IMPLEMENTATION STANDARDS AND MANAGEMENT PRACTICES
FOR STORMWATER PONDS

Overview

Description

Stormwater Ponds are constructed features, on repurposed irrigated lands that are designed to retain stormwater runoff. They will typically be located in topographically favorable locations, such as topographic hollows and drainage swales. Their use may include temporary or seasonal retention, irrigation, recharge and conveyance to floodplain lands. Benefits may include attenuation of flood discharge, a reduction in water demand and consumptive use, an increase in groundwater recharge, increased water supply for irrigation, improved water quality, and/or habitat.

Depending on the application or desired outcome, implementation may include excavation or contour enhancement of the pond area, construction of berms, inlet and outlet structures, connection to irrigation systems or designated floodplain zones, access ramps for maintenance, erosion control measures, and the establishment of beneficial vegetation within or around the pond.

These *Implementation Standards and Management Practices for Stormwater Ponds* cover: Benefits and Objectives, Applicable Land Repurposing Practices, Requirements, Best Practices and Guidelines, and References.

ETSGSA reserves the right to update these *Implementation Standards*.

Benefits and Objectives

The benefits of repurposing irrigated cropland to Stormwater Ponds vary depending on the application objective(s). Benefits may include, but are not necessarily limited to, the following:

- Reduced groundwater demand and consumptive use through repurposing of groundwater-irrigated agricultural land;
- Flood attenuation and flood risk mitigation;
- Improved wildlife habitat;
- Ecological health when floodplains are reconnected, managing water levels in the area through flow control;
- Enhanced groundwater recharge and aquifer replenishment;
- Reduced dependency on groundwater supplies through temporary retention of stormwater for beneficial use;
- Improved water quality through sedimentation and natural filtration of stormwater with vegetation and gravitational settling, reducing sediment and nutrient loads in downstream surface waters or floodplain zones;

- Improved climate resiliency through improved water management;
- Reconnected floodplain benefits, including wildlife and native or resident vegetation habitat, soil health, and erosion control.; and
- Local business employment for design and construction services.

Applicable Land Repurposing Practices

These *Implementation Standards and Management Practices for Stormwater Ponds for Rewilding* may be used together with the following land repurposing practices that are part of ETSGSA's groundwater management framework:

- Floodplain reconnection and related spreading and recharge; and
- Orchard swale rewilding.

Requirements

General

Unless otherwise indicated, these Requirements apply to Stormwater Ponds implemented by an Owner or Operator as defined in ETSGSA *Rules and Regulations* and subject to an agreement under ETSGSA's MLRP; such Stormwater Ponds is referred to herein as a Stormwater Pond Project. Stormwater Ponds constructed by an Owner or Operator that is not covered by an agreement under one of ETSGSA's incentive programs is not considered a Stormwater Pond Project and is not subject to these Requirements. Unless otherwise indicated, all requirements listed herein are the responsibility of the Owner or Operator.

Unless otherwise indicated, all requirements listed herein are the responsibility of the Owner or Operator. An Owner or Operator implementing a Stormwater Pond Project shall:

- Be solely responsible for their management decisions and activities; and
- Maintain the land in a condition that does not create a nuisance because of, but not limited to, the following: erosion, spread of noxious weeds and invasive plants, spread of plant or vector-borne diseases, pests, flood discharge, erosion or sediment discharge.

It is the responsibility of the Owner or Operator to:

- Comply with all federal, state, and local laws, regulations, and ordinances relevant to the Stormwater Pond Project;
- Comply with the terms and requirements of the agreement executed between the Owner or Operator and ETSGSA for implementation of the Stormwater Pond Project, or the larger project in which the Stormwater Pond Project is included as a component (the Project Agreement);
- Comply with flow down terms of any grant agreement from which the Stormwater Pond Project obtains any funding and any applicable public contracting requirements;
- Comply with the requirements prescribed within any permits issued for the Stormwater Pond Project; and

- Comply with all monitoring and mitigation measures specified in the CEQA documentation for the Stormwater Pond Project.

Projects may include multiple land repurposing strategies or components (i.e., other than Stormwater Ponds). Refer to the respective ETSGSA *Implementation Standards and Management Practices* for those components for other requirements associated with the project.

Site Review

Stormwater Pond Project Application and Implementation Agreement

The following requirements related to site review apply to applications submitted for Stormwater Pond Projects to participate in one of ETSGSA's Multi-Benefit Land Repurposing Program (MLRP) and Project Agreements developed between ETSGSA and Owners or Operators for implementation of Stormwater Pond Projects:

- For incentive program applications, demarcate on a map and in the field the area(s) proposed for Stormwater Ponds in accordance with Stormwater Pond Project design, and provide the map to ETSGSA with the incentive program application;
- For Project Agreements that include Stormwater Pond Projects, update the map and field demarcation as needed for if the project extent has been adjusted;
- For documentation of Stormwater Pond Project implementation, document existing (pre-construction) conditions in the area(s) proposed for the Stormwater Pond(s) in accordance with the application requirements and the monitoring requirements included in the implementation agreement, at a minimum:
    - Take a set of representative pre-construction photographs from locations (designated "photo points") that will be accessible after Stormwater Pond Project construction; and
    - Prepare a brief written description of the pre-construction conditions that is keyed to an aerial image of the Stormwater Pond Project area, indicating type and age of crop(s), and any man-made features that will be affected by implementation of the Stormwater Pond Project.

Site Assessment

ETSGSA will conduct any necessary resource investigations and studies, and complete a review of the Project in compliance with the California Environmental Quality Act (CEQA).

Site assessment is required for Stormwater Pond Projects to support Stormwater Pond area demarcation, vegetative cover, and surface drainage modification design (if any). Site assessment for Rewilding Projects may vary from project to project but shall include, at a minimum:

- A site visit including the Owner or Operator and ETSGSA or RCD staff to assess existing areas proposed for the Stormwater Pond, including the evaluation of the existing topography and drainage to develop a pond layout, and assess design considerations for any surface drainage modifications that may be included in the Stormwater Pond Project; and

- Documentation of pre-construction conditions in accordance with the Project's Monitoring Plan

Additional Site Assessment activities may include, but are not limited to:

- Topographic or level line survey to support swale/hollow identification, catchment areas, planning for hydrologic modifications and pond area demarcation;
- Hydrologic analysis and or soil testing to determine infiltration capacity and runoff potential of the contributing catchment area; and
- Evaluation of irrigation system modifications needed to implement the Stormwater Pond Project.

Planning and Design

General

The following general design requirements shall apply for Stormwater Pond Projects:

- Design plans shall be developed for the Stormwater Pond Project, including, at a minimum, a map showing the location and dimensions of the area specified for the Stormwater Pond, any outlet structured, principal features in the area including drainage areas and flow directions, access routes and ongoing land uses in adjacent areas, and a written description of the Rewilding Project.
- Existing underground utilities (if any) in the vicinity of and areas in which earthwork is conducted shall be demarcated in the field.
- A construction cost estimate shall be prepared and submitted to ETSGSA, or a minimum of two (2) itemized bids shall be obtained from a qualified contractor, in accordance with ETSGSA's Incentive Payment Procedures and the requirements of the ETSGSA's MLRP Plan.

Water Management

The following water management design Requirements shall apply for Stormwater Pond Projects:

- If the Owner or Operator seeks a Consumed Surface Water Credit (as defined in ETGSA Rules & Regulations) the project design shall include a means to measure the amount of water diverted from the pond for irrigation use. This may consist of one of the following:
    - A flow meter;
    - A run-time meter may be used of the known discharge rate and number of connected emitters is known; or
    - An electrical meter used per the methodology specified in ITRC 2017.
- Any flow measurement device must meet standards defined by SB x7-7 and include a Registered Civil Engineers stamp verifying accuracy and that the device can accommodate planned flow rates. Note standards include required maintenance and the method of data collection and reporting.
- If the Owner or Operator seeks a Recharge Credit (as defined in ETGSA Rules & Regulations) the project design shall include a staff gauge and camera trap that takes

daily photographs during the rainy season so that the daily inundated pond area may be estimated.
- Ponds shall have an outlet structure of sufficient capacity to allow passage of the 10-year storm shall be designed to allow overtopping in extreme events; and

Earthwork Design

The following earthwork design Requirements shall apply for Stormwater Pond Projects:
- Earthwork shall be in accordance with the *Implementation Standards and Management Practices for General Earthwork*.
- The Stormwater Pond Project design shall provide estimates of earthwork quantities with supporting calculations;
- If the pond is intended to provide a recharge benefit and potentially impeding soil layers are known to exist in the area, the bottom of the pond shall be deep ripped to promote infiltration.
- Berms shall be limited to a size smaller than would be classified as a dam as defined by California Water Code Division 3 Part 1 (Sections 6000-6009), as may be amended; and
- The Stormwater Pond Project design shall incorporate access routes for maintenance equipment.

Multiple Benefits Requirement

Stormwater Pond Projects incentivized through ETSGSA's MLRP using funds from the Department of Conservation (DOC) for which the Owner or Operator seeks a Recharge Credit are required to incorporate a significant habitat or wildlife benefit. Habitat or wildlife benefit shall be achieved through the establishment and maintenance of beneficial vegetation or habitat-friendly design features (e.g., variable water depths or habitat islands) within or around the Stormwater Pond, in accordance with applicable published guidance from the DOC or other sources specified by ETSGSA.

Environmental Compliance

Depending on Project specifics, implementation of Stormwater Pond Projects may trigger environmental compliance requirements under the California Environmental Quality Act (CEQA). It is the responsibility of the Owner or Operator to ensure the Project is compliant with the following requirements:
- The Owner or Operator shall facilitate ETSGSA's completion of any resource studies, CEQA compliance and permitting analysis by ETSGSA as the Lead Agency, which includes but is not limited to conducting Requirements as outlined in the Site Review, Planning and Design, and Permitting sections of this *Implementation Standard*; and
- The Owner or Operator shall comply with all monitoring and mitigation measures applicable to the Project, as prescribed under the Project's CEQA documentation and included in the Project Agreement.

Permitting

Depending on Project specifics, implementation of Stormwater Pond Projects may trigger environmental permitting requirements. Potentially applicable permitting programs may

include, but are not limited to: National Pollutant Discharge Elimination System (NPDES) Construction General Permit, Streambed Alteration Agreement (Section 1600 of the Fish and Wildlife Code), Clean Water Action Section 401 and 404, Waste Discharge Requirements (WDRs), and other required permits and consultations. The permitting process will include the following steps and requirements:

- ETSGSA will conduct an initial permitting analysis of all selected MLRP project applications based on an initial site reconnaissance, a biological and aquatic resources records search, and a cultural and historical resources records search.
- If potentially sensitive resources are identified, ETSGSA may require performance of an Aquatic Resources Delineation, Cultural Resources Survey, or other resources study to determine whether sensitive resources are present that may trigger special permitting or consultation requirements. Prior to conducting these resource investigations, ETSGSA will consult with the Owner and Operator to determine if they wish to proceed with the work, modify the project to avoid potentially sensitive resources, or withdraw the application.
- If the Owner and Operator choose to proceed, based on the results of the resources studies, ETSGSA will determine what permitting requirements apply and develop a Permit Management Plan. The Permit Management Plan will describe the permits that are needed and application process, and identify any additional recommended resource studies and surveys that need to be completed. Prior to conducting these resource investigations, ETSGSA will consult with the Owner and Operator to determine if they wish to proceed with the work, modify the project to avoid potentially sensitive resources, or withdraw the application.
- If the Owner and Operator choose to proceed, ETSGSA would complete the required studies, assist the Owner and Operator in completing the necessary permit applications, and manage the overall permitting process. The Owner and Operator would be responsible to submit the permit applications, provide additional information as may be requested, and participate in key permitting meetings and agency consultations.
- The cost of permit fees, special resource investigations and management of the permitting process may be borne entirely by ETSGSA or split between ETSGSA and the Owner/Operator. The Owner/Operator cost share, if any would be agreed to prior to performing the work.
- It is the responsibility of the Owner or Operator to comply with all requirements of any permits issued for the Project.

Projects may include multiple land repurposing practices (i.e., other than Stormwater Ponds). Potential permitting requirements for other practices that may be part of a given project are discussed in the *Implementation Standards and Management Practices* for those practices.

Construction and Implementation

The following construction and implementation Requirements shall apply to Stormwater Pond Projects, as applicable to the Project's design:

- The Owner or Operator, or their contractor, shall implement construction Best Management Practices (BMPs) as required to comply with the NPDES Construction General Permit;
- The Owner or Operator, or their contractor, shall implement any avoidance and minimization measures, or mitigation measures (if any) in accordance with the CEQA documentation for the Project;
- The Owner or Operator, or their contractor, shall be responsible to comply with the conditions of any additional permits issued for the project;
- The Owner or Operator shall implement and maintain vegetative cover and habitat-related features in accordance with the approved project design and the Project Agreement;
- Earthwork shall be designed and implemented in accordance with design specifications and requirements of the *Implementation Standards and Management Practices for General Earthwork*;
- Payment for project implementation shall be in accordance with the ETSGSA's Project Incentive Payment Procedures and the Project Agreement; and
- Documentation shall be provided to ETSGSA describing post-implementation conditions, including photographs taken at the same locations as the pre-Project baseline condition photographs (photo points), as well as written documentation of conditions at the Project site, in accordance with the Project Agreement.

Projects may include multiple land repurposing practices (i.e., other than Stormwater Ponds). Potential construction and implementation requirements for other practices that may be part of a given project are discussed in the *Implementation Standards and Management Practices* for those practices.

Maintenance

The Owner or Operator is responsible for maintaining the Stormwater Pond Project in accordance with the specifications in the Project Agreement and in compliance with all permitting and CEQA requirements, as applicable.

The Owner or Operator shall be responsible to implement the following additional maintenance requirements, as applicable based on the Stormwater Pond Project's design:

- The Owner or Operator shall conduct regular routine inspections and as needed maintenance of the pond to maintain its intended function(s), including water infiltration, water retention, and habitat, as applicable; and
- Maintenance activities may include but are not limited to: sediment management, erosion repairs, discing or other methods of maintaining permeability, vegetation management, and management for mosquitos or other vectors. Stormwater Ponds shall be maintained on a routine, or as-needed basis, to maintain Stormwater Pond function and avoid nuisance conditions.

Monitoring

It is the responsibility of the Owner or Operator to ensure that all monitoring requirements for the Stormwater Pond Project are met, including those specified herein, required under the CEQA documentation, required pursuant to permits that include the Stormwater Pond Project, and specified in the Monitoring Requirements attached to the Project Agreement. The Owner and Operator shall maintain adequate access, facilities, instruments, and personnel to meet these requirements.

The following minimum monitoring Requirements shall apply to Rewilding Projects:

- Monitor conditions through geo-tagged, date and time-stamped photographs taken from the same locations as the pre-and post-Project photographs (designated photo points), as specified in the Monitoring Requirements attached to the Project Agreement;
- If the Owner or Operator seeks Consumed Surface Water Credits, monitoring of pumped water diversion for irrigation;
- If the Owner or Operator seeks Recharge Credits, a staff gauge and a camera trap that records daily pictures of water levels in the pond during the rainy season; and
- Any additional monitoring specified in the Monitoring Requirements attached to the Project Agreement.

Reporting

It is the responsibility of the Owner or Operator to conduct all reporting as specified in the Monitoring Requirements attached to the Project Agreement, including, but not limited to, the following:

- Any documentation and reporting requirements associated with permits issued for the Project;
- Any documentation and reporting requirements under the Project's CEQA documentation and submit to ETSGSA, as specified in the Monitoring Requirements attached to the Project Agreement; and
- Submittal of required photo documentation to ETSGSA by January 15th of each year of the Project Agreement.

Best Practices and Guidelines

General

The following additional best practices and guidelines for Stormwater Ponds Projects may be considered, but are not required.

<u>Site Assessment</u>

- A hydrogeological assessment may be conducted prior to Stormwater Pond design to determine site suitability, pond size, application rates, and management practices in greater detail. United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Technical Note No. 450-06 may be used as guidance for

soil infiltration capacity evaluation. Additional web sources that provide information relevant to hydrogeologic assessment are included in the References section.

Planning and Design

- Design plans for Stormwater Ponds may be developed prior to construction and should include all specifications and details related to earthwork, excavation, and grading. The design plans should include, but are not limited to, the following:
    - Description of the work and methods of excavation, soil salvage, and debris disposal, as applicable;
    - Plan-view layout map showing the location and extent of any earthwork activities (e.g., excavation areas, berms) and associated stormwater conveyance features (e.g., ditches);
    - Typical cross-section drawings of earthwork structures (e.g., berms), as applicable;
    - Surface drainage control including a stable outlet or other stormwater management practices to handle runoff; and
    - A grading plan showing existing and final proposed grades and specifying cut and fill quantities. The grading plan should aim to balance cut and fill operations, should utilize uniform slopes to the extent possible, and should adhere to applicable regulations for acceptable grades and maximum slope lengths. Avoid reverse grades by removing irregularities and grading short level sections, as applicable.
- The design should include drainage practices for handling runoff without excessive erosion and should incorporate the most current United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) erosion prediction technology and the most current NRCS wind erosion prediction methods, as applicable.
- Stormwater retention ponds should allow for seasonal inundation. When computing the storage volume capacity for the pond, project design should account for sedimentation, evaporation, season of use, and seepage loss.
- Stormwater stored in the Stormwater Pond should be directed to an outflow structure sized to the design storm. For large ponds, the site should allow runoff to safely pass through a natural or constructed spillway. Storage volume and water level in the Stormwater Ponds should be managed using outlet structures with flow control (i.e., a weir or culvert with flashboards). USDA NRCS Conservation Practice Standard (CPS) 587 “Structure for Water Control” may serve as a reference guide for outlet structures. Outflow from the stormwater retention pond should be permitted for discharge according to the relevant local, state, and federal regulations.
- Design should consider applicable requirements contained in USDA NRCS CPS 378 “Pond.”

Construction and Implementation

- Inlet and outlet structures should have erosion protection (e.g., riprap) and should be maintained regularly to clear out debris and sediment.

- An Operations and Maintenance Plan may be developed for the designed Stormwater Pond and included in the final design package. Maintenance activities for Stormwater Ponds should include, but are not limited to:
    - Regular periodic evaluations of all structures, embankments, and spillways;
    - As-needed evaluations of all structures, embankments, and spillways, following significant storm events;
    - Repair or replacement plan for damaged components;
    - Trash removal from pipe inlet and trash rack, as applicable;
    - Periodic sediment and debris removal;
    - Vegetation establishment and re-seeding of bare areas, as needed;
    - Maintain berms, including erosion protection, structural investigation, and prevention of the establishment of woody vegetation on the constructed embankment fill and around the spillway.
- Installation of shallow monitoring well(s) to assess changes to groundwater conditions in the vicinity of the Stormwater Pond may be an additional element of a project. USDA NRCS CPS 353 "Monitoring Well" may be used as a reference for monitoring well installation.

References

California Polytechnic State University Irrigation Training and Research Center (ITRC), 2017. Using Electricity Consumption to Estimate Water Volumes Pumped from Wells.

United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), 2017. Conservation Practice Standard: Structure for Water Control, Code 587.

USDA, NRCS, 2020. Conservation Practice Standard: Monitoring Well, Code 353.

USDA, NRCS, 2022. Conservation Practice Standard: Pond, Code 378.

West Turlock Subbasin Groundwater Sustainability Agency and East Turlock Subbasin Groundwater Sustainability Agency (WTSGSA and ETSGSA), 2023. Consolidated Final Turlock Subbasin Groundwater Sustainability Plan Program Environmental Impact Report. State Clearinghouse No. 2022010100. March 2023. Available: https://turlockgroundwater.org/peir.

Web Sources:

United States Geological Survey (USGS) StreamStats, https://streamstats.usgs.gov/ss/