazardous materials, pesticides, fertilizers or manure. The storm water control plan required by this section shall be submitted to ASEPA and approved in writing prior to commencement of any construction activity for a new project and by the date specified by ASEPA for existing land uses. The plan shall include the following:

(A) an estimate of the volume of storm water to be controlled, an assessment of the potential impacts of the storm water to be addressed, the design of BMPs and/or storm water controls, including a location map for the controls at the site, and a full description of the designs for the stormwater controls.

(B) For nonstructural BMPs, include a description of the management measures or methods to be used at the site to prevent the escape of pollutants to the receiving waters or ground waters. Nonstructural BMPs used in the plan shall be those contained in the document (g) Guidance or guidance from the ASEPA, the Natural Resources Conservation Service, or other source as approved by ASEPA.

(2) For the planning, development, and maintenance of new, modified, and existing land uses, avoidance and prevention of water quality impacts is required. The methods to be utilized include, but are not limited to, BMPs such as site planning, proper use, storage, and disposal of hazardous materials, avoidance of sensitive areas, and proper preparation and maintenance of drainage structures, or others as required by ASEPA.

“(f) Hydromodification

In order to prevent water quality degradation and preserve valuable in stream and riparian habitat, the following practices shall be required and/or implemented by ASEPA:

(1) All projects involving hydromodification shall be evaluated to determine their impacts on the physical and chemical characteristics of surface waters as well as in stream and riparian habitat, using appropriate models and methodologies.

(2) BMPs for use in the design and/or operation of new or existing hydromodification structures shall be identified and implemented by responsible persons. BMPs include, but are not limited to, protection of existing vegetation, minimization of loads on top of stream banks, hydraulic structures, check dam systems, grade control

structures, vegetative cover, in stream sediment load control, soil bioengineering, proper stream bank and shoreline erosion control design, and use of setbacks, as provided in the (g) Guidance or other references approved by ASEPA.

- (3) *ASEPA shall work with other ASG departments and the private sector to ensure the proper operation and maintenance of hydromodification structures.*

“(g) Hazardous Materials and Chemical Control

Notwithstanding any other rules in force pertaining to hazardous materials management, the following BMPs shall be implemented at facilities or construction sites where hazardous materials such as petroleum products, solvents, paints, pesticides, fertilizers, soil additives, and other chemicals in excess are stored or utilized so that contamination of streams, near shore waters, and ground waters is minimized or prevented:

- (1) *Proper storage of hazardous materials. All hazardous materials and chemicals shall be stored within a covered shelter; an impervious berm with a capacity of 110 % of the largest container in the shelter shall be placed around the perimeter of the storage area; and appropriate construction measures shall be taken to prevent the runoff of pollutants;*
- (2) *Proper labeling of chemicals and placement of warning signs in areas where pesticides are or have recently been applied;*
- (3) *Proper disposal of hazardous chemicals or materials in conformance with ASEPA guidelines and/or regulations promulgated by the EQC;*
- (4) *Proper maintenance of vehicles, equipment, and machinery in confined areas specially designed to control runoff; and*
- (5) *Proper application of fertilizers and manure using ASEPA recommended procedures. Soil tests shall also be utilized to determine the specific nutrient needs at the site where such applications are performed.” AS Water Quality Standards, 1999.*

A water quality monitoring plan (WQMP) with measurable parameters is sometimes required to assess baseline water quality and to evaluate the effectiveness of runoff controls implemented under ESCP. Where necessary equipment and resources are unavailable, it is not always practicable to obtain measurements for many of the parameters listed in the ASWQS. A WQMP should be designed to measure the parameters that apply to the potential pollutant sources to the extent possible, within the limits of available resources and technologies.

1.4.3 American Samoa Non-Point Source Pollution Prevention Program

The objective of the American Samoa Non-Point Source Pollution Prevention Program (NPS Program) is to maintain and restore the quality of the territory's surface waters and ground waters. The NPS Program is applicable to a system of environmental review, along with economic and technical considerations to ensure that environmental concerns, including water quality protection, are given consideration in the land use decision-making process. The system of environmental review is the Project Notification and Review System (PNRS), which are governed by a Board made up of representatives from ASG agencies. The ASEPA representative is a principal Board member.

The PNRS is governed by the ASCMP Administrative Code, which was adopted by authority of the American Samoa Coastal Management Act of 1990. ASCMP Administrative Code Section 26.0220 *Standards and criteria for review*, outlines water quality policy that is relevant to runoff control:

"H. Water and air quality

1. *Water quality shall be maintained.*
 - 1.a *Territorial water quality standards shall be the standards of the American Samoa Coastal Management Program and land use permit applications shall adhere to those standards in accordance with ASCA §§ 24.0100 et. seq., the Environmental Quality Act.*
 - 1.b *Consistent with Territorial water quality standards, degraded water quality shall be restored to acceptable levels and potential threats to water quality shall be prevented where feasible.*
 - 1.c *Nonpoint source pollution shall be controlled through implementation of best management practices."*

Of further relevance to environmental managers is Section 26.0221 of the ASCMP Administrative Code which delineates boundaries and sets policies and protections for Special Management Areas (SMA) that "possess unique or irreplaceable habitat, products, or materials, offer beneficial

functions, or affect the cultural values or quality of life significant to the general population of the Territory of fa'a Samoa.”

This section requires that SMAs be protected “to assure the maintenance of natural water flows, natural circulation patterns, natural nutrient and oxygen levels and to avoid the discharge of toxic wastes, sewage, petroleum products, siltation and destruction of productive habitat.” (§ 26.0221 C(3)(e)).

1.5 TYPES OF POLLUTANTS ASSOCIATED WITH RUNOFF DISCHARGES

The following list describes the general categories of problem pollutants typically carried in runoff discharge. These pollutants are captured in both nonpoint source polluted runoff and point source pollution discharge associated with construction and industrial activities. (EPA 1993):

1. **Sediment** - Sediment from erosion of exposed soils, land disturbance (construction activity), and dredging, constitutes the largest mass of pollutant loadings to surface waters. Sedimentation causes increased turbidity and reduced light penetration in receiving waters. It is responsible for decreases in submerged aquatic vegetation, reduced prey capture for sight-feeding predators, impaired respiration of aquatic fauna, reduced fecundity, smothering of benthic communities and coral reef systems, and impairment of fishery resources. Heavy sedimentation can clog water channels and drainage ways, thereby reducing their effectiveness at accommodating storm water flows.
2. **Nutrients** - Nutrient pollution is attributable to the use of commercial fertilizers containing nitrogen, phosphorus, and potassium, the presence of manure and other animal wastes, and effluent from water treatment systems. Excessive nutrient loading to marine ecosystems can result in dense growths of algae and other organisms (eutrophication) and depressed dissolved oxygen (DO) levels due to elevated phytoplankton populations. Eutrophication-induced hypoxia and anoxia have resulted in fish kills and widespread destruction of benthic habitats. Surface algal scum, water discoloration, and the release of toxins from sediment may also occur. Nutrient loadings have been implicated in decreased productivity and yields in fisheries throughout U.S. waters. (NOAA, 1991).

3. **Oxygen-Demanding (DO) Substances** - Proper levels of DO are critical for the maintenance of water quality and the proliferation of aquatic life. Decomposition of organic matter by microorganisms may deplete DO levels and result in the impairment of the waterbody. Data have shown that urban runoff with high concentrations of decaying organic matter can severely depress DO levels after storm events (USEPA, 1983).
4. **Pathogens** - Urban runoff typically contains elevated levels of pathogenic organisms, including bacteria, viruses, and other microorganisms. The presence of pathogens in runoff may result in waterbody impairments such as closed beaches, contaminated drinking water sources, and shell bed closings. Pathogen contamination from onsite sewage disposal systems has been implicated in a number of shellfish bed closings. This problem may be especially prevalent in areas with porous or sandy soils.
5. **Hydrocarbons** - Petroleum hydrocarbons are derived from oil products, and the source of most such pollutants found in urban runoff is vehicles - auto and truck engines that drip oil. Many auto mechanics dump used oil directly into storm drains. Oil and grease contain a wide variety of hydrocarbon compounds. Some polynuclear aromatic hydrocarbons (PAHs) are known to be toxic to aquatic life at low concentrations. Hydrocarbons collect in bottom sediments where they may persist for long periods of time and result in adverse impacts to benthic communities. Lakes and estuaries are especially prone to this phenomenon.
6. **Heavy Metals** - Heavy metals are typically found in urban runoff. Heavy metals are of concern because of toxic effects on aquatic life and the potential for ground-water contamination. Copper, lead, and zinc are the most prevalent nonpoint source pollutants found in urban runoff. High metal concentrations may bioaccumulate in fish and shellfish and impact beneficial uses of the affected waterbody.
7. **Toxics** - Many different toxic compounds (priority pollutants) have been associated with urban runoff, pesticide and herbicide use, and discharges from industrial activities. Many of these toxics are identified by the USEPA as priority pollutants under Section 313 of the Clean Water Act. This list includes organics (volatiles, pesticides, acids), certain metals, cyanides, phenols, and other hazardous materials.